# Hampshire Water Transfer and Water Recycling Project

# Consultation Report Appendix D – Consultation under EIA Regulations 1 of 5 Documents

**VOLUME NUMBER:** 5

**PLANNING INSPECTORATE SCHEME NUMBER:** WA010002

**APPLICATION DOCUMENT REFERENCE:** 5.1

**APFP REGULATION:** 5(2)(q)

May 2026

Version 0

from Southern Water

# Contents

D.1 Scoping report ..... 1

# D.1 Scoping report

# Hampshire Water Transfer & Water Recycling Project

# EIA Scoping Report – Volume I Main report

**VOLUME NUMBER:** III

**DOCUMENT REFERENCE:** 208102-ARU-EGN-XX-RP-L-00001

July 2023 | Issue Rev 01 | The Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017

WATER for LIFE®

from Southern Water®

# Contents

**1 Introduction ..... 1**
1.1 Purpose of this report ..... 1
1.2 The Applicant ..... 1
1.3 Need for the Proposed Development ..... 2
1.4 Water for Life Hampshire ..... 3
1.5 Overview of the Proposed Development ..... 4
1.6 Structure of the Environmental Impact Assessment Scoping Report ..... 6
**2 Planning legislation and policy ..... 8**
2.1 Introduction ..... 8
2.2 Planning legislation ..... 8
2.3 National Policy Statement ..... 11
2.4 National Planning Policy Framework ..... 13
2.5 Local planning policies and other considerations ..... 13
2.6 Other national policy and guidance ..... 14
**3 Description of the Proposed Development ..... 15**
3.1 Introduction ..... 15
3.2 Overview of the Proposed Development ..... 16
3.3 Principal components of the Proposed Development ..... 17
3.4 Proposed Development sections within local authority boundaries ..... 23
3.5 Construction methodology ..... 23
3.6 Operation and maintenance ..... 26
3.7 Decommissioning ..... 29
**4 Consideration of alternatives ..... 30**
4.1 Introduction ..... 30
4.2 Alternatives considered at Gate 1 ..... 31
4.3 Further assessment prior to Gate 2 ..... 33
4.4 Proposed Development following Gate 2 ..... 37
**5 EIA approach and methodology ..... 40**
5.1 The purpose and process of EIA ..... 40
5.2 EIA approach to assessment ..... 42
5.3 Consultation and engagement ..... 52
5.4 Competent experts ..... 53
5.5 Duplication of assessment ..... 53
**6 Air quality and odour ..... 55**

6.1 Introduction ..... 55
6.2 Legislation, policy and guidance ..... 55
6.3 Engagement ..... 58
6.4 Approach to scoping ..... 59
6.5 Baseline conditions ..... 61
6.6 Scoping of potential effects ..... 68
6.7 Approach to assessment ..... 71
6.8 Limitations and assumptions ..... 76
6.9 Approach to mitigation and residual effects ..... 77
6.10 Summary ..... 78
**7 Archaeology and cultural heritage ..... 82**
7.1 Introduction ..... 82
7.2 Legislation, policy and guidance ..... 82
7.3 Engagement ..... 85
7.4 Approach to scoping ..... 88
7.5 Baseline conditions ..... 89
7.6 Scoping of potential effects ..... 93
7.7 Approach to assessment ..... 96
7.8 Limitations and assumptions ..... 102
7.9 Approach to mitigation and residual effects ..... 102
7.10 Summary ..... 104
**8 Terrestrial and freshwater biodiversity ..... 106**
8.1 Introduction ..... 106
8.2 Legislation, policy and guidance ..... 106
8.3 Engagement ..... 109
8.4 Approach to scoping ..... 112
8.5 Baseline conditions ..... 114
8.6 Scoping of potential effects ..... 122
8.7 Effects scoped out of the assessment ..... 126
8.8 Approach to assessment ..... 129
8.9 Limitations and assumptions ..... 136
8.10 Approach to mitigation and residual effects ..... 136
8.11 Summary ..... 137
**9 Marine biodiversity ..... 139**
9.1 Introduction ..... 139
9.2 Legislation, policy and guidance ..... 140

9.3 Engagement ..... 143
9.4 Approach to scoping ..... 145
9.5 Baseline conditions ..... 153
9.6 Scoping of potential effects ..... 172
9.7 Approach to assessment ..... 181
9.8 Limitations and assumptions ..... 188
9.9 Approach to mitigation and residual effects ..... 189
9.10 Summary ..... 191
**10 Carbon and climate change ..... 196**
10.1 Introduction ..... 196
10.2 Legislation, policy and guidance ..... 196
10.3 Engagement ..... 200
10.4 Approach to scoping ..... 201
10.5 Baseline conditions ..... 203
10.6 Scoping of potential effects ..... 206
10.7 In-combination climate change impact assessment ..... 208
10.8 Approach to the assessment ..... 208
10.9 Limitations and assumptions ..... 215
10.10 Approach to mitigation and residual effects ..... 216
10.11 Summary ..... 216
**11 Land quality and ground conditions ..... 218**
11.1 Introduction ..... 218
11.2 Legislation, policy and guidance ..... 219
11.3 Engagement ..... 222
11.4 Approach to scoping ..... 224
11.5 Baseline conditions ..... 226
11.6 Scoping of potential effects ..... 234
11.7 Approach to assessment ..... 236
11.8 Limitations and assumptions ..... 241
11.9 Approach to mitigation and residual effects ..... 241
11.10 Summary ..... 242
**12 Land use and agriculture ..... 245**
12.1 Introduction ..... 245
12.2 Legislation, policy and guidance ..... 246
12.3 Engagement ..... 249
12.4 Approach to scoping ..... 251

12.5 Baseline conditions ..... 253
12.6 Scoping of potential effects ..... 260
12.7 Approach to assessment ..... 267
12.8 Limitations and assumptions ..... 272
12.9 Approach to mitigation and residual effects ..... 273
12.10 Summary ..... 273
**13 Landscape and visual impact ..... 277**
13.1 Introduction ..... 277
13.2 Legislation, policy, and guidance ..... 277
13.3 Engagement ..... 282
13.4 Approach to scoping ..... 288
13.5 Baseline conditions ..... 290
13.6 Scoping of potential effects ..... 305
13.7 Approach to assessment ..... 307
13.8 Limitations and assumptions ..... 323
13.9 Approach to mitigation and residual effects ..... 323
13.10 Summary ..... 324
**14 Noise and vibration ..... 331**
14.1 Introduction ..... 331
14.2 Legislation, policy and guidance ..... 331
14.3 Engagement ..... 336
14.4 Approach to scoping ..... 338
14.5 Scoping of potential effects ..... 342
14.6 Approach to assessment ..... 345
14.7 Limitations and assumptions ..... 358
14.8 Approach to mitigation and residual effects ..... 359
14.9 Summary ..... 359
**15 Resource and waste management ..... 361**
15.1 Introduction ..... 361
15.2 Legislation, policy and guidance ..... 361
15.3 Engagement ..... 365
15.4 Approach to scoping ..... 366
15.5 Baseline conditions ..... 368
15.6 Scoping of potential effects ..... 378
15.7 Approach to assessment ..... 382
15.8 Limitations and assumptions ..... 386

15.9 Approach to mitigation and residual effects ..... 387
15.10 Summary ..... 389
**16 Socio-economics, tourism, recreation and health ..... 391**
16.1 Introduction ..... 391
16.2 Legislation, policy and guidance ..... 392
16.3 Engagement ..... 395
16.4 Approach to scoping ..... 397
16.5 Baseline conditions ..... 400
16.6 Scoping of potential effects ..... 416
16.7 Approach to assessment ..... 420
16.8 Limitations and assumptions ..... 425
16.9 Approach to mitigation and residual effects ..... 425
16.10 Summary ..... 426
**17 Traffic and transport ..... 429**
17.1 Introduction ..... 429
17.2 Legislation, policy and guidance ..... 429
17.3 Engagement ..... 431
17.4 Approach to scoping ..... 433
17.5 Baseline conditions ..... 434
17.6 Scoping of potential effects ..... 438
17.7 Approach to assessment ..... 440
17.8 Limitations and assumptions ..... 450
17.9 Approach to mitigation and residual effects ..... 450
17.10 Summary ..... 451
**18 Water environment ..... 455**
18.1 Introduction ..... 455
18.2 Legislation, policy and guidance ..... 455
18.3 Engagement ..... 460
18.4 Approach to scoping ..... 468
18.5 Baseline conditions ..... 470
18.6 Scoping of potential effects ..... 483
18.7 Approach to assessment ..... 488
18.8 Limitations and assumptions ..... 500
18.9 Approach to mitigation and residual effects ..... 501
18.10 Summary ..... 501
**19 Cumulative Effects Assessment ..... 504**

19.1 Introduction ..... 504
19.2 Legislation, policy and guidance ..... 504
19.3 Cumulative assessment methodology ..... 505
19.4 Study area ..... 512
19.5 Engagement ..... 517
19.6 Potential effects and mitigation measures ..... 517
19.7 Summary ..... 518
**20 Topics scoped out ..... 519**
20.1 Introduction ..... 519
20.2 Major accidents and disasters ..... 519
20.3 Shipping and navigation ..... 522
20.4 Coastal and marine processes ..... 523
20.5 Other marine users ..... 524
20.6 Heat and radiation ..... 525
20.7 Summary ..... 525
**21 Structure and content of the Environmental Statement ..... 526**
21.2 Structure and content of the Environmental Statement ..... 526
21.3 Environmental Statement report structure ..... 527
**22 Glossary ..... 529**
**23 Abbreviations ..... 541**
**24 References ..... 549**

# Images

Image 12-1: Agricultural land use by local authority district, 2021 [221] ..... 256
Graph 15-1 Historic material production: Steel [299] (2012 – 2021) ..... 372
Graph 15-2 Historic material production: Cement [313], Masonry [310] and Aluminium [299] (2012 – 2021) ..... 372
Graph 15-3 Total sales of aggregates in Hampshire [311] (2012 – 2021) ..... 373
Graph 15-4 Historic and Projected future landfill capacity for inert and non-hazardous waste in South East England [302] ..... 376
Graph 15-5 Historic and Projected future landfill capacity for hazardous waste in South West England [9] ..... 376
Image 16-1: Gross value added per head, 2021 [322] ..... 402
Image 16-2: Change in Gross value added per head over time, 2012-2021 [322] ..... 403
Image 16-3: Employees by sector, 2021 [323] ..... 404
Image 16-4: Businesses by sector, 2022 (Source: ONS, Business activity, size and location) ..... 405

# Tables

Table 1-1: Structure of the EIA Scoping Report ..... 6
Table 2-1: Relevant local planning policy ..... 13
Table 3-1: Proposed Development sections within local authority boundaries ..... 23
Table 4-1: Strategic solutions at Gate 1 ..... 31
Table 4-2: Options taken forward to Gate 2 ..... 33
Table 4-3: Site selection criteria ..... 34
Table 4-4: Environmental and planning considerations for site assessment ..... 35
Table 4-5: Options appraisal process interim business evaluation ranking ..... 36
Table 5-1: Assessment scenarios to be considered in the Environmental Statement ..... 45
Table 5-2: Example definitions of value (or sensitivity) for a generic receptor or resource ..... 47
Table 5-3: Example definitions of magnitude of impact for a generic receptor or resource ..... 48
Table 5-4: Significance of effect matrix ..... 49
Table 6-1: List of relevant local policy – Air quality and odour ..... 56
Table 6-2: Air Quality Strategy Objectives (England) for the purpose of local air quality management 58
Table 6-3: Source of baseline data – Air quality and odour ..... 60
Table 6-4: Estimated annual mean background pollutant concentrations within 1km of the Proposed Development ..... 62
Table 6-5: Annual mean $NO_2$ monitoring in the study area ..... 63
Table 6-6: Air quality road traffic assessment screening criteria ..... 72
Table 6-7: Criteria used in the determination of dust emission magnitude ..... 73
Table 6-8: IAQM and EPUK impact descriptors for individual receptors ..... 74
Table 6-9: Summary table – Air quality and odour ..... 78
Table 7-1: List of relevant local policy – Archaeology and cultural heritage ..... 84
Table 7-2: Public Consultation 2022 response – Archaeology and cultural heritage ..... 86
Table 7-3: Source of baseline data – Archaeology and cultural heritage ..... 89
Table 7-4: Criteria for determining heritage importance ..... 98
Table 7-5: Definitions of magnitude of impact to heritage assets ..... 99
Table 7-6: Significance of effect matrix – Archaeology and cultural heritage ..... 100
Table 7-7: Definition of significance of effect – Archaeology and cultural heritage ..... 101
Table 7-8: Summary table – Archaeology and cultural heritage ..... 104
Table 8-1: List of relevant local policy – Terrestrial and freshwater biodiversity ..... 107
Table 8-2: Public Consultation 2022 response – Terrestrial and freshwater biodiversity ..... 110
Table 8-3: Terrestrial and freshwater biodiversity Desk Study areas ..... 112
Table 8-4: Sources of baseline data – Terrestrial and freshwater biodiversity ..... 114
Table 8-5: Habitats within the Scoping Area ..... 116
Table 8-6: Scoped in effects (construction) – Terrestrial and freshwater biodiversity ..... 123
Table 8-7: Scoped in effects (operation phase) – Terrestrial and freshwater biodiversity ..... 126
Table 8-8: Ecological receptors scoped out of the assessment ..... 127
Table 8-9: Transposition of receptor importance descriptors ..... 132
Table 8-10: Magnitude of impact – Terrestrial and freshwater ecology ..... 133
Table 8-11: Significance of effect matrix – Terrestrial and freshwater biodiversity ..... 134
Table 8-12: Summary table – Terrestrial and freshwater biodiversity ..... 137
Table 9-1: List of relevant local policy – Marine biodiversity ..... 141
Table 9-2: Marine ecology ZoI ..... 146
Table 9-3: Study area for marine ecology defined by the ZoI ..... 147
Table 9-4: Study area for commercial fisheries defined by the ZoI ..... 150
Table 9-5: Sources of baseline data – Marine biodiversity ..... 152
Table 9-6: List of marine mammals recorded around the Solent ..... 155
Table 9-7: List of fish species recorded around Chichester Harbour by Sussex IFCA (2019 – 2021) 156
Table 9-8: List of additional Fish species recorded in the Solent during Centre for Environment, Fisheries and Aquaculture Science 2017 Bass survey ..... 157
Table 9-9: Spawning and nursery grounds within study areas 1 and 2 for fish species ..... 159
Table 9-10: Locations of seagrass in Langstone Harbour ..... 161
Table 9-11: Marine habitats within study area 2 ..... 161

Table 9-12: Habitats found in Langstone Harbour and their description ..... 163
Table 9-13: Benthic marine species within study area 2 ..... 165
Table 9-14: Benthic species features of conservation importance within study area 2 ..... 166
Table 9-15: List of INNS around the Solent ..... 167
Table 9-16: Recreational fisheries trends near to study areas 1 and 2 ..... 169
Table 9-17: Average economic value (£) and Landed weight (tonnes) of the 10m and under and over 10m fishing fleets operating within study area 2. ..... 170
Table 9-18: Summary of commercially sensitive target species in the data reporting period of 2015-2019. ..... 171
Table 9-19: Scoped in effects (construction phase) – Marine biodiversity ..... 173
Table 9-20: Scoped in effects (operation phase) -– Marine biodiversity ..... 176
Table 9-21: Scoped out effects (construction phase) – Marine biodiversity ..... 180
Table 9-22: Scoped out effects (operation phase) ..... 181
Table 9-23: Marine biodiversity surveys planned or underway ..... 182
Table 9-24: Value definitions for marine ecology and commercial fisheries ..... 184
Table 9-25: Magnitude of impact definitions for marine ecology and commercial fisheries [115] ..... 186
Table 9-26: Significance matrix ..... 187
Table 9-27: Summary table – Marine biodiversity ..... 191
Table 10-1: UK Carbon Budgets (2008 to 2037) ..... 197
Table 10-2: List of relevant local policy – Carbon and climate change ..... 198
Table 10-3: Source of baseline data ..... 202
Table 10-4: Existing Climate at the Thornley Island Meteorological Station for the Period 1991 – 2020 [183] ..... 204
Table 10-5: Climate Change Projection Data [182] ..... 206
Table 10-6: Assessment significance criteria – *Carbon and climate change* ..... 210
Table 10-7: Sensitivity / exposure matrix for determining vulnerability rating ..... 213
Table 10-8: Descriptors of likelihood for climate hazards ..... 213
Table 10-9: Descriptors of consequence as a result of climate hazards ..... 213
Table 10-10: Likelihood / consequence matrix for determining risk rating ..... 214
Table 10-11: Significance criteria ..... 214
Table 10-12: Summary table ..... 217
Table 11-1: List of relevant local policy ..... 220
Table 11-2: Public Consultation 2022 responses ..... 223
Table 11-3: Proposed buffers for the proposed desk study ..... 224
Table 11-4: Source of baseline data ..... 225
Table 11-5: Geology and hydrogeology ..... 226
Table 11-6: Geology and hydrogeology ..... 227
Table 11-7: Geology and hydrogeology ..... 228
Table 11-8: Geology and hydrogeology ..... 231
Table 11-9: Geology and hydrogeology ..... 233
Table 11-10: Additional datasets ..... 236
Table 11-11: Definition of terms relating to receptor sensitivity ..... 237
Table 11-12: Definition of value of levels for land quality and ground conditions ..... 238
Table 11-13: Definition of terms relating to magnitude of an impact ..... 239
Table 11-14: Significance of effect matrix ..... 240
Table 11-15: Summary table ..... 242
Table 12-1: List of relevant local policy ..... 247
Table 12-2: Summary of stakeholder responses to Public Consultation 2022 ..... 250
Table 12-3: Study areas for land use and agriculture ..... 252
Table 12-4: Source of baseline data ..... 253
Table 12-5: Value sensitivity criteria for land use and agriculture ..... 269
Table 12-6: Criteria for magnitude of impacts on land uses and agriculture ..... 270
Table 12-7: Significance of effect matrix ..... 270
Table 12-8: Summary table ..... 273
Table 13-1: List of relevant local policy ..... 280
Table 13-2: Public Consultation 2022 responses ..... 284
Table 13-3: Source of baseline data ..... 289
Table 13-4: Published Landscape Character Areas which coincide with the Scoping Area ..... 291
Table 13-5: Determining the value attached to the landscape ..... 310

Table 13-6: Susceptibility of landscape receptors to change ..... 312
Table 13-7: Susceptibility of landscape receptors to change ..... 312
Table 13-8: Magnitude of landscape impacts ..... 313
Table 13-9: Value attached to views ..... 316
Table 13-10: Susceptibility of visual receptors to change ..... 317
Table 13-11: Sensitivity of visual receptors ..... 318
Table 13-12: Magnitude of visual impacts ..... 319
Table 13-13: Significance of landscape and visual effects ..... 320
Table 13-14: Descriptions of landscape and visual effects ..... 320
Table 13-15: Scoping summary table ..... 324
Table 14-1: List of relevant local policy ..... 334
Table 14-2: Public consultation 2022 responses ..... 337
Table 14-3: Source of baseline data ..... 339
Table 14-4: Definitions of the different receptor sensitivity levels to noise and/or vibration impacts ..... 346
Table 14-5: PPG-N Noise exposure hierarchy ..... 347
Table 14-6: Effect significance matrix ..... 348
Table 14-7: Construction noise SOAEL and LOAEL for all receptors ..... 349
Table 14-8: Construction vibration criteria for human receptors (annoyance) ..... 351
Table 14-9: Transient Vibration Guide Values for Cosmetic Damage ..... 351
Table 14-10: Construction vibration criteria for assessing building damage ..... 352
Table 14-11: Traffic noise magnitude of impact at receptors ..... 353
Table 14-12: LOAELs and SOAELs at Noise Sensitive Receptors for road traffic ..... 354
Table 14-13: Operational noise magnitude of impact criteria ..... 355
Table 14-14: Summary table ..... 359
Table 15-1: List of relevant local policy ..... 364
Table 15-2: Source of baseline data ..... 367
Table 15-3: Expected construction resources required for the Proposed Development ..... 368
Table 15-4: Availability of construction resources in Hampshire, South East England and UK ..... 370
Table 15-5: Sensitivity of key materials ..... 373
Table 15-6: Material consumption required for Proposed Development to introduce a major impact on aggregates availability ..... 380
Table 15-7: Material consumption required for Proposed Development to introduce a likely significant effect on building material availability (2021) Source: Various ..... 381
Table 15-8: Information and data requirements for waste and MSA assessment ..... 382
Table 15-9: Sensitivity thresholds for mineral sites (based on from IEMA Guidance [202]) ..... 382
Table 15-10: Magnitude thresholds for mineral sites (MSAs and Safeguarded Sites) (adapted from IEMA Guidance [202]) ..... 383
Table 15-11: Sensitivity thresholds for inert, non-hazardous, and hazardous landfill (IEMA Guidance) ..... 384
Table 15-12: Magnitude of impacts threshold (adapted from IEMA Guidance [202]) ..... 384
Table 15-13: Significance of effect matrix (IEMA Guidance [202]) ..... 385
Table 15-14: Potential resources and waste mitigation measures ..... 388
Table 15-15: Summary table ..... 389
Table 16-1: List of relevant local policy ..... 393
Table 16-2: Summary of stakeholder responses to non-statutory consultation ..... 396
Table 16-3: Source of baseline data ..... 399
Table 16-4: Population in 2021 and change since 2011 [319] [320] ..... 400
Table 16-5: Age profile of population, 2021 [320] ..... 401
Table 16-6: Rates of employment and unemployment, 2021 [321] ..... 401
Table 16-7: Value of tourism in Hampshire (2016) [324] ..... 405
Table 16-8: Tourism employment in local authorities within the study area [325] ..... 406
Table 16-9: Tourist accommodation stock in local authorities within the study area [326] ..... 406
Table 16-10: Age profile by ward [327] ..... 407
Table 16-11: Life expectancy, males and females [328] ..... 408
Table 16-12: Out-of-work benefits, March 2023 [329] ..... 409
Table 16-13: Proportion of the population experiencing a limiting long-term illness or disability [320] ..... 410
Table 16-14: Air quality (Hampshire and Isle of Wight Only. Comparable data not available for Portsmouth [330]) ..... 411

Table 16-15: Sensitivity criteria for Socio-economics, tourism, recreation and health ..... 422
Table 16-16: Magnitude criteria for Socio-economics, tourism, recreation and health ..... 423
Table 16-17: Significance of effect ..... 423
Table 16-18: Summary table ..... 426
Table 17-1: List of relevant local policy ..... 430
Table 17-2: Source of baseline data ..... 434
Table 17-3: Proposed baseline surveys ..... 440
Table 17-4: Key roads ..... 445
Table 17-5: Magnitude of impact definitions ..... 447
Table 17-6: Sensitive receptors ..... 448
Table 17-7: Significance Matrix ..... 449
Table 17-8: Summary table ..... 451
Table 18-1: Relevant policies and objectives of the South Inshore and South Offshore Marine Plan 457
Table 18-2: List of relevant local policy ..... 458
Table 18-3: Guidance and standards ..... 459
Table 18-4: Public Consultation 2022 responses ..... 463
Table 18-5: Source of baseline data ..... 469
Table 18-6: Water bodies potentially at risk associated with changes to the Eastney Long Sea Outfall discharge ..... 472
Table 18-7: Definition of terms relating to receptor sensitivity ..... 492
Table 18-8: Definition of terms relating to magnitude of an impact ..... 494
Table 18-9: Summary table ..... 502
Table 19-1: Stages of cumulative effects assessment ..... 507
Table 19-2: Assigning certainty to ‘other existing development and/or approved development’ ..... 509
Table 19-3: Criteria for shortlisting ‘other existing development and/or approved development’ ..... 510
Table 19-4: Zone of influence summary table ..... 513
Table 19-5: Summary table ..... 518
Table 20-1: Source of baseline data ..... 520
Table 20-2: Abbreviations ..... 523
Table 20-4: Summary of topics scoped out of EIA ..... 525
Table 21-1: Summary of topics proposed to be scoped in and out of the EIA ..... 526

# 1 Introduction

## 1.1 Purpose of this report

1.1.1 This Environmental Impact Assessment (EIA) Scoping Report has been prepared to support a request for a Scoping Opinion from the Secretary of State (SoS), for the purposes of Regulation 10 of The Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017 (the "EIA Regulations") for the Hampshire Water Transfer and Water Recycling Project (the "Proposed Development").

1.1.2 The purpose of this EIA Scoping Report is to establish the scope, including content and extent of matters which should be covered in an Environmental Statement (ES) to be prepared and submitted for the Proposed Development. It also sets out the proposed assessment methodologies for the topics proposed to be scoped into the EIA. The EIA Scoping Report has been prepared with regard to the Planning Inspectorate's (2020) Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements, (Version 7) [1] for all environmental factors (topics) set out in the EIA Regulations.

1.1.3 In May 2022, under Section 35 of the Planning Act 2008 (PA 2008), the SoS directed that the Proposed Development be defined as a project of national significance, which requires development consent.

1.1.4 The EIA will be reported in an ES, which will accompany a Development Consent Order (DCO) application to be submitted to the Planning Inspectorate acting under delegation on behalf of the relevant SoS.

## 1.2 The Applicant

1.2.1 The Proposed Development is being progressed by Southern Water Services Limited ("the Applicant"). The Applicant is responsible for supplying water and providing wastewater services to over four million customers in the South East of England, operating across Hampshire, Kent, the Isle of Wight and East and West Sussex.

1.2.2 The Applicant is governed under the Water Industry Act 1991. In accordance with section 37A of the Water Industry Act 1991, the Applicant is required to meet statutory duties as a water undertaker to prepare and maintain a Water Resources Management Plan (WRMP).

1.2.3 A WRMP sets out how each water undertaker will manage and develop water resources to meet their supply obligation for at least the next 25 years. The Applicant produced a WRMP in 2019 (WRMP19), which outlined proposed long-term solutions to protect the unique chalk rivers in Hampshire, the River Test and Itchen and make up future water shortfalls.

## 1.3 Need for the Proposed Development

1.3.1 The South East of England is designated by the Environment Agency (EA) as an area of "serious water stress" [2]. This means that demand for water can outstrip supply, especially during a drought. In Hampshire in particular, a growing population, changing climate and sensitive environment means there is not enough water for people and nature when the weather is dry. Much of the county's water comes from the River Test and River Itchen, both chalk stream rivers that are ecologically important and rare.

1.3.2 As a result of abstraction licence changes on the Rivers Test and Itchen, and the ecological risk that long-term reliance on drought permits and drought orders could pose to these rare and protected habitats, the Applicant has entered into an operating agreement with the EA (under Section 20 of the Water Resources Act 1991). This enables the Applicant to continue to meet its water supply duty until alternative water resource solutions are developed for the western supply area in Hampshire.

1.3.3 The Applicant's WRMP19 was prepared to meet a 1-in-200-year drought level of resilience, which forecast an overall water resource deficit in the western supply area of around 190 million litres per day (Ml/d) by 2030. WRMP19 sets out how the deficit will be met through a number of leakage and demand reduction measures, and through the development of several new supply solutions, including a long-term and large-scale water resource solution, or Strategic Resource Option (SRO).

1.3.4 The Applicant published its draft WRMP24 on 14 November 2022 for consultation. Consultation on this draft was between 14 November 2022 and 20 February 2023 and the Applicant is now developing a Statement of Response. The draft WRMP24 uses updated future forecasts since WRMP19 and reflects wider regional needs. The draft WRMP24 reaffirms the need for a SRO to meet the WRMP19 water resource deficit. It confirms the SRO option as having potential to transfer 90Ml/d to the Southampton area, consistent with the Water Resources South East draft regional plan [3].

1.3.5 To facilitate the Applicant's proposal and need to secure alternative water sources, the Applicant has been working with the Regulators' Alliance for Progressing Infrastructure Development (RAPID). RAPID was set up in 2019 and is a partnership made up of the three water regulators in England – Ofwat, the EA and the Drinking Water Inspectorate. As regulators, RAPID promote the development of strategic water resource solutions that are in the best interests of water users, society, and the environment. Since 2020, as part of RAPID's gated process, the Applicant has investigated several alternative SROs to address the shortfall identified in the WRMP. These alternatives are outlined in Chapter 4 Consideration of alternatives, Table 4.1.

1.3.6 In December 2021, as part of the Applicant's "Gate 2" submission to RAPID, the Applicant presented its Preferred Option from the full options appraisal process undertaken on alternative SROs. Following this extensive optioneering process, and consultation with RAPID and other key stakeholders, the Preferred Option is now identified as the Proposed Development.

1.3.7 The Proposed Development comprises a combination of both water transfer and water recycling technology, with a proposed water recycling plant (WRP) and associated pipeline transferring recycled water to the planned Havant Thicket Reservoir (a separate scheme for which Portsmouth Water obtained planning consent in October 2021 from Havant Borough Council (HBC) (planning application ref. APP/20/00990) and East Hampshire District Council (EHDC) (planning application ref. 51680/001)). The Proposed Development also comprises a transfer pipeline between Havant Thicket Reservoir and Southern Water's Otterbourne Water Supply Works (WSW) in order to serve its Western supply area in Hampshire.

1.3.8 The Proposed Development is a drought resilience scheme, which could provide up to 90Ml/d into Hampshire's supply network during a drought. The Proposed Development would therefore only be fully utilised in a drought, with the rest of the time being operational at a minimal "sweetening flow" of approximately 20Ml/d to maintain water flows through the plant and flow through the pipelines. During drought conditions, when river levels are low and cannot be relied on for water supply, the operation of the Proposed Development would be increased to draw more water out of the reservoir, whilst supplementing levels within the reservoir.

1.3.9 Throughout a drought, the Proposed Development would play a major role in making up any shortfall in water supply across the Hampshire supply area. The Proposed Development has the potential to recycle up to 90Ml/d for the benefit of the wider area should the amount of water that can be taken from the environment be reduced further.

1.3.10 The national significance of the Proposed Development was confirmed in May 2022, when the SoS, made a direction under Section 35(1) of PA 2008 confirming that the Proposed Development should be treated as a project of national significance. In giving reasons for issuing the Direction, the SoS outlined that the Proposed Development would:

- Provide a substantial number of people across Hampshire with a resilient water supply during drought conditions and would be a key piece of strategic regional infrastructure in meeting the modelled supply deficit for Southern Water's water supply zone.
- Make a significant contribution (c.47%) to resolving the overall supply demand deficit in Southern Water's Western Area of supply.
- Support the delivery of up to 87,000 new homes by 2045.
- Have the capacity to be upgraded to support further increases in population growth, housing supply and/or further water resource pressures.
- Mitigate against the social and economic risks of debilitating water restrictions for both businesses and households when the weather is dry.
- Make a significant contribution to the UK Government's environmental objectives and policy priorities.

## 1.4 Water for Life Hampshire

1.4.1 The Applicant's Water for Life Hampshire (WfLH) programme aims to address the sustainability objectives of reduced abstractions on Hampshire's two main rivers

and ensure a resilient water supply for over 850,000 of the County's residents when the weather is dry. The WfLH programme comprises the Proposed Development, which has been identified as the preferred SRO, as well as several supplementary measures beyond the scope of this application. These include:

- Working with Portsmouth Water to build a new reservoir at Havant Thicket to be used as a strategic water resource for the South East.
- Building up to 125km of new pipelines to link up the Applicant's key sites and allow additional bulk transfers of water from neighbouring water companies.
- Tackling leakage across the network.
- Preserving the quality of water sources.
- Supporting and incentivising customers to use water more efficiently.

1.4.2 The Proposed Development is a central part of the programme, which aims to supply up to 90Ml/d of water into the Applicant's Hampshire supply network during a drought to reduce the shortfall.

1.4.3 As part of the WfLH programme, the Applicant has set Strategic Objectives which include:

- Best value for customers – "*We will deliver solutions which provide the best value to our customers whilst discharging our "all best endeavours" legal obligation in the Section 20 agreement and all other legal and policy requirements and obligations.*"
- Net carbon zero – "*We will deliver solutions which ensure that we can continue to make progress towards meeting, and to support and contribute to, Water UK's commitment to become net zero carbon by 2030.*"
- Adaptability – "*We will ensure that all projects within the Programme are sustainable by being flexible and adaptable, including in terms of their:*
  - *Capacity and scalability.*
  - *Ability to contribute to strategic reinforcement of the regional and national network.*
  - *Ability to rely on appropriate transitional measures to manage risks around delivery timescales.*
  - *Ability to allow for technological innovation.*"

## 1.5 Overview of the Proposed Development

1.5.1 The Proposed Development is located in the south of Hampshire, with components spanning from Havant to Otterbourne. The Scoping Area is shown in Figure 1.1 and Figure 1.2 in Volume III.

1.5.2 The Proposed Development will use a full advanced treatment process to turn treated wastewater into purified recycled water at a new WRP south of Havant. The recycled water will then be transferred via a new pipeline to supplement the spring-fed water that will be stored in the planned Havant Thicket Reservoir. Another new pipeline will be constructed to transfer source water from the planned reservoir to the Otterbourne WSW, approximately 40 kilometres to the north-west, to be treated to strict drinking water standards ready for supply to homes and

businesses. A detailed description of the Proposed Development is contained in Chapter 3 Description of the Proposed Development.

1.5.3 The Proposed Development comprises the following principal elements:

### Proposed Water Recycling Plant and proposed High Lift Pumping Station

1.5.4 A proposed WRP in the vicinity of Budds Farm Wastewater Treatment Works (WTW) would be likely to be delivered in two phases. The initial phase would produce approximately 20Ml/d of recycled water at peak operation. The second phase would increase the peak output of the proposed WRP to a total of 60Ml/d of recycled water. There will be up to three pumping stations at the site.

### Proposed Underground Pipelines between Budds Farm Wastewater Treatment Works and the proposed Water Recycling Plant

1.5.5 A number of Proposed Underground Pipelines between Budds Farm WTW and the proposed WRP to accommodate approximately 80Ml/d peak transfer volumes to and from the proposed WRP.

### Proposed Underground Pipeline between the proposed Water Recycling Plant and Havant Thicket Reservoir

1.5.6 A Proposed Underground Pipeline to transfer at peak operation approximately 60Ml/d of recycled water from the proposed WRP to Havant Thicket Reservoir.

### Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

1.5.7 A Proposed Underground Pipeline from Havant Thicket Reservoir to Otterbourne WSW via the High Lift Pumping Station (HLPS), expected to be located at the site of the proposed WRP to transfer approximately 90Ml/d during peak operation (i.e., during severe drought conditions).

### Use of Havant Thicket Reservoir for the storage of recycled water

1.5.8 The Proposed Development comprises the addition of recycled water to Havant Thicket Reservoir for storage before transfer to Otterbourne WSW.

### Proposed Above Ground Plant

1.5.9 As a result of the length of the Proposed Underground Pipeline from Havant Thicket Reservoir to Otterbourne WSW, proposed Above Ground Plant (AGP) is required to support the transfer of water to overcome the topography of the route. Some existing infrastructure is also required to be used.

1.5.10 The Proposed Development will include the following AGP:

- Proposed HLPS, expected to be located at the site of the proposed WRP.
- Proposed Intermediate Pumping Stations (IPS) and proposed Break Pressure Tanks (BPT) located along the proposed underground water transfer pipeline between Havant Thicket Reservoir and Otterbourne WSW.

1.5.11 Associated development will include temporary works to support construction, works to support operation and maintenance, sites accesses, temporary and permanent utility connections, highway diversions and landscaping, environmental mitigation, enhancement, and compensation.

### Release from the Eastney Long Sea Outfall

1.5.12 The reject water from the proposed WRP will be transferred to the Eastney Transfer Tunnel (TT) (connection to Budds Farm) and released from the Eastney Long Sea Outfall (LSO) utilising the Eastney Pumping Station (PS).

## 1.6 Structure of the Environmental Impact Assessment Scoping Report

1.6.1 Competent experts have prepared this EIA Scoping Report and will undertake the EIA and prepare the ES. The Applicant has engaged Ove Arup and Partners Limited (Arup) and Royal Haskoning DHV to undertake the scoping and EIA and produce the resultant ES. Both Arup and Royal Haskoning DHV hold the Institute of Environmental Management and Assessment's (IEMA) EIA Quality Mark. See section 5.4 for further information.

1.6.2 The EIA Scoping Report is provided in three volumes:

- Volume I (this volume) Main report
- Volume II Appendices
- Volume III Figures

1.6.3 This report (Volume I) is structured as set out within Table 1-1 below.

**Table 1-1: Structure of the EIA Scoping Report**

| Chapter | Content |
|---|---|
| 1.Introduction | Introduces the Proposed Development and the purpose and structure of the Scoping Report. |
| 2. Planning legislation and policy | Summarises the relevant national, regional, local and marine legislative and policy context for the Proposed Development. |
| 3. Description of the Proposed Development | Provides an overview of the Proposed Development, including both temporary and permanent works. |
| 4. Consideration of alternatives | Provides an overview of the alternatives considered to the Proposed Development, along with a narrative on how the Proposed Development has been developed to date. |
| 5. General EIA approach and methodology | Sets out the requirements for scoping, the general approach to EIA, and provides definitions for some of the key terms used within the EIA process. This section also summarises the planning regime and application which the EIA will follow. |
| 6-18. Topic chapters | Sets out those environmental topics proposed to be included in the scope of the EIA, along with the methodologies and approaches to assessment proposed for those topics. |

| Chapter | Content |
|---|---|
| 19. Cumulative effects | Sets out the proposed methodology for assessing cumulative effects. |
| 20. Topics scoped out | Presents the topics proposed to be scoped out of the EIA with a justification provided for each. |
| 21. Structure and content of the Environmental Statement | Presents the proposed structure of the ES. |

# 2 Planning legislation and policy

## 2.1 Introduction

2.1.1 The purpose of this chapter is to provide an overview of the legislation and policy relevant to the construction and operation of the Proposed Development.

2.1.2 This chapter outlines the primary legislation that establishes the legal framework of requiring development consent to be obtained for Nationally Significant Infrastructure Projects (NSIPs) and Projects of National Significance (PNS), and other relevant legislation.

2.1.3 This chapter subsequently provides an overview of government policy and local planning policies are considered potentially important and relevant to the Proposed Development and is supported by Appendix 2-1: Local Planning Policy Considerations.

2.1.4 Whilst this chapter outlines key legislation and policy that the Proposed Development will be considered against, it does not represent an exhaustive list of all legislation and policy that is relevant or needs to be considered in respect of the technical disciplines covered by this EIA Scoping Report, or the subsequent ES. The topics described further in this EIA Scoping Report and that will be assessed within the ES will set out further information about discipline-specific legislation and policy.

## 2.2 Planning legislation

2.2.1 The PA 2008 (as amended) is the primary legislation introduced to streamline the decision-making process for NSIPs and PNS. It provides the legal framework for applying for, examining, and determining DCO applications.

### Section 35 of the Planning Act 2008 (as amended)

2.2.2 Southern Water Services Limited ("the Applicant"), by letter dated 6 April 2022, formally requested that the SoS give a direction for the Proposed Development under Section 35 of the PA 2008.

2.2.3 A Direction relating to the Proposed Development was provided by the SoS on 31 May 2022, which stated that the Proposed Development should be treated as a development of national significance for which development consent is required, taking into consideration that the Proposed Development would:

- *"be for a complex and substantial scheme, involving extensive infrastructure works and requiring multiple powers and consents (including multiple planning permissions, compulsory acquisition powers and highway orders), which should be seen as nationally significant development in its own right; and*
- *benefit from an application being determined in a timely and consistent manner by way of the Development Consent regime, and by removing the need to apply, and the uncertainty of applying, for a large number of separate powers and consents*."

2.2.4 The SoS also acknowledged the Proposed Development would:

- *"provide a substantial number of people across Hampshire with a resilient water supply during drought conditions and would be a key piece of strategic regional infrastructure in meeting the modelled supply deficit for Southern Water's water supply zone;*
- *make a significant contribution (c. 47%) to resolving the overall supply demand deficit in Southern Water's Western Area of supply;*
- *support the delivery of up to 87,000 new homes by 2045;*
- *have the capacity to be upgraded to support further increases in population growth, housing supply and / or further water resource pressures;*
- *mitigate against the social and economic risks of debilitating water restrictions for both businesses and households when the weather is dry; and*
- *make a significant contribution to the UK Government's environmental objectives and policy priorities."*

2.2.5 The SoS noted that the Proposed Development relates to the "*construction of new water transfer and water recycling infrastructure for the purposes of water supply*" and thus sits within one of the qualifying infrastructure fields listed in Section 35(2)(a)(i) of the PA 2008, namely water. As such, the Applicant shall make a DCO application under the PA 2008 to seek consent for the construction, operation and maintenance of the Proposed Development.

### The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

2.2.6 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the "EIA Regulations") govern the EIA process.

2.2.7 The Proposed Development falls within the threshold set out in Schedule 2 paragraph 10(l) of the EIA Regulations. Schedule 2 paragraph 10(l) relates to aqueducts, which would include a watercourse constructed to carry water from a source to a distribution point at distance. In engineering terms, the Proposed Development therefore falls within that definition through the transfer of water from Budds Farm WTW to the proposed WRP, from the proposed WRP to the Havant Thicket Reservoir, and from the Havant Thicket Reservoir to Otterbourne WSW.

2.2.8 As such, an EIA will be prepared in respect of the Proposed Development, in support of the DCO application. The Applicant has not sought a Screening Opinion from the SoS as the Applicant considers that the Proposed Development is Schedule 2 development that has the potential to have likely significant effects on the environment by virtue of its scale and complexity and that it is therefore EIA development. The SoS has been notified in writing, pursuant to Regulation 8(1)(b) of the EIA Regulations, that the Applicant proposes to make an application for development consent for the Proposed Development and to provide an ES in respect of the Proposed Development.

2.2.9 Regulation 5(2) of the EIA Regulations states that the EIA must:

*"identify, describe and assess in an appropriate manner, in light of each individual case, the direct and indirect significant effects of the proposed development on the following factors–*

- *a) population and human health;*
- *b)* biodiversity, with particular attention to species and habitats protected under any law that implemented Directive 92/43/EEC and Directive 2009/147/EC*;*
- *c) land, soil, water, air and climate;*
- *d) material assets, cultural heritage, and landscape; and,*
- *e) the interaction between the factors referred to in sub-paragraphs (a) to (d)."*

2.2.10 These topics are considered within the topic-specific chapters (Chapters 6 Air quality and odour to Chapter 18 Water environment (including flood risk)) which contain the recommended information for inclusion in a scoping report in line with Insert 2 of Planning Inspectorate (2020) Advice Note Seven: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping, (Version 7) [1].

2.2.11 In addition, Regulation 5(4) of the EIA Regulations states that the EIA should include, where relevant, "*the expected significant effects arising from the vulnerability of the proposed development to major accidents or disasters that are relevant to that development."* This is considered within Chapter 20 Scoped out topics.

2.2.12 Schedule 4 paragraph 5(e) of the EIA Regulations states that a description should be included, of the significant effects arising from "*the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resource"'*. This requirement is addressed within Chapter 19 Cumulative effects assessment.

2.2.13 Regulation 32 of the EIA Regulations sets out the requirements for developments that are likely to have significant effects on the environment in a European Economic Area state. As stated in Chapter 5 General EIA approach and methodology, no transboundary effects have been identified in relation to the Proposed Development, as there is no pathway for effects to occur outside the UK.

### Other relevant legislation

2.2.14 The following legislation is considered relevant to the Proposed Development:

- Environment Act 2021
- Conservation of Habitats and Species Regulations 2017 as amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019)
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017
- The Waste (England and Wales) Regulations 2011
- The Bathing Water Regulations 2013
- Marine and Coastal Access Act 2009

- Natural Environment and Rural Communities Act 2006
- Countryside and Rights of Way Act 2000
- Water Resources Act 1991
- Water Industry Act 1991
- Wildlife and Countryside Act 1981

2.2.15 A more comprehensive list is provided in each chapter.

## 2.3 National Policy Statement

2.3.1 National Policy Statements (NPSs) designated by the UK Government are the starting point for the consideration and determination of DCO applications. Section 104 of the PA 2008 states that:

*"(2) In deciding the application the Secretary of State must have regard to – (a) any national policy statement which has effect in relation to development of the description to which the application relates (a "relevant national policy statement")*
*(3) The Secretary of State must decide the application in accordance with any relevant national policy statement, except to the extent that one or more of subsections (4) to (8) applies."*

### National Policy Statement for Water Resources Infrastructure

2.3.2 The National Policy Statement for Water Resources Infrastructure (NPSWRI) [4] was published in April 2023. The SoS has issued a Direction under Section 35 of the PA 2008 for the Proposed Development, meaning that it is a water resource infrastructure development and that the NPSWRI has effect.

2.3.3 The NPSWRI (paragraph 2.1.2) notes that there is "*an immediate need to build resilience in the water sector to address pressures on water supplies*" driven by a number of factors.

2.3.4 The NPSWRI contains government policy that is relevant for the Proposed Development. It sets out:

- The urgent need for nationally significant water resources infrastructure.
- The principles against which applications are expected be assessed and examined.
- The likely construction and operational impacts of national water resources infrastructure.

2.3.5 Section 1 of the NPSWRI sets out the background, scope and geographical coverage of the NPS, and the infrastructure covered by the NPSWRI. It also sets out the significance of water resource management plans (WRMPs) in terms of supporting decisions on "*what additional water resources infrastructure is needed*" (paragraph 1.4.3).

2.3.6 Section 2 of the NPSWRI sets out government policy and the need for water resources infrastructure, including:

- Current and predicted future pressure on water availability due to climate, demographic, economic and environmental factors.
- The Government's commitment to pursue a "twin track approach" which requires both new water resources infrastructure and further demand management.
- Quantifying the need for new water resources infrastructure, the need to maintain the current level of resilience, and the regional planning process.
- The role of WRMPs in identifying the need.
- The role of NSIP.

2.3.7 Section 3 of the NPSWRI sets out the assessment principles for water resources NSIPs, including a presumption in favour of granting development consent for water resources NSIPs that fall within the need for infrastructure established in the NPS, and subject to the detailed policies and protections in the NPSWRI. It also sets out some general principles for EIA which are important in forming the approach to scoping, including:

- "*Information gathered from the WRMP options appraisal assessments or information contained within Section 4 of the NPS may be useful to identify the significant effects of the proposed project*" (paragraph 3.2.4).
- "*When examining an application for development consent, the Examining Authority (ExA) must examine the environmental information*" (paragraph 3.2.5).
- "*When considering significant cumulative effects, any Environmental Statement should provide information on how the effects of an applicant's proposal would combine and interact with the effects of other development (including projects for which consent has been granted)*" (paragraph 3.2.6).
- "*The ExA should consider how significant cumulative effects, and the interrelationship between effects, might as a whole affect the environment, even though they may be acceptable when considered on an individual basis or with mitigation measures in place*" (paragraph 3.2.7).

2.3.8 Section 3.6 also contains policies on the criteria for 'good design' for water resources infrastructure.

2.3.9 Section 4 of the NPSWRI sets out policy for generic impacts. This includes policy considering the construction and operational impacts of water resources NSIPs, including the assessments that an applicant will need to carry out, and the specific planning requirements that an applicant will need to meet, in order to gain development consent. It also sets out policies in relation to mitigation and decision making. Each topic chapter of the ES will incorporate the policies within the assessment.

2.3.10 The NPSWRI requires the consideration of the relevant river basin management plans when assessing the likely impact of any proposed development on the water environment. The Proposed Development falls within the South East river basin district where Part 1: South East River Basin District River Basin Management Plan 2022 applies.

2.3.11 As set out in paragraph 1.1.4 of the NPSWRI, where a water resources infrastructure development is treated as a development for which development consent is required through Section 35 of the PA 2008, the NPS will apply. The SoS must decide an application in accordance with the NPS, unless doing so would, amongst other things, result in adverse impacts of the development outweighing its benefits (paragraph 1.1.5).

## 2.4 National Planning Policy Framework

2.4.1 The National Planning Policy Framework (NPPF) [5], revised in July 2021, sets out the government's planning policies for England and how these are expected to be applied. The NPPF is supplemented by the relevant planning practice guidance updated in June 2021.

2.4.2 The NPPF confirms at paragraph 5 that it does not contain specific policies for NSIPs. These are determined in accordance with the decision-making framework in the PA 2008 and relevant NPSs for major infrastructure, as well as any other matters that are relevant.

2.4.3 These other relevant matters may include the NPPF. Each technical topic will therefore consider whether there is important and relevant guidance in the NPPF, or Local Plans that may require consideration by the decision-making authority.

## 2.5 Local planning policies and other considerations

2.5.1 The NPSWRI [4] notes that development plan documents or other documents in the Local Development Framework may be considered both important and relevant. As set out in paragraph 1.1.9 of the NPSWRI, development plan policies may be important and relevant to decision making, but "*in the event of a conflict between these or any other documents and a National Policy Statement, the National Policy Statement prevails…"*.

2.5.2 The local authorities defined as 'host authorities' and their policies and other relevant policy documents are listed in Table 2-1 and summarised within Appendix 2-1. The topic chapters further describe local planning policies that are relevant to their assessments.

**Table 2-1: Relevant local planning policy**

| Local authority | Local planning policy document |
|---|---|
| EHDC | East Hampshire District Local Plan: Joint Core Strategy (2014) [6]<br>Housing and Employment Allocations (2016) [7]<br>Local Plan Second Review (2006) [8] |
| Eastleigh Borough Council (EBC) | Eastleigh Borough Local Plan 2016-2036 (2022) [9]<br>The Policies Maps [10, 11] |
| Fareham Borough Council (FBC) | Fareham Local Plan 2037 (2023) [12]<br>Local Plan 2037 Policies Map (2023) [13]<br>Local Plan Part 3: The Welborne Plan (2015) [14] |
| Hampshire County Council (HCC) | Hampshire Minerals and Waste Plan (HMWP) (2013) [15]<br>Hampshire Strategic Infrastructure Statement (2019) [16] |

| Local authority | Local planning policy document |
|---|---|
| HBC | Havant Borough Core Strategy (2011) [17]<br>Havant Borough Local Plan (Allocations) (2014) [18] |
| Portsmouth City Council (PCC) | Portsmouth Plan (The Portsmouth Core Strategy) (2012) [19]<br>Portsmouth City Local Plan (2006) (extant saved policies) [20]<br>Southsea Town Centre Area Action Plan (2007) [21]<br>Somerstown and North Southsea Area Action Plan (2012) [22]<br>Milton Neighbourhood Plan (adopted July 2022) [23] |
| Winchester City Council (WCC) | Winchester District Local Plan Part 1 Joint Core Strategy (2013) [24]<br>Winchester District Local Plan Part 2 Development Management and Site Allocations (2017) [25]<br>The Policies Map [26] |
| South Downs National Park Authority (SDNPA) | South Downs Local Plan (2019) [27]<br>The Policies Map [28] |

## 2.6 Other national policy and guidance

2.6.1 The following policy and guidance documents are other considerations of relevance:

- National Design Guide (2019, updated 2021) [29]
- Marine Policy Statement from 1 January 2021 (2020) [30]
- National Planning Policy for Waste (2014) [31]
- UK Marine Policy Statement (2011) [32]
- South East Marine Plan (2016, updated 2021) [33]
- Historic England Tall Buildings Advice Note 4 (2022) [34]
- Thames River Basin Management Plan (2022) [35]
- National Policy Statement for Ports (2012) [36]
- National Policy Statement for National Networks (2014) [37]

2.6.2 A list of relevant legislation, policy and guidance to each topic area is set out within each topic chapter. Authors will monitor developments in policy and guidance and ensure that they are taken into account as appropriate when undertaking the EIA, and that this will be reported in the ES.

# 3 Description of the Proposed Development

## 3.1 Introduction

3.1.1 This chapter provides an overview and description of the Proposed Development including a description of its main components, and an outline of construction, operational and decommissioning activities.

3.1.2 The Planning Inspectorate (2020) Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements, (Version 7) [1] requires a Scoping Report to explain the approach to addressing uncertainty (where it remains) in relation to elements of the Proposed Development. This EIA Scoping Report is based on a preliminary design, which will be developed further to take into account the findings of ongoing environmental assessment work, and to have regard to consultation responses.

3.1.3 As part of the design development process, the route of the proposed underground water transfer pipelines, tunnels, locations of proposed AGP, temporary construction compounds and working areas will be developed to take into account the need to avoid or reduce likely significant adverse effects and to ensure the effective use of land. This design development will inform the refinement of Order Limits included in the application for development consent.

3.1.4 The Scoping Area is illustrated in Figure 1.1 and 1.2 in Volume III, and includes all land being considered for the purposes of the Proposed Development. Figure 1.1 and Figure 1.2 constitutes ‘a plan sufficient to identify the land’ for the purposes of this Scoping Report. It represents the maximum extent of land that could be required for temporary or permanent purposes in order to construct and operate the Proposed Development. This allows for consideration of the potential environmental effects of the Proposed Development, to ensure that the likely significant effects are scoped into the assessment. The land required for the Proposed Development, within the envelope of the Scoping Area, will be refined as design work progresses, considering environmental and technical factors, and consultation feedback.

3.1.5 The Scoping Area also includes areas which may not be subject to physical changes or acquisition of land rights, but that the Applicant may need to seek operational powers over in the DCO, such as the Eastney LSO, Eastney PS, and associated Eastney TT.

3.1.6 For the purposes of this EIA Scoping Report, the Scoping Area has been drawn widely enough to allow for flexibility and changes to aspects of the design of the Proposed Development post-scoping, for example, the Proposed Underground Pipelines and tunnels would be located along a defined route which is still being developed, therefore the current Scoping Area includes all of the areas still under consideration (within the Preferred Pipeline Corridor). The area that will eventually form the Order Limits for the DCO application will be refined further through the scheme development and impact assessment processes.

3.1.7 The study areas for each EIA topic, as defined in each topic chapter, cover a much broader area than the Scoping Area to ensure potential impacts are fully identified

to enable a robust assessment to be undertaken. The study areas for each topic have typically been set at prescribed distances from the boundaries of the Scoping Area, are related to interconnected features such as watercourses or roads, and have regard to policy and guidance where relevant. Environmental designations are presented on Figure 3.1 within Volume III.

3.1.8 The Scoping Area includes:

- The site for the proposed WRP.
- The Preferred Pipeline Corridor incorporating three sections of pipeline:
  - Underground pipeline(s) between Budds Farm WTW and the proposed WRP
  - Underground pipeline(s) between the proposed WRP and Havant Thicket Reservoir
  - Underground pipeline between Havant Thicket Reservoir and Otterbourne WSW
- Construction working areas identified at this stage as potentially being required.
- The existing Eastney TT, Eastney PS and Eastney LSO which would be used for the release of reject water into the Solent.
- The Havant Thicket Reservoir, which would be used for the storage of recycled water.
- Budds Farm WTW, an existing Southern Water Services site.
- Otterbourne WSW, an existing Southern Water Services site.

3.1.9 All figures presented within this section of the report are indicative and may be subject to change as a result of further design development.

## 3.2 Overview of the Proposed Development

3.2.1 The Proposed Development comprises the construction, operation, and maintenance of the following components:

- Proposed WRP in the vicinity of Budds Farm WTW with a total peak output of approximately 60Ml/d of recycled water. The proposed WRP may be brought forward in two phases. The initial phase would receive approximately 26Ml/d of treated wastewater from Budds Farm WTW to produce a peak output of approximately 20Ml/d of recycled water. The second phase would increase the proposed WRP capacity to receive a total of approximately 80Ml/d of treated wastewater to produce a total peak output of approximately 60Ml/d of recycled water. During normal (i.e. non peak/drought) operation, the output of the proposed WRP is expected to be approximately 20Ml/d depending on water availability at Bedhampton Springs. There would be three pumping stations at the site including the proposed HLPS.
- Proposed Underground Pipelines between Budds Farm WTW and the proposed WRP to accommodate approximately 80Ml/d peak transfer volumes in each direction.
- Proposed Underground Pipeline to transfer at peak operation approximately 60Ml/d of recycled water from the proposed WRP to Havant Thicket Reservoir.

The Proposed Underground Pipeline would either be located within a single continuous tunnel from the proposed WRP to Havant Thicket Reservoir, or within two separate tunnels from the proposed WRP to Havant Thicket Reservoir with a connection at Bedhampton Springs.

- Proposed Underground Pipeline to transfer at peak operation (i.e. during severe drought conditions) approximately 90Ml/d of water from Havant Thicket Reservoir to Otterbourne WSW via the proposed HLPS. During normal (i.e., non peak/drought) operation, the pipeline would transfer at least 20Ml/d of water from Havant Thicket Reservoir to Otterbourne WSW.
- Proposed additional AGP, IPS and BPT located along the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW.

3.2.2 The Proposed Development would also comprise:

- Use of the Havant Thicket Reservoir for the storage of recycled water.
- Use of the existing Eastney TT, Eastney PS and Eastney LSO for the release of reject water. Works are not anticipated to be undertaken on the Eastney LSO.

3.2.3 The construction and operation of these principal elements of the Proposed Development would be supported by Associated Development which is expected to include, but is not limited to:

- Temporary works to support construction;
- Permanent works to support operation and maintenance;
- Accesses and potential utility connections for the site and
- Landscaping, environmental mitigation, enhancement, and compensation measures.

## 3.3 Principal components of the Proposed Development

### Proposed Water Recycling Plant and proposed High Lift Pumping Station

3.3.1 The proposed WRP is expected to be located at a site in the proximity of Budds Farm WTW as shown in Figure 1.2 in Volume III.

3.3.2 The proposed WRP would receive a total peak volume of approximately 80Ml/d of treated wastewater from Budds Farm WTW to provide a total peak output of approximately 60Ml/d of recycled water. If delivered in two phases, the initial phase of the proposed WRP would receive approximately 26Ml/d of treated wastewater from Budds Farm WTW to produce approximately 20 Ml/d of recycled water at peak operation. The second phase would increase the peak output of the proposed WRP to a total peak output of 60Ml/d of recycled water. Reject water from the proposed WRP process would be combined with the remaining Budds Farm WTW treated wastewater (not needed for water recycling), and released via the existing Eastney TT, Eastney PS, and Eastney LSO into the Solent.

3.3.3 The proposed WRP is expected to consist of a main process building, kiosks for control equipment, administration buildings and parking facilities. Several large

holding tanks and chemical storage units would be required for operation of the proposed WRP.

3.3.4 Three pumping stations are expected to be located at the site of the proposed WRP:

- One pumping station would pump recycled water from the proposed WRP to Havant Thicket Reservoir.
- One pumping station would pump reject water from the proposed WRP to Budds Farm WTW for release via the existing Eastney TT, Eastney PS and Eastney LSO.
- One HLPS that would pump water from Havant Thicket Reservoir onwards to Otterbourne WSW.

### Proposed underground pipelines between Budds Farm Wastewater Treatment Works and the proposed Water Recycling Plant

3.3.5 A number of Proposed Underground Pipelines' between Budds Farm WTW and the proposed WRP would transfer treated wastewater from Budds Farm WTW to the proposed WRP, and transfer reject water from the proposed WRP to discharge via the existing Eastney LSO using the existing Eastney TT. It is anticipated that the Proposed Underground Pipelines would be installed under the Hermitage Stream and would be approximately 0.5km in length. The Proposed Underground Pipelines are expected to transfer a peak flow of approximately 80Ml/d of treated wastewater to and from the proposed WRP. The Proposed Underground Pipelines need to be sized for the same transfer capacity of approximately 80Ml/d as it may be necessary to have a facility to dispose up to the maximum volume of water being treated. This ensures that in the event of a water quality failure any water in the system can be returned via the reject stream and discharged via the Eastney LSO while shutdown procedures at the proposed WRP are initiated. It is expected that the treated wastewater would be pumped to the proposed WRP by a new pumping station at Budds Farm WTW, and the reject water would be pumped to the Eastney TT by a pumping station at the site of the proposed WRP. Works at Budds Farm WTW would include new connections to transfer flows to and from the WRP.

### Proposed underground pipeline between the proposed Water Recycling Plant and Havant Thicket Reservoir

3.3.6 A Proposed Underground Pipeline from the proposed WRP to Havant Thicket Reservoir would transfer at peak flow approximately 60 Ml/d of recycled water. This component of the Proposed Development would comprise of one of the following options:

- The Proposed Underground Pipeline could be located in a single continuous tunnel connecting the proposed WRP and Havant Thicket Reservoir. As the Proposed Underground Pipeline passes through Havant a tunnel is expected to be utilised to reduce the scale of construction activity at surface level and avoid surface crossings of the Hermitage Stream.

- Alternatively, the Proposed Underground Pipeline could be located within two separate tunnels connecting the proposed WRP and Havant Thicket Reservoir, but with a connection between the two tunnels at Bedhampton Springs.

3.3.7 A pumping station located at the site of the proposed WRP would pump approximately 60Ml/d of recycled water from the proposed WRP to Havant Thicket Reservoir

3.3.8 The tunnel(s) for the Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir would also accommodate the pipeline from Havant Thicket Reservoir to the proposed HLPS.

### Proposed underground pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

3.3.9 A Proposed Underground Pipeline, to be approximately 40km long, would transfer approximately 90Ml/d of source water (water that is used as a source for drinking water) at the peak of a drought, from Havant Thicket Reservoir to Otterbourne WSW via the proposed HLPS which is expected to be located at the site of the proposed WRP. Outside of drought conditions, the Proposed Underground Pipeline would transfer at least 20Ml/d of water from Havant Thicket Reservoir to Otterbourne WSW.

3.3.10 The section of this component from Havant Thicket Reservoir to the proposed HLPS would comprise of one of the following options:

- The Proposed Underground Pipeline could be located within a tunnel connecting Havant Thicket Reservoir and the proposed HLPS. As the Proposed Underground Pipeline passes through Havant a tunnel is expected to be utilised to reduce the scale of construction activity at surface level and avoid surface crossings of the Hermitage Stream.
- Alternatively, the Proposed Underground Pipeline could be located within two separate tunnels connecting Havant Thicket Reservoir and the proposed HLPS, but with a connection between the two tunnels at Bedhampton Springs.

3.3.11 Given the proposed HLPS is expected to be located at the site of the proposed WRP, the tunnel(s) from Havant Thicket to the proposed HLPS would also accommodate the Proposed Underground Pipeline from the proposed WRP to Havant Thicket Reservoir.

3.3.12 The Preferred Pipeline Corridor for the Proposed Underground Pipeline from the proposed HLPS to Otterbourne WSW is shown on Figure 1.2 in Volume III. The Proposed Underground Pipeline would be constructed using the most appropriate construction technique dependent on the location of the Proposed Underground Pipeline. The expected techniques for constructing The Proposed Underground Pipeline are outlined in Section 3.5.

3.3.13 No works are proposed to be undertaken at Otterbourne WSW as part of the Proposed Development. Any upgrades to Otterbourne WSW to facilitate the Proposed Development will be subject to separate consents.

### Use of Havant Thicket Reservoir for the storage of recycled water

3.3.14 The Havant Thicket Reservoir is a development proposed by Portsmouth Water that received planning permission in October 2021 (HBC planning application ref. APP/20/00990 and EHDC planning application ref. 51680/001). Following the transfer of recycled water from the proposed WRP, the recycled water would be combined with water contained within the Havant Thicket Reservoir. The Proposed Development comprises the use of the Havant Thicket Reservoir for the additional storage of recycled water, before transfer to Otterbourne WSW.

### Proposed Above Ground Plant

3.3.15 As a result of the length of the Proposed Underground Pipeline from Havant Thicket Reservoir to Otterbourne WSW, proposed AGP is required to support the transfer of water to overcome the topography of the route.

#### *Proposed High Lift Pumping Station*

3.3.16 The proposed HLPS is the first pumping station that is expected to be required along the Proposed Underground Pipeline route from Havant Thicket Reservoir to Otterbourne WSW. Due to variations in ground level between the reservoir and Otterbourne WSW it is necessary for a HLPS to pump the water through the pipeline, providing the water with sufficient 'head' to flow up hills that the Proposed Underground Pipeline traverses. It is expected that the proposed HLPS would be located at the site of the proposed WRP.

#### *Proposed Intermediate Pumping Stations*

3.3.17 Proposed IPSs may be required at intervals along the Proposed Underground Pipeline route to re-pressurise the Proposed Underground Pipeline to accommodate changes in the topography of the land the Proposed Underground Pipeline would pass through. A pumping station would be needed where pressure has fallen to the point where the Proposed Underground Pipeline can no longer convey the required flow.

3.3.18 The exact locations of the proposed IPSs will be dependent on the final route of the Proposed Underground Pipeline. As the route of the Proposed Underground Pipeline is developed, hydraulic assessment will be undertaken to assess the topography of the route to identify where IPSs are needed to ensure the required flow can be achieved in the Proposed Underground Pipeline.

#### *Proposed Break Pressure Tanks*

3.3.19 Proposed BPTs are anticipated to be required at high points along the Proposed Underground Pipeline route. Water is pumped to proposed BPTs located at high points of the route, where it flows using gravity from the tank. This reduces the amount of energy required to transfer water. BPTs reduce the overall maximum pressure in the pipeline system associated with changes in flow rate as a result of topography.

3.3.20 The requirement for, and exact locations of proposed BPTs will be dependent on the final route of the Proposed Underground Pipeline and the topography of this route. Through the development of the Proposed Underground Pipeline route, hydraulic assessments will be undertaken to ascertain pressure levels within the pipeline system which will indicate the requirement for, and locations of, any BPTs.

### Release from the Eastney Long Sea Outfall

3.3.21 Reject water produced by the proposed WRP would be returned to Budds Farm WTW using the Proposed Underground Pipeline between the proposed WRP and Budds Farm WTW. The reject water would then be transferred and released using the existing Eastney TT and Eastney PS to the Eastney LSO. Works on the Eastney TT would include the connection at Budds Farm WTW for the waste stream from the proposed WRP.

3.3.22 In the event of an emergency shut down of the proposed WRP, water within the WRP would be returned to Budds Farm WTW during the emergency shut down procedure by opening the run to waste valve. This water would be transferred through the Proposed Underground Pipeline between the proposed WRP and Budds Farm WTW and released using the existing Eastney TT and Eastney PS from the Eastney LSO.

### Associated Development

3.3.23 This section details the construction working areas anticipated to be required to support the construction of the Proposed Development. The construction working areas are required to support construction, and would include temporary construction compounds, launch and reception sites for trenchless crossings and tunnelling, and a working width in which to construct the pipeline. The working width includes areas required to install the pipeline, including digging trenches, storing the pipeline and other equipment alongside the trench before installation, and storing excavated soil during installation. The working width would also include the temporary construction traffic haul routes needed to construct the Proposed Underground Pipeline.

3.3.24 The construction working areas are anticipated to include the following temporary construction compound requirements.

#### *Temporary construction hub*

3.3.25 A temporary construction hub may be required to act as a main project hub located at a strategic location along the Proposed Underground Pipeline route. It would provide an office building accommodating approximately 60 employees, with welfare and security facilities. It would include a parking area, as well as storage areas for equipment, plant and materials.

3.3.26 The area required for the construction hub is anticipated to be up to 1.5 hectares it is anticipated to be located within 10km of the Proposed Underground Pipeline route. Locating the construction hub adjacent to the strategic road network is required to ensure adequate access, and existing entrances would be utilised

where available. The construction hub would also require connection to utilities assets.

3.3.27 Due to uncertainty over timing and availability of potential construction hub sites, it is envisaged that a temporary construction hub would be identified by the contractor during the construction phase, using an existing consented site. In order to retain flexibility, the construction hub is not included in the Scoping Area, and the study area assessed in this EIA Scoping Report covers a wider geographic region in which the hub could be located, such that any likely significant effects can be appropriately considered.

*Temporary site compounds*

3.3.28 Temporary site compounds are included in the Scoping Area as part of the Associated Development for the Proposed Development. Locations of the temporary site compounds would be refined further through the scheme development and impact assessment process.

3.3.29 Temporary site compounds would be located at suitable intervals along the Proposed Underground Pipeline route. The site compounds would comprise office buildings for approximately 20 construction employees, welfare facilities, parking and storage areas. Where required and depending on the pipeline construction methodology being used, the site compounds may also house any launch or reception shafts required for tunnelling or trenchless construction activities.

3.3.30 The area required for the size of the compounds would vary depending on the construction methodology being used, with the largest anticipated to be up to 2.5 hectares for tunnelling construction activity, as these sites need to accommodate larger plant and equipment for the shaft sinking and tunnelling activities and require far more storage.

3.3.31 Situating the site compounds adjacent to the strategic road network would be required to ensure adequate access, and existing entrances would be utilised where available.

3.3.32 Some smaller sites may be required along the Proposed Underground Pipeline route for storing smaller plant or equipment, pipe fittings, parking and welfare, as works along the pipeline route progress. These sites would be contained within the working width for construction of the Proposed Underground Pipeline, and access would be provided by the temporary construction haul routes which run along the route of the Proposed Underground Pipeline.

*Temporary water storage lagoons*

3.3.33 Temporary water storage lagoons are included in the Scoping Area as part of the Associated Development for the Proposed Development. Locations of the temporary water storage lagoons would be refined further through the scheme development and impact assessment process.

3.3.34 It is anticipated that during the testing of the installed pipeline, temporary lagoons would be required to store water that is required for cleaning and hydro-testing of the pipeline prior to operation. These lagoons would be used to contain the water for cleaning and aid the transfer of the testing water from one section of pipeline to

the next. It is anticipated they would be situated approximately every 3km along the Proposed Underground Pipeline route close to a site compound. They would comprise of a lined shallow bunded area of land with a volume that would vary depending on operational requirement.

## 3.4 Proposed Development sections within local authority boundaries

3.4.1 Table 3-1 identifies which local authority areas the different parts of the Proposed Development are proposed to be located in. Please see Figure 12.1 in Volume III to visualise local authority boundaries.

**Table 3-1: Proposed Development sections within local authority boundaries**

| Proposed Development component | Local Authority |
|---|---|
| Proposed WRP | HBC and HCC |
| Proposed Underground Pipelines between Budds Farm WTW and the Proposed WRP | HBC and HCC |
| Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir | HBC and HCC |
| Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW | HBC, PCC, WCC, FBC, EBC, SDNPA and HCC |
| Connection from Havant Thicket Reservoir including initial HLPS | HBC and HCC |
| Use of the Havant Thicket Reservoir for the storage of recycled water | HBC, EHDC and HCC |
| Use of the existing Eastney TT, Eastney PS and Eastney LSO for the release of reject water | HBC and PCC |

## 3.5 Construction methodology

### Proposed Water Recycling Plant

3.5.1 The preferred site of the proposed WRP is a former domestic landfill site, and the wider area is typified by light industrial units, as well as commercial and office space using steel framed construction.

3.5.2 Construction of the proposed WRP is likely to involve laying reinforced concrete slabs, founded on piled foundations. Given that the piled foundations would be within land, which was previously a domestic landfill, particular requirements for piling would be informed by an assessment of ground conditions and would need to ensure that the integrity of the landfill is not affected. It is expected that piled foundations would be cast in situ to reduce the risk associated with landfill leachate.

3.5.3 Construction of the proposed WRP is expected to consist of the construction of a main process building, pumping stations, kiosks for control equipment,

administration buildings and parking facilities. Several large holding tanks and chemical storage units would also be constructed above ground. These would either be pre-cast concrete tanks or glass fused to steel construction.

### Proposed Underground Pipelines

3.5.4 A number of techniques are expected to be used for constructing the Proposed Underground Pipelines. This does not preclude the use of other construction techniques if these are required. These techniques are described below.

#### *Trenched open-cut method*

3.5.5 It is anticipated that the installation of the majority of the Proposed Underground Pipeline would be constructed using open-cut excavation in open areas such as fields. This involves digging a trench and laying the pipeline within the trench. The trench is then backfilled, reusing as much of the excavated material as possible.

3.5.6 A typical working area for this method is anticipated to be approximately 40m wide which allows for sufficient space for digging the trench, storing the pipeline and other equipment alongside the trench before installation, and storing excavated soil during installation. The working width would also include the temporary construction traffic haul routes needed to construct the Proposed Underground Pipeline.

#### *Trenchless methods*

3.5.7 For some sections of the Proposed Underground Pipeline route there would be crossings that will not be generally suited to open cut excavation. Examples of these could be roads, railways, waterways, sensitive environmental areas, and other areas where construction could be restricted. Trenchless methods that could be used include tunnelling, horizontal directional drilling, and micro tunnelling. Greater detail about the locations of the use of these construction techniques will be set out as the Proposed Development is refined further. The anticipated trenchless construction techniques are outlined in the following sections.

#### *Tunnelling*

3.5.8 Tunnels are likely to be used in areas where the Proposed Underground Pipeline is required to pass through populated residential areas, for example the Proposed Underground Pipeline from the proposed WRP to Havant Thicket Reservoir as described in Section 3.3. Where tunnels are used, a tunnel boring machine (TBM) would be used, with shafts dug at each end of the tunnel: a launch shaft from where the TBM would start and a reception shaft where the TBM would emerge and finish.

3.5.9 Once the TBM is launched, the tunnel construction cycle would begin one tunnel lining ring at a time. On completion of the tunnel the TBM would be moved into the reception shaft, dismantled, and removed, leaving the fully constructed tunnel ready for the pipeline installation. Intermediate shafts may be required along the tunnel route depending on the length of the tunnel or changes in geology.

3.5.10 The exact locations of launch, reception and any intermediate shafts would be subject to further site selection and public consultation.

### *Horizontal directional drilling*

3.5.11 Horizontal directional drilling involves the use of a directional drilling machine, and associated attachments, to accurately drill along the chosen bore path and lay the path for the pipe.

3.5.12 Two working areas would be established on either side of the feature to be crossed with a pit or shaft created at each end of the pipeline route. The directional drilling machine is then guided by the operator to follow the desired route and is advanced through the ground until the machine reaches the reception shaft at the far end of the route. Finally, a pipe is pulled through the hole without disturbing the surface.

### *Microtunnelling*

3.5.13 Microtunnelling is a trenchless pipeline installation technique that utilises microtunnel boring machines which are usually remote controlled from the surface, to install pipes underground.

3.5.14 The microtunnel boring machine is advanced through the ground using specially manufactured jacking pipes which are pushed into the ground using hydraulic pistons. The pistons push the pipe and microtunnel boring machine forward at a controlled rate to ensure effective and safe progress of the machine as it cuts the soil.

3.5.15 The microtunnel boring machine is guided by a steering system which allows the operator to follow the desired route by using steering pistons located just behind the cutterhead. As each pipe advances through the ground one pipe length at a time, the pistons are withdrawn to allow the next pipe section to be added to the pipe string. This process continues until the machine reaches the reception shaft at the far end of the route.

## Proposed Above Ground Plant

### *Intermediate Pumping Stations*

3.5.16 Depending on the topography of the sites associated with each proposed IPS location, the ground may have to be levelled or terraced to accommodate all the components required for each IPS. In doing this, the aim would be to undertake a cut and fill operation, where site won material from the cut exercise would balance the fill, to ensure any waste generated is minimised.

3.5.17 Once the levels are correct the foundations for the main structures would be installed which is envisaged to be piled foundations for the main structures with simple strip of pad foundations for the ancillary structures. Particular requirements for piling would be informed by an assessment of ground conditions at each location.

### *Break Pressure Tanks*

3.5.18 Depending on the topography of the sites associated with each proposed BPT location, the ground may have to be levelled to accommodate the tank and all ancillary structures. In doing this, the aim would be to undertake a cut and fill

operation, where site won material from the cut exercise would balance the fill, to ensure that any waste generated is minimised.

3.5.19 The cut fill balance would take into account any land profiling that may be provided around the tank for screening purposes where required. Should any land reprofiling be required, this would be designed to take into account of local features and be visually sensitive to the wider landscape.

3.5.20 Once the level of the site is as required, the foundations for the tank and main structures would be installed. This is anticipated to be piled foundations with simple strip or pad foundations for the ancillary structures.

*High Lift Pumping Station*

3.5.21 The proposed HLPS is expected to be located at the site of the proposed WRP and therefore the construction methodology for the proposed HLPS is anticipated to be similar as that of the proposed WRP.

3.5.22 Construction of the proposed WRP is likely to involve laying reinforced concrete slabs which would be founded on piled foundations. Given that the piled foundations would be within land, which was previously a domestic landfill, particular requirements for piling would be needed to ensure that the integrity of the landfill is not affected. It is expected that piled foundations would be cast in situ to reduce the risk associated with landfill leachate.

## 3.6 Operation and maintenance

### Proposed Water Recycling Plant

3.6.1 The proposed WRP would receive treated wastewater from Budds Farm WTW. Within the proposed WRP, the treated wastewater would be pumped through two filtering processes. The first of these, micro-filtration, to remove remaining impurities that could block the membranes during reverse osmosis. The reverse osmosis process removes dissolved salts, impurities, bacteria and pharmaceuticals. The next stage within the water recycling process would be the advanced oxidation process involving the use of ultraviolet light and hydrogen peroxide to remove any remaining impurities. To ensure the water is stable for onward pumping and blending, minerals such as calcium and magnesium salts removed during the earlier stages of treatment would be added back in.

3.6.2 During peak operation, the proposed WRP would treat approximately 80Ml/d of treated wastewater into approximately 60Ml/d of recycled water for transfer to Havant Thicket Reservoir. Outside of drought conditions where the peak operation capacity of the proposed WRP is not required, the proposed WRP would treat 20Ml/d of treated wastewater.

3.6.3 The water and particles removed through the water recycling process produce wastewater known as reject water. During peak operation of a 60Ml/d WRP, approximately 20Ml/d of reject water would be produced and released from the existing Eastney LSO to the Solent. Outside of drought conditions, approximately 6Ml/d of reject water will be produced by the proposed WRP.

3.6.4 The approximate parameters of the proposed WRP including outdoor storage, site access roads and paths would be a length of 280m, width of 190m and height of 13m, including a building with approximate parameters of 100m by 150m and 13m high. The proposed WRP would be operational 24 hours a day and it is assumed that operatives would be in attendance 24 hours a day with approximately five operatives during the day and three during the night. The delivery of chemicals is required for the operation of the proposed WRP, which is expected to comprise approximately 80 Heavy Goods Vehicle (HGV) deliveries within a 30 day period when operating at peak operating capacity of 60Ml/d.

3.6.5 External lighting provided by the proposed WRP during operation would consist of internal access road lighting and task lighting. Internal lighting would be provided within the proposed WRP buildings.

3.6.6 It is anticipated that an emergency generator would be provided as part of the proposed WRP which would be used when required.

### Proposed Underground Pipelines

3.6.7 Along the route of the Proposed Underground Pipeline, a number of isolation valves, washout and air valve chambers could be required.

3.6.8 Isolation valves and washouts would be contained with below ground chambers sized to ensure access around the pipework and fittings to enable future operation and maintenance. For example, on an 800mm pipe laid at nominal depth this would equate to approximately a 3x3x3m chamber. Nominal depth is considered to by 900mm above the crown (top) of the pipe. The chambers would be ventilated and stand at least 300mm above ground level in open land, or at the same level as the road surface when located road corridors, finished with an appropriately security rated chamber cover..

3.6.9 Air valves would be contained within below ground chambers. As these are connected to the top of the pipe via a flange the chamber does not need to encompass the entirety of the pipe. For example, for an air valve on a 800mm pipe laid at nominal depth, this would equate to a 1.5m diameter chamber 1m deep. The chambers would be ventilated and stand at least 300mm above ground level in open land, or at the same level as the road surface when located in road corridors, finished with an appropriately security rated chamber cover.

3.6.10 Isolation valves are expected to be required on both sides of major infrastructure/water bodies crossings and other locations where it may be difficult to gain access for repair and maintenance of the pipeline. They may be co-located with washouts / air valves and would be designed with an integral bypass for the balancing of upstream and downstream pressure to facilitate operation.

3.6.11 Washouts are expected to be located at topographical low points along the Proposed Underground Pipeline route to facilitate commissioning and emptying from a section of pipe for repair and maintenance with the aim to clean out any sediments in the pipe. Usage frequencies for washouts are expected to be minimal, such as in the event of an emergency or when a section of the pipe needs to be drained to facilitate replacement of a section or fitting. Washouts would also be required during construction as part of the commissioning stages when a trenchless construction method has been used in the construction of the Proposed

Underground Pipeline. The washout chambers would release source water to a local watercourse where available and acceptable to the relevant authority. If a local watercourse is not available for the release of source water, connection to the existing storm water manhole or a tank would be required.

3.6.12 Air valves are expected to be located at topographical high points to prevent accumulation of air pockets. An air valve would also be required when a trenchless construction method has been used in the construction of the Proposed Underground Pipeline on both sides of major infrastructure crossings. Air pockets can cause water hammer, complete flow stoppage, pipe bursts, system noise, and can cause damage to control valves, metres, and other equipment, and therefore air valves protect pipelines from transient pressures and entrapped air, which are the primary causes of pipeline bursting, collapsing, and fracturing. The proper placement of air valves along the Proposed Underground Pipeline route helps to smooth the flow in the pipelines while also lowering maintenance, operation, and replacement costs, energy consumption, and pressure loss.

3.6.13 Depending on the final route of the Proposed Underground Pipeline and the topography of it, one washout is anticipated to be required every 750m to 1km, as well as one for every trenchless crossing. Air valves are anticipated to be required every 500m, with two for each trenchless crossing.

3.6.14 All types of valve chambers would be located to allow for maintenance access and would be marked with a post and plate for easy location.

### Proposed Above Ground Plant

#### *Intermediate Pumping Stations*

3.6.15 Proposed IPSs would occupy approximately 0.5 hectares of land. The proposed IPS site layouts would have an approximate width of 84.5m, length of 70m and height of 8m. An access road, parking and landscaping would be required which may be outside of this proposed IPS site sizing, depending on the specific location constraints.

3.6.16 During operation and maintenance of the IPSs, attendance by an operative would be required approximately once per month for planned maintenance and approximately once per week for monitoring.

3.6.17 It is anticipated that an emergency generator would be provided as part of the proposed IPSs which would be used when required.

3.6.18 Washout and air valves would also be required at the proposed IPS sites and are described in paragraphs 3.6.7 to 3.6.13.

#### *Break Pressure Tanks*

3.6.19 The proposed BPT would occupy approximately 0.5 hectares of land. The proposed BPT's site layout would have an approximate width of 70m, length of 70m and height of 5.5m (3.5m above ground level). An access road, parking and landscaping would be required within the wider site of the BPT.

3.6.20 During operation and maintenance of the BPTs, attendance by an operative would be required approximately once per month for planned maintenance and approximately once per week for monitoring.

3.6.21 It is anticipated that an emergency generator would be provided as part of the proposed BPTs which would be used when required.

3.6.22 Washout and air valves would also be required at the proposed BPT sites and are described in paragraphs 3.6.7 to 3.6.13.

*High Lift Pumping Station*

3.6.23 The proposed HLPS would occupy approximately 0.12 hectares of land and is anticipated to be located at the site of the proposed WRP. An access road, pump house, kiosk, surge vessels, and standby generator would be required within the site.

3.6.24 As all the pumps and equipment in the HLPS are equipped with remote monitoring and control, attendance by an operative would be required approximately once per month for planned maintenance and monitoring.

## 3.7 Decommissioning

3.7.1 The Proposed Development is assumed to have a life cycle of a minimum 100 years. Any decommissioning works in connection with the Proposed Development would be undertaken using good industry practice, and taking account of obligations owed to landowners under the relevant pipeline deeds, and would comply with all relevant statutory requirements applicable at the time. Any decommissioning works would take place in the context of the regulatory framework in place at that time, which may include a requirement to seek additional consents, permits or licences. Any materials removed would be reused or recycled where possible or disposed of in accordance with relevant waste disposal requirements at that time. Any land no longer needed for operational purposes would be restored in accordance with a scheme agreed with the relevant planning authority.

3.7.2 For the purposes of the EIA, effects from decommissioning will be considered, however it is expected that effects would be similar or less to any effects identified during the construction phase.

# 4 Consideration of alternatives

## 4.1 Introduction

4.1.1 This chapter provides an overview of the alternatives considered to the Proposed Development, along with an explanation on how the Proposed Development has been developed to date.

4.1.2 The Planning Inspectorate (2020) Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements, (Version 7) [38] states that the Planning Inspectorate recommends that the EIA Scoping Report should include an outline of the reasonable alternatives considered and the reasons for selecting the preferred option.

4.1.3 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (hereafter referred to as the EIA Regulations) set out that an ES should include a description of reasonable alternatives in terms of design, technology, location, size, and scale studied by the Applicant. This EIA Scoping Report sets out a summary of the alternatives considered, and the ES will include a detailed description of alternatives considered. The NPSWRI [4] also sets out that the Applicant should set out the consideration of alternatives in line with the EIA Regulations.

4.1.4 The Proposed Development has progressed through an options appraisal process which considered alternative water resources solutions as well as different configurations of these solutions. Further detail on the alternatives to the Proposed Development that have been assessed is set out in the Scheme Development Summary presented as part of the consultation in Summer 2022 on the Proposed Development. The document provides a detailed overview of the process Southern Water has undertaken to identify a preferred strategic solution to address the water supply challenges in Hampshire, known as the options appraisal process. The outcome of this process has been the identification of the Proposed Development as the preferred strategic solution for Southern Water's western supply area.

4.1.5 The NPSWRI sets out that a water company's' WRMP will identify the need for water resources and determine the specific technology solutions required to meet that identified water resources need. Paragraph 2.5.1 of the NPSWRI states that if a water company identifies a future deficit in supply, it will need to assess the water resources and demand management options to eliminate the deficit and justify its preferred option in its WRMP. This emphasises the role of the WRMP in considering and identifying the preferred solution type. The Applicant published its latest WRMP in 2019 (WRMP19), which considered a range of large scale infrastructure options to help meet the identified need, including a large scale desalination plant and water re-use options (referred to as water recycling). A 75 million litres per day (Ml/d) desalination plant at Fawley was identified as the preferred solution as the largest element of the wider WRMP19 preferred strategy, but the water re-use schemes were also reported in the WRMP19 as back-up options as part of an adaptive planning approach to water resources management. The need to carry out further investigations into the large scale infrastructure solution was reported in WRMP19.

4.1.6 This chapter sets out the three key stages in the consideration of alternatives for the Proposed Development, which are as follows:

- Gate 1 of the RAPID gated process required the Applicant to further consider the desalination and water re-use schemes identified in WRMP19 alongside a number of other solutions that were not identified in Southern Water's WRMP19. A high level review of technical, environmental, commercial and other considerations was undertaken and the schemes that were deemed not to be suitable were not progressed; those that were considered feasible were progressed to Gate 2.
- For Gate 2 of RAPID's gated process which was submitted in December 2021, the Applicant presented the outcomes of an options appraisal process which appraised the remaining options. This resulted in the selection of a preferred option to be taken forward for further refinement (ie. the Proposed Development).
- A scheme development process was undertaken following Gate 2 to develop the sites and routes for the required infrastructure and pipelines for the preferred option (being the Proposed Development). This resulted in the selection of a preferred pipeline corridor, a preferred site for the WRP and HLPS and initial zones for the AGP. The outcome of this scheme development process was presented at the Summer 2022 consultation for the Proposed Development.

## 4.2 Alternatives considered at Gate 1

4.2.1 Within the Applicant's WRMP19, a 75 Ml/d desalination plant at Fawley in the New Forest was identified as the preferred long-term water resource solution for the Hampshire area (referred to in Gate 1 as the 'Base Case'). The Base Case was a 75 Ml/d desalination plant at Fawley in the New Forest. WRMP19 also considers a number of strategic alternative options in parallel with the preferred solution. The principal alternative to the Fawley desalination scheme specified in the plan was an indirect water re-use scheme (also referred to as water recycling) utilising the lower River Itchen as an environmental buffer.

4.2.2 Following the Price Review 19 final determination and the creation of the RAPID 'gated process', the Applicant was required to consider a number of additional alternative schemes, which included those identified within WRMP19 as well as schemes that were not specifically included in Southern Water's WRMP19. The Applicant considered 9 strategic solutions for their western supply area at Gate 1. These are set out in Table 4-1.

**Table 4-1: Strategic solutions at Gate 1**

| Configuration Type | Option No. | Option Description |
|---|---|---|
| Desalination | A.1 (Base Case) | 75 Ml/d of drinking water produced by desalination plant in the Fawley area supplying the Hampshire Southampton West Water Resource Zone, with the interface between the new and existing distribution system located at Testwood WSW. |
| | A.2 | 61 Ml/d of drinking water produced by desalination plant in the Fawley area supplying the Hampshire Southampton West Water |

| Configuration Type | Option No. | Option Description |
|---|---|---|
| | | Resource Zone, with the interface between the new and existing distribution system located at Testwood WSW. |
| | D.1 | 40 Ml/d desalinated water for dedicated industrial use at an existing large coastal industrial facility. The existing 30 Ml/d supplied by South West Water to this facility would be redirected to Southern Water at Testwood WSW and re-purposed for drinking water supply, in addition to the proposed 20 Ml/d bulk supply from Knapp Mill. This would be supplemented by an additional 40 Ml/d WRP utilising treated wastewater from Budds Farm WTW, providing a cumulative 81 Ml/d when both the desalination and water recycling components are operating at full capacity. |
| Water Recycling | B.1 | Budds Farm WTW transfer to new 61 Ml/d WRP. Bulk transfer to Lower Itchen and a new 61 Ml/d abstraction from the Lower Itchen. Water is then transferred for treatment at Otterbourne WSW. |
| | B.2 | Budds Farm WTW transfer to new 61 Ml/d WRP. Bulk transfer to a new constructed and lined environmental buffer. Abstraction and transfer for treatment at Otterbourne WSW. |
| | B.3 | Budds Farm WTW transfer to new 61 Ml/d WRP. Direct transfer direct to Otterbourne WSW for treatment. |
| | B.4 | Budds Farm WTW transfer to new 61 Ml/d WRP. Transfer to Havant Thicket Reservoir which acts as an environmental buffer, then 75 Ml/d direct raw water transfer to Otterbourne WSW for treatment. |
| | B.5 | Peel Common WTW and Budds Farm WTW transfer to a new 75 Ml/d WRP. Bulk transfer to a lake that provides an environmental buffer at Otterbourne WSW for treatment. |
| Water Transfer | D.2 | 61 Ml/d raw water transfer from the Havant Thicket Reservoir to Otterbourne WSW for treatment. |

4.2.3 The Applicant also submitted a joint proposal at Gate 1 with Wessex Water and Bristol Water for a regional water transfer scheme called 'West Country North Sources and Transfer'. This scheme was not considered as an alternative to the Base Case as it could not deliver water supplies to address the forecast deficit by 2027.

4.2.4 All the options set out in Table 4-1 were progressed following Gate 1 for further assessment of their feasibility prior to Gate 2. Three options were deemed to be unfeasible by the Applicant and were not taken forward to Gate 2.

4.2.5 Option B.1 was not progressed further following the Ofwat's decision not to fund further investigations as part of its Gate 1 Final Decision. This was due to environmental concerns about the impact of the recycled water release on the integrity of the River Itchen Special Area of Conservation (SAC) and the scheme's ability to meet the resource deficit.

4.2.6 Option D.1 was not progressed as part of this option relies on a South West Water abstraction from the River Avon, which is a chalk stream that already has

significant pressures on its abstractions. This meant there would be uncertainty in being able to rely on the 30 Ml/d supply from South West Water. Additionally, the cost of supply for the desalination element of this option was potentially commercially unviable as it would require a considerable increase in the cost of supplying the industrial facility compared to their existing commercial arrangements. These risks made it too unreliable to be a genuine alternative to the desalination Base Case in the context of the urgent need to meet the supply deficit.

4.2.7 Option B.3 was a direct water recycling solution that involved transfer of recycled water direct to the WSW. Given significant regulatory lead-in times necessary to demonstrate the suitability of this solution, amongst other things, it was not considered to be a genuine alternative to the Base Case, particularly in the context of the urgent need to mee the supply deficit. Therefore, work on this Option ceased in July 2021 and it was not progressed through the options appraisal process to Gate 2.Further modelling of Option B.4 during late 2021 indicated a reduction in the required output of the WRP from 61 Ml/d to 15 Ml/d. A WRP delivering 61 Ml/d in combination with the Havant Thicket Reservoir transfer solution (Option D1) was shown at the time to be oversized to meet the 1-in-200-year drought scenario.

4.2.8 Table 4-2 details the options that were progressed for further assessment prior to Gate 2.

**Table 4-2: Options taken forward to Gate 2**

| Configuration Type | Option No. |
|---|---|
| Desalination | A.1 |
| | A.2 |
| | D.1 – Not progressed |
| Water Recycling | B.1 – Not progressed |
| | B.2 |
| | B.3 – Not Progressed |
| | B.4 |
| | B.5 |
| Water Transfer | D.2 |

## 4.3 Further assessment prior to Gate 2

4.3.1 A detailed options appraisal process was undertaken to evaluate the remaining options. The aim of this was to identify a preferred option and a back-up option. The options appraisal process was developed in consultation with key stakeholders and undertaken by qualified individuals. The options appraisal process comprised of the following stages:

- **Site and route selection**: This stage identified sites and pipeline routes and selected a configuration of components for each option.
- **Consenting evaluation**: This stage assessed each of the Options for consenting risks (based on the recommended configurations and the information available at this time) and ranked the Options relative to each other in terms of levels of consenting risk.

- **Multi-criteria decision analysis**: Each Option was assessed in a multi-criteria decision analysis against several criteria relevant to considering a 'Best Value' solution, including customer, environmental, societal and deliverability criteria. The outcome of the multi-criteria decision analysis was a ranking of the Options based on these criteria.
- **Assessment against legal and policy objectives**: Each option was assessed against the agreed WfLH legal and policy objectives.
- **Assessment against strategic objectives**: Each option was assessed against the agreed WfLH strategic objectives.
- **Interim business evaluation**: Which ranked each option based on the previous stages and their ability to meet the necessary levels of solution resilience for a 1-in-200-year drought event.
- **Future needs assessment**: This stage revised the required solution resilience to a 1-in-500-year drought event and involved the re-assessment of whether the options could meet this need.
- **Final business evaluation**: This stage resulted in the selection of the preferred option and a back-up option.

### Site selection for the proposed Water Recycling Plant

4.3.2 The site and route selection stage of the options appraisal process included the site selection for the proposed WRP. This stage also included the initial site selection of components included within each of the other options set out in Table 4.2.

4.3.3 To select the site of the proposed WRP, firstly a terrestrial search area was determined using the following two parameters:

- A search radius of 1.5 km around Budds Farm WTW. This distance was chosen by increasing the search area from Budds Farm WTW in 500m increments to identify a site that minimised pipeline distances and therefore carbon footprint.
- Excluding areas of coastline susceptible to sea flooding and coastal erosion where major infrastructure development would not be suitable.

4.3.4 Sites were then identified in this search area by applying the criteria outlined in Table 4-3.

**Table 4-3: Site selection criteria**

| Element | Details |
|---|---|
| Land use | Avoidance of the following areas:<br>Densely populated residential areas, private residences, care homes, hospitals, schools, universities, places of worship, burial grounds, holiday parks, hotels, retail parks and leisure parks.<br>Key transport infrastructure.<br>Key utilities. |
| Land conditions | Avoidance of the following areas:<br>Marsh<br>Mudflat<br>Cliff face |

| Element | Details |
|---|---|
| | Open water |
| Site size | Minimum of 60,000m$^2$ (6 hectares) |

4.3.5 Nine sites that met the criteria set out in Table 4-3 were identified. These sites were then assessed against a number of environmental, planning and engineering considerations. A number of sites were not progressed on account of their location within or in proximity to national and local ecological and landscape designations. Additionally, some of the sites were either consented or under construction for residential developments.

**Table 4-4: Environmental and planning considerations for site assessment**

| Site | Description | Environmental and Planning Considerations |
|---|---|---|
| WRP_53 | The site is located north of the A27 and south of the West Coastway railway line. | The site is within the Chichester and Langstone Harbours Special Protection Area (SPA) and Ramsar, and the Langstone Harbour Site of Special Scientific Interest (SSSI). |
| WRP_56 | The site is located south of Havant Road (A2030) and north of the West Coastway railway line. | The site is currently being developed into residential properties. |
| WRP_57 | The site is located south of Havant Road (A2030) and north of the West Coastway railway line. | The site is currently being developed into residential properties. |
| WRP_58 | The site is located south of Portsdown Hill Road and north of Havant Road. | The site is in close proximity to a number of existing residential properties. |
| WRP_69 | The site is located north of Langstone Harbour, west of Mill Lane and south of Penner Road. | The site is within the Chichester and Langstone Harbours SPA and Ramsar, and the Langstone Harbour SSSI. |
| WRP_71 | The site is located south of the A27, north of Harts Farm Way and west of Brockhampton Road. | The site currently consists of a number of existing / active warehousing and office uses. |
| WRP_72 | The site is located south of the A27 and north of Harts Farm Way. | The west of the site is identified as a low use site in the Solent and Waders Brent Goose Strategy, which may require mitigation measures to be put in place. The site also has outline planning permission for employment uses. |
| WRP_77 | The site is located north of the West Coastway railway line and south of Lower Road. | The site is currently being developed into residential properties. |
| WRP_78 | The site is located east of Langstone Road and north west of Emsworth Harbour. | The site is within the Chichester Harbour Area of Outstanding Natural Beauty (AONB). |

4.3.6 The assessment resulted in the identification of WRP_71 and WRP_72 as being the most suitable for the proposed WRP. WRP_71 is developed and comprises existing / active warehousing and office uses and is considered to be more difficult to deliver and develop than WRP_72. It is anticipated that ecological effects can be mitigated to an acceptable level and a Habitats Regulation Assessment will be undertaken. The principle of development at WRP_72 is considered to be acceptable through the allocation and granting of planning permission for employment development of similar uses to the proposed WRThe assessment resulted in the identification of WRP_71 and WRP_72 as being the most suitable for the proposed WRP. WRP_71 is developed and comprises existing / active warehousing and office uses and is considered to be more difficult to deliver and develop than WRP_72. The principle of development at WRP_72 is considered to be acceptable through the allocation and granting of planning permission for employment development of similar uses to the proposed WRP.

### Interim business evaluation

4.3.7 Table 4-5 shows the ranking of the options at the interim business evaluation stage which ranked the options on their performance in the options appraisal process and their ability to meet the need in a 1-in-200-year drought event.

**Table 4-5: Options appraisal process interim business evaluation ranking**

| Option | Overall Ranking |
|---|---|
| D.2 | 1 |
| B.4 | 2 |
| B.2 | 3 |
| B.5 | 4 |
| A.1 | =5 |
| A.2 | =5 |

4.3.8 Options D.2 and B.4 were ranked first and second respectively, with Option D.2 considered the most favourable option as it had a lower capital cost. Options D.2 and B.4 are also considered the most adaptable and able to meet future needs, on account of the flexibility and evolvability afforded by their integration with Havant Thicket Reservoir.

4.3.9 Options B.2 and B.5 were ranked third and fourth respectively, with neither option being evaluated as favourably under the ‘adaptability’ criteria as Options D.2 and B.4.

4.3.10 Option A.1 and A.2 would lead to a range of significant environmental impacts, including the potential to harm the integrity of a SPA. Therefore, they were not considered preferable, as there were other options that would lead to fewer impacts. These Options were therefore ranked the joint fifth and least favoured options. It was recommended that they should not be progressed beyond Gate 2.

### Future needs assessment

4.3.11 Following the interim business evaluation, a future needs assessment was undertaken which established whether the options could meet the needs of a larger

supply deficit in a 1-in-500-year drought event. The requirement for companies to plan for suppling water in an extreme drought event (1-in-500-year drought event) in their WRMP24 is set out in the EA's National Framework for Water Resources Policy [40]. As set out in the NPSWRI [4], if a company identifies a future deficit it will need to assess the options to eliminate this deficit and justify its preferred options within their WRMP The applicant's draft WRMP24 selects the Proposed Development as part of a package of solutions to meet the need to deliver in an extreme drought event. The future needs assessment tested wither the required capacity of the options could be expanded to meet a supply deficit of 87 Ml/d.

4.3.12 Options B.2 and D.2 were not capable of meeting the updated deficit and could not be adapted to do so. Therefore, both options were considered to be the least favourable options. Options B.4 and B.5 could be adapted to provide a transfer of 87 Ml/d which would meet the updated deficit. As such, both options were considered viable options. Option B.4 is regarded as more preferable than Option B.5 as the integration with Havant Thicket Reservoir provides greater resilience.

### Final business evaluation

4.3.13 At the final business evaluation stage, Option B.4 was ranked first on account of its lower cost relative to Option B.5 and its ability to meet future needs (on account of the flexibility afforded by the integration of Havant Thicket Reservoir and water recycling working in tandem) and the means by which the option represents a regionally resilient solution that supports both Southern Water and Portsmouth Water.

4.3.14 Option B.5 was ranked second on account of its higher cost relative to Option B.4, its lower flexibility in scalability terms and its lesser ability to act as a regional asset that benefits both Southern Water and Portsmouth Water.

4.3.15 At the Applicant's Gate 2 submission Option B.4 was selected as the preferred option, and became the Proposed Development, and Option B.5 was selected as the back-up option.

4.3.16 Additionally, the Applicant's draft WRMP24 sets out that Option B.4 (the Proposed Development) is the selected SRO for the western supply area.

## 4.4 Proposed Development following Gate 2

4.4.1 Following Gate 2, the Proposed Development was progressed to further develop the components.

4.4.2 The preferred sites for the WRP and HLPS were selected using a site selection exercise that identified suitable parcels for the infrastructure and then evaluated these parcels against a range of environmental, planning, constructability and engineering considerations.

4.4.3 A number of potential pipeline routes were identified at Gate 2 for the Proposed Development. These were expanded into a pipeline corridor to allow for micro-siting and refinement of the pipeline route taking account of local constraints at later stages. The pipeline corridor was divided into sections so that each section could be evaluated and compared against other pipeline corridor sections. The outcome of this process would be the selection of a preferred 'chain' of corridors.

4.4.4 AGP zones for IPSs and BPTs that could be required along the length of the pipeline route were also identified. The zones were identified using hydraulic modelling and are wider areas of land in which an IPS or BPT could be sited.

4.4.5 The pipeline corridor sections, and AGP zones were then evaluated against a criteria which was developed by subject matter experts in consultation with stakeholders. The evaluation identified potential impacts pre- and post-mitigation of developing the pipeline within the pipeline corridor sections or locating an IPS or BPT within an AGP zone. The evaluation comprised of assessments from the following subject matter experts:

- Constructability
- Ecology and nature conservation
- Flood risk
- Geology and soils
- Historic environment
- Hydraulics and engineering
- Landscape and visual
- Socio-economics
- Special category land
- Water quality and resources

4.4.6 The pipeline corridor sections that were considered can be found in the Book of Maps that was presented at the public consultation in Summer 2022 for the Proposed Development. The evaluation resulted in a number of pipeline corridor sections not being progressed, and the selection of a preferred pipeline corridor which was considered to perform the best against the criteria. This preferred pipeline corridor evolved into the Scoping Area for the Proposed Development. A number of pipeline corridor sections were not progressed as they intersected with the South Downs National Park. Construction challenges were also identified in some pipeline corridor sections, especially those within populated areas and therefore further pipeline corridor sections were not progressed. The potential for introducing AGP as a result of topographical variation was also considered in the evaluation of pipeline corridor sections, as it was considered the effects of the AGP during the construction and operation phase would be greater than those for the pipeline. Therefore pipeline corridor sections that would introduce greater topographical variation were not progressed as a result of requiring IPS or BPT sites to support the flow of water in the pipeline.

4.4.7 To select sites for the proposed AGP, zones were identified within the pipeline corridor sections as potential areas where the AGP could feasibly be sited from an engineering perspective. The parameters used to identify the AGP zones were as follows:

- Hydraulics data;
- Emergency discharge availability/impact;
- Dimensions – land take/maximum envelope for the infrastructure;
- Proximity requirements, especially in relation to the pipeline;

- Access arrangements;
- Energy requirements;
- Other associated development required; and
- Operational details.

4.4.8 The identified zones were then assessed using the same evaluation criteria that was used for the pipeline corridor selection. Some of the AGP zones were not progressed on account of certain pipeline corridor sections not being progressed therefore meaning that AGP within these pipeline corridor sections were no longer required. Additionally, other AGP zones were not progressed as a result of their proximity to sensitive historic environment and ecological receptors.

4.4.9 It should be noted that following this EIA Scoping Report further scheme development will be undertaken that may introduce additional AGP within the Scoping Area as a result of developments in the pipeline route and further hydraulic modelling.

4.4.10 The outcome of the evaluation was the selection of the preferred pipeline corridor, a site for the proposed WRP, and AGP to support the scheme development process for the Proposed Development.

4.4.11 The preferred pipeline corridor, AGP zones and additional land for associated development is shown in Figures 1.1 and 1.2 in Volume III. This is referred to as the Scoping Area for the purpose of this Scoping Report. The Scoping Area will be refined further, through the scheme development and EIA processes, down to Order limits to be presented in the DCO.

# 5 EIA approach and methodology

## 5.1 The purpose and process of EIA

### Purpose

5.1.1 The purpose of the EIA process is to identify, describe and assess the direct, indirect, secondary, cumulative, transboundary, temporary, permanent, beneficial, and adverse likely significant effects of the Proposed Development on the environment. This is achieved by identifying the baseline conditions and understanding how these may change as a result of the Proposed Development to determine the potential impacts on the environment. Mitigation is considered and applied to avoid, prevent, or reduce any potential impacts, where appropriate. An assessment of the residual effects is carried out, after mitigation has been applied, which considers the magnitude of the impact (degree of change) and the importance, sensitivity or value of the impacted receptor or resource.

### Process

5.1.2 EIA is a process that is used to identify the likely significant effects that could occur as a result of a Proposed Development and is outlined in Planning Inspectorate (2020) Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements, (Version 7) [38]. The information gathered is taken into account by the decision making body when determining an application for consent. Three main EIA documents are produced as part of the DCO pre-application process:

- **EIA Scoping Report**: The EIA Scoping Report sets out the proposed scope of the EIA for the Proposed Development. It also presents the data collected so far and the proposed further surveys, data collection, assessment methodology and approach that will be used for the EIA. The EIA Scoping Report is issued to consultees by the Planning Inspectorate on behalf of the SoS for comment on the scope, methodology and approach proposed.
- **PEI Report**: The PEI Report sets out the information that ”*is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the development (and of any associated development)*” ((Regulation 12(2)(b) of the EIA Regulations 2017).
- **ES**: The ES presents the findings of the EIA undertaken for the Proposed Development. It sets out the likely significant effects that would result if the Proposed Development was implemented, and any proposed mitigation to reduce those likely significant effects. The ES is submitted as part of the application for development consent and is taken into account during the decision making process.

5.1.3 The EIA will be undertaken in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (“the EIA Regulations”) and in line with Planning Inspectorate (2020) Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and

Environmental Statements, (Version 7) [38]. The ES will provide the following relevant information as required under Section 14(2)(a)-(f) of the EIA Regulations:

- *"(a) a description of the proposed development comprising information on the site, design, size, and other relevant features of the development;*
- *(b) a description of the likely significant effects of the proposed development on the environment;*
- *(c) a description of any features of the proposed development, or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;*
- *(d) a description of the reasonable alternatives studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment;*
- *(e) a non-technical summary of the information referred to in sub-paragraphs (a) to (d); and*
- *(f) any additional information specified in Schedule 4 relevant to the specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected."*

### Guidance and advice

5.1.4 The approach to the EIA and the production of the ES will take account relevant guidance including:

*Planning Inspectorate Advice Notes*

- Planning Inspectorate (2017) Advice Note Three: EIA Notification and Consultation, (Version 7) [39]
- Planning Inspectorate (2020) Advice Note Seven: Environmental Impact Assessment: Process Preliminary Environmental Information and Environmental Statements, (Version 7) [38]
- Planning Inspectorate (2018) Advice Note Nine: Rochdale Envelope, (Version 3) [40]
- Planning Inspectorate (2020) Advice Note Twelve: Transboundary Impacts and Process, (Version 6) [41]
- Planning Inspectorate (2019) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects, (Version 2) [42]

*The Institute of Environmental Management and Assessment Guidance*

- IEMA (2016) EIA Shaping and Delivering Quality Development [43]
- IEMA (2017) Delivering Proportionate EIA [44]

## 5.2 EIA approach to assessment

5.2.1 EIA applies the conceptual 'source-pathway-receptor' model. The model is effective in the identification of potential effects and the means by which these can manifest themselves on the receiving environment and its sensitive receptors or resources. The aspects of this model are defined as follows:

- Source - the origin of a potential impact (e.g. construction activities).
- Pathway - the means by which the effect of the activity could impact a receptor or resource (e.g. through air, water, or ground).
- Receptor or resource - the element of the receiving environment that is impacted (e.g. terrestrial habitats, archaeology, or communities).

5.2.2 If the source, pathway, or receptor is absent, no linkage exists and thus there will be no potential for an impact to manifest, impacts can typically be scoped out from further assessment. However, at the scoping stage it is common that the project design may not yet be sufficiently advanced to enable adequate evidence to be provided to robustly scope out certain topics or impacts. In such cases, these will be carried forward to the ES stage.

5.2.3 Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements, (Version 7) [38] explains the EIA process set out in the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations). This chapter has taken the approach as set out in this advice note which states that the scoping process should be used to ensure that the EIA process is proportionate. The Planning Inspectorate will agree to 'scope out' from the need for further assessment aspects and matters where it is appropriate to do so. In order to support the Planning Inspectorate with this aim, Applicants should ensure that their requests include sufficient justification for scoping aspects/matters out. The justification should be evidence based and have reference to the assessment process.

5.2.4 The following section of this EIA Scoping Report sets out further detail on key aspects of the assessment methodology that will be applied in the EIA. The following general methodology will apply to all topic assessments undertaken unless otherwise specified within the individual topic methodologies presented in this report.

### Baseline and future conditions

5.2.5 To identify the effects of the Proposed Development on the environment, it is important to understand the environment that would be affected by it (the 'baseline conditions'). Understanding the baseline allows any changes that would be caused by the Proposed Development, to be predicted.

5.2.6 Environmental data to inform the EIA Scoping Report has been obtained primarily through desktop studies and some site surveys. Further studies, field surveys, public consultation and engagement with relevant stakeholders and statutory bodies will build upon and refine the baseline information reported in this EIA Scoping Report and will be reported in the ES.

5.2.7 It is essential for an EIA that data is obtained to form the basis of the assessment. Each topic chapter includes a description of the current (baseline) environmental conditions. This is based on the study area identified for each topic chapter and the information available.

5.2.8 The ES will present baseline information representing the conditions of the environment at the time of writing. The baseline year will be topic specific, depending on when the majority of baseline information has been obtained. . Further details of the baseline environment are provided within the individual environmental chapters of this EIA Scoping Report.

5.2.9 For certain topics the baseline environment is expected to change over time between now and when construction and operation of the Proposed Development will take place, and for these topics this change will be predicted to enable robust identification of the effects of the Proposed Development against a future baseline.

### Spatial and temporal scope

5.2.10 For each environmental topic to be covered, issues to be addressed, the distance from the proposed works to be considered (i.e. the spatial scope) and the periods in time when the issues would be assessed (i.e. the temporal scope) are set out. Consideration is given to effects that would arise during construction, operation, as well as maintenance therein and decommissioning including temporary, permanent, direct, indirect, cumulative and in-combination effects (see Chapter 19 Cumulative effects assessment for further information).

#### *Spatial scope*

5.2.11 The Scoping Area is illustrated in Figure 1.2 within Volume III, and includes all land being considered for the purposes of the Proposed Development. Figure 1.2 constitutes "*a plan sufficient to identify the land*" for the purposes of this EIA Scoping Report. It represents the maximum extent of land that could be required for temporary or permanent purposes in order to construct, operate and maintain the Proposed Development.

5.2.12 This allows for consideration of the potential environmental effects of the Proposed Development, to ensure that the likely significant effects are scoped into the assessment. The land required for the Proposed Development, within the envelope of the Scoping Area, will be refined as design work progresses, considering environmental and technical factors, and consultation feedback.

5.2.13 The location of the temporary construction hub (as described in Chapter 3 Description of the Proposed Development) is not known at this time. The temporary construction hub will be brought into the assessment process once the final location has been confirmed. Where the location of the temporary construction hub falls outside of the Scoping Area, potential effects will be screened and assessed as appropriate, including through further fieldwork.

5.2.14 The geographical extent of the study area will generally be greater than the Scoping Area and will vary depending on the environmental topic and specific receptors or resources under consideration for that topic. For each topic, the study area proposed is of sufficient size to encompass the spatial extent over which

impacts relevant to that topic and the related receptors or resources might operate. The study areas will be refined by reference to the Order Limits, once determined.

5.2.15 The approach to the spatial scope (study area) for each topic assessment has taken into account the following factors:

- The physical extent of the Proposed Development
- The nature of the baseline environment
- The type, extent, and characteristics of the environmental and social effects
- Relevant guidance, best practice and/or legislation

*Temporal scope*

5.2.16 The EIA will predict the changes (effects) to the current and future baseline during the construction, operation and decommissioning phases of the Proposed Development The approach to assessment will be to assess the environmental impacts of the Proposed Development at key stages in its construction, operation, and eventual end of life decommissioning.

5.2.17 The assessment scenarios to be considered within the EIA are as follows and summarised in Table 5-1:

- **Existing baseline (without the Proposed Development)**: the baseline is the reference level of the environmental conditions without implementation of the Proposed Development, against which the potential effects of the Proposed Development are to be assessed.
- **Future baseline (without the Proposed Development)**: for comparison with the construction, operation and decommissioning stages of the Proposed Development, as described below.
  - The future baseline conditions are not necessarily the same as those that exist at the current time; they are the conditions that would exist in the future in the absence of the Proposed Development. For the purposes of the EIA the following future baseline years will be considered (a) a year at the time that construction is expected to start, for impacts arising from construction, and (b) a year during the operational phase of the Proposed Development, for impacts arising from the operation. . However, alternative or additional future baseline years will be considered if required in order to undertake a robust realistic worst case assessment for a particular environmental topic. Therefore, the identification of the future baseline conditions involves predicting changes that are likely to happen between now and the relevant future baseline year, for reasons unrelated to the Proposed Development. This entails taking current conditions and committed development into consideration and using experience and professional judgment to predict what the future baseline conditions might look like prior to start of construction and operation.
  - When describing the future baseline scenario for each environmental topic (i.e. the future conditions without the Proposed Development in place) within the respective topic chapters, the current baseline will be extrapolated to take account of predicted or anticipated change factors including, but not limited to, changes caused by changing climatic conditions, policy,

legislation, urban development, advances in technology and by other planned infrastructure projects, to provide a description of the likely changes to the baseline environment over an appropriate timescale that can be supported by appropriate datasets and modelling.

- **Construction phase**: these are effects that are likely to occur as a result of the construction phase of the Proposed Development, both during construction and after construction as a result of the physical presence of the Proposed Development. This will include effects resulting from the activities associated with installation of the Proposed Development, effects associated with the temporary works such as access tracks, haul roads, construction compound areas and work activities, as well as commissioning. Construction is anticipated to undertaken over a period of five to six years with the intensity and scale of construction along the route varying over this period. The ES will set out the anticipated construction programme establishing the likely duration of works in each location. The assessment of construction effects will then relate to the programme described. ES topic chapters will assess a 'reasonable worst case' construction scenario, representing the 'peak' of activity within the construction programme.
- **Operational phase**: these are effects that are likely to occur as a result of the operation and maintenance of the Proposed Development. Operation is anticipated to start following completion of construction in year five to six. It is assumed that the Proposed Development would have a minimum life cycle of 100 years (see Chapter 3 Description of the Proposed Development). Maintenance activities would be as authorised under the DCO and would follow industry standards control measures. With the implementation of these measures no significant effects are considered likely for maintenance activities.
- **Decommissioning phase**: the Proposed Development at the end of its useful life when it ceases to be operational. Effects from decommissioning of the Proposed Development are expected to be no greater than those identified during the construction phase and are therefore assessed as being the same as construction effects as a realistic worst case scenario. Please refer to Chapter 3 Description of the Proposed Development, section 3.7 for further information on decommissioning.'

**Table 5-1: Assessment scenarios to be considered in the Environmental Statement**

| **Existing baseline 2022/2023** | |
|---|---|
| **Without Proposed Development** | **With Proposed Development** |
| **Future Baseline 1**<br>The conditions that would exist in the absence of the Proposed Development, taking into account changes that are likely to happen between now and the future baseline year linked to the time that construction is expected to start, for impacts arising from **construction**. | **Construction phase**<br>These are effects that are likely to occur as a result of the construction phase of the Proposed Development. Construction works are anticipated to be undertaken over five to six years. A 'reasonable worst case' construction scenario will be assessed, and where necessary, the relevant period or 'peak' of activity within the construction programme. |

| Existing baseline 2022/2023 | |
|---|---|
| **Future Baseline 2**<br>The conditions that would exist in the absence of the Proposed Development at the time that the Proposed Development is expected to operate, for impacts arising from the **operation** of the Proposed Development, taking into account changes that are likely to happen between now and this future baseline year. | **Operational phase**<br>These are effects that are likely to occur as a result of the operation and maintenance of the Proposed Development.<br>It is assumed that the Proposed Development would have a minimum life cycle of 100 years. |
| **Future Baseline 3**<br>The conditions that would exist in the absence of the Proposed Development, taking into account changes that are likely to happen between now and the future baseline year, linked to the time that decommissioning would be expected to start, for impacts arising from the **decommissioning** of the Proposed Development. | **Decommissioning phase**<br>These are effects that are likely to occur as a result of the decommissioning of the Proposed Development assessed as being construction effects as a realistic worst case scenario. . |

5.2.18 The Applicant is not seeking a time limited consent. The operational life of the Proposed Development will not be specified within the DCO. Therefore, the ES as a worst case, assesses the permanent effects of the operational phase.

5.2.19 The environmental assessments will use defined temporal scales to characterise the duration of potential effects. For the purposes of assessment, the following definitions are applied unless otherwise defined in the specific topic chapter. These are based on professional judgement and the characteristics of the Proposed Development.

- **Short-term**: This is assumed to be a duration of six years, which covers construction plus one-year reinstatement.
- **Medium-term**: This is assumed to follow the construction phase and is based on a duration of 2-15 years post construction.
- **Long-term**: This is assumed to describe effects with a duration that extends longer than 15 years post construction.

5.2.20 The temporal nature of effects may extend longer than the phase in which the effects originally occur. For example, effects as a result of vegetation clearance during construction may be experienced for a number of years after construction has been completed, until any replanted habitats have matured. For the purposes of the EIA, the effects are described under the phase within which the impact arises, (i.e. in the above example, vegetation loss assessed for the construction phase).

### Assessment of likely significant effects

5.2.21 The EIA process requires the identification of the likely significant effects of the Proposed Development, as required by the EIA Regulations. This includes

consideration of the likely significant effects during the construction, operational and decommissioning phases of the Proposed Development.

5.2.22 The assessment of the significance of effects for the majority of topics will be based on a three-step process:

- Assigning value (or sensitivity) of receptors or resources
- Assigning magnitude of impact
- Assigning significance

5.2.23 The methodology is designed to consider whether the construction and operation of the Proposed Development would have likely significant effects on any receptors or resources. Where appropriate, a matrix approach is applied to frame and present the judgements and conclusions made. This involves combining elements of topic-specific receptor or resource sensitivity and magnitude of impact to determine the significance of effects resulting from the Proposed Development.

*Assigning receptor or resource value (or sensitivity)*

5.2.24 Receptors or resources are environmental features that have the potential to be affected by the Proposed Development, either beneficially or adversely. The ability of a receptor or resource to adapt to change, tolerate, and/or recover from potential impacts will be key in assessing its value (or sensitivity). The value (or sensitivity) of receptors or resources is an important consideration in the EIA process, and takes into account whether, for example, the receptor or resource is rare, or has protected or threatened status. In some instances the value (or sensitivity) of a receptor or resource may be prescribed in topic specific guidance.

5.2.25 Value (or sensitivity) is defined within each topic chapter and takes into account factors including the following:

- Vulnerability of the receptor or resource to change
- Recoverability of the receptor or resource (e.g. is the change reversible or irreversible, permanent or temporary)
- Importance of the receptor or resource

5.2.26 As a basic guide, the definitions of the value (or sensitivity) levels for a generic receptor or resource are given in Table 5-2.

**Table 5-2: Example definitions of value (or sensitivity) for a generic receptor or resource**

| Value (or sensitivity) | Description |
|---|---|
| High | Very high and high importance and rarity, international / national scale (for example internationally or nationally protected site) |
| Medium | Medium importance and rarity, regional scale (for example regionally protected site) |
| Low | Low importance and rarity, local scale |
| Negligible | Not considered to be important (for example common or widespread) |

5.2.27 The overall receptor or resource value (or sensitivity) is determined by considering a combination of value, adaptability, tolerance and recoverability. Expert

judgement is particularly important when determining the value (or sensitivity) of receptors or resources.

*Determining magnitude of impact*

5.2.28 Impacts caused by a given effect can be either adverse or beneficial. The magnitude of the impact on receptors or resources will be reported within the ES. Magnitude refers to the 'size' or 'amount' of an impact on a receptor or resource and is typically defined by four factors:

- Extent – the area over which an effect occurs
- Duration – the time for which the effect occurs
- Frequency – how often the effect occurs
- Severity – the degree of change relative to existing environmental conditions

5.2.29 The general definitions of the magnitude of impact for a receptor or resource are included in Table 5-3, which notes adverse and beneficial changes. Where relevant, individual topic chapters set out variations in magnitude description requirements.

5.2.30 For each topic, the likely environmental impacts will be identified within the ES. The likely environmental impacts arising from the Proposed Development will be identified and compared with the baseline (the situation without the Proposed Development) and where appropriate the future baseline. Impacts are divided into those occurring during the construction and operation phases.

**Table 5-3: Example definitions of magnitude of impact for a generic receptor or resource**

| Magnitude of impact | | Definition |
|---|---|---|
| Major | Adverse | Loss of receptor or resource and/or quality and integrity of receptor or resource; severe damage to key characteristics, features or elements. |
| | Beneficial | Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality. |
| Moderate | Adverse | Loss of receptor or resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements. |
| | Beneficial | Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality. |
| Minor | Adverse | Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements. |
| | Beneficial | Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring. |
| Negligible | Adverse | Very minor loss or detrimental alteration to one or more characteristics, features or elements. |
| | Beneficial | Very minor benefit to or positive addition of one or more characteristics, features or elements. |

*Assessment of significance*

5.2.31 Subsequent to establishing the receptor or resource sensitivity and magnitude of impact, the significance of effect will be predicted by using quantitative or qualitative criteria, as well as professional judgement to ensure a robust assessment. Where appropriate, a matrix such as the one presented in Table 5-4 will be used to aid the assessment of effect significance based on expert judgement, latest guidance and any specific input from consultation.

5.2.32 However, a description of the approach taken to the assessment and interpretation of significance levels (neutral to major) will be provided within each chapter on a topic-by-topic basis. This approach will ensure that the definition of significance of effect is transparent and the approach taken is relevant to and appropriate for each topic under consideration.

**Table 5-4: Significance of effect matrix**

| | | **Magnitude of impact** | | | |
|---|---|---|---|---|---|
| | | **Major** | **Moderate** | **Minor** | **Negligible** |
| **Sensitivity (Value) of receptor or resource** | **High** | **Major** | **Major** | **Moderate** | Minor |
| | **Medium** | **Major** | **Moderate** | Minor | Minor |
| | **Low** | **Moderate** | Minor | Minor | Neutral |
| | **Negligible** | Minor | Neutral | Neutral | Neutral |

5.2.33 Neutral, minor, moderate or major effects may be beneficial or adverse. Except where guidance requires otherwise, the significance of effect is described using the terms **neutral, minor, moderate or major**. Significant effects are generally defined as those where the significance of the effect is 'moderate' or greater. Effects determined to be minor or neutral are deemed ‘non-significant’ and as such are not reported in detail in the ES and do not require specific mitigation. The exception to this is where the combination of multiple slight effects has the potential to lead to a significant (i.e. moderate or above) cumulative effect.

5.2.34 Not all environmental topics use the above approach. For example, some topics such as Noise and vibration do not use a matrix-based approach but instead use numerical values to identify impacts. The approach for each environmental topic is defined in the relevant chapter.

5.2.35 In some instances, the assessment may conclude that there is no effect on a receptor or resource. This may occur where it was not possible based on the information available to scope an effect or receptor or resource out at the scoping stage of the EIA (i.e. in this EIA Scoping Report). However, it should be noted that ‘no effect’ has not been included in the significance matrix above and as such these effects would be presented as ‘neutral’.

### The Rochdale Envelope

5.2.36 In assessing the effects of the scheme from an environmental perspective, the principle of the 'Rochdale Envelope' will be applied, in accordance with Planning Inspectorate (2018) Advice Note Nine: Rochdale Envelope, (Version 3) [40]. The advice note states:

*"The 'Rochdale Envelope' approach is employed where the nature of the Proposed Development means that some details of the whole project have not been confirmed (for instance the precise dimensions of structures) when the application is submitted, and flexibility is sought to address uncertainty."*

5.2.37 The assessment will therefore be based on a realistic worst-case approach. The assessment will establish those parameters likely to result in the realistic worst case approach and be undertaken accordingly to determine significance.

### Approach to mitigation

5.2.38 The EIA Regulations require an ES to include a description of the measures envisaged to avoid, prevent, or reduce and, if possible offset likely significant adverse effects on the environment.

5.2.39 In broad terms, the EIA and design shall incorporate mitigation measures following a hierarchical system as follows:

- Avoidance and prevention: design and mitigation measures to prevent the effect (e.g. alternative design options or avoidance of environmentally sensitive sites).
- Reduction: where avoidance is not possible, then mitigation is used to lessen the magnitude of impact or significance of effects.
- Remediation: where it is not possible to avoid or reduce a significant adverse effect, these are measures to offset the effect.

5.2.40 For the purposes of the EIA, mitigation has been defined using IEMA's guidance, Delivering Quality Development [45], as falling into three categories:

- **Primary (inherent) mitigation**: Modifications to the location or design of the Proposed Development which are an inherent part of the design for the purpose of avoiding, preventing or minimising likely significant adverse environmental effects. For example, reducing the height of a development to reduce visual impact; identifying a key habitat that should remain unaffected. Where adverse effects can be reduced to acceptable levels through evolution of the Proposed Development design (primary mitigation), this will be identified within the ES.
- **Secondary (foreseeable) mitigation**: Further measures or actions required to reduce likely significant adverse environmental effects. For example, planting trees to screen views where a development is visually intrusive, or replacement of a feature that would be lost such as the creation of hedgerows to replace those that cannot be avoided. These measures will be identified during the EIA process to further prevent, reduce and, where possible, offset any adverse effects on the environment and will be described in the relevant topic chapters.
- **Tertiary (inexorable) mitigation:** Measures to reduce reasonably foreseeable impacts that are undertaken to meet existing legislative requirements, or

actions that are considered to be standard best practices used to manage commonly occurring environmental effects. For example, considerate contractors' practices that manage activities which have potential nuisance and environmental effects, such as the spillage of fuels, oils or other chemicals. Each ES topic chapter will describe standard measures identified to be adopted during construction and operation to avoid and reduce environmental effects, such as pollution control measures.

5.2.41 The ES will report on the likely significant effects of the Proposed Development following the implementation of primary (inherent) mitigation. The ES will then report on the likely significant effects of the Proposed Development following the implementation of secondary (foreseeable) mitigation and tertiary (inexorable) mitigation, which are known as 'residual effects'. A clear statement will be made as to whether the residual effects are significant or not significant. It should be reiterated that not all such effects will be adverse and some will be beneficial.

5.2.42 Proportionate monitoring of associated mitigation measures will be proposed where appropriate, to monitor the effectiveness of the mitigation.

*Implementation and enforcement of mitigation*

5.2.43 Mitigation will be secured by way of requirements in the DCO or through other appropriate control mechanisms. Measures secured by way of DCO requirements or other control mechanisms will be required to be implemented in accordance with the DCO.

5.2.44 A number of management plans will be produced with iterations as detail design develops and will be secured and delivered through the DCO.

5.2.45 Contractors at detailed design and construction will be legally obliged to comply with the requirements of the DCO and other appropriate control mechanisms.

### Environmental enhancement

5.2.46 In addition to mitigation, opportunities to incorporate environmental enhancements and net gain will be explored, not just offsetting but improving the receiving environment and community. Enhancement is defined as measures taken to achieve a net benefit, which are unrelated to an adverse impact or which go beyond that required to mitigate/compensate for an impact. For example, restoration of a degraded habitat to leave it in a measurably better state than it was before the Proposed Development, or other interventions to leave a positive legacy for the community.

5.2.47 Enhancement opportunities will be considered throughout the design development and will be reported within the ES topic chapters.

### In-combination effects

5.2.48 Regulation 5(2)(e) of the EIA Regulations requires that the ES considers the interaction between population and human health, biodiversity, land, soil, water, air and climate, material assets, cultural heritage and the landscape associated with a Proposed Development. In-combination effects are those that result from the interaction between the individual effects of the Proposed Development (i.e.

interaction of environmental aspects such as air quality, noise, health etc), combined together on a single receptor or resource at a single point in time. The interaction between the individual effects may combine to result in a significant effect, even where the individual effects were not significant. In-combination effects will be considered within each individual ES topic chapters.

### Cumulative effects assessment

5.2.49 As outlined in Schedule 4 paragraph 5(e) of the EIA Regulations, the ES is required to consider "*the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources*". Cumulative effects of the Proposed Development together with the effects of other developments/schemes may result in significant effects. This may be the result of effects on the environment during construction or operation of the Proposed Development.

5.2.50 Further details can be found in EIA Scoping Report Chapter 19 Cumulative effects assessment, which provides an overview of the approach to undertaking the cumulative effects assessment (CEA) which follows the guidance set out in Planning Inspectorate (2019) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects, (Version 2) [42].

### Transboundary effects

5.2.51 Regulation 32 of the EIA Regulations establishes the procedural duties necessary where the SoS is of the view that a Proposed Development is likely to have significant effects on the environment in an European Economic Area (EEA) State; or where an EEA State is of the view that its environment is likely to be significantly affected by a Proposed Development. Planning Inspectorate (2020) Advice Note Twelve: Transboundary Impacts and Process, (Version 6) [41] sets out the procedures for transboundary notification and consultation associated with DCO applications for development consent under the PA 2008.

5.2.52 Consideration has been given to the potential for transboundary effects on EEA States as a result of the Proposed Development in relation to each of the topic areas and the extent of effects for their receptors. There are no physical works or impacts likely to extend beyond the jurisdiction of the UK. There are no pathways by which impacts could be spread via air and water (such as rivers and the sea), hence there are no anticipated effects are likely impact an EEA state. No such transboundary effects have been identified in relation to the Proposed Development, as there is no pathway for effects to occur outside the UK.

## 5.3 Consultation and engagement

5.3.1 The DCO process requires consultation and stakeholder engagement as part of the progression of the Proposed Development. Decision-making will have regard to feedback from both statutory consultees, as defined in PA 2008, and the local community through an extensive programme of engagement and consultation. The

EIA process will have regard to issues raised through engagement and consultation where they are relevant to the matters covered in the EIA.

5.3.2 The main aims of consultation and engagement from an EIA perspective are as follows:

- Ensuring that statutory consultees, other bodies with a particular interest in the environment or the Proposed Development, and members of the public are informed of the proposals and provided with an opportunity to comment.
- Supplementing baseline information.
- Obtaining input to the identification of potential impacts and the development of appropriate mitigation.
- Informing the scope of the environmental assessments.
- Seeking consultee feedback on the design of the Proposed Development.

5.3.3 The Applicant's approach to consultation and engagement will seek to be collaborative, with opportunities to properly engage and provide confidence that feedback from consultation have been analysed and taken into account.

5.3.4 Five EIA Working Groups have been set up by the Applicant to facilitate engagement with statutory consultees through the progression of the EIA for the DCO application. It is intended that this engagement will support the EIA process by enabling feedback to be provided on an ongoing basis on scheme development for the Proposed Development, baseline data, assessment methodology, impact significance and potential mitigation measures and monitoring requirements. Further information on engagement is provided in each relevant topic chapter.

5.3.5 Public consultation was undertaken between 5 July and 16 August 2022 to consult the public and stakeholders about the Proposed Development.

## 5.4 Competent experts

5.4.1 In accordance with Regulation 14(4) of the EIA Regulations, a Statement of Competence will be included within the ES, outlining the relevant expertise or qualifications of the experts who prepared the ES.

## 5.5 Duplication of assessment

5.5.1 The EIA will be undertaken taking into account other relevant environmental assessments, with a view to avoiding duplication of assessment.

### Habitat Regulation Assessment

5.5.2 A Habitat Regulation Assessment will be undertaken for all protected sites within the national site network, in accordance with the Conservation of Habitats and Species Regulations 2017. The national site network includes existing Special Areas of Conservation and SPA. Further details on the protected sites considered in the assessment are provided in EIA Scoping Report Chapter 8 Terrestrial and freshwater biodiversity and Chapter 9 Marine biodiversity.

### Water Framework Directive Compliance Assessment

5.5.3 A Water Framework Directive (WFD) Compliance Assessment will be undertaken, in accordance with the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017. This will consider the extent to which the Proposed Development could impact on the current and future target WFD status of water bodies. The assessment will follow the three-stage screening/scoping and detailed assessment approach outlined in Planning Inspectorate (2017) Advice Note Eighteen: The Water Framework Directive, (Version 1) [46]. The WFD assessment outcomes will be used to inform the EIA and will help identify effects which could prevent WFD objectives from being met and require mitigation. Further details are provided in EIA Scoping Report Chapter 18 Water environment (including flood risk).

### Flood Risk Assessment

5.5.4 A Flood Risk Assessment will be undertaken to consider the influence of the Proposed Development on local flooding, in accordance with NPPF [5], Planning Practice Guidance, Ministry of Housing, Communities and Local Government (revised in 2021) [47] and associated Flood Risk and Coastal Change guidance [48] . Further details are provided in EIA Scoping Report Chapter 18 Water environment (including flood risk).

### Biodiversity Net Gain

5.5.5 In line with the NPSWRI [4], published April 2023 and the Environment Act 2021, Biodiversity Net Gain (BNG) will be incorporated through the design process to achieve 10% BNG. BNG is not within the scope of the EIA, however, it will be reported as part of the ES, through the inclusion of a technical appendix.

# 6 Air quality and odour

## 6.1 Introduction

6.1.1 This chapter outlines out the scope and methodology for the assessment of the potential likely significant effects arising from the construction, operation and decommissioning of the Proposed Development on air quality and odour.

6.1.2 Air quality and odour aspects considered within this chapter for the Proposed Development include:

- **Human health receptors**: including residential properties and locations of susceptible populations such as schools, hospitals and care homes.
- **Designated habitats**: including internationally, nationally and locally designated sites, ancient woodland and veteran trees.

6.1.3 This chapter should be read with the following linked chapters:

- Chapter 17 Traffic and transport determined the traffic impacts in relation to the Proposed Development that will then be considered further in the air quality assessment to evaluate the impact of a Proposed Development on air quality.
- Chapter 8 Terrestrial and freshwater biodiversity covers potential impacts on designated sites, habitats, protected and notable species, and invasive non-native species (INNS), which could be affected by changes air quality.
- Chapter 16 Socio-economics, tourism, recreation and health discusses potential impacts in these areas that may be affected by changes in air quality.

## 6.2 Legislation, policy and guidance

6.2.1 The relevant legislation, policies and guidance which underpin the assessment methodology for air quality and odour and inform the scope of the assessment are listed in this section. It is recognised that this list is non-exhaustive and will be kept under review to take account of any later legislation or policy changes.

### Legislation

6.2.2 The scoping assessment has been carried out in accordance with relevant legislation and policy which will also apply to the future EIA assessment:

- The European Union (EU Withdrawal Agreement) Act 2020 which implements the EU limit values, which are legally binding EU parameters set for individual pollutants that must not be exceeded
- Regulations implementing national air quality objectives (AQO): Air Quality (England) Regulations 2000 and Air Quality (England) (Amendment) Regulations 2002
- Air Quality Standards Regulations 2010
- The Environment Act 2021
- Environmental Permitting (England and Wales) Regulations 2016 (as amended)

- Environment Protection Act 1990, Section 79

### National policy

6.2.3 The relevant national policy includes:

- NPSWRI [4]
  - Air Quality: Paragraphs 4.2.3 to 4.2.14. Section 4.2 of the NPSWRI focuses on air quality considerations in water resources infrastructure projects. It highlights the potential adverse impacts on human health, wildlife, and the environment. The section references relevant UK legislation, commitments to reduce air pollutants, and strategies for improving air quality. The applicant is required to assess air quality effects and describe them in the ES, while mitigating measures should be implemented to minimise impacts. The SoS must ensure that necessary mitigation is in place and consider air quality targets and limits. Development consent may be refused if the proposed development would lead to non-compliance with air quality standards (AQS) or hinder the achievement of emission targets.
  - Dust, odour, artificial light, smoke, and steam: Section 3.7, paragraphs 4.6.4 to 4.6.8. Section 4.6 of the NPSWRI outlines the process for considering the effects of dust, odour, artificial light, smoke, and steam in water resources infrastructure projects. The applicant is required to assess these emissions and include the assessment in the PIE and EIA. Mitigation measures should be implemented to minimise the impact on amenity. The SoS is responsible for ensuring the implementation of necessary mitigation and considering the impact on amenity, including light pollution. If development consent is granted, the authorised project may benefit from a defence of statutory authority against nuisance claims.
- NPPF [5]
  - Promoting sustainable transport: Section 9, paragraph 105.
  - Ground conditions and pollution: Section 15, paragraph 186.
- Planning Practice Guidance (PPG) – paragraph 005 [50]
- Clean Air Strategy – Chapter 2 [51]
- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland [52]
  - AQO and Pollutants: Chapter 2, Table 2 defines the objectives for different pollutants.
- Environment Improvement Plan 2023 [53]

### Local policy

6.2.4 The relevant local policies listed in Table 6-1, may be considered both important and relevant to the assessment of air quality and odour. In the event that there is any conflict between these and the NPSWRI, the NPS would prevail.

**Table 6-1: List of relevant local policy – Air quality and odour**

| Local authority | Relevant local Policy |
|---|---|
| EHDC | East Hampshire District Local Plan: Joint Core Strategy (2014) [6] |

| Local authority | Relevant local Policy |
|---|---|
| | • CP27 Pollution |
| EBC | Eastleigh Borough Local Plan 2016-2036 (2022) [9]<br>• Policy DM8 Pollution |
| FBC | Fareham Local Plan 2037 (2023) [12]<br>• Policy NE8: Air Quality |
| HBC | Havant Borough Core Strategy (2011) [17]<br>• DM10 - Pollution<br>• DM12 – Mitigating the Impacts of Travel |
| PCC | Portsmouth Plan (The Portsmouth Core Strategy) (2012) [54]<br>• PCS14: A Healthy City<br>Air Quality and Air Pollution Supplementary Planning Document (2006) [55] |
| WCC | Winchester District Local Plan Part 1 Joint Core Strategy (2013) [56]<br>• Policy DS1 - Development Strategy and Principles<br>Air Quality Supplementary Planning Document (2021) [57] |
| SDNPA | South Downs Local Plan (2019) [58]<br>• Policy SD54: Pollution and Air Quality |

### Guidance and standards

6.2.5 Relevant guidance and standards which have been used as part of the scoping process are listed below and will also be taken into account as part of the EIA:

- EA (2011) H4 Odour Management – how to comply with your environmental permit [59]
- IAQM (2018) Guidance on the assessment of odour for planning (Institute of Air Quality Management [60]
- EA (2016, updated in 2023) Air emissions risk assessment for your environmental permit [61]
- Department for Environment Food and Rural Affairs (Defra) (2022) Local Air Quality Management Technical Guidance (TG22) [62]
- IAQM (2014, updated in 2016) Guidance on the Assessment of Dust from Demolition and Construction [63]
- IAQM (2018) Guidance on the Assessment of Odour for Planning [60]
- IAQM & Environmental Protection UK (EPUK) (2017) Land-Use Planning & Development Control: Planning for Air Quality [64]
- IAQM (2020) A Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites [65]
- Joint Nature Conservation Committee (JNCC) (2021) Guidance on Decision-making Thresholds for Air Pollution: Main Report and Technical Report [66]
- National Highways (2019) Design Manual for Roads and Bridges (DMRB) LA105: Air quality [67]

6.2.6 The pollutants of concern in the context of the air quality assessment are $NO_2$ and Particulate Matter ($PM_{10}$ and $PM_{2.5}$), as these pollutants are most likely to be

present in ambient air at concentrations close to or above the air quality criteria in locations likely to have 'relevant exposure', i.e., where members of the public are exposed for periods equal to or exceeding the averaging periods set for the standards. For this assessment, in accordance with IAQM & EPUK 2017 guidance, locations of relevant exposure will include building facades of residential properties, and relevant schools and medical facilities. Air quality thresholds relevant to the air quality assessment are summarised in Table 6-2.

**Table 6-2: Air Quality Strategy Objectives (England) for the purpose of local air quality management**

| Pollutant | AQO | | To be achieved by |
|---|---|---|---|
| | Concentration (μg.m$^{-3}$) | Measured as* | |
| Nitrogen dioxide ($NO_2$) | 200 | 1-hour mean not to be exceeded more than 18 times per year | 31/12/2005 |
| | 40 | Annual mean | 31/12/2005 |
| Particles ($PM_{10}$) | 50 | 24-hour mean not to be exceeded more than 35 times per year | 31/12/2004 |
| | 40 | Annual mean | 31/12/2004 |
| Particles ($PM_{2.5}$) | 10** | Annual mean (target) | 2040** |
| | 15% cut in annual mean (urban background exposure) | Annual mean | 2010-2020 |
| | 35%** cut in annual mean (urban background exposure) | Annual mean | 2040 |
| *The way the Objectives are to be measured is set out in the UK Air Quality (England) Regulations 2000<br>** New environmental targets required by Section 1 of the Environment Act adopted in January 2023 | | | |

6.2.7 There is no statutory guidance relevant to odour releases from unregulated sites (where emissions of odour are likely to be indeterminable and/or fugitive in nature), those that are exempt from the Environmental Permitting Regulations, or what constitutes a statutory nuisance. Non statutory guidance has been published by several professional and industrial bodies with assessments conducted in the UK following an approach of customs and practice set by case-law precedent. Therefore, any likely impacts arising from odour emissions from the Proposed Development will be determined in line with the guidance provided by the IAQM [60]. Together with guidance contained in the Scottish Environment Protection Agency (2010) Odour Guidance 2010 [68].

## 6.3 Engagement

6.3.1 The following stakeholders have responsibility for aspects of the Air quality and odour assessment and will continue to be engaged as part of the EIA process:

- East Hampshire District Council (EHDC)
- Eastleigh Borough Council (EBC)

- Fareham Borough Council (FBC)
- Hampshire County Council (HCC)
- Havant Borough Council (HBC)
- Portsmouth City Council (PCC)
- South Downs National Park Authority (SDNPA)
- Winchester City Council (WCC)
- National Highways (NH)
- Natural England (NE)
- Environment Agency (EA)

6.3.2 Technical engagement is already underway through EIA Working Groups that have been established for the Proposed Development. For this topic, the Emissions and Transport EIA Working Group has been established and three meetings have already taken place with this group to inform the development of the Proposed Development and this EIA Scoping Report.

6.3.3 An introductory meeting was held with this group on 14 June 2022. This was attended by representatives from EBC, FBC, HCC, PCC, EHDC, WCC, SDNPA, NH, EA and NE. An introduction to the proposed approach, key risks, and receptor types for this chapter, including South Downs National Park was presented. Stakeholders were informed of the proposed methodology for the EIA.

6.3.4 A further meeting was held on 7 September 2022 attended by the representatives as listed for the introductory meeting. The results of the scoping study were presented, and the methodology proposed for the EIA discussed and presented to the Working Group.

6.3.5 Following the close of Public Consultation in 2022, between 5 July and 16 August, all stakeholder and consultee feedback has been reviewed. There were no comments received directly relating to this topic as it was not a focus area of the consultation.

6.3.6 A recent EIA Working Group meeting was held on 8 June 2023, where the results of the scoping study were presented following updates to the Proposed Development. The methodology proposed for the EIA was discussed and presented to the Working Group. This was attended by representatives from EBC, FBC, HCC, PCC, EHDC, WCC, SDNPA, NH, EA, and NE.

6.3.7 Further Working Group meetings will take place throughout the DCO pre-application process to provide updates on the Proposed Development and the air quality and odour assessment.

## 6.4 Approach to scoping

### Study area

6.4.1 The Proposed Development lies within the administrative areas of EBC, EHDC, FBC, HBC, PCC, SDNPA, and WCC.

6.4.2 In the absence of detailed traffic data and construction proposals at the time of writing this EIA Scoping Report, it is assumed at the scoping stage that the air

quality study area, would not extend more than 1km from the Scoping Area. This study area will be reviewed during the EIA following assessment of traffic data and development of construction proposals. Section 6.7 sets out how the study area will be defined for the EIA and presented at the ES. The study area considered for this Scoping Report is shown on Figure 6.1 in Volume III.

6.4.3 The study areas to be used for assessment will be defined as follows:

- Construction phase dust and particulate matter emissions:
  - Human receptors within 350m of the construction works boundary and within 50m of routes used by construction vehicles (for routes used by construction-generated traffic up to 500m from the construction works boundary).
  - Ecological receptors within 200m of the construction works boundary and within 50m of routes used by construction vehicles (for routes used by construction-generated traffic up to 500m from the construction works boundary).
- Construction phase Non-Road Mobile Machinery (NRMM) emissions:
  - Human and ecological receptors within 200m of the construction works boundary where NRMM will be located.
- Construction phase road traffic emissions:
  - Human and ecological receptors within 200m of all roads that trigger the traffic screening criteria and adjoining roads within 200m, referred to as the Affected Road Network (ARN).

6.4.4 The locations of the temporary construction hub (as described in Chapter 3 Description of the Proposed Development) and temporary site compounds are not known at this time of writing. This is expected to be an existing consented site and may be situated outside of the Scoping Area. The effects of air quality on the hub will be assessed as part of the air quality assessment.

### Sources of baseline data

6.4.5 Information on existing ambient air quality and identification of potential air quality constraints to the Proposed Development have been determined through reference to the sources identified in Table 6-3.

**Table 6-3: Source of baseline data – Air quality and odour**

| Baseline data | Source of data |
|---|---|
| Air quality monitoring data collected by local authorities within the air quality study area and baseline information | EBC, 2020 Air Quality Annual Status Report [69] and 2022 monitoring data from EBC website [70]<br>EHDC, 2021 Combined Air Quality 2020 and 2021 Annual Status Report [71]<br>Fareham and Gosport Borough Councils, 2022 Air Quality Annual Status Report [72]<br>HBC, 2020-2021 Air Quality Annual Status Report [73]<br>PCC, 2020 Air Quality Annual Status Report [74]<br>WCC, 2022 Air Quality Annual Status Report [75] |

| Baseline data | Source of data |
|---|---|
| Background pollutant mapping data | Defra 1km x 1km background pollution mapping [76] |
| Defra UK AIR Information Resource | Air Quality Management Area (AQMA) Interactive Map [77]<br>PCM modelling data |
| Magic GIS resource | Designated ecological site information [78] |

6.4.6 A constraints map for the Proposed Development air quality study area is shown in Figure 6.1 in Volume III. The figure shows the Scoping Area for the Proposed Development, boundaries of AQMA, relevant ecological designated sites, Pollution Climate Mapping (PCM) model data and monitored data by local authorities.

## 6.5 Baseline conditions

6.5.1 The baseline conditions within the study area (rather than at each project component) for the Proposed Development are discussed in this section.

### Air Quality Management Areas

6.5.2 A review of the Defra UK AIR AQMAs Interactive Map [77], shows that within the study area there are two statutory AQMAs (Eastleigh No.2 and Portsmouth AQMA No.9) declared by EBC and PCC, respectively. The AQMAs were declared for annual mean $NO_2$.

6.5.3 Eastleigh No.2 AQMA declared by EBC has had no recent exceedances measured for $NO_2$.

6.5.4 PCC has been contacted to share latest monitoring data; and when the data is made available, it will be used to establish any exceedances are still measured for $NO_2$ within the Portsmouth AQMA No.9.

### Background concentrations

6.5.5 Estimates of current and future year background pollutant concentrations in the UK are available on the Defra UK-Air website [76]. The estimated annual mean background estimates, which are a combination of measured and modelled data, are available across 1km grid squares across the UK for a 2018 reference year, which is the basis for the future year estimates up to 2030. These background estimates include contributions from all source sectors, e.g., road transport, rail, aircraft, industry, industrial point sources, agriculture, and domestic and commercial heating systems.

6.5.6 Estimated annual mean background $NO_2$, $PM_{10}$ and $PM_{2.5}$ concentrations are presented as maximum and minimum values across the air quality study area for 2023, as shown in Table 6-4. The maps are based on a 2018 reference year and future year projections do not consider the short or long-term impacts of the Covid-19 pandemic on pollutant concentrations.

Table 6-4: Estimated annual mean background pollutant concentrations within 1km of the Proposed Development

| Parameter | Mapped background concentration 2023 µg.m$^{-3}$ | | |
|---|---|---|---|
| | $NO_2$ | $PM_{10}$ | $PM_{2.5}$ |
| Minimum | 9.26 | 11.4 | 7.90 |
| Maximum | 20.7 | 17.6 | 13.1 |
| AQO | 40µg.m$^{-3}$ | 40µg.m$^{-3}$ | 10µg.m$^{-3}$ |

6.5.7 As shown in Table 6-4 the estimated maximum annual mean background $NO_2$ and $PM_{10}$ concentrations within the study area are below the respective AQOs. However, the maximum annual mean background $PM_{2.5}$ concentrations within the study area exceeds the respective AQOs. There is a larger variation in minimum and maximum concentrations of $NO_2$ than particulate matter; this is likely due to background $NO_2$ being higher in proximity to more urban areas or major roads, and correspondingly lower in areas with very few pollution sources. Concentrations of particulate matter may show less variation as this pollutant is not only emitted by road traffic or industry but has a natural component which can form a significant proportion of the total concentration, particularly in coastal areas where sea salt aerosol is present.

### Pollution Climate Mapping

6.5.8 Defra's Pollution Climate Mapping (PCM) model provides estimates of roadside concentrations of annual mean $NO_2$, which have historically been used for reporting to the EU to demonstrate compliance with limit values. The model provides projected roadside concentrations of pollutants, for the years 2019-2030 inclusive, based on a 2018 reference year.

6.5.9 All links in Defra's PCM model within the study area, demonstrate compliance of the annual mean $NO_2$ EU limit value in 2023 and beyond.

### Air quality monitoring

6.5.10 Local authorities monitor pollutants in several ways such as automatic monitoring and non-automatic monitoring, to assess and manage air quality.

6.5.11 HBC has not undertaken automatic (continuous) monitoring in recent years.

6.5.12 EBC, PCC and WCC undertake continuous monitoring, however, the stations are not within the scoping study area.

6.5.13 Annual mean $NO_2$ concentrations (non-automatic monitoring i.e., diffusion tube monitoring) are, however, measured by EBC, HBC, PCC, WCC, EHDC and FBC. Diffusion sites in EHDC and FBC are not located within the air quality study area. Monitored data within the study area using passive diffusion tubes is presented in Table 6-5 and locations shown in Figure 6.1 in Volume III. Measured concentrations at these sites over the period 2016-2022 are provided. Data for 2019 represents pre-Covid-19 traffic conditions.

Table 6-5: Annual mean $NO_2$ monitoring in the study area

| Local Authority | Site ID | Site Name | Site Type | X, Y | Pollutant Concentration (µg/m$^3$) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| EBC | NH | Nuffield Hospital | U | 445121,122183 | 28.5 | 22.3 | 26.0 | 26.0 | 20.3 | 26.5* | 22.8* |
| HBC | 2 | Rectory Rd | S | 471742,105794 | 28.0 | 25.6 | 25.8 | 22.3 | 18.2 | 23.9* | 22.4* |
| HBC | 7B | Brockhampton Lane | UC | 471180,106064 | 28.1 | 26.7 | 25.3 | 24.5 | 19.5 | 25.0* | 24.3* |
| HBC | 8 | London Road Purbrook | R | 467364,107981 | 26.8 | 26.3 | 23.5 | 26.9 | 18.8 | 26.4* | 25.2* |
| HBC | 10 | Ramblers Way | S | 470028,110044 | 22.9 | 20.1 | 21.4 | 20.0 | 15 | 19.8* | 19.5* |
| HBC | 12 | Xyratex | R | 471613,105672 | 34.2 | 30.3 | 30.5 | 25.4 | 20.6 | 28.4* | 27.3* |
| HBC | 14 | Elm Park Road | S | 471783,106794 | 20.8 | 20.6 | 20.3 | 17.9 | 14.9 | 18.9* | 17.6* |
| HBC | 19B | Langstone Road East | K | 471636,105746 | 56.3 | 46 | 47.7 | 44.4 | - | - | - |
| HBC | 19C | Langstone Road | R | 471637,105687 | n/a | 37.3 | 34.8 | 33.9 | 27.7 | 35.6* | 34.4* |
| HBC | 19D | Regents Court | R | 471665,105756 | n/a | n/a | 26.1 | 22.3 | n/a | - | - |
| HBC | 19E | Langstone Road (11A) | R | 471631,105613 | n/a | n/a | 33.6 | 25.5 | n/a | - | - |
| HBC | 20 | Bosmere Junior | R | 471706,105933 | 28.9 | 30.7 | 27.1 | 25.7 | 19.9 | 24.1* | 22.9* |
| HBC | 22 | Park Road South (Bulbeck Junction) | UC | 471573,106199 | 35.8 | 31.4 | 33 | 30.7 | 23.7 | 30.8* | 32.1* |
| HBC | 25 | Stakes Hill Road | R | 468478,107725 | 24.4 | 24.1 | 26.8 | 24.1 | 18.3 | 22.0* | 21.5* |
| HBC | 27 | Havant Precinct | R | 471654,106287 | n/a | 25.7 | 25.2 | 20.9 | 25.7 | 23.6* | 23.1* |
| HBC | 28 | Park Road South | UB | 471577,106280 | n/a | 30.6 | 34.9 | 33.4 | 25.1 | 34.0* | 34.9* |
| HBC | W10 | Compton Court | R | 471368,106805 | n/a | n/a | 22.9 | 26.7 | 21.4 | 29.5* | 28.7* |

| Local Authority | Site ID | Site Name | Site Type | X, Y | Pollutant Concentration (µg/m$^3$) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| HBC | T2 | The Limes | O | 471683,105809 | n/a | n/a | 25.3 | 25.9 | n/a | n/a | n/a |
| HBC | T3 | Bedhampton Hill | S | 469564,106135 | n/a | n/a | 22.9 | 18.3 | n/a | n/a | n/a |
| PCC | 11 | Anchorage Road (AR-Col6) | R | 466869,103457 | 28.1 | 23.5 | 22.9 | 20.7 | n/a | n/a | n/a |
| PCC | 20 | 136 Eastney Rd (ER-136) | R | 466712,99415 | 29.12 | 29.7 | 28.4 | 24.0 | n/a | n/a | n/a |
| PCC | 70 | Milton Primary School (ER-DS) | R | 466667,99546 | n/a | 23.7 | 25.1 | 21.6 | n/a | n/a | n/a |
| PCC | 71 | 19 Havant Road | K | 465711, 105624 | n/a | n/a | 27.8 | 25.2 | n/a | n/a | n/a |
| PCC | 75 | 1-6 Chipstead House Southampton Road (SR-CH) | R | 465618,105619 | n/a | n/a | 25.7 | 21.3 | n/a | n/a | n/a |
| PCC | 78 | 3 Goldsmith Avenue (GA-3) | R | 466523,99599 | n/a | n/a | 25.0 | 19.9 | n/a | n/a | n/a |
| PCC | 79 | Column 1 Goldsmith Avenue (GA-Col1) | K | 466555,99598 | n/a | n/a | 39.3 | 26.3 | n/a | n/a | n/a |
| PCC | 92 | Locksway Road-13 (LR-13) | R | 466525,99736 | n/a | 28.7 | 27.3 | 25.7 | n/a | n/a | n/a |
| PCC | 98 | 13-29 Eastern Road (ER-13/29) | R | 466700,100591 | n/a | n/a | 22.5 | 18.2 | n/a | n/a | n/a |
| PCC | 99 | 64-80 Eastern Road (ER-64/80) | R | 466727,100572 | n/a | n/a | 23.6 | 20.3 | n/a | n/a | n/a |

| Local Authority | Site ID | Site Name | Site Type | X, Y | Pollutant Concentration (µg/m$^3$) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| PCC | 100 | 340 Havant Road | R | 467783,105677 | n/a | n/a | 22.1 | 19.9 | n/a | n/a | n/a |
| PCC | 101 | Column 52 Havant Road | R | 467693,105714 | n/a | n/a | 28.2 | 25.0 | n/a | n/a | n/a |
| PCC | 124 | Hillsley Road Column 23 | R | 462491,106553 | n/a | n/a | 28.6 | 26.1 | n/a | n/a | n/a |
| PCC | 140 | 69 Hillsley Road | UB | 462813,106442 | n/a | n/a | n/a | 24.6 | n/a | n/a | n/a |
| PCC | 158 | 106 Eastern Road (ER-106) | R | 467322,103333 | n/a | n/a | n/a | 34.0 | n/a | n/a | n/a |
| PCC | 159 | 107 Eastern Road (ER-107) | R | 467357,103337 | n/a | n/a | n/a | 39.2 | n/a | n/a | n/a |
| PCC | 160 | 116 Eastern Road (ER-116) | R | 467378,103247 | n/a | n/a | n/a | 40.9 | n/a | n/a | n/a |
| PCC | 161 | 117 Eastern Road (ER-117) | R | 467343,103240 | n/a | n/a | n/a | 28.5 | n/a | n/a | n/a |
| PCC | 162 | 51 Eastern Road (ER-51) | R | 467441,104208 | n/a | n/a | n/a | 45.3 | n/a | n/a | n/a |
| PCC | 163 | 52 Eastern Road (ER-52) | R | 467423,104211 | n/a | n/a | n/a | 38.6 | n/a | n/a | n/a |
| PCC | 166 | Column 2 Anchorage Road (AR-Col2) | R | 467269,103292 | n/a | n/a | n/a | 34.7 | n/a | n/a | n/a |
| PCC | 176 | Column 3 Anchorage Road (AR-Col3) | R | 467269,103275 | n/a | n/a | n/a | 29.4 | n/a | n/a | n/a |
| WCC | District 6 | Winchester Rd, Wickham | R | 457203,111380 | 38.6 | 27.5 | 29.8 | 26.8 | 21.6 | 21.5 | n/a |

| Local Authority | Site ID | Site Name | Site Type | X, Y | Pollutant Concentration (µg/m$^3$) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
| WCC | District 2 | Southdown Road, Otterbourne | O | 446680, 124644 | n/a | 27.1 | 25.2 | 22.2 | 17.3 | 17.5 | n/a |

R= Roadside; S= Suburban; UC = Urban Centre; UB = Urban Background; K = Kerbside; O = Other
Annual mean objective is 40 µg/m$^3$ for both $NO_2$
*Unadjusted
- decommissioned
** Exceedances of the $NO_2$ annual mean objective of 40µg/m$^3$ are shown in bold.
n/a = not available

6.5.14 The diffusion tube measurements indicate that the annual mean $NO_2$ objective (40 µg/$m^3$) was not exceeded between 2016 and 2022 at all locations in the study area, except, at diffusion tube monitoring sites 19B in HBC and 160 and 162 in PCC, where measurements showed exceedances of the objective.

6.5.15 A review of all monitoring locations in HBC was undertaken by HBC, which determined site 19B is located adjacent to a bus stop which is on a busy road. Site 19B directly samples emissions from idling buses serving the bus stop, without adequate mixing with the air. Therefore, this site was regarded as not being representative of 'ambient' air (to which the AQS objectives apply). As a result, no diffusion tube monitoring was further continued at site 19B i.e., it was decommissioned.

6.5.16 PCC was contacted to share latest monitoring data and when the data is made available it will be considered in informing the air quality eia.

6.5.17 PCC's Clean Air Zone 2021 initiative states that it will ensure to achieve legal limits for $NO_2$ by the end of 2022.

### Baseline odour conditions

6.5.18 Budds Farm WTW is a source of odour in the study area. However, the Budds Farm's WTW must incorporates odour management systems to ensure any odour from WTW has no detrimental impact on the quality of the local environment. This is supported by no significant odour issues raised in a recent planning permission (application number: APP/21/00189) granted by HBC on 15 June 2022 to build an industrial, storage and distribution development on the former landfill site within the immediate vicinity of Budds Farm WTW.

6.5.19 No significant odour issues were raised previously in a planning permission (application number: APP/16/00441) granted by HCC with HBC as a statutory consultee. on 25 April 2016 to build Erection of additional Combined Heat and Power (CHP) kiosk on the existing Budds Farm WTW.

6.5.20 Therefore, there are no sources of empirical data within the study area which would define baseline odour conditions within the study area for the Proposed Development.

### Receptors

#### *Human health receptors*

6.5.21 Sensitive human health receptors for the purposes of the air quality assessment to consider will include residential properties, locations of susceptible populations e.g., schools, hospitals and care homes, or any other location where a member of the public may be exposed to an air pollutant for the relevant exposure time period. Sensitive human health receptors within the study area will be identified in the EIA and presented within the ES.

*Designated habitats*

6.5.22 Designated habitats may contain features that are sensitive to increased concentrations of airborne pollutants. The IAQM (2020) A guide to the assessment of air quality impacts on designated nature conservation sites guidance, section 1.3 paragraph 1.3.1 [65], requires assessment of air quality impacts on Ramsar sites, SPAs, Special Areas of Conservation (SAC), Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNRs), Local Nature Reserves (LNR), Local Wildlife Sites (LWS) and Ancient Woodland within 200m of any road affected by the Proposed Development.

6.5.23 In the absence of traffic data to determine the affected roads, designated nature conservation sites within the indicative air quality study area for the Proposed Development which could potentially be affected are shown in Figure 6.1 in Volume III. These designated habitats include:

- Chichester and Langstone Harbours SPA and Solent and Dorset Coast SPA
- Chichester and Langstone Harbours Ramsar
- River Itchen SAC, Solent Maritime SAC and Solent & Isle of Wight Lagoons SAC
- Botley Wood and Everett's and Mushes Copses SSSI, Hook Heath Meadows SSSI, Langstone Harbours SSSI, Lye Heath Marsh SSSI, Portsdown SSSI, River Itchen SSSI and Waltham Chase Meadows SSSI.
- Bishops Waltham Branch Line LNR, Claylands LNR, Farlington Marshes LNR, Hazleton Common LNR and Shawford Down LNR
- 186 areas of Ancient Woodland
- More than 28 Veteran trees (it should be noted that the ongoing arboriculture surveys are updating this data set).
- 241 areas of LWS

6.5.24 Further assessment will be undertaken to determine whether these sites contain habitats sensitive to nitrogen and acid deposition as part of EIA as per the IAQM 2020 and JNCC guidance.

## 6.6 Scoping of potential effects

6.6.1 The Proposed Development has the potential to affect local air quality, during construction, operation and decommissioning.

6.6.2 Effects from decommissioning of the Proposed Development are considered to be no greater than those identified during the construction phase and are therefore assessed as construction effects as a realistic worst-case scenario. Further information on decommissioning is provided in Chapter 3 Description of the proposed development, section 3.7.

### Effects scoped into the assessment

*Construction effects*

*Impacts on human and ecological receptors as a result of dust and particulate matter emissions*

6.6.3 There would be a potential for dust emissions during construction of the Proposed Development. Therefore, impacts of dust and particulate matter on dust soiling and human health will need to be assessed for any likely significant effects.

*Impacts on human and ecological receptors as a result of Non-Road Mobile Machinery and machinery emissions*

6.6.4 NRMM and plant used during construction can increase air emissions which can impact upon human and ecological receptors. Therefore, impacts of these emissions on human receptors would therefore be scoped into the assessment.

*Impacts on human and ecological receptors as a result of road traffic emissions*

6.6.5 Air quality could be affected by changes in traffic flows during construction, as a result of temporary traffic management measures and/or additional vehicles travelling to and from the construction site transporting materials, plant and labour. Therefore, impacts of emissions from increased traffic movements on human receptors need to be scoped into the assessment.

### Effects scoped out of the assessment

*Construction effects*

*Impacts on human and ecological receptors as a result of odour emissions*

6.6.6 The proposed WRP is proposed to be built on a former landfill site. Planning permission (application number: APP/21/00189) was granted by HCC with HBC as a statutory consultee on 15 June 2022 for an industrial, storage and distribution development on this former landfill site. No significant odour issues were raised by the Applicant in the planning statement (Former Landfill Site, Brockhampton West, Harts Farm Way, Havant, Michael Sparks Associates, 2021) or in the supporting technical assessments. Hence, no historical odour nuisance has been established for Budds Farm WTW.

6.6.7 However, it is acknowledged that some odorous emissions may occur during excavations due to exposure of the landfill waste, but this would be mitigated by damping down or misting. Odour was not raised by HCC in the decision notice.

6.6.8 Given that the development referred to above was consented within the same former landfill and no significant odour impacts were identified, it is expected that any odour impacts from the Proposed Development (such as construction of the WTW pipeline etc). would also be able to be mitigated to prevent significant impacts from occurring. In addition, any odour would be of short duration e.g., for the duration of the excavation works. Therefore, during construction, no significant odour effects are anticipated.

*Operational effects*

*Impacts on human and ecological receptors as a result of dust and particulate matter emissions*

6.6.9 The Proposed Development itself has inherently low dust generation potential during its operation. The activities and processes during operation would involve minimal or no generation of dust particles that can have adverse effects on the surrounding environment, human health, or ecological systems. This is due to the nature of the operations, the materials used, and the advanced technology employed. Therefore, there would be no potential loss of amenity and/or health or ecological impacts due to dust emissions during operation.

*Impacts on human and ecological receptors as a result of road traffic emissions*

6.6.10 Once operational, air quality could be affected by changes in vehicle activity (flows, speeds and composition) as a result of the Proposed Development.

6.6.11 The proposed WRP is likely to be operational 24 hours a day, potentially requiring around 16 light vehicle movements associated with staff travel for shift changes per day, plus one HGV (tanker) is anticipated per day. One vehicle movement per week is anticipated to be required for monitoring/maintenance at each of the proposed AGP locations The change in traffic flows on nearby roads due to this traffic introduced by the operation of the Proposed Development would fall far short of the threshold (described in Table 6-6) needed to give rise to any significant air quality effects.

*Impacts on human and ecological receptors as a result of NRMM and machinery emissions*

6.6.12 During operation, the only other source of emissions to air would be backup diesel generators (used for a minimum period in emergency use only) and these emissions would not give rise to any significant air quality effects.

*Impacts on human and ecological receptors as a result of odour emissions*

6.6.13 There would be no changes to the existing operations at the Budds Farm WTW, which will transfer secondary treated final effluent to the proposed WRP. Advanced treatment techniques will be employed at the proposed WRP, which will require the use of several chemicals. The secondary treated effluent has a low odour potential and is more akin to river water than wastewater odours. The odour strength of the material will be low with a neutral hedonic tone. Odour surveys of secondary treated effluent at other sites have shown concentrations lower than 1.0 $ou_E/m^2/s$, which is the lowest concentration at which odour can be detected in laboratory conditions by 50% of a human test panel. Secondary treated effluent processes are typically excluded from detailed odour dispersion models due to the low odour emissions. Therefore, they are not typically covered with odour treatment. It is therefore considered that the proposed WRP would not increase the risk of odour impact and complaints at local sensitive receptors. Additionally, the proposed process will include a covered storage tank and a treatment plant, which is a fully contained system. Hence, the proposed WRP will be a closed

system, reducing the risk of odour emissions directly into the atmosphere resulting from these processes. Hence, there would be no potential for additional odour from the operation of Budds Farm WTW during the operation of the Proposed Development.

## 6.7 Approach to assessment

6.7.1 The study areas to be used for assessment as part of the EIA would be defined as follows:

- For the potential effects of construction dust, the study area would be defined as the area within 350m of the construction works boundary, in accordance with the Institute for Air Quality Management (IAQM) Construction Dust Assessment Guidance 2016. Version 1.1, Chapter 6, Box [63].
- For the potential effects of construction NRMM emissions on air quality, the study area would be defined as the area within 200m of the construction works boundary where NRMM will be located.
- For the potential effects of construction/operational road traffic emissions on air quality, the study area would be defined as the area within 200m of a road affected by changes in traffic.

### Additional baseline data collection

6.7.2 The information on ambient air quality and identification of potential air quality constraints to the Proposed Development will be re-visited through reference to the sources identified in Table 6-3, following the study area to be determined as part of the EIA.

### Assessment methodology

#### *Construction dust*

6.7.3 The effects of dust-producing activities during construction will be assessed in accordance with the IAQM (2016) Construction Dust Assessment Guidance. Version 1.1, Chapter 6, Box 1 [63]. This will consider likely significant effects on amenity, human health receptors and designated nature conservation sites. The aim of this assessment will be to identify suitable dust mitigation measures that are proportionate to the risk. Assuming the relevant mitigation measures are implemented, the residual effect from all dust generating activities is very unlikely to be significant.

#### *Construction non-road mobile machinery*

6.7.4 NRMM and plant used during construction can increase air emissions which can impact upon human and ecological receptors. Defra technical guidance [62] states that emissions from NRMM on construction sites are typically unlikely to lead to significant air quality effects. However, intensive construction activities may temporarily increase pollutant concentrations in the vicinity of receptors. The location of human and ecological receptors in relation to construction works will be reviewed as part of the ES to determine whether any further assessment of

emissions from NRMM is required; if required, this assessment may be qualitative or quantitative depending on the scale and nature of activities, their duration and baseline pollutant concentrations.

*Construction road traffic*

6.7.5 The air quality assessment will be undertaken in line with guidance outlined in the EPUK/IAQM Planning Guidance [64] and Defra's Local Air Quality Management Guidance [62] and will consist of the following:

- Once traffic data is available, the increase in construction traffic flows generated by the Proposed Development will be screened using criteria in IAQM and EPUK [64] and JNCC [66] guidance as detailed in Table 6-6. The study area will consequently be updated.
- Where traffic flows exceed the screening criteria and there are relevant human or ecological receptors located within 200m of the road, a detailed dispersion modelling assessment will be undertaken to consider impacts at these locations. Concentrations of $NO_2$, $PM_{10}$ and $PM_{2.5}$ will be predicted at human receptors, and concentrations of NOx, ammonia and associated nutrient nitrogen and/or acid deposition will be calculated at ecological receptors.

**Table 6-6: Air quality road traffic assessment screening criteria**

| Guidance document | Receptor | Screening criteria | |
|---|---|---|---|
| IAQM and EPUK [64] | Human receptors | Light duty vehicles (LDVs) | A change in annual average daily traffic (AADT) of more than 100 within or adjacent to an AQMA, or more than 500 elsewhere. |
| | | Heavy duty vehicles | An increase in HGV movements of more than 25 per day within or adjacent to an AQMA, or more than 100 elsewhere. |
| JNCC [66] | Ecological receptors | AADT | An increase 0.15% or more of existing AADT (over 5 years) (i.e., Decision-making Threshold (DMT)) |

## Definition of impact magnitude and significance

6.7.6 The methodology for determining the magnitude of impacts and significance of effects in relation to air quality is set out within IAQM guidance documents [64, 65] [64] [60] [65] and is considered to be the most appropriate and robust method for determining the significance of air quality effects.

*Construction phase dust emissions*

6.7.7 The magnitude of dust emissions is determined in accordance with the criteria provided in IAQM guidance [63], as detailed in Table 6-7.

Table 6-7: Criteria used in the determination of dust emission magnitude

| Activity | Criteria used to determine dust emission magnitude | | |
|---|---|---|---|
| | Small | Medium | Large |
| Demolition | Total building volume <20,000m$^2$;<br>Material with low potential for dust release<br>Demolition activities <10m above ground level. | Total building volume 20,000 – 50,000m$^2$;<br>Potentially dusty material.<br>Height of building between 10-20m above ground level. | Total building volume >50,000m$^2$;<br>Potentially dusty material.<br>Demolition activities >20m above ground level. |
| Earthworks | Total site area <2,500m$^2$;<br><5 heavy moving earth vehicles active at any one time. | Total site area 2,500 – 10,000m$^2$;<br>5 – 10 heavy moving earth moving vehicles active at any one time. | Total site area >10,000m$^2$,<br>>10 heavy earth moving vehicles active at any one time. |
| Construction | Total building volume <25,000m$^3$;<br>Construction material with low potential for dust release. | Total building volume 25,000 – 100,000m$^3$;<br>Potentially dusty construction material (e.g. concrete). | Total building volume >100,000m$^3$;<br>On-site concrete batching. |
| Trackout | <10 outward HGV trips in any one day;<br>Unpaved road length <50m. | 10 – 50 outward HGV trips in any one day.<br>Unpaved road length 50 – 100m. | >50 outward HGV trips in any one day;<br>Unpaved road length >100m. |

6.7.8 The IAQM dust assessment guidance [63]) requires combination of the dust emission magnitude of the Proposed Development with the sensitivity of the area to determine the risk of likely significant effects to human and ecological receptors, prior to any mitigation.

6.7.9 This assessment deviates slightly from the methodology set out in Chapter 5 General EIA approach and methodology, as the IAQM guidance does not assign a significance before applying mitigation measures.

6.7.10 Once appropriate mitigation measures have been identified, the significance of construction phase effects can be determined. The aim is to prevent likely significant effects on receptors by means of implementing effective mitigation. Measures typically include dust suppression techniques, such as water spraying, covering exposed surfaces, and implementing good site management practices.

6.7.11 With implementation of effective mitigation measures, generation of airborne dust and particulate matter would be reduced such that the residual impacts can be considered to be 'not significant', in accordance with guidance provided by the IAQM [64].

6.7.12 The IAQM considers it to be most appropriate to only assign significance post-mitigation as it assumes mitigation is inherent in the design/construction approach. A matrix is therefore not provided in the guidance to determine significance. To

determine the significance of construction dust after mitigation, it is common practice to assess the post-mitigation dust levels against relevant air quality standards, guidelines, or objectives. This involves comparing the measured or modelled dust concentrations with the applicable limits or thresholds to evaluate whether the levels remain within acceptable limits.

*Construction phase Non-Road Mobile Machinery emissions – human receptors*

6.7.13 During construction, NNRMM and plant can increase air emissions which may impact upon human receptors. Defra technical guidance [62] states that emissions from NRMM used on construction sites are unlikely to have a significant effect on local air quality where relevant control and management measures are employed. The guidance also states that in the vast majority of cases a quantitative assessment of emissions from NRMM is not required, and qualitative consideration of the potential impact is sufficient.

6.7.14 NRMM control measures will be implemented as embedded mitigation and therefore, a qualitative assessment of project generated NRMM used during construction will be undertaken, where impacts on receptors may occur, will be undertaken..

6.7.15 This assessment will take into account:

- The number and type of plant to be used
- The working hours to be employed and the duration of works
- Distances from NRMM to the nearest receptors
- Existing air quality conditions in the area (based on either local monitoring (where available) and/or Defra background pollutant concentration maps [76]))
- Prevailing meteorological conditions

6.7.16 The significance of effects will be determined using professional judgement, taking into account the factors above.

*Construction road vehicle exhaust emissions - human receptors*

6.7.17 Guidance is provided by the IAQM and EPUK [64] to determine the significance of a development's impact on local ambient air quality from exhaust emissions from road traffic and NRMM. Table 6-8 details the impact descriptors that take account of the magnitude of change in pollutant concentrations, and the concentration value in relation to the AQO, which shall be applied at individual receptors.

**Table 6-8: IAQM and EPUK impact descriptors for individual receptors**

| Long term average concentration at receptor in assessment year | % Change in concentration relative to the AQO | | | |
|---|---|---|---|---|
| | 1 | 2 - 5 | 6 – 10 | >10 |
| 75 % or less of AQO | Negligible | Negligible | Slight | Moderate |
| 76 % to 94 % of AQO | Negligible | Slight | Moderate | Moderate |
| 95 % to 102 % of AQO | Slight | Moderate | Moderate | Substantial |
| 103 % to 109 % of AQO | Moderate | Moderate | Substantial | Substantial |

| Long term average concentration at receptor in assessment year | % Change in concentration relative to the AQO | | | |
|---|---|---|---|---|
| | 1 | 2 - 5 | 6 – 10 | >10 |
| 110 % or more of AQO | Moderate | Substantial | Substantial | Substantial |

6.7.18 Further to the determination of the impact at individual receptors, the guidance recommends that assessment is made of the overall significance of the impact from a development on local air quality. The overall significance will consider the following factors:

- The existing and future air quality in the absence of the development
- The extent of current and future population exposure to the impacts
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

6.7.19 The guidance also states that a judgement of the significance shall be made by a competent professional who is suitably qualified. The air quality assessment and determination of the significance effects on local air quality will be undertaken by members of the IAQM.

6.7.20 The above criteria relate to impacts based on annual mean pollutant concentrations. Short-term pollutant concentrations will be compared to the relevant AQOs; any predicted exceedances of these AQOs will be considered to constitute a significant effect.

*Ecological receptor assessment*

6.7.21 The JNCC has published a suite of documents [66] which provide additional guidance on cumulative and in-combination effects assessment for projects and plans which generate increases in atmospheric nitrogen emissions. The reports deal with identifying thresholds for road traffic flow increases, above which detailed assessment of the effects upon Critical Level (pollutant concentrations in the atmosphere) and/or Critical Loads (deposition of pollutants) for nitrogen at nearby designated sites would be required. The reports were solely concerned with the effects arising as a result of permanent and lasting changes (increases) in operational phase road traffic flows, associated exhaust emissions of ammonia ($NH_3$) and nitrogen oxides ($NO_x$) and consequent permanent impacts on designated sites. While any potential impacts of the Proposed Development traffic emissions on ecological sites during construction would likely be short-term, transient and temporary, the guidance, screening criteria and methodology provided in JNCC reports will be used for this assessment of ecological receptors.

6.7.22 The consideration of the JNCC guidance will allow for a more conservative assessment of any potential road traffic emission impacts on ecological receptors, as the 0.15% increase in AADT screening criterion (or DMT) is more stringent than the screening criteria of a 1,000 AADT or 200 HGV increase considered by Natural England [79] and Institute of Air Quality Management [65].

6.7.23 Any development-generated nutrient nitrogen deposition values above 1% Critical Load or Critical Level, would suggest significant effects experienced at the affected

habitats. This will require assessment as part of Chapter 8 Terrestrial and freshwater biodiversity.

### Assessment scenarios

6.7.24 The future baseline will include committed developments that will be delivered prior to commencement of construction.

6.7.25 The assessment will consider the following scenarios:

- Verification / Baseline year (2023)
- Peak year of construction 'without the Proposed Development'
- Peak year of construction 'with the Proposed Development'

6.7.26 A base year of 2019 will be used in the assessment as it is considered that conditions in 2020 (or 2021) will not provide a representative baseline due to the Covid-19 outbreak in March 2020. Therefore, it will not be possible to represent short or longer term impacts on emissions in 2020 (and 2021) as a result of behavioural changes during national or local lockdowns within the dispersion model.

### Cumulative effects

6.7.27 Cumulative effects of the Proposed Development together with the effects of other developments/schemes may result in likely significant effects. This may be the result of effects on the environment during construction or operation of the Proposed Development.

6.7.28 Cumulative effects for all topics will be reported within the cumulative effects chapter of the ES. Please refer to Chapter 19 Cumulative effects assessment which presents the proposed methodology for the assessment of cumulative effects that will be undertaken for the EIA.

### In-combination effects

6.7.29 In-combination effects are those that result from the interaction between the individual effects of the Proposed Development (e.g., interaction of environmental factors such as air quality, noise and health), combined on a single receptor at a single point in time. The interrelationship between the individual effects may combine to result in a significant effect, even where the individual effects were not significant. Any in-combination impacts in relation to air quality will be assessed in the ES.

6.7.30 The nature of likely in-combination effects for air quality can include impacts on human health and ecological designated sites resulting from fugitive dust and road traffic emissions in proximity to the Proposed Development, temporary access tracks and the road network.

## 6.8 Limitations and assumptions

6.8.1 Monitoring data from the local authorities were reviewed, which for most areas included recorded concentrations for 2020. Pollutant concentrations recorded in

2020 are likely to have been influenced by disruptions in traffic conditions as a result of the Covid-19 pandemic.

6.8.2 A further source of baseline data is available through the background pollutant concentrations provided by Defra for 1km grid squares across the UK [76]. These data are derived using an empirical model, calibrated using monitoring data from the UK Automatic Urban and Rural Network and, as such, there are inherent uncertainties associated with modelled data.

6.8.3 Deposition rates for designated ecological sites and habitats have not been considered at the scoping stage. These will be taken into consideration as part of the EIA once the study area has been fully defined.

## 6.9 Approach to mitigation and residual effects

6.9.1 For the purposes of the EIA, mitigation has been defined as falling into three categories as described in Chapter 5 of this Scoping Report. For air quality and odour the types of mitigation that will be considered include:

- Primary (inherent) mitigation: Ensuring the Preferred Pipeline Corridor avoids known odorous sites where possible.
- Tertiary (inexorable) mitigation:
  - A construction phase assessment will be undertaken when further detailed information is available as part of the EIA, in order to determine the construction dust risk potential and potential construction traffic impacts on human health receptors and ecological receptors. The outcome of the assessment will then determine the relevant mitigation measures recommended and stated in the IAQM 2016 guidance [63] that will need to be considered.
  - Potential construction dust impacts will be controlled by the best practice mitigation measures which will be secured in a construction management plan.
  - The following provides example measures (LAQM.TG [62]) of how NRMM emissions from construction sites may be reduced:
    - Ensure all equipment complies with the appropriate NRMM standards [80];
    - Where feasible, ensure further abatement plant is installed on NRMM equipment, e.g., Diesel Particulate Filters (DPFs).
    - Ensure all vehicles switch off engines when stationary – no idling vehicles.
    - Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where possible.
    - Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).

- Odour control may be required during the cut and fill programme of the proposed WRP due to exposure of the landfill waste. Additionally, odour suppression may be required as necessary during excavation of contaminated materials – damping down and/or misting as appropriate.

## 6.10 Summary

6.10.1 The baseline air quality conditions within the study area are considered to be generally good. There are likely to be dominant sources of existing air emissions near to Havant and Portsmouth, and to a lesser extent near Eastleigh.

6.10.2 Potential air quality and odour effects include impacts on human and ecological receptors as a result of;

- Dust and fine particulate matter emissions
- NRMM and machinery emissions
- Road traffic emissions
- Odour emissions

6.10.3 There are likely to be several sensitive receptors that would be included in the assessment. These will mainly comprise residential dwellings or designated ecological sites that are situated near to the Proposed Development components or roads used by construction vehicles which exceed the relevant screening criteria for requirement of a detailed assessment.

6.10.4 Air quality effects have the potential to occur predominantly within the construction phase due to the nature of the works to be undertaken. During operation, there are anticipated to be negligible odour, dust, plant or road traffic emissions and it is therefore proposed to scope these effects out of the assessment.

6.10.5 Table 6-9 outlines the effects which refer to the early identification of the likely significant effects and effects that it is considered can be scoped out. This may be refined through the EIA as additional information and data become available.

**Table 6-9: Summary table – Air quality and odour**

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| Impacts on human and ecological receptors as a result of dust and particulate matter emissions | Scoped in | Scoped out | Construction:<br>There would be increased emissions of dust during construction of the Proposed Development.<br><br>Operation:<br>The Proposed Development itself has inherently low dust generation potential during its operation. The activities and processes during operation would involve minimal or no generation of dust particles that can have adverse effects on the surrounding environment, human health, or ecological systems. This is due to the nature of the operations, the materials used, and the advanced technology employed. Therefore, |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| | | | there would be no potential loss of amenity and/or health or ecological impacts due to dust emissions during operation, hence, operation phase will not be assessed. |
| Impacts on human and ecological receptors as a result of NRMM and machinery emissions | Scoped in | Scoped out | Construction:<br>NRMM used during construction can generate air pollutant emissions which can cause potentially significant effects on human and ecological receptors.<br><br>Operation:<br>During operation, the only other source of emissions to air would be backup diesel generators used for a minimum period in emergency use only and therefore these emissions would not lead to significant air quality effects. |
| Impacts on human and ecological receptors as a result of road traffic emissions | Scoped in | Scoped out | Construction:<br>Air quality could be affected by changes in traffic flows during construction, because of temporary traffic management measures and/or additional vehicles travelling to and from the construction site transporting materials, plant and labour. Therefore, road traffic emissions during construction would need to be scoped into the assessment.<br><br>Operation:<br>Once operational, air quality may be affected by changes in vehicle activity (flows, speeds and composition) as a result of the Proposed Development components. However, the change in traffic flows on nearby roads due to this traffic introduced by the operation of the Proposed Development would fall far short of the threshold needed to give rise to would not give rise to any significant air quality effects. |
| Impacts on human and ecological receptors as a result of odour emissions | Scoped out | Scoped out | Construction:<br>The proposed WRP may be built on a former landfill site. Planning permission (application number: APP/21/00189) was granted by HCC on 15/06/22 for this former landfill site for industrial, storage and distribution development. No odour issues were discussed neither by the Applicant in the planning statement (Former Landfill Site, Brockhampton West, Harts Farm Way, Havant, Michael Sparks Associates, 2021) nor in the decision notice and agreement by HBC on granting the outline planning permission, APP/21/00189. |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| | | | There can be a potential of some level of odour emission during ground works at the proposed WRP. Consequently, odour control may be required during the cut and fill programme due to exposure of the landfill waste. However, any odour would be of short duration i.e., for the duration of the excavation works. Therefore, during construction, no likely significant odour effects are anticipated.<br>The advanced treatment techniques to be employed at the proposed WRP will require the use of several chemicals. The proposed WRP will be a closed system, and therefore there would be no potential for odour emissions resulting from these processes.<br><br>Operation:<br>There would be no changes to the existing operations at the Budds Farm WTW, which will transfer secondary treated final effluent to the proposed WRP. Advanced treatment techniques will be employed at the proposed WRP, which will require the use of several chemicals. The secondary treated effluent has a low odour potential and is more akin to river water than wastewater odours. The odour strength of the material will be low with a neutral hedonic tone. Odour surveys of secondary treated effluent at other sites have shown concentrations lower than 1.0 $ou_E/m^2/s$, which is the lowest concentration at which odour can be detected in laboratory conditions by 50% of a human test panel. Secondary treated effluent processes are typically excluded from detailed odour dispersion models due to the low odour emissions. Therefore, they are not typically covered with odour treatment. It is therefore considered that the proposed WRP would not increase the risk of odour impact and complaints at local sensitive receptors. Additionally, the proposed process will include a covered storage tank and a treatment plant, which is a fully contained system. Hence, the proposed WRP will be a closed system, reducing the risk of odour emissions directly into the atmosphere resulting from these processes. Hence, there would be no potential for additional odour from the operation of Budds Farm WTW during the operation of the Proposed Development. |

# 7 Archaeology and cultural heritage

## 7.1 Introduction

7.1.1 This chapter outlines out the scope and methodology for the assessment of the potential likely significant effects arising from the construction, operation and decommissioning of the Proposed Development on archaeology and cultural heritage.

7.1.2 Archaeology and cultural heritage aspects considered within this chapter for the Proposed Development include:

- **Designated heritage assets:** including Scheduled Monuments, Listed Buildings, Registered Parks and Gardens, Registered Battlefields, World Heritage Sites and Conservation Areas.
- **Non-designated heritage assets:** including archaeological, historic landscape character and historic building information, and information on previous events (archaeological surveys and investigations) known at the time of writing.

7.1.3 Effects on some historic landscape features which also form valued habitats, primarily hedgerows and ancient woodland, are also considered in Chapter 8 Terrestrial and freshwater biodiversity.

7.1.4 Effects on some historic landscape features, landscape character and valued views, including those from heritage assets, are considered in Chapter 13 Landscape and visual.

7.1.5 Assessment of noise and vibration effects on human receptors is considered in Chapter 14 Noise and vibration and this may inform understanding of change to setting of heritage assets.

7.1.6 Chapter 16 Socio-economics, tourism, recreation and health considers effects on the local economy and labour market and on tourism businesses, and effects on human health arising from aspects including impacts on residential and community receptors and areas of recreation, and disruption to communities more widely.

7.1.7 Chapter 17 Traffic and transport considers changes in current traffic and transport and its effect on human receptors and may inform understanding of change to setting of heritage assets.

7.1.8 Chapter 18 Water environment (including flood risk) covers hydrology, hydrogeology and flood risk and may inform understanding of indirect effects on heritage assets arising though change to the water environment.

## 7.2 Legislation, policy and guidance

7.2.1 The scoping assessment has been carried out in accordance with relevant legislation, planning policy and guidance which will also apply to the future EIA assessments. It is recognised that this list is non-exhaustive and will be kept under review to take account of any later legislation or policy changes.

### Legislation

7.2.2 The relevant legislation includes:

- Ancient Monuments and Archaeological Areas Act (1979) (as amended)
- Planning (Listed Buildings and Conservation Areas) Act (1990)
- Hedgerow Regulations 1997, as amended by The Hedgerows (England) (Amendment) Regulations 2002
- The Infrastructure Planning (Decisions) Regulations 2010 Section 3

### National policy

7.2.3 The relevant national policies include:

- NPSWRI [4], Section 4.8: Historic environment, paragraphs 4.8.4 to 4.8.29 [81]
  - The Historic Environment: Paragraph 4.8.1 to 4.8.6. These paragraphs define the historic environment and its component parts, known as heritage assets, and sets out the requirement that effects of proposed development on the historic environment will be considered in determining applications for development consent.
  - Applicant's Assessment: Paragraph 4.8.7 to 4.8.10. This section sets out the requirement for the applicant to provide an assessment of the effects of proposed development on the historic environment and sets out requirements for the scope of the assessment and supporting information.
  - Mitigation: Paragraph 4.8.11 to 4.8.14. This section discusses the use of investigative mitigation, stressing that a record of a heritage asset, while not as valuable as the retention of that heritage asset, will be required where a heritage asset is to be lost as a result of development, and sets out general requirements for such investigation to be carried out and disseminated in a timely fashion and to have regard to the need to identify and record previously unrecorded remains.
  - Decision making: Paragraph 4.8.15 to 4.8.29. These paragraphs set out the basic principle that harm to heritage assets should be considered in determining an application for development consent and sets out guidance for weighting that harm proportionately to its magnitude and the significance of the heritage asset affected. Regardless of the magnitude of harm, great weight is to be placed on harm to significance of designated heritage assets and substantial harm to these assets should be 'exceptional' or 'wholly exceptional' in the case of designated heritage assets of the highest significance.
- NPPF [5], Section 16: conserving and enhancing the historic environment, paragraphs 189-208

### Local policy

7.2.4 The relevant local policies listed in Table 7-1 may be considered both important and relevant to the Proposed Development. In the event that there is any conflict between these and the NPSWRI, the NPS would prevail.

Table 7-1: List of relevant local policy – Archaeology and cultural heritage

| Local authority | Relevant local policy |
|---|---|
| EHDC | East Hampshire District Local Plan: Joint Core Strategy (2014) [83]<br>• CP30 - Historic Environment |
| EBC | Eastleigh Borough Local Plan 2016-2036 (2022) [84]<br>• S8 - Historic Environment |
| FBC | Fareham Local Plan 2037 (2023) [85]<br>• HE1 – HE6<br>• TIN4 |
| HCC | Hampshire Strategic Infrastructure Statement (2019) [86]<br>Serving Hampshire Strategic Plan 2021 to 2025 (2021) [22] |
| HBC | Havant Borough Core Strategy (2011) [87]<br>• CS11 - Protecting and Enhancing the Special Environment and Heritage of Havant Borough<br>Old Bedhampton Conservation Area Appraisal (2019)<br>Brockhampton Conservation Area Appraisal (2007) |
| PCC | Portsmouth Local Plan 2038 (Draft) (2021) [88]<br>D5 - Heritage and Archaeology<br>Portsmouth Plan (The Portsmouth Core Strategy) [89]<br>• DCS23 - Design and Conservation |
| WCC | Winchester District Local Plan Part 1 Joint Core Strategy (2013) [90]<br>• CP20 - Heritage and Landscape Character |
| SDNPA | South Downs Local Plan (2019) (2014–33) [28]<br>• SD12 - Historic Environment<br>• SD13 - Listed Buildings<br>• SD15 - Conservation Areas<br>• SD16 - Archaeology |

## Guidance and standards

7.2.5 Relevant guidance and standards which have been used as part of the scoping process are listed below and will also be taken into account as part of the EIA include:

- Historic England, The Historic Environment in Local Plans: Historic Environment Good Practice Advice in Planning 1 [92] [93]
- Historic England, Managing Significance in Decision-Taking in the Historic Environment: Historic Environment Good Practice Advice in Planning 2 [94] [94]
- Historic England, The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning 3 [95] [95]
- English Heritage, Conservation Principles: Policy and Guidance for the Sustainable Management of the Historic Environment [96]
- Chartered Institute for Archaeologists, Standard and guidance for historic environment desk-based assessment [97] [97]

- Chartered Institute for Archaeologists, Code of Conduct [98] [98]
- IEMA, Principles of Cultural Heritage Impact Assessment in the UK [99] [99]
- HCC, Archaeology and Planning: Guidance for Developers [86] [100]
- HCC, Hampshire Archaeology Strategy [101] [101]
- Oxford Archaeology, Solent-Thames Research Framework for the Historic Environment: Resource Assessments and Research Agendas [102] [102]

## 7.3 Engagement

7.3.1 The following stakeholders have responsibility for aspects of archaeology and cultural heritage and will continue to be engaged as part of the EIA process:

- Historic England (HisEng)
- East Hampshire District Council (EHDC)
- Eastleigh Borough Council (EBC)
- Fareham Borough Council (FBC)
- Hampshire County Council (HCC)
- Havant Borough Council (HBC)
- Portsmouth City Council (PCC)
- South Downs National Park Authority (SDNPA)
- Winchester City Council (WCC)

7.3.2 Technical engagement is taking place through EIA Working Groups that have been established for the Proposed Development. For this topic, the Historic Environment and Landscape Working Group has been established and three meetings have already taken place with this group to inform the development of the Proposed Development and this EIA Scoping Report.

7.3.3 An introductory meeting was held with this group on 13 June 2022. This was attended by representatives from HE, EHDC, EBC, FBC, HCC, PCC, and WCC. An introduction to the proposed approach to the archaeology and cultural heritage assessment was provided at this meeting.

7.3.4 Following this meeting the Outline Survey Strategy was circulated to the EIA Working Group. The Outline Survey Strategy summarises the proposed approach for undertaking any necessary baseline surveys to be conducted to inform the DCO application and any other necessary license or consents. The baseline data resulting from these surveys, where available, will be used to inform the EIA.

7.3.5 A second EIA Working Group was held on 13 September 2022. This included attendance of Archaeological Advisors to HCC and WCC, and the Principal Conservation Officer from EHDC. The feedback received on the Outline Survey Strategy was discussed and the approach to scoping was presented, including discussion of study areas. The Zone of Theoretical Visibility (ZTV) and proposed heritage viewpoints were also presented to the Working Group.

7.3.6 A third EIA Working Group was held on 6 June 2023. This included attendance of Archaeological Advisors to HCC and WCC, and the Principal Conservation Officer from EHDC. The feedback received on the Outline Survey Strategy was discussed

and the approach to scoping was presented including a restatement of study areas proposed at the second EIA Working Group Meeting.

7.3.7 Further Working Group meetings will take place throughout the DCO pre-application process to provide updates on the Proposed Development, agree survey and mitigation measures and to provide initial results of the desk-based assessments and survey work.

7.3.8 In addition to the EIA Working Group meetings, engagement with the Archaeological Advisors to HCC and WCC took place on 13 July 2022 to approve a Written Scheme of Investigation (WSI) for Archaeological and Geoarchaeological Monitoring of Ground Investigation Works at the proposed WRP and existing Budds Farms WTW. This WSI was then updated with further requirements for subsequent phases of ground investigation works and issued to the Archaeological Advisors to HCC and WCC for their approval on 22 September 2022. A further survey-specific WSI for Phase 1 (priority) Geophysical Survey was issued at the same time to the Archaeological Advisors to HCC and WCC for their approval on 22 September 2022.

7.3.9 Further engagement, outside of the Working Group meetings, will take place as necessary to seek approval for other survey-specific WSIs, for example trial trenching (see section 7.7).

7.3.10 In addition to topic-specific engagement, project-wide Public Consultation was undertaken in 2022f between 5 July and 16 August. Feedback received from this consultation exercise has been reviewed and is summarised in Table 7-2, which will be considered within the EIA as part of the archaeology and cultural heritage assessment.

**Table 7-2: Public Consultation 2022 response – Archaeology and cultural heritage**

| Stakeholder | Consultation response | Scoping response |
|---|---|---|
| HE | For the assessment of setting, it is important that all factors affecting setting are considered (for example, noise, lighting levels and general 'openness') and that setting is not conflated simply with views. Where views are important for their contribution to setting, the assessment should identify those views and analyse the impact of the proposal on those views with photomontages submitted. | Assessment of setting will follow the GPA3 methodology which considers all perceptual change in the setting of an asset:<br>Refer to section 7.6 |
| | Non-designated archaeological sites and remains, some of which may have the potential to be considered nationally important in equivalence to Scheduled Monuments, should also be accounted for, considered and appropriate mitigation proposed. | In line with NPSWRI and NPPF, the potential significance of non-designated heritage assets will be assessed and those of potential significance equivalent to Scheduled Monuments will be assessed accordingly.<br>Refer to section 7.7 and section 7.9 |

| Stakeholder | Consultation response | Scoping response |
|---|---|---|
| | An Archaeological Desk Based Assessment should be undertaken (which also considers setting) which considers the impact of specific proposals on identified nationally important heritage assets [list provided in 7.3.11] and, potentially, associated undesignated archaeology associated with them. It should also make recommendations for appropriate mitigation to address any perceived harm. | An Archaeological Desk-based Assessment will be undertaken. A separate settings study will be undertaken in line with the standards set out at GPA3.<br>Refer to section 7.7 |
| HCC | The construction of the proposed underground water transfer pipeline and associated works is likely to encounter archaeological remains which will need to be recognised and recorded in an appropriate manner to mitigate their loss. | The assessment of direct and indirect physical effects will propose appropriate mitigation measures where loss of heritage assets cannot be avoided.<br>Refer to section 7.9 |
| | The route alignment should seek to avoid the most important archaeological remains, such as Scheduled Monuments, and where permanent surface infrastructure is installed should seek to ensure that the impact on the setting of any monuments is considered appropriate and avoided where possible. | Routing decision-making will seek to avoid, where practicable, all direct or indirect physical effects on any designated heritage assets, including Scheduled Monuments and archaeological remains of equivalent significance. Siting and design of above-ground infrastructure will have regard to the desirability of conserving the settings of designated heritage assets.<br>Refer to section 7.9 |
| WCC | Design of the route should seek to avoid and ensure separation of scheme elements from key historic features, including listed buildings, Scheduled Monuments and Registered Parks and Gardens and have regard to potential change to their settings. | Routing decision-making will seek to avoid, where practicable, all direct or indirect physical effects on any designated heritage assets, including Scheduled Monuments and archaeological remains of equivalent significance. Siting and design of above-ground infrastructure will have regard to the desirability of conserving the settings of designated heritage assets.<br>Refer to section 7.9 |
| | Discussions are ongoing regarding the production of archaeological and geoarchaeological assessments of the route and further survey. | The proposed scope of further archaeological investigation is set out at section 7.7 of this Scoping Report |

7.3.11 The consultation response from HE had highlighted the following Scheduled Monuments to be considered within the Archaeological Desk Based Assessment and any settings assessment;

- Moated site at Otterbourne Manor (UID 1013055)

- Park pale at Marwell, south of Fisher's Pond (UID 1012309)
- Bishop's Waltham Palace and associated fishponds (UID 1016169)
- Fort Purbrook, including covered-way to east (UID 1001842)
- Fort Widley (UID 1001862)
- Fort Southwick (UID 1003802)
- Fort Nelson (UID 1001860)
- World War II Heavy Anti-aircraft gunsite (P12) at Monument Farm (UID 1020960)

## 7.4 Approach to scoping

### Study area

7.4.1 The study areas established to inform this scoping chapter and which will be used in the subsequent EIA and presented in the ES are as follows:

- Designated heritage assets within 1km of the Scoping Area (Figure 7.1 in Volume III). This will also inform a setting assessment of heritage assets identified as potentially being affected by the construction of the Proposed Development (including consideration of temporary construction compounds) through changes to their setting.
- Non-designated heritage assets within 500m of the Scoping Area (Figure 7.2 in Volume III).

7.4.2 Consideration of designated heritage assets within 3km of visible elements of the Proposed Development (WRP, AGP) will inform a setting assessment of the heritage assets identified as potentially being affected by the construction and operational phases of the Proposed Development through changes to their setting.

7.4.3 The study areas defined above take account of the guidance in ‘The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning 3’ [95]and ‘Standard and guidance for historic environment desk-based assessment’ [97]. These study areas are subject to agreement through this scoping process and with the historic environment stakeholders, in particular the study area used to inform the setting assessment.

7.4.4 The location of the temporary construction hub (as described in Chapter 3 Description of the Proposed Development) is not known at the time of writing. This is expected to be an existing consented site, and may be situated outside of the Scoping Area. The effects of the hub on archaeology and cultural heritage will be assessed as part of the Archaeology and cultural heritage assessment reported in the ES.

### Sources of baseline data

7.4.5 For the purposes of establishing the existing baseline within these study areas, the National Heritage List for England (NHLE), the Hampshire Historic Environment Record (HHER), Portsmouth Historic Environment Record (PHER) and Winchester Historic Environment Record (WHER) have been consulted. The following data presented in Table 7-3 has been used to inform the baseline.

7.4.6 The Historic Environment Record (HER) data shown on Figure 7.2 in Volume III was sourced from an earlier iteration of the study area and may not be comprehensive. New searches of the HHER, PHER and WHER will be undertaken during the EIA assessment process and ensure that data coverage is comprehensive.

7.4.7 There are no Protected Wrecks or recorded non-designated wrecks and obstructions within the study area.

**Table 7-3: Source of baseline data – Archaeology and cultural heritage**

| Source of data | Baseline data |
|---|---|
| NHLE | Data on all designated heritage assets within England, maintained by Historic England. GIS data for all Scheduled Monuments, Listed Buildings, Registered Parks and Gardens, Registered Battlefields, World Heritage Sites and Conservation Areas. |
| HHER | Contains data on all recorded non-designated heritage assets for the County of Hampshire with the exception of Winchester City. The data includes archaeological, historic landscape character and historic building information, and information on previous events (archaeological surveys and investigations). |
| Portsmouth Historic Environment Record (PHER) | Contains data on all recorded non-designated heritage assets for the Portsmouth City. The data includes archaeological, historic landscape character and historic building information, and information on previous events (archaeological surveys and investigations). |
| Winchester Historic Environment Record (WHER) | Contains data on all recorded non-designated heritage assets for the Winchester City. The data includes archaeological, historic landscape character and historic building information, and information on previous events (archaeological surveys and investigations). |

## 7.5 Baseline conditions

### Proposed Development wide conditions

7.5.1 Details of the historic environment baseline are provided under the key components of the Proposed Development below.

7.5.2 The location of all designated heritage assets within the study areas defined above (see section 7.3.11) are presented on Figure 7.1 in Volume III, with the location of all non-designated heritage assets within the study area presented on Figure 7.2 in Volume III. This section should be read with reference to these figures. There are no Registered Battlefields or World Heritage Sites within the Study Area (the closest being the Battle of Cheriton, approximately 13km north west of Otterbourne, and Stonehenge, Avebury and related sites, approximately 30km north-west of Otterbourne) and these are consequently not shown on these figures.

### Proposed Water Recycling Plant and proposed High Lift Pumping Station

7.5.3 There is one Scheduled Monument within 1km of the proposed WRP - Bevis's Grave long barrow and early medieval cemetery, 100m west of Belmont Castle (NHLE 1012831) and approximately 970m to the north-west of the proposed WRP.

7.5.4 There is one Grade II* Listed Building and 13 Grade II Listed Buildings within 1km of the proposed WRP. The closest (The Old Mill House, Grade II, NHLE 1340188) is approximately 230m north-northeast of the proposed WRP.

7.5.5 There are two Conservation Areas within 1km of the proposed WRP. The closest (Old Bedhampton) is approximately 70m north of the proposed WRP.

7.5.6 There are no other designated heritage assets within 1km of the proposed WRP.

7.5.7 There are 17 non-designated heritage assets within 500m of the proposed WRP including two records of Bronze Age pottery and three records of Iron Age activity, in the form of hearths with finds of flint and pottery, located within the proposed WRP. However, these archaeological remains are no longer present as they were identified and recorded during the stripping of the site in advance of land reclamation and use as a landfill.

7.5.8 In consideration of the known historic environment records within the non-designated heritage assets study area and previous development of the site, there is considered to be a low potential for unknown buried archaeology to be present within the site due to the previous remodelling of the area to make way for a landfill. There is potential for deposits of geoarchaeological interest to survive within the site but these would be deeply buried below modern fill material.

### Proposed Underground Pipelines between Budds Farm Wastewater Treatment Works and the proposed Water Recycling Plant

7.5.9 There is one Grade II* Listed Building and 12 Grade II Listed Buildings within 1km of the Proposed Underground Pipeline between Budds Farm WTW and the proposed WRP. The closest (The Old Mill House, Grade II, NHLE 1340188) is approximately 400m to the north of the Scoping Area.

7.5.10 There are two Conservation Areas within 1km of the Proposed Underground Pipeline, with the closest (Old Bedhampton) being approximately 260m (from the nearest boundary of the Conservation Area) to the north of the Scoping Area.

7.5.11 There are no other designated heritage assets within 1km of the Scoping Area.

7.5.12 There are 15 non-designated heritage assets within 500m of the Scoping Area, the closest historic environment records include a findspot of Roman pottery located approximately 20m to the east, and an undated row of 58 stakes aligned northwest-southeast identified during a watching brief approximately 30m to the west.

7.5.13 In consideration of the known historic environment records within the non-designated heritage assets study area, there is considered to be a low to moderate potential for unknown buried archaeology from the Roman and medieval periods to be present within this study area.

### Proposed Underground Pipeline between the proposed Water Recycling Plant and Havant Thicket Reservoir

7.5.14 There is one Scheduled Monument within 1km of the Scoping Area between the proposed WRP and Havant Thicket Reservoir - Bevis's Grave long barrow and early medieval cemetery, 100m west of Belmont Castle (NHLE 1012831) approximately 980m to the west.

7.5.15 There are two Grade II* Listed Buildings and 28 Grade II Listed Buildings within 1km of the Scoping Area. The closest (Bedhampton Arts Centre (The Old School), Grade II, NHLE 1393209) is approximately 37m to the east.

7.5.16 The northern end of the Scoping Area is located within Leigh Park, a Grade II* Registered Park and Garden, and the Sir George Staunton Conservation Area. Leigh Park is a Regency landscaped garden, laid out in the 1820s and 1830s on the site of late 18th century pleasure grounds and a walled garden, with a series of specialist gardens and follies by Sir George Staunton to accommodate his Chinese and botanical interests. The gardens are surrounded by a park of 18th century origin, which was developed by Sir George in the early 19th century, and also incorporates late 19th century alterations.

7.5.17 The Scoping Area includes Old Bedhampton Conservation Area and is located approximately 200m west of Brockhampton Conservation Area.

7.5.18 There are 65 non-designated heritage assets within 500m of the Scoping Area. The route of the Proposed Underground Pipeline intersects the Chichester to Bitterne Roman road in Bedhampton and an area recorded as the site of post-medieval ridge and furrow located approximately 380m north of the Roman road in Bedhampton. The Scoping Area is also located in proximity to two World War Two air raid shelters located towards its southern end.

7.5.19 In consideration of the known historic environment records within the non-designated heritage assets study area, there is considered to be a high potential for unknown buried archaeology associated with the Roman road, and a moderate potential for unknown buried archaeology from the medieval and post-medieval periods to be present within the southern part of the study area and at the northern extent of the study area. The potential for buried archaeology across the centre-north of the study area is unknown as there are few records of heritage assets in this area. Further surveys will be undertaken in line with the Outline Survey Strategy to further investigate this potential.

### Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

7.5.20 There are 18 Scheduled Monuments within 1km of the Scoping Area between Havant Thicket Reservoir and Otterbourne WSW. The closest Scheduled Monument (Park Pale at Marwell, south of Fisher's Pond, NHLE 1012309) is approximately 60m from the Scoping Area.

7.5.21 The Scoping Area also falls within the field of fire associated with the Palmerston Forts to the south (Fort Widley, NHLE 1001862; Fort Southwick, NHLE 1001808; and Fort Nelson, NHLE 1001860). The forts were constructed on Portsdown Hill to defend Portsmouth Harbour from inland attack by the French. However, by the

time they were built in the 1860s, the French were no longer a threat and the forts became obsolete. Since then, the forts have been used for many other purposes, most notably for planning during the World War Two D-Day landings.

7.5.22 There are 275 Listed Buildings located within 1km of the Scoping Area; including six Grade I Listed Buildings, 17 Grade II* Listed Buildings and 252 Grade II Listed Buildings. The Listed Buildings located in proximity (less than 50m) to the Scoping Area include (from east to west):

- Sunspan, Bedhampton, Grade II, NHLE 1249638
- George Inn, Drayton and Farlington, Grade II, NHLE 1333449
- Little Park Mansions, Wickham, Grade II, NHLE 1350591

7.5.23 One Registered Park and Garden is within the 1km study area at the north-western end of the Proposed Underground Pipeline, to the south-west of Otterbourne WSW; Cranbury Park, Grade II*, NHLE 1000860.

7.5.24 There are seven Conservation Areas within 1km of the Scoping Area. The closest (Old Bedhampton) is approximately 220m to the north-east.

7.5.25 There are no other designated heritage assets within 1km of the Scoping Area.

7.5.26 There are 453 non-designated heritage assets within 500m of the Scoping Area ranging in date from the Palaeolithic to the modern period. The non-designated heritage assets are representative of settlement and agricultural activity, transport and navigation, industry, military defences and religious centres.

7.5.27 The eastern end of the Scoping Area is located within the Portsdown Hill area where there is a high potential for buried archaeological remains of Prehistoric date and which has been designated as an area of archaeological restraint by Portsmouth HER.

7.5.28 There are four Roman roads within the 500m non-designated heritage assets study area, of which three cross the Scoping Area:

- The potential route of the Portchester to Wickham Roman road passes through the Scoping Area to the north-east of North Fareham.
- Chichester to Bitterne Roman road is passes through the Scoping Area at Wickham.
- An unnamed Roman road aligned north-west to south-east, is located to the south and west of Bishop's Waltham.

7.5.29 There are four historic deer parks located within the 500m non-designated heritage assets study area. Three of these cross the Scoping Area; Wickham Park, Bishops Waltham Park and Marwell Park.

7.5.30 A number of historic water meadows are also recorded within the 500m non-designated heritage assets study area.

7.5.31 The 500m non-designated heritage assets study area also contains numerous records of cropmarks representative of enclosures, platforms, field systems, drainage systems, quarries, pits, trackways, roads and bomb decoys. These cropmarks range in date from the Roman period through to the modern period with those of uncertain date possibly indicative of prehistoric activity.

7.5.32 In consideration of the known historic environment records with the study area, there is considered to be a moderate to high potential for unknown buried archaeology from the Palaeolithic through to the modern period to be present within the area.

### Use of the Havant Thicket Reservoir for the storage of recycled water

7.5.33 There are no Scheduled Monuments within 1km of the Havant Thicket Reservoir, although there are four Scheduled Monuments within 3km.

7.5.34 The closest Scheduled Monument within 3km consists of The Castle (NHLE1001923),1.1km to the east of Havant Thicket Reservoir.

7.5.35 The southern end of the Havant Thicket Reservoir is located within Leigh Park, a Grade II* Registered Park and Garden, and the Sir George Staunton Conservation Area (see 7.5.16).

7.5.36 There is one Grade II* listed building and 15 Grade II listed buildings within 1km of the Havant Thicket Reservoir. The Grade II* building, the Staunton Memorial (NHLE 1303476), formerly known as the Shell-House is located 400m south of the proposed reservoir. The closest Grade II listing is a World War Two memorial stone (NHLE 1351135) located 15m to the east of the reservoir.

7.5.37 There are 24 non-designated heritage assets within 500m of the Havant Thicket Reservoir ranging in date from the Neolithic to the Post Medieval period. The non-designated heritage assets are representative of Neolithic flint working, Medieval fishponds and possible associated lodges and enclosure and Post Medieval pathways within Leigh Park.

### Proposed Above Ground Plant

7.5.38 The proposed AGP is considered in the above baseline sub sections as they will be located within the Scoping Area, although in line with the methodology for assessment of affects arising through change to setting, further searches of the NHLE will be undertaken to inform siting and assessment of these elements of the scheme.

## 7.6 Scoping of potential effects

7.6.1 The Proposed Development has the potential to affect archaeology and cultural heritage, during construction, operation and decommissioning.

7.6.2 Effects arising through change to setting from decommissioning of the Proposed Development are considered to be no greater than those identified during the construction phase and are therefore assessed as construction effects as a worst-case scenario. Further information on decommissioning is provided in Chapter 3 Description of the Proposed Development, section 3.7.

7.6.3 In addition, the decommissioning of the Proposed Development would not require any intrusive works out with areas that have been disturbed during the construction period. Consequently, this phase does not have the potential to physically impact the archaeology and cultural heritage resource, and therefore direct and indirect

physical effects to designated and non-designated heritage assets during decommissioning would be greatly reduced compared to the construction phase.

7.6.4 Potential impacts to heritage assets include both direct and indirect effects, as well as changes in the setting of heritage assets, which could affect heritage significance.

7.6.5 A direct physical effect is one in which construction works for the Proposed Development (e.g. excavations, and groundworks) result in a direct physical change to the fabric of a heritage asset (e.g. partial or complete removal).

7.6.6 Direct effects also include hydrological changes which may cause desiccation and drying out of any wetland deposits and associated preserved waterlogged archaeological/geoarchaeological remains. Similarly, should an area become inundated, this too can impact heritage assets both directly through physical change and indirectly by chemical changes and, where inundation is permanent, through the effective exclusion of that area from future investigation.

7.6.7 An indirect physical effect is one that results from the Proposed Development but is not caused by direct (planned) intervention from the Proposed Development construction (e.g. vibration from significant groundworks affecting the fabric of a heritage asset or changes in ground conditions resulting in an effect on preservation conditions beyond the Proposed Development's parameters).

7.6.8 Impacts to the significance of a heritage asset may also occur if a development changes the surroundings in which a heritage asset is located, experienced, and appreciated (i.e. its setting). Similarly, historic character may also be affected if the Proposed Development results in a change to the prevailing character of the area.

7.6.9 The archaeology and cultural heritage assessment is likely to have key inter-relationships with Chapter 13 Landscape and visual, Chapter 14 Noise and vibration, Chapter 16 Socioeconomic, tourism, recreation and health, Chapter 17 Traffic and transport, and Chapter 18 Water environment (including flood risk). These will be considered in the ES where relevant.

## Effects scoped into the assessment

### *Construction effects*

7.6.10 Construction activities which could affect the archaeology and cultural heritage resource through physical change and change to setting include:

- Any intrusive groundworks, including trenchless technologies, draining, and open cut trench excavation.
- Construction of any temporary works areas or permanent above ground infrastructure.
- General construction activities such as plant movement or increased traffic movements due to construction.

7.6.11 The potential effects during construction that will be assessed and are scoped in are:

- Direct, physical effects to designated heritage assets.
- Direct, physical effects to non-designated heritage assets.

- Indirect, physical effects to designated heritage assets.
- Indirect, physical effects to non-designated heritage assets.
- Temporary change to the setting of designated heritage assets, which could affect their heritage significance.
- Temporary change to the setting of non-designated heritage assets, which could affect their heritage significance.
- Permanent change to the setting of designated and non-designated heritage assets resulting from visible permanent infrastructure retained during the operational period.

7.6.12 The Assessment will consider effects throughout the construction period as well as those that arise during the construction period and persist into or through the operational period. To properly understand the significance of an effect, this assessment will take into account the changing nature of proposed works across different phases of construction.

*Operation effects*

7.6.13 Activity which could have an ongoing impact to archaeology and cultural heritage may arise from the operation of the Proposed Development which would comprise change to the setting of designated and non-designated heritage assets, arising from the ongoing use of permanent above-ground structures, comprising perceptual change such as vehicle movements and operational noise in addition to the ongoing visible presence of scheme elements in the settings of heritage assets..

## Effects scoped out of the assessment

*Construction effects*

7.6.14 The majority of construction effects cannot be scoped out at this stage, however effects to two components of the Proposed Development are proposed to be scoped out:

7.6.15 It is not anticipated that any physical works to the Eastney TT and Eastney LSO will take place, except to allow for connection to the Eastney TT at Budds Farm. It is therefore not anticipated that any potential physical disturbance of heritage assets or change to setting would arise. These effects are consequently proposed to be scoped out, except at the connection at Budd's Farm.

7.6.16 No intrusive works are planned at Havant Thicket Reservoir (ref. APP/020/00990), apart from the connection to the Proposed Underground Pipeline leading to Otterbourne WSW. Any change to setting during the construction of the consented reservoir has been considered in the determination of that application and therefore assessment will only be undertaken of effects that arise as a result of the construction of the pipeline and any connections to the consented infrastructure.

*Operation effects*

7.6.17 The operation and maintenance of the Proposed Development will not require any intrusive works out with areas that have been disturbed during the construction period. Consequently, this phase does not have the potential to physically impact the archaeology and cultural heritage resource and it is proposed to scope out direct and indirect physical effects to designated and non-designated heritage assets during operation.

7.6.18 No physical works or visible change are proposed at the Eastney TT or Eastney LSO or Havant Thicket Reservoir during operation, and it is therefore proposed to scope out any effects, whether arising from physical change or change to setting of designated and non-designated heritage assets during operation.

## 7.7 Approach to assessment

### Additional baseline data collection

7.7.1 The following data sources will be accessed to characterise the existing historic environment with respect to archaeology and cultural heritage:

- British Geological Survey for historic borehole logs and the wider geological background for the area
- National Mapping Project (NMP) data maintained by Historic England
- Heritage Records maintained by Historic England
- Conservation Area Appraisals
- ZTV model
- Existing archaeological studies and published sources
- Aerial Photographs and LiDAR data
- Historic maps

7.7.2 New searches of the HHER, PHER and WHER will also be undertaken to inform the EIA assessment and ensure that data coverage is comprehensive.

7.7.3 The surveys that will be undertaken to inform the assessment in accordance with industry guidelines and agreed in advance with the historic environment stakeholders include:

- Walkover surveys
- Setting assessment site visits
- Geophysical Survey (priority locations followed by more extensive coverage, or as close to as possible)
- Geoarchaeological desk-based assessment
- Archaeological and geoarchaeological monitoring of engineering-led ground investigation works
- Targeted archaeological fieldwalking and metal detecting

7.7.4 Following these baseline surveys, the requirement for any initial targeted archaeological evaluation (e.g. trial trenching) will be considered and discussed

with the historic environment stakeholders as part of the EIA stakeholder engagement. If targeted trial trenching is required, it will be undertaken in areas where the baseline surveys and geophysical surveys have identified a high potential for buried archaeological remains to be present and/or at key areas of proposed AGP such as the proposed BPT locations and/or at other project related pinch points, such as areas of engineering or other environmental constraints subject to landowner access permissions being agreed.

### Assessment methodology

7.7.5 The future baseline will include committed developments that will be delivered prior to the commencement of construction.

7.7.6 The impact assessment methodology adopted for archaeology and cultural heritage will define heritage assets, and their settings, likely to be impacted by the Proposed Development and assess the level of any resulting benefit, harm or loss to their cultural significance. The assessment is not limited to direct (physical) effects, but also assesses possible indirect (physical) effects upon heritage assets which may arise as a result of changes to hydrological processes and changes to the setting of heritage assets, whether visually, or in the form of noise, dust and vibration, spatial associations and a consideration of historic relationships between places which may impact their cultural significance.

7.7.7 As set out in Principles of Cultural Heritage Impact Assessment in the UK [99], Cultural Heritage Impact Assessment (CHIA) is concerned with "*understanding the consequences of change to cultural significance*". The principles of assessment are:

- Understanding cultural heritage assets.
- Evaluating the consequences of change.

7.7.8 Understanding cultural heritage assets distinguishes between:

- Describing the asset (what it is and what is known about it).
- Ascribing cultural significance (a description of what is valued about it).
- Attributing importance (a scaled measure of the degree to which the cultural significance of that asset should be protected).

7.7.9 Evaluating the consequences of change also distinguishes between three separate analytical stages:

- Understanding change (a factual statement of how a proposal would change a cultural heritage asset or its setting, including how it is experienced).
- Assessing impact (a scaled measure of the degree to which any change would impact on cultural significance).
- Weighting the effect (the measure that brings together the magnitude of the impact and the cultural heritage asset's importance).

### Definitions

7.7.10 The sensitivity of a receptor is a function of its capacity to accommodate change and reflects its ability to recover if it is affected. However, while impacts to a

heritage asset's setting or character can be temporary, impacts which result in damage or destruction of the assets themselves, or their relationship with their wider environment and context, are permanent. Once destroyed, an asset cannot recover. On this basis, the assessment of the significance of effect of any identified impact is largely a product of the importance of an asset (rather than its sensitivity) and the degree to which any change would impact on cultural significance.

7.7.11 The criteria for determining the heritage importance of any relevant heritage assets are described in Table 7-4.

7.7.12 The categories and definitions of heritage importance do not necessarily reflect a definitive level of importance of an asset. They are intended to provide a provisional guide to the assessment of perceived heritage importance, which is to be based upon professional judgement incorporating the evidential, archaeological, historical, aesthetic, architectural and communal heritage values of the asset or assets. It is important to note that the importance and cultural significance of an asset can be amended or revised as more information comes to light (i.e. as part of further investigations planned post-consent).

7.7.13 Table 7-4 includes heritage assets of uncertain heritage importance i.e. where the importance, existence and/or level of survival of an asset has not been ascertained (or fully understood) from available evidence. Although Table 7-4 provides a definition for assets of an uncertain heritage importance, where uncertainty occurs, the precautionary approach is to assign the highest likely level of importance. This precautionary approach represents good practice in cultural heritage impact assessment and reduces the potential for impacts to be under-estimated.

**Table 7-4: Criteria for determining heritage importance**

| Importance | Definition |
|---|---|
| High (perceived International/National Importance) | World Heritage Sites<br>Scheduled Monuments<br>Grade I and II* Listed Buildings or structures<br>Designated historic landscapes of outstanding interest<br>Conservation Areas containing buildings or structures with high heritage importance, or high concentrations of listed buildings<br>Assets of acknowledged international/national importance<br>Assets that can contribute significantly to acknowledged international/national research objectives |
| Medium (perceived Regional Importance) | Grade II Listed Buildings or structures<br>Designated special historic landscapes<br>Other types and character of Conservation Areas<br>Assets that contribute to regional research objectives<br>Assets with regional value, educational interest or cultural appreciation |
| Low (perceived Local importance) | 'Locally Listed' buildings or structures<br>Assets that contribute to local research objectives<br>Assets with local value, educational interest or cultural appreciation<br>Assets compromised by poor preservation and/or poor contextual associations |
| Very low | Assets with no significant value or archaeological/historical interest |

| Importance | Definition |
|---|---|
| Uncertain or unknown | The importance/existence/level of survival of the asset has not been ascertained (or fully ascertained/understood) from available evidence |

7.7.14 The magnitude of impact broadly equates to the degree to which cultural significance is positively or negatively changed by the Proposed Development.

7.7.15 Direct physical effects, indirect physical effects and effects from a change in setting on the significance of heritage assets are considered relevant. Effects may be adverse or beneficial. Depending on the nature of the impact and the duration of development, effects can also be temporary and/or reversible or permanent and/or irreversible.

7.7.16 The finite nature of archaeological remains means that physical effects are almost always permanent and irreversible as the 'fabric' of the asset and, hence, its potential to inform historical understanding, will be removed. By contrast, impacts resulting from the change in the setting of heritage assets will depend upon the longevity of construction and operation of the Proposed Development and the sensitivity with which the landscape is re-instated subsequent to decommissioning/demolition, if applicable.

7.7.17 The magnitude of adverse impact with respect to archaeology and cultural heritage directly relates to the extent of harm to, or loss of, key elements of the asset's cultural significance, which may include its setting.

7.7.18 The magnitude of beneficial impact with respect to archaeology and cultural heritage directly relates to the level of public benefit associated with an individual impact. Benefits may correspond directly to the Proposed Development itself where it will enhance the historic environment (e.g. through measures which will improve the setting of a heritage asset or public access to it).

7.7.19 Alternatively, benefits may occur on the basis of data gathering exercises undertaken for the purpose of a project which will enhance public understanding by adding to the archaeological record (e.g. through the accumulation of publicly available information and data). The measure of beneficial impact (high/medium/low) is, therefore, necessarily situational and specific to a given site, area or subject. One such example of a positive magnitude of impact could be relevant to, for example, new survey data being acquired, which will ultimately be made publicly accessible.

7.7.20 The criteria used for assessing the magnitude of impact with regard to archaeology and cultural heritage are presented in Table 7-5.

**Table 7-5: Definitions of magnitude of impact to heritage assets**

| Magnitude of impact | Definition |
|---|---|
| Major Adverse | Key elements of the asset's fabric and/or setting are lost or fundamentally altered, such that the asset's cultural significance is lost or severely compromised. |
| Moderate Adverse | Elements of the asset's fabric and/or setting which contribute to its significance are affected, but to a more limited extent, resulting in an appreciable but partial loss of the asset's cultural significance. |

| Magnitude of impact | Definition |
|---|---|
| Minor Adverse | Elements of the asset's fabric and/or setting which contribute to its cultural significance are affected, resulting in a slight loss of cultural significance. |
| Negligible Adverse | The asset's fabric and/or setting is changed in ways which do not materially affect its cultural significance. |
| No Impact | No change to the assets fabric or setting which affects its cultural significance. |
| Negligible Beneficial | The asset's fabric and/or setting is changed in ways which do not materially affect its cultural significance. |
| Minor Beneficial | Elements of the asset's physical fabric which would otherwise be lost, leading to a slight loss of cultural significance, are preserved in situ; or<br>Elements of the asset's setting are improved, slightly enhancing its cultural significance; or<br>Research and recording leads to a slight enhancement to the archaeological or historical interest of the asset. This only applies in situations where the asset would not be otherwise harmed i.e. it is not recording in advance of loss. |
| Moderate Beneficial | Elements of the asset's physical fabric which would otherwise be lost, leading to an appreciable but partial loss of cultural significance, are preserved in situ; or<br>Elements of the asset's setting are considerably improved, appreciably enhancing its cultural significance; or<br>Research and recording leads to a considerable enhancement to the archaeological or historical interest of the asset. This only applies in situations where the asset would not be otherwise harmed i.e. it is not recording in advance of loss. |
| Major Beneficial | Elements of the asset's physical fabric which would otherwise be lost, severely compromising its cultural significance, are preserved in situ; or<br>Elements of the asset's setting, which were previously lost or unintelligible, are restored, greatly enhancing its cultural significance. |

7.7.21 In basic terms, the potential significance of effect is a function of the sensitivity of the receptor and the magnitude of the impact (see Chapter 5 General EIA approach and methodology for further details). As described above, for archaeology and cultural heritage this equates to the importance of a heritage asset weighed against the magnitude of change to its cultural significance. The determination of significance is guided by the use of a significance of effect matrix, as shown in Table 7-6, with bold text indicating significant effects. Definitions of each level of significance are provided in Table 7-7.

**Table 7-6: Significance of effect matrix – Archaeology and cultural heritage**

| | | Magnitude of impact (Adverse) | | | | Magnitude of impact (Beneficial) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Major | Moderate | Minor | Negligible | Negligible | Minor | Moderate | Major |
| Importance/sensitivity of | High | Major | Major | Moderate | Minor | Minor | Moderate | Major | Major |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Medium** | Major | Moderate | Minor | Minor | Minor | Minor | Moderate | Major |
| | **Low** | Moderate | Minor | Minor | Neutral | Neutral | Minor | Minor | Moderate |
| | **Very low** | Minor | Neutral | Neutral | Neutral | Neutral | Neutral | Neutral | Minor |

**Table 7-7: Definition of significance of effect – Archaeology and cultural heritage**

| Significance | Definition |
|---|---|
| Major | Change in cultural significance, both adverse or beneficial, which are likely to be important considerations at a national or regional level because they contribute to achieving national or regional objectives.<br>Effective/acceptable mitigation options may still be possible, to offset and/or reduce residual impacts to satisfactory levels. |
| Moderate | Change in cultural significance, both adverse or beneficial, which are likely to be important considerations at a local level.<br>Effective/acceptable mitigation options may still be possible, to offset and/or reduce residual impacts to satisfactory levels. |
| Minor | Change in cultural significance, both adverse or beneficial, which may be raised as local issues but are unlikely to be material considerations in the decision-making process.<br>Industry standard mitigation measures may still apply. |
| Neutral | No material change to cultural significance. |
| No Impact | No impact, therefore, no change to cultural significance. |

### Assessment scenarios

7.7.22 The assessment will compare the effects on archaeology and cultural heritage in the scenario that the Proposed Development is implemented to the scenario without implementation of the Proposed Development, that is, the current and future baseline scenario. The assessment will be undertaken using a 'realistic worst-case' scenario.

7.7.23 The future baseline will use readily available information about developments that will have been constructed prior to commencement of construction of the Proposed Development and climate change scenario data to describe the natural changes in the local environment over the relevant timescale. For the purposes of the assessment it has been assumed that archaeological remains and designated heritage assets would survive in broadly stable condition throughout the construction and operational periods in the absence of future development.

7.7.24 The assessment of effects will take into consideration the duration of any temporary effects that arise during construction.

### Cumulative effects

7.7.25 Cumulative effects of the Proposed Development together with the effects of other developments/schemes may result in likely significant effects. This may be the result of effects on the environment during construction or operation of the Proposed Development.

7.7.26 Cumulative effects for all topics will be reported within the cumulative effects chapter of the ES. Please refer to Chapter 19 Cumulative effects assessment which presents the proposed methodology for the assessment of cumulative effects that will be undertaken for the EIA.

### In-combination effects

7.7.27 In-combination effects are those that result from the interaction between the individual effects of the Proposed Development (that is, the interaction of environmental factors), combined together on a single receptor at a single point in time. The interrelationship between the individual effects may combine to result in a significant effect, even where the individual effects were not significant. Any potentially significant in-combination effects in relation to archaeology and cultural heritage will be assessed within the relevant chapter of the ES.

7.7.28 The nature of likely in-combination effects that may give rise to likely significant effects for archaeology and cultural heritage includes:

- Combination of socio-economic and heritage effects on a heritage asset where heritage significance or character bears on the economic viability of an enterprise such as a tourist attraction.
- Combination of biodiversity and heritage effects where a heritage asset or a historic landscape provide habitat that complements or contributes to heritage significance.

## 7.8 Limitations and assumptions

7.8.1 The HER is not a complete record, as it relies on non-designated assets being recorded and reported. The amount of archaeological work and surveys undertaken in an area and whether resulting findspots have been reported can limit the level of records within the HER. Similarly, unknown heritage assets are being found regularly, as part of new developments or new local research. As such, the HER is not a final record and does not preclude further assets being found in the future.

7.8.2 Consultation with local authority Archaeological Advisors has been and will continue to be undertaken in order to refine the understanding of the historic environment across the Scoping Area.

## 7.9 Approach to mitigation and residual effects

7.9.1 Avoidance, micro-siting and route refinement will be embedded into the design of the Proposed Development where possible. This strategy ensures that, when and where available, baseline data collection will input directly into the iterative design process so that designated heritage assets, non-designated heritage assets, potential sub-surface archaeological remains (particularly suspected features of likely medium or high heritage importance or concentrated areas of known complex archaeological features) and above ground heritage assets are avoided, wherever possible within the confines of engineering and other environmental constraints.

7.9.2 Further programmes of survey and evaluation may be undertaken at the post-consent stage which, of relevance to sub-surface archaeological remains, may include any outstanding geophysical survey and a scheme wide programme of trial trenching. This strategy will be presented in an Outline WSI to be submitted with the DCO. Any outstanding survey and evaluation work may indicate the presence of previously unknown buried archaeology (and further verify previously known/anticipated buried remains as indicated by the previous non-intrusive survey methods), enabling the resource to be appropriately addressed by means of mitigating any impacts in a manner that is proportionate to the significance of the remains present.

7.9.3 Mitigation is envisaged to comprise a combination of the following recognised standard approaches as appropriate:

- Primary mitigation inherent to the design of the Proposed Development, comprising design measures such as location of infrastructure, routing and enaction of preservation in situ options and requirements (e.g. non-intrusive access methods, avoidance/micro-siting/trenchless technologies etc. where possible);
- Secondary mitigation developed as a response to identified effects which may include:
  - archaeological and geoarchaeological investigation and recording including subsequent post-excavation assessment, and analysis, publication and archiving; and
  - provision of visual and audible screening, mounding/bunding and planting around permanent infrastructure.
- Tertiary mitigation, including development of best practice measures such as control of noise and vibration during construction works and protection/demarcation of heritage assets to ensure that avoidance measures are in place.

7.9.4 The preferred and optimum mitigation measure is preservation in situ, wherever possible. This would normally be achieved by avoidance measures at design stage. By avoiding designated and non-designated heritage assets, including sub-surface archaeological remains (sites/features), either largely or in their entirety (as indicated by existing and available data), the magnitude of impact may be reduced depending on the extent of the site/feature in question (with reference to change or impact upon heritage significance) and the degree to which preservation in situ has been applied.

7.9.5 Routing decision-making will seek to avoid, where practicable, all direct or indirect physical effects on any designated heritage assets, and siting and design of above-ground infrastructure will have regard to the desirability of conserving the settings of designated heritage assets. However, where avoidance is not possible, bespoke mitigation measures will be undertaken to reduce or off-set the magnitude of impact, for example reducing the duration of construction activity, reducing the size of proposed infrastructure and working footprints, where possible.

7.9.6 Impacts to the historic landscape (including hedgerows and parish boundaries) will be reduced by reinstating field boundaries/areas/hedgerows in accordance with agreed landscape and biodiversity mitigation strategies, as part of a sensitive

programme of backfilling and reinstatement/landscaping. Certain hedgerows and field boundaries (e.g. parish boundaries) may require recording prior to the construction process and enhanced provisions made during backfilling and reinstatement.

7.9.7 Any significant impacts upon sub-surface archaeological remains may potentially to a degree be offset by the application of appropriate alternative mitigation measures which serve to preserve archaeological remains, where present, by record (e.g. following intrusive evaluation and subsequent excavation, where required). Although preservation by record cannot be considered to reduce the magnitude of impact (and associated significance of effect) per se, given the physical loss of a given site/feature, the acquisition of a robust archaeological record of a site/feature may be considered to adequately compensate identified, recognised and acceptable harm to a heritage asset in line with industry standard good practice mitigation measures and compatible with the definitions outlined Table 7-7.

7.9.8 It is likely that, subject to agreement with stakeholders, any further site-specific measures will be determined post-consent as the Proposed Development is progressed in a specific and bespoke manner, tailored on a case-by-case/area-by-area basis (as required) and in response to the combination of archaeological and cultural heritage assessment. Opportunities to optimise the programme, including expedient commencement of archaeological work in the immediate post-consent stages would also be sought in ongoing discussion and agreement with the historic environment stakeholders.

## 7.10 Summary

7.10.1 A summary of the sub-topics that have been considered as part of this chapter are provided in Table 7-8.

**Table 7-8: Summary table – Archaeology and cultural heritage**

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| **Designated Heritage Assets** | | | |
| Direct physical effects on designated heritage assets | Scoped in | Scoped out | Physical effects would only occur during the construction phase, and any impacts would have been mitigated for prior to/during construction. |
| Indirect physical effects on designated heritage assets | Scoped in | Scoped out | Physical effects would only occur during the construction phase, and any impacts would have been mitigated for prior to/during construction. |
| Temporary change to the setting of designated heritage assets | Scoped in | Scoped out | Temporary change occurring in the construction period (e.g. visibility of pipeline construction) may give rise to temporary perceptual change in the setting of heritage assets. |
| Permanent change to the setting of | Scoped in | Scoped in | Change to setting caused during construction of the visible elements of the |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| designated heritage assets | | | Proposed Development may persist, albeit at a reduced magnitude, into the operational period and therefore have a permanent effect on heritage setting. Operational activities may also present lasting perceptual change in the setting of heritage assets. |
| **Non-Designated Assets** | | | |
| Direct physical effects on non-designated heritage assets | Scoped in | Scoped out | Physical effects would only occur during the construction phase, and any impacts would have been mitigated for prior to/during construction. |
| Indirect physical effects on non-designated heritage assets | Scoped in | Scoped out | Physical effects would only occur during the construction phase, and any impacts would have been mitigated for prior to/during construction. |
| Temporary change to the setting of non-designated heritage assets | Scoped in | Scoped out | Temporary change occurring in the construction period (e.g. visibility of pipeline construction) may give rise to temporary perceptual change in the setting of heritage assets. |
| Permanent change to the setting of non-designated heritage assets | Scoped in | Scoped in | Change to setting caused during construction of the visible elements of the Proposed Development may persist, albeit it at a reduced magnitude, into the operational period and therefore have a permanent effect on heritage setting. Operational activities may also present lasting perceptual change in the setting of heritage assets. |

# 8 Terrestrial and freshwater biodiversity

## 8.1 Introduction

8.1.1 This chapter outlines the scope and methodology for the assessment of the likely significant effects arising from the construction, operation and decommissioning of the Proposed Development on terrestrial and freshwater biodiversity, which includes designated sites, habitats and protected and notable species. Marine biodiversity is covered in Chapter 9.

8.1.2 Terrestrial and freshwater biodiversity aspects considered within this chapter for the Proposed Development include:

- **Designated sites**: including their associated designated interest features. Designated sites within the Zone of Influence (ZoI) or that are hydrologically connected to the Proposed Development are considered.
- **Habitats**: all habitats, including priority habitats, are considered.
- **Protected and notable species:** species considered to occur within the ZoI for the Proposed Development are considered.
- **Invasive and Non-Native Species (INNS):** INNS are considered for the Proposed Development as a potential effect to terrestrial and freshwater biodiversity receptors.

8.1.3 Within this chapter components of the Proposed Development are considered for their potential to result in likely significant effects on terrestrial and freshwater biodiversity receptors outlined above.

8.1.4 Where it is considered that likely significant effects may occur on receptors as a result of the Proposed Development and associated activities, these matters have been scoped in for further assessment in the ES. A list of the activities and receptors scoped in for further assessment are outlined in section 8.6. Where likely significant effects are not anticipated, receptors and associated components of the Proposed Development are proposed to be scoped out. A list of receptors that it is considered can be scoped out is provided in section 8.7.

## 8.2 Legislation, policy and guidance

8.2.1 The assessment has been carried out in accordance with relevant policy, legislation and guidance. It is recognised that this list is non-exhaustive and will be kept under review to take account of any later legislation or policy changes.

### Legislation

8.2.2 The relevant legislation includes:

- The Conservation of Habitats and Species Regulations 2017 (as amended)
- The Wildlife and Countryside Act 1981 (as amended)
- The Natural Environment and Rural Communities (NERC) Act 2006
- The Environment Act 2021

- Protection of Badgers Act 1992
- The Hedgerows Regulations 1997
- Countryside and Rights of Way Act 2000
- Invasive Alien Species (Enforcement and Permitting Order 2019)

### National policy

8.2.3 The relevant national policies include:

- NPSWRI [4], 2023 paragraphs:
  - Habitats Regulations Assessment (HRA): Paragraphs 3.3.1 to 3.3.5. These paragraphs set out the need for the Applicant to provide sufficient information within the HRA to enable the SoS to discharge their functions as the competent authority.
  - Environmental Net Gain: Paragraphs 3.4.1 to 3.4.4. These paragraphs set out the requirement that projects should consider and seek to incorporate improvements in natural capital, ecosystem services and the benefits they deliver when planning how to deliver BNG. This includes improvements to water quality and reductions in flood risk.
  - Biodiversity and Nature Conservation: Paragraphs 4.3.1 to 4.3.15 and 4.3.17 to 4.2.23. These paragraphs set out the need to consider the full range of potential impacts of the Proposed Development, include appropriate mitigation measures and to clearly set out any likely significant effects on designated sites, protected species and habitats within the assessment.
- NPPF [5] section 15, paragraphs 174-182.
- Environmental Improvement Plan 2023 [53]
- Biodiversity 2020: A strategy for England's wildlife and ecosystem services [103]

### Local policy

8.2.4 Relevant local policies are listed within Table 8-1 may be considered important and relevant to the project. In the event that there is any conflict between these and the NPSWRI, the NPS would prevail.

**Table 8-1: List of relevant local policy – Terrestrial and freshwater biodiversity**

| Local authority | Relevant local policy |
|---|---|
| EHDC | East Hampshire District Local Plan: Joint Core Strategy (2014) [6]<br>• CP21 - Biodiversity<br>• CP22 - Internationally designated sites<br>• CP28 - Green infrastructure<br>Reclaiming Local Plan (2006) [104]<br>• Chapter 3 – Countryside and heritage<br>Biodiversity and Planning Guidance (2021) [105] |

| Local authority | Relevant local policy |
|---|---|
| EBC | Eastleigh Borough Local Plan 2016–2036 (2022) [9]<br>• S9 - Green infrastructure.<br>• DM1 - General criteria for new development.<br>• DM10 - Water and Wastewater.<br>• DM11 - Nature conservation.<br>Securing our Natural Environment: Biodiversity Strategy 2022-2032 [106] |
| FBC | Fareham Local Plan 2037 (2023) [12]<br>• NE1 – Protection of Nature Conservation, Biodiversity, and the Local Ecological Network<br>• NE3 – Recreational Disturbance of the Solent Special Protection Areas<br>• NE4 – Water Quality Effects of the Special Protection Areas, Special Areas of Conservation and Ramsar Sites of the Solent<br>• NE5 – Solent Wader and Brent Goose Sites<br>• NE6 – Trees, Woodland and Hedgerows<br>• NE9 – Green Infrastructure<br>Fareham Local Development Framework – Core Strategy (2011) [107]<br>• CS4 - Green Infrastructure, Biodiversity and Geological Conservation<br>Local Biodiversity Action Plan (LBAP) (2008) [108] |
| HCC | HCC has no local policy, instead they adhere to the NPPF 2021 [5] as outlined under 'National Policy'. |
| HBC | Havant Borough Core Strategy (2011) [17]<br>• DM8 – Conservation, Protection and Enhancement of Existing Natural Features. Updated in the Draft Havant Borough Local Plan 2036 [109] to Policy E2, E10 and E15 – Green Infrastructure, Landscape and the Coast and Ecological conservation respectively.<br>• CS11 – Protecting and Enhancing the Special Environment and Heritage of Havant Borough<br>Draft Havant Borough Local Plan 2036 (2018) [109]<br>• E2 – Green infrastructure<br>• E10 – Landscape and Townscape<br>• E15 – Ecological Conservation<br>• E16 – Solent Special Protection Areas<br>• E17 – Brent Goose and wader roosting sites<br>• E18 – Protected species<br>Havant Borough Biodiversity Strategy (2019) [110]<br>• The Havant Borough Biodiversity Strategy (HBBS) replaces the 2011 Havant Borough Biodiversity Action Plan (BAP) and, like its predecessor, provides a vision and a strategy to both conserve and produce a net gain in, biodiversity throughout the Borough. |

| Local authority | Relevant local policy |
|---|---|
| PCC | Portsmouth Plan (The Portsmouth Core Strategy) (2012) [19]<br>• PCS13 - A Greener Portsmouth<br>Portsmouth Local Plan 2038 (Draft) (2021) [111]<br>• G1 – Biodiversity<br>• G2 – Green Infrastructure |
| WCC | Winchester District Local Plan Part 1 Joint Core Strategy (2013) [56]<br>• CP15 - Green Infrastructure<br>• CP16 - Biodiversity<br>• CP17 - Flooding, Flood Risk and the Water Environment<br>Winchester District Local Plan Part 2 Development Management and Site Allocations (2017) [25]<br>• DM19 - Development and Pollution<br>• DM24 – Special Trees, Important Hedgerows and Ancient Woodlands<br>Winchester District Local Plan 2019-2039 (Emerging) (2022) [112]<br>• NE4 - Green and Blue Infrastructure<br>• NE5 - Biodiversity<br>• NE6 - Flooding, Flood Risk and the Water Environment<br>• NE15 - Special Trees, Important Hedgerows and Ancient Woodlands<br>• NE16 - Nutrient Enrichment and Neutrality |
| SDNPA | South Downs Local Plan (2019) [58]<br>• SD2 - Ecosystem Services<br>• SD9 - Biodiversity and Geodiversity<br>• SD10 - International Sites<br>• SD11 - Trees, Woodland, and Hedgerows |

### Guidance and standards

8.2.5 Relevant guidance and standards which have been used as part of scoping and will also be taken into account as part of the EIA include:

- British Standard (BS) 42020:2013 Biodiversity. Code of practice for planning and development [113];
- Guidelines for Preliminary Ecological Appraisal – 2nd edition [114];
- Guidelines for Ecological Impact Assessment in the United Kingdom (UK) and Ireland 2018 [115]; and
- Standard Advice for Protected Species from Natural England [116].

## 8.3 Engagement

8.3.1 The following stakeholders have responsibility for aspects of terrestrial and freshwater biodiversity and will continue to be engaged as part of the EIA process:

- Eastleigh Borough Council (EBC)
- East Hampshire District Council (EHDC)

- Fareham Borough Council (FBC)
- Hampshire County Council (HCC)
- Havant Borough Council (HBC)
- Portsmouth City Council (PCC)
- South Downs National Park Authority (SDNPA)
- Winchester City Council (WCC)
- Hampshire and Isle of Wight Wildlife Trust (HIWWT)
- Royal Society for the Protection of Birds (RSPB)
- Marine Management Organisation (MMO)
- Natural England (NE)
- Environment Agency (EA)

8.3.2 Along with ongoing engagement, survey protocols were shared with the EA and NE in June 2022. As surveys progress, data will be shared with the EA and NE.

8.3.3 Technical engagement is taking place through EIA Working Groups that have been established for the Proposed Development. For this topic, the Biodiversity and Water Working Group has been established and an introductory meeting was held with this group on 25 May 2022 which was attended by representatives from NE, the EA, EBC, HBC, HCC, WCC and the MMO. Also included within the Biodiversity and Water Working Group are the Forestry Commission, Sussex Inshore Fisheries and Conservation Authority (IFCA), Southern IFCA, PCC, FBC and the SDNPA. An introduction to the proposed approach, key risks and receptors for terrestrial and freshwater biodiversity were presented.

8.3.4 The second EIA Working Group was held on 31 August 2022, presenting the EIA Scoping Report methodology and findings. This included attendance of representatives from NE, the EA, EBC, HBC, HCC, WCC, FBC, EHDC, PCC, Sussex IFCA, and SDNPA.

8.3.5 Following the close of Public Consultation 2022, which was held between 5 July 2022 and 16 August 2022, stakeholder feedback has been received. This feedback is summarised in Table 8-2 and will be considered within the EIA as part of the terrestrial and freshwater biodiversity assessment.

8.3.6 The consultation responses received from statutory and key stakeholders are responded to in broad terms in Table 8-2. None of the responses has required a modification to the proposed survey approach.

**Table 8-2: Public Consultation 2022 response – Terrestrial and freshwater biodiversity**

| Stakeholder | Consultation response | Scoping response |
|---|---|---|
| HCC | Received 16 August 2022.<br>Highlighted the requirement of a Habitats Regulation Assessment (HRA) for any development proposals likely to impact internationally designated sites.<br>Linear projects have the potential to result in the severance of key habitat corridors and consideration will need to be given to the avoidance of such severances. | A HRA will be undertaken as outlined within section 8.8.2.<br><br>Mitigation measures are being incorporated into the Proposed Development to |

| Stakeholder | Consultation response | Scoping response |
|---|---|---|
| | The calcareous grassland and scrub habitats on Portsdown Hill are particularly valuable and support numerous scarce plants, animals and invertebrate species. Corridor routes within these habitats will need to be assessed.<br>Construction works will be required to accord with the mitigation hierarchy (avoid-mitigate-compensation) and the Proposed Development should be guided by a robust assessment of ecological risk. | avoid adverse effects on habitats and species. |
| WCC | Received 16 August 2022<br>Measurable BNG must be achieved and evidenced in accordance with relevant legislation and local policy.<br>Highlighted the risk of accidental construction impacts on the River Itchen SSSI and the River Hamble. WCC is supportive of tunnelling beneath these watercourses to reduce potential construction risks. WCC seeks further details on the construction methodology at future consultation events.<br>Wildlife corridors to be assessed as part of future surveys and mitigation assessments. | BNG is being incorporated into the Proposed Development with a BNG target of 10%.<br><br>Mitigation measures are being be incorporated into the Proposed Development to avoid adverse effects on designated sites and habitats. |
| NE | Received 12 August 2022<br>NE are broadly supportive of the Proposed Development at this stage. Continued engagement is required to ensure any potential impacts to designated sites, protected landscapes and priority habitats are considered.<br>The main areas of concern for NE are the impact of the proposed WRP associated pipeline corridors through the River Itchen SAC & SSSI and those of the River Meon. NE advises that river crossings should be kept to a minimum and suitable methods implemented to limit impacts to river and wetland habitats.<br>NE seeks more information on potential impacts on sites identified under the Solent Waders and Brent Geese Strategy for overwintering birds.<br>NE outline that construction works within corridors P and O require a specialist contractor to ensure Bechstein bat *Myotis bechsteinii* foraging routes which are found in the nearby ancient woodland are not impacted. | Mitigation measures are being incorporated into the Proposed Development to avoid adverse effects on designated sites and habitats.<br><br>Construction works will be undertaken in accordance with industry best practice to avoid adverse effects on protected species including bats. |
| Woodland Trust | Received 10 August 2022<br>The Woodland Trust (WT) have outlined that no ancient/veteran trees should be lost as a result of the Proposed Development. In addition, the WT highlight that the Proposed Underground Pipeline has the potential to cause significant impacts to ancient woodland from potential direct and indirect construction works. | Mitigation measures are being incorporated into the Proposed Development to avoid adverse impacts on woodlands and ancient/veteran trees. |

| Stakeholder | Consultation response | Scoping response |
|---|---|---|
| | Any non-ancient woodlands impacted by the Proposed Development are reviewed to ensure any areas of unmapped ancient woodland are accounted for as the design evolves.<br>Root systems, stems and canopies all need allowance for future movement and growth and should be taken into account in all proposed works for the Proposed Development. Measures should be incorporated into the design using BS5837: 2012 – Trees in relation to design, demolition and construction. | Construction will will be undertaken in accordance with industry best practice to avoid adverse effects on trees. |

## 8.4 Approach to scoping

### Study area

8.4.1 The study area comprises the Scoping Area plus a buffer, the size of which is dependent on the ZoI of the relevant ecological feature. The ZoI is defined as the area in which ecological features (including habitats and species) could be affected by biophysical changes as a result of the Proposed Development [115]. The ZoI is likely to extend beyond the Scoping Area, for example where there is hydrological or habitat connectivity. The ZoI will vary for different ecological features depending on their sensitivity to an environmental change, or the extent of their range.

8.4.2 The Scoping Area consists of the Proposed Development described in Chapter 3 Description of the Proposed Development.

8.4.3 The study areas outlined in Table 8-3 have been used to gather information on ecological receptors for the Desk Study which have the potential to be adversely effected by the Proposed Development. The geographical area for obtaining ecological data has been informed by design information, accepted best practice and field survey guidance.

**Table 8-3: Terrestrial and freshwater biodiversity Desk Study areas**

| Ecological Receptor | Distance from Scoping Area | Justification |
|---|---|---|
| Statutory international and national designated nature conservation sites, including SAC, SPA, Ramsar sites, SSSI, NNR and LNR. | 2km | In accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Preliminary Ecological Appraisal 2nd edition [115]. |
| SACs designated for bat populations. | 10km | In accordance with the Bat Conservation Trust Good Practice Guidelines [117]. |

| Ecological Receptor | Distance from Scoping Area | Justification |
|---|---|---|
| Statutory designated nature conservation sites that are hydrologically linked to the Proposed Development. | Downstream sites, groundwater dependant sites; determined by professional judgement | Considered sufficient to ensure that all likely significant effects are identified within the ZoI. |
| Protected and notable species biological records. | 2km | In accordance with the CIEEM Guidelines for Preliminary Ecological Appraisal 2nd edition [115]. |
| Non-statutory locally designated nature conservation sites including Sites of Interest for Nature Conservation (SINC) and Road Verges of Ecological Importance (RVEI). | 2km | Considered sufficient to ensure that all likely significant effects on these receptors are identified. |
| Habitats and botanical features, including priority habitats. | 200m | Considered the maximum distance for risk of indirect effects via air and water. |

### Survey area

8.4.4 Due to the size of the study area, it would not be appropriate to survey it in its entirety. Field surveys will be undertaken within the survey area which comprises:

- A 50m buffer from the Scoping Area for terrestrial habitats and protected/notable species; and
- A 200m buffer for watercourses up- and downstream of the Scoping Area.

8.4.5 Where required, surveys will be conducted on ecological features within the predicted ZoI of the Proposed Development that are known or likely to be present based on best practice guidance.

8.4.6 Based on the nature of the Proposed Development and the current design, the initial survey areas have been deemed sufficient based on relevant guidance and best practice. Additional survey areas for ecological receptors might be required if the design of the Proposed Development is amended or evidence of protected/notable species are identified during surveys.

8.4.7 The location of the temporary construction compounds (as described in Chapter 3 Description of the Proposed Development) is not known at this time of writing. This is expected to be an existing consented site and may be situated outside of the Scoping Area. The effects of the hub on terrestrial and freshwater biodiversity on will be assessed as part of the Terrestrial and freshwater biodiversity assessment reported in the ES.

### Sources of baseline data

8.4.8 Data used to inform the baseline set out in this chapter is outlined in Table 8-4.

**Table 8-4: Sources of baseline data – Terrestrial and freshwater biodiversity**

| Data source | Date data accessed/received | Contents |
|---|---|---|
| Hampshire Biological Information Centre (HBIC) | January 2023 | Biological records data<br>Priority habitats<br>Solent Waders and Brent Goose strategy sites<br>Ecological Network Mapping<br>Local sites |
| NE | April 2023 | Statutory designated sites<br>Ancient Woodland Inventory [118] |
| APEM | July 2021 | Flyover Phase 1 imagery data and 3D aerial imagery |
| Maps for Draft Havant Borough Local Plan 2036 | March 2022 | Bat species data |
| Woodland Trust | March 2022 | Ancient Tree Inventory [119]. |
| EA | January 2022 | The Ecology and Fish data explorer<br>WFD River Waterbody Catchments Cycle 2 [120] |
| Ordnance Survey (OS) | February 2023 | Open Rivers Dataset [121] |
| Multi-Agency Geographic Information for the Countryside (MAGIC) [121] | April 2023 | Granted European Protected Species (EPS) Licences [78] |

## 8.5 Baseline conditions

8.5.1 This section considers the baseline conditions for the study area as a whole, rather than for each individual component of the Proposed Development. This has been undertaken to avoid repetition and double counting of designated sites and biological records (where these may be within the distances defined above for multiple components of the Proposed Development).

### Proposed Development wide conditions

*Statutory designated sites*

8.5.2 A total of 11 internationally designated sites (known collectively as National Site Network (NSN) sites) are either within 2km of the Scoping Area and/or have a hydrological connection to it. They are:

- River Itchen SAC
- Chichester and Langstone Harbours SPA and Ramsar

- Solent Maritime SAC
- South Wight Maritime SAC
- Solent and Isle of Wight Lagoons SAC
- Portsmouth Harbour SPA and Ramsar
- Solent and Southampton Water SPA and Ramsar
- Solent and Dorset Coast SPA

International sites that are hydrologically connected to and/or are within 2km of the Scoping Area are shown on Figure 8.1 within Volume III and detailed within Appendix 8-1.

8.5.3 No SACs designated for bats are located within 10km of the Scoping Area. The closest SAC designated for bats is Singleton and Cocking Tunnels SAC and Mottisfont bats SAC located 15.2km north-east and 15.6km north-west from the Scoping Area respectively.

8.5.4 Associated with the coastal SPAs, there are 61 Solent Waders and Brent Goose Strategy sites within 2km of the Scoping Area. These are sites outside of the boundaries of Chichester and Langstone Harbour SPA and Portsmouth Harbour SPA but which are essential roosting or feeding sites identified as being key to achieving favourable conservation status for the Solent's SPAs and Ramsar sites. There are 14 of these sites located within the Scoping Area which are shown on Figure 8.1 within Volume III.

8.5.5 A total of 31 national statutory designated sites are within 2km of the Scoping Area and/or have a hydrological connection to it. These comprise 16 SSSIs and 15 LNRs. These are shown on Figure 8.1 within Volume III and detailed within Appendix 8-2. SSSI Impact Risk Zones will be fully reviewed and considered within the EIA.

*Non-statutory sites*

8.5.6 There are 434 non-statutory designated sites within 2km of the Scoping Area. These consist of 429 Sites of Importance for Nature Conservation (SINC) and five Road Verges of Ecological Importance (RVEI) including one combined SINC and RVEI. Of these, 135 sites are within 200m of the Scoping Area and are shown on Figure 8.2 in Volume III. In total there are 57 non-statutory sites that are wholly or partially located within the Preferred Pipeline Corridor.

8.5.7 Non-statutory designated sites within 200m the Scoping Area and criteria outlining the justification for non-statutory site designation within Hampshire are listed within Appendix 8-3.

*Habitats*

8.5.8 This section provides a summary of the broad habitat types currently identified within the Scoping Area. The habitats described in this section follows the UK Habitats Classification system [122]. Linear habitat features within the Scoping Area consist of hedgerows, ditches and major watercourses. Information regarding waterbodies have been obtained from the OS Open Rivers dataset [121].

Hedgerow locations within the Scoping Area have been informed by assessment of pre-existing aerial photography and surveys.

8.5.9 The Scoping Area encompasses a total of 2232ha. All habitats which have been classified from surveys or APEM aerial flyover data in 2021 are shown in Table 8-5. This flyover data is being ground-truthed and surveyed to undertake a condition assessment. Habitats within the wider study area that have been surveyed to date have predominantly consisted of modified grassland (491ha) and arable fields (452ha). Other frequent habitats include other neutral grassland and woodlands. All habitats which have been surveyed within the Scoping Area are shown in Table 8-5.

8.5.10 There are sections within the Scoping Area where habitat classifications were not generated by the APEM flyover data. The total area for this is 581 hectares, which is 26% of the Scoping Area. These areas include 234 hectares within Havant Thicket Reservoir, which is 10.4% of the Scoping Area. This area has not been subject to survey due to the commencement of preconstruction activities associated with the Havant Thicket Reservoir project. In addition to this, there are areas within the Scoping Area that were not part of the flyover route in 2021 and have yet to be surveyed. Finally, there area locations where areas have not been assigned a habitat type by the APEM data. These consist predominantly of arable or pasture fields where an accurate categorisation was not possible. These are being surveyed in 2023.

**Table 8-5: Habitats within the Scoping Area**

| Habitat | Hectares present and corresponding % coverage of the Scoping Area |
|---|---|
| Modified grassland | 846.3 (37.91%) |
| Cropland | 631.8 (28.3%) |
| Woodland | 141.1 (6.32%) |
| Neutral grassland | 90.9 (4.08%) |
| Urban | 51.9 (2.33%) |
| Rivers and lakes | 12.3 (0.56%) |
| Heathland and shrub | 12.2 (0.55%) |
| Wetland | 0.8 (0.4%) |
| Coniferous woodland | 2.3 (0.1%) |
| Sparsely vegetated land | 1.3 (<0.1%) |
| Unidentified habitats (to be mapped and surveyed) | 581.39 (26.04%) |

Source: APEM 2022 and Southern Water surveys 2022-Present

*Hedgerows*

8.5.11 The Desk Study identified 110.8km of species rich, species poor and defunct hedgerows within the Scoping Area. Further hedgerow surveys will be undertaken within the study area where there is the potential for likely significant effects as a result of the alignment of the Proposed Underground Pipeline.

*Ancient Woodland*

8.5.12 There are 81 areas of Ancient Woodland within 200m of the Scoping Area, which include ancient and semi-natural woodland and ancient replanted woodland. A total of 16 ancient trees have currently been identified within 200m of the Scoping Area.

*Priority habitats*

8.5.13 Priority habitats identified within 200m of the Scoping Area are shown on Figure 8.3 within Volume III and include:

- Lowland mixed deciduous woodland
- Coastal and floodplain grazing marsh
- Lowland meadows
- Lowland calcareous grassland (including calcareous grassland at Portsdown Hill)
- Lowland dry acid grassland
- Purple moor grass *Molinia caerulea* and rush pastures
- Wet woodland
- Coastal sand dunes
- Coastal saltmarsh
- Coastal vegetated shingle
- Intertidal mudflats
- Reedbeds
- Wood-pasture and parkland
- Species-rich hedgerows
- Ponds which may qualify as priority habitats

*Watercourses and waterbodies*

8.5.14 There are 35 watercourses within the Scoping Area. Rivers within the Scoping Area include the River Itchen, River Meon, River Hamble, Wallington River, Moors Steam, Horton Heath Stream, Brockhampton Stream, Hermitage Stream, Potwell Tributary, Bow Lake and the Itchen Navigation.

8.5.15 The Desk Study identified 42 ponds and 219 drainage ditches within the Scoping Area. There are 90 ponds and 310 drainage ditches within 200m of the Scoping Area.

*Flora*

8.5.16 Although predominantly arable, there are a range of habitats within 200m of the Scoping Area that could support notable and rare flora including woodland, arable field margins and floodplain meadows.

8.5.17 The NERC Act (2006) places the duty on every local authority to conserve and enhance biodiversity. Section 40 refers to the restoration and enhancement of

populations and habitats, whilst Section 41 requires the SoS to produce a list of species and habitats of principal importance for the conservation of biodiversity in England. Records of species of principal importance on the list published under Section 41 of the NERC Act (2006) were returned within 2km of the Scoping Area namely, annual knawel *Scleranthus annuus*, basil thyme *Clinopodium acinos*, Borrer's saltmarsh-grass *Puccinellia fasciculata*, chalk eyebright *Euphrasia pseudokerneri*, chamomile *Chamaemelum nobile*, cornflower *Centaurea cyanus*, divided sedge *Carex divisa*, fly orchid *Ophrys insectifera*, red hemp-nettle *Galeopsis ladanum* var. *angustifolia*, sea barley *Hordeum marinum,* slender hare's ear *Bupleurum tenuissimum* and small cordgrass *Spartina maritima*

8.5.18 The Desk Study returned one species listed under Annex 5 of the EU Habitats Directive (butcher's broom *Ruscus aculeatus*) and there were 68 instances within 2km of the Scoping Area.

### *Species*

#### *Amphibians*

8.5.19 The Scoping Area and surrounding landscape consists of both aquatic and terrestrial habitat suitable for foraging, commuting, hibernating and breeding great crested newt *Triturus cristatus* (GCN). Habitats include woodland, hedgerows, scrub, grassland, arable field margins, ponds and drainage ditches.

8.5.20 The Desk Study returned 38 records of GCN within 2km of the Scoping Area. The closest record is located 421m from the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW.

8.5.21 A total of 11 EPS mitigation licences for GCN have previously been granted by NE within 2km of the Scoping Area, with the closest located 400m from Havant Thicket Reservoir.

8.5.22 The Desk Study also returned 12 records of common toad *Bufo bufo* within 2km of the Scoping Area. The closest of which is located within the Havant Thicket Reservoir.

#### *Badger*

8.5.23 The network of field boundary hedgerows and scrub that exist within the Scoping Area provide suitable shelter, foraging opportunities and connectivity for Eurasian badger *Meles meles* between woodland patches and open countryside.

8.5.24 The Desk Study returned 28 records of badger within 2km of the Scoping Area. The closest record is located within the Scoping Area. In addition, several badger setts have been recorded during surveys in 2022 and 2023.

#### *Bats*

8.5.25 The Scoping Area includes habitats suitable for foraging, commuting and roosting bats, including woodland, lines of trees, hedgerows, grassland, scrub and waterbodies.

8.5.26 The Desk Study returned 2,298 records of bats within 2km of the Scoping Area. These comprise 15 species, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *P. pygmaeus*, Nathusius pipstrelle *P. nathusii*, Leisler's bat *Nycatlus leisleri*, noctule *N. noctula*, serotine *Eptesicus serotinus*, greater horseshoe bat *Rhinolophus ferrumequinum*, brown long-eared bat *Plecotus auritus*, Alcathoe bat *Myotis althacoe*, Brandt's bat *M. brandtii*, Bechstein's bat, Daubenton's Bat *M. daubentonii*, Natterer's bat *M. nattereri*, whiskered bat *M. mystacinus* and western barbastelle *Barbastella barbastellus*.

8.5.27 There are 208 records located within the Scoping Area which include Alcathoe bat, Bechstein's bat, common pipistrelle, Daubenton's bat, long-eared bat, Nathusius pipistrelle, Natterer's bat, noctule bat, serotine bat, soprano pipistrelle, western barbastelle, whiskered bat and Brandt's bat.

8.5.28 As identified on MAGIC three granted EPS mitigation licences for bats within the Scoping Area; one covering brown long eared and common pipistrelle, one covering soprano pipistrelle and one covering for brown long eared, common pipistrelle and soprano pipistrelle. A further 81 granted EPS mitigation licences for bats were identified within 2km of the Scoping Area.

*Birds*

8.5.29 The Desk Study returned 59,602 records of birds within 2km of the Scoping Area.

8.5.30 A total of 5,332 records of 48 species listed under Annex I of the Birds Directive were returned within 2km of the Scoping Area. A total of 7,225 records of 55 species listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) were returned within 2km of the Scoping Area. A total of 2,578 records of 26 species listed as species of principal importance under Section 41 of the NERC Act (2006) were identified within 2km of the Scoping Area.

8.5.31 In addition, the mosaic of open countryside, hedgerows, woodland and watercourses that make up the Scoping Area and surrounding landscape provide nesting and foraging habitats for a wide range of bird species.

*Eurasian beaver*

8.5.32 There are numerous watercourses and woodland habitats within the Scoping Area which provide suitable shelter, commuting and foraging opportunities for Eurasian beaver *Castor fiber*.

8.5.33 The Desk Study returned no records of Eurasian beaver within 2km of the Scoping Area.

*Hazel dormouse*

8.5.34 Although predominantly an arable landscape, the Scoping Area is regularly crossed by hedgerows and treelines. These often connect to both small and large woodland blocks within the wider landscape and provide an extensive network of habitats for hazel dormouse *Muscardinus avellanarius* to forage, breed, shelter and transverse through.

8.5.35 The Desk Study returned 34 records of hazel dormouse within 2km of the Scoping Area. The closest record is located 49m from the Scoping Area.

8.5.36 The Desk Study identified 11 granted EPS licences for hazel dormouse within 2km of the Scoping Area, with the closest located 190m from the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW.

8.5.37 In addition, to date, the presence of hazel dormouse has been confirmed at 12 survey sites out of a total of 28 across the Scoping Area.

*Terrestrial invertebrates*

8.5.38 The Desk Study returned 1,391 records of notable terrestrial invertebrates from within 2km of the Scoping Area. These comprised 162 species of nine orders: Coleoptera (beetles), Diptera (flies), Lepidoptera (butterflies and moths), Hymenoptera (bees, wasps, sawflies and ants), Araneae (spiders), Blattaria (cockroaches), Dermaptera (earwigs) and Hemiptera (bugs).

8.5.39 There were 99 records of 16 species located within the Scoping Area representing three orders (Coleoptera, Lepidoptera and Hymenoptera). Of these species, one is Nationally Rare, 10 are Nationally Scarce, one is Red Data Book 2 (RDB2) and four are listed under S41.

8.5.40 One of the species listed is the nationally rare alder leaf beetle (*Agelastica alni*). While still uncommon, this species has shown a significant increase in range since its rediscovery in Britain in 2003 and it is widely accepted that it may now not even meet the criteria for Nationally Scarce. A formal status review is in progress but a reporting date is not currently known.

*Freshwater invertebrates*

8.5.41 The Desk Study returned very few records of freshwater invertebrates from within 2km of the Scoping Area. Only two species of those listed are recognised as having an aquatic larval stage – both from the Order Diptera; the dark giant horsefly *Tabanus sudeticus* and the soldier-fly *Stratiomys potamida,* found increasingly in silt beds of slow river pools and in floating vegetation of very shallow ponds and ditches respectively. Both species are considered Nationally Scarce.

8.5.42 Although no records were returned in the Desk Study, the southern damselfly *Coengrion mercuriale* should be considered a species of interest, as it is an Annex II species listed for the River Itchen SAC, and the Itchen Valley constitutes a major European stronghold for this species. It also represents a population in a managed chalk-river flood plain, an unusual habitat for this species in the UK, rather than its typical heathland habitat. A separate feasibility study undertaken in 2021 identified suitable habitat was also present in the River Meon catchment for this species.

8.5.43 Of the eight riverflies that are considered species of principal importance under S41 of the NERC Act (2006), there is suitable habitat for the southern iron blue mayfly (*Baetis niger*) in the flowing rivers in the Scoping Area. However, the Desk Study returned no records for this species.

8.5.44 White-clawed crayfish were formerly widespread in Hampshire's chalk streams but are now restricted to only three small populations including the River Itchen SAC

where suitable habitat is present. The Desk Study returned no records of white-clawed crayfish within 2km of the Scoping Area.

*Otter*

8.5.45 The Desk Study returned 34 records of Eurasian otter *Lutra lutra* within 2km of the Scoping Area, none of which were related to otter holts. The closest record is located 857m from the Scoping Area.

8.5.46 The Desk Study records indicate otter presence along the River Meon, the River Itchen and the River Hamble, which all fall within the Scoping Area. River Itchen SAC, SSSI 'is considered to support a significant presence of otter' as outlined in the designation reasoning.

*Reptiles*

8.5.47 The Scoping Area contains suitable foraging, sheltering, breeding and hibernation habitat for common reptile species. This includes woodland, hedgerow, scrub, grassland habitats. The presence of waterbodies also provides suitable grass snake *Natrix helvetica* foraging habitat.

8.5.48 The Desk Study returned 107 records of slow worm *Anguis fragilis* within 2km of the Scoping Area. The closest record is located 77m from Havant Thicket Reservoir.

8.5.49 There are 21 records of common lizard *Zootoca vivipara* within 2km of the Scoping Area. The closest record is located 77m from Havant Thicket Reservoir.

8.5.50 There are 21 records of adder *Vipera berus* within 2km of the Scoping Area. The closest record is located within the scope of the reservoir. There are 31 records of grass snake within 2km of the Scoping Area. The closest record is located within the Havant Thicket Reservoir.

*Water vole*

8.5.51 The Scoping Area contains waterbodies suitable for water vole burrowing, foraging and breeding. These include ponds, ditches and wetland habitats.

8.5.52 The desk study returned 44 records of European water vole *Arvicola amphibius* within 2km of the Scoping Area. The closest record is located within the Scoping Area.

*Other notable species*

8.5.53 The Desk Study returned 147 records of west European hedgehog *Erinaceus europaeus* within 2km of the Scoping Area. The closest record is located within the Scoping Area.

8.5.54 The Desk Study also returned three records of brown hare *Lepus europaeus* within 2km of the Scoping Area. The closest record is located 150m of the Scoping Area.

8.5.55 The Desk Study returned three records of harvest mouse *Micromys minutus* within 2km of the Scoping Area. The closest record is located within the Scoping Area.

*Legally controlled/invasive species*

8.5.56 There are 2,789 records of Invasive Non-Native Species (INNS) within 2km of the Scoping Area.

8.5.57 A total of 45 records were located within the Scoping Area, which includes 16 records of species listed under either Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) or the Invasive Alien Species (Enforcement and Permitting) Order 2019. Notable species included Japanese rose *Kerria japonica*, few flowered garlic *Allium paradoxum*, montbretia *Crocosmia x crocosmifolia*, Japanese knotweed *Fallopia japonica*, Himalayan balsam *Impatiens glandulifera*, wall cotoneaster *Cotoneaster horizontalis*, three cornered garlic *Allium triquetrum*, water fern *Azolla filiculoides* and Nuttall's waterweed *Elodea nuttallii*.

## 8.6 Scoping of potential effects

8.6.1 The Proposed Development has the potential to affect biodiversity, during construction, operation and decommissioning.

8.6.2 Effects from decommissioning of the Proposed Development are expected to be no greater than those identified during the construction phase and are therefore assessed as being the same as construction effects as a worst-case scenario. Further information on decommissioning is provided in Chapter 3 Description of the Proposed Development, section 3.7.

### Effects scoped into the assessment

8.6.3 The likely significant effects of the Proposed Development that will be subject to further assessment are set out for the construction and operational phases. These are presented in Table 8-6 and Table 8-7.

*Construction effects*

8.6.4 Likely significant effects on terrestrial and freshwater biodiversity during construction of the Proposed Development and which will be assessed as part of the EIA process and reported in the ES are shown in Table 8-6.

Table 8-6: Scoped in effects (construction) – Terrestrial and freshwater biodiversity

| Potential effects | Likely significant effect on receptor | Rationale |
|---|---|---|
| **Statutory designated sites** | | |
| Potential temporary direct effects on designated sites due to airborne pollution within 200m of the Scoping Area, run-off to hydrologically connected sites and compaction of root systems. | Yes | Emissions from vehicles or plant and dust from construction activities associated with the Proposed Development may result in deposition on designated sites within 200m of the Proposed Development (a total of nine NSNs and 31 sites of national importance). 200m is considered an appropriate cut off for linear schemes such as this [67].<br>Run-off associated with construction activities may have an impact pathway to hydrologically connected designated sites.<br>Compaction of tree root systems may occur where designated sites are within or adjacent to the Scoping Area. |
| Potential for indirect effects on designated sites due to effects on hydrology. | Yes | There is a risk of changes to water flows, quality or quantities during construction of the Proposed Development, due to the presence of groundwater dependant designated sites including the River Itchen SAC, causing habitat degradation or loss. |
| Potential for indirect effects on designated sites due to disturbance of qualifying species. | Yes | The use of temporary construction lighting may adversely affect nocturnal species through disturbance and displacement. There is also potential for construction works to result in increased visual, noise and vibrational effects which may disturb protected and/or notable species which are qualifying features of designated sites. For example, otter, which are a qualifying feature for the River Itchen SAC. |
| **Non-statutory designated sites** | | |
| Potential indirect temporary effects on designated sites due to airborne pollution and run-off. | Yes | Emissions and associated runoff, from vehicles or plant and dust from construction activities associated with the construction of the proposed WRP and the Preferred Pipeline Corridor may result in deposition on habitat within and adjacent to the Proposed Development. There are 57 non-statutory sites that are wholly or partially located within the Preferred Pipeline Corridor which could be indirectly affected due to airborne pollution and run off. |

| Potential effects | Likely significant effect on receptor | Rationale |
|---|---|---|
| Potential for indirect effects on designated sites due to effects on hydrology. | Yes | There is a risk of changes to water flows, quality, or quantities during construction of the Proposed Development, causing habitat degradation or loss during construction. There are 57 non-statutory sites that are wholly or partially located within the Preferred Pipeline Corridor which could be indirectly impacted due to effects on hydrology. |
| Potential direct temporary damage or loss of, or changes to, habitats within non-statutory designated sites. | Yes | There is a risk of causing habitat degradation, changes in hydrology and water quality and loss and severance of commuting and foraging habitats during construction. For instance, the damage or loss of hedgerows. |
| Potential permanent, direct loss of habitats, including priority habitats. | Yes | Land take would be required for the construction of any new above ground infrastructure resulting in the loss of habitats. This may result in localised loss of habitat within non-statutory sites. For instance, the loss of priority habitats such as lowland mixed deciduous woodland and or coastal and floodplain grazing marsh which are located within the Scoping Area. |
| **Habitats** | | |
| Potential permanent, direct loss of habitats, including priority habitats. | Yes | Land take would be required for the construction of any new above ground infrastructure resulting in the loss of habitats. This may result in the severance of habitats, causing habitat fragmentation and a loss in ecological connectivity. |
| Potential indirect temporary effects on habitats, including priority habitats, due to hydrological changes. | Yes | There is a risk of causing habitat degradation or loss due to changes in hydrology and water quality. |
| Potential direct temporary damage or loss of, or changes to, habitats, including priority habitats. | Yes | There is a risk of causing habitat degradation, and loss and severance of commuting and foraging habitats during construction. |
| Potential indirect temporary effects on habitats, including priority habitats, due to airborne pollution and surface run-off. | Yes | Emissions, including vehicle and plant, and dust from construction activities associated with the construction of the proposed WRP and the Preferred Pipeline Corridor may result in deposition on habitat within and adjacent to the Proposed Development. |

| Potential effects | Likely significant effect on receptor | Rationale |
|---|---|---|
| **Protected and notable species** | | |
| Potential killing and injury of protected and notable species. | Yes | Installation of the Preferred Pipeline Corridor and the construction of the proposed WRP may result in the killing and injury of protected or notable species. |
| Potential disturbance of protected and notable species due to visual effects associated with construction activities. | Yes | The use of temporary construction lighting may adversely affect nocturnal species (for example, bats, otters and/or badgers) through disturbance and displacement. |
| Potential disturbance of protected and notable species due to noise effects associated with construction activities. | Yes | Noise generated as a result of the construction of the proposed WRP may adversely affect species (for example, bats, otters and/or badgers) through disturbance and displacement. |
| Potential disturbance/displacement of protected and notable species through habitat loss. | Yes | Construction activities such as vegetation clearance have the potential to cause disturbance to protected or notable species. The temporary and permanent habitat loss required for the construction of the Proposed Development may result in the reduction of available habitat and in the isolation or severance of habitats. |
| Potential displacement of protected and notable species through fragmentation. | Yes | Construction activities associated with the installation of the Preferred Pipeline Corridor could lead to the reduction in the availability of foraging and commuting habitat and resting and breeding sites for protected or notable species (e.g. bats and/or dormice). |
| Potential introduction and or spread of non-native species and disease | Yes | The construction of the Proposed Development may result in the unintentional spread of unknown invasive non-native species or diseases. Known species within the study area include Japanese rose, few flowered garlic, montbretia, Japanese knotweed, Himalayan balsam, wall cotoneaster, three cornered garlic, water fern and Nuttall's waterweed. |

### Operation effects

8.6.5 Likely significant effects on terrestrial and freshwater biodiversity during construction of the Proposed Development and which will be assessed as part of the EIA process and reported in the ES are shown in Table 8-7.

**Table 8-7: Scoped in effects (operation phase) – Terrestrial and freshwater biodiversity**

| Potential effects | Likely significant effect on receptor | Rationale |
|---|---|---|
| **Statutory designated sites** | | |
| Potential hydrological effects to designated sites and the surrounding area. | Yes | There is a risk of likely significant effects associated with changes to the flow or quantity of water entering watercourses as a result of the operation and maintenance activities of Proposed Development. |
| **Habitats** | | |
| Potential hydrological effects to the surrounding habitats, including priority habitats | Yes | There is a risk of likely significant effects associated with increased flows or quantities of water entering watercourses or feeding reliant habitats during the operation and maintenance activities of the Proposed Development. |
| **Protected and notable species** | | |
| Potential effect on protected or notable species through increased disturbance at the proposed AGP. | Yes | The Proposed Development may result in increased levels of disturbance, depending on the activity this may comprise visual, vibration and noise disturbance. |
| Potential effect on protected or notable species through hydrological changes | Yes | There is a risk of changes to flow or quantity of water entering watercourses as a result of the operation and maintenance activities of the Proposed Development which could effect freshwater species. |
| Potential introduction and or spread of non-native species and disease | Yes | Potential release of invasive non-native species during routine maintenance activities and washouts. |

## 8.7 Effects scoped out of the assessment

### Construction and operation effects

8.7.1 The ecological receptors listed in Table 8-8 are proposed to be scoped out of the EIA because appropriate mitigation will be undertaken at a project wide level.

Table 8-8: Ecological receptors scoped out of the assessment

| Ecological receptor | Construction Phase | Operational Phase | Justification |
|---|---|---|---|
| Designated sites over 200m from the Scoping Area (excluding NSNs SSSIs and those hydrologically connected to the Proposed Development) as shown on Figure 8.1 and 8.2 in Volume III respectively. | Scoped out | Scoped out | Given the distance and lack of potential pollution pathways present no likely significant effects are anticipated on designated sites over 200m from the Scoping Area during the construction phase. The implementation of best practice measures would ensure no adverse effects on designated sites over 200m from the Scoping Area. 200m is considered an appropriate cut off for linear schemes such as this [67].<br><br>No likely significant effects to these sites are anticipated once the Proposed Development is operational due to the nature of the Proposed Development and the lack of potential pollution pathways present. |
| Eurasian Beaver | Scoped out | Scoped out | Given the absence of records of beaver and the fact that the catchments within the study area are not connected to any known release sites, this species is not considered to be present within the Scoping Area and has been scoped out of the EIA. |
| GCN | Scoped out | Scoped out | Any likely significant effects on this species would be mitigated through the use of a District Level Licence (DLL) which is an approved licensing and mitigation approach endorsed and regulated by NE. An application for a DLL will be made as part of the Proposed Development to ensure no adverse effects occur to this species during the construction phase. No operational likely significant effects are anticipated on this species due to the nature of the Proposed Development and the lack of potential impact pathways present.<br><br>A feasibility study has been carried out by NatureSpace, which operates DLL in Hampshire on behalf of NE; this study confirmed that use of DLL is appropriate for the Proposed Development. NE have been informed of this have raised no objections to the use of DLL. |

| Ecological receptor | Construction Phase | Operational Phase | Justification |
|---|---|---|---|
| Terrestrial invertebrates | Scoped out | Scoped out | Given the relatively small number of records of notable terrestrial invertebrates identified in the desk study and the habitats to be crossed by the Proposed Development, it is considered highly unlikely that the assemblages present are of sufficient importance to result in likely significant effects. Additionally, the habitats to be affected by the Proposed Development are widespread throughout the Scoping Area and as such, it is anticipated that despite temporary habitat losses there would be sufficient habitat remaining in any one location to sustain the assemblages present. As such, likely significant effects on this group are considered to be extremely unlikely and they are scoped out from the EIA. |

8.7.2 The Proposed Development is currently in its preliminary design phase and further surveys are ongoing. As such, it is not possible to scope out any other receptors outlined in this chapter.

## 8.8 Approach to assessment

8.8.1 The study areas for the assessment of likely significant effects from the Proposed Development are outlined in section 8.4. The study areas for additional baseline data collection in relation to future planned surveys, outlined in the following section, vary dependant on each survey and will be defined in the technical appendices once produced However, these are consistent with the study areas outlined within this report.

### Habitats Regulations Assessment

8.8.2 A HRA will be provided as required by the Conservation of Habitats and Species Regulations 2017 (as amended). The HRA focuses solely on NSNs and follows a methodology that is different to the assessment approach presented below. National Site Network sites are considered both within the EIA and HRA processes and, although the end conclusions are common, the steps taken to reach these end points and the terms used to describe the outcomes differ.

8.8.3 National Site Network sites include:

- SACs
- SPAs
- A site of community importance which has been placed on the list of sites of Community importance
- A site (possible SAC) that has been approved for consultation by the Government but has yet to be submitted to the European Commission
- A site (potential SPA) that has been approved for consultation by the Government but is not yet classified
- A site which has been proposed to the European Commission until such time as the site is placed on the list of sites of Community importance or agreement is reached or a decision is taken not to place the site on that list (candidate SAC)

8.8.4 The NPPF [5] extends the protection afforded to habitat sites to listed or proposed Ramsar sites.

8.8.5 The HRA is a staged and iterative process. The European Commission's Methodological guidance on the implementation of Article 6(3) of the Habitats Directive (92/43/EEC) defines four distinct stages of an HRA, which are as follows:

- **Stage 1 - Screening**: Screening for Likely Significant Effects (LSE). Stage 1 sets out which habitat sites may experience LSE in the absence of mitigation. The habitat sites identified at the screening stage where LSE are anticipated will be taken forward to Stage 2 (Appropriate Assessment).

- **Stage 2 - Appropriate Assessment**: If Stage 1 identifies LSE, it is necessary to assess the implications of the Project with respect to the conservation objectives of the affected habitat site(s).
- **Stage 3 - Assessment of alternatives**: A consideration of alternative solutions is required if it cannot be excluded beyond reasonable scientific doubt that there will be an adverse effect on the integrity of the affected habitat site.
- **Stage 4 - Consideration of Imperative Reasons of Overriding Public Interest (IROPI)**: If there are no alternative solutions, an assessment of IROPI is required.

8.8.6 Consultation will be undertaken with NE to agree the scope of the HRA, which will be produced as a standalone document and referred to within the ES. The HRA will be undertaken in accordance with Planning Inspectorate (2022) Advice Note Ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects, (Version 9) [123].

### Additional baseline data collection

8.8.7 The gathering of further baseline data will include undertaking surveys to provide information on the distribution of protected and notable habitats and species. Additional surveys are currently planned and/or underway to obtain baseline data relevant to the Proposed Development. The study area for these surveys is as described in section 8.4. The purpose of this is to provide the basis for a robust assessment to be undertaken for the Proposed Development. Additional baseline information will be obtained through the following surveys:

- UK Habitat survey and condition assessments
- Bat roost suitability surveys, supplemented by tree-climbing inspections, and emergence and re-entry surveys as required
- Deployment of static bat detectors
- Badger surveys
- Hazel dormouse surveys
- Wintering bird surveys and scoping for Schedule 1 species and breeding birds
- Water vole and otter surveys
- River habitat and corridor surveys
- Aquatic macroinvertebrate surveys
- Southern damselfly surveys
- Diatom and phytobenthos surveys
- White-clawed crayfish surveys
- Fish surveys
- Macrophyte surveys

8.8.8 Where the preliminary surveys scope in the potential for effects the following surveys will be undertaken:

- Reptile surveys
- National Vegetation Classification (NVC) surveys

- Hedgerow surveys

## Assessment methodology

8.8.9 The impact assessment on terrestrial and freshwater biodiversity will be undertaken in accordance with the Guidelines for Ecological Impact Assessment in the UK and Ireland [115]. This guidance will be used to help evaluate sites, habitats and species and to assess the effects on ecological integrity.

8.8.10 The assessment of the likely significant effects considers those within the footprint of the Proposed Development and those that could occur beyond the footprint, within the study area. The assessment will consider any mitigation measures required and assess the likely significance of effects and residual effects. The assessment process will cover the following phases:

- Determine the importance of ecological features affected, through survey and/or research and with reference to available contextual information.
- Assess likely significant effects potentially affecting important features.
- Characterise the effects, which will consider the extent, magnitude, duration, reversibility, timing and frequency.
- Identify cumulative effects.
- Identify likely significant effects of impacts in the absence of any mitigation.
- Identify mitigation measures to avoid and reduce any adverse effects.
- Report any residual significant effects.

### *Assigning value*

8.8.11 Ecological importance is determined with reference to:

- Legal protection: level of designation (sites) or biodiversity-based protection (species and habitats).
- Biodiversity value (e.g. rarity, scarcity, function within ecosystem, population trends).

8.8.12 The ecological importance of a feature is determined on a geographical scale, where the broader geographical context reflects an increased value and/or sensitivity to change:

- International (within Europe) value
- National (relating to the UK, specifically England) value
- Regional value
- County value
- Local value

8.8.13 The geographical context for each important ecological receptor will be determined on the basis of a variety of factors, for example, the quality or extent of designated sites or habitats; habitat/species rarity; the extent to which they are threatened throughout their range; and their rate of decline.

8.8.14 In the interests of interdisciplinary consistency and with the approach to EIA, CIEEM receptor importance and evaluation of significance descriptors have been transposed to the standardised EIA terminology in Table 8-9.

**Table 8-9: Transposition of receptor importance descriptors**

| Chartered Institute of Ecology and Environmental Management terminology | Environmental Impact Assessment terminology | Definition |
|---|---|---|
| International | Very high | Habitats or species that form part of the cited interest within an internationally protected site, such as those designated under the Conservation of Habitats and Species Regulations 2017 (as amended) (e.g. SPAs and SACs) or other international convention (e.g. Ramsar site).<br>A feature (e.g., habitat or population) which is either unique or sufficiently unusual to be considered as being one of the highest quality examples in an international/national context. For example, areas which meet the published selection criteria for an international protected site (SPA, SAC and Ramsar) but which are not themselves designated as such. |
| National | High | Habitats or species that form part of the cited interest within a nationally designated site, such as an SSSI, LNR or NNR.<br>A feature (e.g., habitat or population) which is either unique or sufficiently unusual to meet the published selection criteria e.g., Joint Nature Conservation Committee (JNCC) (1998) for those sites listed above but which are not themselves designated as such.<br>Species that are protected under the Wildlife and Countryside Act 1981 (as amended) or Conservation of Habitats and Species Regulations 2017 (as amended).<br>Presence of habitats or species, where the UK BAP states that all areas of representative habitat or individuals of the species should be protected. |
| Regional | Medium | A feature (e.g., habitat or population), which is either unique or sufficiently unusual to meet the selection criteria, or have been identified by a regional plan, and be considered as being of nature conservation value at a regional level. |
| County | Medium | Habitats or species that form the citied interest for a non-statutory site (e.g., LNR, Local Wildlife Site (LWS) etc).<br>Presence of habitats or species listed under S41 of the NERC Act (2006).<br>Presence of LBAP, habitats or species, where the LBAP states that all areas of representative habitat or individuals of the species should be protected. |
| Local | Low | A feature of importance at district or local level.<br>A feature (e.g. habitat or population) that is of nature conservation value in a local context only, with insufficient value to merit a formal nature conservation designation. |

*Assigning magnitude of impact*

8.8.15 When considering the likely significant effects on ecological features, whether these be adverse or beneficial, the following characteristics of environmental change have been taken into account, as per CIEEM guidance [115]:

- Probability of the impact occurring
- Positive or negative:
  - positive – a change that improves the quality of the environment e.g. by increasing species diversity, extending habitat or improving water quality. This may also include halting or slowing an existing decline in the quality of the environment.
  - negative – a change which reduces the quality of the environment e.g. destruction of habitat, removal of foraging habitat, habitat fragmentation, pollution.
- Extent – the spatial or geographical area over which the environmental change may occur.
- Magnitude – the size, amount, intensity or volume of the environmental change.
- Duration – the length of time over which the environmental change may occur and whether this is permanent or temporary.
- Frequency and timing – the number of times an environmental change may occur and the periods of the day, season or year during which an environmental change may occur; considering seasonal or life cycle constraints).
- Reversibility – whether the environmental change can be reversed through restoration actions or regeneration.
- 
- Table 8-10 summarises the definitions of magnitude that will be used for ecological receptors. These definitions are also detailed in Chapter 5 General EIA approach and methodology.

**Table 8-10: Magnitude of impact – Terrestrial and freshwater ecology**

| Magnitude | Definition |
|---|---|
| Major | Fundamental, permanent or irreversible changes, over the whole receptor, and/or fundamental alteration to key characteristics or features of the particular receptor's character or distinctiveness. |
| Moderate | Considerable, permanent or irreversible changes, over the majority of the receptor, and/or discernible alteration to key characteristics or features of the particular receptor's character or distinctiveness. |
| Minor | Discernible, temporary (throughout Proposed Development project duration) change, over a minority of the receptor, and/or limited but discernible alteration to key characteristics or features of the particular receptor's character or distinctiveness. |
| Negligible | Discernible, temporary (for part of the project duration) change, or barely discernible change for any length of time, over a small area of the receptor, and/or slight alteration to key characteristics or features of the particular receptor's character or distinctiveness. |

### *Evaluation of significance of effects*

8.8.16 In determining the significance of a potential effect, the magnitude of impact arising from the Proposed Development is correlated with the geographical importance of the ecological feature. In accordance with CIEEM Ecological Impact Assessment Guidelines [115], a 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Significant effects are assessed as either beneficial or adverse. Where an effect is neither beneficial nor adverse, this is assessed as neutral.

8.8.17 The significance matrix in Table 8-11 will be used to assess the significance of potential effects arising from the Proposed Development, with bold text indicating significant effects.

**Table 8-11: Significance of effect matrix – Terrestrial and freshwater biodiversity**

| | | **Magnitude of impact** | | | |
|---|---|---|---|---|---|
| | | **Major** | **Moderate** | **Minor** | **Negligible** |
| **Sensitivity of resource** | **Very High** | **Major** | **Major** | **Moderate** | Minor |
| | **High** | **Major** | **Moderate** | Minor | Minor |
| | **Medium** | **Moderate** | Minor | Minor | Neutral |
| | **Low** | Minor | Neutral | Neutral | Neutral |

8.8.18 Significance is informed by conservation objectives for the affected feature, where available (for example conservation objectives set by NE for European designated sites, or in habitat and species action plans). The 'conservation status' (habitats and species) or the degree to which a feature is exhibiting 'integrity' in terms of structure, function and condition (defined sites or ecosystems) is also considered. The predicted effect of natural and man-made trends in the absence of development is also taken into account in determining the conservation status or integrity of a feature and in considering whether otherwise insignificant effects may contribute to a significant cumulative effect.

## Assessment scenarios

8.8.19 The future baseline will include committed developments that will be delivered prior to commencement of construction. The future baseline will be set in accordance with the Planning Inspectorate (2019) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects, (Version 2) [42].

8.8.20 For the assessment, likely significant effects during construction will be taken to be those for which the source begins and ends during the construction and

commissioning stages prior to the Proposed Development becoming fully operational.

8.8.21 For the assessment, likely significant effects during operation include those that start once the Proposed Development is commissioned and fully operational and includes the effects of the infrastructure in terms of its operation, use and maintenance.

8.8.22 Timescales associated with these effects, regardless of phase are as follows:

- Short-term - endures for up to a period of 12 months;
- Medium-term - endures for between 1 and 5 years;
- Long-term - endures for between 5 and 15 years; and
- Permanent effects - endure for more than 15 years and/or effects which cannot be reversed.

### Cumulative effects

8.8.23 Cumulative effects of the Proposed Development together with the effects of other developments/schemes may result in significant effects. This may be the result of effects on the environment during construction or operation of the Proposed Development.

8.8.24 Cumulative effects for all topics will be reported within the cumulative effects chapter of the ES. Please refer to Chapter 19 Cumulative Effects Assessment which presents the proposed methodology for the assessment of cumulative effects that will be undertaken for the EIA.

### In-combination effects

8.8.25 In-combination effects are those that result from the interaction between the individual effects of the Proposed Development (i.e. interaction of environmental factors such as air quality and noise), combined together on a single receptor at a single point in time. The interrelationship between the individual effects may combine to result in a significant effect, even where the individual effects were not significant. Any in-combination effects in relation to terrestrial and freshwater biodiversity topic will be assessed within the relevant chapter of the ES.

8.8.26 The nature of likely in-combination effects for terrestrial and freshwater biodiversity includes:

- Potential effects on aquatic habitats and ecosystems resulting from changes to surface and groundwater flows, direct disturbance of surface waterbodies and increased sediment supply to surface waters (Chapter 18 Water environment (including flood risk)).
- Potential effects on designated sites, habitats or protected species resulting from fugitive dust and road traffic emissions in proximity to the Proposed Development, temporary access tracks and the road network (Chapter 6 Air quality and odour and Chapter 17 Traffic and transport).
- Potential effects on protected or notable species resulting from noise and vibration from construction related activities (Chapter 14 Noise and vibration).

## 8.9 Limitations and assumptions

8.9.1 This scoping assessment has been based on an initial desk study undertaken in May 2023. As surveys are ongoing, it is currently not possible to conclude the presence or likely absence of protected/notable species and habitats within the study area. A precautionary approach has therefore been taken in the scoping assessment of likely significant effects on protected or notable species until such further ecological surveys have been undertaken.

8.9.2 Locations of biological records provided in the form of UK Grid References (often four to six digits) provide a central, not exact, location of records. Therefore, the location of records discussed is considered indicative. Furthermore, where data is held for a geographic area, a lack of records does not necessarily mean an absence of ecological interest, as species may be under-recorded. These are consistent limitations of biological recording data within the UK. Surveys within the study area will address these limitations and provide a robust baseline for assessment to sit alongside biological record data.

## 8.10 Approach to mitigation and residual effects

8.10.1 Through the design process, the Proposed Development will include primary (inherent) mitigation i.e. engineering design measures incorporated to avoid or reduce the effects of habitat loss, habitat fragmentation, habitat degradation and species disturbance and mortality and thus avoid or reduce significant adverse environmental effects. These measures will be identified and developed through the design process, including consultation with stakeholders and statutory bodies and form part of the Proposed Development design.

8.10.2 To define what additional mitigation is required to avoid and prevent the occurrence of adverse significant effects, the assessment of effects needs to take place. Therefore, mitigation will be determined on an ongoing basis through the EIA process, taking on board feedback from stakeholders. As a general principle, the mitigation hierarchy will be applied and opportunities to avoid or reduce significant effects taken where possible. Avoidance and mitigation measures associated with the conservation of notable and legally protected habitats and species will be actively considered throughout the preliminary design process. Appropriate mitigation (i.e. application of best practice) will be applied where significant effects are unavoidable, and, as a last resort, compensation provided for residual effects that remain after avoidance and mitigation measures are implemented.

8.10.3 The following principles are used to define the types of mitigation measures for the Proposed Development:

- **Primary (inherent) mitigation:** Modifications to the location or engineering design of the Proposed Development which are an inherent part of the design for the purpose of avoiding, preventing or reducing likely significant adverse environmental effects. For example, retaining ecological features where possible through the design of the Proposed Development or by siting of temporary compounds, laydown areas and access in areas of least ecological sensitivity.

- **Secondary (foreseeable) mitigation**: Measures or actions that will require further activity in order to achieve the anticipated outcome. These may be imposed as part of the planning consent or through inclusion in the ES. Secondary measures may be detailed activities for example the preparation and delivery of specific environmental management plans and the preparation and implementation is secured through construction management plans.
- **Tertiary (inexorable) mitigation**: Measures to reduce reasonably foreseeable construction effects, such as recognised good construction site management practices (for example, the use of spill kits and impermeable bunds when working within close proximity to watercourses). Actions that would occur with or without input from the EIA feeding into the design process as they are imposed as a result of legislative requirements (for example, protected species licensing) and/or standard sectoral practices (for example, a precautionary two-stage approach to vegetation clearance of suitable terrestrial habitat supporting reptiles).

8.10.4 The Proposed Development will deliver a 10% BNG. A technical appendix will be included within the ES outlining how this will be achieved.

## 8.11 Summary

8.11.1 Table 8-12 summarises the scoping results of terrestrial and freshwater biodiversity.

**Table 8-12: Summary table – Terrestrial and freshwater biodiversity**

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| Statutory and non-statutory designated sites within 200m of the Scoping Area and/or NSNs and/or SSSIs and/or sites hydrologically connected to the Proposed Development. | Scoped in | Scoped in | Potential for direct and indirect effects as a result of construction and operation of the Proposed Development. |
| Habitats, terrestrial and freshwater, including priority habitats | Scoped in | Scoped in | Surveys are ongoing.<br><br>Potential for direct and indirect effects as a result of construction and operation of the Proposed Development. |
| Badger | Scoped in | Scoped in | |
| Bats | Scoped in | Scoped in | |
| Breeding birds | Scoped in | Scoped in | |
| Hazel dormouse | Scoped in | Scoped in | |
| Otter | Scoped in | Scoped in | |
| Water vole | Scoped in | Scoped in | |
| Winter birds | Scoped in | Scoped in | |
| Fish | Scoped in | Scoped in | |
| White-clawed crayfish | Scoped in | Scoped in | |
| Aquatic macroinvertebrates | Scoped in | Scoped in | |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| Aquatic diatoms, phytobenthos and macrophytes | Scoped in | Scoped in | |
| Potential introduction and or spread of invasive non-native species and disease | Scoped in | Scoped in | Risk of potential release/spread of invasive non-native species. |
| Statutory and non-statutory designated sites over 200m from the Scoping Area which are not NSNs, SSSIs or hydrologically connected to the Proposed Development. | Scoped out | Scoped out | No direct or indirect effects likely due to the sites' distance. |
| GCN | Scoped out | Scoped out | Any potential adverse construction effects would be mitigated by the use of a DLL. |
| Eurasian Beaver | Scoped out | Scoped out | No records identified within the Desk Study. No connectivity to catchments where there have been official releases of this species. |
| Terrestrial invertebrates | Scoped out | Scoped out | Only a small number of terrestrial invertebrate records identified from the Desk Study.<br><br>The majority of suitable habitat would be temporarily effected and reinstated on a like for like basis. |

# 9 Marine biodiversity

## 9.1 Introduction

9.1.1 This chapter outlines the scope and methodology for the assessment of the likely significant effects arising from the construction, operation and decommissioning of the Proposed Development on marine biodiversity, which includes marine ecology (habitats and species) and also commercial fisheries. Hereafter “marine biodiversity” is used to refer to both marine ecology and commercial fisheries together.

9.1.2 Marine biodiversity aspects considered within this chapter for the Proposed Development include:

- **Designated sites**: including their associated designated interest features. Designated sites within the ZoI or that are hydrologically connected to the Proposed Development are considered.
- Marine ecology comprising:
- **Marine mammals:** species considered to enter the ZoI for the Proposed Development are considered.
- **Fish**: including fish spawning and nursery grounds within the ZoI for the Proposed Development.
- **Marine habitats**: both intertidal and subtidal habitats within the ZoI for the Proposed Development are considered.
- **Benthic marine species**: species within the ZoI for the Proposed Development are considered.
- **Invasive and Non-Native Species (INNS)**: INNS are considered for the Proposed Development as a potential impact to marine biodiversity receptors. These are not considered a separate receptor.
- **Commercial fisheries**: including commercially sensitive fish and shellfish species within the ZoI for the Proposed Development.

9.1.3 Within this chapter, components of the Proposed Development are considered for their potential to result in likely significant effects on marine ecology and commercial fisheries receptors outlined above. The components of the Proposed Development considered in this scoping are outlined in Section 9.4, which are as described in Chapter 3 Description of the Proposed Development. A more detailed list of the marine biodiversity receptors relevant to this chapter are outlined in Section 9.5.

9.1.4 Where it is considered possible that likely significant effects may arise because of the Proposed Development, the components leading to these and the associated receptors impacted will be assessed in the ES. The methodology for this assessment is provided in Section 9.7. A list of the activities and receptors scoped in for assessment are outlined in Section 9.6. Where likely significant effects are not anticipated, receptors and associated components of the Proposed Development will be scoped out and a justification (with evidentiary references

where relevant) for each of these decisions is provided. A list of receptors considered scoped out are provided in Section 9.6.

9.1.5 As this chapter addresses potential effects on marine biodiversity only, any terrestrial components of the Proposed Development that do not interact with or are not connected to the marine environment are not considered further within this chapter. These terrestrial and freshwater aquatic biodiversity components are considered as part of Chapter 8 Terrestrial and freshwater biodiversity. In addition, potential effects on birds that use the marine environment are considered only within Chapter 8 Terrestrial and freshwater biodiversity to avoid repetition.

## 9.2 Legislation, policy and guidance

9.2.1 The assessment has been carried out in accordance with relevant policy, legislation, and guidance. It is recognised that this list is non-exhaustive and will be kept under review to take account of any later legislation or policy changes.

### Legislation

9.2.2 The relevant legislation includes:

- The Wildlife and Countryside Act 1981
- The Natural Environment and Rural Communities (NERC) Act 2006
- The Marine and Coastal Access Act 2009
- The Water Framework Directive (2000/0/EC) (transposed by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017)
- The Conservation of Offshore Marine Habitats and Species Regulations 2017
- The Habitats Directive (92/43/EEC) (transposed by the Conservation of Habitats and Species Regulations 2017 as amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019)

### National policy

9.2.3 The relevant national policy includes:

- NPSWRI [4], 2023 paragraphs:
- Environmental Net Gain Paragraphs: 3.4.1 to 3.4.4. These paragraphs set out the requirement that projects should consider and seek to incorporate improvements in natural capital, ecosystem services and the benefits they deliver when planning how to deliver BNG. This includes improvements to water quality.
- Biodiversity and Nature Conservation: Paragraphs 4.3.1 to 4.3.23. These paragraphs set out the need to consider the full range of potential impacts of the Proposed Development, include appropriate mitigation measures and to clearly set out any likely significant effects on designated sites, protected species and habitats within the assessment.
- Coastal Change: Paragraphs 4.5.1 to 4.5.14 These paragraphs set out potential impacts on the coast that would need to be considered as part of the

assessment of the Proposed Development, including effects on coastline, seabed, marine ecology and biodiversity.

- Marine Policy Statement 2011 [32]
- South Inshore and Offshore Marine Plans 2018 [124]
- UK Marine Strategy 2019 [125]
- NPPF [5] (paragraphs 174 – 188)

9.2.4 The South Inshore and Offshore Marine Plans [124] were developed in accordance with the Marine and Coastal Access Act 2009 with reference to the Marine Policy Statement [32] and NPPF [5]. These plans provide a strategic approach to planning within the inshore and offshore waters between Folkestone in Kent and the River Dart in Devon. It provides a clear, evidence-based approach to inform decision-making by marine users and regulators about where activities might take place within the marine plan area. The policies of relevance to marine biodiversity and commercial fisheries are listed in Appendix 9-1 in Volume II.

### Local policy

9.2.5 Relevant local policies are listed in Table 9-1 may be considered both important and relevant to the Proposed Development. In the event that there is any conflict between these and the NPSWRI, the NPS would prevail. Although the SDNPA have planning policies relating to marine biodiversity, their jurisdiction is outside of the marine area covered by the current Proposed Development Order Limits.

**Table 9-1: List of relevant local policy – Marine biodiversity**

| Relevant Authority | Relevant local policy |
|---|---|
| EHDC | East Hampshire District Local Plan: Joint Core Strategy (2014) [6]<br>• CP26 - Water Resource/Water Quality safeguards the site identified for the Havant Thicket Reservoir and sets out the duty of EHDC to take account of the WFD objectives.<br>Reclaiming Local Plan (2006) [104]<br>• Chapter 3 - Countryside and heritage<br>Biodiversity and Planning Guidance (2021) [105] |
| EBC | Eastleigh Borough Local Plan 2016-2036 (2022) [9]<br>• S7 - The coast<br>• S9 - Green infrastructure<br>• DM1 - General criteria for new development<br>• DM11 - Nature conservation |
| FBC | Fareham Local Plan 2037 (2023) [12]<br>• D2 - Ensuring Good Environmental Conditions<br>• D4 - Water Efficiency and Resources<br>• NE1 - Protection of Nature Conservation, Biodiversity and the Local Ecological Network<br>• NE3 - Recreational Disturbance on the Solent Special Protection Areas |

| Relevant Authority | Relevant local policy |
|---|---|
| | • NE4 - Water Quality Effects on the Special Protection Areas, Special Areas of Conservation and Ramsar Sites of the Solent<br>• NE9 - Green Infrastructure |
| HCC | HCC has no local policy, instead they adhere to the NPPF [5] as outlined in above under 'National Policy'. |
| HBC | Havant Borough Core Strategy (2011) [17]<br>• DM8 – Conservation, Protection and Enhancement of Existing Natural Features. Updated in the Draft Havant Borough Local Plan 2036 [109] to policy E2, E10 and E15– Green Infrastructure, Landscape and the Coast and Ecological conservation respectively<br>• CS11 – Protecting and Enhancing the Special Environment and Heritage of Havant Borough<br>Draft Havant Borough Local Plan 2036 (2018) [109]<br>• E18 – Protected Species |
| PCC | Portsmouth Plan (The Portsmouth Core Strategy) (2012) [19]<br>• PCS13 - A Greener Portsmouth includes "Stating the requirements for protecting international, national and locally designated sites in relation to new development, requiring a net gain in biodiversity where possible and mitigation where negative impacts occur, requiring that development is informed and influenced by the existing presence of on-site trees and requiring measures to enhance existing, and provide new, green infrastructure".<br>Portsmouth Local Plan 2038 (Draft) (2021) [111]<br>• G1 - Biodiversity |
| WCC | Winchester District Local Plan Part 1 Joint Core Strategy (2013) [56]<br>• CP15 - Green Infrastructure<br>• CP16 - Biodiversity<br>• CP17 - Flooding, Flood Risk and the Water Environment<br>Winchester District Local Plan Part 2 Development Management and Site Allocations (2017) [25]<br>• DM19 - Development and Pollution |
| Chichester Harbour Conservancy | Chichester Harbour AONB Management Plan 2019-2024 (2019) [126]<br>• Policy 1 - Conserving and Enhancing the Landscape<br>• Policy 3 - Diversity of Habitats<br>• Policy 6 - Water Quality<br>• Policy 7 - Catchment Sensitive Farming – This specific policy supports the reduction of Nitrate Vulnerable Zone (NVZ) and aims to reduce the nutrient input into the Chichester Harbour.<br>• Policy 8 - Thriving Wildlife<br>• Policy 12 - Connecting People to Nature<br>• Policy 13 - Prosperous Economy – This policy aims to support commercial fisheries in the Chichester Harbour. |

| Relevant Authority | Relevant local policy |
|---|---|
| | • Policy 14 - Marine Litter Pollution |

### Guidance and standards

9.2.6 Relevant guidance and standards which have been used as part of the scoping assessment and will also be taken into account as part of the EIA include:

- Planning Inspectorate (2020) Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements, (Version 7) [1]
- CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland – Version 1.2 (updated in April 2022) [115]
- Joint Nature Conservation Committee (JNCC) (2001) Marine Monitoring Handbook [127]
- JNCC (2004) The Marine Habitat Classification for Britain and Ireland [128]
- The British Trust for Ornithology's Wetland Bird Survey, 'look-see' methodology [129]
- Centre for Environment, Fisheries and Aquaculture Science (Cefas) (2012) Spawning and nursery grounds of selected fish species in UK waters [130]
- Offshore Wind Farms: Guidance Note for Environmental Impact Assessment in Respect of Food and Environmental Protection Act (FEPA) and Coast Protection Act Requirements [131]: Section 6 – Commercial Fisheries

9.2.7 Although Cefas have developed the Guidance Note [131] for EIA in Respect of FEPA and Coast Protection Act Requirements specifically for Offshore Wind Farm installation, the method of identifying appropriate fisheries receptors and assessing potential impacts on commercial fisheries is broadly similar across all marine infrastructure projects. In the absence of specific commercial fisheries assessment guidance for EIA, this document provides the most comprehensive example of an appropriate approach to determine relevant fisheries receptors and the data required to inform a robust commercial fisheries assessment for the purposes of the EIA framework. As such, it is considered that this approach is suitable for a Project of National Significance (PNS) consented under the PA 2008 regime.

## 9.3 Engagement

9.3.1 The Applicant is undertaking ongoing engagement with stakeholders and has already held one round of public consultation for the Proposed Development with statutory consultees. The following stakeholders have responsibility for aspects of the marine biology and will continue to be engaged as part of the EIA process:

- Chichester Harbour Conservancy
- Eastleigh Borough Council (EBC)
- Environment Agency (EA)
- Fareham Borough Council (FBC)
- Hampshire County Council (HCC)

- Havant Borough Council (HBC)
- Langstone Harbour Board
- Marine Management Organisation (MMO)
- Natural England (NE)
- Portsmouth City Council (PCC)
- South Downs National Park Authority (SDNPA)
- Southern Inshore Fisheries and Conservation Authority (Southern IFCA)
- Sussex Inshore Fisheries and Conservation Authority (Sussex IFCA)

9.3.2 Technical engagement is already underway through EIA Working Groups that have been established for the Proposed Development. Appropriate to this topic, the Biodiversity and Water Environment EIA Working Group has been established and three meetings have already taken place with this group. An introductory meeting was held with this group on 13 June 2022. This was attended by representatives from EBC, FBC, HCC, PCC, EHDC, WCC and NE. An introduction to the proposed approach, key risks and receptor types for this chapter was presented.

9.3.3 A second meeting was held on 31 August 2022 during which an overview of the approach to the Biodiversity and Water Environment topics of the EIA were presented. This meeting was attended by representatives from EBC, EA, FBC, HCC, MMO, NE, PCC, SDNPA, Sussex IFCA and WCC.

9.3.4 A third meeting was held on 16 June 2023 which outlined updated scoping considerations with the phasing of the operational capacity of the Proposed Development, summarised results of the surveys completed to date and discussed the approach to obtaining additional baseline data around the existing Eastney LSO. This meeting was attended by representatives from EBC, EA, Forestry Commission, FBC, HCC, HBC, MMO, NE, and WCC.

9.3.5 Relevant statutory consultees under the EIA Regulations (MMO, NE and the EA) were consulted ahead of the EIA Scoping Report production to review the survey protocol for the Proposed Development. As a result, the comments from these three bodies have been taken into consideration for survey design to inform the assessment of likely significant effects.

9.3.6 Non-statutory consultees including the Southern IFCA, Sussex IFCA and the Langstone Harbour Board were also consulted ahead of the production of the EIA Scoping Report. This was to place data requests to inform the baseline.

9.3.7 Following the close of the Public Consultation 2022, consultee feedback has been reviewed. Stakeholders did not directly comment on marine biodiversity as it was not specifically part of the consultation. However, feedback has been received from NE who asked if the area effected by the proposed discharge had been assessed for sand eels (Ammodytidae). Background literature has been reviewed and confirmed the likely presence of two sand eel species within the study area (see section 9.4 relating to the study area and section 9.5 relating to baseline conditions). Geophysical surveys were conducted which provide an indication of the sediments which can generally infer areas suitable for sand eel (and other fish species) spawning. Effects on juvenile fish and eggs will be assessed together in

the EIA. As such, it is considered that any further investigation of sand eels specifically does not add additional value to meeting the required objectives of the EIA and additional survey targeting these species are not considered necessary.

## 9.4 Approach to scoping

### Study area

9.4.1 Two study areas are considered for marine biodiversity which are the same for both marine ecology and commercial fisheries. The study areas are based on the ZoI of the Proposed Development (the ZoI for the Proposed Development is defined in Table 9-2). The ZoI is defined as the area in which ecological features (including habitats and species) could be affected by biophysical changes as a result of the Proposed Development [115]. The ZoI is likely to extend beyond the Scoping Area, for example where there is hydrological or habitat connectivity. The ZoI will vary for different ecological features depending on their sensitivity to an environmental change, or the extent of their range.

9.4.2 The Scoping Area consists of the Proposed Development described in Chapter 3 Description of the Proposed Development

9.4.3 All bar two of the components of the Proposed Development are considered to interact with the marine environment, including the use of the Havant Thicket Reservoir for the storage of recycled water. The following two components are not considered to interact with the marine environment and therefore are proposed to be scoped out from further consideration for their effects on marine biodiversity in the EIA and not considered in the definition of the study area:

- Proposed Underground Pipeline between the proposed WRP to Havant Thicket Reservoir:
  - This element involves tunnelling northwards of the proposed WRP up to Havant Thicket which is fully within the terrestrial environment. It is noted that this pipeline does cross under a watercourse (Hermitage Stream) which leads into Langstone Harbour. However, this section of the stream is outside of the tidal limits of the watercourse. Due to the distance of this from the marine environment, it is not considered that any effects will arise on marine receptors from this activity. The potential effects on freshwater and aquatic ecology from this element of the Proposed Development are addressed in Chapter 8 Terrestrial and freshwater biodiversity.
- Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW:
  - This element involves tunnelling through the terrestrial environment to reach Otterbourne. It is noted that this tunnelling passes underneath the River Itchen. However, this is outside of the tidal extent of the watercourse. Due to the distance of this from marine environment, it is not considered that any effects will arise on marine biodiversity receptors from this activity. The potential effects on freshwater and aquatic ecology will be addressed in Chapter 8 Terrestrial and freshwater biodiversity.

9.4.4 The location of the temporary construction hub (as described in Chapter 3 Description of the Proposed Development) are not known at the time of writing. This is expected to be an existing consented site and may be situated outside of the Scoping Area. The potential effects of marine biodiversity (comprising marine ecology and commercial fisheries) on the hub will be considered as part of the marine biodiversity assessment and presented in the ES.

*Study area – marine ecology*

9.4.5 The most recent guidance on Ecological Impact Assessment (EcIA) has been applied for marine ecology to establish two study areas [115]. This guidance recommends that all ecological features that occur within the ZoI for a proposed development are considered for potential effects. Under CIEEM guidance [115], the ZoI includes:

- Areas directly within the land take for the Proposed Development and access
- Areas that would be temporarily affected during construction
- Areas likely to be impacted via hydrological connection as existing impact pathways are extended further by existing currents, flows during rainfall and tidal effects or any changes to these connections brought about by the Proposed Development. This also constitutes areas that may functionally relate to effects or changes brought about by the Proposed Development
- Areas where there is a high risk of pollution and noise disturbance during construction and/or operation

9.4.6 The ZoI is variable depending on the nature of the construction activities and the ecological receptors present. For the Proposed Development, the ZoI is defined in Table 9-2. For marine ecology, each study area is considered to be the entirety of the hydrologically connected ZoI. This is due to hydrological connectivity within the marine environment providing the greatest potential for impacts to travel large distances.

**Table 9-2: Marine ecology ZoI**

| Type of site | Distance | Justification |
|---|---|---|
| All designated marine sites | 2km | Considering the construction methodology and operational description of the Proposed Development (Chapter 3 Description of the Proposed Development), it is considered that this 2km buffer reflects a precautionary distance within which designated features may be affected. This is in line with guidance on considering protected areas when undertaking WFD assessments in estuarine and coastal waters [132]. |
| Hydrologically connected statutory designated sites | 10km | Were any deleterious substances to enter the water, this distance is considered to cover the potential maximum dispersion and is based upon the tidal excursion anticipated for the region [133]. |
| Sites designated for marine mammals | 30km | This distance is based upon the typical daily travelling distance for marine mammal species which are known to exhibit spatial dependency. |

| Type of site | Distance | Justification |
|---|---|---|
| | | Typically grey seal are reported to conduct mean round trips of 39.8km [134] whilst harbour porpoise have been reported to travel on average 26.0 km per day [135].<br>As such this distance is the point at which designated travelling marine mammals would frequently transit into the study area and could be affected by the Proposed Development components. |

9.4.7 The main components of the Proposed Development that are considered to interact with the marine environment and potentially result in effects on marine ecological receptors are the following:

- Proposed WRP[1] and HLPS[1]
- Proposed Underground Pipelines between Budds Farm WTW and the proposed WRP
- Proposed AGP[1] including
- IPS
- BPT
- Use of the Havant Thicket Reservoir for the storage of recycled water[2]
- Discharge from the existing Eastney LSO

9.4.8 These components occupy different geographical areas within the ZoI. As a result, it is necessary to define multiple study areas to cover these geographical extents. Two study areas are identified for marine ecology, and they are outlined in Table 9-3. For marine ecology the study area is considered to be the entirety of the hydrological connectivity ZoI defined in Table 9-1. Baseline conditions within each study area for marine biodiversity (comprising both marine ecology and commercial fisheries) is provided in Section 9.5.

9.4.9 The two marine ecology study areas are displayed visually in Figure 9.1 in Volume III.

**Table 9-3: Study area for marine ecology defined by the ZoI**

| Study area | ZoI (study area is based on the ZoI) | Features present | Justification |
|---|---|---|---|
| Study area 1:<br>The entirety of Langstone Harbour, including | The whole of Langstone Harbour (anticipated | Marine designated sites and | The area of Langstone Harbour (and its tidal extent within the Hermitage Stream) has been assigned as a study |

[1] These components are included as at this stage the possibility cannot be ruled out that the general construction works may be situated immediately adjacent to the marine area (defined as on or below mean high-water springs) and adjacent to flood risk zones. This is based upon published flood risk zones by the Environment Agency [136, 137].

[2] As indicated in Chapter 18 Water environment (including flood risk), the Havant Thicket Reservoir will be hydrologically connected to Langstone Harbour which means that variations to water quality within the reservoir have the potential to affect the inputs into the harbour.

| Study area | ZoI (study area is based on the ZoI) | Features present | Justification |
|---|---|---|---|
| the tidal extent of Hermitage stream (see Figure 9.1 in Volume III) | extent that any potential pollution events may affect the marine environment based upon approximate tidal excursions for the region and the nature of the works). This area is immediately adjacent to the Budds Farm WTW.<br>The extent has been defined as the area below mean high water spring that extends from the Portcreek Viaduct crossing in the west, to the obstruction to east from the remains of the old Hayling railway bridge and to south until the Langstone Harbour limits as shown on Admiralty charts. | marine species | area due to the following components of the Proposed Development:<br>• Proposed WRP and HLPS<br>• Proposed Underground Pipelines between Budds Farm WTW and the proposed WRP<br>• Proposed AGP (including subcomponents)<br>All of these components involve undertaking construction activities either adjacent to the marine environment, within Flood Zones 2 and 3 which connect to the marine environment under flood conditions, or underneath a waterbody which connects to the marine environment [136, 137]. Therefore, there is a risk to the marine environment of pollution spills and a potential for blow-out3 during pipeline construction (the pipelines cross watercourses which are connected to the marine environment in Langstone Harbour). Underwater noise and vibration are likely to be generated during the construction of the pipeline between Budds Farm WTW and the proposed WRP as this pipeline will pass under Hermitage Stream which could impact migratory marine fish species. Noise and visual disturbance to wading birds using the marine area is possible due to their proximity to the Proposed Development components. However, all impacts on birds (including those using the marine area) are considered separately within Chapter 8 Terrestrial and freshwater biodiversity.<br>In addition, the use of the Havant Thicket Reservoir for the storage of recycled water means it is hydrologically connected to the Langstone Harbour (see explanatory footnote 2 within paragraph 9.4.7). Accordingly, any water quality modifications (including any potential |

[3] A blow-out is where the pressure of a tunnel unintentionally causes it to push the soils/sediment towards the river/seabed and may potentially result in waters entering the tunnel causing a possible collapse due to sudden depressurisation.

| Study area | ZoI (study area is based on the ZoI) | Features present | Justification |
|---|---|---|---|
| | | | positive or negative changes) may affect the marine ecology within or migratory through this area. |
| Study area 2: 10km from the LSO within the Solent (see Figure 9.1 in Volume III) | 10km from the discharge point of the LSO located within the Solent (anticipated extent of hydrological connection based upon tidal excursion and search range for transitory species). | Marine designated sites and species | This study area of 10km surrounding the point of discharge from the existing LSO is based on the following element of the Proposed Development:<br>• Discharge of effluent from the Eastney LSO<br>The LSO is situated within the Solent; a 10km buffer reflects a precautionary distance within which designated features may be affected (anticipated as the point at which designated marine mammals and fish species may transit into the study area and could be affected by the construction or operation of the Proposed Development). Additionally, this precautionary 10km distance is greater than the range of two tidal incursions at this location [133]. Therefore, it is considered that any changes to discharge would have fully dispersed through the water column after this distance. |

*Study area – commercial fisheries*

9.4.10 Currently, there are no specific guidelines to define the spatial extent of commercial fisheries studies. An appropriate study area for commercial fisheries is largely determined by professional judgement based on the parameters of the potential effects. Consequently, the study area has been defined in line with the marine ecology receptors described in Table 9-3. These comprise the 10km ZoI established around the LSO discharge point and also the entirety of Langstone Harbour including the tidal extent of Hermitage stream established in line with CIEEM [115] guidelines (see Table 9-4).

9.4.11 Commercial fisheries data is spatially defined by International Council for the Exploration of the Sea (ICES) Statistical Rectangles. Due to the size of each ICES rectangle, and the nature of fisheries derived data recording methods for landing statistics, this often extends beyond the ZoI. Accordingly, their use provides a broader analysis of commercial fisheries operating within the wider regional area. The Proposed Development is located within ICES Division VIId (Eastern Channel). Fisheries data within each ICES Division is collected and analysed by ICES statistical rectangle. Assessment of commercial fisheries landing activity has been undertaken using information across the ICES rectangles which intersect with the ZoI that defines the study area. This includes the following:

- ICES statistical rectangle 30E8 (contains Eastney LSO)
- ICES statistical rectangle 30E9.

9.4.12 The study area defined has been used to identify fisheries activities in areas which could be affected by the Proposed Development, and the levels of fishing that these areas sustain. These ICES rectangles include Portsmouth Harbour, Langstone Harbour, Chichester Harbour and the Solent within their boundary.

9.4.13 The ZoI for commercial fisheries is displayed visually in Figure 9.2 in Volume III against the ICES rectangles.

9.4.14 Principal components of the Proposed Development are considered to result in possible effects on commercial fisheries receptors. These are the:

- Proposed WRP[4] and HLPS[5]
- Proposed Underground Pipelines between Budds Farm WTW and the proposed WRP
- Proposed AGP[5] including
- IPS
- BPT
- Use of the Havant Thicket Reservoir for the storage of recycled water
- Discharge from the existing Eastney LSO

**Table 9-4: Study area for commercial fisheries defined by the ZoI**

| Study area | ZoI (study area is based on the ZoI) | Features present | Justification |
|---|---|---|---|
| Study area 1: The entirety of Langstone Harbour, including the tidal extent of Hermitage stream (see Figure 9.2 in Volume III) | The whole of Langstone Harbour (anticipated extent that any potential pollution events may affect the bass nurseries located within Langstone Harbour, on which the commercial fisheries of the area are reliant. This has been defined based on the approximate tidal excursions for the region and the nature of the | Commercially sensitive fisheries species | The area of Langstone Harbour (and its tidal extent within the Hermitage Stream) has been assigned as a study area due to the following components of the Proposed Development:<br>• Proposed WRP and HLPS<br>• Proposed Underground Pipelines between Budds Farm WTW and the proposed WRP<br>• Proposed AGP (including subcomponents)<br>All of these components involve undertaking construction activities either adjacent to the marine environment, within Flood Zones 2 and 3 which connect to the marine |

[4] These components are included as at this stage the possibility cannot be ruled out that the general construction works may be situated immediately adjacent to the marine area (defined as on or below mean high-water springs) and adjacent to flood risk zones. This is based upon published flood risk zones by the Environment Agency [136, 137]. Langstone harbour is host to a variety of shellfish harvesting areas (see Appendix 9-2 in Volume II), therefore any hydrologically connected effects should be assessed for impacts on commercial fisheries.

| Study area | ZoI (study area is based on the ZoI) | Features present | Justification |
|---|---|---|---|
| | Proposed Development components).<br>This area is immediately adjacent to the Budds Farm WTW.<br>The extent has been defined as the area below mean high water spring that extends from the Portcreek Viaduct crossing in the west, to the obstruction to east from the remains of the old Hayling railway bridge and to south until the Langstone Harbour limits as shown on Admiralty charts. | | environment under flood conditions, or underneath a waterbody which connects to the marine environment (See publicly available data on flood risk zones provided by the EA [136, 137]). Therefore, there is a risk to the bass nurseries in Langstone Harbour from pollution spills and potential blow-out[3] during pipeline construction. The pipelines cross under watercourses which are connected to the marine environment in Langstone Harbour where the nurseries are present (As published by Cefas [130]). The fisheries in the area are reliant on these bass nurseries with Langstone Harbour designated as a Bass nursery under the Bass Order 1999. Underwater noise and vibration are likely to be generated during the construction of the pipeline between Budds Farm WTW and the Proposed WRP as this pipeline will pass under Hermitage Stream which could impact on bass nurseries (See studies by Popper *et al.* regarding impacts on noise impacts on fish [138, 139]).<br>In addition, the use of the Havant Thicket Reservoir for the storage of recycled water means it is hydrologically connected to the Langstone Harbour5. Accordingly, any water quality modifications (including any potential positive or negative changes) may affect the shellfish harvesting, fish spawning or nursery grounds that may occur within this area. |

[5] As indicated in Chapter 18 Water environment (including flood risk), the Havant Thicket Reservoir will be hydrologically connected to Langstone Harbour which means that variations to water quality within the reservoir have the potential to affect the inputs into the harbour and the watercourse in between. This may affect any migratory fish species that use these waters.

| Study area | ZoI (study area is based on the ZoI) | Features present | Justification |
|---|---|---|---|
| Study area 2: *10km from Eastney LSO within the Solent (including the nearest ICES statistical rectangles 30E8, and 30E9) (see Figure 9-2 in Volume III)* | This is 10km from the discharge point of the LSO located within the Solent (anticipated extent of hydrological connection based upon tidal excursion and search range for transitory species). | Commercially sensitive fisheries species | This study area has been defined due to the following element of the Proposed Development:<br>• Discharge of effluent from the Eastney LSO<br>The LSO is situated within the Solent and so this 10km buffer reflects a precautionary distance within which designated features may be affected (anticipated as the distance at which commercial fish species may transit into the study area and could be affected by the construction or operation of the Proposed Development). Additionally, this precautionary 10km distance is greater than the range of two tidal excursions at this location and therefore it is considered that any changes to discharge would have fully dispersed through the water column after this distance (See closest mean tidal ellipses derived from Proudman Oceanographic Laboratory available from the UK Renewables Atlas [133]). |

### Sources of baseline data

9.4.15 The baseline data for this chapter has been obtained from a range of publicly available datasets and from responses received from data requests sent to a variety of companies. These data sources are outlined in Table 9-5 with associated limitations and assumptions detailed in Section 9.8.

**Table 9-5: Sources of baseline data – Marine biodiversity**

| Data source | Publicly available? | Date data accessed/received | Contents |
|---|---|---|---|
| MAGIC Maps (Defra) [140] | ✓ | 22 March 2022 | Designated sites data. |
| Southern IFCA | × (Data requested) | 23 March 2022 | Annual trawl fish surveys 2016-2020. |
| Sussex IFCA | × (Data requested) | 05 April 2022 | Annual fish surveys 2016 – 2020. |

| | | | |
|---|---|---|---|
| Cefas | × (Data requested) | 30 May 2022 | Annual fish surveys undertaken between 2016 – 2020 (broader scale), including the bass survey. |
| MMO fisheries landing statistics [141] | ✓ | 23 March 2022 | Commercial fisheries landings/economic value data obtained for the data reporting period of 2016 – 2020. |
| Automated identification system (AIS) surveillance data [142] | ✓ | 06 July 2022<br>07 July 2022 | Observations of live AIS vessel tracking were undertaken 4 times at equidistant points throughout both days. All vessels observed within the study area were 10m and under in length and using153 either potting or towed demersal gear. |
| Cefas [143] | ✓ | 23 March 2022 | Bivalve mollusc production bed areas and current classification status. |
| JNCC [144] | ✓ | Feb 2023 | Publicly available marine recorder results on benthic data such as species, biotopes and physical attributes |

## 9.5 Baseline conditions

9.5.1 This section considers the baseline conditions relating to marine biodiversity (comprising both marine ecology and fisheries) for the Proposed Development within the study areas described in Section 9.4.

*Marine ecology:*

*Designated sites*

9.5.2 There are ten statutory designated sites within study area 1. These comprise the following:

- Solent Maritime Special Area of Conservation (SAC)
- Solent & Isle of Wight Lagoons SAC
- Chichester and Langstone Harbours Special Protected Area (SPA)
- Solent and Dorset Coast SPA
- Chichester and Langstone Harbours Ramsar site
- Langstone Harbour Site of Special Scientific Interest (SSSI)
- Sinah Common SSSI
- Hayling Billy LNR

- The Kench Hayling Island LNR
- Farlington Marshes LNR

9.5.3 The statutory sites listed above also overlap into study area 2. Study area 2 has a further 13 statutory designated sites comprising the following:

- Chichester Harbour SSSI
- South Wight Maritime SAC
- Solent & Southampton Water SPA
- Solent and Southampton Water Ramsar
- Bembridge Marine Conservation Zone (MCZ)
- Brading Marshes to St Helen's Ledges SSSI
- Whitecliff Bay and Bembridge Ledges SSSI
- Ryde Sands and Wootton Creek SSSI
- Gilkicker Lagoon SSSI
- Portsmouth Harbour SPA
- Portsmouth Harbour Ramsar
- Portsmouth Harbour SSSI
- Sandy Point LNR

9.5.4 Accordingly, there are 23 designated sites across both study areas. Details of these designated sites across both study areas are outlined in Appendix 9-3 in Volume II.

*Marine mammals*

9.5.5 The Solent is becoming increasing important for grey seals (*Halichoerus grypus*) and harbour seals (*Phoca vitulina*), with surveys observing that that the counts of seals have increased in Chichester and Langstone Harbour to 47 harbour seals and 20 grey seals respectively. Two major haul-out sites are located in Chichester Harbour and Langstone Harbour, with more seals commonly found in Chichester Harbour[6]. Though only Langstone harbours hall-out site lies within study area 1 it is likely that seals from the Chichester harbour hall-out site (which is located outside of the study area) would use areas covered by study area 2 which extends into Chichester harbour.

9.5.6 The Solent is situated between the coast of Portsmouth, Southampton and the Isle of Wight. The Eastney LSO is situated within the Solent and as a result, study areas 1 and 2 include part of this waterbody. Harbour porpoise (*Phocoena phocoena*) and bottlenose dolphins (*Tursiops truncatus*) are frequently recorded around the Solent, along with harbour seals (*P. vitulina*). Occasional sightings of grey seals (*H. grypus*) and minke whales (*Balaenoptera acutorostrata*) have also been reported around the Solent. As these species typically have large territories it is possible that they could be present within study areas 1 and 2. A list of the

[6] Approximately <10% of the combined seal population across both harbours was noted within recent studies to use Langstone Harbour as a haul-out site [416].

marine mammal species identified around the wider Solent area is presented in Table 9-6.

**Table 9-6: List of marine mammals recorded around the Solent**

| Source | Species | Number of individuals | Date identified | Location |
|---|---|---|---|---|
| ORCA [145] | Harbour porpoise | 3 | 31/07/2015 | Off the coast of Isle of Wight |
| | Unidentified dolphin | 8 | 26/06/2015 | |
| SCANS-III [146] | Harbour porpoise | 17,323 (abundance) | Surveys conducted between 2015-2017 | Celtic/Irish Seas and North Sea (Block C) |
| | Unidentified common/striped dolphin (*Stenella coeruleoalba*) | 1,765 (abundance) | | |
| | Minke whale | 186 (abundance) | | |
| The Wildlife Trusts [147] | Bottlenose dolphin | N/A | N/A | Selsey Bill and the Hounds |
| Sea Watch Foundation [148] | Dolphin species | 14 | 22/08/2021, 27/08/2021 and 26/01/2022 | St Catherine's Point, Isle of Wight |
| | Grey seal | 1 | 3/08/2021 | |
| | Harbour porpoise | 1 | 10/07/2021 | |
| | Bottlenose dolphin | 1 | 15/11/2021 | East Wittering Beach, West Sussex |
| | Bottlenose dolphin | 4 | 31/07/2021 | |
| | Bottlenose dolphin | 1 | 22/09/2021 | Off Portsmouth, Hampshire |
| | Bottlenose dolphin | 4 | 20/06/2021 | 0.5 miles East Chichester Bar Beacon, Sussex |
| Solent Seal Tagging Project [149] | Common seal | Number of Common seals currently estimated at 23-25, with 18 being the most recorded at any one time | 2010 report | Only two significant haul-out sites exist, one in Langstone Harbour and one in Chichester Harbour. |

*Fish*

9.5.7 Various fish species have been recorded around the Solent and Langstone Harbour. These include short-snouted seahorse (*Hippocampus hippocampus*) which are protected as UK priority species and are listed under OSPAR

Commission's list of threatened and/or declining species. A summary of fish species recorded by Sussex IFCA within Chichester Harbour from 2019 – 2021, along with their conservation actions are shown in Table 9-7. Within the wider Solent other species were noted by Cefas during their most recent bass survey [150] and these have been included in Table 9-8:.

9.5.8 The Solent and Isle of Wight area is highlighted as a shark and ray hotspot, providing pupping grounds for smooth hound (*Mustelus mustelus*), tope (*Galeorhinus galeus*) and possibly thresher shark (*Alopias* spp.) [151].

**Table 9-7: List of fish species recorded around Chichester Harbour by Sussex IFCA (2019 – 2021)**

| Common name | Species | Conservation Status/ Legislation |
|---|---|---|
| Bass | *Dicentrarchus labrax* | The Minimum Conservation Reference Size (MCRS) for bass caught within the Southern IFC District is 42 cm total length.<br>Bass Nursery areas (The Sea Fisheries (Amendment etc.) Regulations 2021).<br>The Bass (Specified Areas) (Prohibition of Fishing) (Variation) Order 1999 Article 10 of Council Regulation (EU) 2020/123. |
| Brill | *Scophthalmus rhombus* | Minimum landing size: 30 cm under the Minimum Fish Sizes byelaw. |
| Goby – Common | *Pomatoschistus microps* | None |
| Goby – Juvenile | *Pomatoschistus* spp. | None |
| Goby – Sand | *Pomatoschistus minutus* | None |
| Herring | *Clupea harengus* | UK priority species.<br>The Sea Fishing (Control Procedures for Herring, Mackerel and Horse Mackerel) (Scotland) Order 2008. |
| Mullet – golden grey | *Chelon aurata* | None |
| Mullet – juvenile | *Chelon* spp. | None |
| Mullet – thick lipped | *Chelon labrosus* | None |
| Mullet – thin lipped | *Chelon ramada* | None |
| Plaice | *Pleuronectes platessa* | UK priority species.<br>Subject to a minimum landing size of 27 cm (total length) under European Legislation (Regulation (EU) 2019/1241). |

| Common name | Species | Conservation Status/ Legislation |
|---|---|---|
| | | Since 2019 plaice has been subject to the Landing Obligation. |
| Sand eel – greater | *Hyperoplus lanceolatus* | None |
| Sand smelt | *Atherina presbyter* | None |
| Sprat | *Sprattus sprattus* | None |

**Table 9-8: List of additional Fish species recorded in the Solent during Centre for Environment, Fisheries and Aquaculture Science 2017 Bass survey**

| Common name | Species | Conservation Status/Legislation |
|---|---|---|
| Baillion's wrasse | *Symphodus bailloni* | None |
| Ballan wrasse | *Labrus bergylta* | None |
| Black sea bream | *Spondyliosoma cantharus* | Feature of conservation importance. |
| Corkwing wrasse | *Symphodus melops* | None |
| Clingfish | *Gobiesocidae* | None |
| Gilt-head bream | *Sparus auratus* | None |
| Greater pipefish | *Syngnathus acus* | None |
| Five-bearded rockling | *Ciliata mustela* | None |
| Horse mackerel | *Trachurus trachurus* | UK priority Species, Species of priority importance in England. |
| Mackerel | *Scomber scombrus* | UK priority Species, Species of priority importance in England. |
| Goby – rock | *Gobius pagnellus* | None |
| Sand eel – lesser | *Ammodytes tobianus* | None |
| Snake pipefish | *Entelurus aequoreus* | None |
| Sole | *Solea solea* | UK priority Species, Species of priority importance in England. |
| Spotted ray | *Raja montagui* | OSPAR threatened and/or declining species. |
| Starry smooth hound | *Mustelus asterias* | None |
| Stickleback (15 spined) | *Spinachia spinachia* | None |
| Thornback ray | *Raja clavata* | OSPAR threatened and/or declining species. |
| Goby – transparent | *Aphia minuta* | None |
| Gurnard – tub | *Chelidonichthys lucerna* | None |

| Common name | Species | Conservation Status/Legislation |
|---|---|---|
| Undulate ray | *Raja undulata* | UK priority Species, Species of priority importance in England. Feature of Conservation Interest. Endangered on the International Union for the Conservation of Nature red list. |
| Whiting | *Merlangius merlangus* | UK priority Species, Species of priority importance in England. |
| Whiting-pout (bib) | *Trisopterus luscus* | None |

9.5.9 Following engagement with the EA, marine migratory fish surveys have been commissioned by the Applicant for the mouth of the Hermitage Stream (which is located at the Northern end of Langstone Harbour within study area 1) to add to the baseline data already gathered to inform the EIA. These surveys will be undertaken using a variety of best practice techniques including netting and electrofishing. These migratory fish surveys commenced in autumn 2022, with further surveys commissioned for spring 2023 (30 May and 1 June 2023). Full results will be assessed as part of the EIA and reported within the ES. In addition, assessment of commercial fisheries and their sensitivities have been included separately within this chapter.

9.5.10 A survey was undertaken in June 2022 of the Hermitage Stream to determine whether there are any suitable areas of fish habitat present and to assess the suitability of the Hermitage Stream as a potential migratory route for fish species. Initial results show that the stream is highly modified with many structures present that would act as a barrier to the majority of migratory fish species and that there is very limited habitat available upstream that is suitable for fish spawning. Additionally, during summer months the water levels in the stream were <5cm in depth in some parts which would deem it unsuitable for use by migratory species. There is a possibility that eel could utilise the watercourse due to their ability to bypass dried areas of the channel, but this cannot be confirmed until the survey results from the migratory fish surveys are obtained.

*Fish spawning and nursery grounds*

9.5.11 Ellis et al. [130] provide an evidence-based understanding of the distribution of fish spawning and nursery grounds. Their report also covers other ecologically important fish habitats that are required to enable scientific advisors and regulators to better manage human activities in our seas. Ecologically important habitats for highly mobile marine fish can include sites of importance to breeding (i.e. mating sites, spawning beds, spawning grounds, and parturition grounds), recruitment and growth of early life-history stages (i.e. nursery grounds), as well as feeding grounds and migratory pathways.

9.5.12 Data on the distribution of the planktonic stages of fish eggs and larvae (ichthyoplankton) were collated by Ellis et al. [130] from numerous surveys conducted by Cefas and associated UK fisheries laboratories, and from internationally coordinated ichthyoplankton surveys. Based upon this data, Table 9-9 provides an overview of species that could potentially use study areas 1 and 2 as nursery and spawning areas. A number of the species identified are commercially sensitive target species and these have been highlighted in the 'Notes' column of Table 9-9. It is important to note that study area 1 overlaps with study area 2 so many of the spawning and nursey grounds overlap. In addition, Langstone Harbour (within Study area 1) is a designated bass nursery under the Bass Order 1999 therefore it provides a protected area for juvenile bass to grow.

**Table 9-9: Spawning and nursery grounds within study areas 1 and 2 for fish species**

| Species | Nursery/spawning grounds present | Notes |
|---|---|---|
| Tope shark<br>G. galeus | Low intensity nursery grounds found within the study area | Data limited for English Channel, although the Solent is often regarded as an important habitat for tope. Locations and temporal stability of specific parturition grounds are not well established. Data layer indicates nominal nursery grounds of tope, as indicated by the presence of juveniles. |
| Thornback ray<br>R. clavata | Low intensity nursery grounds found within the study area | Low intensity nursery grounds. Data layer indicates nominal nursery grounds of thornback ray, as indicated by the presence of juveniles. There are insufficient data on the occurrence of the egg cases or egg-bearing females in the spawning season with which to delineate spawning grounds, although these should broadly overlap with nursery grounds. |
| Spotted ray<br>R.montagui | Low intensity nursery grounds found within the study area | Low intensity nursery grounds. Data layer indicates nominal nursery grounds of spotted ray, as indicated by the presence of juveniles. There are insufficient data on the occurrence of the egg cases or egg-bearing females in the spawning season with which to delineate spawning grounds, although these should broadly overlap with nursery grounds. |
| Undulate ray<br>R. undulata | Low intensity nursery grounds found within the study area | Low intensity nursery grounds. Data layer indicates nominal nursery grounds of undulate ray, as indicated by the presence of juveniles. There are insufficient data on the occurrence of the egg cases or egg-bearing females in the spawning season with which to delineate spawning grounds, although these should broadly overlap with nursery grounds. |
| Herring<br>C. harengus | Low intensity spawning grounds found within the study area | High intensity herring spawning grounds identified further offshore and not within the study area. No Nursery grounds were identified within the study area.<br>Herring is a commercially sensitive target species, and under policy S-FISH-4-HE of the South Marine Plans, it is stated that "proposals will consider herring spawning mitigation during the period 01 November to the last day of February annually". |

| Species | Nursery/spawning grounds present | Notes |
|---|---|---|
| Cod<br>G. morhua | Low intensity spawning grounds found within the study area | Low intensity spawning grounds identified within the study area. No Nursery grounds were identified within the study area. |
| Whiting<br>M.merlangus | No spawning grounds<br>Very low intensity nursery grounds found within the study area | Whiting form part of the commercially sensitive target species for the study area. No spawning grounds were identified within the study area, however very low intensity nursery grounds were observed. |
| Horse mackerel T. trachurus | No spawning grounds<br>No nursery grounds | Horse mackerel forms part of the annual commercial fisheries catch; however, no spawning or nursery grounds were identified in the study area. |
| Mackerel<br>S. scombrus | Low intensity spawning grounds found within the study area<br>Low intensity nursery grounds found within the study area | Mackerel form part of the commercially sensitive target species for the study area. Low intensity spawning grounds and nursery grounds were identified in the study area for the species. |
| Plaice<br>P. platessa | Low intensity spawning area found within the study area<br>Low intensity nursery grounds found within the study area | Low intensity spawning grounds were identified inshore of the study area, however high intensity spawning sites are located further offshore. |
| Sole<br>S. solea | High intensity spawning grounds found within the study area<br>Low intensity nursery grounds found within the study area | The study area was identified as a high intensity location for sole spawning and a low intensity nursery ground. A high abundance of larvae was sampled within the study area.<br>Sole form part of the commercially sensitive target species for the study area. |

*Marine habitats*

9.5.13 Within study areas 1 and 2, habitats in Langstone Harbour primarily consist of intertidal soft sediment with some salt marsh and rocky shore to the north of the Harbour. There is gravel and cobble along the west and some subtidal sediment present.

9.5.14 The EA has identified Langstone Harbour as an area of seagrass potential due to the wave and current energy, elevation and salinity criteria. The Solent Seagrass Restoration Project is currently active in the Harbour.

9.5.15 Habitat surveys have been carried out in study areas 1 and 2. A desktop study was carried out to identify different habitats. Seagrass locations in Langstone Harbour using MAGIC [140] and these locations are outlined in Table 9-10. These seagrass habitats area known to be host to commercial species [152] and also species that are considered to be of conservation interest.

Table 9-10: Locations of seagrass in Langstone Harbour

| Site | Unique Identifier | Size | Coordinates |
|---|---|---|---|
| North near Anchorage Park | NE_0444_26 | 92ha | SU68300299 |
| 8 spots between Baker's Island and South Binness Island | NE_04NE_0444_18<br>NE_0444_19<br>NE_0444_20<br>NE_0444_21<br>NE_0444_22<br>NE_0444_23<br>NE_0444_24<br>NE_0444_2544_17 | 0.1ha<br>0.1ha<br>0.1ha<br>0.1ha<br>0.1ha<br>0.8ha<br>0.1ha<br>0.1ha<br>0.1ha<br>0.2ha | SU69560373<br>SU69600366<br>SU69630361<br>SU69660351<br>SU69760344<br>SU69720333<br>SU69700328<br>SU69580326<br>SU69600334 |
| 3 spots west of Langstone Harbour along the Hayling Billy Trail on Hayling Island | D_00091___4<br>D_00091___3<br>NE_0449_308 | 0.1ha<br>0.3ha<br>26.7ha | SU70970189<br>SU71180174<br>SU71110137 |
| 2 spots south-west of Langstone Harbour near Sinah Warren Village and Leisure Club | D_00091___7<br>NE_0449__304 | 0.2ha<br>5.3ha | SU70250046<br>SU70240001 |

*Source: MAGIC* [140]

9.5.16 Table 9-11 outlines the various marine habitats present within study areas 1 and 2 of the Proposed Development. This information has been gathered by undertaking a desk study. Specific intertidal and subtidal habitat surveys including seagrass surveys have been commissioned for the Proposed Development to support the EIA and these will be reported in the ES. Survey data that is currently available will be summarised in this report. The completed survey data will be available for the assessment which will be reported in the ES.

Table 9-11: Marine habitats within study area 2

| Habitats | Description |
|---|---|
| Intertidal mudflats | The intertidal area adjacent to the Proposed Development is predominately characterised by extensive mudflats which support several species of macroinvertebrates. Intertidal mudflats provide an overwintering feeding ground for wintering wildfowl and waders. Intertidal mudflats are also listed on the OSPAR list of Threatened and/or Declining Species and Habitats, Annex I listed habitat, and they are considered a habitat of principal importance in England [153]. |
| Intertidal sandflats | These intertidal areas are submerged at high tide and exposed at low tide. They are present along the coastline of the Isle of Wight and also mainland Portsmouth (seaward side of Chichester, Langstone and Portsmouth Harbours). They form a major component of estuarine and large shallow |

| Habitats | Description |
|---|---|
| | inlets and bay habitats. This habitat can be categorised into three broad categories: clean sands, muddy sands and muds. |
| Coastal saltmarsh | There are areas of coastal saltmarsh within Chichester, Langstone and Portsmouth Harbours. Coastal saltmarsh is listed as a habitat of principal importance in England [153] and is considered to be present within the study area of Langstone Harbour. |
| Intertidal eelgrass beds (seagrass) | Eelgrass beds comprised of both Z. marina and Z. noltii are found at various locations within the following designated sites: Solent Maritime SAC, Portsmouth Harbour SPA, Chichester and Langstone Harbour SPA and the Solent and Southampton Water SPA. These beds are a habitat of principal importance in England [153] and are also present near the Proposed Development. Additional beds are located across the Meon bay and Ryde coast. |
| Estuaries | The Proposed Development involves works within the terrestrial environment; however, some elements of noise and effluent discharge will occur within Langstone Harbour and in the Solent (east of the Isle of Wight). Both areas are connected to the Solent Estuary. The Solent estuary is made up of a variety of habitats including; saltmarsh, maritime cliffs, sand dunes, saline lagoons, mudflats, vegetated shingle and coastal grazing marsh [154]. |
| Subtidal benthic habitats | The subtidal benthic environment in the Solent area is generally characterised by intertidal soft sediments. This transitions into gravel and cobbles further from land. Areas of the benthic environment consists of various reefs including, chalk, rocky, limestone and sandstone reefs.<br>Subtidal eelgrass beds, comprising (Z. marina and Z. noltii, are located along the Isle of Wight between Cowes and Fishbourne. There are substantial areas of eelgrass beds within Portsmouth Harbour and Langstone and Chichester Harbour. These are important resources for several species of coastal bird species including waterfowl and waders. |

9.5.17 The Applicant has commissioned specific habitat surveys to support the EIA and these will be reported in the ES. A seagrass survey was conducted by APEM Limited for the Applicant on 28-29 September 2022, to inform consents and licencing requirements for the Proposed Development. This survey covered the total area of Langstone Harbour, as defined by the WFD waterbody outline [120]. The results identified seven seagrass beds (Figure 9.3 in Volume III); four within the north-west region covering an area of 0.13km$^2$ consisting of *Zostera noltii, Z. marina* or combinations of both species, and three *Z. noltii* beds within the south-east region covering an area of 0.7km$^2$. These beds were found to be in good condition with little browning and generally low macroalgae coverage, with the exception of a few areas in the north-west region.

9.5.18 In addition, the Applicant commissioned an intertidal habitat survey which was conducted by APEM Limited on 26- 27 September 2022. This survey covered the northern extremity of Langstone Harbour where the Hermitage Stream outputs into the Brockhampton Mill Lake watercourse. The survey area extends approximately 1km southwards towards the North Binnes Island and Long Island whilst spans approximately 3km from Chalkdock Lake to the edge of Bridge Lake. This survey

identified a total of five habitats in Langstone Harbour, summarised in Table 9-12 As part of this survey, samples were acquired in order to assess the intertidal infaunal community. The draft results were received end of June 2023 and will be assessed as part of the EIA.

**Table 9-12: Habitats found in Langstone Harbour and their description**

| Broadscale habitat with European Nature Information System and JNCC code | Area ($m^2$) | Habitat description during survey |
|---|---|---|
| Littoral mud<br>A2.3<br>LS.LMu | 912,536 | There was extensive coverage of this habitat across the central, western and eastern sections of the survey area, with an area of 912,536 $m^2$ (91ha).<br>Habitat ranged from 0% to 100% coverage of green mat forming algae. Small number of empty bivalve shells noted on the surface. Mud was often anoxic at very shallow sediment depths (0.1cm). |
| Fucus vesiculosus on mid eulittoral mixed substrata<br>A1.3132<br>LR.LLR.F.Fves.X | 374,252 | The habitat had an extent of 374,252 $m^2$ (37ha) and was mainly recorded in the north-eastern section of the survey area.<br>Habitat occurred on substrate comprising of boulders, cobbles, gravel and mud. F. vesiculosus was observed, ranging from 30-60% coverage. Ulva intestinalis also observed in addition to small patches of Fucus serratus. |
| Littoral mud/<br>Littoral mixed sediment<br>A2.3 / A2.4<br>LS.LMu / LS.LMx | 315,579 | The mosaic of habitats was observed to the north and north-eastern sections of the survey area, covering 315,579$m^2$ (32ha).<br>Mosaic habitat comprised of boulders, cobbles and gravel, interspersed by a high coverage of anoxic mud. Varying coverage of green mat forming algae. Hard substrata, where present, was frequently colonised by H. perleve. |
| Coastal saltmarshes and saline reedbeds<br>A2.5<br>LS.LMp.Sm | 311,519 | This habitat was observed in the south, west and north-western areas of the Harbour, covering an area of 311,519$m^2$ (31ha).<br>Large areas observed in the west and south-west in addition to small, isolated patches (<25 $m^2$) of saltmarsh observed along the north-west of the sea wall. |
| Ascophyllum nodosum on full salinity mid eulittoral mixed substrata<br>A1.3142<br>LR.LLR.F.Asc.X | 17,548 | This habitat covered the least extent of those recorded, covering 17,548$m^2$ (2ha) and was observed in the south-eastern area of the Harbour.<br>Habitat comprised of A. nodosum and F. vesiculosus on boulders and cobbles. |

*Source: APEM Ltd intertidal survey report* [155]

9.5.19 Geophysical characterisation surveys to support the EIA took place in May 2022 and grab samples were taken from the seabed. This survey, undertaken by Seastar Survey Limited and APEM Limited spanned both Langstone Harbour, its

approaches extending from Gilkicker Point near Portsmouth Harbour's approach channel across to Hayling Island's eastern edge within the Solent. The survey generally extended 1-3km from shore and was developed in consultation with the regulators. As such the survey covers all vessel accessible areas within study area 1 and partially covers the northern extent of study area 2.

9.5.20 These surveys intended to obtain information to determine the presence of any broadscale features of conservation interest such as those listed on Annex I habitats under The Conservation of Habitats and Species Regulations 2017 (as amended), any listed under OSPAR Commission's list of threatened and/or declining species or habitats and those considered under the Review of the MCZ features of conservation importance [156].

9.5.21 The subtidal area adjacent to Hayling island and across Eastney Beach to eastern edge of Southsea common was relatively flat and shallow with maximum reported water depths of approximately 3.5m below Chart Datum (CD). In terms of larger scale features near the entrance to the Langstone Harbour next to western edge of Hayling Island, an intertidal sandbank was identified. This bank was likely formed by sediment transport out of the entrance channels to Langstone Harbour (in the west) and Chichester Harbour (in the east). The entrance to Langstone Harbour comprised a deep channel with a maximum depth of 13.3m below CD in its centre which is approximately 200m wide at the harbour entrance though 400m at its widest observed point. The sides of this channel are relatively steep with a slope between 6-18% as they progress up toward the intertidal or wider approach areas which return to a generally flat area. This channel is not regularly dredged and is thought to be created by the high tidal flows. Further features include the approach channel to Portsmouth Harbour which has depths observed between 15m and 18m below CD. To the west of the Portsmouth channel the seabed similarly shoaled as the other nearshore areas to around 3 to 4m CD. However, it was apparent that depths rapidly increased approximately 0.5km south of Gilkicker Point to the maximum depths of approximately 20m below CD.

9.5.22 Sidescan sonar data indicated that sediments comprise mud and fine sand, with discrete areas of coarser mixed material. Areas of megaripples, likely associated with the high current flows of the channel, were interpreted though other indeterminate bedforms were apparent. Outside of Langstone Harbour, sediments were fairly uniform and likely to consist of mixed sediments comprising varying degrees of mud, sand and fine gravel. Various bedforms were interpreted including a megarippled sand area primarily south of Hayling island and smaller areas of megarippled mixed coarse sediment near Portsmouth Harbour. Other bedforms were less distinct, although areas of cobbles were interpreted south of Eastney Beach, and an area of anchor scars interpreted nearby Portsmouth Harbour.

9.5.23 This survey mapped 11 different habitats including sublittoral coarse sediment, sublittoral sands and muddy sand, sublittoral mixed sediments and sublittoral cohesive mud and sandy mud communities at Level 3 under JNCC Marine Habitat Classification for Britain and Ireland [157].

9.5.24 A total of 29 stations were sampled for particle size analysis and 24 station for faunal analysis distributed across the geophysical survey area to represent the predicted habitat types. Particle size analysis revealed that the majority of samples (11) were dominated by gravel size particles, although mud size particles were

dominant in five samples. The muddier areas were within northern part of Langstone Harbour or in the deep waters near Gilkicker Point

9.5.25 The sampling stations were biologically diverse with a good representation of annelids, crustacea, molluscs and "other non-countable" taxa. A number of species that are considered rare, or that are component parts of priority habitats, were recorded across the survey area. *Epistomia bursaria* was recorded and is listed as a nationally rare species by the JNCC. In addition, two individuals of *Maxmuelleria lankesteri* were noted at one station with supporting community most closely representative of the biotope "Burrowing megafauna *Maxmuelleria lankesteri* in circalittoral mud" (A5.362), which can be a component part of the priority habitat "Mud habitats in deep water". *Sabelleria spinulosa* was identified, but not enough to be reef forming.

9.5.26 An additional survey to investigate the habitats that would be present around the Eastney LSO and establish existing water quality the habitats currently encounter has been commissioned by the Applicant. The specification of these surveys is currently being discussed with NE and the EA. These surveys are anticipated to be conducted before the end of 2023. Results of these surveys will be assessed as part of the EIA and reported within the ES.

*Benthic marine species*

9.5.27 The subtidal benthic environment supports a diverse variety of species. The Diver's Guide to Marine Life of Britain and Ireland (Wood, 2013) has been used to detail general benthic species that may be found within the two study areas that have been identified in the public Marine Recorder snapshot [144] . The book determines UK distribution based on 'common', 'occasional', 'rare' and 'absence' of species observed during dives whilst the Marine Recorder snapshot lists species that are 'superabundant', 'abundant', 'common', 'occasional' and 'rare'. Examples of species identified with study area 2 as 'common' or above have been included within Table 9-13 (these species may also be found in study area 1). The list is not exhaustive as there are numerous species present under each species group. A more complete list of species present can be found in the book mentioned above.

**Table 9-13: Benthic marine species within study area 2**

| Species group | Phylum | Example species |
|---|---|---|
| Sponges | Porifera | Purse sponge *Sycon ciliatum*<br>Sea orange *Suberites ficus*<br>Shredded carrot sponge *Amphilectus fucorum* |
| Hydroids, anemones | Cnidaria | Oaten pipe hydroid *Tubularia indivisa*<br>Antenna hydroid *Nemertesia antennina*<br>Dead men's fingers *Alcyonium digitatum*<br>Sandalled anemone *Actinothoe sphyrodeta* |
| Worms | Platyhelminthes, Nemertea and Annelida | Sand mason worm *Lanice conchilega* |
| Crabs, lobster and prawns | Crustacea | Lobsters *Homarus gammarus*<br>Common shore crabs *Carcinus maernis* |

| Species group | Phylum | Example species |
|---|---|---|
| | | Common hermit crab *Pagarus bernhardus* |
| Sea shells, sea snails and clams | Mollusca | Whelks *Buccinum undatum*<br>Grey topshell *Gibbula cineraria*<br>Flat topshell *Gibbula umbilicalis*<br>Scallops *Pectinidae* spp.<br>Common periwinkle *Littorina littorea* |
| Sea mats and sea moss | Bryozoa | Spiral bryozoans *Bugula* spp.<br>Frosty sea mat *Electra pilosa*<br>Hornwrack *Flustra foliacea* |
| Starfish, sea urchins and sea cucumbers | Echinodermata | Common starfish *Asterias rubens*<br>Sand brittlestar *Ophiua ophiura* |
| Sea squirts | Tunicata | Star sea squirt *Botryllus schlosseri*<br>Leathery sea squirt *Styela clava* |
| Fish | Pisces | Thornback ray *Raya clavata*<br>Spotted ray *Raya montagui*<br>Undulate ray *Raya undulata*<br>Plaice *Pleuronectes platessa*<br>Sole *Solea solea*<br>Goby – rock, *Gobius pagnellus*<br>Sand eel – lesser, *Ammodytes tobianus*<br>Snake pipefish, *Entelurus aequoreus*<br>Also see species listed in Table 9-7 and Table 9-8 |
| Sea weeds and seagrasses | Algae and Angiosperms | Eelgrass *Zostera marina*<br>Dwarf eelgrass *Zostera noltii.*<br>Sugar kelp *Saccharina latissima*<br>Sea lettuce *Ulva lactuca*<br>Discoid fork weed *Polyides rotunda* |

9.5.28 In a review of NEs published distribution of MCZ species features of conservation importance, 12 benthic species are anticipated within the study area [158]. Four of these are fish species, some of which are mentioned above. These are provided in Table 9-14 (these species may also be found in study area 1).

**Table 9-14: Benthic species features of conservation importance within study area 2**

| Common name | Scientific name |
|---|---|
| Black seabream | *S. cantharus* |
| European eel | *Anguilla anguilla* |
| European smelt | *Osmerus eperlanus* |
| Lagoon sand shrimp | *Gammarus insensibilis* |
| Lagoon snail | *Paludinella littorina* |
| Maerl | *Phymatolithon calcareum* |

| Common name | Scientific name |
|---|---|
| Peacock's tail | *Padina pavonica* |
| Stalked jellyfish | *Calvadosia campanulata* |
| Stalked jellyfishes | *Haliclystus* species |
| Starlet sea anemone | *Nematostella vectensis* |
| Tentacled lagoon worm | *Alkmaria romijni* |
| Undulate ray | *R. undulata* |

### *Invasive and non-native species*

9.5.29 There are a number of established marine invasive and non-native species (INNS) within the Solent and the wider coastal area near to the Proposed Development, which will need to be considered. Study areas 1 and 2 are located within the Solent, meaning that these INNS could be present here. Marine INNS included in the JNCC 2021 indicator [159] found within the Solent area [160] are listed in Table 9-15:.

**Table 9-15: List of INNS around the Solent**

| Common name | Scientific name |
|---|---|
| Asian mussel | *Arcuatula senhousia* |
| Harpoon weed | *Asparagopsis armat* |
| Compass sea squirt (rare in the Solent) | *Asterocarpa humilis* |
| Modest barnacle | *Austrominius modestus* |
| A colonial sea squirt | *Botrylloides diegensis* |
| Chain tunicate | *Botrylloides violaceus* |
| Japanese skeleton shrimp | *Caprella mutica* |
| Green sea fingers | *Codium fragile* subsp. *fragile* |
| Orange-tipped Sea squirt | *Corella eumyota* |
| Pacific oyster | *Crassostrea gigas* |
| Slipper limpet | *Crepidula fornicate* |
| Siphoned Japan weed | *Dasysiphonia japonica* |
| Carpet sea-squirt | *Didemnum vexillum* |
| Coral worm | *Ficopomatus enigmaticus* |
| Devil's tongue weed | *Grateloupia turuturu* |
| Annelid worm | *Hydroides ezoensis* |
| Amphipod crustaceans | *Monocorophium sextonae* |
| Harvey's siphon weed | *Melanothamnus harveyi* |
| Wireweed | *Sargassum muticum* |
| Leathery sea squirt | *Styela clava* |
| Tufty-buff bryozoan | *Tricellaria inopinata* |

| Common name | Scientific name |
|---|---|
| Wakame | *Undaria pinnatifida* |
| Red ripple bryozoan | *Watersipora subatra* |

### *Fisheries*

#### *Recreational fisheries*

9.5.30 Langstone Harbour is an important location for charter fishing boats, providing suitable access for sea angling trips into the Solent and wider coastal area, and as a designated bass nursery under the Bass Order 1999. Bass are one of a number of primary species targeted by recreational sea anglers from both the shore and boats.

9.5.31 The Southern IFCA District stretches from the Devon/Dorset border in the west across to the Hampshire/Sussex border in the east. This district is recognised as a nationally significant area for recreational sea angling. This is due to the broad diversity of features, habitats and fish species found within the estuaries and coastal areas across the district. The district is supported by good boat access provided by sheltered moorings in areas around the Solent Waters. Offshore angling is facilitated by privately owned vessels, angling club boats and numerous professional charter angling boats. The sport is widespread across the area, particularly in the summer months, with the charter angling vessels operating out of Poole Harbour and Weymouth Bay which utilise fishing grounds within study areas 1 and 2. Shore anglers visit popular spots such as Chesil Beach, Sandbanks, Eastney, Bournemouth, Boscombe and Southsea Piers, with marinas, cliffs and harbour walls also important. Anglers use rod and line to target a wide variety of fish species, with primary catches consisting of seabass, black seabream, pollack, squid and flatfish. However, a wide range of species are targeted, including tope.

9.5.32 The Sussex IFCA District stretches from the Hampshire/Sussex border in the west across to the Kent and Essex border in the east. This district also contains a broad diversity of features and habitats and diverse assemblage of fish species found within the estuaries and coastal areas, which support a significant number of recreational fisheries that are fished both from shore and from numerous charter boats operating within the area. Primary recreational target species within the area include black seabream, tope and bass. Portsmouth, Langstone and Chichester Harbours, and the surrounding coastline support an active fleet of charter boats and shore fishermen.

9.5.33 Whilst commercial fisheries landings statistics are reported annually by the MMO, recording and reporting methods for recreational fisheries are still widely undeveloped to provide annual data on catch, effort and target species. Information provided within the baseline study includes anecdotal reporting from the IFCAs, Harbour Conservancy Boards and recreational fishing/charter boat online sources to identify the key species targeted within these fisheries. Each of the recreational target species identified have also been included within the Marine Ecology section of this baseline for study area 1. The MMO1163 Mapping Sea Angling project [161] provides further insights into the spatial distribution of recreational sea angling in England. The research was commissioned to support

the development and implementation of marine plan policies, and to assist the MMO and IFCAs to manage impacts on Marine Protected Areas and uses of the marine environment. The report utilises the 'data mining' methodology, whereby all relevant data held within online text is extracted to provide spatio-temporal data from which to understand recreational fisheries. This provides an overview of important target species within the study area and the level of shoreline fishing activity undertaken [161]. Trends in this data are shown in Table 9-16.

**Table 9-16: Recreational fisheries trends near to study areas 1 and 2**

| Location | High/medium/low shore activity | Charter boat species catches ranking[7] | | | | | |
|---|---|---|---|---|---|---|---|
| | | Cod | Bass | Skates and Ray | Flatfish | Bream | Shark |
| Southampton Waters (study area 1) | Medium – High | 0 | 0 | 0 | 0 | 0 | 0 |
| Portsmouth Harbour (partially within study area 2) | Medium – High | 24 | 6 | 27 | 18 | 8 | 23 |
| Langstone Harbour (study area 1) | Medium – High | 39 | 25 | 43 | 34 | 21 | 29 |
| Chichester Harbour (partially within study area 2) | Medium – High | 4 | 8 | 17 | 8 | 11 | 14 |

### *Commercial fisheries*

9.5.34 The following section characterises the fishing fleet operating within the study area and the commercially sensitive target species fished. This is to provide a baseline of receptors and allow consideration of potential impacts that could arise from the Proposed Development.

9.5.35 For the purpose of this study, commercial fishing is defined as any fishing activity undertaken by licensed fishing vessels for the legitimate capture and sale of fish and shellfish. Publicly available information from MMO landing statistics [162] and AIS fishing vessel surveillance results have been used to inform this section. Landings and economic value data have been obtained from MMO fisheries landings statistics to describe current activity within each fishery.

[7] Values are described by MMO1163 project [161] as a "proxy indicator of relative shore marine angling activity expressed as a 3-bin quantile rank, aggregated by species and a 2-bin season (Winter: October to March; Summer: April to September). The rank was calculated from the co-occurrence of named spatial locations with words indicative of an angling trip and the month or season in which the activity occurred in. The co-occurrence sum approximates to trip count. Data was aggregated to the nearest-neighbour intertidal polygon)". Consequently, higher values indicate greater importance of that species for recreational use.

*Commercial fishing fleet*

9.5.36 The fishing fleet operating within the study area can generally be separated by vessel category in relation to size. Vessels 10m and under are considered to form the inshore fleet. These vessels generally have less range and fishing capability than larger vessels, and fish inshore waters with a return to port each day. Vessels over 10m are generally considered to have the capability to fish further afield, with larger engine capacities, more deck space for storage of gear and processing of catch and opportunities to fish over several days when needed.

9.5.37 The predominant fleet operating within the study area consists of inshore vessels, 10m and under in length with primary fishing grounds located closer to shore than larger vessels (corroborated by recent AIS data observations). Whilst a number of these vessels will have multipurpose capabilities, being able to deploy pots, trawls nets and/or lines, given their small size and associated limited operational ranges, they will be unable to utilise fishing grounds further afield.

*Commercial fishing ports*

9.5.38 Langstone Harbour has a small fleet of commercial fishing vessels that land catch at two wharves. Fishing vessels moor and unload at Locke Lake on Ferry Road at the entrance to the Harbour. Hermitage Stream is very shallow and heavily modified with no provisions for mooring fishing boats or landing catch. Depth limitations will restrict access and manoeuvrability of fishing vessels within the waterbody; therefore no interaction is anticipated between fishing vessels and the proposed construction works at Hermitage Stream. Chichester Harbour has a small fleet of inshore fishing vessels that operate from the Harbour, often fishing in the wider Solent. Portsmouth Harbour has berths at The Camber in Old Portsmouth, primarily used by the City's fishing fleet.

*Commercially sensitive species*

9.5.39 A substantial difference in landed weight and economic value of target species between the 10m and under and the over 10m fishing fleets is broadly evident across the data reporting period supporting increased reliance of the inshore fleet on fishing grounds within ICES rectangle 30E8 in which study area 2 is located (see Table 9-17).

**Table 9-17: Average economic value (£) and Landed weight (tonnes) of the 10m and under and over 10m fishing fleets operating within study area 2.**

| ICES rectangle (see Figure 9.2 in Volume III) | Year | Average Economic value (£) | | Average Landings (tonnes) | |
|---|---|---|---|---|---|
| | | 10m and under | Over 10m | 10m and under | Over 10m |
| 30E8 | 2016 | 3,716,257 | 783,507 | 1,796 | 441 |
| | 2017 | 3,174,839 | 558,293 | 1,170 | 290 |
| | 2018 | 3,290,269 | 312,238 | 852 | 144 |
| | 2019 | 3,571,398 | 433,364 | 1,058 | 200 |
| | 2020 | 2,970,951 | 621,174 | 1,090 | 292 |
| | | 3,344,743 | 541,715 | 1,193 | 273 |

| ICES rectangle (see Figure 9.2 in Volume III) | Year | Average Economic value (£) | | Average Landings (tonnes) | |
|---|---|---|---|---|---|
| | | 10m and under | Over 10m | 10m and under | Over 10m |
| | 5-year average | | | | |
| 30E9 | 2016<br>2017<br>2018<br>2019<br>2020<br>5-year average | 3,358,339<br>3,105,822<br>2,912,120<br>3,236,690<br>2,834,302<br>3,089,455 | 2,116,846<br>2,277,891<br>1,892,173<br>2,313,399<br>2,073,974<br>2,134,857 | 1,665<br>1,484<br>1,082<br>1,347<br>1,466<br>1,409 | 1,887<br>1,633<br>907<br>1,422<br>1,511<br>1,472 |

Source: MMO, 2022

9.5.40 Table 9-18 identifies commercially sensitive species fished in each of the ICES rectangles across the latest data reporting period of 2015-2019 (the latest published source). The table includes species that have been identified as important commercial catch for each rectangle based on the annual value (£) of the fishery and the landed weight (tonnes) fished each year. A detailed description of each of the target species identified with regard to sensitivities to water quality changes is provided in Appendix 9-4 in Volume II.

**Table 9-18: Summary of commercially sensitive target species in the data reporting period of 2015-2019.**

| ICES Statistical Rectangle | Top Ten Annual Economic Value (£) | Top Ten Annual Landed Catch (tonnes) |
|---|---|---|
| **30E8** | Manilla clam (*R. philippinarum*)<br>Whelks (*B. undatum*)<br>Sole (*S. solea*)<br>Brown/edible crabs (*C. pagurus)*<br>Lobsters (*H. gammarus*)<br>Bass (*D. labrax*)<br>Cuttlefish (Sepiida spp.)<br>Plaice (*P. platessa*)<br>Mixed clams<br>Mullet (Mugilidae) | Whelks (*B. undatum*)<br>Manilla clam (*R. philippinarum*)<br>Brown/edible crabs (*C. pagurus*)<br>Cuttlefish (*S. officinalis*)<br>Sole (*S. solea*)<br>Scallops (Pectinidae spp)<br>Plaice (*P. platessa*)<br>Bass (*D. labrax*)<br>Mullet (Mugilidae)<br>Lobsters (*H. gammarus*) |
| **30E9** | Whelks (*B. undatum*)<br>Sole (*S. solea*)<br>Scallops (Pectinidae spp)<br>Bass (*D. labrax*)<br>Lobsters ( *H. gammarus*)<br>Cuttlefish (*S. officinalis*)<br>Brown/edible crabs (*C. pagurus*)<br>Horse mackerel (*T. trachurus*)<br>Plaice (*P. platessa*)<br>Turbot (*Scophthalmus maxima*) | Whelks (*B. undatum*)<br>Horse mackerel (*T. trachurus*)<br>Scallops (Pectinidae spp)<br>Plaice (*P. platessa*)<br>Brown/edible crabs (*C. pagurus)*<br>Cuttlefish (*S. officinalis*)<br>Sole (*S. solea*)<br>Lesser spotted dog (*Scyliorhinus canicula*)<br>Bass (*D. labrax*)<br>Smooth hound (*Mustelus mustelus*) |

*Bivalve mollusc production areas*

9.5.41 Chichester Harbour, Langstone Harbour (study area 1), Portsmouth Harbour and the Solent Southampton Waters (study area 2) have all been identified as classified shellfish production beds within and/or adjacent to some of the study areas. Bivalve mollusc (shellfish) harvesting areas are classified according to the extent of microbial (faecal) contamination as shown by monitoring of *Escherichia coli (E. coli)* in shellfish flesh. The following species were identified as being target species of these classified beds:

- European oyster (*O. edulis*)
- Pacific oyster (*C. gigas*)
- Hard clam (*Mercenaria* spp.)
- Manila clam (V. philippinarum)
- Common cockle (*C. edule*)

9.5.42 The areas delineated within the charts provided in Appendix 9-2 in Volume II are those classified as bivalve mollusc production areas under Regulation (EU) 2019/627.

## 9.6 Scoping of potential effects

9.6.1 The Proposed Development has the potential to affect marine biodiversity, both during construction and once in operation.

9.6.2 Effects from decommissioning of the Proposed Development are considered to be no greater than those identified during the construction phase and are therefore assessed as construction effects as a realistic worst case scenario. Please refer to Chapter 3 Description of the Proposed Development, Section 3.7 for further information on decommissioning.

9.6.3 This section identifies the receptors that could be affected by the Proposed Development and considers if there could be a likely significant effect on them. Where no likely significant effect is identified from the construction and operational activities of the Proposed Development, these receptors are scoped out of assessment with supporting justification provided. Accordingly, those receptors where potential likely significant effects occur are scoped in for assessment.

### Effects scoped in to the assessment

9.6.4 The potential likely significant effects of the Proposed Development that will be subject to assessment are set out below for the construction and operational phases for marine ecology and commercial fisheries. These are presented in Table 9-19 and Table 9-20. Note that although a single study area is referred to in the potential effects column, given that the study areas overlap, both areas will be considered in the EIA.

*Construction effects*

9.6.5 Table 9-19 shows the potential construction effects that may arise from the Proposed Development.

Table 9-19: Scoped in effects (construction phase) – Marine biodiversity

| Potential effects | Likely significant effect on receptor | Rationale |
|---|---|---|
| **Marine ecology** | | |
| Potential effects on marine ecology receptors from underwater noise associated with construction of the Proposed Underground Pipelines between Budds Farm WTW and the proposed WRP (within study area 1). | Yes | It is currently unknown at what depths tunnelling will occur nor the exact tunnelling methodology that will be used. There is the potential for noise and vibration to occur as a result of the tunnelling, therefore until tunnelling details have been defined, likely significant effects cannot be ruled out at this stage.<br>Migratory fish species may be impacted by underwater noise and vibration, which can create barriers to migration, cause permanent or temporary injury, or induce behavioural changes. Following initial results from a fish habitat suitability walkover survey of the Hermitage Stream (see Section 9.7), the water depth within the Stream is reduced to as much as <5cm in places and the majority is highly artificial and modified. There is a lack of suitable habitat for migratory species upstream, however final migratory fish surveys result have not yet been received to confirm species (see Section 9.7).<br>Therefore, possible effects on marine ecology receptors from underwater noise and vibration are scoped in to adhere with the precautionary principle. These effects will be fully assessed in the EIA. |
| Potential effects on juvenile fish/larvae/eggs from underwater noise and vibration as a result of the construction of the Proposed Underground Pipelines between Budds Farm WTW and the proposed WRP (within study area 1). | Yes | It is recognised that due to the increased fragility of juvenile fish/larvae/eggs compared to adult migratory or non-migratory fish, these younger individuals may be more vulnerable to changes in baseline conditions such as noise and vibration generated by the tunnelling of the underground pipeline. It is also recognised that Langstone Harbour is a designated bass nursery under the Bass Order 1999 [163]. Underwater noise and vibration are not expected to be generated to a high enough level to effect bass outside of the Hermitage Stream. However, when considering the vulnerability of juveniles/eggs/larvae and the potential tunnelling of the bass nursery to the Hermitage Stream, additional information |

| Potential effects | Likely significant effect on receptor | Rationale |
|---|---|---|
| | | regarding habitat suitability of the Hermitage Stream for juveniles and details on the drilling methodology is required to make an informed judgement as to the potential level of effect. As a result, this is scoped in and will be assessed in the EIA.<br>It is also noted that these fish species may in turn act as prey species for designated birds within the area. Therefore, if these prey species are adversely affected, this could in turn adversely affect bird species. Potential effects on birds are considered within Chapter 8 Terrestrial and freshwater biodiversity. |
| Pollution events within Langstone Harbour (within study area 1) from the use of plant and machinery adjacent to the marine environment (all marine ecological receptors). | Yes | Works are taking place adjacent to the marine environment as part of two separate components of the Proposed Development comprising proposed WRP and HLPS, and the Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir. As a result, the use of plant and associated fuel requirements poses the risk of pollution spills which may pass into the marine environment in Langstone Harbour. Additionally, works are being undertaken on reclaimed land adjacent to the marine environment which has the potential for any leachate to enter into the marine environment. Given the scale of both the tidal excursions in the area and the works being undertaken, it is not anticipated that a pollution event (such as an oil spill, chemical spill, or construction dust creation) associated with the Proposed Development would be great enough to affect the marine environment outside of Langstone Harbour.<br>It should be noted that there is also a risk of a potential blow-out[3] occurring under the Hermitage Stream during the tunnelling process for constructing the pipelines between Budds Farm WTW and the proposed WRP. This could lead to pollutants and/or sediments travelling downstream into Langstone Harbour. In the instance of a blow-out, and if tunnelling apparatus were broken off under the stream, it may require direct excavation for |

| Potential effects | Likely significant effect on receptor | Rationale |
|---|---|---|
| | | their retrieval. This would pose further risk of pollution if any equipment were required to be used within the marine environment.<br>As a result, pollution events are scoped in for the construction phase for all marine ecological receptors considered to visit or be present within Langstone Harbour. |
| **Commercial fisheries** | | |
| Pollution events within Langstone Harbour (within study area 1) from the use of plant and machinery adjacent to the marine environment (commercially exploited fish and shellfish species). | Yes | Works are taking place adjacent to the marine environment as part of two separate components of the Proposed Development comprising proposed WRP and HLPS, and the Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir. As a result, the use of plant and associated fuel requirements poses the risk of pollution spills which may pass into the marine environment in Langstone Harbour. Additionally, works are being undertaken on reclaimed land adjacent to the marine environment which has potential for leachate into the marine environment to occur. It should be noted that there is also a risk of a potential blow-out[3] occurring under the Hermitage Stream during the tunnelling process for the construction of the Proposed Underground Pipelines between Budds Farm WTW and the proposed WRP. This could lead to pollutants and/or sediments traveling downstream into Langstone Harbour. In the instance of a blow-out and if tunnelling apparatus were broken off under the stream, it may require direct excavation for their retrieval. This would pose further risk of pollution if any equipment were required to be used within the marine environment.<br>As a result, pollution events are scoped in for the construction phase of the Proposed Development for commercially sensitive fisheries species that are present within Langstone Harbour, including classified shellfish production beds. |
| Potential effects on fish nursery/spawning grounds as a result of construction (within study area 1). | Yes | Works are taking place adjacent to the marine environment as part of two separate components of the Proposed Development comprising proposed WRP and HLPS, and the Proposed Underground Pipeline |

| Potential effects | Likely significant effect on receptor | Rationale |
|---|---|---|
| | | between the proposed WRP and Havant Thicket Reservoir. As a result, the use of plant and associated fuel requirements poses the risk of pollution spills which may pass into the marine environment in Langstone Harbour. Additionally, works are being undertaken on reclaimed land adjacent to the marine environment which has potential for any leachate to enter into the marine environment. It should be noted that there is also a risk of a potential blow-out[3] occurring under the Hermitage Stream during the tunnelling process for the construction of the Proposed Underground Pipelines between Budds Farm WTW and the proposed WRP. This could lead to pollutants and/or sediments traveling downstream into Langstone Harbour. In the instance of a blow-out and if tunnelling apparatus were broken off under the stream, it may require direct excavation for their retrieval. This would pose further risk of pollution if any equipment were required to be used within the marine environment.<br>As a result, pollution events are scoped in for the construction phase of the Proposed Development for commercially sensitive fisheries species that are considered to utilise the Harbour as nursery and/or spawning grounds. |
| Potential effects on commercially exploited fish and shellfish species from underwater noise and vibration linked to tunnelling under Hermitage Stream (within study area 1). | Yes | It is possible that underwater noise and vibration would be generated as a result of the tunnelling between Budds Farm WTW and the proposed WRP, therefore until tunnelling details have been defined impacts cannot be ruled out at this stage. |

### *Operation effects*

9.6.6 Table 9-20 shows the potential operational effects that may arise from the Proposed Development.

**Table 9-20: Scoped in effects (operation phase) –– Marine biodiversity**

| Potential effects | Likely significant effect on receptor | Rationale |
|---|---|---|
| **Marine Ecology** | | |
| Potential effects on marine ecology (fish, | Yes | Discharge from the Eastney LSO would partially comprise a reject stream from the |

| Potential effects | Likely significant effect on receptor | Rationale |
|---|---|---|
| marine mammals, marine habitats including nursery and spawning grounds) from changes in effluent discharged from Eastney LSO (within study area 2). | | WRP necessary to achieve 20Ml/d of recycled water. This would alter as operational capacity phases to achieve a peak output of 60Ml/d of recycled water depending upon water availability at Bedhampton Springs (see Chapter 3 Description of the proposed development).<br>Budds Farm WTW already discharges effluent into the marine environment from the existing LSO. As part of the operational process, a portion of the existing effluent from Budds Farm WTW will be subject to the water recycling processes described in Chapter 3 Description of the Proposed Development before the reject stream is discharged at the same location.<br>As a result, the discharge effluent (comprising the existing discharge from Budds Farm WTW and the rejected stream from the operational WRP) from the existing LSO would have a decreased volume because water has been removed and would be slightly more saline (although still below full marine salinity).<br>Also, in the event of an emergency shutdown minerals added to the purified water may also be discharged which would also modify the salinity. In both cases this means that the resulting discharge effluent's salinity will be closer to the conditions of the Solent open water environment in which it is being discharged into when compared to the existing discharge. Accordingly, this is likely to slightly modify the existing dispersion pathway though the exact change has yet to be modelled. In addition, it is unclear how existing compounds within the discharge would be affected by this recycling process. It is possible that it may concentrate compounds above environmental quality standard for estuarine and coastal waters8 or it may even reduce nutrient concentrations.<br>Given that changes may potentially raise deleterious compounds above thresholds of effect levels or may alter the availability of nutrients or organic matter to existing communities it is likely that the benthic community may be affected. As such, effects |

[8] See Screening tests: estuaries and coastal waters available from Surface water pollution risk assessment for your environmental permit - GOV.UK (www.gov.uk)

| Potential effects | Likely significant effect on receptor | Rationale |
|---|---|---|
| | | on marine ecology are scoped in as a precaution as it is unclear if community changes could result in likely significant effects.<br>It is also important to note that benthic habitats in the area potentially include features of conservation interest including blue mussel, peacock's tail (Padina pavonica), sheltered muddy gravels, fragile sponge and anthozoan communities on subtidal rocky habitat. Currently the proximity of such features to the discharge location are unknown though additional survey work will seek to resolve what benthic communities are adjacent to the Eastney LSO.<br>Further, updated effluent modelling results need to be reviewed to confirm the potential effects and the likely extent of any changes in order to determine if there would be any likely significant effects on marine ecology receptors. |
| **Commercial Fisheries** | | |
| Potential effects on commercially exploited fish and shellfish species from changes in effluent discharged from Eastney LSO (within study area 2). | Yes | Discharge from the Eastney LSO would partially comprise a reject stream from the WRP necessary to achieve 20Ml/d of recycled water. This would alter as operational capacity phases to achieve a peak output of 60Ml/d of recycled water depending upon water availability at Bedhampton Springs (see Chapter 3 Description of the proposed development).<br>Budds Farm WTW already discharges effluent into the marine environment from the existing LSO. As part of the operational process, a portion of the existing effluent from Budds Farm WTW will be subject to the water recycling processes described in Chapter 3 Description of the Proposed Development before the reject stream is discharged at the same location.<br>As a result, the discharge effluent (comprising the existing discharge from Budds Farm WTW and the rejected stream from the operational WRP) from the existing LSO would have a decreased volume because water has been removed and would be slightly more saline (although still below full marine salinity).<br>Also, in the event of an emergency shutdown, minerals added to the purified |

| Potential effects | Likely significant effect on receptor | Rationale |
|---|---|---|
| | | water may also be discharged which would also modify the salinity. In both cases this means that the resulting discharge effluent's salinity will be closer to the conditions of the Solent open water environment in which it is being discharged into when compared to the existing discharge. Accordingly, this is likely to slightly modify the existing dispersion pathway though the exact change has yet to be modelled. In addition, it is unclear how existing compounds within the discharge would be affected by this recycling process. It is possible that it may concentrate compounds above environmental quality standard for estuarine and coastal waters8 or it may even reduce nutrient concentrations.<br>The majority of commercial fisheries target species within study area 2 are mobile, some to a lesser degree, such as whelk with daily movements of 10-100s of metres, and some, including mackerel and herring, that are highly mobile within a broad regional area. They are likely to be reliant upon a variety of habitats across study area 2.<br>Given that changes may potentially raise deleterious compounds above thresholds of effect levels or may alter the availability of nutrients or organic matter to existing communities, there is potential that the benthic community of those habitats that commercial fisheries may be reliant upon could be subject to likely significant effects.<br>Any change in water composition as a result of the new effluent is likely to be localised around the Eastney LSO as the effluent dilutes with mixing. However, the exact extent of potential influence is unknown and will be fully explored as part of the EIA. Currently the proximity of supporting habitat for commercial fisheries to the discharge location is unknown, though additional survey work will seek to resolve this uncertainty. Further, updated effluent modelling results will be reviewed to confirm any likely significant effects. Therefore, as a precaution effects on commercially sensitive species are scoped in as it is unclear if changes could result in likely significant effects. |

## Effects scoped out of the assessment

9.6.7 Scoped out effects are split between the construction and operational phase and also between marine ecology and commercial fisheries. This is presented in Table 9-21 and Table 9-22.

### *Construction effects*

9.6.8 The following potential construction effects are scoped out across both study area 1 and 2.

**Table 9-21: Scoped out effects (construction phase) – Marine biodiversity**

| Potential effects | Likely significant effect on receptor | Rationale |
|---|---|---|
| **Marine Ecology** | | |
| Potential effects on marine ecology from the introduction and/or spread of INNS | No | Although tunnelling would occur under the Hermitage Stream, and therefore under the seabed within the marine environment, there is no connectivity between tunnelling activity and the water column as entry and egress of the pipeline will be in the terrestrial environment, located at Budds Farm WTW and the proposed WRP. No other components of the Proposed Development involve undertaking works directly within the marine environment. Based on these parameters, there is no pathway for INNS to enter the water column during construction. |
| Potential effects from visual disturbance (human presence, vehicle movement and light pollution) | No | It is acknowledged that a seal haul-out site is present within Langstone Harbour (see Section 9.5). The Harbour is a busy location with a high level of marine traffic and baseline visual disturbance meaning any seals utilising the Harbour are likely to be used to changes to visual baseline. In addition, the seal haul-out location is thought to be south of Farlington Marshes which over 2km away from the terrestrial works [149, 164].<br>Although tunnelling will occur under the Hermitage Stream, and therefore under the seabed within the marine environment, there is no connectivity between tunnelling activity and the water column as entry and egress of the pipeline will be in the terrestrial environment, located at Budds Farm WTW and the proposed WRP.<br>Based on these factors, there is no pathway for visual disturbance to marine mammals or fish from this aspect of the Proposed Development. |

| Potential effects | Likely significant effect on receptor | Rationale |
|---|---|---|
| Temporary habitat loss | No | Although tunnelling will occur under the Hermitage Stream, and therefore under the seabed within the marine environment, there is no connectivity between tunnelling activity and seabed habitats as entry and egress of the pipeline will be in the terrestrial environment, located at Budds Farm WTW and the proposed WRP. Based on these parameters, there is no pathway for temporary habitat loss from this aspect of the Proposed Development as there would be no land take within the marine environment as a result of pipeline construction. |

*Operation effects*

9.6.9 The following potential operation effects are scoped out.

**Table 9-22: Scoped out effects (operation phase)**

| Potential effects | Potential significant effect on receptor | Rationale |
|---|---|---|
| Marine Ecology | | |
| Direct habitat loss | No | There is no land take or construction within the marine environment into the operational phase that would result in the direct loss of habitat. |

## 9.7 Approach to assessment

### Additional baseline data collection

9.7.1 Additional surveys have been commissioned by the Applicant, or are in the process of being commissioned, to obtain baseline data relevant to the Proposed Development to support the next stages of assessment. Those which have been completed are outlined at a high level in Section 9.5. A summary of surveys, associated progress and aim of information to be acquired is outlined in Table 9-23 which will be assessed as part of the EIA. A separate geophysical survey is also planned to take place to inform the drilling methodology for the Proposed Underground Pipeline between Budds Farm WTW and the proposed WRP. Following this, further details as to the likely levels of underwater noise and vibration can be understood and an informed decision made as to whether underwater noise modelling is required.

Table 9-23: Marine biodiversity surveys planned or underway

| Survey name | Explanation of survey | Progress / programme |
|---|---|---|
| Geophysical survey | Side scan sonar survey of the seabed within Langstone Harbour and surrounding areas. Results will help to understand presence of any key benthic features within the ZoI. | Sampling completed in April 2022, using grab sampling to identify biota and particle size analysis. |
| Habitat walkover of Hermitage stream | Walkover of Hermitage stream to confirm stream suitability as a migratory route for fish species. | Initial survey completed in June 2022 and analysis is ongoing alongside the further migratory fish survey. |
| Marine Migratory Fish surveys | Spring and autumn surveys are planned for the mouth of the Hermitage Stream to understand if migratory fish species utilise the Hermitage Stream. | Surveys completed. |
| Intertidal seagrass survey | Seagrass surveys will take place using a hovercraft in the intertidal areas of Langstone Harbour to map areas of seagrass. | Survey completed in September 2022. |
| Intertidal biotope survey | Intertidal walkover surveys have taken place to obtain samples and map habitats present within Langstone Harbour. | Survey completed in September 2022. Final laboratory analysis is pending and draft results received end of June 2023. |
| Benthic survey around the Eastney LSO | Survey of broadscale benthic habitat, observable epibiota and water quality around the existing Eastney LSO. These surveys will be conducted in conjunction with the separate Sandown WRP scheme to investigate the benthic habitats around the Sandown LSO and where the two discharge plumes likely transect. This will provide information on existing benthic habitats and a snapshot of water quality prior to commencement of both schemes. | The benthic survey specification is currently being discussed with NE and the EA. It is currently considered to comprise multibeam bathymetric and side scan sonar survey with investigation of habitats using a drop-down camera system to conduct transects. In addition, multiparameter CTD profiles (focusing on salinity, turbidity, dissolved oxygen and pH) will be acquired along with discrete water samples at three depths (near surface, mid depth and near bottom) to test for water quality parameters. The survey is intended to be undertaken during period of good weather suitable to the intended survey vessel, ideally during late spring to late autumn 2023 to maximise chance of observing species which have more cryptic overwintering stages (i.e. stalked jellyfish and peacock tails). |

## Assessment methodology

9.7.2 Marine ecology (habitats and species) and commercial fisheries will be assessed using the same best practice Ecological Impact Assessment (EcIA) guidance published by CIEEM [115]. The CIEEM guidance stipulates that "*EcIA reports should be tailored to suit individual circumstances and different formats are acceptable"*, therefore where appropriate, the methodology has been modified based on professional judgement to suit the purposes of this EIA.

9.7.3 The methodology for the assessment of likely significant effects will be largely the same for marine ecology and commercial fisheries. However, each topic has varying definitions in terms of value of receptor and magnitude of impact. The below sections outline the considerations for both topics and the overall method for assessing likely significant effects as a result of the Proposed Development. The approach to assessment has been presented during EIA Working Groups stakeholder engagement with no concerns raised to date (see section 9.3 for details of engagement undertaken).

9.7.4 There is no statutory definition of what constitutes a likely significant effect. The interpretation of the significance of an effect is dependent on the specialist assessor's professional opinion taking account of any relevant legislation, policy and guidance. The methodology for assessing effects as part of the EIA will adopt the following three stage process to assess the likely significance of any effect on marine ecology and commercial fisheries:

- **Step 1:** Identification of the baseline conditions and the **value** and importance of receptors within the identified study areas (see Table 9-24).
- **Step 2:** Identification of the **magnitude** (i.e. size) of change (impact) upon each receptor (see Table 9-25).
- **Step 3:** Evaluation of the **significance** (i.e. importance) of the effect, which is the product of a combination of the above two variables (see Table 8-11:).

9.7.5 Environmental impacts will also be classified as temporary (occurring over a number of hours to months, see), or permanent (irreversible or reversible changes occurring over a longer period than would be deemed temporary i.e. across a number of years, see Table 9-25).

9.7.6 The below sections outline the definitions to consider in terms of value and magnitude for both marine ecology and commercial fisheries.

### *Assigning value*

9.7.7 Ecological importance is determined with reference to:

- Legal protection: level of designation (sites) or biodiversity-based protection (species and habitats).
- Biodiversity value (e.g. rarity, scarcity, function within ecosystem, population trends).

9.7.8 The ecological importance of a feature is determined on a geographical scale, where the broader geographical context reflects an increased value and/or sensitivity to change:

- International (within Europe) value
- National (relating to the UK, specifically England) value
- Regional value
- County value
- Local value

9.7.9 The geographical context for each important ecological receptor will be determined on the basis of a variety of factors, for example, the quality or extent of designated sites or habitats; habitat/species rarity; the extent to which they are threatened throughout their range; and their rate of decline.

9.7.10 In the interests of interdisciplinary consistency and with the approach to EIA, CIEEM receptor importance and evaluation of significance descriptors have been presented in Table 9-24.

**Table 9-24: Value definitions for marine ecology and commercial fisheries**

| Value | Definition (marine ecology) | Definition (commercial fisheries) |
|---|---|---|
| Very high | Receptor is of international importance:<br>Sites forming part of OSPAR marine protected area network or under the Emerald Network under the Bern convention (SCI; SPA; pSPA; SAC; cSAC or pSAC) Wetlands of International Importance (Ramsar sites). Biogenetic Reserves, World Heritage Sites and Biosphere Reserves).<br>Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such. Resident, or regularly occurring, populations of species which may be considered at an International or European level where:<br>• the loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale<br>• the population forms a critical part of a wider population at this scale<br>• the species is at a critical phase of its life cycle at this scale | Limited operational range and/or limited gear/target species versatility. High dependence upon a single fishing ground. |
| High | Receptor is of national importance:<br>Designated sites (SSSI; non internationally listed Marine Protected Areas (MPA) including Marine Conservation Zones (MCZ); and NNR).<br>Areas which meet the published selection criteria e.g. JNCC (1998) for those sites listed above but which are not themselves designated as such.<br>Areas of key/priority habitats identified in the UK, including those published in accordance with Section 41 of the Natural Environment and Rural Communities Act (2006) and those considered to be of principal importance for the conservation of biodiversity. | Moderate extent of operational range and/or limited gear/target species versatility. Dependence upon a limited number of fishing grounds. |

| Value | Definition (marine ecology) | Definition (commercial fisheries) |
|---|---|---|
| | Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level where:<br>• the loss of these populations would adversely affect the conservation status or distribution of the species at this scale<br>• the population forms a critical part of a wider population at this scale<br>• the species is at a critical phase of its life cycle at this scale | |
| Medium | Receptor is of regional/county importance:<br>Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such.<br>Areas of key/priority habitats identified; and areas of habitat identified in the appropriate Natural Area Profile (or equivalent).<br>Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level where:<br>• the loss of these populations would adversely affect the conservation status or distribution of the species across the County or Unitary Authority Area<br>• the population forms a critical part of a wider population<br>• the species is at a critical phase of its life cycle | Extensive operational range and/or some gear/target species versatility. Ability to fish a number of fishing grounds. |
| Low | Receptor is of local value:<br>Areas of habitat; or populations/communities of species considered to appreciably enrich the habitat resource within the local context, including features of value for migration, dispersal or genetic exchange. | Extensive operational range and high gear/ target species versatility. Vessels are able to exploit a large number of fishing grounds. |

### *Assigning magnitude of impact*

9.7.11 Table 9-25 provides the definitions for determining the magnitude of impact for both marine ecology and commercial fisheries using CIEEM guidance [115].

9.7.12 This has considered the following characteristics of environmental change:

- Probability of the impact occurring
- Positive or negative:
  - positive – a change that improves the quality of the environment e.g. by increasing species diversity, extending habitat or improving water quality. This may also include halting or slowing an existing decline in the quality of the environment.
  - negative – a change which reduces the quality of the environment e.g. destruction of habitat, removal of foraging habitat, habitat fragmentation, pollution.

- Extent – the spatial or geographical area over which the environmental change may occur.
- Scale – the size, amount, intensity or volume of the environmental change.
- Duration – the length of time over which the environmental change may occur and whether this is permanent or temporary.
- Frequency and timing – the number of times an environmental change may occur and the periods of the day, season or year during which an environmental change may occur; considering seasonal or life cycle constraints).
- Reversibility – whether the environmental change can be reversed through restoration actions or regeneration.

9.7.13 For commercial fisheries the magnitude of an impact is considered on an individual fleet basis and is defined taking account of the spatial and temporal extent of the impact. This is considered in the context of the relative level of importance to each fleet of the area affected by the potential impact (i.e. the level of fishing in the area with reference to the extent of alternative grounds that the fleet is able to exploit).

**Table 9-25: Magnitude of impact definitions for marine ecology and commercial fisheries [115]**

| Magnitude of impact on receptor | Definition (marine ecology) | Definition (commercial fisheries) |
|---|---|---|
| Major adverse | Impact with serious consequences and/or on a large area. Impact is considered to be permanent. | The area affected by the adverse impact excludes activities in an area that sustains high levels of activity by the fishery and covers a large or moderate extent of its grounds; and/or the impact is considered to be long term or permanent. |
| Moderate adverse | Impact with undesirable consequences. Impact is considered to be temporary (for a medium to long term). | The area affected by the adverse impact excludes activities in an area that sustains medium/high levels of activity by the fishery and covers a moderate extent of its grounds; and/or the impact is considered to be temporary (lasting for a medium term). |
| Minor adverse | Discernible negative impacts and/or on a small area. Impact is considered to be temporary (for a short term). | The area affected by the adverse impact excludes activities in an area that sustains medium/low levels of activity by the fleet and covers a small extent of its grounds; and/or the impact is considered to be temporary (for a short term). |
| Negligible | No impact or no discernible impact. Impact is considered to be temporary (lasting for a number of hours). | The fleet in the impacted area has very little or no history of fishing in the area affected; and/or the impact is considered to be temporary (lasting for a number of hours). |
| Minor beneficial | Discernible positive impacts and/or on a small area. Impact is considered to be temporary (lasting for a number of days). | The area affected by the beneficial impact improves activities in an area that sustains medium/low levels of activity by the fleet and covers a small extent of its grounds; and/or the impact is considered to be temporary (lasting for a number of days). |

| Magnitude of impact on receptor | Definition (marine ecology) | Definition (commercial fisheries) |
|---|---|---|
| Moderate beneficial | Impact with favourable consequences. Impact is considered to be temporary (lasting for a number of months). | The area affected by the beneficial impact improves activities in an area that sustains medium/high levels of activity by the fishery and covers a moderate extent of its grounds; and/or the impact is considered to be temporary (lasting for a number of months). |
| Major beneficial | Impact provides substantial gains and/or on a large area. Impact is considered to be permanent (lasting for a number of years). | The area affected by the beneficial impact improves activities in an area that sustains high levels of activity by the fishery and covers a large or moderate extent of its grounds; and/or the impact is considered to be permanent (lasting for a number of years). |

### *Evaluation of significance of effects*

9.7.14 The following significance matrix will be used to assess the significance of potential effects arising from the Proposed Development. Where a range of effects on a receptor is considered, professional judgement would be applied to assign the appropriate level of significance.

**Table 9-26: Significance matrix**

| | | Magnitude of impact | | | |
|---|---|---|---|---|---|
| | | **Major** | **Moderate** | **Minor** | **Negligible** |
| **Value of receptor** | **Very High** | **Major** | **Major** | **Moderate** | Minor |
| | **High** | **Major** | **Moderate** | Minor | Minor |
| | **Medium** | **Moderate** | Minor | Minor | Neutral |
| | **Low** | Minor | Neutral | Neutral | Neutral |

9.7.15 Any effect listed as ‘Major’ or ‘Moderate’ using the matrix (Table 9-26) is considered to be significant for the purposes of this EIA.

## Assessment scenarios

9.7.16 The future baseline will also include committed developments that will be delivered prior to commencement of construction.

9.7.17 For the assessment, construction effects will be taken to be those for which the source begins and ends during the construction and commissioning stages prior to the Proposed Development becoming fully operational.

9.7.18 For the assessment, operational effects include those that start once the Proposed Development is commissioned and fully operational and includes the effects of the infrastructure in terms of its operation, use and maintenance.

9.7.19 Timescales associated with these effects, regardless of phase are as follows:

- Short-term - endures for up to a period of 12 months
- Medium-term - endures for between 1 and 5 years
- Long-term - endures for between 5 and 15 years
- Permanent effects - endures for more than 15 years and/or effects which cannot be reversed.

### Cumulative effects

9.7.20 Cumulative effects of the Proposed Development together with the effects of other developments/schemes may result in likely significant effects. This may be the result of effects on the environment during construction or operation of the Proposed Development.

9.7.21 Cumulative effects for all topics will be reported within the cumulative effects chapter of the ES. Please refer to Chapter 19 Cumulative effects assessment which presents the proposed methodology for the assessment of cumulative effects that will be undertaken for the EIA.

### In-combination effects

9.7.22 In-combination effects are those that result from the interaction between the individual effects of the Proposed Development (i.e. interaction of environmental factors such as air quality, noise, health), combined together on a single receptor at a single point in time. The interrelationship between the individual effects may combine to result in a significant effect, even where the individual effects were not significant. Any in-combination effects in relation to the marine biodiversity topic will be assessed within the relevant chapter of the ES.

9.7.23 The nature of likely in-combination effects for marine biodiversity includes:

- Underwater noise and vibration
- Pollution spills

## 9.8 Limitations and assumptions

9.8.1 A number of limitations and assumptions have been realised/made for this chapter. These are outlined below:

### Marine ecology

9.8.2 The baseline information for marine ecology has been informed using data obtained from publicly available data sets and data requests submitted to various groups (see Section 9.4). Further surveys to inform the baseline for marine biodiversity are being undertaken which will provide up to date baseline information for the study area. However, the ecological surveys are limited to factors which

affect the presence of species, such as time of year or migration patterns and behaviour. As a result, it is possible that some receptors have been missed within this chapter. However, this is a limitation faced by all survey methods and publicly available datasets so by using multiple sources of information the risk of missing potential receptors is reduced. Results from commissioned surveys will be available to inform the assessment of potential effects and will aid completion of the receptor list.

### Commercial fisheries

9.8.3 It is possible that during the desk-based study undertaken to gather publicly available commercial fisheries data, certain species may have been under-reported with regard to economic value and landed weight due to:

- MMO landings data is derived from sales notes generated when fishermen sell their catch to a registered buyer or seller. Critically, the submission of sales notes is not required when catch is sold directly to the public, or for individual sales smaller than 25kg. Because of the nature of some inshore fisheries, particularly for crab and lobster, where much of the catch is sold in small quantities and/or direct to the public, possibly via their own shops, these landings are not captured by the MMO database.
- Fisheries derived data provided by the industry is often an estimation of weight based on box size and previous weight parameters for weight that each box can hold and is often underestimated.
- Economic value and landed target species weight for each fishery has been expressed as an amalgamation of all vessel activity operating within each fishery within the study area. It has not been possible to determine the economic value and landed weight of each fishery for individual vessels in this study.
- It should be noted that commercial fisheries reporting data provided to the MMO by fishermen for 2018 has often been used where reported fisheries landing data have shown anomalous results due to the unknown impact of the coronavirus pandemic on effort and/or reporting since 2019 onwards.
- Analysis of the fleet operating in the study area using AIS fishing vessel surveillance provides a momentary view of activity occurring within the area and does not provide long term trends in vessel presence.
- Potential presence of recreational fishers/chartered fishing vessels operating within the study area and associated target species have not been considered in this assessment.
- These limitations are generally inherent to any commercial fisheries assessment. Care has been taken to minimise these limitations where possible by correlating with other available studies and to use engagement to validate findings where feedback provided by stakeholders.

## 9.9 Approach to mitigation and residual effects

9.9.1 The following principles are used to define the types of mitigation measures for the Proposed Development:

- **Primary (inherent) mitigation:** Modifications to the location or design of the Proposed Development that are an inherent part of the project, and do not require additional action to be taken. For example, reducing the height of a development to avoid or reduce visual impact on marine birds; identifying a key habitat that should remain unaffected and re-siting the required works elsewhere. Where adverse effects can be reduced to acceptable levels through evolution of the Proposed Development design (primary mitigation), this will be identified within the ES.
- **Secondary (foreseeable) mitigation**: Measures or actions required to reduce likely significant adverse environmental effects. For example, the use of bubble curtain adjacent to sources of harmful underwater noise that would reduce the sound exposure levels on marine mammals or other receptors. These measures will be identified during the EIA process to further prevent, reduce and, where possible, offset any adverse effects on the environment and will be described in the relevant topic chapters.
- **Tertiary (inexorable) mitigation**: Measures to reduce reasonably foreseeable impacts, such as recognised good construction site management practices. These include actions that will be undertaken to meet existing legislative requirements, or actions that are considered to be standard best practices used to manage commonly occurring environmental effects. For example, considerate contractors' practices that manage activities which have potential nuisance and environmental effects, such as the spillage of fuels, oils or other chemicals which could have a negative impact on sensitive marine habitats (through smothering or damage) or marine birds (through ingestion and mortality). The marine biodiversity ES chapter will describe measures identified to be adopted during construction to avoid and reduce environmental effects, such as pollution control measures.

9.9.2 Currently additional surveys are being undertaken to gather more baseline data to ensure all aspects of the marine environment within the Proposed Development's study areas are understood. Once this data is gathered the design of the Proposed Development can be adapted to avoid and reduce the likelihood of any adverse effects occurring. This is known as primary mitigation. Currently the interaction of the Proposed Development with the marine environment is limited to a few components of the Proposed Development only, with the change in the effluent discharged anticipated to result in beneficial change (in comparison to the existing discharge currently released). As a result, no primary mitigation for the marine environment other than avoidance of construction within the marine environment itself has been specified.

9.9.3 As more baseline data is gathered through additional surveys, a greater understanding of opportunities for mitigation will be realised.

9.9.4 As a general principle, the mitigation hierarchy will be applied and opportunities to avoid or reduce significant effects will be taken where possible. Avoidance and mitigation measures associated with the conservation of notable and legally protected habitats and species will be actively considered throughout the design process. Appropriate tertiary mitigation (i.e. application of best practice) will be applied where significant effects are unavoidable, and, as a last resort,

compensation provided for residual effects that remain after avoidance and mitigation measures are implemented.

9.9.5 Opportunities to contribute to the improvement of the marine environment will be explored as part of the Proposed Development. The Applicant is aware that the government is considering potential requirements in relation to marine net gain, and the Proposed Development will comply with relevant legal requirements at the time of application

## 9.10 Summary

9.10.1 Table 9-27 summarises the results of the scoping of marine biodiversity (comprising both marine ecology (habitats and species) and commercial fisheries).

**Table 9-27: Summary table – Marine biodiversity**

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| Underwater noise and vibration associated with construction of the Proposed Underground Pipeline between Budds Farm and the proposed WRP. | Scoped in (marine ecology receptors sensitive to sound in study area 1, including migratory and non-migratory fish, commercially exploited fish and shellfish species, juvenile fish/ larvae/ eggs, benthic marine receptors).<br><br>Scoped out (marine habitats). | Scoped out for all marine biodiversity (underwater noise and vibration would only be generated during the construction phase). | Due to the tunnelling of the pipelines from Budds Farm WTW to the proposed WRP there is potential to generate underwater noise and vibration. Though the tunnelling methodology design is still in development it is anticipated that species within Langstone Harbour could potentially be impacted. In addition, due to their susceptibility juvenile fish/eggs/ larvae could potentially be impacted. At this stage, it is considered that the noise is likely to be highly localised and temporary in nature due to the short segment of drilling required and the scale of works proposed. Habitats identified are not sensitive to underwater noise or vibration.<br>There are no known sources of underwater noise and vibration in the operational phase. |
| Habitat loss (direct from construction activities). | Scoped out (all marine biodiversity). | Scoped out (all marine biodiversity). | Works are happening in the terrestrial and subterranean environment. As a result, there would be no direct temporary or permanent marine habitat take or loss. |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| Pollution events (from use of plant and machinery). | Scoped in (for all marine biodiversity receptors within Langstone Harbour/ study area 1). | Scoped out (all marine biodiversity). | Works are taking place adjacent to the marine environment within Langstone Harbour. The use of plant and machinery and associated fuel use creates potential for spills into the marine environment during the construction phase. The works are taking place partially within Flood Zones 2 and 3, creating an impact pathway to the marine environment during a flood event.<br>Additionally, works are being undertaken on reclaimed land adjacent to the marine environment which has potential for any leachate to enter into the marine environment. There are further risks of pollution events taking place during the construction of the Proposed Underground Pipelines between Budds Farm WTW and the proposed WRP. These events could impact on both marine ecology, commercial fishing stock and associated habitats/ nursery habitats. During the operational phase no works are planned to take place using substantial plant and best practice measures will be in place so probability of significant effects from pollution during operation is negligible. |
| Introduction of Invasive Non-Native Species (INNS). | Scoped out (for all marine biodiversity). | Scoped out (for all marine biodiversity). | No works are taking place with direct connection to the marine aquatic environment itself. No new structures directly in contact with marine waters or in flood areas, no access to the marine environment and works conducted terrestrial or subterranean tunnelling underneath the seabed |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| | | | without water column connection. Therefore, there is no pathway for effect during construction. No works are taking place in the operational phase and therefore there is no pathway for effect. |
| Visual disturbance. | Scoped out (all marine biodiversity). | Scoped out (all marine biodiversity). | It is acknowledged that a seal haul-out site is present within Langstone Harbour (see Section 9.5), thought to be south of Farlington Marshes [149, 164], which is greater than 2km away from the works so it no visual disturbance impacts on seals are anticipated. Additionally, the Harbour is a busy location with a high level of marine traffic and baseline visual disturbance meaning any seals utilising the harbour are likely to be used to changes to visual baseline. Visual disturbance on birds is considered separately in Chapter 8 Terrestrial and freshwater biodiversity. |
| Changes in effluent discharge from Eastney LSO. | Scoped out (all marine biodiversity). | Scoped in (all marine biodiversity). | Budds Farm WTW already discharges effluent into the marine environment from the existing Eastney LSO. No change to the effluent currently discharged from the outfall will occur in the construction phase.<br>As part of the operational process, a portion of the existing effluent from Budds Farm WTW would be subject to the water recycling processes described in Chapter 3 Description of the Proposed Development before being discharged at the same location.<br>As a result, the discharge effluent (comprising the existing discharge from Budds Farm WTW and the rejected |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| | | | stream from the operational WRP) from the existing LSO would have a decreased volume because water has been removed and would be slightly more saline (although still below full marine salinity).<br>Also, in the event of an emergency shutdown, minerals added to the purified water may also be discharged which would also modify the salinity. In both cases this means that the resulting discharge effluent's salinity will be closer to the conditions of the Solent open water environment in which it is being discharged into when compared to the existing discharge. Accordingly, this is likely to slightly modify the existing dispersion pathway though the exact change has yet to be modelled. In addition, it is unclear how existing compounds within the discharge would be affected by this recycling process. It is possible that it may concentrate compounds above environmental quality standard for estuarine and coastal waters or it may even reduce nutrient concentrations.<br>The change in dispersion pathway, the availability of nutrients or the potential concentration of deleterious compounds has the potential to alter the benthic ecology around the Eastney LSO. As such, this may either effect marine ecology receptors directly (habitats or low mobility species local to the LSO) or those that may be dependent upon those local features (higher mobility feature such as fish and |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| | | | marine mammals). Given that the exact features around the LSO are unknown and the degree of change is yet to be modelled, all marine biodiversity is scoped in. |

# 10 Carbon and climate change

## 10.1 Introduction

10.1.1 This chapter sets out the scope and methodology for the assessment of the potential likely significant effects arising from the construction, operation and decommissioning of the Proposed Development in respect of carbon and climate change.

10.1.2 Carbon and climate change aspects considered within this chapter for the Proposed Development comprises two assessments:

- **Greenhouse gas (GHG) emissions assessment**: to determine the effects of the Proposed Development on climate, encompassing life cycle emissions during the construction and operational phases. Contextualisation for the outcomes of the assessment will include the Applicant's existing and future emissions and targets, and national trends in annual GHG emissions including Carbon Budgets.
- **Climate change resilience (CCR) assessment:** to determine the potential effects of climate change on the Proposed Development (i.e., vulnerability of infrastructure and assets) with consideration of regional climate projection data.

10.1.3 In addition, an In-Combination Climate Change Impact assessment will be provided as an Appendix to the carbon and climate change chapter of the ES, which will consider the likely significant effects of future climate change on the potential impacts presented in the ES.

## 10.2 Legislation, policy and guidance

10.2.1 The following sections provide a summary of key topic specific legislation, policy and guidance with respect to carbon and climate change. It is recognised that this list is non-exhaustive and will be kept under review to take account of any later legislation or policy changes.

### Legislation

10.2.2 Relevant legislation includes:

- The Climate Change Act 2008.
- Carbon Budget Orders (2009, 2011, 2016, 2021).

#### *The Climate Change Act 2008*

10.2.3 The Climate Change Act 2008 provides a framework for the UK to meet its long-term goals of reducing GHG emissions to net zero (i.e. at least a 100% reduction of 1990 levels) by 2050 (climate mitigation). This target was introduced by the Climate Change Act 2008 (2050 Target Amendment) Order 2019, which amended the previous 2050 GHG target of an 80% reduction compared to 1990 levels. The UK Net Zero Strategy sets outs the approach the UK Government will take to cut

emissions, enhance green economic opportunities, and leverage further private investment to support reaching net zero by 2050 [165].

10.2.4 The Climate Change Act 2008 was enacted as part of the UK's obligations as a signatory of the Kyoto Protocol 1997. The UK target covers the seven main GHGs referenced in the Kyoto Protocol: carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride ($SF_6$) and nitrogen trifluoride ($NF_3$) which was incorporated into the second Kyoto Protocol compliance period in 2012.

10.2.5 The Climate Change Act 2008 also requires the UK Government to produce a Climate Change Risk assessment (CCRA) every five years. The CCR assessment assesses current and future risks to, and opportunities for, the UK from climate change (to inform climate adaptation actions). In response to the CCR assessment, the Climate Change Act 2008 also requires the Government to produce a National Adaptation Programme (NAP) (both discussed further below).

### *Carbon Budgets Orders*

10.2.6 The Climate Change Act 2008 requires the Government to set legally-binding 'Carbon Budgets' to provide a constraint of GHG emissions in a given time period. The Carbon Budgets are set by the Climate Change Committee (CCC) and legislated by the UK government to provide a legally binding five year limit for the amount of carbon dioxide equivalent ($CO_2e$) emissions that can be released in the UK. The first six Carbon Budgets have been enshrined in legislation and will run up to 2037. The sixth Carbon Budget was published by the CCC in December 2020 and brought into force in The Carbon Budget Order 2021 24 June 2021 and outlines the level of GHG emissions that the UK can release from 2033 to 2037 [166]. It also included a potential pathway to the net-zero carbon emissions target and was the first Carbon Budget set in law since the commitment was adopted. The UK is currently in the fourth carbon budget period. The six carbon budgets are shown in Table 10-1.

**Table 10-1: UK Carbon Budgets (2008 to 2037)**

| Budget Period | Carbon Budget (Mt of carbon dioxide equivalents) | Reduction Relative to 1990 Levels |
|---|---|---|
| First carbon budget (2008 to 2012) | 3,018 | 25% |
| Second carbon budget (2013 to 2017) | 2,782 | 31% |
| Third carbon budget (2018 to 2022) | 2,544 | 37% by 2020 |
| Fourth carbon budget (2023 to 2027) | 1,950 | 51% by 2025 |
| Fifth carbon budget (2028 to 2032) | 1,725 | 57% by 2030 |
| Sixth carbon budget (2033 to 2037) | 965 | 78% by 2035 |
| Net zero target | At least 100% by 2050 | |

10.2.7 The SoS is under a duty to ensure that the net UK carbon account remains within budget.

## National policy

10.2.8 The relevant national policies are set out below.

- NPSWRI [4]
  - Climate change adaptation: Section 3.7, paragraphs 3.7.1 to 3.7.1. Section 3.7 of the NPS sets out how the applicant should, and the SoS will, take into account the effect of climate change when developing and considering water resources NSIP applications.
  - Climate change mitigation – GHG emissions: Section 4.4, paragraphs 4.4.1 to 4.4.16. Section 4.4 of the NPS sets out the detailed requirements for climate change mitigation in relation to GHG emissions, including the requirement to consider government policy relating to the mitigation of and adaptation to climate change. The section also sets out how the SoS will consider the climate change mitigation measures for water resources NSIP applications.
- NPPF [5]
  - Planning for climate change: Section 14, paragraphs 153 to 158
- National Adaptation Programme, 2018 [167]:
  - Climate change risks, Section 4.1
- Net Zero Strategy: Build Back Greener 2021 [168]

## Local policy

10.2.9 Relevant local policies are listed in Table 10-2 may be considered both important and relevant to the project. In the event that there is any conflict between these and the NPSWRI, the NPS would prevail.

**Table 10-2: List of relevant local policy – Carbon and climate change**

| Local authority | Relevant local policy |
|---|---|
| EHDC | East Hampshire District Local Plan: Joint Core Strategy (2014) [6]<br>• CP24 – Sustainable construction<br>• CP25 – Flood Risk<br>• CP26 – Water resources/water quality<br>• CP27 – Pollution |
| EBC | Eastleigh Borough Local Plan 2016-2036 (2022) [9]<br>• S1 – Delivering Sustainable Development<br>• DM2 - Environmentally Sustainable Development<br>• DM3 – Adaptation to Climate Change<br>• DM10 - Water and Waste Water<br>• DM11 - Nature Conservation |
| FBC | Fareham Local Plan (2037) [12]<br>• CC1 - Climate Change<br>• CC2 – Managing Flood Risk and Sustainable Drainage Systems<br>• D4 – Water Quality and Resources |

| Local authority | Relevant local policy |
|---|---|
| HBC | Havant Borough Core Strategy (2011) [17]<br>• CS11 - Protecting and Enhancing the Special Environment and Heritage of Havant Borough<br>• CS14 - Efficient Use of Resources<br>• CS16 - High Quality Design<br>• DM12 - Mitigation the Impacts of Travel |
| PCC | Portsmouth Plan (The Portsmouth Core Strategy) (2012) [19]<br>• PCS12 - Flood Risk<br>• PCS15 - Sustainable Design and Construction |
| WCC | Winchester District Local Plan Part 1 Joint Core Strategy (2013) [56]<br>• CP11 - Sustainable Low and Zero Carbon Built Development<br>• CP13 - High Quality Design<br>• CP17 - Flooding, Flood Risk and the Water Environment |
| SDNPA | South Downs Local Plan (2019) [58]<br>• SD2 - Ecosystem Services<br>• SD3 - Major Development<br>• SD45 - Green Infrastructure<br>• SD48 - Climate Change and Sustainable Use of Resources |

### Guidance and standards

10.2.10 The IEMA has published an updated guidance document titled 'Assessing Greenhouse Gas Emissions and Evaluating their Significance' to advise on best approaches for the consideration of GHG emissions within an EIA [169]. The guidance sets out the areas for consideration at all stages of the assessment, and provides guidelines for, and requirements of, an assessment. In particular, the guidance provides advice regarding setting an appropriate baseline and significance criteria for the assessment.

10.2.11 IEMA has also published a framework for the consideration of climate change resilience and adaptation in the EIA process through its guidance document 'Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation' [170]. The guidance advises that the future climate at the development site should be identified, and information should be provided as to how adaptation and resilience measures have been built into the design of a development.

10.2.12 The approach to the GHG and CCR assessment will be undertaken in accordance with these IEMA guidance methodologies.

10.2.13 The methodology for calculating GHG emissions will be based on the PAS2080 framework which sets out the approach to carbon management across the scheme, this sets out the quantification assessment principles and supports decision making in a structured way across the scheme [171].

10.2.14 The UK Water Industry Research (UKWIR) published 2012 guidance, 'A Framework for Accounting for Embodied Carbon in Water Industry Assets' [172]. This guidance provides clear and consistent guidelines for UK water companies to estimate carbon embodied in constructing and maintaining capital assets using

recognised sources of information. The UKWIR updated 2022 guidance document, 'Calculating whole life/TOTEX Carbon' builds on the UKWIR 2012 guidance and presents the finding of a high-level review of the assessment methods currently used by the water sector [173].

10.2.15 In addition to the UKWIR 2012 and 2022 guidance, the EN15804, European Standard for the generation of Environmental Product Declaration for construction products [174], will be used to inform the boundaries of the GHG assessment and data quality requirements for capital and whole life carbon assessment and reporting to infrastructure projects. These are aligned to the GHG Protocol.

10.2.16 The Department for Business, Environment and Industrial Strategy (BEIS) 'Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal', provides data for projection on grid location and carbon prices for the UK, as well as sets out principles on how GHG emissions should be considered in project and programme appraisal [175].

10.2.17 Other guidance relevant to the compilation of the Scoping Report include:

- Planning Inspectorate (2020) Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements, (Version 7) [1]

## 10.3 Engagement

10.3.1 The following stakeholder have responsibility for aspects of carbon and climate change and will continue to be engaged as part of the EIA process:

- East Hampshire District Council (EHDC)
- Eastleigh Borough Council (EBC)
- Environment Agency (EA)
- Fareham Borough Council (FBC)
- Hampshire County Council (HCC)
- Havant Borough Council (HBC)
- Portsmouth City Council (PCC)
- South Downs National Park Authority (SDNPA)
- Winchester City Council (WCC)

10.3.2 Technical engagement is taking place through EIA Working Groups that have been established for the Proposed Development, primarily the Emissions and Transport Working Group for the GHG assessment, and the Resilience Working Group for the In-combination Climate Change Impact assessment and the CCR assessment. Three meetings have already taken place with these groups to engage with stakeholders with respect to the development of the Proposed Development and this Scoping Report.

10.3.3 An introductory meeting was held with the Emissions and Transport Working Group on 14 June 2022. This was attended by representatives from EBC, EA, FBC, HCC, HBC, National Highways, PCC and WCC. An introduction to the proposed approach to the GHG assessment, and the likely emission sources during construction and operation of the Proposed Development were presented.

10.3.4 A meeting was held on 13 September 2022, which provided further information on the assessment approach, including the introduction of the scenarios likely to be considered, the study area and significance criteria. The third meeting of the Emissions and Transport Working Group was held on 08 June 2023, where further information on the carbon modelling undertaken by the Applicant was shared. In addition, it was advised that carbon hotspots will be identified as part of future rounds of modelling, where targeted emission reduction measures could be considered.

10.3.5 An introductory meeting was held with the Resilience Working Group on 14 September 2022. This was attended by representatives from EBC, EA, FBC, HCC, Hampshire & Isle of Wight Fire and Rescue Service, HBC and PCC. An introduction to the proposed methodology for the CCR assessment was presented, including an overview of the likely considerations. During this meeting, it was agreed that an In-Combination Climate Change Impact Assessment will be undertaken (see section 10.6).

10.3.6 The second Resilience Working Group was held on 6 June 2023, which reiterated the approach to the methodology, and highlighted that the Proposed Development will be divided into individual receptors, based on the geographic location or likely climate risk.

10.3.7 Following the close of Public Consultation 2022, between 5 July and 16 August, stakeholder feedback has been reviewed. No feedback from key stakeholders associated with this topic was received from the public consultation process.

## 10.4 Approach to scoping

### Study area

*Greenhouse gas emissions*

10.4.1 There is only one receptor that will be considered for the GHG emissions assessment, which is the global atmosphere. Furthermore, the outcomes of the assessment will be contextualised using national or organisational emissions, applied over wide geographical areas rather than a spatially defined study area.

10.4.2 The study area for the GHG assessment includes direct emission generating activities associated with the Proposed Development during construction and operation. It also includes indirect emissions embodied within the construction materials from the energy used for their extraction and manufacture, indirect emissions from the consumption of purchased electricity, and emissions arising from the transportation of materials, waste and construction workers. Emissions considered during decommissioning of the Proposed Development are scoped out of the GHG assessment, and therefore activities during this phase are not considered as part of the study area. Further justification for scoping emissions from the decommissioning phase is provided in paragraph 10.6.1.

*Climate change resilience*

10.4.3 The Study Area for the CCR assessment is the land within the Scoping Area, and encompasses all assets and infrastructure associated with the Proposed

Development. The temporal boundaries of the CCR assessment will be defined to include the operational phase of the Proposed Development which is assumed to be at least 100 years.

10.4.4 The location of the temporary construction hub (as described in Chapter 3 Description of the proposed development) is not known at the time of writing. This is expected to be an existing consented site and may be situated outside of the Scoping Area. The effects of climate change on the temporary construction hub will be assessed as part of the CCR assessment.

*In-combination climate change impact assessment*

10.4.5 The Study Area for the In-Combination Climate Change Impact assessment is the extent of the Study Area for other topics within the EIA. It is acknowledged that the In-Combination Climate Change Impact assessment will be more relevant to some topics compared to others.

## Sources of baseline data

10.4.6 The data outlined in Table 10-3: has been used to inform the baseline:

**Table 10-3: Source of baseline data**

| Baseline data | Assessment | Source of data |
|---|---|---|
| The Applicant's annual emissions | GHG Assessment | Southern Water 2021 Net Zero Plan [176]<br>Southern Water, 2022 – 2023 Annual Report [177] |
| National carbon budgets used to contextualise the Proposed Development emissions | GHG Assessment | UK Carbon Budget Orders (2009, 2011, 2016, 2021) [178, 179, 180, 166] |
| Annual estimates of national, regional, and sectoral GHG emissions in the UK | GHG Assessment | 2022 BEIS GHG Emissions National Statistics [181] |
| Historical climate records and climate projections for the UK and by region | CCR Assessment | The Met Office's UK Regional Climates, and UK Climate Projections (UKCP) [182] |
| Historical Thorney Island Climate Data | CCR Assessment | The Met Office Thorney Island Climate Data 2022 [183] |
| Key climate change risks and opportunities across the UK | CCR Assessment | Defra UK CCRA 2022 [184] |
| Local authority core strategy/local plans | CCR Assessment | Relevant local authority as detailed in Table 10-2 |

## 10.5 Baseline conditions

### Greenhouse gas emissions

#### *National baseline emissions*

10.5.1 The most recent available annual GHG emission figures for the UK were for the year 2021, where net territorial GHG emissions were estimated to be 426.5 million tonnes $CO_2e$ [185]. This was an increase of 5% compared to emissions in 2020, but it is worth acknowledging that activities within the UK in 2020 will have been affected by restrictions associated with the Covid-19 pandemic. The largest contributing sectors within the UK by emissions contribution are 'Transport', 'Energy supply' and 'Business' [185]. It is not clear where the water sector sits within the sectors set out in the BEIS national emissions report [185], however Water UK reports emissions from the sector each financial year (1st April – 31st March) [186]. The latest available figures highlight that emissions from the sector were approximately 2.5 or 1.6 Metric tonnes $CO_2e$ in the 2020 – 2021 financial year, depending on the calculation methodology[9] [186]. These are emissions within the organisational boundary adopted by the sector to calculate GHG emissions, which covers "*operational emissions*" and "*any other additional emissions data being gathered at the discretion of the water company*" [187].

10.5.2 Over the operational lifespan of the Proposed Development, national UK emissions are anticipated to reduce as a result of the anticipated decarbonisation of many sectors in the UK. A prescribed pathway for the reduction of emissions to 2050 and beyond is not available, however Carbon Budgets have been published up until 2037, as detailed in Table 10-1.

10.5.3 The Carbon Budgets set a cap on the total amount of GHGs the UK can emit over a five-year period. The sixth Carbon Budget enshrined in UK law by the Carbon Budget Order 2021 was published by the CCC in December 2020, which is the latest available Carbon Budget for the UK.

#### *The Applicant's emissions*

10.5.4 The Applicant reports emissions associated with its annual operations. The Applicant's emissions were categorised into three scopes as follows [175]:

- Scope 1 – "are direct emissions that are produced from our sites and assets, such as process emissions, our vehicle fleet and fuels used on site".
- Scope 2 – "emissions are indirect energy emission from the generation of electricity provided by energy suppliers".
- Scope 3 – "are other indirect emissions such as the transport and energy emissions from our operational contractors and the emissions associated with the efficiency of electricity distribution".

[9] The GHG Protocol and Defra recommend that GHG emissions are reported for both Market-based and Location-based methodologies. The Market-based approach reflects decisions made by the organisation to purposefully choose its electricity supply, whereas the Location-based method reflects the average emission intensity of the grid where the consumption occurs.

10.5.5 Emissions for the 2020 - 2021 financial year were 91 kilotonnes (kt) of $CO_2e$, of which 70% were direct emissions from its sites and assets (Scope 1), 10% were emissions from purchased electricity from the grid (Scope 2), and 20% were indirect emissions (Scope 3) [176]. In 2021, emissions associated with the Applicant's activities have decreased by 60% since 2018 – 19, when it began to purchase lower carbon electricity as part of its strategy to reduce GHG emissions [176].

10.5.6 The Applicant's 2023 Annual Report advises that the scope of operational emissions was expanded within its GHG quantification methodology [177]. In the 2022 – 2023 financial year, the Applicant's emissions were 109.5 kt of $CO_2e$. If emissions had been quantified in accordance with the same methodology as the 2020 – 2021 financial year [25], the emissions total would have been 72.9 kt $CO_2e$ [177].

10.5.7 The Applicant has published a Net Zero Plan, which sets out how it will reduce GHG emissions associated with its activities [188]. It developed the plan following collaboration with other water companies in Water UK's Net Zero 2030 Routemap, which set out a target for the water industry to achieve net zero emissions by 2030 [187]. This is supported by the Public Interest Commitment (PIC) made by all of the water companies which sets out a goal of achieving net zero carbon emissions for the sector by 2030, through measures such as greater water efficiency, buying green energy as well as generating renewable energy [189]. To support the water industry's PIC, emission reports based on water companies' operational emissions are issued on an annual basis [186].

10.5.8 A Strategic Objective for the Proposed Development is to support and contribute to Water UK's net zero target and the PIC [189].

### Climate change resilience

10.5.9 The receptors for the CCR are the proposed infrastructure and assets associated with the Proposed Development. The assessment will provide a description of how the Proposed Development will be designed and constructed to be more resilient to the climate change impacts identified during the review of the latest UK Climate Projection (UKCP) data [182]. A more detailed review of the climate change projection data within the study area will be undertaken as part of the EIA.

10.5.10 The Proposed Development is located on the south coast of England, and currently experiences a coastal climate which is typical of the UK.

10.5.11 Existing climate data for the period 1991 to 2020 were obtained from the Thornley Island meteorological station (grid reference 475640, 103025), which is considered to have representative weather conditions for the Proposed Development. Climate data for Thornley Island and the UK average are provided in Table 10-4.

**Table 10-4: Existing Climate at the Thornley Island Meteorological Station for the Period 1991 – 2020 [183]**

| Climate variable | Units | Thornley Island annual average | UK average |
|---|---|---|---|
| Maximum temperature (average over 12 months) | ºC | 14.8 | 12.8 |

| Climate variable | Units | Thornley Island annual average | UK average |
|---|---|---|---|
| Minimum temperature (average over 12 months) | ºC | 7.7 | 5.5 |
| Days of air frost | Days per year | 31.5 | 53.4 |
| Rainfall | mm per year | 767.7 | 1163.0 |
| Days of rainfall ≥ 1 mm | Days per year | 118 | 159 |
| Mean Wind Speed at 10 m | Knots | 9.6 | 9.3 |

10.5.12 Table 10-4 displays the influence of the maritime setting of the study area for the CCR assessment, compared to the average climate in the UK. Maximum and minimum temperatures are both higher than the UK average, and there are fewer days of air frost. In addition, annual precipitation is 34% less than the UK average.

10.5.13 Future climate projection data within the UK are available through the UKCP18 database [182]. The UKCP database contains climate projection data for a variety of parameters for grid scales at different scales across the UK. These include Local (2.2km), Regional (12km) and Global (60km) grid squares, depending on the climate parameter and variable.

10.5.14 The UKCP dataset uses emission scenarios, called Representative Concentration Pathways (RCPs), which are based on those used in the Intergovernmental Panel on Climate Change's (IPCC) 'Fifth Assessment Report'. The RCPs relate to concentrations of GHGs that would result in target amounts of radiative forcing at the top of the atmosphere by 2100, relative to pre-industrial levels. Four forcing levels have been set which are used as scenarios in UKCP, these are RCP 2.6, RCP 4.5, RCP 6.0 and RCP 8.5, all of which will be considered in the assessment.

10.5.15 The main climate parameters which are within the UKCP database and may affect the Proposed Development are:

- Temperature change
- Sea level rise
- Precipitation change
- Wind speed

10.5.16 Projected climate change data for the main climate parameters were obtained from the UKCP database [182] to inform the Scoping process. This data shows the likely changes to the climate parameters during construction (by 2030), and during operation of the Proposed Development (2060, 2080 and 2099), and are displayed in Table 10-5. The data are relevant for the 25 km grid square which encompasses the majority of the Scoping Area. Data are presented for the 50$^{th}$ percentile model output results for RCP6.0, a high emission scenario for 2030, 2060 and 2080, compared to a 1981 – 2000 baseline.

Table 10-5: Climate Change Projection Data [182]

| Climate Parameter | 2030 | 2060 | 2080 | 2099 |
|---|---|---|---|---|
| Change in Mean Air Temperature (°C) | 0.79 | 1.54 | 2.44 | 3.57 |
| Annual Precipitation Anomaly (%) | 0.86 | 1.14 | 1.44 | 0.04 |
| Winter Precipitation Anomaly (%) | 3.75 | 6.61 | 13.8 | 14.1 |
| Summer Precipitation Anomaly (%) | -0.47 | -11.6 | -19.4 | -19.6 |
| Wind Speed Anomaly (%)* | -0.11 | -0.17 | -0.16 | No data |
| * Data for wind speed anomaly data are only available for RCP 8.5 | | | | |

10.5.17 The data in Table 10-5 show that the mean annual air temperature could increase by 3.57°C within the Scoping Area by 2099. In addition, although the annual precipitation anomaly is unlikely to change significantly, there will be more of a pronounced seasonal rainfall pattern, with more rainfall in the winter and less in the summer. There is low confidence associated with wind speed anomaly data, but there is a similar pattern as the rainfall data, with greater wind speeds expected in winter, and lesser in the summer.

10.5.18 The climate data suggests that future conditions within the Scoping Area are anticipated to be warmer, with drier summers and wetter, windier and stormier winters.

### In-combination climate change impact assessment

10.5.19 The receptors for the In-Combination Climate Change Impact assessment are those that will be impacted by the Proposed Development in combination with future climatic conditions. Baseline conditions for the In-Combination Climate Change Impact assessment are determined using the UKCP climate change projections data for parameters such as temperature, precipitation, wind speed and sea level rise. Baseline conditions for the individual environmental receptors are covered in each of the relevant topic chapters, such as Chapter 18 Water environment (including flood risk).

## 10.6 Scoping of potential effects

10.6.1 The approach to decommissioning and specific nature of activities required for the Proposed Development are not currently known and will be developed at a later stage.

10.6.2 With respect to the GHG assessment, the main decommissioning activities are likely to take place beyond 2100, where it is likely that many sectors in the UK such as transport and waste disposal will have decarbonised. Therefore, it is likely that GHG effects of decommissioning will be negligible in the context of the whole life carbon for the Proposed Development.

10.6.3 In addition, there are uncertainties in longer term climate change projections (particularly beyond 2100) due to differences in emissions scenarios and natural variability in the Earth's climate system [190]. It is expected that suitable climate change adaptation measures would be developed in the future once it becomes

clear how long-term climate change would affect the Proposed Development, which aligns with IEMA's approach to adaptive management [170].-Therefore, the decommissioning phase will not be considered as part of the CCR assessment for the Proposed Development.

### Effects scoped into the assessment

*Greenhouse gas assessment (construction and operation)*

10.6.4 Construction and operation activities associated with the Proposed Development will likely result in the release of GHG emissions.

10.6.5 Emission source activities during construction include those associated with the extraction and manufacturing of materials to be used for the construction and operation of the Proposed Development. Other sources of GHG emissions during construction will be associated with the combustion of fuel by plant and equipment, and road vehicles travelling to and from the site. There also may be a minor emission source associated with the change in land use through differing carbon sequestration rates associated with the Proposed Development.

10.6.6 Operational GHG emissions will be associated with a number of activities, including the operation of the proposed WRP, the proposed HLPS, and other proposed AGP as detailed in Chapter 3 Description of proposed development.

10.6.7 Modelling of GHG emissions associated with various design options is being undertaken by the Applicant, which will be used to inform the GHG assessment presented in the climate change chapter of the ES.

*Climate change resilience assessment (operation)*

10.6.8 The Proposed Development is assumed to have a design life of a minimum of 100 years. It is considered likely that climate conditions will change from present day conditions over the design life of the Proposed Developments, which could impact the operation and function of infrastructure and assets associated with the Proposed Development. Therefore, a CCR assessment for the operation of the Proposed Development will be undertaken.

### Effects scoped out of the assessment

*Climate change resilience assessment (construction)*

10.6.9 Construction of the Proposed Development is expected to take place within the next 15 years. The data in Table 10-5 highlights that it is therefore not considered likely that there will be large changes to the climate parameters from present day conditions, particularly as the anomaly data are compared to a 1981-2000 baseline. Changes in annual air temperature and rainfall are anticipated to be less than 1°C and 1% respectively compared to this baseline.

10.6.10 Gradual changes to average climatic conditions are therefore not expected to impact construction. If construction coincides with extreme weather events, which are projected to become more frequent and severe, there may be climate related hazards such as flooding, damage through winds or storms, or overheating of

construction materials. The vulnerability of receptors during construction is however considered likely to be low, and measures will be included within a construction management plans to ensure the site is prepared and responsive to extreme weather events. Therefore, a CCR assessment for the construction phase of the Proposed Development will be scoped out of the assessment.

## 10.7 In-combination climate change impact assessment

10.7.1 The In-Combination Climate Impact assessment will identify how the resilience of various receptors in the surrounding environment is affected by a combination of future climate conditions and the Proposed Development. The climate parameters relevant to the Proposed Development are detailed in Table 10-5. The same rationale for the CCR assessment applies for the In-combination Climate Change Impact assessment, whereby the climate change projection data shows that within the 15-year horizon, significant changes to the Proposed Development will not apply. Therefore, it is proposed that In-combination Climate Change effects during construction will be scoped out of the assessment.

10.7.2 The data in Table 10-5 highlights that there is potential for climate parameters to change over the operational lifespan of the Proposed Development. Therefore, an In-combination Climate Change Impact assessment will be undertaken for the operational phase.

## 10.8 Approach to the assessment

### Greenhouse gas emissions

10.8.1 The GHG assessment will be a Desk Study. The design of the Proposed Development is being informed by GHG emission estimates, which is being undertaken in accordance with Water resources planning guidance with respect to consideration of carbon or GHGs within solution development [191]. The outcomes of these emission estimates will be used to inform the GHG assessment in the EIA.

*Additional baseline data collection*

10.8.2 The GHG assessment will be informed by carbon and GHG optioneering work undertaken by the Applicant as part of the development of the design of the Proposed Development work streams.

*Assessment methodology*

10.8.3 The term ‘GHG’ in this assessment will encompass the GHGs in the Kyoto Protocol as referenced in Section 10.2. Legislation It is likely that the primary emissions from the emissions sources associated with the release of $CO_2$, methane ($CH_4$) and nitrous oxide ($N_2O$), but where appropriate the other ‘Kyoto’ gases will be considered. Where practicable, the results of the GHG assessment will be expressed in units of $CO_2$ equivalents ($CO_2eq$) which recognises that different gases have notably different global warming potential.

10.8.4 GHG emissions during construction of the Proposed Development will be from the creation, refurbishment, and end of life treatment of existing assets such as

buildings and infrastructure. This is likely to include embodied emissions in materials, fuel (or electricity) consumption by road vehicles and construction plant and equipment, and emissions arising from land use change. GHG emissions will also be quantified from activities associated with the operation and any required maintenance of assets during delivery of their function and services. Emissions associated with power consumption, chemical use, and fuel consumption in road vehicles will be quantified for the operational phase.

10.8.5 The process for calculating emissions will be based on the PAS2080 framework [171]. The assessment will apply representative emission factors to activity data to determine GHG emissions associated with the Proposed Development. Emission factors will be obtained from sources such as the GHG conversion factors from the Department for Energy Security and Net Zero [192].

*Definition of significance*

10.8.6 Significance criteria for the assessment will be obtained from IEMA guidance 'Assessing Greenhouse Gas Emissions and Evaluating their Significance' [169], which is a variation from the general EIA approach presented in Chapter 5 General EIA approach and methodology of this Scoping Report. The guidance [169], recognises "*when evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project's emissions should therefore be based on its net impact over its life time, which may be positive, negative or negligible*".

10.8.7 Significance can be evaluated in a number of ways depending on the context of the assessment, i.e., sector-based, locally, nationally, policy goals or against performance standards. The IEMA guidance recommends that significance criteria align with The Paris Agreement international treaty, the UK's Carbon Budgets up to 2037 and net zero commitments: "*the crux of significance is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*" [169].

10.8.8 The updated IEMA guidance provides relative significance descriptions to assist assessments, specifically in the EIA context. Section VI of the updated IEMA guidance [169] describes five distinct levels of significance which are not solely based on whether a project emits GHG emissions alone, but how the project makes a relative contribution towards achieving a science-based 1.5°C aligned transition towards net zero. These are presented in Table 10-6:.

10.8.9 The effect of the Proposed Development will be determined from the difference in emissions between a baseline scenario (as defined in paragraphs 10.8.10 and 10.8.11), and 'with development' scenario, but with additional context for the likely contribution of the Proposed Development to sectoral and national carbon emissions. This is discussed further below in paragraphs 10.8.10 and 10.8.11.

Table 10-6: Assessment significance criteria – *Carbon and climate change*

| Significance of effect | Description |
|---|---|
| Major adverse | The Proposed Development's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for Proposed Developments of this type. A Proposed Development with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero. |
| Moderate adverse | The Proposed Development's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for Proposed Developments of this type. A Proposed Development with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero. |
| Minor adverse | The Proposed Development's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for Proposed Developments of this type. A Proposed Development with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero. |
| Negligible | The Proposed Development's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for Proposed Developments of this type, such that radical decarbonisation or net zero is achieved well before 2050. A Proposed Development with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions. |
| Beneficial | The Proposed Development's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-Proposed Development baseline. A Proposed Development with beneficial effects substantially exceeds net zero requirements with a positive climate impact. |

10.8.10 For the purposes of the EIA, 'Major' and 'Moderate' effects will be considered to be significant. This is a deviation from the approach set out in Chapter 5 General EIA approach and methodology, and is as a topic-specific assessment methodology which will be informed by IEMA guidance with respect to determining the significance of effects [169].

*Assessment scenarios*

10.8.11 As noted, the design of the Proposed Development is going through a scheme development process in accordance with PAS2080, UKWIR 2012 and 2022 guidance, EN15804 and Green book supplementary guidance as detailed in Section 10.2, where carbon and GHG emissions are an inherent component of the decision making process.. The Proposed Development is a drought resilience scheme, responding to abstraction licences changes on the Rivers Test and Itchen, and to develop capacity to address future forecasts for water resource deficits in the region. Therefore, unlike other conventional GHG assessments, development of representative scenarios to determine the effect on GHG

emissions is not only a case of comparing emissions without and with the Proposed Development in place.

10.8.12 Therefore, the establishment of assessment scenarios will be an ongoing process as further work is undertaken by the Applicant during development of the design. It is likely however that the GHG assessment will consider scenarios associated with iterations of the design, acknowledging that there are wider needs for the Proposed Development to be implemented. This approach is in accordance with the IEMA guidance [169] which states that the baseline can take the form of "*GHG emissions arising from an alternative project design*" As noted in paragraph 10.8.4, the GHG assessment will consider emissions during the construction and operational phases of the Proposed Development. The outcomes of the GHG assessment will reflect the change in emissions associated with iterations of the design, and will evaluate the contribution of the Proposed Development to the decarbonisation ambitions of the Applicant and the water sector through the PIC [189].

### *Cumulative effects*

10.8.13 GHG emissions released to the atmosphere contribute to climate change, and therefore the effects are global and cumulative in nature. This is taken into account in defining the receptor (i.e. the global atmosphere) as high sensitivity. The IEMA guidance [169] states that effects of GHG emissions from specific cumulative projects should therefore not be individually assessed, as there is no basis for selecting which projects to assess cumulatively over any other.

10.8.14 Therefore, a cumulative assessment with other projects has been scoped out of the GHG assessment. This approach is in line with IEMA guidance 'Assessing Greenhouse Gas Emissions and Evaluating their Significance' [169].

### *In-combination effects*

10.8.15 In-combination effects are those that result from the interaction between the individual effects of the Proposed Development (i.e., interaction of environmental factors such as air quality, health etc), combined together on a single receptor at a single point in time. The interrelationship between the individual effects may combine to result in a significant effect, even where the individual effects were not significant.

10.8.16 As the receptor for the GHG emissions assessment is the global atmosphere, there are no common receptors between this assessment and other disciplines to be considered in the EIA. In-combination effects in relation to GHG emissions will therefore be scoped out of the EIA.

## Climate change resilience

### *Additional baseline data collection*

10.8.17 As noted, the CCR assessment will be informed by future climate projection data from the latest UKCP database or any other updated climate projection as may be published [182]. Further climate change projection data for each of the grid

squares encompassing the Study Area will be obtained for the assessment to be presented within the ES.

*Assessment methodology*

10.8.18 The methodology for the assessment will be consistent with the IEMA guidance, Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation [170]. The methodology varies from the general EIA approach presented in Chapter 5 General EIA approach and methodology of this Scoping Report being necessarily bespoke to this topic.

10.8.19 A four-step methodology will be applied for the CCR assessment. The initial steps of the assessment aim to identify the climate variables to which the Proposed Development could be vulnerable during its lifetime. A more detailed risk assessment is then undertaken following the identification of influencing climate variables, to assess the level of risk associated with the hazards posed by the predicted changes in climate variables.

10.8.20 The approach to be undertaken for each step of the CCR assessment is provided below.

*Step 1: Identifying receptors, climate variables and potential impacts*

10.8.21 The first step of the CCR assessment is to identify the climate receptors, climate variables and potential effects of climate change at the site.

10.8.22 It is likely that the receptors for the assessment will comprise individual components associated with the Proposed Development, where section-specific climate hazards can be identified.

10.8.23 The climate variables likely to change as a result of climate change will be identified from a relevant database for climate variables applicable to the site.

*Step 2: Climate vulnerability assessment*

10.8.24 Stage 2 consists of a qualitative assessment, informed by professional judgement, climate projection data and supporting literature, to determine the vulnerability of each of the receptors to changes in the identified climate variables. Vulnerability is considered to be a function of:

- the sensitivity of the Proposed Development and any associated infrastructure to climate variables.
- the exposure (both spatially and temporally) of the Proposed Development and its associated infrastructure to climate variables.

10.8.25 This step of the assessment attributes either a high, moderate or low sensitivity / exposure categorisation to each vulnerability. The overall vulnerability is determined by considering the interrelationship between the exposure and the receptor sensitivity, as set out in Table 10-7.

Table 10-7: Sensitivity / exposure matrix for determining vulnerability rating

| Sensitivity | Exposure | | |
|---|---|---|---|
| | Low | Moderate | High |
| Low | Low vulnerability | Low vulnerability | Low vulnerability |
| Moderate | Low vulnerability | Medium vulnerability | Medium vulnerability |
| High | Low vulnerability | Medium vulnerability | High vulnerability |

10.8.26 For those vulnerabilities categorised as medium or high, it is considered that there is a risk from climate change to the design and infrastructure of the Proposed Development and its operations. These vulnerabilities are then considered in Steps 3 and 4 of the methodology.

*Step 3: Risk assessment*

10.8.27 For those vulnerabilities categorised as medium or high, climate-related hazards are identified through professional judgement and previous project experience. The risks to the Proposed Development and its associated infrastructure are qualitatively identified through a hazard likelihood and consequence matrix. The descriptors of likelihood and consequence are provided in Table 10-8 and Table 10-9. The matrix is detailed in Table 10-10.

Table 10-8: Descriptors of likelihood for climate hazards

| Likelihood | Description |
|---|---|
| Almost certain | The climate hazard is likely to occur numerous times during the anticipated operational lifespan of the Proposed Development |
| Likely | The climate hazard is likely to occur on several occasions during the anticipated operational lifespan of the Proposed Development |
| Moderate | The climate hazard will occur on limited occasions during the anticipated operational lifespan of the Proposed Development |
| Unlikely | The climate hazard will occur infrequently during the anticipated operational lifespan of the Proposed Development |
| Very unlikely | The climate hazard may occur once during the anticipated operational lifespan of the Proposed Development |

Table 10-9: Descriptors of consequence as a result of climate hazards

| Consequence | Description |
|---|---|
| Catastrophic | Permanent damage to infrastructure, resulting in a severe lasting effect to the Proposed Development to function. Very significant adverse effect to the surrounding environs requiring remediation and restoration |
| Major | Extensive damage to infrastructure requiring major repairs and maintenance, resulting in a severe effect to the Proposed Development to function. Significant adverse effect to the surrounding environs |
| Moderate | Limited damage to infrastructure requiring maintenance or minor repair, resulting in a potential effect to the Proposed Development to function. Adverse effect to the surrounding environs |

| Consequence | Description |
|---|---|
| Minor | Small and localised damage to infrastructure and a minor effect to the Proposed Development to function. Potential for slight adverse effect to the surrounding environs |
| Insignificant | No damage to infrastructure or the ability of the Proposed Development to function. No adverse effect to the surrounding environs |

Table 10-10: Likelihood / consequence matrix for determining risk rating

| Likelihood | Consequence | | | | |
|---|---|---|---|---|---|
| | Insignificant | Minor | Moderate | Major | Catastrophic |
| Almost certain | Low | Medium | High | Extreme | Extreme |
| Likely | Low | Medium | Medium | High | Extreme |
| Moderate | Low | Low | Medium | High | Extreme |
| Unlikely | Low | Low | Medium | Medium | High |
| Very unlikely | Low | Low | Low | Medium | Medium |

*Stage 4: Mitigation and resilience rating*

10.8.28 For climate risks identified as 'medium' or higher in the likelihood /consequence matrix in Step 3 (see Table 10-10), secondary mitigation measures are identified. With the proposed mitigation measures taken into consideration, a residual risk rating is assessed. For each hazard, a resilience rating is identified as one of the following:

- **High** – strong degree of climate resilience. Remedial action or adaptation may be required but is not a priority.
- **Moderate** – a moderate degree of climate resilience. Remedial action or adaptation is recommended.
- **Low** – a low level of climate resilience. Remedial action or adaptation is required as a priority.

*Definition of significance*

10.8.29 The significance of the CCR assessment is determined through consideration of the climate risk (identified in Step 3) and resilience rating (identified in Step 4), applied to each climate hazard. Table 10-11 presents the matrix used to identify the overall significance of the CCR assessment.

Table 10-11: Significance criteria

| Risk rating | Resilience rating | | |
|---|---|---|---|
| | High | Moderate | Low |
| Extreme | Significant | Significant | Significant |
| High | Not significant | Significant | Significant |
| Medium | Not significant | Not significant | Significant |
| Low | Not significant | Not significant | Not significant |

*Assessment scenarios*

10.8.30 As noted in paragraph 10.5.14, three climate scenarios will be considered for the CCR assessment. Climate change projection data will be obtained for the 2060s, 2080s and 2099. These scenarios encompass the operational phase of the Proposed Development where climate projection data is available, and will be used to inform the likely climate variables and hazards that will be considered in the assessment.

*Cumulative effects*

10.8.31 Potential cumulative impacts with respect to climate resilience may arise from other developments, which have the potential to exacerbate the vulnerability of the Proposed Development to the effects of climate change, for example other projects giving rise to increased flood risk or coastal erosion. These cumulative effects will be considered in the cumulative effects chapter of the ES (for example flood risk and hydrology) and summarised within the carbon and climate section of the cumulative effects ES chapter.

*In-combination effects*

10.8.32 In-combination effects are those that result from the interaction between the individual effects of the Proposed Development (i.e. interaction of environmental factors such as air quality, noise, health etc), combined together on a single receptor at a single point in time. The interrelationship between the individual effects may combine to result in a significant effect, even where the individual effects were not significant.

10.8.33 As the receptors for the climate resilience assessment are the infrastructure and sections of Proposed Development itself, there are no common receptors between this assessment and other disciplines to be considered in the EIA. In-combination effects in relation to climate resilience in combination with other disciplines will therefore be scoped out of the EIA.

### In-combination climate change impact assessment

10.8.34 The In-Combination Climate Change Impact Assessment (noting that this is a different assessment compared to in-combination effects of the CCR assessment) will consider any effects of the Proposed Development on receptors identified by an environmental topic that are also affected by climate change. It will use the climate projection data used to inform the CCR assessment to inform the future baseline. The assessment will consider whether a projected future climate impact will interact or change an effect identified by another topic and exacerbates/alleviates its impacts. The In-Combination Climate Change Impact Assessment will be presented as an Appendix to the ES.

## 10.9 Limitations and assumptions

10.9.1 As noted, as the Proposed Development is not replacing infrastructure with similar ‘outcomes’, defining the baseline or ‘without development’ scenario has inherent

difficulties. The definition of the scenarios to be used in the assessment will be refined as the carbon and GHG workstreams being undertaken to inform the design are progressed.

10.9.2 The assessment will quantify emissions associated with activity data, which will be collated for known sources at the time of assessment, and any data omissions or limitations will be identified in the ES.

10.9.3 With respect to the CCR assessment, a climate modelling exercise will be undertaken to determine the future climate projection data within the study area. Climate projection data will be obtained from the UKCP database provided by the [182]. The UKCP database provides expected changes in key climate parameters over the 21st Century and has a number of uncertainties inherent within them. The database is widely recognised in the industry as the most appropriate and representative data that is currently available, but there is inherent uncertainty in estimating the extent of climate change over an extended temporal scale.

10.9.4 Changes in temperature and rainfall are modelled with a high level of confidence, but other climate parameters considered in this assessment such as wind speed have more uncertainty, which will be discussed further in the ES.

## 10.10 Approach to mitigation and residual effects

### Greenhouse gas emissions

10.10.1 IEMA guidance recommends that GHG mitigation is embedded as part of the design at an early stage referenced here as primary mitigation, and mitigation should be considered at all stages of design development [169].

10.10.2 Therefore, GHG mitigation (Primary, Secondary and Tertiary) will be incorporated at all stages of the Proposed Development, including during construction. As part of the design process, mitigation measures will be incorporated and will evolve as the EIA progresses and in response to consultation.

### Climate change resilience

10.10.3 Resilience measures to adapt to future climate conditions will be incorporated into the design of the Proposed Development. This will consider parameters such as flood risk, storms, and extreme temperatures. These measures will be embedded into the design (Primary mitigation), any further required mitigation measures recommended following Stage 4 of the CCR assessment will be provided (including any applicable Primary, Secondary or Tertiary measures).

## 10.11 Summary

10.11.1 A summary of the potential impacts that have been considered in this chapter is provided in Table 10-12.

Table 10-12: Summary table

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| **GHG emissions** | | | |
| GHG assessment | Scoped in | Scoped in | Emissions during construction of the Proposed Development will release GHG emissions, albeit over a short-term and temporary period, and therefore will be scoped into the carbon and climate change ES chapter.<br>During operation, the Proposed Development may result in a change in GHG emissions, and therefore will be scoped into the carbon and climate change ES chapter. |
| **CCR assessment** | | | |
| Climate Change Resilience assessment | Scoped out | Scoped in | The construction phase is likely to be take place over a short-term period where change in the climate is unlikely to change significantly from present day conditions. Therefore, climate change resilience effects during construction are proposed to be scoped out of the assessment.<br><br>The Proposed Development is assumed to have a design life of a minimum of 100 years. It is considered likely that climate conditions will change from present day conditions over the 21st Century, which could impact the operation and function of infrastructure and assets associated with the Proposed Development. |
| **In-Combination Climate Change Impact assessment** | | | |
| In-Combination Climate Change Impact assessment | Scoped Out | Scoped in | Similar to the CCR assessment, the construction phase is likely to take place over a short-term period where change in the climate is unlikely to change significantly from present day conditions. Therefore, In-Combination Climate Change Impact during the construction are proposed to be scoped out of the assessment.<br><br>There are uncertainties in the longer-term climate change projection, therefore during operation of the Proposed Development over the 100 year minimum design life, it is considered likely that changes in climate conditions could impact the Proposed Developments of infrastructure and assets. |

# 11 Land quality and ground conditions

## 11.1 Introduction

11.1.1 This chapter outlines out the scope and methodology for the assessment of the potential likely significant effects arising from the construction, operation and decommissioning of the Proposed Development on land quality and ground conditions.

11.1.2 Land quality and ground conditions aspects considered within this chapter for the Proposed Development include:

- **Land quality:** potential sources of contamination based on historical and current land uses.
- **Ground conditions:** designated environmental sites, underlying geological and hydrogeological conditions and how these may interact or be impacted by potential sources of ground contamination. In addition, consideration of the effects arising from the ground conditions and how likely these are to have an effect on human health, controlled waters (includes surface waters and hydrogeology) and designated sites and how these will be considered.

11.1.3 There are links between this land quality and ground conditions chapter and the following chapters:

- Chapter 8 Terrestrial and freshwater biodiversity covers ecological designated sites, habitats and protected and notable species. There is the potential for pre-existing contamination to be mobilised during the construction of the Proposed Development, this has the potential to impact on ecologically designated sites. There is also the potential for new sources of contamination to be introduced during the construction, operation and decommissioning of the Proposed Development; again this has the potential to impact on ecologically designated sites.
- Chapter 12 Land use and agriculture covers property types, agricultural land designations and soils. There is the potential for pre-existing contamination to be mobilised, or for new sources of contamination to be introduced as part of the construction, operation and decommissioning of the Proposed Development. This could impact the quality of agricultural land, potentially reducing its productivity.
- Chapter 13 Landscape and visual covers arboriculture effects and changes in view and their effects on visual receptors. There is the potential for pre-existing contamination, along with the potential to introduce new sources of contamination, to impact on the surrounding environment. There is the potential that this contamination could reduce the aesthetic qualities and enjoyment of a landscape.
- Chapter 15 Resource and waste management covers material resources that would be used or consumed by the Proposed Development and how waste would be managed. Should contaminated materials or groundwater be encountered as part of the construction phase of the Proposed Development there is the potential that it may need to be removed from site as a waste if it is

deemed to represent an unacceptable risk to human health and other identified receptors.

- Chapter 16 Socio-economics, tourism, recreation and health covers employment, tourism resources, social infrastructure, health and social care. Potential impacts to neighbourhood amenity (which is includes associated with ground conditions) may arise as a result of the construction, operation and decommissioning of the Proposed Development.
- Chapter 18 Water environment (including flood risk) covers hydrology, hydrogeology and flood risk. There is the potential for construction works to mobilise pre-existing contamination which may migrate into the surrounding water environment impacting both the quality and quantity of water resources. There is also the potential for construction works to create new preferential pathways between currently unconnected sources and receptors.

11.1.4 Although there are crossovers between the above chapters and this chapter, this chapter specifically considers the potential receptors which may be impacted by ground contamination which may be present within the land quality and ground conditions study area (as defined in section 11.4). As part of the EIA, the source – pathway – receptor model will be applied to formulate the conceptual site model and identify potential contaminant linkages.

## 11.2 Legislation, policy and guidance

11.2.1 The following sections provide a summary of key topic-specific policy and legislation which will inform the scope of the assessment. It is recognised that this list is non-exhaustive and will be kept under review to take account of any later legislation or policy changes.

### Legislation

11.2.2 Relevant legislation includes:

- Environmental Protection Act 1990 (Part 2A): Contaminated Land
- Environment Act 1995
- The Water Resources Act (1991) as amended by the Water Act 2003
- Environmental Damage (Prevention and Remediation) (England) Regulations 2015
- Construction (Design and Management) Regulations 2015
- Environmental Permitting (England and Wales) Regulations 2016
- Groundwater (Water Framework Directive) (England) Direction 2016
- Water Environment (Water Framework Directive) (England and Wales) Regulations 2017
- Environment Act 2021

### National policy

11.2.3 Relevant national policy includes:

- NPSWRI [4]
  - Environmental Regulation: Paragraph 3.8.1, 3.8.6 and 3.8.8. These paragraphs set out how the applicant should consult with relevant consenting authorities, for example the EA, to discuss the requirements needed for construction and operational activities. Requirements may include the need for environmental permits to be applied for as well as a demonstration that all relevant environmental impacts have been assessed.
  - Health: Paragraphs 3.12.3 and 3.12.4. These paragraphs set out the requirement for the applicant to identify, assess impacts and discuss potential mitigation measures to reduce impacts on human health. The assessment should consider impacts associated with the project alone and cumulatively with other projects.
  - Biodiversity and Nature Conservation: Paragraphs 4.3.5, 4.3.6, 4.3.11, 4.3.14 and 4.3.17. These paragraphs outline how the project would impact internationally, nationally and locally designated ecological or geologically sites and any measures that would reduce potential impacts on these features.
  - Land Use including Open Space, Green Infrastructure and Green Belt: Paragraphs 4.10.5, 4.10.9, 4.10.15 and 4.10.17. These paragraphs highlight that when a development is proposed in an area of previous development, an assessment should be undertaken to identify potential risks associated with contamination. The assessment should also consider potential mitigation measures to reduce the identified risks posed, including proper management of excavated soils.
- NPPF [5]
  - Conserving and Enhancing the Natural Environment: section 15 paragraphs 15-174, 15-183, 15-184, 15-185 and 15-188.

### Local policy

11.2.4 The relevant local policies listed in Table 11-1 may be considered both important and relevant to the Proposed Development. In the event that there is any conflict between these and the NPS for Water Resources Infrastructure, the NPS would prevail.

**Table 11-1: List of relevant local policy**

| Local authority | Relevant local policy |
|---|---|
| EHDC | East Hampshire District Local Plan: Joint Core Strategy (2014) [6]<br>• CP26 - Water resources/water quality and CP27 Pollution. |
| EBC | Eastleigh Borough Local Plan 2016-2036 (2022) [9]<br>• Policy 35 - ES Contaminated Land. |
| FBC | Fareham Local Plan 2037 (2023) [12]<br>• D2 - Ensuring Good Environmental Conditions and D4 Water Quality and Resources. |
| HBC | Havant Borough Core Strategy (2011) was withdrawn on 16 March 2022. |

| Local authority | Relevant local policy |
|---|---|
| | The Draft Havant Borough Local Plan 2036 (2018) [109] is presently open for consultation. Reference is made to contaminated land and brownfield sites within the Local Plan, however no specific numbered policies are outlined within the document. |
| PCC | Portsmouth Plan (The Portsmouth Core Strategy) (2012) [19]<br>Portsmouth Local Plan 2038 (Draft) (2021) is in the process of being updated and remains as draft September 2021 which includes a Contaminated Land Policy (G4) [111]. |
| WCC | Winchester District Local Plan Part 1 Joint Core Strategy (2013) [193]<br>• Chapter 9: High Quality Environment<br>Winchester District Local Plan 2019–2039 (Emerging) (2022) [112] |
| SDNPA | South Downs Local Plan (2019)<br>• Policies SD25, SD34 and SD55 [58] |

### Guidance and standards

11.2.5 Relevant guidance and standards which have been used as part of the scoping assessment include:

- Department of the Environment 'Industry Profiles for previously developed land', 1995 [194]
- Construction Industry Research and Information Association (CIRIA) ‘Contaminated Land Risk Assessment – A Guide to Good Practice, C552, 2001 [195]
- CIRIA 'Assessing Risks Posed by Hazardous Ground Gases to Buildings', C665, 2007 [196]
- HBC, Borough Design Guide, 2011 [197]
- Hampshire and Isle of Wight Contaminated Land Liaison Group, Informal Guidance, ‘Development on Potentially Contaminated Land’, 2014 [198]
- Winchester City Council ‘Development on Potentially Contaminated Land’, 2014 [199]
- BS 'Code of Practice for Ground Investigations', BS 5930:2015+A1 [200]
- BS 'Investigation of Potentially Contaminated Sites - Code of Practice', BS EN 10175:2011 +A2:2017 [201]
- BS 'Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings', BS8485:2015 +A1:2019 [202]
- IEMA EIA Guidance, 2020 [203]
- EA ‘Land Contamination: Risk Management Framework’, 2021 [204]
- HCC Technical Guidance Note TG5 – Geotechnical Investigation, Testing and Design, 2022 [205]

- Portsmouth City Council 'Developing Potentially Contaminated Land', undated [206]
- Winchester City Council 'Development on Potentially Contaminated Land Leaflet' undated [207]

11.2.6 There is presently no known additional emerging guidance which relates to land quality or ground conditions that would be considered relevant.

## 11.3 Engagement

11.3.1 Key stakeholders with views and concerns regarding land quality and ground conditions have been provided with sufficient information on the Proposed Development to discuss and agree the details of the assessment in a meaningful and inclusive manner. The following stakeholders have responsibility for aspects of land quality and ground conditions and will continue to be engaged as part of the EIA process:

- Eastleigh Borough Council (EBC)
- Fareham Borough Council (FBC)
- Hampshire County Council (HCC)
- Havant Borough Council (HBC)
- East Hampshire District Council (EHDC)
- Portsmouth City Council (PCC)
- South Downs National Park Authority (SDNPA)
- Winchester City Council (WCC)
- Environment Agency (EA)
- Natural England (NE)

11.3.2 Technical engagement has taken place through EIA Working Groups that have been established for the Proposed Development, primarily the Biodiversity and Water Environment Working Group which includes the following disciplines: land quality, hydrogeology, water, marine ecology and terrestrial/aquatic ecology. An introductory meeting was held with this group on 25 May 2022. This was attended by representatives from the EA, NE, EHDC, HBC and WCC. An introduction to the proposed approach to the land quality and ground conditions assessment was provided at this meeting.

11.3.3 The second EIA Working Group was held on 31 August 2022. This included attendance of the EA, NE, EDC, FDC, HCC, HBC, PCC, SDNPA and WCC and provided a summary of the main issues identified in the scoping stage environmental assessment and the intrusive ground investigation methodology.

11.3.4 The third EIA Working Group was held on the 16 June 2023. This included attendance of the EA, NE, Marine Management Organisation (MMO), EHDC, FBC, HCC, HBC, WCC and Forestry England. The EIA Working Group provided an update on the main issues identified in the scoping stage since previous meetings as well as an update on the progress of ongoing ground investigations.

11.3.5 Following the close of Public Consultation 2022, between 5 July and 16 August, stakeholder feedback has been reviewed. Feedback is summarised in Table 11-2, which will be considered within the EIA as part of the land quality and ground conditions assessment and reported in the ES.

**Table 11-2: Public Consultation 2022 responses**

| Stakeholder | Consultation response | Scoping Response |
|---|---|---|
| NE<br><br>Received 12 August 2022 | Annex 1 NE's Response:<br><br>The main areas of concern for NE currently are the impact of the [proposed] WRP, associated [proposed Underground Water Transfer] Pipeline corridors through the River Itchen SAC and SSSI and those of the River Meon. | Potential impacts, and mitigation measures, associated with the construction and operation of the Proposed Development will be assessed as part of the EIA process. Should unacceptable risks be identified then mitigation measures proportionate to the level of the risk will be implemented (e.g. remediation of contaminated soils). |
| NE<br><br>Received 12 August 2022 | NE also has some concerns about the potential for leaching from the former landfill site situated on the proposed site for the WRP. A site assessment and surveys are needed to ensure this does not impact the designated sites. | This feedback is being factored into the scheme development process and will be considered ES. |
| NE<br><br>Received 12 August 2022 | P2 [southern tunnel] with the information provided to date would be the preferred option as this avoids protected sites and priority habitats. As outlined in the consultation documents P1 [northern tunnel] also has the potential to impact groundwater quality during construction so P2 avoids this*. | This feedback is being factored into the scheme development process and will be presented in the ES. |
| NE<br><br>Received 12 August 2022 | Z2 [southern route at Fisher's pond] with the information provided to date would be the preferred option though the planning of the pipeline construction will need to consider impacts on the historic landfill, the ancient woodland, and the priority habitats (good quality semi-improved grassland and woodland). | This feedback is being factored into the scheme development process and will be presented in the ES. |
| Wildfish<br><br>Received 1 August 2022 | Consideration of impacts on freshwater from chemicals, sediments and physical alteration to be reduced and early assessment undertaken. | Potential impacts on freshwater receptors will be assessed and presented in the ES for both the land quality and ground conditions chapter and water resources chapter. |

* See Hampshire Water Transfer and Water Recycling Project Consultation Brochure, Public Consultation 2022 [208]

## 11.4 Approach to scoping

### Study area

11.4.1 The area of land illustrated on the Scoping Area plans (Figures 1.1 and 1.2 in Volume III) has been identified as being potentially required for the construction, operation and decommissioning of the Proposed Development. The Scoping Area, as illustrated in Figures 1.1 and 1.2 in Volume III, will be refined as part of the ongoing EIA and design process.

11.4.2 The study area for land quality and ground conditions is based on the Scoping Area including a 250m buffer zone. The study area has been defined on the basis of the distance over which potential sources of contamination may have an impact and the location of any receptors that may be affected by those potential sources. The land quality and ground conditions study area is shown on sheets 1 to 8 (inclusive) of Figure 11.1 (Volume III). The study area for land quality and ground conditions has not included the Eastney TT and LSO as no physical works are currently anticipated relating to this existing operational asset.

11.4.3 The location of a temporary construction hub (as described in Chapter 3 Description of the proposed development) is not known at this time of writing. This is expected to be an existing consented site, and may be situated outside of the Scoping Area. The effects of land quality and ground conditions on the hub will be assessed as part of the Land quality and ground conditions assessment.

11.4.4 As the design for the Proposed Development continues to be refined and the route of the Proposed Underground Pipelines is determined, along with associated proposed WRP and proposed AGP, the study area for land quality and ground conditions will be refined on the basis of the distance over which effects may occur and by the location of any receptors that may potentially be affected. Consideration will also be given to the low sensitivity of the Proposed Development and how it may potentially be affected by potential sources of contamination.

11.4.5 In relation to the land quality and ground conditions study area, the following buffers are proposed in relation to the completion of further assessments (such as a detailed desk study to support the ES), as set out in Table 11-3. The proposed distances consider the development type, location and setting, taking into account the distance over which potential sources of contamination may have an impact on identified receptors.

**Table 11-3: Proposed buffers for the proposed desk study**

| Parameter | Search distance from Proposed Underground Pipelines, proposed Water Recycling Plant and proposed Above Ground Plant |
|---|---|
| Source Protection Zones | On-site |
| Potential Sources of Contamination (PSCs) not landfill-related | 50m |
| Trade directories (where applicable and not a registered addressed at a residential property) | 50m |

| Parameter | Search distance from Proposed Underground Pipelines, proposed Water Recycling Plant and proposed Above Ground Plant |
|---|---|
| Groundwater abstractions (private potable abstractions) | 50m |
| Discharge consents | 50m |
| Pollution incidents | 50m |
| Active consents (IPPC and LAAPC) | 50m |
| Infilled land and landfills | 250m |
| Surface water abstractions | 250m |
| Control of Major Accident Hazards (COMAH) sites | 50m |
| Other waste sites – not licensed landfills, waste transfer stations and waste management | 250m |
| Ecological designations including SSSI, Ramsar, SAC, SPA and NVZ | 250m |
| Groundwater abstractions | 500m |

11.4.6 Sources of baseline data

11.4.7 Table 11-4 sets out the data that has been used to inform the baseline section (section 11.5) of this chapter.

**Table 11-4: Source of baseline data**

| Baseline data | Source of data |
|---|---|
| Geology, hydrogeology, potential sources of contamination and historic landfill sites. | Data sources include British Geological Society (BGS) electronic 1:50,000 mapping [209], EA, National Library of Scotland, Google Earth, HCC, WCC, HBC, FBC, PCC. |
| Geology | BGS Geology Survey of England and Wales 1:50,000 geological map series number 315, Southampton, Solid and Drift, 1987 [210] and Number 316, Fareham, Solid and Drift 1998 [211] |
| | BGS Geology of Britain Viewer [212] |
| | BGS Geo Index (onshore) [209] |
| Hydrogeology | BGS 1:100,000 regional hydrogeology map series sheet 9, Hydrogeological Map of Hampshire and the Isle of Wight 1979 [213] |
| Hydrogeology, designated environmentally sensitive areas (limited to Ramsar Sites, SPA, SSSI, SAC) | Defra Multi Agency Government Information for the Countryside (MAGIC) map application [78] |

## 11.5 Baseline conditions

### Proposed Development wider conditions

11.5.1 The scoping assessment for land quality and ground conditions has comprised a desk study, using existing publicly available information to identify the ground conditions and potential sources of contamination within the study area (inclusive of the Scoping Area and a 250m buffer zone). Baseline information for each of the principal components set out in Chapter 3 Description of the proposed development is set out below.

### Proposed Water Recycling Plant and proposed High Lift Pumping Station

*Geology and hydrogeology*

11.5.2 A review of published geological mapping available on the BGS Geology of Britain Viewer [212] and BGS solid and drift geological maps [210, 211, 213] is summarised in

11.5.3 Table 11-5:.

**Table 11-5: Geology and hydrogeology**

| Strata | Description | Aquifer Designation |
|---|---|---|
| Made Ground | Associated with historic landfills | N/A |
| Superficial – Raised Marine Deposits | Sand and gravel | Secondary (undifferentiated) |
| Bedrock – Lewes Nodular Chalk Formation | Chalk | Principal |

11.5.4 The superficial and bedrock geology at the proposed WRP and expected location of the HLPS, including the 250m buffer, is shown on sheet 1 of Figures 11.2 and 11.3 in Volume III respectively.

11.5.5 There are no Source Protection Zones (SPZs) located at the proposed WRP (see sheet 1 of Figure 11.4 in Volume III).

11.5.6 Information regarding surface and groundwater abstractions will be gathered through engagement with both the EA and local authorities as part of the EIA process.

*Designated environmentally and geologically sensitive areas*

11.5.7 No designated environmentally or geologically sensitive areas have been identified at the location of the proposed WRP. There are no geologically sensitive areas within 250m of the proposed WRP, however, the following designated environmentally sensitive areas have been identified within the 250m buffer:

- Chichester and Langstone Harbours Ramsar Site and SPA
- Langstone Harbour SSSI
- Solent Maritime SAC

11.5.8 Environmentally sensitive areas within the location of the proposed WRP and its 250m buffer zone are shown on sheet 1 of Figure 11.5 in Volume III.

*Land quality*

11.5.9 One feature that may act as a potential source of contamination has been identified at the location of the proposed WRP. The record relates to Harts Farm Way, a historical landfill.

11.5.10 Five further features that may act as potential sources of contamination were identified within 250m of the proposed WRP:

- Infilled pond (infilled water feature on Figure 11.6 in Volume III) – potential source of contamination
- Historical sewage works – potential source of contamination
- Corn Mill (former brickworks and mills on Figure 11.6 in Volume III) – potential source of contamination
- Railway line – potential source of contamination
- Land south of Budds Farm – authorised landfill

11.5.11 Identified features that may act as potential sources of contamination within the location of the proposed WRP and its 250m buffer zone are shown on sheet 1 of Figure 11.6 in Volume III.

## Proposed Underground Pipelines between Budds Farm Wastewater Treatment Works and the proposed Water Recycling Plant

*Geology and hydrogeology*

11.5.12 Information on geological and hydrogeological conditions is summarised in Table 11-6:.

**Table 11-6: Geology and hydrogeology**

| Strata | Description | Aquifer Designation |
|---|---|---|
| Made Ground | Associated with historical landfills | N/A |
| Superficial – Beach and Tidal Flat Deposits | Clay, silt sand and gravel | Secondary (undifferentiated) |
| Superficial – Alluvium | Clay, silt, sand and gravel | Secondary A |
| Superficial – River Terrace Deposits | Sand, silt and clay | Secondary A |
| Bedrock – Lewes Nodular Chalk Formation | Chalk | Principal |

11.5.13 The superficial and bedrock geology of the Proposed Underground Pipelines between Budds Farm WTW and the proposed WRP and the 250m buffer is shown on sheet 1 of Figures 11.2 and 11.3 in Volume III respectively.

11.5.14 There are no SPZs located within the location of the Proposed Underground Pipelines between Budds Farm WTW and the proposed WRP (see sheet 1 of Figure 11.4 in Volume III).

11.5.15 Information regarding surface and groundwater abstractions will be gathered through engagement with both the EA and local authorities as part of the EIA process.

*Designated environmentally and geologically sensitive areas*

11.5.16 Other than those already identified as being in proximity to the proposed WRP (paragraph 11.5.7), no additional designated environmentally or geologically sensitive areas were identified within the proposed location of the underground pipelines between Budds Farm WTW and the proposed WRP or the 250m buffer (sheet 1 of Figure 11.5 in Volume III).

*Land quality*

11.5.17 Four features that may act as potential sources of contamination were identified within the location of the Proposed Underground Pipelines between Budds Farm WTW and the proposed WRP. Identified features include the following:

- Budd's Farm Sewage Works – potential source of contamination
- Land south of Budd's Farm Sewage Works (historical landfill) – potential source of contamination
- Potential infilled land – potentially infilled with earth spoils, domestic refuse and incinerator ash
- Infilled pond (Mill Lake) (infilled water feature on Figure 11.6 in Volume III) – potential source of contamination

11.5.18 Other than those already identified, no additional features that may act as potential sources of contamination were identified within the location of the Proposed Underground Pipelines between Budds Farm WTW and the proposed WRP or its 250m buffer zone.

### Proposed Underground Pipeline between the proposed Water Recycling Plant and Havant Thicket Reservoir

*Geology and hydrogeology*

11.5.19 Information on geological and hydrogeological conditions is summarised in

11.5.20 Table 11-7:.

**Table 11-7: Geology and hydrogeology**

| Strata | Description | Aquifer Designation |
|---|---|---|
| Made Ground | Associated with historical landfills, roads and developments along the route | N/A |
| Superficial – Raised Marine Deposits | Sand and gravel | Secondary (undifferentiated) |

| Strata | Description | Aquifer Designation |
|---|---|---|
| Superficial – River Terrace Deposits | Sand, silt and clay | Secondary A |
| Superficial – Alluvium | Clay, silt, sand and gravel | Secondary A |
| Superficial – Head Deposits | Clay, silt, sand and gravel | Secondary (undifferentiated) |
| Bedrock – Lewes Nodular Chalk Formation | Chalk | Principal |
| Bedrock – Lambeth Group | Clay, silt and sand | Secondary A |
| Bedrock – London Clay | Clay, silt and sand | Unproductive Strata |
| Bedrock – Bognor Sand Member | Sand | Secondary A |

11.5.21 The superficial and bedrock geology of the Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir and the 250m buffer is shown on sheet 1 of Figures 11.2 and 11.3 in Volume III respectively.

11.5.22 The area of the Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir crosses over, below or through an SPZ 1 and an SPZ 1C. The SPZs are shown on sheet 1 of Figure 11.4 in Volume III.

11.5.23 Whether the SPZ is a potential receptor would be dependent on the vertical extent of the SPZ in relation to the stratigraphy underlying the Proposed Development. Determination of whether the SPZ would be considered a receptor, and therefore be impacted by the Proposed Development, would be driven by the outputs of hydrogeological risk assessments for the Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir (see also Chapter 18 Water Environment (including Flood Risk)).

11.5.24 Information regarding surface and groundwater abstractions will be gathered through engagement with both the EA and local authorities as part of the EIA process.

*Designated environmentally and geologically sensitive areas*

11.5.25 No designated environmentally or geologically sensitive areas were identified within the location of the Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir. There are no geologically sensitive areas within 250m of the Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir, however, the following designated environmentally sensitive areas have been identified within the 250m buffer:

- Chichester and Langstone Harbours Ramsar Site and SPA
- Langstone Harbour SSSI
- Solent Maritime SAC

11.5.26 Environmentally sensitive areas within the 250m buffer of the Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir are shown on sheet 1 of Figure 11.5 in Volume III.

*Land quality*

11.5.27 The following features that may act as potential sources of contamination have been identified within the location of the Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir:

- Historical sewage works – potential source of contamination
- Bedhampton Landfill – authorised waste site
- Corn Mill (former brickworks and mills on Figure 11.6 in Volume III) – potential source of contamination
- Railway line – potential source of contamination
- Infilled ponds/infilled watercourses/potentially infilled watercourses (infilled water features on Figure 11.6 in Volume III) – potential source of contamination
- Embankment – potential source of contamination
- Infilled swimming pool (infilled water features on Figure 11.6 in Volume III) – potential source of contamination
- Garage/depot/warehouse – potential source of contamination
- Historical industrial estate – potential source of contamination
- Hook's Farm – potential source of contamination

11.5.28 The following additional features that may act as potential sources of contamination were identified within the 250m buffer of the location of the Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir:

- Infilled ponds (infilled water features on Figure 11.6 in Volume III) – potential source of contamination (additional features to those identified within the location of the Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir)
- Harts Farm Way – historical landfill (overlap with Broad Marsh potential source of contamination, potential of infilling of marshland)
- Health Farm – historical farm, potential source of contamination
- Historical water works (pumping station) – potential source of contamination
- Padnell Farm – authorised landfill
- Dunsbury Hill Farm – authorised landfill

11.5.29 Identified potential sources of contamination within the location of the Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir and its 250m buffer zone are shown on sheet 1 of Figure 11.6 in Volume III.

### Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

*Geology and hydrogeology*

11.5.30 Information on geological and hydrogeological conditions is summarised in Table 11-8.

Table 11-8: Geology and hydrogeology

| Strata | Description | Aquifer Designation |
|---|---|---|
| Made Ground | Associated with historical landfills, infilled land, roads and developments along the route | N/A |
| Superficial – Head Deposits | Clay, silt, sand and gravel | Secondary (undifferentiated) |
| Superficial – Alluvium | Clay, silt, sand and gravel | Secondary A |
| Superficial – River Terrace Deposits | Sand, silt and clay | Secondary A |
| Superficial – Raised Marine Deposits | Sand and gravel | Secondary (undifferentiated) |
| Superficial – Clay-with-flints Formation | Clay, silt, sand and gravel | Unproductive |
| Bedrock – Culver Chalk Formation | Chalk | Principal |
| Bedrock – Earnley Sand Formation | Sand, silt and clay | Secondary A |
| Bedrock – Wittering Formation | Sand, silt and clay | Secondary A |
| Bedrock – Whitecliff Sand Member | Sand | Secondary A |
| Bedrock – London Clay | Clay, silt and sand | Unproductive Strata |
| Bedrock – Bognor Sand Member | Sand | Secondary A |
| Bedrock – Lambeth Group | Clay, silt and sand | Secondary A |
| Bedrock – Portsdown Chalk Formation | Chalk | Principal |
| Bedrock – Spetisbury Chalk Member | Chalk | Principal |
| Bedrock – Tarrant Chalk Member | Chalk | Principal |
| Bedrock – Newhaven Chalk Formation | Chalk | Principal |
| Bedrock – Lewes Nodular Chalk Formation | Chalk | Principal |

11.5.31 The superficial and bedrock geology of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW and the 250m buffer is shown on sheets 1 to 6 of Figures 11.2 and 11.3 in Volume III respectively.

11.5.32 The area of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW passes over, below or through two SPZ 1, four SPZ 1C, one SPZ 2, three SPZ 2C and two SPZ 3. The SPZs are shown on sheets 1 to 6 of Figure 11.4 in Volume III.

11.5.33 Whether the SPZ is a potential receptor would be dependent on the vertical extent of the SPZ in relation to the stratigraphy underlying the Proposed Development. Determination of whether the SPZ would be considered a receptor, and therefore be impacted by the Proposed Development, would be driven by the outputs of hydrogeological risk assessments for the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW (see also Chapter 18 Water Environment (including Flood Risk)).

11.5.34 Information regarding surface and groundwater abstractions will be gathered through engagement with both the EA and local authorities as part of the EIA process.

*Designated environmentally and geologically sensitive areas*

11.5.35 Sections of the River Itchen SSSI and SAC bisect the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. Several further designated environmentally sensitive areas have been identified within the 250m buffer of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW:

- Chichester and Langstone Harbours Ramsar site and SPA
- Langstone Harbour SSSI
- Solent Maritime SAC
- Portsdown SSSI
- Hook Heath Meadows SSSI
- Botley Wood and Everett's and Mushes Copses SSSI

11.5.36 Environmentally sensitive areas within the location of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW and its 250m buffer zone are shown on sheets 1 to 6 of Figure 11.5 in Volume III.

11.5.37 There are no geologically sensitive areas within the location of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW and its 250m buffer zone.

*Land quality*

11.5.38 Eight historical landfills have been identified within the area of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW, these include:

- Quob Copse Landfill - historical landfill
- Whitedell Farm - historical landfill
- Heytesbury Farm Landfill - historical landfill
- Albany Farm - historical landfill
- Crowd Hill Landfill - historical landfill
- Brambridge - historical landfill
- Bugle Farm Landfill - historical landfill
- Ash House Farm - historical landfill

11.5.39 A further seven historical landfills and one active authorised landfill are located within the 250m buffer zone.

11.5.40 A total of 67 features that may act as potential sources of contamination have been identified within the area of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. An additional 28 features that may act

as potential sources of contamination are located within the 250m buffer zone. Potential sources of contamination identified include:

- Historical sewage works
- Historical railways
- Potentially infilled pits (disturbed or Made Ground on Figure 11.6 in Volume III)
- Potentially infilled reservoirs, watercourses and ponds (infilled water features on Figure 11.6 in Volume III)
- Farms
- Water Treatment Works (non-potable)
- Historical military installations
- Garages
- A historical hospital
- Disturbed or Made Ground
- Former brickworks and mills

11.5.41 The area of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW contains a mixture of agricultural land, developed towns and villages. These present further potential sources of contamination.

11.5.42 Identified features that may act as potential sources of contamination within the location of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW (and its 250m buffer zone) are shown on sheets 1 to 6 of Figure 11.6 in Volume III.

### Use of Havant Thicket Reservoir for the storage of recycled water

#### *Geology and hydrogeology*

11.5.43 Information on geological and hydrogeological conditions is summarised in Table 11-9:.

**Table 11-9: Geology and hydrogeology**

| Strata | Description | Aquifer Designation |
|---|---|---|
| Made Ground | Associated with historical landfills, infilled land, roads and developments along the route | N/A |
| Superficial – Head Deposits | Clay, silt, sand and gravel | Secondary (undifferentiated) |
| Bedrock – London Clay | Clay, silt and sand | Unproductive Strata |
| Bedrock – Bognor Sand Member | Sand | Secondary A |
| Bedrock – Lambeth Group | Clay, silt and sand | Secondary A |

11.5.44 The superficial and bedrock geology of Havant Thicket Reservoir and the 250m buffer is shown on sheet 1 of Figure 11.2 and 11.3 in Volume III respectively.

11.5.45 Havant Thicket Reservoir is located within an SPZ 1 and SPZ 1c. The SPZs are shown on sheet 1 of Figure 11.4 in Volume III.

11.5.46 Whether the SPZ is a potential receptor would be dependent on the vertical extent of the SPZ in relation to the stratigraphy underlying the Proposed Development. Determination of whether the SPZ would be considered a receptor, and therefore be impacted by the Proposed Development, would be driven by the outputs of hydrogeological risk assessments for the Havant Thicket Reservoir (see also Chapter 18 Water Environment (including Flood Risk)).

11.5.47 Information regarding surface and groundwater abstractions will be gathered through engagement with both the EA and local authorities as part of the EIA process.

*Designated environmentally and geologically sensitive areas*

11.5.48 No designated environmentally or geologically sensitive areas were identified within the area occupied by Havant Thicket Reservoir, or within its 250m buffer zone (see sheet 1 of Figure 11.5 in Volume III).

*Land quality*

11.5.49 There are no historical landfills located within the area occupied by Havant Thicket Reservoir, however there are two located within the 250m buffer zone. An infilled watercourse is located within the area occupied by Havant Thicket Reservoir with additional infilled watercourses and ponds located within its 250m buffer zone.

11.5.50 The 250m buffer zone surrounding Havant Thicket Reservoir comprises a mixture of agricultural land, developed towns and villages. These present further potential sources of contamination.

11.5.51 Identified features that may act as potential sources of contamination within the area occupied by Havant Thicket Reservoir (and its 250m buffer zone) are shown on sheet 1 of Figure 11.6 in Volume III.

### Proposed Above Ground Plant

11.5.52 The proposed AGP is considered in the above baseline sub sections as they will be located within the Preferred Pipeline Corridor.

## 11.6 Scoping of potential effects

11.6.1 The Proposed Development has the potential to affect land quality and ground conditions, both during construction and operation.

11.6.2 Effects from decommissioning of the Proposed Development are considered to be no greater than those identified during the construction phase and are therefore assessed as construction effects as a worst case scenario. Please refer to section 3.7 of Chapter 3 Description of the Proposed Development for further information on decommissioning.

## Effects scoped into the assessment

*Construction effects*

11.6.3 The following potential construction stage effects have been identified.

*Effects on groundwater*

11.6.4 Direct effects on the Secondary A Aquifers, Secondary Undifferentiated Aquifers and SPZs associated with the superficial deposits and any potential groundwater abstractions may occur due to the intrusive nature of earthworks, trenching, trenchless construction, tunnelling (and associated shafts) and piling (as required). The significance of the disturbance would be dependent on the depth of the aquifer unit in relation to the proposed depth of the intrusive works. During construction, surface layers would be excavated allowing increased infiltration of rainwater and surface run-off which could potentially mobilise existing sources of contamination and create new pathways to the superficial aquifers.

11.6.5 Direct effects on the Principal Aquifers, Secondary A Aquifers and SPZs associated with the bedrock geology and any potential groundwater abstractions may occur from deep ground workings associated with trenchless construction, tunnelling (and associated shafts) or piling (as required). There is potential for contaminants (including drilling mud) to migrate along newly created preferential pathways which could cause a deterioration of groundwater quality.

*Effects on surface water quality and ecological habitats*

11.6.6 Direct effects to environmentally designated sensitive areas and surface waters may occur from existing sources of contamination. This may be a result of the creation of new pathways to sensitive receptors via groundwater, installation of temporary drainage or surface water run-off that may occur during construction.

11.6.7 The construction works could also introduce new sources of contamination for example from the storage of fuels and chemicals or via spillages and leaks. These have potential to migrate into environmentally sensitive areas through the groundwater or surface water run-off as well as having the potential to cause a deterioration in WFD status to these environmentally sensitive areas.

*Effects on human health*

11.6.8 Excavation activities including trenchless crossings, tunnelling (and associated shafts), surface excavation and earthworks, as well as the movement and stockpiling of soils, have the potential to mobilise existing sources of ground contamination. In addition to mobilising pre-existing contaminants, construction works may alter migration pathways or create new preferential pathways that did not previously exist between a source and receptor. This could result in impacts to human health through dermal contact, inhalation (inclusive of vapours and ground gases) and ingestion of contaminants.

11.6.9 The construction works could also introduce new sources of contamination such as fuel or chemical spillages and leaks which human receptors may be directly exposed to.

11.6.10 Additional effects on human health associated with the Proposed Development are discussed in Chapter 16 Socio-economics, tourism, recreation and health.

*Operation effects*

11.6.11 Indirect impacts to identified receptors (e.g. human health and groundwater) may occur as a result of leakage/spillages of stored materials at the proposed WRP, Budds Farm WTW and proposed AGP during the operational phase.

### Effects scoped out of the assessment

*Construction and operation effects*

*Effects on geologically sensitive areas*

11.6.12 At this stage potential impacts to geologically sensitive sites are proposed to be scoped out of the assessment. This is following a review of the baseline conditions which did not identify any geologically sensitive sites within the Scoping Area or the 250m buffer zone.

*Direct impacts associated with the operation*

11.6.13 Direct impacts to, for example, aquifers and groundwater resources, as a result of the operation of the Proposed Development are considered unlikely. It is assumed that the Applicant will conduct routine operation and maintenance activities which would reduce any potential likely significant effects. The Proposed Development will be operated in line with proposed operational management plans. It is for these reasons that direct impacts to identified receptors associated with the operational phase are proposed to be scoped out of the assessment.

## 11.7 Approach to assessment

### Additional baseline data collection

11.7.1 In order to further establish the baseline conditions, additional data sources will be considered, as set out in

11.7.2 Table 11-10.

**Table 11-10: Additional datasets**

| Data Source | Data contents |
|---|---|
| Environmental Database Report | Historical maps, site sensitivity data, surface water features, trade directory and regulatory information. |
| EA | Historical landfill sites, permitted waste sites – authorised landfill site boundaries, aquifer designations, groundwater abstractions and groundwater source protection zones. |
| BGS | Solid geology, superficial geology, borehole records and mineral extraction sites, radon gas risk. |

| Data Source | Data contents |
|---|---|
| Stantec desk study, Hydrogeological Impact Assessment and ground investigation reports | Superficial geology, solid geology, hydrogeology, contamination sources. |
| AECOM ground investigation reports | Superficial geology, solid geology, hydrogeology, contamination sources. |
| MAGIC map application [78] | Ramsar sites, SPAs, SACs, SSSIs, NNR and LNR, groundwater vulnerability and aquifer designations. |
| EBC, EHDC, HBC, HCC, PCC, FBC, SDNPA, WCC | Private groundwater abstractions, the register of sites designated and formally designated as Contaminated Land under Part 2A of the Environment Protection Act 1990, a list of sites that have been identified for further inspection under Part 2A of the Environmental Protection Act 1990 and the brownfield register. |

11.7.3 Any additional datasets would be identified through ongoing consultation with stakeholders as part of the EIA process.

### Assessment methodology

11.7.4 Determining the significance of effect is a two-stage process that involves defining the sensitivity of the receptors and the magnitude of the impacts. Values will be assigned to the sensitivity of receptors and to the magnitude of potential impacts.

11.7.5 The sensitivity of receptors is assessed according to the criteria set out in Table 11-11 and is based on the capacity of receptors to tolerate change and whether or not increased risks would be acceptable within the scope of the prevailing legislation and guidelines (e.g. Land Contamination Risk Management, EA, 2021). The degree of change that is considered acceptable is dependent on the value of a receptor. Human health is considered to be of a high sensitivity in all cases (in the absence of any mitigation, such as use of personal protective equipment).

**Table 11-11: Definition of terms relating to receptor sensitivity**

| Sensitivity | Definition used | Examples |
|---|---|---|
| High | Very high importance and rarity, international scale and very limited potential for substitution.<br><br>High importance and rarity, national scale and limited potential for substitution. | **Human Health**<br>Construction workers<br>Site operatives<br>General public |
| | | **Controlled Waters**<br>Groundwater SPZs (public and private water supply)<br>Surface Waters with WFD ‘high’ status objective<br>Surface water or groundwater supporting internationally designated or nationally important conservation sites or fisheries |
| Medium | High or medium importance and rarity, regional scale, | **Controlled Waters**<br>Principal Aquifer (resource potential)<br>Licensed groundwater or surface water abstractions |

| Sensitivity | Definition used | Examples |
|---|---|---|
| | limited potential for substitution | Surface waters with WFD 'good' status objective<br>Surface water or groundwater supporting regionally wildlife sites or commercial aquaculture |
| Low | Low or medium importance and rarity, local scale | **Controlled Waters**<br>Secondary A or Undifferentiated Aquifer (resource potential)<br>Unlicensed water supplies<br>Surface waters with WFD 'moderate' or 'poor' status objective<br>Surface water or groundwater supporting locally important wildlife or amenity site |
| Very low | Very low importance and rarity, local scale | **Controlled Waters**<br>Water bearing Unproductive Strata (resource potential)<br>Surface waters with WFD 'bad' status objective |

11.7.6

11.7.7 The sensitivity assessment takes into account how 'acceptable' changes to the availability or quality of a particular resource would be. This is dependent on the value of that resource, which is assessed based on its strategic or geographic importance. Definitions of value are provided in Table 11-12.

**Table 11-12: Definition of value of levels for land quality and ground conditions**

| Value | Definition |
|---|---|
| High | Is an international or nationally important resource |
| Medium | Is a regionally important resource |
| Low | Is a locally important resource |
| Very low | Is of no significant resource value |

11.7.8 High value and high sensitivity are not necessarily linked within a particular impact. A receptor could be of high value but have low or negligible sensitivity to an effect.

11.7.9 Potential effects may be adverse, beneficial or neutral. The magnitude of an impact is assessed qualitatively according to the criteria set out in Table 11-13. The following definitions apply to time periods used in the magnitude assessment:

- Long-term
- Medium-term
- Short-term.

11.7.10 For impacts related to human health, magnitude reflects the likely increase or decrease in exposure risk for a receptor. For controlled waters, magnitude represents the likely impact that an activity would have on resource usability or value at the receptor. Magnitude is therefore affected by the distance and connectivity between the source and the receptor.

11.7.11 The magnitude of potential impacts, which are based on CIRIA 552 'Contaminated Land Risk Assessment, A Guide to Good Practice [195], are assessed qualitatively, according to the criteria set out in

11.7.12 Table 11-13.

**Table 11-13: Definition of terms relating to magnitude of an impact**

| Magnitude of impact | Definition | |
|---|---|---|
| | **Human Health Risk – Proposed Development or activity is likely to result in:** | **Controlled Waters – Physical, biological or chemical impacts on groundwater or surface water likely to result in:** |
| **Major** | Permanent or major change to existing risk of exposure (adverse/beneficial).<br>Unacceptable risks to one or more receptors over the long-term or permanently (adverse).<br>Prosecution e.g. under health and safety or environmental legislation (adverse).<br>Remediation and complete source removal (beneficial).<br>Construction workers at risk due to lack of appropriate personal protective equipment (adverse). | Permanent, long-term or wide scale impacts on water quality or availability (adverse/beneficial)<br>Permanent loss or long-term degradation of a water supply source resulting in prosecution (adverse).<br>Change in WFD water body status or its ability to achieve WFD status objectives in the future (adverse/beneficial).<br>Permanent habitat creation or complete loss (adverse/beneficial).<br>Measurable habitat change that is sustainable or recoverable over the long-term (adverse/beneficial). |
| **Moderate** | Medium-term or moderate change to existing risk of exposure (adverse/beneficial).<br>Unacceptable risks to one or more receptors over the medium-term (adverse). | Medium-term or local scale impacts on water quality or availability (adverse/beneficial).<br>Medium-term degradation of a water supply source (adverse).<br>Observable habitat change that is sustainable or recoverable over the medium-term (adverse/beneficial). |
| **Minor** | Short-term temporary or minor change to existing risk of exposure (adverse/beneficial).<br>Unacceptable risks to one or more receptors over the short-term (adverse). | Short-term or very localised impacts on water quality or availability (adverse/beneficial).<br>Short-term degradation of a water supply source (adverse).<br>Measurable permanent impacts on a water supply source that do not impact on its operation (adverse).<br>Observable habitat change that is sustainable or recoverable over the short-term (adverse/beneficial). |
| **Negligible** | Negligible change to existing risk of exposure (neutral).<br>Activity is unlikely to result in unacceptable risks to receptors (neutral). | Very minor or intermittent impact on local water quality or availability (adverse/beneficial).<br>Usability of a water supply source would be unaffected (neutral). |

| Magnitude of impact | Definition | |
|---|---|---|
| | **Human Health Risk – Proposed Development or activity is likely to result in:** | **Controlled Waters – Physical, biological or chemical impacts on groundwater or surface water likely to result in:** |
| | | Very slight local changes that have no observable impact on dependant receptors (neutral). |

11.7.13 The significance of the effect upon land quality and ground conditions is determined by correlating the magnitude of the impact and the sensitivity of the receptor (which is a function of its value), as presented in

11.7.14 Table 11-14, in line with the methodology presented in Chapter 5 General EIA approach and methodology.

**Table 11-14: Significance of effect matrix**

| | | Magnitude of impact | | | |
|---|---|---|---|---|---|
| | | **Major** | **Moderate** | **Minor** | **Negligible** |
| **Sensitivity of receptor or resource** | **High** | **Major** | **Major** | **Moderate** | Minor |
| | **Medium** | **Major** | **Moderate** | Minor | Minor |
| | **Low** | **Moderate** | Minor | Minor | Neutral |
| | **Very low** | Minor | Neutral | Neutral | Neutral |

11.7.15 For the purposes of this assessment, any effects with a significance level of 'moderate' or greater are deemed 'significant' in accordance with the EIA Regulations. Effects determined to be minor or neutral are deemed 'non-significant' and as such are not reported in detail.

### Assessment scenarios

11.7.16 The future baseline will also include committed developments that will be delivered prior to commencement of construction.

11.7.17 Assessment of potential effects will consider the construction and operational phases of the Proposed Development.

### Cumulative effects

11.7.18 Cumulative effects of the Proposed Development together with the effects of other developments/schemes may result in significant effects. This may be the result of effects on the environment during construction, operation and maintenance or decommissioning of the Proposed Development.

11.7.19 Cumulative effects for all topics will be reported within the cumulative effects chapter of the ES. Please refer to Chapter 19 Cumulative effects assessment which presents the proposed methodology for the assessment of cumulative effects that will be undertaken for the EIA.

### In-combination effects

11.7.20 In combination effects are those that result from the interaction between the individual effects of the Proposed Development (i.e. interaction of environmental factors such as air quality, noise, health etc), combined together on a single receptor at a single point in time. The interrelationship between the individual effects may combine to result in a likely significant effect, even where the individual effects were not significant. Any in-combination effects in relation to land quality and ground conditions will be assessed as part of the EIA and reported within the relevant chapter of the ES.

11.7.21 The nature of likely in-combination effects for land quality and ground conditions includes:

- In-combination impacts to human health in relation to potential contamination.
- In-combination impacts on the quality and quantity of groundwater resources and hydrologically connected surface water receptors (including water dependent biological features).
- In-combination impacts on agricultural land in relation to potential contamination.

## 11.8 Limitations and assumptions

11.8.1 At this stage, the assessment of the baseline environment has been made using publicly available desk-based information as listed in section 11.4 and the level of design detail currently available for the Proposed Development.

11.8.2 The assessment will be refined once further desk-based information is obtained, intrusive investigations are progressed and detailed design information becomes available.

## 11.9 Approach to mitigation and residual effects

11.9.1 Mitigation measures will be developed as site-specific information and data is gathered, the Proposed Development is refined and the ES is prepared. The mitigation hierarchy (Primary mitigation, Secondary mitigation and Tertiary mitigation) is specified in Chapter 5 General EIA approach and methodology.

11.9.2 The following principles are used to define the types of mitigation measures for the Proposed Development:

- Primary (inherent) mitigation: Modifications to the location or engineering design of the Proposed Development which are an inherent part of the design for the purpose of avoiding, preventing or reducing likely significant adverse environmental effects. For example, avoidance of known sources of contamination, environmentally sensitive areas, groundwater and surface water abstractions, and historical and active landfills where practicable. Avoidance of construction in areas of historical development such as historical pits and infilled land where practicable.
- Secondary (foreseeable) mitigation: Measures or actions that will require further activity to achieve the anticipated outcome. These may be imposed as

part of the planning consent or through inclusion in the ES. Secondary measures may be detailed activities, for example the development and implementation of construction management plans would include a Pollution Prevention Response Plan for construction activities which would adhere to construction industry good practice guidance.

- Tertiary (inexorable) mitigation: Measures to reduce reasonably foreseeable construction effects, such as recognised good construction site management practices (for example, the use of spill kits). Actions that would occur with or without input from the EIA feeding into the design process as they are imposed as legislative requirements.

11.9.3 The Applicant will engage with and consult stakeholders on proposed mitigation measures throughout the EIA process and present a consultation summary in the ES.

## 11.10 Summary

11.10.1 A summary of the potential effects that have been considered in this chapter is provided in Table 11-15.

**Table 11-15: Summary table**

| Potential impacts | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| Effects on human health | Scoped in | Scoped in | Deemed to be relevant to construction, operational and decommissioning phases. The high-level desk based information has identified that contaminant linkages may be present. The high-level development of Conceptual Site Models following the source – pathway – receptor definition has identified the following (with examples):<br>Sources exist along the route and include (but are not limited to) landfills, garages and sewage works.<br>Pathways are present and include the direct inhalation/dermal contact of soils and potentially ground gas.<br>Receptors are present including adjacent land users, construction, maintenance and decommissioning workers.<br>There are therefore potential pollutant linkages along some parts of the route which require further consideration.<br>During the construction, operational and decommissioning phases there are additional risks from spills and linkages which needs to be considered. |
| Effects on groundwater | Scoped in | Scoped in | Deemed to be relevant to construction, operational and decommissioning phases. The high-level desk based information has identified that contaminant linkages may be present. The high-level development of Conceptual Site Models |

| Potential impacts | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| | | | following the source – pathway – receptor definition has identified the following (with examples):<br>Sources exist along the route and include (but are not limited to) landfills, garages and sewage works.<br>Pathways are present and include the direct migration of groundwater from the saturated and unsaturated zones to underlying aquifers.<br>Receptors are present including source protection and safeguarded zones.<br>There are therefore potential pollutant linkages along some parts of the route which require further consideration.<br>During the construction, operational and decommissioning phases there are additional risks from spills and linkages which needs to be considered. |
| Effects on surface water quality and ecological habitats | Scoped in | Scoped in | Deemed to be relevant to construction, operational and decommissioning phases. The high-level desk based information has identified that contaminant linkages may be present. The high-level development of Conceptual Site Models following the source – pathway – receptor definition has identified the following (with examples):<br>Sources exist along the route and include (but are not limited to) landfills, garages and sewage works.<br>Pathways are present and include the direct migration of groundwater from the saturated and unsaturated zones, drainage to adjacent surface waters.<br>Receptors are present including surface waters and the ecological habitats that they support.<br>There are therefore potential pollutant linkages along some parts of the route which require further consideration.<br>During the construction, operational and decommissioning phases there are additional risks from spills and linkages which needs to be considered. |
| Effects on geologically sensitive areas | Scoped out | Scoped out | No geologically sensitive areas have been identified as part of the review of baseline conditions for the Proposed Development. Therefore this topic has been scoped out. |
| Direct impacts associated with | Scoped out | Scoped out | It is assumed that routine maintenance will be carried out by the Applicant during the operational phase of the Proposed Development. It is also |

| Potential impacts | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| operation and maintenance | | | assumed that these works would be undertaken in accordance with best practice and operational management plans. Therefore the potential for likely significant effect is considered low and has been scoped out of the assessment. |

# 12 Land use and agriculture

## 12.1 Introduction

12.1.1 This chapter outlines out the scope and methodology for the assessment of the potential likely significant effects arising from the construction, operation and decommissioning of the Proposed Development on land use and agriculture.

12.1.2 Land use and agriculture aspects considered within this chapter for the Proposed Development include:

- **Residential property**: including associated buildings such as garages and sheds, gardens and parking areas.
- **Community facilities and land**: commercial or public authority managed facilities for use by the whole community, e.g. doctors' surgeries, schools, hospitals, sports facilities, places of worship and recycling sites and community land such as established public recreational resources, country parks, woodlands, playgrounds, parks, nature reserves and waterways.
- **Commercial property and land**: such as industrial businesses, rural business parks, leisure centres and utilities and commercial land such as commercial forestry used for timber production, sports grounds, roads, railways and allotments.
- **Development land**: including major land allocations for housing or employment through the Local Planning Authorities' Local Plans and major committed development with current planning permissions.
- **Agricultural land**: including best and most versatile (BMV) land (as defined by the Agricultural Land Classification (ALC) system), agricultural buildings such as barns and cattle sheds, access and boundary features, livestock water supply and field drainage systems, and land management, woodland grant or energy crop schemes.
- soils: including soil function.

12.1.3 This chapter interfaces with a number of other chapters, including:

- Chapter 6 Air quality and odour, which considers effects for receptors including residential properties and community facilities such as schools and hospitals.
- Chapter 8 Terrestrial and freshwater biodiversity, which looks at aspects including designated sites and habitats.
- Chapter 11 Land quality and ground conditions, which looks at potential contamination, designated geological sites, and underlying geological and hydrogeological conditions.
- Chapter 13 Landscape and visual, which covers arboricultural effects and changes in view and their effects on visual receptors.
- Chapter 14 Noise and vibration, which considers effects on receptors including residential property and certain community receptors.
- Chapter 16 Socio-economics, tourism, recreation and health, which considers effects on the local economy and labour market and on tourism businesses,

and effects on human health arising from aspects including impacts on residential and community receptors and areas of recreation, and disruption to communities more widely.

- Chapter 17 Traffic and transport, which considers changes in current traffic and transport and its effect on receptors.

## 12.2 Legislation, policy and guidance

12.2.1 The assessment will be carried out in accordance with relevant legislation and planning policy and will follow established standards and guidance for land use and agricultural assessment. It is recognised that this list is non-exhaustive and will be kept under review to take account of any later legislation or policy changes.

### Legislation

12.2.2 The relevant legislation for land use and agriculture includes the Sustainable Communities Act 2007.

### National policy

12.2.3 The relevant national policies include:

- NPSWRI [4] section 4.10: Land use including open space, green infrastructure and Green Belt, paragraphs:
  - 4.10.1 – 4.10.8. These paragraphs introduce the land use implications of proposed water resources infrastructure, including agricultural land, soils, open spaces, and green and blue infrastructure.
  - 4.10.9 – 4.10.16. These paragraphs set out detailed requirements for the assessment of impacts on land use, including the requirement to undertake surveys to confirm the agricultural land grade in order to assess impacts on agricultural land.
  - 4.10.17 – 4.10.28. Thes paragraphs set out mitigations that can be put in place, and how impacts on land use should be taken into account in decision making by the SoS.
- The NPPF [5] section 11: Making effective use of land and Section 15: Conserving and enhancing the natural environment.

### Local policy

12.2.4 Local policies listed in Table 12-1 may be considered both important and relevant to the Proposed Development. In the event that there is any conflict between these and the NPSWRI, the NPS would prevail.

Table 12-1: List of relevant local policy

| Local authority | Relevant local policy |
|---|---|
| EHDC | East Hampshire District Local Plan: Joint Core Strategy (2014) [6]<br>• CP4 - Existing Employment Land<br>• CP6 - Rural Economy and Enterprise<br>• CP16 - Protection and Provision of Social Infrastructure<br>• CP17 - Protection of Open Space, Sport and Recreation and Built Facilities<br>• CP19 - Development in the Countryside<br>• CP20 - Landscape<br>• CP28 - Green Infrastructure<br>• CP32 - Infrastructure |
| EBC | Eastleigh Borough Local Plan 2016-2036 (2022) [9]<br>• S12 - Strategic footpath, cycleway and bridleway links<br>• DM32 - Protection of recreation and open space facilities<br>• DM34 - New and enhanced recreation and open space facilities<br>• DM36 - Community, leisure and cultural facilities |
| FBC | Fareham Local Plan 2037 (2023) [12]<br>• NE9 - Green Infrastructure<br>• NE10 - Protection and Provision of Open Space<br>• NE11 - Open Green Space<br>Local Plan Part 3: The Welborne Plan (2015) [14] |
| HCC | Hampshire Minerals and Waste Plan (2013) [15]<br>• Policy 1 - Sustainable minerals and waste development<br>• Policy 3 - Protection of habitats and species<br>• Policy 4 - Protection of the designated landscape<br>• Policy 5 - Protection of the countryside<br>• Policy 6 - South West Hampshire Green Belt<br>• Policy 7 - Conserving the historic environment and heritage assets<br>• Policy 8 - Protection of soils<br>• Policy 9 - Restoration of minerals and waste developments<br>• Policy 13 - High quality design of minerals and waste development<br>• Policy 15 - Safeguarding – mineral resources<br>• Policy 16 - Safeguarding – minerals infrastructure<br>• Policy 19 - Aggregate wharves and rail deposits<br>• Policy 20 - Local land-won aggregates<br>• Policy 23 - Chalk development<br>• Policy 26 - Safeguarding – waste infrastructure<br>• Policy 29 - Locations and sites for waste management |
| HBC | Havant Borough Core Strategy (2011) [17]<br>• CS1 - Health and Wellbeing<br>• CS2 - Employment<br>• CS11 - Protecting and Enhancing the Special Environment and Heritage of Havant Borough |

| Local authority | Relevant local policy |
|---|---|
| | • CS13 - Green Infrastructure<br>• CS18 - Strategic Site Delivery<br>• DM1 - Recreation and Open Space<br>• DM2 - Protection of Existing Community Facilities and Shops<br>• DM3 - Protection of Existing Employment and Tourism Sites<br>• DM9 - Development in the Coastal Zone<br>Havant Borough Council Local Plan (Allocations) (2014) [18]<br>• AL6 - Havant Thicket Reservoir Pipeline<br>• AL8 - Local Green Spaces<br>• HB1 - Havant and Bedhampton Housing Allocations<br>• HB2 - Havant and Bedhampton Employment Allocations |
| PCC | Portsmouth Plan (The Portsmouth Core Strategy) (2012) [19]<br>• PCS13 - A Greener Portsmouth |
| WCC | Winchester District Local Plan Part 1 Joint Core Strategy (2013) [56]<br>• CP7 - Open Space, Sport and Recreation<br>• CP8 - Economic Growth and Diversification<br>• CP9 - Retention of Employment Land and Premises<br>• CP14 - The Effective Use of Land<br>• CP15 - Green Infrastructure<br>• CP19 - South Downs National Park<br>• SH2 - Strategic Housing Allocation – West of Waterlooville<br>• SH4 - North Fareham SDA |
| SDNPA | South Downs Local Plan (2019) [58]<br>• SD1 - Sustainable Development<br>• SD2 - Ecosystem Services<br>• SD26 - Supply of Homes<br>• SD34 - Sustaining the Local Economy<br>• SD35 - Employment Land<br>• SD39 - Agriculture and Forestry<br>• SD40 - Farm and Forestry Diversification<br>• SD46 - Provision and Protection of Open Space, Sport and Recreational Facilities and Burial Grounds/Cemeteries<br>• SD47 - Local Green Spaces |

### Guidance and standards

12.2.5 Relevant guidance and standards that have been used as part of the scoping assessment and that will inform the assessment of land use and agriculture effects as part of the EIA include:

- Natural England (2021) Guide to assessing development proposals on agricultural land [214]
- DMRB LA 109 Geology and Soils (2019 rev 0) [215].
- DMRB LA 112 Population and Human Health (2020, rev 1) [216].

- Planning Inspectorate (2020) Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements, (Version 7) [1]

12.2.6 DMRB provides guidance for linear infrastructure projects and is therefore considered relevant in the context of the Proposed Development.

12.2.7 ALC surveys will be undertaken in accordance with the relevant Natural England guidance and standards [214].

## 12.3 Engagement

12.3.1 The following stakeholders have responsibility for aspects of Land use and agriculture and will continue to be engaged as part of the EIA process:

- East Hampshire District Council (EHDC)
- Eastleigh Borough Council (EBC)
- Fareham Borough Council (FBC)
- Hampshire Country Council (HCC)
- Havant Borough Council (HBC)
- Portsmouth City Council (PCC)
- South Downs National Park Authority (SDNPA) and
- Winchester City Council (WCC)

12.3.2 Technical engagement has commenced through EIA Working Groups that have been established for the Proposed Development, primarily the Community Working Group. An introductory meeting was held with this group on 7 June 2022. This was attended by representatives from EBC, HCC, PCC, WCC, and NHS Hampshire, Southampton and Isle of Wight Clinical Commissioning Group. An introduction to the proposed approach to the land use and agriculture and socio-economics, tourism, recreation and health assessments was presented.

12.3.3 The second Community EIA Working Group was held on 8 September 2022. This was attended by representatives from NHS Hampshire, Southampton and Isle of Wight Clinical Commissioning Group, EHDC, EBC, FBC, HCC, HBC, PCC, SDNPA, and WCC. Attendees included economic development, planning, public health and community officers from the local authorities. The approach to scoping for the land use and agriculture assessment and for the socio-economics, tourism, recreation and health assessments were presented, along with key feedback from the Public Consultation 2022.

12.3.4 The third Community EIA Working Group was held on 12 June 2023. This was attended by representatives from EBC, EHDC, FBC, HBC, HCC, PCC, and WCC. Attendees included regeneration, planning, community, countryside services, and demography officers. Updates to scheme development and to the scoping for the land use and agriculture assessment and for the socio-economics, tourism, recreation and health assessments were presented, along with an introduction to the Equality Impact Assessment and Skills and Employment Strategy that will be undertaken for the Proposed Development.

12.3.5 Ongoing engagement with the Community EIA Working Group will continue to inform the assessment of land use and agriculture effects. Additional engagement with local authority officers will take place as required. Issues for discussion with local authority stakeholders will include identification of relevant land use receptors, including those who could experience potential severance, access and disruption effects, as well as those directly impacted by the Proposed Development. It is anticipated that any other considerations or concerns regarding the assessment would be raised through the 2024 Public Consultation and liaison with landowners.

12.3.6 Following the close of Public Consultation 2022, held between 5 July and 16 August 2022, stakeholder feedback has been reviewed. Feedback is summarised in Table 12-2 which will be considered within the EIA as part of the land use and agriculture assessment.

**Table 12-2: Summary of stakeholder responses to Public Consultation 2022**

| Stakeholder | Consultation response | Scoping response |
|---|---|---|
| HCC | Received 16 August 2022<br>HCC noted the potential impact of the Proposed Development on Staunton Country Park and on the Public Right of Way (PRoW) network. HCC stated that it considered it likely that impacts on PRoW are capable of being mitigated, and that there may be opportunities to enhance the PRoW network. HCC also identified a number of strategic roads on which it would not support closures to undertake works, and the potential impact of the Proposed Development on the Welborne Garden Village development. | The potential impacts of the Proposed Development on PRoW and open space are addressed in Chapter 16 Socio-economics, tourism, recreation and health. Welborne Garden Village is included in the baseline at paragraph 12.5.8 and will be considered further in the ES. |
| HBC | Received 17 August 2022<br>HBC raised concerns around the loss of potential economic uses on the site of the proposed WRP (Brockhampton West) and stated that further information about the type and level of employment supported by the proposed WRP would be welcomed. HBC would also welcome any proposals to combine the proposed WRP alongside employment use. | The employment land at Brockhampton West is included in the baseline at paragraph 12.5.7 and permanent impacts on employment land have been scoped into the land use and agriculture assessment in paragraph 12.6.15. This will be considered further in the ES. |
| The British Horse Society | Received 16 August 2022<br>The British Horse Society raised concerns about the potential impact of the Proposed Development on local roads and PRoW used by equestrians, | The potential impacts of the Proposed Development on PRoW including walking, cycling and horse riding provision are addressed in Chapter 16 |

| Stakeholder | Consultation response | Scoping response |
|---|---|---|
| | including the impact of construction traffic and changes in traffic flows due to road closures and diversions. | Socio-economics, tourism, recreation and health. |
| SDNPA | Received 8 August 2022<br>The SDNPA noted that one option for the preferred pipeline corridor would fall within the National Park boundary, and that other sections of the preferred pipeline corridor are in close proximity to the SDNP boundary. Any direct impact on the SDNP would require clear justification for why the corridor could not avoid the National Park. Where the preferred pipeline corridor is in close proximity to the National Park, consideration should be given to the setting of the National Park and on potential impacts on access to the National Park during construction. | Potential impacts on tourism within SDNP are addressed in Chapter 16 Socio-economics, tourism, recreation and health. |
| WCC | Received 16 August 2022<br>WCC noted the proximity of the preferred pipeline corridor to the proposed Welborne development, including an area of open space known as Dashwood, and on a proposed development of 200 homes on land north of Ravenswood House in Knowle. | Potential impacts are addressed in Chapter 16 Socio-economics, tourism, recreation and health. Welborne Garden Village is included in the baseline at paragraph 12.5.8 and will be considered further in the ES. |

## 12.4 Approach to scoping

### Study area

12.4.1 The study areas established to inform this scoping chapter which will be used in the subsequent EIA and presented in the ES are set out below.

12.4.2 The study area has been defined based on:

- the extent and characteristics of the Proposed Development
- the residential property, community facilities and land, commercial property and land, development land and agricultural land likely to be directly and indirectly affected by the construction and operation of the Proposed Development.

12.4.3 No study areas for land use and agriculture are specified in DMRB Geology and Soils. The study areas that will be used for the assessment of land use and agriculture have been defined using professional judgement, based on the extents

and characteristics of the Proposed Development, likely impact pathways, the location of the local area and characteristics and sensitivities of communities and associated facilities and amenities. Typically, receptors located beyond the study areas are unlikely to experience significant effects as a result of the Proposed Development. However, if any land use receptors are identified beyond these areas that do have the potential to be significantly affected as a result of the Proposed Development, they will also be considered.

12.4.4 The study area for direct impacts on residential property, commercial property and land, development land and agricultural land consists of the Scoping Area of the Proposed Development, which is shown in Figure 1.2 in Volume III. The study area for community facilities and land and for indirect impacts on residential property, commercial property and land encompasses all open space and community facilities within 500m of the Scoping Area. The study area for each aspect of the assessment is summarised in Table 12-3.

**Table 12-3: Study areas for land use and agriculture**

| Aspect of land use and agriculture assessments | Study area |
|---|---|
| **Land use** | |
| Residential property | Scoping Area of the Proposed Development (direct impacts)<br>Within 500m of the Scoping Area (indirect impacts) |
| Community facilities and land | Within 500m of the Scoping Area |
| Commercial property and land | Scoping Area of the Proposed Development (direct impacts)<br>Within 500m of the Scoping Area (indirect impacts) |
| Development land | Scoping Area of the Proposed Development |
| Agricultural land | Scoping Area of the Proposed Development |
| **Agriculture** | |
| BMV land | Scoping Area of the Proposed Development |
| Soils | Scoping Area of the Proposed Development |

12.4.5 The assessment will consider indirect impacts and impacts on access to particular resources over a wider geography. It is expected, however, that any identified effects at this scale are likely to be in relation to access, such as temporary disruption during construction. The study area will also take account of other factors including construction phase infrastructure, such as construction compounds, stockpile areas and drilling shaft locations, the extent of which are not yet fixed.

12.4.6 The study area and relevant local authority district boundaries are shown in Figure 12.1 in Volume III. It is acknowledged that the Proposed Development is, in places, in close proximity to the boundary of the SDNP. There is one area, near Colden Common, where the Proposed Development may encroach on the SDNP, and there are other areas where the SDNP falls within a 500m buffer of the Proposed Development. Scoping has therefore considered the potential for impacts on the SDNP.

12.4.7 The location of the temporary construction hub (as described in Chapter 3 Description of the proposed development) is not known at this time of writing. This is expected to be an existing consented site, and may be situated outside of the Scoping Area. The effects of land use and agriculture on the hub will be assessed as part of the land use and agriculture assessment.

### Sources of baseline data

12.4.8 The data outlined in Table 12-4 has been used to inform the baseline.

Table 12-4: Source of baseline data

| Baseline data | Source of data |
|---|---|
| Residential property | OS Master Map [217]<br>Google Maps [218] |
| Community facilities and land (schools, places of worship, healthcare) | OS Important Buildings [219]<br>OS Green Space [220]<br>Google Maps [218] |
| Commercial property and land | OS Important Buildings [219]<br>Google Maps [218] |
| Development land | Relevant Local Authority Adopted Local Plans<br>Relevant Local Authority Planning Portals |
| Agricultural land | Defra Annual Statistics on the Structure of the Agricultural Industry [221]<br>https://www.gov.uk/government/statistical-data-sets/structure-of-the-agricultural-industry-in-england-and-the-uk-at-june<br>Defra ALC Grades Post 1988 Survey [222]<br>Land Information System Soilscapes Viewer Soilscapes soil types viewer [223] |

## 12.5 Baseline conditions

### Proposed-Development-wide conditions

12.5.1 Baseline data for the following resource types is presented at the Proposed-Development-wide level: residential property; community facilities and land; commercial property and land; development land; agricultural land; and soils. Where individual community facilities have been identified, additional baseline data is presented under separate headings for each section of the Proposed Development.

*Residential property*

12.5.2 The western part of the Proposed Development passes through rural areas with a sparse mix and density of residences, whereas the eastern section through Havant is much more urbanised. In the urban areas of Havant, the Proposed Underground Pipeline is to be constructed within a tunnel and therefore will not directly impact residential property or gardens. The more rural sections of the Proposed Underground Pipeline border settlements including Knowle, Wickham, Shedfield,

Bishop's Waltham, Colden Common, and Otterbourne. It is not expected that the Proposed Development will directly impact residential property (including gardens) in these areas.

*Community facilities and land*

12.5.3 Various community facilities and land are associated with the settlements along the preferred pipeline corridor. Community facilities lying within proximity to the Proposed Development for which information is currently available comprise education, religious buildings and grounds, health care facilities, and open space and recreation. The ES will additionally provide information about other community facilities such as libraries and community centres. Community land within the Proposed Development corridors includes recreational areas such as playgrounds, public parks and nature reserves.

12.5.4 Where individual community facilities have been identified as part of the scoping assessment, this information is provided for the relevant section of the Proposed Development, in paragraphs 12.5.18 – 12.5.27.

*Commercial property and land*

12.5.5 There is a range of commercial property and land located wholly or partially within a 500m buffer of the Scoping Area. These include:

- Industrial/manufacturing businesses, including around the proposed WRP and the Brockhampton industrial estate along Harts Farm Way in Havant.
- Rural business centres and clusters of businesses.
- Commercially run sports grounds/centres, including a number of golf courses.
- Hotels, restaurants and other tourism related businesses.

12.5.6 Further information about the types of businesses located close to the corridor and any effects will be provided in the ES. The ES will also include information about any utilities (for example, areas of land owned by utility companies that are used for electricity sub-stations, pumping stations or telecommunications) that may be affected by the Proposed Development.

*Development land*

12.5.7 While the Proposed Development has been designed to avoid major housing allocation sites for future development, it would result in the permanent loss of employment land for the siting of the proposed WRP at Harts Farm Way, Havant. The site is allocated for manufacturing and/or warehousing floorspace under site reference BD11 in Policy HB2 of the HBC Local Plan (Allocations) (2014) [18]. In June 2022, outline planning permission was granted for new development units to provide up to 29,000 square metres for flexible uses across classes E (light industrial), B2 and B8.

12.5.8 The Proposed Development will pass near to or through the site of a major committed development at Welborne, north of Fareham (see FBC Fareham Local Plan Part 3: The Welborne Plan [14]), shown in Figure 12.2 in Volume III. The site has outline planning permission for a new garden village of 6,000 homes as well

as: a district centre and smaller village centre with shops and community facilities; commercial, industrial, warehousing and employment space; a secondary school and three primary schools; parks, open spaces and sports pitches; works to the M27 Junction 10 and to the A32; and connections to the cycleway and pedestrian network. There is optionality in this area and the Proposed Development will seek to avoid the site.

12.5.9 The Proposed Development will pass near to three further sites allocated for future development in adopted or emerging local plans; one at Lower Road in Havant, one north and east of Bishopstoke and Fair Oak in Eastleigh (see Strategic Policy S5 of the Emerging Eastleigh Local Plan [10]), and one west of Waterlooville in Winchester District (see policy SH2 of the adopted Winchester Local Plan [56]). The site north of Bishopstoke and Fair Oak in Eastleigh is shown in Figure 12.3 in Volume III and is allocated as a strategic location for two new communities, providing a total of approximately 5,200 new homes, as well as employment land and community facilities. The site west of Waterlooville in Winchester is shown in Figure 12.4 in Volume III and has outline planning permission for approximately 3,000 new homes and supporting uses, including a local centre and employment land.

12.5.10 The number and location of housing sites is likely to change as new developments are brought forward. The ES will provide a list of third party proposals and consents that will be assessed.

*Agricultural land*

12.5.11 Figure 12.5 in Volume III shows the ALC for land along the preferred pipeline corridor, using desktop data published by Defra [222] which provides data for ALC grades 1-5, but no breakdown of grade 3 into grade 3a (considered BMV land) and 3b (not considered BMV land). In accordance with the NPSWRI [4], the assessment for the ES will be supported by additional survey information to confirm the ALC grade of land that is likely to be required permanently for the Proposed Development.

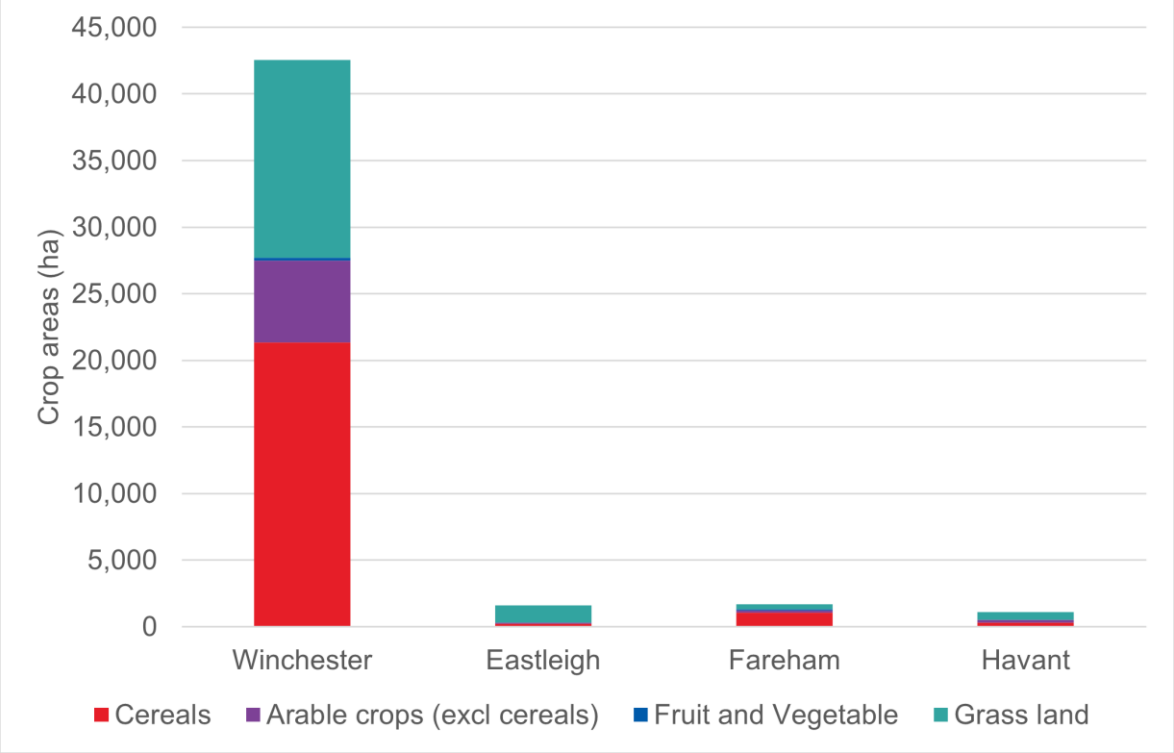
12.5.12 Most of the agricultural land likely to be affected by the Proposed Development is in the Havant Thicket Reservoir to Otterbourne WSW section of the Proposed Underground Pipeline and falls within Winchester or Fareham District. Much of the land is Grade 3 (moderate) or Grade 4 (poor) land, although there are smaller areas of higher quality land (Grades 1 and 2) along the preferred pipeline corridor and particularly around Waltham Chase and Shirrell Heath, and along the M27 motorway north of the town of Fareham. While much of the land around the proposed WRP, Budds Farm WTW and the Proposed Underground Pipeline to Havant Thicket Reservoir is urban and non-agricultural, the proposed site of the WRP at Harts Farm Way is classified as Grade 1 (excellent) land, although a historic landfill also underlies the entirety of the site. Data for the proportion of agricultural land that is Grades 3a and 3b is not available at this stage but will be provided for the EIA.

12.5.13 Of the local authority areas directly impacted by the Proposed Development, Winchester has by far the largest amount of land in agricultural use, at 49,971 hectares (ha). There are 445 holdings in the district, giving an average farm holding size of 112.3ha. Eastleigh (48), Fareham (34) and Havant (25) have much smaller

numbers of holdings, and much smaller average holding sizes. Portsmouth does not have any land in agricultural use.

12.5.14 Image 12-12-1 shows the breakdown of agricultural land use in each district. In Winchester, 42.7% of agricultural land is used for cereals, with 29.7% used for grass land and 12.3% for other crops. Fruit and vegetables account for 0.4% of agricultural land. The district has herds of approximately 15,800 cattle, 16,000 sheep, 12,000 pigs, and 575,000 poultry.

**Image 12-1: Agricultural land use by local authority district, 2021 [221]**




12.5.15 A more detailed breakdown of agricultural land use is available for South Hampshire (which includes Eastleigh, Fareham, Havant, and Portsmouth, as well as Southampton and Gosport) and Central Hampshire (which includes Winchester). This shows that the most widely planted crops across South and Central Hampshire are wheat, spring barley, winter barley, and rapeseed oil. Across this geography, just over half of agricultural land is arable and around 35% is used for grazing. The remaining land is woodland.

*Soils*

12.5.16 Online soils mapping provided on the Land Information System website [223] shows that there are a variety of soil types present in the study area, although the largest areas have soil described as “slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils”. This type of soil supports grassland, arable and some woodland, and is mostly suitable for grass production for dairy or beef, and some cereal production.

12.5.17 Around Portsdown Hill, soils are described as ‘shallow lime-rich soils over chalk or limestone’ [223], generally suitable only for grassland. Coastal areas around

Havant have soils described as loamy, with high groundwater. Elsewhere in the study area there are pockets of fertile loamy and clayey soils, and of heathland.

### Proposed Water Recycling Plant and High Lift Pumping Station

*Community facilities and land*

12.5.18 The proposed WRP is located on the site of Broadmarsh Open Spaces. Broadmarsh Coastal Park is to the south, on the southern side of Harts Farm Way. A PRoW (Havant 30/3) runs along the eastern boundary of the site of the proposed WRP and connects Broadmarsh Coastal Park with Bedhampton[10]. Southmoor Nature Reserve is also located within a 500m buffer of this section of the Scoping Area.

### Proposed Underground Pipelines between Budds Farm Wastewater Treatment Works and the proposed Water Recycling Plant

*Community facilities and land*

12.5.19 Open space within a 500m buffer of this section of the Scoping Area is discussed in paragraph 12.5.18. There are no other community facilities identified within this section.

### Proposed Underground Pipeline between the proposed Water Recycling Plant and Havant Thicket Reservoir

*Community facilities and land*

12.5.20 Schools and educational facilities within a 500m buffer of this section of the Proposed Development Scoping Area include:

- Front Lawn Primary Academy, Leigh Park
- Riders Infant and Junior School, Leigh Park
- Sharps Copse Primary School, Leigh Park
- Trosnant Infant and Junior School, Bedhampton
- Barncroft Primary School, Bedhampton
- Bidbury Junior School, Bedhampton
- St Thomas More's Roman Catholic (RC) Primary School, Bedhampton
- Havant College

12.5.21 Healthcare facilities within a 500m buffer of this section of the Scoping Area include:

- Blossom Health GP Surgery, Bedhampton
- Bedhampton Nursing Home

[10] This information is included here for context. PRoW are assessed as part of the Chapter 16 Socio-economics, tourism, recreation and health in this EIA Scoping Report.

12.5.22 Religious buildings and grounds within a 500m buffer of this section of the Scoping Area include:

- Bethel Evangelical Church, Leigh Park
- St Michael and All Angels Church, Leigh Park
- St Francis Church, Leigh Park
- Leigh Park Baptist Church
- Empower Centre, Havant
- St Clare's Church, Havant
- St Nicholas's Church, Bedhampton
- St Thomas's Church, Bedhampton
- Bedhampton Methodist Church

12.5.23 Open space and recreational facilities within a 500m buffer of this section of the Scoping Area include:

- Stanton Country Park, Leigh Park
- Great Copse, Leigh Park
- Bell's Copse, Leigh Park
- Front Lawn Community Hub sports complex, Leigh Park
- Kingsley Green, Leigh Park
- Bishopstoke Road play area, Leigh Park
- Stockheath Lane playing fields, Leigh Park
- Fred Francis Close play area, Leigh Park
- Leigh Park Gardens
- Havant Rugby Club, Bedhampton
- Stockheath Lane playing fields and multi-use games area (MUGA), Leigh Park
- Bedhampton Mariners Cricket Club
- Stockheath Lane allotments, Leigh Park
- James Road allotments, Bedhampton
- Allotments adjacent to Bidbury Infant School, Bedhampton
- Havant Leisure Centre

### Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

*Community facilities and land*

12.5.24 Schools and educational facilities within a 500m buffer of this section of the Scoping Area include:

- Morelands Primary School, Widley
- Solent Infant School, Farlington
- Solent Junior School, Farlington

- St John the Baptist Church of England (CofE) Primary School, Fareham
- Colden Common Primary School, Colden Common
- Purbrook Park School, Widley

12.5.25 Healthcare facilities within a 500m buffer of this section of the Scoping Area include:

- Albany Farm Care Home, Fareham
- Ravenswood House Hospital, Knowle

12.5.26 Religious buildings and grounds within a 500m buffer of this section of the Scoping Area include:

- Church of the Good Shepherd, Widley
- St Andrew's Church, Farlington
- Church of the Resurrection, Farlington
- Christ Church, Portsdown
- St Nicholas's Church, Boarhunt
- Shirrell Heath Methodist Church
- Colden Common Methodist Church

12.5.27 Open space and recreational facilities within a 500m buffer of this section of the Scoping Area include:

- Upper Moors Road play space, Colden Common
- Oakwood Park Recreational Ground, play area and Colden Common Football Club, Colden Common
- Upper Church Road playground and cricket pitch, Shedfield
- Knowle Avenue open space, Knowle
- Greater Horseshoe Way play space, Knowle
- St Vigor Way playground, Colden Common
- Torbay Farm play space, Lower Upham
- Privett Road play area, Widley
- Sandy Brow play area, Widley
- Knowle Village Green, football pitches, skate park and MUGA
- Waterworks Field MUGA and play area, Farlington
- Purbrook Heath, Purbrook
- Shedfield Common
- Priory Park sports facilities, Bishop's Waltham
- Colden Common Recreation Ground and play area
- Highbridge Community Farm allotments
- Albany Road allotments, football pitch and cricket club, Bishop's Waltham
- London Road allotments, Widley
- Wickham allotments

### Proposed Above Ground Plant

12.5.28 The proposed AGP has been considered in paragraphs 12.5.2 – 12.5.27 as they will be located within the Preferred Pipeline Corridor.

*Summary of baseline information for further consideration*

12.5.29 The following have been identified through the baseline as key potential impacts for assessment in the EIA:

- Permanent loss/sterilisation of allocated employment land at Harts Farm Way, Havant
- Permanent loss of open space at Broadmarsh Open Spaces
- Temporary loss of land/access to land due to impact of tunnelling shafts
- Potential indirect construction impacts on sensitive receptors, to be identified in the ES.
- Potential temporary loss/disruption of access to community facilities and commercial properties during construction
- Potential impact during construction on site of Wickham Festival
- Potential impact on housing allocation at Welborne

## 12.6 Scoping of potential effects

12.6.1 The Proposed Development has the potential to affect land use and agriculture, both during construction and operation.

12.6.2 Effects from decommissioning of the Proposed Development are considered to be no greater than those identified during the construction phase, and are therefore assessed as being the same as construction effects as a worst case scenario. Please refer to Chapter 3 Description of the proposed development, section 3.7 for further information on decommissioning.

12.6.3 This section sets out the potential land use and agricultural effects that are proposed to be scoped into and out of the EIA, during construction and operation of the Proposed Development.

### Effects scoped into the assessment

*Construction effects*

*Residential property*

12.6.4 During the construction phase, direct effects on residential property may include temporary impacts on access and impacts on boundary features, such as fences, walls, hedges or ditches. Any temporary impacts on access to residential properties or temporary impacts on boundary features will be managed through good practice, which will be defined in construction management plans.

12.6.5 There may be the potential for indirect in-combination effects on amenity for residential receptors during construction, where residential properties are located

close to construction activities or proposed AGP. These effects will be assessed in the EIA, drawing on the conclusions of other relevant environmental topics.

12.6.6 The significance of effects on residential property would be dependent on:

- the type of impact e.g., loss of access or amenity and/or loss of land
- proportion of loss of land
- duration of disruption to the receptor
- working methods and use of good practice mitigation as defined in construction management plans.

*Community facilities and land*

12.6.7 During the construction phase, effects on community facilities and land may include temporary or permanent loss of community land and/or impacts on access and boundary features such as fences, walls, hedges or ditches. The Proposed Development has sought to avoid settlements where possible, and any temporary loss of access to community facilities or land, or temporary loss of boundary features, will be managed through good practice, which will be defined in construction management plans. These effects on community facilities are therefore unlikely to be significant but, in accordance with Planning Inspectorate (2020) Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements, (Version 7) [1], are proposed to be scoped in for assessment as part of the EIA given the extent of facilities identified.

12.6.8 The Proposed Underground Pipeline will be below ground, operating and maintenance practices would be minimal and the siting of proposed AGP has sought to identify locations away from community facilities and land. However, there is the potential for a small permanent loss of land associated with proposed AGP and so it is proposed that these effects are scoped in for assessment as part of the EIA [1].

12.6.9 There may be the potential for indirect in-combination effects on amenity for community facilities during construction, where these facilities are located close to construction activities or proposed AGP and are particularly sensitive to changes in their operating environment. The land use and agriculture assessment as part of the EIA will consider these effects, drawing on the conclusions of other relevant environmental topics.

12.6.10 The significance of effects on community facilities and land would be dependent on:

- The nature and character of the community facility/land, including size and level of importance (local, regional or national)
- Proportion of temporary loss of land
- Duration of disruption to the receptor
- Working methods and use of good practice mitigation.

*Commercial property and land*

12.6.11 During the construction phase, effects on commercial property and land may include temporary or permanent loss of commercial land and/or impacts to access and boundary features. The Proposed Development has sought to avoid commercial land and property where possible, and any temporary loss of access to commercial facilities or land or loss of boundary features will be managed through good practice, which will be defined in construction management plans. These effects on commercial property and land are therefore not likely to be significant but have been scoped in for assessment as part of the EIA given the extent of properties identified [38].

12.6.12 The Proposed Underground Pipeline will be below ground and the siting of proposed AGP has sought to identify locations away from commercial land and property. However, as there is the potential for a small permanent loss of land associated with proposed AGP, it is proposed that these effects are scoped in for assessment as part of the EIA.

12.6.13 There may be the potential for indirect in-combination effects on amenity for commercial properties during construction, where these properties are located close to construction activity or proposed AGP and businesses are particularly sensitive to changes in their operating environment. The land use and agriculture assessment will consider these effects, drawing on the conclusions of other relevant environmental topics.

12.6.14 The significance of effects on commercial property and land would be dependent on the same considerations as listed for community facilities.

*Development land*

12.6.15 During the construction phase, effects on development land may include temporary and permanent loss of development land and/or access and boundary features. While the Proposed Development has sought to avoid major housing allocations where possible, affected land includes the proposed site of the WRP, allocated for manufacturing and/or warehousing floorspace under site reference BD11 in Policy HB2 of the HBC Local Plan (Allocations) (2014) [18]. There is also the potential for impacts on the housing allocation at Welborne, although there is optionality in this area and the Proposed Development will seek to avoid the site.

12.6.16 Any temporary loss of access to development land or temporary loss of boundary features will be managed through good practice, which will be defined in construction management plans. Effects on development land are scoped in for assessment as part of the EIA given the extent of development land identified [38].

12.6.17 There may also be the potential for permanent loss of development land due to proposed AGP or permanent wayleaves for pipelines. These effects on development land are considered unlikely to be significant but are scoped in for assessment as part of the EIA given the extent of development land identified [38].

12.6.18 The significance of effects on development land would be dependent on:

- the nature and type of development land, including size and level of importance and timing of construction of the development;

- proportion of loss of land;
- duration of disruption to the receptor; and
- working methods and use of good practice of mitigation in design as described in the design evolution and construction method.

*Agricultural land*

12.6.19 During the construction phase, effects on agricultural land could include:

- temporary or permanent loss of agricultural land
- temporary or permanent loss of access and boundary features
- disruption to livestock water supply
- disruption to field drainage systems
- disruption to land management agreements
- temporary or permanent severance of agricultural fields, limiting land use and access for machinery and livestock.

12.6.20 Construction good practice, which will be defined in construction management plans, would reduce the likelihood of significant effects caused by temporary loss of access, loss of boundary features or disruption to livestock water supply and field drainage systems. These effects are therefore considered unlikely to be significant but are scoped in for assessment as part of the EIA given the extent of agricultural land identified [38].

12.6.21 There may also be the potential for permanent loss of agricultural land due to proposed AGP or permanent rights for pipelines. This has been scoped in on a precautionary basis and further information will be provided in the ES.

12.6.22 The significance of effects on agricultural land would be dependent on:

- the farm size and type
- the proportion of land lost, including BMV land
- the type of land management agreement
- the duration of disruption to the receptor, and
- the construction methods and application of good practice mitigation.

*Operational effects*

*Residential property*

12.6.23 Noise, visual and air quality effects associated with permanent proposed AGP or maintenance activities could, in combination, result in temporary or permanent amenity effects for residential property during operation. It is proposed that indirect amenity effects for residential property during operation are scoped into the assessment.

*Community facilities and land*

12.6.24 Noise, visual and air quality effects associated with permanent proposed AGP or maintenance activities could, in combination, result in temporary or permanent

amenity effects for community facilities during operation, where these facilities are particularly sensitive to changes in their operating environment. It is proposed that indirect amenity effects for community facilities during operation are scoped into the assessment.

*Commercial property and land*

12.6.25 Noise, visual and air quality effects associated with permanent infrastructure or maintenance activities could, in combination, result in temporary or permanent amenity effects for commercial properties during operation, where affected businesses are particularly sensitive to changes in their operating environment. It is proposed that indirect amenity effects for commercial property during operation are scoped into the assessment.

*Development land*

12.6.26 There are no operational effects on development land that are proposed to be scoped in.

*Agricultural land*

12.6.27 There are no operational effects on agricultural land that are proposed to be scoped in.

**Effects scoped out of the assessment**

*Construction effects*

*Residential property*

12.6.28 The Proposed Development is not expected to require the demolition of any residential property, nor is it expected to require the temporary loss of gardens or car parking areas or removal of ancillary structures. Demolition of properties, ancillary structures and temporary loss of gardens or car parking areas are therefore proposed to be scoped out from assessment as part of the EIA [38].

12.6.29 Should demolition become necessary, assessment as part of the EIA would be needed to assess the potential significance of the loss of buildings, plus temporary loss of land use from residential property.

*Community facilities and land*

12.6.30 The Proposed Development is not expected to require the demolition of community facilities during construction and so is proposed to be scoped out of the assessment [38]. Should demolition become necessary, assessment as part of the EIA would be needed to assess the potential significance of the loss of buildings, plus temporary loss of land use from community use.

*Commercial property and land*

12.6.31 The Proposed Development is not expected to require the demolition of commercial property during construction and so is proposed to be scoped out of the assessment. However, should demolition become necessary, assessment as part of the EIA would be needed to assess the potential significance of the loss of buildings, plus temporary loss of land use from commercial use.

*Agricultural land*

12.6.32 The Proposed Development is not expected to require the demolition of agricultural property during construction so this will be scoped out of the assessment. However, should demolition become necessary, assessment as part of the EIA would be needed to assess the potential significance of the loss of buildings, plus temporary loss of land use from agricultural use.

*Soils*

12.6.33 During the construction phase, effects on soil could include:

- The temporary and permanent loss of BMV agricultural soils through land-take.
- Degradation of soil resources (including damage to soil structure, reduced biological function, mixing of soil types) resulting from soil compaction due to heavy construction vehicle movements, and the exacerbation of soil erosion through handling and storage of soils.
- Change to the function or quality of soil as a resource, including the deposition of dust on sensitive land uses, disruption to drainage, irrigation and water supply systems, unintentional pollution of soil and watercourses, and spread of injurious weeds to adjacent agricultural land from soil and material stockpiles. This could lead to the generation of waste soils that cannot be reused elsewhere on the Proposed Development, requiring off-site disposal as waste.

12.6.34 Ground investigation surveys have been used to understand site conditions and identify areas of concern where, for example, there may be a risk of contamination. This information has informed scheme development, which has sought to avoid areas of concern where practicable. Knowledge from landowners has also been taken into account, for example in relation to drainage and existing site conditions. Information from ground investigations will be shared with contractors as appropriate.

12.6.35 Construction of the Proposed Development will comply with the Civil Engineering Standard for the Water Industry [224], which sets out industry best practice in relation to the construction of pipelines and ancillary works, tunnelling, and shaft sink works. It is anticipated that established best practice will include preparation of the following documents:

- A Soil Management Plan, which will include the method of excavation, segregation and storage of different soil types to ensure the pipe trench is back filled and reinstated to the original condition with the original material;

- A Waste Management Plan, which will identify and detail contamination and how it is dealt with including segregation, safe treatment and removal from site to ensure no spread of the contaminants;
- An Environment Management Plan (EMP), which will detail the means to prevent pollution and minimise adverse environmental impacts; and
- A Reinstatement Plan including seeding and planting requirements.

12.6.36 When used together, these cover the full excavation and reinstatement of land required temporarily for the construction of the Proposed Development and would reduce the likelihood of significant effects on soils during construction. These effects are therefore scoped out of the EIA.

*Operational effects*

*Residential property*

12.6.37 Existing residential land use is unlikely to be affected directly during the operational phase of the Proposed Development. The Proposed Underground Pipeline will be below ground and operating practices will be limited to residential property in close proximity to proposed AGP (including the proposed WRP, IPS and BPT). Any disruption to boundary features during operation is likely to be minor and temporary and is therefore considered unlikely to result in significant effects. Therefore direct effects on residential property are scoped out.

*Community facilities and land*

12.6.38 Existing community facilities and land use are unlikely to be affected directly during the operational phase of the Proposed Development. The Proposed Underground Pipeline will be mainly below ground and operating practices will be limited to community facilities and land in close proximity to proposed AGP (including the proposed WRP, IPS and BPS). Any disruption to boundary features during operation is likely to be minor and temporary and is therefore considered unlikely to result in significant effects. Therefore direct effects on community facilities and land are scoped out.

*Commercial property and land*

12.6.39 Existing commercial property and land use are unlikely to be affected directly during the operational phase of the Proposed Development. The Proposed Underground Pipeline will be below ground and operating practices will be limited to commercial property and land in close proximity to proposed AGP (including the proposed WRP, IPS and BPS). Any disruption to boundary features during operation is likely to be minor and temporary, and is therefore considered unlikely to result in significant effects. Therefore direct effects on commercial property and land are scoped out.

*Development land*

12.6.40 Existing development land is unlikely to be affected directly during the operational phase of the Proposed Development. The Proposed Underground Pipeline will be

below ground and operating practices will be limited to development land in close proximity to proposed AGP (including the proposed WRP, IPS and BPT). Any disruption to boundary features during operation is likely to be minor and temporary and is therefore considered unlikely to result in significant effects. Permanent effects as a result of impacts on the proposed WRP will be reported as a permanent construction effect, and it is anticipated that a smaller area of land will be required during operation than during the construction phase. Therefore direct effects on development land are scoped out.

*Agricultural land*

12.6.41 Existing agricultural land is unlikely to be affected directly during the operational phase of the Proposed Development. The Proposed Underground Pipeline will be below ground and operating practices will be limited to agricultural land in close proximity to proposed AGP (including the proposed WRP, IPS and BPT). Any disruption to boundary features during operation is likely to be minor and temporary and is therefore considered unlikely to result in significant effects. Therefore direct effects on agricultural land are scoped out.

*Soils*

12.6.42 The likelihood of effects on soils at operational stage are considered to be negligible. These effects are therefore scoped out at operational stage.

## 12.7 Approach to assessment

12.7.1 This section sets out the proposed methodology for the assessment of land use and agriculture effects.

### Additional baseline data collection

12.7.2 Baseline data collected to inform this EIA Scoping Report will be updated as required, for example where data is drawn from surveys that are updated annually.

12.7.3 The baseline for the ES will also include data from agricultural land quality surveys which will be undertaken to identify the extent of the BMV agricultural land that will be impacted permanently by the Proposed Development.

12.7.4 Further information is required through consultation with the relevant local authorities on consented developments within the study area.

### Assessment methodology

12.7.5 The impact assessment methodology has been determined by consulting Planning Inspectorate (2020) Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements, (Version 7) [1] and the NPSWRI [4]. It is also based on guidance presented in the DMRB Geology and Soils [225] and DMRB Population and Human Health [226]. DMRB has been used as it provides guidance for linear projects.

12.7.6 As discussed above, it is anticipated that the construction of the Proposed Development will not require the demolition of any residential, community or commercial property. Should demolition become necessary, assessment as part of the EIA would be needed to assess the potential significance of the loss of buildings, plus any loss of land from residential property or from commercial, community or agricultural use.

12.7.7 The assessment will consider the effects of any temporary or permanent loss of land, access or boundary features on residential, community and commercial properties and land. Indirect effects on amenity will also be assessed for these receptors, taking into account the findings of other relevant environmental assessments, including air quality, noise, landscape and visual, and traffic and transport.

12.7.8 The effects on businesses in relation to employment implications and loss of resources or amenities arising from direct and indirect impacts on commercial property and land will be assessed, for example effects on businesses from impacts on local road networks or from changes in their operating environment.

12.7.9 The assessment of effects on community land (and community facilities) will be undertaken in accordance with the methodology set out in DMRB Population and Human Health [226] and considers both direct and indirect effects arising as a result of the Proposed Development. The assessment will identify community land and resources in the study area, as well as receptors relevant to the topic, and identify the activities relating to the Proposed Development that could have an effect on those resources and receptors. For the basis of this assessment, community resources include, but will not be limited to, doctor's surgeries, hospitals, medical facilities, schools, places of worship, leisure facilities (e.g. leisure centres) and formal recreation facilities (e.g. parks, sports and recreation grounds, children's play areas and outdoor sports facilities).

12.7.10 The assessment of effects on development land will be undertaken in accordance with the methodology set out in DMRB Population and Human Health [226] and consider the effects arising as a result of the Proposed Development. Development sites will be identified through the relevant adopted Local Plans. Land with planning permission or subject to a planning application will be identified for the ES through a search of local authority planning portals at an appropriate point in time, and through ongoing engagement with local authority planning officers through the Community EIA Working Group. The effects in terms of loss of land and wider economic potential (e.g. arising through change in access) will be assessed qualitatively. In relation to the site of the proposed WRP, which is allocated for employment and currently has planning permission for B2 and B8 uses, further engagement with the Applicant and with other key stakeholders including HBC will be undertaken. Engagement will also continue around potential impacts on the housing allocation at Welborne.

12.7.11 The assessment of effects on BMV agricultural land will follow the methodology set out in the NPSWRI [4]. An assessment of effects on individual farm businesses will also be undertaken, which considers effects of the Proposed Development on husbandry, severance and major accommodation works for access, livestock water supply and drainage for each farm business within the study area.

### *Sensitivity of receptors*

12.7.12 Chapter 5 General EIA approach and methodology presents the overall environmental assessment significance methodology for the Proposed Development. However, the definition of a significant effect depends on the environmental topic or receptor.

12.7.13 The sensitivity of receptors and resources is governed by their capacity to absorb the proposed changes arising from the Proposed Development. It ultimately reflects their vulnerability to the impacts of the proposed activities and their access to additional or alternative resources of a similar nature. If a resource is frequently used, if few alternatives exist, or if receptors have limited capacity to absorb the changes arising from the Proposed Development, then a receptor is considered to be sensitive to the changes. Criteria describing the sensitivity of receptors for land use are identified in Table 12-5Table 12-5.

12.7.14 In certain circumstances, receptors or resources may fall within several sensitivity categories. In this situation professional judgement will be used to assign an appropriate sensitivity category.

**Table 12-5: Value sensitivity criteria for land use and agriculture**

| Value Sensitivity | Criteria Guidance |
|---|---|
| Very High | Very high importance and rarity, international scale and very limited potential for substitution.<br>Receptors possessing very high economic, social or community value, that are expected to incur a material loss or gain as a result of potential changes in the environment. |
| High | High importance and rarity, national scale, and limited potential for substitution.<br>Receptors possessing high economic, social or community value, that are expected to incur a material loss or gain as a result of potential changes in the environment. |
| Medium | Medium importance and rarity, regional scale, limited potential for substitution.<br>Receptors possessing economic, social or community value, that are expected to incur a limited material loss or gain as a result of potential changes in the environment. |
| Low | Low importance and rarity, local scale.<br>Receptors possessing limited local economic, social or community value, that are not expected to incur a material loss or gain as a result of potential changes in the environment |

### *Magnitude of impact*

12.7.15 To assess the magnitude of an impact, each impact will consider the following indicators:

- Spatial scope: whether land use impacts would be likely to be experienced within the Scoping Area of the Proposed Development, within the identified 500m study area, or more widely.
- Extent: how many receptors are likely to be impacted.

- Duration: whether the land use impacts would be short or long-term.
- Reversibility: whether the land use impact is permanent or temporary.

12.7.16 Taking these indicators into consideration, and also primary mitigation measures that can be applied; the criteria described in Table 12-6Table 12-6 are used as guidelines to assess the magnitude of each impact.

**Table 12-6: Criteria for magnitude of impacts on land uses and agriculture**

| Magnitude | Description of impact |
|---|---|
| Major | Demolition of associated residential property, community facility or commercial property (including ancillary structures) or agricultural buildings (including outbuildings, barns or cattle sheds).<br>Temporary loss, greater than 50% of the total of any land use type (e.g. agricultural, commercial) within study area.<br>Temporary loss of any land use for 12 months or longer, or any permanent loss of land. |
| Moderate | Temporary loss above 25% and up to and including 50% of total, of any land use type (e.g. agricultural, commercial) within study area.<br>Temporary loss of any land use for between 6 months and 12 months. |
| Minor | Temporary loss between 5% and up to and including 25% of total of any land use type (e.g. agricultural, commercial) within study area.<br>Temporary loss of any land use for between a period of 1 month and 6 months |
| Negligible | No change or very slight change from baseline condition.<br>No change or change hardly discernible, approximating to 'no change' in conditions.<br>Temporary loss of any land use for less than 1 month |

*Significance of effect*

12.7.17 Significance is a product of the magnitude of an impact and the sensitivity of the receptor or resource that is experiencing the impact. This is illustrated in Table 12-7.

**Table 12-7: Significance of effect matrix**

| | | Magnitude of impact | | | |
|---|---|---|---|---|---|
| | | **Major** | **Moderate** | **Minor** | **Negligible** |
| **Sensitivity of resource** | **High** | **Major** | **Major** | **Moderate** | Minor |
| | **Medium** | **Major** | **Moderate** | Minor | Minor |
| | **Low** | **Moderate** | Minor | Minor | Neutral |
| | **Very Low** | Minor | Neutral | Neutral | Neutral |

12.7.18 An effect will be deemed to be ‘significant’ where the significance of the effect is 'moderate' or greater. Effects determined to be minor or neutral will be deemed ‘non-significant’.

12.7.19 Land use and agriculture aspects with a likely significant effect will be further reviewed. This will determine whether or not the community facility, commercial or agricultural business or soil resources would remain viable and/or functional as a result of the Proposed Development. The assessment of effects on possible future viability of land use aspects will be undertaken using the following criteria and professional judgement:

- **No significant effect**: the business, facility, agricultural holding or soil resource would be affected by the land-take requirements of the Proposed Development, which may result in a reduction or restructuring of its activities or functionality, but this does not compromise its likely future viability. A business, facility or agricultural holding would be able to continue trading but may require some restructuring of its operations.
- **Significant beneficial effect**: the business, facility, agricultural holding or soil resource and/or its operating environment would be enhanced.
- **Significant adverse effect**: the business, facility or agricultural holding may have to reduce its activities to a point where it becomes unviable, requires relocation, or chooses to cease trading due to the Proposed Development. The long-term productivity of a soil resource is compromised.

### Assessment scenarios

12.7.20 The assessment of land use and agricultural effects will look across the whole of the construction timeline for the Proposed Development. Assessment of temporary effects such as construction phase disruption to access or construction noise effects will provide the estimated duration of these effects and will take this into account when deciding the magnitude and significance of the effect.

12.7.21 The future baseline will also include committed developments that will be delivered prior to commencement of construction.

### Cumulative effects

12.7.22 Cumulative effects of the Proposed Development together with the effects of other developments/schemes may result in likely significant effects. This may be the result of effects on the environment during construction or operation of the Proposed Development.

12.7.23 Cumulative effects for all topics will be reported within the cumulative effects chapter of the ES. Please refer to Chapter 19 Cumulative effects assessment which presents the proposed methodology for the assessment of cumulative effects that will be undertaken for the EIA.

### In-combination effects

12.7.24 In-combination effects are those that result from the interaction between the individual effects of the Proposed Development (i.e. interaction of environmental

factors such as air quality, noise, health), combined together on a single receptor at a single point in time. The interrelationship between the individual effects may combine to result in a likely significant effect, even where the individual effects were not significant. Any in-combination effects in relation to the land use and agriculture topic will be assessed within the relevant chapter of the ES.

12.7.25 The nature of likely in-combination effects for land use and agriculture includes:

- In-combination effects on amenity as a result of noise, air quality, visual and traffic effects for residential properties.
- In-combination effects on amenity as a result of noise, air quality, visual and traffic effects for community facilities that may be sensitive to changes in their operating environment.
- In-combination effects on amenity as a result of noise, air quality, visual and traffic effects for commercial properties that may be sensitive to changes in their operating environment.

## 12.8 Limitations and assumptions

12.8.1 The following assumptions have been made in relation to the land use and agriculture assessment to date.

12.8.2 Landowner information has been based on Land Registry data and, in some cases, it is anticipated that boundaries could be out of date or incorrect. Landowner information is currently being updated based on information gathered from site visits, etc.

12.8.3 The assessment for the EIA will use the most up to date land information available. Full information on individual farm businesses such as the type of husbandry, severance and major accommodation works is not known at this stage and would be obtained as part of work to support the EIA. The assessment for the EIA will use the most up to date information available for individual farm businesses to ensure a robust assessment is completed.

12.8.4 Information on community facilities has been primarily drawn from desk-based research using OS data and checked against Google Maps [218]. This may not capture the most comprehensive or up to date information, and therefore, the list of baseline community facilities outlined should be viewed as an indication of provisions rather than a comprehensive assessment of provisions. A more detailed baseline will be provided as part of the EIA, drawing on information provided through consultation on this EIA Scoping Report.

12.8.5 The assessment for the EIA will use the most up to date information available for community facilities to ensure a robust assessment is completed. Data used to define the baseline social and community conditions has been compiled from existing published sources. Assessments are based on the most recent data available for the study area. The currency of data varies from dataset to dataset depending on how frequently information is collected. Dates for each dataset are noted in the baseline section where available. Given that the most reputable up to date datasets available have been used to inform the land use and agriculture chapter, there is confidence in the assessment scope.

12.8.6 It has been assumed that the planning permission in place on the site of the proposed WRP has not been implemented.

## 12.9 Approach to mitigation and residual effects

12.9.1 As noted in the NPSWRI [4], the following types of mitigation and good practice would be employed where required, categorised as either primary (inherent), secondary (foreseeable) or tertiary (inexorable) mitigation:

- Primary (Inherent Mitigation): As part of project design evolution the Proposed Development has been selected to avoid settlements, commercial land and property, major housing allocations and BMV land where possible. This reduces the risk of temporary and permanent disruption to land and property during construction.
- Secondary (Foreseeable) Mitigation: Secondary mitigations require further activity to achieve an outcome and are typically secured through requirements discharge. Consultation will be undertaken with landowners to discuss the potential for site specific mitigation where relevant. The assessment of amenity effects for community and commercial receptors will consider the residual noise or visual effects identified by the relevant topics after mitigation is accounted for. The need for any additional mitigation will be identified based on assessment outcomes and will be included in the assessment of residual land use effects. Examples of these could include fencing to mitigate noise effects or bunding to reduce landscape and visual effects to sensitive receptors.
- Tertiary (Inexorable) Mitigation: Typically these are actions that would occur with or without input from the EIA feeding into the design evolution, including actions undertaken to meet other legislative requirements, or actions that are standard practices to manage commonly occurring environmental effects. For example, considerate contractors' practices that manage activities which have potential nuisance effects. Construction management plans will set out the working standards and good practice mitigation to which the contractor for the Proposed Development will be required to work. This will require measures to control amenity impacts and incidents and reinstate all temporary construction sites to their previous use. Where replacement land is required, consideration should be given to how this can be delivered to maximise public benefit.

## 12.10 Summary

12.10.1 Table 12-8 summarises the land use and agriculture subtopics that are scoped in and out of the EIA.

**Table 12-8: Summary table**

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| **Residential property** | | | |
| Demolition of ancillary structures | Scoped out | Scoped out | It is not anticipated that the Proposed Development will require demolition of ancillary structures. |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| Temporary loss of gardens or car parking areas | Scoped out | Scoped out | It is not anticipated that the Proposed Development will require any loss of gardens or parking areas. |
| In-combination effects on amenity | Scoped in | Scoped in | Noise, visual and air quality effects could, in combination, result in amenity effects for residents during construction. There may be the potential for effects during operation where properties are located close to Proposed AGP. |
| Temporary loss of access and boundary features | Scoped in | Scoped out | Effects would arise during the construction period, therefore scoped out for operation. |
| **Community land and facilities** | | | |
| Demolition of associated facilities | Scoped out | Scoped out | It is not anticipated that the Proposed Development will require demolition of facilities. |
| Temporary or permanent loss of Community Land | Scoped in | Scoped out | Temporary effects would arise during the construction period. There may be the potential for some permanent loss of land, however this would be assessed as a permanent construction effect. |
| Temporary in-combination effects on amenity for sensitive community facilities | Scoped in | Scoped in | Noise, visual and air quality effects could, in combination, result in amenity effects for community facilities that may be sensitive to such effects. There may be the potential for effects during operation where facilities are located close to proposed AGP. |
| Temporary loss of access and boundary features | Scoped in | Scoped out | Effects would arise during the construction period, therefore scoped out for operation. |
| **Commercial property and land** | | | |
| Demolition of associated commercial property | Scoped out | Scoped out | It is not anticipated that the Proposed Development will require demolition of commercial property. |
| Temporary or permanent loss of Commercial Land | Scoped in | Scoped out | Temporary effects would arise during the construction period. There may be the potential for some permanent loss of land, however this would be assessed as a permanent construction effect. |
| Temporary in-combination effects | Scoped in | Scoped in | Noise, visual and air quality effects could, in combination, result in |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| on amenity for sensitive commercial properties and land | | | amenity effects for businesses that may be sensitive to such effects. There may be the potential for effects during operation where properties are located close to proposed AGP. |
| Temporary loss of access and boundary features | Scoped in | Scoped out | Effects would arise during the construction period, therefore scoped out for operation. |
| **Development land** | | | |
| Temporary or permanent loss of development land | Scoped in | Scoped out | Temporary effects would arise during construction. There may be the potential for some permanent loss of land, however this would be assessed as a permanent construction effect. |
| Temporary loss of access and boundary features | Scoped in | Scoped out | Effects would arise during the construction period. Any disruption during operation is likely to be minor and temporary and is therefore considered unlikely to result in significant effects. |
| Future sterilisation of land allocations or committed schemes | Scoped in | Scoped out | Loss of Allocated Employment Land (BD11 Brockhampton West, Harts Farm Way Havant). Location of the proposed WRP. Effects would arise during the construction period and would be assessed as a permanent construction effect. Potential impacts on the Welborne housing allocation will also be considered, noting optionality in this area, and reported as a permanent construction effect. |
| **Agricultural land** | | | |
| Demolition of agricultural buildings | Scoped out | Scoped out | It is not anticipated that the Proposed Development will require demolition of agricultural buildings. |
| Temporary or permanent loss of agricultural land | Scoped in | Scoped out | Temporary effects would arise during the construction period. There may be the potential for some permanent loss of land, however this would be assessed as a permanent construction effect. |
| Temporary loss of access and boundary features | Scoped in | Scoped out | Effects would arise during the construction period, therefore scoped out for operation.<br>Any disruption during operation is likely to be minor and temporary and |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| | | | is therefore considered unlikely to result in significant effects. |
| **Soils** | | | |
| Temporary disruption to soils | Scoped out | Scoped out | Best practice soil management measures including compliance with Civil Engineering Specification for the Water Industry will reduce potential for likely significant effects. |

# 13 Landscape and visual impact

## 13.1 Introduction

13.1.1 This chapter outlines out the scope and methodology for the assessment of the potential likely significant effects arising from the construction, operation and decommissioning of the Proposed Development on landscape and visual receptors.

13.1.2 There are clear differences between landscape effects and visual effects and the following distinctions have been made:

- Landscape effects relate to changes to the landscape as a resource, including physical changes to the fabric or individual elements of the landscape, its aesthetic or perceptual qualities, and landscape character.
- Visual effects relate to changes to existing views of identified visual receptors ('people'), from the loss or addition of landscape features within their view due to the Proposed Development.

## 13.2 Legislation, policy, and guidance

13.2.1 The relevant legislation, policies and guidance which underpin the methodology and inform the scope of the Landscape and Visual Impact Assessment (LVIA) are summarised in this section. It is recognised that this list is non-exhaustive and will be kept under review to take account of any later legislation or policy changes.

### Legislation

*European Landscape Convention*

- European Landscape Convention. The United Kingdom Instrument of Ratification was deposited on 21 November 2006 and the Convention entered into force for the United Kingdom on 1 March 2007 (Treaty Series No. 36 (2012)).

*UK legislation*

13.2.2 Nationally important landscapes in the UK are given statutory status through.

- Section 11A(2) of the National Parks and Access to the Countryside Act 1949
- Section 17A of the Norfolk and Suffolk Broads Act 1988 and
- Section 85 of the Countryside and Rights of Way Act 2000. Parts of the South Downs National Park and Chichester Harbour AONB fall within the LVIA study area.

### International policy

- The South Downs National Park became an International Dark Sky Reserve in 2016. This designation was awarded by the International Dark Sky Association,

officially recognising areas to be naturally dark at night and free of light pollution, and therefore some of the best places in the world to view the beauty of the night sky [227].

### National policy

- NPSWRI [4]

13.2.3 Landscape contributes to delivery of several government objectives and policies outlined in the NPSWRI. Section 3.4 of NPSWRI sets out the requirements regarding Environmental Net Gain, which is "*an approach to development that aims to leave the natural environment in a measurably better state than beforehand*". These opportunities will be considered at the landscape scale in preparing appropriate design guidelines and management measures for landscape and ecology.

13.2.4 "Criteria for good design" for water resources infrastructure are described in section 3.6 of NPSWRI and cross-referenced in paragraph 4.9.8. Paragraph 3.6.1 explains that "*good design is a key aspect of sustainable development, creates better places and helps make infrastructure projects acceptable to communities*".

13.2.5 Section 4.9 of NPSWRI specifically addresses policy relating to landscape and visual impacts. Paragraph 4.9.1 recognises that landscape and visual impacts will vary on a case-by-case basis and that landscape and visual effects also include tranquillity effects, which could affect people's enjoyment of the national environment and recreational facilities. The LVIA will consider impacts on tranquillity through the assessment of landscape effects, including waterscape, seascape and townscape where appropriate.

13.2.6 Paragraphs 4.9.2 to 4.9.6 set out the expectations regarding the scope of the LVIA and how these are to be reported in the ES. These points are addressed in the methodology for the LVIA set out in section 13.7.

13.2.7 A small part of the Scoping Area at the western end extends into the South Downs National Park. Parts of the Proposed Development are also within the setting of the South Downs National Park and the Chichester Harbour AONB, meaning that NPS policies relating to both National Parks and AONB would have effect.

13.2.8 Paragraph 4.9.11 of the NPSWRI notes that "*great weight should be given to conservation and enhancement of landscape and scenic beauty in nationally designated landscapes. National Parks, the Broads and Areas of Outstanding Natural Beauty have the highest status of protection in relation to landscape and scenic beauty*". Paragraph 4.9.14 goes on to say *'the duty to have regard to the purposes of nationally designated areas also applies when considering applications for projects outside the boundaries (in their "setting") of these areas which may have impacts within them. The development should aim to avoid compromising the purposes of designation, and such projects should be designed sensitively given the various siting, operational, and other relevant constraints*."

13.2.9 In paragraphs 4.9.15 and 4.9.16, NPSWRI notes that local landscape impacts should not be a reason for refusing the proposed development, however the development should avoid adverse effects on landscape or minimise harm by reasonable mitigation. Paragraph 4.9.17 of the NPS requires the SoS to "*judge*

*whether the visual effects on sensitive receptors, such as local residents, and other receptors, such as visitors to the local area, outweigh the benefits of the development*".

- NPPF [5]

13.2.10 Paragraph 5 provides context on the extent to which the NPPF applies to infrastructure projects. It states that *"the Framework does not contain specific policies for NSIP. These are determined in accordance with the decision making framework in the PA 2008 (as amended) and relevant national policy statements for major infrastructure, as well as any other matters that are relevant (which may include the NPPF). National policy statements form part of the overall framework of national planning policy and may be a material consideration in preparing plans and making decisions on planning applications."*

13.2.11 The importance of landscape in establishing strategic policies in development plans is recognised in paragraph 20, which states that these should *"set out an overall strategy for the pattern, scale and design quality of places, and make sufficient provision for… (d) conservation and enhancement of the natural, built and historic environment, including landscapes and green infrastructure, and planning measures to address climate change mitigation and adaptation."*

13.2.12 Paragraph 130 goes on to state that *"planning policies and decisions should ensure that developments… (c) are sympathetic to local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging appropriate innovation or change (such as increased densities)"*.

13.2.13 Paragraph 145 relates to green belt and states that *"once Green Belts have been defined, local planning authorities should plan positively to enhance their beneficial use, such as looking for opportunities to provide access; to provide opportunities for outdoor sport and recreation; to retain and enhance landscapes, visual amenity and biodiversity; or to improve damaged and derelict land."*

13.2.14 Paragraph 174 requires that planning policies and decisions should contribute to and enhance the natural and local environment by, inter alia, (a) *"protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan)"*. Paragraph 175 further states that plans should *"distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries"*. The LVIA will include an assessment of the likely effects on the landscape at different scales, drawing distinctions between areas of valued landscape and other areas.

13.2.15 Paragraph 176 states that *"great weight should be given to conserving and enhancing landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty which have the highest status of protection in relation to these issues. The conservation and enhancement of wildlife and cultural heritage are also important considerations in these areas and should be given*

*great weight in National Parks and the Broads. The scale and extent of development within all these designated areas should be limited, while development within their setting should be sensitively located and designed to avoid or minimise adverse impacts on the designated areas."* The LVIA will assess the likely effects on the SDNP and the Chichester Harbour AONB and their designation.

13.2.16 Paragraph 177 states that *"when considering applications for development within National Parks, the Broads and Areas of Outstanding Natural Beauty, permission should be refused for major development other than in exceptional circumstances, and where it can be demonstrated that the development is in the public interest."* The NPS for Water Resources Infrastructure contains more detail on how development within nationally designated landscapes should be considered. The Scoping Area crosses a small part of the SDNP to the west of Colden Common and is adjacent to it at Durley Street, Wickham and Havant Thicket Forest. The Chichester Harbour AONB lies within approximately 750m at its closest point.

- Planning Practice Guidance [50]

### Local policy

13.2.17 Local plan policies and strategies of relevance to landscape and visual amenity have been reviewed in Table 13-9 below and will inform the design of the Proposed Development. In the event that there is any conflict between these and the NPSWRI, the NPS would prevail. A detailed summary of relevant policies will be set out in an appendix to the Landscape and Visual chapter of the ES.

**Table 13-9: List of relevant local policy**

| Local Authority | Relevant Local Policy |
|---|---|
| EHDC | East Hampshire District Local Plan: Joint Core Strategy (2014) [6]<br>• CP17 - Protection of open space, sport and recreation and built facilities.<br>• CP19 – Development in the countryside<br>• CP20 – Landscape<br>• CP21 – Biodiversity<br>• CP28 – Green Infrastructure<br>• CP29 – Design<br>• CP30 - Historic Environment<br>Housing and Employment Allocations (2016) [228] |
| EBC | Eastleigh Borough Local Plan 2016-2036 (2022) [9]<br>• G2 - Managing the countryside.<br>• G3 - Protecting and enhancing biodiversity.<br>• G4 - Maintaining and improving green infrastructure.<br>• G6 - Creating quality places and improving the quality of the Borough's built environment.<br>• G7 - Conserving and enhancing the historic environment.<br>• G8 - Addressing climate change and natural resources. |

| Local Authority | Relevant Local Policy |
|---|---|
| | • G16 - Maintaining and improving the footpath/cycleway/bridleway network |
| FBC | Fareham Local Plan 2037 (2023) [12]<br>• Strategic Policy DS1 - Development in the Countryside<br>• DS3 – Landscape<br>• Strategic Policy NE1 - Protection of Nature Conservation, Biodiversity, and the Local Ecological Network<br>• NE2 – Biodiversity Net Gain<br>• NE6 – Trees, Woodland, and Hedgerows<br>• NE9 – Green Infrastructure<br>• NE10 – Protection & Provision of Open Space<br>• D1 – High Quality Design and Place Making<br>• Strategic Policy HE1 - Historic Environment and Heritage Assets |
| HCC | Serving Hampshire Strategic Plan 2021 to 2025 (2021) [229]<br>Hampshire Strategic Infrastructure Statement (2019) [16]<br>No landscape specific policies |
| HBC | Havant Borough Core Strategy (2011) [17]<br>• CS11 - Protecting and Enhancing the Special Environment and Heritage of Havant Borough<br>• CS12 - Chichester Harbour AONB<br>• CS13 - Green Infrastructure<br>• CS16 - High Quality Design<br>Havant Borough Local Plan (Allocations) (2014) [18]<br>• DM1 - Recreation and Open Space<br>• DM8 - Conservation, Protection and Enhancement of Existing Natural Features<br>• DM9 - Development in the Coastal Zone |
| PCC | Portsmouth Plan (The Portsmouth Core Strategy) (2012) [19]<br>• PSC13 - A Greener Portsmouth<br>• PSC23 - Design and Conservation |
| WCC | Winchester District Local Plan Part 1 Joint Core Strategy (2013) [56]<br>• Policy MTRA4 - Development in the Countryside<br>• Policy CP7 – Open Space, Sport and Recreation<br>• Policy CP13 – High Quality Design<br>• Policy CP14 – The Effective Use of Land<br>• Policy CP15 – Green Infrastructure<br>• Policy CP16 – Biodiversity<br>• Policy CP19 – South Downs National Park<br>• Policy CP20 – Heritage and Landscape Character<br>Winchester District Local Plan Part 2 Development Management and Site Allocations (2017) [25] |
| SDNPA | South Downs Local Plan (2019) [19] |

| Local Authority | Relevant Local Policy |
|---|---|
| | • SD1 - Sustainable Development<br>• SD2 - Ecosystem Services<br>• SD3 - Major Development<br>• SD4 - Landscape Character<br>• SD5 - Design<br>• SD6 - Safeguarding Views<br>• SD7 - Relative Tranquillity<br>• SD8 - Dark Night Skies<br>• SD9 - Biodiversity and Geodiversity<br>• SD11 - Trees, Woodland and Hedgerows<br>• SD12 - Historic Environment<br>Dark Skies Technical Advice Note (2021) [230]<br>Lightscape Management Plan (2016) [231] |

### Guidance and standards

13.2.18 Relevant guidance and standards which have been used as part of the EIA scoping assessment include:

- Landscape Institute and IEMA, *'Guidelines for Landscape and Visual Impact Assessment' Third edition (GLVIA3),* 2013 and subsequent statements of clarification. [232]
- Landscape Institute, *Technical Guidance Note 04/20: Infrastructure*, 2020. [233]
- Landscape Institute, *Technical Guidance Note 06/19: Visual Representation of Development Proposals*, 2019 [234]
- Landscape Institute, T*echnical Information Note 05/17: Townscape Character Assessment*, 2017. [235]
- Natural England (2014) An Approach to Landscape Character Assessment, [236]
- Natural England (2012) An approach to Seascape Character Assessment [237]
- Planning Inspectorate (No date) Advice Note Six: Preparation and submission of application documents, (Version 11) [238]

## 13.3 Engagement

13.3.1 The Applicant has undertaken extensive engagement with stakeholders through the Local Planning Authorities Joint Officers Group (JOG), EIA Working Groups and through bilateral meetings with local planning authorities. This has included matters of relevance to landscape and visual amenity. Feedback received through this engagement has informed the scoping process and scheme development. The following stakeholders have responsibility for aspects of landscape and visual amenity and will continue to be engaged as part of the EIA process:

- Chichester Harbour Conservancy

- East Hampshire District Council (EHDC)
- Eastleigh Borough Council (EBC)
- Fareham Borough Council (FBC)
- Hampshire County Council (HCC)
- Havant Borough Council (HBC)
- Historic England (HE)
- Natural England (NE)
- Portsmouth City Council (PCC)
- South Downs National Park Authority (SDNPA) and
- Winchester City Council (WCC).

13.3.2 Technical engagement will take place through EIA Working Groups that have been established for the Proposed Development, primarily the Historic Environment and Landscape Working Group. An introductory meeting was held with this group on 13 June 2022. This was attended by representatives from EBC, FBC, HCC, PCC, EHDC, WCC and NE. An introduction to the proposed approach, key risks and receptor types for this chapter, including in relation to the SDNP were presented. Stakeholders were informed that no night time photography is planned as part of the EIA, and no concerns were raised on this point.

13.3.3 A further meeting was held on 9 August 2022 as part of the JOG. This included attendance of landscape officers from the SDNPA, HBC, PCC, EBC, FBC, WCC with apologies from HCC and EHDC. No response was received from the Chichester Harbour Conservancy. The landscape officers were engaged to discuss and agree provisional viewpoint locations, the landscape character baseline, the approach to the LVIA and the survey strategy. Officers fed back that an assessment based on the HCC integrated character assessment areas would be too high-level and that effects may appear inconsequential to the landscape at that scale. It was agreed to continue the discussion at the next working group on 13 September with the aid of a ZTV and all relevant published landscape character assessments shown on one plan.

13.3.4 The second EIA Working Group was held on 13 September 2022. This included attendance of landscape officers from FBC, HCCl, EBC, WCC, the SDNPA, PCC, HBC, EHDC, NE and HE. The ZTV and all relevant published landscape character assessments were presented to the working group. FBC requested that a viewpoint on Kiln Road is added and WCC clarified that their landscape character assessment did not cover the SDNP and to use the SDNP Character Assessment within the National Park boundary.

13.3.5 Stakeholder feedback following the close of the non-statutory Public Consultation held between 5 July and 16 August 2022 has been reviewed and considered as part of the Scoping Report and ongoing design of the Proposed Development. The feedback received and the Applicant's response relevant to the LVIA is summarised in Table 13-10.

Table 13-10: Public Consultation 2022 responses

| Stakeholder | Consultation response | Scoping Response |
|---|---|---|
| HCC | Received 16 August 2022<br>HCC identified potential mitigation measures for the Proposed Development. This included replacement planting for any loss of mature or veteran trees, including those on the roadside, noting such planting is unlikely to be capable of being provided in close proximity to the existing tree(s). In areas of landscape value or areas of woodland that cannot be avoided, HCC would expect the pipeline to be underground bored to reduce impacts in these areas. HCC confirmed that they are in general support of horizontal directional drilling, however, opportunities should be explored to utilise existing bridge structures as an alternative where adverse impacts are identified. Feedback also stated that the proposed AGP and the proposed WRP should be included in the LVIA with consideration of impacts to open coastal land from the sizing and scale of the proposed WRP. | The mitigation measures proposed by HCC will be considered in refining the design of the Proposed Development. See section 13.10 Approach to mitigation and residual effects.<br><br>Proposed AGP and WRP will be considered in the LVIA, including impacts on the landscape of the open coastal land and people's views. |
| HE | Received 22 July 2022<br>Feedback provided from HE on the LVIA included comments on the inclusion for assessment of views which make significant contributions to an asset's heritage significance and assessment of impacts of the Proposed Development upon those views. HE have requested for photomontages illustrating effects of the development on those views to be submitted with the ES. | Refer to chapter 7 Archaeology and cultural heritage. |
| NE | Received 12 August 2022<br>NE provided feedback that ongoing consultation will be needed to ensure any potential impacts to designated sites and protected landscapes are considered. | Ongoing consultation with statutory bodies has been scheduled as part of the scoping process through the Landscape and Heritage EIA Working Group. |
| SDNPA | Received 8 August 2022<br>SDNPA was pleased to note that the majority of pipeline has avoided direct incursion into the SDNP. This follows early engagement with SDNPA officers, during which the importance of the SDNP, which is afforded the highest level of protection in the NPSWRI was highlighted, with particular reference to paragraphs 4.9.9 and 4.9.10. The latter making | The SDNP is a key consideration in the scheme development. Further engagement was undertaken with the SDNPA in late June |

| Stakeholder | Consultation response | Scoping Response |
|---|---|---|
| | clear that development consent should be refused in these areas except in exceptional circumstances.<br>SDNPA expressed a preference for the Z4 southern route rather than the Z3 route to avoid the SDNP. SDNPA would expect to see clear justification for why the corridor could not avoid the SDNP.<br>There are other sections of the corridor which are near the SDNP boundary. In these locations, SDNPA will be considering not only whether there would be any impact on the setting of the National Park in terms of landscape and visual impact, but also if there would be any impacts during the construction period in terms of access into the National Park from the south. SDNPA welcome the opportunity to remain involved and provide comments as the pre-application discussions evolve.<br>Request: plans for pipeline routes should include local authority boundaries and the National Park boundary. | 2023 to discuss specific issues regarding the National Park and its setting. The SDNP boundary is included within LVIA Scoping Figures 13.1, 13.2, 13.3 and 13.4 in Volume III. |
| WCC | Received 16 August 2022<br>The principle of the Proposed Development is supported and WCC will continue to assess the technical aspects of the Proposed Development to ensure it can be completed without adverse harm to the environment, local residents and special interests of the District.<br>There are a high number of ancient woodlands in the area to the south of North Boarhunt and the pipeline could potentially sit close to woodlands at Stroud Coppice, Ashleydown Coppice and Moor Coppice and the final positioning of the pipeline should sit as far as possible from these areas.<br>A proposed open space for the new Welbourne Garden Village known as Dashwood, which Winchester seeks to ensure the delivery of and is not impacted by pipeline development.<br>Notes the Proposed Underground Pipeline crosses into Park Place, a Hampshire Inventory of Historic Park and Garden, removal of hedgerows and features to create a visible 'scar' on the landscape above the pipeline must be avoided.<br>The Council notes that the Proposed Underground Pipeline is close to Long Copse Ancient Woodland and Shirrel Copse Ancient Woodland. It also notes that the Proposed Underground Pipeline is close to New Place, a Hampshire Inventory of Historic Park and Garden, Grade I listed. Any long term visual changes must be avoided in this area.<br>WCC assumes tunnelling across the River Hamble to prevent a long term visual impact and that it is highly likely to dissect the Pilgrims Trail, an important walking route in the area. | Ancient woodland: LLCA have been defined by the Applicant and were presented to local authorities in June 2023. The presence of ancient woodland will inform the character and value of LLCAs and will be considered in the LVIA.<br>Welborne Garden Village: The EIA Scoping Area currently evaluates several routes.<br>Park Place: The EIA Scoping Area runs to the northwest (not across) Park Place. Existing vegetation will inform the character and value of the relevant LLCA, and the effects will be assessed in the LVIA. The potential temporary loss of vegetation has been scoped |

| Stakeholder | Consultation response | Scoping Response |
|---|---|---|
| | The Proposed Underground Pipeline enters the Wintershill Hall area (Historic Inventory for Historic Gardens) and notes an above ground permanent feature is proposed here (BPT4), this must be designed and landscape sensitively to protect the features of this garden or relocated outside of the area.<br>The Proposed Underground Pipeline appears to straddle the boundary between Winchester and Eastleigh in this location and both authorities will collaborate on this section during future consultations.<br>The Brambridge Lodge Tree Preservation Order Area must be avoided.<br>Brambridge Park which is a Historic Garden containing a Grade II* listed property, is a highly sensitive section of the route with multiple constraints.<br>The Council noted that the route is tunnelled below the River Itchen to avoid long term visual impact to this attractive area.<br>The Proposed Underground Pipeline is in close proximity to Otterbourne Manor, and it is vital the long term visual appearance of the pipeline (considering AGP and scarring of the landscape through hedgerow removal) is avoided.<br>There is potential for an evident line or scar to be created across the landscape through removal of hedgerows, landscaping, and any future planting restrictions to protect the Proposed Underground Pipeline. It is therefore important that restrictions for planting and development above and in proximity to the pipeline are understood to ensure this is avoided.<br>Any landscaping, hedgerow planting and habitat creation should be looked at on a wider scale to support connecting habitats and areas of interest.<br>The Council made the following requests: a plan showing only sections of the Proposed Underground Pipeline within the Winchester district are submitted with greater detail to allow a thorough assessment by the Council's landscape specialists. Confirmation was also sought on the amount of land required for the Proposed Underground Pipeline post-construction to allow for maintenance access. If any form of permanent maintenance tracks are required this must be demonstrated and assessed for its impact on the landscape character of the area. | into the assessment (refer to section 13.6). For the approach to mitigation, refer to section 13.10.<br>New Place and Brambridge Park: Listed buildings and registered parks, and gardens will inform the character and value of the relevant LLCA.<br>Pilgrims Trail: People using the Pilgrims Trail have been idenfied as visual receptors.<br>Design of proposed AGP (in response to comments about Wintershill Hall and Otterbourne Manor, but also relevant to all designated buildings and structures): The application documents will set out the design objectives, functions, and principles of the proposed environmental mitigation and enhancement measures (refer to section 13.10).<br>The potential loss of vegetation and changes to existing field patterns has been scoped into the assessment (refer to section 13.6). For the approach to mitigation, refer to section 13.10. |

| Stakeholder | Consultation response | Scoping Response |
|---|---|---|
| Woodland Trust | Received 10 August 2022<br>The WT has significant concerns regarding the Proposed Development on the grounds of potential detrimental impact and/or loss of numerous ancient woodlands, and a Woodland Trust site which are located either within or adjacent to the Preferred Pipeline Corridor.<br>The Proposed Underground Pipeline has the potential to cause significant adverse impacts to ancient woodland from potential direct loss to facilitate construction of the pipeline, or through indirect impact if construction works occur within close proximity to these habitats.<br>In addition to the above, the WT would recommend that any non-ancient woodlands affected by the Proposed Development are reviewed to ensure any areas of potentially unmapped ancient woodland are accounted for as the Proposed Development progresses. Surveys detailing woodland flora and fauna, alongside an assessment of historical mapping, should be undertaken to ensure impacts to all irreplaceable habitats are considered and mitigated for as part of the design process.<br>It is essential that no ancient or veteran trees are lost as part of the proposals.<br>Annex 1 provides a table of ancient woodland which are adjacent to the Preferred Pipeline Corridor.<br>Annex 2 provides Natural England and Forestry Commission standing advice on direct and indirect effects to ancient woodland, ancient trees and veteran trees, mitigation measures and the use of buffer zones. | In regard to ancient woodlands: Both published landscape character assessments and LLCAs defined by the Applicant have been identified as landscape receptors. The presence of ancient woodland will inform the character and value of landscape receptors and will be considered in the LVIA.<br>For woodland habitats, refer to chapters 8 and 9 Terrestrial and Marine Ecology. |

13.3.6 The third meeting of the Historic Environment and Landscape Working Group was held on 7 June 2023. This meeting was attended by of landscape officers of EBC, FBC, HCC, HDC, PCC and WCC. This meeting comprised an update on the desk study and fieldwork carried out in early 2023 to inform the LVIA study area and the selection of proposed landscape and visual receptors. These receptors were set out in schedules and on figures and provided by e-mail for landscape officers to review and comment.

## 13.4 Approach to scoping

### Study area

13.4.1 The first stage of defining the LVIA study area was informed by detailed desk study, including the preparation of computer-generated ZTV. A ZTV is defined in GLVIA3 as "*a map, usually digitally produced, showing areas of land within which, a development is theoretically visible.*" The ZTV is *"bare-earth",* based on a three-dimensional Digital Terrain Model (DTM), which does not include surface features, and the maximum parameters of the proposed AGP of the Proposed Development. The results are illustrated in Figure 13.4 Zone of Theoretical Visibility (Operational Phase) and Representative Viewpoint Location in Volume III, which shows areas from which the Proposed Development is theoretically visible or not visible. Extensive fieldwork was then carried out between February and April 2023 to test the assumptions made through the desk study. This identified further existing features including landform, built development and vegetation which limit potential landscape and visual interactions with the Proposed Development.

13.4.2 There is insufficient detail at this stage regarding the parameters of construction to prepare a construction phase ZTV. Reasonable worst case assumptions have been applied in considering the likely extent of views, assuming construction activity across the whole of the scoping area. A construction phase ZTV will be presented in the ES.

13.4.3 The location of the temporary construction hub (as described in Chapter 3 Description of the proposed development) is not known at this time of writing. This is expected to be an existing consented site and may be situated outside of the Scoping Area. The landscape and visual effects of the hub will be assessed as part of the LVIA.

13.4.4 The LVIA study area has been identified as a 3km buffer for landscape and up to 5km for views measured from the edge of the Scoping Area, as shown in Figure 13.1 to Figure 13.4 in Volume III.

13.4.5 The LVIA study area may be further refined to focus the assessment or extended areas to include other sensitive receptors as the design of the Proposed Development progresses. Such changes will be made in consultation with Local Authorities and other relevant stakeholders.

### Sources of baseline data

13.4.6 The following data has been used to inform the baseline for the LVIA study area:

Table 13-11: Source of baseline data

| Baseline data | Source of data |
|---|---|
| LiDAR Digital Terrain Map – 1m resolution | EA |
| South Downs National Park Special Qualities, taken from their Management Plan | SDNPA |
| South Downs Landscape character assessment 2020 [239] | SDNPA |
| South Downs International Dark Skies mapping | SDNPA |
| South Downs Dark Night Sky Adoption mapping | SDNPA |
| Public Right of Way (PRoW), including National Trails and long-distance footpaths | NE, Ordnance Survey Data and Local Planning Authorities Definitive Maps |
| National Cycle Network and cycle routes | OS Data / Sustrans / Strava |
| National Character Areas | NE |
| Hampshire Landscape Character Assessment 2012 [240] | HBC |
| Landscape Character Assessment for Eastleigh Borough 2011 [241] | EBC |
| Fareham Landscape Character Assessment 2017 [242] | FBC |
| Landscape Character Assessment SPD, 2022 [243] | WCC |
| East Hampshire Landscape Character Assessment 2005-2006 [244] | EHDC |
| Havant Borough Townscape, Landscape and Seascape Character Assessment 2007 [245] | HBC |
| Tree Preservation Orders | EHDC, EBC, FBC, HBC, WCC |
| Registered Parks and Gardens | HE |
| Ordnance survey 1:25k mapping | Ordnance Survey |
| Ancient woodland [246] | NE |
| Historic OS mapping | National Library of Scotland |
| Google Earth Map Data and Street View | Google |

13.4.7 Landscape designations and other relevant environmental designations which inform the value attached the landscape and views have been reviewed and are shown in Figure 13.1 Designations in Volume III.

13.4.8 Published landscape character assessments have been overlaid and analysed in GIS. Those at the national and county scale and within the SDNP are shown in Figure 13.2 Published Landscape Character Areas in Volume III.

## 13.5 Baseline conditions

### Proposed Development wide conditions

13.5.1 This section sets out information relating to relevant designations and provides a summary of the landscape character and visual context of the LVIA study area.

### Internationally designated sites

13.5.2 The Moore's Reserve, which takes in the entire SDNP boundary, has International Dark Sky Reserve status, an official recognition of spaces naturally dark at night and free of light pollution. The designation is largely defined by a critical core, identified as E0- dark sky core [227], which is outside the LVIA study area. Surrounding the main core, are the buffer areas E1b Transition Zones and E1a Intrinsic Rural Darkness zones, which do lie within the LVIA study area.

### Designated landscapes

13.5.3 The Scoping Area lies partly within and in close proximity to the SDNP from Otterbourne to Bishops Waltham; the affected character areas are described in Table 13-12 Published Landscape character areas. The Scoping Area also lies in proximity to Chichester Harbour AONB at Broadmarsh Coastal Park.

13.5.4 Locally designated landscapes comprise the Forest of Bere Area of Special Landscape Quality, and the Portsdown Hill Area of Special Landscape Quality defined within the Fareham Local Plan 2037. Figure 13.1 Designations in Volume III shows the location and extent of designated landscapes and other designations which assist with understanding the value attached to the landscape.

### Landscape Character

13.5.5 The landscape character within the LVIA study area has been studied in detail from the national to the local scale. Figure 13.2 Published Landscape Character Assessments in Volume III shows the extent of LCAs defined by NE, HCC, the SDNPA and local planning authorities derived from published landscape character assessments.

13.5.6 Each of the published landscape character assessments cover different parts of the LVIA study area at different levels of detail. Some of these assessments are old and others more recent and the veracity of these assessments has been considered below. As shown in Figure 13.2 Published Landscape Character Assessments in Volume III, the county-level landscape character areas cover the entirety of the Scoping Area and the majority of the LVIA study area.

13.5.7 LCAs defined in published landscape character assessments which coincide with the Scoping Area are set out in Table 13-12**.** LCAs which extend beyond the Scoping Area and across the LVIA study area are shown in Figure 13.2 in Volume III and will be described within the ES.

Table 13-12: Published Landscape Character Areas which coincide with the Scoping Area

| Scale | Name | Location | Summary description |
|---|---|---|---|
| National | National Character Area 128 South Hampshire Lowlands | The Scoping Area traverses Otterbourne to Havant across the length of National Character Area 128 South Hampshire Lowlands and is entirely within the character area. See Figure 13.3 sheets 1-5 in Volume III. | A low-lying undulating plain abutting the chalk downs to the north and the coastal plain to the south, chalk rivers in wide, open valleys with water meadows and riparian vegetation, well wooded farmed landscape characterised by ancient woodland, an intimate and enclosed field pattern with small and irregular fields bounded by mixed species hedgerow or woodland and fragmented by major transport links including the M3 and M27. |
| National South Downs National Park 2020 | LCA G5 Itchen Valley Sides | The Scoping Area traverses LCA G5 Itchen Valley Sides for 500m between Brambridge and Otterbourne | Mixture of pasture and arable land with fields of irregular shape with mature tree belts along field boundaries. Twyford Conservation Area and transport corridors are located within the Study Area. The B335 and B334 roads cross through this area in a north-south direction. |
| National South Downs National Park 2020 | LCA F5 Itchen Floodplain | The Scoping Area traverses LCA F5 Itchen Floodplain for 500m between Brambridge and Otterbourne | The area contains the River Itchen, incorporating a diversity of habitats. There are several features relating to water management and agricultural/industrial use of the river, including fragments of water meadows, weirs and mill ponds, fish farms, trout lakes, and watercress beds. There is a general absence of settlement, but the area sits between Otterbourne and Colden Common. |
| County – HCC, 2012 | LCA 9g Havant and Emsworth Coastal Plain (within) | The Scoping Area crosses 2.5km of LCA 9g from the northern edge of urban Havant to the coastline of the harbour at Broadmarsh Coastal Park. | Small scale enclosure landscape with larger open fields in northern half of character area. Remnant mature oaks in suburban settings along verges and stream courses. Varying tranquillity levels, lower in proximity to modern development and busy transport links. Enclosed feel from numerous wooded stream courses, thick hedgerows and settlement fringe vegetation. |
| County | LCA 10a Langstone and Chichester Harbours (within) | The Scoping Area crosses 100m of LCA 10a across the confluence of the Hermitage Stream at Brockhampton. The | Shallow marine basin enclosed by low lying natural and man-made sea defence shoreline of low walls and embankments. Nationally renowned recreational sailing area with locally important oyster and clam fishing. Strong sense of remoteness from surrounding highly populated areas. |

| Scale | Name | Location | Summary description |
|---|---|---|---|
| | | Scoping Area is adjacent to LCA 10a for 7km from Brockhampton Industrial Estate to Portsdown Hill. | |
| County | LCA 10b Portsmouth Harbour | The Scoping Area crosses 2.250km of LCA 10b, to the south of B2177 road, sharing a boundary with LCA 8i. | Coastal region encompassing the city of Portsmouth and is therefore urban in character. There are historical and cultural associations with the Royal Navy and coastal fortifications and Spinnaker Tower dominates the skyline. |
| County | LCA 2f Forest of Bere East (within) | The Scoping Area crosses 1.850 km of LCA 2f within the norther part of Havant and within Staunton Park; and 750m within Widley, sharing a boundary with LCA 8i. | Low lying landscape with shallow undulations predominantly south sloping. Dominant in pasture, commercial forestry and woodland. High proportion of woodland creating a secluded landscape. High proportion of semi natural habitats including ancient woodland, wet woodland, remnant heath, unimproved neutral meadows, and acid grassland. Part of the former Royal Forest of Bere. Hedgerow oaks and hedgebanks are common features. Routes vary from straight roads with wide verges to narrow winding lanes with hedges. |
| County | LCA 8i Portsdown Hill Open Downs (within) | The Scoping Area crosses 13.5km of LCA 8i from the western urban edge of Havant to Knowle, sharing a boundary with LCA 2f. | Outlying chalk escarpment in a predominantly low-lying coastal landscape. Large mostly arable fields with straight boundaries set between drove lanes, and more irregular fields around the Wallington stream and fringe areas. Generally low or no hedges, occasional banks to field boundaries associated with drove routes. Small copses, otherwise, a distinct lack of trees. Long panoramic views over Forest of Bere to the north and Portsmouth, the harbours, Isle of Wight and the Solent to the south which lends a strong sense of space, prominence and intervisibility. Forts form a series of historic landmarks on the hill top. Significant areas of open access on steeper south facing slopes. Little settlement other than military features and occasional farms. High perceptual tranquillity due to commanding views and presence of semi natural habitats. |
| County | LCA 3e Meon Valley (within) | The Scoping Area crosses 1km of LCA 3e between Knowle and Wickham. | Narrow major river with narrow valley floor. Southern valley slides indented by dry valleys and scarp faces in the downland section. Woodland common on steeper slopes, nationally valued woodland and |

| Scale | Name | Location | Summary description |
|---|---|---|---|
| | | | chalk grassland sites. The canal and associated features between the Solent and Titchfield are thought to be second oldest waterway in the country. Major communication links follow above the valley floor, A32, B3334 and Meon Valley railway recreational route. Strong pattern of nucleated settlements. |
| County | LCA 2e Forest of Bere West (within) | The Scoping Area crosses 12.5km of LCA 2e from Wickham to Colden Common. | Low lying landscape with shallow undulations predominantly south sloping. Extensive 20th C development. Hedgerows often low but with individual spreading mature oaks, lines of oak with no hedge, and occasional field specimens of oak. Permanent pasture, plantations and secluded heavily wooded small holdings. Views often short and with a wooded backdrop. |
| County | LCA 3c Itchen Valley (within) | The Scoping Area crosses 3km of LCA 3c from Colden Common to Otterbourne. | Classic chalk stream with largely undeveloped floodplain and valuable chalk stream habitat. Important remnant water meadows. Valley floor is mainly neutral grassland, considered the largest assemblage of species rich neutral grassland in England. Small villages and scattered farms, extremely rich built heritage and setting to Winchester. Frequent minor crossing points marked by white parapets to bridges. |
| Local – Eastleigh Borough, 2011 | LCA 7 Bishopstoke – Fair Oak Woodland & Farmland (within) | The Scoping Area crosses 5km of LCA 7 from Bishopstoke road to Mortimers Lane. | Undulating ridge with frequent woodland blocks and small copses forming a wooded character. Rectilinear pattern of small fields with good hedgerow trees. Prominent roadside development. Views across rural landscape from the northern edge and to the south from woodland clearings. |
| Local | LCA 7a Stroudwood Levels (within) | The Scoping Area crosses 600m of Sub area 7a from Stroudwood Lane to Mortimers Lane. | Undulating ridge with frequent woodland blocks and small copses forming a wooded character. Rectilinear pattern of small fields with good hedgerow trees. Strong hedgerow pattern. |
| Local – Fareham Borough, 2017 | LCA 9 North Fareham Downs (within) | The Scoping Area crosses 2.7km of LCA 9 from Knowle village to the Wallington River. | Gentle rolling landform sloping down to flat floodplain of Wallington River. Intensively farmed arable with large field pattern and open and denuded character. Weak hedgerow structure and only occasional copses and trees. Small scale pasture along floor of Wallington River valley with riverside trees and more intimate enclosed character. Visual containment |

| Scale | Name | Location | Summary description |
|---|---|---|---|
| | | | to the north by strong woodland structure of the Forest of Bere character area. |
| Local | LCA 11 Portsdown (within) | The Scoping Area crosses 1.7km of LCA 11 from Wallington River to Boarhunt Road. | Large to medium scale mosaic of pasture and arable fields with open expansive character and few hedgerows or trees. Distinctive rolling chalk downland above Wallington River valley and dramatic ridge and steep south-facing scarp of Portsdown Hill. Prominence of unsightly elements such as masts, fences and roadside clutter. Intrusion of M27 which cuts through scarp and divides upper and lower slopes. |
| Local | LCA 10 Forest of Bere (adjacent at Crockerhill) | LCA 10 runs parallel and adjacent to 2.5km of the Scoping Area from the A32 at Crockwehill to Bere Farm. | Distinctive and attractive enclosed character consisting of large blocks of mixed woodland connected by mature hedgerows, including remnants of ancient woodland. Continuous edge to woodland forms backdrop to the open arable farmland of North Fareham Downs LCA. Strong sense of enclosure. |
| Local – Winchester, 2022 | LCA 13 Lower Itchen valley (within) | The Scoping Area crosses 1km of LCA 13 Lower Itchen Valley between Otterbourne and Colden Common. | Overlaps with South Downs LCAs FG and G5.<br>WCC confirmed that the South Downs LCA should be used instead. |
| Local | LCA 18 Forest of Bere Lowlands (within) | The Scoping Area crosses 10.5km along the southern boundary of LCA 18 from Knowle to Purbrook. | Undulating landscape at the food of the Chalk Downs which drop steeply down to the coastal plain at Portsdown Hill to the south. Largely arable farmland and high proportion of assarted woodland. High proportion of semi natural habitats. Scattered settlements with the largest located I the north and small hamlets to the south. Southwich Park historic park situated in the area. Straight roads with wide verges and long winding narrow hedged routes. Remote, enclosed feel due to presence of woodland and narrow hedged roads. |
| Local | LCA 19 Portsdown Hill (within) | The Scoping Area crosses 6.5km parallel along the north boundaries of LCA 19 from Boarhunt Road to Purbrook, sharing a boundary with LCA18. | Chalk dipslope, rising from north to south. Large arable fields with straight boundaries and larger irregular fields bounded by lanes. Chalk grassland developed on steep slopes of man-made structures as at Fort Southwick, species rich hedgerows and small areas of woodland, long panoramic views to the north over Forest of Bere and south over Portsmouth. Sunken |

| Scale | Name | Location | Summary description |
|---|---|---|---|
| | | | lanes linking hilltop to lowlands. Grade I listed forts and their man-made treeless northern slopes, Nelson Monument. |
| Local | LCA 20 Lower Meon Valley (within) | The Scoping Area crosses 1.5km of LCA 20 Lower Meon Valley from Tichfield Lane to Knowle. | Linear, narrow river valley with gently sloping sides. Riparian character with flat low-lying floodplain with riverside pastures and marshy grassland. Well treed area with sense of intimacy, enclosure and scenic quality. Willow-lined watercourses with remnants of ancient woodland. Locally registered deer parkland at Park Place west of Wickham. Sparse settlement pattern, traditional building materials in the area. |
| Local | LCA 21 Whiteley Woodlands (within) | The Scoping Area crosses the eastern corner of LCA 21 Whiteley Woodlands at Wickham Park Golf Club over approximately 2km. | Gently undulating lowlands with minor streams. Irregular small to medium sized meadows closely integrated with strong assarted woodland structure. Prominence of woodland, high proportion of ancient woodland. Boundaries of strong hedgerows often on banks. Occasional long views including towards South Downs from Tichfield Lane, but generally enclosed by woodland. Generally well-wooded settlement edges. Sparse settlement. |
| Local | LCA 22 Shedfield Heathlands (within) | The Scoping Area crosses 3.5km of LCA 22 from Winchester Road to north of Waltham Chase. | Low lying, flat to gently undulating landform with distinct ridge at Curdridge. Relatively high proportion of the area is settled with villages. Scattered species rich neutral grassland and mixture of small-scale horticulture and paddocks. Generally little woodland with assarted semi natural ancient woodland. Straight boundaries, hedges, and roads. Generally short views due to undulating topography, frequent buildings, trees, and overgrown hedgerows. Blackhorse Lane and Sandy Lane ancient in character with narrow winding lanes and irregular fields. |
| Local | LCA 23 Durley Claylands (within) | The Scoping Area crosses 6.5km of LCA 23 from Waltham Chase to Fair Oak. | Low-lying gently undulating landscape. Numerous ponds, streams, wells and associated wetland habitats and mills. Varied landscape of arable and pasture, copses and scattered settlement, small irregular fields. Hedgerow and woodland network dominated by oak, ash, hawthorn, hazel, and field maple. Numerous ancient winding lanes. Historic parkland. Numerous scattered farms and dwellings centred around Durley. |

| Scale | Name | Location | Summary description |
|---|---|---|---|
| Local – East Hampshire, 2005-2006 | LCA 10a Havant Thicket and Southleigh Forest (adjacent) | The Scoping Area is situated in the southern half of Staunton Country Park and the north half is the LCA 10a. | Transitional area of low-lying vale and edge of chalk downland dislope. Varied landcover dominated by woodland, and including pasture, paddocks, common land, pocket heathland. Remnant woodland. Small geometric fields. Severed by motorway. Small pockets of tranquillity. |
| Local – Havant, 2007 | LCA 12 Portsdown Hill (within) | The Scoping Area crosses LCA12 east-west from Portsea View to Hilltop Crescent. | Elevated chalk ridge with a steep south side and undulating north side containing two streams draining in a west-east direction. Arable fields loosely aligned with the ridge, some hedgerows and small woodland copses regenerating in disused chalk pits. Strong bands of tree and shrub along the urban edge of Purbrook. |
| Local | LCA 41 South Moor and Broadmarsh Coastal Park (within) | The Scoping Area crosses LCA 41 at Broadmarsh Coastal Park. | Flat coastal plain with artificial bunding associated with the A3(M) and A27 (T) junction. Artificial harbour shoreline to Broadmarsh Coastal Park and artificial bunding along Budds Farm WTW. Intermittent thick hedgerows, areas of amenity grassland surrounded in tree belts. Medium size regular fields fragmented by roads and urban areas. Tranquillity of Langstone harbour degraded by highway and Brockhampton industrial estate. |
| Local – Portsmouth, 2011 | LCA 7 Cosham | The Scoping Area crosses LCA 7 700m at Fort Widley. | Extends from Ports Creek in the south to the crest of Portsdown Hill in the north, including historic areas of the city including Widley. Largely residential with large areas of open space along the crest of Portsdown Hill with spectacular panoramic views across the city extending across the Solent to the Isle of Wight, Gosport, Hayling Island and as far west as the chimneys of Fawley on the edge of the New Forest. |
| Portsmouth | LCA 9 Drayton and Farlington | The Scoping Area crosses LCA 9 for 2.2km at Fort Purbrook in tunnel. | A gateway for people approaching the city from the east on the A27. Heavily settled, mainly residential with large areas of open space to the south, and local wildlife sites to the north of the B2177. |
| Portsmouth | LCA 19 Paulsgrove | The Scoping Area crosses LCA 19 for 3.2km from Fort Southwick to Fort Widley. | Principal land uses are residential and informal public open space associated with Portsdown Hill. |
| Local – Havant | TCA 2b Bedhampton and | The Scoping Area crosses TCA 2b through | A mix of Victorian inter-war and post war housing set on informal grids of streets, historic character of Brockhampton Conservation Area and listed |

| Scale | Name | Location | Summary description |
|---|---|---|---|
| Townscape Assessment, 2010 | Brockhampton suburbs | Bedhampton recreation ground. | buildings. Predominantly flat topography and consistent building line of two storey houses. |
| Local | TCA 2c Bedhampton historic core | The Scoping Area lies immediately adjacent to TCA 2c's eastern boundary at Bedhampton recreation ground. | Semi-rural village character survives despite 20th C infill and redevelopment. Historic character of Old Bedhampton Conservation Area and listed buildings. Land steadily rising to the west and slightly undulating. Large irregular plots and inconsistent building line throughout. Entirely residential with the exception of the church. Good tree cover mostly in private gardens and good quality public realm. Quiet roads lined with open streams or brick/flint boundary walls or mature hedges. Few street lights. |
| Local | TCA 7d Leigh Park west | The Scoping Area crosses TCA 7d through the school recreation ground. | Pre to post war residential development. Undulating landform and falls from the west. Long sweeping roads of terraced and semi-detached housing in small to medium sized irregular plots. High degree of small to medium public open green space with mature trees between houses and to edges. Tree lined Hermitage Stream. |
| Local | TCA 7e Leigh Park | The Scoping Area crosses TCA 7e following the Hermitage Stream. | Part of the extensive Leigh Park Estate. Gently undulating landform and falls to west and south Long sweeping roads of terraced and semi-detached housing in small to medium regular plots. High degree of small to medium public open green space. Some hedges to front gardens. Mature oak trees in wide roadside grass verges. Some very wide grass verges and green spaces to roadside with on street parking. |
| Local | TCA 7g Stockheath Lane environs | The Scoping Area crosses TCA 7g's western corner at Hermitage Stream. | Distinct grouping of three storey blocks of flats with good open green areas between blocks. Limited tree cover. Flat topography. Large areas of open space often tree lined, good quality public realm with wide roads. Good sense of openness. |

13.5.8

13.5.9

### Local Landscape Character Areas

13.5.10 A total of 44 Local Landscape Character Areas (LLCA) have also been defined by the Applicant. These LLCA are intended to provide an additional level of detail to the published studies set out above and a consistent scale against which to assess the effects of the Proposed Development.

13.5.11 Maps and schedules of the LLCA were issued to local planning authorities for comment in June 2023 and will be confirmed prior to preparation of the PEI Report.

### Visual baseline

13.5.12 The extent of visibility of the Proposed Development is informed by the preliminary ZTV of proposed AGP illustrated in Figure 13.4 in Volume III. This shows that the theoretical visibility of the Proposed Development extends across a wide area. This includes parts of the protected landscapes of the SDNP, where the land is more elevated, and the Chichester Harbour AONB. However, beyond these isolated points the visibility and perception of the Proposed Development would generally be confined to a distance of 3km given the pattern of intervening landform, landcover and settlement.

13.5.13 The preliminary ZTV, together with information and observations gained through the desk-based review and fieldwork have identified the following groups of visual receptors within the LVIA study area:

- Residents within properties on the edges of settlements including Havant, Portsmouth, Fareham, Fair Oak, Bishopstoke, Colden Common and Eastleigh;
- Residents within isolated properties scattered throughout the open countryside and residents of hotels and holiday parks;
- Users of public rights of way (PRoW) that cross the landscape, including promoted routes such as the Wayfarer's Walk and the Pilgrim's Trail;
- People visiting cultural and tourist attractions;
- Users of public open space, including common land, country parks and the coastline; and
- People in workplaces or educational establishments.

13.5.14 A total of 107 viewpoints representative of visual receptors in the LVIA study area have been defined by the Applicant to represent these views. These viewpoints have been identified through desk study and initial winter fieldwork carried out between February and April 2023. They have been selected on the basis that they cover a range of viewing distances, elevations and orientations from locations afforded different viewing experience. This includes the viewpoints presented at the Local Planning Authorities Joint Officers Group meeting on 9 August 2022 and additional viewpoints identified by the Applicant.

13.5.15 Maps and schedules of the proposed representative viewpoints and associated visual receptor groups were issued to local planning authorities for comment in June 2023 and will be confirmed prior to preparation of the PEI Report.

## Local baseline conditions

13.5.16 The LVIA study area has been split into the following parts, running west to east to assist with summarising the baseline conditions and likely impacts and effects.

- Proposed WRP and HLPS.
- Proposed Underground Pipeline between Budds Farm WTW and the Proposed WRP.
- Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir.
- Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW.
- Proposed AGP.

13.5.17 The proposed AGP is considered in the baseline sub-sections as they would be located within the Preferred Pipeline Corridor.

## Proposed Water Recycling Plant and High Lift Pumping Station

### *Location*

13.5.18 The site of the proposed WRP and HLPS site is located to the north of Harts Farm Way and south of the A27 junction with the A3(M). The site is identified as a 'playing field' on the Ordnance Survey map but is rough grassland and scrub enclosed by fences and tall-tree lined boundaries and is not open to the public. It is situated to the north of Broadmarsh Coastal Park. The Park is largely enclosed by dense trees on its northern edge and faces south onto Langstone Harbour. There are extensive footpaths and visitor parking provision within the park.

### *Landscape*

13.5.19 This section is located within LCA 9g Havant and Emsworth Coastal Plain defined within the Hampshire Integrated Character Assessment, 2015 and described in Table 13-12.

### *Visual*

13.5.20 Visual receptors in the vicinity of the proposed WRP include users of Broadmarsh Coastal Park, people using the local PRoW, the Solent Way long distance footpath, and the Hayling Billy Coastal Path in Hayling Island with an identified local view point along the path; cyclists on National Cycle Network route 22, motorists on the A27 and Harts Farm Way, recreational users of boats within Langstone Harbour, and workers within the Brockhampton Industrial Estate.

### Proposed Underground Pipeline between Budds Farm Wastewater Treatment Works and the proposed Water Recycling Plant

*Location*

13.5.21 A section of the Proposed Underground Pipeline runs along the coast from Broadmarsh Coastal Park across the Hermitage stream to Budds Farm WTW. This section of the Proposed Underground Pipeline would comprise a tunnel and buried pipe, shown in Figure 13.1 Designations in Volume III. Tunnel shafts are likely to be located along the route of the tunnel. These tunnel shafts would be used during the construction period and would be capped after construction and reinstated.

*Landscape*

13.5.22 The tunnel shafts are proposed to be located in LCA 9g Havant and Emsworth Coastal Plain, with a section of the Proposed Underground Pipeline crossing LCA 10a Langstone and Chichester Harbours defined within the Hampshire Integrated Character Assessment, 2015.

*Visual*

13.5.23 Visual receptors in the vicinity of the proposed WRP include users of Broadmarsh Coastal Park, people using the local PRoW network and the Solent Way long distance footpath, cyclists on NCN route 22, motorists on the A27 and Harts Farm Way, recreational users of boats within Langstone Harbour, and workers within the Brockhampton Industrial Estate. Visual receptors have limited visibility of Budds Farm WTW to the south and west due to intervening earthworks. There are limited views across Brockhampton Industrial Estate to the east due to intervening built form.

### Proposed Underground Pipeline between the proposed Water Recycling Plant and Havant Thicket Reservoir

*Location*

13.5.24 A section of the Proposed Development will be located to the south of Havant Thicket Reservoir within Staunton Country Park, close to the Leigh Park community to the west.

13.5.25 The majority of the Proposed Development within this section will be underground in tunnel extending south from Staunton Country Park and along the Hermitage Stream in Havant to the Broadmarsh Coastal Park south of the A27 Havant Bypass. Tunnel shafts are likely to be located along the route of the tunnel. These tunnel shafts will be used during the construction period and will be capped after construction and reinstated.

*Landscape*

13.5.26 A part of the SDNP falls within the LVIA study area to the north-east of Manor Lodge Road. The Scoping Area within Staunton Country Park crosses LCA 2f

Forest of Bere East and LCA 9g Havant Emsworth Coastal Plain defined within the Hampshire Integrated Character Assessment, 2015.

*Visual*

13.5.27 Visual receptors include visitors of Staunton County Park. *"The Lookout"* is a viewing platform within the Park providing views across The Lake to the west. Within Havant, residents of potentially impacted communities include those adjacent to Bedhampton Park and Leigh Park, those on Lower Road, Bedhampton Road, Kings Croft Lane, Mill Lane, Park Lane, Middle Park Way, Winterslow Drive, Swanmore Road, Bitterne Close and Well Meadow, shown in Figure 13.4 Zone of Theoretical Visibility (Operational Phase), and Representative Viewpoints location sheet 1 in Volume III. Recreational users within Staunton Country Park and walkers on the Wayfarers Walk long distance path, European Route 9, and Staunton Way recreational trail may also have views towards the Proposed Development.

### Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

13.5.28 The Scoping Area between Havant Thicket Reservoir and Otterbourne WSW, crosses several LCAs defined within the Hampshire Integrated Character Assessment, 2015. To facilitate analysis at a proportionate scale, this section has been divided in six sub-areas.

### Portsdown Hill (Boarhunt to the escarpment section north of Broadmarsh Coastal Park)

*Location*

13.5.29 This section of the Proposed Underground Pipeline comprises a tunnel between the proposed WRP and Portsdown Hill. Tunnel shafts and proposed AGP structures are likely to be located along the route of the tunnel.

*Landscape*

13.5.30 The Scoping Area crosses through the Portsdown Hill Area of Special Landscape Quality (ASLQ), and part of the Winchester Portsdown ASLQ, as shown in Figure 13.1 Designations sheet 2 in Volume III.

13.5.31 This section of the Proposed Underground Pipeline where open cut trenching is proposed is situated within LCA8i Portsdown Hill Open Downs defined within the Hampshire Integrated Character Assessment, 2015. The chalk escarpment, large, predominantly arable fields with straight boundaries, lack of trees and woodland give an open character with expansive long-distance views to the north and south. The Proposed Development has the potential to impact some woodland and trees.

*Visual*

13.5.32 LCA8i gives rise to long panoramic views over the Forest of Bere to the north and Portsmouth, Langstone and Chichester harbours and distinct views of the profile of the Isle of Wight to the south. This is due to the elevated, exposed east-west

ridge line. Fort Nelson and Nelson's Monument, Fort Widley and Fort Southwick are prominent landmarks and tourist destinations in close proximity. Visitors to the two promoted viewpoints along Portsdown Hill experience wide, open panoramic views to the north and south. The Proposed Development is sited in an open landscape, as shown in Figure 13.4 Zone of Theoretical Visibility (Operational Phase), and Representative Viewpoints location plan sheets 1 and 2 in Volume III.

13.5.33 Nearby visual receptors include residents of the communities of Purbrook, Widley, Crookhorn, Southwick and of Geoffrey Avenue, Hillside Avenue, Dell Close and local isolated farm dwellings.

13.5.34 People using the local PRoW, including the Allan King Way, Pilgrims Trail and Wayfarer's Walk promoted routes, are in proximity to this section of the Scoping Area. These routes cross the Scoping Area between Crocker Hill and Widley in three locations. Transport receptors include motorists on the B2177, which runs along the top of the ridge with several opportunities for open, expansive, panoramic views to the north and south and with frequent car parks overlooking the Solent.

### Fareham (eastern edge of Knowle to Swivelton Lane)

*Location*

13.5.35 The Scoping Area lies north of Knowle, to the east and parallel with Knowle Road where the proposed Welborne Garden Village will be located. It crosses the A32 Wickham Road and east across agricultural land over the River Wallington to Swivelton Lane in open cut trenching. Proposed AGP structures are likely to be located along the Preferred Pipeline Corridor.

*Landscape*

13.5.36 This section is also situated within LCA8i Portsdown Hill Open Downs defined within the Hampshire Integrated Character Assessment, 2015. The Forest of Bere ASLQ is situated between the A32 Wickham Road and Swivelton Lane. The landscape is open in character with expansive long-distance views and comparatively fewer landscape features than the rest of the LVIA study area.

*Visual*

13.5.37 Community receptors include residents of Crockerhill, Funtley, North Fareham and scattered properties north of the M27. Residents of properties along Kiln Road with open views to the north of the M27 may also be affected.

13.5.38 People using the Allan King Way cross through this area in proximity to the Proposed Development.

### Wickam (Shirrell Heath, Wickham and Knowle)

*Location*

13.5.39 There will be open cut trenching to install the Proposed Underground Pipeline between Waltham Chase and Wickham, turning south then further east around

Knowle, crossing fields, field boundaries and avoiding woodland. A short section of trenchless tunnel is proposed at Shirrell Heath, and beneath watercourses.

*Landscape*

13.5.40 The Scoping Area is within LCAs 2e Forest of Bere West; and 3e Meon Valley defined within the Hampshire Integrated Character Assessment, 2015. This LCA comprises a major river valley, where woodland is common, and nucleated settlements are located. Important landscape features include historic hedgerow oaks and hedgebanks associated with the Royal Forest of Bere.

13.5.41 The area has a high concentration of ancient woodland. The Proposed Development has the potential to impact a group of trees with a TPO designation along Winchester Road, and along Titchfield Lane. Within the LVIA study area, Park Place (Grade II* listed building) and Wickham Park Golf Club are located west of Wickham.

*Visual*

13.5.42 Residents of the communities of Shedfield, Wickham, Knowle, surrounding rural settlements and along Knowle Road, Mayles Lane, Titchfield Lane, Blind Lane, and neighbouring streets are near the Scoping Area. People using the Pilgrims Trail and Itchen Way long distance routes are in close proximity to the Scoping Area. Approximately 1.5km of the Pilgrims Way lies in proximity to the Scoping Area. The communities of Shedfield, High Street and Sandy Lane are crossed by the Scoping Area.

13.5.43 People using the Allan King Way cross through this area in proximity to the Scoping Area. Transport receptors include motorists on the B2177.

### Bishops Waltham (Lower Upham to Bishops Waltham)

*Location*

13.5.44 The area between Lower Upham and Bishops Waltham is a wooded, small scale area with a notable presence of mature roadside trees. The area is settled with numerous towns and linear settlement along winding lanes. Short sections of trenchless tunnel will be used to cross watercourses such as the River Hamble and major roads. Proposed AGP structures are likely to be located along the Preferred Pipeline Corridor.

*Landscape*

13.5.45 This area is located within LCA 2e Forest of Bere West defined within the Hampshire Integrated Character Assessment, 2015. This area has well-conserved historical features and a rich cultural heritage associated with the Bishops Waltham historic deer park including the Park Lug. The area has a high concentration of ancient woodland, and possible veteran trees along roadsides and within fields. Bishops Waltham Palace scheduled monument lies within the LVIA study area, to the north of the Scoping Area and within the settlement of Bishops Waltham.

*Visual*

13.5.46 Residents of Lower Upham, Durley Street and along Scivier's Lane, Alma Lane, Portsmouth Road, and Hillview Manor Park are in proximity.

13.5.47 People using the Allan King Way and Pilgrims Trail cross the Scoping Area with numerous local PRoW within the LVIA study area.

13.5.48 Transport receptors include motorists on the B2177.

### Fair Oak (Winchester Road to Mortimers Lane)

*Location*

13.5.49 The area between Mortimers Lane and Winchester Road is gently undulating and wooded with a high concentration of settlement. The large settlement of Fair Oak lies to the south of the Scoping Area, and the B2177 runs parallel to the north. A short section of tunnel is proposed across the B3354 at Fisher's Pond, and at Bow Lake.

*Landscape*

13.5.50 This area is located within LCA 2e Forest of Bere West defined within the Hampshire Integrated Character Assessment, 2015.

13.5.51 The SDNP lies close to the Scoping Area to the north of the B2177. The Scoping Area crosses through a small, intimate scale, wooded landscape in this location between Park Hills Wood and numerous water features including Fishers Pond, Bow Lake, Store House Gully and other unnamed streams and brooks. The area has a high concentration of ancient woodland.

*Visual*

13.5.52 Residents of Fishers Pond, Crowd Hill and Fair Oak are in close proximity with residents along Portsmouth Road within the Study Area. Two PRoW cross the Scoping Area in this location.

13.5.53 Transport receptors include motorists on the B2177 Portsmouth Road and Winchester Road.

### Otterbourne (west of Winchester Road/B3354)

*Location*

13.5.54 The Scoping Area includes the fields to the south east of Otterbourne, where open cut trenching is proposed. The Proposed Underground Pipeline will traverse the River Itchen via a tunnel and will cross through fields in open cut trenching south of Colden Common to Fishers Pond at Winchester Road. Short sections of trenchless tunnel are proposed at Church Lane and Winchester Road and across watercourses.

*Landscape*

13.5.55 This section is located within LCA 3c Itchen Valley, defined within the Hampshire Integrated Character Assessment, 2015.

13.5.56 A small part of the SDNP falls within the Scoping Area to the north of Kiln Lane. This part of the South Downs has well-conserved historical features and a rich cultural heritage, mainly evidence of earlier farming traditions which can still be seen today in the pattern of field boundaries. In this area, the Scoping Area avoids TPOs and, as shown in Figure 13.1 Designations sheet 4 in Volume III**,** there is a high proportion of ancient woodland.

13.5.57 The special qualities of the SDNP relevant to the section of the Preferred Pipeline Corridor between Priory Park and Otterbourne are:

- Diverse, inspirational landscapes and breath-taking views.
- Tranquil and unspoilt places (feeling of peace and space, retaining areas of dark skies).
- Opportunities for recreational activities and learning experiences.
- Distinctive towns and villages.
- An environment shaped by centuries of farming and embracing new enterprise.

*Visual*

13.5.58 Views are shortened due to a high degree by built form and woodland. Residents of Colden Common, Bambridge, Otterbourne and properties along Kiln Lane, Church Lane, Highbridge Road and Bishopstoke Lane are all in close proximity or within the Scoping Area.

13.5.59 Walkers on the Itchen Way and local PRoW cross the Scoping Area in this location.

## 13.6 Scoping of potential effects

13.6.1 The Proposed Development has the potential to affect landscape and visual receptors, both during construction and in operation.

13.6.2 Effects from decommissioning of the Proposed Development are considered to be no greater than those identified during the construction phase, and are therefore assessed as construction effects as a reasonable worst-case scenario. Please refer to Chapter 3 Description of the proposed development, section 3.7 for further information on decommissioning.

### Effects scoped into the assessment

*Construction effects*

13.6.3 To avoid double counting of effects, the assessment of landscape and visual construction effects will identify and assess only temporary effects which arise because of activities and elements that are unique to the construction phase. Sources of potentially significant temporary construction impacts (the construction activities and processes) on landscape and visual receptors include:

- Site clearance and removal of vegetation cover and field boundaries where such cover forms a key characteristic of a particular landscape.
- Temporary loss of vegetation where replanting and regrowth would be anticipated.
- Removal of trees with Tree Preservation Orders (TPO), veteran or ancient trees or protected hedgerows.
- Disturbance of natural landform through excavation.
- The presence of plant and construction compounds including welfare facilities, and increased movement of vehicles and workers.
- Temporary storage of soils.
- Haul routes and associated movement of plant along them.
- Excavation required for the open cut trenching method for underground pipeline installation.
- Presence of launch shaft sites and intermediate tunnel shafts associated with the trenchless methods for pipe installation including tunnelling and horizontal directional drilling. The effects of tunnel construction would be limited to the tunnel drilling sites, and intermediate tunnel shaft sites. However, the location of tunnel portals and intermediate shaft locations are not yet fixed and it is assumed they can be at any open space along tunnel sections.
- Construction of permanent and temporary intermediate tunnel shafts and the presence of associated compounds.
- Construction of the proposed WRP, proposed IPS and proposed BPT.
- Intensification of vehicular movements into and out of the construction sites.
- Lighting of the works and construction compounds for safety and security.
- Disruption to the landscape pattern.
- Disruption to tranquillity.
- Temporary diversions to PRoW.
- Temporary loss of public open space for use as construction compounds for intermediate tunnel shafts.

*Operational effects*

13.6.4 Sources of potentially significant temporary and permanent operational effects (e.g. the loss or changes to existing landscape features or characteristics, or the addition of new infrastructure or features within the landscape or view) on landscape and visual receptors include:

- Loss of vegetation including veteran or ancient trees, parkland trees, mature woodland and pasture.
- Loss of field boundaries or amalgamation of fields.
- Permanent changes to existing field patterns including relocation or provision of new field boundaries. New permanent boundary treatments to demarcate new land ownership boundaries.
- Permanent diversions and stopping up of PRoW.

- Permanent changes to natural landform.
- Presence of the proposed WRP and HLPS and associated proposed AGP.
- Presence of proposed BPT and proposed IPS and associated AGP.
- Proposed lighting causing light spill or sky glow.
- Changes in access arrangements.
- Presence of easements that prevent existing vegetation being replaced or mitigation planting.
- Presence of maintenance hatches, bell mouths and tracks.

### Effects scoped out of the assessment

*Construction effects*

13.6.5 The parts of the Proposed Underground Pipeline that will be within tunnel, outside of the launch sites and intermediate shaft sites ZTV would not result in changes to the landscape or visual baseline during construction.

13.6.6 Havant Thicket Reservoir is included within the Scoping Area, but the proposed changes relate to the storage of recycled water and not to the physical structures and are not likely to change the landscape or visual baseline. These changes are therefore scoped out of further assessment.

*Operational effects*

13.6.7 The existence and operation of the Proposed Underground Pipelines and proposed changes at Havant Thicket Reservoir are not likely to change the landscape and visual baseline and are therefore scoped out of further assessment.

## 13.7 Approach to assessment

### Additional baseline data collection

13.7.1 This EIA Scoping Report chapter has been compiled through a desk study and initial fieldwork carried out between February and April 2023. Further fieldwork will be carried out in summer 2023 and winter 2023/24 to capture final photography to illustrate the chapter, to inform the emerging design and assess the likely effects of the Proposed Development.

### Assessment methodology

13.7.2 Paragraph 4.9.2 of the NPSWRI [4] states that *"The applicant should undertake an assessment of any likely significant landscape and visual impacts and describe these in the Environmental Statement, including cumulative impacts".*

13.7.3 Chapter 5 General EIA approach and methodology sets out the standard EIA methodology and matrix. The methodology for the LVIA has been developed with reference to the best practice guidance set out in section 13.2.

13.7.4 The methodology for the LVIA will be developed further in the preparation of the ES to set out how potential effects of the setting of the SDNP will be assessed. This methodology will be developed in consultation with the SDNPA.

*Assessment of landscape effects*

*Landscape baseline*

13.7.5 Landscape is defined by the European Landscape Convention as *"an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors"* [247].

13.7.6 NEs 'An Approach to Landscape Character Assessment' [236] provides some useful context to the European Landscape Convention. It sets out the following five principles in section 1.4, which apply to landscape character assessment:

- Landscape is everywhere and all landscape has character.
- Landscape occurs at all scales and the process of Landscape Character Assessment can be undertaken at any scale.
- The process of Landscape Character Assessment should involve an understanding of how the landscape is perceived and experienced by people.
- A Landscape Character Assessment can provide a landscape evidence base to inform a range of decisions and applications.
- A Landscape Character Assessment can provide an integrating spatial framework- a multitude of variables come together to give us our distinctive landscapes.

13.7.7 Landscape receptors are defined in GLVIA3 as "*aspects of the landscape resource that have the potential to be affected by a proposal*" [232]. Landscape receptors will be identified via a review of published landscape character assessments, maps and aerial photography, relevant planning policy and fieldwork surveys.

13.7.8 Landscape character is defined by GLVIA3 as "*a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse*."

13.7.9 Published landscape character assessments at the national, regional and local level have been reviewed to identify Landscape Character Types (LCT) and Landscape Character Areas (LCA). The scale of these assessments at the district level varies, with some authorities publishing studies with very small LCAs and others with areas closer to the scale published at the county level. To provide a consistent scale across the LVIA study area, the Applicant has reviewed the existing landscape baseline and has defined 44 Local Landscape Character Areas (LLCA), which provide a more consistent scale against which the likely effects of the Proposed Development will be assessed. This will allow an assessment at scales from national to local, to draw distinctions between localised and wider ranging effects.

*Sensitivity of landscape receptors*

13.7.10 Paragraph 5.39 of GLVIA3 [232] states that *"landscape receptors need to be assessed firstly in terms of their sensitivity, combining judgements of their susceptibility to the type of change or development proposed and the value attached to the landscape"*.

13.7.11 Judging landscape sensitivity is thus a two-part process of:

- **Value attached to the landscape** – relates to the existing landscape and has been determined at the baseline stage in line with paragraph 5.19 of GLVIA3, which states that "*as part of the baseline description the value of the potentially affected landscape should be established*"; and
- **Susceptibility to change** – which is considered in relation to the Proposed Development.

*Value attached to the landscape*

13.7.12 Landscape Institute Technical Guidance Note (TGN) 02/21: Assessing landscape value outside national designations [248] defines landscape value as "*the relative value or importance attached to different landscapes by society on account of their landscape qualities*".

13.7.13 As set out in paragraph 4.9.11 of NPSWRI [4], "*great weight should be given to conservation and enhancement of landscape and scenic beauty in nationally designated landscapes. National Parks, the Broads and Areas of Outstanding Natural Beauty have the highest status of protection in relation to landscape and scenic beauty. Each of these designated areas has specific statutory purposes which help ensure their continued protection and which the Secretary of State has a statutory duty to have regard to in decisions. .* Nationally designated landscapes will therefore be attributed with very high value.

13.7.14 For assessing landscape value outside national designations, Landscape Institute Technical Guidance Note 02/21 is now the primary source of guidance. The approach to assessing the value attached to the landscape will follow a three-stage process:

- **Stage 1:** identify if the landscape is covered by any landscape designations;
- **Stage 2**: consider each of the factors listed in Table 13-13 which have been developed with reference to Table 1 of TGN 02/21 [248] and are pertinent and most important to understanding its value; and
- **Stage 3**: make an assessment the value attached to the landscape and assign value based on a five-point scale, clearly articulating the reasons for these judgements.

Table 13-13: Determining the value attached to the landscape

| Stage 1 – Landscape designations | Stage 2 - Define landscape value factors with reference to TGN 02/21 [248] | Criteria | Description |
|---|---|---|---|
| Landscape with statutory status or national policy protection: National Park, AONB, or World Heritage Sites | Natural heritage - Landscape with clear evidence of ecological, geological, geomorphological or physiographic interest which contribute positively to the landscape.<br>Cultural heritage - Landscape with clear evidence of archaeological, historical or cultural interest which contribute positively to the landscape.<br>Landscape condition - Landscape which is in a good physical state both with regard to individual elements and overall landscape structure.<br>Associations - Landscape which is connected with notable people, events and the arts.<br>Distinctiveness - Landscape that has a strong sense of identity.<br>Recreational - Landscape offering recreational opportunities where experience of landscape is important.<br>Perceptual (scenic) - Landscape that appeals to the senses, primarily the visual sense.<br>Perceptual (wildness and tranquillity) - Landscape with a strong perceptual value notably wildness, tranquillity and/or dark skies<br>Functional - Landscape which performs a clearly identifiable and valuable function, particularly in the healthy functioning of the landscape. | Very high | A designated landscape with statutory status (National Park or AONB). Valued landscape in the context of NPPF [5] paragraph 174 (a) |
| Local landscape designation, such as Special Landscape Area or Area of Great Landscape Value, supported by policy and a detailed evidence base. | | High | A locally designated landscape supported by a detailed evidence base or with other strong indicators of value, which may include other relevant designations such as ancient woodland or conservation areas, with identified quality in the development plan or evidence base. May be considered valued landscape in the context of NPPF [5] paragraph 174(a) with strong supporting evidence. |
| | | Medium | Unlikely to be a designated for landscape quality but may exhibit some indicators of value which are identified in the development plan or evidence base and are important at the community level. |
| No relevant designations | | Low | Not designated for landscape quality and likely to exhibit few indicators of value which are identified in the development plan or evidence base. |
| | | Very low | A landscape dominated by industry or infrastructure or which is damaged or degraded landscape, not designated for landscape quality and not likely to exhibit indicators of value which are identified in the |

| Stage 1 – Landscape designations | Stage 2 - Define landscape value factors with reference to TGN 02/21 [248] | Criteria | Description |
|---|---|---|---|
| | | | development plan or evidence base. |

*Valued landscape*

13.7.15 The principle of "valued landscape" in England is supported by the NPPF [5] (Chapter 15). Paragraph 174 requires that planning policies and decisions should contribute to and enhance the natural and local environment by, inter alia, (a) "*protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan)*".

13.7.16 According to paragraph A4.2.11 of TGN 02/21 [248], a 'valued landscape' is an area identified as having sufficient landscape qualities to elevate it above other more everyday landscapes. There is therefore a high bar for an area to be considered valued landscape in the context of the NPPF [5].

13.7.17 Paragraph A4.2.5 of TGN 02/21 [248] states that, "*where a landscape has a statutory status, such as a National Park or AONB, it is self-evident that it is a valued landscape*". Therefore, where such landscapes are present within the LVIA study area, these will be recognised as valued landscapes in the context of the NPPF [5].

13.7.18 A different approach has been taken to determine whether landscapes outside of nationally designated landscapes can be considered valued landscape in the context of the NPPF [5]. Paragraph A4.2.6 of TGN 02/21 [248] states that the interpretation of 'identified quality in the development plan' is not clear and that there are two fundamentally different interpretations that have been adopted by inspectors, which are considered below in more detail:

13.7.19 1. It means non-statutory, locally designated landscapes.

13.7.20 2. It means any landscape where there is evidence to justify the identification of a 'valued landscape'. Local designation alone may not be sufficient evidence.

13.7.21 For a landscape without statutory status to be considered valued landscape in the context of the NPPF [5] it must be supported by strong evidence. The LVIA will therefore consider each of the criteria set out in Table 13-13, references in Local Plan policy and evidence base, including whether there are existing local landscape designations in forming an overall judgement. Landscapes with high value may also be considered valued landscape.

*Susceptibility of landscape receptors to change*

13.7.22 GLVIA3 [232] paragraph 5.40 defines the susceptibility to change of landscape receptors as:

13.7.23 "*the ability of the landscape receptor (whether it be overall character or condition of a particular landscape type or area, or an individual element and/or features, or a particular aesthetic and perceptual aspect) to accommodate the proposed*

*Scheme without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies*" (paragraph 5.40).

13.7.24 The features and characteristics which are more or less susceptible to the type of changes proposed will be set out for each landscape receptor. The supporting narrative will provide a clear explanation based upon analysis of the landscape receptor and the extent to which it is able to accommodate the type of change arising from the specific proposal. The susceptibility to change will then be categorised with reference to the criteria in Table 13-14.

**Table 13-14: Susceptibility of landscape receptors to change**

| Criteria | Description |
|---|---|
| Very high | The type of change arising from the specific proposal are very likely to lead to undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies. |
| High | The type of change arising from the specific proposal are likely to lead to undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies. |
| Medium | The type of change arising from the specific proposal may lead to undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies. |
| Low | The type of change arising from the specific proposal are unlikely to lead to undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies. |
| Very low | The type of change arising from the specific proposal are very unlikely to lead to undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies. |

13.7.25 The sensitivity of each landscape receptor will be defined by combining professional judgements on the value attached to the landscape and its susceptibility to change and will be supported by a clear narrative. Reference will be made to the criteria set out in Table 13-15.

**Table 13-15: Susceptibility of landscape receptors to change**

| Criteria | Description |
|---|---|
| Very high | Landscapes with statutory status or national policy protection with very limited ability to accommodate the type of change without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies. |
| High | Landscapes which may be locally designated or otherwise supported by a detailed evidence base or landscape with other strong indicators of value with limited ability to accommodate the type of change without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies. |

| Criteria | Description |
|---|---|
| Medium | Landscapes which are unlikely to be a designated for landscape quality but may exhibit some indicators of value and which may have some ability to accommodate the type of change without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies. |
| Low | Not designated for landscape quality and likely to exhibit few indicators of value and likely to accommodate the type of change no or limited undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies. |
| Very low | Landscapes of very low value able to accommodate the type of change without undue consequences for the maintenance of the baseline situation and/or the achievement of landscape planning policies and strategies. |

*Magnitude of landscape impacts*

13.7.26 Paragraph 3.28 of GLVIA3 notes that the magnitude is informed by combining considerations relating to the scale, extent and duration of impacts. This includes the geographical extent of influence, the spatial extent of the impact, the level of integration of new features with existing elements, its duration and degree to which the impact is reversible.

13.7.27 In summarising the magnitude of landscape impacts, reference will be made to the following:

- **Size and scale** – the degree to which key characteristics or features identified in the baseline would change.
- **Geographical extent** – the area over the change would occur.
- **Duration and reversibility** – the time over which the change would occur and if these changes are reversible, set out on the following scale: short (weeks); medium (months); and long (years)).

13.7.28 The criteria set out in Table 13-16 will be referred to in determining the magnitude of landscape impacts.

**Table 13-16: Magnitude of landscape impacts**

| Criteria | Description |
|---|---|
| Very high | Substantial changes to key characteristics across most of the area or to unique and distinctive features at a local level. May be longer term impacts, permanent or reversible. |
| High | Changes to the character of the landscape across large parts of the area or to distinctive features at a local level. May be longer term impacts, permanent or reversible |
| Medium | Changes to the character of the landscape across parts of the area or to some existing features at a local level. May be medium term impacts, permanent or reversible. |
| Low | Slight change to landscape character or landscape features across a small area. May be short to medium term impacts, permanent or reversible. |

| Criteria | Description |
|---|---|
| Very low | Barely perceptible change to the landscape receptor or may impact a limited area or no key characteristics. May be short term impacts, permanent or reversible. |

13.7.29 There may be cases where there would be no impacts on a receptor, for example where the design has been changed to avoid such impacts. In such cases this will be recorded as no change.

*Assessment of visual effects*

*Visual baseline*

13.7.30 Two types of ZTV will be prepared with an assumed viewing height of 1.6m above ground level in line with paragraph 6.11 of GLVIA3 [232]. The first will be based on "bare earth" DTM data to represent the reasonable worst case scenario and to assist with scoping areas out of the assessment where the Proposed Development will not be visible. The second will include existing built form derived from Ordnance Survey MasterMap [217] and woodland blocks derived from the National Forest Inventory [250] will be added to the terrain and extruded based on average heights derived from a 2m Digital Surface Model (DSM). There are limitations in what ZTVs can show and these maps will not take account of the screening effect of small blocks of vegetation such as hedgerows and vegetation in gardens. The true extent of visibility in winter and summer will therefore be assessed through fieldwork and will be described in the baseline. These ZTVs also do not indicate how much of the Proposed Development will be visible. The purpose of the ZTV will be to:

- Identify the theoretical extents of visibility of the Proposed Development i.e., areas from which it would not be visible and areas from which it could potentially appear in existing views.
- Assist in the iterative process of design and the refinement of the LVIA study area.
- Identify visual receptors likely to be affected by the Proposed Development.
- Identify locations that are representative of the views experienced by visual receptors at different locations within the LVIA study area (representative viewpoints).
- Inform the design, including the extent and type of proposed mitigation.

13.7.31 The ZTVs will be updated as the design of the Proposed Development changes to separately illustrate the theoretical limits of construction activity and the Proposed Development. ZTVs will be generated by GIS computer software using open-source LiDAR DTM data with a 2m resolution, offset by 1.6m to represent the eye height of an average person as defined in paragraph 6.11 of GLVIA3. This DTM will be combined with three-dimensional models of the Proposed Development representing the maximum height, scale and location of the construction elements and proposed AGP, including the proposed WRP.

*Visual receptors and representative viewpoints*

13.7.32 Visual receptors are defined in GLVIA3 as "*individuals and/or defined groups of people who have the potential to be affected by a proposal*". This includes, for example, residents, users of public rights of way and motorists.

13.7.33 Visual receptors likely to experience views of the Proposed Development will be identified through interrogation of the ZTV, desktop analysis of maps, aerial and Google Street View photography, and fieldwork surveys. They will subsequently be categorised into the following types:

- Residents
- People travelling through the area on public rights of way
- People travelling through the area on promoted recreational routes and quiet lanes
- People travelling through the area on local roads
- People travelling through the area on major routes and public transport
- Tourists
- People using parks and open spaces
- People working outdoors
- People working indoors

13.7.34 Where a collection of visual receptors in the same category are likely to experience similar views, they will be grouped.

13.7.35 Representative viewpoints will be identified within the ZTV to assist in describing the baseline view and the effects likely to be experienced by visual receptor groups. These representative viewpoints will be selected on the basis that they cover a range of viewing distances, elevations, and orientations from locations with different viewing experiences of the Proposed Development. They will be agreed with relevant local authorities. The selection of representative viewpoints will be informed by the following criteria:

- Accessibility to the public
- Number and sensitivity of people whose can be affected
- Viewing direction, distance, openness and elevation
- Nature of the viewing experience

13.7.36 Photographs taken at each viewpoint during fieldwork surveys in winter and summer will be used to help demonstrate the nature of baseline views including the extent of existing screening. All photographs will follow Planning Inspectorate advice on photographic requirements, to be correctly labelled, annotated and dated. The location at which photographs have been taken will be identified on a plan and specifications of the camera and type of lens used will also be provided.

13.7.37 All photographs and photomontages will be prepared in accordance with Landscape Institute TGN 06/19 [234]. Baseline photographs will be presented as Type 1 annotated photographs. Type 4 photomontages will also be prepared for selected viewpoints to illustrate the likely extent and nature of changes in baseline

views. Further detail on the methodology for the preparation of photomontages will be provided in the ES.

*Sensitivity of visual receptors*

13.7.38 Paragraph 6.31 of GLVIA3 states that *"each visual receptor, meaning the particular person or group of people likely to be affected at a specific viewpoint, should be assessed in terms of both their susceptibility to change in views and visual amenity and also the value attached to particular views."* The sensitivity of visual receptors results from a combination of parameters, such as:

- The activity/occupation/ pastime of the receptors at particular locations.
- The extent to which their attention or interest may be focused on the views.
- The visual amenity they experience.

13.7.39 Consideration will also be given to the:

- Location, focus and orientation
- Features or characteristics of value within the view
- Principal or secondary interests
- Static or kinetic nature of views
- Duration of the view

*Value attached to views*

13.7.40 A three-stage process will be used to determine the value attached to views. This relates to the features and characteristics of the baseline landscape within the view and other indicators of value, including reference in policy, guide books, literature or art.

- **Stage 1**: identify if the view or the landscape within the view is covered by any relevant policy or designations and note features and characteristics of value with reference to the landscape baseline.
- **Stage 2**: identify if the view is identified on maps, is likely to be from a popular visitor location or has historical or cultural importance or associations.
- **Stage 3**: Determine the value attached to the view with reference to the criteria provided in Table 13-17, using the evidence from stages 1 and 2.

**Table 13-17: Value attached to views**

| Criteria | Description |
|---|---|
| Very high | Views within or across a nationally or internationally designated landscapes and/or specific views designated in national or regional policy. Views are likely to have few or no detracting features and which may also have strong cultural associations supported by evidence, which could include links to historical events or people, representation in art or literature, for example. |
| High | Views within or across regionally or locally designated landscapes, other or landscapes with strong indicators of value, or views identified in the development plan or evidence base. Views are likely to have few or no detracting features and may also have some cultural associations supported by strong evidence. |

| Criteria | Description |
|---|---|
| Medium | Views across landscapes which are unlikely to be designated but may exhibit some indicators of value which are identified in the development plan or evidence base and are important at the community level. Views may have some detracting features and cultural associations supported by evidence. |
| Low | Views across landscapes which are not designated for landscape quality and likely to exhibit few indicators of value which are identified in the development plan or evidence base. Views are likely to have some detracting features and lack cultural associations supported by evidence. |
| Very low | View across landscapes which are neither designated, nor identified in the development plan or evidence base, and without cultural associations. The landscape in the view is in poor condition or notably detracts from the experience of the view. |

*Susceptibility of visual receptors to change*

13.7.41 The sensitivity of visual receptors is also dependent upon their susceptibility to changes in views and the visual amenity they experience at particular locations.

13.7.42 Paragraph 6.32 of GLVIA3 explains that "*the susceptibility of different visual receptors to changes in views and visual amenity is mainly a function of:*

- *The occupation or activity of people experiencing the view at particular locations; and*
- *The extent to which their attention or interest may therefore be focussed on the views and the visual amenity they experience at particular locations."*

13.7.43 It is noted in GLVIA3 that visual receptors most susceptible to change, include residents and visitors engaged in outdoor recreation "*whose attention or interest is likely to be focused on the landscape and on particular views*" (paragraph 6.33).

13.7.44 Table 13-18 sets out the criteria which will be referred to in determining the susceptibility of visual receptors to the Proposed Development.

**Table 13-18: Susceptibility of visual receptors to change**

| Criteria | Description |
|---|---|
| Very high | Visitors to nationally or internationally designated landscapes, particularly at specific viewpoints or viewing places, where views of the landscape are fundamental to the experience.<br>People engaged in specific activities for enjoyment of dark skies. |
| High | Residents at home.<br>Visitors to tourist hotspots, heritage assets or other attractions outside of nationally or internationally designated landscapes, particularly at specific viewpoints or viewing places, where views of the landscape are important to the experience.<br>People engaged in outdoor recreation whose attention or interest is likely to be focussed on the landscape and on particular views, for example those using promoted walking and cycling routes.<br>People travelling along promoted scenic routes. |
| Medium | People engaged in outdoor recreation or travelling along public rights of way or local roads, which are not promoted routes but where an appreciation of the surrounding landscape are relevant to the experience.<br>People working outdoors. |

| Criteria | Description |
|---|---|
| Low | People engaged in outdoor sport or recreation which does not involve or depend upon appreciation of views of the landscape<br>People travelling on major road, rail or other transport routes which are not recognised as scenic routes. |
| Very low | People working indoors and in industrial areas. |

### *Summarising the sensitivity of visual receptors*

13.7.45 The sensitivity of visual receptors is based on professional judgement and will be informed by the criteria in Table 13-19, considering the value attached to views and susceptibility of visual receptors to the changes proposed.

**Table 13-19: Sensitivity of visual receptors**

| Criteria | Description |
|---|---|
| Very high | Activity where views are fundamental to the experience and are related to landscapes with national or international designation and with few or no detracting features and which may also have strong cultural associations supported by evidence. |
| High | Activity resulting in a particular interest or appreciation of the view and/or views within or across regionally or locally designated landscapes, other or landscapes with strong indicators of value, or views identified in the development plan or evidence base with few or no detracting features and may also have some cultural associations supported by strong evidence. |
| Medium | Activity resulting in a general interest or appreciation of the and/or a view, likely to exhibit some indicators of value which are identified in the development plan or evidence base and are important at the community level. |
| Low | Activity where interest or appreciation of the view is secondary to the activity or the period of exposure to the view is limited, and/or views across landscapes which are not designated for landscape quality and likely to exhibit few indicators of value and likely to have some detracting features and lack cultural associations supported by evidence. |
| Very low | Activity where interest or appreciation of the view is inconsequential to their activity, and/or across landscapes which are neither designated, nor recognised in policy, and without cultural associations or is in poor condition or notably detracts from the experience of the view. |

### *Magnitude of visual impacts*

13.7.46 The magnitude of visual impacts relates to the extent to which the baseline view would change as a result of the Proposed Development. This assessment will be made with reference to the photographs and photomontages from the representative viewpoints.

13.7.47 Paragraph 3.28 of GLVIA3 notes that magnitude is informed by combining considerations relating to the scale, extent and duration of impacts. This includes the geographical extent of influence, the spatial extent of the impact, the level of integration of new features with existing elements, its duration and degree to which the impact is reversible.

13.7.48 Reference will be made to the following in summarising the magnitude of visual impacts:

- **Size and scale** – loss of existing features or addition of new features.
- **Geographical extent** – where the proposed changes would be visible and to what extent.
- **Duration and reversibility** – the time over which the change would occur and if these changes are reversible, set out on the following scale: short (weeks); medium (months); and long (years)).

13.7.49 The criteria set out in Table 13-20 will be referred to in determining the magnitude of visual impacts.

**Table 13-20: Magnitude of visual impacts**

| Criteria | Description |
|---|---|
| Very high | The Proposed Development will result in extensive changes to the character and composition and will become the dominant feature of the landscape within the view. There may be longer term impacts, permanent or reversible. |
| High | The Proposed Development will change the character and composition of large parts of the landscape within the view. There may be longer term impacts, permanent or reversible. |
| Medium | The Proposed Development will change the character and composition of discrete parts of the landscape within the view. There may be medium term impacts, permanent or reversible. |
| Low | The Proposed Development will cause small changes to the character and composition of the landscape within the view. There may be short to medium term impacts, permanent or reversible. |
| Very low | The development will cause barely perceptible changes in the character and composition of the landscape within view. May be short term impacts, permanent or reversible. |

13.7.50 There may be cases where there will be no impacts on a receptor, for example where the design has been changed to avoid such impacts. In such cases this will be recorded as no change.

### Significance of landscape and visual effects

13.7.51 The approach to determining the significance of landscape effects and visual effects and whether these effects are considered significant in EIA terms will be the same.

13.7.52 Judgements on the sensitivity of each receptor and the magnitude of impact will be combined to establish the significance of effect and whether effects are considered significant in EIA terms. There are important distinctions between these two terms:

- Significance of effect relates to the level recorded for any effect, with reference to the matrix set out in Table 13-21.
- Significant effects are those which are considered most important in the decision-making process. An effect in this LVIA will be considered significant in

EIA terms if it is of major or moderate significance. All other effects will be categorised as not significant.

13.7.53 Table 13-21 will be used to guide judgements on the relationship between the sensitivity of a visual receptor, the magnitude of impact and the resulting significance of effect. Where conclusions differ from this guide, a reasoned explanation will be provided in the assessment text.

**Table 13-21: Significance of landscape and visual effects**

| | | **Magnitude of impact** | | | | |
|---|---|---|---|---|---|---|
| | | **Very high** | **High** | **Medium** | **Low** | **Very low** |
| **Sensitivity** | **Very high** | **Major** | **Major** | **Major or Moderate** | Moderate | Moderate or Minor |
| | **High** | **Major** | **Major or Moderate** | Moderate | Moderate or Minor | Minor |
| | **Medium** | **Major or Moderate** | Moderate | Moderate or Minor | Minor | Minor or Negligible |
| | **Low** | Moderate | Moderate or Minor | Minor | Minor or Negligible | Negligible |
| | **Very low** | Moderate or Minor | Minor | Minor or Negligible | Negligible | Negligible |

13.7.54 The identification of the likely significant effects on landscape and visual receptors will be supported by detailed analysis and the professional judgement of competent experts, and consultation with stakeholders. Table 13-22 defines what the significance of effect terms mean.

**Table 13-22: Descriptions of landscape and visual effects**

| **Significance of effect** | **Landscape effects** | **Visual effects** |
|---|---|---|
| Major beneficial | Effects that result in a considerable improvement of the existing landscape resource. Valued characteristic features would be restored or reintroduced as part of the development. | Effects that result in a substantial improvement in the existing view. |
| Moderate beneficial | Effects that result in a partial improvement of the existing landscape resource. Valued characteristic features would be largely restored or reintroduced. | Effects that result in a noticeable improvement in the existing view. |
| Minor beneficial | Effects that result in a slight improvement of the existing landscape resource. Characteristic features would be partially restored. | Effects that result in a limited improvement in the existing view. |

| Significance of effect | Landscape effects | Visual effects |
|---|---|---|
| Negligible beneficial | Effects that result in a very slight improvement to the existing landscape resource, not uncharacteristic within the receiving landscape. | Effects that result in a barely perceptible improvement in the existing view. |
| Neutral | Effects which are a balance between adverse and beneficial effects and are neutral in their consequences for the landscape. | Effects that are a balance between adverse and beneficial effects and are neutral in their consequences for the view of visual receptors. |
| Negligible adverse | Effects that result in a very slight deterioration to the existing landscape resource, not uncharacteristic within the receiving landscape. | Effects that result in a barely perceptible deterioration in the existing view. |
| Minor adverse | Effects that result in a slight deterioration of the existing landscape resource. Characteristic features would be partially lost. | Effects that result in a limited deterioration in the existing view. |
| Moderate adverse | Effects that result in a partial deterioration of the existing landscape resource. Valued characteristic features would be largely lost. | Effects that result in a noticeable deterioration in the existing view. |
| Major adverse | Effects that result in a considerable deterioration of the existing landscape resource. Valued characteristic features would be wholly lost. | Effects that result in a substantial deterioration in the existing view. |

13.7.55 Whether effects are adverse, beneficial or neutral will be determined by considering the way in which the changes are likely to affect the baseline.

13.7.56 Adverse effects are likely to occur where the Proposed Development introduces new elements or changes which are discordant or intrusive resulting in a deterioration to existing character or valued features of the landscape or of views and visual amenity.

13.7.57 Beneficial effects are likely to occur where the Proposed Development enhances the character of the landscape or existing views.

13.7.58 Paragraphs 5.37 and 6.29 of GLVIA3 state that is possible for effects to be neutral in their consequences for landscape and for visual receptors. Where a judgement of neutral effects is reached, reference will be made to the contribution of the Proposed Development to the baseline and acknowledging the positive and negative aspects which have been considered.

13.7.59 Where the assessment concludes that there will be no impacts on a receptor, this will be reported as no effect. This may, for example, be a consequence of changes

to the design which has avoided impacts on receptors identified at the scoping stage.

13.7.60 Residual effects are those which will remain even with embedded or primary mitigation at construction and year 15 of existence and operation and which cannot be further mitigated by design or other measures in this time period.

### Assessment scenarios

13.7.61 The future baseline will include committed developments that will be delivered prior to commencement of construction.

13.7.62 The assessment of likely effects compares a scenario with the Proposed Development against one without the Proposed Development over time.

13.7.63 The following assessment years and scenarios have been defined and will be adopted within the LVIA:

- Current baseline (winter and summer) – reflective of the conditions which exist at the time of gathering baseline environmental data and undertaking the LVIA.
- Future baseline (winter and summer) – reflective of the conditions that will be experienced in the future, immediately prior to construction of the Proposed Development.
- Construction (winter) – reflective of the conditions that will be experienced during the period over which construction of the Proposed Development is planned to take place.
- Year 1 of operation (winter) – reflective of the conditions that will be experienced in the year when the Scheme will become operational.
- Year 15 of operation (summer) – reflective of the conditions that will be experienced at a point 15 years after the year of opening of the Proposed Development.

### Cumulative effects

13.7.64 Cumulative effects of the Proposed Development together with the effects of other developments may result in significant cumulative effects. This may be the result of effects during construction or operation of the Proposed Development.

13.7.65 Cumulative effects for all topics will be reported within the cumulative effects chapter of the ES. Please refer to Chapter 19 Cumulative Effects Assessment which presents the proposed methodology for the assessment of cumulative effects that will be undertaken for the EIA.

### In-combination effects

13.7.66 In-combination effects are those that result from the interaction between the individual effects of the Proposed Development (e.g. interaction of environmental factors such as air quality, noise, health), combined together on a single receptor at a single point in time. The interrelationship between the individual effects may combine to result in a likely significant effect, even where the individual effects were not significant. Any in-combination effects in relation to landscape and visual

effects will be assessed within the Landscape and Visual Amenity chapter of the ES.

13.7.67 The nature of likely in-combination landscape and visual effects includes:

- Combination of heritage, landscape and visual effects where heritage assets or historic landscape contribute to landscape character and where visitors to heritage assets or historic landscapes are also considered as visual receptors.
- Combination of terrestrial and freshwater biodiversity and landscape and visual effects where ecological designations contribute to landscape character.
- Combination of socio-economic and landscape and visual effects, for example where the health and wellbeing of users of PRoW is likely to be affected, for example where PRoW need to be diverted.

## 13.8 Limitations and assumptions

13.8.1 This EIA Scoping Report is based on a Desk Study, initial fieldwork carried out between February and April 2023 and consultation with the EIA Working Group and Local Authorities Joint Officers Group. Further consultation and engagement, fieldwork and design refinement is scheduled to take place during the pre-application period for the Proposed Development, which may further refine the scope and approach to this assessment. The Applicant will seek to agree such changes with statutory consultees before submission of the DCO application.

## 13.9 Approach to mitigation and residual effects

13.9.1 The LVIA will be key to achieving the criteria for good design set out in section 3.6 of the NPSWRI [4].

13.9.2 The most effective mitigation for adverse landscape and visual effects is to avoid impacts at source as part of the design process, for example through the siting of infrastructure. Where effects cannot be avoided, the hierarchy is that impacts should be minimised, rectified, reduced or finally offset. All landscape mitigation is therefore considered primary. This will be supported by a comprehensive reinstatement strategy and appropriate management measures for landscape and ecology. Beneficial effects will be maximised wherever practicable, for example through the design of multi-functional green infrastructure which provides a range of ecosystem services to deliver Environmental Net Gain.

13.9.3 Mitigation principles to avoid or minimise potential construction effects of the Proposed Underground Pipeline will focus on reducing the duration and footprint of construction activity, locating development in the least prominent positions and wherever practicable maximising the distance from nearby visual receptors. Other measures which will be considered include positioning the works to make use of existing natural features such as landform and vegetation to screen views.

13.9.4 The Proposed Development will be designed to avoid or minimise the loss of existing landscape features of value, such as trees, woodland, and hedgerows wherever practicable. Any loss will be mitigated with replacement planting as close to the location, type and character of the existing vegetation to reduce effects resulting from such losses. The design will also identify opportunities for landscape

restoration and enhancement, by introducing planting which repairs or reinforces existing vegetation patterns and contributes to BNG.

13.9.5 Loss of ancient woodland will be avoided, wherever practicable in line with section 4.3.18 of the NPSWRI [4], which states that "*the Secretary of State should not grant development consent for any development that would result in the loss or deterioration of irreplaceable habitats including ancient woodland and the loss of ancient or veteran trees found outside ancient woodland, unless there are wholly exceptional reasons for the development, and a suitable compensation strategy exists*".

13.9.6 It will take time for planting proposed to reinstatement vegetation lost as a consequence of construction or provided to mitigate other effects of the Proposed Development, for example for visual screening. Therefore landscape and visual effects have been scoped in and will be assessed at year 1 and year 15 or operation. Effects which persist at year 15 of operation will be considered residual effects. Opportunities for advanced planting will be sought where this is practicable as this would allow for early establishment of mitigation.

13.9.7 The Applicant will set out the design objectives, functions, principles and inter-relationships between different environmental elements. Information will be included to explain how these elements will be designed to integrate with the wider nature network, through the detailed design and how they will be implemented, maintained and monitored. This will include consideration of existing landscape and historical character and function, landscape permeability, landform and vegetation whilst integrating biodiversity and nature conservation interests, as set out in paragraph 3.6.3 of the NPSWRI [4]. The type, extent and functions of the proposed mitigation will be illustrated set out on plans which will accompany the DCO application.

## 13.10 Summary

13.10.1 A summary of the topics proposed to be scoped in and out of the assessment is provided in Table 13-13.

**Table 13-23: Scoping summary table**

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| Below ground pipeline not in tunnel | Scoped in | Scoped in | At this stage it is not possible to confirm what easements may be required and therefore if reinstatement can be achieved |
| Below ground pipeline in tunnel | Scoped out | Scoped out | Tunnelled sections of the Proposed Development will not result in changes to the landscape or visual baseline. |
| Tunnel shafts | Scoped in | Scoped in | Tunnel shafts will result in changes to the landscape and visual baseline and will be capped and reinstated following construction. There may be some effects during the operational |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| | | | phase while proposed planting establishes. |
| AGP, including the WRP | Scoped in | Scoped in | The introduction of the proposed AGP, including the proposed WRP, would result in changes to the landscape and visual baseline. |
| LSO, Eastney PS | Scoped out | Scoped out | Works to the Eastney LSO are not anticipated. |
| Havant Thicket Reservoir | Scoped out | Scoped out | The proposed changes to Havant Thicket Reservoir relate to the storage of recycled water and would not affect the landscape and visual baseline |
| Night-time lighting | Scoped in | Scoped in | Potential impacts on the landscape and visual baseline of temporary lighting of the works during construction and the permanent lighting of proposed AGP during operation will be considered. |
| **Landscape receptors** | | | |
| South Downs National Park designated landscape and its setting<br>Special qualities:<br>Diverse, inspirational landscapes and breath-taking views<br>Tranquil and unspoilt places<br>Opportunities for recreational activities and learning experiences<br>Distinctive towns and villages | Scoped in | Scoped in | The western half of the Scoping Area is next to the SDNP boundary. There is the potential for direct effects if the Proposed Development is within the SDNP and indirect effects on the setting of the designated landscape, including impacts on the night time baseline. |
| Chichester Harbour AONB | Scoped in | Scoped in | There is potential for impacts on the setting of the Chichester Harbour AONB relating principally to the WRP and HLPS. |
| NCA 128 South Hampshire Lowlands | Scoped in | Scoped in | The content will be considered as part of the landscape baseline. Considered too high level for the nature of the Proposed Development to be assessed as a landscape receptor itself. |
| South Downs National Park LCA E4 Itchen Valley | Scoped in | Scoped in | In the absence of mitigation, negative effects on designated sites could occur during the construction and |
| South Downs National Park LCA D1 South | Scoped in | Scoped in | |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| Winchester Downland Mosaic | | | operational phases of the Proposed Development. |
| Hampshire LCA 9g Havant and Emsworth Coastal Plain | Scoped in | Scoped in | In the absence of mitigation, negative effects on designated sites could occur during the construction and operational phases of the Proposed Development. |
| Hampshire LCA 10a Langstone and Chichester Harbours | Scoped in | Scoped in | Only very limited direct effects from the underground section of the Preferred Pipeline Corridor are anticipated. Indirect effects from the proposed WRP. |
| Hampshire LCA 2f Forest of Bere East | Scoped in | Scoped in | In the absence of mitigation, negative effects on designated sites could occur during the construction and operational phases of the Proposed Development. |
| Hampshire LCA 8i Portsdown Hill Open Downs | Scoped in | Scoped in | In the absence of mitigation, negative effects on designated sites could occur during the construction and operational phases of the Proposed Development. |
| Hampshire LCA 3e Meon Valley | Scoped in | Scoped in | In the absence of mitigation, negative effects on designated sites could occur during the construction and operational phases of the Proposed Development. |
| Hampshire LCA 2e Forest of Bere West | Scoped in | Scoped in | In the absence of mitigation, negative effects on designated sites could occur during the construction and operational phases of the Proposed Development. |
| Hampshire LCA 3c Itchen Valley | Scoped in | Scoped in | In the absence of mitigation, negative effects on designated sites could occur during the construction and operational phases of the Proposed Development. |
| Eastleigh LCA 7 Bishopstoke – Fair Oak Woodland & Farmland<br>Eastleigh LCA 7a Stroudwood Levels<br>Eastleigh LCA 8 Knowle Hill Farmland & Woodland | Scoped in | Scoped in | The content will be considered as part of the landscape baseline, however using HCC Integrated Landscape Character Assessment boundaries as a basis of scale of assessment.<br><br>In the absence of mitigation, negative effects on designated sites could occur during the construction and operational phases of the Proposed Development. |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| Fareham LCA 9 North Fareham Downs<br>Fareham LCA 11 Portsdown<br>Fareham LCA 10 Forest of Bere | Scoped in | Scoped in | The content will be considered as part of the landscape baseline, however using HCC Integrated Landscape Character Assessment boundaries as a basis of scale of assessment.<br><br>In the absence of mitigation, negative effects on designated sites could occur during the construction and operational phases of the Proposed Development. |
| Winchester LCA 13 Lower Itchen valley<br>LCA 18 Forest of Bere Lowlands<br>LCA 19 Portsdown Hill<br>LCA 20 Lower Meon Valley<br>LCA 21 Whiteley Woodlands<br>LCA 22 Shedfield Heathlands<br>LCA 23 Durley Claylands | Scoped in | Scoped in | The content will be considered as part of the landscape baseline, however using HCC Integrated Landscape Character Assessment boundaries as a basis of scale of assessment.<br><br>In the absence of mitigation, negative effects on designated sites could occur during the construction and operational phases of the Proposed Development. |
| East Hampshire LCA 10a Havant Thicket and Southleigh Forest | Scoped in | Scoped in | The content will be considered as part of the landscape baseline, however using HCC Integrated Landscape Character Assessment boundaries as a basis of scale of assessment.<br><br>In the absence of mitigation, negative effects on designated sites could occur during the construction and operational phases of the Proposed Development. |
| Havant LCA 12 Portsdown Hill<br>LCA 41 South Moor and Broadmarsh Coastal Park | Scoped in | Scoped in | The content will be considered as part of the landscape baseline, however using HCC Integrated Landscape Character Assessment boundaries as a basis of scale of assessment. |
| Havant Borough townscape character areas<br>TCA 2b Bedhampton and Brockhampton suburbs, TCA 2c Bedhampton historic core, TCA 7d Leigh Park west, TCA 7e | Scoped in | Scoped out | Scoped in during construction due to the presence of interim tunnel shafts and associated compounds throughout Havant.<br><br>Scoped out of operation as the tunnel shafts will be capped and there will be |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| Leigh Park and TCA 7g Stockheath Lane environs | | | no likely significant change to townscape or visual baseline. |
| **Recreational visual receptors** | | | |
| Walkers on the Allan King Way | Scoped in | Scoped in | Construction: potential impacts to sequential views.<br><br>Operation: Location of the proposed AGP potentially resulting in changes to sequential views. |
| Walkers on the Itchen Way | Scoped in | Scoped in | |
| Walkers on the Harts Farm Way | Scoped in | Scoped in | |
| Walkers on the Pilgrims Trail | Scoped in | Scoped in | |
| Walkers on Solent Way | Scoped in | Scoped in | |
| Walkers on the Wayfarer's Walk | Scoped in | Scoped in | |
| European Route 9 LDP, and Staunton Way Recreational Trail | Scoped in | Scoped in | Direct impacts to users of the PRoW anticipated |
| Visitors to Bambridge Park | Scoped in | Scoped in | Direct impacts to users of the park anticipated |
| Visitors to Broadmarsh Coastal Park | Scoped in | Scoped in | Direct impacts from the proposed WRP are anticipated |
| Visitors to Staunton Country Park | Scoped in | Scoped in | Direct impacts to park anticipated |
| Recreational users at Langstone Harbour | Scoped in | Scoped in | Potential impacts of views of the proposed WRP |
| Users of local PRoW | Scoped in | Scoped in | Large coverage of PRoW leaves greater level of uncertainty of effects, therefore PRoWs have been scoped in. |
| **Community visual receptors** | | | |
| Colden Common and Bambridge and Otterbourne Communities | Scoped in | Scoped in | Potential impacts to close-range views of open cut trenching, and potential for direct impacts resulting from open cut trenching and tunnelling during construction. Operation: potential changes to views of proposed AGP.<br>Potential impacts to close-range views during operation. |
| Crowdhill and Fisher's Pond community | Scoped in | Scoped in | Potential impacts to close-range views and potential for direct impacts of open cut trenching and tunnelling during construction. |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| | | | Potential impacts to close-range views during operation. |
| Fair Oak and Bishopstoke | Scoped in | Scoped in | Mid-range views of open cut trenching.<br><br>Potential impacts to mid-range views during operation. |
| Durley Street and Lower Upham communities | Scoped in | Scoped in | Very close-range views of open cut trenching, tunnelling and potentially of proposed AGP. |
| Bishop's Waltham, Newtown community | Scoped in | Scoped in | Close range views of open cut trenching, tunnelling and potential for views of proposed AGP. |
| Waltham Chase community | Scoped in | Scoped in | Close range views of open cut trenching, tunnelling and potential for views of proposed AGP. |
| Shedfield and Shirrel Heath community | Scoped in | Scoped in | Close range views of Proposed Development through High Street. |
| Wickham community | Scoped in | Scoped in | Close range views of Proposed Development. |
| Knowle community | Scoped in | Scoped in | Close range views of construction of Proposed Development through River Meon. Operation: Potential for views of proposed AGP. |
| Community of Funtley, North Fareham and surrounding scattered properties north of M27 | Scoped in | Scoped in | Medium range views of Proposed Development. |
| Southwick community | Scoped in | Scoped in | Close range views of construction of Proposed Development.<br>Operation: Potential for views of proposed AGP. |
| Communities at Purbrook Heath, Widley and Crookhorn | Scoped in | Scoped in | Mid-range views of Proposed Development<br>Operation: Potential for views of proposed AGP. |
| **Tourism visual receptors** | | | |
| Visitors to Fort Widley, Fort Southwick and Fort Nelson | Scoped in | Scoped in | Elevated panoramic views north over Proposed Development between Purbrook and Southwick. |
| Visitors to the viewpoint on B2177and surrounding common land of Portsdown Hill | Scoped in | Scoped in | Elevated panoramic views north over Proposed Development between Purbrook and Southwick. |
| **Transport visual receptors** | | | |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| Motorists of the A27/ M27 | Scoped out | Scoped out | Low sensitivity receptors with sequential views unlikely significant effects |
| Motorists of the B2177 | Scoped out | Scoped out | |
| Motorists of the local road network | Scoped out | Scoped out | |

# 14 Noise and vibration

## 14.1 Introduction

14.1.1 This chapter outlines the scope and methodology for the assessment of the potential likely significant effects arising from the construction, operation and decommissioning of the Proposed Development on noise and vibration.

14.1.2 The construction and operational phases of the Proposed Development may emit airborne and groundborne noise and vibration with the potential to result in direct effects at noise and vibration sensitive receptors (NVSRs). The Proposed Development may also result in increased traffic flows on nearby roads, thereby causing indirect effects due to increases in road traffic noise levels at NVSRs. Changes in road traffic noise levels are classified as indirect effects as they are caused by a separate impact of the Proposed Development (additional road traffic) rather than noise emitted by the specific Proposed Development activities.

14.1.3 This chapter only assesses effects on human NVSRs, which includes structures, as discussed in section 0 of this chapter. The Proposed Development may result in noise and vibration effects at ecological receptors, and these topics are considered in Chapter 8 Terrestrial and freshwater biodiversity and Chapter 9 Marine biodiversity.

14.1.4 There are links between this chapter and the following chapters of this Scoping Report:

- Chapter 12 Land use and agriculture considers effects on amenity, taking into account potential noise impacts.
- Chapter 7 Archaeology and cultural heritage considers effects from changes to the setting of heritage assets, which includes noise and vibration impacts, and vibration affecting the fabric of a heritage asset.
- Chapter 13 Landscape and visual considers effects from disruption to tranquillity, which could include noise impacts.

## 14.2 Legislation, policy and guidance

14.2.1 The assessment has been carried out in accordance with relevant policy, legislation, and guidance as summarised below. It is recognised that this list is non-exhaustive and will be kept under review to take account of any later legislation or policy changes.

### Legislation

14.2.2 The relevant legislation includes:

- Control of Pollution Act 1974 (Section 60 and 61) [251]
- Environmental Protection Act 1990 (Part III) [252]
- The Environmental Noise (England) Regulations 2006 [253]

## National policy

14.2.3 The relevant national policy includes:

- NPSWRI [4] (paragraphs 4.11.1 to 4.11.16) (see description below)
- NPPF [5] (paragraphs 174 and 185)
- Noise Policy Statement for England (NPSE), 2010 [255]
- Planning Practice Guidance on Noise (PPG-N), 2019 [256]

*National Policy Statement for Water Resources Infrastructure 2023*

14.2.4 The NPSWRI [4] is the *"primary basis for preparing applications for development consent, for examination by the Examining Authority and for making decisions by the SoS in considering development consent applications"* (NPSWRI paragraph 1.1.2). The requirements of the NPSWRI in relation to noise and vibration are set out below.

14.2.5 Paragraph 4.11.3 sets out the required information relating to noise and vibration that should be included in the ES, as follows:

- "*a description of the noise-generating aspects of the development proposal leading to noise impacts, including the identification of any distinctive tonal, impulsive or low frequency characteristics of the noise;*
- *identification of noise-sensitive receptors and noise-sensitive areas that may be affected;*
- *the characteristics of the existing noise environment;*
- *a prediction of how the noise environment will change with the proposed development:*
  - in the shorter term, such as during the construction period;
  - in the longer term, during the operating life of the infrastructure; and
  - at particular times of the day, evening and night (and weekends) as appropriate, and at different times of the year.
- *an assessment of the effect of predicted changes in the noise environment on any noise-sensitive receptors, including an assessment of any likely impact on health and well-being where appropriate, and noise-sensitive areas;*
- *if likely to cause disturbance, an assessment of the effect of underwater or subterranean noise; and*
- *measures to be employed in mitigating the effects of noise - applicants should consider using best available techniques to reduce noise impacts."*

14.2.6 The above information will be included into the ES Noise and vibration chapter as applicable.

14.2.7 Paragraph 4.11.5 requires an assessment of noise impacts from "ancillary activities associated with the development" such as transportation to be assessed. The only anticipated Proposed Development ancillary activity with the potential to cause noise impacts is additional road traffic. Section 14.5 of this chapter discusses the proposed scope of the Noise and vibration ES assessment, including road traffic noise impacts.

14.2.8 Paragraph 4.11.6 requires assessments of operational and construction phase noise impacts to be undertaken in accordance with relevant BS and other guidance. The applicable guidance and standards to these assessments are described in this chapter of the EIA Scoping Report.

14.2.9 Paragraphs 4.11.7 and 4.11.9 discuss assessments of noise impacts on protected species or other wildlife. These topics are considered in Chapter 8 Terrestrial and freshwater biodiversity and Chapter 9 Marine biodiversity of this EIA Scoping Report.

14.2.10 Paragraphs 4.11.8, 4.11.9, 4.11.10, 4.11.12 4.11.14 and 4.11.15 all discuss design and mitigation requirements for construction and operational noise impacts and how these will be secured to ensure noise impacts are no worse than those on which the assessment is based. The noise and vibration assessment will identify all design and mitigation measures incorporated into the assessment and the means by which they will be secured.

14.2.11 Paragraph 4.11.11 requires that due regard is given to the NPSE, NPPF and PPG-N.

14.2.12 Paragraph 4.11.13 states that "*The Secretary of State should not grant development consent unless satisfied that the proposals will meet the following aims, through the effective management and control of noise, within the context of government policy on sustainable development:*

- *avoid significant adverse impacts on health and quality of life from noise as a result of the new development*
- *minimise and mitigate other adverse impacts on health and quality of life from noise from the new development*
- *where possible, contribute to improvements to health and quality of life"*

### *National Planning Policy Framework*

14.2.13 The NPPF [5] forms the basis of the Government's planning policies for England and how these should be applied. Paragraph 5 of the document states that it "*does not contain specific policies for nationally significant infrastructure projects. These are determined in accordance with the decision-making framework in the Planning Act 2008 (as amended) and relevant national policy statements for major infrastructure, as well as any other matters that are relevant (which may include the National Planning Policy Framework). National policy statements form part of the overall framework of national planning policy, and may be a material consideration in preparing plans and making decisions on planning applications.*"

14.2.14 Section 15, paragraph 174 of the NPPF states planning policies and decisions should contribute to and enhance the natural and local environment by: *"e)……preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution……"*

14.2.15 Furthermore, Section 15, paragraph 185 states: "Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the

site or the wider area to impacts that could arise from the development. In doing so they should:

14.2.16 a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development - and avoid noise giving rise to significant adverse impacts on health and the quality of life;

14.2.17 b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason….."

*Noise Policy Statement for England*

14.2.18 The Explanatory Note within the NPSE introduces the following concepts to aid in the establishment of likely significant effects:

- No Observed Effect Level (NOEL): the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established.
- Lowest Observable Adverse Effect Level (LOAEL): the level above which adverse effects on health and quality of life can be detected.
- Significant Observed Adverse Effect Level (SOAEL): the level above which significant adverse effects on health and quality of life occur.

14.2.19 The aims of the NPSE can therefore be interpreted as follows (within the context of Government policy on sustainable development):

- The first aim is to avoid noise levels above the SOAEL.
- To consider situations where noise levels are between the LOAEL and SOAEL. In such circumstances, all reasonable steps should be taken to mitigate and minimise the effects. However, this does not mean that such adverse effects cannot occur.

14.2.20 The NPSE recognises that 'it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations'. The levels are likely to be different for different noise sources, for different receptors and at different times of the day. Section 14.6 of this chapter defines the LOAEL and SOAEL proposed for each potential impact. The setting of these levels has been informed by the additional guidance in the web-based PPG-N on the concepts of NOEL, LOAEL and SOAEL.

## Local policy

14.2.21 Relevant local policies are listed in Table 14-1 may be considered both important and relevant to the Proposed Development. In the event that there is any conflict between these and the NPSWRI, the NPS would prevail.

**Table 14-1: List of relevant local policy**

| Local authority | Relevant local policy |
|---|---|
| EHDC | East Hampshire District Local Plan: Joint Core Strategy (2014) [257]<br>• CP27 - Pollution |
| EBC | Eastleigh Borough Local Plan 2016-2036 (2022) [258] |

| Local authority | Relevant local policy |
|---|---|
| | • DM1 - General criteria for new development<br>• DM8 - Pollution |
| FBC | Fareham Local Plan 2037 (2023) [259]<br>• D2 - Ensuring Good Environmental Conditions |
| HBC | Havant Borough Core Strategy (2011) [260]<br>• CS16 - High Quality Design<br>• CS20 - Transport and Access Strategy<br>• DM8 - Conservation, Protection and Enhancement of Existing Natural Features<br>• DM10 - Pollution<br>• DM12 - Mitigating the Impacts of Travel |
| PCC | Portsmouth Plan (The Portsmouth Core Strategy) (2012) [261]<br>• PCS13 - A Greener Portsmouth<br>Portsmouth Local Plan 2038 (Draft) (2021) [262]<br>• C3 - Transport<br>• G1 - Biodiversity<br>• D3 - Pollution, Health and Amenity |
| WCC | Winchester District Local Plan Part 1 Joint Core Strategy (2013) [56]<br>No specific relevant policies; however, the following saved policies from the Winchester District Local Plan Review (2006) [263] are relevant:<br>• DP10 - Pollution Generating Development<br>• DP11 - Unneighbourly Uses |
| SDNPA | South Downs Local Plan (2019) [58]<br>• SD7 - Relative Tranquillity<br>• SD54 - Pollution and Air Quality |

### Guidance and standards

14.2.22 Relevant guidance and standards which have been used as part of the scoping assessment include:

- BS 4142:2014+A1:2019 Method for Rating and Assessing Industrial and Commercial Sound [264] [264]
- BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 1: Noise [265]
- BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 2: Vibration [266]
- BS 7385-2:1993 Evaluation and measurement for vibration in buildings - Guide to damage levels from ground borne vibration [267]
- ISO 4866: 2010 Mechanical vibration and shock — Vibration of fixed structures — Guidelines for the measurement of vibrations and evaluation of their effects on structures [268]

- BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings [269]
- BS 7445-1:2003 Description and measurement of environmental noise. Guide to quantities and procedures [270]
- BS 7445-2:1991 Description and measurement of environmental noise. Guide to the acquisition of data pertinent to land use [271]
- BS 6472-1:2008 Guide to Evaluation of Human Exposure to Vibration in Buildings [272]
- Calculation of Road Traffic Noise (CRTN), 1988 [273]
- DMRB LA111 Noise and Vibration, 2021 [274]
- World Health Organization (1999) Guidelines for Community Noise [275]
- World Health Organization (2009) Night Noise Guidelines for Europe [276]
- World Health Organization (2018) Environmental Noise Guidelines for the European Region [277]
- Planning Inspectorate (2020) Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements, (Version 7) [1]
- Institute of Environmental Management & Assessment (IEMA) (2014), Guidelines for Environmental Noise Impact Assessment [278]
- Department for Education (2015), Building Bulletin 93 Acoustic design of schools: performance standards [279]
- Department of Health (2013), Health Technical Memorandum 08-01: Acoustics [280]

14.2.23 Whilst the DMRB LA111 is specifically related to the impact of proposed highway schemes, it provides guidance on the assessment of construction noise and vibration impacts, as well as the impact of construction traffic noise, which is considered relevant to the Proposed Development.

## 14.3 Engagement

14.3.1 Technical engagement on noise and vibration is taking place through EIA Working Groups that have been established for the Proposed Development. For noise and vibration, this is the Emissions and Transport EIA Working Group, which includes the stakeholders listed below. Working groups have been held on 14 June 2022, 9 September 2022 and 8 June 2023. Stakeholders were provided with an overview of the Proposed Development and were invited to comment on the scope and methodology of the assessment for noise and vibration.

14.3.2 The following stakeholders have responsibility for aspects of noise and vibration and will continue to be engaged as part of the EIA process:

- Eastleigh Borough Council (EBC)
- Fareham Borough Council (FBC)
- Hampshire County Council (HCC)
- Havant Borough Council (HBC)

- Portsmouth City Council (PCC)
- South Downs National Park Authority (SDNPA)
- Winchester City Council (WCC)
- National Highways (NH)
- Natural England (NE)

14.3.3 The EIA Working Group was also provided with an Outline Acoustic Survey Strategy document, which details the proposed approach to baseline data collection for the noise and vibration assessment to be included within the EIA. Following the close of Public Consultation 2022, held between 5 July and 16 August, stakeholder feedback has been reviewed. Relevant feedback on this topic from consultees and stakeholders are summarised in Table 14-2, which will be considered within the EIA as part of the noise and vibration assessment.

**Table 14-2: Public consultation 2022 responses**

| Stakeholder | Consultation response | Scoping response |
|---|---|---|
| Woodland Trust | Received 10 August 2022.<br>This feedback raises concerns about the potential for "*significant adverse impacts to ancient woodland from potential direct loss to facilitate construction of the pipeline, or through indirect impact if construction works occur within close proximity to these habitats.*" Of specific concern is the potential "*noise and dust pollution impact to woodlands within close proximity of the pipeline*". It recommends mitigation measures are used to control pollution to alleviate these impacts, including control of noise. | The potential noise impacts on ecological receptors, such as the species habitats in ancient woodland referenced in this response, are considered within Chapter 8 Terrestrial and freshwater biodiversity of this EIA Scoping Report. |
| EBC | Received 7 September 2022<br>This feedback related to the Outline Acoustic Survey Strategy and included comments on the following:<br>Assessment of road traffic noise impacts – lack of baseline information, potential for disturbance in rural areas and assessment of noise from haul routes<br>Assessment of operational noise – criteria which will be used and procedures for dealing with low background noise levels and intermittent sources such as back-up generators<br>Assessment of construction noise impacts to consider minimum durations for likely significant effects to occur | These comments were discussed in EIA Working Group session 3 and a further meeting is to be arranged to discuss them in more detail. |

| Stakeholder | Consultation response | Scoping response |
|---|---|---|
| | Additional Local Authorities may require consultation where work is close to a boundary<br>What are the criteria for determining what will be 'significant' noise and/ or vibration impact?<br>If access for unattended surveys in some gardens cannot be achieved, are alternative 'representative' locations being considered for the longer surveys? | |

## 14.4 Approach to scoping

### Study area

14.4.1 The noise and vibration study areas for the EIA will be established through stakeholder engagement and by identifying the NVSRs with the potential to be impacted by the Proposed Development. Separate study areas will be established for direct effects due to construction noise, construction vibration and operational noise, as well as for indirect effects due to construction traffic noise, as discussed in paragraph 14.4.4 and 14.4.5.

14.4.2 The indicative study area for the purpose of EIA scoping is based on the Scoping Area for the Proposed Development, as described in Chapter 3 Description of the proposed development, and the nearby NVSRs within the maximum distances specified below.

14.4.3 The proposed study areas for noise receptors will be refined at the assessment stage as the design and consultation processes progress, and as related topic assessments are progressed (e.g., Traffic and transport).

#### *Direct effects*

14.4.4 The direct noise and vibration effects study area extends from the Scoping Area to the closest NVSRs, except for the Havant Thicket Reservoir and Eastney TT elements of the Scoping Area, which are excluded from the assessment scope. The maximum distances to NVSRs at which effects will be considered depend on the Proposed Development phase as follows:

- Construction - in accordance with the guidance in the DMRB LA111 Noise and Vibration Rev 2 (2020) [271], construction impacts would only be assessed at NVSRs which are no further than 300m from the Scoping Area for noise, and 100 m from the Scoping Area for vibration. These study areas are shown in Figure 14.1 Noise and Vibration Direct Construction Effects Study Areas in Volume III.
- Operation - to ensure all potential operational noise impacts are assessed, the proposed WRP, proposed HLPS and proposed AGP have all been assumed to have the potential to emit audible levels of operational noise. There is no

applicable guidance on an appropriate study area for the assessment of operational noise impacts, this depends on the sound emission levels from the plant at each site, which are not known at this stage. Through stakeholder engagement, a sufficient study area will be determined that captures all receptors with the potential to experience likely significant operational noise effects, once the plant sound emissions data are available.

*Indirect effects*

14.4.5 The indirect noise effects study area relates to potential impacts due to changes in road traffic noise levels. In accordance with the DMRB, it incorporates the roads on which the Proposed Development traffic is anticipated to result in noise level changes of at least 1 dB(A). These road links will be identified once the required traffic data are available; hence, it has not been possible to identify an indirect noise effects study area at scoping stage. The indirect noise effects study area will incorporate the identified links and the closest NVSRs which are no more than 50m away. Where there are no NVSRs within 50m, this link will be excluded from the study area.

14.4.6 The location of the temporary construction hub (as described in Chapter 3 Description of the proposed development) is not known at this time of writing. This is expected to be an existing consented site and may be situated outside of the Scoping Area. The noise and vibration effects of the hub will be assessed as part of the Noise and vibration Assessment.

## Sources of baseline data

14.4.7 The data in Table 14-3 has been used to inform the baseline:

**Table 14-3: Source of baseline data**

| Baseline data | Source of data |
|---|---|
| Ordnance Survey mapping | Ordnance Survey data |
| Noise Important Areas | Defra Spatial Data Download [281] |
| Strategic Noise Mapping | Extrium.co.uk [282] [282] |

## Baseline conditions

14.4.8 This section provides a summary of baseline conditions in respect of noise and vibration, including the presence of the following within the study area:

- NVSRs - including residential and sensitive sites such as schools, parks and places of worship
- Vibration sensitive other receptors - buildings containing potentially vibration sensitive equipment (such as scientific laboratories or microelectronics manufacturing) and cultural heritage assets.
- Road traffic Noise Important Areas (NIAs) - locations where the highest 1% of road traffic noise levels have been predicted, according to the Round 3 strategic noise mapping undertaken by Defra as part of its obligations under the Environmental Noise Directive (END) (2002/49/EC) (European Parliament,

2002), implemented in England by the Environmental Noise (England) Regulations 2006 (as amended).

- Areas prized for their recreational and amenity value due to tranquillity, and therefore considered to require protection from noise impacts, in accordance with the NPPF [5].

14.4.9 Further information of relevance to the baseline noise and vibration conditions is provided in the following chapters of this EIA Scoping Report:

- Chapter 7 Archaeology and cultural heritage identifies potentially sensitive cultural sites.
- Chapter 12 Land use and agriculture and Chapter 16 Socio-economics, tourism, recreation and health discusses types and locations of industrial sites.
- Chapter 13 Landscape and visual identifies landscape receptors including tranquil and unspoilt spaces for inclusion in the EIA.

14.4.10 In the absence of measurements, existing strategic noise mapping data has been utilised to give an indication of baseline noise levels within the study area. The strategic noise mapping has been published by Defra as part of implementing the END and shows predicted railway and road traffic noise levels in the vicinity of major transportation routes.

14.4.11 The noise baseline within the study area is described by reference to the following principal components of the Proposed Development:

- Proposed WRP and HLPS
- Proposed Underground Pipeline between Budds Farm WTW and the proposed WRP
- Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir
- Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW
- Use of Havant Thicket Reservoir for the storage of recycled water

14.4.12 The proposed AGP will be located within the above principal components; hence, the applicable baseline noise conditions are captured in the descriptions for these components.

14.4.13 Baseline noise conditions are specific to individual locations and therefore not identified on a Proposed Development wide basis.

### Proposed Water Recycling Plant and proposed High Lift Pumping Station

14.4.14 The closest high sensitivity (see Table 14-4 for sensitivity definitions) human NVSRs have been identified to be the two residential dwellings at the end of Mill Lane to the north at a minimum of around 181m from the site of the proposed WRP.

14.4.15 No NIAs have been identified within 300 m of the proposed WRP.

14.4.16 The Broadmarsh Business and Innovation Centre is around 70m from the proposed WRP and may include buildings containing vibration sensitive plant. Stakeholder engagement undertaken during the EIA process will include engaging

with the businesses in this centre to determine the nature of the activities and plant undertaken at this location.

14.4.17 The proposed WRP is surrounded to the north and west by trunk roads (the A27 and A3(M)). Traffic on these roads is likely to be the dominant source in the baseline noise climate. Strategic noise mapping indicates baseline road traffic noise levels at the NVSRs on Mill Lane (the façades of the nearest noise sensitive buildings) are likely to be between 65 and 70 dB $L_{Aeq,16h}$.

### Proposed Underground Pipeline between Budds Farm Wastewater Treatment Works and the proposed Water Recycling Plant

14.4.18 No human NVSRs have been identified within 300m of the Scoping Area from Budds Farm WTW to the proposed WRP.

14.4.19 No other receptors which are likely to be vibration sensitive have been identified within 100m.

### Proposed Underground Pipeline between the proposed Water Recycling Plant and Havant Thicket Reservoir

14.4.20 The Preferred Pipeline Corridor runs through the residential areas of Bedhampton and Leigh Park.

14.4.21 No other receptors that are likely to be vibration sensitive have been identified within 100 m of the Scoping Area.

14.4.22 One NIA has been identified within 300m of the Scoping Area.

- ID 1864 on the A27, the asset owner is National Highways

14.4.23 At its southern end, road traffic on the A27 and A3(M) are likely to be the dominant sources in the baseline noise climate and strategic noise mapping indicates noise levels at the closest NVSRs range from 65 to 55 dB $L_{Aeq,16h}$, depending on proximity to these roads. However, in the identified residential areas, Defra has not produced strategic noise mapping due to the distance from nearby major transportation sources. This can be assumed to indicate that baseline road traffic noise levels are below 55 dB $L_{Aeq,16h}$ (the minimum predicted noise level in the strategic mapping dataset).

### Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

14.4.24 This section of Preferred Pipeline Corridor runs through the residential areas of Bedhampton, Leigh Park, Farlington, Widley, Knowle, Wickham, Shedfield, Shirral Heath and near isolated individual dwellings to the south of Waltham Chase, Bishops Waltham and Newtown.

14.4.25 At some locations, the Scoping Area is less than 300m from the South Downs National Park. The South Downs National Park is likely to be considered a "*tranquil area*" as per paragraph 185 of the NPPF [5], which requires that planning policies and decisions should: "*identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason*".

14.4.26 No other receptors that are likely to be vibration sensitive have been identified within 100m of the Scoping Area.

14.4.27 Three NIAs have been identified within 300m of the Scoping Area.

- ID 1855 on the A3(M), the asset owner is National Highways
- ID 12609 on the A3, the asset owner is PCC
- ID 6021 is on the M3, the asset owner is National Highways

14.4.28 Strategic noise mapping indicates that the baseline noise levels at the closest NVSRs to the Scoping Area and in the vicinity of A2030, A3(M) and the A27 range from 70 to 60 dB $L_{Aeq,16h}$. At NVSRs in proximity to A32, B2177 and the A334 the noise levels range from 65 to 55 dB $L_{Aeq,16h}$. At all other NVSR locations, Defra has not produced strategic noise mapping, indicating that the baseline noise levels at the NVSRs are likely to be <55dB $L_{Aeq,16h}$.

### Use of Havant Thicket Reservoir for the storage of recycled water

14.4.29 The proposed usage of Havant Thicket Reservoir for the storage of recycled water will not require any construction activities outside the scope of the Proposed Underground Pipeline and its connection with the reservoir, as described above, and will not require any operational plant. Hence, this is not anticipated to result in noise-related effects, and therefore, as discussed in section 14.5 of this chapter, is scoped out of the assessment. Hence, baseline conditions at this location have not been identified.

## 14.5 Scoping of potential effects

14.5.1 The Proposed Development has the potential to affect NVSRs, both during construction and once in operation.

14.5.2 Effects from decommissioning of the Proposed Development are considered to be no greater than those identified during the construction phase, and are therefore assessed as construction effects as a worst case scenario. Please refer to section 3.7 of Chapter 3 Description of the proposed development, for further information on decommissioning.

### Effects scoped into the assessment

#### *Construction effects*

14.5.3 The proximity of sensitive receptors to the Proposed Development, means that there would be potential for adverse effects, albeit temporary, during the construction phase.

14.5.4 Construction of the proposed WRP, proposed HLPS and proposed AGP is likely to involve earthworks and construction of structures, and potentially piling foundations. All these activities will emit noise and vibration with the potential to impact on nearby NVSRs.

14.5.5 The Proposed Underground Pipelines are likely be installed using a combination of open cut and trenchless techniques/tunnelling. Open-cut excavation is likely to

result in short duration (less than one month) impacts at any nearby NVSRs as the construction will progress relatively quickly. Trenchless techniques may result in noise and vibration impacts lasting for more than one month (including the potential for night-time works) at NVSRs close to the pit or shafts. Tunnelling can also result in ground-borne noise and vibration impacts at NVSRs.

14.5.6 Temporary construction compounds, haul routes and construction of the proposed AGP also have the potential to result in noise and vibration impacts lasting more than one month at nearby NVSRs than the construction of the Proposed Underground Pipeline, because these locations are fixed.

14.5.7 According to Chapter 17 Traffic and transport of this EIA Scoping Report, increased road traffic flows due to the Proposed Development would principally be associated with the delivery of materials and contractor movements to and from the construction compounds associated with the Proposed Underground Pipeline and AGP, which are assumed to be by road. In addition, traffic flows could be affected by potential road works, closures and diversions. These temporary road traffic flow changes on existing roads have the potential to result in noise effects.

14.5.8 The potential effects associated with the construction of the Proposed Development, and therefore scoped into the noise and vibration assessment, are likely to include:

- Direct, temporary, and adverse effect of increases in noise and vibration levels at NVSRs due to the construction activities; and
- Indirect, temporary adverse effect of changes in noise levels at NVSRs resulting from increased road traffic flows on existing roads.

*Operation effects*

14.5.9 The sources of noise associated with the operation of the Proposed Development are likely to comprise stationary mechanical plant such as pumps, ventilation fans and emergency generators. Where required, mitigation measures can be incorporated into the design of the Proposed Development to significantly reduce operational noise emissions from these plant types, such as enclosure of items with high noise emissions and/or attenuators. It is anticipated that potential operational noise effects will be limited to certain elements, such as the proposed WRP, proposed HLPS and proposed AGP, and therefore these effects are scoped into the EIA.

## Effects scoped out of the assessment

*Construction effects*

14.5.10 The primary mechanism for heavy vehicles to give rise to vibration is the movement of the vehicles over irregularities in the road surface. The DMRB states that "*a maintained road surface will be free of irregularities as part of project design and under general maintenance, so operational vibration will not have the potential to lead to significant adverse effects.*" The highways authority has a duty to undertake regular inspection and maintenance of the local highway network. Maintenance of the local highway network is outside of the control of the Applicant, and the Construction Traffic Management Plan (CTMP) will include a commitment to

reinstate the transport network if the road surface condition is damaged by construction traffic associated with the Proposed Development. For those roads which are currently in good condition, there would be no pathway for the increase in traffic flows on public roads associated with the construction of the Proposed Development to increase vibration levels at sensitive receptors.

14.5.11 If the construction traffic associated with the Proposed Development uses roads with existing surface irregularities, HGVs passing over these irregularities could emit vibration which is perceptible in nearby buildings. However, the additional HGVs introduced by the Proposed Development construction will generate vibration which is at a similar level to that caused by HGVs currently using the road. Whilst the additional HGVs would increase the frequency of passbys, and therefore the frequency of potential exposure to perceptible vibration, vibration levels are not calculated cumulatively. The impact assessment criteria for both annoyance (Table 14-8) and building damage (Table 14-10) are based on exceedance of a fixed limit (specified in peak particle velocity (PPV) by one event (in this case, one HGV passby)). The number of HGVs passing a property would therefore not affect the PPV experienced at a receptor in the way that it does for noise and hence, annoyance impacts due to vibration associated with construction traffic will be no worse than those due to noise. Research undertaken by the Transport and Road Research Laboratory (TRRL Report 246) [283] confirms this assertion, concluding that "*Overall, fewer people are bothered by vibration from traffic than by traffic noise. However, the proportion of residents seriously bothered by vibration (8%) is similar to the percentage seriously bothered by noise (9%).*" In accordance with best practice in the UK acoustics industry, the assessment therefore focusses on the potential for annoyance due to change in noise levels caused by construction traffic and vibration effects due to construction traffic are scoped out of the assessment.

14.5.12 TRRL Report 246 concluded that "there is no evidence to support the assertion that traffic vibration has a significant damaging effect on buildings". Hence, the impact of building damage due to vibration generated by the project construction traffic will also be not significant and this effect has been scoped out of the assessment.

### *Operation effects*

14.5.13 Since the Proposed Underground Pipeline will be buried, noise from the flow of water within the pipeline is considered unlikely to be perceptible at receptor locations. The Proposed Underground Pipeline will be designed and operated in accordance with industry good practice. This will ensure that pipeline walls are suitably rigid, and that fluid flow within the pipeline will be smooth enough that vibration issues associated with turbulent flow will be avoided. Smooth flowing water at pressure does not generate sound; hence, there would be no potential noise source associated with the Proposed Underground Pipeline. There have been no known instances of perceptible noise or vibration above ground due to the flow of water along modern designed and good condition buried pipelined operated by the developer. Hence, operational effects due to noise from the Proposed Underground Pipeline have been scoped out of the assessment.

14.5.14 The proposed WRP, HLPS and AGP are likely to incorporate pumps in the design which have the potential to be sources of vibration. However, as the pumps will be balanced, located on large concrete bases (anti-vibration mounts) and isolated from pipes using flexible connectors, any vibration transmitted into the ground is likely to be negligible. It is also the case that, once the attenuation due to the vibration by the concrete base and propagation with distance is accounted for, any ground-borne vibration which could be perceptible at receptors would cause damage to the plant emitting it; hence, such vibration issues will be controlled through site maintenance. As the vibration level would be negligible at source, it would be orders of magnitude less than what would be expected to give rise to likely significant effects at NVSRs. Therefore, operational effects due to vibration have been scoped out of the assessment.

14.5.15 To result in a change of 1dB (minimum noise level change perceptible), an increase in traffic levels of 20% is required. The proposed WRP is likely to be manned 24/7, potentially requiring around 16 light vehicle movements associated with staff travel for shift changes, plus one chemical delivery by HGV (tanker) is anticipated per day. One vehicle movement per week is anticipated to be required for monitoring/maintenance at the proposed IPS and proposed BPT. For these additional vehicles to result in a change in road traffic noise level of 1 dB, the baseline flow on the roads would need to be <50 vehicles as an Annual Average Weekday Traffic (AAWT) 18hr flow. Such low baseline flows would mean that traffic noise impacts from that road would be negligible, and for any other road, the change in traffic flows due to this traffic introduced by the operation of the Proposed Development will fall far short of the threshold needed to give rise to a noise impact. Therefore, the operational effects due to changes in road traffic noise levels have been scoped out of the assessment.

14.5.16 The Proposed Development comprises the use of the Havant Thicket Reservoir for the storage of recycled water before transfer to Otterbourne WSW. This usage is not anticipated to require any plant and therefore will not emit noise or vibration; hence, this component of the Proposed Development is scoped out of the assessment.

## 14.6 Approach to assessment

### Additional baseline data collection

14.6.1 Baseline attended and unattended noise surveys, to determine existing noise levels, will be conducted in accordance with current guidance, including BS 4142:2014 +A1:2019, and BS 7445-2:1991.

14.6.2 As required by BS 4142, traceable calibrated Class 1 Sound Level Meters will be used for all measurements during the survey. Measurements will capture the following noise level parameters in 15-minute intervals: $L_{Aeq}$, $L_{Amax}$, $L_{A90}$ and $L_{A10}$. Third-octave band sound levels will also be measured. The sound level meters will be calibrated before and after the survey using a portable sound pressure level calibrator.

14.6.3 Records of the meteorological conditions during the survey will be made and measurements will not be considered valid during periods of rain or when average wind speeds exceed 5m/s.

14.6.4 As shown in Table 14-7, the airborne construction noise level criteria are independent of the baseline noise level; hence, baseline noise levels are not required to assess construction noise effects using these criteria. However, where longer-term effects are anticipated, the predicted change in ambient noise level can be used to inform the qualitative assessment. Hence, baseline surveys are only proposed at receptors with the potential to experience direct construction noise effects for at least one month (anticipated to comprise the proposed WRP and proposed HLPS, proposed AGP, temporary construction compounds and trenchless crossings), or permanent direct operational noise effects. Further details are provided on the approach to baseline data collection within the following Assessment methodology sub-section relating to each identified impact.

### Assessment methodology

14.6.5 The impact assessment of noise and vibration effects is based on the sensitivity of the receptor and the magnitude of the impact. The assessment of magnitude of impact is based on comparison with the relevant noise and vibration criteria depending on the specific impact being considered.

14.6.6 In accordance with the Guidelines for Environmental Noise Impact Assessment [275], the sensitivity of receptors to noise or vibration has been classified. This has been done based on their usage, using professional judgement, as defined in Table 14-4.

**Table 14-4: Definitions of the different receptor sensitivity levels to noise and/or vibration impacts**

| Sensitivity | Definition | Examples |
|---|---|---|
| Very high | Receptors where noise or vibration level changes may significantly affect their usage. | Certain hospital wards (e.g. operating theatres or high dependency units), auditoria, laboratories with highly vibration sensitive equipment or buildings which are structurally unsound or identified as requiring special protection by cultural specialists (for example some historical/listed buildings or scheduled monuments). |
| High | Receptors where noise and/or vibration level changes may cause disturbance, protection is required but some tolerance is expected. | Residential accommodation, private gardens, hospital wards, care homes, schools, universities, research facilities and national parks (during the day). |
| Medium | Receptors where noise and/or vibration level changes may cause some distraction or disturbance. | Offices, shops (including cafes), outdoor amenity areas during the day (including recreation, public amenity space/play areas), long distance footpaths (including ProW, dog walking routes, bird watching areas, footpaths and other walking routes, visitor attractions, cycling routes including rural roads), doctor's surgeries, sports facilities and places of worship. |

| Sensitivity | Definition | Examples |
|---|---|---|
| Low | Receptors where noise and/or vibration level changes are not expected to be detrimental. | Warehouses, light industry, car parks, and agricultural land. |

14.6.7 The PPG-N provides a relationship between various perceptions of noise, effect level and required action in accordance with the NPPF [5]. This is reproduced in Table 14-5.

**Table 14-5: PPG-N Noise exposure hierarchy**

| Perception | Examples of outcomes | Increasing effect level | Action |
|---|---|---|---|
| Not noticeable | No effect | No Observed Effect | No specific measures required |
| Noticeable and not intrusive | Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there would be a perceived change in the quality of life. | No Observed Adverse Effect | No specific measures required |
| Lowest Observed Adverse Effect Level (LOAEL) | | | |
| Noticeable and intrusive | Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there would be no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there would be a perceived change in the quality of life. | Observed Adverse Effect | Mitigate and reduce to a minimum |
| Significant Observed Adverse Effect Level (SOAEL) | | | |
| Noticeable and disruptive | The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there would be no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area. | Significant Observed Adverse Effect | Avoid |
| Noticeable and very disruptive | Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep | Unacceptable Adverse Effect | Avoid |

| Perception | Examples of outcomes | Increasing effect level | Action |
|---|---|---|---|
| | deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory. | | |

14.6.8 Government policy for noise is based on community exposure response relationships and noise insulation of a typical dwelling. Consequently, an assessment based on LOAELs and SOAELs cannot be applied to non-residential sensitive receptors. As such, the approach to the assessment of non-residential receptors differs from that adopted for residential receptors. Non-residential receptors are considered on a case-by-case basis by considering the applicable design criteria for good indoor/outdoor noise levels.

14.6.9 The significance of an effect is determined using the matrix shown in Table 14-6, combined with professional judgement. Details of the professional judgement analysis are provided in relation to each impact. Typically, only moderate or major effects are considered significant and minor or neutral effects are not significant.

**Table 14-6: Effect significance matrix**

| | | Magnitude of impact | | | |
|---|---|---|---|---|---|
| | | **Major** | **Moderate** | **Minor** | **Negligible** |
| **Sensitivity of receptor** | **Very high** | **Major** | **Major** | **Moderate** | Minor |
| | **High** | **Major** | **Moderate** | Minor | Neutral |
| | **Medium** | **Moderate** | Minor | Neutral | Neutral |
| | **Low** | Minor | Neutral | Neutral | Neutral |

*Construction airborne noise*

14.6.10 A quantitative assessment of construction noise impacts is proposed based on estimates of reasonable worst case construction noise levels at the closest identified potentially sensitive receptors to the works. Reasonable worst case construction noise levels will be estimated in accordance with the methodology in BS 5228-1. Before contractors have been appointed to construct the Proposed Development, precise information on the construction works will not be available. The Applicant will engage with contractors to help inform assumptions. Construction noise levels between the LOAEL and the SOAEL have the potential to result in adverse effects but would not normally be classed as significant adverse effects. However, noise mitigation measures would still be considered/ applied in such locations to seek to keep all effects to a minimum, as per the second aim of the NPSE. Table 14-7 sets out the construction noise SOAEL and LOAEL proposed for the assessment of impacts on residential receptors.

Table 14-7: Construction noise SOAEL and LOAEL for all receptors

| Magnitude of Impact | Construction noise level (dB $L_{Aeq,T}$) | | | NPSE/PPG category |
|---|---|---|---|---|
| | Daytime* | Evenings and weekends** | Night-time*** | |
| Major | ≥80 | ≥70 | ≥60 | - |
| Moderate | ≥75 to <80 | ≥65 to <70 | ≥55 to <60 | Lower end of range is equivalent to SOAEL |
| Minor | ≥65 to <75 | ≥55 to <65 | ≥45 to <55 | Lower end of range is equivalent to LOAEL |
| Negligible | <65 | <55 | <45 | - |

*07:00 to 19:00 weekdays and 07:00 to 13:00 Saturdays
**19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays
***23:00 to 07:00

14.6.11 For the assessment of construction noise effects on public open space receptors, these will be deemed to be potentially significant if the total noise (pre-construction ambient plus construction noise) exceeds the pre-construction ambient noise by 5dB or more, subject to lower cut-off values of 65dB, 55dB and 45dB $L_{Aeq\ T}$, from construction noise alone, for the daytime, evening, and night-time periods respectively.

14.6.12 For the assessment of construction noise impacts on non-residential sensitive receptors and the noise sensitive space is indoors, the following guidance will be used to define appropriate noise level criteria:

- BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings
- Department for Education, Building Bulletin 93 Acoustic design of schools: performance standards, 2015
- Department of Health, Health Technical Memorandum 08-01: Acoustics, 2013

14.6.13 BS 5228-1 states that: *"If the site noise level exceeds the appropriate category [threshold] value, then a potential significant effect is indicated. The assessor then needs to consider other project-specific factors, such as the number of receptors affected and the duration and character of the impact, to determine if there is a significant effect."* The following demonstrates how these other factors can be considered to determine the effect significance:

The duration of the impact – construction noise levels equating to moderate or major impacts for less than 10-days (or 10-evenings/weekends or nights) in any 15, or 40-days (or 40 evenings/weekends or nights) in any 6-month period, would not normally be considered significant;

- The change in ambient noise level at the NVSR during the works – where impacts of minor or greater magnitude are predicted and baseline noise level data are available, the ambient noise level change will be calculated and compared with suitable criteria;

- The timing of the impact – night time impacts are more likely to be considered significant than daytime impacts;
- The location of the impact at the NVSR – a receptor may contain areas which are more or less sensitive than others, for example in a school, office spaces or kitchens would be considered less sensitive than classrooms; and
- The nature, times of use and design of the receptor, for example a Noise Sensitive Receptor (NSR) which is not used at night would not be considered sensitive to night-time construction works.

14.6.14 Baseline noise levels are not required to identify the LOAEL and SOAEL values for this assessment.

*Construction ground-borne noise*

14.6.15 A quantitative assessment is also proposed of construction ground-borne noise impacts, based on estimates of reasonable worst case tunnelling noise levels at the closest identified potentially sensitive receptors to the works.

14.6.16 There are no UK legislative standards or criteria that define when groundborne noise becomes significant. The most relevant guidance is in the Association of Noise Consultants 'Measurement and assessment of groundborne noise and vibration' [284] which describes published guidelines for assessing impacts of groundborne noise, including those published by the American Public Transit Association (APTA) [285]. The APTA guidelines suggest criteria for acceptable maximum levels of groundborne noise affecting various building types, including a criterion of 35 dB $L_{Amax}$ for groundborne noise affecting residential properties, during the day or night. This criterion is typically adopted as a LOAEL (as 35 dB $L_{Asmax}$) by major infrastructure projects in the UK, with 45 dB $L_{Asmax}$ as the SOAEL. These criteria are typically applied to permanent groundborne noise sources, such as new underground railway lines, however in the absence of suitable alternative criteria these will also be applied to the assessment of ground-borne noise during construction.

*Construction vibration*

14.6.17 Construction vibration impacts will be assessed for all activities which are a potentially significant source of vibration, such as vibratory rollers/compactors, where proposed within 100m of any identified potentially sensitive receptors.

14.6.18 Vibration from construction sites at the worst-case vibration sensitive receptors within the study area will be predicted using empirical calculations to predict the period Peak Particle Velocity (PPV) according to the guidance in Transport and Road Research Laboratory (TRRL) Report 53 [286], Transport Research Laboratory (TRL) Report 429 [287] and BS 5228-2 [263].

14.6.19 The transmission of groundborne vibration is highly dependent on the nature of the intervening ground between the source and receptor and the activities being undertaken. BS 5228-2 provides data on measured levels of vibration for various construction works under a variety of ground conditions and these will be used where required to supplement the calculations, for example to determine the likelihood of predicted levels actually occurring, based on real-life examples.

14.6.20 Impacts will be considered for both damage to buildings and annoyance to occupiers. Table 14-8 details PPV vibration levels and provides a semantic scale for the description of construction vibration effects on human receptors, based on guidance contained in BS 5228-2. The guidance does not state whether these relate to continuous or intermittent sources; however, it does state that "*Single or infrequent occurrences of these levels do not necessarily correspond to the stated effect in every case. The values are provided to give an initial indication of potential effects, and where these values are routinely measured or expected then an assessment in accordance with BS 6472-1 or -2, and/or other available guidance, might be appropriate to determine whether the time varying exposure is likely to give rise to any degree of adverse comment*."

**Table 14-8: Construction vibration criteria for human receptors (annoyance)**

| Vibration limit PPV ($mms^{-1}$) | Interpreted significance to humans | Magnitude of impact | NPSE/PPG Category |
|---|---|---|---|
| <0.14 | Vibration unlikely to be perceptible | Negligible | NOEL |
| 0.14 to 0.3 | Vibration might just be perceptible in the most sensitive situations for most vibration frequencies associated with construction | | |
| 0.3 to 1.0 | Vibration might just be perceptible in residential environments | Minor | LOAEL |
| 1.0 to <10.0 | It is likely that vibration at this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents | Moderate | SOAEL |
| >10.0 | Vibration is likely to be intolerable for any more than a brief exposure to this level | Major | |

14.6.21 Construction vibration effects on humans are considered significant when it is determined that a major or moderate magnitude of impact (according to Table 14-8) will occur for a duration exceeding:

- Ten or more days or nights in any 15 consecutive days or nights, or
- A total number of days exceeding 40 in any six consecutive months.

14.6.22 The response of a building to groundborne vibration is affected by the type of foundation, ground conditions, the building construction, and the condition of the building. BS 7385-2 provides guidance on vibration levels likely to result in cosmetic damage and is referenced in BS 5228-2. Guide values for transient vibration in terms of peak particle velocity (PPV), above which cosmetic damage could occur, are given in Table 14-9.

**Table 14-9: Transient Vibration Guide Values for Cosmetic Damage**

| Type of building | Peak component particle velocity in frequency range of predominant pulse | |
|---|---|---|
| | 4 Hz to 15 Hz | 15 Hz and above |
| Reinforced or framed structures | 50 $mm.s^{-1}$ at 4 Hz and above | |

| Type of building | Peak component particle velocity in frequency range of predominant pulse | |
|---|---|---|
| | 4 Hz to 15 Hz | 15 Hz and above |
| Industrial and heavy commercial buildings | | |
| Un-reinforced or light framed structures<br><br>Residential or light commercial type buildings | 15 mm.s$^{-1}$ at 4 Hz increasing to 20 mm.s$^{-1}$ at 15 Hz | 20 mm.s$^{-1}$ at 15 Hz increasing to 50 mm.s$^{-1}$ at 40 Hz and above |

14.6.23 BS 7385-2 states that the probability of building damage tends to zero for transient vibration levels less than 12.5 mm.s$^{-1}$ PPV. For continuous vibration, such as from vibratory rollers, the threshold is around half this value.

14.6.24 The values in Table 14-9 refer to the likelihood of cosmetic damage. ISO 4866:2010 defines three different categories of building damage:

- Cosmetic – formation of hairline cracks in plaster or drywall surfaces and in mortar joints of brick/concrete block constructions
- Minor – formation of large cracks or loosening and falling of plaster or drywall surfaces or cracks through brick/block.
- Major – damage to structural elements, cracks in support columns, loosening of joints, splaying of masonry cracks.
- BS 7385-2 states that minor damage occurs at a vibration level twice that of cosmetic damage and major damage occurs at a vibration level twice that of minor damage. Therefore, this guidance can be used to define the potential impact identified in Table 14-10 for continuous vibration.

**Table 14-10: Construction vibration criteria for assessing building damage**

| Magnitude of impact | Continuous vibration level PPV mms$^{-1}$ | Damage risk |
|---|---|---|
| Negligible | <6 | Negligible |
| Minor | 6 | Cosmetic |
| Moderate | 15 | Minor |
| Major | 30 | Major |

14.6.25 Construction vibration effects on buildings may therefore be considered significant where it is determined that a moderate or major magnitude of impact, according to Table 14-10.

14.6.26 The criteria adopted to assess construction vibration impacts are independent of vibration levels; therefore, a baseline vibration survey is not required to inform the construction vibration impact assessment.

*Construction traffic noise*

14.6.27 Construction traffic noise impacts along existing roads will be estimated based on the CRTN methodology for the calculation of the Basic Noise Level (BNL) at a reference distance of 10m from the nearside carriageway. Predictions will be undertaken for both the 'with' and 'without' construction traffic scenarios for the peak construction year, for each road link in the construction traffic model.

14.6.28 Details of the road network study area for the construction phase traffic assessment will be provided by the traffic EIA specialists, along with AAWT 18hr flows, % HGVs and speed data for each road link. These data will be used to undertake the BNL calculations. The Transport Research Laboratory (TRL) publication 'Converting the UK traffic noise level $L_{A10,18h}$ to EU noise indices for noise mapping' [288] will be used to determine night-time traffic noise levels.

14.6.29 If the provided traffic flow data indicate that traffic flows are below the validated CRTN range (<1000 vehicles per 18hrs), the alternative calculation method detailed in 'A Guide to Measurement and Prediction of the Equivalent Continuous Sound Level $L_{eq}$, Report by a Working Party for the Technical Sub-committee of the Noise Advisory Council' (NAC) will be used. This alternative methodology predicts the noise level at 10m from the nearside carriageway edge, similar to CRTN methodology. The NAC alternative methodology will be applied for both 'with development construction phase flows' and 'without development construction phase flows' noise level predictions, where the flow in either case falls outside the range of validity for CRTN (for each of the scenarios being assessed). Following this approach ensures that the resulting noise level change is determined based on following the same calculation approach i.e. CRTN without development and CRTN with development, NAC without development and NAC with development.

14.6.30 In order to determine impacts, the assessment of construction traffic noise compares the calculated BNLs with and without the construction traffic. Any changes in day or night-time noise levels due to a corresponding change in volume and composition will be assessed using the impact magnitude criteria detailed in Table 14-11, which is reproduced from Table 3.17 of DMRB.

**Table 14-11: Traffic noise magnitude of impact at receptors**

| Magnitude of impact | Increase in Basic Noise Level of closest public road used for construction traffic (dB) |
|---|---|
| Negligible | Less than 1.0 |
| Minor | Greater than or equal to 1.0 and less than 3.0 |
| Moderate | Greater than or equal to 3.0 and less than 5.0 |
| Major | Greater than or equal to 5.0 |

14.6.31 The LOAEL and SOAELs for construction traffic noise are defined in DMRB. These thresholds are detailed in Table 14-12.

Table 14-12: LOAELs and SOAELs at Noise Sensitive Receptors for road traffic

| Time Period | LOAEL | SOAEL |
|---|---|---|
| Day | 55dB $L_{A10,18hr}$ façade | 68dB $L_{A10,18hr}$ facade |
| Night | 40dB $L_{night, outside}$ free-field | 55dB $L_{night, outside}$ free-field |

14.6.32 The calculated BNLs used to determine the change in road traffic noise levels are the noise level at 10m from the carriageway edge, depending on traffic flow parameters only i.e., total flow, vehicle speed and %HGV. They do not account for actual distance to the receptor, the presence of screening, angle of view or road gradient. Therefore, these BNLs cannot be compared directly with the LOAELs and SOAELs in Table 14-12. Where a comparison with the LOAEL and SOAEL criteria is required, a simplified calculation will be undertaken to determine a potential $L_{Aeq}$ road traffic noise level, based on the distance to the closest identified NSR to each link.

14.6.33 The same analysis undertaken for assessing potential effect significance for construction noise will be used to determine the effect significance for construction traffic noise impacts.

14.6.34 As the assessment of construction traffic noise impacts is purely based on noise level calculations, a baseline sound survey is not deemed necessary to inform this assessment. However, if likely significant traffic noise effects are predicted using these calculations, additional baseline surveys may be undertaken to inform the assessment.

*Operational noise*

14.6.35 Operational noise effects on residential NVSRs will be assessed using the guidance set out in BS 4142, which is the accepted UK standard for rating and assessing the impact of sound of an industrial and/or commercial nature. The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a residential dwelling upon which sound is incident.

14.6.36 The basis of BS 4142 is a comparison between the background sound level in the vicinity of residential locations and the rating level of the noise source under consideration. The relevant parameters in this instance are as follows:

- *Background sound level* – $L_{A90,T}$ – defined in the Standard as the 'A' weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F (Fast) and quoted to the nearest whole number of decibels;
- *Specific sound level* – $L_{Aeq,Tr}$ – the equivalent continuous 'A' weighted sound pressure level produced by the specific sound source at the assessment location over a reference time interval, $T_r$ (1 hour during the daytime hours (07:00 to 23:00 hours) and 15 minutes during night-time hours (23:00 to 07:00 hours));
- *Residual Sound Level* - $L_{Aeq,T}$ - the equivalent continuous 'A' weighted sound pressure level at the assessment location in the absence of the specific sound source under consideration, over a given time interval, T; and

- *Rating level* – $L_{Ar,Tr}$ – the *specific sound level* plus any adjustment made for the characteristic features of the noise such as tonality, impulsivity and intermittency.

14.6.37 When comparing the background and the rating sound levels, the standard states that:

- "*A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- *A difference of around + 5dB is likely to be an indication of an adverse impact, depending on the context.*
- *The lower the rating level relative to the measured background sound level the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context".*

14.6.38 When assessing the noise from a source, it is necessary to have regard to the acoustic features that may be present in the source noise at the receptor. Section 9.1 of BS 4142 states:

*"Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level."*

14.6.39 The assessment of noise will be based on the measured *background sound levels* and predicted *rating levels* at the receptors in accordance with BS 4142.

14.6.40 The operational sound levels will be predicted at the identified receptors using 3-d noise modelling software which will be set to implement the International Standard (ISO) 9613-2 prediction methodology. The model will incorporate proposed buildings and operational noise sources. The model will also include nearby residential dwellings and other buildings in the study area, intervening ground cover and topographical information.

14.6.41 An indicative list of plant and equipment noise levels will be provided by the project team and compiled based on details of the operational activities. Where details are not known or available, target noise levels will be recommended based on the measured background/ambient noise level and in accordance with relevant policy.

14.6.42 The magnitude of impact will be based on a quantitative assessment of noise impact using BS 4142, as shown in Table 14-13. Separate assessments will be undertaken of day and night-time impacts, the overall magnitude of impact will be based on the worst-case time period.

**Table 14-13: Operational noise magnitude of impact criteria**

| Rating level dB $L_{Ar,Tr}$ | Magnitude of impact |
|---|---|
| = Measured $L_{A90}$ | Negligible |
| $L_{A90}$ + up to 5 dB | Minor |
| Measured $L_{A90}$ + >5 dB to <10dB | Moderate |

| Rating level dB $L_{Ar,Tr}$ | Magnitude of impact |
|---|---|
| Measured $L_{A90}$ + ≥10 dB | Major |

14.6.43 The BS 4142 methodology is interpreted to mean that a difference between the background sound level and rating level of 5 dB equates to the LOAEL and a difference of 10 dB equates to the SOAEL. In accordance with BS 4142, a suitable operational noise limit is that the *rating level* does not exceed the *background sound level* by more than 5 dB, as this is the threshold at which adverse impacts are anticipated.

14.6.44 BS 4142 also requires that the context is considered. Of particular relevance to this assessment is the absolute sound levels, on this point BS 4142 states that "*Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.*" The standard offers no guidance about what *background* and *rating levels* are considered low; however, the 1997 version of the standard stated that *background sound levels* below around 30dB $L_{A90}$, and *rating levels* below around 35dB $L_{ArTr}$, were considered very low and therefore outside the scope of the assessment method. The Association of Noise Consultants produced guidance on the application of BS 4142 (BS 4142:2014+A1:2019 Technical Note, Association of Noise Consultants, March 2020) which states that "*similar values* [i.e. *background sound levels* below around 30dB $L_{A90}$, and *rating levels* below around 35dB $L_{ArTr}$] *would not be unreasonable in the context of BS 4142, but that the assessor should make a judgement and justify it where appropriate."*

14.6.45 The WHO Night Noise Guidelines for Europe (NNG) have been used to establish alternative LOAEL and SOAEL values for night-time operational noise which could be applied when *background sound levels* are low. In summary, the NNG found that below the level of 30 dB(A) $L_{night,outside}$ (equivalent to a free-field $L_{Aeq,23:00\ to\ 07:00}$) there are no observed effects on sleep. Furthermore, there is no evidence that biological effects observed at levels below 40 dB(A) $L_{night,outside}$ are harmful to health. However, the NNG found that "*closer examination of the precise impact will be necessary in the range between 30 dB and 55 dB as much will depend on the detailed circumstances of each case*" and Table 5.2 of the document states that the threshold for the wellbeing effect of "*complaints*" is 35 dB $L_{night,outside}$. At levels above 55 dB(A) $L_{night,outside}$, the NNG detailed that adverse health effects occur frequently and there is limited evidence that the cardio-vascular system is coming under stress.

14.6.46 Therefore, based on the NNG, the following effect levels for assessing against the NPSE categories are applicable:

- 30 dB(A) $L_{night,outside}$ - NOEL;
- 35 dB(A) $L_{night,outside}$ - LOAEL; and
- 55 dB(A) $L_{night,outside}$ - SOAEL.

14.6.47 Of additional relevance to the contextual analysis is the change in ambient sound levels. The Guidelines for Environmental Noise Impact Assessment [275] provide the following discussion of the potential for changes in ambient sound levels to be

perceptible, will be used to assist in the assessment of ambient sound levels as part of the contextual analysis using BS 4142. "*For broad band sounds which are very similar in all but magnitude, a change or difference in noise level of 1 dB is just perceptible under laboratory conditions, 3 dB is perceptible under most normal conditions, and a 10 dB increase generally appears to be twice as loud. These broad principles may not apply where the change in noise level is due to the introduction of a noise with different frequency and/or temporal characteristics compared to sounds making up the existing noise climate. In which case, changes of less than 1 dB may be perceptible under some circumstances.*" Operational noise effects may be considered significant depending on the margin by which the *rating level* of the specific sound source exceeds the *background sound level* and also the context in which the sound occurs. Magnitude of impacts described as moderate or major in Table 14-13 may be considered significant, depending on the context.

14.6.48 Operational noise effects on non-residential NVSRs will be assessed using the indoor noise level criteria identified for the assessment of construction noise effects on these receptor types (see paragraph 14.6.12) and with reference to the predicted change in ambient sound levels.

14.6.49 Operational noise effects from emergency generators will be assessed separately, to account for the infrequent nature of their usage. Suitable criteria will be determined once the frequency and duration of running of any maintenance procedures is defined, subject to agreement through consultation.

### Assessment scenarios

14.6.50 The future baseline will include committed developments that will be delivered prior to the commencement of construction.

14.6.51 The noise and vibration assessment will consider a number of different assessment scenarios through the construction and operational phases of the Proposed Development and the activities which would give rise to the most likely significant effects.

14.6.52 In response to this requirement, the proposed assessment scenarios are as follows:

- Construction – assessment of the peak of construction activities
- Operational – once all fixed above ground operational plant are operational, i.e. year one of operation. In general, the impact of the operational noise depends on the predicted change from the baseline sound levels. Future baseline sound levels will be considered and if there is robust evidence to show that these are likely to reduce, the operational noise impacts will be assessed against the lower baseline to consider the potential worst-case impacts.

### Cumulative effects

14.6.53 Cumulative effects of the Proposed Development together with the effects of other developments/schemes may result in likely significant effects. This may be the result of effects on the environment during construction or operation of the Proposed Development.

14.6.54 Cumulative effects for all topics will be reported within the cumulative effects chapter of the ES. Please refer to Chapter 19 Cumulative Effects Assessment which presents the proposed methodology for the assessment of cumulative effects that will be undertaken for the EIA.

### In-combination effects

14.6.55 In-combination effects are those that result from the interaction between the individual effects of the Proposed Development (i.e. interaction of environmental factors such as air quality, noise, health), combined together on a single receptor at a single point in time. The interrelationship between the individual effects may combine to result in a likely significant effect, even where the individual effects were not significant. Any in-combination effects in relation to noise and vibration will be assessed within the relevant chapter of the ES.

14.6.56 The nature of likely in-combination effects for noise and vibration includes:

- In-combination effects on amenity as a result of land use (addressed in Chapter 12 Land use and agriculture), air quality (addressed in Chapter 6 Air quality and odour), visual (addressed in Chapter 13 Landscape and visual) and traffic effects (addressed in Chapter 17 Traffic and transport).
- In-combination effects on health as a result of air quality (addressed in Chapter 16 Socio-economics, tourism, recreation and health).

## 14.7 Limitations and assumptions

14.7.1 The following limitations and assumptions are anticipated to be applicable to the ES noise and vibration assessment.

14.7.2 The assessments of construction impacts will be based on information supplied by the Early Works Involvement contractor. Such information will include the types of plant and equipment which are likely to be used for the construction works, along with the construction schedule, works locations and traffic demand. Depending on the level of detail available, it may be necessary to make worst-case assumptions on aspects such as plant locations and works durations to ensure a robust assessment.

14.7.3 Any measurement of existing ambient or background sound levels will be subject to a degree of uncertainty. Environmental sound levels vary between days, weeks, and throughout the year due to variations in source levels and conditions, meteorological effects on sound propagation and other factors. Hence, any measurement survey can only provide a sample of the ambient levels. Every effort is made to ensure that measurements are undertaken in such a way to provide a representative sample of conditions, such as avoiding periods of adverse weather conditions, and school holiday periods (which are often considered to result in atypical sound levels). There would be the potential for ambient or background sound levels to change in the future, for example due to changes in transportation modes and developments with the potential to emit noise, change traffic flows, or introduce additional sensitive receptors. The assessment will identify potential sources of future changes in baseline sound levels to ensure a robust assessment is undertaken.

## 14.8 Approach to mitigation and residual effects

14.8.1 In accordance with the NPSWRI [4] mitigation and minimisation of potential observed adverse noise and vibration effects will be embedded (i.e. primary mitigation) into the design of the Proposed Development where possible following the application of the hierarchy of mitigation as described in Chapter 5 General EIA approach and methodology. The assessment of impacts will be made with these primary mitigation measures in place.

14.8.2 The type and level of mitigation measures required will be informed by the expected level of impact. The NPSWRI [4] lists a number of mitigation measures relevant to the construction and operational phases which could be put forward to minimise impacts associated with the Proposed Development, these include primary, secondary and tertiary mitigation. Paragraph 4.11.8 of the NPSWRI states:

*Mitigation measures for the project should be proportionate and reasonable and may include one or more of the following:*

- *engineering: reduction of noise at point of generation and containment of noise generated;*
- *materials: use of materials that reduce noise;*
- *lay-out: adequate distance between source and noise-sensitive receptors; incorporating good design to minimise noise transmissions through screening by natural or purpose-built barriers or buildings;*
- *administration: restricting activities allowed on the site, either during construction and/or operation such as specifying acceptable noise limits or times of use (for example, any facilities needing to use a public announcement system). This should also take into account seasonality of wildlife in any nearby designated sites.*

14.8.3 The Applicant will ensure that the most appropriate and effective measures are taken forward in consultation with local communities and other stakeholders.

14.8.4 Residual effects will be assessed using the same methodologies applicable to the assessment of pre-mitigation effects. For some impacts, it may not be possible to quantify the reduction in noise or vibration impacts due to the proposed mitigation.

## 14.9 Summary

14.9.1 Table 14-14 provides a summary of the impacts anticipated to be included within the noise and vibration assessment (i.e., scoped in) and those which have been excluded, along with a decision-making rationale.

**Table 14-14: Summary table**

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| Direct temporary noise and vibration impacts on sensitive receptors | Scoped in | Scoped out | The construction phases will include noise and vibration emitting activities which could temporarily increase noise and vibration levels at sensitive receptors. |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| | | | The operation phase will only introduce permanent impacts (as described below). |
| Indirect temporary road traffic noise impacts on sensitive receptors | Scoped in | Scoped out | The construction will introduce additional road traffic which could temporarily increase road traffic noise levels at sensitive receptors.<br>The operation phase will only introduce permanent impacts (as described below). |
| Direct permanent noise impacts on sensitive receptors | Scoped out | Scoped in | The construction will only introduce temporary impacts (as described above).<br>The operational phase will include above ground noise emitting plant which may have a permanent effect on sensitive receptors |
| Direct permanent vibration impacts on sensitive receptors | Scoped out | Scoped out | The construction will only introduce temporary impacts (as described above).<br>The operational phase will include proposed AGP with the potential to emit vibration; however, vibration levels will be controlled through the use of standard design measures (pump balancing, anti-vibration mounts) and perceptible levels of vibration at receptors are not anticipated. |
| Indirect permanent road traffic noise impacts on sensitive receptors | Scoped out | Scoped out | The construction will only introduce temporary impacts (as described above).<br>The operational phase will introduce additional road traffic associated with maintenance; however, due to the small number of vehicles required, any resultant noise impacts would be negligible |
| Indirect temporary or permanent road traffic vibration impacts on sensitive receptors | Scoped out | Scoped out | Assessment of indirect road traffic noise effects suitably captures the potential for annoyance to occur, a similar assessment of vibration would be disproportionate. Vibration from road traffic would not cause structural damage. |

# 15 Resource and waste management

## 15.1 Introduction

15.1.1 This chapter outlines the scope and methodology for the assessment of the potential likely significant effects arising from the construction, operation and decommissioning of the Proposed Development on resources and waste management. This is assessed in the context of the availability of resources and the available capacity of waste management infrastructure within the assessment study areas and focuses the need to optimise the use of resources (material resources) and to reduce waste generation.

15.1.2 Resources and waste management aspects considered within this chapter for the Proposed Development includes:

- **Availability of material resources**: material resources, in the context of this assessment, are resources that would be used or consumed as a result of the Proposed Development. They include Primary Materials, such as aggregates and minerals, Secondary Materials and materials used in manufactured goods. Primary Materials are defined as physical substances from non-renewable sources and are also referred to as 'virgin' materials. Secondary Materials are defined as materials that are by-products from manufacturing or industrial processes, such as recycled aggregates. The assessment considers the resource demand of the Proposed Development in relation to the available resources within the study area.
- **Available capacity of waste management infrastructure**: Waste is defined in line with the EU Waste Framework Directive (2008/98/EC) as "*any substance or object which the holder discards or intends or is required to discard*. In relation to the Proposed Development, this is expected to include certain construction and excavation materials generated during the construction phase. The assessment considers these arisings in relation to the current waste management infrastructure within the study areas. For further information on study areas, see section 15.4.

15.1.3 The operation of the Proposed Development would not produce any significant solid waste materials. Wastewater discharge is discussed further within Chapter 18 Water environment (including flood risk) of this EIA Scoping Report. Chapter 11 Land quality and ground conditions covers the proposed assessment of land contamination.

## 15.2 Legislation, policy and guidance

15.2.1 The following section provides a list of key topic-specific legislation, policy and guidance that has informed the proposed scope of assessment. It is recognised that this list is non-exhaustive and will be kept under review to take account of any later legislation or policy changes.

## Legislation

- Directive 2008/98/EC the Waste Framework Directive (as transposed into UK law as of 2018; see The Waste and Environmental Permitting etc. (Legislative Functions and Amendments etc.) (EU Exit) Regulations 2020
- The Waste (England and Wales) Regulations 2011
- The Controlled Waste (England and Wales) Regulations 2012
- The Hazardous Waste (England and Wales) Regulations 2005
- Waste (Circular Economy) Regulations 2020
- The Environmental Permitting (England and Wales) Regulations 2016
- The Landfill Directive (1999/31/EC)
- Environmental Protection Act 1990
- Environment Act 1995
- Environment Act 2021Waste Minimisation Act 1998
- Waste and Emissions Trading Act 2003
- Clean Neighbourhoods and Environment Act 2005.

## National policy

- NPSWRI [4]
  - Environmental Regulation: Paragraphs 3.8.1, 3.8.6 and 3.8.8. These paragraphs set out how the applicant should consult with relevant consenting authorities, for example the EA, to discuss the requirements needed for construction and operational activities. Requirements may include the need for environmental permits to be applied for as well as a demonstration that all relevant environmental impacts have been assessed.
  - Resource and waste management: Paragraphs 4.12.1 to 4.12.10. These paragraphs highlight the importance of sustainable waste management through the implementation of the 'waste hierarchy' and that an assessment should be undertaken to identify potential risks associated on resources and waste management. The assessment should also consider potential mitigation measures to reduce the identified risks posed, to ensure effective management of hazardous and non-hazardous waste arising from all stages of the lifetime of the development.
- NPPF [5]
  - Section 17 Facilitating the sustainable use of minerals paragraphs 209 – 214.
- Waste Management Plan for England 2021 [290]
  - The Plan fulfils the requirements of the Waste (England and Wales) Regulations 2011 for waste management plans to be reviewed every six years. While the Resources and Waste Strategy sets out a vision and associated policies to move to a more circular economy, the Waste Management Plan for England focuses on waste arisings and their management. It provides a high-level analysis of the current waste

management situation in England and evaluates how implementation of the objectives of the Waste (England and Wales) Regulations 2011 will be supported.

- Our waste, our resources: A strategy for England 2018 [291]
  - The strategy focuses on the importance of driving waste management up the waste hierarchy and states the importance of considering the Government's ambition of promoting resource efficiency and moving towards a circular economy. There is a focus on producer responsibility, minimising plastic wastes and improving recycling rates, though the collection of a consistent set of dry recyclable materials from all households and businesses, weekly separate food waste collection for every household and appropriate businesses and eliminating the disposal of food waste to landfill by 2030. New recycling targets will be adopted in line with the EU Circular Economy Package which include: 55% by 2025; 60% by 2030; and 65% by 2035. In addition, there is an ambition for reviewing and consulting on extended producer responsibility for some construction materials. The Green Construction Board has begun developing guidance for increasing resource efficiency and reducing waste in the construction sector through the adoption of circular economy principles and establishing a definition for net zero avoidable waste.
- National Planning Policy for Waste 2014 [31]
  - The National Planning Policy for Waste is the formal replacement for Planning Policy Statement 10 (PPS10). It sets out how waste planning authorities should discharge their responsibilities with respect to facilitating sufficient waste management capacity within their area, and still follows the principles set out in PPS10, which states that waste should be managed in line with the principles of the waste hierarchy. Defra sets out in the Waste Management Plan for England [290], that the National Planning Policy for Waste is scheduled to be updated to align with changes to the NPPF and the Resources and Waste Strategy for England.
- National Policy Statement for Hazardous Waste 2013 [292]
  - The hazardous waste national policy statement sets out the strategic need and justification of government policy for the provision of nationally significant infrastructure for hazardous waste. It will be used to guide decisions made by the Planning Inspectorate on applications for development consent for such infrastructure.
- Waste Planning Practice Guidance 2015 [293]
  - The Planning Practice Guidance 2015 details how to adhere to the National Planning Policy for Waste 2014. The guidance should be followed to satisfy the local authority that impacts introduced by a Proposed Development on the existing waste management facilities are acceptable and do not prejudice the implementation of the waste hierarchy.

## Local policy

15.2.2 The relevant local policies are listed in Table 15-1 may be considered both important and relevant to the Proposed Development. In the event that there is any conflict between these and the NPSWRI, the NPS would prevail.

**Table 15-1: List of relevant local policy**

| Local authority | Relevant local policy |
|---|---|
| EHDC | East Hampshire District Local Plan: Joint Core Strategy (2014) [6]<br>• CWB7 - Waste |
| EBC | Eastleigh Borough Local Plan 2016-2036 (2022) [9]<br>• S7 - New development in the countryside |
| FBC | Fareham Local Plan 2037 (2023) [12]<br>• D1 - High Quality Design and Place Making |
| Hampshire Authorities (including HCC, PCC, Southampton City Council (SCC), New Forest National Park Authority (NFNPA) and the SDNPA) | Hampshire Minerals and Waste Plan (2013) [294]<br>• Policy 1 - Sustainable minerals and waste development<br>• Policy 15 - Safeguarding – mineral resources<br>• Policy 16 - Safeguarding – minerals infrastructure<br>• Policy 17 - Aggregate supply – capacity and source<br>• Policy 18 - Recycled and secondary aggregates development<br>• Policy 20 - Local land-won aggregates<br>• Policy 21 - Silica sand development<br>• Policy 22 - Brick-making clay<br>• Policy 23 - Chalk development<br>• Policy 25 - Sustainable waste management<br>• Policy 26 - Safeguarding – waste infrastructure<br>• Policy 27 - Capacity for waste management development<br>• Policy 29 - Locations and sites for waste management<br>• Policy 30 - Construction, demolition and excavation waste development<br>• Policy 32 - Non-hazardous waste landfill<br>• Policy 33 - Hazardous and Low Level Radioactive Waste development<br>Hampshire Minerals and Waste Plan: Minerals and Waste Safeguarding in Hampshire Supplementary Planning Document (2016) [295] |
| HBC | Havant Borough Core Strategy (2011) [17]<br>• CS14 - Efficient Use of Resources |
| PCC | Portsmouth Plan (The Portsmouth Core Strategy) (2012) [19]<br>• PCS15 - Sustainable design and construction |
| WCC | Winchester District Local Plan Part 1 Joint Core Strategy (2013) [56]<br>• CP13 - High Quality Design |
| SDNPA | South Downs Local Plan (2019) [58]<br>• SD2 - Ecosystem Services<br>• SD48 - Climate Change and Sustainable Use of Resources |

### Guidance and standards

15.2.3 Relevant guidance and standards that have been used as part of the scoping assessment include:

- Materials and Waste in Environmental Impact Assessment [296] (hereafter referred to as the 'IEMA Guidance'); and
- Planning Inspectorate (2020) Advice Note Seven: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping, (Version 7) [1].

## 15.3 Engagement

15.3.1 The following stakeholders have responsibility for aspects resources and waste management and will continue to be engaged as part of the EIA process:

- Hampshire County Council (HCC)

15.3.2 HCC, together with PCC, SCC, NFNPA and the SDNPA ("the Hampshire Authorities"), are the Minerals and Waste Planning Authorities for Hampshire, and are responsible for ensuring sufficient extraction and supply of minerals as part of the partnership responsible for the HMWP.

15.3.3 HBC, FBC and EBC refer to the HMWP as part of their respective Local Plans [17, 12, 297].

15.3.4 Technical engagement has commenced through EIA Working Groups that have been established for the Proposed Development, primarily the Emissions and Transport Working Group. An introductory meeting was held with this group on 14 June 2022. This was attended by representatives from HCC. An introduction to the proposed approach, key risks and receptor types for this chapter was presented, and no concerns were raised.

15.3.5 A second meeting with the Emissions and Transport Environment Working Group, also attended by HCC, was held on 7 September 2022 to discuss the approach to Scoping and invite any comments on the baseline and methodology proposed.

15.3.6 A further meeting with the leads from the minerals and waste departments of HCC was held on 1 November 2022. An introduction to the Proposed Development, methodology, and baseline for resources and waste was presented. Landfill capacity issues in Hampshire for non-hazardous waste was raised by HCC. Additionally, clarity was provided around how the Mineral Safeguarding Areas (MSAs) were derived using BGS data.

15.3.7 HCC also confirmed the preference to extract as much sand and gravel as possible during any excavation, as there is currently a shortfall in supply. Where extracted materials are required as the backfill over the Proposed Underground Pipeline, lower quality infill should be used where suitable. This will enable higher quality material to be separated and exported for use where higher quality materials are required as advised during the meeting by HCC. Following the meeting, data requests were submitted and followed up by HCC.

15.3.8 As part of the Public Consultation 2022, undertaken between 5 July and 16 August, key stakeholder feedback was reviewed. Feedback in relation to resources and

waste (from the EA and HCC minerals and waste teams) was not provided at this stage.

15.3.9 A third meeting with the Emissions and Transport Environment Working Group, attended by HCC, was held on 8 June 2023 to update stakeholders to the updated design and re-discuss the approach to Scoping and invite comments on approach. Working Group sessions for Emissions and Transport will continue to be held throughout the EIA and consenting process as the design develops.

## 15.4 Approach to scoping

### Study area

15.4.1 The study areas established to inform this scoping chapter which will be used in the subsequent EIA and presented in the ES are set out below,

15.4.2 There are two study areas that have been used to inform the scoping of the resources and waste management assessment. These are referred to as the 'primary study area' and 'secondary study area'. The study areas set out are proportionate to the assessment of material resource consumption, waste arisings and disposal to landfill for the Proposed Development, and the impact these elements are anticipated to have on regional availability of material resources and waste infrastructure capacity. This study area approach is based on advice set out in the IEMA Guidance which states that two study areas are proposed for materials and waste, as set out below.

15.4.3 The primary study area, for both resources and waste, is the same as the Scoping Area (including construction compounds and land that is temporarily required). This constitutes the area within which construction materials would be consumed (used, re-used) and waste would be generated. The primary study area comprises all development within the Scoping Area, as described in Chapter 3 Description of the proposed development, including:

- Proposed WRP and HLPS
- Proposed underground pipelines between Budds Farm WTW and the proposed WRP
- Proposed underground pipeline between the proposed WRP and Havant Thicket Reservoir
- Proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW
- Proposed AGP

15.4.4 The secondary study area (referred to as the 'expansive study area' under the IEMA Guidance) covers an area sufficient to identify feasible sources of construction materials, and suitable waste infrastructure that could accept arisings of waste generated by the Proposed Development.

15.4.5 The secondary study area for material resources encompasses the South East, in relation to Primary Materials, including sand and gravels, and the UK, for all other materials.

15.4.6 The 2021 Waste Data Interrogator [298] data, published by the EA, identifies where waste generated from the South East is managed:

- 81% of inert waste is managed in South East, with 19% in South West;
- 53% of non-hazardous waste is managed in South West, with 45% in South East and 1% in Yorkshire and Humber; and
- 70% of hazardous waste is managed in the South West, with 20% in South East, 6% in West Midlands, 2% in East of England and 1% in East Midlands.

15.4.7 It is therefore proposed that the secondary study area for inert waste encompasses South East England (comprising the counties of Berkshire, Buckinghamshire, East Sussex, Hampshire, Isle of Wight, Kent, London, Oxfordshire, Surrey, and West Sussex). For hazardous waste, because the majority of this waste stream produced in the South East is disposed of in the South West, any impact is expected to be here and, the study area for Hazardous Waste is therefore South West England (comprising Cornwall, Devon, Dorset, Gloucestershire, Somerset, and Wiltshire). For non-hazardous waste because only slightly more is managed in the South West the proximity principle, which directs that waste should be managed close to where waste is generated, means that the study area used for non-hazardous waste is South East England.

15.4.8 The secondary study area for material resources encompasses the South East, in relation to Primary Materials, and the UK, for all other materials.

15.4.9 The location of the temporary construction hub (as described in Chapter 3 Description of the proposed development) is not known at the time of writing. This is expected to be an existing consented site, and may be situated outside of the Scoping Area. The effects of resources and waste on the hub will be assessed as part of the resources and waste management assessment.

### Sources of baseline data

15.4.10 This chapter is based on information gathered from publicly available data sources.

15.4.11 The data shown in Table 15-2 has been used to inform the baseline:

**Table 15-2: Source of baseline data**

| Baseline data | Source of data |
|---|---|
| UK 2021 Material availability of sand and gravel, crushed rock, cement, aluminium, and steel | British Geological Survey [299] |
| Marine Aggregates: Capability and portfolio 2021 | The Crown Estate [300] |
| UK Statistics on waste - Recovery rate from non-hazardous construction and demolition waste, England, 2010-2020 | Department of Environment, Food and Rural Affairs [301] |
| EA Remaining Landfill Capacity 2021 | EA [302] |
| EA Waste Data Interrogator 2021 | EA [298] |
| Transfer, material recovery and recycling in the South East region (2010 – 2021) | EA [303] |
| Hampshire Minerals and Waste Plan 2013 and Partial Update 2022 | Hampshire Authorities [294] [304] |

| Baseline data | Source of data |
|---|---|
| The Hampshire Minerals and Waste Local Plan Policies Map 2013 | Hampshire Authorities [305] |
| Hampshire Minerals and Waste Plan: Minerals and Waste Safeguarding in Hampshire Supplementary Planning Document 2016 | Hampshire Authorities [295] |
| Minerals and Waste in Hampshire Monitoring Report 2021 | Hampshire Authorities [306] |
| Project Integra; Joint Municipal Waste Management Strategy 2021 | Hampshire Authorities [307] |
| Material availability of recycled and secondary aggregates in Great Britain | Mineral Products Association [308] |
| South East England Aggregate Working Party Annual Report 2021 | South East England Aggregate Working Party [309] |
| Annual production of bricks in Great Britain from 2010 to 2022 | Statista [310] |

## 15.5 Baseline conditions

### Proposed Development wide conditions

*Geographic conditions*

15.5.1 The Scoping Area is primarily occupied by a mix of open land, agricultural land, and industrial and residential areas.

15.5.2 As described in Chapter 3 Description of the proposed development, the Proposed Development extends across HCC, EHDC, HBC, PCC, WCC, FBC, EBC and SDNPA areas. HCC, in conjunction with PCC and SCC, has entered into a partnership as a waste disposal authority with 11 waste collection authorities (including those listed above) as part of Project Integra; the Joint Municipal Waste Management Strategy for Hampshire. Project Integra covers around 750,000 households and over 800,000 tonnes of waste a year [307].

*Resources*

15.5.3 Baseline conditions relating to resources describe the regional and/or national availability of the main materials required for the Proposed Development.

*Resources required during construction*

15.5.4 Table 15-3 provides a list of resources that are assumed to be required in the construction of the Proposed Development, however at this stage the specification and quantities of the materials that would be required is not yet confirmed.

**Table 15-3: Expected construction resources required for the Proposed Development**

| Material | Material use |
|---|---|
| Aggregate | Used for the construction of the proposed AGP (including the Proposed WRP, proposed HLPS, proposed BPT and proposed IPS) and where |

| Material | Material use |
|---|---|
| | required, along the Proposed Underground Pipeline. However, it is proposed to lay and cover the Proposed Underground Pipeline using excavated soil, minimising the use of aggregate along the pipeline route to bedding material only. |
| Cement | Used for concrete and concrete blocks for proposed AGP (including the proposed WRP, proposed HLPS, proposed BPTs, proposed IPS) and larger gauge water pipelines, assumed for greater than 1.2m diameter pipes. |
| Masonry | Used for construction of the proposed WRP and IPS |
| Aluminium | Proposed WRP, proposed HLPS, proposed BPTs, proposed IPS and building features |
| Steel | Proposed WRP, proposed HLPS, proposed BPTs, proposed IPS, Proposed Underground Pipelines and building features |
| Ductile iron | Proposed Underground Pipelines |
| High-density polyethylene (HDPE) plastic | Proposed Underground Pipelines |

*Availability of construction resources*

15.5.5 Baseline information on local, regional, and national supply for material resources has been collected for the key raw materials likely to be used in the construction of the Proposed Development, as shown in Table 15-4. The baseline is expressed as the quantity of materials used in the study areas each year. The sensitivity of each material that would be considered in the assessment should be based on the remaining capacity in the context of the annual use.

15.5.6 The latest Annual Report from the South East England Aggregates Working Party (SEEAWP) establishes that on average primary aggregate landbanks and reserves at the end of 2021 were all above the minimum landbank requirements of the NPPF [5], however this varies over the South East. In 2021, there were 12 permitted quarries in Hampshire, of which 11 were active [311].

15.5.7 Hampshire has no crushed rock resources of its own and therefore relies on imports, predominately from Somerset [311]. Cement, masonry, aluminium, and steel are all considered in relation to the national/global supply chain.

Table 15-4: Availability of construction resources in Hampshire, South East England and UK

| Material[11] | | Hampshire (2021) [306] [311] | | | South East England (2021) [309] | | | National Planning Policy Framework 2021 landbank years to be maintained [5] | UK material availability (2021) (tonnes) | Global material availability (2021) (tonnes) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Sales (Mt/yr) | Reserve (Mt) | Landbank (years) | Sales (Mt/yr) | Reserve (Mt) | Landbank (years) | | | |
| Aggre-gate | Sand and gravel | 0.81 | 11.99 | 10.42 years | 6,644 | 67,000 | 8 years | 7 years | 57,500,000 per annum [308] | - |
| | Crushed rock | N/A[12] | | | 2,077 | 23,434 | 14 years | 10 years | 125,900,000 per annum [308] | - |
| | Marine sand and gravel | 1.33 | N/A | N/A | 6,588 | N/A | N/A | N/A | 306,600,000 per annum [300] | - |
| | Recycled and secondary aggregates | 0.75 | N/A | N/A | 4,232 | N/A | N/A | N/A | 62,700,000 per annum [308] | - |
| Cement | | N/A | | | | | | | 9,008,000 per annum [313] | - |
| Masonry | | N/A | | | | | | | 5,387,250 per annum [310] [13] | - |
| Aluminium | | N/A | | | | | | | - | 67,000,000 [299] |

[11] Ductile iron and HDPE plastic have been named as expected construction resources in Table 15-3. No data available for specific quantities available nationally or globally. Potential sensitivity has been determined by examining trends in global supply chains.

[12] Hampshire does not have a supply of crushed rock in the region.

[13] Supply of bricks is reported in number of bricks, therefore a conversion into tonnes was undertaken. Average UK brick weighs 2.75kg [415]

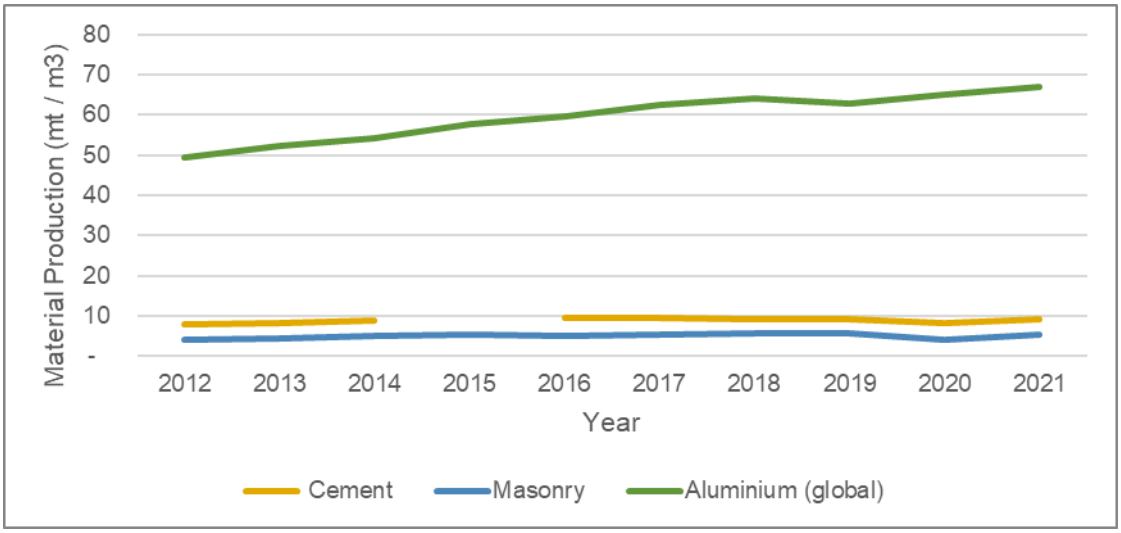
| Material[11] | Hampshire (2021) [306] [311] | | | South East England (2021) [309] | | | National Planning Policy Framework 2021 landbank years to be maintained [5] | UK material availability (2021) (tonnes) | Global material availability (2021) (tonnes) |
|---|---|---|---|---|---|---|---|---|---|
| | Sales (Mt/yr) | Reserve (Mt) | Landbank (years) | Sales (Mt/yr) | Reserve (Mt) | Landbank (years) | | | |
| Steel | N/A | | | | | | | - | 1,915,000,000 [212] |
| | | | | | | | | | |

15.5.8 Resource sensitivity: The IEMA Guidance states that the 'sensitivity' of effect which give rise to impacts on materials is related to the availability and type of resources to be utilised by the Proposed Development. As part of identifying the baseline for materials, the IEMA Guidance has been used to inform assessment methodology for resource sensitivity as defined in section 15.7.

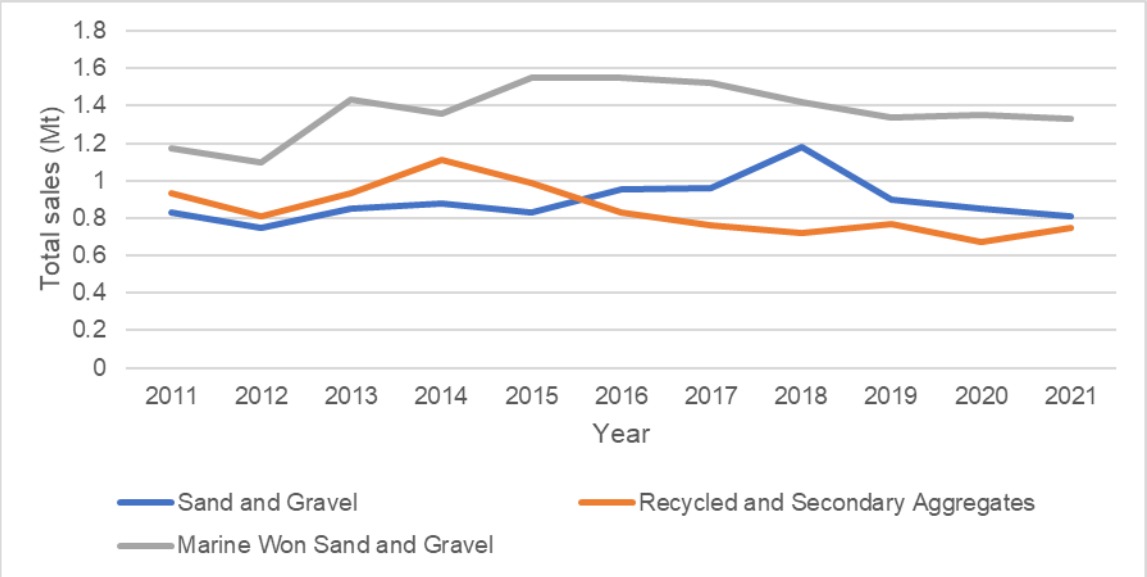
15.5.9 It is envisaged that the construction period would be conducted over approximately 5 years. To ensure that the potential impact of material consumption by the Proposed Development is considered against the quantities of the respective material resources likely to be available in the years in which the materials are required, trend analysis has been undertaken. Historical records (Graph 15-1, Graph 15-2 and Graph 15-3) show that material production has been growing or a slight decline (although considered stable), throughout the last 9 years.

**Graph 15-1 Historic material production: Steel [299] (2012 – 2021)**

**Graph 15-2 Historic material production: Cement [313], Masonry [310] and Aluminium [299] (2012 – 2021)**



Graph 15-3 Total sales of aggregates in Hampshire [311] (2012 – 2021)




15.5.10 The key materials expected to be consumed during construction of the Proposed Development are regionally, nationally, and globally traded commodities, and historically have few issues regarding supply and stock in the UK. However, recent global issues relating to shipping, economic uncertainties and rising energy prices have destabilised commodity markets and created short and medium-term supply issues for some materials, however these have not affected the source quantity of these materials. Whilst the stock and supply issues are assumed to have resolved prior to the commencement of construction, a reasonable worst-case has been taken when appraising the sensitivity of these receptors, as identified in Table 15-5: Sensitivity of key materials, based on data from Table 15-4 and sensitivity criteria from IEMA Guidance as set out in Table 15-11.

Table 15-5: Sensitivity of key materials

| Material | Supply availability | Sensitivity |
|---|---|---|
| Aggregate | Regional supply chain.<br>Generally free from known issues | Negligible/ Low |
| Cement | Regional and national supply chain. Suffers from some potential issues | Medium |
| Masonry | National supply chain.<br>Suffers from some potential issues | Medium |
| Aluminium | National/international supply chain. Generally free from known issues | Low |
| Steel | National/international supply chain. Generally free from known issues | Low |
| HDPE plastic | International supply chain. Generally free from known issues | Low |
| Ductile iron | International supply chain. Generally free from known issues | Low |

*Resources required during operation*

15.5.11 The resources that would be required during operation consist of water treatment chemicals (including antiscalant, Hydrochloric Acid, Hydrogen Peroxide, Sodium Hydroxide, Sodium Hypochlorite, Citric Acid and Sodium Bisulphite) and maintenance and plant replacement items in limited quantities. These materials would be sourced from a national or international supply chain and the quantities that would be required are considered to be negligible in relation to the supply chain capacity.

*Waste management*

15.5.12 Waste generated during the construction and operation of the Proposed Development is expected to be managed within Hampshire or South East (inert and non-hazardous waste) or South West (hazardous waste).

15.5.13 The baseline relating to the waste management and disposal infrastructure is illustrated by the current waste generation within the secondary study area and by the available waste management infrastructure relevant to the expected waste generation, in particular the landfill capacity.

15.5.14 The EAs Waste Interrogator [298] and Remaining Landfill Capacity Report [302] provides up to date baseline information regarding waste management data, including quantities and types of waste that operators of regulated waste management facilities deal with, and landfill capacity.

*Expected waste types*

15.5.15 The preferred pipeline corridor runs through both greenfield and brownfield land, which are likely to generate arisings from activities including earthworks and vegetation removal. The current land use within the Scoping Area also includes areas of historic landfill at both the site for the proposed WRP and Budds Farm WTW which is expected to generate contaminated land arisings. Chapter 11 Land quality and ground conditions covers the proposed assessment of land contamination. No significant demolition would be required in the study area.

15.5.16 The EA Waste Interrogator for 2021 [298] states that a total of 431,000 tonnes of waste was sent to landfill in Hampshire (133,000 tonnes of non-hazardous waste and 298,000 tonnes of inert waste).

15.5.17 Hampshire Minerals and Waste Plan (adopted 2013) [294] establishes targets under Policy 25 (sustainable waste management) to divert 95% of non-hazardous waste from landfill and that 60% of non-hazardous waste should be recycled. Defra data [301] shows that within England, between 2010 and 2020, non-hazardous construction and demolition waste increased from 54 to 62 million tonnes per year[14] and the recovery rate remained above 90% since 2010, reaching 93.80% in 2018.

[14] With the exception of 2020 when during the peak of Government restriction measures aimed at mitigating the COVID-19 pandemic, non-hazardous construction and demolition waste fell back to 54 Mt.

*Landfill Capacity*

15.5.18 Data produced by the EA [302] (converted from cubic metres to tonnes using appropriate density conversion factors[15,16]) states that the remaining landfill capacity at end of 2021 in the South East and South West was as follows:

- Inert waste – 30,126,00 tonnes (South East);
- Non-hazardous waste – 26,979,000 tonnes (South East); and
- Hazardous waste – 1,239,000 tonnes (South West).

*Landfill capacity future baseline*

15.5.19 Whilst it is acknowledged that there is a general trend in reducing landfill capacity, Waste Planning Authorities have a responsibility under the National Planning Policy for Waste, to make provision for sufficient waste infrastructure capacity. Trends in waste generation, the way in which waste is managed, and the timeline of landfill waste diversion policies, show that there is likely to be a continued demand for landfill capacity.

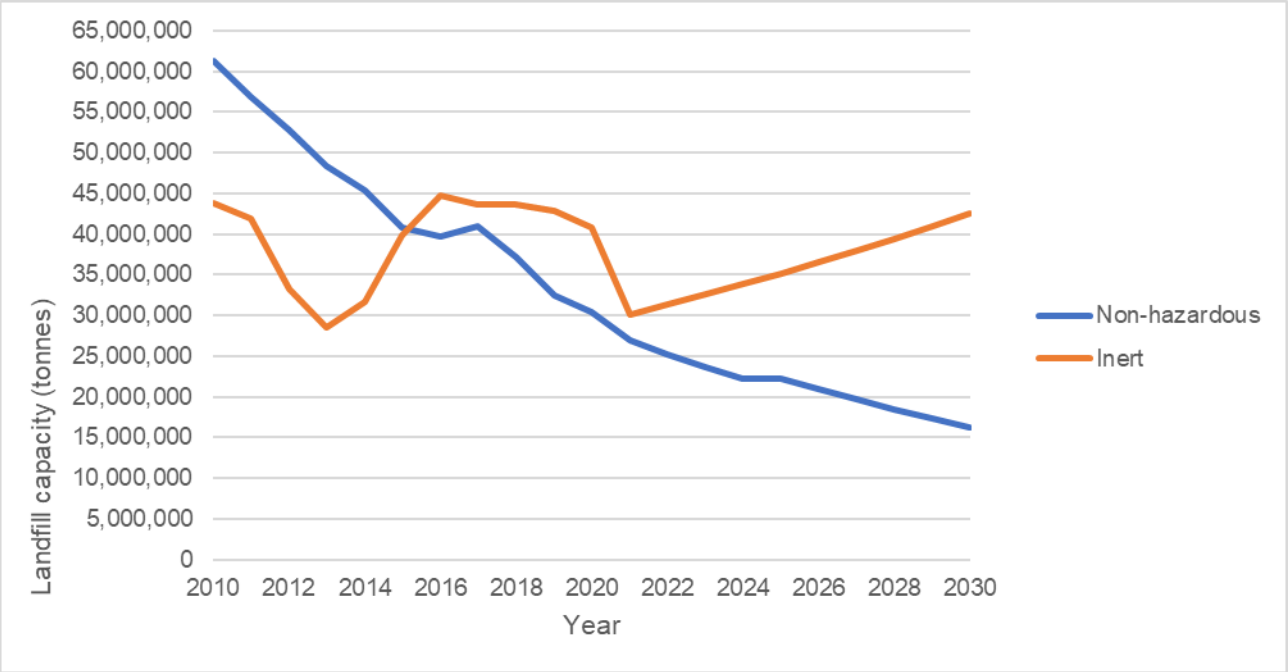
15.5.20 It is envisaged that the construction period for the Proposed Development would be conducted over approximately 5 years. So that the potential impact of waste generated by the Proposed Development is considered against the landfill capacity likely to be available at the time the waste is generated, forecasts for landfill capacity have been made for the expected construction (as presented in Appendix 15.1 in Volume II).

15.5.21 Landfill capacity data from the EA (converted from cubic metres to tonnes using appropriate density conversion factors[15,16]) for the last 10 years was analysed and trends calculated. The trend for non-hazardous and hazardous landfill was extrapolated from 2020 for the baseline period (2021 - 2030). The calculated trend shows a steady decrease in hazardous and non-hazardous landfill capacity in the future. Conversely, all available data shows that inert landfill capacity in the secondary study area is increasing. Graph 15-4 and Graph 15-5 show the projected future baseline landfill capacity throughout the assessment period.

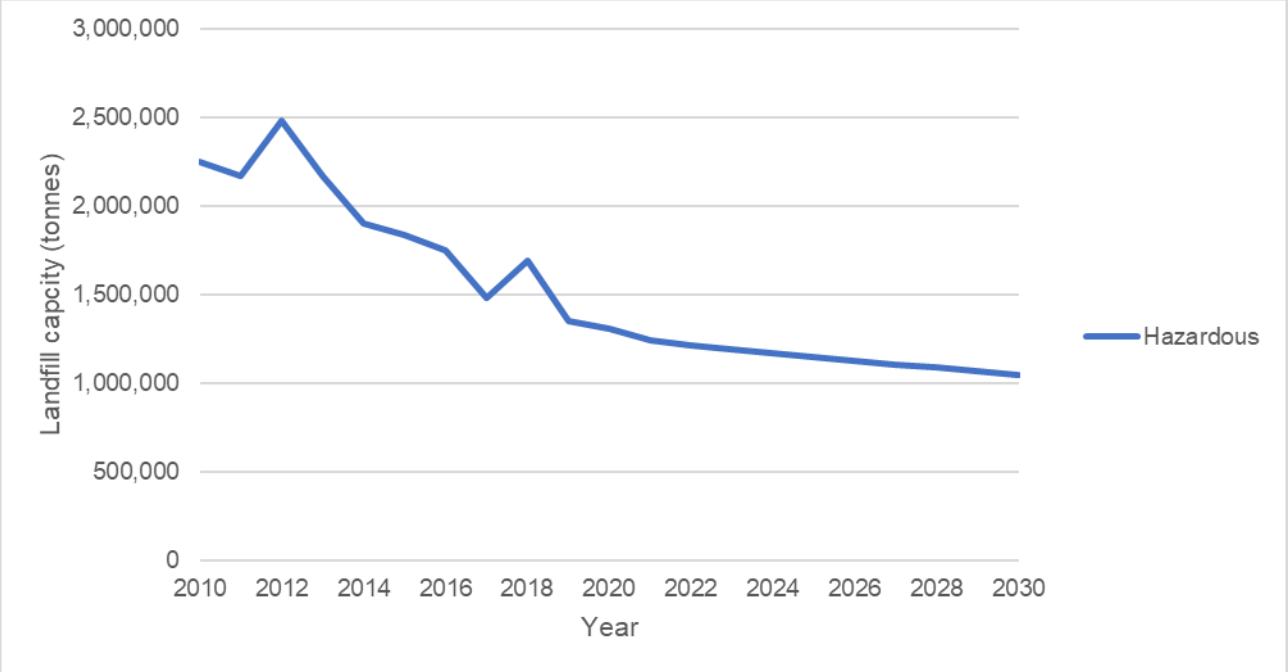
[15] Hazardous waste density of 1 t/m$^3$ and inert waste density of 1.5 t/m$^3$ [417]

[16] Non-hazardous waste density of 0.85 t/m$^3$ [418]

Graph 15-4 Historic and Projected future landfill capacity for inert and non-hazardous waste in South East England [302]




Graph 15-5 Historic and Projected future landfill capacity for hazardous waste in South West England [9]




15.5.22 As defined in the IEMA Guidance, the sensitivity of landfill capacity as a receptor is defined by the projected proportional decline in capacity within the assessment period, without the Proposed Development. It is forecast that by the first full year of operation of the Proposed Development, landfill capacity in the South East and South West would have changed by the following rates:

- Inert waste – increase of 41% by 2030 from 2021 baseline landfill capacity

- Non-hazardous waste – decrease of 40% by 2030 from 2021 baseline landfill capacity
- Hazardous waste – decrease of 15% by 2030 from 2021 baseline landfill capacity

15.5.23 Based on the above, the sensitivity of the identified receptors as defined in the IEMA Guidance is considered to be:

- Inert waste landfill capacity – Negligible
- Non-hazardous waste landfill capacity – Very High
- Hazardous waste landfill capacity – Very High

*Mineral Safeguarding Areas and Safeguarded Sites*

15.5.24 The Hampshire Minerals and Waste Plan Polices Map identifies the Minerals and Waste Consultation Area, including MSAs and mineral and waste infrastructure as Safeguarded Sites.

15.5.25 The baseline for MSAs and Safeguarded Sites relevant to the Proposed Development is set out below and shown on Figure 15.1 in Volume III, based on Proposed Development components.

*Proposed Water Recycling Plant*

15.5.26 The proposed WRP is located within a Superficial Sand and Gravel MSA that extends to the north-east of the site.

15.5.27 It is also located partially within a Safeguarded Site, designated for:

- Bedhampton Aggregates Wharf, Havant. Mineral Processing, aggregates wharf and concrete batching
- Harts Farm Way, Havant Household Waste Recycling Centre (HWRC)
- Budds Farm WTW, Havant. WTW

*Proposed Underground Pipelines between Budds Farm Wastewater Treatment Works and the proposed Water Recycling Plant*

15.5.28 The Scoping Area between Budds Farm WTW and the WRP, is located within a Brick Clay MSA. The preferred pipeline corridor is also located within two historic landfills: Harts Farm Way and Land South of Budds Farm WTW, previously used as a domestic waste landfill site.

15.5.29 Other safeguarded sites for mineral infrastructure and waste infrastructure located within the vicinity of the Scoping Area include:

- Bedhampton Aggregates Wharf, Havant – designated as a mineral processing concrete batching and asphalt plant
- Harts Farm Way, Havant, designated as a HWRC
- Budds Farm WTW, Havant, designated as a WTW

*Proposed Underground Pipeline between the proposed Water Recycling Plant and Havant Thicket Reservoir*

15.5.30 The Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir, is located within a Brick Clay MSA, and partially a Superficial Sand and Gravel MSA. A Brick Clay MSA and the 'Horndean ( C ) Wellsite Rowlands Castle designated as a minerals infrastructure Safeguarded Site for oil and gas is located within the Scoping Area to the north. The section of the Proposed Development that is located within the Brick Clay MSA and Safeguarded Site is within Havant Thicket Reservoir.

*Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works*

15.5.31 The Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW is located within Brick Clay, Superficial Sand and Gravel and Soft Sand MSAs, designated under the Hampshire Minerals and Waste Plan [15]. The preferred pipeline corridor is also located directly adjacent to various historic landfills.

15.5.32 Other safeguarded sites for mineral infrastructure and waste infrastructure located within the vicinity of the Proposed Underground Pipeline include:

- 'L&S Waste Management' site at Farlington Redoubt Portsdown Hill, a waste processing; concrete batching waste infrastructure Safeguarded Site;
- 'Tyre Recycling Services Ltd' at Unit 1, Pinks Sawmill, Wickham Road, a waste transfer station designated as a waste infrastructure Safeguarded Site; and
- 'Amey YK plc', Bishop's Waltham Depot, Botely Road, a coated stone depot designated as a minerals infrastructure Safeguarded Site.

15.5.33 Route development will be undertaken to avoid the boundaries of MSAs to reduce the localised impact.

*Proposed Above Ground Plant*

15.5.34 The location of the proposed AGP is not yet confirmed, but will be within the areas described in the above baseline sub-sections, as they will be located within the preferred corridor.

*Eastney Long Sea Outfall*

15.5.35 The existing Eastney LSO is located within Superficial Sand and Gravel MSA. The only works anticipated at the Eastney LSO are to allow for the transfer of treated wastewater from the Eastney PS to discharge into the Solent.

## 15.6 Scoping of potential effects

15.6.1 The Proposed Development has the potential to affect resources and waste receptors.

15.6.2 Effects from decommissioning of the Proposed Development are considered to be no greater than those identified during the construction phase and are therefore assessed as construction effects as a worst-case scenario. Please refer to Chapter

3 Description of the proposed development, section 3.7 for further information on decommissioning.

### Effects scoped into the assessment

*Construction effects*

15.6.3 An assessment of the residual waste material generated during the construction of the Proposed Development is scoped in due to the potential effects of the Proposed Development on existing waste infrastructure and landfill capacity.

15.6.4 Potential effects on MSAs and safeguarded mineral and waste infrastructure sites that are present in the vicinity of the Proposed Development are scoped in. There are potential effects on MSAs and Safeguarded Sites based on the Scoping Area. MSA's below areas of undisturbed, greenfield or agricultural land are potentially sensitive to the Proposed Development, where there is a risk that they could be sterilised.

15.6.5 On this basis, potential effects on MSAs and Safeguarded Sites have been scoped into the assessment.

*Operation effects*

15.6.6 There are no operational effects that are deemed likely to be significant. Therefore operational effects are scoped out of the assessment (see below).

### Effects scoped out of the assessment

*Construction effects*

*Materials*

15.6.7 While the estimated quantities of material that would be required in the construction of the Proposed Development have not been quantified at this stage of the design, the potential for the Proposed Development to have a likely significant effect on of material resources has been established based on the availability of resources and a comparison of the scale of the Proposed Development in relation to wider development, in the study areas. This is described against each material type in paragraphs 15.6.9 to 0 below.

15.6.8 To support this the quantity of materials that would need to be used for the scale of construction impacts to result in a significant environmental effect has been calculated based on the IEMA significance criteria (see Table 15-6 and Table 15-7).

*Aggregates consumption*

15.6.9 The available landbank of sand and gravel and of crushed rock in South East England is above NPPF [5] landbank requirements, see Table 15-4, however Hampshire does not have a regional supply of crushed rock, marine sand and gravel, and no data is available for recycled and secondary aggregates, therefore

the scoping is considered against availability of sand and gravel and of crushed rock.

15.6.10 Table 15-6 provides the quantity of aggregates that would need to be used by the Proposed Development for it to result in a likely significant effect on the supply of materials within the South East England, the study area, based on the sensitivity of baseline (as per IEMA Guidance).

**Table 15-6: Material consumption required for Proposed Development to introduce a major impact on aggregates availability**

| Material availability | Baseline availability (Reserves, tonnes) | | Becomes significant at magnitude of [296] | Significance criteria [296] | Material consumption required for Proposed Development to introduce a significant impact on materials availability (t) | |
|---|---|---|---|---|---|---|
| | Hampshire [306] [311] | South East England[ 16] | | | Hampshire | South East England |
| Sand and gravel | 11,990,000 | 54,349,000 | Moderate / Major | 6% | 719,400 | 3,260,940 |
| Crushed rock | - | 23,434,000 | Major | 10% | - | 2,343,400 |
| Marine sand and gravel | - | - | N/A | - | - | - |
| Recycled and secondary aggregates | - | - | N/A | - | - | - |

15.6.11 Chapter 3 Description of the proposed development provides a description of the construction methodology and has been used to inform where aggregates would be required in the construction stages of the Proposed Development.

15.6.12 The main uses of aggregate use in the Proposed Development would include temporary access roads, use in wet poured concrete for reinforced concrete slabs and associated pile foundation, other wet poured concrete structures such as water tanks. Site won materials extracted as part of the site preparation will be used on site for the cut and fill, both to reduce waste generation and aggregate consumption.

15.6.13 Along the route of the Proposed Underground Pipeline the open-cut excavation, making up the majority of the route, will involves digging a trench and laying the pipeline in bedding aggregate within the trench, and the excavation material will then be used to backfill the trench, recycling as much of the excavated material as possible to minimise the use aggregate to pipeline bedding material.

15.6.14 The tunnelled sections may require the use of some sand in wet poured concrete at the tunnel boring reception shafts, however the tunnels will be constructed using precast concrete sections, and therefore not require aggregate use within their structure.

15.6.15 Based on the limited use of aggregate in the tunnel and in the above ground infrastructure sites, when compared to wider aggregate use in the study area and

aggregate availability in the south east in comparison to the typical regional use, see Table 15-4 for available landbank year, the Proposed Development would not impact on the regional supply of aggregates.

*Manufactured materials consumption*

15.6.16 Manufactured materials availability is based on national or international supply chains, which define the area where any impacts on the supply of material would affect. Table 15-7 identifies the material yearly available in the supply chain and the percentage and total quantity of this which would need to be used in the construction of the Proposed Development to have a likely significant effect, based on the IEMA assessment methodology.

**Table 15-7: Material consumption required for Proposed Development to introduce a likely significant effect on building material availability (2021) Source: Various**

| Material | Supply chain | Material availability (t) | % of total material available that would introduce a likely significant effect. | Material consumption required to introduce a likely significant effect (t) |
|---|---|---|---|---|
| Cement | National | 9,008,000 | > 6% | 540,480 |
| Masonry | National | 5,387,250 | > 6% | 323,235 |
| Aluminium | Global | 67,000,000 | >10% | 6,700,000 |
| Steel | Global | 1,915,000,000 | >10% | 191,500,000 |

15.6.17 The scale and nature of the above ground infrastructure sites consist of a small total area of light industrial or utility development, when compared to typical yearly development scale within the study areas. Based on the percentage of the total supply chain resource that would have to be used to result in a likely significant effect it is considered that the Proposed Development would not impact on the regional supply of manufactures materials.

*Operation effects*

15.6.18 The materials that would be required during operation include water treatment chemicals and maintenance and plant replacement items. These materials would be sourced from a national supply chain and the quantities that would be required are considered to be negligible in relation to the supply chain capacity. On this basis, the operational materials are scoped out of the assessment.

15.6.19 Waste generated during the operation of the proposed WRP will consist of materials discarded during maintenance of the plant, including oils and rags, cleaning materials and associated packaging and containers, and occasionally discarded plant parts. The quantity of these will be negligible in relation to the regional generation of industrial and commercial waste and on this basis, the operational waste is scoped out of the assessment.

15.6.20 Liquid discharges generated from the operation of the proposed WRP would be discharged as part of the final effluent and is to be assessed as part of the water

environment assessment of the EA. Please refer to Chapter 18 Water environment (including flood risk) which presents the proposed methodology for the assessment of the water environment that will be undertaken for the EIA.

15.6.21 Operation of the Proposed Underground Pipeline is not anticipated to result in any further impacts, therefore the impact on MSAs and Safeguarded Sites during operation is proposed to be scoped out of the EIA.

## 15.7 Approach to assessment

### Additional baseline data collection

15.7.1 Further baseline data collection will be undertaken via a Desk Study to inform the ES. Table 15-8 provides an indication of the types of data and information that, where available, will be analysed during the EIA of the Proposed Development.

**Table 15-8: Information and data requirements for waste and MSA assessment**

| Element | Information and data required |
|---|---|
| Waste | The type and volume of construction and demolition waste to be sent to landfill; and<br>The capacity of landfill sites to receive the type and volume of waste forecast. |
| Mineral Safeguarding Areas and Safeguarded Sites | Sensitivity and risk of sterilisation to MSAs and Safeguarded sites. |

### Assessment methodology

*Mineral Safeguarded Areas and Safeguarded Sites*

15.7.2 The assessment of the effects on MSAs and Safeguarded Sites during construction will be undertaken in line with the IEMA Guidance and National Policy.

15.7.3 MSA or Safeguarded Sites (allocated mineral sites) sensitivity relates to the availability and type of resources to be impacted on by the Proposed Development. Table 15-9 sets out the thresholds for assessing sensitivity for allocated mineral sites.

**Table 15-9: Sensitivity thresholds for mineral sites (based on from IEMA Guidance [202])**

| Sensitivity | Thresholds |
|---|---|
| Negligible | Mineral resource is forecast to be free from known issues regarding supply and stock<br>and/or<br>Area is likely to be completely sterilised owing to urban activities.<br>No minerals or waste infrastructure Safeguarded Sites are impacted directly. |
| Low | Mineral resource is forecast to be generally free from known issues regarding supply and stock;<br>and/or<br>Area is likely to be mostly sterilised owing to urban activities.<br>Minerals or waste infrastructure Safeguarded Sites are impacted indirectly. |

| Sensitivity | Thresholds |
|---|---|
| Medium | Mineral resource is forecast to suffer from some potential issues regarding supply and stock;<br>and/or<br>Area includes some undisturbed, open space that could have potential for mineral extraction with some environmental constraints.<br>Direct impact to minerals or waste infrastructure Safeguarded Sites. |
| High | Mineral resource is forecast to suffer from known issues regarding supply and stock;<br>and/or<br>Area is mostly undisturbed, open space that has potential for extraction and minimal environmental constraints.<br>Direct impact to minerals or waste infrastructure Safeguarded Sites leading to partial removal of some land and impacts on services linked to the designation. |
| Very High | Mineral resource is known to be insufficient in terms of production, supply and/or stock;<br>and/or<br>Area comprises all undisturbed, open space that has excellent potential for mineral extraction and no environmental constraints.<br>Direct impact to minerals or waste infrastructure Safeguarded Sites leading to total removal of Safeguarded Site. |

15.7.4 The potential magnitude of any impact on MSAs is defined by assessing the potential for the Proposed Development to sterilise (substantially) one or more allocated mineral sites. Table 15-10 sets out the thresholds for assessing the magnitude for allocated mineral sites (MSAs and Safeguarded Sites).

**Table 15-10: Magnitude thresholds for mineral sites (MSAs and Safeguarded Sites) (adapted from IEMA Guidance [202])**

| No change | Negligible | Minor | Moderate | Major |
|---|---|---|---|---|
| The Proposed Development is not proposed within an allocated mineral site. | The Proposed Development includes very limited impacts on allocated mineral sites, that are considered to be of low sensitivity due to existing sterilisation. | The Proposed Development has the potential to adversely and substantially impact access to one or more allocated mineral site (in their entirety), placing their future use at risk | One allocated mineral site is substantially sterilised by the Proposed Development rendering it inaccessible for future use. | More than one allocated mineral site is substantially[17] sterilised by the Proposed Development rendering it inaccessible for future use. |

15.7.5 The identification of significance of effect for mineral sites is detailed in paragraph 15.7.10.

15.7.6 Where there would be a likely significant effect from the sterilisation of materials available for extraction, potential mitigation will be identified, including micro-siting

[17] Justified using professional judgement, based on the scale and nature of the allocated mineral site being assessed.

of the pipeline route, separation of materials excavated as part of the pipeline laying, or possible extraction of materials.

*Waste management*

15.7.7 For waste, the sensitive receptor is considered to be landfill capacity. Due to the ongoing disposal of waste, there is a continued need to develop further capacity.

15.7.8 Landfill sensitivity is defined by assessing how the future baseline of regional landfill void capacity is expected to change without any additional waste from the Proposed Development. Table 15-11 sets out the thresholds for assessing sensitivity in inert, non-hazardous and hazardous landfill.

**Table 15-11: Sensitivity thresholds for inert, non-hazardous, and hazardous landfill (IEMA Guidance)**

| Waste Types | Negligible | Low | Medium | High | Very High |
|---|---|---|---|---|---|
| Inert and non hazardous | Remain unchanged or is expected to increase through a committed change in capacity. | Reduce minimally: by <1% as a result of wastes forecast. | Reduce noticeably: by 1-5% as a result of wastes forecast | Reduce considerably: by 6-10% as a result of wastes forecast. | Reduce very considerably (by >10%); reach capacity during construction or operation; is already known to be unavailable; or would require new capacity or infrastructure to be put in place to meet forecast demand. |
| Hazardous | Remain unchanged or is expected to increase through a committed change in capacity. | Reduce minimally: by <0.1% as a result of wastes forecast. | Reduce noticeably: by 0.1-0.5% as a result of wastes forecast. | Reduce considerably: by 0.5-1% as a result of wastes forecast. | Reduce very considerably (by >1%); reach capacity during construction or operation; is already known to be unavailable; or, would require new capacity or infrastructure to be put in place to meet forecast demand. |

15.7.9 Using future baseline and waste forecast data, the potential magnitude of impact from waste is assessed by determining the percentage of the remaining landfill void capacity that will be depleted by waste produced by the Proposed Development, see Table 15-12.

**Table 15-12: Magnitude of impacts threshold (adapted from IEMA Guidance [202])**

| Waste Types | No change | Negligible | Minor | Moderate | Major |
|---|---|---|---|---|---|
| Inert and non hazardous | Zero waste generation and disposal from the development | Waste generated by the development will reduce regional landfill void capacity | Waste generated by the development will reduce regional landfill void capacity | Waste generated by the development will reduce regional landfill void capacity | Waste generated by the development will reduce regional landfill void capacity |

| Waste Types | No change | Negligible | Minor | Moderate | Major |
|---|---|---|---|---|---|
| | | baseline by <1% | baseline by 1-5% | baseline by 6-10% | baseline by >10% |
| Hazardous | Zero waste generation and disposal from the development | Waste generated by the development will reduce national landfill void capacity baseline by <0.1% | Waste generated by the development will reduce national landfill void capacity baseline by 0.1-0.5% | Waste generated by the development will reduce national landfill void capacity baseline by 0.5-1% | Waste generated by the development will reduce national landfill void capacity baseline by >1% |

### *Significance of effect*

15.7.10 The significance of effect for mineral sites is identified through comparisons of the sensitivity of the material resource availability and type in the study area, and the magnitude of potential impact to access or sterilisation of allocated mineral sites.

15.7.11 The significance of the effect for waste is identified through comparison of the sensitivity of the landfill resource in the study area and the magnitude of the estimated waste arising.

15.7.12 Effects of moderate, large, or very large significance, are considered to be significant in EIA terms.

15.7.13 Table 15-13 sets out the significance of effect matrix in line with IEMA Guidance.

**Table 15-13: Significance of effect matrix (IEMA Guidance [202])**

| | | Magnitude of impact | | | | |
|---|---|---|---|---|---|---|
| | | **No change** | **Negligible** | **Minor** | **Moderate** | **Major** |
| **Sensitivity of resource/receptor** | **Very High** | Neutral | Slight | **Moderate or large** | **Large or very large** | **Very large** |
| | **High** | Neutral | Slight | Slight or moderate | **Moderate or large** | **Large or very large** |
| | **Medium** | Neutral | Neutral or slight | Slight | **Moderate** | **Moderate or large** |
| | **Low** | Neutral | Neutral or slight | Neutral or slight | Slight | Slight or moderate |
| | **Negligible** | Neutral | Neutral | Neutral or slight | Neutral or slight | Slight |

## Assessment scenarios

15.7.14 The future baseline will include committed developments that will be delivered prior to commencement of construction.

15.7.15 The assessment will be carried out in line with the approach to assessment set out in Chapter 5 General EIA approach and methodology, section 5.2.

15.7.16 The resources and waste management assessment will consider the realistic worst-case scenario based on the Preferred Pipeline Corridor. In relation to the location of MSAs the assessment will consider the greatest potential for sterilisation of the MSA, within the Proposed Pipeline Corridor. Regarding waste generation the assessment will assess the estimated the waste generation within the preferred route against predictions of the most sensitive year during the construction program.

### Cumulative effects

15.7.17 Cumulative effects of the Proposed Development together with the effects of other developments/schemes may result in likely significant effects. This may be the result of effects on the environment during construction or operation of the Proposed Development.

15.7.18 Cumulative effects for all topics will be reported within the cumulative effects chapter of the ES. Please refer to Chapter 19 Cumulative effects assessment which presents the proposed methodology for the assessment of cumulative effects that will be undertaken for the EIA.

### In-combination effects

15.7.19 In-combination effects are those that result from the interaction between the individual effects of the Proposed Development (i.e., interaction of environmental factors such as air quality, noise or health, combined together on a single receptor at a single point in time. The interrelationship between the individual effects may combine to result in a likely significant effect, even where the individual effects were not significant. Any in-combination effects in relation to resources and waste management will be assessed within the cumulative effects chapter of the ES.

15.7.20 The nature of likely in-combination effects for resources and waste management includes:

- Impact and effects on human health as a result of contaminated site arisings from the Proposed Development links to the human health, water resources and land quality and ground conditions assessments.
- Impacts and effects resulting from the transportation of material resources and waste to and from site, which links to the Air Quality, Climate, Traffic and Transport and Noise and Vibration assessments.

## 15.8 Limitations and assumptions

15.8.1 It assumed that in order to reduce demand on materials, it is anticipated that Primary Material required as fill material for the Proposed Underground Pipeline will be sourced from the cut and fill on the site, other than aggregate used as pipe bedding material. This assumes that processing of the site won materials will produce the necessary quality for materials resulting in a neutral cut and fill balance for the sections of Proposed Underground Pipeline laid using cut and fill.

15.8.2 It is assumed that any reused or recycled materials will be used in line with measures set out in Construction Management Plans, which would include a Materials Management Plan (MMP), to be produced and managed by the contractor.

15.8.3 It is assumed that a Site Waste Management Plan (SWMP) would be produced during the design phase and managed by the contractor during the construction phase to direct an effective circular economy approach to the management of resources and waste materials. This would drive the waste management activities up the Waste Hierarchy, to ensure that as much material is reused and/or recycled as possible to reduce the amount of construction waste requiring disposal.

15.8.4 It is assumed that all material disposed of to landfill would be within South East or South West England.

15.8.5 It is assumed that waste generation associated with various existing land uses along the geography of the Preferred Pipeline Corridor would not be considered as part of the assessment.

15.8.6 A limitation of the assessment is that the material production rates, rather than the available resources, has been used as the baseline, in line with the IEMA Guidance methodology. This approach is considered to be suitable in light of the limited data availability on the remaining material in consented sites and information on suitable but unconsented extraction sites.

## 15.9 Approach to mitigation and residual effects

15.9.1 The mitigation hierarchy (Primary mitigation, Secondary mitigation and Tertiary mitigation) is specified in Chapter 5 General EIA approach and methodology of this Report.

15.9.2 Mitigation measures will be developed as site specific information and data is gathered, the Proposed Development is refined and the ES is prepared. There are a number of mitigation measures which may be appropriate for the Proposed Development and Primary mitigation will be incorporated into the design. Residual effects will then be assessed with this mitigation in place.

15.9.3 As part of the design process, a number of mitigation measures (Primary) are proposed to reduce the potential for impacts on material resources and waste management facilities. These measures would evolve as the EIA progresses and in response to consultation.

15.9.4 The mitigation measures identified in Table 15-14 would be implemented to mitigate any potential adverse effects from materials consumption and the generation and disposal of waste, and will maximise benefits derived from arising re-use/ recycling. The construction measures would be implemented through construction management plans.

Table 15-14: Potential resources and waste mitigation measures

| Element | Description | Mitigation |
|---|---|---|
| **Materials** | Design for resource optimisation: simplifying layout and form, using standard sizes, balancing cut and fill, maximising the use of renewable materials, and materials with recycled or secondary content, and setting net importation as a scheme goal | Primary |
| | Design for the future: Considering how materials can be designed to be more easily adapted over an asset lifetime, and how deconstructability and demountability of elements can be maximised at end-of-first-life. | Primary |
| | Manage engineering plan configurations and layouts to ensure the most effective use of materials and arisings can be achieved. | Primary and Tertiary |
| | Identification and specification of material resources that can be acquired responsibly, in accordance with BES 6001 responsible Sourcing of Construction Products. | Tertiary |
| | Design for off-site construction: Maximising the use of pre-fabricated structures and components, encouraging a process of assembly rather than construction. | Tertiary |
| | Identify opportunities to reduce the export and import of material resources. | Primary, Secondary and Tertiary |
| | As part of a Construction management plan, implement a MMP in accordance with the Contaminated Land: Applications in Real Environments (CL:AIRE) Definition of Waste: Code of Practice | Tertiary |
| Waste | Identify areas for stockpiling and storing wastes that will reduce quality degradation and leachate and will reduce damage and loss. | Primary |
| | Engage early with contractors to identify possible enhancement and mitigation measures (for example, waste exemption licenses), and to identify opportunities to reduce waste through collaboration and regional synergies. | Primary and Tertiary |
| | Design for recovery and reuse: identifying, securing, and using material resources at their highest value, whether they already exist on-site, or are sourced from other schemes. | Primary and Tertiary |
| | Ensure arisings are properly characterised before or during design, to maximise the potential for highest value reuse. | Secondary |
| | Forecast and identify the volume and type of woodland and other vegetative arisings that will be generated and establish opportunities for high-value reuse and recycling, both on and off-site. | Secondary |
| | Working to a proximity principle, ensuring arisings generated are handled, stored, managed, and reused or recycled as close as possible to the point of origin. | Primary and Tertiary |
| | As part of a Construction management plan, specify management requirements for waste and arisings and capture information and data on-site arisings recovered and diverted from landfill, by developing a SWMP for the Proposed Development | Tertiary |

## 15.10 Summary

15.10.1 A summary of the topics proposed to be scoped in and out of the assessment is provided in Table 15-15.

**Table 15-15: Summary table**

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| Consumption of material resources associated with the Proposed Development | Scoped out | Scoped out | The materials required for construction of the Proposed Development will include primary aggregates and other materials. These materials would be sourced from regional, national or global supply chain, and the quantities that will be required are considered to be negligible in relation to supply chain capacity. No significant demolition activities (for example existing buildings or road infrastructure) are anticipated as part of the construction phase. On this basis, the construction materials are scoped out of the assessment.<br>The materials that will be required during operation will include water treatment chemicals and maintenance and plant replacement items. These materials would be sourced from a national or international supply chain and the quantities that will be required are considered to be negligible in relation to the supply chain capacity. On this basis, the operational materials are scoped out of the assessment. |
| Effects on MSAs and safeguarded minerals and waste infrastructure | Scoped in | Scoped out | Further information is required to assess the potential effects of the construction of the Proposed Development on MSAs and safeguarded minerals and waste infrastructure.<br>There would be a potential effect on the available minerals during construction. Operation of the Proposed Underground Pipeline would not result in any further effects. On this basis, effects on minerals during the operational stage are scoped out of the assessment. |
| Disposal of waste associated with the Proposed Development | Scoped in | Scoped out | Further information is required to assess the potential effects of the Proposed Development on existing waste infrastructure and landfill capacity. The assessment will confirm remaining landfill capacity and identify on-site storage, potential disposal/treatment/reuse of waste and required mitigation measures. No significant demolition activities (for example existing buildings or road infrastructure) are anticipated as part of the construction phase. However, this is to be reviewed as the design develops and |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| | | | clarity on any potential demolition can be gained.<br>The operation of the Proposed Development is anticipated to generate only minimal waste arisings from routine maintenance and repairs. As such, the effects associated with waste generation and disposal are considered to be minimal and not significant. |

# 16 Socio-economics, tourism, recreation and health

## 16.1 Introduction

16.1.1 This chapter outlines the scope and methodology for the assessment of the potential likely significant effects arising from the construction, operation and decommissioning of the Proposed Development, on socio-economics, tourism, recreation and health. These topics have been brought together in one chapter as there are overlaps in receptors and in the baseline information required.

16.1.2 It is proposed that the assessment of likely significant effects will include the following aspects:

- **Socio-economics** including impacts on employment and the local supply chain, and potential opportunities for training and apprenticeships.
- **Tourism and recreation** including impacts on strategic tourism resources and on the availability of tourism accommodation during the construction phase, amenity effects for strategic tourism receptors, and impacts on access to open space and Public Rights of Way (PRoW) for recreation.
- **Health** including impacts on access to healthcare, social care and other social infrastructure, access to open space and nature, neighbourhood amenity, accessibility and active travel, community safety, access to work and training, and social cohesion.

16.1.3 This chapter interfaces with several chapters, including:

- Chapter 6 Air quality and odour
- Chapter 8 Terrestrial and freshwater biodiversity
- Chapter 12 Land use and agriculture
- Chapter 13 Landscape and visual
- Chapter 14 Noise and vibration
- Chapter 17 Traffic and transport

16.1.4 There are some areas of overlap with Chapter 12 Land use and agriculture, which covers impacts on community land and facilities and on commercial property and land, and with Chapter 13 Landscape and visual, which covers recreational, tourism and community visual receptors.

16.1.5 Impacts on individual businesses have been considered as part of the scoping assessment for socio-economics, tourism, recreation, and health only where they are considered to be strategic tourism businesses. Other impacts on businesses, including tourism related businesses, will be reported in Chapter 12 Land use and agriculture. The socio-economics, tourism, recreation, and health assessment will also consider the in-combination effects from noise, visual and air quality impacts, which could result in amenity effects for strategic tourism receptors.

16.1.6 Effects that are identified in Chapter 12 Land use and agriculture, as well as effects that are identified in this EIA Scoping Report Chapter 16 Socio-economics,

tourism, recreation and health, may also have implications for health outcomes of the populations within the study area. Impacts and potential effects identified in the assessment of those aspects will be assessed in terms of how they impact the determinants of health and therefore health outcomes of the communities affected.

16.1.7 The existing baseline of community facilities, tourism receptors, open space and employment land within each section of the Proposed Development is included in Chapter 12 Land use and agriculture, and will be updated for the EIA, however key receptors that are likely to be relevant to the assessment of socio-economic, tourism, recreation and health effects are also included in the baseline section of this chapter.

16.1.8 The chapter will also interface with the Equality Impact Assessment (EqIA) and Skills and Employment Strategy (SES) that will be prepared for the Proposed Development. These documents will be separate from the EIA but submitted as part of the DCO.

## 16.2 Legislation, policy and guidance

16.2.1 The assessment will be carried out in accordance with relevant legislation and policy and will follow established standards and guidance for socio-economic, tourism, recreation, and health assessments. It is recognised that this list is non-exhaustive and will be kept under review to take account of any later legislation or policy changes.

### Legislation

16.2.2 The relevant legislation includes:

- Countryside and Rights of Way Act 2000
- Health and Social Care Act 2012
- Sustainable Communities Act 2007
- Equality Act 2010
- Health and Safety at Work Act 1974

### National policy

16.2.3 The relevant national policies include:

- NPSWRI [], paragraphs:
  - 3.12.1 – 3.12.4. These paragraphs set out the potential direct and indirect impacts on people's health, wellbeing and quality of life, and how these should be assessed.
  - 4.13.1 – 4.13.11. These paragraphs set out the economic and social impacts of water resources infrastructure and how these should be assessed during the construction and operational phases, the mitigations that can be put in place, and how the assessment should inform decision making by the SoS.
- The NPPF [5] section 6: building a strong, competitive economy, and Section 8: Promoting healthy and safe communities.

## Local policy

16.2.4 Local policies listed in Table 16-1 may be considered both important and relevant to the project. In the event that there is any conflict between these and the NPSWRI, the NPS would prevail.

**Table 16-1: List of relevant local policy**

| Local authority | Relevant local policy |
|---|---|
| EHDC | East Hampshire District Local Plan: Joint Core Strategy (2014) [6]<br>• CP4 - Existing Employment Land<br>• CP5 - Employment and Workforce Skills<br>• CP9 - Tourism<br>• CP16 - Protection and Provision of Social Infrastructure<br>• CP17 - Protection of Open Space, Sport and Recreation and Built Facilities<br>• CP20 - Landscape<br>• CP32 - Infrastructure |
| EBC | Eastleigh Borough Local Plan 2016-2036 (2022) [258]<br>• S12 - Strategic footpath, cycleway and bridleway links<br>• DM16 - Workforce training requirements and new jobs<br>• DM32 - Protection of recreation and open space facilities<br>• DM36 - Community, leisure and cultural facilities |
| FBC | Fareham Local Plan 2037 (2023) [259]<br>• NE10 - Protection and Provision of Open Space |
| HCC, PCC, Southampton City Council<br>New Forest National Park Authority (NFNPA), SDNPA | Hampshire Minerals and Waste Plan (2013) [15]<br>• Policy 4 - Protection of the designated landscape<br>• Policy 2 - Climate change – mitigation and adaptation<br>• Policy 5 - Protection of the countryside<br>• Policy 7 - Conserving the historic environment and heritage assets<br>• Policy 10 - Protecting public health, safety and amenity<br>• Policy 12 - Managing traffic<br>• Policy 14 - Community benefits |
| HBC | Havant Borough Core Strategy (2011) [17]<br>• CS1 - Health and Wellbeing<br>• CS2 - Employment<br>• CS3 - Skills and Employability<br>• CS5 - Tourism<br>• CS6 - Regeneration of the Borough<br>• CS13 - Green Infrastructure<br>• DM1 - Recreation and Open Space<br>• DM2 - Protection of Existing Community Facilities and Shops<br>• DM3 - Protection of Existing Employment and Tourism Sites<br>Havant Borough Local Plan (Allocations) 2014 [18] |

| Local authority | Relevant local policy |
|---|---|
| | • HB2 - Havant and Bedhampton Employment Allocations |
| PCC | Portsmouth Plan (The Portsmouth Core Strategy) (2012) [261]<br>• PCS14 - A Healthy City |
| WCC | Winchester District Local Plan Part 1 Joint Core Strategy (2013) [24]<br>• CP7 - Open Space, Sport and Recreation<br>• CP8 - Economic Growth and Diversification<br>• CP19 - South Downs National Park |
| SDNPA | South Downs Local Plan (2019) [58]<br>• SD19 - Transport and Accessibility<br>• SD20 - Walking, Cycling and Equestrian Routes<br>• SD23 - Sustainable Tourism<br>• SD24 - Equestrian Uses<br>• SD34 - Sustaining the Local Economy<br>• SD35 - Employment Land<br>• SD46 - Provision and Protection of Open Space, Sport and Recreational Facilities and Burial Grounds/Cemeteries<br>• SD47 - Local Green Spaces<br>• SD54 - Pollution and Air Quality |

### Guidance and standards

16.2.5 Relevant guidance and standards that have been used to inform the scoping assessment and that will inform the assessment of socio-economic, tourism, recreation, and health effects as part of the EIA include:

- Additionality Guide (Fourth Edition), Homes and Communities Agency (HCA) (2014) [314]. The Additionality Guide sets out guidance for assessing the impact of local economic growth interventions, taking account of leakage, displacement, and multiplier effects (see Glossary for definitions of terms).
- Employment Density Guide (Third Edition), HCA, 2015 [315]. The Employment Density Guide provides a methodology for estimating employment numbers based on the floorspace and use class of industrial and commercial buildings.
- Rapid Health Impact Assessment Tool, National Health Service (NHS) London Healthy Urban Development Unit (HUDU) (2017) [316]. HUDU work with local and national organisations across the UK on behalf of the NHS to enable health and planning sectors to work together. The HUDU tool is designed to assess the likely health impacts of development plans and proposals and identifies those determinants of health which are likely to be influenced by a specific development proposal.
- IMPACT Urban Health Impact Assessment methodology (UrHIA), Liverpool University (2015) [317]. The IMPACT methodology sets out a process for assessing health effects and improving health outcomes.
- Wales Health Impact Assessment Support Unit (WHIASU) Health Impact Assessment – A practical guide (2011) [318]. The WHIASU Guidance

describes the process and methods used to undertake a health assessment and provides resources to support the assessment. It includes checklists for identifying the health determinants and vulnerable groups relevant to the health assessment being undertaken. It is relevant and widely applied to assessments outside of Wales.

## 16.3 Engagement

16.3.1 The Applicant has undertaken extensive engagement with stakeholders through the Local Planning Authorities Joint Officers Group (JOG), EIA Working Groups and through bilateral meetings with local authorities. This has included matters of relevance to socio-economics, tourism, recreation and health. Feedback received through this engagement has informed the scoping process and scheme development. Stakeholders that have been and will continue to be consulted in relation to this socio-economics, tourism, recreation and health assessment include:

- East Hampshire District Council (EHDC)
- Eastleigh Borough Council (EBC)
- Fareham Borough Council (FBC)
- Hampshire County Council (HCC)
- Havant Borough Council (HBC)
- Portsmouth City Council (PCC)
- South Downs National Park Authority (SDNPA)
- Winchester City Council (WCC)
- NHS Hampshire, Southampton and Isle of Wight Clinical Commissioning Group
- Office for Health Improvement and Disparities (OHID)

16.3.2 Technical engagement has commenced through EIA Working Groups that have been established for the Proposed Development, primarily the Community EIA Working Group. An introductory meeting was held with this group on 7 June 2022. This was attended by representatives from EBC, HCC, PCC, WCC, and NHS Hampshire, Southampton and Isle of Wight Clinical Commissioning Group. An introduction to the proposed approach to the socio-economics, tourism, recreation and health assessment (and Land use and agriculture assessment, covered in Chapter 12 of this EIA Scoping Report) was presented.

16.3.3 The second Community EIA Working Group was held on 8 September 2022. This was attended by representatives from NHS Hampshire, Southampton and Isle of Wight Clinical Commissioning Group, EHDC, EBC, FBC, HCC, HBC, PCC, SDNPA and WCC. Attendees included representatives from economic development, planning, public health and community officers from the local authorities. The approach to scoping for the socio-economics, tourism, recreation and health assessment (and Land use and agriculture assessment, covered in Chapter 12 of this EIA Scoping Report) was presented, along with key feedback from the non-statutory Public Consultation 2022.

16.3.4 The third Community EIA Working Group was held on 12 June 2023. This was attended by representatives from EBC, EHDC, FBC, HBC, HCC, PCC, and WCC.

Attendees included regeneration, planning, community, countryside services, and demography officers. Updates to scheme development and to the scoping for the Land use and agriculture assessment and for the socio-economics, tourism, recreation and health assessments were presented, along with an introduction to the EqIA and SES that will be undertaken for the Proposed Development.

16.3.5 Ongoing engagement with the Community EIA Working Group will continue to inform the assessment of socio-economic, tourism, recreation and health effects. Additional engagement with local authority officers and public health teams will be undertaken as required. Issues for discussion with local authority stakeholders will include identification of relevant receptors, including those that could experience potential severance, access and disruption effects, as well as those directly impacted by the Proposed Development. In addition, the OHID will be consulted on the health aspects of the assessment, offering them a review of this EIA Scoping Report.

16.3.6 Following the close of non-statutory Public Consultation 2022, which was held between 5 July and 16 August, stakeholder feedback has been reviewed. Feedback is summarised in Table 16-2, which will be considered within the EIA as part of the socio-economics, tourism, recreation and health assessment.

**Table 16-2: Summary of stakeholder responses to non-statutory consultation**

| Stakeholder | Consultation response | Scoping Response |
|---|---|---|
| HCC | Received 16 August 2022<br>HCC noted the potential impact of the Proposed Development on Staunton Country Park and on the PRoW network. The Council stated that it considered it likely that impacts on PRoW are capable of being mitigated, and that there may be opportunities to enhance the PRoW network. The Council also identified a number of strategic roads on which it would not support closures to undertake works. | The potential impact of the Proposed Development on PRoW and open space is addressed in paragraphs 16.6.6, 16.6.7 and □ of this scoping report. This will be assessed as part of the EIA. |
| HBC | Received 17 August 2022<br>HBC raised concerns around the loss of potential economic uses on the site of the Proposed WRP (Brockhampton West) and stated that further information about the type and level of employment supported by the proposed WRP would be welcomed. The Council would also welcome any proposals to combine the proposed WRP alongside employment use. | The potential impact of the Proposed Development on jobs as a result of impacts on employment land at Brockhampton West is addressed in paragraph 16.6.8 of this scoping report. This will be assessed as part of the EIA.. |
| The British Horse Society | Received 16 August 2022<br>The British Horse Society raised concerns about the potential impact of the Proposed Development on local roads and PRoW used by equestrians, including the impact of construction traffic and changes in traffic flows due to road closures and diversions. | The potential impact of the Proposed Development on PRoW and Walking, Cycling and Horse riding (WCH) provision is addressed in paragraph 16.6.6 of this |

| Stakeholder | Consultation response | Scoping Response |
|---|---|---|
| | | scoping report. This will be assessed as part of the EIA. |

## 16.4 Approach to scoping

### Study area

16.4.1 The study area for socio-economics, tourism, recreation and health has been defined based on:

- the extent and characteristics of the Proposed Development
- the communities and receptors (including schools, healthcare facilities, open spaces and tourism receptors) likely to be directly and indirectly affected by the construction, operation and decommissioning of the Proposed Development
- professional judgement, drawing on guidance, best practice and previous experience of large linear infrastructure projects
- Extent of available demographic and health data

16.4.2 Relevant stakeholder feedback has been taken into account in defining the study area.

16.4.3 The location of the temporary construction hub (as described in Chapter 3 Proposed Development Description) is not known at this time of writing. This is expected to be an existing consented site and may be situated outside of the Scoping Area. The effects of socio-economics, tourism, recreation and health on the hub will be assessed as part of the socio-economics, tourism, recreation and health assessment.

16.4.4 The study areas established to inform this scoping chapter which will be used in the subsequent EIA and presented in the ES are set out below.

#### *Socio-economics*

16.4.5 The assessment of impacts on employment and skills arising from the construction and operation of the Proposed Development will consider likely significant effects at local authority level and will also take into account labour market conditions at a sub-regional level for the whole of Hampshire. The Proposed Development intersects with six local authority areas: East Hampshire District, Eastleigh Borough, Fareham Borough, Havant Borough, Portsmouth City and Winchester City. Baseline socio-economic data will therefore be provided for each of these areas, along with data for Hampshire and England, and effects will be assessed for the relevant local authority/ies and for Hampshire as a whole.

#### *Tourism and recreation*

16.4.6 The study area for the assessment of tourism and recreational impacts is based on the Scoping Area plus a 500m buffer.

16.4.7 Where appropriate, the assessment will consider indirect impacts and impacts on access to particular resources such as strategic tourism receptors over a wider

geography. It is expected that the extent of identified likely significant effects at this scale is likely to be relatively limited, and that any identified likely significant effects would be in relation to temporary disruption during construction or in-combination effects on amenity. Assessment of in-combination effects will draw on the findings of other topics and will take account of the relevant study areas.

16.4.8 The study area may also be extended to take account of construction phase infrastructure, such as construction compounds and stockpile areas, the extent of which are not yet known.

16.4.9 It is acknowledged that the Proposed Development is, in places, in proximity to the boundary of the South Downs National Park (SDNP). There is one area, near Colden Common, where the Preferred Pipeline Corridor may encroach on the SDNP, and there are other areas where the SDNP falls within the 500m buffer of the Proposed Development. The scoping assessment has therefore considered the potential for impacts on tourism and recreation within the SDNP.

*Health*

16.4.10 Consideration of health effects is applied at a population level. The most appropriate data is generally available at ward level. There are no wards entirely within the Scoping Area, but those which intersect with it and therefore form the study area for the health assessment are:

- Badger Farm and Oliver's Battery (E05010996)
- Colden Common and Twyford (E05010999)
- Fair Oak and Horton Heath (E05011194)
- Upper Meon Valley (E05011008)
- Bishop's Waltham (E05010997)
- Bishopstoke (E0501187) / Bishopstoke West (E05004498)[18]
- Whiteley and Shedfield (E05011009)
- Central Meon Valley (E05010998)
- Southwick and Wickham (E05011006)
- Fareham East (E05004516)
- Fareham North (E05004547)
- Cosham (E05002445)
- Purbrook (E05004575)
- Drayton and Farlington (E05002446)
- Paulsgrove (E05002452)
- Bedhampton (E05004568)
- Warren Park (E05004578)
- St. Faith's (E05004576)
- Barncroft (E05004566)

[18] Census data is available for Bishopstoke West ward. More recent datasets are available for Bishopstoke ward.

- Battins (E05004567)
- Rowlands Castle (E05004489)

16.4.11 The relevant local authority and ward boundaries are shown in Figures 12.1 and 16.1 respectively in Volume III.

16.4.12 In respect of impacts relevant to health that are identified by other environmental topics (such as air quality, noise and landscape and visual), the defined study area used within those assessments is applied where relevant, but also considered within the context of the health assessment study area, particularly in relation to any vulnerable receptors within those areas.

### Sources of baseline data

16.4.13 The data in Table 16-3 has been used to inform the baseline for this EIA Scoping Report:

**Table 16-3: Source of baseline data**

| Baseline data | Source of data |
|---|---|
| Deprivation | Index of Multiple Deprivation (IMD) |
| Community facilities (schools, places of worship, healthcare) | Ordnance Survey (OS) OpenMap Local Important Buildings |
| Open space | OS Open Greenspace |
| Public Rights of Way (PRoW) and accessibility | Hampshire Public Rights of Way<br>Defra Countryside Rights of Way<br>Sustrans National Cycle Network and Long Distance National Cycle Routes |
| Tourism data | Office for National Statistics (ONS) Tourism Employment Data<br>Visit Britain Accommodation Stock Audit<br>Visit Hampshire visitor data |
| Population and age profile | ONS Census 2021 |
| Employment and unemployment | ONS Annual Population Survey |
| Gross Value Added (GVA) | ONS Regional GVA |
| Employees by sector | ONS Business Register and Employment Survey |
| Businesses by sector | ONS Business Size, Activity and Location |
| Long-term health problem or disability | ONS Census 2011 |
| Population claiming out-of-work benefits | ONS Claimant Count |
| Air quality | Hampshire Joint Strategic Needs Assessment |

## 16.5 Baseline conditions

### Proposed Development wide conditions

16.5.1 This section sets out the baseline conditions in the study area for the assessment of socio-economic, tourism, recreation and health effects. A development-wide socio-economic baseline is provided, followed by a ward level health profile. Ward level data is discussed under separate headings for each section of the Proposed Development.

*Socio-economics*

16.5.2 This section provides socio-economic baseline information at a local authority level for the local authority areas within the study area, with comparator data for Hampshire and England.

*Population*

16.5.3 Table 16-4 shows the population at the 2021 Census for each local authority area within the study area, Hampshire and England, and the rate of change since the 2011 Census. Winchester, Eastleigh and East Hampshire have experienced higher rates of population growth than the county and national averages, however other districts have recorded notably lower than average rates of growth, particularly Portsmouth which has seen its population grow by 1.5% compared with the national average of 6.7%.

**Table 16-4: Population in 2021 and change since 2011 [319] [320]**

| | 2021 | % change since 2011 |
|---|---|---|
| Havant | 124,200 | 2.9% |
| Winchester | 127,500 | 9.4% |
| Fareham | 114,500 | 2.6% |
| Eastleigh | 136,400 | 8.9% |
| Portsmouth | 208,100 | 1.5% |
| East Hampshire | 125,700 | 8.8% |
| Hampshire | 1,400,800 | 6.3% |
| England | 56,550,138 | 6.7% |

*Age profile*

16.5.4 Table 16-5 shows the age profile of the population of each local authority within the study area, in comparison with Hampshire and England. The proportion of residents aged 65 and over is above average in Hampshire, however this varies considerably at local authority level with Havant and Fareham having the largest proportions of residents in these age groups. Portsmouth and Winchester both have higher than average proportions of residents aged 15-24, reflecting the student population in each city. Eastleigh has a slightly higher than average proportion of residents who are children aged under 15.

Table 16-5: Age profile of population, 2021 [320]

| | 0-4 | 5-14 | 15-24 | 25-64 | 65-84 | 85 and over |
|---|---|---|---|---|---|---|
| Havant | 4.9% | 11.2% | 9.7% | 49.8% | 20.8% | 3.5% |
| Winchester | 4.7% | 11.8% | 13.6% | 48.9% | 17.7% | 3.1% |
| Fareham | 4.5% | 11.0% | 9.4% | 50.6% | 20.9% | 3.7% |
| Eastleigh | 5.6% | 12.4% | 9.8% | 52.6% | 16.9% | 2.7% |
| Portsmouth | 5.4% | 11.4% | 16.6% | 51.8% | 12.7% | 2.0% |
| East Hampshire | 4.7% | 11.5% | 9.7% | 50.9% | 19.9% | 3.2% |
| Hampshire | 5.1% | 11.6% | 10.1% | 51.5% | 18.6% | 3.1% |
| England | 5.4% | 12.0% | 11.7% | 52.4% | 16.0% | 2.4% |

*Deprivation*

16.5.5 Figure 16.2 in Volume III shows data from the Index of Multiple Deprivation 2019. Much of the study area is in areas of relatively low deprivation. The exception is in Havant, and particularly around the Leigh Park area to the north-west of the town, around the Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir.

*Employment and unemployment*

16.5.6 Table 16-6 uses data from the Annual Population Survey for employment and working-age unemployment in 2023. Hampshire generally is an area of relatively low unemployment, recording a rate of 3% which is below the national average of 3.7%. The county also has a considerably higher proportion of residents who are in employment than the national average. At local authority level, the highest rates of employment and lowest rates of unemployment are in Fareham and Eastleigh. Havant and East Hampshire record higher than average rates of unemployment, at 4.6% and 4.8% respectively.

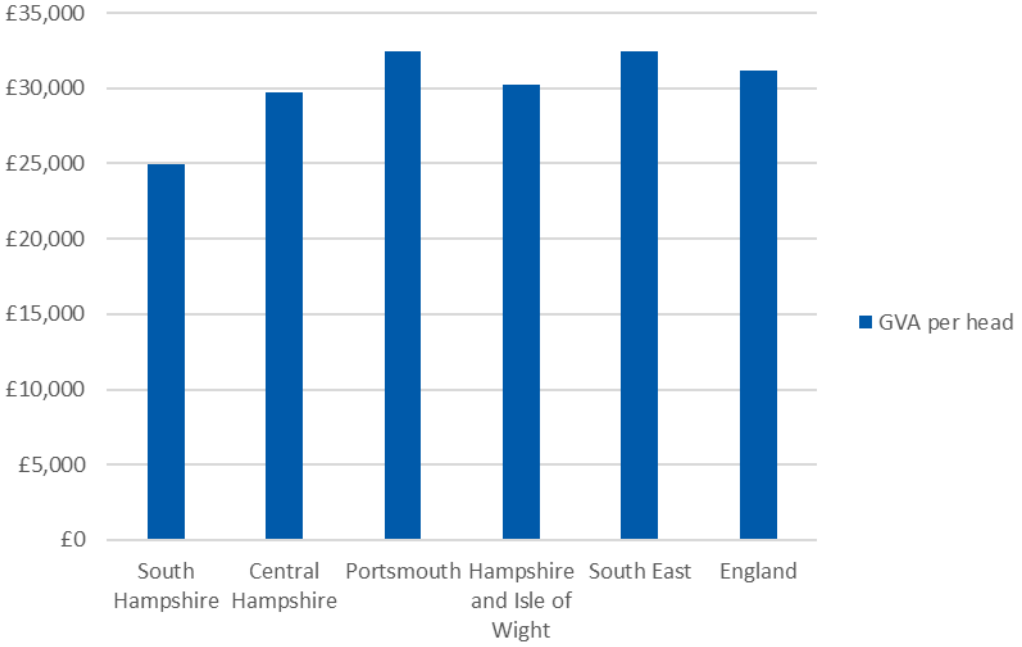
Table 16-6: Rates of employment and unemployment, 2021 [321]

| | Employment | Unemployment |
|---|---|---|
| Havant | 68.9% | 4.6% |
| Winchester | 74.6% | 3.5% |
| Fareham | 84.7% | 2% |
| Eastleigh | 85.5% | 2.4% |
| Portsmouth | 74.1% | 2.6% |
| East Hampshire | 76.5% | 4.8% |
| Hampshire | 77.9% | 3% |
| England | 75.8% | 3.7% |

*Gross Value Added*

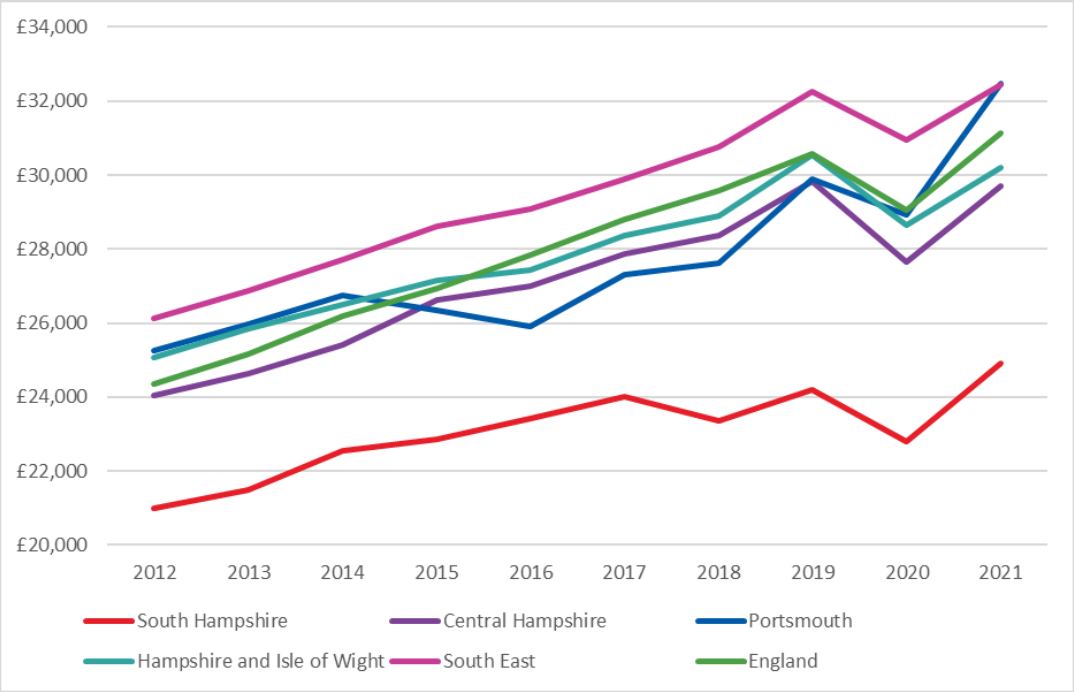
16.5.7 Image 16-1 shows GVA per head for the relevant International Territorial Level (ITL) statistical areas: South Hampshire (covering Eastleigh, Fareham, Gosport and Havant), Central Hampshire (covering East Hampshire, New Forest, Test Valley and Winchester), Portsmouth, Hampshire and Isle of Wight, South East, and England. GVA per head is slightly lower across Hampshire and the Isle of Wight than the national and regional averages, and is particularly low in South Hampshire at £24,914 compared with the national average of £31,138.

**Image 16-1: Gross value added per head, 2021 [322]**




16.5.8 Image 16-2 shows the change in GVA per head between 2012 and 2021. All areas saw a decrease in GVA per head between 2019 and 2020, reflecting the impact of the Covid-19 pandemic, followed by a recovery between 2020 and 2021. All areas returned to, or returned close to, pre-pandemic levels by 2021, with some recording higher GVA per head in 2021 than they had done in 2019. In Portsmouth in particular, GVA per head in 2021 was over £1,000 higher than it had been in 2019. GVA per head in South Hampshire also returned to higher than pre-pandemic levels in 2021 but has remained consistently lower than the level recorded in other areas throughout this period.

Image 16-2: Change in Gross value added per head over time, 2012-2021 [322]

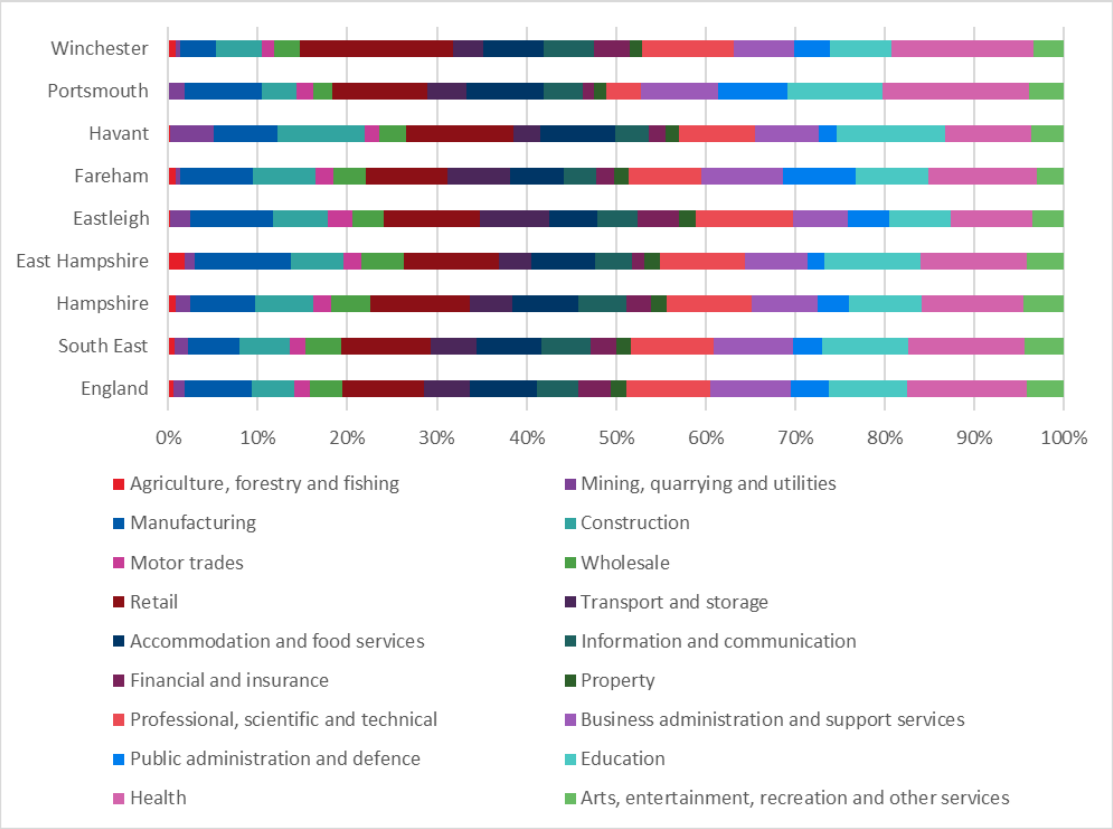



## *Business and industry*

16.5.9 Image 16-3 shows the proportion of employees by sector for each local authority area within the study area, with regional and national comparators. As the chart illustrates, industrial structure varies quite considerably between local authority areas.

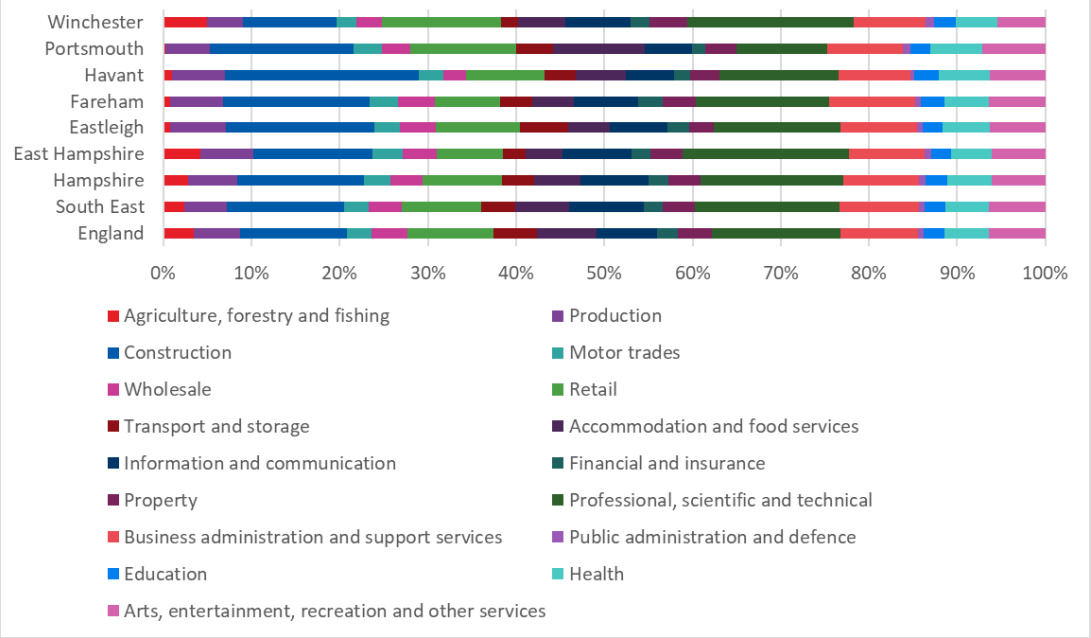
16.5.10 Winchester and Hampshire as a whole both have a slightly higher than average proportion of residents employed in agriculture, forestry and fishing. The mining, quarrying and utilities sector accounts for 4.9% of employment in Havant, above the national average of 1.2%. Havant also has higher than average employment in the manufacturing (7.3%) and construction (9.7%) sectors. Employment in the accommodation and food services sector, which includes many tourism businesses, is above average in Havant (8.5%) and in Portsmouth (8.7%).

Image 16-3: Employees by sector, 2021 [323]




16.5.11 Image 16-4: Businesses by sector, 2022 (Source: ONS, Business activity, size and location) shows the proportion of businesses by sector, and again illustrates the variation between areas. 5% of businesses in Winchester are in the agriculture, forestry and fishing sector, above the national average of 3.5%. The proportion of businesses in the construction sector is higher than average in all areas, with the exception of Winchester, and is particularly high in Havant at 21.9%. Portsmouth records a higher than average proportion of businesses in accommodation and food, but this is smaller than average in all other areas.

Image 16-4: Businesses by sector, 2022 (Source: ONS, Business activity, size and location)




## *Tourism and recreation*

### *Value of tourism*

16.5.12 The study area for the assessment of tourism impacts will be relevant local authorities and the county of Hampshire. The most recent data available for tourism activity in Hampshire is for 2016, and is shown in Table 16-7. In 2016, there were 43.5 million day visitors to the county and 4.8 million overnight visitors. The tourism economy was worth £3.27 billion and supported 87,000 jobs.

Table 16-7: Value of tourism in Hampshire (2016) [324]

| Tourism indicators | Value (2016) |
|---|---|
| Value of tourism activity in Hampshire | £3.27bn |
| Day visitors to Hampshire | 43.5m |
| Overnight visitors | 4.8m |
| People employed in the tourism industry | 87,000 |

16.5.13 The most recent data available at local authority level is from 2012 and should therefore be treated with caution[19]. Table 16-8 shows the proportion of employment that was in tourism related industries in 2012 in each of the local authorities within the study area, in comparison with England as a whole. Portsmouth had the highest proportion of jobs in tourism, at 10.6%, and was the only local authority within the study area at that time with a higher proportion of tourism jobs than the national average of 10.1%.

[19] Given the time that has elapsed since this data was collected and the impact of the Covid-19 pandemic on the tourism and hospitality sectors, this should be treated with caution.

Table 16-8: Tourism employment in local authorities within the study area [325]

| Local authority | % of jobs in tourism industries (2012) |
|---|---|
| Havant | 7.1% |
| Winchester | 8.4% |
| Eastleigh | 7.3% |
| Fareham | 7.1% |
| Portsmouth | 10.6% |
| East Hampshire | 8.9% |
| England | 10.1% |

### *Tourist accommodation*

16.5.14 Table 16-9 provides the total tourist accommodation stock in local authorities within the study area and Hampshire as a whole, broken down into serviced accommodation (i.e. hotels, guest houses) and non-serviced accommodation (i.e. self-catering lets). This is the most recent data available and is from 2016. Winchester, East Hampshire and Portsmouth have the largest stock of serviced tourist accommodation in the study area, while Havant and Winchester have the largest stock of non-serviced accommodation.

Table 16-9: Tourist accommodation stock in local authorities within the study area [326]

| | Serviced accommodation | Non-serviced accommodation |
|---|---|---|
| Havant | 55 | 53 |
| Winchester | 180 | 52 |
| Eastleigh | 44 | 10 |
| Fareham | 43 | 13 |
| Portsmouth | 108 | 28 |
| East Hampshire | 125 | 25 |
| Hampshire | 1,361 | 523 |

### *Tourism and recreation assets*

16.5.15 Chapter 12 Land use and agriculture identifies commercial properties and land within 500m of the Proposed Development, as well as open spaces, play spaces and playgrounds within the study area. PRoW and strategic tourism and recreation assets are identified in the baseline for each section of the Proposed Development set out in paragraphs 16.5.24 to 16.5.42.

### *Health*

16.5.16 This section presents additional information, mostly at ward level, for use in the assessment of health effects. Ward-level baseline data is then discussed for each section of the Proposed Development.

*Age profile*

16.5.17 Table 16-10 sets out ward-level 2021 Census data for all wards within the study area (see Table 16-5 for comparator data for local authorities, Hampshire and England).

**Table 16-10: Age profile by ward [327]**

| | 0-4 | 5-14 | 15-24 | 25-64 | 65-84 | 85 and over |
|---|---|---|---|---|---|---|
| Bedhampton | 4.5% | 10.3% | 9.4% | 52.7% | 19.3% | 3.8% |
| St Faith's | 4.9% | 10.2% | 9.8% | 51.4% | 20.3% | 3.5% |
| Rowlands Castle | 3.9% | 9.4% | 7.6% | 50.8% | 24.7% | 3.7% |
| Barncroft | 6.2% | 15.0% | 11.2% | 53.0% | 13.0% | 1.5% |
| Warren Park | 6.7% | 17.7% | 13.2% | 49.7% | 11.3% | 1.4% |
| Battins | 7.6% | 13.8% | 10.8% | 52.5% | 13.3% | 2.0% |
| Purbrook | 4.4% | 10.4% | 9.9% | 51.7% | 20.6% | 3.1% |
| Southwick and Wickham | 6.2% | 11.8% | 9.7% | 53.4% | 16.2% | 2.6% |
| Drayton and Farlington | 4.8% | 12.5% | 10.2% | 49.9% | 18.5% | 4.1% |
| Cosham | 5.6% | 13.5% | 11.0% | 52.5% | 14.9% | 2.6% |
| Paulsgrove | 5.7% | 14.5% | 12.4% | 52.4% | 13.6% | 1.5% |
| Fareham East | 4.6% | 10.3% | 9.7% | 52.7% | 19.0% | 3.7% |
| Fareham North | 4.6% | 10.0% | 9.2% | 49.5% | 21.6% | 5.1% |
| Whiteley and Shedfield | 5.4% | 12.0% | 10.6% | 55.4% | 14.6% | 2.1% |
| Central Meon Valley | 4.9% | 12.0% | 9.6% | 49.9% | 20.9% | 2.7% |
| Bishop's Waltham | 4.9% | 10.7% | 8.7% | 48.6% | 23.6% | 3.5% |
| Upper Meon Valley | 4.0% | 11.4% | 9.7% | 50.7% | 21.7% | 2.6% |
| Fair Oak and Horton Heath | 6.2% | 11.7% | 10.7% | 52.8% | 16.4% | 2.3% |
| Bishopstoke West | 5.4% | 11.7% | 8.6% | 51.7% | 19.3% | 3.3% |
| Colden Common and Twyford | 5.2% | 14.4% | 8.7% | 49.5% | 19.2% | 3.0% |
| Badger Farm and Oliver's Battery | 4.2% | 12.9% | 9.8% | 49.5% | 20.3% | 3.3% |
| Havant | 4.9% | 11.2% | 9.7% | 49.8% | 20.8% | 3.5% |
| Winchester | 4.7% | 11.8% | 13.6% | 48.9% | 17.7% | 3.1% |

| | 0-4 | 5-14 | 15-24 | 25-64 | 65-84 | 85 and over |
|---|---|---|---|---|---|---|
| Fareham | 4.5% | 11.0% | 9.4% | 50.6% | 20.9% | 3.7% |
| Eastleigh | 5.6% | 12.4% | 9.8% | 52.6% | 16.9% | 2.7% |
| Portsmouth | 5.4% | 11.4% | 16.6% | 51.8% | 12.7% | 2.0% |
| East Hampshire | 4.7% | 11.5% | 9.7% | 50.9% | 19.9% | 3.2% |
| Hampshire | 5.1% | 11.6% | 10.1% | 51.5% | 18.6% | 3.1% |
| England | 5.4% | 12.0% | 11.7% | 52.4% | 16.0% | 2.4% |

*Life expectancy*

16.5.18 Table 16-11 sets out data on life expectancy at birth for males and females. Life expectancy is higher in all local authority areas than the national average, with the exception of Portsmouth where it is lower for both males and females.

**Table 16-11: Life expectancy, males and females [328]**

| Administrative areas | Males | Females |
|---|---|---|
| Bedhampton | 79.7 | 81.8 |
| St Faith's | 80.9 | 85.0 |
| Rowlands Castle | 83.6 | 93.7 |
| Barncroft | 78.9 | 80.2 |
| Warren Park | 76.4 | 82.1 |
| Battins | 76.9 | 79.5 |
| Purbrook | 80.7 | 84.9 |
| Southwick and Wickham | 84.3 | 84.4 |
| Drayton and Farlington | 82.5 | 83.8 |
| Cosham | 78.1 | 82.8 |
| Paulsgrove | 78.6 | 83.1 |
| Fareham East | 81.0 | 84.7 |
| Fareham North | 82.6 | 82.6 |
| Whiteley and Shedfield | 80.1 | 82.8 |
| Central Meon Valley | 84.6 | 86.9 |
| Bishop's Waltham | 81.2 | 85.8 |
| Upper Meon Valley | 81.4 | 88.3 |
| Fair Oak and Horton Heath | 82.6 | 82.5 |
| Bishopstoke | 82.5 | 87.2 |
| Colden Common and Twyford | 85.0 | 89.5 |
| Badger Farm and Oliver's Battery | 83.7 | 87.0 |
| Havant | 80.3 | 83.5 |
| Winchester | 82.0 | 85.5 |
| Fareham | 81.7 | 84.1 |
| Eastleigh | 81.7 | 84.9 |

| Administrative areas | Males | Females |
|---|---|---|
| Portsmouth | 78.4 | 82.3 |
| East Hampshire | 81.4 | 84.9 |
| Hampshire | 81.4 | 84.6 |
| England | 79.5 | 83.2 |

*Unemployment*

16.5.19 The employment and unemployment data from the Annual Population Survey [321], referred to in paragraph 16.5.6, is not available at ward level. Instead, data on the proportion of the working-age population claiming out-of-work benefits can be used to give an indication of the rate of unemployment. Again, comparator data for the local authorities within the study area, Hampshire and England is provided for reference.

16.5.20 As set out in the socio-economic baseline (in paragraphs 16.5.2 to 16.5.11), Hampshire generally is an area of relatively low unemployment. The proportion of the working-age population claiming out of work benefits in the county as of March 2023 was 2.3% compared with the national average of 3.8% (Table 16-12). The proportion of residents claiming out-of-work benefits is close to the national average in Portsmouth, at 4.6%, but is lower in all other local authorities within the study area. At ward level, however, there is some variation, with some pockets of higher than average unemployment. This is discussed in more detail for each section of the Proposed Development.

**Table 16-12: Out-of-work benefits, March 2023 [329]**

| Administrative areas | Working-age population claiming out-of-work benefits |
|---|---|
| Bedhampton | 2.5% |
| St Faith's | 3.1% |
| Rowlands Castle | 2.5% |
| Barncroft | 4.5% |
| Warren Park | 5.6% |
| Battins | 6.0% |
| Purbrook | 2.3% |
| Southwick and Wickham | 2.3% |
| Drayton and Farlington | 1.5% |
| Cosham | 3.6% |
| Paulsgrove | 4.8% |
| Fareham East | 2.2% |
| Fareham North | 2.1% |
| Whiteley and Shedfield | 1.9% |
| Central Meon Valley | 1.5% |
| Bishop's Waltham | 1.9% |
| Upper Meon Valley | 1.3% |

| Administrative areas | Working-age population claiming out-of-work benefits |
|---|---|
| Fair Oak and Horton Heath | 1.4% |
| Bishopstoke | 1.9% |
| Colden Common and Twyford | 1.7% |
| Badger Farm and Oliver's Battery | 1.5% |
| Havant | 3.5% |
| Winchester | 2.0% |
| Fareham | 1.7% |
| Eastleigh | 2.0% |
| Portsmouth | 4.6% |
| East Hampshire | 2.0% |
| Hampshire | 2.3% |
| England | 3.8% |

### *Illness and disability*

16.5.21 Table 16-13 provides Census 2021 data on the proportion of the population experiencing a limiting long-term illness or disability. This is below the national average of 17.3% in all local authorities with the exception of Havant, where it is 19.9%. Again, there is considerable variation at ward level.

**Table 16-13: Proportion of the population experiencing a limiting long-term illness or disability [320]**

| Administrative areas | Limiting long-term illness or disability |
|---|---|
| Bedhampton | 19.1% |
| St Faith's | 16.7% |
| Rowlands Castle | 15.1% |
| Barncroft | 20.5% |
| Warren Park | 22.2% |
| Battins | 23.4% |
| Purbrook | 17.6% |
| Southwick and Wickham | 15.9% |
| Drayton and Farlington | 16.0% |
| Cosham | 18.1% |
| Paulsgrove | 20.9% |
| Fareham East | 16.7% |
| Fareham North | 17.9% |
| Whiteley and Shedfield | 12.9% |
| Central Meon Valley | 13.2% |
| Bishop's Waltham | 16.7% |
| Upper Meon Valley | 12.6% |
| Fair Oak and Horton Heath | 13.8% |
| Bishopstoke | 17.3% |

| Administrative areas | Limiting long-term illness or disability |
|---|---|
| Colden Common and Twyford | 14.0% |
| Badger Farm and Oliver's Battery | 12.8% |
| Havant | 19.9% |
| Winchester | 15.4% |
| Fareham | 16.8% |
| Eastleigh | 16.0% |
| Portsmouth | 17.6% |
| East Hampshire | 15.6% |
| Hampshire | 16.4% |
| England | 17.3% |

*Air quality*

16.5.22 Table 16-14 provides data on air quality, specifically the proportion of the population exposed to high concentrations of Nitrogen Dioxide ($NO_2$) and Particulate Matter (PM2.5). $NO_2$ exposure is highest in Fareham at 13%, and PM2.5 exposure is highest in Eastleigh and Winchester, at 28% and 27% respectively.

**Table 16-14: Air quality (Hampshire and Isle of Wight Only. Comparable data not available for Portsmouth [330])**

| Local Authority | Population exposed to high $NO_2$ concentrations | Population exposed to high PM2.5 concentrations |
|---|---|---|
| Havant | 7% | 4% |
| Winchester | 1% | 27% |
| Fareham | 13% | 13% |
| Eastleigh | 4% | 28% |
| East Hampshire | 1% | 11% |

16.5.23 The following sections set out the baseline conditions for the distinct geographic parts of the study area.

### Proposed Water Recycling Plant and High Lift Pumping Station

16.5.24 The site for the proposed WRP and HLPS is in Bedhampton Ward within Havant District. Both Bedhampton (2.5%) and Havant (3.5%) have a lower rate of unemployment[20] than the national average of 3.8%. In Bedhampton, life expectancy for males is in line with the national average at 79.7, and for females slightly lower than average at 81.8. The proportion of the population experiencing long-term illness or disability is above average at 19.1% compared with 17.3% for England. The ward has a smaller than average proportion of residents who are children, and a higher-than-average proportion of residents aged 65 and over. The

[20] Ward level unemployment data refers to the proportion of the working-age population claiming out-of-work benefits. 'Unemployment' is used here for brevity.

study area for the proposed WRP and HLPS is located in an area of relatively low deprivation, falling in the 8th decile of deprivation in England.

16.5.25 Tourism and recreation receptors in the study area for this section of the Proposed Development are shown in Figure 16.3 in Volume III and include:

- PRoW: Havant 30/1, which is located along the eastern boundary of the study area for the proposed WRP and crosses its north eastern corner.
- National Cycle Network (NCN) Route 22, which is located immediately south and west of the study area along Harts Farm Way.

16.5.26 Several businesses are located to the east of the study area along Harts Farm Way, the closest of which are Tarmac Havant Concrete Plant and businesses based at Basepoint Business Centre. The proposed site for location of the proposed WRP and HLPS is allocated for employment in the Havant Local Plan [257] (Brockhampton West Policy BD10).

### Proposed Underground Pipeline between Budds Farm Wastewater Treatment Works and the proposed Water Recycling Plant

16.5.27 The Proposed Underground Pipeline between Budds Farm WTW and the proposed WRP is within the Bedhampton and St. Faith's wards of Havant. The baseline for Bedhampton Ward is set out in paragraph 16.5.23.

16.5.28 St Faith's has a slightly higher rate of unemployment (3.1%) than Bedhampton, however still lower than the national average of 3.8%. Life expectancy is slightly higher than national averages, at 80.9 for males and 85 for females. The proportion of the population experiencing a limiting long-term illness or disability is 16.7%, lower than the rate in Bedhampton and the national average of 17.3%. The ward has a smaller than average proportion of the population who are children, and a higher-than-average proportion of residents aged 65 and over. This section of the Proposed Development is located in an area of relatively low deprivation, with the majority of the area falling in the least deprived decile.

16.5.29 Tourism and recreation receptors in the study area for this section of the Proposed Development are shown in Figure 16.3 in Volume III and include:

- Havant Sea Angling Club
- ProWs: Havant 30/3 and Havant 45/2 (part of the Solent Way)
- NCN Route 22 along Harts Farm Way
- Wayfarers Walk long distance walking route
- Broadmarsh Open Spaces.

### Proposed Underground Pipeline between the proposed Water Recycling Plant and Havant Thicket Reservoir

16.5.30 The Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir is within the Bedhampton, Barncroft, Warren Park and Battins wards of Havant. Havant Thicket Reservoir itself is in Battins, with parts of the study area around the reservoir in the Rowlands Castle ward of East Hampshire. The baseline for Bedhampton is set out in paragraph 16.5.23.

16.5.31 The rate of unemployment in Barncroft (4.5%), Warren Park (5.6%) and Battins (6%) is higher than that recorded in Bedhampton, and also above the national average. However, Rowlands Castle records lower than average unemployment, at 2.5%. Life expectancy is lower than average in Barncroft, Warren Park and Battins, but considerably above average in Rowlands Castle. Female life expectancy ranges from 79.5 in Battins to 93.7 in Rowlands Castle, while male life expectancy ranges from 76.4 in Warren Park to 83.6 in Rowlands Castle.

16.5.32 The proportion of residents who experience a long-term limiting illness or disability is above average in all wards in this area, with the exception of Rowlands Castle, and is highest in Battins at 23.4% (compared with a national average of 17.3%). Barncroft, Warren Park and Battins all have younger populations than Bedhampton and the Hampshire and England averages, with smaller proportions of residents aged 65 and over, and larger than average proportions of residents who are children under 16. In Rowlands Castle, there is a smaller than average proportion of children and a larger than average proportion of older residents. Parts of the Proposed Development are located in areas of relatively high deprivation, with some falling in the most deprived decile nationally, however the area around Rowlands Castle records very low levels of deprivation.

16.5.33 Tourism and recreation receptors in the study area for this section of the Proposed Development are shown in Figure 16.3 in Volume III and include:

- Staunton Country Park
- Stockheath Common
- Playing fields adjacent to Havant Rugby Football Club and St Thomas More's Roman Catholic (RC) Primary School
- Bedhampton Mariners Cricket Club and playing fields adjacent
- PRoWs: Havant 30/1, 30/2, 34/4, 34/5, 40/1, 506b/1.

### Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

16.5.34 Between Havant Thicket Reservoir and Otterbourne WSW, the Proposed Development passes through Havant, Fareham, and Winchester districts, with small portions also in Eastleigh and the City of Portsmouth. The Proposed Development passes through the following wards (travelling from east to west):

- Bedhampton
- Drayton and Farlington
- Southwick and Wickham
- Cosham
- Paulsgrove
- Fareham East
- Fareham North
- Whiteley and Shedfield
- Central Meon Valley
- Bishop's Waltham

- Upper Meon Valley
- Fair Oak and Horton Heath
- Bishopstoke / Bishopstoke West
- Colden Common and Twyford
- Badger Farm and Oliver's Battery.

16.5.35 Baseline data for Bedhampton is set out in paragraph 16.5.24.

16.5.36 Unemployment in Drayton and Farlington (1.5%) and Southwick and Wickham (2.3%) is lower than the national average of 3.8%. Life expectancy for both males and females is above average in both wards. The proportion of the population experiencing a limiting long-term illness or disability is below average at 16% in Drayton and Farlington and 15.9% in Southwick and Wickham. Drayton and Farlington has an older than average age profile, while the age profile of Southwick and Wickham is in line with the national average.

16.5.37 Unemployment in Cosham is close to the national average at 3.6%, and in Fareham East is below average at 2.2%. Paulsgrove records unemployment of 4.8%, above the local and national averages. Cosham and Paulsgrove have life expectancies for males (78.1 and 78.6 respectively) and females (82.8 and 83.1 respectively) that are below or in line with the national averages, while in Fareham East they are slightly above average (81 for males and 84.7 for females). The proportion of the population experiencing a limiting long-term illness or disability is above average in Paulsgrove (20.9%) and Cosham (18.1%) and below average in Fareham East (16.7%). Cosham and Paulsgrove have a higher than average proportion of residents who are children aged under 15, while Fareham East has a higher than average proportion of residents aged over 65 (22.7%).

16.5.38 Both Fareham North (2.1%) and Whiteley and Shedfield (1.9%) record levels of unemployment that are below the national average of 3.8%. Life expectancy for females is broadly in line with average in both wards, however life expectancy for males is higher than average in Fareham North at 82.6. The proportion of the population who experience a limiting long-term illness or disability is slightly higher than average in Fareham North (17.9%) and considerably lower than average in Whiteley and Shedfield (12.9%). Fareham North has a considerably higher than average proportion of residents who are aged 65 and over (26.7%). The age profile of Whiteley and Shedfield is broadly in line with the national average.

16.5.39 Central Meon Valley (1.5%) and Bishop's Waltham (1.9%) both record lower than average rates of unemployment. Life expectancy for both males and females is also above average in both wards. The proportion of residents who experience a limiting long-term illness or disability is below average in both Central Meon Valley (13.2%) and Bishop's Waltham (16.7%). Both wards have higher than average proportions of residents aged 65 and above, at 23.6% in Central Meon Valley and 27.1% in Bishop's Waltham, compared to 18.4% nationally.

16.5.40 Wards at the western extent of the corridor record lower than average rates of unemployment, at 1.3% in Upper Meon Valley and 1.5% in Badger Farm and Oliver's Battery, 1.4% in Fair Oak and Horton Heath, and 1.7% Colden Common and Twyford. Life expectancy is higher than average for both males and females across these wards, and the proportion of the population experiencing a limiting

long-term illness or disability is lower than average (12.6% in Upper Meon Valley, 13.8% in Fair Oak and Horton Heath, 14% in Colden Common and Twyford, and 12.8% in Badger Farm and Oliver's Battery). The age profile of Fair Oak and Horton Heath is broadly in line with the national average. The proportion of residents aged 65 and above is above average in Upper Meon Valley (24.3%), Colden Common and Twyford (22.2%), and Badger Farm and Oliver's Battery (23.6%).

16.5.41 Deprivation along the Preferred Pipeline Corridor between Havant Thicket Reservoir and Otterbourne WSW is generally relatively low, although there are pockets of higher deprivation at the eastern extent of the Proposed Underground Pipeline, around Bedhampton and Purbrook.

16.5.42 Tourism and recreation receptors in the study area for this section of the Proposed Development are shown in Figure 16.3 in Volume III and include:

- Fort Purbrook Attraction and Activity Centre
- Fort Widley Attraction and Activity Centre
- Peter Ashley Activity Centre
- Golf course at Marriott Meon Valley Hotel and Country Club
- Portsdown Hill
- Nelsons Monument and Fort Nelson
- Bishop Waltham's Palace
- Marwell Zoo and Marwell Resort
- Quob Park Estate
- Portsmouth Golf Course
- Wickham Park, a designated OS Open Greenspace
- Wickham Park Golf Club
- Fields used temporarily each August for Wickham Festival
- Fishers Pond Fishery
- Hensting Alpacas
- BellaCrafts Crafts and Activity Centre
- NCN route 222
- An unnamed Long Distance National Cycle Route
- Wayfarers Walk
- PRoWs: Boarhunt 14 and 19; Fareham PRoW 84, 101, 103, 107, 106; Southwick and Widley 3, 28 3, 36 and 130; Fareham 84, Winchester 501, Wickham 5 and 14; Shedfield 2, 4, 6, 12 and 13; Bishop's Waltham 42a, 43/2, 44/2 and 502; Curdridge 4; Upham 20; Colden Common 1, 6, 8, 9, 21, 22, 23, 30, 5/2, 21/2, 33/2, 23/2 and 22/3; Upham 20; Fairoak and Horton Heath 23 and 27; and Otterbourne 2, 3, 6, 7 and 5/4.

### Proposed Above Ground Plant

16.5.43 The proposed AGP has been considered in Section 16.5 as they will be located within the Preferred Pipeline Corridor.

## 16.6 Scoping of potential effects

16.6.1 The Proposed Development has the potential to affect socio-economics, tourism and recreation and health receptors, both during construction and operation.

16.6.2 Effects from decommissioning of the Proposed Development are considered to be no greater than those identified during the construction phase, and are therefore assessed as construction effects as a worst case scenario. Please refer to Chapter 3 Description of the proposed development, section 3.7 for further information on decommissioning.

16.6.3 This section sets out the potential socio-economic, tourism, recreation and health effects that are proposed to be scoped into and out of the assessment, during construction and operation of the Proposed Development. The scoping assessment has considered effects associated with all elements of the Proposed Development Scoping Area, including proposed AGP, Havant Thicket Reservoir and the Eastney LSO.

### Effects scoped into the assessment

*Construction effects*

*Socio-economics, tourism and recreation assessment*

16.6.4 The construction of the Proposed Development will create temporary direct and indirect employment, training and supply chain opportunities in the local and sub-regional economy. The following effects are proposed to be scoped into the assessment:

- Direct and indirect construction employment and impacts on the local and sub-regional economy
- Supply chain opportunities, including those for local businesses
- Training and apprenticeships associated with the construction of the Proposed Development

16.6.5 There may be the potential for disruption and environmental impacts arising from construction activity to result in temporary direct and indirect effects for strategic tourism receptors and the local and sub-regional tourism sector. The following effects are proposed to be scoped into the assessment:

- Temporary disruption to strategic tourism receptors, including changes in or loss of access, as a result of construction activity
- Temporary amenity effects for strategic tourism receptors as a result of construction activity
- Temporary impacts from the construction workforce on the availability of tourism accommodation

16.6.6 There is the potential for the construction of the Proposed Underground Pipeline and proposed AGP to result in temporary direct and indirect effects on recreational assets including open space. It is proposed that temporary disruption to open spaces and WCH provision, including changes in or loss of access, as a result of construction activity, is scoped into the assessment.

16.6.7 There may be potential for permanent enhancements to PRoW, for example where PRoW are diverted or reinstated as part of construction. It is proposed that potential improvements to PRoW and increased/improved WCH provision and access to open space are scoped into the assessment. Further information around any potential enhancements will be presented in the ES.

16.6.8 The site of the proposed WRP is allocated for manufacturing and/or warehousing floorspace under site reference BD11 in Policy HB2 of the Havant Allocations Plan. In June 2022, outline planning permission was granted for new development units to provide up to 29,000 square metres for flexible uses across use classes E (light industrial), B2 (general industrial) and B8 (storage and distribution). The proposed WRP would fit within the allocation for B2 and B8 uses and would generate some permanent employment. As there is not currently any employment on the site it is not anticipated that the construction and operation of the Proposed Development will lead to any net loss of employment. However, it is proposed that this aspect is scoped into the construction assessment at this stage to allow for further consideration and discussion with key stakeholders, including HBC. Any effects would arise during construction and would therefore be assessed as permanent construction effects.

*Health assessment*

- Health determinants proposed to be scoped in to the assessment of construction effects are:
- Access to health, social care and other social infrastructure, which may experience change as a result of construction activities.
- Access to open space and nature, which may become restricted during construction due to land take, diversions and or disruption from construction traffic and plant.
- Neighbourhood amenity (air quality, noise, lighting, landscape, traffic levels, water quality and ground conditions) – there is potential for construction activities to impact these elements of the environment which all contribute to the amenity of an area and the physical and perceived relationship with it.
- Accessibility and active travel – there is potential for construction activities to result in changes to how areas of communities are accessible (e.g. changes in parking provision, changes to public transport provision and/or routes) as well as how people are able to engage in active travel (in particular from use of PRoW that may be impacted during construction).
- Community safety – there is potential for the risk of interaction with construction vehicles and plant to increase during the construction stage.
- Access to work and training – construction activities may result in access to work and educational places becoming impeded or it may offer opportunities

for local people to engage with employment and training opportunities within the construction industry engaged in the Proposed Development.

- Social cohesion – changes that occur during construction such as temporary or long-term severance of communities can result in a change to the way in which the community engages with each other.

*Operation effects*

*Socio-economics, tourism and recreation assessment*

16.6.9 The operation of the Proposed Development will create permanent direct and indirect employment and supply chain opportunities in the local and sub-regional economy. There may also be the opportunity for ongoing training and apprenticeship opportunities, and for links with local training providers. The following effects are proposed to be scoped into the assessment:

- Direct and indirect operational employment
- Ongoing supply chain opportunities, including for local businesses
- Potential training and apprenticeship opportunities associated with the operation of the Proposed Development

16.6.10 Noise, visual and air quality effects associated with permanent AGP or maintenance activities could, in combination, result in temporary or permanent amenity effects for strategic tourism receptors during operation. It is proposed that indirect amenity effects for strategic tourism receptors during operation are scoped into the assessment.

*Health assessment*

16.6.11 Health determinants proposed to be scoped into the assessment of operation effects are:

- Neighbourhood amenity (air quality, noise, lighting, landscape). There is potential for operational activities to impact these elements of the environment which all contribute to the amenity of an area and the physical and perceived relationship with it.
- Community safety – there is potential for the risk of interaction with operational/maintenance vehicles and plant during the operation stage.

**Effects scoped out of the assessment**

*Construction effects*

*Socio-economics, tourism and recreation assessment*

16.6.12 It is proposed that impacts on tourism in the South Downs National Park (SDNP) are scoped out of this assessment. The Proposed Development is close to the boundary of the SDNP, particularly around Wickham, Lower Upham, and Otterbourne, and parts of the SDNP fall within the 500m study area used for the socio-economic, tourism and recreation assessment. There is one small area, near Colden Common, where the Preferred Pipeline Corridor may encroach on the

SDNP. The SDNP covers an area of approximately 1,600 square kilometres, stretching from Winchester in the west to Beachy Head near Eastbourne in the east. While the assessment will consider the potential for likely significant effects for individual strategic tourism receptors in affected areas of the park, such as Marwell Zoo and Marwell Resort, it is not anticipated at this stage that there will be any likely significant effects on tourism in the national park as a whole.

*Health assessment*

16.6.13 There are a wide range of health determinants that can affect health outcomes, and health determinants considered relevant to the construction phase of the Proposed Development have been listed in paragraph □. Health determinants that are not relevant to the Proposed Development, and so will not be considered within the assessment include:

- Indoor environment – the Proposed Development does not include any indoor space that would affect population health.
- Diet and other lifestyle choices – the Proposed Development has no scope for influencing diet and other lifestyle choices of the local population
- Workplace conditions – the Proposed Development will include construction workers whose workplace conditions will be managed appropriately and according to legal requirements. At a population level there is no influence on workplace conditions.
- Housing – there is no housing provision being proposed as part of the Proposed Development.
- Social or community influences such as racism or social exclusion – the Proposed Development would have no influence on these social elements.

*Operation effects*

*Socio-economics, tourism and recreation assessment*

16.6.14 It is unlikely that the Proposed Development would result in likely significant effects on access to strategic tourism receptors as a result of operation, and that any effects arising from maintenance activities on access to receptors or on PRoW and open space would be minor or temporary in nature. On this basis, it is proposed that the following potential direct effects arising from the operation of the Proposed Development are scoped out of the assessment:

- Disruption to strategic tourism receptors, including changes in or loss of access.
- Disruption to Walking, Cycling and Horseriding (WCH) provision, including PRoW and open spaces, including changes in or loss of access.

16.6.15 As noted in paragraph 16.6.8, any effects on employment resulting from the impact of the proposed WRP on an allocated employment site would arise during construction and would be treated as permanent construction effects,and are therefore scoped out for operation.

*Health assessment*

16.6.16 Health determinants proposed to be scoped out during the operation phase include those listed below:

- Access to health, open space and nature, social care and other social infrastructure – it is anticipated that there would be no change to access provision to such infrastructure, or open space, hence the Proposed Development would not result in likely significant effects.
- Access to work and training – during operation there would be few additional employment and training opportunities generated, such that at a population level the benefit would not be significant.
- Social cohesion – during operation the cohesion of the community would not be impacted significantly and therefore this has been scoped out.
- Accessibility and active travel – any impacts would be related to permanent construction impacts that affect access and provision (or quality) of PRoW, rather than new impacts specific to operation.

## 16.7 Approach to assessment

16.7.1 This section sets out the proposed methodology for the assessment of socio-economic, tourism, recreation and health effects.

### Additional baseline data collection

16.7.2 Baseline data collected to inform the EIA Scoping Report will be updated as required, for example where data is drawn from surveys that are updated annually. There may also be further releases of data from the 2021 Census of relevance to the assessment. Census data releases will be reviewed, and the baseline updated as necessary.

### Assessment methodology

*Socio-economics and tourism assessment*

16.7.3 The assessment will consider the potential direct and indirect effects of the Proposed Development for the economy, businesses and strategic tourism receptors within the study area. Effects will be considered both during the construction phase and once the Proposed Development is operational.

16.7.4 Where relevant, the assessment will draw on the findings of other EIA topics, including but not limited to, Chapter 12 Land use and agriculture, Chapter 6 Air quality and odour, Chapter 14 Noise and vibration, and Chapter 17 Traffic and transport, in order to understand the range of impacts including the potential for severance and amenity effects for strategic tourism receptors in the study area. The assessment will cross refer to baseline data in Chapter 12 Land use and agriculture.

16.7.5 The EIA will include an estimate of peak and average construction employment over the construction programme that will be developed in collaboration with the Applicant. The assessment will also consider supply chain opportunities for local

businesses, and potential training and apprenticeship opportunities associated with the construction of the Proposed Development.

16.7.6 The construction assessment will also look at the potential implications for jobs associated with permanent impacts on allocated employment land, including on the site of the proposed WRP. As noted in paragraph 16.6.8, it is not anticipated that this will result in a net loss of employment. Further engagement between the Applicant and other key stakeholders including HBC will be undertaken to inform the assessment of any potential effects.

16.7.7 Operational employment will be estimated as far as possible using information that can be provided by the Applicant regarding anticipated employment generation for the various components of the Proposed Development. The assessment will also consider the potential for long-term training and apprenticeship opportunities associated with the operation of the Proposed Development.

16.7.8 The assessment will follow the methodology set out by the HCA in the 'Additionality Guide' to calculate net additional employment, and will consider the effects of deadweight, leakage, and displacement. An appropriate multiplier will be applied to both construction and operational employment numbers to capture the wider effects of induced spend and additional income within the local economy.

16.7.9 The assessment will consider the potential accommodation requirements of the construction workforce, taking into account the number of construction workers required throughout the programme and where they are likely to travel from, and the potential impact that there could be on the overall availability of tourism accommodation in the study area.

*Recreation*

16.7.10 The recreation assessment will consider impacts on access to open space and the PRoW network, including impacts on the NCN and National Trails, during construction, drawing on the findings in Chapter 12 Land use and agriculture.

*Health assessment*

16.7.11 The health assessment will identify potential impacts related to the different stages of the Proposed Development (i.e. construction and operation) and identify whether these would result in changes to health determinants that would result in beneficial or adverse, direct or indirect and long-term or temporary health outcomes within the study area. The assessment will take into account mitigation measures embedded into the design of the Proposed Development.

16.7.12 The significance of effects will be determined through consideration of impact magnitude alongside the sensitivity of the population to changes in the health determinant in question. The sensitivity of the population will be defined by considering vulnerabilities within the study population (identified through establishing the health profile of the study area). Population sensitivity will be assigned as either high, medium, or low depending on the combination of vulnerability and exposure to change.

*Assessing significance*

16.7.13 Chapter 5 General EIA approach and methodology presents the overall environmental assessment significance methodology for the Proposed Development. However, the definition of a significant effect depends on the environmental topic or receptor.

16.7.14 The sensitivity of receptors and resources is governed by their capacity to absorb the proposed changes arising from the Proposed Development. It ultimately reflects their vulnerability to the impacts of the proposed activities and their access to additional or alternative resources of a similar nature. If a resource is frequently used, if few alternatives exist, or if receptors have limited capacity to absorb the changes arising from the Proposed Development, then a receptor is considered to be sensitive to the changes.

16.7.15 Criteria describing the sensitivity of receptors for socio-economics, tourism, recreation and health are identified in Table 16-15.

**Table 16-15: Sensitivity criteria for Socio-economics, tourism, recreation and health**

| Value Sensitivity | Criteria Guidance |
|---|---|
| Very High | Businesses, labour markets, individuals, groups of individuals, tourism and recreation assets or other receptors possessing very high economic, social or community value, that are expected to incur a material loss or gain as a result of potential changes in the environment.<br>Includes populations that have a concentration of vulnerable or disadvantaged groups (such as children or older people) who are more likely to experience adverse health effects as a result of the impact in question. |
| High | Businesses, labour markets, individuals, groups of individuals, tourism and recreation assets or other receptors possessing high economic, social or community value, that are expected to incur a material loss or gain as a result of potential changes in the environment.<br>Includes populations that have a higher than national average proportion of vulnerable or disadvantaged groups who are more likely to experience adverse health effects as a result of the impact in question. |
| Medium | Businesses, labour markets, individuals, groups of individuals, tourism and recreation assets or other receptors possessing economic, social or community value, that are expected to incur a limited material loss or gain as a result of potential changes in the environment. Includes populations that have an average, or close to average, proportion of vulnerable or disadvantaged groups who are more likely to experience adverse health effects as a result of the impact in question. |
| Low | Businesses, labour markets, individuals, groups of individuals, tourism and recreation assets or other receptors possessing limited local economic, social or community value, that are not expected to incur a material loss or gain as a result of potential changes in the environment.<br>Includes populations that have a below average proportion of vulnerable or disadvantaged groups who are more likely to experience adverse health effects as a result of the impact in question. |

16.7.16 Table 16-16Table 12-6 sets out criteria that are used as guidelines to assess the magnitude of each impact. Alongside these criteria, the assessment will also take into account the spatial scope, extent, duration, and reversibility of an impact, as well as any mitigation that can be applied.

**Table 16-16: Magnitude criteria for Socio-economics, tourism, recreation and health**

| Magnitude | Description of effect |
|---|---|
| Major | An adverse or beneficial effect that would be likely to result in total or major changes to baseline conditions for a labour market, or a large number of businesses, individuals, groups of individuals, tourism and recreation assets, health determinants, or other receptors. |
| Moderate | An adverse or beneficial effect that would be likely to result in partial changes to baseline conditions for a labour market, or moderate number of businesses, individuals, groups of individuals, tourism and recreation assets, health determinants, or other receptors. |
| Minor | An adverse or beneficial effect that would be likely to result in minor changes to baseline conditions for a labour market, or a small number of businesses, individuals, groups of individuals, tourism and recreation assets, health determinants, or other receptors. |
| Negligible | An adverse or beneficial effect that would be likely to result in little or no change to baseline conditions for labour markets, businesses, individuals, groups of individuals, tourism and recreation assets, health determinants, or other receptors. |

16.7.17 The likely significance of an effect is determined by combining the sensitivity of the affected labour market, business, population, tourism and recreation asset or other receptor, with the magnitude of the impact, as shown in Table 16-17. An effect will be deemed to be ‘significant’ where the significance of the effect is 'moderate' or greater. Effects determined to be minor or neutral will be deemed ‘non-significant’.

**Table 16-17: Significance of effect**

| | | **Magnitude of impact** | | | |
|---|---|---|---|---|---|
| | | **Major** | **Moderate** | **Minor** | **Negligible** |
| **Population / resource Sensitivity** | **Very High** | **Major** | **Major** | **Moderate** | Minor |
| | **High** | **Major** | **Moderate** | Minor | Minor |
| | **Medium** | **Moderate** | Minor | Minor | Neutral |
| | **Low** | Minor | Neutral | Neutral | Neutral |

16.7.18 Socio-economic, tourism, recreation and health aspects with a likely significant effect would be further reviewed. The assessment of effects would be undertaken using the following criteria and professional judgement:

- **No Significant Effect (neutral or minor)**: a receptor may be affected by the Proposed Development, but this would not result in changes in the labour market or to PRoW, recreation and WCH infrastructure that would affect local populations. Changes to health determinants would not affect population health.
- **Significant Beneficial Effect (moderate or major)**: there may be positive impacts on jobs and local supply chains or potential enhancements to PRoW, recreation and WCH infrastructure that would affect local populations. Changes to health determinants would bring significant population health benefits.
- **Significant Adverse Effect (moderate or major)**: there may be a loss of jobs, a change in operating environment that could affect tourism receptors, or a reduction in access to PRoW, recreation and WCH infrastructure that would affect local populations. Changes to health determinants would bring significant population health disbenefits.

### Assessment scenarios

16.7.19 The assessment will compare the effects on socio-economic, tourism, recreation and health receptors in the scenario that the Proposed Development is implemented to the scenario without implementation of the Proposed Development, that is, the current and future baseline scenario. The assessment will be undertaken using a realistic 'worst case' scenario.

16.7.20 The assessment of socio-economic, tourism, recreation and health effects will look across the whole of the construction timeline for the Proposed Development and once in operation. The assessment of construction employment, for example, will aim to provide a profile of employment over the course of the construction period. Assessment of temporary effects such as construction phase disruption to access or construction noise effects will provide the estimated duration of these effects and will take this into account when deciding the magnitude of the impact and significance of the effect. The operational assessment will consider temporary and permanent effects arising from operation and ongoing maintenance activities, in the first year of operation.

16.7.21 The future baseline scenario will also include committed developments that will be delivered prior to commencement of construction.

### Cumulative effects

16.7.22 Cumulative effects of the Proposed Development together with the effects of other developments/schemes may result in likely significant effects. This may be the result of effects on the environment during construction or operation of the Proposed Development.

16.7.23 Cumulative effects for all topics will be reported within the cumulative effects chapter of the ES. Please refer to Chapter 19 Cumulative effects assessment which presents the proposed methodology for the assessment of cumulative effects that will be undertaken for the EIA.

### In-combination effects

16.7.24 In-combination effects are those that result from the interaction between the individual effects of the Proposed Development (i.e. interaction of environmental factors such as air quality, noise, health), combined together on a single receptor at a single point in time. The interrelationship between the individual effects may combine to result in a likely significant effect, even where the individual effects were not significant. Any in-combination effects in relation to socio-economics, tourism, recreation and health will be assessed within the relevant chapter of the ES.

16.7.25 The nature of likely in-combination effects for socio-economics, tourism, recreation and health includes:

- In-combination effects on amenity as a result of noise, air quality, visual and traffic effects for strategic tourism receptors which may be more sensitive to changes in their operating environment than other businesses.
- In-combination effects on neighbourhood amenity as a result of effects on air quality, noise, lighting, landscape, traffic levels, water quality and ground conditions.

## 16.8 Limitations and assumptions

16.8.1 The socio-economic, tourism, recreation and health assessments are reliant on information from other topics, and so can be limited by the availability of outcomes of other topic assessments, such as air quality and noise.

16.8.2 The assessment of health effects may also be limited by the availability of existing third-party data. The socio-economic and health baseline will be updated as required.

## 16.9 Approach to mitigation and residual effects

16.9.1 Mitigation measures will be developed as site-specific information and data is gathered, the Proposed Development is refined and the ES is prepared. As noted in the NPSWRI [4], the following types of mitigation and good practice will be employed where required, categorised as either primary (inherent), secondary (foreseeable) or tertiary (inexorable) mitigation. The mitigation hierarchy is specified in Chapter 5 General EIA approach and methodology.

16.9.2 The following principles are used to define the types of mitigation measures for the Proposed Development for Socio-economics, tourism, recreation and health:

- Primary (Inherent Mitigation): The Proposed Development has been selected to avoid settlements, commercial land and property and major housing allocations where possible. This reduces the risk of temporary and permanent disruption to businesses, tourism and recreation receptors (including PRoW) and communities during construction.
- Tertiary (Inexorable) Mitigation: Where new jobs and training opportunities will be created, consideration will be given to how these can be delivered to maximise public benefit. Where infrastructure such as PRoW will be reinstated

or re-provided, consideration will be given to any improvements that could be made to the network and to access to open space. Construction management plans will set out the working standards and good practice mitigation to which the contractor for the Proposed Development will be required to work. This will require measures to control amenity impacts and incidents and reduce disruption to transport routes.

16.9.3 The assessment of amenity effects for businesses and strategic tourism receptors will consider the residual noise or visual effects identified by the relevant topics after mitigation is accounted for. The need for any additional mitigation will be identified based on assessment outcomes and will be included in the assessment of residual socio-economic effects.

## 16.10 Summary

16.10.1 In summary, it is considered that the following socio-economic, tourism, recreation and health subtopics in Table 16-18 should be scoped in and out of the EIA.

**Table 16-18: Summary table**

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| **Socio-economics** | | | |
| Employment | Scoped in | Scoped in | Construction and operation of the Proposed Development will create jobs in the local economy. |
| Supply chain effects | Scoped in | Scoped in | There will be opportunities for the local supply chain to benefit from the construction and operation of the Proposed Development |
| Training and apprenticeships | Scoped in | Scoped in | Construction and operation of the Proposed Development will create opportunities for training and apprenticeships |
| Effects on employment from impacts on allocated employment land | Scoped in | Scoped out | The site of the proposed WRP is allocated for manufacturing and/or warehousing floorspace under site reference BD11 in Policy HB2 of the Havant Allocations Plan. It is proposed that this aspect is scoped into the assessment at this stage to allow for further consideration and discussion with key stakeholders.<br>Any effects would arise during construction and would therefore be assessed as permanent construction effects and scoped out for operation. |
| **Tourism** | | | |
| Access to strategic tourism receptors | Scoped in | Scoped out | Access to strategic tourism receptors could be affected by travel disruption during the construction phase. It is |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| | | | anticipated that disruption associated with the operation of the Proposed Development would be minimal. |
| Amenity effects for strategic tourism receptors | Scoped in | Scoped in | Noise, visual and air quality effects could, in combination, result in amenity effects for strategic tourism receptors during construction and operation. |
| Impacts on tourist accommodation | Scoped in | Scoped out | Tourism accommodation may be required for the construction workforce, which could reduce overall availability. It is not anticipated there will be any effect on tourist accommodation during operation. |
| Impacts on tourism in the SDNP | Scoped out | Scoped out | It is not expected that there will be any likely significant effects on tourism in the National Park as a whole during construction or operation. |
| **Recreation** | | | |
| Access to open space and nature including WCH provision | Scoped in | Scoped out | Access to open space and nature may be disrupted during construction. Any disruption during operation is likely to be minor and temporary in nature (e.g. temporary access restrictions during maintenance activities), and is therefore considered unlikely to result in likely significant effects. There may be potential for enhancements to PRoW arising from construction activities such as diversion and reinstatement of PRoW, which will be assessed as a permanent construction effect |
| **Health** | | | |
| Access to health, social care and other social infrastructure | Scoped in | Scoped out | Access to health, social care and other social infrastructure may be disrupted during construction. It is anticipated that there would be no permanent change to access provision to such infrastructure. |
| Neighbourhood amenity (air quality, noise, lighting, landscape, water quality and ground conditions) | Scoped in | Scoped in | Construction activities are likely to result in impacts on amenity due to the general disturbance and uncertainty. During operation impacts are likely to be limited, but at this stage cannot be scoped out. |
| Accessibility and active travel (including WCH) | Scoped in | Scoped out | Construction activities and changes to access may reduce accessibility for |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| | | | some people and may also act as a barrier to engaging in active travel activities. Changes to PRoW are likely at construction stage. There may be potential for enhancements to PRoW which would be long-term construction impacts. It is unlikely there would be any additional significant operational effects. |
| Community safety | Scoped in | Scoped in | Construction introduces construction activities and plant to the local areas that could pose a risk to community safety. During operation, access requirements and maintenance activities could also introduce additional safety risk to the local communities. |
| Access to work and training | Scoped in | Scoped out | During construction there may be opportunities for local people to have access to work and training resulting from construction activities. During operation there would be few additional employment and training opportunities generated, such that at a population level this would not be significant |
| Social cohesion | Scoped in | Scoped out | Construction works, followed by ongoing changes experienced during operation may lead to changes in the ways that the community works together/interacts and places trust in various sectors and people of that community. |
| Access to open space and nature | Scoped in | Scoped out | Construction activities may affect access to open space used by people for physical activities and general enjoyment. During operation it is unlikely that access to open space and nature would be impacted significantly with only minor disruptions expected during periods of maintenance. |

# 17 Traffic and transport

## 17.1 Introduction

17.1.1 This chapter outlines out the scope and methodology for the assessment of the potential likely significant effects arising from the construction, operation and decommissioning of the Proposed Development on traffic and transport.

17.1.2 Traffic and transport aspects considered within this chapter for the Proposed Development include:

- **Delay**: including delay caused to drivers, bus and rail passengers, cyclists, pedestrians, and equestrians
- **Accident and safety**: including road safety and accident data
- **Amenity, fear and intimidation**: the impact of the anticipated volume of traffic and Heavy Goods Vehicle (HGV) composition
- **Severance**: the perceived division within a community when it becomes separated by a major traffic artery

17.1.3 The relevant highway authorities, as referenced in this chapter include National Highways (as the national highway authority) and HCC and PCC (as the local highway authorities).

## 17.2 Legislation, policy and guidance

17.2.1 The assessment will be carried out in accordance with relevant legislation and local and national planning policy as well as applicable guidance. It is recognised that this list is non-exhaustive and will be kept under review to take account of any later legislation or policy changes.

### National policy

17.2.2 As detailed in Chapter 2 Planning legislation and policy of this EIA Scoping Report, the relevant national policy includes:

- NPSWRI [4] (paragraphs 4.14.1 to 4.14.22).
  - Paragraph 4.14.2-3 notes that environmental impacts may result particularly from trips generated on road and the disturbance caused by traffic and abnormal loads generated during the construction phase will depend on the scale and type of the proposal.
  - Paragraph 4.14.6 notes that applicants should consult National Highways, Network Rail and Highway Authorities as appropriate on the assessment and mitigation. The approach to engagement is detailed in section 17.3 and includes engagement with National Highways and the relevant local highway authorities.
  - Paragraph 4.14.7 notes that a construction management plan and travel plan should be prepared for the construction an operational phase.

Supporting documentation will be discussed as part of the ongoing engagement with the relevant highway authorities.

- Paragraph 4.14.18 notes that the assessment should also consider any possible disruption to services and infrastructure and paragraph 4.14.11 notes that if a Proposed Development is likely to have significant transport implications, the applicant's ES should also include a transport assessment. As detailed in section 17.3, a Transport Assessment will be prepared following ongoing engagement with the relevant highway authorities.

- NPPF [5] (paragraphs 104 to 113).

### Local policy

17.2.3 Local policies are listed in Table 17-1 may be considered both important and relevant to the Proposed Development. In the event that there is any conflict between these and the NPSWRI, the NPS would prevail.

**Table 17-1: List of relevant local policy**

| Local Authority | Relevant Local Policy |
|---|---|
| EHDC | East Hampshire District Local Plan: Joint Core Strategy (2014) [331]<br>Housing and Employment Allocations (2016) [332]<br>Local Plan Second Review (2006) [8]<br>Vehicle Parking Standards Supplementary Planning Document (2018) [333] |
| EBC | Eastleigh Borough Local Plan 2016-2036 (2022) [297] |
| FBC | Fareham Local Plan 2037 (2023) [12]<br>Local Plan 2037 Policies Map (2023) [13]<br>Local Plan Part 3: Welbourne Plan (2015) [334] |
| HCC | Hampshire Local Transport Plan (LTP3) (2011) [335]<br>Draft Hampshire Local Transport Plan (LTP4) (2022) [336] |
| HBC | Havant Borough Core Strategy (2011) [337]<br>Havant Borough Local Plan (Allocations) (2014) [338]<br>Parking Supplementary Planning Document (2016) [339] |
| PCC | Portsmouth City Local Plan (2006) (extant saved policies) [340]<br>Portsmouth Local Plan 2038 (Draft) (2021) [111] |
| WCC | Winchester District Local Plan Part 1 Joint Core Strategy (2013) [56]<br>Winchester District Local Plan Part 2 Development Management and Site Allocations (2017) [25]<br>The Policies Map [341] |
| SDNPA | South Downs Local Plan (2019) [342]<br>Supplementary Planning Document: Sustainable Construction (2020) [343] |

### Guidance and standards

17.2.4 Relevant guidance and standards which have been used as part of the EIA scoping assessment, and are relevant to the EIA, include:

- Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government (2015) Transport evidence bases in plan making and decision taking [344]
- IEMA (2004) Guidelines for Environmental Impact Assessment [345]
- Institute of Environmental Assessment (now the Institute of Environmental Management & Assessment) (1993) Guidelines for the Environmental Assessment of Road Traffic (IEA Guidelines) [346]
- National Highways (2020) The DMRB, LA 104 Environmental Assessment and Monitoring [347]
- National Highways (2020) DMRB LA 112 Population and Human Health [348]
- Planning Inspectorate (2017) Advice Note Three: Advice Note Three: EIA Notification and Consultation, (Version 7) [349]
- Planning Inspectorate (2020) Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements, (Version 7) [1]

## 17.3 Engagement

17.3.1 The following stakeholders have responsibility for aspects of traffic and transport and will continue to be engaged as part of the EIA process:

- Hampshire County Council Highways Authority (HCC)
- Eastleigh Borough Council (EBC)
- Fareham Borough Council (FBC)
- Havant Borough Council (HBC)
- Portsmouth City Council (PCC)
- South Downs National Park Authority (SDNPA)
- Winchester City Council (WCC)
- East Hampshire District Council (EHDC)
- Royal Mail Group Ltd
- The British Horse Society

17.3.2 Public consultation was undertaken between 5 July and 16 August 2022 to consult the public and stakeholders about the Proposed Development and feedback was received in August 2022. Those groups that provided responses with regards to Traffic and Transport included HCC, Royal Mail Group Ltd, The British Horse Society, and WCC. The key themes from the feedback received were:

- Construction impact should be as minimal as possible, particularly on walkers, cyclists and horse riders and public transport routes where possible. As the design develops, potential opportunities to minimise impacts will be discussed with the relevant stakeholders.
- Suggested mitigation measures to be considered i.e. night time working, and early engagement and notice for route closures. Potential Traffic Management will be discussed with the relevant highway authority.
- Consents required for road or Public Rights of Way (PRoW) closures.

- Requirements that a framework Transport Management Strategy (fTMS) and a framework Construction Traffic Management Plan (fCTMP) be provided alongside the Transport Assessment (TA). This should provide details of the construction activity and potential measures to limit the impact on the highway e.g. trenchless technology. Further management plans and impact studies have been requested by HCC in subsequent engagement. The scope and list of supporting documents will be agreed with the relevant highway authorities as part of the scoping exercise for the Transport Assessment.
- Infrastructure improvements - PRoW and cycleways - be considered along the route of the Proposed Underground Pipeline where existing highway is disrupted from construction. As the design develops, potential opportunities to minimise impacts will be discussed with the relevant stakeholders.
- Highways that should be avoided for road closures where possible, include A3, A32, A334, B2177 and B3354.

17.3.3 The EIA will be supported by a TA. The TA will present the policy context and baseline conditions, the existing and future travel demand and present an assessment of the potential transport impacts on Rights of Way, public transport and the local highway network. A fTMS and fCTMP have also been requested by HCC. The TA will consider Public Consultation 2022 feedback on potential mitigation and enhanced PRoW (including all walkers, cyclists and horse riders) infrastructure. Whilst the TA will also consider the operational phase of the development, as detailed in section 17.6, limited impacts are expected in this phase.

17.3.4 It is important to caveat that the individual transport and traffic routes and specific issues and impacts from increased traffic are still under review and specific matters will be forthcoming through the pre-application discussions and further survey work undertaken to inform the EIA process. As such, the following ongoing engagement is proposed:

- Engagement with the relevant highway authority at early stages of this assessment.
- Liaise with the landowners of the land used by walkers, cyclists, and horse riders that may be impacted by the additional traffic and possible road or PRoW/Bridleway closures.

17.3.5 The Emissions and Transport EIA Working Group consists of key stakeholders (which include local highway officers from HCC and PCC), traffic and transport, air quality and odour, noise and vibration, and waste and material topic specialists. The indicative study area for the purposes of EIA Scoping is described in section 17.4 below and has been further discussed with the Emissions and Transport EIA Working Group. The extent of assessment includes associated traffic routes that are most likely to be used for movement of material and employees, traffic surveys, traffic impacts and mitigation measures in relation to the Proposed Development. It is proposed for there to be periodic meetings with the Emissions and Transport EIA Working Group to provide ongoing engagement opportunities.

17.3.6 Other engagement with National Highways, the railway service operator(s), and Network Rail, will be undertaken as required, for the EIA assessment and as part of the pre-application consultation process. Consultation with bus service providers

and emergency services will be undertaken to seek to ensure mitigation and diversion routes are sufficient. Currently the delivery of materials to/from the Proposed Development is anticipated to be by road but should it require delivery by waterways, the relevant navigation authorities will be consulted. Similarly, Associated British Ports will also be consulted if maritime delivery routes are proposed.

## 17.4 Approach to scoping

### Study area

17.4.1 The traffic and transport study area for the EIA will be established through stakeholder engagement and by determining the most probable routes for construction traffic, for both the movement of materials and employees, and operational traffic. The study area will be divided by splitting out the Proposed Development components as follows:

- The proposed WRP and proposed HLPS
- The Proposed Underground Pipeline between Budds Farm WTW and the proposed WRP
- The Proposed Underground Pipeline between the Proposed WRP and Havant Thicket Reservoir
- The Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW
- The proposed AGP:

  The proposed AGP is considered in the baseline sub-sections as they will be located within the preferred pipeline corridor.

17.4.2 The indicative study area for the purposes of EIA Scoping is bound by Winchester and Petersfield in the north, B2149 and Havant in the east, M27 and Langstone in the south and the M3 in the west. The Scoping Area, proposed WRP, and potential key highway routes that could form part of the EIA TA are shown in Figure 17.1 Traffic and Transport Study Area: Preferred Corridor and Key Links in Volume III. This will evolve during the EIA process as the Proposed Development design is progressed further. The indicative traffic and transport study area for the EIA has been identified with refence to the relevant receptors i.e., walkers, cyclists, horse riders, drivers and passengers in vehicles (including buses), that could be directly or indirectly impacted by the Proposed Development. A direct impact could be the temporary closure of a road, whilst an indirect impact could be from a diversion which could increase traffic in other neighbouring areas.

17.4.3 The Proposed Development is in the early stages of design development, and the study area currently defined will be kept under review as the design and consultation processes progress, in consultation with the Emissions and Transport EIA Working Group.

17.4.4 Materials are expected to be delivered by land. However, in the unlikely scenario that materials could also be transported by sea i.e., potential shipping of materials such as pipe bedding, delivery from the associated port to site will be reflected within the study area as the design progresses.

17.4.5 The location of the temporary construction hub (as described in Chapter 3 Description of the Proposed Development) is not known at this time of writing. This is expected to be an existing consented site, and may be situated outside of the Scoping Area. The effects of traffic and transport on the hub will be assessed as part of the Traffic and transport Assessment.

### Sources of baseline data

17.4.6 The following data, listed in Table 17-2, has been used to inform the baseline and EIA:

Table 17-2: Source of baseline data

| Baseline data | Source of data |
|---|---|
| Land ownership | HM Land Registry |
| PRoWs and Open Access Land | OS Data/Council Definitive Maps/ HCC |
| Road Classification | OS Data |
| National Cycle Network and cycle routes | OS Data/Sustrans/Strava |
| Local plan sites (emerging and adopted) | Council Local Development Plans (LDPs)/Council Definitive Map |
| Community functional sites i.e. education, medical care, attraction and leisure etc | Council Definitive Map |
| Bus stop location, and bus route timetable and services | Bustimes.org |
| Rail network | National Rail |
| Baseline AADT flows for many major roads in the study area. | Department for Transport (DfT) traffic counts |
| Personal injury collision data for all links within the study area. | County Council collision data/CrashMap Data |

## 17.5 Baseline conditions

17.5.1 Some receptors can be sensitive to changes in traffic flow (and its composition). These include walkers, cyclists, horse riders, drivers, and passengers in vehicles. Therefore, within the study area, the baseline covers roads, PRoWs, community facilities, public transport services and infrastructure where the Proposed Development could have an impact on receptors.

### Proposed Water Recycling Plant and High Lift Pumping Station

17.5.2 Currently, there is no road access to this area, however the adjacent roads of Harts Farm Way and the A27 dual carriageway connect to the A3 motorway. These roads have the following function:

- The A3 trunk road, managed by National Highways, is a major road connecting London and Portsmouth.
- The A27 is a major east-west trunk road in England connecting Whiteparish in Wiltshire County to East Sussex via the south coast of Hampshire and West

Sussex. The A27 provides access to the A3 motorway approximately 450m north-east of the proposed site.

- Harts Farm Way is a short street in Havant which also provides access to Broad Marsh Coastal Park footpath and car park, and Havant's employment area, which includes the existing Budds Farm WTW site. Between Budds Farm WTW and the proposed WRP is Harts Farm Way bridge, which has no known weight limit.

17.5.3 A PRoW from the A27 footbridge north-east of the site of the proposed WRP connects to the Broad Marsh Coastal path adjacent to the eastern boundary of the site of the proposed WRP. Analysis of Strava heat maps [350] shows it is heavily used by both cyclists and pedestrians.

17.5.4 The Brighton to Portsmouth Railway routes along an east/west alignment and forms part of the London, Brighton and South Coast Railway. There are two services per hour between Portsmouth Harbour and Brighton.

17.5.5 See Figure 17.2 Roads, PRoWs and Cycleways in Volume III for relevant roads, PRoWs and cycleways.

### Proposed Underground Pipeline between Budds Farm Wastewater Treatment Works and the Proposed Water Recycling Plant

17.5.6 Baseline transport conditions at the Proposed Underground Pipelines are likely to be similar to those described in paragraphs 17.5.2 and 17.5.4. Additional roads identified between Budds Farm WTW and the proposed WRP include:

- The A3032 (Langstone Road) is the only road that connects Hayling Island and the mainland at Havant and continues north onto the B2149. The A3032 runs through a few residential areas in Hayling Island and east of Budds Farm in Havant.
- The B2149 is the main route to Havant town centre with frequent traffic lights and pedestrian crossings and provides access to many residential areas, schools, retail, and leisure facilities. The speed limit of this road is 40 mph.
- Southmoor Lane provides vehicle access across the A27 carriageway via an overbridge to Havant's employment business zone to Solent Way and access to Budds Farm.
- Penner Road connects the A3023 to Southmoor Lane through Havant's employment area.

17.5.7 A small pay and display car park is located at the southern end of Southmoor Lane. It is operated by HBC and accommodates 37 formalised parking bays and two blue badge parking bays. As of 20 July 2022, the car park is available 24/7 and charges £3.00 for parking during Monday to Saturday, from 8:00 to 18:00.

17.5.8 Solent Way is a coastal path and PRoW that runs between Milford-on-Sea to Emsworth Harbour following much of the Hampshire Coast and passes Budds Farm on its southern and western border.

17.5.9 Havant bus station is located off the B2149 on Elm Lane and is a 20-minute walk from Budds Farm Entrance. The bus station operates bus services 20, 21, 23, 27, 28A, 30, 31, 37, 39 and 700.

17.5.10 Bus services 30, 31 and 700 all operate along Park Road (S) on to the A27. Stagecoach bus services 30 and 31 continue onto the A3023 (Langstone Road), and together provide a frequency of four buses per hour.

17.5.11 Bus stop infrastructure includes raised kerbs, shelter, seating and a timetable. Some bus stops also include a bus layby.

17.5.12 See Figure 17.2 Roads, PRoWs and Cycleways in Volume III for relevant roads, PRoWs and cycleways.

### Proposed Underground Pipeline between the Proposed Water Recycling Plant and Havant Thicket Reservoir

17.5.13 Key road links between the proposed WRP and Havant Thicket Reservoir include:

- The B2149 (Petersfield Road) is an urban dual carriageway within Kingley Green residential area from Park Road and New Road four arm roundabout in the south to Staunton Country Park in the north, where it continues to Durrants as a single carriageway.
- Middle Park Way connects to the B2149 and provides access to the A3 via Purbrook Way and Hulbert Road in the west. The community function of Middle Park Way is similar to that of the B2149 above in that it provides access to many residential areas and has commercial properties along its carriageway.

17.5.14 Bus stops located along the B2149 within Havant operate bus services 20, 21, 27, 28A, 39, 621 and 641, and continue along Park Road (N) to Havant Bus Station. Bus stop infrastructure includes raised kerbs, shelter, seating, and a timetable. Some bus stops also include a bus layby.

17.5.15 Bus services 20, 21 and 39 are operated by Stagecoach and together provide a frequency of eight buses per hour along the B2149.

17.5.16 The railway line runs across the M3 and A27 from Fareham and Portsmouth to Havant, with many stations along its alignment, including Cosham, Hilsea, Bedhampton, and Havant. The train operators are South Western Railway (Portsmouth Direct Line), and Southern (West Coastway Line), with a service of six trains per hour on a weekday.

17.5.17 See Figure 17.2 Roads, PRoWs and Cycleways in Volume III for relevant roads, PRoWs and cycleways.

### Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

17.5.18 Key road links between Havant Thicket Reservoir and Otterbourne WSW include:

- ThB2177 is part of the strategic road network and connects Havant/Bedhampton, Wickham and Fisher's Pond. Urban sections of this road have many community amenities and provide access to large residential areas and an industrial/commercial area in the west. The rural parts of this road provide the main route through many small-town areas, and provide access to several singular dwellings i.e. farmhouses.

- The A32 connects Alton, Fareham and Gosport, and ends at the A31/A32 roundabout in the north. The majority of the A32 is a rural single carriageway, with some small towns located along the carriageway.
- The A334 connects to the A32 and B2177 and provides an east-west connection between Wickham and the M27.
- The B3035 connects the A32 and B2177 and is a main road through the town of Bishop Waltham with some community amenities along the carriageway.
- The M3 Junction 12 provides access to the B3335. This strategic rural road connects the A335 and the B3354.

17.5.19 The Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW will cross many PRoWs and open access land, particularly across Wickhams Park, Kimbers Copse, Brambridge Park, Portsmouth Golf Course, and the National Cycle Network (NCN) Route.

17.5.20 The NCN Route 222 is a north-south connection from NCN 2 south of Portsmouth to NCN 22 south of Petersfield and is a mixture of traffic free and on road provision. Analysis of Strava heat maps shows it is heavily used by both cyclists and pedestrians within Winchester City District.

17.5.21 Route 224 of the NCN runs from Farnham to Medstead and from Wickham to Gosport. The southern section links with the Meon Valley Trail at Wickham, following quiet streets and shared paths through Fareham. Analysis of Strava heat maps shows it is heavily used by cyclists and there is moderate usage by pedestrians for walking.

17.5.22 Between Fareham and Gosport, a new busway provides a direct and high speed route between the two towns. At the southern end, a shared path within the old railway corridor leads to Gosport town centre facilities, connection with Route 2 and the ferry to Portsmouth.

17.5.23 There are three railway lines in the study area:

- **The Didcot, Newbury, and Southampton railway line** runs parallel to the M3 from Southampton to Winchester, with many stations along its alignment, including Southampton Airport Parkway, Eastleigh, and Shawford stations. Train operators include Cross country and South Western Railway, with a train service of three to four trains per hour Monday – to Saturday.
- **The Eastleigh - Fareham line,** between Eastleigh Station and Fareham Station in the south-east, is operated by South Western Railway and provides an hourly service.
- **The West Coastway line,** connecting Fareham and Portsmouth, runs across the M3 and A27 to Havant Station, with many stations along its alignment, including Cosham, Hilsea, and Bedhampton. The train operators are South Western Railway (Portsmouth Direct Line), and Southern (West Coastway Line), with a train service of six trains per hour on a weekday.

17.5.24 See Figure 17.2 Roads, PRoWs and Cycleways in Volume III for relevant roads, PRoWs, open access spaces and cycleways.

### Proposed Above Ground Plant

17.5.25 The proposed AGP is considered in the above baseline sub-sections as they will be located within the preferred corridor.

## 17.6 Scoping of potential effects

17.6.1 The Proposed Development has the potential to affect traffic and transport, both during construction and once in operation.

17.6.2 Effects from decommissioning of the Proposed Development are considered to be no greater than those identified during the construction phase, and are therefore assessed as construction effects as a worst case scenario. Please refer to Chapter 3 Description of the Proposed Development, section 3.7 for further information on decommissioning.

17.6.3 The IEA Guidelines [346] set out a number of potential environmental impacts which may require assessment. Those which relate to this Chapter 17 Traffic and transport of the EIA include the following:

- Severance
- Delay
- Amenity
- Fear and intimidation
- Accidents and safety, and
- Hazardous loads.

17.6.4 Amenity and Fear and intimidation can be considered together as they are strongly interrelated.

17.6.5 This section describes the potential likely significant effects which could arise from the Proposed Development along with justification as to why each effect is proposed to be scoped in or out of the EIA.

### Effects scoped into the assessment

#### *Construction effects*

17.6.6 The potential likely significant effects arising from the construction of the Proposed Development, including those associated with changes in traffic/HGVs volumes, have been identified below based on IEA Guidelines. The following criteria have been considered for highways, rights of way and other transport infrastructure:

- **Severance** is the perceived division that can occur within a community when it becomes separated by a major traffic artery (IEA Guidelines) [346]. Severance may occur where changes in traffic volumes are predicted as a result of construction traffic and road closures/diversions.
- **Delay** refers to the perceived changes to journey times and includes driver and bus passenger delay, and pedestrian, cyclist and horse riding delay. Diver and bus passenger delay may occur as a result of changes to traffic volumes, road

works or closures/diversions. Pedestrian, cycle and horse riding delay may occur as a result of temporary closures or diversions to existing routes.

- **Fear and intimidation** is dependent on the volume of traffic, its HGV composition, its proximity to people or the lack of protection caused by such factors as narrow pavement widths.
- **Pedestrian and cyclist amenity** is broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition, and footway width/separation from traffic, and
- **Accidents and safety** considers how travel and the design of the transport networks interrelate to affect prevailing road safety. Potential for change can occur where there are fundamental changes to travel patterns, such as diverting traffic from a major road to a country lane.

*Operation effects*

17.6.7 The construction of permanent infrastructure such as the proposed IPS and proposed BPT may require permanent diversion or closure of some PRoWs. Similarly, there is potential that enhancements will be explored for the existing pedestrian and cycle network within the study area. Therefore, the following operational effects have been scoped into the assessment:

- **Delay** (pedestrian, cyclist and horse riding). Pedestrian, cycle and horse-riding delay may occur as a result of permanent diversions to existing routes, and
- **Pedestrian and cyclist amenity** could be enhanced as a result of improvements to existing routes.

### Effects scoped out of the assessment

*Construction effects*

17.6.8 Effects that are unlikely to be significant and have therefore been scoped out in full include:

- **Potential effects associated with the transportation of hazardous loads:** There are not expected to be any hazardous loads associated with the construction of the Proposed Development. As such, the assessment of hazardous loads has been scoped out of the assessment.

*Operation effects*

17.6.9 The proposed WRP is likely to be manned 24/7, potentially requiring around 16 light vehicle movements associated with staff travel for shift changes. In addition, one chemical delivery by HGV (tanker) is anticipated per day. One vehicle movement per week is anticipated to be required for monitoring/maintenance at the proposed IPS and proposed BPT. The change in traffic flows on nearby roads due to this traffic introduced by the operation of the Proposed Development will fall far short of the IEA Guidelines threshold (30% change in traffic flow, see paragraph 17.7.17) needed to give rise to a transport effect. This has been discussed and agreed with the relevant stakeholders including HCC and PCC and the relevant

local highway authorities. There is no requirement for a detailed assessment as daily traffic flows on all roads substantially exceed 57 vehicles. Therefore, the operational effects due to changes in road traffic have been scoped out of the assessment. The following effects have therefore been scoped out in full:

- Severance
- Delay (driver and bus)
- Fear and intimidation
- Accidents and safety
- Potential effects associated with the transportation of hazardous loads.

## 17.7 Approach to assessment

### Additional baseline data collection

17.7.1 Subsequent sections detail the data that will be collected in support of the traffic and transport chapter of the ES.

*Surveys*

17.7.2 To establish a baseline position, traffic data will be collected at key locations within the agreed study area. The locations of the traffic surveys will be identified through discussion with the relevant Highways Authority. Survey locations will also be defined to meet the traffic data requirements for the Air Quality and Noise assessments.

17.7.3 As per TAG Unit M1.2 [351], surveys are typically carried out during a 'neutral' or representative month avoiding main and local holiday periods, local school holidays and other abnormal traffic periods. 'Neutral' months are between March and November, excluding July and August. Whilst initial Automated Traffic Count (ATC) surveys are proposed for June 2023, the programme and study area for remaining survey data collection will be discussed with the Emissions and Transport EIA Working Group stakeholders. It is expected that the scope of these surveys will be agreed prior to the presentation of the PEI report at Statutory Consultation.

17.7.4 Existing traffic data from the last four-year period will be collected from Local Authorities. Data that is more than four years old is not considered to be reflective of baseline conditions. Where existing traffic data is not available from LAs, or the latest, ATC and Manual Classified Count (MCC) surveys will be undertaken. Traffic surveys will be discussed in advance with stakeholders and undertaken by specialist sub-consultants. Table 17-3 details the proposed baseline surveys that would be commissioned to inform the assessment.

**Table 17-3: Proposed baseline surveys**

| Data survey | Data contents |
|---|---|
| ATC | Radar or induction loop surveys to provide classified hourly and daily count and speed data (over seven days) for all identified roads. |

| Data survey | Data contents |
|---|---|
| Manual Classified Count (MCC) | Video surveys to provide classified hourly turning count data for identified sensitive junctions. MCCs may also be needed on Pedestrian, cycle and horse riding routes. MCCs would be carried out for 12 hours 07:00-19:00 on a neutral weekday (Monday to Thursday). |

17.7.5 Junction modelling will be required to understand the impacts of the Proposed Development on the capacity of affected junctions. Estimated traffic flows for the Average Annual Daily Traffic (AADT) and AAWT will be required for the construction of the Proposed Development to inform the Transport, Air Quality and Noise assessments. The methodology for establishing the future baseline will be discussed with the relevant highway authorities as part of the scoping exercise for the Transport Assessment.

*Accident data*

17.7.6 The DfT publish all recorded road traffic collisions that are categorised as slight, serious, or fatal. This data will be used to compare the accident data associated with the construction routes and identify any potential clusters of serious or fatal collisions where there will be an increase in traffic. Where further information regarding road traffic collisions may be required, data will be requested from the relevant Constabulary.

17.7.7 The scope of the analysis of the accident data will be agreed with the relevant highway authorities as part of the scoping exercise for the Transport Assessment. It is anticipated that accident data for the most recent five-year period will be analysed for the study area. The impacts of the Covid-19 pandemic on accident data will also be discussed with the relevant highway authorities and the potential to review pre-pandemic data will be agreed.

*Construction traffic data*

17.7.8 The Transport, Air Quality and Traffic Noise assessments will be informed by predicted construction traffic volumes, including:

- Proposed Development construction programme
- HGV movements in peak hours, weekday and daily
- Contractor vehicle movements in peak hours, weekday and daily
- Construction compound locations
- Origin and destination of HGV movements
- Origin and destination of contractor movements

*Public Rights of Way*

17.7.9 Strava analysis will be used to inform the assessment on the usage of PRoWs. This will be supplemented with survey data, subject to discussions with the relevant highway authority.

*Local Authority data*

17.7.10 The extent of adopted highway will be considered for any mitigation or proposals to avoid the use of private land, where possible. This will be requested from the relevant highway authority.

17.7.11 Existing diversion routes from neighbouring construction works will be requested from Local Authorities and taken into consideration for impacts on the Proposed Development. Where appropriate, this will be considered as part of the future baseline.

## Assessment methodology

17.7.12 The IEA Guidelines sets out some useful criteria for determining a study area, which has been used for context. In general terms, the travel patterns and conditions that will be considered include, without ('Do Minimum') and with ('Do Something') the Proposed Development to determine anticipated changes that are likely to occur as a result of construction and/or operation of the Proposed Development. Those changes between the Do Minimum and Do Something scenarios, such as a forecast change in traffic flow as a result of the construction or operation of the Proposed Development in combination with other committed developments on a road, are then assessed in terms of their likely effect on transport receptors (vehicular drivers, pedestrians, cyclists, horse riders and public transport passengers).

- Do Minimum/Future Base – the reference scenario relative to which the changes arising from Proposed Development will be considered. This will include the existing/surveyed conditions plus any changes which are committed or otherwise reasonably expected (as agreed) to take place to existing conditions by the future design year(s) (which will be consistent with the TA and defined by the available strategic traffic modelling to be agreed through TA scoping).
- Do Something/Future Base plus Development – this will include the 'Do Minimum/Future Base' scenario plus the Proposed Development in the future design year(s).

17.7.13 The methodology for establishing the future baseline transport conditions will be agreed with the relevant stakeholders as part of the scoping exercise for the Transport Assessment. It is anticipated this will include a combination of the DfT Trip End Model Presentation Programme (TEMPro) and a review of relevant committed developments within the study area.

17.7.14 In summary, the following assessment scenarios will be considered:

- Current baseline
- Do Minimum (construction) – future baseline (construction period)
- Do Something (construction – future baseline with construction traffic (construction period)
- Do Minimum (operation) – future baseline (opening year)
- Do Something (operation – future baseline with operational traffic (opening year)

*Sensitive receptors*

17.7.15 Within the study area, it will be necessary to identify particular user groups, which may be sensitive to changes in the traffic and transport network conditions. These user groups are deemed to be receptors for the purpose of the assessment. Potential receptors that are vulnerable to increased traffic on links include:

- Walkers
- Cyclists
- Horse riders
- Drivers and passengers in vehicles including public transport (through driver delay and safety impacts)

17.7.16 The nature, extent, and sensitivity of key receptors and any identified threats or vulnerabilities caused from increased vehicles include:

- People at home or work, walking, or cycling
- People travelling by public transport
- Sensitive groups such as children, elderly and disabled
- Sensitive locations such as hospitals, churches, schools, and historical buildings
- Open spaces, recreational areas, shopping areas
- Sites of ecological/nature conservation value
- Sites of tourist/visitor attractions

17.7.17 The IEA Guidelines sets out two rules that are used to establish whether an environmental assessment of traffic effects should be carried out on receptors. This will also inform the study area for the EIA. The IEA Guidelines threshold is as follows:

- Rule 1 - Include road links where traffic flows will increase by more than 30% (or the number of HGVs will increase by more than 30%), and
- Rule 2 - Include any other specifically sensitive areas where net traffic flows have increased by 10% or more. This would include areas with pedestrians or cyclists, shopping areas, schools, and accident hotspots.

17.7.18 Where the predicted increase in traffic flows is lower than the above thresholds, the IEA Guidelines suggests that the significance of the effects can be stated as negligible and further detailed assessments on the effects on receptors is not warranted on those links.

*Severance*

17.7.19 Severance is defined by the 'IEA Guidelines in paragraph 4.27:

*"Severance is the perceived division that can occur within a community when it becomes separated by a major traffic artery. The term is used to describe a complex series of factors that separate people from places and other people. Severance may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road*

*itself. It can also relate to quite minor traffic flows if they impede pedestrian access to essential facilities…"*

17.7.20 During the construction stage, changes in traffic flow associated with construction traffic is not expected to result in changes which could significantly affect perceptions of severance because the level of construction traffic is likely to be modest. However, potential temporary road closures and diversions associated with the construction of the Proposed Development could result in changes in traffic flow which could significantly affect perceptions of severance.

17.7.21 Severance will be assessed qualitatively based on a review of the quantitative data available in the Transport Assessment. This will be assessed using assessor judgment in the context of the principles set out in IEA Guidelines including:

*"The correlation between the extent of severance and the physical barrier of a road is not clear and there are no predictive formulae which give simple relationships between traffic factors and levels of severance… Factors which need to be given attention in determining whether severance is likely to be an important issue include road width, traffic flow and composition, traffic speeds, the availability of crossing facilities and the number of movements that are likely to cross the affected route… The assessment of severance should pay full regard to specific local conditions, e.g. whether crossing facilities are provided or not, traffic signal settings etc".*

*Driver and bus delay*

17.7.22 Drawing upon the IEA Guidelines and professional experience, driver delay and delay to bus users may change where:

- Traffic flows change at junctions
- New junctions are introduced
- Existing junctions are changed
- Speeds on existing links are changed
- Existing links are closed
- New links are opened
- Frequency of use of controlled pedestrian or cycle crossings change, and
- New controlled pedestrian or cycle crossings are introduced.

17.7.23 Delay to bus users may also change where bus routes or bus stops are proposed to be changed or where demand for a bus exceeds capacity.

17.7.24 The Proposed Development could result in changes which could significantly affect perceptions of driver/bus delay during construction because of increased vehicle travel demand on the local network and temporary road closures/diversions.

17.7.25 Driver and bus delay will be assessed qualitatively based on a review of the quantitative data available in the Transport Assessment. This will be assessed using assessor judgment in the context of the principles set out in IEA Guidelines including:

*"delays are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system".*

17.7.26 Table 17-4 shows some road links that could be impacted from the construction of the Proposed Development and could require short-term mitigation. These A- and B-roads are the roads that will most likely be affected from traffic routeing. Local roads are the roads that could have direct conflict with the route of the Proposed Underground Pipeline however, this is not an exhaustive list and will require further consideration for the whole pipeline alignment, proposed WRP and proposed AGP, and the associated road closures and diversions depending on route selection and the material import/distribution required.

**Table 17-4: Key roads**

| Road Classification | Road Name |
|---|---|
| A Roads | A27, A3 Motorway, A3, A2030, A32, A334 |
| B Roads | B2149, B2177 |
| Local Roads | Harts Farm Way, Mill Lane, Bidbury Lane, Beaufort Road, Hooks Farm Way, Tarrant Garden, Barncroft Way, Riders Lane, Ditcham Cresent, Purbrook Way, Ellisfield Road, Dunsbury Way, High Lawn Way, Middle Park Way, Kiln Lane, Church Lane, Bishopstoke Lane, Stroudwood Lane, Alma Lane, Scivier's Lane, Winters Hill, Curdridge Lane, Black Horse Lane, Pricketts Hill, Titchfield Lane, Knowle Road, Boarhunt Road, Monument Lane, Portchester Lane, Crooked Walk Lane, Pigeon House Lane, Mill Lane, and Widley Walk. |

*Pedestrian, cycle and horse riding delay*

17.7.27 Drawing upon the IEA Guidelines and professional experience, pedestrian and cycle delay may change where:

- Pedestrians, cyclists and horse riders cross existing roads where traffic flows are projected to change
- Pedestrians, cyclists and horse riders cross new roads
- Existing roads which pedestrians, cyclists and horse riders would have crossed are removed
- Road speeds change
- Pedestrians, cyclists and horse riders volumes change
- New crossing facilities are provided, and
- Existing pedestrians, cyclists or horse riders crossing facilities change.

17.7.28 During construction, the Proposed Development could result in changes which could affect perceptions of pedestrian and cyclist delay because of the implementation of works to the existing highway network which may require temporary control or diversion and because of the potential for temporary diversion or closure of pedestrian and cycle routes across the study area.

17.7.29 Pedestrian and cyclist delay will be assessed qualitatively based on the nature of the Proposed Development and construction proposals using assessor judgment and guidance set out in LA 112 Population and Human Health.

*Amenity, fear and intimidation*

17.7.30 Amenity is defined by the IEA Guidelines in paragraph 4.39:

*"…It is broadly defined as the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition, and pavement width/separation from traffic. This definition also includes pedestrian fear and intimidation, and can be considered to be a much broader category including consideration of the exposure to noise and pollution, and the overall relationship between pedestrians and traffic…"*

17.7.31 Whilst the IEA Guidelines discuss amenity in the context of pedestrians, it is also relevant for cyclists, horse riders and bus passengers.

17.7.32 Fear and Intimidation is defined by the IEA Guidelines in paragraph 4.40:

*"…The impact of this is dependent on the volume of traffic, its HGV composition, its proximity to people or the lack of protection caused by such factors as narrow pavement widths…".*

17.7.33 Amenity, fear and intimidation may be considered for pedestrians, cyclists, horse riders and bus passengers.

17.7.34 The Proposed Development could result in changes which could significantly affect perceptions of amenity, fear and intimidation during operation because of increased traffic flows and changes to highway infrastructure.

17.7.35 Amenity, fear and intimidation will be assessed qualitatively based on a review of the quantitative data available in the Transport Assessment and in the context of the facilities for pedestrians, cyclists, horse riders and bus passengers. This will be assessed using assessor judgment in the context of the principles set out in IEA Guidelines including:

*"there are no commonly agreed thresholds for estimating levels of danger, or fear and intimidation, from known traffic and physical conditions… there will be a need for judgement to be exercised in determining the degree of fear and intimidation… Special consideration should be given to areas where there are likely to be particular problems such as high speed sections of road, locations of turning points and accesses…".*

*Accident and safety*

17.7.36 The key issue in assessing accidents and safety is in understanding the potential for change. There can be some small changes in prevailing road safety conditions arising simply as a result of having a greater number of journeys being made on a network; very simply, the more people that are travelling, the more people that are liable to become involved in an accident. By far the more important issue to consider is how travel and the design of the transport networks interrelate to affect prevailing road safety. In that context, prevailing road safety may change where:

- Fundamental changes are proposed to the form of nature of a transport network such as changes to the geometry of a junction or changing the form of a junction.

- Fundamental changes are proposed to prevailing travel patterns on transport networks not designed to cater for them such as introducing a pedestrian demand on a rural road without footways or introducing a pedestrian demand across a heavily trafficked and high-speed road without a suitable crossing provision.

17.7.37 Whilst the Proposed Development is not expected to result in changes which could significantly affect accidents and safety, potential temporary diversions during construction may increase traffic movements through existing accident clusters. As such, accidents and safety has been scoped in for the assessment of construction effects.

### *Definition of impact magnitude*

17.7.38 Criteria for assessing the magnitude of impact are defined in Table 17-5. These topic specific classifications are summarised in DMRB LA 104 Environmental Assessment and Monitoring and LA 112 Population and Human Health, and have been interpreted with specific reference to traffic and transport. Broadly, the magnitude of impact will be defined as follows:

**Table 17-5: Magnitude of impact definitions**

| | **Definition (from DMRB LA 104 Environmental Assessment and Monitoring)** [347] |
|---|---|
| **Large** | Changes which are likely to be perceptible and which would significantly change conditions which would otherwise prevail to the extent that it would significantly affect travel behaviour (such as the night time closure of a road or the introduction of a new controlled pedestrian crossing on a busy road). |
| **Medium** | Changes which are likely to be perceptible and which would materially change conditions which would otherwise prevail to the extent that it may affect travel behaviour to some degree (such as a change in road network capacity which may lead to some rerouting or retiming of journeys, or creation of a secondary supplementary route servicing a similar function as an existing route). |
| **Small** | Changes which are likely to be perceptible but not the extent that it would materially change conditions which would otherwise prevail (such as the introduction of a new site access junction or resurfacing of a footway). |
| **Negligible** | Changes which are unlikely to be perceptible (such as a low change in traffic or pedestrian volumes). |

### *Sensitivity of receptors*

17.7.39 The link sensitivity will be determined by the concentration of sensitive receptors served by that link. Applying the principles from the EIA Guidance and DMRB LA 104 Environmental Assessment and Monitoring, Table 17-6 provides broad definitions of the different sensitivity levels that will be adopted for the assessment.

Table 17-6: Sensitive receptors

| Sensitivity | Definition (DMRB LA 104) [347] | Transportation approach |
|---|---|---|
| **Very High** | Very high importance and rarity, international scale and very limited potential for substitution. | Receptors travelling on internationally important routes/journeys (such as routes to ports) at significant volumes.<br>Receptors travelling on routes/journeys where there is no alternative (such as a single route across a railway line for a particular mode/group/town) at significant volumes.<br>Vulnerable road user Receptors travelling on networks at significant volumes (such as immediately outside schools or doctors' surgeries). |
| **High** | High importance and rarity, national scale, and limited potential for substitution. | Receptors travelling on nationally important routes/journeys (such as the national cycle network or motorways) at significant volumes.<br>Receptors travelling on routes/journeys where there is little alternative (such as multiple but infrequent routes across a railway line for a particular mode/group/town) at significant volumes.<br>Vulnerable road user Receptors travelling on networks at significant volumes (such as on main approaches to schools or doctors' surgeries). |
| **Medium** | High or medium importance and rarity, regional scale, limited potential for substitution. | Receptors travelling on routes/journeys important at a district level (such as a road or cycle route connecting two towns) at significant volumes.<br>Receptors travelling on routes/journeys where there is some alternative (such as a public right of way or footway forming part of a coarse wider network of routes) at significant volumes.<br>Vulnerable road user Receptors travelling on networks at a non-elevated rate (such as in a residential area away from schools and doctors' surgeries). |
| **Low** | Low or medium importance and rarity, local scale. | Receptors travelling on routes/journeys important at a town scale (such as local 'through' routes) at significant volumes.<br>Receptors travelling on routes/journeys where there is similar/equivalent alternatives (such as a local street in a network of connected streets).<br>Vulnerable road user Receptors travelling on networks at a very low rate (such as a rural road away from schools and doctors' surgeries). |

| Sensitivity | Definition (DMRB LA 104) [347] | Transportation approach |
|---|---|---|
| **Neglivible** | Very low importance and rarity, local scale. | Receptors travelling on local estate level routes/journeys (such as residential streets not serving a significant 'through' function).<br>Receptors travelling on routes/journeys where there is little demand for that route. |

17.7.40 All proposed construction access routes will be assessed for their suitability to accommodate forecast HGV traffic and abnormal loads.

17.7.41 As details of the proposed traffic demand become known, a specific detailed method statement will be prepared and submitted to the relevant highway authorities (including National Highways) to confirm the traffic impact assessment methodology.

### *Significance of effects*

17.7.42 Generally, moderate and major beneficial/adverse effects are deemed significant, whilst negligible and minor beneficial/adverse effects are deemed non-significant in EIA terms, as shown in Table 17-7.

**Table 17-7: Significance Matrix**

| | | Magnitude of impact | | | |
|---|---|---|---|---|---|
| | | **Negligible** | **Small** | **Medium** | **Large** |
| **Sensitivity of Receptor** | **Very High** | Minor | **Moderate or Major** | **Major** | **Major** |
| | **High** | Minor | Minor or Moderate | **Moderate or Major** | **Major** |
| | **Medium** | Negligible or Minor | Minor | Moderate | **Moderate or Major** |
| | **Low** | Negligible or Minor | Negligible or Minor | Minor | Minor or Moderate |
| | **Negligible** | Negligible | Negligible or Minor | Negligible or Minor | Minor |

## Assessment scenarios

17.7.43 The Proposed Development will be constructed across an anticipated timeframe of approximately five years. The traffic and transport assessment will consider a number of different assessment scenarios as detailed in paragraph 17.7.14, and the activities that would give rise to the most significant traffic effects as a result of the Proposed Development i.e. the likely worst-case scenario.

17.7.44 The future baseline will also include committed developments that will be delivered prior to commencement of construction. Scenarios for the TA will be discussed

with the relevant highway officers and the Emissions and Transport EIA Working Group.

### Cumulative effects

17.7.45 Cumulative effects of the Proposed Development together with the effects of other developments/schemes may result in likely significant effects. This may be the result of effects on the environment during construction or operation of the Proposed Development.

17.7.46 Cumulative effects for all topics will be reported within the cumulative effects chapter of the ES. Please refer to Chapter 19 Cumulative Effects Assessment which presents the proposed methodology for the assessment of cumulative effects that will be undertaken for the EIA.

### In-combination effects

17.7.47 In-combination effects are those that result from the interaction between the individual effects of the Proposed Development (i.e. interaction of environmental factors such as air quality, noise, health etc), combined together on a single receptor at a single point in time. The interrelationship between the individual effects may combine to result in a likely significant effect, even where the individual effects were not significant. Any in-combination effects in relation to traffic and transport will be assessed within the relevant chapter of the ES.

## 17.8 Limitations and assumptions

### Construction compound sites

17.8.1 It is considered likely that transport and traffic impacts would principally be associated with the delivery of materials and contractor movements to and from the construction compounds associated with the Proposed Underground Pipeline, AGP, HLPS and WRP. It has been assumed that all materials will be delivered by road and it is very unlikely any materials will be delivered by sea.

17.8.2 Construction compound sites will be determined in locations near the Proposed Development to store materials and for contractor car parking. The location and access to these sites will be determined as part of the ongoing scheme development and environmental assessment processes.

17.8.3 In addition, traffic and transport impacts are anticipated as a result of potential road works, closures and diversions. Similarly, temporary closures and diversions are expected to be required for a number of Rights of Way to enable construction.

## 17.9 Approach to mitigation and residual effects

17.9.1 As noted in the NPSWRI [4], the following types of mitigation and good practice would be employed where required, categorised as either primary (inherent), secondary (foreseeable) or tertiary (inexorable) mitigation:

*Primary (Inherent) Mitigation*

- Siting and construction activities could be undertaken so as to reduce any short-term adverse effects on PRoWs.
- Where substantial HGV traffic is likely, the Proposed Development would make sufficient provision for HGV parking within the construction compounds to avoid impacting normal operating conditions, 'overspill' parking on public roads, prolonged queuing on approach roads and uncontrolled on-street HGV parking.

*Secondary (Foreseeable) Mitigation*

- Where mitigation is needed, subject to feasibility issues, demand management measures are preferred before considering and imposing new transport infrastructure to manage transport impacts.
- Where substantial HGV traffic is likely and where practicable, the Proposed Development would consider how to:
  - Control numbers of HGV movements to and from the site in a specified period during construction where possible and consider the impacts of alternative transport routes.
  - Ensure satisfactory arrangements for reasonably foreseeable abnormal disruption, in consultation with relevant network providers and the responsible police force.

*Tertiary (Inexorable) Mitigation*

- Where new transport infrastructure is required (for example, roads) consideration should be given to how this can be delivered to maximise public benefit.
- Where practical, HGV movements and construction vehicles could be routed and timed to avoid peak traffic periods and sensitive receptors.
- Use of best practice methods including the development and implementation of CTMP should be considered.
- Where mitigation is needed, subject to feasibility issues, demand management measures are preferred before considering and imposing new transport infrastructure to manage transport impacts.

## 17.10 Summary

17.10.1 Table 17-8 summarises sub-topics detailed within this EIA Scoping Report Chapter 17 Traffic and transport, that will be scoped in or out of the EIA, giving rationale in reference to Planning Inspectorate (2020) Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements, (Version 7) [1], and other relevant policy and guidance.

**Table 17-8: Summary table**

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| Delay (driver) | Scoped In | Scoped Out | At this stage, the transport impacts of the construction phase are not confirmed. Traffic flows will potentially exceed the IEA Guidelines threshold on some links dependant on the preferred |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| | | | construction traffic routing and road works, closures and diversions.<br>The impact of this will need to be assessed if sensitive receptors are present when further information is available, to ensure correct mitigation is implemented for delay.<br>The change in traffic flows on nearby roads in the operational phase of the Proposed Development are set out in paragraph 17.6.9 and will fall far short of the IEA Guidelines threshold needed to give rise to a transport impact (see paragraph 17.7.17). Therefore, the operational effects due to changes in road traffic have been scoped out of the assessment. |
| Delay (bus passenger) | Scoped In | Scoped Out | At this stage, the transport impacts of the construction phase are not confirmed. Traffic flows will potentially exceed the IEA Guidelines threshold on some links dependant on the preferred construction traffic routing and road works, closures and diversions. The impact of this will need to be assessed when further information is available, to ensure correct mitigation is implemented for delay.<br>Predicted changes in traffic flows on nearby roads in the operational phase of the Proposed Development are set out in paragraph 17.6.9 and will fall far short of the IEA Guidelines threshold needed to give rise to a transport impact (see paragraph 17.7.17). Therefore, the operational effects due to changes in road traffic have been scoped out of the assessment. |
| Delay (cyclist) | Scoped In | Scoped In | During the construction phase, it is envisioned that some links will experience impact from additional traffic from the Proposed Development, and there may be temporary link closures and/or diversions that would impact cyclist journey times.<br>The EIA Scoping Report lacks information on potential permanent cycleway diversions in the operational phase of the proposed IPS and proposed BPT. Therefore, any potential impact on cyclists as a result will be scoped in. |
| Delay (pedestrian and equestrian) | Scoped In | Scoped In | During the construction phase, it is envisioned that some links will experience impact from additional traffic from the Proposed Development, and there may be temporary link closures or diversions that would impact pedestrians and equestrians.<br>The EIA Scoping Report lacks information on potential permanent footway/footpath/bridleway closure or diversions in the operational phase of the proposed IPS and proposed BPT. Therefore, any |

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| | | | potential impact on pedestrians and equestrians as a result will be scoped in. |
| Accidents and safety | Scoped In | Scoped Out | During the construction phase, the increase in traffic and HGVs could impact safety where there are existing issues on the network or where significant changes to travel patterns are predicted.<br>The change in traffic flows on nearby roads in the operational phase of the Proposed Development are set out in paragraph 17.6.9 and will fall far short of the IEA Guidelines threshold (paragraph 17.7.17) needed to give rise to a transport safety impact. Therefore, the operational effects due to changes in road traffic have been scoped out of the assessment. |
| Amenity, fear and intimidation | Scoped In | Scoped In | At this stage, the transport impacts of the construction phase are not confirmed. Traffic flows will potentially exceed the IEA Guidelines threshold on some links dependant on the preferred routing. The impact of this will need to be assessed if sensitive receptors are present when further information is available, to ensure correct mitigation is implemented.<br>The change in traffic flows on nearby roads in the operational phase of the Proposed Development are set out in paragraph 17.6.9 and will fall far short of the IEA Guidelines threshold needed to give rise to a transport impact (see paragraph 17.7.17). However, there is potential for long-term enhancements to existing routes and therefore the operational phase has been scoped into the assessment. |
| Severance | Scoped In | Scoped Out | During the construction phase, changes in traffic flows associated with road closures and diversions could impact severance. These impacts could give rise to likely significant effects on sensitive receptors particularly walkers, cyclists, and horse riders.<br>The change in traffic flows on nearby roads in the operational phase of the Proposed Development will fall far short of the IEA Guidelines threshold needed to give rise to a transport impact. Therefore, the operational effects due to changes in road traffic have been scoped out of the assessment. |
| Hazardous Loads | Scoped Out | Scoped Out | The number of hazardous loads associated with the construction or operational stages of the Proposed Development is not considered to be significant (IEA Guidelines, paragraph 7.4.3) and therefore a risk or catastrophe analysis is not warranted. As such, the assessment of hazardous loads has been scoped out of the assessment. |

# 18 Water environment

## 18.1 Introduction

18.1.1 This chapter sets out the scope and methodology for the assessment of the potential likely significant effects arising from the construction, operation and decommissioning of the Proposed Development on the water environment.

18.1.2 The aspects of the water environment considered in this chapter include:

- The hydrology, geomorphology and quality of surface waters (including freshwater, coastal and transitional waters)
- The quantity and quality of groundwater
- Surface and groundwater resources
- Surface and groundwater-dependent designated sites
- Flood risk to and from the Proposed Development

18.1.3 This chapter has links with other topics, and potential for likely significant effects are discussed in the following chapters:

- Chapter 7 Archaeology and cultural heritage covers potential impacts on heritage assets, which could be affected by changes in hydrology and hydrogeology.
- Chapter 8 Terrestrial and freshwater biodiversity covers potential impacts on designated sites, habitats, protected and notable species, and INNS, which could be affected by changes hydrology and hydrogeology.
- Chapter 9 Marine biodiversity covers potential impacts on designated sites, marine mammals, fish, marine habitats, benthic marine species, INNS and commercial fisheries. These receptors could be affected by changes in coastal and marine water quality.
- Chapter 10 Carbon and climate change covers potential impacts on GHG emissions and climate change resilience. Climate change could affect hydrology, hydrogeology, flood risks and water resources.
- Chapter 11 Land quality and ground conditions covers potential impacts on sources of contamination and underlying geological and hydrogeological conditions, which could affect water quality.

## 18.2 Legislation, policy and guidance

18.2.1 The following sections provide a summary of key topic specific policy, legislation and guidance with respect to the water environment. Further information on legislation, policy and guidance relevant to the EIA is set out in Chapter 2 Planning legislation and policy. It is recognised that this list is non-exhaustive and will be kept under review to take account of any later legislation or policy changes.

### Legislation

18.2.2 The relevant legislation includes:

- The Environment Act 2021
- The Environmental Permitting (England and Wales) (Amendment) (EU Exit) Regulations 2019
- The Floods and Water (Amendment etc.) (EU Exit) Regulations 2019
- The Water Supply (Water Quality) Regulations 2018
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, which transpose the Water Framework Directive (2000/0/EC)
- The Conservation of Habitats and Species Regulations 2017, as amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, which transpose the Habitats Directive (92/43/EEC)
- The Water Abstraction and Impounding (Exemptions) Regulations 2017
- The Environmental Permitting (England and Wales) Regulations 2016
- The Environmental Damage (Prevention and Remediation) (England) Regulations 2015
- The Bathing Water Regulations 2013
- The Flood and Water Management Act 2010
- The Flood Risk Regulations 2009
- The Water Resources (Abstraction and Impounding) Regulations 2006 (as amended)
- Marine and Coastal Access Act 2009
- The Water Act 2003
- The Water Industry Act 1991
- The Environment Act 1995
- The Urban Waste Water Treatment (England and Wales) Regulations 1994
- The Land Drainage Act 1991
- The Water Resources Act 1991
- Marine and Coastal Access Act 2009
- The Urban Waste Water Treatment (England and Wales) Regulations 1994

### National policy

18.2.3 The relevant national policies include:

- NPSWRI [4]
  - Environmental Net Gain: paragraph 3.4.1 to 3.4.4. These paragraphs set out the requirement that projects should consider and seek to incorporate improvements in natural capital, ecosystem services and the benefits they deliver when planning how to deliver BNG. This includes improvements to water quality and reductions in flood risk.

- Climate Change Adaptation: section 3.7 paragraph 3.7.4. Section 3.7 of the NPS sets out how the applicant should, and the SoS will, take into account the effects of climate change when developing and considering water resources NSIP applications. Paragraph 3.7.4 identifies areas where climate change adaptation should be incorporated into detailed design, such as flood risk and coastal change, biodiversity and nature conservation, and water quality.
- Flood risk: paragraphs 4.7.1 to 4.7.15. These paragraphs set out detailed requirements for flood risk, including the need to undertake a flood risk assessment, ensure that climate change is taken into account, and ensure that the development's design takes into account flood risk, and should put forward measures to mitigate the impact of flooding.
- Water Quality and Resources: paragraphs 4.15.1 and 4.15.3 to 4.15.12. These paragraphs set out a series of requirements for the assessment of environmental impacts on surface and groundwaters are also set out, as well as requirements to deliver environmental net gain (e.g. reduced flood risk, improvements to water quality).

- NPPF [5]
  - Flood risk: section 14, paragraphs 153 and 159-169 of the NPPF set out detailed considerations for flood risk in terms of planning for climate change, avoiding new development in areas of inappropriate flood risk, and ensuring that new developments are sufficiently resilient to flooding.
  - Water quality: section 15, paragraph 174 states that new development should not pose an unacceptable risk of water pollution, and that it should help to improve local environmental conditions, including water quality and actions set out in the River Basin Management Plans.

### *South Inshore and South Offshore Marine Plan*

18.2.4 Under section 51 of the Marine Coastal Access Act (2009), a marine plan authority may prepare a marine plan for an area (a "marine plan area") consisting of the whole or any part of its marine planning region. There are 11 English marine plan areas including inshore and offshore areas. Similar to land-use plans, marine plans consist of a main strategy document and supporting documents, including a statement of public participation and a sustainability appraisal. The South Inshore and South Offshore Marine Plan is the second English marine plan to be adopted (in 2018) [124]. The Proposed Development is located within the South Inshore Marine Plan area. The relevant objectives of the Marine Plan are set out in Table 18-1.

**Table 18-1: Relevant policies and objectives of the South Inshore and South Offshore Marine Plan**

| Objective | Policies |
|---|---|
| Objective 2: To manage existing, and aid the provision of new, infrastructure supporting marine and terrestrial activity. | S-INF-1 |
| Objective 7: To support the reduction of the environmental, social and economic impacts of climate change, through encouraging the implementation of mitigation and adaptation measures that: avoid proposals' indirect contributions to GHG | S-CC-1<br>S-CC-2 |

| Objective | Policies |
|---|---|
| emissions; reduce vulnerability; improve resilience to climate and coastal change; and consider habitats that provide related ecosystem services. | |
| Objective 10: To support marine protected area objectives and a well-managed ecologically coherent network with enhanced resilience and capability to adapt to change. | S-MPA-1 to S-MPA-4 |
| Objective 11: To complement and contribute to the achievement or maintenance of Good Ecological Status or Potential under the Water Framework Directive and Good Environmental Status under the Marine Strategy Framework Directive, with respect to descriptors for marine litter, non-indigenous species and underwater noise. | S-NIS-1<br>S-WQ-1<br>S-WQ-2 |
| Objective 12: To safeguard space for, and improve the quality of, the natural marine environment, including to enable continued provision of ecosystem goods and services, particularly in relation to coastal and seabed habitats, fisheries and cumulative impacts on highly mobile species. | S-BIO-1 to S-BIO-4<br>S-FISH-4 |

### Local policy

18.2.5 Local policies are set out in Table 1818-2Table 18 may be considered both important and relevant to the Proposed Development. In the event that there is any conflict between these and the NPSWRI, the NPS would prevail.

**Table 1818-2: List of relevant local policy**

| Local Authority | Relevant Local Policy |
|---|---|
| EHDC | East Hampshire District Local Plan: Joint Core Strategy (2014) [6]<br>• Core police 25 - Flood risk<br>• Core policy 26 - Water quality/water resources |
| EBC | Eastleigh Borough Local Plan 2016-2036 (2022) [9]<br>• DM5 - Managing flood risk<br>• DM6 - Sustainable surface water management and watercourse management<br>• DM8 - Pollution |
| FBC | Fareham Local Plan 2037 (2023) [12]<br>• CC2 - Managing Flood Risk and Sustainable Drainage Systems<br>• NE4 - Water Quality Effects on the SPAs, SACs and Ramsar Sites of the Solent |
| HCC | Local Flood and Water Management Strategy (2020) [353]<br>• Policies 1 to 7 |
| HBC | Havant Borough Core Strategy (2011) [17]<br>• CS15 - Flood and Coastal Erosion Risk<br>• DM8 – Conservation, Protection and Enhancement of Existing Natural Features. Updated in the Draft Havant Borough Local Plan 2036 (2018) [109] to policy E2, E10 and E15 – Green Infrastructure, Landscape and the Coast and Ecological conservation respectively. |
| PCC | Portsmouth Local Plan 2038 (Draft) (2021) [111] |

| Local Authority | Relevant Local Policy |
|---|---|
| | • G3 - Water Quality Nutrient Neutrality<br>• G5 - Flood Risk Drainage |
| WCC | Winchester District Local Plan Part 1 Joint Core Strategy (2013) [56]<br>• CP17 - Flooding, Flood Risk and the Water Environment |
| SDNPA | South Downs Local Plan (2019) [58]<br>• SD17 - Protection of the Water Environment Policy SD49 Flood Risk Management Policy SD50 Sustainable Drainage Systems |

### Guidance and standards

18.2.6 Relevant guidance and standards that have informed the scoping process and will also be taken into account as part of the EIA are listed in Table 1818-3.

**Table 1818-3: Guidance and standards**

| Topic | Guidance |
|---|---|
| Impact assessment guidance | DfT (2022) Transport Analysis Guidance Unit A3: Environmental Impact Appraisal (Section 10) [354]<br>EA (2007) Hydrogeological impact appraisal for groundwater abstractions. Science Report – SC040020/SR2 [355]<br>EA (2007) Hydrogeological impact appraisal for dewatering abstractions. Science Report – SC040020/SR1 [356]<br>EA (2014) Modelling: Surface water pollution risk assessment [357]<br>EA (2016) Environmental Quality Standards Directive (EQSD) list for WFD assessments [358]<br>EA (2016) Surface water pollution risk assessment for your environmental permit [359]<br>EA (2017) Clearing the Waters for All [360]<br>National Highways (2019) DMRB – Sustainability and Environmental Appraisal, LA 113 Road drainage and the water environment. Revision 1. HE-DMRB-SE LA 113 [361]<br>Planning Inspectorate (2017) Advice Note Eighteen: The Water Framework Directive, (Version 1) [46]<br>UK Technical Advisory Group (TAG) (2003) Water Framework Directive UK Risk assessment of groundwater-dependent terrestrial ecosystems [362] |
| National flood risk management policy and guidance | Department for Levelling Up, Communities and Housing (2022) Guidance: Flood risk and coastal change [50]<br>EA and Defra (2022) Preparing a Flood Risk Assessment: Standing Advice [363]<br>EA (2022) Flood Risk Assessments: Climate Change Allowances [364]<br>MHCLG (2021) National Planning Policy Framework [352]<br>Pollution prevention guidance:<br>CIRIA (2001) Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors (C532) [365] |

| Topic | Guidance |
|---|---|
| | CIRIA (2006) Control of Water Pollution from Linear Construction Projects – Technical Guidance (C648) [366]<br>CIRIA (2015) Environmental good practice on site (4th edition) (C741) [367]<br>CIRIA (2016) Groundwater control: design and practice (second edition) (C750) [368]<br>Defra (2023) Pollution prevention for businesses [369]<br>EA's Pollution Prevention Guidance (PPG) notes (PPG1, PPG5, PPG8 and PPG21). Although EA PPG notes have been revoked in England, they have been updated as Guidance for Pollution Prevention (GPP notes) for use in Scotland and Northern Ireland (NetRegs, 2022) [370]<br>EA (2017) Protect groundwater and prevent groundwater pollution [371]<br>EA (2017) Groundwater protection technical guidance [372]<br>EA (No date) Check if you need permission to do work on a river, flood defence or sea defence [373] |
| Local guidance | EHDC (No date) Position statement on nutrient neutral development [374]<br>HCC (2011) Preliminary Flood Risk Assessment [375]<br>HCC (2013) Hampshire Groundwater Management Plan [376]<br>HCC (2020) Local Flood and Water Management Strategy [353]<br>HCC (undated) Catchment Management Plans [377]<br>HBC (2023) Flood Risk Sequential Test and Exception Test: Policy Guidance for Applicants and Planning Officers [378]<br>HBC (2020) Position Statement and Mitigation Plan for Nutrient Neutral Development [379]<br>South Downs National Park Authority (2023) Water resources in the central area of the South Downs National Park [380] |

## 18.3 Engagement

### Biodiversity and Water Environment Impact Assessment Working Group

18.3.1 The following stakeholders have responsibility for aspects of the water environment (e.g. water quality, geomorphology, flood risk and water-dependent habitats) and will continue to be engaged as part of the EIA process:

- East Hampshire District Council (EHDC)
- Eastleigh Borough Council (EBC)
- Environment Agency (EA)
- Fareham Borough Council (FBC)
- Forestry Commission (FC)
- Hampshire County Council (HCC)
- Havant Borough Council (HBC)
- Joint Nature Conservation Committee (JNCC)

- Marine Management Organisation (MMO)
- Natural England (NE)
- Portsmouth City Council (PCC)
- South Downs National Park Authority (SDNPA)
- Southern Inshore Fisheries and Conservation Authority (Southern IFCA)
- Winchester City Council (WCC)

18.3.2 Technical engagement has commenced through EIA Working Groups that have been established for the Proposed Development, primarily the Biodiversity and Water Environment Working Group.

18.3.3 An introductory meeting was held with this group on 25 May 2022. This was attended by representatives from the EA, NE, MMO, HCC, WCC, EBC and HBC. The meeting provided an overview of the Proposed Development, a summary of the assessment progress and programme, and included a discussion of key risks to the water environment that would be examined as part of the EIA scoping assessment.

18.3.4 A second meeting was held on 31 August 2022, and was attended by the EA, EBC, FBC, EA, HBC, HCC, MMO, NE, PCC, SDNPA, Sussex IFCA and WCC. The meeting provided a summary of the main issues identified in the scoping stage prior to undertaking the EIA. This included an update on terrestrial and marine ecology surveys, land quality and ground conditions surveys, and approach to scoping (effects scoped in and out).

18.3.5 A third EIA Working Group was held on 16 June 2023. The meeting covered key issues and approach to scoping for terrestrial and aquatic ecology, marine ecology, land quality and ground conditions, and the water environment.

18.3.6 The comments from stakeholders received during the public consultation process, as summarised in Table 18-4, reflects the feedback provided during these meetings.

18.3.7 Further Working Group meetings will take place throughout the DCO pre-application process to provide updates on the Proposed Development, agree survey and mitigation measures and to provide initial results of the desk-based assessments and survey work.

18.3.8 In addition, more focused Technical Working Group meetings have been taking place with the EA, NE and the MMO, during which specific technical aspects can be discussed and agreed as and when required.

### Resilience EIA Working Group

18.3.9 The remit of the Resilience EIA Working Group includes consideration of flood risk and is therefore relevant to this chapter. The following non-statutory consultees will be engaged with as part of the Resilience Working Group:

- Civil Aviation Authority
- East Hampshire District Council (EHDC)
- Eastleigh Borough Council (EBC)

- Environment Agency (EA)
- Fareham Borough Council (FBC)
- Hampshire County Council (HCC)
- Hampshire & Isle of Wight Fire and Rescue Service
- Hampshire Police and Crime Commissioner
- Havant Borough Council (HBC)
- Health and Safety Executive (HSE)
- Portsmouth City Council (PCC)
- South Downs National Park Authority (SDNPA)
- Winchester City Council (WCC)

18.3.10 The EA has strategic responsibility for flood risk management and is responsible for managing flood risk from main rivers and the sea. The Lead Local Flood Authorities (LLFAs) (HCC and PCC) are lead authorities with respect to managing flood risks from surface water, groundwater and ordinary watercourses. The District and Borough Councils work with the LLFAs to ensure that flood risks are managed effectively.

18.3.11 The first resilience EIA working group meeting took placed on 14 September 2022. Topics discussed included climate change, flood risk, major accidents and disasters, and emergency planning. A second meeting was held on 6 June 2023. During this meeting a project update was provided and the main topics were the climate change assessment methodology and mitigation, details/methodology of the Flood Risk Assessment (FRA), and updates to emergency planning.

18.3.12 The comments from stakeholders received during the public consultation process, as summarised in Table 18-4, reflects the feedback provided during these meetings.

### Wildlife and Water Interest Group

18.3.13 The following non-statutory consultees have a significant involvement in the management, conservation and enhancement of the water environment, and will therefore continue to be engaged with as part of the Wildlife and Water Interest Group so that that their specialist local expertise can be considered as part of the EIA process.

- Angling Trust
- Bourne Rivulet Initiative
- Chichester Harbour Conservancy
- Hampshire and Isle of Wight Local Nature Partnership
- Hampshire and Isle of Wight Wildlife Trust
- Hampshire Ornithological Society
- Royal Society for the Protection of Birds
- Solent Forum
- Test and Itchen Association

- Test Valley Angling Club and Southampton Piscatorial Society
- The Woodland Trust
- Upper Itchen Initiative
- Wessex Rivers Trust
- Wildfish (formerly known as Salmon and Trout Conservation)

18.3.14 Topics to be discussed will include baseline characterisation and the availability of site-specific data, the approach to be used in the EIA and the potential scope of any mitigation measures identified in the assessment. An initial meeting of this group was held on 18 July 2022, which provided an introduction to the Proposed Development and the proposed assessment timescales.

### Public consultation

18.3.15 Following the close of Public Consultation 2022 between 5 July and 16 August, consultee feedback has been reviewed. Feedback is summarised in Table 18-4, which will be considered within the EIA as part of the water environment assessment.

**Table 18-4: Public Consultation 2022 responses**

| Stakeholder | Consultation response | Scoping response |
|---|---|---|
| EA | The requirement for an FRA that should assess risk over the full lifetime of the Proposed Development and incorporate the latest climate change allowances.<br><br>The FRA should also assess any potential impact the pipeline may have upon groundwater flow routes, particularly if the pipeline crosses areas where groundwater is located at shallow depths. | A preliminary FRA has been prepared to support this Scoping Report. A more detailed FRA will be prepared in support of the ES and included as part of the DCO application. |
| | The requirement for a Water Environment Regulations (WER) assessment that should be carried out to ensure that there will be no deterioration of the status of any waterbody as a result of any of the proposed works. | A WER compliance assessment (Water Environment (Water Framework Directive) (England and Wales) Regulations 2017) will be submitted as an appendix to Chapter 18 Water environment (including flood risk) of the EIA that will be reported in the ES and included as part of the DCO application. |
| | The need for a detailed EMP, with harm/impacts detailed along with mitigation and compensation measures. This is key to ensure protection and enhancement of the environment. | For all construction activities, a CEMP or equivalent will be developed and agreed with stakeholders to identify the measures needed to avoid, minimise or mitigate construction effects on the water environment. |

| Stakeholder | Consultation response | Scoping response |
|---|---|---|
| | There should be more reference to how the Proposed Development links with wider WRMP timelines/processes, and options outlined, so that it is clear how these link together within the water resource management planning process. This will enable wider understanding of where this scheme fits into the wider water resource picture. | The WRMP that is currently being finalised by Southern Water considers the overall balance between water supply and demand and the type and scale of solutions required. This includes consideration of the strategic need for the Proposed Development and how it fits into to wider water resources management requirements.<br>In addition, a summary of the RAPID gated process undertaken to select strategic water resource options is provided in Chapter 4 Consideration of alternatives. This includes a description of the different options considered prior to the selection of the Proposed Development as the preferred option. |
| HCC (LLFA) | The LLFA advises that any new impermeable surfaces should have an appropriate drainage scheme developed in line with the requirements set out in LLFA guidance. | A drainage strategy will be developed for the Proposed Development in consultation with the EA and LLFA. |
| | Any modifications (temporary or permanent) to ordinary watercourses will require consent from the LLFA. | The approach to obtaining relevant consents and licences will be discussed with stakeholders as part of the EIA and consenting process. |
| | Consideration needs to be given to the overland water flow routes, as identified on the flood map for surface water, such that they are managed during the construction process and retained post construction.<br><br>The LLFA advise that above ground infrastructure is avoided in areas of high or medium surface water flood risk. If such infrastructure is demonstrated to be necessary, the LLFA would expect the infrastructure to be water resilient, with measures put in place to avoid displacing water to other locations. | A preliminary FRA has been prepared and has been issued alongside this scoping report. A more detailed FRA will be prepared in support of the ES and included as part of the DCO application. |
| NE | Potential impacts of the proposed WRP and associated pipeline corridors on the | As set out in section 18.6 of this EIA Scoping Report, impacts |

| Stakeholder | Consultation response | Scoping response |
|---|---|---|
| | River Itchen SAC and SSSI, and those of the River Meon. NE has expressed concerns about the other river crossings needed for this option and the potential environmental impacts. These concerns have been discussed further in detailed sessions held between the company, Natural England and the EA. To limit these concerns going forward, river crossings should be kept to a minimum, and suitable methods should be used to limit impacts to the river habitat and associated wetlands and hydrological studies undertaken.<br><br>When crossing the River Itchen SSSI and SAC the option with minimal river crossings, and least disturbance to the floodplain should be chosen. Crossings of the Itchen, and other waterbodies, should be situated in areas already disturbed within the corridors, such as at river or railway crossings to limit environmental disturbance/damage.<br><br>Survey data was not available as part of the consultation which has made it hard to determine the sites/pipeline sections that have the biggest impacts to the habitats and/or species. Discussions should be had with Natural England when these surveys are available to finalise corridor route options and discuss any necessary mitigation/compensation.<br><br>The corridor should look to minimise river and floodplain crossings of the River Itchen SSSI, SAC and supporting habitat of this site which may lay out of the designated areas such as the Otterbourne Stream. | resulting from the physical disturbance of surface water bodies, including at watercourse crossings, will be assessed as part of the EIA that will be reported in the ES and included as part of the DCO application.<br><br>Preferred techniques for crossing each Main River and larger Ordinary Watercourses will be identified during the EIA and used to inform the development of the worst case scenario. A detailed crossing schedule will be produced detailing the methodology for each crossing as part of the post-DCO detailed design process.<br><br>A geomorphology baseline survey will also be undertaken to gather up-to-date information on the current condition of watercourses that will be crossed by the Proposed Development. The survey scope will be agreed with NE and EA. |
| | Natural England also has some concerns about the potential for leaching from the former landfill site situated on the site of the proposed WRP. A site assessment and surveys are needed to ensure this does not impact the designated sites. | Potential landfill leaching issues will be assessed in Chapter 11 Land quality and ground conditions) of the ES and included as part of the DCO application |

| Stakeholder | Consultation response | Scoping response |
|---|---|---|
| | The pipeline location crosses the Hermitage Stream which flows into Langstone Harbour and the protected sites there (outlined in question 3) and priority woodland and mudflat habitats. It is understood the need for this pipe but the method for putting in the pipeline will need to be carefully assessed to minimise any environmental impact. The methods chosen should take into account bird disturbance in the vicinity and ensure disruption to that of migratory fish into the Hermitage stream catchment is limited and mitigated for.<br><br>Z3 with the information provided to date would be preferred to Z4. Z4 has more impact on the River Itchen SAC, SSSI as it crosses the river in more places and crosses over a larger area of the River Itchen SSSI surrounding wetland areas.<br><br>Areas where construction works may be disruptive will be the protected sites (SSSIs, SACs, SPAs, Ramsar's, MCZs), protected landscapes such as South Downs National Park and ancient woodlands, all waterbody crossings, and priority habitats. Further consultation with local councils may flag particular areas of these alongside other areas of habitats or species. | As set out in section 18.6 of this EIA Scoping Report, impacts from the direct disturbance of surface water bodies, including watercourse crossings, will be fully assessed as part of the EIA and will be reported in the ES and included as part of the DCO application.<br><br>Crossing techniques and locations will be evaluated in detail as part of the scheme development and design process, which will seek to avoid, then reduce environmental impacts on receptors. This evaluation will for part of the EIA and will be reported in the ES and included as part of the DCO application.<br><br>A detailed crossing schedule will be produced detailing the methodology for each crossing as part of the post-DCO detailed design process.<br><br>Ecological impacts will be fully assessed as part of the EIA and will be reported in the ES and included as part of the DCO application in Chapter 8 Terrestrial and freshwater biodiversity and Chapter 9 Marine biodiversity. |
| Rowlands Castle Parish Council | There is potential for significant adverse impact on downstream water quality in the coastal SAC, SPA and RAMSAR sites, especially in Langstone Harbour. The benefit that Havant Thicket Reservoir was to have made in reducing nitrates will be lost. The Habitats Regulation Screening Assessment (HRA) completed by SW to date is not robust and does not consider the adverse impact on Langstone Harbour from the poorer water quality leaving the reservoir via the compensation discharge. | The impact of discharges from the reservoir on water quality will be assessed as part of the EIA and reported in the ES and included as part of the DCO application. A Habitat Regulations Assessment will also be undertaken, and ecological impacts will be fully assessed in the EIA that will be reported in Chapter 8 Terrestrial and freshwater biodiversity and Chapter 9 Marine biodiversity and included as part of the DCO application. |

| Stakeholder | Consultation response | Scoping response |
|---|---|---|
| | There will be an adverse impact on water quality in the streams below the reservoir, removing the positive benefit that the Havant Thicket Reservoir proposal would have delivered.<br><br>There is insufficient evidence on the impacts of the proposed WRP on chalk catchments. | A geomorphology baseline survey will be undertaken to assess characteristics of the chalk catchments. As set out in section 18.6 of this EIA Scoping Report, impacts of water quality will be fully assessed as part of the EIA and will be reported in the ES and included as part of the DCO application and associated WER (Water Environment (Water Framework Directive) (England and Wales) Regulations 2017) compliance assessment. |
| Wild Fish | That all environmental impacts are minimised and/or mitigated against. Concerns are the potential impacts on freshwater environments, which are sensitive to and already suffering from chemicals, excess fine sediment, and physical alteration. All early assessment outcomes, arising from the preliminary EIA, need to be shared in full, as early as possible.<br><br>Confirmation that the proposed water transfer does not have the capability of transferring aquatic invasive non-native species from one site to another, because the water transfer from Havant Thicket Reservoir to Otterbourne WSW is a direct transfer, thus water does not enter the Itchen.<br><br>Risks associated with the change from non-consumptive use to consumptive use of water depleting sensitive sites. Confirmation is required that the preferred option does not serve any flow augmentation purpose. | For all construction activities, construction management plans will be developed and agreed with stakeholders to identify the measures needed to avoid, minimise or mitigate any construction effects on the environment.<br><br>The potential for the transfer of INNS will be assessed as part of the EIA process. |
| Partnership for South Hampshire | Concerns regarding quality of reject water and potential effects on Solent water quality. | The potential impact of changes to the discharges from Eastney LSO will be assessed in the EIA and will be reported in the ES and included as part of the DCO application and WER compliance assessment Water Environment (Water Framework Directive) (England and Wales) Regulations 2017). |

## 18.4 Approach to scoping

### Study area

18.4.1 The study areas established to inform this scoping chapter and which will be used in the subsequent EIA are set out below.

18.4.2 As part of the South East River Basin Management Plan [381], the EA has defined river water body catchments based on surface hydrological catchments with an area of greater than 5km$^2$. For the purpose of this EIA Scoping Report and EIA, the study area for the surface water environment (including flood risk) has been defined based on the hydrological catchments that intersect with the Scoping Area (Figure 18.1 in Volume III). These hydrological catchments were used to define the study area for surface waters because they are an established representation of distinct units (or receptors) within the surface drainage network. Surface catchments have been included within the study area if they are crossed by the Proposed Development or if they are hydrologically connected (i.e. downstream) to a catchment in which activities associated with the Proposed Development would take place.

18.4.3 The groundwater study area (Figure 18.2 in Volume III) includes those groundwater bodies that underlie the Scoping Area, or are hydrologically connected to these bodies. EA groundwater bodies are based on large-scale hydrogeological units and will be used to delineate the boundaries of the study area and define groundwater receptors. The extent of the initial groundwater study area has been based on the 'source-pathway-receptor' linkage principle, which incorporates a risk-based approach based on the assessment of impact pathways. The groundwater study area focusses on groundwater features within a 1km radius of the Scoping Area. However, this will be kept under review as the understanding of complex interactions evolve (e.g. where baseline condition studies identify the presence of pathways such as karst features).

18.4.4 With respect to the marine water environment, the study area covers the onshore coastal catchments as outlined above, but also the water bodies within which changes could potentially occur as a result of alterations to the existing discharge at the Eastney LSO (Figure 18.1 in Volume III). This has been determined through a number of early dispersion modelling studies for various WRP peak outputs [382]. This modelling study considered the potential effects the Proposed Development would have on biological oxygen demand (BOD), chemical oxygen demand (COD), suspended solids concentrations (SSC), salinity, iron and total nitrogen for two flow scenarios; 5 mega litres per day (Ml/d) and 15Ml/d. The model results indicated that effects (albeit very minor ones) could potentially occur within the Solent as far as Southampton Water and within Portsmouth, Langstone and Chichester Harbours. Whilst the modelled scenarios do not reflect the current proposed peak outputs of up to 60 Ml/d (and will not be directly used to inform the ES), the modelling work enables an indicative study area and likely scale of effects to be defined.

18.4.5 The location of the temporary construction hub (as described in Chapter 3 Description of the Proposed Development) is not known at this time of writing. This is expected to be an existing consented site and may be situated outside of the

Scoping Area. The effects of the water environment on the hub will be assessed as part of the water environment assessment.

18.4.6 Statutory consultees with statutory functions relevant to the water environment have been engaged in relation to the extent of the study area (see section 18.3 for further details). The study areas will be reviewed as the baseline conditions review is undertaken to enable sensitive receptors at risk of likely significant effects to be appropriately captured.

## Sources of baseline data

18.4.7 Table 18-5Table 18-5Table 18 summarises the key data sources that have been used to inform the baseline assessment presented in this report.

**Table 18-5: Source of baseline data**

| Baseline data | Source of data |
|---|---|
| Water body status objectives and classification data | EA Catchment Data Explore [383] |
| Water quality data | EA Water Quality Archive [384] |
| Licensed and unlicensed abstraction data (surface and groundwater) | EA and Local Councils (unpublished data available on request from the EA and Local Councils) |
| Consented discharges | EA (unpublished data available on request) |
| Detailed flood risk information (Product 4, 5 and 8) | EA (unpublished data available on request) |
| Aquatic ecology data (freshwater and marine survey data are extracted from the National Fish Populations database (NFPD) and Biosys (Biological survey) database) | EA Ecology and Fish Data Explorer [385] |
| Source Protection Zones (SPZ) | Defra Magic [140] |
| Aquifer designation mapping | |
| Groundwater vulnerability mapping | |
| Statutory and non-statutory designated sites | |
| Geological mapping | British Geological Survey [386] |
| Hydrogeology maps | |
| Flood risk mapping (rivers and sea, surface water, reservoirs) | EA [387] |
| Groundwater Dependent Terrestrial Ecosystems (England only) | EA [388] |
| Historical flood incident information relating to highways, surface water and drainage flooding | Lead Local Flood Authority (various dates; unpublished data available on request from the LLFA) |

## 18.5 Baseline conditions

### Proposed Development wide conditions

18.5.1 The Proposed Development would cross a number of river catchments, including lowland, low gradient systems such as the Hermitage Stream, River Wallington and River Hamble, which drain into Langstone Harbour, Portsmouth Harbour and Southampton Water, respectively. The Proposed Development would also occur within the catchments of the River Itchen and the River Meon, both of which are highly sensitive chalk river systems. Additional details on each river catchment are provided in the subsequent sections, which consider the baseline characteristics associated with each part of the Proposed Development.

18.5.2 Hydrogeological baseline conditions for the Proposed Development are detailed in Appendix 18-1 Preliminary hydrogeological impact assessment in Volume II and summarised in the following sub-sections.

### Proposed Water Recycling Plant and proposed High Lift Pumping Station

#### *Surface water*

18.5.3 The proposed WRP and the proposed HLPS, as set out below in paragraph 18.5.85, is situated adjacent to the tidally influenced lower course of Hermitage Stream (Main River) (see Figure 18.1 in Volume III). The tidal section of the Hermitage Stream has a straight planform, and it is constrained by artificial banks and other urban infrastructure. A short Ordinary Watercourse (ditch/drain) follows the southern perimeter of the proposed WRP and drains into the tidal Hermitage Stream. Water quality in the Hermitage Stream catchment is adversely affected by point source pollution (misconnections) and physical modifications [383].

18.5.4 Hermitage Stream flows into Langstone Harbour (c. 180m south of the proposed WRP), which is designated as a Ramsar site (Chichester and Langstone Harbours), SAC (Solent Maritime), SPA (Chichester and Langstone Harbours) and SSSI (Langstone Harbour).

#### *Groundwater*

18.5.5 Geological mapping indicates that the site of the proposed WRP is mainly underlain by superficial deposits comprising raised marine deposits made up of sands and gravels. River terrace deposits potentially encroach on northern areas of the site of the proposed WRP. Raised marine deposits support a Secondary (undifferentiated) aquifer (Figure 18.3 in Volume III) (defined as an aquifer that can't be classified as Secondary A or B due to the variable characteristics of the rock type – these have only a minor value). River terrace deposits support a Secondary A aquifer (Figure 18.3 and Figure 18.4 in Volume III) (Secondary A aquifers comprise permeable layers that can support local water supplies and may form an important source of base flow to rivers). Bedrock comprises White Chalk Subgroup rocks of the undifferentiated Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation – these are classed as a Principal aquifer (Figure 18.4 in Volume III). Principal aquifers provide significant quantities of drinking water,

and water for business and other needs. They may also support rivers, lakes and wetlands. Groundwater vulnerability mapping indicates a medium to high risk from pollution, with a potential for the presence of solution features, which would enable a rapid movement of pollutants.

18.5.6 The site of the proposed WRP is located approximately 350m south of an inner source protection zone (SPZ 1) (Figure 18.5 in Volume III). Source protection zones (SPZs) are defined around large and public potable groundwater abstraction sites. Their purpose is to provide additional protection to safeguard drinking water quality through constraining the proximity of an activity that may impact upon a drinking water abstraction. The zones are defined by groundwater travel time, with SPZ 1 having a travel time of 50-days or less from any point within the zone at or below the water table, and has a minimum 50 metre radius. This SPZ is associated with the Chalk springs at Bedhampton which are used for potable water supply by Portsmouth Water.

18.5.7 Langstone Harbour is identified as a Groundwater Dependant Terrestrial Ecosystems (GWDTE) (designated under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017)).

18.5.8 Groundwater quality is adversely affected by diffuse pollution from agriculture and flow issues (abstraction) [383].

18.5.9 The site of the proposed WRP is located in the East Hampshire Catchment Abstraction Management Strategy (CAMS) area (Figure 18.9 in Volume III). CAMS help to identify where water may be available for future use but also where water resource demands may be impacting the water balance.

*Water bodies*

18.5.10 The status of water bodies is assessed under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.

18.5.11 The site of the proposed WRP is situated in the coastal catchment associated with Langstone Harbour (GB580705130000) (Figure 18.1 in Volume III). The heavily modified transitional water body is at ‘Moderate’ ecological potential (due to a ‘Moderate’ classification for angiosperms and a lack of feasible mitigation measures) and ‘Fail’ for chemical status. Failed chemical status is due to high levels of priority hazardous substances (mercury and its compounds and PBDE (polybrominated diphenyl ethers)) [383]. PBDEs are a group of organobromine compounds. They have been used as flame retardants in a wide range of products including electrical and electronic equipment, textiles and foams.

18.5.12 The underlying groundwater body (East Hants Chalk (GB40701G502700)) (Figure 18.2 in Volume III) is at ‘Poor’ status due to diffuse pollution associated with agricultural and rural land management and flow issues (abstractions). The objective is to achieve ‘Good’ chemical status by 2027 through natural groundwater recovery [383].

18.5.13 Water-dependent protected areas associated with each water body are listed in Appendix 18.2 Water Body dependent protected areas in Volume II. These are protected under a variety of international and national legislation for environmental,

water quality, habitats and species conservation including Conservation of Habitats and Species Regulations 2017 and WER.

*Flood risk*

18.5.14 The site of the proposed WRP is situated in Flood Zone 1 (land with less than a 0.1% annual probability of river and sea flooding (<0.1%)) (Figure 18.6 in Volume III). The site of the proposed WRP is also at the edge of Flood Zone 2 and Flood Zone 3. Flood Zone 2 is defined as land that has a 1% to 0.1% annual probability of flooding, and a 0.5% to 0.1% annual probability of flooding from the sea). Flood Zone 3 is defined as land that has a 1% or greater annual probability of river flooding, or a 0.5% or greater annual probability of flooding from the sea. Flood Zones 2 and 3 are confined to the channel of Hermitage Stream to the east of the site [4].

18.5.15 The EA surface water flood mapping shows that surface water flood risk is very low (Figure 18.7 in Volume III).

### Eastney Long Sea Outfall

18.5.16 The Eastney LSO is located within the Solent water body (GB650705150000) (see Figure 18.1 in Volume III) and adjacent to the Isle of Wight East water body (GB650705530000). The Solent water body is heavily modified and at 'Moderate' ecological potential. Chemical status is 'Fail' due to high levels of some priority hazardous substances (mercury and its compounds and PBDEs). The Isle of Wight East water body is also heavily modified and at 'Good' ecological potential. Chemical status is also 'Fail' due to the same parameters recorded as failing in the Solent water body. Wastewater discharged via the LSO would disperse and could mix with several other transitional water bodies. These water bodies are listed in Table 18-6Table 18-6. All water bodies are heavily modified and at 'Moderate' ecological potential.

18.5.17 Water-dependent protected areas associated with each water body are listed in Appendix 18-2 Water Body dependent protected areas in Volume II. These are protected under a variety of international and national legislation for environmental, water quality, habitats and species conservation.

**Table 18-6: Water bodies potentially at risk associated with changes to the Eastney Long Sea Outfall discharge**

| Water body and type | ID and designation | Ecological status | Chemical Status |
|---|---|---|---|
| Portsmouth Harbour Transitional | GB580705140000 Heavily modified | Moderate ecological potential<br>Moderate angiosperms<br>Moderate macroalgae<br>Moderate dissolved inorganic nitrogen<br>Moderate or less mitigation measures assessment<br>Does not support good hydrological regime | Fail<br>Mercury and its compounds<br>PBDEs |

| Water body and type | ID and designation | Ecological status | Chemical Status |
|---|---|---|---|
| Southampton Water Transitional | GB520704202800 Heavily modified | Moderate ecological potential<br>Moderate dissolved inorganic nitrogen<br>Moderate or less mitigation measures assessment | Fail<br>Mercury and its compounds<br>Benzo(g-h-i)perylene<br>PBDEs |
| Chichester Harbour Transitional | GB580705210000 Heavily modified | Moderate ecological potential<br>Moderate dissolved inorganic nitrogen<br>Moderate or less mitigation measures assessment<br>Does not support good hydrological regime | Fail<br>Mercury and its compounds<br>PBDEs |

### Proposed Underground Pipeline between Budds Farm Wastewater Treatment Works and the proposed Water Recycling Plant

*Surface water*

18.5.18 This component of the Proposed Development is situated in the onshore coastal catchment that drains directly to Langstone Harbour (Figure 18.1 in Volume III), and the same surface water description applies as provided above for the site of the proposed WRP. The Proposed Underground Pipeline would be drilled under the seabed, meaning there is no influence on the channel. In addition to crossing below Hermitage Stream, the proposed underground pipeline also crosses below Brockhampton Stream (Main River), which is a tributary of Hermitage Stream.

*Groundwater*

18.5.19 The hydrogeological setting of this component of the Proposed Development is similar to that described for the site of the proposed WRP, except for the absence of superficial deposits. Geological mapping indicates that the Proposed Development is underlain by alluvium (clay, silt, sands and gravels) and river terrace deposits. River terrace deposits support a Secondary A aquifer (Figure 18.3 in Volume III). Groundwater within river terrace deposits is likely to be in hydraulic continuity with the Hermitage Stream, which transects the central part of the Proposed Development.

18.5.20 This component of the Proposed Development is located approximately 570m south of SPZ 1 (Figure 18.5 in Volume III).

18.5.21 Langstone Harbour is identified as a GWDTE in the study area.

18.5.22 This component of the Proposed Development is located in the East Hampshire CAMS area (Figure 18.9 in Volume III).

*Water bodies*

18.5.23 The water bodies baseline as described for the proposed WRP applies to the Proposed Underground Pipeline between Budds Farm WTW and the proposed WRP.

*Flood risk*

18.5.24 The majority of this component of the Proposed Development is situated in Flood Zone 1 and the rest is in Flood Zones 2 and 3 Budds Farm WTW is located in Flood Zones 2 and 3 (Figure 18.6 in Volume III).

18.5.25 The EA's surface water flood risk mapping shows that surface water flood risk is very low (Figure 18.7 in Volume III).

### Proposed Underground Pipeline between the proposed Water Recycling Plant and Havant Thicket Reservoir

*Surface water*

18.5.26 The Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir is situated in the catchment of Hermitage Stream, which rises near Horndean and is predominantly urban (Figure 18.1 in Volume III). Its course (mostly straight planform) and geomorphology are constrained by urban development and infrastructure for most of its length. Water quality is adversely affected by point source pollution from misconnections and physical modifications (e.g., flood protection structures) [383].

18.5.27 This component of the Proposed Development passes below Hermitage Stream and tributary sections of Main River immediately south of Bidbury Lane, and near Pulbrook Lane to Havant Thicket Reservoir.

*Groundwater*

18.5.28 Geological mapping indicates that this component of the Proposed Development is mainly underlain by head deposits (clay, silt, sands, and gravels), with river terrace deposits underlying the southern end of the Proposed Development. Head deposits support a Secondary (undifferentiated) aquifer (Figure 18.3 in Volume III). River terrace deposits support a Secondary A aquifer (Figure 18.4 in Volume III). Limited areas of alluvium and raised marine deposits are also present.

18.5.29 Bedrock primarily comprises the London Clay Formation with areas of Bagnor Sand Member in the central section of the Proposed Development. Lambeth Group and White Chalk Subgroup rocks are located beneath the southern end of the Proposed Development. The London Clay Formation is classed as a non-aquifer, whereas the Bagnor Sand Member and Lambeth Group are classed as a Secondary A aquifer. Chalk areas are classed as a Principal aquifer (Figure 18.4 in Volume III).

18.5.30 Most of this component of the Proposed Development is located within a SPZ 1 and 1c (Figure 18.5 in Volume III). SPZ 1c indicates the presence of a protective

geology cover (e.g. clay) within a SPZ 1. In these areas deep drilling could create pathways for pollutants to enter groundwater.

18.5.31 Groundwater within head deposits is likely to be in hydraulic continuity with Hermitage Stream. Groundwater quality is adversely affected by diffuse pollution from agriculture and flow issues (abstraction) [383].

18.5.32 Langstone Harbour is identified as a GWDTE in the study area. In addition, the priority habitat inventory (Natural England, 2022) indicates the presence of coastal and floodplain grazing marsh (a potential GWDTE) at the southern end of the Proposed Underground Pipeline.

18.5.33 Appendix 18-1 Preliminary hydrogeological impact assessment in Volume II provides further details on baseline groundwater conditions associated with this component of the Proposed Development.

18.5.34 The Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir is located in the East Hampshire CAMS area (Figure 18.9 in Volume III).

*Water bodies*

18.5.35 Over half of this component of the Proposed Development is located in the Hermitage Stream water body catchment (GB107042016370), the remainder being in the coastal catchment associated with Langstone Harbour (as described for the proposed WRP) (Figure 18.1 in Volume III). Hermitage Stream (classed as heavily modified) is at 'Moderate' ecological potential due to a 'Moderate' classification for invertebrates, phosphate, pH and mitigation measures assessment, and a Poor fish classification [383]. Chemical status is characterised as 'Fail' due to high levels of priority hazardous substances (mercury and its compounds, PBDE). The river water body also has several associated water-dependent protected areas (see Appendix 18.2 in Volume II).

18.5.36 This component of the Proposed Development is underlain by the East Hants Chalk (GB40701G502700) groundwater body and the South Hants Lambeth Group (GB40702G503700) groundwater body (Figure 18.2 in Volume III). The East Hants Chalk groundwater body is described for the proposed WRP. The South Hants Lambeth Group groundwater body is at 'Good' overall status and 'Good' for all classification elements, and also supports several water-dependent protected areas (see Appendix 18.2 in Volume II).

*Flood risk*

18.5.37 Most of this component of the Proposed Development is in Flood Zone 1, but intersects with Flood Zones 2 and 3 adjacent to the Hermitage Stream and Riders Lane Stream (Ordinary Watercourse) immediately north of the proposed WRP (Figure 18.6 in Volume III). The Proposed Underground Pipeline also passes through Flood Zones 2 and 3 where it follows an Ordinary Watercourse to Havant Thicket reservoir.

18.5.38 The EA's surface water flood mapping shows that surface water flood risk is mostly very low but increases to high adjacent to watercourses and where the route

follows the Ordinary Watercourse to Havant Thicket reservoir (Figure 18.7 in Volume III).

### Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

*Surface water*

18.5.39 Surface water drainage of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW is achieved by north-south flowing watercourses that rise on the South Downs and drain to the Solent in the east, and Southampton Water in the west (Figure 18.1 in Volume III). There are numerous Ordinary Watercourses across the Proposed Development, which will be discussed in more detail in the ES and included as part of the DCO application. The primary watercourses (Main Rivers) are Hermitage Stream (as described for the proposed WRP), Potwell Tributary, and Wallington River, River Meon, River Hamble and Moors Stream, and Horton Heath Stream, Bow Lake and the River Itchen. These are described in further detail below.

*Hermitage Stream*

18.5.40 As described in the section for the Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir.

*Potwell Tributary*

18.5.41 The watercourse has a gently sinuous planform and flows through a mostly rural catchment. The channel is impounded near Southwick by Southwick Park Lake. Water quality is adversely affected by point source and diffuse pollution, and physical modifications (barriers) [383].

*Wallington River*

18.5.42 This watercourse has a gently sinuous planform with little evidence of artificial straightening. Water quality in the catchment is adversely affected by point source and diffuse pollution, physical modifications and flow issues (abstraction) [383].

*River Meon*

18.5.43 The River Meon is a chalk stream and the whole river has received protection under the HCC designation ‘SINC’. The river has a meandering planform with little evidence of engineering works (straightening). Water quality is generally good although there are issues associated with flows (due to abstraction) and a risk of phosphate deterioration [383].

*River Hamble*

18.5.44 The River Hamble has a gently sinuous planform, although there is an area of multi-thread channel (some of which appears straight and artificial) just downstream of where the preferred pipeline corridor crosses the Main River. The

Upper Hamble has several straight sections which are indicative of historical resectioning. The preferred pipeline corridor also crosses several Ordinary Watercourses at Meon Valley Golf Course. Water quality is adversely affected by point source and diffuse pollution, physical modifications and a deterioration in dissolved oxygen levels [383].

*Horton Heath Stream, Bow Lake, River Itchen, Itchen Navigation*

18.5.45 In the Highbridge-Otterbourne area the preferred pipeline corridor crosses several Main Rivers. These are Horton Heath Stream, Bow Lake, River Itchen and the Itchen Navigation. Horton Heath Stream and Bow Lake all have straight planforms that have probably been engineered. The Itchen is a chalk stream and designated as a SSSI and SAC along its course. At both crossing options the channel has a meandering planform.

18.5.46 Water quality in the Itchen is generally good although there are issues associated with physical modifications that affect the hydrological regime, and high levels of some pollutants [119]. Water quality is generally good in Horton Heath Stream and but there are issues with diffuse pollution, physical modifications and abstraction in Bow Lake's catchment [383].

*Groundwater*

18.5.47 For ease of reference this section has been split into shorter summary sections, as presented below.

*Proposed Water Recycling Plant to Land West of London Road (A3)*

18.5.48 Geological mapping indicates that the Proposed Development between the proposed WRP and land west of London Road (A3) crosses rocks associated with the White Chalk Subgroup, Lambeth Group, London Clay Formation (Thames Group) and Wittering Formation (Bracklesham Group). These rocks support Principal and Secondary A aquifers (Figure 18.4 in Volume III), except for the London Clay Formation, which is classed as a non-aquifer. Localised superficial head deposits support Secondary (undifferentiated) aquifers. Approximately half of the northern pipeline corridor option and only the northern end of the southern corridor option crosses the SPZ 1c (Figure 18.5 in Volume III). The Langstone Harbour SSSI, also a GWDTE, is located approximately 400m south of the south-eastern end of the preferred corridor. Three licenced groundwater abstractions are located within the study area and are from Bedhampton and Havant Springs.

*Land West of London Road (A3) to A32 road*

18.5.49 The Proposed Development from the land west of London Road (A3) to A32 road is underlain by White Chalk Subgroup rocks, which support a Principal aquifer (Figure 18.4 in Volume III). The Proposed Development crosses the Lambeth Group rocks (supporting Secondary A aquifers) and London Clay Formation (non-productive strata) in northern areas (Figure 18.4 in Volume III). The Proposed Development is intersected by narrow strips of head deposits over much of its course, which support Secondary (undifferentiated) aquifers (Figure 18.3 in Volume III). Where the Proposed Development crosses the Wallington River, it is

underlain by river terrace deposits and alluvium, which support a Secondary A aquifer. The northern section of the Proposed Development is classed as unproductive and of low groundwater vulnerability, whereas the southern area is medium to high vulnerability.

18.5.50 At the north-eastern end of the Proposed Development small areas fall within a SPZ 1c (Figure 18.5 in Volume III). Another catchment of a public abstraction overlaps the western end of this pipeline section. The area where the Wallington River is crossed also falls within an outer source protection zone (SPZ 2). The SPZ 2 extent is based on a 400-day pollutant travel time to source, with a minimum extent of a 250 or 500 metres radius around the source, depending on the amount of water taken.

18.5.51 The western end of the Proposed Development falls within a SPZ 2c (outer zone with protective cover (e.g. clay)) and SPZ 3 (defined as a total catchment) (Figure 18.5 in Volume III). The total catchment is the area around a supply source needed to support long-term groundwater recharge of the protected yield. All groundwater within this zone potentially feeds into the abstraction. An inner zone (SPZ 1) is located approximately 100m to the south of the preferred pipeline corridor.

18.5.52 The priority habitat inventory [389] indicates the presence of coastal and floodplain grazing marsh (a potential GWDTE) in the Wallington River area.

18.5.53 Groundwater quality in this area is adversely affected by diffuse pollution from agriculture and flow issues (abstraction) [383].

*A32 Road to Shirrell Heath*

18.5.54 The Proposed Development between the A32 Road to Shirrel Heath is underlain by the White Chalk Sub Group, Lambeth Group, London Clay Formation, Wittering Formation, Earnley Sand Formation and Whitecliff Sand Member rocks. These strata support a Principal and Secondary A aquifer (Figure 18.4 in Volume III). London Clay deposits are non-productive strata. The Principal aquifer is located mainly east of the Meon Valley. The preferred pipeline corridor crosses superficial deposits (river terrace deposits and head deposits) classified as Secondary A and Secondary (undifferentiated) aquifers (Figure 18.3 in Volume III). Groundwater vulnerability ranges from unproductive to high, with low to medium vulnerability in areas of Secondary aquifers and high in the area of the Principal aquifer. At its eastern end a small area of the preferred pipeline corridor is within an SPZ (total catchment Zone 3) (Figure 18.5 in Volume III). Groundwater quality is adversely affected by point source pollution [383].

*Shirrell Heath to Bishop's Waltham*

18.5.55 Northern areas of the Proposed Development (and some sections to the south) are underlain by unproductive strata of the London Clay Formation (Thames Group rocks). Some southern sections are underlain by Whitecliff Sand Member or Wittering Formation rocks, which support a Secondary A aquifer (Figure 18.4 in Volume III). Short sections are underlain by superficial deposits, comprising head deposits in the central area of the preferred pipeline corridor, and river terrace deposits and alluvium associated with the River Hamble in the northern part of the preferred pipeline corridor. These deposits support Secondary A and

undifferentiated aquifers. Secondary aquifers have medium groundwater vulnerability. The Proposed Development does not cross any SPZs. Groundwater quality is adversely affected by point source pollution from landfill leaching [383].

*Bishop's Waltham to Otterbourne*

18.5.56 Most of this area is underlain by the London Clay Formation of Thames Group rocks. Near Bishop's Waltham, the Proposed Development encroaches onto Lambeth Group and White Chalk Subgroup rocks. Over most of the Proposed Development these rocks are unproductive in terms of groundwater, but there is a small area at Otterbourne where a Principal and Secondary A aquifer are crossed (Figure 18.4 in Volume III). These are highlighted as of medium to high groundwater vulnerability. There are also very small areas of a Secondary A aquifer within the Proposed Development, beside the B2177 near Lower Upham, and at Durley Street.

18.5.57 The only mapped superficial deposits that underlie the Proposed Development are located in the Itchen valley, in the Highbridge-Otterbourne area (river terrace deposits (sand and gravel) and alluvium (sand, silt, clay)). These deposits support a Secondary A aquifer and a very small section of Secondary (undifferentiated) aquifer (Figure 18.4 and Figure 18.3 in Volume III) – they are classed as either unproductive or low to medium – low groundwater vulnerability.

18.5.58 North of Durley Street, the Proposed Development crosses inner (1c) and outer (2c) areas of a SPZ (Figure 18.5 in Volume III). In the Itchen valley (between Highbridge and Otterbourne) the Proposed Development falls within the inner zone (1, 1c) of a SPZ. Between Highbridge and Crowdhill, the Proposed Development also crosses into an outer zone (2c) SPZ. These SPZs are most likely associated with abstraction from the underlying chalk aquifer.

18.5.59 The priority habitat inventory indicates the presence of coastal and floodplain grazing marshes (potential GWDTEs) to the north of Durley Street, to the north of Crowdhill and at the western end of the Proposed Development between the River Itchen and Otterbourne.

18.5.60 Groundwater quality is adversely affected by point source and diffuse pollution within the Bow Lake's catchment. Water quality is generally good in the Itchen and Horton Heath Stream catchments [383].

18.5.61 The Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW is located in two CAMS areas. The area from Havant Thicket Reservoir to just west of Horton Heath Stream is located in the East Hampshire CAMS area (Figure 18.9 in Volume III). The area from near Horton Heath Stream to Otterbourne WSW is in the test and Itchen CAMS area.

*Water bodies*

18.5.62 The Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW is located in the following surface water catchments (Figure 18.1 in Volume III):

- Hermitage Stream (GB107042016370)
- Coastal catchment associate with Langstone Harbour (GB580705130000)

- Potwell Tributary (GB107042016400)
- Wallington below Southwick (GB107042016360)
- Meon (GB107042016640)
- Coastal catchment associated with Southampton Water (GB520704202800)
- Moors Stream (GB107042016260)
- Main River Hamble (GB107042016250)
- Upper Hamble (GB107042016250)
- Horton Heath Stream (GB107042016270)
- Bow Lake (GB107042016650)
- Itchen (GB107042022580)
- Itchen Navigation (GB70710008)

18.5.63 The majority of water bodies are at 'Moderate' ecological status or potential. The exceptions at 'Good' ecological status or potential are the Meon, Moors Stream, Itchen and Itchen Navigation. The exception, at 'Bad' status, is Bow Lake.

18.5.64 Pressures affecting water bodies that are preventing them reaching a 'Good' ecological status/potential include point source and diffuse pollution, physical modifications and abstraction. All water bodies are at 'Fail' for chemical status due to high levels of some priority hazardous substances (typically mercury and its compounds, PBDE and perfluorooctane sulphonate (PFOS)).

18.5.65 Water-dependent protected areas associated with the water bodies crossed by this component of the Proposed Development are listed in Appendix 18.2 in Volume II.

18.5.66 This section of the Proposed Development is located in the following groundwater catchments (Figure 18.2 in Volume III):

- East Hants Chalk (GB40701G502700)
- South Hants Lambeth Group (GB40702G503700)
- South East Hants Bracklesham Group (GB40702G503000)
- East Hants Lambeth Group (GB40702G500800)
- Central Hants Lambeth Group (GB40702G503800)
- River Itchen Chalk (GB40701G505000)

18.5.67 The South Hants Lambeth Group, East Hants Lambeth Group, and Central Hants Lambeth Group groundwater bodies are at 'Good' overall status. The remainder are at 'Poor' overall status. Pressures affecting groundwater bodies that are preventing them reaching a 'Good' overall status include diffuse and point source pollution and abstraction.

18.5.68 Protected areas associated with the groundwater bodies located within this section of the Proposed Development are listed in Appendix 18.2 in Volume II.

*Flood risk*

18.5.69 This section of the Proposed Development is largely located in Flood Zone 1 (Figure 18.6 in Volume III). Key areas of flood risk (Flood Zones 2 and 3) are located where the preferred pipeline corridor crosses the following watercourses:

- Wallington River (in three locations: north of Boarhunt Mill, south of Bere Farm, west of Whitedell Farm
- River Meon (south of Wickham)
- River Hamble (adjacent to the B3035 road)
- Bow Lake (north of Crowdhill)
- River Itchen (flood risk is complex in this area and preferred pipeline corridor crosses multiple areas of mainly Flood Zone 3)

18.5.70 Except for the River Itchen, the above areas of flood risk are restricted to relatively narrow areas of mainly Flood Zone 3. The Itchen floodplain is relatively wide and flood risk is characterised by several areas of Flood Zone 3 associated with the River Itchen, Rosemary Leat and an Ordinary Watercourse that rises near Otterbourne.

18.5.71 Surface water flood risk is generally very low across along the route of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. Key areas of increased risk (medium to high) are located in the following places (Figure 18.7 in Volume III):

- Flow paths associated with Ordinary Watercourses draining north to northwest between Widley and Boarhunt
- Flow paths associated with Ordinary Watercourses draining south to southwest near North Boarhunt
- Flow paths on the slopes of the Meon valley and associated with the Ordinary Watercourse south of Shedfield
- Flow paths in the Lower Upham and Durley Street areas
- Flow paths in Bow Lake's valley and adjacent to the Itchen in the Highbridge and Otterbourne areas

18.5.72 Land is at risk of flooding from a reservoir or dam failure under dry-day and wet-day scenarios in the following locations (Figure 18.8 in Volume III):

- Where the preferred pipeline corridor crosses the Wallington River ('dry-day' and 'wet-day' scenarios)
- Where the preferred pipeline corridor crosses Bow Lake (dry-day and wet-day scenarios)

18.5.73 The dry-day scenario predicts flooding that would occur if a dam or reservoir failed when rivers are at normal levels. The wet-day scenario predicts how much worse the flooding might be if a river is already experiencing an extreme natural flood.

### Use of Havant Thicket Reservoir for the storage of recycled water

#### *Surface water*

18.5.74 Surface water drainage at the site of the Havant Thicket Reservoir is achieved by several headwater Ordinary Watercourses that flow from north to south from the ridge to the north, centred on Horsefoot Hill (Figure 18.1 in Volume III). One of these channels feeds a small lake (Upper Lake) which is part of Staunton Country Park. The headwater channels join near Thicket Bottom to form a single

watercourse (Riders Lane Stream) that flows south through Havant before joining Hermitage Stream. At the western side of the consented reservoir site, at Bell's Copse, several Ordinary Watercourses drain from east to west to join Park Lane Stream, another tributary of Hermitage Stream. The eastern side of Havant Thicket is drained by Durrants Stream, a tributary of the River Lavant.

18.5.75 The construction of the consented Havant Thicket Reservoir will change the current baseline by intercepting the small Ordinary Watercourses that currently flow across the site and creating a new body of open water on Havant Thicket. The new reservoir has been designed to maintain flows in Riders Lane Stream, and the watercourse will not be directly altered downstream of the new embankment and associated discharge infrastructure. The effects associated with the construction of the reservoir have been subject to a separate assessment.

*Groundwater*

18.5.76 Superficial geological deposits are head (clay, silt, sand and gravel). Construction of the consented Havant Thicket Reservoir may alter current baseline ground conditions through earthworks by potentially removing soils and introducing made ground (e.g. reworked site won materials or imported engineering fill). Solid geology underlying the reservoir site is characterised by rocks of London Clay Formation, Bognor Sand Member and Lambeth Group. The London Clay Formation is classed as a non-aquifer, whereas the Bognor Sand Member and Lambeth Group are classed as Secondary A aquifers (Figure 18.3 and Figure 18.4 in Volume III).

18.5.77 All of the Havant Thicket Reservoir site is located in a SPZ 1c (Figure 18.5 in Volume III). Groundwater within head deposits is likely to be in hydraulic continuity with the Ordinary Watercourses at the site of Havant Thicket Reservoir. The northern area is located in Bedhampton and Havant Springs groundwater Drinking Water Safeguard Zone. The construction of the consented Havant Thicket Reservoir may locally alter current baseline groundwater conditions.

18.5.78 The effects associated with the construction of the consented Havant Thicket Reservoir have been subject to separate assessments.

18.5.79 The site of Havant Thicket Reservoir is located in the East Hampshire CAMS area (Figure 18.9 in Volume III).

*Water bodies*

18.5.80 The majority of the site of Havant Thicket Reservoir is located in the Hermitage Stream water body catchment, as described for the Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir (Figure 18.1 in Volume III).

18.5.81 Very small areas of the site of Havant Thicket Reservoir cross into the Lavant (Hants) (GB107042016420) river water body catchment. The water body is not designated artificial or heavily modified and is at 'Poor' ecological status. Poor status is due to a 'Poor' classification for fish, which are being adversely affected by physical modifications associated with urban development and barriers

(ecological discontinuity). Chemical status is classified as 'Fail' due to high levels of some priority hazardous substances (mercury and its compounds, PBDE).

18.5.82 The Lavant (Hants) water body has three associated water-dependent protected areas, which are listed in Appendix 18.2 in Volume II.

18.5.83 Northern areas of the site of Havant Thicket Reservoir are underlain by the East Hants Lambeth Group (GB40702G500800) groundwater body. The groundwater body is at 'Good' overall status and has 'Good' classifications for quantitative and chemical status. Water-dependent protected areas associated with the groundwater body are listed in Appendix 18.2 in Volume II.

*Flood risk*

18.5.84 Nearly all of the site of Havant Thicket Reservoir is located in Flood Zone 1 (Figure 18.6 in Volume III). Havant Thicket Reservoir encroaches into small areas of Flood Zones 2 and 3 in three locations:

- South of Thicket Bottom where an Ordinary Watercourse flows south to Havant
- At Durrants, west of Durrants Road, where an Ordinary Watercourse flows in a south easterly direction
- At Bell's Copse, where an Ordinary Watercourse flows south towards Leigh Park

18.5.85 Surface water flood risk is very low apart from several narrow high risk flow paths associated with Ordinary Watercourses described in the surface water and flood risk sections (Figure 18.7 in Volume III).

### Proposed Above Ground Plant and use of existing infrastructure

18.5.86 All proposed AGP will be located along the Preferred Pipeline Corridor. Therefore, the previous baseline descriptions apply.

## 18.6 Scoping of potential effects

18.6.1 The Proposed Development has the potential to affect the water environment, both during construction and operation.

18.6.2 Effects from decommissioning of the Proposed Development are considered to be no greater than those identified during the construction phase and are therefore assessed as construction effects as a realistic worst case scenario. Please refer to Chapter 3 Description of the Proposed Development, section 3.7 for further information on decommissioning.

### Effects scoped into the assessment

*Construction effects*

*Direct disturbance of surface and groundwaters*

18.6.3 Construction activities could have a direct effect on the geomorphology, hydrology, water quality and physical habitats of the surface water bodies identified. There

could also be direct effects on other hydraulically linked surface water features, with potential for direct effects on the biological, chemical and physical parameters for both surface waters and groundwater bodies.

18.6.4 Disturbance could occur from the installation of underground pipelines and associated infrastructure (e.g. temporary access crossings over surface watercourses), or installation of piled foundations associated with proposed AGP structures. Direct disturbance could also occur as a result of dewatering activities and washouts, or below ground activities, which could result in increased water turbidity, impacting water quality.

*Surface water quality – Increased sediment supply to surface waters*

18.6.5 Construction activities in water body catchments could increase soil erosion and the supply of fine sediment (e.g. clays, fine silts and sands) to surface watercourses. This could arise from earthworks and vegetation removal to install the Proposed Underground Pipelines, and washouts following drilling activities. Increased sediment supply would increase turbidity levels within the water column, resulting in greater fine sediment deposition on the channel bed. This could, in turn, alter geomorphological adjustment rates locally and in hydrologically connected (downstream) water bodies. This could impact upon in-channel morphological features. Higher sediment loads entering the channel could also smother bed habitats, reduce light penetration, and decrease temperature and dissolved oxygen levels.

18.6.6 These impacts could adversely affect stream biota, such as fish, macroinvertebrates and macrophytes. These effects will be assessed in detail in a separate WER compliance assessment, and in Chapter 8 Terrestrial and freshwater biodiversity and Chapter 9 Marine biodiversity.

*Surface and groundwater quality – release of pollutants to surface and groundwaters*

18.6.7 The operation of construction machinery in or adjacent to surface watercourses has the potential for accidental release of lubricants, fuels and oils into the surface water body or on to the ground, where pollutants could migrate into underlying groundwater. This could also be caused by spillage, leakage and in-wash from vehicle storage areas following rainfall, accidental release of foul waters (e.g., from welfare facilities) and construction materials, such as concrete, grout and inert drilling fluids from trenchless crossings, washouts or tunnelling. Such pollutants could enter the aquatic system and adversely affect its physical and chemical properties. This could have associated impacts upon stream biota.

18.6.8 Any activities that disturb the ground, such as excavation, tunnelling or piling, could mobilise contaminants within soils or groundwater, and potentially adversely affect groundwater quality or locally alter the hydraulic properties of the aquifer, which in turn would impact groundwater-dependent features such as abstraction points or GWDTEs.

18.6.9 Ground disturbance could also adversely affect the water quality of water supply boreholes located close to the Proposed Development. This is assessed in Chapter 11 Land quality and ground conditions of this Scoping Report. It could also

occur in the event of an accidental release of drilling fluid (bentonite) during horizontal directional drilling activities used to construct pipelines below sensitive watercourses. The impact assessment of these activities will be considered in this chapter.

*Changes to surface and groundwater flows and flood risk*

18.6.10 Proposed Development preparation and construction activities could lead to an increase in surface water runoff due to alterations in surface drainage patterns and surface flows. Infiltration rates could be reduced because of soil compaction by construction vehicles and surface infrastructure. Increased surface runoff could have an adverse impact on the geomorphology of surface watercourses (e.g. through associated bed and bank scour and increase in fine sediment input).

18.6.11 Flood risk could also be potentially altered particularly in the study areas designated as Flood Zone 2 or 3. Subsurface flow patterns could also be altered due to potential changes in infiltration rates and/or surface flow patterns.

18.6.12 Groundwater flows and levels may also be impacted by temporary physical modifications (e.g. excavations, tunnelling or infilling followed by compaction), which would interrupt the natural groundwater flow pathways. The other potential risks to groundwater associated with excavations and/or tunnel construction include temporary dewatering, if required, for tunnel, shafts or pipeline construction diverting water away from groundwater-dependent receptors, or bypassing part of the system, leading to reduced groundwater flow. Dewatering could also cause drawdown of the local water table resulting in reduced groundwater levels, which would also impact groundwater-dependent features within the ZoI.

18.6.13 Construction of tunnel sections and partially buried structures below the maximum groundwater level in the Chalk could create a permanent barrier to groundwater flow. This could lead to a rise in groundwater levels on the upstream side, which could cause additional groundwater flooding, and a reduction of groundwater levels on the downstream side. This could potentially permanently affect groundwater-dependent features located in the vicinity of the Proposed Development.

18.6.14 The installation of the tunnels could also result in creating a permanent connection between two currently hydraulically disconnected aquifers. This could impact the quality of groundwater and consequently any groundwater-dependent features like water supplies and GWDTEs.

*Operational effects*

*Surface and groundwater quality – release of pollutants to surface and groundwaters*

18.6.15 There is the potential for accidental release of pollutants to surface water or groundwater during planned and unplanned operational maintenance. Activities could lead to the accidental release of fine sediment, treatment chemicals, oils, fuels or lubricants. There could also be emergency drainage, spillage and accidents associated with the above ground infrastructure of the Proposed Development. This could adversely affect the geomorphology and water quality of

the surface water drainage network, as well as groundwater. This in turn could impact on aquatic ecology and the use of water resources for abstractions.

*Surface and groundwater quality due to washouts and pipeline leaks*

18.6.16 Washouts are expected to be located at topographical low points along the Proposed Underground Pipeline to facilitate commissioning and emptying treated water from a section of pipes for repair and maintenance with the aim to clean out any sediments in the pipe. Usage frequencies for washouts are expected to be minimal, used in the event of an emergency or when a section of the pipe needs to be drained to facilitate replacement of a section or fitting. Sediments from washouts could smother habitats in the receiving watercourses and washout water may differ in its chemistry from that in the receiving watercourses. Flood risk and the hydrology and geomorphology of receiving watercourses could also be affected.

18.6.17 Leaks or accidental spillage of clean treated water from the pipeline or associated infrastructure (e.g., resulting from failure or accidental damage) could also affect flood risk, surface water hydrology, geomorphology and chemistry, particularly if these leaks are large or long term. Sensitive Chalk rivers such as the Itchen and Meon are likely to be particularly susceptible to changes in water chemistry, although any changes are not likely to be sufficient to result in significant ecological responses.

*Impacts on water quality in Havant Thicket Reservoir and receiving watercourses*

18.6.18 Details of the treatment process to turn wastewater into purified recycled water can be found in Chapter 3 Description of the Proposed Development.

18.6.19 The majority of water within Havant Thicket Reservoir will be groundwater pumped from Bedhampton Springs Chalk aquifer, which will be augmented with purified recycled water from the proposed WRP. The Proposed Development comprises the use of the Havant Thicket Reservoir for the storage of recycled water, before transfer to Otterbourne WSW.

18.6.20 If the proportion of spring water to purified recycled water in the reservoir changes (if the chalk aquifer becomes less productive due to climate change over long timescales, for example), this could also have an impact on water quality in downstream receiving watercourses (as any discharges are made up of more purified recycled water and less spring water).

*Changes to surface flows, recharge of aquifers and flood risk*

18.6.21 Permanent above ground infrastructure is likely to increase the impermeable area across surface water catchments. This could decrease infiltration rates and permanently change surface runoff pathways, which may increase and/or alter flood risk. The greatest flood risk impact from these changes is likely to be within the Proposed Development designated as Flood Zone 2 or 3 (see study area description (section 18.4) and Figure 18.6 in Volume III). This could also impact recharge rate of the underlying aquifers. Small volumes of water from washouts are unlikely to affect flood risk.

*Changes to surface waters associated with changes to the existing discharge at Eastney LSO*

18.6.22 There is the potential that changes to Budds Farm WTW discharge at Eastney LSO could affect compliance with Environmental Quality Standards (EQS) by discharging new substances that have not been previously assessed as part of the permitting process associated with the Budds Farm WTW discharge. Removal of some of the sewage effluent flow could also alter existing effects on sanitary parameters such as BOD and SSCs.

### Effects scoped out of the assessment

*Construction effects*

18.6.23 No construction effects have been scoped out of the assessment.

*Operational effects*

*Direct disturbance of surface and groundwaters*

18.6.24 The activities associated with operation of the Proposed Development will not result in direct disturbance of surface water or groundwater bodies. The required infrastructure will be in place and therefore no significant intrusive works will be necessary. Any routine intrusive maintenance work will be small scale and localised e.g. associated with limited localised excavation to allow repairs to subsurface infrastructure. The small spatial extent and limited duration of likely future maintenance activities means that significant effects on surface water catchments and underlying groundwaters are considered to be unlikely.

*Increased sediment supply*

18.6.25 Routine or unplanned maintenance work will likely be very infrequent and limited to discreet areas of the Proposed Development. Best practice mitigation measures for preventing and limiting soil erosion and turbid runoff will be in place. Any limited increase in fine sediment is considered in the operational effect of the supply of contaminants to surface and groundwaters, described above.

*Changes to groundwater flow*

18.6.26 The likely significant permanent effects of the presence of underground infrastructure on groundwater flows will be assessed as part of the construction phase assessments when these elements of the Proposed Development would be introduced. Once constructed, the underground infrastructure will not have any further likely significant effect on groundwater flows to those assessed during the construction phase, and therefore it can be scoped out from assessment as part of the EIA.

## 18.7 Approach to assessment

### Additional baseline data collection

18.7.1 The EIA and supporting assessments will be informed by desk studies, surveys and intrusive ground investigations, as detailed below.

*Desk study*

18.7.2 The assessment will be informed by a baseline desk study using publicly available data, including the sources listed in Table 18-5.Table 18-5 Data requests have been made to the EA and local authorities for further information to support the EIA.

*Additional data collection*

18.7.3 A geomorphology baseline survey will be undertaken to inform the ES and be included as part of the DCO application. It will acquire primary data on the watercourses and water bodies potentially impacted by the Proposed Development. This will be undertaken in accordance with best practice geomorphological walkover methodologies. The Applicant will engage with the stakeholders included in the Water EIA Working Group in advance of undertaking the survey on the proposed method and scope of the survey (as discussed in section 18.3).

18.7.4 The geomorphology baseline survey will focus on river reaches where crossings of Main Rivers or other sensitive watercourses are proposed.

18.7.5 The following best-practice guidance for geomorphological characterisation and monitoring will be followed:

- EA (2003) River Habitat Survey in Britain and Ireland: Field Survey Guidance Manual [390]
- EA (2007) Geomorphological Monitoring Guidelines for River Restoration Schemes [391]
- River Restoration Centre (2011) Practical River Restoration Appraisal Guidance for Monitoring Option [392]

18.7.6 Following these best-practice documents, a visual inspection will be undertaken on each watercourse. The main characteristics of each watercourse will be carefully recorded from the bank and include detailed photographs and locations of key features using GPS. The following parameters will be recorded to characterise the baseline geomorphology of each watercourse:

- Channel form, including planform, width and depth variation, bank form and condition, substrate types and the type and presence of bed forms such as pools, riffles and bars
- Flow conditions, including dominant flow types and the degree of variability within each reach
- Floodplain characteristics, including connectivity to the river channel, and the structure of the riparian zone

- In-channel/riparian vegetation, cross-checked against the results of ecological surveys
- Evidence of channel modification, including enlargement and re-sectioning, artificial bank protection, embankments and in-channel structures

18.7.7 The survey will aim to identify any visual watercourse contamination (e.g. excessive sedimentation/smothering, hydrocarbons, sewage fungus, discoloration), as well as any operating discharges/pipes (e.g. septic tank outflows). This would help to identify any evidence of contamination or local sources of pollution.

18.7.8 Targeted ground investigations and groundwater level monitoring for the Proposed Development has already commenced, which will allow for verification of ground conditions as well as the collection of data on groundwater levels and quality. Groundwater level monitoring will be undertaken in purpose-constructed monitoring wells in locations of the proposed shafts, tunnel sections and sensitive river crossings, with selected wells installed with automatic water level data loggers. Monitoring will be undertaken for a minimum 6-month period. Engagement with the EA is ongoing and will continue throughout the duration of the ground investigation works. For the limitations and assumptions associated with the data gathered through ground investigations, please refer to section 18.8.

18.7.9 A site-specific marine water quality survey will also be carried out in the location of the Eastney LSO discharge to determine the baseline environment condition. This is likely to consist of water column profiles at four sites for parameters contributing to WER classification status for both chemical and ecological status.

### Assessment methodology

18.7.10 The methodology for assessing effects will be based on the principle that the environmental effects of the Proposed Development, in relation to surface water and groundwater receptors, should be determined by identifying the potential receptors, assigning receptor value, assessing the magnitude of change the Proposed Development would have on the resource's significance (where significance is defined as the attributes that give the resource its value) and then combining these two elements to identify the likely significance of the effect. The assessment will consider each of the Proposed Development components and also assess the project as a whole together for the ES when the full assessment is undertaken.

18.7.11 With respect to changes to the existing discharge at the Eastney LSO, the modelling carried out in 2022 for parameters COD, BOD, SSC, iron, total nitrogen and salinity will be updated to reflect the updated WRP flows. The output will be presented in the ES and included as part of the DCO application.

18.7.12 Work is also currently ongoing regarding the permitting assessment associated with the LSO which considers the screening tests as required by EA guidance [393] to identify any potential hazardous chemicals and elements associated with the new WRP wastewater discharge. Following the output of this assessment, modelling will be updated to include any chemical parameters that are screened in via this process. For priority hazardous substances, the annual limit will also be assessed against significant load limits, also outlined in this guidance. The output

of the screening assessment and associated modelling (if required) will be presented within the ES as well as within the documents prepared to support permit applications.

*Types of receptors*

18.7.13 Within the water resources and flood risk topic, there are four types of receptors that will be assessed as part of the EIA. Selection of these receptors is based on WER requirements, the National Policy Statement, NPPF [5] and Planning Practice Guidance (flood risk). Receptors are listed below alongside the characteristics of each receptor type that will be considered in the assessment:

- Surface water features (including rivers, canals, lakes, reservoirs, estuarine and coastal waters): The hydrology, geomorphology and water quality of surface waters (e.g. rivers, canals, lakes and reservoirs) and water-dependent habitats, including designated sites (e.g. SAC, SPA, SSSI).
- Groundwater features: The flows, quantity and quality of groundwater resources and groundwater-dependent habitats, including designated sites (e.g. SAC, SPA, SSSI).
- Surface and groundwater resources: Water resources, including abstractions from surface and groundwaters (e.g. Principal, Secondary A and Secondary Undifferentiated aquifers) and associated designated sites (e.g. Source Protection Zones, Drinking Water Protected Areas (DrWPA)) and water supply infrastructure (including Havant Thicket reservoir, treatment plants, pumping stations and distribution networks) and surface and foul drainage infrastructure.
- Flood risk to and from the Proposed Development: Flood risk to the Proposed Development from all sources, including fluvial, coastal, surface water, groundwater, sewer and reservoir flooding, and changes in flood risk from all sources (fluvial, coastal, surface water, groundwater, sewer and reservoir flooding) as a result of the Proposed Development.

*Sensitivity of receptors*

18.7.14 For each likely effect, the assessment will identify receptors sensitive to that likely effect and implement a systematic approach to understanding the impact pathways, the sensitivity of the receptor and the magnitude of impacts on given receptors.

18.7.15 Definitions of sensitivity for the purposes of water receptors and flood risk are described in Table 18-7 using a standard scale set out in Chapter 5 General EIA approach and methodology. These have been developed using professional judgement and adopt the definitions, where applicable, provided in the DMRB standard for assessment of effects on water environment from road schemes. This standard sets out a well-established framework for EIA that is approved by regulators and is widely applied by the industry with respect to infrastructure projects (linear in nature, however the guidance is also applicable to their non-linear elements). As the Proposed Development is an infrastructure project of similar nature to a road scheme comprising linear and non-linear elements, the type and scale of impacts with respect to construction activities and principles of assessments are similar and therefore considered applicable.

18.7.16 The sensitivity of a receptor is dependent on its capacity to tolerate changes to hydrology, geomorphology, water quality or flood risk and its potential for substitution. It takes account of water resources which support human health and/or economic activity, water-dependant ecosystems and the vulnerability of the receptors to flooding.

Table 18-7: Definition of terms relating to receptor sensitivity

| Sensitivity | Summary |
|---|---|
| High | Receptor has no or very limited capacity to tolerate changes to hydrology, geomorphology, water quality or flood risk and has little potential for substitution. Includes water resources which support human health and/or economic activity at a regional scale, or receptors with a high vulnerability to flooding.<br><br>**Water resources**<br>Controlled waters with an unmodified, naturally diverse hydrological regime, a naturally diverse geomorphology with no barriers to the operation of natural processes, and good water quality.<br>Supports habitats or species that are highly sensitive to changes in surface hydrology, geomorphology, water quality or groundwater flow and level.<br>Supports Principal aquifer with public water supply abstractions by provision of recharge<br>Principal aquifer providing a regionally important resource and/or supporting GWDTE, a site protected under UK legislation Ecology and Nature Conservation<br>Proposed Development is within Inner or Outer Source Protection Zones (i.e. SPZ 1 or SPZ 2)<br>National (SSSI, NNR or equivalent) or international level (SPA, SAC or Ramsar). This includes WER protected areas (e.g., DrWPA)<br><br>**Flood risk**<br>Highly Vulnerable Land Use, as defined by NPPF [5], Planning Practice Guidance (PPG) [51], Ministry of Housing, Communities and Local Government [352]<br>Land with more than 100 residential properties (after DMRB [361]) |
| Medium | Receptor has limited capacity to tolerate changes to hydrology, geomorphology, water quality or flood risk. Water resources which support human health and/or economic activity at a local scale. Receptors with a moderate vulnerability to flooding.<br><br>**Water resources**<br>Controlled waters with hydrology that sustains natural variations, geomorphology that sustains natural processes, and water quality that is not contaminated to the extent that habitat quality is constrained<br>Supports or contributes to habitats or species that are sensitive to changes in surface hydrology, geomorphology, water quality and/or groundwater flow and level.<br>Supports Secondary A or Secondary B aquifer with water supply abstractions.<br>Proposed Development is within a Catchment Source Protection Zone (i.e. SPZ 3)<br><br>**Flood risk**<br>More Vulnerable Land Use, as defined by NPPF [5]<br>Land with between 1 and 100 residential properties or more than 10 industrial premises [361] |
| Low | Receptor has moderate capacity to tolerate changes to hydrology, geomorphology, water quality or flood risk. Water resources that support human health and/or economic activity at a neighbourhood (multiple property) scale. Receptors with a low vulnerability to flooding. |

| Sensitivity | Summary |
|---|---|
| | **Water resources**<br>Controlled waters with hydrology that supports limited natural variations, geomorphology that supports limited natural processes, and water quality that may constrain some ecological communities<br>Supports or contributes to habitats that are not sensitive to changes in surface hydrology, geomorphology or water quality<br>Supports Secondary A or Secondary B aquifer without abstractions<br>Not designated but may contain habitats or populations/assemblages of species that appreciably enrich the local habitat resource (e.g., species rich hedgerows, ponds)<br><br>**Flood risk**<br>Less Vulnerable Land Use, as defined by NPPF [5]<br>Land with 10 or fewer industrial properties [361] |
| Very Low | Receptor is generally tolerant of changes to hydrology, geomorphology, water quality or flood risk. Water resource that supports human health and/or economic activity at a single property scale. Receptors with a very low vulnerability to flooding.<br><br>**Water resources**<br>Controlled waters with hydrology that does not support natural variations, geomorphology that does not support natural processes, and water quality that constrains ecological communities<br>Aquatic or water-dependent habitats and/or species are tolerant to changes in hydrology, geomorphology or water quality<br>Non-productive strata that do not support groundwater resources.<br>Surface water not designated for relevant features<br><br>**Flood risk**<br>Water Compatible Land Use, as defined by NPPF [5]<br>Land with limited constraints and a low probability of flooding of residential and industrial properties [361] |

### *Magnitude of impact*

18.7.17 Impact magnitude is a function of the duration and scale of the change to the usability or value of the receptor. The magnitude will consider whether there is any alteration to the characteristics or features of the receptor's character or its designation or classification status (distinctiveness). Table 18-8 provides full definitions of each scale of magnitude (as set out in Chapter 5 General EIA approach and methodology) for water resources and flood risk receptors based. As discussed above with respect to receptor sensitivity, the magnitude of impact definitions have been adapted from the definitions provided in the DMRB guidance, where applicable to the Proposed Development (i.e. DMRB definitions associated with outcomes of assessments specific to road schemes have been omitted).

Table 18-8: Definition of terms relating to magnitude of an impact

| Magnitude | Summary |
|---|---|
| Major | Permanent/irreversible, or large-scale changes, over the whole receptor affecting usability or value. Causes fundamental changes to key features of the receptor's character or distinctiveness.<br><br>**Water resources**<br>■ Permanent changes to geomorphology and/or hydrology that prevent natural processes operating<br>■ Permanent and/or wide scale effects on water quality or availability<br>■ Permanent loss or long-term degradation of a water supply source resulting in prosecution<br>■ Permanent or wide scale degradation of habitat quality<br><br>**Flood risk**<br>■ Permanent or major change to existing flood risk |
| Moderate | Partial loss or noticeable change over the majority of the receptor, and/or discernible alteration to key features of the receptor's character or distinctiveness. Moderate permanent or long-term reversible change affecting usability or value over the medium-term or local area.<br><br>**Water resources**<br>■ Medium-term effects on water quality or availability<br>■ Medium-term degradation of a water supply source, possibly resulting in prosecution<br>■ Habitat change over the medium-term<br><br>**Flood risk**<br>■ Medium-term or moderate change to existing flood risk<br>■ Possible failure of sequential or exception test (if applicable) |
| Minor | Discernible temporary change over a minority of the receptor, and/or with minimal effect on usability, risk or value. Also, potential discernible alteration to key features of the receptor's character or distinctiveness.<br><br>**Water resources**<br>■ Short-term or local effects on water quality or availability<br>■ Short-term degradation of a water supply source<br>■ Habitat change over the short-term<br><br>**Flood risk**<br>■ Short-term temporary or minor change to existing flood risk<br>■ Passing of sequential and exception test |

| Magnitude | Summary |
|---|---|
| Negligible | Temporary change, undiscernible over the medium- to long-term, with no effect on usability or value. Slight, or no, alteration to the characteristics or features of the receptor's character or distinctiveness.<br><br>**Water resources**<br>■ Intermittent impact on local water quality or availability<br>■ Intermittent or no degradation of a water supply source<br>■ Very slight local changes to habitat that have no observable impact on dependent receptors<br><br>**Flood risk**<br>■ Intermittent or very minor change to existing flood risk |

18.7.18 In addition to the magnitude of impact definitions outlined in Table 18-8, three specific measures of magnitude are used for assessing water resources and flood risk:

- For construction impacts related to the direct disturbance of surface water bodies, magnitude of impact is defined in terms of the number of trenched crossings in each hydrological catchment.
- For construction impacts related to increased sediment supply and the supply of contaminants to surface and groundwater, magnitude of impact is defined in terms of the estimated total area of directly disturbed ground (construction footprint).
- The total area of buried/permanent infrastructure is used to estimate the potential for changes in surface runoff, subsurface flows and flood risk due to an increased area of impermeable surfaces.

18.7.19 These measures will add a degree of quantification to the assessment process and ensure that impacts in individual receptors are assessed consistently. When presented proportionally, these measures will also allow the direct comparison of likely significant effects across all receptors.

*Significance of effect*

18.7.20 By combining the magnitude of impact (or change) and the sensitivity of each water environment feature, an assessment will be made of the significance of the likely effect, considering the possibility and nature of primary mitigation. The resultant likely effects may be either negative (adverse), positive (beneficial) or neutral, depending on the nature of the impact. The significance of the likely effect is assessed before any secondary or tertiary mitigation is considered and after mitigation, which is known as the residual likely effect.

18.7.21 The significance of effect upon the receptor is assessed using the matrix presented in Chapter 5 General EIA approach and methodology. Likely significant effects are defined as neutral, minor, moderate or major.

18.7.22 Likely significant effects identified within the assessment as major or moderate are regarded as significant in terms of the EIA Regulations. Appropriate mitigation will be identified, where possible, in consultation with the statutory consultees. The aim of mitigation measures will be to avoid or reduce the overall impact.

### Assessment scenarios

18.7.23 The future baseline will include committed developments that will be delivered prior to commencement of construction.

18.7.24 The assessment of likely effects compares a scenario with the Proposed Development against one without the Proposed Development over time. The absence and presence of the Proposed Development will be referred to as the 'Do Minimum' and 'Do Something' scenarios respectively. The 'Do Minimum' scenario will represent the future baseline without the Proposed Development. The 'Do Something' scenario will represent the scenario with the construction and operation of the Proposed Development.

18.7.25 Construction effects are considered to be effects that commence during the construction phase of the Proposed Development. Effects resulting from the physical presence of infrastructure will also be considered as part of this assessment (i.e. effects will be considered in the project phase during which they first occur). Two construction scenarios will be considered; the first will consider effects during the peak of construction of the Proposed Development as a whole. The second scenario will consider effects during the peak of construction of the second phase of the WRP, assuming that the WRP is constructed in two phases and that no further construction is required for the remainder of the Proposed Development.

18.7.26 Operational effects are likely to occur as a result of the operation and maintenance of the Proposed Development (cf. Chapter 5) and are therefore considered to commence when the Proposed Development has been commissioned and is fully operational. The WRP will have an initial phase 1 peak output of approximately 20Ml/d and a second phase peak output of approximately 40Ml/d. Following the completion of both phases the total WRP peak output would be approximately 60Ml/d. Two operational scenarios will therefore be assessed; the 20Ml/d and the 60Ml/d flows.

### Cumulative effects

18.7.27 Cumulative effects of the Proposed Development together with the effects of other developments/schemes may result in likely significant effects. This may be the result of effects on the environment during construction or operation of the Proposed Development.

18.7.28 Cumulative effects for all topics will be reported within the cumulative effects chapter of the ES. Please refer to Chapter 19 Cumulative effects assessment which presents the proposed methodology for the assessment of cumulative effects that will be undertaken for the EIA.

### In-combination effects

18.7.29 In-combination effects are those that result from the interaction between the individual effects of the Proposed Development (i.e. interaction of environmental factors such as air quality, noise, health etc), combined together on a single receptor at a single point in time. The interrelationship between the individual effects may combine to result in a likely significant effect, even where the individual effects were not significant. Any in-combination effects in relation to the water environment (including flood risk) topic will be assessed within the relevant chapter of the ES.

18.7.30 The nature of likely in-combination effects for the water environment (including flood risk) includes:

- Potential impacts on buried archaeology/heritage assets (Chapter 7 Archaeology and cultural heritage):
  - Changes to surface and groundwater flows
- Potential impacts on aquatic habitats and ecosystems (Chapter 8 Terrestrial and freshwater biodiversity and Chapter 9 Marine biodiversity):
  - Changes to surface and groundwater flows (including discharges from Havant Thicket Reservoir)
  - Direct disturbance of surface water bodies
  - Increased sediment supply to surface waters
  - Changes to marine water quality associated with changes to discharges or new discharges
- Potential impacts the supply of contaminants (Chapter 11 Land quality and ground conditions)
  - Increased sediment supply to surface waters
- Potential impacts of climate change (Chapter 10 Carbon and climate change)
  - Flood risk and land drainage
  - Changes to surface and groundwater flows

### Supporting assessments

#### *Flood Risk Assessment*

18.7.31 A Preliminary Flood Risk Assessment (PFRA) has been prepared to support the EIA Scoping Report. This will be used to support engagement with the relevant competent authorities (see section 18.3) and updated Flood Risk Assessments will be presented alongside the ES.

18.7.32 The Flood Risk Assessments presented with the ES will be undertaken in accordance with the NPS for Water Resources Infrastructure, NPPF [5] and associated Flood Risk and Coastal Change guidance [50]. Flood risk assessments for planning and DCO applications are required for all development, regardless of scale for development within Flood Zone 2 or 3, or within a Critical Drainage Area. Developments of 1ha or greater will also require a flood risk assessment regardless of location.

18.7.33 The information and data required within a Flood Risk Assessment is dependent on location and type of development; for example, a new development of over 1ha in Flood Zone 1 will have different needs to a new development over 1ha in Flood Zone 3. EA data is required for all flood risk assessments for planning purposes; however, the level of detail required again varies depending on the type of development and its location. Furthermore, information from the LLFAs and Southern Water (responsible for public wastewater collection and treatment in Hampshire) will be key in understanding the existing surface water, foul water or combined sewer system and any known capacity issues within the network.

*WER Compliance Assessment*

18.7.34 A WER Compliance Assessment will be required to assess compliance of the proposed activities as required by The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (as amended). In accordance with guidance on WER compliance, requirements from the Planning Inspectorate [394] and the EA [360], this assessment will comprise screening, scoping and detailed assessment stages.

18.7.35 Stage 1 Screening consists of an initial screening exercise to identify relevant water bodies in the study area (section 18.4). Water bodies will be selected for inclusion in the early stages of the compliance assessment if they could potentially be directly impacted by the Proposed Development or are hydrologically connected to water bodies that could be directly impacted.

18.7.36 Stage 2 Scoping identifies whether there is potential for deterioration in water body status or failure to comply with WER objectives for any of the water bodies identified in Stage 1. This stage considers potential non-temporary impacts and impacts on critical or sensitive habitats for each water body and each activity. Water bodies and activities can be scoped out of further assessment if it can be satisfactorily demonstrated that there will be no impacts. If impacts are predicted, it will be necessary to undertake a detailed compliance assessment.

18.7.37 The Stage 3 Compliance Assessment presents a detailed assessment of water bodies and their quality elements that are considered likely to be affected by the Proposed Development, identification of any areas of non-compliance, consideration of mitigation measures, enhancements, and contributions to River Basin Management Plan (RBMP) objectives. If it is established that an activity and/or component of the Proposed Development is likely to affect water body status (that is, by causing deterioration in the status of relevant quality elements or by preventing achievement of status objectives and the implementation of mitigation measures for Heavily Modified Water Bodies specified by the EA in the RBMP) potential measures to avoid the effect or achieve improvement will be identified. Note that this stage is referred to as an Impact Assessment in the guidance produced by the Planning Inspectorate (2017) Advice Note Eighteen: The Water Framework Directive, (Version 1) [46].

18.7.38 It is important to note that deterioration in the status of any water bodies is not expected at this stage, and that every effort to mitigate impacts and avoid status deterioration will be made as part of the ongoing impact assessment and design processes. This position will be reviewed throughout the WER compliance assessment process.

*Hydrogeological Impact Assessment*

18.7.39 The assessment methodology for groundwater will adopt the methodology set out in DMRB standard LA 113 Road drainage and water environment [361]. This standard sets out a well-established and approved by regulators framework for EIA and is widely applied by the industry with respect to linear (and other) infrastructure projects. As the Proposed Development is a linear infrastructure project, the nature and scale of impacts with respect to construction activities and principles of assessments are similar and therefore applicable. The approach and methodology of the assessment is set out in the Preliminary hydrogeological impact assessment (Appendix 18-1 in Volume II).

18.7.40 An assessment will be undertaken following the procedures set out in Appendix 18.2 Groundwater levels and flow of DMRB LA 113 in Volume II. This follows a stepped approach:

- Step 1: Establish regional groundwater body status
- Step 2: Develop a conceptual model for the surrounding area
- Step 3: Based on the conceptual model, identify all potential features which are susceptible to groundwater level and flow impacts

18.7.41 The assessment of potential effects resulting from the construction and operation of the Proposed Development will be presented in the Hydrogeological Impact Assessment (HIA). This will be focus on the tunnelling sections and trenchless crossings of the underground pipelines that form part of the Proposed Development.

18.7.42 The HIA will be prepared to evaluate quantitative impacts of the Proposed Development on selected groundwater receptors before and after mitigation. It will be conducted in accordance with DMRB LA 113 and EA guidance for dewatering abstractions [356] and groundwater abstractions [355] .

18.7.43 The source-pathway-receptor model will be applied to water resources and water features that are sensitive to groundwater levels and flow. In this context sources will include abstraction and recharge points, which may be for dewatering or drainage purposes, that are artificially altering groundwater level and flows. The pathway is the hydraulic connection between the water resource that is being changed and features up or down gradient, so this could include the aquifer that connects the two. The receptors are groundwater bodies and groundwater-dependent features.

Groundwater dependent terrestrial ecosystems (GWDTEs)

18.7.44 An assessment will be undertaken following the procedures set out in Appendix B Groundwater dependent terrestrial ecosystems of DMRB LA 113 in Volume II (applicability of which to the Proposed Development is discussed in Hydrogeological Impact Assessment section above), which follows a stepped, risk-based approach which depends upon establishing linkages between potential impacts from the Proposed Development on the hydrological and hydrogeological regime and the GWDTEs.

18.7.45 The site-specific conceptual hydrogeological model will be derived to provide an overview of the interactions between groundwater and surface water and will

identify potential linkages between potential impacts from the Proposed Development (during construction or operation) and GWDTEs. Groundwater flow paths, groundwater levels and the proximity of GWDTEs will be taken into account in the conceptual hydrogeological model, which will be included in the HIA.

*Havant Thicket Reservoir Water Quality Modelling*

18.7.46 Potential impacts on water quality in Havant Thicket Reservoir will be assessed with reference to modelling undertaken by the Applicant and Portsmouth Water. This will consider a range of water quality parameters and will examine a range of scenarios for the proportion of water from different sources (e.g. groundwater, surface water and water from the WRP) in the reservoir.

*Eastney LSO Water Quality Modelling*

18.7.47 The modelling as outlined in paragraph 18.4.4 will be updated to reflect the revised proposed WRP flows.

## 18.8 Limitations and assumptions

18.8.1 This section sets out the limitations and assumptions that will be used in the future EIA and reported in the ES.

18.8.2 The baseline conditions will be derived from both desk-based and field studies.

18.8.3 It is assumed that the requested/expected data (as detailed in section 18.4) will be made available. There is a level of uncertainty associated with use of published information in the EIA. For example, the known characteristics of the drainage network and attributes and conditions specific to water bodies will be used as a proxy to assign value and sensitivity to the wider catchment.

18.8.4 At the time of writing the EIA Scoping Report, not all baseline information may be available (e.g. depending on the progress of the intrusive investigations only partial data may be available). It may therefore be necessary to update assessments in the ES as further information becomes available. Although there will be a level of uncertainty associated with the assessment and it may be necessary to make assumptions based on published data, there will still be sufficient data available to inform a robust assessment.

18.8.5 The assessments will include the information reasonably required to assess likely significant environmental effects. The assessments will represent a ‘reasonable worst case’ and will be based on conservative inputs derived from available field or desk study data and published research literature relevant to the study area. It is acknowledged that uncertainty is inherent to the assessment of interaction between surface water and groundwater. However, the collected data will enhance the understanding of assessment conditions in current and future assessment scenarios.

18.8.6 Due to the complexities of the hydrogeological regime in the study area, it is considered that the Proposed Development cannot be sufficiently defined in a full scale three-dimensional numerical model to accurately represent the processes occurring and how they may be affected by the Proposed Development. Analytical

and two-dimensional conceptual models will be developed for key assessment areas to ascertain the impacts of the Proposed Development. The requirement for additional 3D modelling in key areas will be reviewed on the completion of initial 2D and analytical assessments.

18.8.7 Intrusive ground investigations field work to determine the site-specific ground conditions across the majority of the Proposed Development will be undertaken. Conceptual models applied within the assessment will be derived with the available baseline groundwater level monitoring information obtained from the completed exploratory holes and groundwater monitoring.

18.8.8 Further information on the chemistry of the WRP reject water will be developed as part of the permitting process which may not be available for the EIA.

## 18.9 Approach to mitigation and residual effects

18.9.1 This project will use the mitigation hierarchy (primary, secondary and tertiary mitigation) described in Chapter 5 General EIA approach and methodology to minimise effects on surface water and groundwater receptors and flood risk as far as is practicable within the confines of engineering and other environmental constraints. Mitigation is therefore envisaged to comprise a combination of the following recognised standard approaches as appropriate:

- Primary Mitigation inherent of the design of the Proposed Development, comprising design measures such as location of infrastructure, routing and enaction of preservation in situ options and requirements (e.g. micro-siting and the use of trenchless technologies to cross sensitive surface watercourses. where possible).
- Secondary mitigation developed as a response to identified effects, potentially including site-specific measures to prevent adverse impacts on rivers at crossing points. Measures to protect water quality and prevent changes to flood risk, as set out in the NPSWRI [4] (e.g. paragraphs 4.15.11 to 4.15.12 and 4.7.9 to 4.7.15) may also be included if appropriate.
- Tertiary mitigation, including measures to reduce reasonably foreseeable construction effects, such as recognised good construction site management practices (e.g. the use of spill kits and impermeable bunds when working within close proximity to watercourses).

18.9.2 The Applicant will engage with and consult stakeholders on proposed mitigation measures throughout the EIA process including during the preparation of the PEI Report and ES.

## 18.10 Summary

18.10.1 A summary of the topics proposed to be scoped in and out of the assessment is provided in Table 18-9.

Table 18-9: Summary table

| Sub-topic | Construction | Operation | Rationale for scoping in/ out |
|---|---|---|---|
| Surface water – Increased sediment supply to surface waters | Scoped in | Scoped out | Construction: Earthworks during construction could increase the supply of fine sediment to surface watercourses.<br>Operation: Any routine or unplanned maintenance work would be very limited in scale. Any increase in sediment from such activities is covered in the potential impact from the supply of contaminants to surface and groundwaters. |
| Surface water quality – release of pollutants | Scoped in | Scoped in | Construction: The operation of construction machinery working in or adjacent to surface watercourses has the potential to accidentally release lubricants, fuels and oils into a surface water body.<br>Operation: There is the potential for accidental release of pollutants to surface water or groundwater and underlying groundwater during planned and unplanned operational maintenance |
| Surface water – Changes to surface water flows | Scoped in | Scoped in | Construction: Earthworks during construction and the presence of permanent infrastructure could alter surface water flows.<br>Operation: The presence of permanent infrastructure could alter surface water flows. |
| Surface water – Direct disturbance of surface water | Scoped in | Scoped out | Construction: Direct disturbance during construction could affect the hydrology, water quality and physical habitat conditions of surface water.<br>Operation: Once operational, there is no mechanism for permanent infrastructure to directly disturb surface water bodies. |
| Groundwater – Direct disturbance of groundwater | Scoped in | Scoped out | Construction: Direct disturbance during construction could affect the hydrogeology and water quality and groundwater-dependent features.<br>Operation: Once operational, there is no mechanism for permanent infrastructure to directly disturb groundwater. |
| Groundwater – Changes to groundwater flows | Scoped in | Scoped out | Construction: Construction activities such as dewatering could change natural subsurface flow patterns.<br>Construction of the underground infrastructure could potentially permanently alter subsurface flow patterns and volumes and affect flood risk. |

| Sub-topic | Construction | Operation | Rationale for scoping in/ out |
|---|---|---|---|
| | | | Operation: Once operational, there is no mechanism for permanent infrastructure to cause further changes to groundwater flows to those caused by insertion of subsurface infrastructure as assessed during construction phase. |
| Groundwater quality – release of pollutants | Scoped in | Scoped in | Construction: The operation of construction machinery working in or adjacent to surface watercourses has the potential to accidentally release lubricants, fuels and oils into a surface water body, or on to the ground and migrate into the underlying groundwater<br>Operation: There is the potential for accidental release of pollutants to surface water or groundwater and underlying groundwater during planned and unplanned operational maintenance |
| Flood risk and land drainage – Changes to flood risk | Scoped in | Scoped in | Construction: Construction activities could change natural surface and subsurface flow patterns and affect flood risk.<br>Operation: Operational infrastructure could potentially alter surface flow patterns and volumes, and recharge of aquifers, and consequently affect flood risk. |
| Havant Thicket Reservoir and receiving watercourses water quality | Scoped out | Scoped in | Construction: There will be no water in the reservoir during construction so there is no pathway for impact.<br>Operation: Purified recycled water would be transferred via a new pipeline to supplement spring-fed water that will be stored in Havant Thicket Reservoir. The introduction of purified recycled water could impact on water quality in downstream receiving watercourses. |
| Coastal water quality | Scoped out | Scoped in | Construction: There are no activities directly within transitional or coastal water bodies during construction.<br><br>Operation: Reject water from the WRP will be combined with the existing Budds Farm WTW discharge that currently discharges via the Eastney LSO. Changes to this discharge could affect water quality. |

# 19 Cumulative Effects Assessment

## 19.1 Introduction

19.1.1 This Chapter outlines the scope and methodology for the assessment of the potential likely significant effects arising from the construction, operation and decommissioning of the Proposed Development on cumulative and in-combination effects.

- **In-combination effects** from the Proposed Development (the interrelationship between different environmental topics) ('intra-project') and
- **Cumulative effects** from the interrelationship between different projects along with the Proposed Development ('inter-project').

19.1.2 In-combination effects, or intra-project effects, occur when a resource, receptor or group of receptors are potentially affected by more than one source of direct environmental impact resulting from the same development. For example, a community may be affected by noise and dust effects resulting from the construction phase activities of a single development.

19.1.3 Cumulative effects, or inter-project effects, occur when a resource, receptor or group of receptors are potentially affected by more than one development at the same time. For example, the construction traffic effects of a development in isolation may not be significant, but when combined with the construction traffic effects of another development (using the same geographical area at the same time) may result in significant cumulative effects on the surrounding highway network.

## 19.2 Legislation, policy and guidance

19.2.1 The following sections provide a summary of key topic specific policy, legislation and guidance with respect to the CEA. Further information on legislation, policy and guidance relevant to the EIA is set out in Chapter 2 Planning legislation and policy. It is recognised that this list is non-exhaustive and will be kept under review to take account of any later legislation or policy changes.

### Legislation

19.2.2 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations) set out in paragraph 5 of Schedule 4 state that an ES should include:

*"(e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources".*

### National policy

19.2.3 The requirement to consider cumulative effects is also outlined in national planning policy. The NPSWRI [4] states under section 3.1 General principles of assessment, paragraph 3.1.3 that:

*"In considering any proposed development, and in particular, when weighing its adverse impacts against its benefits, the Examining Authority and the Secretary of State should take into account its potential adverse impacts, including any longer-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts."*

19.2.4 Paragraph 3.2.6 of the NPS further states:

*"When considering significant cumulative effects, any environmental statement should provide information on how the effects of an applicant's proposal would combine and interact with the effects of other development (including projects for which consent has been granted, as well as those already in existence if they are not otherwise considered as part of the "baseline" conditions)."*

19.2.5 Paragraph 3.2.7 of the NPS further states:

*"The Examining Authority should consider how significant cumulative effects, and the interrelationship between effects, might as a whole affect the environment, even though they may be acceptable when considered on an individual basis or with mitigation measures in place."*

### Guidance

19.2.6 A range of public sector and industry-led guidance is available on CEA and in-combination effects assessment but at present there is no single, agreed industry standard method. The assessment will be consistent with the following guidance:

- Planning Inspectorate (2019) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects, (Version 2) [42] provides advice regarding a staged approach for documenting the CEA within an ES, relevant to NSIP, and highlights the need to consider the potential for cumulative effects to arise due to the interactions between different components of the development, as well as with 'other existing development and/or approved development'.

## 19.3 Cumulative assessment methodology

19.3.1 Consistent with the distinction between in-combination effects and cumulative effects, as outlined in paragraph 19.1.2 the assessment will be split in to two sections:

- **In-combination effects assessment:** comprising an assessment of the combined effects resulting from a number of different effects from the Proposed Development upon a single resource/receptor.
- **CEA:** comprising an assessment of cumulative effects of a number of different projects within the vicinity, in combination with the environmental impact of the Proposed Development on a range of different resources/receptors.

19.3.2 The proposed methodology for each of these assessments is described separately below.

19.3.3 In-combination and cumulative effects from decommissioning of the Proposed Development are expected to be no greater than those identified during the construction phase, and are therefore assessed as construction effects as a worst case scenario. Please refer to Chapter 3 Description of the proposed development, section 3.7 for further information on decommissioning.

### In-combination effects assessment

Planning Inspectorate (2019) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects, (Version 2) [42] notes that the assessment of interrelationships between topics for a proposed NSIP are typically assessed as part of the specialist topic chapters of an ES.

19.3.4 In accordance with this guidance, in-combination effects from the action of a number of different effects upon a single resource/receptor will be considered inherently within the environmental topic chapters of the ES. The nature of such interrelationships during construction and operation will include, but may not be limited to:

- Chapter 7 Archaeology and cultural heritage will consider how changes in groundwater conditions may directly or indirectly impact buried archaeological assets. The loss of ecological features (especially hedgerows) could physically impact an asset or result in a change to its setting. Changes in landscape and views could also change the setting of an asset along with changes to noise and traffic levels.
- Chapter 8 Terrestrial and freshwater biodiversity and Chapter 9 Marine biodiversity will consider the combined ecological effects on single receptors of a number of individual environmental effects. These effects may comprise land take, noise and vibration disturbance (both airborne and underwater), visual disturbance (including lighting and human presence), changes in air quality, airborne dust deposition, and changes in water quality (including surface run-off, pollution events and changes to the discharged effluent). Cumulative loss and fragmentation of certain habitat types will also be assessed.
- Chapter 10 Carbon and climate change will consider in-combination effects of the Proposed Development on receptors identified by environmental aspects that are also affected by climate change (i.e. projected changes to local climatic and weather conditions). For example, an increase in hotter and drier conditions and increased frequency of droughts and heatwaves could exacerbate dust generation during construction or lead to loss of vegetation and defoliation. This will be undertaken in the form of an “In-combination climate change impact (ICCI) assessment”.
- Chapter 11 Land quality and ground conditions will consider the in-combination effects on human health, controlled waters and environmentally sensitive areas of multiple potential sources of contamination during construction such as earthworks, trenching, deep ground workings, potential spillages and leaks, groundwater or surface water run-off, impacts from temporary drainage, contaminated dusts, vapours and ground gases.

- Chapter 12 Land use and agriculture will consider the conclusions of other environmental topic assessments such as changes in traffic, severance, air quality, landscape, visual and noise effects in the assessment of amenity impacts to residential properties, community facilities and commercial properties that could be sensitive to changes in their operating environment.
- Chapter 13 Landscape and visual will consider in-combination effects on landscape and visual receptors from different sources during construction such as changes in traffic, land take, lighting and noise levels.
- Chapter 14 Noise and vibration will consider the combined effects of both airborne noise and any identified vibration.
- Chapter 16 Socio-economics, tourism, recreation and health will consider the conclusions of other environmental topic assessments such as changes in traffic, severance, air quality, landscape, visual and noise effects in the assessment of amenity impacts to tourism assets which could be sensitive to changes in their operating environment. The health assessment will also consider a wide range of technical aspects such as air quality, noise and visual amenity in assessing effects on health determinants.
- Chapter 18 Water environment (including flood risk) will consider in-combination effects such as the accumulation of effects on water resources and receptors such as rivers and aquifers, which when considered together constitute a greater impact. For example, a minor impact on river hydrology which, together with a minor impact on the riparian habitat (an ecological impact), when considered together, may constitute a major impact leading to a likely significant effect. It will also consider in-combination effects on the water environment as a result of construction phasing. The chapter will also consider in-combination effects that may arise from new and planned alterations to discharges from the WRPs and LSOs in the vicinity.

### Cumulative effects assessment

19.3.5 Planning Inspectorate (2019) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects, (Version 2) [42] provides a staged and sequential approach to CEA which can be split into four distinct phases, explained in Table 19-1. Paragraph 2.5 of the Advice Note notes that the recommended process focusses on cumulative effects with 'other existing development and/or approved development'. It notes that the assessment should be iterative and may need to be repeated a number of times during the preparation of a DCO application.

**Table 19-1: Stages of cumulative effects assessment**

| CEA Stage | Activity |
|---|---|
| **Stage 1:** Establish the ZoI and establish the long list of 'other existing development and/or approved development' | Identify the ZoI (study area) for each environmental aspect considered within the ES.<br>Identify a long list of 'other existing development and/or approved development' in the vicinity of the Proposed Development which may have cumulative effects (during either construction or operation). |

| CEA Stage | Activity |
|---|---|
| | Undertake desktop review of available environmental information for identified cumulative developments. To identify the long list of 'other existing development and/or approved development', a desk study exercise is proposed to be undertaken in the form of a review of planning applications, relevant development plans and any other available and relevant sources, as noted in paragraph 3.1.3 of Planning Inspectorate (2019) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects, (Version 2) [42]. |
| **Stage 2:** Establish the short list of 'other existing development and/or approved development' | Identify which of the identified 'other existing development and/or approved development' from Stage 1 has the potential to give rise to significant cumulative effects by virtue of overlaps in temporal scope, due to the scale and nature of the 'other existing development and/or approved development'/receiving environment; or any other relevant factors such as the nature and/ or capacity of the receiving environment that would make a significant cumulative effect with 'other existing development and/or approved development' more or less likely'. |
| **Stage 3:** Information gathering | Information relating to each of the 'other existing development and/or approved development' shortlisted at Stage 2 is gathered and reviewed. |
| **Stage 4:** Assessment | An assessment of the cumulative effects of the Proposed Development with the 'other existing development and/or approved development' identified in Stages 1-3 of the process outlined above is undertaken.<br>Mitigation measures are identified to avoid, prevent, reduce or, if possible, offset any identified significant cumulative effects. |

### *CEA Stage 1: Establishing the Proposed Development's zone of influence and long list of 'Other existing development and/or approved development'*

#### *Establishing the zone of influence (study area)*

19.3.6 The ZoI (study area) refers to the spatial area over which an effect from a project is likely to be experienced. The proposed ZoI for the Proposed Development varies for each environmental topic and is set out under the section titled 'Study area' within each environmental topic chapter of the Scoping Report (from Chapter 6 Air quality and odour to Chapter 18 Water environment (including flood risk)). The relevant ZoIs proposed at this early stage are summarised in Table 19-4 of this chapter and will be refined for the ES.

#### *Establishing the long list of 'Other existing development and/or approved development'*

19.3.7 Planning Inspectorate (2019) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects, (Version 2) [42] recommends that a wide range of future projects is included within the CEA,

which can be tiered (from Tier 1-3) according to how far advanced the development is within the planning system and to the level of detail that is likely to be available for each tier. The tiers are set out in Table 19-2.

**Table 19-2: Assigning certainty to 'other existing development and/or approved development'**

| | | |
|---|---|---|
| **Tier 1** | • Projects under construction<br>• Permitted application(s) but not yet implemented<br>• Submitted application(s) but not yet determined | **Decreasing level of detail likely to be available** ↓ |
| **Tier 2** | • Projects on the Planning Inspectorate's Programme of Projects where a scoping report has been submitted | |
| **Tier 3** | • Projects on the Planning Inspectorate's Programme of Projects where a scoping report has not been submitted<br>• Identified in the relevant Development Plan (and emerging Development Plans – with appropriate weight being given as they move closer to adoption) recognising that there will be limited information available on the relevant proposals<br>• Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward | |
| Note: Where other projects are expected to be completed before construction of the proposed NSIP and the effects of those projects are fully determined, effects arising from them will be considered as part of the baseline and will be considered as part of both the construction and operational assessment. The ES will clearly distinguish between projects forming part of the dynamic baseline and those in the CEA. | | |

19.3.8 The less information that is available for the future projects (for example environmental effects predicted and project definition), the less likely that the CEA will be able to make any robust assessment in relation to these projects. Reasonable steps will be taken to review publicly available information when conducting the CEA.

19.3.9 For the Proposed Development, relevant 'other existing development and/or approved developments' will be identified through a desk-based review of published sources on relevant local authority websites. Searches will be conducted online, using the websites of the relevant local authorities and the Planning Inspectorate's website.

19.3.10 Searches will be undertaken for the following local authorities, within the greatest ZoI of the Proposed Development, over the previous five-year period[21].

- Planning Inspectorate: permitted and submitted NSIPs
- The DfT: permitted and submitted Transport and Works Act Order (TWAO) applications

[21] It is considered that any development with a consent older than five years will have been built out or lapsed after the three year consent for commencement has passed.

- Local authorities: permitted and submitted planning applications

*CEA Stage 2: Establishing a shortlist of 'other existing development and/or approved development'*

19.3.11 The 'long list' of 'other existing development and/or approved developments' identified under CEA Stage 1 will be subject to further threshold and criteria refinement to identify a more proportionate list of developments to be assessed within the CEA.

19.3.12 The threshold and criteria proposed to be considered in shortlisting a development in CEA Stage 2 is outlined in Table 19-3. Criteria has been adapted from the Planning Inspectorate's guidance within Planning Inspectorate (2019) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects, (Version 2) [42] and the EIA Regulations.

**Table 19-3: Criteria for shortlisting 'other existing development and/or approved development'**

| Threshold | Description |
|---|---|
| The temporal scope of 'other existing development and/or approved development' | • Consideration of relative construction, operation and decommissioning programmes of the 'other existing development and/or approved development' identified in the ZoI with the Proposed Development programme, to establish whether there is overlap, or similar temporal scope for construction and operation phases, and any potential for interaction. |
| The scale and nature of 'other existing development and/or approved development' | • Consideration of whether the scale and nature of the 'other existing development and/or approved development' identified in the ZoI are likely to interact with the Proposed Development and to result in a cumulative effect. |
| Any other relevant factors | Could the nature and/or capacity of the receiving environment make a significant cumulative effect with 'other existing development and/or approved development' more or less likely. The sensitivity of the receiving environment includes whether the sites are within:<br>• wetlands, riparian areas, river mouths<br>• coastal zones and the marine environment<br>• forest areas<br>• nature reserves and parks<br>• European sites[22] and other areas classified or protected under national legislation<br>• areas in which there has already been a failure to meet the environmental quality standards, laid down in retained EU legislation and relevant to the project, or in which it is considered that there is such a failure<br>• densely populated areas<br>• landscapes and sites of historical, cultural or archaeological significance |

[22] In Schedule 3 of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 "European site" means a site within the meaning of the Conservation of Habitats and Species Regulations 2010.

| Threshold | Description |
|---|---|
| | • the relative abundance, availability, quality and regenerative capacity of natural resources (including soil, land, water and biodiversity) in the area and its underground<br>• potential for creation of source-pathway-receptor impacts |

19.3.13 Professional judgement will be applied to 'other existing development and/or approved development' that exceed the thresholds but do not give rise to discernible environmental effects. Where relevant, the reasons for excluding any 'other existing development and/or approved development' from further consideration will be outlined. Local authorities will also be consulted on the shortlisted 'other existing development and/or approved developments'.

*CEA Stage 3: Information gathering*

19.3.14 In line with Planning Inspectorate (2019) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects, (Version 2) [42], the following information on the shortlisted 'other existing development and/or approved development' will be compiled from publicly available information as outlined under CEA Stage 1 above:

- *"proposed design and location information;*
- *proposed programme of construction, operation and decommissioning; and*
- *environmental assessments that set out baseline data and effects arising from the 'other existing development and/or approved development'".*

*CEA Stage 4: Assessment*

19.3.15 The ES will report an assessment of the cumulative effects of the Proposed Development with the 'other existing development and/or approved development' identified through CEA Stages 1-3, outlined above.

19.3.16 In accordance with Planning Inspectorate (2019) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects, (Version 2) [42], an assessment will be provided for all Tier 1 and Tier 2 'other existing development and/or approved development', where possible. For 'other existing development and/or approved development' falling into Tier 3, it is proposed to undertake an assessment where possible, although this may be qualitative and at a very high level.

19.3.17 The assessment of significance of any cumulative effects will be determined in accordance with the assessment methodologies outlined within each specialist topic chapter of the ES. The assessment of cumulative effects will vary, depending on each environmental topic's individual assessment criteria and thresholds for likely significant effects.

19.3.18 Cumulative effects will be identified by considering whether:

- There would be any change in magnitude of the likely significant effects from the Proposed Development, as identified within the specialist topic chapter of the ES, taking into consideration any effects from the 'other existing development and/or approved developments'. For example, a moderate

adverse likely significant effect becoming a likely major adverse significant effect, or

- The effects of the Proposed Development on key receptors potentially affected by 'other existing development and/or approved development', in combination with any effects of the 'other existing development and/or approved development' would trigger a likely significant effect where the effects of the Proposed Development in isolation would not, that is a likely non-significant effect becoming a likely significant effect.
- Where significant cumulative effects beyond those identified as residual likely significant effects from the Proposed Development in isolation are identified, an assessment of the need for additional mitigation (further to that already identified within each specialist topic chapter) will be undertaken.

## 19.4 Study area

- Planning Inspectorate (2019) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects, (Version 2) [42] notes that the scale and nature of NSIPs will typically dictate a broad spatial and temporal ZoI.
- As outlined in section 19.3 Cumulative assessment methodology, the proposed ZoI for the Proposed Development varies for each topic and is set out within each topic chapter of the Scoping Report (Chapters 6-18). A summary is presented in Table 19-4. Please also refer to figures within Volume III which presents the ZoI for each topic.

Table 19-4: Zone of influence summary table

| Environmental topic | Proposed Zone of Influence |
|---|---|
| Chapter 6 Air quality and odour | • ZoI is defined in accordance with the relevant IAQM (2016) Guidance on the assessment of dust from demolition and construction [63].<br>*Dust and fine particulate matter emissions:*<br>• Human receptors within 350m of the Order Limits and within 50m of routes used by construction vehicles (for routes used by construction-generated traffic up to 500m from the construction works boundary), and<br>• Ecological receptors within 200m of the Order Limits and within 50m of routes used by construction vehicles (for routes used by construction-generated traffic up to 500m from the construction works boundary).<br>*NRMM emissions:*<br>• Human and ecological receptors within 200m of the Order Limits where NRMM will be located.<br>*Road traffic emissions:*<br>• Human and ecological receptors within 200m of all roads that trigger the traffic screening criteria and adjoining roads within 200m, referred to as the Affected Road Network (ARN). |
| Chapter 7 Archaeology and cultural heritage | • ZoI defined in accordance with the relevant Chartered Institute for Archaeology (CIfA) (2020) Standard and guidance for historic environment desk-based assessment [395].<br>• Designated heritage assets within 1km of the Order Limits.<br>• Non-designated heritage assets within 500m of the Order Limits. |
| Chapter 8 Terrestrial and freshwater biodiversity | • ZoI defined in accordance with the relevant CIEEM (2022) Guidelines for Ecological Impact Assessment in the UK and Ireland [396]; and Natural England and Defra (2022) Standard Advice for Protected Species [397].<br>• 2km from the Order Limits for Statutory international and national designated nature conservation sites, including SAC, SPA, Ramsar sites, SSSI, NNR and LNR.<br>• 10km from the Order Limits for SACs designated for bat populations.<br>• Statutory designated nature conservation sites that are hydrologically linked to the Proposed Development would be based on downstream sites, groundwater dependant sites; determined by professional judgement.<br>• 2km from the Order Limits for protected and notable species biological records. |

| Environmental topic | Proposed Zone of Influence |
|---|---|
| | • 2km from the Order Limits for non-statutory locally designated nature conservation sites including SINC and RVEI.<br>• 200m from the Order Limits for Habitats and botanical features, including priority habitats. |
| Chapter 9 Marine biodiversity | • ZoI defined in accordance with the relevant CIEEM (2022) Guidelines for Ecological Impact Assessment in the UK and Ireland [396].<br>*Marine ecology:*<br>• 2km for All designated marine sites.<br>• 30km for Sites designated for marine mammals.<br>• 10km for hydrologically connected statutory designated sites.<br>*Commercial fisheries:*<br>• The entirety of Langstone Harbour, including the tidal extent of Hermitage stream.<br>• 10km from the discharge point of the LSO located within the Solent (anticipated extent of hydrological connection based upon tidal excursion and search range for transitory species). |
| Chapter 10 Carbon and climate change | Climate change resilience<br>• Potential cumulative impacts with respect to climate resilience may arise from other developments, which have the potential to exacerbate the vulnerability of the Proposed Development to the effects of climate change, for example other projects giving rise to increased flood risk or coastal erosion. For climate change resilience this will cross reference to these topics in the cumulative effects chapter of the ES. |
| Chapter 11 Land quality and ground conditions | • ZoI defined in accordance with the relevant IEMA guidance [203].<br>• The ZoI consists of the footprint of the Proposed Development and an additional 250m buffer for identifying potential sources of contamination and receptors.<br>• 1km for groundwater abstractions. |
| Chapter 12 Land use and agriculture | • ZoI defined in accordance with the NPSWRI [4].<br>*Land use*<br>• Footprint and 500m from the Order Limits for residential property, commercial property and land, development land, community facilities and agricultural land. |

| Environmental topic | Proposed Zone of Influence |
|---|---|
| | *Agriculture*<br>• Footprint of the Order Limits for BMV land. |
| Chapter 13 Landscape and visual | • ZoI defined in accordance with the relevant Landscape Institute guidance [398].<br>• 3km buffer for landscape and up to 5km for views measured from the Order Limits. |
| Chapter 14 Noise and vibration | • The noise and vibration study areas for the EIA will be established through stakeholder engagement and by identifying the NVSRs with the potential to be impacted by the Proposed Development. Separate study areas will be established for direct effects due to construction noise, construction vibration and operational noise, as well as for indirect effects due to construction traffic noise. |
| Chapter 15 Resources and waste management | • ZoI defined in accordance with the relevant IEMA (2020) Materials and Waste in Environmental Impact Assessment [399]. There are two defined ZoIs.<br>• The primary ZoI for both resources and waste will be the Order Limits.<br>• The secondary ZoI (referred to as the 'expansive study area' under the IEMA Guidance [399]) covers an area of the South East, in relation to Primary Materials, including sand and gravels, and the UK, for all other materials. |
| Chapter 16 Socioeconomics, tourism, recreation and health | • ZoI defined in accordance with the relevant HCA (2014) Additionality Guide (Fourth Edition) [314].<br>*Socio-economics*<br>• Employment and skills arising from the construction and operation of the Proposed Development will consider a ZoI at a local authority level.<br>*Tourism and recreation*<br>• The ZoI for the assessment of tourism and recreational impacts will be based on the Order Limits plus a 500m buffer.<br>*Health*<br>• This is based on a ward level which intersect the Order Limits. The relevant local authority and ward boundaries are shown in Figures 12.1 and 16.1 respectively in Volume III. |
| Chapter 17 Traffic and transport | • ZoI defined in accordance with traffic modelling and relevant Institute of Environmental Assessment (now IEMA) (1993) Guidelines for the Environmental Assessment of Road Traffic [400]. |

| Environmental topic | Proposed Zone of Influence |
|---|---|
| | • The traffic and transport ZoI for the EIA will be established through stakeholder engagement and by determining the most probable routes for construction traffic, for both the movement of materials and employees, and operational traffic. |
| Chapter 18 Water environment (including flood risk) | • ZoI defined in accordance with EA guidance as outlined within Table 18.3 of Chapter 18.<br>*Surface water (including flood risk)*<br>• ZoI is defined based on the hydrological catchments that intersect with the Order Limits.<br>*Groundwater*<br>• The ZoI for groundwater includes those groundwater bodies that underlie the Order Limits, or are hydrologically connected to these bodies.<br>*Marine water*<br>• The ZoI for marine water is defined as the onshore coastal catchments as outlined in Chapter 18, but also the water bodies within which changes could potentially occur as a result of alterations to the existing discharge at the Eastney LSO. |

## 19.5 Engagement

19.5.1 Relevant statutory consultation bodies, and particularly the local authorities will be consulted on the shortlisted 'other existing development and/or approved developments' proposed to be included in the CEA during the pre-application stage.

19.5.2 This will provide an opportunity to identify and discuss issues and should also assist with identifying a robust suite of mitigation measures that might otherwise remain unresolved and require exploration during examination. Details of any identified mitigation measures will be submitted with the application for development consent. The process may need to be repeated during the pre-application stage and will be based on the most up to date list of developments available. The CEA will also include a summary of any consultation undertaken and evidence of any agreements reached.

19.5.3 Engagement with statutory consultation bodies will also include consultation on in-combination effects.

## 19.6 Potential effects and mitigation measures

### Assessment of in-combination effects

19.6.1 During construction, there is the potential for in-combination effects to receptors as a result of the Proposed Development due to the potential interactive effects outlined in section 019.3. These effects will be reported within the topic chapters of the ES, including the identification of any required mitigation measures. During construction, the majority of effects would be temporary in nature and best practice mitigation measures included in the CEMP would ensure that these temporary in-combination effects are reduced as far as possible.

19.6.2 During operation, there is potential for in-combination effects to receptors as a result of the Proposed Development due to the potential interactive effects outlined in section 19.3. These effects will be reported within the environmental topic chapters of the ES, including the identification of any required mitigation measures.

19.6.3 Any identified mitigation measures will be subject to agreement with the relevant consultation bodies.

### Assessment of cumulative effects

19.6.4 During construction, there would be the potential for cumulative effects on receptors, as a result of the Proposed Development with any of the 'other existing development and/or approved development' within the vicinity, for which the construction or operation stages overlap.

19.6.5 Once operational, there would be the potential for cumulative effects on receptors due to interactions with the 'other existing development and/or approved development'. The likely residual effects and proposed mitigation for each of the 'other existing developments and/or approved developments' will be identified and

reported within the CEA of the ES. Any identified mitigation measures will be subject to agreement with the relevant consultation bodies.

## 19.7 Summary

19.7.1 A summary of the in-combination effects and cumulative effects that are scoped in and scoped out at construction and operations stages is presented in Table 19-5.

**Table 19-5: Summary table**

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics in or out |
|---|---|---|---|
| In-combination effects | Scoped In | Scoped In | During construction and operation, there is the potential for in-combination effects to receptors as a result of the Proposed Development due to potential interactive effects. In-combination effects will be assessed and reported within the environmental topic chapters of the ES, including the identification of any required mitigation. |
| Cumulative effects | Scoped In | Scoped In | During construction and operation, there would be the potential for cumulative effects on receptors, as a result of the Proposed Development with any of the 'other existing development and/or approved developments' within the vicinity. The CEA will be reported within the Cumulative effects chapter of the ES. |

# 20 Topics scoped out

## 20.1 Introduction

20.1.1 The aim of the scoping stage is to focus the EIA on those environmental aspects that may give rise to likely significant effects upon the environment as a consequence of the Proposed Development. The following sections provide a summary of other environmental topics which have been considered during the preparation of this EIA Scoping Report and which are not expected to give rise to likely significant effects. All sections have been written in line with Planning Inspectorate (2020) Advice Note Three: EIA Notification and Consultation, (Version 7) [349]. Construction and operational effects are considered.

20.1.2 Effects from decommissioning of the Proposed Development are considered to be no greater than those identified during the construction phase, and are therefore assessed as being the same as construction effects as a worst case scenario. Please refer to Chapter 3 Description of the Proposed Development, section 3.7 for further information on decommissioning.

20.1.3 The scoping out of these topics has been addressed relatively briefly and qualitatively, without modelling (which is not deemed required), detailed assessment, or standalone chapters. The topics to be scoped out of the EIA are:

- Major accidents and disasters
- Shipping and navigation
- Coastal and marine processes
- Other marine users
- Heat and radiation

## 20.2 Major accidents and disasters

20.2.1 This section outlines the relevance of the topic of major accidents and disasters to the Proposed Development and the justification for scoping it out of further assessment. A technical report has been produced which provides a risk screening assessment for Major Accidents and Disasters and methodology found in Appendix 20-1 in Volume II. A summary of the technical report is set out in this section.

### Baseline

20.2.2 For the topic of Major Accidents and Disasters the baseline is addressed at a Proposed Development wide level.

20.2.3 The following data has been used to inform the baseline:

Table 20-1: Source of baseline data

| Baseline data | Source of data |
|---|---|
| Potential risks | Hampshire and Isle of Wight Community Risk Register [401] and the National Risk Register [402] |
| COMAH sites | HSE website and COMAH search tool [403] |
| Flooding | EA flooding data [404] |
| Fire risk | Fire and Rescue Service statistics [405] and Met Office [406] |
| Storm frequency and severity | Met Office [407] |
| Climate (maximum and minimum temperatures and precipitation) | Met Office [408] |
| Air quality | Defra UK AIR AQMAs Interactive Map [409] |
| Traffic | DfT traffic counts and County Council collision data |
| Statutory designated sites | Natural England |
| Unexploded Ordnance | Zetica |
| Malicious attacks | Hampshire Local Resilience Forum [401] |

20.2.4 The technical report (in Appendix 20-1 in Volume II) outlines the baseline information for identified potential risks from the National Risk Register and Hampshire and Isle of Wight Community Risk Register. In addition, in line with the IEMA Primer on Major Accidents and Disasters [410], further risks have been identified based on the specific potential risks to and resulting from the Proposed Development.

20.2.5 It should be noted that no COMAH sites have been identified within 4.8km (the set search distance for the HSE webmap) of the Proposed Development. The Proposed Development itself will also not be a COMAH site or a Hazardous Substances Consent (HSC) site. Therefore, COMAH sites are not considered a risk to the Proposed Development and have not been included in the risk screening exercise in Appendix 20-1 in Volume II.

20.2.6 Effects from decommissioning of the Proposed Development are expected to be no greater than those identified during the construction phase, and are therefore assessed as being the same as construction effects as a worst case scenario. Please refer to Chapter 3 Proposed Development Description, section 3.7 for further information on decommissioning.

### Potential effects

20.2.7 The IEMA Primer states that the major accidents and disasters topic can be scoped out of the EIA if the assessment can demonstrate:

- "*there is no source-pathway-receptor linkage of a hazard that could trigger a major accident and/or disaster or potential for the scheme to lead to a significant environmental effect; or*

- *all possible major accidents and/or disasters are adequately covered elsewhere in the assessment or covered by existing design measures or compliance with legislation and best practice*." [410]

20.2.8 The risk screening assessment, in Appendix 20-1 in Volume II, considers the current risk profile identified within the Community Risk Register and National Risk Register and consideration of specific risks relating to the construction and operation of Proposed Development. The sources of these risks can both be from the Proposed Development itself which pose potential risks to receptors outside the Proposed Development and from external sources which are potential risks to the Proposed Development itself. It looks at the potential for a source-pathway-receptor linkage in terms of risks to environmental receptors such as designated environmental sites, residents local to the Proposed Development and workers on and in close proximity to the site, local businesses and cultural heritage and archaeology during construction and operation of the Proposed Development. If a source-pathway-receptor linkage is present it then examines to what extent the risk generated is capable of being adequately mitigated and if, with this mitigation in place and secured through the DCO consent process, the risk could lead to a major accident and/or disaster.

*Potential effects during construction*

20.2.9 The risk screening assessment presented in Appendix 20-1 in Volume II identified that all potential construction risks were considered to be adequately mitigated, meaning there was no source-pathway-receptor linkage. Mitigation measures included construction management plans, emergency response plans, site security and an environmental management plan. It also identified potential risks which were covered by other assessment topics within the EIA. Therefore, no potential effects as a result of major accident and disaster risks are anticipated during construction of the Proposed Development.

*Potential effects during operation*

20.2.10 The risk screening assessment identified that all potential operation risks were considered to be capable of being adequately mitigated, meaning there was no source-pathway-receptor linkage. Mitigation measures include emergency response plans and an environmental management plan. Therefore, no potential effects, as a result of major accident and disaster risks, are anticipated during operation of the Proposed Development.

### Summary

20.2.11 In conclusion, the topic of Major Accidents and Disasters is scoped out of the EIA as all the potential risks for the Proposed Development, during construction and operation, are considered to be adequately mitigated. For full details of the risk identification and assessment methodology see Appendix 20-1 in Volume II.

## 20.3 Shipping and navigation

20.3.1 This section outlines the relevance of the topic of shipping and navigation to the Proposed Development and the justification for scoping it out of further assessment. This topic includes receptors such as commercial vessels (including cargo, tanker and passenger vessels), recreational users (such as yachts, power boats and recreational anglers), fishing vessels and other offshore users (such as pilot boats, support vessels, dredgers and Search and Rescue (SAR) vessels).

### Baseline

20.3.2 No works are anticipated to take place with direct connection to the marine aquatic environment. Subterranean tunnelling underneath the seabed would not have connection with the water column. Therefore there is no pathway for effect during construction. Furthermore, no works are taking place in the operational phase and therefore there is no pathway for effect to shipping and navigation receptors. Therefore, baseline conditions are not detailed further in this section.

### Potential likely significant effects

*Likely significant effects during construction*

20.3.3 In the case of the Proposed Development, works are not anticipated within the marine environment and materials for construction are proposed to be delivered to site via road, as such, there is no anticipated impact pathway. It is therefore considered that there are unlikely to be effects (including significant effects) upon shipping and navigation as a consequence of the Proposed Development.

20.3.4 It is noted that the potential for transit of some construction materials to port is yet to be determined. Should materials be delivered by marine vessel during construction, this would require delivery to either the Port of Southampton or the Port of Portsmouth, with the final stage being transported to site by road. If required, such movements will be managed via existing port procedures. Under this scenario, consultation will be undertaken with the relevant Harbour Authority to ensure that the transport of materials can be accommodated in line with the port's existing Marine Safety Management System (MSMS).

*Likely significant effects during operation*

20.3.5 Operation of the Proposed Development will not require transportation of materials by vessel. As the Proposed Development does not comprise any permanent infrastructure in the marine environment, no collision risk or displacement activities are anticipated. Therefore, operational shipping and navigation effects during operation are proposed to be scoped out for further consideration.

### Summary

20.3.6 There is no impact pathway and as such, the shipping and navigation topic is proposed to be scoped out from further consideration.

### Abbreviations

Table 20-2: Abbreviations

| Abbreviation | Definition |
|---|---|
| COMAH | Control of Major Accidents and Hazards |
| DfT | Department for Transport |
| IEMA | Institute of Environmental Management Assessment |
| MSMS | Marine Safety Management System |
| SAR | Search and Rescue |

## 20.4 Coastal and marine processes

20.4.1 This section outlines the relevance of the topic of coastal and marine processes to the Proposed Development and the justification for scoping it out of further assessment. This topic includes potential changes to tidal currents, waves and suspended sediment in the Solent.

20.4.2 No works are anticipated to take place with direct connection to the marine aquatic environment. Subterranean tunnelling underneath the seabed would not have physical connection with the water column or coastal environment. Therefore there is no pathway for effect during construction.

20.4.3 The only potential operational impact would be changes to the discharge volumes and concentrations (suspended solids) from the existing Eastney LSO, with potential for changes to the quality of water in the surrounding marine environment. This potential effect is already considered in Chapter 18 Water environment and is not proposed to be duplicated under the coastal and marine processes topic.

### Baseline conditions

20.4.4 No works are anticipated taking place with direct connection to the marine aquatic environment. Subterranean tunnelling underneath the seabed would not have connection with the water column. Therefore there is no pathway for effect during construction. Furthermore, no works are taking place in the operational phase and therefore there is no pathway for effect on coastal processes. Therefore, baseline conditions are not detailed further in this section.

### Potential likely significant effects

*Likely significant effects during construction*

20.4.5 There will be no construction below Mean High Water Spring (all construction will be on land or beneath the seabed at depth for the Proposed Underground Pipeline between Budds Farm WTW and the proposed WRP) and so there is no potential for changes to coastal and marine processes due to construction. Hence, there are no predicted impacts during construction and this is proposed to be scoped out of the EIA.

*Likely significant effects during operation*

20.4.6 The only operational changes would be changes to the volume and composition (suspended solids) of water discharged into the Solent. This potential effect is considered with Chapter 18 Water environment. Hence, there are no predicted impacts to coastal and marine processes during operation and this is proposed to be scoped out of the EIA.

### Summary

20.4.7 On the basis that works are not anticipated in the marine environment, and as such there is no impact pathway, it is proposed that impacts on coastal and marine processes be scoped out of the EIA.

## 20.5 Other marine users

20.5.1 This EIA topic includes activities and users in the marine environment not considered elsewhere within the EIA and include: those associated with the petroleum industry (including platforms, and subsea infrastructure including pipelines); offshore wind infrastructure; telecommunications and interconnector cables; marine aggregate extraction; disposal sites; and marine recreational activities.

20.5.2 Chapter 16 Socioeconomics, tourism, recreation and health and section 20.3 shipping and navigation provide further information and assessment in relation to impacts to businesses and shipping and navigation.

### Baseline

20.5.3 No works are anticipated with direct connection to the marine aquatic environment. Subterranean tunnelling underneath the seabed would not have connection with the water column. Therefore there is no pathway for effect during construction. Furthermore, no works are taking place in the operational phase and therefore there is no pathway for effect to other marine users. Therefore, baseline conditions are not detailed further in this section.

### Potential likely significant effects

*Likely significant effects during construction*

20.5.4 No works are anticipated with direct connection to the marine aquatic environment. Subterranean tunnelling underneath the seabed would not have physical connection with the marine environment or have the potential to significantly effect any of the receptors listed in paragraph 20.5.1. Therefore there is no pathway for effect during construction which might impact upon other marine users.

*Likely significant effects during operation*

20.5.5 As the Proposed Development does not comprise any permanent infrastructure in the marine environment, there is no pathway for effect during operation which might impact upon other marine users.

### Summary

20.5.6 On the basis that works are not anticipated in the marine environment, and as such there is no impact pathway, it is proposed that impacts on other marine users be scoped out of the EIA.

## 20.6 Heat and radiation

20.6.1 Schedule 4 of the EIA Regulations requires a consideration of the likely significant effects of the Proposed Development resulting from the emission of heat, light and radiation.

20.6.2 The Proposed Development is a water transfer and water recycling project, as such it would not generate any emissions of heat and/or radiation from its construction or operation that could result in likely significant effects on the environment. Therefore, it is proposed to scope this topic out of the EIA.

20.6.3 Potential likely significant effects of lighting on sensitive receptors are considered within Chapter 8 Terrestrial and Freshwater Biodiversity, Chapter 13 Landscape and visual and Chapter 16 Socio-economics, tourism and recreation and health.

## 20.7 Summary

Table 20-3: Summary of topics scoped out of EIA

| Sub-topic | Construction | Operation | Rationale for scoping sub-topics out |
|---|---|---|---|
| Major accidents and disasters | Scoped out | Scoped out | The potential risks for the Proposed Development, during construction and operation, are considered to be adequately mitigated and therefore no significant effects are anticipated. |
| Shipping and navigation | Scoped out | Scoped out | No significant effects are anticipated given works are not anticipated within the marine environment and materials are proposed to be delivered to site via road during construction and operation. |
| Coastal and marine processes: | Scoped out | Scoped out | No significant effects are anticipated given the very small predicted effect of changes in the discharge and suspended sediment concentrations from the Eastney LSO. |
| Other marine users | Scoped out | Scoped out | Works are not anticipated within the offshore marine area and, as such, there is no impact pathway. |
| Heat and radiation | Scoped out | Scoped out | No significant effects are anticipated from emissions of heat, light and/or radiation from the Proposed Development as there are no notable sources. |

# 21 Structure and content of the Environmental Statement

21.1.1 This chapter summarises the topics that are proposed to be scoped into and out of the EIA, and the proposed content of the ES. It also sets out the proposed next steps as the project moves forward.

21.1.2 Table 21-1 below summarises all aspects that are proposed to be scoped into and out of the EIA, and the proposed content of the ES.

**Table 21-4: Summary of topics proposed to be scoped in and out of the EIA**

| Topic | Construction | Operation |
|---|---|---|
| Air Quality and odour | Scoped In | Scoped Out |
| Archaeology and cultural heritage | Scoped In | Scoped In |
| Terrestrial and freshwater biodiversity | Scoped In | Scoped In |
| Marine biodiversity | Scoped In | Scoped In |
| Carbon and climate change | Scoped In | Scoped In |
| Land quality and ground conditions | Scoped In | Scoped In |
| Land use and agriculture | Scoped In | Scoped In |
| Landscape and visual | Scoped In | Scoped In |
| Noise and vibration | Scoped In | Scoped In |
| Resource and waste management | Scoped In | Scoped Out |
| Socio-economics, tourism, recreation and health | Scoped In | Scoped In |
| Traffic and transport | Scoped In | Scoped In |
| Water environment (including flood risk) | Scoped In | Scoped In |
| Cumulative effects | Scoped In | Scoped In |
| Major accidents and disasters | Scoped Out | Scoped Out |
| Shipping and navigation | Scoped Out | Scoped Out |
| Coastal and marine processes | Scoped Out | Scoped Out |
| Other Marine Users | Scoped Out | Scoped Out |
| Heat and Radiation | Scoped Out | Scoped Out |

## 21.2 Structure and content of the Environmental Statement

21.2.1 An outline structure of the ES is provided within this chapter, in accordance with guidance for the content of scoping requests contained in the Planning Inspectorate (2020) Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements, (Version 7) [38]. The ES will be prepared in accordance with the requirements for an ES as set out in Regulation 14 and Schedule 4 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations).

21.2.2 The ES will be produced in a number of volumes. These will include the following:

- NTS - this document will summarise the main elements of the Proposed Development and the significant environmental effects identified through the EIA process as outlined within Part 5 (14 (2) (e)) of the EIA regulations 2017. The NTS will be designed to provide information on the Proposed Development in an accessible format which can be understood by a wide audience and to assist interested parties with their familiarisation of the Proposed Development.
- ES Volume 6.1 - This will comprise the main body of the ES, detailing the results of the environmental assessment, the likely significant effects arising from the Proposed Development and any proposed mitigation measures to avoid, reduce or minimise any identified likely significant adverse environmental effects.
- ES Volume 6.2I - This will comprise the supporting technical appendices, comprising of background data, technical reports and surveys to the topic chapters in Volume I.
- ES Volume 6.3 - This will comprise the supporting figures to the topic chapters in Volume I.

## 21.3 Environmental Statement report structure

21.3.1 The structure of the ES will reflect the topics included within the Scoping Opinion provided by the Planning Inspectorate. It is anticipated that the ES would be based on the structure presented below:

- Introduction
- Planning legislation and policy
- Description of the Proposed Development
- Consideration of alternatives
- EIA approach and methodology
- Air quality
- Archaeology and cultural heritage
- Terrestrial and freshwater biodiversity
- Marine biodiversity
- Carbon and climate change
- Land quality and ground conditions
- Land use and agriculture
- Landscape and visual
- Noise and vibration
- Resource and waste management
- Socio-economics, tourism, recreation, and health
- Traffic and transport
- Water environment (including flood risk and marine water quality)
- Cumulative effects

- Summary
- Abbreviations and glossary

21.3.2 The ES will be supported by a number of documents either as appendices or standalone application documents, including but not limited to:

- Habitats Regulations Assessment
- Flood Risk Assessment
- Statement of Statutory Nuisance
- Hydrological Impact Assessment
- Environmental Master Plans
- Construction Management Plans
- Operational Management Plans
- Water Environment Regulations Compliance Assessment

# 22 Glossary

| Term | Definition |
|---|---|
| Accident | Something that happens by chance or without expectation. |
| Agricultural land classification | A method for assessing the quality of farmland to enable informed choices to be made about its future use within the planning system. Agricultural land is classified into five grades: Grade 1 (excellent), Grade 2 (very good), Grade 3 (good to moderate), Grade 4 (poor), and Grade 5 (very poor). Grade 3 can be further broken down into subgrades 3a (good) and 3b (moderate). |
| Air Valves | Air valves are located at high points along the pipeline route to automatically release any build-up of air in the pipeline and prevent air locking or cavitation of the pumps. |
| Amenity effects | In planning terms, 'amenity' is often used to refer to the quality or character of a property or area, and elements that contribute to the overall enjoyment of that property or area. Inherently, amenity values are subjective in nature, although there are qualities that are commonly accepted and shared such as privacy, outlook, access or quality of life. |
| Archaeology | The study of human activity through the recovery and analysis of material culture. |
| Associated Development | Temporary works to support construction, works to support operation and maintenance, site accesses, temporary and permanent utility connections, highway diversions and landscaping, environmental mitigation, enhancement and compensation. |
| A-weighting<br>$L_A$ or $L_{pA}$, $L_{WA}$,<br><br>similar – C-weighting<br>$L_C$ or $L_{pC}$, $L_{WC}$ | Is an electronic filter which is equal to the frequency sensitivity of the human ear. Our sensitivity is at a maximum at around 2 kHz and steadily decreases above and below. Below 20 Hz and above about 20 kHz we can't hear at all.<br>Within its operating limits a precision measurement microphone measures all frequencies the same so the output it produces does not reflect what we would hear. When considering impacts on humans, it is therefore often necessary to apply an A-weighting to the measured sound frequency spectrum. When A-weighted, the Sound Pressure Level $L_p$ becomes $L_{pA}$ (or $L_A$) and the Sound Power Level $L_W$ becomes $L_{WA}$.<br>The response of the human ear varies depending on how loud the sound is. A-weighting matches the response of a sound level meter to human hearing at low levels (~ 40-90 dB). For higher levels there are other weightings, the most common of which is the C-weighting. |
| BMV agricultural land | Grades 1, 2 and 3a are classed as BMV agricultural land. Consultation with Natural England is required on any non-agricultural development that involves the loss of 20 |

| Term | Definition |
|---|---|
| | hectares or more of BMV land and is not in a development plan. |
| Biodiversity Net Gain (BNG) | Development that leaves biodiversity in a better state than before. |
| Budds Farm Wastewater Treatment Works | This is an existing Southern Water site. |
| Capacity (traffic) | The maximum traffic flow that the road or junction can accommodate without causing unreasonable delay. |
| Carbon Dioxide Equivalent ($CO_2e$) | Carbon dioxide equivalent is a term for describing different greenhouse gases in a common unit. The unit takes the different Global warming potentials of greenhouses gases into account. $CO_2e$ is signifies the amount of $CO_2$ which would have the equivalent global warming impact. |
| Temporary Construction Compound | Temporary construction compounds will be located at suitable intervals along the proposed pipeline route. The site compounds will comprise office buildings, welfare facilities, parking and storage areas. They will be used for a range of supporting activities including storage and transfer of materials. |
| Construction waste | Consists of all waste produced directly or indirectly during the construction process, including excavated material displaced during this process. |
| Construction works boundary | Construction boundary means the line beyond which the construction of buildings and/or construction works is banned, except for the construction of roads or streets and engineering and utility networks. |
| Contractor | A general term used to describe an individual or company appointed by a developer to construct or manage a project at a certain price or rate. |
| Deadweight | The outputs that would occur if an intervention was not implemented. |
| Decibels<br>dB | A logarithmic ratio of two values of a variable. The decibel is not a true measurement unit nor is it exclusive to acoustics. Decibels are used because they can represent very wide ranges of ratios (from trillionths and billionths to billions and trillions) with a small range of decibel values. Decibels can be used to represent measured values by using a known reference value in the ratio. When using decibels to measure something it is therefore important to specify what variable is being measured and what reference level has been used. This is done by adding a reference value statement in the form “dB re x units”, where the units indicate the variable being measured and x is the reference value.<br>Decibels are used in acoustics because the human ear responds to sound pressure in a logarithmic way and the quantities measured in acoustics vary over wide ranges.<br>As the decibel is used in acoustics to represent a range of sound level parameters, there is a standardised notation system. This takes the form of an italic capital letter ‘*L*’ |

| Term | Definition |
|---|---|
| | (referring to 'level') and subscript characters which give specific details of what is being represented.<br>Because decibels are logarithmic, they must be added, subtracted, multiplied, divided and averaged using different techniques from normal numbers. |
| Designated heritage asset | A World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area designated under the relevant legislation. (NPPF [5] Annex 2) |
| Desk-based Assessment (heritage) | A programme of assessment of the known or potential archaeological resource within a specified area or site on land, inter-tidal zone or underwater [395] |
| Directivity | The amount by which a sound source radiates more sound in one direction than another. |
| Disaster | A natural hazard (e.g. earthquake) or a man-made / external hazard (e.g. act of terrorism) with the potential to cause an event or situation that meets the definition of a major accident. |
| Displacement (economic) | Economic displacement is the extent to which an increase in economic activity is offset by reductions in economic activity in the study area. For example, where a supported business through a mitigation or compensation programme takes market share from an unsupported business'. |
| Drought conditions | Droughts are naturally occurring events and are typically characterised by a prolonged period of<br>abnormally low rainfall, leading to a shortage of water. |
| Eastney Long Sea Outfall | This is an existing Southern Water infrastructure component.<br>This long sea outfall transfers treated wastewater from the Eastney Pumping Station to release into the Solent. |
| Eastney Pumping Station | This is an existing Southern Water infrastructure component and no works is anticipated on it as part of this project. This pumping station receives treated wastewater flows, via gravity, from Budds Farm WTW and pumps it out via the Eastney LSO. This pumping station also receives storm flows from the Eastney catchment area. |
| Eastney Transfer Tunnel | This is an existing Southern Water infrastructure component. This tunnel connects the Budds Farm WTW final effluent channel via a shaft located at Budds Farm WTW to the Eastney Pumping Station to release treated wastewater. |
| Frequency Weighted | Spectral values have been modified to reflect a frequency sensitivity. |
| Global Warming Potential | Global Warming Potential of a greenhouse gas (GHG) is a measure of how much heat is trapped by a certain amount of gas in the atmosphere relative to carbon dioxide. |
| Greenhouse gas (GHG) | A greenhouse gas is a gaseous constituent of the atmosphere, both natural and anthropogenic that absorbs |

| Term | Definition |
|---|---|
| | and re-emits infrared radiation causing the greenhouse effect. |
| Geoarchaeology | The application of earth science principles and techniques to the understanding of the archaeological record. (Historic England) |
| Geophysical survey | The systematic collection of measurements of physical properties of the earth to provide spatial information allowing interpretation of site formation processes and/or the potential presence of archaeologically significant remains. |
| Gross value added (GVA) | A measure of the value of goods and services in an area. |
| Hampshire Authorities | Comprising Hampshire County Council, Portsmouth City Council, Southampton City Council, New Forest National Park Authority and the South Downs National Park Authority. |
| Havant Thicket Reservoir | The Havant Thicket Reservoir is a development proposed by Portsmouth Water that has the benefit of planning permission. The proposed development interfaces with and proposes to connect into the reservoir as required to facilitate the Proposed Development. |
| Health detriment | Term used to describe the factors which can influence health outcomes of people and populations. |
| Heritage asset | A building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. It includes designated heritage assets and assets identified by the local authority (including local listing). (NPPF [5] Annex 2) |
| Historic environment | All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora. (NPPF [5] Annex 2) |
| Historic Landscape Characterisation | Historic landscape characterisation (HLC) is a method of identification and interpretation of the varying historic character within an area that looks beyond individual heritage assets as it brigades understanding of the whole landscape and townscape into repeating HLC Types (Historic England). |
| Index | A value based on the mathematical processing of raw data. |
| Indicator | A value used to indicate the likelihood of a particular response of effect<br>e.g. L10,18hr is an index based on statistical processing of sound pressure data that is used as an indicator for road traffic noise response. |

| Term | Definition |
|---|---|
| Inert waste | According to Regulation 7(4) of the Landfill Regulations 2002, inert waste is waste that:<br>Will not undergo any significant physical, chemical or biological transformations.<br>Will not dissolve.<br>Will not burn.<br>Will not physically or chemically react.<br>Will not biodegrade.<br>Will not adversely affect other matter with which it comes into contact in a way likely to give rise to environmental pollution or harm to human health.<br>Has insignificant total leachability and pollutant content<br>Produces a leachate with an ecotoxicity that is insignificant (if it produces leachate). |
| Indicator | A value used to indicate the likelihood of a particular response or effect.<br>e.g. *L*10,18hr is an index based on statistical processing of sound pressure data that is used as an indicator for road traffic noise response. |
| Landscape character areas (LCA) | Single unique areas which are the discrete geographical areas of a particular landscape type.. |
| Landscape character assessment | The process of identifying and describing variation in the character of the landscape, and using this information to assist in managing change in the landscape. It seeks to identify and explain the unique combination of elements and features that make landscapes distinctive. The process results in the production of a Landscape Character Assessment. |
| Landscape character types- (LCT) | Distinct types of landscape that are relatively homogeneous in character. They are generic in nature in that they may occur in different areas in different parts of the country, but wherever they occur they share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern, and perceptual and aesthetic attributes. |
| Leakage (economic) | Economic leakage is the extent to which outputs (jobs or gross value added) “leak out” of a study area into others. The leakage of employment effects reduces employment effects in the study area[23]. |
| LiDAR | A survey detection system based on radar principles using light. It makes 3-dimensional representations of areas of the Earth's surface. |
| Link | A section of highway, footway or footpath, cycleway or cycle path, or bridleway |
| $L_p$ | The instantaneous sound pressure level ($L_p$) |

[23] Homes and Communities Agency, Additionality Guide (Fourth Edition), London, 2014

| Term | Definition |
|---|---|
| $L_{pA}$ (or $L_A$)<br><br>$L_{AF}$, $L_{AS}$ | The A-weighted instantaneous sound pressure level ($L_{pA}$ or $L_A$)<br>This is the root mean square size of the pressure fluctuations in the air. This level can fluctuate wildly even for seemingly steady sounds. To make sound level meters easier to read the values on the display are smoothed or damped out. This is effectively done by taking a rolling average of the previous 0.125 s (FAST time constant) or the previous 1 s (SLOW time constant).<br>The letters F or S are added to the subscripts in the notation to indicate when the FAST or SLOW time constant has been used. These are often omitted but it is good practice to include them. |
| $L_{max}$<br>$L_{Amax}$<br>$L_{AFmax}$<br><br>$L_{min}$ , $L_{Fmin}$ | The maximum instantaneous sound pressure level ($L_{max}$),<br>The A-weighted maximum instantaneous sound pressure level ($L_{Amax}$)<br>The A-weighted maximum instantaneous sound pressure level with a FAST time constant ($L_{AFmax}$).<br>This is the highest instantaneous sound pressure level reached during a measurement period.<br>The opposite of the $L_{max}$ is the minimum instantaneous sound pressure level or $L_{min}$ etc.<br>It is good practice to include the letter which identifies the time constant used as this can make a significant difference to the value. |
| $L_{N,T}$<br>$L_{AN,T}$ $L_{AFN,T}$<br>$N$ = %age value, 0-100<br>$T$ = measurement time<br>e.g. $L_{A90}$, $L_{A10}$, $L_{AF90,\ 5\ min}$ | The percentage exceedance sound pressure level ($L_{N,T}$),<br>The A-weighted percentage exceedance sound pressure level ($L_{AN,T}$), the A-weighted percentage exceedance sound pressure level with a FAST time constant ($L_{AFN,T}$).<br>This is the sound pressure level exceeded for $N$% of the time $T$. e.g. If an A-weighted level of x dB is exceeded for a total of 6 minutes within one hour, the level will have been above x dB for 10% of the measurement period. This is written as $L_{A10,1hr}$ = x dB.<br>$L_{A0}$ (the level exceeded for 0 % of the time) is equivalent to the $L_{Amax}$ and $L_{A100}$ (the level exceeded for 100 % of the time) is equivalent to the $L_{Amin}$.<br>It is good practice to include the letter which identifies the time constant used as this can make a significant difference to the value. |
| $L_{eq,T}$<br>$L_{Aeq,T}$<br>$T$ = measurement time<br>eg. $L_{Aeq,5min}$ | The equivalent continuous sound pressure level over period T ($L_{eq,T}$),<br>The A-weighted equivalent continuous sound pressure level over period T ($L_{Aeq,T}$).<br>This is effectively the average sound pressure level over a given period. As the decibel is a logarithmic quantity the $L_{eq}$ is not a simple arithmetic mean value.<br>The $L_{eq}$ is calculated from the raw sound pressure data. It is not appropriate to include a reference to the FAST and SLOW time constants in the notation. |

| Term | Definition |
|---|---|
| Main River | Watercourses designated as ‘main’ are generally the larger arterial watercourses. The EA has permissive powers, but not a duty, to carry out maintenance, improvement or construction work on designated Main Rivers. |
| Major Accident | Events that threaten immediate or delayed serious environmental effects to human health, welfare and / or the environment and require the use of resources beyond those of the applicant or its appointed representatives to manage. |
| Material resources | Construction materials and products (from primary (natural assets), recycled or secondary and renewable sources) and built assets. |
| Mineral Safeguarding Areas | Areas defined by mineral planning authorities with known mineral resources that are of identified economic or conservation value. |
| Mitigation | Measures intended to avoid, reduce and, where possible, remedy significant adverse environmental effects. Measures follow a hierarchical system as described in Chapter 5, section 5.2 |
| Multiplier effects | Further economic activity associated with additional local income and local supplier purchases (i.e. supply chain effects). |
| National Policy Statement for Water Resources Infrastructure (NPSWRI) | The National Policy Statement for water resources infrastructure published in April 2023. |
| Noise | No strict definition and is often used interchangeably with sound however it is usually taken to mean noticeable unwanted sound. |
| Noise level | Values measured in decibels. |
| Non-hazardous waste | Any waste not defined as 'hazardous' under Directive 2008/98/EC. |
| Non-motorised users | A 'non-motorised user' is someone walking or cycling, or a horse rider. |
| Ordinary Watercourse | On these watercourses the Lead Local Flood Authority or, if within an Internal Drainage District, the Internal Drainage Board, have similar permissive powers to the EA to maintain and improve. |
| Otterbourne Water Supply Works | This is an existing Southern Water site. |
| Peak operation | The period when the Proposed Development is operating at maximum capacity, treating approximately 80Ml/d of treated wastewater. |
| Preferred Pipeline Corridor | The preferred pipeline corridor is a wider area of land in which a pipeline could be sited. Utilising pipeline corridors allows for micro-siting of the pipeline route at future stages.<br>Collective term for the whole of the pipeline, when not referring to a specific section |
| Preliminary Environmental Information (PEI) Report | The PEI Report sets out the information that ‘is reasonably required for the consultation bodies to develop an informed view of the likely significant environmental effects of the |

| Term | Definition |
|---|---|
| | development' ((Regulation 12(2)(b) of the EIA Regulations 2017) as set out in Planning Inspectorate (2019) Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects, (Version 2) [42], Section 8.3) |
| Primary Materials | Physical substances from non-renewables sources, i.e. those that cannot or will not be replaced in short (non-geological) periods of time. Also referred to as 'virgin' materials. |
| Principal Aquifer | These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer. |
| Project Integra | Project Integra is a partnership working to provide an integrated approach to the collection, treatment and disposal of municipal waste in Hampshire.<br>The partnership includes:<br>the 11 district/borough authorities in Hampshire (waste collection)<br>Hampshire County Council (waste disposal)<br>Portsmouth and Southampton unitary authorities (waste collection and disposal)<br>Veolia Hampshire (integrated waste management contractor). |
| Project of National Significance | Used to describe large scale developments (relating to energy, transport, water, or waste) that are of national significance and require a development consent order. |
| Proposed Above Ground Plant | This collectively refers to the proposed IPSs, BPTs and HLPS. |
| Proposed Break Pressure Tank | The break pressure tank (BPTs) would be located at high points on the pipeline route. Water would be pumped up hill into the tank and then flow downhill from the tank through gravity. This reduces the amount of energy required to transfer the water along the pipeline route between Havant Thicket Reservoir and Otterbourne Water Supply Works compared to if the entire route was pumped. As break pressure tanks help to reduce the overall maximum pressure within the system, this reduces rapid changes in water pressure within the pipeline, which are associated with sudden changes in flow rate.<br>The break pressure tanks are currently proposed to be partially buried to blend into the surrounding landscape. |
| Proposed Development | This refers to the proposed Hampshire Water Transfer and Water Recycling Project, as described in Chapter 3 of this EIA Scoping Report. |

| Term | Definition |
|---|---|
| Proposed High Lift Pumping Station | The HLPS would be located at the site of the WRP or along the underground pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works.<br>The HLPS would be the first pumping station required along the pipeline route to support the transfer of water from Havant Thicket Reservoir to Otterbourne Water Supply Works. |
| Proposed Intermediate Pumping Station | The intermediate pumping station (IPS) would provide additional pumping for the underground pipeline to reduce the maximum pressure and overcome topographical high points. |
| Proposed Underground Pipeline | This is the proposed underground water transfer pipeline |
| Proposed Water Recycling Plant | The Water Recycling Plant (WRP) would be located in the vicinity of Budds Farm Wastewater Treatment Works and would have an output of at least 15Ml/d. Water recycling uses advanced treatment techniques to turn highly treated wastewater, that is usually pumped away into rivers and the sea, into purified recycled water. |
| Public Consultation 2022 | The non-statutory consultation undertaken in summer 2022 which consulted on the Proposed Development, including the process undertaken to select the Proposed Development and the process undertaken to identify the preferred pipeline corridor, WRP and HLPS sites, and emerging above ground plant zones. |
| Risk | The likelihood of an impact occurring, combined with the effect or consequence(s) of the impact on a receptor if it does occur. |
| Risk event | An identified, unplanned event, which is considered relevant to the Proposed Development and has the potential to result in a major accident and / or disaster, subject to its potential to result in a significant adverse effect on an environmental receptor. |
| Run to waste from the WRP | The volume of water that is discharged from the water recycling plant during the time it takes for an emergency shut down to take place, typically this is a matter of minutes as the pumps are shut down and forward process valves are closed and run to waste valve is opened. |
| Scoping Area | The Scoping Area is illustrated in Figure 4.1 and Figure 4.2, and includes all land being considered for the purposes of the Proposed Development. Figure 4.1 and Figure 4.2 constitutes ‘a plan sufficient to identify the land’ for the purposes of this Scoping Report. It represents the maximum extent of land that could be required for temporary or permanent purposes in order to construct and operate the Proposed Development. This allows for consideration of the potential environmental effects of the Proposed Development, to ensure that the likely significant effects are scoped into the assessment. The land required for the Proposed Development, within the envelope of the |

| Term | Definition |
|---|---|
| | Scoping Area, will be refined as design work progresses, considering environmental and technical factors, and consultation feedback.<br>The Scoping Area also includes areas which may not be subject to physical changes or acquisition of land rights, but that the Applicant may need to seek operational powers over in the Development Consent Order (DCO), such as the Eastney Long Sea Outfall (LSO), Eastney Pumping Station (PS), and associated Eastney Transfer Tunnel (TT). |
| Secondary A Aquifer | These are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers. |
| Secondary Materials | Useful by-products from manufacturing or industrial processes. |
| Secondary Undifferentiated Aquifer | This has been assigned in cases where it has not been possible to attribute either a Secondary A or B aquifer to the soil type due to the variable characteristics. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type. |
| Setting (of a heritage asset) | The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral. (NPPF [5] Annex 2) |
| Significance (of a heritage asset) | The value of a heritage asset to this and future generations because of its heritage interest. The interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting. For World Heritage Sites, the cultural value described within each site's Statement of Outstanding Universal Value forms part of its significance. (NPPF [5] Annex 2) |
| Significant environmental effect (in relation to a major accident and / or disaster assessment) | Includes the loss of life, permanent injury and temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration. |
| Sound | The physical phenomenon of the transmission of energy through gaseous or liquid media via rapid fluctuations in pressure. |
| Source Protection Zone 1 (SPZ1) | Inner protection zone - defined as the 50-day travel time from any point below the water table to the abstraction source. This zone has a minimum radius of 50 metres. |

| Term | Definition |
|---|---|
| Source Protection Zone 1c (SPZ1c) | Inner protection zone - defined as the 50-day travel time from any point below the water table to the abstraction source. This zone has a minimum radius of 50 metres and is where there is protective geology cover, such as clay. |
| Source Protection Zone 2 (SPZ2) | Outer protection zone - defined by a 400-day travel time from a point below the water table. This zone has a minimum radius of 250 or 500 metres around the abstraction source, depending on the size of the abstraction. |
| Source Protection Zone 2c (SPZ2c) | Outer protection zone – defined by a 400-day travel time from an point below the water table. This zone has a minimum radius of 250 or 500 metres and is where there is protective geology cover, such as clay. |
| Source Protection Zone 3 (SPZ3) | Source catchment protection zone - defined as the area around an abstraction source within which all groundwater recharge is presumed to be discharged at the abstraction source. |
| Source water | Water that is used as a source for drinking water. |
| Sound | The physical phenomenon of the transmission of energy through gaseous or liquid media via rapid fluctuations in pressure. |
| South East England | Comprising counties of Berkshire, Buckinghamshire, East Sussex, Hampshire, Isle of Wight, Kent, London, Oxfordshire, Surrey and West Sussex |
| Subcontractor | Any business which has agreed to carry out construction operations for another business or body which is a contractor or deemed contractor. |
| Temporary lagoons | .<br>A temporary lagoon is used to aid the transfer of water from one section to the next and is used as a storage vessel to contain the water used for testing if direct transfer is not possible e.g. the next section is not ready for testing when the testing of the previous section is complete. |
| The Applicant | Southern Water Services Limited |
| Trial trenching | Archaeological investigation using discrete trenches to investigate an area or specific features of interest to provide information to inform consent or allow a scheme of mitigation to be designed. |
| Unproductive Strata | These are predominantly rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow. |
| Vulnerability | Describes the potential for harm as a result of an event, for example due to the sensitivity or value of receptors. Vulnerability is influenced by sensitivity, adaptive capacity and magnitude of impact. |
| Washout Valves | Washouts are valves that can be opened on occasion to clear sediment from a water transmission pipeline or |

| Term | Definition |
|---|---|
| | completely drain sections of pipelines in maintenance or repair scenarios. |
| Waste | Any substance or object which the holder discards or intends or is required to discard – unusable or unwanted. |
| Waste Hierarchy | The “waste hierarchy” ranks waste management options according to what is best for the environment. It gives top priority to preventing waste in the first place. When waste is created, it gives priority to preparing it for re-use, then recycling, then recovery, and last of all disposal (e.g. landfill). |
| Zone of Influence (ZoI) | The spatial scale at which features could be affected as a result of the Proposed Development and associated activities. |
| Zone of Theoretical Visibility (ZTV) | A map, usually digitally produced, showing areas of land within which a development is theoretically visible. |

# 23 Abbreviations

| Abbreviation | Definition |
|---|---|
| AGP | Above Ground Plant |
| ARN | Affected Road Network |
| ALC | Agricultural land classification |
| AQMA | Air Quality Management Area |
| AQO | Air Quality Objective |
| AQS | Air Quality Standard |
| APTA | American Public Transit Association |
| NH3 | Ammonia |
| AADT | Annual Average Daily Traffic |
| AONB | Area of Outstanding Natural Beauty |
| ASLQ | Area of Special Landscape Quality |
| AIS | Automated Identification System |
| ATC | Automated Traffic Count |
| AAWT | Average Annual Weekly Traffic |
| BNL | Basic Noise Level |
| BMV | Best and Most Versatile |
| BAP | Biodiversity Action Plan |
| BNG | Biodiversity Net Gain |
| BOD | Biological Oxygen Demand |
| BPT | Break Pressure Tank |
| BGS | British Geological Society |
| BS | British Standard |
| BSI | British Standards Institution |
| CRTN | Calculation of Road Traffic Noise |
| cSAC | Candidate Special Area of Conservation |
| CO2 | Carbon Dioxide |
| CO2e | Carbon Dioxide Equivalent |
| CAMS | Catchment Abstraction Management Strategy |
| Cefas | Centre for Environment, Fisheries and Aquaculture Science |
| CD | Chart Datum |
| CIfA | Chartered Institute for Archaeology |
| CIEEM | Chartered Institute of Ecology and Environmental Management |
| COD | Chemical Oxygen Demand |
| CofE | Church of England |
| CCRA | Climate Change Risk Assessment |
| CHP | Combined Heat and Power |

| Abbreviation | Definition |
|---|---|
| CIRIA | Construction Industry Research and Information Association |
| CTMP | Construction Traffic Management Plan |
| CL:AIRE | Contaminated Land: Applications in Real Environments |
| COMAH | Control of Major Accidents and Hazards |
| LPD | Council Local Development Plan |
| CHIA | Cultural Heritage Impact Assessment |
| CEA | Cumulative Effects Assessment |
| DMT | Decision-making Threshold |
| BEIS | Department for Business, Energy and Industrial Strategy |
| Defra | Department for Environment, Food & Rural Affairs |
| DLUHC | Department for Levelling Up, Communities and Housing |
| DfT | Department for Transport |
| DMRB | Design Manual for Roads and Bridges |
| DCO | Development Consent Order |
| DPF | Diesel Particulate Filters |
| DSM | Digital Surface Model |
| DTM | Digital Terrain Model |
| DLL | District Level Licence |
| DrWPA | Drinking Water Protected Area |
| EHDC | East Hampshire District Council |
| EBC | Eastleigh Borough Council |
| EcIA | Ecological Impact Assessment |
| EA | Environment Agency |
| EMP | Environment Management Plan |
| EIA | Environmental Impact Assessment |
| END | Environmental Noise Directive |
| EPUK | Environmental Protection UK |
| EQS | Environmental Quality Standards |
| ES | Environmental Statement |
| EqIA | Equality Impact Assessment |
| EEA | European Economic Area |
| EPS | European Protected Species |
| EU | European Union |
| ExA | Examining Authority |
| FBC | Fareham Borough Council |
| FRS | Fire and Rescue Service |
| FRA | Flood Risk Assessment |
| FEPA | Food and Environmental Protection Act 1985 |

| Abbreviation | Definition |
|---|---|
| FC | Forestry Commission |
| FE | Forestry England |
| fCTMP | Framework Construction Traffic Management Plan |
| fTMS | Framework Transport Management Strategy |
| GCN | Great Crested Newt |
| GHG | Greenhouse Gas |
| GVA | Gross value added |
| GWDTE | Groundwater Dependant Terrestrial Ecosystems |
| GWSWI | Groundwater -surface water Interactions |
| GLIVA3 | Guidelines for Landscape and Visual Impact Assessment. Third edition |
| HRA | Habitat Regulations Assessment |
| HSI | Habitat Suitability Index |
| HIWWT | Hampshire and Isle of Wight Wildlife Trust |
| HBIC | Hampshire Biological Information Centre |
| HCC | Hampshire County Council |
| HHER | Hampshire Historic Environment Record |
| HMWP | Hampshire Minerals and Waste Plan |
| HMWP | Hampshire Minerals and Waste Plan |
| HBC | Havant Borough Council |
| HSC | Hazardous Substances Consent |
| HSWA | Health and Safety at Work etc. Act 1974 |
| HSE | Health and Safety Executive |
| HUDU | Healthy Urban Development Unit |
| HGV | Heavy Goods Vehicle |
| ha | Hectare |
| HLPS | High Lift Pumping Station |
| HDPE | High-density polyethylene |
| HE | Historic England |
| HER | Historic Environment Record |
| HCA | Homes and Communities Agency |
| HisEng | Homes England / Historic England |
| HWRC | Household Waste Recycling Centre |
| HFC | Hydrofluorocarbon |
| HIA | Hydrogeological Impact Assessment |
| IROPI | Imperative Reasons of Overriding Public Interest |
| IED | Improvised Explosive Device |
| ICCI | In-combination climate change impact |
| IMD | Index of multiple deprivation |

| Abbreviation | Definition |
|---|---|
| IFCA | Inshore Fisheries and Conservation Authority |
| IHBC | Institute for Historic Building Conservation |
| IAQM | Institute of Air Quality Management |
| IEMA | Institute of Environmental Management Assessment |
| IPCC | Intergovernmental Panel on Climate Change |
| IPS | Intermediate Pumping Station |
| ICES | International Council for the Exploration of the Sea |
| ISO | International Organisation for Standardisation |
| ITL | International Territorial Level |
| INNS | Invasive and Non-Native Species |
| ICE | Inventory of Carbon and Energy |
| JNCC | Joint Nature Conservation Committee |
| JOG | Joint Officers Group |
| km | Kilometre |
| Kt | Kilotonnes |
| LCRM | Land Contamination Risk Management |
| LVIA | Landscape and Visual Impact Assessment |
| LCA | Landscape character area |
| LCT | Landscape character type |
| LLFA | Lead Local Flood Authority |
| LiDAR | Light detection and ranging. |
| LDV | Light Duty Vehicle |
| LSE | Likely Significant Effects |
| LAQM. TG | Local Air Quality Management Technical Guidance |
| LBAP | Local Biodiversity Action Plan |
| LDP | Local Development Plans |
| LEAP | Local equipped areas for play |
| LLCA | Local Landscape Character Areas |
| LNR | Local Nature Reserve |
| LPA | Local Planning Authority |
| LRF | Local Resilience Forum |
| LWS | Local Wildlife Site |
| LDF | Long distance footpath |
| LSO | Long Sea Outfall |
| LOAEL | Lowest Observed Adverse Effect Level |
| MCC | Manual Classified Count |
| MCZ | Marine Conservation Zones |
| MMO | Marine Management Organisation |

| Abbreviation | Definition |
|---|---|
| MPA | Marine Protected Areas |
| MSMS | Marine Safety Management System |
| MRF | Material Recovery Facility |
| MMP | Materials Management Plan |
| MHWS | Mean High Water Springs |
| m2 | Meters squared |
| CH4 | Methane |
| m | Metre |
| m AOD | metres Above Ordnance Datum (m AOD) |
| mm | Millimetre |
| Ml | Million litres |
| Ml/d | Million litres per day |
| Mt | Million tonnes |
| MSA | Mineral Safeguarding Area |
| MHCLG | Ministry of Housing, Communities and Local Government |
| MUGA | Multi-use games area |
| NAP | National Adaptation Programme |
| NCA | National Character Area |
| NCN | National Cycle Network |
| NHS | National Health Service |
| NHLE | National Heritage List for England |
| NH | National Highways |
| NMP | National Mapping Programme |
| NNR | National Nature Reserve |
| NPPF | National Planning Policy Framework |
| NPPG | National Planning Practice Guidance |
| NPS | National Policy Statement |
| NPSWRI | National Policy Statement for Water Resources Infrastructure |
| NSN | National Site Network |
| NVC | National Vegetation Classification |
| NSIP | Nationally Significant Infrastructure Project |
| NE | Natural England |
| NERC | Natural Environment and Rural Communities |
| NEAP | Neighbourhood equipped areas for play |
| NR | Network Rail |
| NFNPA | New Forest National Park Authority |
| NNG | Night Noise Guidelines |
| NVZ | Nitrate Vulnerable Zones |

| Abbreviation | Definition |
|---|---|
| NO2 | Nitrogen dioxide |
| NOx | Nitrogen oxides |
| NF3 | nitrogen trifluoride |
| N2O | Nitrous oxide |
| NOEL | No Observed Effect Level |
| NAC | Noise Advisory Council’ |
| NVSR | Noise and Vibration Sensitive Receptor |
| NIA | Noise Important Areas |
| NPSE | Noise Policy Statement for England |
| NSR | Noise Sensitive Receptor |
| NRMM | Non-Road Mobile Machinery |
| OAE | Observed Adverse Effect |
| OHID | Office for Health Improvement and Disparities |
| ONS | Office for National Statistics |
| OS | Ordnance Survey |
| OWSW | Otterbourne Water Supply Works |
| OLEMP | Outline Landscape and Ecology Management Plan |
| Arup | Ove Arup and Partners Limited |
| PM10 | Particulate Matter where particles are less than 10 micrometres in diameter |
| PM2.5 | Particulate Matter where particles are less than 2.5 micrometres in diameter |
| PUSH | Partnership for South Hampshire |
| PPV | Peak Particle Velocity |
| PFC | Perfluorocarbon |
| PFOS | Perfluorooctane Sulphonate |
| PA 2008 | Planning Act 2008 |
| PPG | Planning Practice Guidance |
| PPG-N | Planning Practice Guidance on Noise |
| PCM | Pollution Climate Mapping |
| PBDE | Polybrominated Diphenyl Ethers |
| PCC | Portsmouth City Council |
| PHER | Portsmouth Historic Environment Record |
| PSC | Potential Sources of Contamination |
| pSAC | Potential Special Area of Conservation |
| pSPA | Potential Special Protection Area |
| PEI | Preliminary Environmental Information |
| PFRA | Preliminary Flood Risk Assessment |
| PNS | Projects of National Significance |
| PIC | Public Interest Commitment |

| Abbreviation | Definition |
|---|---|
| PRoW | Public Right of Way |
| PWS | Public water supply |
| PS | Pumping Station |
| RDB | Red Data Book |
| RAPID | Regulators' Alliance for Progressing Infrastructure Development |
| RCP | Representative Concentration Pathways |
| RAMS | Risk Assessment and Method Statements |
| RVEI | Road Verge of Environmental Importance |
| RC | Roman Catholic |
| RSPB | Royal Society for the Protection of Birds |
| SIB | Safety Instructions Book |
| SAR | Search and Rescue |
| SoS | Secretary of State |
| SOAEL | Significant Observed Adverse Effect Level |
| SINC | Site of Importance for Nature Conservation |
| SSSI | Site of Special Scientific Interest |
| SWMP | Site Waste Management Plan |
| SOM | Size of Maturity |
| SES | Skills and Employment Strategy |
| SPZ | Source Protection Zone |
| SDNP | South Downs National Park |
| SDNPA | South Downs National Park Authority |
| SEEAWP | South East England Aggregates Working Party |
| SERBMP | South East river basin district River basin management plan |
| SCC | Southampton City Council |
| SW | Southern Water |
| SAC | Special Area of Conservation |
| SPA | Special Protection Area |
| SRO | Strategic Resource Option |
| SF6 | Sulphur hexafluoride |
| SPD | Supplementary Planning Document |
| SPG | Supplementary Planning Guidance |
| SSC | Suspended solids concentrations |
| TAG | Technical Advisory Group |
| TGN | Technical Guidance Note |
| TIA | Test and Itchen Association |
| TICP | Test and Itchen Catchment Partnership |
| Ofwat | The Water Services Regulation Authority |

| Abbreviation | Definition |
|---|---|
| WT | The Woodland Trust |
| t | Tonnes |
| TT | Transfer Tunnel |
| TraC | Transitional and coastal |
| TRRL | Transport and Road Research Laboratory |
| TWAO | Transport and Works Act Order |
| TA | Transport Assessment |
| TRL | Transport Research Laboratory |
| TPO | Tree Preservation Order |
| TEMPro | Trip End Model Presentation Programme |
| TBM | Tunnel boring machine |
| UKCP | UK Climate Projections |
| UKWIR | UK Water Industry Research |
| UXO | Unexploded Ordnance |
| UK | United Kingdom |
| UrHIA | Urban Health Impact Assessment |
| WHIASU | Wales Health Impact Assessment Support Unit |
| WCH | Walkers, cyclists, and horse riders |
| WTW | Wastewater Treatment Works |
| WER | Water Environment Regulations |
| WfLH | Water for Life Hampshire |
| WFD | Water Framework Directive |
| WRP | Water Recycling Plant |
| WRMP19 | Water Resource Management Plan 19 |
| WRMP | Water Resources Management Plan |
| WSM | Water Services Manual |
| WSW | Water Supply Works |
| WCSRT | Wessex Chalk Stream and Rivers Trust |
| WCC | Winchester City Council |
| WHER | Winchester Historic Environment Record |
| WSI | Written Scheme of Investigation |
| ZoI | Zone of Influence |
| ZTV | Zone of Theoretical Visibility |

# 24 References

[1] Planning Inspectorate, “Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements (Version 7),” June 2020. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/.

[2] Environment Agency and Department for Environment, Food & Rural Affairs, “Water stressed areas – 2021 classification,” 1 July 2012. [Online]. Available: https://www.gov.uk/government/publications/water-stressed-areas-2021-classification.

[3] Water Resources South East, “Our draft best value regional plan,” November 2022. [Online]. Available: https://wrse.uk.engagementhq.com/our-draft-best-value-regional-plan.

[4] Department for Environment, Food & Rural Affairs, “National Policy Statement for Water Resources Infrastructure,” 17 April 2023. [Online]. Available: https://www.gov.uk/government/publications/national-policy-statement-for-water-resources-infrastructure.

[5] Ministry of Housing, Communities & Local Government, “National Planning Policy Framework,” 20 July 2021. [Online]. Available: https://www.gov.uk/government/publications/national-planning-policy-framework--2.

[6] Department for Environment, Food & Rural Affairs, “National Policy Statement for water resources infrastructure,” 17 April 2023. [Online]. Available: https://www.gov.uk/government/publications/national-policy-statement-for-water-resources-infrastructure.

[7] East Hampshire District Council and South Downs National Park Authority, “East Hampshire District Local Plan: Joint Core Strategy,” 8 May 2014. [Online]. Available: https://www.easthants.gov.uk/planning-services/planning-policy/local-plan/adopted-local-plan.

[8] East Hampshire District Council Planning Services, “East Hampshire District Local Plan: Housing and Employment Allocations,” April 2016. [Online]. Available: https://www.easthants.gov.uk/planning-services/planning-policy/local-plan/adopted-local-plan.

[9] East Hampshire District Council, “East Hampshire District Local Plan: Second Review,” March 2006. [Online]. Available: https://www.easthants.gov.uk/planning-services/planning-policy/local-plan/adopted-local-plan.

[10] Eastleigh Borough Council, “Eastleigh Borough Local Plan (2016 - 2036),” April 2022. [Online]. Available: https://www.eastleigh.gov.uk/planning-and-building/planning-policy-and-implementation/local-plan/local-plan-adoption#:~:text=The%20Eastleigh%20Borough%20Local%20Plan%202016%2D2036%20was%20adopted%20on,Adopted%20Local%20Plan%202001%2D2011..

[11] Eastleigh Borough Council, “Eastleigh Borough Local Plan 2016-2036: Policies Map (North),” April 2022. [Online]. Available: https://www.eastleigh.gov.uk/planning-and-building/planning-policy-and-implementation/local-plan/local-plan-adoption#:~:text=The%20Eastleigh%20Borough%20Local%20Plan%202016%2D2036%20was%20adopted%20on,Adopted%20Local%20Plan%202001%2D2011..

[12] Eastleigh Borough Council, “Eastleigh Borough Local Plan 2016-2036: Policies Map (South),” April 2022. [Online]. Available: https://www.eastleigh.gov.uk/planning-and-building/planning-policy-and-implementation/local-plan/local-plan-adoption#:~:text=The%20Eastleigh%20Borough%20Local%20Plan%202016%2D2036%20was%20adopted%20on,Adopted%20Local%20Plan%202001%2D2011..

[13] Fareham Borough Council, “Fareham Local Plan 2037,” April 2023. [Online]. Available: https://www.fareham.gov.uk/planning/localplan.aspx.

[14] Fareham Borough Council, “Fareham Local Plan 2037: Policies Map,” 2023. [Online]. Available: https://www.fareham.gov.uk/planning/localplan.aspx.

[15] Fareham Borough Council, “Local Plan Part 3: The Welborne Plan,” June 2015. [Online]. Available: https://www.fareham.gov.uk/planning/localplan.aspx.

[16] Hampshire County Council, “Minerals and Waste Plan,” October 2013. [Online]. Available: https://www.hants.gov.uk/landplanningandenvironment/strategic-planning/hampshire-minerals-waste-plan.

[17] Hampshire County Council, “Hampshire Strategic Infrastructure Statement,” April 2019. [Online]. Available: https://www.hants.gov.uk/landplanningandenvironment/strategic-planning/infrastructure-planning.

[18] Havant Borough Council, “Havant Borough Core Strategy,” March 2011. [Online]. Available: https://www.havant.gov.uk/local-plan-core-strategy.

[19] Havant Borough Council, “Havant Borough Local Plan (Allocations),” July 2014. [Online]. Available: https://www.havant.gov.uk/local-plan-allocations.

[20] Portsmouth City Council, “The Portsmouth Plan,” 24 January 2012. [Online]. Available: https://www.portsmouth.gov.uk/services/development-and-planning/planning-policy/the-portsmouth-plan-adopted-2012/.

[21] Portsmouth City Council, “Portsmouth City Local Plan adopted 2006,” 2006. [Online]. Available: https://www.portsmouth.gov.uk/services/development-and-planning/planning-policy/portsmouth-city-local-plan-adopted-2006/.

[22] Portsmouth City Council, “Southsea Town Centre Area Action Plan: Development Plan Document,” 2007. [Online]. Available: https://www.portsmouth.gov.uk/wp-content/uploads/2020/05/development-and-planning-southsea-town-centre-area-action-plan.pdf.

[23] Portsmouth City Council, “Somerstown and North Southsea Area Action Plan: Development Plan Document (DPD),” 2012. [Online]. Available: https://www.portsmouth.gov.uk/wp-content/uploads/2020/05/development-and-planning-somerstown-and-north-southsea-area-action-plan.pdf.

[24] Milton Plan, “Milton Neighbourhood Development Plan Submission Version 2021 - 2036,” 2022. [Online]. Available: http://miltonplan.org.uk/about/the-plan-process/draft-neighbourhood-plan-june-2018/.

[25] Winchester City Council, “Local Plan Part 1: Joint Core Strategy,” March 2013. [Online]. Available: https://www.winchester.gov.uk/planning-policy/winchester-district-local-plan-2011-2036-adopted/local-plan-part-1-joint-core-strategy-adopted-march-2013-local-plan-review-2006/local-plan-part-1-joint-core-strategy-adopted-2013.

[26] Winchester City Council, “Winchester District Local Plan Part 2 – Development Management and Site Allocations,” April 2017. [Online]. Available: https://www.winchester.gov.uk/planning-policy/winchester-district-local-plan-2011-2036-adopted/local-plan-part-2-development-management-allocations.

[27] Winchester City Council, “The Policies Map,” April 2017. [Online]. Available: https://www.winchester.gov.uk/planning-policy/winchester-district-local-plan-2011-2036-adopted/local-plan-part-2-development-management-allocations/lpp2-adoption.

[28] South Downs National Park Authority, “South Downs Local Plan,” July 2019. [Online]. Available: https://www.southdowns.gov.uk/planning-policy/south-downs-local-plan/local-plan/.

[29] South Downs National Park Authority, “The Policies Map,” No date. [Online]. Available: https://www.southdowns.gov.uk/planning-policy/south-downs-local-plan/policies-map/.

[30] Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government, “National Design Guide,” 30 January 2021. [Online]. Available: https://www.gov.uk/government/publications/national-design-guide.

[31] Department for Environment, Food & Rural Affairs, “UK marine policy statement,” 22 September 2020. [Online]. Available: https://www.gov.uk/government/publications/uk-marine-policy-statement.

[32] Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government, “National planning policy for waste,” 16 October 2014. [Online]. Available: https://www.gov.uk/government/publications/national-planning-policy-for-waste.

[33] HM Government, “UK Marine Policy Statement,” March 2011. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69322/pb3654-marine-policy-statement-110316.pdf.

[34] Marine Management Organisation, “South East Marine Plan,” 23 June 2021. [Online]. Available: https://www.gov.uk/government/collections/south-east-marine-plan.

[35] Historic England, “Tall Buildings: Historic England Advice Note 4 (2nd ed),” 4 March 2022. [Online]. Available: https://historicengland.org.uk/images-books/publications/tall-buildings-advice-note-4/.

[36] Environment Agency, “Thames river basin district river basin management plan: updated 2022,” 22 December 2022. [Online]. Available: https://www.gov.uk/guidance/thames-river-basin-district-river-basin-management-plan-updated-2022.

[37] Department for Transport, “National policy statement for ports,” 28 February 2012. [Online]. Available: https://www.gov.uk/government/publications/national-policy-statement-for-ports.

[38] Department for Transport, “National policy statement for national networks,” 17 December 2014. [Online]. Available: https://www.gov.uk/government/publications/national-policy-statement-for-national-networks.

[39] Planning Inspectorate, “Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements, (Version 7),” June 2020. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/.

[40] Environment Agency, “Meeting our future water needs: a national framework for water resources,” 16 March 2020. [Online]. Available: https://www.gov.uk/government/publications/meeting-our-future-water-needs-a-national-framework-for-water-resources.

[41] Planning Inspectorate, “Advice Note Three: EIA Notification and Consultation, (Version 7),” August 2017. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-three-eia-notification-and-consultation-2/#:~:text=The%20purpose%20of%20this%20Advice,accordance%20with%20the%20Infrastructure%20Planning%20(.

[42] Planning Inspectorate, “Advice Note Nine: Rochdale Envelope, (Version 3),” July 2018. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-nine-rochdale-envelope/.

[43] Planning Inspectorate, “Advice Note Twelve: Transboundary Impacts and Process, (Version 6),” December 2020. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-twelve-transboundary-impacts-and-process/#:~:text=This%20Advice%20Note%20explains%20the,stages%20of%20a%20DCO%20application..

[44] Planning Inspectorate, “Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects, (Version 2),” August 2019. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/.

[45] Institute of Environmental Management and Assessment, “EIA - Shaping and Delivering Quality Development,” 14 July 2016. [Online]. Available: https://www.iema.net/watch-again/eia-shaping-and-delivering-quality-development.

[46] Institute of Environmental Management and Assessment, “Delivering Proportionate EIA: A Collaborative Strategy for Enhancing UK Environmental Impact Assessment Practice,” July 2017. [Online]. Available: https://www.iema.net/resources/reading-room/2017/07/18/delivering-proportionate-eia.

[47] Institute of Environmental Management and Assessment, “IEMA Environmental Impact Assessment Guide to: Delivering Quality Development,” July 2016. [Online]. Available: https://www.iema.net/policy-and-practice/practice-reports.

[48] Planning Inspectorate, “Advice Note Eighteen: The Water Framework Directive, (Version 1),” June 2017. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-18/.

[49] Ministry of Housing, Communities & Local Government, “National Planning Policy Framework (NPPF),” 20 July 2021. [Online]. Available: https://www.gov.uk/government/publications/national-planning-policy-framework--2.

[50] Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government, “Flood risk and coastal change,” 25 August 2022. [Online]. Available: https://www.gov.uk/guidance/flood-risk-and-coastal-change.

[51] Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government, “Planning Practice Guidance,” June 24 2021. [Online]. Available: https://www.gov.uk/government/collections/planning-practice-guidance.

[52] Department for Energy Security and Net Zero, Department for Environment, Food & Rural Affairs, Department for Transport, Department of Health and Social Care, Ministry of Housing, Communities & Local Government, “Clean Air Strategy 2019,” 14 January 2019. [Online]. Available: https://www.gov.uk/government/publications/clean-air-strategy-2019.

[53] Department for Environment, Food & Rural Affairs, “The air quality strategy for England, Scotland, Wales and Northern Ireland: Volume 1,” 26 March 2011. [Online].

[54] Department for Environment, Food & Rural Affairs, “Environmental Improvement Plan 2023,” 7 February 2023. [Online]. Available: https://www.gov.uk/government/publications/environmental-improvement-plan.

[55] Portsmouth City Council, “The Portsmouth Plan (Portsmouth’s Core Strategy),” 2012.

[56] Portsmouth City Council, “Air Quality and Air Pollution Supplementary Planning Document.,” 2006.

[57] Winchester City Council, “Local Plan Part 1: Joint Core Strategy Adopted 2013,” 2023. [Online]. Available: https://www.winchester.gov.uk/planning-policy/winchester-district-local-plan-2011-2036-adopted/local-plan-part-1-joint-core-strategy-adopted-march-2013-local-plan-review-2006/local-plan-part-1-joint-core-strategy-adopted-2013.

[58] Winchester City Council, “Air Quality Supplementary Planning Document,” September 2021. [Online]. Available: https://www.winchester.gov.uk/environment/air-quality/air-quality-in-winchester.

[59] South Downs National Park Authority, “South Downs Local Plan,” 2 July 2019. [Online]. Available: https://www.southdowns.gov.uk/planning-policy/south-downs-local-plan/local-plan/.

[60] Environment Agency, “H4 Odour Management: How to comply with your environmental permit,” 4 April 2011. [Online]. Available: https://www.gov.uk/government/publications/environmental-permitting-h4-odour-management.

[61] Institute of Air Quality Management, “Guidance on the Assessment of Odour for Planning,” July 2018. [Online]. Available: https://www.iaqm.co.uk/text/guidance/odour-guidance-2014.pdf.

[62] Environment Agency, “Air emissions risk assessment for your environmental permit,” 2023.

[63] Department for Environment, Food & Rural Affairs, “Local Air Quality Management Technical Guidance (TG22),” August 2022. [Online]. Available: https://laqm.defra.gov.uk/air-quality/featured/uk-regions-exc-london-technical-guidance/.

[64] Institute of Air Quality Management, “Guidance on the assessment of dust from demolition and construction,” June 2016. [Online]. Available: https://iaqm.co.uk/text/guidance/construction-dust-2014.pdf.

[65] Institute of Air Quality Management and Environmental Protection UK, “Land-Use Planning & Development Control: Planning for Air Quality,” January 2017. [Online]. Available: https://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf.

[66] Institute of Air Quality Management, “A guide to the assessment of air quality impacts on designated nature conservation sites,” 2020. [Online]. Available: https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2020.pdf.

[67] C. K. B. Chapman, “Guidance on Decision-Making Thresholds for Air Pollution. JNCC Report No.696 (Main Report), JNCC, Peterborough, ISSN 0963-8091. Air Quality Consultants Ltd,” Air Quality Consultants Ltd., Peterborough, 2021.

[68] National Highways, “Design Manual for Roads and Bridges: LA105 Air Quality,” November 2019. [Online]. Available: https://www.standardsforhighways.co.uk/search/10191621-07df-44a3-892e-c1d5c7a28d90.

[69] Scottish Environmental Protection Agency, “Odour Guidance 2010,” January 2010. [Online]. Available: https://www.sepa.org.uk/media/154129/odour_guidance.pdf.

[70] Eastleigh Borough Council, “Air Quality Annual Status Report,” June 2020. [Online]. Available: https://www.eastleigh.gov.uk/media/8028/ebc-asr-2020.pdf. [Accessed July 2022].

[71] Eastleigh Borough Council, “Latest monitoring data from all stations,” No date. [Online]. Available: http://eastleigh.my-air.uk/. [Accessed July 2022].

[72] East Hampshire District Council, “Combined Air Quality 2020 and 2021 Annual Status Report (ASR),” December 2021. [Online]. Available: https://www.easthants.gov.uk/climate-and-environment/air-quality.

[73] Fareham Borough Council and Gosport Borough Council, “2022 Air Quality Annual Status Report,” June 2022. [Online]. Available: https://www.fareham.gov.uk/PDF/licencing_and_inspections/AirQualityAnnualStatusReport2022.pdf.

[74] Havant Borough Council, “Air Quality Annual Status Report,” 2021.

[75] Portsmouth City Council, “2020 Air Quality Annual Status Report (ASR),” November 2020. [Online]. Available: https://www.portsmouth.gov.uk/wp-content/uploads/2020/12/2020-Air-Quality-Annual-Status-Report_Accessible.pdf.

[76] Winchester City Council, “Air Quality Annual Status Report.,” June 2022. [Online]. Available: https://www.winchester.gov.uk/environment/air-quality/historical-air-quality-reports-for-government.

[77] Department for Environment, Food & Rural Affairs, “Background Mapping data for local authorities,” 2023. [Online]. Available: https://uk-air.defra.gov.uk/data/laqm-background-home.

[78] Department for Environment, Food & Rural Affairs, “AQMAs interactive map,” No date. [Online]. Available: https://uk-air.defra.gov.uk/aqma/maps/.

[79] Department for Environment, Food and Rural Affairs, “Multi-Agency Geographic Information for the Countryside (MAGIC),” No date. [Online]. Available: https://magic.defra.gov.uk/magicmap.aspx.

[80] Natural England, “Natural England’s approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations,” 19 June 2018. [Online]. Available: https://publications.naturalengland.org.uk/publication/4720542048845824.

[81] Vehicle Certification Agency, “What is Vehicle Type Approval: Type Approval for Non-Road Mobile Machinery (NRMM),” 3 November 2022. [Online]. Available: https://www.vehicle-certification-agency.gov.uk/vehicle-type-approval/what-is-vehicle-type-approval/non-road-mobile-machinery-nrmm/.

[82] Department for Environment, Food and Rural Affairs, National Policy Statement for Water Resources Infrastructure, 2023.

[83] East Hampshire Council, Joint Core Strategy, 2014.

[84] Eastleigh Borough Council, Eastleigh Borough Local Plan (2016-2036), 2022.

[85] Fareham Borough Council, Fareham Local Development Framework Core Strategy, 2011.

[86] Hampshire County Council, Hampshire Strategic Infrastructure Statement, 2019.

[87] Havant Borough Council, Havant Borough Core Strategy March 2011, 2011.

[88] Portsmouth City Council, Portsmouth Local Plan 2038. Regulation ‘18’ Consultation Document. Draft for consultation September 2021, 2021.

[89] Portsmouth City Council, The Portsmouth Plan (Portsmouth's Core Strategy), 2012.

[90] Winchester City Council and South Downs National Park Authority, Winchester District Local Plan Part 1 - Joint Core Strategy Development Plan.

[91] Historic England, The Historic Environment in Local Plans: Historic Environment Good Practice Advice in Planning 1, 2015.

[92] Historic England, The Historic Environment in Local Plans: Historic Environment Good Practice Advice in Planning 1, 2015.

[93] Historic England, Managing Significance in Decision-Taking in the Historic Environment: Historic Environment Good Practice Advice in Planning 2, 2015.

[94] Historic England, The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning 3, 2017.

[95] English Heritage, Conservation Principles Policy and Guidance for the Sustainable Management of the Historic Environment, 2008.

[96] Chartered Institute for Archaeologists, Standard and guidance for historic environment desk-based assessment, 2020.

[97] Chartered Institute for Archaeologists, Code of Conduct, 2022.

[98] Institute for Environmental Management and Assessment , Chartered Institute for Archaeologists and Institute for Historic Buildings Conservation, Principles of Cultural Heritage Impact Assessment in the UK, 2021 .

[99] Hampshire County Council, Archaeology and Planning: Guidance for Developers, not dated.

[100] Hampshire County Council, Hampshire Archaeology Strategy, not dated.

[101] G. H. a. J. Hind, Solent-Thames Research Framework for the Historic Environment: Resource Assessments and Research Agendas, Oxford Wessx Monograph No. 6, 2014.

[102] Department for Environment, Food & Rural Affairs, “Biodiversity 2020: A strategy for England’s wildlife and ecosystem services,” 11 August 2011. [Online]. Available: https://www.gov.uk/government/publications/biodiversity-2020-a-strategy-for-england-s-wildlife-and-ecosystem-services.

[103] East Hampshire District Council, “Chapter 3 - Countryside and heritage,” March 2006. [Online]. Available: https://www.easthants.gov.uk/media/5072/download?inline.

[104] East Hampshire District Council, “Biodiversity and Planning Guidance,” June 2021. [Online]. Available: https://www.easthants.gov.uk/planning-services/planning-policy/planning-policy-guidance-documents/guidance-documents.

[105] Eastleigh Borough Council, “Securing our Natural Environment: Eastleigh Borough Council Biodiversity Strategy 2022-2032,” No date. [Online]. Available: https://meetings.eastleigh.gov.uk/documents/s50032382/Appendix.%201%20for%20Biodiversity%20Strategy%202022-2032.pdf.

[106] Fareham Borough Council, “Fareham Local Development Framework: Core Strategy,” August 2011. [Online]. Available: https://moderngov.fareham.gov.uk/documents/s25381/CDE.1.%20Core%20Strategy%202011.pdf.

[107] Fareham Borough Council, “Fareham Local Biodiversity Action Plan,” August 2008. [Online]. Available: https://www.fareham.gov.uk/pdf/planning/bap.pdf.

[108] Havant Borough Council, “Draft Havant Borough Local Plan 2036,” 2018. [Online]. Available: https://cdn.havant.gov.uk/public/documents/The%20Draft%20Local%20Plan%202036_for%20web%20with%20policy%20numbers%20(1).pdf#:~:text=The%20Draft%20Havant%20Borough%20Local,meet%20the%20need%20for%20development..

[109] Havant Borough Council, “Havant Borough Biodiversity Strategy,” January 2019. [Online]. Available: https://cdn.havant.gov.uk/public/documents/Havant%20Borough%20Biodiversity%20Strategy.pdf.

[110] Portsmouth City Council, “Portsmouth Local Plan 2038: 'Regulation 18’ Consultation Document Draft for consultation September 2021,” September 2021. [Online]. Available: https://www.portsmouth.gov.uk/wp-content/uploads/2021/09/207.9-Local-plan-2021-document-FULL-ACCESSIBLE.pdf.

[111] Winchester City Council, “Winchester District Local Plan (Emerging) 2018-2039,” November 2022. [Online]. Available: https://www.winchester.gov.uk/planning-policy/winchester-district-local-plan-2018-2038-emerging.

[112] British Standards Institute, BS 42020:2013 Biodiversity Code of Practice for planning and development, British Standards Institution ed., London, 2013.

[113] Chartered Institute of Ecology and Environmental Management, “Guidelines for Preliminary Ecological Appraisal, 2nd edition,” Winchester, 2017.

[114] Chartered Institute of Ecology and Environmental Management, “Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine, Version 1.2,” Winchester, 2018.

[115] Natural England and Department for Environment, Food and Rural Affairs, “Protected species and development: Advice for local planning authorities,” 2022. [Online]. Available: https://www.gov.uk/guidance/protected-species-how-to-review-planning-applications. [Accessed May 2023].

[116] J. Collins, “Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition),” The Bat Conservation Trust, London, 2016.

[117] Natural England, “Ancient Woodland (England),” 25 July 2019. [Online]. Available: https://naturalengland-defra.opendata.arcgis.com/datasets/ancient-woodland-england.

[118] Woodland Trust, “Ancient Tree Inventory,” No date. [Online]. Available: https://ati.woodlandtrust.org.uk/?gad=1&gclid=CjwKCAjw-IWkBhBTEiwA2exyO6tacS-K4MPvNP9fwPCYUjhJeJyBx-BH6RYDDVHlUruwAlG0t1cfBxoCLvcQAvD_BwE.

[119] Environment Agency, “Catchment Data Explorer,” No date. [Online]. Available: https://environment.data.gov.uk/catchment-planning/v/c3-plan. [Accessed 3 July 2023].

[120] Ordnance Survey, “OS Open Rivers,” 1 February 2023. [Online]. Available: https://www.data.gov.uk/dataset/dc29160b-b163-4c6e-8817-f313229bcc23/os-open-rivers.

[121] Department for Environment, Food & Rural Affairs, “Multi-Agency Geographic Information for the Countryside (MAGIC),” No date. [Online]. Available: https://magic.defra.gov.uk/MagicMap.aspx. [Accessed 7 July 2022].

[122] B. Butcher, P. Carey, R. Edmonds, L. Norton and J. Treweek, “UK Habitat Classification - Habitat Definitions, Version 1.1,” 2020. [Online]. Available: https://ukhab.org/.

[123] Planning Inspectorate, “Advice Note Ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects, (Version 9),” August 2022. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-ten/.

[124] HM Government, “South Inshore and South Offshore Management Plan,” July 2018. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/726867/South_Marine_Plan_2018.pdf. [Accessed May 2023].

[125] Centre for Environment, Fisheries and Aquaculture Science, “Introduction to UK Marine Strategy,” 23 October 2019. [Online]. Available: https://moat.cefas.co.uk/introduction-to-uk-marine-strategy/.

[126] Chichester Harbour Conservancy, “Chichester Harbour Management Plan 2019 - 2024,” 19 February 2019. [Online]. Available: https://chichester.moderngov.co.uk/documents/s13876/Chichester%20Harbour%20AONB%20Management%20Plan%202019-2024%20-%20Appendix%20-%20Online%20Only.pdf.

[127] J. Davies, J. Baxter, M. Bradley, D. Connor, J. Khan, E. Murray, W. Sanderson, C. Turnbull and M. Vincent, “Marine Monitoring Handbook,” Joint Nature Conservation Committee, Peterborough, 2001.

[128] D. W. Connor, J. H. Allen, N. Golding, K. L. Howell, L. M. Lieberknecht, K. O. Northen and J. B. Reker, “The Marine Habitat Classification for Britain and Ireland, Version 04.05,” Joint Nature Conservation Committee, 2004.

[129] C. J. Bibby, N. D. Burgess, D. A. Hill and S. Mustoe, “Bird Census Techniques, Second edition,” *Academic Press,* 2000.

[130] J. R. Ellis, S. P. Milligan, L. Readdy, N. Taylor and M. J. Brown, “Spawning and nursery grounds of selected UK fish species,” Centre for Environment, Fisheries and Aquaculture Science, 2012.

[131] Centre for Environment, Fisheries and Aquaculture Science, “Offshore Wind Farms: Guidance Note for Environmental Impact Assessment in Respect of FEPA and CPA Requirements,” 2004.

[132] Environment Agency, “Guidance: Water Framework Directive assessment: estuarine and coastal waters,” 2017. [Online]. Available: https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters. [Accessed 21 02 2023].

[133] ABPMer, “UK Renewables Atlas: WEBvision - Renewables (Tide),” 2017. [Online]. Available: https://www.renewables-atlas.info/explore-the-atlas/. [Accessed 16 May 2022].

[134] B. J. Mcconnell, M. A. Fedak, P. Lovell and P. S. Hammond, “Movements and foraging areas of grey seals in the North Sea,” *Journal of Applied Ecology,* no. 36, pp. 573-590.

[135] A. J. Read and A. J. Wesgate, “Monitoring the movements of harbour porpoises (Phocoena phocoena) with satellite telemetry,” *Marine Biology,* no. 130, pp. 315-322, 1997.

[136] Environment Agency, “Flood Map for Planning (Rivers and Sea) - Flood Zone 2,” 2022. [Online]. Available: https://www.data.gov.uk/dataset/cf494c44-05cd-4060-a029-35937970c9c6/flood-map-for-planning-rivers-and-sea-flood-zone-2. [Accessed 12 July 2022].

[137] Environment Agency, “Flood Map for Planning (Rivers and Sea) - Flood Zone 3,” 2022. [Online]. Available: https://www.data.gov.uk/dataset/bed63fc1-dd26-4685-b143-2941088923b3/flood-map-for-planning-rivers-and-sea-flood-zone-3. [Accessed 12 July 2022].

[138] A. N. Popper and A. D. Hawkins, “An overview of fish bioacoustics and the impacts of anthropogenic sounds on fishes,” 2019. [Online]. Available: https://onlinelibrary.wiley.com/doi/full/10.1111/jfb.13948. [Accessed 20 02 2023].

[139] A. Popper, A. Hawkins, R. Fay, D. Mann, S. Bartol, T. Carlson, S. Coombs, W. Ellison, R. Gentry, M. Halvorsen, S. Løkkeborg, P. Rogers, B. Southall, D. Zeddies and W. Tavolga, “Sound Exposure Guidelines,” in *ASA S3/SC1.4 TR-2014 Sound Exposure Guidelines for Fishes and Sea Turtles: A Technical Report prepared by ANSI-Accredited Standards Committee S3/SC1 and registered with ANSI. SpringerBriefs in Oceanography.*, Cham, Springer, 2014.

[140] Marine Management Organisation, “UK sea fisheries annual statistics,” 30 September 2021. [Online]. Available: https://www.gov.uk/government/collections/uk-sea-fisheries-annual-statistics.

[141] Marine Traffic, “MarineTraffic: Global Ship Tracking Intelligence,” No date. [Online]. Available: https://www.marinetraffic.com/. [Accessed 2022].

[142] Centre for Environment, Fisheries and Aquaculture Science, “Shellfish classification and microbial monitoring,” 2022. [Online]. Available: https://www.cefas.co.uk/data-and-publications/shellfish-classification-and-microbiological-monitoring. [Accessed 05 May 2023].

[143] Joint Nature Conservation Committee, “Marine Recorder Public UK snapshot – v20220124 (Latest version) 2022,” 24 January 2022. [Online]. Available: https://hub.jncc.gov.uk/assets/b9934e31-39b6-41f9-9364-d1e93db68307. [Accessed 15 January 2023].

[144] ORCA, “Sightings Map,” 2022. [Online]. Available: https://www.orcaweb.org.uk/species-sightings/sightings-map.

[145] P. S. Hammond, C. Lacey, A. Gilles, S. Viquerat, P. Börjesson, H. Herr, K. Macleod, V. Ridoux, M. B. Santos, M. Scheidat, J. Tellmann, J. Vingada and N. Olen, “Estimates of cetacean abundance in European Atlantic waters in summer 2016 from the SCANS-III aerial and shipboard surveys,” 2021.

[146] The Wildlife Trusts, “Selsey Bill and the Hounds Marine Conservation Zone (MCZ),” 2019. [Online]. Available: https://www.wildlifetrusts.org/sites/default/files/2019-05/Selsey%20Bill%20and%20the%20Hounds.pdf. [Accessed 30 May 2022].

[147] Sea Watch Foundation, “Recent sightings,” 2022. [Online]. Available: https://www.seawatchfoundation.org.uk/recentsightings/.

[148] J. C. Chesworth, V. L. Leggett and E. S. Rowsell, “Solent Seal Tagging Project Summary Report,” Wildlife Trusts’ South East Marine Programme, Hampshire and Isle of Wight Wildlife Trust, Hampshire, 2010.

[149] M. Brown, “Cefas Solent Bass Survey in 2017, and update of bass recruitment index time series,” 2017. [Online]. Available: https://data.cefas.co.uk/view/18912. [Accessed 08 July 2022].

[150] The Solent Forum, “Fish,” 2017. [Online]. Available: http://www.solentforum.org/solent/our_biodiversity/fish/. [Accessed 08 July 2022].

[151] R. Unsworth and C. Bertelli, “Protecting the hand that feeds us: Seagrass (Zostera marina) serves as commercial juvenile fish habitat,” *Marine Pollution Bulletin,* vol. 83, no. 2, pp. 425-429, 2013.

[152] Department for Environment, Food & Rural Affairs and Natural England, “Habitats and species of principal importance in England,” [Online]. Available: https://www.gov.uk/government/publications/habitats-and-species-of-principal-importance-in-england. [Accessed 03 July 2023].

[153] Solent Forum, “Solent Habitats,” 2022. [Online]. Available: http://www.solentforum.org/solent/our_coastal_zone/habitats/.

[154] APEM Ltd, “Langstone Harbour Intertidal Phase I Mapping Survey, Version 1,” Stockport, UK., 2023.

[155] Joint Nature Conservation Committee and Natural England, “Review of the MCZ Features of Conservation Importance,” May 2016. [Online]. Available: https://data.jncc.gov.uk/data/94f961af-0bfc-4787-92d7-0c3bcf0fd083/MCZ-review-foci-201605-v7.0.pdf. [Accessed 30 September 2022].

[156] Joint Nature Conservation Committee, “The Marine Habitat Classification for Britain and Ireland Version 22.04,” 19 May 2022. [Online]. Available: https://mhc.jncc.gov.uk/.

[157] Natural England, “MCZ Species Features of Conservation Importance (Points),” 2021. [Online]. Available: https://naturalengland-defra.opendata.arcgis.com/datasets/Defra::mcz-species-features-of-conservation-importance-points/about. [Accessed 09 June 2022].

[158] C. A. Harrower, S. L. Rorke and H. E. Roy, “UK Biodiversity Indicators 2021,” Joint Nature Conservation Commitee, Petersborough, 2021.

[159] GB Non-native Species Secretariat, “GB Non-native species secretariat,” 2022. [Online]. Available: https://www.nonnativespecies.org/. [Accessed 10 May 2022].

[160] Marine Management Organisation, “MMO1163: Mapping recreational sea anglers in English waters,” February 2020. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/915877/003-MMO1163_mappingreport_20200902_Updated_Report.pdf.

[161] Marine Management Organisation, “Statistic at MMO - - GOV.uk,” 2022. [Online]. Available: https://www.gov.uk/government/organisations/marine-management-organisation/about/statistics. [Accessed 08 July 2022].

[162] Langstone Harbour Board, “Fishing,” 2022. [Online]. Available: https://www.langstoneharbour.org.uk/fish-and-fishing.

[163] J. Chesworth, “Tracking the Solent's Seals. Hampshire and Isle of Wight Wildlife Trust Presentation at Porcupine Marine Natural History Society in Southampton 2011.,” 12 March 2011. [Online]. Available: http://pmnhs.co.uk/wp-content/uploads/2011/11/jolyonchesworth.pdf. [Accessed 24 October 2022].

[164] HM Government, “Net Zero Strategy: Build Back Greener,” October 2021.

[165] UK Government , “The Carbon Budget Order 2021,” June 2021.

[166] Department for Environment. Food and Rural Affairs, “The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting: Making the country resilient to a changing climate,” July 2018. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/727252/national-adaptation-programme-2018.pdf. [Accessed June 2023].

[167] Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy, “Net Zero Strategy: Build Back Greener,” 5 April 2022. [Online]. Available: https://www.gov.uk/government/publications/net-zero-strategy.

[168] Institute of Environmental Management & Assessment, “Guide: Assessing Greenhouse Gas Emissions and Evaluating their Significance,” 2022.

[169] Institute of Environmental Management & Assessment , “EIA Guide to Climate Change Resilience and Adaptation,” 2020.

[170] British Standards Institution , “PAS 2080: 2023 Carbon management in buildings and infrastructure,” March 2023.

[171] UK Water Industry Research, “A Framework for Accounting for Embodied Carbon in Water Industry Assets,” 17 August 2022.

[172] UK Water Industry Research , “Calculating whole life/TOTEX Carbon,” 05 July 2022.

[173] European Committe for Standardization , “EN15804 - Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products,” November 2019.

[174] Department for Business, Energy and Industrial Strategy , “Valuation of energy use and greenhouse gas (GHG) emissions - Supplementary guidance to the HM Treasury Green Book on Appraisal and Evaluation in Central Government,” January 2023.

[175] Southern Water, “Our Net Zero Plan,” July 2021. [Online]. Available: https://www.southernwater.co.uk/media/4931/5585_net_zero_report_a4_v10.pdf.

[176] S. Water, “Annual Report and Financial Statements for the year ended 31 March 2023,” 2023.

[177] Uk Government, “The Carbon Budgets Order 2009,” 2009.

[178] UK Government, “The Carbon Budget Order 2011,” 2011.

[179] UK Government, “UK Carbon Budget Order 2016,” 2016.

[180] Department for Business, Energy & Industrial Strategy and Department for Energy Security and Net Zero, “Final UK greenhouse gas emissions national statistics: 1990 to 2021,” 23 June 2023. [Online]. Available: https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2021.

[181] Met Office, “UK Climate Projects Database User Interface,” 2018.

[182] Met Office, “Thorney Island climate,” 2022.
[183] Department for Environment, Food & Rural Affairs, “UK Climate Change Risk Assessment 2022,” 17 January 2022. [Online]. Available: https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2022.
[184] Department for Business, Environment and Industrial Strategy, “2021 UK Greenhouse Gas Emissions, Final Figures,” 7 February 2023.
[185] Water UK, “Water UK Annual Emission Report 2021,” 27 October 2021.
[186] Water UK, “Net Zero 2030 Routemap,” 2020.
[187] Southern Water, “Our Net Zero Plan,” 2021.
[188] Water UK, “Public Interest Commitment,” 25 April 2019.
[189] Intergovernmental Panel on Climate Change , “Working Group I Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change: The Physical Science Basis,” 2021.
[190] Environment Agency , “Water resources planning guidance,” 14 April 2022.
[191] Department for Energy Security and Net Zero, “Greenhouse gas reporting: conversion factors 2023,” 7 June 2023.
[192] Winchester City Council, “Winchester District Local Plan (adopted 2013),” 2013.
[193] Department of the Environment, “Industry Profiles for Previously Developed Land,” 1995.
[194] Construction Industry Research and Information Association, “Contaminated land risk assessment: A guide to good practice (C552),” January 2001. [Online]. Available: https://www.ciria.org/CIRIA/CIRIA/Item_Detail.aspx?iProductCode=C552&Category=BOOK#:~:text=A%20guide%20to%20good%20practice%20(C552),and%20technical%20approach%20to%20control..
[195] Construction Industry Research and Information Association, Assessing Risks Posed by Hazardous Ground Gases to Buildings (C665), 2011.
[196] Havant Borough Council, “Borough Design Guide Supplementary Planning Document,” December 2011. [Online]. Available: https://www.havant.gov.uk/borough-design-guide.
[197] Hampshire and Isle of Wight Contaminated Land Liaison Group , “Informal Guidance, Development on Potentially Contaminated Land,” 2014.
[198] Winchester City Council, “Development on Potentially Contaminated Land,” 2013. [Online]. Available: https://www.winchester.gov.uk/environment/contaminated-land.
[199] British Standards Institution, “Code of Practice for Ground Investigations, BS 5930,” 2015.
[200] British Standards Institution, “BS 10175:2011 Investigation of potentially contaminated sites - code of practice (+A2:2017),” 2017.
[201] British Standards Institution, “Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings, BS8485:2015 +A1:2019,” 2019.
[202] Institute of Environmental Management and Assessment, “EIA Guidance,” 2020.
[203] Environment Agency , “Land Contamination: Risk Management Framework,” 2021.
[204] Hampshire County Council , “Technical Guidance Note TG5 – Geotechnical Investigation, Testing and Design,” 2022.
[205] Portsmouth City Council, “Developing Potentially Contaminated Land,” No date. [Online]. Available: https://www.portsmouth.gov.uk/services/development-and-planning/planning-policy/developing-contaminated-land/.
[206] Winchester City Council, “Development on Potentially Contaminated Land (Leaflet),” No date. [Online]. Available: https://www.winchester.gov.uk/environment/contaminated-land.
[207] Southern Water, “Hampshire Water Transfer and Water Recycling Project Consultation Brochure, Public Consultation 2022,” 2022.
[208] British Geological Survey, “GeoIndex Onshore,” 2020. [Online]. Available: https://mapapps2.bgs.ac.uk/geoindex/home.html. [Accessed 25 April 2023].
[209] British Geological Society , “Geological Survey of England and Wales 1:63,360/1:50,000 geological map series, New Series,” 1987. [Online]. Available: https://largeimages.bgs.ac.uk/iip/mapsportal.html?id=1001805. [Accessed May 2023].

[210] British Geological Society , “Geological Survey of England and Wales 1:63,360/1:50,000 geological map series, New Series,” 1988. [Online]. Available: https://webapps.bgs.ac.uk/data/maps/maps.cfc?method=viewRecord&mapId=10306. [Accessed May 2023].

[211] British Geological Survey, “Geology of Britain Viewer,” 2023. [Online]. Available: https://mapapps.bgs.ac.uk/geologyofbritain/home.html. [Accessed 25 April 2023].

[212] British Geological Society , “Sheet 9 : Hydrogeological Map of Hampshire and the Isle of Wight (1:100,000),” 1979. [Online]. Available: https://largeimages.bgs.ac.uk/iip/hydromaps.html?id=hampshire-iow.jp2. [Accessed May 2023].

[213] Natural England, “Guide to assessing development proposals on agricultural land,” 2021. [Online].

[214] Standards for Highways, “Design Manual for Roads and Bridges, LA 109 - Geology and soils,” 2019. [Online]. Available: https://www.standardsforhighways.co.uk/search/adca4c7d-4037-4907-b633-76eaed30b9c0. [Accessed June 2023].

[215] Standards for Highways, “Design Manual for Roads and Bridges, LA 112 - Population and human health,” 2020. [Online]. Available: https://www.standardsforhighways.co.uk/search/1e13d6ac-755e-4d60-9735-f976bf64580a. [Accessed June 2023].

[216] Ordnance Survey, “OS MasterMap,” 1 February 2023. [Online]. Available: https://www.data.gov.uk/dataset/96083a9f-6714-4301-9890-98924c4c723e/os-mastermap-topography-layer.

[217] Google, “Google Maps,” No date. [Online]. Available: https://www.google.com/maps.

[218] Ordnance Survey, “OS MasterMap Sites Layer,” No date. [Online]. Available: https://www.ordnancesurvey.co.uk/products/os-mastermap-sites-layer.

[219] Ordnance Survey, “OS MasterMap Greenspace Layer,” No date. [Online]. Available: https://www.ordnancesurvey.co.uk/products/os-mastermap-greenspace-layer.

[220] https://www.data.gov.uk/dataset/c002ceea-d650-4408-b302-939e9b88eb0b/agricultural-land-classification-alc-grades-post-1988-survey-polygons, “Structure of the Agricultural Industry in England and the UK at June 2021,” 2022. [Online]. Available: https://www.gov.uk/government/statistical-data-sets/structure-of-the-agricultural-industry-in-england-and-the-uk-at-june. [Accessed June 2023].

[221] Department for Environment Food and Rural Affairs, “Agricultural Land Classification (ALC) Grades Post 1988 Survey,” 7 December 2021. [Online]. Available: https://www.data.gov.uk/dataset/c002ceea-d650-4408-b302-939e9b88eb0b/agricultural-land-classification-alc-grades-post-1988-survey-polygons.

[222] National Soil Resources Institute, Cranfield University, “Soilscapes Soil Types Viewer,” Landis. [Online]. [Accessed 2022].

[223] Water Research Centre, “Civil Engineering Specification for the Water Industry (7th Edition),” March 2011. [Online]. Available: http://sites.wrcplc.co.uk/ceswielectronic/.

[224] Highways England, “LA 109 Geology and soils,” October 2019. [Online]. Available: https://www.standardsforhighways.co.uk/search/adca4c7d-4037-4907-b633-76eaed30b9c0.

[225] Highways England, “LA 112 - Population and human health,” January 2020. [Online]. Available: https://www.standardsforhighways.co.uk/search/1e13d6ac-755e-4d60-9735-f976bf64580a.

[226] D. Oakley, “South Downs National Park Dark Skies Technical Advice Note Version 2,” South Downs National Park, 2021.

[227] East Hampshire District Council, “East Hampshire District Local Plan: Housing and Employment Allocations,” April 2016. [Online]. Available: https://www.easthants.gov.uk/media/4181/download?inline.

[228] Hampshire County Council, “Serving Hampshire’s Residents - Strategic Plan 2021 to 2025,” [Online]. Available: https://www.hants.gov.uk/aboutthecouncil/strategiesplansandpolicies/corporatestrategy. [Accessed June 2023].

[229] South Downs National Park Authority, “Dark Skies Technical Advice Note, Version 2,” May 2021. [Online]. Available: https://www.southdowns.gov.uk/planning-policy/supplementary-planning-documents/technical-advice-notes-tans/dark-skies-technical-advice-note-tan/.

[230] International Dark Sky Association, “Lightscape Management Plan - South Downs National Park,” 2016. [Online]. Available: https://www.darksky.org/wp-content/uploads/2016/05/SouthDowns_LMP.pdf.

[231] Landscape Institute and Institute of Environmental Management and Assessment, Guidelines for Landscape and Visual Impact Assessment Third edition, Routledge, 2013.

[232] Landscape Institute, “Infrastructure Technical Guidance Note 04/2020,” 2020.

[233] Landscape Institute, “Visual Representation of Development Proposals. Technical Guidance Note 06/19,” 2019.

[234] Landscape Institute, “Townscape Character Assessment Technical Information Note 05/17,” 2017.

[235] Natural England, “An Approach to Landscape Character Assessments,” October 2014. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/691184/landscape-character-assessment.pdf.

[236] Natural England , “An approach to Seascape Character Assessment,” Natural England , 2012.

[237] Planning Inspectorate, “Advice Note Six: Preparation and submission of application documents, (Version 11),” No date. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-six-preparation-and-submission-of-application-documents/. [Accessed 14 July 2023].

[238] South Downs National Park Authority, “South Downs Landscape Character Assessment (LCA) 2020,” 2020. [Online]. Available: https://www.southdowns.gov.uk/landscape-design-conservation/south-downs-landscape-character-assessment/south-downs-landscape-character-assessment-2020/.

[239] Hampshire County Council, “Landscape Character Areas,” 2012. [Online]. Available: https://www.hants.gov.uk/landplanningandenvironment/environment/landscape/integratedcharacterassessment/characterareas.

[240] Eastleigh Borough Council, “Landscape character assessment for Eastleigh Borough,” 2011. [Online]. Available: https://www.eastleigh.gov.uk/planning-and-building/planning-policy-and-implementation/planning-policy-guidance/landscape-character-assessment.

[241] LDA Design, “Fareham Landscape Assessment,” Fareham Borough Council, 2017. [Online]. Available: https://www.fareham.gov.uk/PDF/planning/local_plan/DraftLocalPlanEvidenceBase/EV40-FarehamLandscapeAssessment_FINAL.pdf.

[242] Winchester City Council, “Landscape Character Assessment SPD,” 2022. [Online]. Available: https://www.winchester.gov.uk/planning/landscape---countryside/landscape-character-assessment/#:~:text=Landscape%20character%20assessments%20describe%20the,help%20conserve%20and%20enhance%20them..

[243] East Hampshire District Council, “East Hampshire District Landscape Character Assessment 2005-2006,” July 2006. [Online]. Available: https://www.easthants.gov.uk/planning-services/planning-policy/local-plan/emerging-local-plan/evidence-base/environment-1.

[244] Havant Borough Council, “Havant Borough Townscape, Landscape and Seascape Character Assessment,” February 2007. [Online]. Available: https://cdn.havant.gov.uk/public/documents/Section5%20Character%20AreasTable.pdf.

[245] Natural England, “Ancient Woodland (England),” July 2019. [Online]. Available: https://naturalengland-defra.opendata.arcgis.com/datasets/Defra::ancient-woodland-england/about.

[246] Council of Europe, “European Landscape Convention,” Council of Europe, 2000.

[247] Landscape Institute, “TGN 02-21: Assessing landscape value outside national designations,” 26 May 2021. [Online]. Available: https://www.landscapeinstitute.org/publication/tgn-02-21-assessing-landscape-value-outside-national-designations/.

[248] Forestry Commission, “National Forest Inventory Woodland England 2020,” 6 November 2022. [Online]. Available: https://data-forestry.opendata.arcgis.com/datasets/30cf3ba3df444b6695cdafe250ed2172_0/explore.

[249] UK Government, *Control of Pollution Act,* London: The Stationary Office, 1974.

[250] UK Government, *Environmental Protection Act,* London: The Stationary Office, 1990.

[251] UK Government, *The Environmental Noise (England) Regulations,* London: The Stationary Office, 2006.

[252] Department for Environment, Food & Rural Affairs, “Noise policy statement for England,” 15 March 2010. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf. [Accessed 14 June 2023].

[253] Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government, “Planning Practice Guidance on Noise,” 22 July 2019. [Online]. Available: https://www.gov.uk/guidance/noise--2. [Accessed 14 June 2023].

[254] East Hampshire District Council and South Downs National Park Authority, “East Hampshire District Local Plan: Joint Core Strategy,” June 2014. [Online]. Available: https://cdn.easthants.gov.uk/public/documents/DP01%20East%20Hampshire%20District%20Local%20Plan%20Joint%20Core%20Strategy%20COMPLETE.pdf. [Accessed 14 June 2023].

[255] Eastleigh Borough Council, “Eastleigh Borough Local Development Plan (2016-2036),” April 2022. [Online]. Available: https://www.eastleigh.gov.uk/media/11234/eastleigh-borough-local-plan.pdf. [Accessed 14 June 2023].

[256] Fareham Borough Council, “Fareham Local Plan 2037,” April 2023. [Online]. Available: https://www.fareham.gov.uk/pdf/planning/local_plan/1.FLP2037.pdf. [Accessed 28 June 2023].

[257] Havant Borough Council, “Havant Borough Core Strategy,” March 2011. [Online]. Available: https://cdn.havant.gov.uk/public/documents/ADOPTED%20CORE%20STRATEGY%20.pdf. [Accessed 15 June 2023].

[258] Portsmouth City Council, “The Portsmouth Plan: Portsmouth’s Core Strategy,” January 2012. [Online]. Available: https://www.portsmouth.gov.uk/wp-content/uploads/2020/05/The-Portsmouth-Plan.pdf. [Accessed 15 June 2023].

[259] Portsmouth City Council, “Portsmouth Local Plan 2038: ‘Regulation 18’ Consultation Document (Draft for consultation September 2021),” September 2021. [Online]. Available: https://www.portsmouth.gov.uk/wp-content/uploads/2021/09/207.9-Local-plan-2021-document-FULL-ACCESSIBLE.pdf. [Accessed 15 June 2023].

[260] Winchester City Council, “Winchester District Local Plan Review,” July 2006. [Online].

[261] British Standards Institution, British Standard 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound, London: BSI, 2019.

[262] British Standards Institution, British Standard 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1 Noise, London: BSI, 2014.

[263] British Standards Institution, British Standard 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2 Vibration, London: BSI, 2014.

[264] British Standards Institution, British Standard 7385-2:2003 Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from groundborne vibration, London: BSI, 1993.

[265] International Standards Organization, ISO 4866: 2010 Mechanical vibration and shock — Vibration of fixed structures — Guidelines for the measurement of vibrations and evaluation of their effects on structures, London: ISO, 2010.

[266] British Standards Institution, British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings, London: BSI, 2014.

[267] British Standards Institution, British Standard 7445-1:2003 Description and measurement of environmental noise – Part 1: Guide to quantities and procedures, London: BSI, 2003.

[268] British Standards Institution, British Standard 7445-2:1991 Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use, London: BSI, 1991.

[269] British Standards Institution, British Standard 6472-1:2008 Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration sources other than blasting, London: BSI, 2008.

[270] Department of Transport Welsh Office, *Calculation of Road Traffic Noise,* London: The Stationary Office, 1988.

[271] Highways England, “LA 111 Noise and Vibration Revision 2,” May 2020. [Online]. Available: https://www.standardsforhighways.co.uk/tses/attachments/cc8cfcf7-c235-4052-8d32-d5398796b364?inline=true. [Accessed 15 June 2023].

[272] World Health Organisation, *Guidelines for Community Noise,* London: WHO, 1999.

[273] World Health Organisation, *Night Noise Guidelines for Europe,* Copenhagen: WHO, 2009.

[274] World Health Organisation, *Environmental Noise Guidelines for the European Region,* Copenhagen: WHO, 2018.

[275] Institute of Environmental Management & Assessment, *(2014), Guidelines for Environmental Noise Impact Assessment, Institute of Environmental Management & Assessment,* IEMA, 2014.

[276] Department for Education, “Acoustic design of schools - performance standards, Building bulletin 93,” February 2015. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/400784/BB93_February_2015.pdf. [Accessed 29 June 2023].

[277] Department of Health, “Health Technical Memorandum 08-01: Acoustics,” 2013. [Online]. Available: https://www.england.nhs.uk/wp-content/uploads/2021/05/HTM_08-01.pdf. [Accessed 29 6 2023].

[278] Department for Environment, Food & Rural Affairs, “Noise Action Planning Important Areas Round 3 England,” 24 October 2018. [Online]. Available: https://www.data.gov.uk/dataset/948d6c4c-772e-4f55-9f39-97508e1cc701/noise-action-planning-important-areas-round-3-england. [Accessed 14 June 2023].

[279] Extrium, “England Noise and Air Quality Viewer,” [Online]. Available: http://www.extrium.co.uk/noiseviewer.html. [Accessed 08 07 2022].

[280] Transport and Road Research Laboratory, Report 246 Traffic Induced Vibrations in Buildings, Wokingham: TRRL, 1990.

[281] Association of Noise Consultants, Measurement & Assessment of Groundborne Noise & Vibration, Northallerton: ANC, 2020.

[282] American Public Transit Association, *Guidelines for Design of Rail Transit Facilities, Section 2-7, "Noise and Vibration",* Washington: APTA, 1981.

[283] Transport and Road Research Laboratory, Report 53 Ground Vibration Caused by Civil Engineering Works, Wokingham: TRRL, 1986.

[284] Transport Research Laboratory, Report 429 Groundborne Vibration Caused by Mechanised Construction Works, Wokingham: TRL, 2000.

[285] Transport Research Laboratory, “Converting the UK traffic noise level LA10,18h to EU noise indices for noise mapping,” 2002. [Online]. Available: https://programmeofficers.co.uk/Aylesbury/CD/CD%209.11.pdf. [Accessed 15 June 2023].

[286] Department for Environment, Food & Rural Affairs, “Waste Management Plan for England 2021,” 27 January 2021. [Online]. Available: https://www.gov.uk/government/publications/waste-management-plan-for-england-2021.

[287] Department for Environment, Food & Rural Affairs and Environment Agency, “Resources and waste strategy for England,” 18 December 2018. [Online]. Available: https://www.gov.uk/government/publications/resources-and-waste-strategy-for-england.

[288] Department for Environment, Food & Rural Affairs, “Hazardous waste national policy statement,” 18 July 2013. [Online]. Available: https://www.gov.uk/government/publications/hazardous-waste-national-policy-statement.

[289] Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government, “Waste,” 15 October 2015. [Online]. Available: https://www.gov.uk/guidance/waste.

[290] Hampshire Authorities, “Hampshire Minerals and Waste Plan,” 2013. [Online]. Available: http://documents.hants.gov.uk/mineralsandwaste/HampshireMineralsWastePlanADO PTED.pdf. [Accessed 05 June 2023].

[291] Hampshire Authorities, “Minerals and Waste Safeguarding in Hampshire. Hampshire Minerals and Waste Plan; Supplementary Planning Document.,” 2016. [Online]. Available: https://documents.hants.gov.uk/planning-strategic/HMWPMineralsandWasteSafeguardinginHampshireSPDFinalFeb2016.pdf?_gl=1*jnbez7*_ga*MTA4MDU5Njg2Mi4xNjU3MTg5OTAz*_ga_8ZVSPZWL5T*MTY1NzU0OTkzNC4xLjAuMTY1NzU0OTkzNC4w . [Accessed 05 June 2023].

[292] Institute of Environmental Management and Assessment, “Materials and Waste in Environmental Impact Assessment,” 2020. [Online]. Available: https://www.iema.net/preview-document/materials-and-waste-in-eia. [Accessed 05 June 2023].

[293] Eastleigh Borough Council , “Eastleigh Borough Local Plan 2016-2036,” 2022.

[294] Environment Agency, *Waste Interrogator 2021,* 2023.

[295] British Geological Survey, “World Mineral Production 2017 – 21.,” 2023. [Online]. Available: https://nora.nerc.ac.uk/id/eprint/534316/1/WMP_2017_2021_FINAL.pdf . [Accessed 05 June 2023].

[296] The Crown Estate, “Marine Aggregates: Capability and Portfolio 2021,” 2021. [Online]. Available: https://www.thecrownestate.co.uk/media/3945/2021-capability-portfolio-report.pdf. [Accessed 05 June 2023].

[297] Department of Environment, Food and Rural Affairs, “ENV23 – UK statistics on waste – Table 8: Recovery rate from non-hazardous construction and demolition waste, England, 2010-2020,” 2022. [Online]. Available: https://assets.publishing.service.gov.uk/gover. [Accessed 05 June 2023].

[298] Environment Agency, *Remaining Landfill Capacity,* 2023.

[299] Environment Agency, *Waste Summary Tables for England,* 2023.

[300] Hampshire Authorities, “Minerals and Waste Plan: Partial Update - Draft Plan,” October 2022. [Online]. Available: https://documents.hants.gov.uk/mineralsandwaste/HampshireMineralsandWastePlan-PartialUpdateDraftPlan-October2022.pdf. [Accessed 06 June 2023].

[301] Hampshire County Council, “Hampshire Minerals and Waste Plan Policies Map.,” 2013. [Online]. Available: https://documents.hants.gov.uk/mineralsandwaste/HampshireMineralsWastePlan-PoliciesMap.pdf . [Accessed 05 June 2023].

[302] Hampshire Authorities, “Minerals and Waste in Hampshire Monitoring Report 2021.,” 2023. [Online]. Available: Available online at: https://documents.hants.gov.uk/planning-strategic/minerals-waste-sites/2021monitoringreport.pdf . [Accessed 05 June 2023].

[303] Hampshire Authorities, “Project Integra: Joint Municipal Waste Management Strategy 2021.,” 2021. [Online]. Available: https://www.hants.gov.uk/wasteandrecycling/projectintegra. [Accessed 05 June 2023].

[304] Mineral Products Association, “The Contribution of Recycled and Secondary Materials to total Aggregates Supply in Great Britain - Estimates for 2021,” 2023. [Online]. Available: https://www.mineralproducts.org/MPA/media/root/Publications/2023/Contribution_of_Recycled_and_Secondary_Materials_to_Total_Aggs_Supply_in_GB_2021_Estimates.pdf. [Accessed 05 June 2023].

[305] South East England Aggregates Working Party, “Annual Report 2021.,” 2022. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1142514/2021_SEAWP_Report__Dec_2022_.pdf . [Accessed 05 June 2023].

[306] Statista, “ Annual production of bricks in England, Scotland and Wales from 2010 to 2022.,” 2023. [Online]. Available: https://www.statista.com/statistics/472894/annual-brick-production-great-britain/ . [Accessed 05 June 2023].

[307] Hampshire Authorities, “Local Aggregate Assessment 2022,” 2022. [Online]. Available: https://documents.hants.gov.uk/mineralsandwaste/2022LocalAggregateAssessment.pdf. [Accessed 05 June 2023].

[308] Statista, “Production volume of cement in Great Britain (GB) from 2001 to 2021,” 2023. [Online]. Available: https://www.statista.com/statistics/472849/annual-cement-production-great-britain/. [Accessed 06 June 2023].

[309] Homes and Communities Agency, Additionality Guide (Fourth Edition), London, 2014.

[310] Homes and Communities Agency, Employment Density Guide (Third Edition), London, 2015.

[311] NHS, “Health Impact Assessment Tool. Healthy Urban Design Unit (HUDU),” 2019. [Online]. Available: www.healthyurbandevelopment.nhs.uk/our-services/delivering-healthy-urban-development/healthimpact-assessment. [Accessed 15 June 2022].

[312] Liverpol University, “Urban Healthy Impact Assessment Methodology,” 2015. [Online]. Available: https://livrepository.liverpool.ac.uk/2018902/ . [Accessed 15 June 2022].

[313] Wales Health Impact Assessment Support Unit, “Health Impact Assessment - A practical guide,” 2011. [Online]. Available: https://whiasu.publichealthnetwork.cymru/files/1415/0710/5107/HIA_Tool_Kit_V2_WEB.pdf. [Accessed 15 07 2022].

[314] Office for National Statistics, “Census 2011,” 2011. [Online].

[315] Office for National Statistics, “Census 2021,” 2021. [Online]. Available: https://www.ons.gov.uk/census.

[316] Office for National Statistics, “Annual Population Survey,” 2022. [Online]. Available: https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/methodologies/annualpopulationsurveyapsqmi.

[317] Office for National Statistics, “Regional Gross Value Added (GVA),” 2022. [Online]. Available: https://www.ons.gov.uk/economy/grossvalueaddedgva.

[318] Office for National Statistics, “Business Register and Employment Survey,” 2022. [Online]. Available: https://www.ons.gov.uk/surveys/informationforbusinesses/businesssurveys/businessregisterandemploymentsurvey.

[319] Hampshire County Council, “Tourism in Hampshire,” 2022. [Online]. Available: https://www.hants.gov.uk/business/tourism.

[320] Office for National Statistics, “Tourism employment summaries,” 2012. [Online]. Available: https://www.ons.gov.uk/peoplepopulationandcommunity/leisureandtourism/articles/tourismemploymentsummaries/characteristicsoftourismindustries2014.

[321] Visit Britain , “Accommodaton Stock Audit,” 2016. [Online]. Available: https://www.visitbritain.org/accommodation-stock.

[322] Office for National Statistics, “Mid-year population estimates,” 2021. [Online]. Available: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/timeseries/ukpop/pop.

[323] Office for Health Improvements and Disparities, “Local Health Dashboard,” 2023. [Online]. Available: https://www.localhealth.org.uk/#c=home.

[324] Office for National Statistics, “Claimant count and vacancies time series,” March 2023. [Online]. Available: https://www.ons.gov.uk/employmentandlabourmarket/peoplenotinwork/unemployment/datasets/claimantcountandvacanciesdataset.

[325] Hampshire County Council, “Joint Strategic Needs Assessment,” 2023. [Online]. Available: https://www.hants.gov.uk/socialcareandhealth/publichealth/jsna.

[326] East Hampshire District Council , “Joint Core Strategy,” 2014.

[327] East Hampshire District Council , “Housing and Employment Allocations,” 2016.

[328] East Hampshire District Council, “Vehicle Parking Standards Supplementary Planning Document,” July 2018. [Online]. Available: https://www.easthants.gov.uk/planning-services/planning-policy/planning-policy-guidance-documents/supplementary-planning.

[329] Fareham Borough Council, “Local Plan 2026,” 2011.

[330] Hampshire Local Transport Plan, “Hampshire Local Transport Plan,” 2011.

[331] Hampshire County Council, “Local Transport Plan (LTP4),” 2022.

[332] Havant Borough Council, “Core Strategy: Local development Framework,” 2021.

[333] Havant Borough Council , “Local Plan (Allocations),” 2021.

[334] Havant Borough Council, “Parking Supplementary Planning Document,” July 2016. [Online]. Available: https://www.havant.gov.uk/supplementary-planning-documents/parking-supplementary-planning-document#:~:text=The%20Parking%20Supplementary%20Planning%20Document,cycle%20provision%20in%20the%20borough..

[335] Portsmouth City Council, “2006,” The Portsmouth Plan: Portsmouth’s Core Strategy .

[336] Winchester City Council, “Winchester District Local Plan (Emerging) 2018-2039”.

[337] South Downs National Park Authority , “2019,” South Downs Local Plan (2014–33).

[338] South Downs National Park Authority, “Sustainable Construction Supplementary Planning Document,” August 2020. [Online]. Available: https://www.southdowns.gov.uk/planning-policy/supplementary-planning-documents/supplementary-planning-documents/sustainable-construction-supplementary-planning-document/.

[339] Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government, “Transport evidence bases in plan making and decision making.,” 2015.

[340] Institute of Environmental Management and Assessment , “Guidelines for Environmental Impact Assessment.,” 2004.

[341] Institute of Environmental Assessment (now the Institute of Environmental Management Assessment) , “Guidelines for the Environmental Assessment of Road Traffic (IEA Guidelines).,” 1993.

[342] National Highways, “The Design Manual for Roads and Bridges (DMRB), LA 104 Environmental Assessment and Monitoring,” 2020.

[343] National Highways , “DMRB LA 112 Population and Human Health,” 2020.

[344] Planning Inspectorate , “Advice Note Three: EIA consultation and notification, (Version 7).,” 2017.

[345] Strava, “Strava Global Heat Map,” 2023. [Online]. Available: https://www.strava.com/heatmap#6.41/-120.87512/38.53969/hot/all. [Accessed June 2023].

[346] DfT, “Transport Analysis Guidance (TAG) UNIT M1.2 Data Sources and Surveys,” 2020.

[347] Hampshire County Council, “Local flood and water management strategy,” 2020. [Online]. Available: https://www.hants.gov.uk/landplanningandenvironment/environment/flooding/strategies/local-flood-risk-management-strategy. [Accessed 08 July 2022].

[348] Department for Transport, “TAG Unit A3: Environmental Impact Appraisal,” May 2023. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1079013/TAG-unit-A3-environmental-impact-appraisal.pdf.

[349] Environment Agency, “Hydrogeological impact appraisal for dewatering abstractions,” 2007. [Online]. Available: https://www.gov.uk/government/publications/hydrogeological-impact-appraisal-for-dewatering-abstractions. [Accessed 20 July 2022].

[350] Environment Agency, “Hydrogeological impact appraisal for dewatering abstractions,” 2007. [Online]. Available: https://www.gov.uk/government/publications/hydrogeological-impact-appraisal-for-dewatering-abstractions. [Accessed 20 July 2022].

[351] Environment Agency, “LIT 10419 Modelling: surface water pollution risk assessment risk assessment,” 2014. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/509313/LIT_10419.pdf. [Accessed 05 April 2023].

[352] Environment Agency, “Environmental Quality Standards Directive (EQSD) list for WFD assessments,” 2016. [Online]. Available: https://www.gov.uk/government/publications/list-of-chemicals-for-water-framework-directive-assessments/environmental-quality-standards-directive-eqsd-list-for-wfd-assessments. [Accessed 5 April 2023].

[353] Environment Agency, “Surface water pollution risk assessment for your environmental permit,” 1 February 2016. [Online]. Available: https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit. [Accessed 4 May 2023].

[354] Environment Agency, “Water Framework Directive assessment: estuarine and coastal waters,” 9 November 2017. [Online]. Available: https://www.gov.uk/guidance/water-framework-directive-assessment-estuarine-and-coastal-waters. [Accessed 8 July 2022].

[355] National Highways, “LA 113 Road drainage and the water environment,” 2020. [Online]. Available: https://standardsforhighways.co.uk/tses/attachments/d6388f5f-2694-4986-ac46-b17b62c21727?inline=true. [Accessed 6 September 2022].

[356] UK Technical Advisory Group, “UK Technical Advisory Group on the Water Framework Directive: Guidance on the identification and risk assessment of groundwater dependent terrestrial ecosystems,” 2003. [Online]. Available: https://www.wfduk.org/sites/default/files/Media/Characterisation%20of%20the%20water%20environment/Risk%20assessment%20of%20terrestrial%20ecosystems%20groundwater_Draft_210104.pdf.

[357] Environment Agency and Department for Environment, Food & Rural Affairs, “Preparing a flood risk assessment: standing advice,” 2022. [Online]. Available: https://www.gov.uk/guidance/flood-risk-assessment-standing-advice. [Accessed 19 June 2023].

[358] Environment Agency, “Flood risk assessments: climate change allowances,” 2022. [Online]. Available: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances. [Accessed 19 June 2023].

[359] Ministry of Housing, Communities and Local Government, “National Planning Policy Framework,” 8 July 2021. [Online]. Available:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf. [Accessed 2022].

[360] Construction Industry Research and Information Association, “Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors,” 2001.

[361] Construction Industry Research and Information Association, “Control of Water Pollution from Linear Construction Projects – Technical Guidance (C648),” 2006.

[362] Construction Industry Research and Information Association, “Environmental good practice on site guide (fourth edition),” 2015.

[363] Construction Industry Research and Information Association, “Groundwater control: design and practice (second edition) (C750),” CIRIA, 2006.

[364] Department for Environment, Food & Rural Affairs and Environment Agency, “Pollution prevention for businesses,” 2023. [Online]. Available: https://www.gov.uk/guidance/pollution-prevention-for-businesses. [Accessed 19 June 2023].

[365] NetRegs, “Guidance for Pollution Prevention (GPP),” 2022. [Online]. Available: https://www.netregs.org.uk/environmental-topics/guidance-for-pollution-prevention-gpp-documents/. [Accessed 19 June 2023].

[366] Environment Agency, “Protect groundwater and prevent groundwater pollution,” 2017. [Online]. Available: https://www.gov.uk/government/publications/protect-groundwater-and-prevent-groundwater-pollution/protect-groundwater-and-prevent-groundwater-pollution. [Accessed 19 June 2023].

[367] Environment Agency, “Groundwater protection technical guidance,” 2017. [Online]. Available: https://www.gov.uk/government/publications/groundwater-protection-technical-guidance. [Accessed 19 June 2023].

[368] Environment Agency, “Check if you need permission to do work on a river, flood defence or sea defence,” Undated. [Online]. Available: https://www.gov.uk/permission-work-on-river-flood-sea-defence. [Accessed 8 July 2022].

[369] East Hampshire District Council, “Position statement on nutrient neutral,” Undated. [Online]. Available: https://cdn.easthants.gov.uk/public/documents/EH%20-%20Nutrient%20Neutrality%20Position%20Statement%20.pdf. [Accessed 4 October 2022].

[370] Hampshire County Council, “Preliminary Flood Risk Assessment,” 2011. [Online]. Available: https://documents.hants.gov.uk/flood-water-management/watercourses/PFRAReportsavedJan2016.pdf. [Accessed 19 June 2023].

[371] Hampshire County Council, “Hampshire Groundwater Management Plan,” 2013. [Online]. Available: https://documents.hants.gov.uk/flood-water-management/groundwater/GroundwaterManagementPlan.pdf. [Accessed 19 June 2023].

[372] Hampshire County Council, “Catchment Approach to Flood Risk Management,” Undated. [Online]. Available: https://www.hants.gov.uk/landplanningandenvironment/environment/flooding/strategies/catchment-management-plans. [Accessed 19 June 2023].

[373] Havant Borough Council, “Flood Risk Sequential Test & Exception Test,” March 2023. [Online]. Available: https://cdn.havant.gov.uk/public/documents/Sequential%20Test%20Note%20(March%202023).pdf.

[374] Havant Borough Council, “Position Statement and Mitigation Plan for Nutrient Neutral Development,” 2020. [Online]. Available: https://cdn.havant.gov.uk/public/documents/Position%20statement%20and%20mitigation%20plan_0.pdf. [Accessed 8 July 2022].

[375] South Downs National Park Authority, “Water resources in the central area of the South Downs National Park,” 2023. [Online]. Available: https://www.southdowns.gov.uk/planning-news/water-resources-in-the-central-area-of-the-south-downs-national-park/. [Accessed 8 July 2022].

[376] Environment Agency, “South East river basin district river basin management plan: updated 2022,” 2022. [Online]. Available: https://www.gov.uk/guidance/south-east-river-basin-district-river-basin-management-plan-updated-2022. [Accessed 19 June 2023].

[377] Royal HaskoningDHV, “Hampshire Water Transfer and Water Recycling Project Eastney Long Sea Outfall: Dispersion Modelling S3/P01,” Royal HaskoningDHV, 2022.

[378] Environment Agency, “Catchment Data Explorer,” 2022. [Online]. Available: https://environment.data.gov.uk/catchment-planning/. [Accessed 8 July 2022].

[379] Environment Agency, “Water quality data archive,” Undated. [Online]. Available: https://environment.data.gov.uk/water-quality/view/landing. [Accessed 8 July 2022].

[380] Environment Agency, “Ecology & Fish Data Explorer,” Undated. [Online]. Available: https://environment.data.gov.uk/ecology/explorer/. [Accessed 8 July 2022].

[381] British Geological Society, “Geology Viewer,” Undated. [Online]. Available: https://geologyviewer.bgs.ac.uk/?_ga=2.122224843.1109077595.1663076242-627234099.1663076242. [Accessed 8 July 2022].

[382] HM Government, “Check the long term flood risk for an area in England,” Undated. [Online]. Available: https://www.gov.uk/check-long-term-flood-risk. [Accessed 8 July 2022].

[383] Environment Agency, “Groundwater Dependent Terrestrial Ecosystems (England only),” Updated 2023. [Online]. Available: https://www.data.gov.uk/dataset/72a149a2-1be7-441f-bc37-94a77f261e27/groundwater-dependent-terrestrial-ecosystems-england-only. [Accessed 19 June 2023].

[384] Natural England, “Priority Habitats Inventory (England),” Updated 2023. [Online]. Available: https://www.data.gov.uk/dataset/4b6ddab7-6c0f-4407-946e-d6499f19fcde/priority-habitats-inventory-england. [Accessed 19 June 2023].

[385] Environment Agency, “River Habitat Survey in Britain and Ireland,” 2003. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1093961/RHS-manual-2003_2022-reprint-LIT-1758.pdf. [Accessed 8 July 2022].

[386] Environment Agency, “Geomorphological Monitoring Guidelines for River Restoration Schemes,” February 2007. [Online]. Available: https://www.therrc.co.uk/MOT/References/EA_Geomorphological_monitoring_guidelines.pdf. [Accessed 8 July 2022].

[387] River Restoration Centre, “Practical River Restoration Appraisal Guidance for Monitoring Options (PRAGMO),” Updated 2023. [Online]. Available: https://wiki.therrc.co.uk/index.php/PRACTICAL_RIVER_RESTORATION_APPRAISAL_GUIDANCE_FOR_MONITORING_OPTIONS_(PRAGMO). [Accessed 19 June 2023].

[388] Environment Agency and Department for Environment, Food & Rural Affairs, “Surface water pollution risk assessment for your environmental permit,” 2022. [Online]. Available: https://www.gov.uk/guidance/surface-water-pollution-risk-assessment-for-your-environmental-permit. [Accessed 8 July 2022].

[389] Planning Inspectorate, “Advice Note Eighteen: The Water Framework Directive, Version 1,” 2017. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-18/. [Accessed 8 July 2022].

[390] Chartered Institute for Archaeologists, “Standard and guidance for historic environment desk-based assessment,” 1 October 2020. [Online]. Available: https://www.archaeologists.net/sites/default/files/CIfAS%26GDBA_4.pdf.

[391] Chartered Institute of Ecology and Environmental Management, “Guidelines for Ecological Impact Assessment in the UK and Ireland,” September 2018. [Online]. Available: https://cieem.net/resource/guidelines-for-ecological-impact-assessment-ecia/.

[392] Natural England and Department for Environment, Food and Rural Affairs, “Protected species and development: Advice for local planning authorities,” 8 September 2022. [Online]. Available: https://www.gov.uk/guidance/protected-species-how-to-review-planning-applications.

[393] Landscape Institute and Institute of Environmental Management and Assessment, Guidelines for Landscape and Visual Impact Assessment (Third edition), Routledge, 2013.

[394] Institute of Environmental Management and Assessment, “Materials and Waste in Environmental Impact Assessment,” March 2020. [Online]. Available: https://www.iema.net/resources/reading-room/2020/03/30/materials-and-waste-in-environmental-impact-assessment.

[395] Institute of Environmental Assessment, “Guidelines for the Environmental Assessment of Road Traffic,” East Kirkby, 1993.

[396] Hampshire and Isle of Wight Local Resilience Forum, “Community Risk Register,” No date. [Online]. Available: https://documents.hants.gov.uk/emergencyplanning/CommunityRiskRegisterbooklet.pdf. [Accessed 08 June 2023].

[397] UK Government, “National Risk Register,” 2020. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/952959/6.6920_CO_CCS_s_National_Risk_Register_2020_11-1-21-FINAL.pdf. [Accessed 08 June 2023].

[398] Health and Safety Executive, “COMAH 2015 Public Information,” No date, [Online]. Available: https://notifications.hse.gov.uk/COMAH2015/Search.aspx. [Accessed 08 June 2023].

[399] Environment Agency, “Flood Risk Map,” No date, [Online]. Available: https://check-long-term-flood-risk.service.gov.uk/postcode. [Accessed 08 June 2023].

[400] UK Government, “Fire and Rescue Incident Statistics: England, year ending December 2021,” December 2021. [Online]. Available: https://www.gov.uk/government/statistics/fire-and-rescue-incident-statistics-england-year-ending-december-2021/fire-and-rescue-incident-statistics-england-year-ending-december-2021. [Accessed 08 June 2023].

[401] Met Office, “England and Wales Fire Severity Index,” No date, [Online]. Available: https://www.metoffice.gov.uk/public/weather/fire-severity-index/#?tab=map&fcTime=1653303600&zoom=5&lon=-4.00&lat=55.74. [Accessed 08 June 2023].

[402] Met Office, “UK Storm Season 2020/21,” [Online]. Available: https://www.metoffice.gov.uk/weather/warnings-and-advice/uk-storm-centre/uk-storm-season-2020-21. [Accessed 08 June 2023].

[403] Met Office, “Existing Climate at the Thornley Island Meteorological Station for the Period 1991 – 2020,” 2022.

[404] Defra, “UK AIR: Air Information Resource,” March 2023. [Online]. Available: https://uk-air.defra.gov.uk/aqma/maps/. [Accessed 08 June 2023].

[405] Institute of Environmental Management and Assessment, “IEMA Major Accidents and Disasters in EIA Guide,” 23 September 2020. [Online]. Available: https://www.iema.net/resources/blog/2020/09/23/iema-major-accidents-and-disasters-in-eia-primer. [Accessed 08 June 2023].

[406] Ministry of Housing, Communities and Local Government, National Planning Policy Framework, Section 16: conserving and enhancing the historic environment, 2021.

[407] Soth Downs National Park Authority, South Downs Local Plan, 2019.

[408] Ministry of Housing, Communities and Local Government, “National Planning Policy Framework,” July 2021. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf. [Accessed 14 June 2023].

[409] Planning Inspectorate, “Advice Note Seven: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping (Version 7),” June 2020. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/#6. [Accessed 15 June 2023].

[410] Ministry of Housing Communities & Local Goverment , “National Planning Policy Framework,” 2021.

[411] European Parliament and of the Council, *Waste Framework Directive 2008/98/EC,* 2008.

[412] PINS, “Advice Note Seven: Environmental Impact Assessment: Preliminary Environmental Information, Screening and Scoping,” 2020. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-seven-environmental-impact-assessment-process-preliminary-environmental-information-and-environmental-statements/. [Accessed 28 June 2023].

[413] Ministry of Housing, Communities and Local Government, “National Planning Policy Framework,” 2021. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf. [Accessed 05 June 2023].

[414] Planning Inspectorate, “Advice Note Eighteen: The Water Framework Directive, (Version 1),” June 2017. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-18/.

[415] CivilSir, “What is the weight of a standard brick and their size,” no date. [Online]. Available: https://civilsir.com/weight-of-a-brick/#:~:text=According%20to%20several%20standard%2C%20the,brick%2C%20size%20and%20their%20density.

[416] R. Castles, F. Woods, P. Hughes, J. Arnott, L. MacCallum and M. Marley, “Increasing numbers of harbour seals and grey seals in the Solent,” *Ecology and Evolution,* no. 11, p. 16524–16536, 2021.

[417] Greater London Authority, “London Plan Waste Forecasts and Apportionments: Task 2 - Construction, Demolition & Excavation Waste and Hazardous Waste Forecasts,” 2017.

[418] International Solid Waste Association, [Online]. Available: https://www.iswa.org/?eID=tx_iswaknowledgebase_download&documentUid=5237&v=79cba1185463.

WATER
for LIFE®
from
Southern
Water®

# Hampshire Water Recycling & Water Transfer Project

# EIA Scoping Report – Volume II Appendices

**VOLUME NUMBER:** II

**DOCUMENT REFERENCE:** 208102-ARU-EGN-XX-RP-L-00002

July 2023 | Issue Rev 01

**The Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017**

WATER for LIFE®

from Southern Water®

# Contents

**Appendix 2.1 Local planning policy considerations ..... 1**
1.1 Introduction ..... 1
1.2 East Hampshire District Council ..... 1
1.3 Eastleigh Borough Council ..... 1
1.4 Fareham Borough Council ..... 2
1.5 Hampshire County Council ..... 2
1.6 Havant Borough Council ..... 3
1.7 Portsmouth City Council ..... 3
1.8 Winchester City Council ..... 4
1.9 South Downs National Park Authority ..... 4
1.10 Other considerations and guidance ..... 5
**Appendix 8-1 Internationally designated sites within 2km/hydrologically connected to the Scoping Area ..... 7**
**Appendix 8-2 National statutory designated sites within 2km/hydrologically connected to the Scoping Area ..... 11**
**Appendix 8-3: Non-statutory Designated Sites within the Scoping Area and associated criteria ..... 19**
1.11 Non-statutory Designated Sites Criteria ..... 19
1.12 Non-statutory sites within 200m of the Scoping Area ..... 21
**Appendix 9-1 List of policies relevant to the marine biodiversity chapter in the South Inshore and Offshore Marine Plan ..... 30**
**Appendix 9-2 Classified shellfish production areas ..... 34**
**Appendix 9-3 Designated sites identified within study areas 1 and 2 ..... 46**
**Appendix 9-4 Baseline for commercially sensitive species ..... 59**
**Appendix 15.1 Landfill capacity calculations ..... 67**
**Appendix 18-1 Preliminary hydrogeological impact assessment ..... 69**
**1 Introduction ..... 70**
1.2 Approach ..... 70
**2 Baseline information ..... 76**
2.1 Regional understanding ..... 76
2.2 Local understanding ..... 85
**3 Conceptualisation ..... 136**
**4 Preliminary assessment of impacts ..... 146**
4.1 Construction impacts ..... 146
4.2 Operational impacts ..... 147

4.3 Receptor value ..... 147
4.4 Receptor impacts ..... 168
**5 Mitigation measures and residual impacts ..... 174**
5.1 Introduction ..... 174
5.2 Embedded mitigation measures ..... 174
5.3 Significance of effect taking into consideration embedded mitigation 174
5.4 Additional mitigation measures ..... 175
5.5 Residual impacts ..... 175
**6 Conclusions and recommendations ..... 176**
**Annex A - Conceptual model cross sections ..... 179**
**Appendix 18.2 Water Body water dependent protected areas ..... 190**
**1 Water Body water dependent protected areas ..... 191**
1.1 River water bodies ..... 191
1.2 Canal water bodies ..... 192
1.3 Transitional water bodies ..... 192
1.4 Coastal water bodies ..... 194
1.5 Groundwater Bodies ..... 196
**Appendix 20-1 Major accidents and disasters ..... 198**
**1 Major accidents and disasters ..... 199**
1.1 Introduction ..... 199
1.2 Definitions ..... 199
1.3 Relevant policy and guidance ..... 200
1.4 Engagement ..... 203
1.5 Approach to Baseline Review ..... 203
1.6 Baseline conditions ..... 204
1.7 Potential effects ..... 205
1.8 Limitations and assumptions ..... 207
1.9 Summary ..... 207
1.10 Glossary and abbreviations ..... 207
**Annex A - Risk identification screening ..... 209**
**Abbreviations ..... 220**
**References ..... 222**

# Tables

Table 1-1: Data sources and date accessed/received ..... 72
Table 1-2: Additional data requested/to be requested ..... 74

Table 2-1: WFD groundwater bodies summary [51] ..... 78
Table 2-2: Average rainfall at proximal climate stations ..... 85
Table 2-3: Surface water catchments in study area ..... 86
Table 2-4: Superficial deposits within study area ..... 87
Table 2-5: Bedrock geology within study area ..... 88
Table 2-6: Licensed groundwater abstractions ..... 90
Table 2-7: Consented discharges ..... 90
Table 2-8: Surface water catchments in study area ..... 91
Table 2-9: Superficial deposits in study area ..... 92
Table 2-10: Bedrock geology in study area ..... 93
Table 2-11: Licensed groundwater abstractions ..... 95
Table 2-12: Consented discharges ..... 95
Table 2-13: Surface water catchments in study area ..... 97
Table 2-14: Superficial deposits in study area ..... 98
Table 2-15: Bedrock geology in study area ..... 99
Table 2-16: Licensed groundwater abstractions ..... 100
Table 2-17: Consented discharges ..... 101
Table 2-18: Surface water catchments in study area ..... 103
Table 2-19: Superficial deposits in study area ..... 104
Table 2-20: Bedrock geology in study area ..... 105
Table 2-21: Licensed groundwater abstractions ..... 107
Table 2-22: Consented discharges ..... 108
Table 2-23: Surface water catchments within study area ..... 110
Table 2-24: Superficial deposits in study area ..... 110
Table 2-25: Bedrock geology in study area ..... 111
Table 2-26: Licensed groundwater abstractions ..... 113
Table 2-27: Consented discharges ..... 114
Table 2-28: Surface water catchments in study area ..... 117
Table 2-29: Superficial deposits in study area ..... 117
Table 2-30: Bedrock geology in study area ..... 118
Table 2-31: Licensed groundwater abstractions ..... 120
Table 2-32: Consented discharges ..... 120
Table 2-33: Surface water catchments in study area ..... 122
Table 2-34: Superficial deposits in study area ..... 123
Table 2-35: Bedrock geology in study area ..... 123
Table 2-36: Consented discharges ..... 125
Table 2-37: Surface water catchments in study area ..... 127
Table 2-38: Superficial deposits in study area ..... 128
Table 2-39: Bedrock geology in study area ..... 129
Table 2-40: Licensed groundwater abstractions ..... 131
Table 2-41: Consented discharges ..... 132
Table 3-1: Conceptual model for proposed Water Recycling Plant ..... 136
Table 3-2: Conceptual model for Proposed Underground Pipeline between Budds Farm Water Treatment Works and the proposed Water Recycling Plant (including the Budds Farm Water Treatment Works site) ..... 137
Table 3-3: Conceptual model for Proposed Underground Pipeline between the proposed Water Recycling Plant and Havant Thicket Reservoir ..... 138
Table 3-4: Conceptual model for proposed Water Recycling Plant to proposed land west of London Road (A3) (northern pipeline corridor) ..... 139
Table 3-5: Conceptual model for proposed Water Recycling Plant to proposed land west of London Road (A3) (southern pipeline corridor) ..... 140
Table 3-6: Conceptual model for land west of London Road (A3) to A32 Road ..... 141
Table 3-7: Conceptual model for A32 to Shirrel Heath ..... 142
Table 3-8: Conceptual model for Shirrel Heath to Bishop's Waltham ..... 143
Table 3-9: Conceptual model for Bishop's Waltham to Otterbourne ..... 144
Table 4-1: Receptor value (very low to high) ..... 148
Table 4-2: Estimating magnitude of impact on an attribute ..... 168
Table 5-1: Significance matrix ..... 174
Table 1-1: Source of baseline data ..... 204

# Appendix 2.1 Local planning policy considerations

## 1.1 Introduction

1.1.1 The Proposed Development relates to the administrative areas of both upper and lower tier local authorities, and a National Park Authority.

1.1.2 Local planning policies can be important and relevant to the decision on the application for the Proposed Development as they contain information about local designation and allocations, provide an understanding of local issues, and help to define the scope of appropriate mitigation.

1.1.3 This appendix provides an overview of the relevant local authorities whose areas the Proposed Development would be located in and associated statutory development plans. The level of weight to be attached to adopted statutory development plan policies will be guided by whether they represent up to date policies.

1.1.4 As weight can be given to policies in emerging plans guided by their stage of preparation, the extent of outstanding objections to relevant policies and the degree of consistency to the National Planning Policy Framework (NPPF) [1], this appendix also outlines the relevant emerging plans below.

## 1.2 East Hampshire District Council

1.2.1 The Proposed Development would connect to the Havant Thicket Reservoir (ref. APP/20/00990 in relation to land within the administrative boundary of Havant Borough Council (HBC) and Ref: 51680/001 for the section within East Hampshire District Council (EHDC)).

1.2.2 EHDC is a lower-tier district council. The statutory development plan for EHDC is made up of the documents mentioned in Table 2-1 within Volume I.

1.2.3 Policy CP26 Water Resources/Water Quality in the East Hampshire District Local Plan: Joint Core Strategy (2014) [2] safeguards the site identified for the Havant Thicket Reservoir and sets out the duty of EHDC to take account of the Water Framework Directive (WFD) objectives.

1.2.4 There is an emerging Local Plan which will replace the Joint Core Strategy [2], Housing and Employment Allocations (2016) [4] and the Local Plan Second Review (2006) [5]. EHDC consulted on the Draft Local Plan 2017-2036 in 2019 [6]. Consultation on the draft Local Plan in accordance with Regulation 19 of the Town and Country Planning (Local Planning) (England) Regulations 2012 (Regulation 19) is due to take place in 2024.

## 1.3 Eastleigh Borough Council

1.3.1 The Proposed Development would intersect areas designated as Sites of Importance for Nature Conservation (SINC) within the Eastleigh Borough Council (EBC).

1.3.2 EBC is a lower-tier district council. The statutory development plan for EBC is made up of the documents mentioned in Table 2-1 within Volume I.

1.3.3 Policy DM11 [6] Nature Conservation requires development proposals that have a direct or indirect adverse effect on a SINC to demonstrate the following:

- *"a. there are no alternative solutions;*
- *b. the adverse effects are unavoidable;*
- *c. measures are taken to mitigate or, as a last resort, compensate for the adverse effects;*
- *d. there is an overall biodiversity net gain; and*
- *e. if there are any residual adverse effects which cannot be avoided, mitigated or compensated, the benefits of the development must clearly outweigh the adverse effects on the nature conservation value of the site and any broader impacts on national and local designations."*

## 1.4 Fareham Borough Council

1.4.1 Part of the Proposed Development intersects an area of special landscape quality within the Fareham Borough Council (FBC).

1.4.2 FBC is a lower-tier district council. The statutory development plan for FBC is made up of the documents mentioned in Table 2-1 within Volume I.

1.4.3 Policy DS3 Landscape protects areas of special landscape quality identified on the policies map [7]. Proposals for major development must be accompanied by a comprehensive landscape mitigation and enhancement scheme.

1.4.4 Policies NE1 Protection of Nature Conservation, Biodiversity and the Local Ecological Network and NE9 Green Infrastructure protect the natural environment, habitats, species, designated sites and green infrastructure [8].

1.4.5 Policy DS1 Development in the Countryside protects the countryside or land outside the defined settlements from development that would have an adverse impact on its landscape character, appearance and function. Provision of infrastructure meeting an overriding public need is an acceptable form of built development on such land [8].

## 1.5 Hampshire County Council

1.5.1 Hampshire County Council (HCC) as an upper-tier county council is the local highway authority, the Lead Local Flood Authority and the local authority for minerals and waste in Hampshire.

1.5.2 HCC adopted the Hampshire Minerals and Waste Plan (HMWP) [9] in 2013. The HMWP sets out the vision, objectives, spatial strategy and policies for "*safeguarding of mineral resources, mineral infrastructure, waste infrastructure and potential minerals and waste wharf or rail depot infrastructure*" in Hampshire up to 2030.

## 1.6 Havant Borough Council

1.6.1 The following components forming part of the Proposed Development are located in HBC:

- The proposed Water Recycling Plant (WRP)
- The proposed High Lift Pumping Station (HLPS)
- The Proposed Underground Pipeline between the Budds Farm Wastewater Treatment Works (WTW) and the proposed WRP and
- The start of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works (WSW)

1.6.2 The Proposed Development also covers areas designated as SINCs and allocated as employment site within HBC.

1.6.3 HBC is a lower-tier district council. The statutory development plan for HBC is made up of the documents mentioned in Table 2-1 within Volume I.

1.6.4 Part of the Proposed Development covers an area allocated as BD11 Brockhampton West [10] which is described as "*a large 'gateway' employment site*". Policy CS2 Employment [11] sets out the employment floorspace requirements (former B Class uses) for HBC.

1.6.5 Policy CS11 Protecting and Enhancing the Special Environment and Heritage of Havant Borough [11] requires development proposals to have particular regard to the hierarchy of nature conservation designations in the HBC, including SINCs.

1.6.6 Policy CS19 Effective Provision of Infrastructure [11] safeguards the requirements of infrastructure providers including the Budds Farm WTW and Havant Thicket Reservoir.

1.6.7 HBC submitted the Havant Borough Local Plan for examination in 2021, which was subsequently withdrawn in March 2022 following the Inspector's recommendation to undertake additional work and consultation prior to resubmitting for examination. A Regulation 18 consultation took place in late 2022 on a revised new local plan. The local plan is forecasted to be adopted in 2025.

## 1.7 Portsmouth City Council

1.7.1 Part of the Proposed Development lies within the northern administrative boundary of Portsmouth City Council (PCC). PCC is a unitary authority. The development plan for PCC comprises:

- Portsmouth Plan (The Portsmouth Core Strategy) (2012) [12]
- A number of saved policies from the Portsmouth City Local Plan (2006) [13]
- Southsea Town Centre Area Action Plan (2007) [14]
- Somerstown and North Southsea Area Action Plan (2012) [15]
- Milton Neighbourhood Plan (adopted July 2022) [16]

1.7.2 PCC are in the process of preparing a new Local Plan [18]. Consultation in accordance with Regulation 18 took take place in autumn 2021.

## 1.8 Winchester City Council

1.8.1 The Proposed Development is partly located in and adjacent to areas designated as priority habitats, including Ancient Woodland, Sites of Special Scientific Interest (SSSI) and SINC.

1.8.2 Winchester City Council (WCC) is a lower-tier district council. The statutory development plan for WCC is made up of the documents mentioned in Table 2-1 within Volume I.

1.8.3 Policy CP16 Biodiversity [19] requires development proposals that have the potential to impact on priority habitats and/or species to take account of relevant evidence and assessments or surveys.

1.8.4 WCC has commenced the preparation of a new Local Plan [20] to accommodate growth needed for the district, outside of the South Downs National Park (SDNP). The Regulation 18 consultation took place in late 2022 with the Regulation 19 consultation planned for August 2023.

## 1.9 South Downs National Park Authority

1.9.1 An area of the Proposed Development may intersect the SDNP. The Proposed Development is also in proximity of a landscape character area identified within the National Park.

1.9.2 South Downs National Park Authority (SDNPA) is the LPA for the SDNP. The statutory development plan for SDNPA is made up of the documents mentioned in Table 2-1 within Volume I.

1.9.3 Policy SD3 Major Development [21] indicates that a proposal for major development in the SDNP, including infrastructure and associated works, will only be permitted in exceptional circumstances and where it is demonstrably in the public interest. Such proposal is required to be supported by an assessment of the following:

- *"a) The need for the development, including in terms of any national considerations, and the impact of permitting it, or refusing it, upon the local economy;*
- *b) The cost of, and scope for, developing elsewhere outside the designated area, or meeting the need for it in some other way; and*
- *c) Any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated."*

1.9.4 If the development is considered acceptable, Policy SD3 expects the proposal to harness all opportunities to conserve and enhance the special qualities of the National Park.

1.9.5 The South Downs Local Plan [21] identifies landscape character types for which Policies SD4 Landscape Character, SD5 Landscape-led Approach to Design, SD6 Safeguarding Views, SD7 Relative Tranquillity and SD8 Dark Night Skies are of relevance. Development proposals are required to conserve and enhance landscape character, relative tranquillity and dark night skies. Policy also requires

design that is sensitive to local character as well as preservation of the visual integrity, identity and scenic quality of the National Park.

1.9.6 Policy SD42 Infrastructure [21] requires proposals for new infrastructure to be the least environmentally harmful option reasonably available, taking account of relevant operational requirements and technical limitations.

1.9.7 SDNPA is the local authority for minerals and waste for their administrative area, and share the same minerals and waste plan [17] with HCC as outlined above.

## 1.10 Other considerations and guidance

1.10.1 The following policy and guidance documents are other considerations of relevance:

*Local policy and guidance:*

- Hampshire Local Flood and Water Management Strategy (2020) [22]
- Hampshire County Council Climate Change Strategy (2020-2025) [23]
- Hampshire County Council technical guidance notes (2022)
- Hampshire Local Transport Plan 2011-2031 [24] and draft Local Transport Plan 4 [25]
- Hampshire County Council Local Cycling and Walking Infrastructure Plan (November 2022)
- Hampshire County Council Walking Strategy (2016) [26]
- East Hampshire District Climate Change and Sustainable Construction Supplementary Planning Document (SPD) (2022) [27]
- Fareham Open Space Supplementary Planning Guidance (SPG) (2002) [28]
- Fareham Borough Landscape Assessment (2017) [29]
- Fareham Borough Design Guidance SPG (Excluding Welborne) (2015) [30]
- Havant Borough Council Borough Design Guide SPD (2011) [31]
- Portsmouth Air Quality and Air Pollution SPD (2006) [32]
- Portsmouth Achieving Employment and Skills Plans SPD (2013) [33]
- Portsmouth Parking Standards and Transport Assessment SPD (2014) [34]
- Portsmouth Sustainable Design and Construction A Practical Guide for Developers (2013) [35]
- City of Winchester Movement Strategy (2019) [36]
- Winchester High Quality Places SPD (2015) [37]
- Winchester Landscape Character Assessment SPD (2022) [38]
- Winchester Air Quality SPD (2021) [39]
- South Downs National Park Sustainable Construction SPD (2020) [40]
- South Downs National Park Design Guide SPD (2022) [41]
- Eastleigh Biodiversity SPD (2009) [42]
- Eastleigh Character Area Appraisals SPD (2007) [43]

- Eastleigh Trees and Development SPD (2022) [44]
- Eastleigh Environmentally Sustainable Development SPD (2009) [45]
- Eastleigh Quality Places SPD (2011) [46]

# Appendix 8-1 Internationally designated sites within 2km/hydrologically connected to the Scoping Area

| Site Name | Designation | Distance from Scoping Area | Description |
|---|---|---|---|
| River Itchen | SAC | Within the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation for which this is considered to be one of the best areas in the United Kingdom.<br><br>The site supports; Brook lamprey *Lampetra planeri* and Atlantic salmon *Salmo salar* for which the area is considered to support a significant presence; European bullhead *Cottus gobio* for which this is considered to be one of the best areas in the United Kingdom; Otter *Lutra lutra* for which the area is considered to support a significant presence; Southern damselfly *Coenagrion mercuriale* for which this is considered to be one of the best areas in the United Kingdom and white-clawed crayfish *Austropotamobius pallipes* of which the area is considered to support a significant presence. |
| Solent Maritime | SAC | Within the Proposed Underground Pipeline between Budds Farm WTW and the proposed WRP and within Eastney Long Sea Outfall (LSO). | The Solent encompasses a major estuarine system on the south coast of England with four coastal plain estuaries (Yar, Medina, King's Quay Shore, Hamble) and four bar-built estuaries (Newtown Harbour, Beaulieu, Langstone Harbour, Chichester Harbour). Solent Maritime is the only site for smooth cordgrass Spartina alterniflora in the UK and is one of only two sites where significant amounts of small cord-grass S. maritima are found. The Solent contains the second-largest aggregation of Atlantic salt meadows in south and south-west England.<br><br>Qualifying habitats: The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:<br>Annual vegetation of drift lines<br>Atlantic salt meadows (Glauco-Puccinellietalia maritimae)<br>Coastal lagoons<br>Spartina swards (Spartinion maritimae). (Cord-grass swards)<br>Mudflats and sandflats not covered by seawater at low tide. (Intertidal mudflats and sandflats) |

| Site Name | Designation | Distance from Scoping Area | Description |
|---|---|---|---|
| | | | Perennial vegetation- of stony banks. (Coastal shingle vegetation outside the reach of waves)<br>Salicornia and other annuals colonising mud and sand (Glasswort and other annuals colonising mud and sand)<br>Sandbanks which are slightly covered by sea water all the time. (Subtidal sandbanks)<br>Shifting dunes along the shoreline with Ammophila arenaria (white dunes). (Shifting dunes with marram).<br>The site is designated under article 4(4) of the Directive (92/43/EEC) as it hosts the following species listed in Annex II:<br>Desmoulin's whorl snail Vertigo moulinsiana |
| Solent and Isle of Wight Lagoons | SAC | Hydrologically connected to the proposed WRP. | The site includes a number of lagoons in the marshes in the Keyhaven – Pennington area, at Farlington Marshes in Chichester Harbour, behind the sea-wall at Bembridge Harbour and at Gilkicker, near Gosport. The lagoons show a range of salinities and substrates, ranging from soft mud to muddy sand with a high proportion of shingle, which support a diverse fauna including large populations of three notable species: the nationally rare foxtail stonewort *Lamprothamnium papulosum*, the nationally scarce lagoon sand shrimp *Gammarus insensibilis* and the nationally scarce starlet sea anemone *Nematostella vectensis*. |
| South Wight Maritime | SAC | Hydrologically connected to the Eastney LSO. | The Solent encompasses a major estuarine system on the south coast of England with four coastal plain estuaries (Yar, Medina, King's Quay Shore, Hamble) and four bar-built estuaries (Newtown Harbour, Beaulieu, Langstone Harbour, Chichester Harbour). The site is the only one in the series to contain more than one physiographic sub-type of estuary and is the only cluster site. The Solent and its inlets are unique in Britain and Europe for their hydrographic regime of four tides each day, and for the complexity of the marine and estuarine habitats present within the area. |
| Chichester and Langstone Harbour | SPA | Within the Proposed Underground Pipeline between Budds Farm WTW | An internationally important site for regularly supporting 10,000 wintering wildfowl and more than 20,000 wintering waders. The site also supports internationally important numbers of:<br>Grey plover *Pluvalus sqatarola*: 3.9% of the western European population<br>Sanderling *Caldris alba*: 3.1% |

| Site Name | Designation | Distance from Scoping Area | Description |
|---|---|---|---|
| | | and the proposed WRP. | Dunlin *Caldris alpina* 2.6% of the north-west European and western African population<br>Redshank *Tringa totanus*: 1.4% of the eastern Atlantic population<br>Brent goose *Branta bernicla*: 12% of the western European population<br>Shelduck *Tadorna tadorna*: 3.3% of the UK population<br>Teal *Anas crecca*: 1% of the north-west Europe population |
| Portsmouth Harbour | SPA | 1.6km south of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | Portsmouth Harbour qualifies under Article 4.2 of the Birds Directive by supporting internationally or nationally important wintering populations of the following species of migratory waterfowl (average peak counts for the five-year period 1986/87 to 1990/91):<br>2,290 dark-bellied brent geese Branta bernicla bernicla (1.3% of the north-western Europe population and 2.5% of the British wintering population)<br>100 red-breasted merganser Mergus serrator (1% of the UK population)<br>70 black-tailed godwit Limosa limosa (over 1% of the UK population)<br>1,010 dunlin (over 1% of the UK population) |
| Solent and Dorset Coast | SPA | 1.6 km south of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | The Solent and Dorset Coast SPA is located along the coasts of Dorset and the varied habitats include saltmarsh, wet meadows, drier grassland, heath, sand dune, woodland and scrub and the site is of great ornithological interest. The SPA is designated for populations of Annex 1 species of the Bird Directive including:<br>Sandwich tern<br>Common tern<br>Little tern |
| Solent and Southampton Water | SPA | Hydrologically connected to the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | Solent and Southampton Water SPA is designated for its waterbird assemblage and populations of Annex 1 species of the Bird Directive:<br>Mediterranean Gull Larus melanocephalus<br>Sandwich tern Sterna sandvicensis<br>Common tern Sterna hirundo<br>Little tern Sterna albifrons<br>Roseate tern Sterna dougalli<br><br>Non-annex 1 migratory species: |

| Site Name | Designation | Distance from Scoping Area | Description |
|---|---|---|---|
| | | | Dark-bellied brent geese<br>Teal<br>Black-tailed godwit<br>Ringed plover Charadrius hiaticula |
| Chichester and Langstone Harbour | Ramsar | Within the Proposed Underground Pipeline between Budds Farm WTW and the proposed WRP. | Chichester and Langstone Harbours are large, sheltered estuarine basins comprising extensive mud and sand flats exposed at low tide. The site is of particular significance for 20,000 over-wintering wildfowl and waders and a wide range of coastal and transitional habitats supporting plant and animal communities. |
| Portsmouth Harbour | Ramsar | 1.6km south of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | Portsmouth harbour is a large, industrialised estuary consisting of a saltmarsh, vast expanses of mudflats, and tidal creeks on the south coast. The mudflats, supporting extensive beds of eelgrass, green algae and sea lettuce *Ulva lactuca*, providing feeding grounds for internationally important numbers of wintering dark-bellied brent geese.<br><br>Nationally important numbers of grey plover, dunlin, and black-tailed godwit are supported. Set in an urban area, there is a major port facility, and large-scale military activities occur at the site. |
| Solent and Southampton Water | Ramsar | Hydrologically connected to the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | The site exhibits an "unusual strong double tidal flow" and has long periods of slack water at high and low tide. It supports internationally important numbers of wintering waterfowl (51,361 over the winter) including ringed plover, teal and brent goose, important breeding gull and tern populations, and an impressive assemblage of rare invertebrates and plants. |

# Appendix 8-2 National statutory designated sites within 2km/hydrologically connected to the Scoping Area

| Site Name | Designation | Distance from Scoping Area | Description |
|---|---|---|---|
| River Itchen | SSSI | Within the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | The Itchen is a chalk river and shows a greater uniformity in physical characteristics along its entire length than other rivers of this type. The river's vegetation is dominated by higher plants, and the aquatic flora is exceptionally species-rich with many typical chalk stream plants present in abundance.<br><br>The Itchen supports one of the few populations of the native white-clawed crayfish remaining in the rivers of southern England and breeding otters.<br><br>The Itchen valley contains areas of fen, swamp and meadow supporting vegetation with diverse plant communities, some species rich. These areas, together with semi-natural riparian vegetation bordering much of the river's courses, provide habitat for diverse invertebrate assemblages which include nationally rare and scarce species, including aquatic molluscs. |
| Langstone Harbour | SSSI | Within the Proposed Underground Pipeline between Budds Farm WTW and the proposed WRP. | Langstone Harbour is a tidal basin which at high water resembles an almost land-locked lake. The harbour includes one of the largest areas of mixed saltmarsh on the south coast, and extensive cord-grass *Spartina anglica* marsh in an advanced state of degeneration. The SSSI includes Farlington Marshes, a peninsula of grassland and marsh on reclaimed tidal silt protected by a sea wall; and a similar but much smaller area at Southmoor. The harbour is of international importance as a rich intertidal system supporting high densities of intertidal invertebrates and large populations of migrant and overwintering waders and wildfowl, dependent upon them and upon the extensive beds of eelgrass *Zostera species*. The *Zostera angustifolia* and *Z. noltii* beds are among the largest in Britain. |

| Site Name | Designation | Distance from Scoping Area | Description |
|---|---|---|---|
| Portsdown | SSSI | 80m south of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | Portsdown is an isolated east-west chalk anticline with a long south-facing escarpment which remains un-reclaimed. Diverse rich chalk grassland flora and insect fauna found at the site. |
| Hook Heath Meadows | SSSI | 280m north of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | Hook Heath Meadows comprise an intimate mixture of woodland and agriculturally unimproved acid pasture lying within a shallow river valley. Many of the habitats present are now rare in lowland Britain through agricultural intensification. This site is of particular value as an invertebrate habitat. |
| Waltham Chase Meadows | SSSI | 400m north-east of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | Comprises a group of unimproved neutral meadows, at present cut for hay. Collectively they represent one of the best examples in the county of dry neutral unimproved pasture. The flora is rich and includes a number of species now scarce or local, through habitat loss, such as: green-winged orchid *Orchis morio*, adder's-tongue *Ophioglossum vulgatum*, callous-fruited water-dropwort *Oenanthe pimpinelloides*, pepper-saxifrage *Silaum silaus*, southern marsh orchid *Dactylorhiza praetermissa* and cowslip *Primula veris*. The rich and varied flora supports a rich invertebrate fauna. |
| Botley Wood and Everett's and Mushes Copses | SSSI | 510m south-west of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | Comprises a large tract of woodland in a poorly drained low-lying hollow. |
| Lye Heath Marsh | SSSI | 830m north-east of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | Situated along a spring-line which, within a relatively small area, supports an intimate mixture of basic flushes, unimproved grassland, alder woodland and dense hedgerows, which combine to form a now rare association of individually restricted habitats. |

| Site Name | Designation | Distance from Scoping Area | Description |
|---|---|---|---|
| The Moors, Bishop's Waltham | SSSI | 1.53km north-east of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | Unimproved wet meadows, draining to a central pool with associated mature alder *Alnus carr*, occupying a small alluvial basin in the headwaters of a tributary of the River Hamble.<br><br>The site supports a species-rich and ecologically diverse flora including many local or rare plants confined to unimproved, damp meadows. It is probably the richest site of its kind in the Hampshire Basin and the vegetation of the meadows exhibits an interesting juxtaposition of acid and basic elements. |
| Warblington Meadow | SSSI | 1.91km south-east of the Proposed Underground Pipeline between Budds Farm WTW and the proposed WRP. | An unimproved grazing marsh adjoining Chichester Harbour, this SSSI is an unimproved grazing marsh and is of special interest for its gradation from freshwater, base-rich marsh to old reclaimed saltmarsh, and for its rich associated flora, with a total of 158 species of flowering plants having been recorded up to the time of notification.<br><br>The freshwater marsh consists of a sedge-rush community with lesser pond sedge *Carex acutiformis*, false fox sedge *C. otrubae,* blue sedge *C. flacca,* carnation grass *C. panicea,* common sedge *C. nigra,* brown sedge *C. disticha and* oval sedge *C. ovalis growing together with* soft rush *Juncus effusus,* hard rush *J. inflexus,* sharp-flowered rush *J. acutiflorus* and jointed rush *J. articulatus*. The grass component is also high and the sward contains a number of locally distributed herbs. |
| Portsmouth Harbour | SSSI | Hydrological connectivity to the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | Portsmouth Harbour is the westernmost of three extensive and connected tidal basins – Portsmouth, Langstone and Chichester Harbours – which share physical characteristics and, in many respects, should be seen as a single biological system. At high water they resemble large, nearly land-locked shallow lagoons. At low water extensive mudflats are exposed which are drained by systems of channels and creeks. The harbours have a salinity approximating to that of the sea but they do receive some fresh water from springs arising in the intertidal zone, and from a number of small streams, the largest of which is the River Wallington, which flows into Fareham Creek, the westernmost channel of Portsmouth Harbour. |

| Site Name | Designation | Distance from Scoping Area | Description |
|---|---|---|---|
| Moorgreen Meadows | SSSI | Hydrological connectivity to the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | Neutral meadows and alder *Alnus wood* flanking a small tributary of the River Hamble. The sward comprises at least 17 co-dominant herbs and grasses and is of exceptional scientific importance for its populations of marsh orchids *Dactylorhiza*. In particular the site includes a geographically isolated population of the Northern Marsh Orchid *D. purpurella*, the nearest other localities being in Wales, Staffordshire and Yorkshire. The plants grow in close juxtaposition to four other species of the genus *Dactylorhiza* – early marsh orchid *D. incarnata*, common spotted orchid *D. fuchsii*, heath spotted orchid *D. maculata*, subspecies *ericetorum* and southern marsh orchid *D. praetermissa*. Hybrids between the five species occur in every combination and the site can thus be regarded as a 'hot bed' of micro-evolution. |
| Upper Hamble Estuary and Woods | SSSI | Hydrological connectivity to the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | This SSSI comprises the upper estuary of the River Hamble, together with adjoining saltmarsh, reed swamp and ancient semi-natural woodland. The woods have a diverse ground flora and invertebrate fauna. There is also a narrow zone of mudflats, with large numbers of marine worms, crustaceans and molluscs, which provide food for birds. |
| Titchfield Haven | SSSI | Hydrological connectivity to the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | Titchfield Haven was formerly the estuary of the River Meon, which receives most of its water from the chalk. Tidal water is excluded by one-way tidal valves and the former estuary is an extensive freshmarsh, the river being flanked successively by common reed *Phragmites australis* beds and wet, unimproved meadows dissected by drainage ditches and further diversified by pools, 'flashes' and patches of fen. In addition, extensive 'scrapes' have been constructed.<br><br>The area is an important resort for surface-feeding duck, with winter populations of 2,000 wigeon *Anas penelope*, 1,500 teal and smaller numbers of other surface feeding ducks. It possesses a rich wetland breeding bird community including bearded reedlings *Panurus biarmicus* and large populations of reed warblers *Acrocephalus scirpaceus* and sedge warblers *Acrocephalus schoenobaenus* |

| Site Name | Designation | Distance from Scoping Area | Description |
|---|---|---|---|
| Lincegrove and Hackett's Marshes | SSSI | Hydrological connectivity to the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | Comprises is one of the best examples of saltmarshes on the south coast. It is dominated by sea purslane and common cordgrass *Sporobolus anglicus*, with other flora including sea lavender *Limonium platyphyllum*, thrift *Armeria maritima*, sea aster *Tripolium pannonicum* and sea clubrush *Bolboschoenus maritimus*. They are one of only eight extensive saltmarshes on the central south coast between Poole in Dorset and Pagham in West Sussex. |
| Lee-on-the-Solent to Itchen | SSSI | Hydrological connectivity to Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | Comprised mainly of intertidal muds, there are also areas of saltmarsh, vegetated shingle, reedbeds, deciduous woodland and marshy grassland. It is outstanding for nationally scarce coastal plants, internationally important for dark-bellied brent geese, and nationally important for eight other species of birds, including great crested grebe *Podiceps cristatus* and ringed plover. |
| Bishops Waltham Branch Line | Local nature reserve (LNR) | 290m north-east of Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | Dismantled railway line lined by trees, including oak *Quercus robur*, hawthorn *Crataegus monogyna* and field maple *Acer campestre* supporting bird species, with a ground flora comprising flowering plants and male ferns *Dryopteris filix-mas*. The Kings Way and Pilgrims Trail routes pass through the LNR. |
| Farlington Marshes | LNR | 590m from the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | Farlington marshes is the Hampshire and Isle of Wight Wildlife Trust's oldest nature reserve. It is 125 hectares of flower-rich grazing marsh on the northern shore of Langstone harbour between Portsmouth and Havant. |
| Shawford Down | LNR | 800m north of Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW.. | Shawford Down is a 19.6 hectares site of chalk grassland and scrub, grazed with Highland cattle. The site supports chalk downland plants and butterflies. |
| Hazleton Common | LNR | 890m north-east of the Havant Thicket Reservoir. | Area of lowland heath, with ponds and woodland areas. The site supports a range of species, including common lizard *Zootoca vivipara*, slow worm *Anguis fragilis*, adder *Vipera berus*, grass *snake Natrix natrix* and great crested newt *Triturus cristatus* have been identified in the main pond. A total of 26 ancient woodland indicator species have been identified in the |

| Site Name | Designation | Distance from Scoping Area | Description |
|---|---|---|---|
| | | | woodland areas and the site supports a diverse range of invertebrates and birds. |
| Claylands | LNR | 910m north-east of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | Comprised of secondary woodland, grassy and scrub covered south facing slopes, forming banks of an old clay working. A meadow which was landfill, two neutral grassland meadows and a number of ponds which support a population of great crested newts. |
| West Hayling | LNR | 1.19km south of the Proposed Underground Pipeline between Budds Farm WTW and the proposed WRP. | Formerly known as the Hayling Oysterbeds, is home either permanently or on a migratory basis for tens and thousands of seabirds, which find that the thousands of hectares of intertidal mudflats contain a massive assemblage of marine invertebrate life. |
| Hayling Billy | LNR | 1.25km south-east of the Proposed Underground Pipeline between Budds Farm WTW and the proposed WRP. | This old section of the Hayling Billy train supports rare plant species. |
| The Moors, Bishop's Waltham | LNR | 1.53km east of the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW. | An area of semi-natural woodland, fen and grassland and open water. It is the main source of the Hamble River. Springs and streams feed a mill pond surrounded by a complex of woodland, fen and meadows.<br><br>The meadow to the west of the Mill Pond is managed in a traditional way, being cut for hay and grazed by cattle. Orange Tip *Anthocharis cardamines* and Green-veined White *Pieris napi* butterflies lay their eggs on cuckoo flowers *Cardamine pratensis* in May. Other spring wildflowers typical of damp, herb rich meadows include water avens *Geum rivale*, marsh marigold *Caltha palustris* and the scarce common bistort *Bistorta officinalis*. |
| Dell Piece West | LNR | 1.61km north-west of the Havant Thicket Reservoir. | Unimproved grassland area bordered by woodland, with damp marshy ground and a large shallow pond, which provides habitat for a rich variety of wildlife that includes various butterflies, dragonflies and reptiles. |

| Site Name | Designation | Distance from Scoping Area | Description |
|---|---|---|---|
| Titchfield Haven | LNR | Hydrological connectivity to the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW via the River Meon. | A wetland nature reserve with a rich habitat of rivers, marshlands and scrapes. A nationally renowned nature reserve providing a winter refuge for ducks, geese and wading birds, and summer breeding ground for avocet *Recurvirostra avosetta*. |
| Chessel Bay | LNR | Hydrological connectivity to the Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW via the River Itchen and its tributaries. | Chessel Bay is of great local importance, being the only remaining long stretch of natural shoreline in the lower reaches of the River Itchen. It also contains the only salt-marsh vegetation occurring within Southampton. A large proportion of the site is composed of mudflats and, at low tide, these provide major feeding grounds for wading birds and wildfowl. |
| Hackett's Marsh | LNR | Hydrological connectivity to Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW through via the River Hamble and its tributaries. | Comprises of saltmarshes and species-rich grassland, the saltmarsh vegetation is dominated by cord grass and saltmarsh grass with sea purslane, glasswort, sea lavender, thrift, sea aster, sea rush *Juncus maritimus* and sea clubrush. Its diverse insects, which include some species which are nationally rare, provide an important source of food for waders, such as golden plovers, black-tailed godwits and curlews. |
| Mercury Marshes | LNR | Hydrological connectivity to Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW via the River Hamble and its tributaries. | Located on the west bank of the River Hamble this site has intertidal mud, reedbeds, islands, saltmarsh, creeks and woodland. The saltmarsh and islands are dominated by sea purslane, cordgrass, sea aster and glasswort. The reserve is important for invertebrates and waders. |
| Hook with Warsash | LNR | Hydrological connectivity to Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne WSW via the River Hamble and its tributaries. | A shingle shore and intertidal flats that run along the edge of Southampton Water. Inland there are grazing pastures interspersed with tree lines, woodland and wetland habitats. Some of these habitats are rare and declining in the region. The foreshore and intertidal areas provide a winter feeding ground for many species of wading birds and wildfowl. Hook Spit is used by roosting turnstones as well as by a few pairs of breeding ringed plovers. The shingle zones have plant species such as sea kale *Crambe maritima*, sea beet *Beta vulgaris* and yellow-horned poppy *Glaucium flavum*. |

| Site Name | Designation | Distance from Scoping Area | Description |
|---|---|---|---|
| | | | The areas of grassland and scrub on Hook Links support a variety of breeding birds including linnets *Linaria cannabina*, meadow pipits *Anthus pratensis* and skylarks *Alauda arvensis*. |
| The Kench, Hayling Island | LNR | Hydrological connectivity to the proposed WRP and Proposed Underground Pipeline between Budds Farm WTW and the proposed WRP via Langstone Harbour. | A small area of inter-tidal mud and saltmarsh within Langstone Harbour. This shallow tidal inlet alongside Ferry Road on Hayling Island is used by many birds as a feeding area and when the tide is high the shingle ridge between the inlet and the main harbour is used as a roost by wading birds. |

# Appendix 8-3: Non-statutory Designated Sites within the Scoping Area and associated criteria

## 1.11 Non-statutory Designated Sites Criteria

| Code | Criteria |
|---|---|
| 1A | Ancient Semi-natural Woodlands |
| 1B | Other woodland where there is a significant element of ancient semi-natural woodland surviving |
| 1C | Other semi-natural woodland if they comprise important community types of restricted distribution in the county, such as yew woods and alder swamp woods |
| 1Ci | Yew Woods |
| 1Cii | Wet Woodlands such as Alder or Willow Woods and Birch Bog Woods which Support a Good Diversity of Woodland and/or Marsh/Swamp/Mire Species |
| 1D | Pasture woodland and wooded commons not included in any of the above which are of considerable biological and historical interest |
| 1E | Hedgerows |
| 1F | Traditional Orchards |
| 1G | Ancient and veteran trees which occur outside any of the previously defined woodland categories |
| 2A | Agriculturally unimproved grasslands which are not of recent origin |
| 2Ai | Lowland Meadow (Neutral Grassland) |
| 2Aii | Lowland Dry Acidic Grassland (Acid Grassland) |
| 2Aiii | Lowland Calcareous Grassland (Calcareous Grassland) |
| 2B | Semi-improved grasslands which retain a significant element of unimproved grassland |
| 2Bi | Grasslands with species-rich fungal communities (“waxcap grasslands”) |
| 2C | Grassland of Recent Origin of a Significant Size and Species Diversity |
| 2Ci | Grasslands created by deliberate addition of plant material |
| 2Cii | Early successional grasslands developing by natural colonisation |
| 2D | No 2D criteria outlined within guidance document |
| 3A | Areas of Heathland Vegetation including mosaics of dwarf shrub heath, acidic grassland, valley mire and scrub |
| 3B | Areas of Heathland which are afforested or have succeeded to woodland |
| 4A | Semi-natural coastal and estuarine habitats (including saltmarsh, intertidal mudflats, sand dunes, brackish ponds, saline lagoons, inundation grasslands of the coastal plain, maritime cliffs and maritime grasslands |
| 4Ai | Coastal Grazing marsh |
| 4Aii | Coastal Saltmarsh |
| 4Aiii | Coastal sand-dunes |
| 4Aiv | Coastal Vegetated Shingle |
| 4Av | Intertidal Mudflats and Seagrass Beds |

| Code | Criteria |
|---|---|
| 4Avi | Maritime Cliffs and Slopes |
| 4Avii | Saline Lagoons |
| 5A | Areas of open freshwater (e.g. lakes, ponds, canals, rivers, streams and ditches) |
| 5Ai | Areas of open freshwater which support good floristic assemblages |
| 5Aii | Wetlands which support significant assemblages of invertebrates, birds or amphibians |
| 5Aiii | Wetlands which have a high water quality status or a high biotic index |
| 5B | Fens, flushes, seepages, springs and inundation grasslands of floodplains that support a flora and fauna of less-improved wet conditions (seasonal or permanent). |
| 5Bi | Coastal and Floodplain Grazing Marsh |
| 5Bii | Spring-fed fens and flushes |
| 5Biii | Purple Moor-grass and Rush-pasture |
| 6A | Sites which support one or more Hampshire Notable Species |
| 6B | Sites which regularly support a significant population of a Hampshire Notable Species but which are used seasonally or for only one part of a species life-cycle. |
| 6C | Sites which support an outstanding assemblage of species. |
| 7A | Sites of nature conservation interest which occur in areas otherwise deficient in such interest, and/or are known to be of particularly high value to local communities |
| 8A | Sites designated as Local Geological Sites, formerly known as Regionally Important Geological and Geomorphological Sites (RIGS) |
| 9A | Sites which possess a rich mosaic of habitats and/or have an outstanding assemblage of species |
| 10A | Sites which support outstanding assemblages of arable plant or animal species either within whole fields or along margins |
| 11A | Habitat mosaics |

## 1.12 Non-statutory sites within 200m of the Scoping Area

| Site Name | Designation | Approximate Distance to the Scoping Area (m) | Criteria |
|---|---|---|---|
| Bell's Copse | SINC | Within Havant Thicket Reservoir. | 1A/1B |
| Blendworth Common (North) | SINC | Within Havant Thicket Reservoir. | 2Ai/5Biii |
| Blendworth Common (South) | SINC | Within Havant Thicket Reservoir. | 2A |
| Cabbagefield Row | SINC | Within Havant Thicket Reservoir. | 1A |
| Dunsbury Hill Grassland 2 | SINC | Within Havant Thicket Reservoir. | 2B |
| Dunsbury Hill Wood | SINC | Within Havant Thicket Reservoir. | 1Cii |
| Hammond's Lands Copse | SINC | Within Havant Thicket Reservoir. | 1A |
| Havant Thicket | SINC | Within Havant Thicket Reservoir. | 1B/1Cii/1D/2B/3Bi/5B/6A |
| Havant Thicket (South-West Corner) | SINC | Within Havant Thicket Reservoir. | 1B/3Bi |
| Idsworth Common | SINC | Within Havant Thicket Reservoir. | 1B/1D/6A |
| Meadow by Bells Copse | SINC | Within Havant Thicket Reservoir. | 2A/2D |
| Middle Clearing | SINC | Within Havant Thicket Reservoir. | 1A/6A |
| The Holt | SINC | Within Havant Thicket Reservoir. | 1A/3Bi/6A |
| Thicket Bottom | SINC | Within Havant Thicket Reservoir. | 1D |
| Thicket Bottom Woods & Lake | SINC | Within Havant Thicket Reservoir. | 1A |
| Thicket Lawn | SINC | Within Havant Thicket Reservoir. | 2B/5B |
| Birkdale Avenue | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 2Aiii |
| Camp Down Grassland Remnants | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 2D |

| Site Name | Designation | Approximate Distance to the Scoping Area (m) | Criteria |
|---|---|---|---|
| Carpenters Copse | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A |
| Chestnut Gully Wood | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A |
| Colden Common Wood & Blacknells Copse | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A |
| Dell Row South | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A |
| East and West of Gillman Road | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 2B/6A |
| Farlington Avenue | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 2B |
| Field to West of Gillman Road | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 2B |
| Fielders Farm Meadows (Eastleigh) | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 2D/5B/6A |
| Fielders Farm Meadows (Winchester) | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 2D |

| Site Name | Designation | Approximate Distance to the Scoping Area (m) | Criteria |
|---|---|---|---|
| Fields off Havant Road | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 6A |
| Finches Copse | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A |
| Great Copse, Havant | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A |
| High Lawn | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 2B/5B |
| Hill Copse, Fair Oak and Horton Heath | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A |
| Kimbers Copse | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A/1B |
| Land to the north of Portsdown Hill Road | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 2B/6A |
| Land to the South of Portsdown Hill Road | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 2A/2B |
| London Road Fen | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1Cii/5B |

| Site Name | Designation | Approximate Distance to the Scoping Area (m) | Criteria |
|---|---|---|---|
| Meadow west of Farlington Avenue | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 2D |
| Motte & Bailey & Chalk Pit | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A |
| Oakwood Copse | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A |
| Otterbourne Wood | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A |
| Park Hills Wood | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A |
| Perrige's Coppice | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A |
| Portsmouth City Golf Course Copse | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW.. | 1B/6A |
| Portsmouth Golf Course East | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 2B/2D |
| Portsmouth Golf Course West | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 2B/2D |

| Site Name | Designation | Approximate Distance to the Scoping Area (m) | Criteria |
|---|---|---|---|
| Purbrook Park Wood | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A |
| Ravenswood Row | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A |
| Redhill Copse, Wickham | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A |
| River Meon (Winchester) | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1Cii/5A/5B |
| Sandy & Aldermoor Coppices | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A |
| Sparrowgrove Copse | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A |
| Tankerhill Copse | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A |
| The Mount, Fair Oak and Horton Heath | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A |
| Knowle Copse/Dash Wood/Ravens Wood | SINC | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | 1A/6A |

| Site Name | Designation | Approximate Distance to the Scoping Area (m) | Criteria |
|---|---|---|---|
| Birkdale Avenue | RVEI | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | North verge along residential area of Birkdale Avenue and southern verge of Troon Crescent |
| Farlington Avenue | RVEI | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | North verge along residential area of Farlington Avenue, starting just past the junction with Birkdale Avenue, continuing onto Burnham Road. |
| B2177 Portsdown Hill Road | RVEI | Within the proposed underground pipeline between Havant Thicket Reservoir and Otterbourne WSW. | Both sides of Portsdown Hill Road, between C423 Crookhorn Lane and Farlington Redoubt entrance |
| Knowle Copse/Dash Wood/Ravens Wood | SINC | 0.0 | 1A/6A |
| Blendworth Common (South) | SINC | 0.3 | 2A |
| Dell Row | SINC | 0.6 | 1A |
| Blendworth Common (North) candidate amendment | SINC | 1.2 | 2A/5Bii |
| Homerhill Copse & The Hanger | SINC | 1.4 | 1A |
| Durley Roughett | SINC | 1.8 | 2A |
| Calcot Farm Meadow 2 | SINC | 2.3 | 2A |
| Marls & Stroud Coppices | SINC | 2.4 | 1B |
| Pinsley Complex | SINC | 2.7 | 1A |
| St. Anne's Wood | SINC | 2.9 | 1B |
| Fishers Pond Wood | SINC | 2.9 | 1A |

| Site Name | Designation | Approximate Distance to the Scoping Area (m) | Criteria |
|---|---|---|---|
| Great Breach Row | SINC | 2.9 | 1A |
| Stroud Coppice Field | SINC | 3.2 | 2D |
| Carmans Copse | SINC | 3.9 | 1A |
| Wickham Meadow | SINC | 4.0 | 2A |
| Birchfrith Copse | SINC | 4.2 | 1A/1B |
| Quob Copse | SINC | 4.3 | 1B |
| Knowle Hospital Row | SINC | 4.5 | 1A/1B/6A |
| Ham Coppice | SINC | 4.8 | 1A |
| Moor Coppice | SINC | 6.7 | 1A |
| Hookheath Scrubs | SINC | 6.9 | 1A/1Cii |
| Buck's Copse | SINC | 7.5 | 1A |
| Opposite Carmans Copse | SINC | 7.5 | 1A |
| Field East of Farlington Redoubt (North) | SINC | 8.7 | 2B |
| P203 Mayles Lane | SINC | 10.0 | South side of P203 Mayles Lane, road verge of Dash Wood |
| Pigeonhouse Coppice | SINC | 10.6 | 1A |
| Birching Copse | SINC | 11.3 | 1A |
| Ashleydown Coppice | SINC | 12.3 | 1B |
| Pitymoor Lane Wood | SINC | 12.7 | 1A |
| Gravelhole Copse | SINC | 13.2 | 1A |
| Gravelhole Copse (South-West) | SINC | 14.2 | 1A |
| Orchard Copse, Boarhunt | SINC | 14.9 | 1A/6A |
| Hookheath Meadows (G3-G7) | SINC | 15.9 | 1Cii/2B/5B |
| Pigeonhouse Row | SINC | 17.1 | 1A |

| Site Name | Designation | Approximate Distance to the Scoping Area (m) | Criteria |
|---|---|---|---|
| Woodland Strip East of Dirtystile Coppice | SINC | 20.4 | 1A |
| Grub Coppice/Mill Coppice | SINC | 20.6 | 1A/1B |
| Crooked Walk Meadow | SINC | 20.7 | 2D |
| Rowlands Castle Golf Course | SINC | 22.3 | 2A/6A |
| Walton Heath/Ashlands/Staplecross | SINC | 24.4 | 1B |
| Wickham Common | SINC | 32.6 | 1Cii/1D/2B/3A |
| Sandy Dell | SINC | 39.6 | 1A |
| Gravelpit Copse | SINC | 56.5 | 1B |
| Lower Beacon Field | SINC | 65.5 | 2B/5B |
| Shedfield Common | SINC | 66.2 | 1D/2B/3A/6A |
| Fort Purbrook Paddock 1 (Havant) | SINC | 69.3 | 2B/6A |
| Fort Purbrook Paddock 2 (Havant) | SINC | 69.8 | 2B |
| Fort Purbrook | SINC | 70.3 | 2A/6A |
| Farlington Marshes Grassland (North-East) | SINC | 70.3 | 2A/4A |
| Fort Purbrook Paddock 3 (Havant) | SINC | 70.6 | 2B |
| Fort Purbrook Paddock 4 (Havant) | SINC | 71.7 | 2Aiii |
| Wintershill Farm Woodland | SINC | 73.7 | 1A/1B/1Cii |
| Lord's Wood, Colden Common | SINC | 77.6 | 1A |
| Cutlers Copse | SINC | 81.5 | 1B |
| Upperbarn Copse | SINC | 82.2 | 1B |
| Aldermoor Meadow Part | SINC | 90.5 | 5B |
| Fort Widley and Surrounds | SINC | 90.5 | 2B/2D/6A |
| Pyle Farm Meadow South | SINC | 91.4 | 2A |
| Wakefords Copse, Havant | SINC | 95.9 | 1A |

| Site Name | Designation | Approximate Distance to the Scoping Area (m) | Criteria |
|---|---|---|---|
| Broomground Coppice/Potwell Coppice | SINC | 109.3 | 1A/1B/1Cii/6A |
| Mill Farm Woodland | SINC | 110.0 | 1A/1Cii |
| Southwick Meadow | SINC | 118.6 | 2D |
| Alma Meadows (North) | SINC | 128.3 | 2A |
| Mincingfield Copse | SINC | 144.1 | 1A |
| Blakes Copse | SINC | 145.3 | 1A |
| Dunsbury Hill - Areas 5 & 6 | SINC | 152.5 | 2A |
| Crooked Walk Banks | SINC | 157.4 | 2A |
| Lower Upham Meadow | SINC | 162.2 | 2A |
| Dunsbury Hill - Area 1 | SINC | 163.7 | 2A |
| Peatmoor, Shedfield | SINC | 169.0 | 1Cii/5B |
| Southmoor - Big Field (south edge) | SINC | 170.5 | 4A |
| Calcot Farm Meadow 1 | SINC | 171.5 | 1A/2B/6A |
| Blacknell's Copse Paddock | SINC | 175.3 | 2A |
| Church of The Holy Trinity | SINC | 184.1 | 2A |
| Oaklands Meadows 1 & 2 | SINC | 187.1 | 2B/2D/6A |
| Pitymoor Coppice | SINC | 191.4 | 1A |
| Meadows at Allbrook | SINC | 196.5 | 2D |
| Martin's Copse | SINC | 199.2 | 1A |
| Venables Coppice | SINC | 199.2 | 1A |

# Appendix 9-1 List of policies relevant to the marine biodiversity chapter in the South Inshore and Offshore Marine Plan

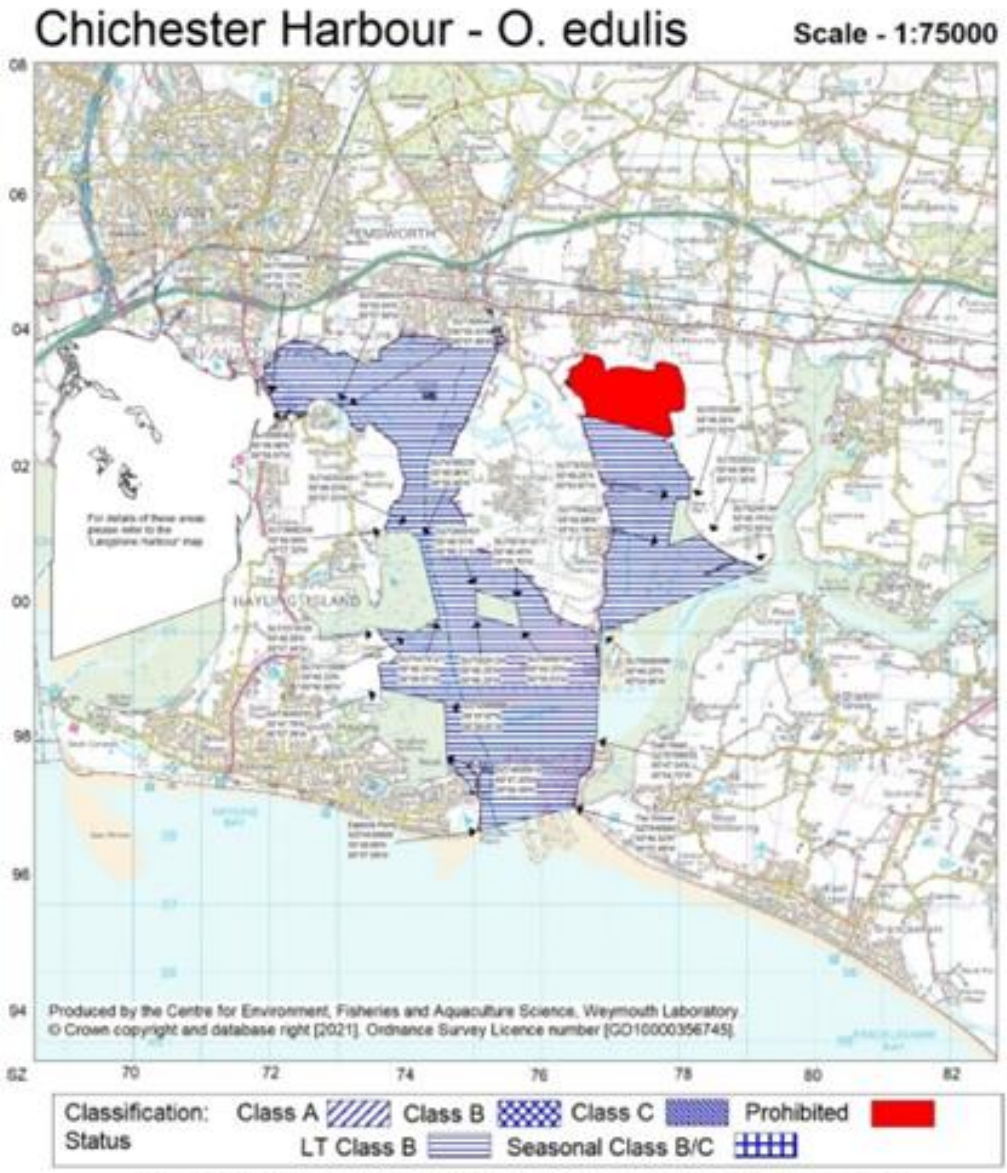
| Policy | | Policy Aim |
|---|---|---|
| **Objective 1: To encourage effective use of space to support existing, and future sustainable economic activity through co-existence, mitigation of conflicts and minimisation of development footprints.** | | |
| S-CO-1 | Proposals will minimise their use of space and consider opportunities for co-existence with other activities. | Space within the south marine plan areas is limited and required to realise social, environmental and economic benefits. S-CO-1 enables proposals to be spatially planned and make appropriate use of available space by minimising footprints. Those activities that can co-exist, should do so. |
| **Objective 5: To avoid, minimise, mitigate displacement of marine activities, particularly where of importance to adjacent coastal communities, and where this is not practical to make sure significant adverse impacts on social benefits are avoided.** | | |
| S-FISH-2 | Proposals that may have significant adverse impacts on access to, or within, sustainable fishing or aquaculture sites must demonstrate that they will, in order of preference: a) avoid, b) minimise, c) mitigate significant adverse impacts, d) if it is not possible to mitigate the significant adverse impacts, proposals should state the case for proceeding. | Sustainable fishing and aquaculture industries provide benefits to coastal communities and contribute to UK food security. These activities are restricted in where they can operate, making them vulnerable to loss of access caused by surrounding sea use. S-FISH-2 limits impacts of other marine activities on fishing and aquaculture access, enabling maximum marine resource use and generating prosperous resilient and cohesive coastal communities. |
| **Objective 10: To support marine protected area objectives and a well-managed ecologically coherent network with enhanced resilience and capability to adapt to change.** | | |
| S-MPA-1 | Proposals that support the objectives of marine protected areas and the ecological coherence of the marine protected area network will be supported. Proposals that may have adverse impacts on the objectives of marine protected areas and the ecological coherence of the marine protected area network must demonstrate that they will, in order of preference: a) avoid, b) minimise, c) mitigate adverse impacts, with due regard given to statutory advice on an ecologically coherent network. | The UK government is committed to establishing a network of marine protected areas, creating a 'Blue Belt' of protected areas around the country. The south marine plan areas will make a significant contribution to this network, through the many existing and proposed marine protected area sites. S-MPA-1 makes sure proposals take account of adverse impacts on individual sites and the overall network, protecting important habitats, species and geological features, enabling the successful and continued management of these sites |
| S-MPA-2 | Proposals that enhance a marine protected area's ability to adapt to climate change and so enhance the resilience of the marine protected area network will be supported. | The effects of climate change on habitats and species poses a challenge to designated marine protected area sites in the south marine plan areas. |

| Policy | | Policy Aim |
|---|---|---|
| | Proposals that may have adverse impacts on an individual marine protected area's ability to adapt to the effects of climate change and so reduce the resilience of the marine protected area network, must demonstrate that they will, in order of preference: a) avoid, b) minimise, c) mitigate adverse impacts. | S-MPA-2 makes sure proposals account for adverse impacts on individual marine protected areas ability to adapt to climate change, improving resilience and working towards a well-managed marine protected area network. |
| S-MPA-4 | Until the ecological coherence of the marine protected area network is confirmed, proposals should demonstrate that they will, in order of preference: a) avoid, b) minimise, c) mitigate adverse impacts on features that may be required to complete the network, d) if it is not possible to mitigate adverse impacts, proposals should state the case for proceeding. | It is important to make sure that possible locations for further marine protected areas, which may be needed to complete the network, remain in sufficient condition to merit designation. S-MPA-4 makes sure proposals do not prevent the future inclusion of features which may be required to enhance network coherence. The focus of S-MPA-4 is on Features of<br>Conservation Importance, priority habitats and species, and Annex 1 habitats. |
| **Objective 11: To complement and contribute to the achievement or maintenance of Good Ecological Status or Potential under the Water Framework Directive and Good Environmental Status under the Marine Strategy Framework Directive, with respect to descriptors for marine litter, non-indigenous species and underwater noise.** | | |
| S-UWN-1 | Proposals generating impulsive sound, must contribute data to the UK Marine Noise Registry as per any currently agreed requirements. Public authorities must take account of any currently agreed targets under the UK Marine Strategy part one descriptor 11. | Impulsive sounds can have an adverse effect on marine life and human enjoyment of marine areas. S-UWN-1 supports the newly established noise registry to record, assess, and manage the distribution and timing of impulsive sounds sources. S-UWN-1 encourages data collection to determine current baselines and levels of impulsive sound in the marine environment enabling effective marine management and protection of biodiversity or viable populations of species. |
| S-UWN-2 | Proposals that generate impulsive sound and/or ambient noise must demonstrate that they will, in order of preference: a) avoid, b) minimise, c) mitigate significant adverse impacts on highly mobile species, d) if it is not possible to mitigate significant adverse impacts, proposals must state the case for proceeding. | Underwater noise levels have increased with marine space use. Noise can affect highly mobile species, including causing chronic stress and death at higher intensities. S-UWN-2 supports management of underwater noise requiring proposals to take appropriate noise reduction actions. S-UWN-2 enables clear and proportionate regulation to make sure marine activity respects environmental limits and protects biodiversity. |
| S-WQ-1 | Proposals that may have significant adverse impacts upon water environment, including upon habitats and species that can be of benefit to water quality must demonstrate that they will, in order of preference: a) | Much of the economic and cultural prosperity of the south marine plan areas is reliant on water quality. Activities can place stress on water bodies such that, in parts of the south marine plan areas water quality requires improvement. S-WQ-1 seeks to manage impacts on water quality, and |

| Policy | | Policy Aim |
|---|---|---|
| | avoid, b) minimise, c) mitigate significant adverse impacts. | the habitats and species which benefit water quality through the ecosystem service they provide. |
| S-WQ-2 | Activities that can deliver an improvement to water environment or enhance habitats and species which can be of benefit to water quality should be supported. | Habitats such as coastal saltmarsh, intertidal mudflats, seagrass, reed beds and natural blue mussel beds provide ecosystem services which maintain and can improve water quality. S-WQ-2 encourages activities improving water quality including habitat restoration, bioremediation and voluntary measures. |
| **Objective 12: To safeguard space for, and improve the quality of, the natural marine environment, including to enable continued provision of ecosystem goods and services, particularly in relation to coastal and seabed habitats, fisheries and cumulative impacts on highly mobile species.** | | |
| S-BIO-1 | Proposals that may have significant adverse impacts on natural habitat and species adaptation, migration and connectivity must demonstrate that they will, in order of preference: a) avoid, b) minimise c) mitigate significant adverse impacts. | Competition for space, increased levels of development and predicted effects of climate change can affect the south marine plan areas' natural habitats and species connectivity, ability to adapt to change and migrate. S-BIO-1 requires proposals to manage negative effects which may not<br>enable the functioning of healthy, resilient and adaptable marine ecosystems |
| S-BIO-2 | Proposals that incorporate features that enhance or facilitate natural habitat and species adaptation, migration and connectivity will be supported. | S-BIO-2 supports proposals that incorporate features that enhance or facilitate natural habitat and species adaptation, migration and connectivity, enabling the environment to respond to climate change and development. This may include novel designs, and collaboration between developers and public authorities. |
| S-BIO-3 | Proposals that enhance coastal habitats where important in their own right and/or for ecosystem functioning and provision of goods and services will be supported. Proposals must take account of the space required for coastal habitats where important in their own right and/or for ecosystem functioning and provision of goods and services and demonstrate that they will, in order of preference: a) avoid, b) minimise, c) mitigate for net loss of coastal habitat. | In the south inshore marine plan area there is a lack of space for coastal habitats. This is due to coastal squeeze, a process where habitats have decreasing space between rigid coastal structures and rising sea level or coastal erosion. S-BIO-3 requires proposals to manage their impacts on these habitats to support the functioning of healthy, resilient and adaptable marine ecosystems. |
| S-BIO-4 | Proposals that enhance the distribution and net extent of priority habitats should be supported. Proposals must demonstrate that they will avoid reducing the | Maintaining the extent and distribution of priority and coastal habitats is important as it reduces habitat fragmentation, species isolation and supports strong, biodiverse biological communities. S-BIO-4 maintains the distribution and net extent of priority habitats throughout the |

| Policy | | Policy Aim |
|---|---|---|
| | distribution and net extent of priority habitats. | south marine plan areas by ensuring proposals do not adversely affect them. |
| S-FISH-4 | Proposals that enhance essential fish habitat, including spawning, nursery and feeding grounds, and migratory routes should be supported. Proposals must demonstrate that they will, in order of preference: a) avoid, b) minimise, c) mitigate significant adverse impact on essential fish habitat, including, spawning, nursery, feeding grounds and migration routes. | Sustainable fish populations rely upon specific habitats throughout their life. S-FISH-4 recognises protection of habitats and the services they provide can enhance fish populations, supporting the long-term existence of the fisheries and contributing to Good Environmental Status. S-FISH-4 enables sustainable use of marine resources within environmental limits alongside productive fisheries by requiring proposals to manage impacts on these habitats. |
| S-FISH-4-HER | Proposals will consider herring spawning mitigation in the area highlighted on Figure 26 (in the technical annex of the plans) during the period 01 November to the last day of February annually. | The south marine plan areas include a number of important herring spawning zones; these are located within the Southern Bight and Downs areas. S-FISH-4-HER highlights these zones and makes sure proposals mitigate any potential impacts. Specific mitigation measures are provided. S-FISH-4-HER identifies areas where development is now able to take place if impacts are mitigated. This will enable sustainable development whilst protecting herring stock. |

# Appendix 9-2 Classified shellfish production areas




Classification of Bivalve Mollusc Production Areas: Effective from 1 September 2021

The areas delineated above are those classified as bivalve mollusc production areas under Regulation (EU) 2019/627.

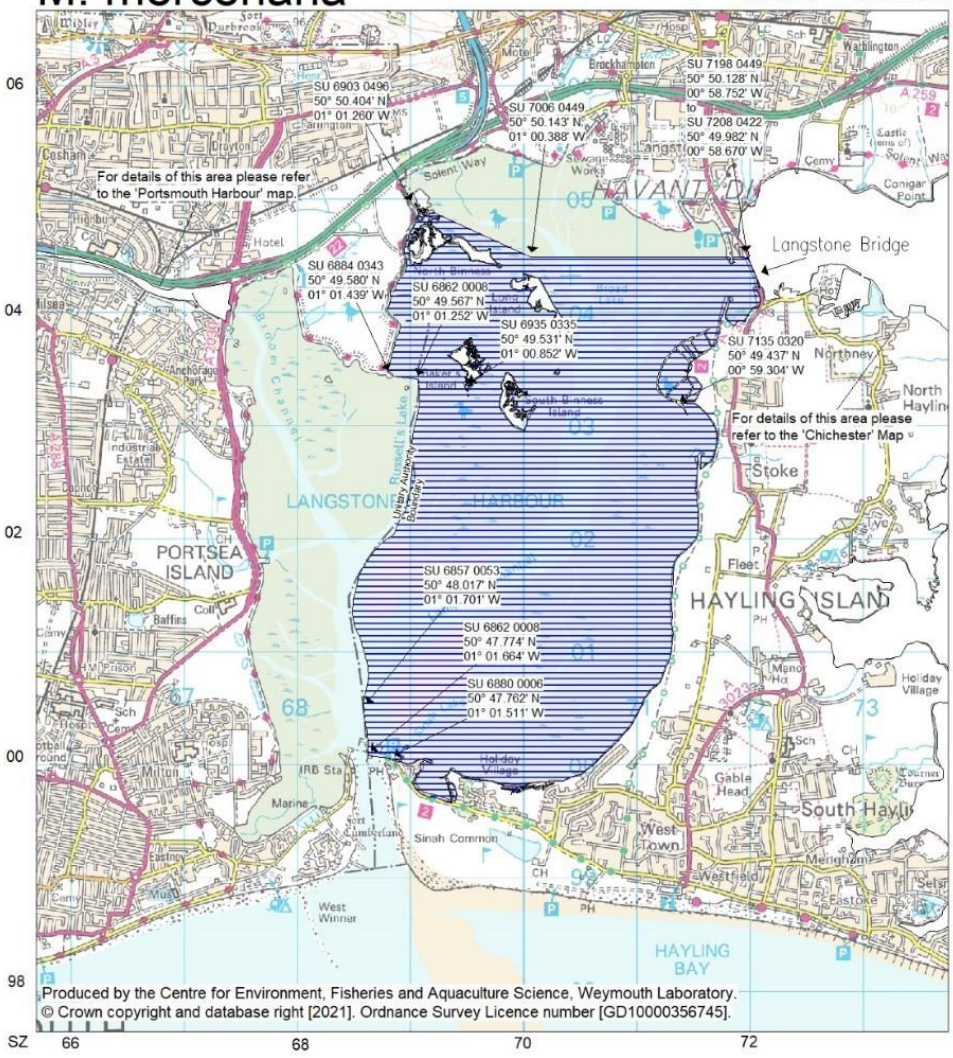
Further details on the classified species and the areas may be obtained from the responsible Food Authority. Enquiries regarding the maps should be directed to: Shellfish Microbiology, CEFAS Weymouth Laboratory, Barrack Road, The Nothe, Weymouth, Dorset DT4 8UB.
(Tel: 01305 206600 Fax: 01305 206601)

N.B. Lat/Longs quoted are WGS84
Unless otherwise stated, non-straight line boundaries between co-ordinates follow the OS 1:25,000 mean high water line.
Separate maps available for Tapes spp. and C. edule at Chichester Harbour

Food Authorities: Havant Borough Council
Chichester District Council

# Langstone Harbour - M. mercenaria

**Scale - 1:50000**




Classification: Class A | Class B | Class C | Prohibited
Status: LT Class B | Seasonal Class B/C

Classification of Bivalve Mollusc Production Areas: Effective from 1 September 2021

The areas delineated above are those classified as bivalve mollusc production areas under Regulation (EU) 2019/627.

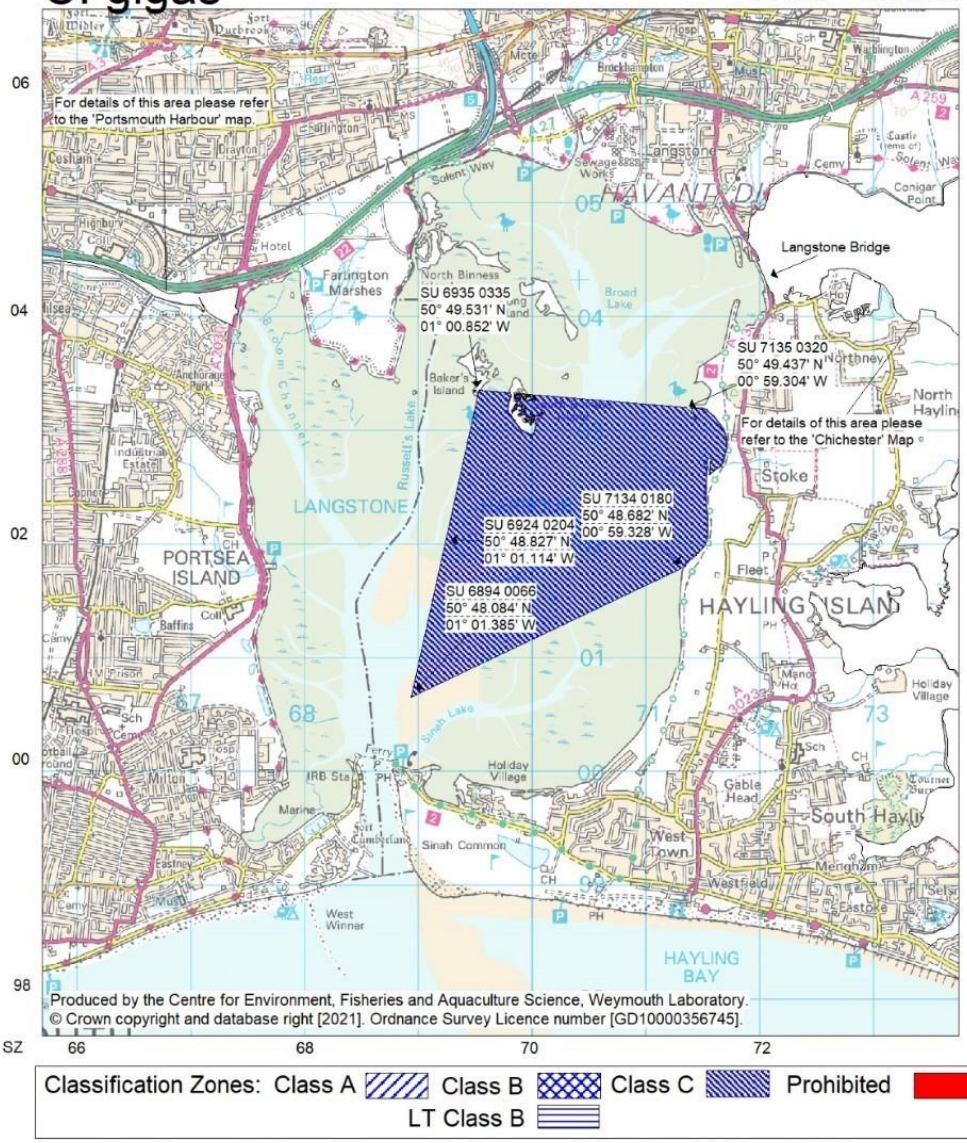
Further details on the classified species and the areas may be obtained from the responsible Food Authority. Enquiries regarding the maps should be directed to: Shellfish Microbiology, CEFAS Weymouth Laboratory, Barrack Road, The Nothe, Weymouth, Dorset DT4 8UB.
(Tel: 01305 206600 Fax: 01305 206601)

N.B. Lat/Longs quoted are WGS84
Unless otherwise stated, non-straight line boundaries between co-ordinates follow the OS 1:25,000 mean high water line.

Food Authority: Portsmouth Port Health Authority

# Langstone Harbour - C. gigas

**Scale - 1:50000**




Classification Zones: Class A | Class B | Class C | Prohibited | LT Class B

Classification of Bivalve Mollusc Production Areas: Effective from 1 September 2021

The areas delineated above are those classified as bivalve mollusc production areas under Regulation (EU) 2019/627.

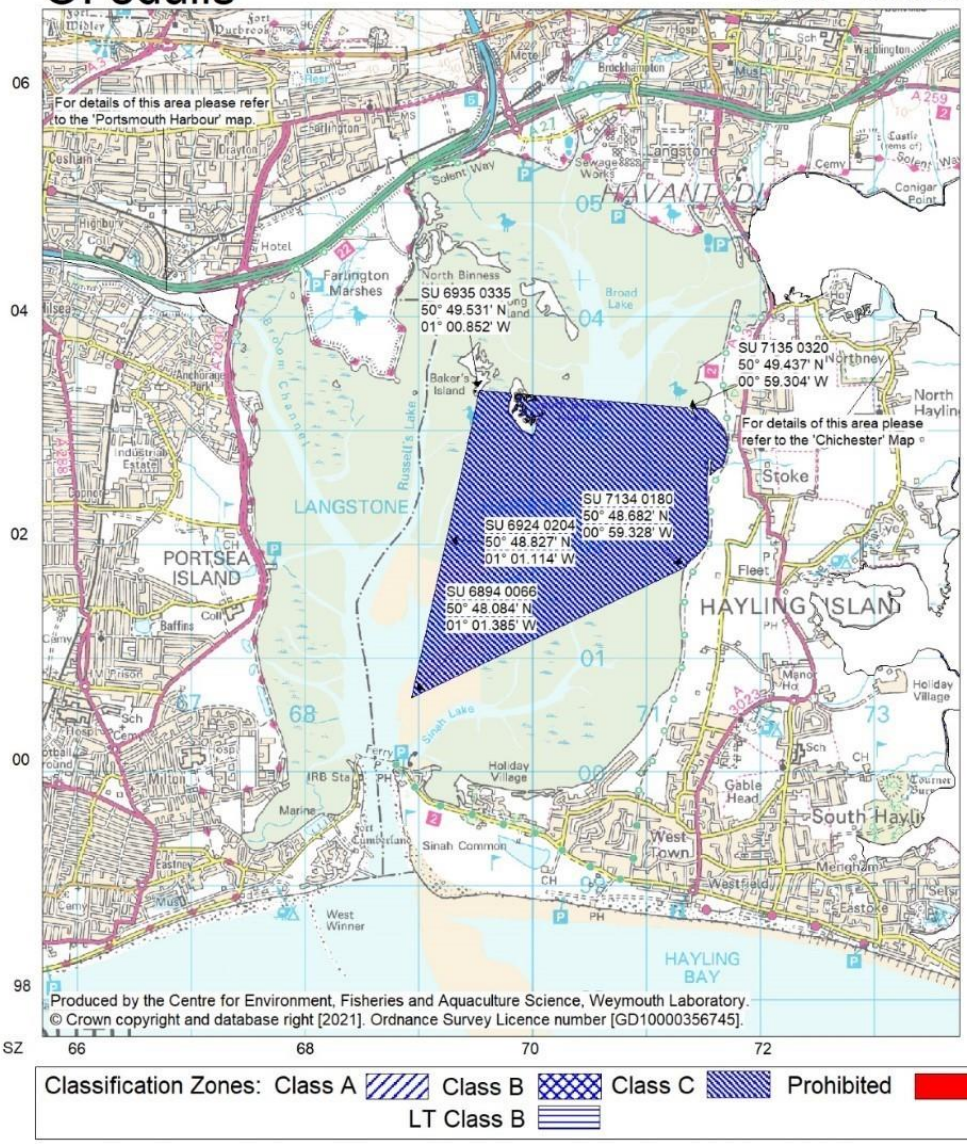
Further details on the classified species and the areas may be obtained from the responsible Food Authority. Enquiries regarding the maps should be directed to: Shellfish Microbiology, CEFAS Weymouth Laboratory, Barrack Road, The Nothe, Weymouth, Dorset DT4 8UB.
(Tel: 01305 206600 Fax: 01305 206601)

N.B. Lat/Longs quoted are WGS84
Unless otherwise stated, non-straight line boundaries between co-ordinates follow the OS 1:25,000 mean high water line.
Separate maps available for O. edulis and M. mercenaria at Langstone Harbour

Food Authority: Portsmouth Port Health Authority

# Langstone Harbour - O. edulis

**Scale - 1:50000**




Classification Zones: Class A | Class B | Class C | Prohibited | LT Class B

Classification of Bivalve Mollusc Production Areas: Effective from 1 September 2021

The areas delineated above are those classified as bivalve mollusc production areas under Regulation (EU) 2019/627.

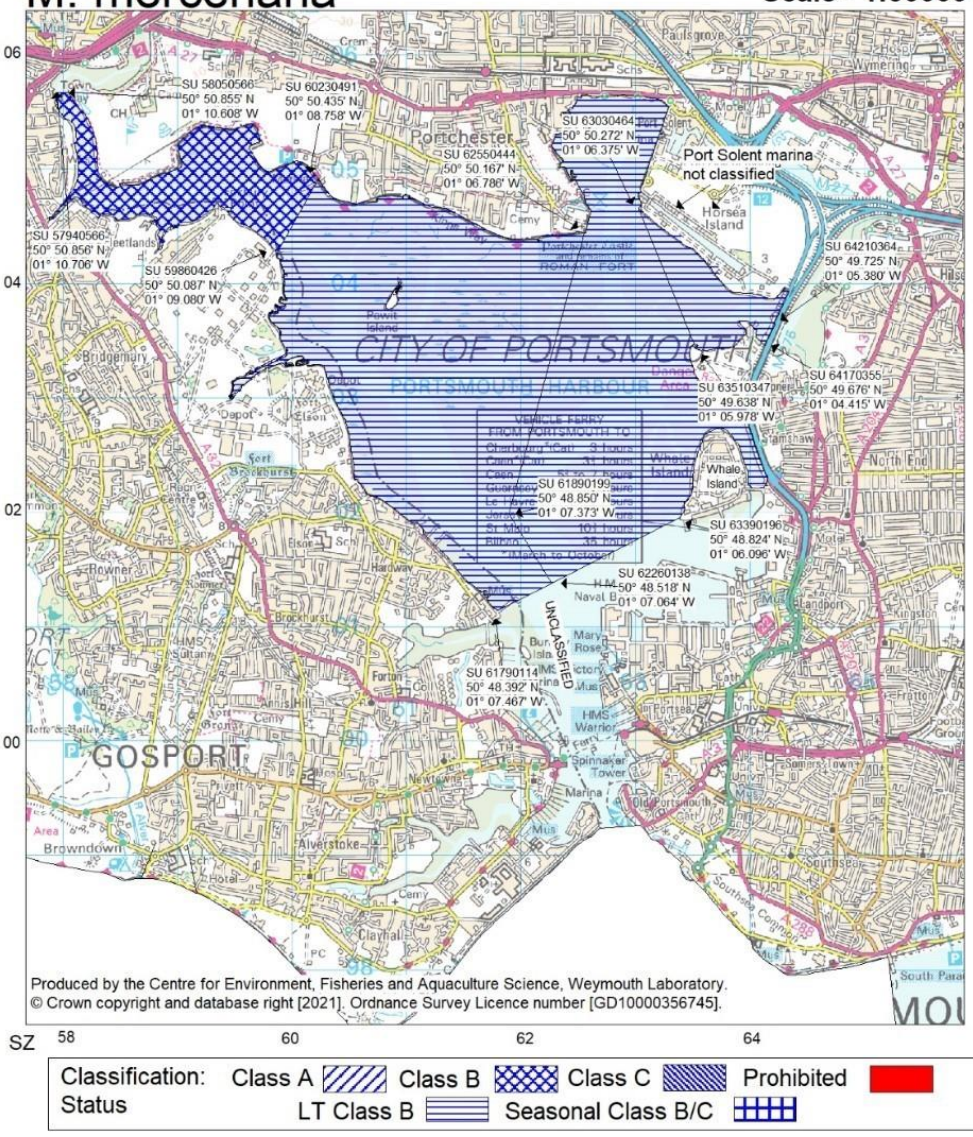
Further details on the classified species and the areas may be obtained from the responsible Food Authority. Enquiries regarding the maps should be directed to: Shellfish Microbiology, CEFAS Weymouth Laboratory, Barrack Road, The Nothe, Weymouth, Dorset DT4 8UB.
(Tel: 01305 206600 Fax: 01305 206601)

N.B. Lat/Longs quoted are WGS84
Unless otherwise stated, non-straight line boundaries between co-ordinates follow the OS 1:25,000 mean high water line.
Separate maps available for M. mercenaria at Langstone Harbour

Food Authority: Portsmouth Port Health Authority

# Portsmouth Harbour - M. mercenaria

**Scale - 1:50000**



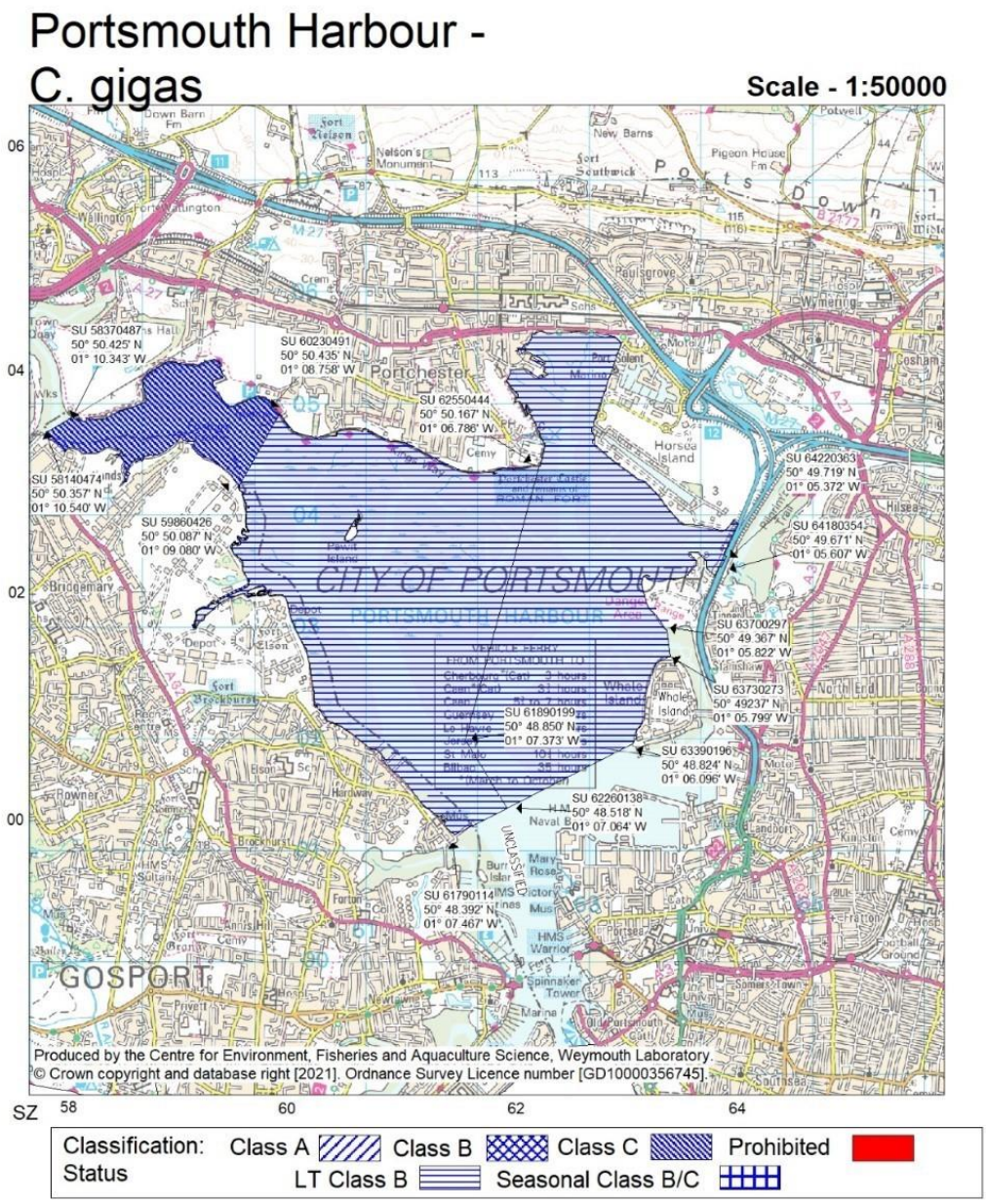

Classification of Bivalve Mollusc Production Areas: Effective from 1 September 2021

The areas delineated above are those classified as bivalve mollusc production areas under Regulation (EU) 2019/627.

Further details on the classified species and the areas may be obtained from the responsible Food Authority. Enquiries regarding the maps should be directed to: Shellfish Microbiology, CEFAS Weymouth Laboratory, Barrack Road, The Nothe, Weymouth, Dorset DT4 8UB.
(Tel: 01305 206600 Fax: 01305 206601)

N.B. Lat/Longs quoted are WGS84
Unless otherwise stated, non-straight line boundaries between co-ordinates follow the OS 1:25,000 mean high water line.
Separate maps available for Tapes spp. and C. edule at Portsmouth Harbour

Food Authority: Portsmouth Port Health Authority




Classification of Bivalve Mollusc Production Areas: Effective from 1 September 2021

The areas delineated above are those classified as bivalve mollusc production areas under Regulation (EU) 2019/627.

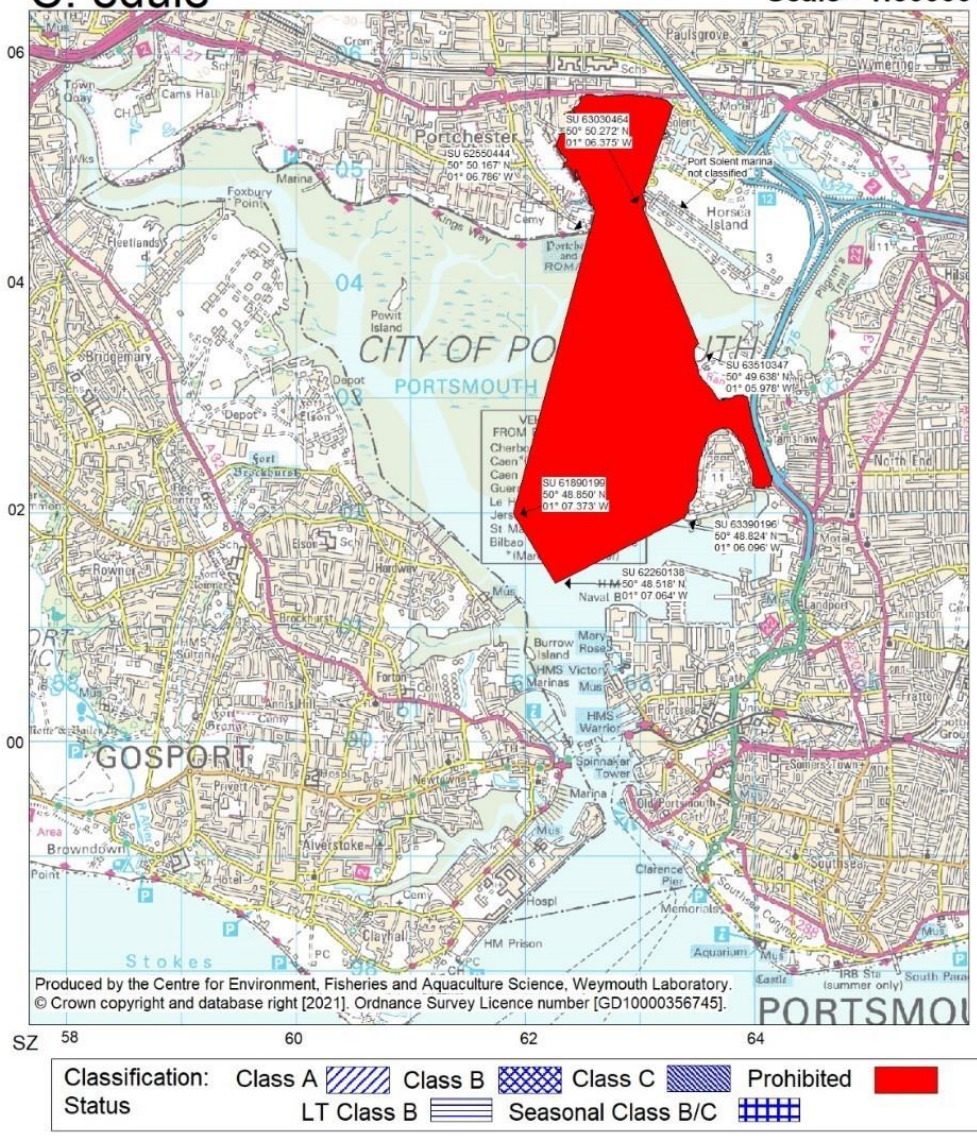
Further details on the classified species and the areas may be obtained from the responsible Food Authority. Enquiries regarding the maps should be directed to: Shellfish Microbiology, CEFAS Weymouth Laboratory, Barrack Road, The Nothe, Weymouth, Dorset DT4 8UB.
(Tel: 01305 206600 Fax: 01305 206601)

N.B. Lat/Longs quoted are WGS84
Seperate maps available for O. edulis, C. edule, Tapes spp. and M. mercenaria at Portsmouth Harbour
Unless otherwise stated, non-straight line boundaries between co-ordinates follow the OS 1:25,000 mean high water line.

Food Authority: Portsmouth Port Health Authority

# Portsmouth Harbour - C. edule

**Scale - 1:50000**




Classification: Class A | Class B | Class C | Prohibited
Status: LT Class B | Seasonal Class B/C

Classification of Bivalve Mollusc Production Areas: Effective from 1 September 2021

The areas delineated above are those classified as bivalve mollusc production areas under Regulation (EU) 2019/627.

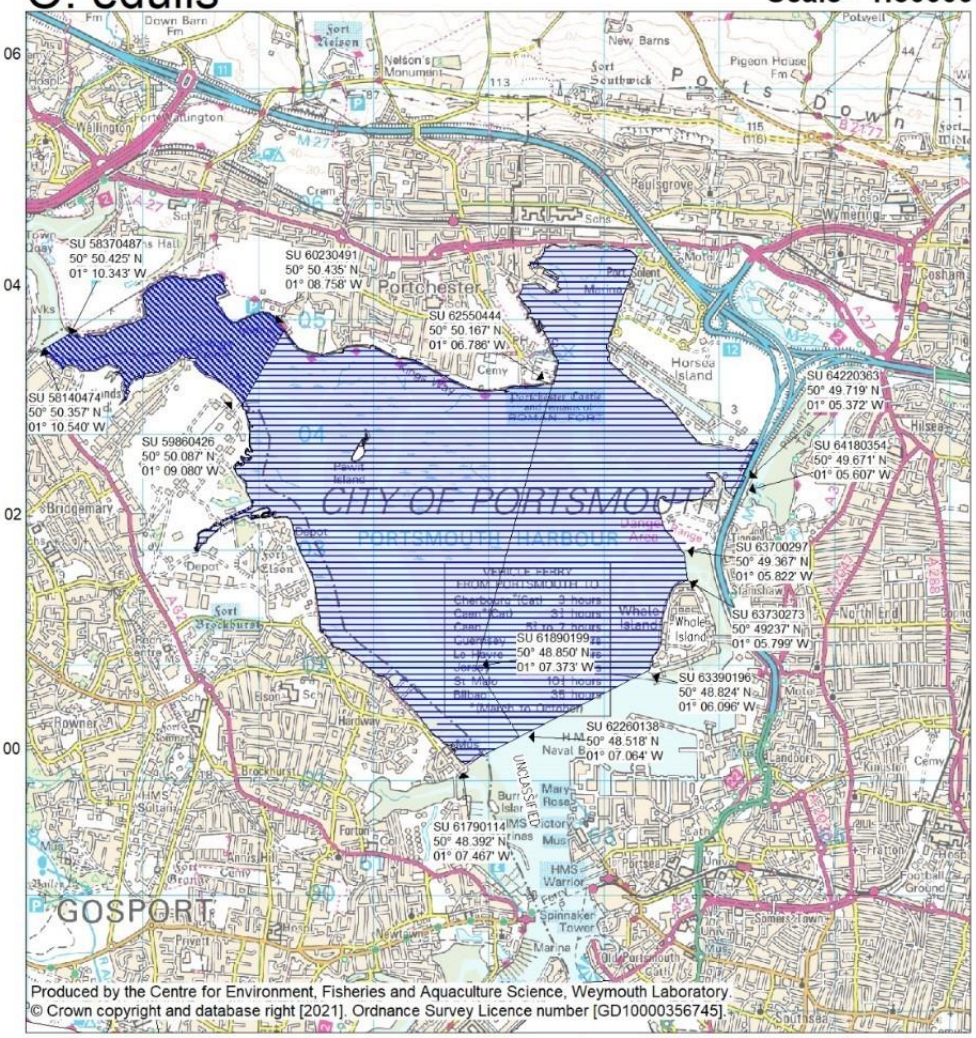
Further details on the classified species and the areas may be obtained from the responsible Food Authority. Enquiries regarding the maps should be directed to: Shellfish Microbiology, CEFAS Weymouth Laboratory, Barrack Road, The Nothe, Weymouth, Dorset DT4 8UB.
(Tel: 01305 206600 Fax: 01305 206601)

N.B. Lat/Longs quoted are WGS84
Unless otherwise stated, non-straight line boundaries between co-ordinates follow the OS 1:25,000 mean high water line.
Separate maps available for Tapes spp. and M. mercenaria at Portsmouth Harbour

Food Authority: Portsmouth Port Health Authority

# Portsmouth Harbour - O. edulis

**Scale - 1:50000**




Classification: Status — Class A, Class B, Class C, Prohibited, LT Class B, Seasonal Class B/C

Classification of Bivalve Mollusc Production Areas: Effective from 1 September 2021

The areas delineated above are those classified as bivalve mollusc production areas under Regulation (EU) 2019/627.

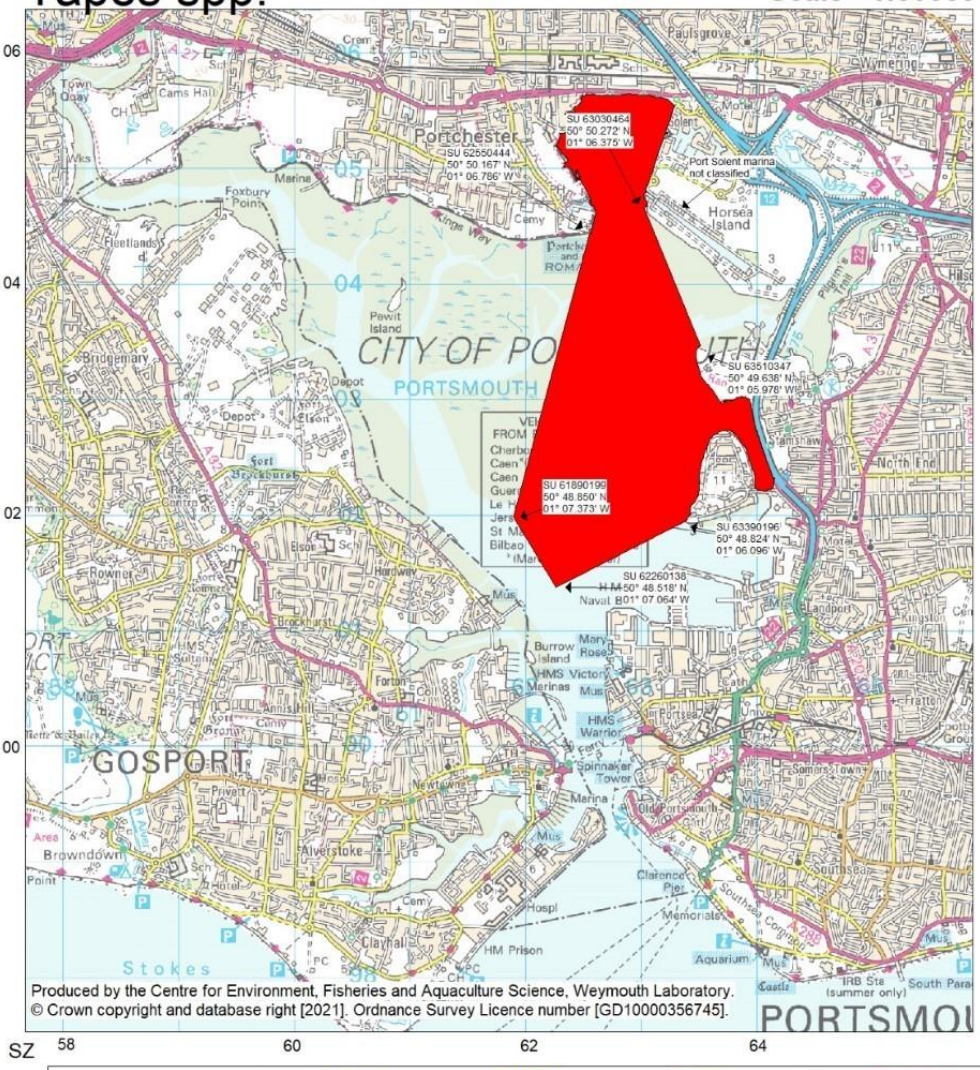
Further details on the classified species and the areas may be obtained from the responsible Food Authority. Enquiries regarding the maps should be directed to: Shellfish Microbiology, CEFAS Weymouth Laboratory, Barrack Road, The Nothe, Weymouth, Dorset DT4 8UB.
(Tel: 01305 206600 Fax: 01305 206601)

N.B. Lat/Longs quoted are WGS84
Seperate maps available for O. edulis, C. edule, Tapes spp. and M. mercenaria at Portsmouth Harbour
Unless otherwise stated, non-straight line boundaries between co-ordinates follow the OS 1:25,000 mean high water line.

Food Authority: Portsmouth Port Health Authority

# Portsmouth Harbour - Tapes spp.

**Scale - 1:50000**



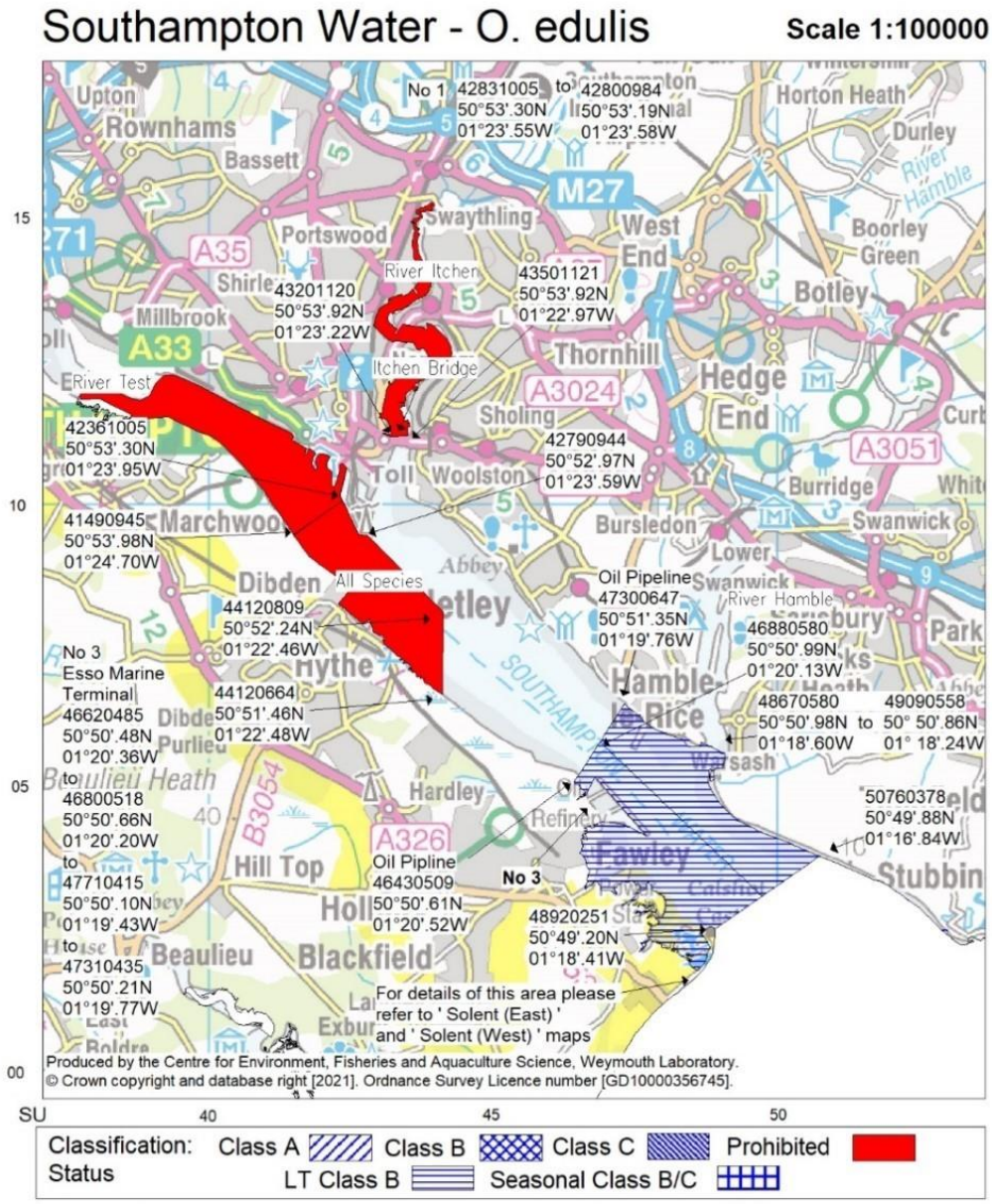

Classification of Bivalve Mollusc Production Areas: Effective from 1 September 2021

The areas delineated above are those classified as bivalve mollusc production areas under Regulation (EU) 2019/627.

Further details on the classified species and the areas may be obtained from the responsible Food Authority. Enquiries regarding the maps should be directed to: Shellfish Microbiology, CEFAS Weymouth Laboratory, Barrack Road, The Nothe, Weymouth, Dorset DT4 8UB.
(Tel: 01305 206600 Fax: 01305 206601)

N.B. Lat/Longs quoted are WGS84
Unless otherwise stated, non-straight line boundaries between co-ordinates follow the OS 1:25,000 mean high water line.
Separate maps available for M mercenaria and C. edule at Portsmouth Harbour

Food Authority: Portsmouth Port Health Authority




Classification of Bivalve Mollusc Production Areas: Effective from 01 September 2021

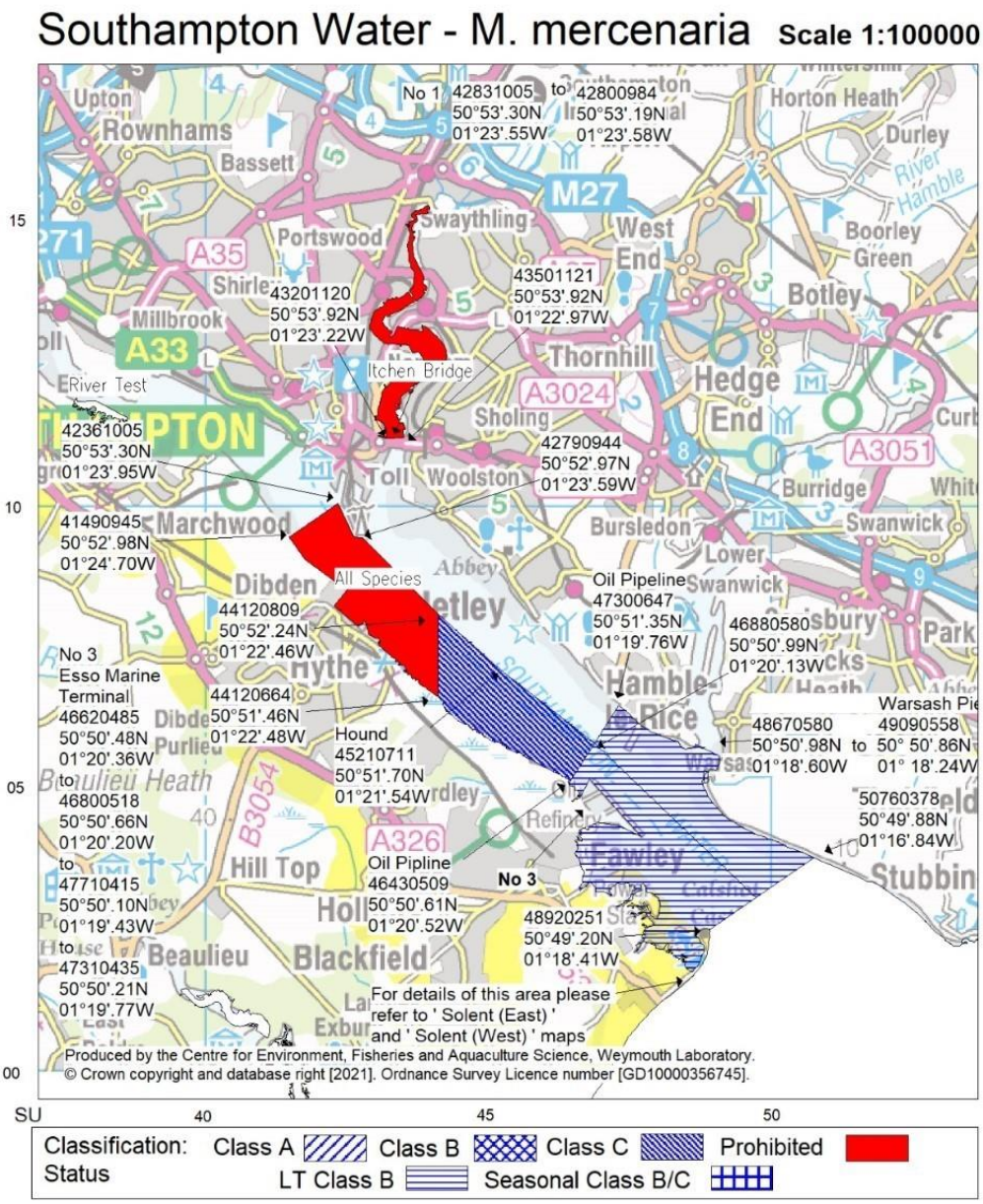
The areas delineated above are those classified as bivalve mollusc production areas under Regulation (EU) 2019/627.

Further details on the classified species and the areas may be obtained from the responsible Food Authority. Enquiries regarding the maps should be directed to: Shellfish Microbiology, CEFAS Weymouth Laboratory, Barrack Road, The Nothe, Weymouth, Dorset DT4 8UB.
(Tel: 01305 206600 Fax: 01305 206601)

N.B. No harvesting is permitted from Prohibited or unclassified areas
i.e. areas that are not shaded to denote class A, B, LT B or C

Lat/Longs quoted are WGS84
Unless otherwise stated, non-straight line boundaries between co-ordinates follow the OS 1:25,000 mean high water line.
Separate map available for M. mercenaria & Tapes spp. at Southampton Water

Food Authority: Southampton Port Health Authority



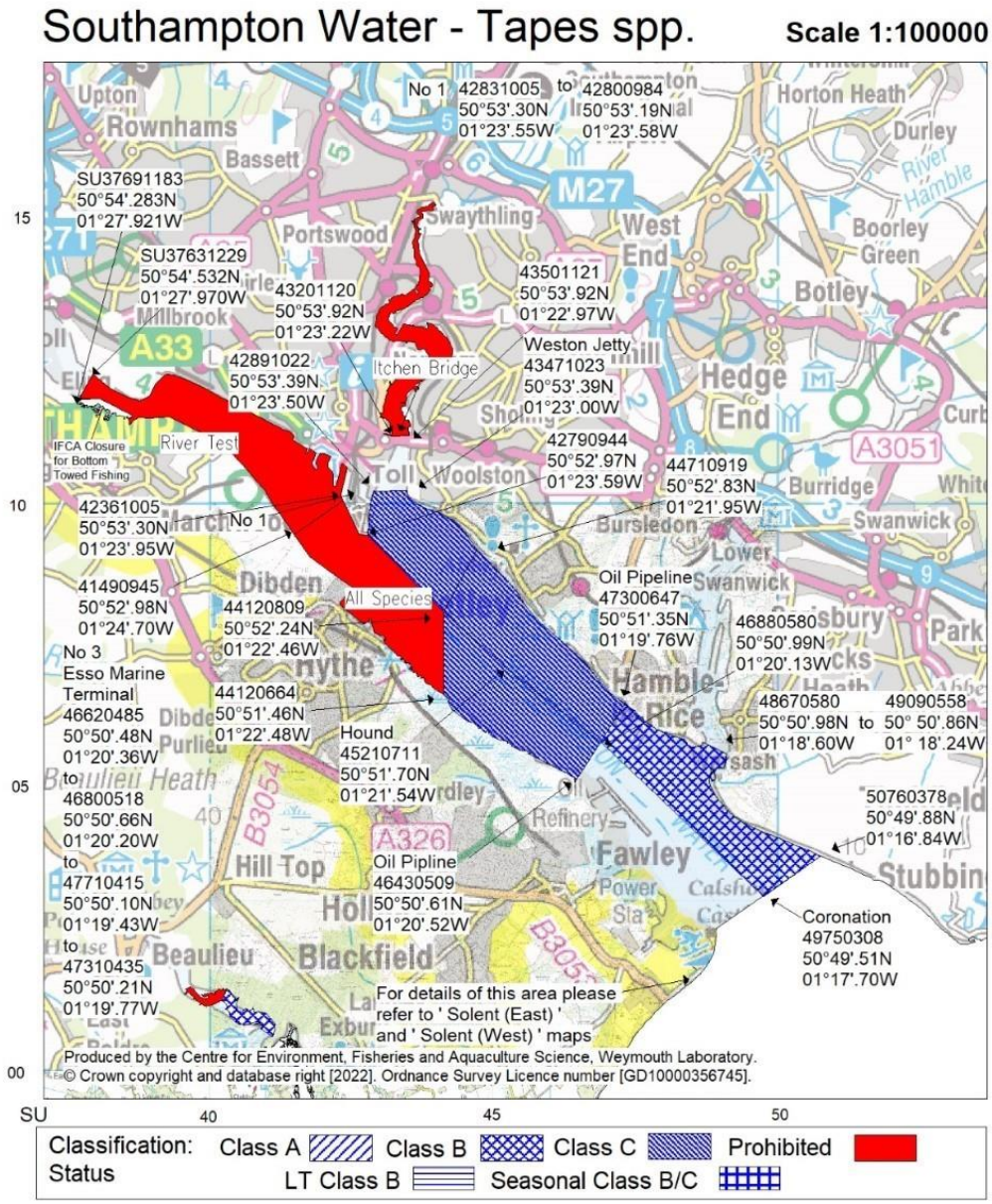

Classification of Bivalve Mollusc Production Areas: Effective from 01 September 2021

The areas delineated above are those classified as bivalve mollusc production areas under Regulation (EU) 2019/627.

Further details on the classified species and the areas may be obtained from the responsible Food Authority. Enquiries regarding the maps should be directed to: Shellfish Microbiology, CEFAS Weymouth Laboratory, Barrack Road, The Nothe, Weymouth, Dorset DT4 8UB.
(Tel: 01305 206600 Fax: 01305 206601)

N.B. No harvesting is permitted from Prohibited or unclassified areas
i.e. areas that are not shaded to denote class A, B, LT B or C
Lat/Longs quoted are WGS84
Unless otherwise stated, non-straight line boundaries between co-ordinates follow the OS 1:25,000 mean high water line.
Separate map available for O. edulis and Tapes spp. at Southampton Water

Food Authority: Southampton Port Health Authority




Classification of Bivalve Mollusc Production Areas: Effective from 4 April 2022

The areas delineated above are those classified as bivalve mollusc production areas under Regulation (EU) 2019/627.

Further details on the classified species and the areas may be obtained from the responsible Food Authority. Enquiries regarding the maps should be directed to: Shellfish Microbiology, CEFAS Weymouth Laboratory, Barrack Road, The Nothe, Weymouth, Dorset DT4 8UB.
(Tel: 01305 206600 Fax: 01305 206601)

N.B. No harvesting is permitted from Prohibited or unclassified areas
i.e. areas that are not shaded to denote class A, B, LT B or C
Lat/Longs quoted are WGS84
Unless otherwise stated, non-straight line boundaries between co-ordinates follow the OS 1:25,000 mean high water line.
Separate map available for O. edulis and M. mercenaria at Southampton Water

Food Authority: Southampton Port Health Authority

# Appendix 9-3 Designated sites identified within study areas 1 and 2

| Site | Valuation | Approximate Distance and Direction from the LSO (km) | Designated Features | Description of Site |
|---|---|---|---|---|
| **Solent Maritime Special Area of Conservation (SAC)** | Statutory designation/ National Site Network Site | LSO discharge point is located within this designated site | Primarily designated for the following qualifying Annex I habitats under The Conservation of Habitats and Species Regulations 2017 (as amended):<br>Estuaries<br>Spartina swards (*Spartinion maritimae*)<br>Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)<br>Also hosts other qualifying Annex I habitats which were not the primary reason for selection though do form part of the designated features. These comprise:<br>Sandbanks which are slightly covered by sea water all the time<br>Mudflats and sandflats not covered by seawater at low tide<br>Coastal lagoons<br>Annual vegetation of drift lines<br>Perennial vegetation of stony banks<br>*Salicornia* and other annuals colonizing mud and sand<br>Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")<br>In addition, other non-primarily selected qualifying Annex II species that form part of the designated features includes Desmoulin's whorl snail (*Vertigo moulinsiana*). | **This area is 112.43km$^2$ and is designated for important Annex I habitats, including estuaries, Spartina swards and Atlantic salt meadows.**<br>**The Solent encompasses a major estuarine system with four coastal plain estuaries and four bar-built estuaries. This area is unique as it has four tides. Sediment habitats within the estuaries include extensive estuarine flats, often with intertidal areas supporting eelgrass (*Zostera spp*.), green algae, sand and shingle spits. The mudflats support rare sponges in the Yar estuary and a sandy reef of *Sabellaria spinulosa* at the eastern side of Chichester Harbour.**<br>**Solent Maritime is the only site for smooth cord-grass *Spartina alterniflora* in the UK and one of two sites where there is significant amounts of small cord grass *S.maritima* are found. Furthermore, this site is one of a few sites for Townsend's cord-grass *S. x townsendii* and extensive areas of common cord-grass *Spartina anglica*.**<br>**The Solent contains the second largest aggregation of Atlantic salt meadows in the south of England. These salt meadows are notable for being representative of ungrazed and support a range of communities including sea-purslane (*Atriplex portulacoides*), common sea lavender (*Limonium vulgare*) and thrift (*Armeria maritima*).**<br>**Other habitats that are present include sandbanks, mudflats and sandflats, coastal lagoons, annual vegetation of drift lines, perennial vegetation of stony banks, *Salicornia* and other annuals colonising mud and sand and shifting dunes with *Ammophila arenaria*.**<br>**Solent maritime is also known to have Desmoulin's whorl snail (*V. moulinsiana*), a species which is restricted to calcareous wetlands.** |
| **Chichester and Langstone** | Statutory designation/ | LSO discharge | This site is designated as it supports the following breeding birds: | **Chichester and Langstone Harbours SPA covers two large, estuarine basins. Urban development surrounds the west of** |

| Site | Valuation | Approximate Distance and Direction from the LSO (km) | Designated Features | Description of Site |
|---|---|---|---|---|
| **Harbours Special Protection Areas (SPA)** | National Site Network site | point is located within this designated site | Common tern (*Sterna hirundo*)<br>Little tern (*Sterna albifrons*)<br>Sandwich tern (*Sterna sandvicensis*)<br>The site also supports overwintering populations of the following birds:<br>Bar-tailed godwit (*Limosa lapponica*)<br>Curlew (*Numenius arquata*)<br>Dark-bellied Brent goose (*Branta bernicla bernicla*)<br>Dunlin (*Calidris alpina alpina*)<br>Grey plover (*Pluvialis squatarola*)<br>Pintail (*Anas acuta*)<br>Red-breasted merganser (*Mergus serrator*)<br>Redshank (*Tringa tetanus*)<br>Ringed plover (*Charadrius hiaticula*)<br>Sanderling (*Calidris alba*)<br>Shelduck (*Tadorna tadorna*)<br>Shoveler (*Anas clypeata*)<br>Teal (*Anas crecca*)<br>Turnstone (*Arenaria interpres*)<br>Wigeon (*Anas Penelope*)<br>It also qualifies as it supports a significant wading bird population. | **Langstone Harbour, whereas farmland surrounds the majority of Chichester Harbour. Together, with neighbouring Portsmouth Harbour, the area forms one of the most sheltered intertidal areas on the South Coast of England.**<br>**Both Chichester and Langstone Harbours contain extensive intertidal mudflats and sandflats with areas of seagrass beds, saltmarsh, shallow coastal waters, coastal lagoons, coastal grazing marsh and shingle ridges and islands. These habitats support internationally and nationally important numbers of overwintering and breeding bird species.**<br>**At low tide the mudflats are exposed, the water is drained by channels and creeks which meet to form narrow exits into the Solent. The sediments support rich populations of intertidal invertebrates, which provide an important food source for overwintering birds. Several small freshwater streams flow into the harbours; however, these contribute relatively little freshwater input compared to the tidal flows.**<br>**There are more than 300 ha of seagrass beds (*Zostera noltii* and *Zostera marina*) in the SPA which are an important food source for dark-bellied Brent geese [47]. Overwintering birds also feed and roost in the saltmarsh areas, which are dominated by cordgrass (*Spartina*) swards, as well as on coastal grazing marsh.**<br>**The shingle ridges and islands within the site provide important nesting habitat for three species of tern during the summer breeding season. Adult terns use the shallow coastal waters in the harbours and the wider Solent to forage for small fish to feed themselves and their chicks.**<br>**Areas outside the SPA contain important supporting habitats for the birds, including coastal grazing marsh, amenity grassland and agricultural land. Details of these can be found online, in particular via the Solent Wader and Brent Goose Strategy [48].** |
| **Chichester and Langstone Harbour Ramsar** | Statutory designation/ National Site Network site | LSO discharge point is located within | This site is designated for the following passage and wintering birds:<br>Black-tailed godwit (*Limosa limosa)* - Passage | **Chichester and Langstone Harbours are large, sheltered estuarine basins comprising extensive mud and sand flats exposed at low tide. The site is of particular significance for over-wintering wildfowl and waders and also a wide range of** |

| Site | Valuation | Approximate Distance and Direction from the LSO (km) | Designated Features | Description of Site |
|---|---|---|---|---|
| | | this designated site | Dark-bellied brent goose (*Branta bernicla)* - Wintering<br>Dunlin (*Calidris alpina alpina)* - Wintering<br>Grey plover (*Pluvialis squatarola)* - Wintering<br>Redshank (*Tringa tetanus)* - Passage<br>Ringed plover (*Charadrius hiaticula)* - Passage<br>Shelduck (*Tadorna tadorna)* - Wintering<br>Waterbird assemblage – Wintering<br>It is also designated for the Estuary habitat. | **coastal and transitional habitats supporting important plant and animal communities. The two large estuarine basins are linked by the channel which divides Hayling Island from the main Hampshire coastline. The site includes intertidal mudflats, saltmarsh, sand and shingle spits and sand dunes. The mudflats support beds of seagrass (*Zostera*) and algae (*Enteromorpha*), whilst the lower saltmarsh is dominated by *Spartina anglica*, with a more varied community at higher levels. Although many areas bordering the site have been developed, some grassland and brackish/freshwater marshes with reedbeds remain** |
| **Chichester Harbour SSSI** | Statutory designation | LSO discharge point is located within this designated site | This site is designated for breeding birds:<br>Common Tern (*Sterna hirundo*)<br>Little tern (*Sterna albifrons)*<br>Sandwich tern (*Sterna sandvicensis)*<br>Aggregations of non-breeding birds:<br>Bar-tailed Godwit (*Limosa lapponica*)<br>Black-tailed Godwit (*Limosa limosa islandica*)<br>Dark-bellied Brent Goose (*Branta bernicla bernicla*)<br>Curlew (*Numenius arquata*)<br>Dunlin (*Calidris alpina alpina*)<br>Greenshank (*Tringa nebularia*)<br>Grey Plover (*Pluvialis squatarola*)<br>Redshank (*Tringa tetanus*)<br>Ringed Plover (*Charadrius hiaticula*)<br>Sanderling (*Calidris alba*)<br>Shelduck (*Tadorna tadorna*)<br>Teal (*Anas crecca*)<br>It is also designated for:<br>IA - Coastal Geomorphology<br>Invertebrate assemblage<br>MG5 - *Cynosurus cristatus* - Centaurea nigra grassland | **Chichester Harbour is a sheltered estuarine basins joined by a stretch of water that separates Hayling Island from the mainland. This area consists of coastal saltmarshes, seagrass, sand dunes, mudflats and reedbeds.**<br>**This site supports breeding waterbirds including Little tern (*S. albifrons*) and Sandwich tern (*S. sandvicensis*).**<br>**Chichester Harbour has a population of harbour seals which use two significant haul-out sites, one in Langstone Harbour and the other in Chichester Harbour. Both these haul-out sites are used on a daily bases, however Chichester harbour is used by more seals [47].** |

| Site | Valuation | Approximate Distance and Direction from the LSO (km) | Designated Features | Description of Site |
|---|---|---|---|---|
| | | | S4 - Phragmites australis swamp and reed-beds<br>SD1 - *Rumex crispus* - Glaucium flavum shingle community<br>SD2 - *Honkenya peploides - Cakile maritima* strandline community<br>SD4 - *Elymus farctus ssp*. Boreali-atlanticus foredune community<br>SD6 - *Ammophila arenaria* mobile dune community<br>Sheltered muddy shores (including estuarine muds)<br>SM1 - *Zostera* communities<br>SM14 - *Atriplex portulacoides* saltmarsh<br>SM6 - *Spartina anglica* saltmarsh<br>W10 - *Quercus robur* - Pteridium aquilinum - *Rubus fruticosus* woodland<br>W16 - *Quercus spp.-Betula spp.-Deschampsia flexuosa* woodland | |
| **Langstone Harbour SSSI** | Statutory designation | LSO discharge point is located within this designated site | This site is designated for breeding birds:<br>Common Tern (*Sterna hirundo*)<br>Little Tern (*Sterna albifrons*)<br>Sandwich Tern (Sterna sandvicensis)<br>Non breeding birds:<br>Bar-tailed Godwit (*Limosa lapponica*)<br>Dark-bellied Brent Goose (*Branta bernicla bernicla*)<br>Curlew (*Numenius arquata*)<br>Dunlin (*Calidris alpina alpina*)<br>Grey Plover (*Pluvialis squatarola*)<br>Pintail (*Anas acuta*)<br>Red-breasted Merganser (*Mergus serrator*)<br>Redshank (*Tringa tetanus*)<br>Ringed Plover (*Charadrius hiaticula*) | **Langstone Harbour is a sheltered estuarine basins joined by a stretch of water that separates Hayling Island from the mainland. This area consists of coastal saltmarshes, seagrass, sand dunes, mudflats and reedbeds.**<br>**This site supports breeding waterbirds including Little tern (*S. albifrons*) and Sandwich tern (*S. sandvicensis*).** |

| Site | Valuation | Approximate Distance and Direction from the LSO (km) | Designated Features | Description of Site |
|---|---|---|---|---|
| | | | Sanderling (*Calidris alba*)<br>Shelduck (*Tadorna tadorna*)<br>Shoveler (*Anas clypeata*)<br>Teal (*Anas crecca*)<br>Turnstone (*Arenaria interpres*)<br>Wigeon (*Anas penelope*)<br>Other designations include<br>Invertebrate assemblage<br>MG11 - *Festuca rubra - Agrostis stolonifera - Potentilla anserina* grassland<br>MG13 - *Agrostis stolonifera - Alopecurus geniculatus* grassland<br>MG5 - *Cynosurus cristatus - Centaurea nigra* grassland<br>S26 - *Phragmites australis - Urtica dioica* tall-herb fen<br>S4 - *Phragmites australis* swamp and reed-beds<br>Saline coastal lagoons<br>SD3 - *Matricaria* maritima - *Galium aparine* strandline community<br>Sheltered muddy shores (including estuarine muds)<br>SM1 - *Zostera* communities<br>SM14 - *Atriplex portulacoides* saltmarsh<br>SM16b - *Festuca rubra* saltmarsh *Juncus gerardii* sub-community<br>SM23 - *Spergularia marina - Puccinellia distans* saltmarsh<br>SM24 - *Elytrigia atherica* saltmarsh<br>SM4 - *Spartina maritima*<br>SM6 - *Spartina anglica* saltmarsh<br>SM7 - *Sarcocornia perennis*<br>SM8 - Annual *Salicornia* saltmarsh | |

| Site | Valuation | Approximate Distance and Direction from the LSO (km) | Designated Features | Description of Site |
|---|---|---|---|---|
| | | | SM9 - *Suaeda maritima* saltmarsh<br>Vascular plant assemblage | |
| **South Wight Maritime SAC** | Statutory designation/<br>National Site Network Site | 3km South of the LSO | The site is designated for Annex I habitats:<br>1170 Reefs<br>1230 Vegetated Sea cliffs of the Atlantic and Baltic Coasts<br>8330 Submerged or partially submerged sea caves | **South Wight Maritime SAC is 199km² on the south coast of England and represents contrasting Cretaceous hard cliffs, semi-stable soft cliffs, and mobile soft cliffs. The site is also selected on account of its variety of reef types and associated communities, including chalk, limestone, and sandstone reefs.** |
| **Solent & Southampton Water SPA** | Statutory designation/<br>National Site Network Site | 4km SW from the LSO | The site is designated as it supports the following breeding birds:<br>Common tern (*Sterna hirundo*)<br>Little tern (*S. albifrons*)<br>Mediterranean gull (*Larus melanocephalus*)<br>Roseate tern (*Sterna dougallii)*<br>Sandwich tern (*Thalasseu sandvicensis*)<br><br>The site is also designated as it supports the following overwintering birds:<br>Black-tailed godwit (*Limosa limosa islandica)*<br>Dark-bellied brent goose (*Branta bernicla bernicla)*<br>Ringed plover (*Charadrius hiaticula)*<br>Teal (*Anas crecca*)<br><br>The area also regularly supports at least 20,000 waterfowl. | **The 54km² area extends from Hurst Spit to Hill Head along the south coast of Hampshire, and from Yarmouth to Whitecliff Bay along the north coast of the Isle of Wight. The site comprises a series of estuaries and harbours with extensive mudflats and saltmarshes together with adjacent coastal habitats including saline lagoons, shingle beaches, reedbeds, damp woodland and grazing marsh. The mudflats support beds of Enteromorpha spp. and Zostera spp. and have a rich invertebrate fauna that forms the food resource for the estuarine birds. In summer, the site is of importance for breeding seabirds, including gulls and four species of terns. In winter, the SPA holds a large and diverse assemblage of waterbirds.** |
| **Solent and Dorset Coast SPA** | Statutory designation/<br>National Site Network site | LSO discharge point is located within this | This site is designated as it supports the following breeding birds:<br>Common tern (*Sterna hirundo*)<br>Little tern (*S. albifrons*) | **Solent and Dorset Coast SPA is 472.6km² and is designated for three species of tern; Sandwich tern, Common tern and Little tern [47]. The site covers the entirety of the area of the Solent, along with Portsmouth, Langstone and Chichester harbours.** |

| Site | Valuation | Approximate Distance and Direction from the LSO (km) | Designated Features | Description of Site |
|---|---|---|---|---|
| | | designated site | Sandwich tern (*Thalasseu sandvicensis*)<br>This site is not designated for any overwintering bird species or other wading bird populations. | **Additionally, this site extends to the coastline of the Isle of Wight.**<br>**The site consists of sea inlets, salt marshes, salt pastures, salt steppes, estuaries, mudflats, sandflats, lagoons and sea cliffs.** |
| **Bembridge Marine Conservation Zone (MCZ)** | Statutory designation/ National Site Network site | 2.2km from LSO | This site is designated for:<br>Maerl beds<br>Native oyster (*Ostrea edulis*)<br>Peacock's tail (*Padina pavonica*)<br>Seagrass beds<br>Sea-pen and burrowing megafauna communities<br>Sheltered muddy gravels<br>Short snouted seahorse (*Hippocampus hippocampus*)<br>Stalked jellyfish (*Calvadosia campanulata)*<br>Stalked jellyfish (*Haliclystus spp*)<br>Subtidal coarse sediment<br>Subtidal mixed sediments<br>Subtidal mud<br>Subtidal sand | **Located on the east coast of the Isle of Wight, Bembridge MCZ covers an area of 75km$^2$, stretching from Nettlestone Point in the north to Ventnor in the south. The site follows the mean high water mark along the coast and extends out from the land seawards. The site encompasses the intertidal and subtidal areas extending to the edge of the deep water channel approach into the Eastern Solent.**<br><br>**The area within Bembridge MCZ is highly diverse and includes a wide range of habitats including intertidal sediments which support the notable algae peacock's tail, Padina pavonica and deep water habitats supporting features such as sea pens and burrowing megafauna. The large areas of subtidal mixed sediments act as a supporting substrate to several important features such as maerl beds.**<br><br>**Bembridge is the only known site in the region where maerl can be found. Maerl is a fragile, calcareous, red seaweed that forms large mats and provides shelter for many other species. Maerl is highly sensitive to seabed activities and takes a long time to recover from damage. The site also protects important seagrass beds which provide refuge for the short-snouted seahorse along with tiny stalked jellyfish, *Calvadosia campanulata* and *Haliclystus* sp.** |
| **Sinah Common SSSI** | Statutory designation | 4.2km from LSO | This site is designated for:<br>*Calluna vulgaris - Carex arenaria* heath<br>*Armeria maritima - Cerastium diffusum ssp. diffusum maritime therophyte* community<br>*Atriplex prostrata - Beta vulgaris ssp.* maritima sea-bird cliff community | **The site is notified for its coastal habitats including the following: pioneer shingle vegetation, maritime shingle grassland which includes dry acid grassland and lichen rich acid grassland, mobile dune, semi-fixed dune, dune heath and an associated small area ofsaltmarsh.** |

| Site | Valuation | Approximate Distance and Direction from the LSO (km) | Designated Features | Description of Site |
|---|---|---|---|---|
| | | | *Festuca rubra - Armeria maritima maritime* grassland<br>Population of Schedule 8 plant - *Petrorhagia nanteuilii, Childing* Pink<br>*Rumex crispus - Glaucium flavum* shingle community<br>*Ammophila arenaria* mobile dune community<br>*Ammophila arenaria - Festuca rubra* semi-fixed dune community<br>*Atriplex portulacoides* saltmarsh<br>*Festuca rubra* saltmarsh *Puccinellia maritima* sub-community<br>*Juncus maritimus* saltmarsh<br>*Festuca ovina - Agrostis capillaris - Rumex acetosella* grassland<br>*Festuca ovina-Agrostis capillaris-Rumex acetosella* subcom *Cornicularia aculeata-Cladonia arbuscula*<br>Vascular plant assemblage | |
| **Brading Marshes to St Helen's Ledges SSSI** | Statutory designation | 4.6km from LSO | The site is designated for aggregations of non-breeding birds:<br>Black-tailed Godwit (*Limosa limosa islandica)*<br>Dark-bellied Brent Goose (*Branta bernicla bernicla*)<br>Cormorant (*Phalacrocorax carbo*)<br>Curlew (*Numenius arquata*)<br>Dunlin (*Calidris alpina alpina*)<br>Gadwall (*Mareca strepera*)<br>Grey Plover (*Pluvialis squatarola*)<br>Little Grebe (*Tachybaptus ruficollis*)<br>Redshank (*Tringa tetanus*)<br>Ringed Plover (*Charadrius hiaticula*)<br>Shelduck (*Tadorna tadorna*) | **Bembridge Harbour today has a wide variety of estuarine habitats. These include intertidal mudflats and sandflats of ornithological importance, and sand dunes and shingle pits of geomorphological and biological importance which guard the harbour mouth. Beyond the spits are extensive intertidal sandflats with rocky outcrops, shingle, limestone reefs and ledges forming St Helen's Ledges, and the sheltered shallow waters of Priory Bay. This combination of hard and soft coast features supports a rich flora and marine invertebrate fauna including a number of species at their most easterly locality in the English Channel. A series of lagoons associated with the estuary have a high species diversity and support several rare specialist lagoonal species.**<br>**The intertidal mudflats, sandflats, eelgrass Zostera beds, and shingle, together with Brading Marshes, support large numbers of overwintering wildfowl and waders which form an important** |

| Site | Valuation | Approximate Distance and Direction from the LSO (km) | Designated Features | Description of Site |
|---|---|---|---|---|
| | | | Shoveler (*Anas clypeata*)<br>Teal (*Anas crecca*)<br>Wigeon (*Anas penelope*)<br>Habitats for assemblages of breeding birds:<br>Lowland damp grasslands<br>Assemblages of breeding birds - Lowland open waters and their margins<br>Other features include:<br>EC - Palaeoentomology<br>FM - Palaeoentomology<br>Invertebrate assemblage<br>Lowland ditch systems<br>M22 - Juncus subnodulosus - Cirsium palustre fen meadow<br>M23 - *Juncus effusus/acutiflorus - Galium palustre* rush pasture<br>MG11 - *Festuca rubra - Agrostis stolonifera - Potentilla anserina* grassland<br>MG5 - *Cynosurus cristatus - Centaurea nigra* grassland<br>Saline coastal lagoons<br>SD1 - *Rumex crispus - Glaucium flavum* shingle community<br>SD12 - Carex arenaria - Festuca ovina - Agrostis capillaris dune grassland<br>SD2 - Cakile maritima-Honkenya peploides strandline community<br>SD4 - Elymus farctus ssp. Boreali-atlanticus foredune community<br>Sheltered muddy shores (including estuarine muds)<br>Sheltered rocky shores (predominately sheltered to very sheltered from wave action) | **component of the internationally important bird populations of The Solent. Brading Marshes is also important for its assemblage of breeding birds.** |

| Site | Valuation | Approximate Distance and Direction from the LSO (km) | Designated Features | Description of Site |
|---|---|---|---|---|
| | | | SM14 - Atriplex portulacoides saltmarsh<br>SM16a - Festuca rubra saltmarsh Puccinellia maritima sub-community<br>SM18 - Juncus maritimus saltmarsh<br>SM24 - Elytrigia atherica saltmarsh<br>U1 b,c,d,f - Festuca ovina - Agrostis capillaris - Rumex acetosella grassland<br>U2 - Deschampsia flexuosa grassland<br>Vascular plant assemblage<br>W8 - Fraxinus excelsior - Acer campestre - Mercurialis perennis woodland | |
| **Whitecliff Bay and Bembridge Ledges SSSI** | Statutory designation | 5.1km from LSO | This site is designated for:<br>EC - Palaeogene<br>EC - Tertiary Mammalia<br>EC - Tertiary Palaeobotany<br>MC11 - *Festuca rubra - Daucus carota ssp. gummifer maritime* grassland<br>Moderately exposed rocky shores<br>Moderately exposed sandy shores (with polychaetes and bivalves)<br>Reefs<br>SM1 - *Zostera* communities<br>Soft Maritime Cliff and Slope | **The Whitecliff Bay and Bembridge Ledges SSSI comprises extensive areas of intertidal sand, rock and shingle and includes a series of actively eroding cliffs. Collectively these features comprise the coastline of a broad heathland at the eastern extremity of the Isle of Wight.** |
| **Solent and Southampton Water Ramsar** | Statutory designation/ National Site Network site | 5.8km from LSO | This site is designated for the following breeding birds:<br>Black-tailed godwit (*Limosa limosa*)<br>Common tern (*Sterna hirundo*)<br>Little tern (*Sternula albifrons*)<br>Roseate tern (*Sterna dougallii*)<br>Sandwich tern (*Thalasseus sandvicensis*)<br>For the designated wintering birds:<br>Dark-bellied brent goose (*Branta bernicla*) | **The area covered extends from Hurst Spit to Gilkicker Point along the south coast of Hampshire and along the north coast of the Isle of Wight. The site comprises of estuaries and adjacent coastal habitats including intertidal flats, saline lagoons, shingle beaches, saltmarsh, reedbeds, damp woodland, and grazing marsh. The diversity of habitats support internationally important numbers of wintering waterfowl, important breeding gull and tern populations and an important assemblage of rare invertebrates and plants.** |

| Site | Valuation | Approximate Distance and Direction from the LSO (km) | Designated Features | Description of Site |
|---|---|---|---|---|
| | | | Ringed plover (*Charadrius hiaticula*)<br>Teal (*Anas crecca*)<br>Waterbird assemblage<br>And for the following assemblages and habitats:<br>Wetland invertebrate assemblage<br>Wetland plant assemblage<br>Estuary<br>Sheltered channel between island/mainland | **The site is one of the few major sheltered channels between a substantial island and mainland in European waters, exhibiting an unusual strong double tidal flow and has long periods of slack water at high and low tide. It includes many wetland habitats characteristic of the biogeographic region: saline lagoons, saltmarshes, estuaries, intertidal flats, shallow coastal waters, grazing marshes, reedbeds, coastal woodland and rocky boulder reefs.** |
| **Ryde Sands and Wootton Creek SSSI** | Statutory designation | 5.8km from LSO | This site is designated for non-breeding birds:<br>Sanderling (*Calidris alba*)<br>Other designations include:<br>Moderately exposed sandy shores (with polychaetes and bivalves)<br>Population of Schedule 8 stonewort - *Lamprothamnium papulosum*, Foxtail Stonewort<br>Saline coastal lagoons<br>Sheltered muddy shores (including estuarine muds)<br>SM1 - *Zostera* communities<br>Vascular plant assemblage<br>W8 - *Fraxinus excelsior - Acer campestre - Mercurialis perennis* woodland | **The Ryde Sands and Wootton Creek SSSI extends some 10 kilometres along the sheltered north-eastern shore of the Isle of Wight between Fishbourne and Horestone Point. At low water a particularly wide range of intertidal sediments are exposed over this stretch of coastline, grading from the fine estuarine muds of Wootton Creek, through cobbles and boulders at Pelhamfield to the extensive sandflats at Ryde which reach a maximum width of almost 2 kilometres. These sandflats are the most extensive in the Solent and support the richest assemblage of sandy shore marine flora and fauna on the central south coast of Britain.** |
| **Gilkicker Lagoon SSSI** | Statutory designation | 7.3km from LSO | Population of red data book stonewort - *Lamprothamnium papulosum,* Foxtail Stonewort<br>Population of Schedule 5 crustacean - *Gammarus insensibilis*, Lagoon Sand Shrimp<br>Population of Schedule 5 sea anemone - *Nematostella vectensis*, Starlet Sea Anemone<br>Saline coastal lagoons | **Gilkicker Lagoon represents a rare habitat in Britain, where there are relatively few saline lagoons. It is a relict of a former defensive moat which in turn is thought to have been partially derived from an ancient fleet extending parallel and to the rear of the apposition beach of Gilkicker Point. The Lagoon is linked to the sea by an intake through the shingle beach separating it from the sea. It usually maintains a salinity comparable to that of the sea water in the Solent. Saline lagoons characteristically experience large variations in water chemistry and other environmental parameters, and thus support a specialised flora and fauna.** |

| Site | Valuation | Approximate Distance and Direction from the LSO (km) | Designated Features | Description of Site |
|---|---|---|---|---|
| **Portsmouth Harbour SPA** | Statutory designation/ National Site Network site | 7.6km northwest of LSO discharge point location | This site is designated as it supports the following overwintering birds:<br>Black-tailed Godwit (*Limosa limosa islandica*)<br>Dark-bellied brent goose (*B. b. bernicla)*<br>Dunlin (*C. a. alpina*)<br>Red-brested merganser (*M. serrator*)<br>This site is not designated for any breeding bird species or other wading bird populations. | **Portsmouth Harbour is composed of intertidal mudflats and sandflats with seagrass beds, areas of salt marsh, coastal lagoons and coastal grazing marsh. There is approximately 0.77km² of seagrass beds, comprised of *Zostera marina* and *Zostera noltii* [48].**<br>**The area is designated for non-breeding birds including black-tailed godwit (*L. l. islandica*), dark-bellied brent goose (*B. b. bernicla),* Dunlin (*C. a. alpina*) and Red-breasted merganser (*M. serrator*)** |
| **Portsmouth Harbour Ramsar** | Statutory designation/ National Site Network site | 7.6km northwest of LSO discharge point location | Assemblage of wintering birds associated with intertidal habitats:<br>Black-tailed godwit*, Limosa limosa*<br>Dark-bellied brent goose, *Branta bernicla*<br>Dunlin, *Calidris alpina*<br>Red-breasted merganser, *Mergus serrator* | **Portsmouth Harbour is composed of intertidal mudflats and sandflats with seagrass beds, areas of salt marsh, coastal lagoons and coastal grazing marsh. There is approximately 0.77km² of seagrass beds, comprised of *Zostera marina* and *Zostera noltii*** *Error! Bookmark not defined.***.** |
| **Portsmouth Harbour SSSI** | Statutory designation | 7.6km northwest of LSO discharge point location | This site is designated for aggregations of non-breeding birds:<br>Black-tailed Godwit (*Limosa limosa islandica*)<br>Dark-bellied Brent Goose (*Branta bernicla bernicla*)<br>Dunlin (*Calidris alpina alpina*)<br>Grey Plover (*Pluvialis squatarola*)<br>Other designated features include:<br>CG2 - *Festuca ovina - Avenula pratensis* lowland calcareous grassland<br>Population of Schedule 5 crustacean - *Gammarus insensibilis,* Lagoon Sand Shrimp<br>Population of Schedule 5 sea anemone - *Nematostella vectensis*, Starlet Sea Anemone<br>SM13a - *Puccinellia maritima* saltmarsh, *Puccinellia maritima* dominant sub-community<br>SM14 - *Atriplex portulacoides* saltmarsh<br>SM15 - *Juncus maritimus - Triglochin maritima* saltmarsh | **Portsmouth Harbour is composed of intertidal mudflats and sandflats with seagrass beds, areas of salt marsh, coastal lagoons and coastal grazing marsh. There is approximately 0.77km² of seagrass beds, comprised of *Zostera marina* and *Zostera noltii*** *Error! Bookmark not defined.***.** |

| Site | Valuation | Approximate Distance and Direction from the LSO (km) | Designated Features | Description of Site |
|---|---|---|---|---|
| | | | SM16a - *Festuca rubra* saltmarsh *Puccinellia maritima* sub-community<br>SM6 - *Spartina anglica* saltmarsh<br>Vascular plant assemblage | |

Source: Designated Sites View [52].

# Appendix 9-4 Baseline for commercially sensitive species

## Introduction

1.12.1 The following section describes the sensitivity of each commercially targeted species with regard to habitat preference, foraging behaviours and reproductive patterns when considering potential modifications in water chemistry from the Proposed Development for each of the species identified. In most cases a concurrent list of species can be found within both the economic value and landed catch columns for each rectangle, albeit in different orders due to differences in price per kilo attained for individual target species.

## Bivalve mollusc production area species

1.12.2 European oyster (O. edulis), Pacific oyster (C. gigas), Hard clam (Mercenaria Spp.), Manila clam (R. philippinarum) and Common cockle (C. edule) are cultivated within Langstone, Chichester and Portsmouth harbours, and the Solent, all of which are located within the boundaries of ICES rectangles 30E8 and 30E9. Due to similarities in their life cycle stages, sessile nature and filter feeding mechanisms, these species have been described together in this section. Where differences exist, in relation to potential modifications to water quality from the Project, these have been specifically addressed for the relevant species. Water quality, in terms of the bacteria and viruses, affects the incidence of microbial contamination in shellfish. As filter feeders, bivalves can also accumulate biotoxins if certain types of phytoplankton are present in the water column. Therefore, there are specific hygiene requirements in order to ensure the safety of bivalve molluscs. These ensure that the risks posed by microbiological contamination and biotoxins are reduced to an absolute minimum. The most important viral hazards associated with the consumption of bivalve molluscs are acquired from human faecal pollution of bivalve production areas, resulting in the temporary closure of bivalve production areas. Due to the sessile nature of filter feeding species that are cultivated within the study area they have the potential to be affected by any modifications to water quality as a result of the intended discharge from LOS. This can be further exacerbated by habitat modifications from increased nutrient loading, with changes to species assemblage within the cultivation areas competing for the availability of space and resources, with the potential for smothering by algal/floral species and eutrophication effects if the natural balance of the ecosystem changes. These species bio-accumulate; therefore, any impacts may not be immediately visible but can accumulate over time.

## Whelks (B. Undatum)

1.12.3 Buccinum undatum, commonly known as whelk, are large marine gastropods with a wide distribution range across the North Atlantic Ocean. Whelk commonly inhabit the entire UK coastline, from intertidal areas to depths of more than 1200m where they can be found in various benthic substrates including gravel, sand and mud [49]. Movement is limited once individuals reach maturity, with an upper limit of

155m of daily movement [50] resulting in discrete localised populations. The timing of the reproductive cycle for whelk varies depending on geographical distribution and is temperature dependent. In UK waters mating is triggered when temperatures fall below at least 12°C, in some cases 9°C as has been evidenced for populations found in the Solent. In the Solent whelks were found to lay eggs between December and February [49]. Recruitment is low within the species, despite the large numbers of eggs in an egg mass. Studies on a Solent whelk population found approximately 1% of eggs developed to juveniles and the remaining eggs are used as nurse eggs for the developed embryos. Size of Maturity (SOM) for whelk varies greatly between populations on a small geographical scale. A range of anthropogenic and environmental pressures have been attributed to variations in SOM for whelks including water temperature, depth, fishing pressure, food availability and predation. Whelk populations can be susceptible to modifications in water quality, due to limited mobility of 155m daily, meaning they cannot readily flee from habitats that become temporarily unsuitable. They also have a high dependency on water temperature cues to induce mating and very low recruitment to the fishery.

### Sole (S. solea)

1.12.4 Solea solea, commonly known as the common sole is widely distributed in UK waters and inhabits sandy and muddy sediments from 10-100m in depth. Juveniles can be found at depths of 1m in intertidal pools and on sandy shores. The spawning season in the English Channel starts when temperatures rise above 7°C and takes place from late February until the end of June in depths between 40-50 m, peaking in April and May and largely driven by changes in temperature. Several spawning sites have been identified along the south coast including between Beachy Head and the Isle of Wight, to the west of the Isle of Wight and further west of the Channel around Hurd Deep. Once hatched, larvae float at the surface, remaining pelagic for up to 6 weeks before moving towards inshore nurseries. As juveniles, individuals inhabit estuaries, tidal inlets, and shallow, sandy shores. Smaller individuals are found in deeper areas of estuaries whereas larger juveniles of 1 year move with the tides onto mudflats. Juveniles remain in estuaries for approximately two years before moving to deeper water. Adults undertake short migrations between offshore areas and shallower spawning grounds, returning to the spawning ground that they were born at each year [51]. Adult sole are highly mobile and can flee from environments where water modifications have made the area temporarily unsuitable, however pelagic larvae, and juvenile sole are more dependent on estuaries, tidal inlets, and shallow, sandy shores, moving to mudflats after 1 year and into deeper water at 2 years. This time period is critical for the species and may be influenced by modifications to water quality in the study area.

### Manilla Clam (R. philippinarum)

1.12.5 Ruditapes phillippinarum, commonly known as the Manila clam, is native to the Indo Pacific region, however through a mix of deliberate and accidental introductions the species is now widely distributed along the Atlantic coast of Europe. Following their introduction, they quickly became a self-sustaining population and were first recorded in the Solent in 2005. Environmental conditions in Poole harbour and the Solent are similar to those of the species native range,

providing a relatively sheltered, nutrient rich, shallow water habitat with extensive intertidal mud flats, and temperatures up to 27°C in the summer, providing optimum reproductive conditions. Manila clams inhabit fine sand and mud sediments in the intertidal zone residing in the top 4 cm of the substratum, but can bury as deep as 10 cm, filtering phytoplankton and sedimentary organic matter from the water. The manila clam is a highly fecund species that becomes sexually mature at an early age and displays an extended spawning season. In the Solent spawning takes place from May to September with a peak between June and August [51]. Due to the sessile nature of these filter feeding species within the study area, they have the potential to be affected by any modifications to water quality as a result of the intended discharge from the Sandow LSO. This can be further exacerbated by habitat modifications from increased nutrient loading, with changes to species assemblage leading to increased competition for the availability of space and resources, with the potential for smothering by algal/floral species and eutrophication effects if the natural balance of the ecosystem changes. These species bio-accumulate; therefore, any impacts may not be immediately visible but can accumulate over time.

### Lobsters (H. gammarus)

1.12.6 Homarus gammarus, commonly known as the European lobster is widely distributed in the coastal waters of the northeast Atlantic and inhabits rocky habitats in intertidal areas up to 200m, where boulders and crevices provide shelter from predation and foraging opportunities [52]. Female lobsters display a two-year reproductive cycle. Copulation occurs in the summer months and fertilised eggs are secreted onto the pleopods setae underneath the abdomen. Berried (egg-bearing) females appear from September to December. Eggs then develop over winter in response to water temperature, day length and photoperiodic experience and hatch from May to July. Upon release larvae enter the water column and remain planktonic for the first three larval stages. The fourth stage is referred to as the metamorphosis moult and become the first post larval stage [51]. At this stage they are active, contributing to further dispersal before settling into benthic habitats. Unlike brown crabs, lobsters do not undertake regular migrations instead they move randomly based on limiting environmental factors [52]. Tagging studies have highlighted the limited scale of movement displayed by lobsters with the majority moving less than 4 km over several years. Lobster populations can be susceptible to modifications in water quality, due to limited mobility, meaning they cannot readily flee from habitats that become temporarily unsuitable, high dependency on water temperature cues to induce mating, very low recruitment to the fishery and specific habitat requirements as adult individuals.

### Bass (D. labrax)

1.12.7 Dicentrarchus labrax, commonly known as European seabass inhabit shallow coastal and estuarine habitats, favouring rocky reefs and sand banks. Bass begin spawning in the mid-western channel from February, gradually moving eastwards as water temperatures increase [53] Bass spawn in the coastal waters between the Isle of Wight and Beachy Head from May onwards. Once hatched, the pelagic larvae move inshore over a 2–3-month period. Once larvae reach 15mm, they actively swim into estuaries and brackish water and remain in these habitats for 2

years. Adult bass demonstrate strong site fidelity, returning to the same spawning/foraging grounds year after year [51]. Bass is the second most expensive commercial species caught in the Northeast Atlantic after the European Lobster. It is an important target species within the study area and is mainly caught by hook and lines using handlines and pole-lines. Adult bass are highly mobile and can flee from environments where water modifications have made the area temporarily unsuitable, however pelagic larvae drift with currents, and juveniles are more dependent on estuaries and tidal inlets inshore before maturing and heading to deeper water. This time period is critical for the species and may be influenced by modifications to water quality in the study area.

### Brown/ Edible Crabs (C. pagurus)

1.12.8 Cancer pagurus, commonly known as the brown or edible crab, is broadly distributed along all British coasts. The species inhabits a broad range of habitats from intertidal areas to depths of 100 m including rocky substrates, coarse sediments, boulders and sandy or muddy seabed habitats [52]. In the English Channel brown crab mate during late spring. Eggs are brooded for 7 to 9 months, during this period females are inactive and do not feed, remaining in sheltered habitat for protection. Hunter et al., (2013) [50] attached tags to 128 mature female crabs across different locations in the English Channel. They found westerly offshore crabs commenced brooding in late October whilst eastern Channel crabs tended to start brooding slightly later in mid to late November. Larvae hatch from March onwards with peak sightings recorded in the plankton between May and July. The larvae are planktonic for 60-90 days before settling on hard substrates in the intertidal zone. Juveniles remain in shallow, rocky habitat for 3 years until they reach a carapace width of 60-70 mm, at which point they migrate to subtidal areas. Brown crab populations can be susceptible to modifications in water quality, due to limited mobility, meaning they can’t readily flee from habitats that become temporarily unsuitable, high dependency on water temperature cues to induce mating, low recruitment to the fishery and specific habitat requirements as adult individuals.

### Scallops (Pectinidae spp)

1.12.9 Scallops are a filter-feeding bivalve species which inhabit fine sand and gravel habitats from the sublittoral zone up to depths of 100m. As sessile filter feeders, they sift plankton and organic detritus from the water column [56]. Adults are hermaphroditic and begin to spawn into the water column from around 3 years old. The larvae stay in the water column until they have metamorphosed into spat which then attach for a short period to material such as seaweeds, then detaching and moving to their preferred habitat. Due to the sessile nature of these filter feeding species, they have the potential to be affected by any modifications to water quality as a result of the intended discharge from LOS. This can be further exacerbated by habitat modifications from increased nutrient loading, with changes to species assemblage leading to increased competition for the availability of space and resources, with the potential for smothering by algal/floral species and eutrophication effects if the natural balance of the ecosystem changes. These species bio-accumulate; therefore, any impacts may not be immediately visible but can accumulate over time.

### Cuttlefish (S. officinalis) and Squid (L. vulgaris)

1.12.10 Both cuttlefish and squid, along with nautilus and octopus, make up the group known as cephalopods. All species in this group have tentacles attached to their head. Foraging and life cycle traits are broadly similar across the group due to alignments in their anatomy and reproductive capacity. Cuttlefish and squid are demersal species, typically inhabiting moderately warm, shallow coastal waters with sand and mud substrates in the shallow sublittoral up to depths of 200m [56]. Adults are highly mobile and can flee from environments where water modifications have made the area temporarily unsuitable, however juveniles are dependent on shallow inshore nurseries before moving offshore once they have matured. This time period is critical for the species and may be influenced by modifications to water quality in the study area.

### Plaice (P. platessa)

1.12.11 Pleuronectes platessa, commonly known as plaice, are a bottom dwelling species found most abundantly on sandy bottoms, but it can also occupy mud and gravel substrates to depths of up to 200m. Plaice spawn offshore throughout the central English Channel at depths ranging from 38 m to 67 m between late November and March [51]. After spawning the eggs initially float on the surface before sinking and hatching in 10 to 12 days depending on temperature. The pelagic larvae drift on tidal currents until they are ready to undergo metamorphosis. After metamorphosis the post larvae resemble miniature plaice and settle on sandy, shallow, inshore nursery grounds. Juveniles remain in shallow nurseries for the first few years of their live before moving to deeper water once they are around 25 cm in length [51]. Adult plaice are highly mobile and can flee from environments where water modifications have made the area temporarily unsuitable, however pelagic larvae, and juveniles are dependent on shallow, sandy inshore nurseries. This time period is critical for the species and may be influenced by modifications to water quality in the study area.

### Horse Mackerel (T. trachurus)

1.12.12 Horse mackerel is a pelagic coastal species that inhabits continental shelves and over sandy substrates at depths of up to 200m and is widely distributed throughout the English Channel [58]. It is a migratory species, moving northwards in the summer months and returning southwards when the sea temperature starts to fall. In the northeast Atlantic two stocks are recognised, the western stock spawns in a wide area from Ireland to the Bay of Biscay in the early Spring and moves northward to the southern coasts of Norway and the northern North Sea in the summer. The North Sea stock spawns in the southern part of the North Sea during the summer and then migrates northwards into the central North Sea. Spawning occurs irregularly during the summer from June to August reaching its peak in July. Due to the preferred pelagic environment of Horse Mackerel, it is unlikely that modifications to water quality in the study area will affect the species at any of its life stages as there is limited dependency on inshore nursery areas at the larval/juvenile stage. Adults are highly mobile and can flee from environments where water modifications have made the area temporarily unsuitable.

### Lesser Spotted Dog (S. canicula)

1.12.13 Scyliorhinus canicular, commonly known as the lesser spotted dogfish are widely distributed across the Eastern North Atlantic and around the British Isles, and the dominant shark species within the English Channel. Lesser spotted dogfish are bottom-living sharks that occur in depths of up to 400 m but are usually found no deeper than 100 m on sandy, gravelly or muddy seabed habitats. The lesser spotted dogfish is an oviparous (egg laying) species and fertilisation takes place internally. Reproduction occurs year-round. Egg cases are laid in pairs and attached to fixed structures on the seabed such as kelp holdfasts and sessile organisms. Females can lay eggs throughout the year, but peak activity occurs between May and July. Few eggs are laid between August and October. Juveniles remain in shallow water until they mature at which point, they move offshore to deeper water [51]. Adults are highly mobile and can flee from environments where water modifications have made the area temporarily unsuitable, however juveniles are dependent on shallow inshore nurseries before moving offshore once they have matured. This time period is critical for the species and may be influenced by modifications to water quality in the study area.

### Herring (C. harengus)

1.12.14 Clupea harengus, commonly known as herring are a pelagic fish, inhabiting northeast Atlantic waters up to depths of 400m. Herring spawning areas are limited by the need for a gravel substrate to which the eggs attach [56]. Depending on water temperature, larvae hatch on the seabed from 8 to 40 days after spawning and drift passively as plankton for the following 4 to 6 months. Young herring remain in nursery areas for 2 years, in shallow nutrient-rich water. The abundance of juveniles in the different nursery areas is dictated by annual variations in the strength and direction of the drift of the larvae and their variable mortality on route. After two years, they swim to deeper waters, spending daytime in deeper water and migrating to shallower waters at night. Although a pelagic species as adults, Herring depend on shallow nutrient-rich nursery water until maturing and heading offshore after 2 years. This time period is critical for the species and may be influenced by modifications to water quality in the study area.

### Red Mullet (M. surmuletus) and Mullet (M. cephalus)

1.12.15 Mullus surmuletus, commonly known as the red mullet is a demersal fish broadly distributed in the northeastern and central eastern Atlantic, occurring at depths up to 330m over mud, sand or gravel habitats. Breeding takes place in the spring and summer, with spawning occurring in April and May in the Adriatic Sea, at depths between 60 and 70 m. The larvae soon move to shallower depths and are pelagic as are the juveniles at first. At a length of about 5 cm the juveniles move to the coast and become demersal, often congregating in estuaries, and sometimes swimming a short distance upstream. Later they disperse to muddy, sandy or gravelly substrates becoming sexually mature at a length of 10 to 14 cm during their first year of life [60]. Adults are highly mobile and can flee from environments where water modifications have made the area temporarily unsuitable, however juveniles are dependent on shallow inshore nurseries before moving offshore once

they have matured. This time period is critical for the species and may be influenced by modifications to water quality in the study area.

### Mackerel (S. scombrus)

1.12.16 Scrombus scrombus, commonly known as Atlantic Mackerel are a fast-swimming pelagic species that are widely distributed around the British Isles usually at depths of less than 200m [57]. The species makes extensive migrations, and there are a variety of hydrographical features such as temperatures as well as the abundance and composition of zooplankton and other prey is likely to affect its distribution. By 3 years old, most mackerel are mature (at a length of approximately 28cm). Females shed their eggs in about twenty separate batches over the course of the spawning season. Mackerel are batch spawners; they spawn mainly in March to July; the eggs and larvae are pelagic. Due to the preferred pelagic environment of Mackerel, it is unlikely that modifications to water quality in the study area will affect the species at any of its life stages as there is no dependency on inshore nursery areas at the larval/juvenile stage. Adults are highly mobile and can flee from environments where water modifications have made the area temporarily unsuitable.

### Pouting (Bib) (T. luscus)

1.12.17 Trisopterus luscus, commonly known as pouting (bib) are widely distributed in inshore and coastal waters around the south coast of the British Isles, inhabiting rocky and sandy habitats up to depths of 300m. Pouting are scavengers which feed on the seabed. They forage for any food source they can find with marine worms, shellfish and dead fish all making up their diet. Due to their small size pouting are a source of prey for large species such as cod, bass and conger eels. The species moves inshore to depths of 50m or less to spawn in March to April having matured at 1-2 years old at lengths of 21-25cm [58]. Adults are highly mobile and can flee from environments where water modifications have made the area temporarily unsuitable, however adults are dependent on inshore waters to spawn. This time period is critical for the species and may be influenced by modifications to water quality in the study area.

### Tub Gurnards (C. lucerna)

1.12.18 Chelidonichthys lucerne, commonly known as tub gurnards are a bottom-dwelling coastal species of fish and are widely distributed in the Atlantic Ocean at depths of up to 100m. Tub gurnard are found throughout the UK, particularly in the south of the British Isles, in the English Channel. Gurnard move out into deeper water in the winter and generally come into shallower inshore waters in the warmer summer months. Spawning also takes place in the summer while the fish are in inshore waters. Gurnard will feed where there are offshore sandbanks or swim along sandy coastlines looking for gullies or features where sources of food have gathered. Gurnard will feed over mixed ground if food sources are present and can also be found in clean patches of ground among rocky ground. Adults are highly mobile and can flee from environments where water modifications have made the area temporarily unsuitable, however adults are dependent on inshore waters to spawn.

This time period is critical for the species and may be influenced by modifications to water quality in the study area.

### Whiting (M. merlangus)

1.12.19 Merlangius merlangus, commonly known as whiting are widely distributed throughout the northeast Atlantic, in particular in the southeast of England and in the English Channel. These fish live primarily in demersal habitats, or habitats along the seafloor. It is a bentho-pelagic species usually found at depths of 30-100m over a variety of substrates including mud, gravel, sand and rock. Whiting is a fast-growing species reaching around 12 inches, and sexual maturity, by their second year. They have a high fecundity compared to other gadoids but with relatively small eggs, females of 30 cm in length can produce up to 400,000 eggs during the spawning season. Spawning takes place at a depth of 20-150 m, the timing of which varies depending on location, and occurs from January-September around UK coasts. Whiting spawn in batches, eggs are pelagic and larvae form part of the plankton until they reach around 10cm in length. Juveniles spend around one year in shallow waters up to 30m deep before migrating to adult feeding grounds after their first year [53]. Adults are highly mobile and can flee from environments where water modifications have made the area temporarily unsuitable, however juveniles are dependent on shallow inshore nurseries before moving offshore once they have matured. This time period is critical for the species and may be influenced by modifications to water quality in the study area.

### Black Sea bream (S.cantharus)

1.12.20 Spondyliosoma cantharus, commonly known as black sea bream are widely distributed throughout the Northeast Atlantic, inhabiting rocky and sandy habitats and seagrass beds in depths of up to 300m and are most abundant along the south coast in UK waters. In 2019 black sea bream was designated as a feature of three MCZ in the Southern Inshore Fisheries and Conservation Authorities (IFCA) District: Poole Rocks, Southbourne Rough and Purbeck Coast [51]. Rising sea temperature as a result of climate change is thought to have had a positive on bream stocks in the English Channel as mean annual frequency of the species has increased in line with rising temperatures. In the English Channel adult black bream move inshore to spawn between April and July once water temperatures are between 12-14°C. Juveniles stay in the vicinity of their nest until they reach 7-8 cm in length before dispersing slightly but still remaining in shallow inshore waters for 2-3 years until they reach sexual maturity. Seagrass beds have been identified as key nursery areas for juvenile black bream. Once juveniles recruit into the adult stock they overwinter in deeper water (50-100 m) before migrating inshore in the spring to spawn [51]. As a designated species of three MCZs within close vicinity of the Project, and with consideration to the nature in which the species builds nests as opposed to egg laying in broad suitable substrate types, as seen with other species, black sea bream should be considered as highly sensitive to modifications in water quality within the study area during the spawning period.

# Appendix 15.1 Landfill capacity calculations

This appendix presents calculations to determine the future landfill capacity for hazardous, non-hazardous and inert waste, utilising data collated from the Environment Agency [49].

| | South East | | | | South West | |
|---|---|---|---|---|---|---|
| | Inert | | Non-hazardous | | Hazardous | |
| | Capacity | Annual change % | Capacity | Annual change % | Capacity | Annual change % |
| 2005 | 13,812 | - | 95,221 | - | 2,498 | - |
| 2006 | 15,026 | 8.79% | 79,962 | -16.02% | 2,487 | -0.45% |
| 2007 | 23,034 | 53.29% | 76,771 | -3.99% | 2,291 | -7.89% |
| 2008 | 28,378 | 23.20% | 77,297 | 0.69% | 4,169 | 82.01% |
| 2009 | 29,077 | 2.46% | 63,611 | -17.71% | 2,619 | -37.18% |
| 2010 | 29,228 | 0.52% | 72,041 | 13.25% | 2,249 | -14.13% |
| 2011 | 27,888 | -4.58% | 66,892 | -7.15% | 2,168 | -3.60% |
| 2012 | 22,200 | -20.40% | 62,019 | -7.28% | 2,481 | 14.44% |
| 2013 | 19,002 | -14.41% | 56,825 | -8.37% | 2,169 | -12.58% |
| 2014 | 21,097 | 11.03% | 53,374 | -6.07% | 1,905 | -12.17% |
| 2015 | 26,531 | 25.76% | 48,037 | -10.00% | 1,837 | -3.57% |
| 2016 | 29,795 | 12.30% | 46,624 | -2.94% | 1,748 | -4.84% |
| 2017 | 29,121 | -2.26% | 48,160 | 3.29% | 1,480 | -15.33% |
| 2018 | 29,068 | -0.18% | 43,834 | -8.98% | 1,692 | 14.32% |
| 2019 | 28,525 | -1.87% | 38,142 | -12.99% | 1,352 | -20.09% |
| 2020 | 27,174 | -4.74% | 35,753 | -6.26% | 1,310 | -3.11% |
| 2021 | 20,084 | -26.09% | 31740 | -11.22% | 1,239 | -5.42% |
| **Average** | | **3.93%** | | **-6.36%** | | **-1.85%** |

| | Trend Approach | baseline capacity year taken and the average change (for each region calculated separately) since 2005 applied to each year | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
| | | Historic baseline (tonnes) | Historic baseline (tonnes) | Historic baseline (tonnes) | Historic baseline (tonnes) | Historic baseline (tonnes) | Historic baseline (tonnes) | Historic baseline (tonnes) | Historic baseline (tonnes) | Historic baseline (tonnes) | Historic baseline (tonnes) | Historic baseline (tonnes) | Baseline Capacity (tonnes) | Capacity (tonnes) | Capacity (tonnes) | Capacity (tonnes) | Capacity (tonnes) | Capacity (tonnes) | Capacity (tonnes) | Capacity (tonnes) | Capacity (tonnes) | Capacity (tonnes) |
| South East | Inert | 43,842,000 | 41,832,000 | 33,300,000 | 28,503,000 | 31,645,500 | 39,796,500 | 44,692,500 | 43,681,500 | 43,602,000 | 42,787,500 | 40,761,000 | 30,126,000 | 31,309,012 | 32,538,479 | 33,816,225 | 35,144,148 | 36,524,216 | 37,958,478 | 39,449,061 | 40,998,178 | 42,608,127 |
| | Non-hazardous | 61,234,850 | 56,858,200 | 52,716,150 | 48,301,250 | 45,367,900 | 40,831,450 | 39,630,400 | 40,936,000 | 37,258,900 | 32,420,700 | 30,390,050 | 26,979,000 | 25,263,042 | 23,656,224 | 22,151,606 | 22,260,598 | 20,916,928 | 19,654,364 | 18,468,008 | 17,353,263 | 16,305,804 |
| South West | Hazardous | 2,249,000 | 2,168,000 | 2,481,000 | 2,169,000 | 1,905,000 | 1,837,000 | 1,748,000 | 1,480,000 | 1,692,000 | 1,352,000 | 1,310,000 | 1,239,000 | 1,216,086 | 1,193,595 | 1,171,520 | 1,149,854 | 1,128,588 | 1,107,716 | 1,087,230 | 1,067,122 | 1,047,387 |

# Appendix 18-1 Preliminary hydrogeological impact assessment

# 1 Introduction

1.1.1 This Preliminary Hydrogeological Impact Assessment (Preliminary HIA) has been prepared on behalf of the Applicant, for the Hampshire Water Transfer and Water Recycling Project (hereby referred to as the Proposed Development), which forms part of the Water for Life Hampshire Programme. This preliminary assessment of hydrogeological risks, based on desktop information, aims to:

- Identify key environmental constraints and opportunities to inform:
  - The next stages of the scheme development at the Environmental Impact Assessment (EIA) stage, and
  - The definition of environmental design principles and mitigation strategy.
- Identify the need for any additional work required to understand the environmental baseline for the purpose of the EIA.

1.1.2 This iteration of the HIA has been prepared to inform design development and stakeholder engagement, and also to support the EIA Scoping Report. The report comprises an initial desk study of the hydrogeological features within 1km of the Scoping Area, together with their importance and sensitivity to potential impacts from the Proposed Development.

1.1.3 The report is based on data already collated for the Proposed Development and, any additional desktop information that it has been possible to collate from publicly available data sources and stakeholders. These sources of data are described within this document.

1.1.4 The Preliminary HIA will be updated as the design is developed, through consultation with stakeholders and as additional site investigation outputs and monitoring data becomes available. Key assumptions at this stage are highlighted in 1.2.12 to 1.2.19.

1.1.5 The Proposed Development Scoping Area is shown in Figure 1.1 and 1.2 within Volume III. The study area is discussed in section 1.2.8.

## 1.2 Approach

### Guidance

1.2.1 There is no specific guidance in relation to assessing the impact of pipelines on the hydrogeological regime, therefore the hydrogeological assessment of the Proposed Development will be carried out in accordance with the Design Manual for Roads and Bridges (DMRB) LA 113 standard. DMRB is considered to be an appropriate methodology because it is designed for assessing the effects of linear schemes. It is also a well-utilised and tested methodology, familiar to statutory consultees.

1.2.2 In particular, DMRB LA 113 Appendix A – Groundwater Levels and Flows will be utilised which follows a stepped approach to assessment:

- Step 1 – Establish regional groundwater body status
- Step 2 – Develop a conceptual model for the study area

- Step 3 – Based on the developed conceptualisation, identify all potential features which are susceptible to groundwater impacts (both flow and level).

1.2.3 DMRB LA 113 Appendix B – Groundwater dependent terrestrial ecosystems (GWDTE) would be utilised for assessment of impacts on GWDTE, following a stepped approach:

- Step 1 – Identify potential linkages
- Step 2 – Assess GWDTE importance
- Step 3 – Assess potential impacts
- Step 4 – Establish risk to GWDTE
- Step 5 – Assessment outcomes and actions.

1.2.4 The methodology for groundwater assessment also incorporates Environment Agency (EA) guidance on hydrogeological impact appraisal for dewatering abstractions:

- Hydrogeological Impact Appraisal for Dewatering Abstractions, Report SC040020/SR1 [50] and
- Hydrogeological Impact Appraisal for Groundwater Abstractions, Report SC040020/SR2 [51].

### Scope of assessment

1.2.5 At this stage, the Preliminary HIA is to identify key environmental constraints and opportunities to inform the next stages of the proposed WRP and pipeline design development at the EIA stage, together with identifying the design principles and mitigation strategy.

1.2.6 The assessment also aims to analyse gaps in environmental data and inform further works.

1.2.7 As the Proposed Development design develops, the report will be updated to identify the hydrogeological impacts from the Proposed Development design and ensure appropriate control measures are in place to mitigate impacts. An updated assessment based on the developed design will be provided at both the Preliminary Environmental Information Report and Environmental Statement stages.

### Study area

1.2.8 The initial study area for this assessment includes groundwater features within a 1km buffer of the Scoping Area and is based on the ‘source-pathway-receptor’ pollutant linkage principle. This study area would be extended as appropriate where features or impacts are likely to be impacted at greater distance (e.g., karst features). The Havant Thicket Reservoir has not been included in the Preliminary HIA at this stage, as no intrusive construction works are proposed, and the impacts of the Havant Thicket Reservoir have been considered previously by others.

1.2.9 The study area is to be confirmed with stakeholders and would be reviewed as the assessment is undertaken and the design progresses to ensure sensitive receptors at risk of impact are appropriately captured.

## Data sources

1.2.10 This desk study is based on data and information gathered from the following data sources:

**Table 1-1: Data sources and date accessed/received**

| Data source | Date Received/ Last Accessed | Contents |
|---|---|---|
| British Geological Society (BGS) GeoIndex | 12th August 2022 | 1:50,000 Scale Geological Mapping<br>Historic Borehole Logs |
| Department for Environment, Food and Rural Affairs (Defra) Magic Map | 12th August 2022 | Source Protection Zones (SPZs)<br><br>Aquifer Designation Mapping<br><br>Groundwater Vulnerability Mapping<br><br>Statutory and non-statutory designated sites (Sites of Special Scientific Interest, Special Areas of Conservation, SPA and Ramsar sites) |
| EA Abstraction Licensing Strategies (CAMS process) Collection | 12th August 2022 | East Hampshire Abstraction Licensing Strategy (2019)<br>Test and Itchen Abstraction Licensing Strategy (2019) |
| EA Catchment Data Explorer | 2nd May 2023 | WFD water body status objectives and classification data (Cycle 3) |
| EA GWDTE Data | 12th August 2022 | Designated Groundwater Dependent Terrestrial Ecosystems (England Sites of Special Scientific Interest Only) |
| Portsmouth Water Request for Information | 2nd August 2022 | BGS Commissioned Report CR/19/046 'A review of the hydrogeology of the Bedhampton and Havant Springs Source Protection Zones' 2019<br><br>B.A. Hydro Solutions Report 'Portsmouth Water Head Office Redevelopment Hydrogeological Risk Assessment' Nov 2014 |
| Winchester City Council Request for Information | 15th July 2022 | Unlicensed abstractions within study area (abstractions <20m$^3$/d which do not require a license from the EA) |
| Eastleigh Borough Council | 16th November 2022 | Unlicensed abstractions within study area (abstractions <20m$^3$/d which do not require a license from the EA) |
| Havant Borough Council | 26th July 2022 | Havant Borough Council were contacted in regard to unlicensed abstractions (<20 m$^3$/day) within the area, but no data was available for the area. |
| East Hampshire District Council | 8th November 2022 | East Hampshire District Council were contacted in regard to unlicensed abstractions |

| Data source | Date Received/ Last Accessed | Contents |
|---|---|---|
| | | (<20 $m^3$/day) within the area, but no data was available for the area. |
| Fareham Borough Council | 22nd November 2022 | Fareham Council were contacted in regard to unlicensed abstractions (<20 $m^3$/day) within the area, but no data was available for the area. |
| Portsmouth City Council | 11th November 2022 | Portsmouth City Council were contacted in regard to unlicensed abstractions (<20 $m^3$/day) within the area, but no data was available for the area. |
| South Downs National Park Authority | 20th October 2022 | South Downs National Park Authority were contacted in regard to unlicensed abstractions (<20 $m^3$/day) within the area, but no data was available for the area. |
| Ordnance Survey | 12th August 2022 | Maps (including historical) showing location of springs etc. |
| MetOffice | 12th August 2022 | Climate Averages Data |
| EA | 8th June 2022 | EA Consented Discharges |
| EA | 30th August 2022 | Selected groundwater model reports and figures |
| EA | 31st January 2023 | EA Regulated Abstractions<br>Groundwater level data<br>Rainfall data |
| EA | 12th August 2022 | LIDAR Data [50] |

1.2.11 At this stage no site-specific investigation data is available, with several requests for information outstanding (outstanding requests for information noted in Table 1-2)

### Assumptions, gaps and limitations

1.2.12 The Preliminary HIA has been collated based on a range of publicly available data and information provided by stakeholders at the time of writing.

1.2.13 However, there is a level of uncertainty associated with their use in this iteration of the report. As an example, the geology along the route has been assumed to be as per the geological maps available from the BGS. Site Investigation works are proposed to inform the ground and groundwater conditions along the route which would need to be incorporated into the updated HIA to support the Environmental Statement.

1.2.14 Data requests have been submitted to several stakeholders for additional data within the area which may assist in conceptualisation of the hydrogeology. Other data has been identified as beneficial and would be requested as the Proposed Development design progresses. Data that has been requested or would be requested in the future is summarised in Table 1-2 below.1

**Table 1-2: Additional data requested/to be requested**

| Baseline Data | Data Requests |
|---|---|
| Portsmouth Water<br>- Any relevant hydrogeological reports or water feature surveys<br>- Abstraction Data (groundwater + surface water)<br>- Groundwater levels<br>- Groundwater chemistry<br>- Havant Thicket Reservoir Documents (Site Investigations etc) | Ongoing engagement with Portsmouth Water |
| Southern Water<br>- Any relevant hydrogeological reports or water feature surveys<br>- Surface water levels, flows and chemistry<br>- Groundwater levels<br>- Groundwater chemistry<br>- Any existing/historical site investigation reports | On-going document review and ground investigation |
| EA<br>- Regional groundwater modelling inc. conceptual and numerical modelling reports | Ongoing engagement |
| BGS<br>- Karst Database<br>- Groundwater Flooding Susceptibility | Karst database and groundwater flooding susceptibility information to be requested for Preliminary Environmental Information (PEI) Report.<br>Karst features within 10km of preferred corridor to be requested for PEI Report.<br>Groundwater flooding susceptibility information within the scoping boundary is to be requested for PEI Report. |

1.2.15 It is assumed that the requested data from stakeholders (documented in Table 1-2) would be made available for future revisions of the HIA and would be accurate. Any data collected would be used to refine the conceptual models in future revisions of the HIA document and would form part of ongoing dialogue with the EA and others.

1.2.16 It is assumed that there will be gaps in data where the information is not readily available, such as the location of springs or unlicensed abstractions (<20 $m^3$/day) which are not registered with local councils. The design and construction methodology will need to take this into consideration, with appropriate mitigation

[1] Note that some data within Table 1-1 has been received, but not utilised within this report (such as groundwater levels from the EA). The data will be incorporated into future revisions of the HIA).

measures available should additional receptors be encountered/identified during construction.

1.2.17 The assessments would include the information reasonably required to assess potential environmental effects. The assessments would represent a 'reasonable worst-case' and would be based on conservative inputs derived from available field or desk study data and published research literature relevant to the study area. It is acknowledged that uncertainty is inherent to the assessment of interaction between surface water and groundwater. Future ongoing monitoring would be undertaken to validate the design and assessment assumptions.

1.2.18 Due to the complexities of the hydrogeological regime in the study area, it is considered that the Proposed Development cannot be defined in a full scale three-dimensional numerical model sufficiently enough to accurately represent the processes occurring and how they may be affected by the Proposed Development. Analytical and two-dimensional conceptual models would be developed for key assessment areas to ascertain the impacts of the Proposed Development. The requirement for additional 3D modelling in key areas would be reviewed on the completion of initial 2D and analytical assessments.

1.2.19 The design of the Proposed Development and construction methodologies is currently being developed. At this stage of assessment, the following key assumptions are made in relation to the construction methodologies based on preliminary discussions with the design team:

- Any abstractions required for the works would be temporary in nature (e.g. construction dewatering), with no permanent groundwater control operations proposed or required.
- All trenchless pipeline sections would utilise methodologies which exclude groundwater (closed face tunnelling or horizontal directional drilling). Temporary groundwater control would only be required for associated drive and receptions shafts.

# 2 Baseline information

## 2.1 Regional understanding

### Designations and directives

*Catchment Abstraction Management Strategy*

2.1.1 The Proposed Development is located within two Catchment Abstraction Management Strategy (CAMS) areas (water resource management boundaries as defined by the EA). The CAMS areas are listed below and illustrated in Figure 18.9 within Volume III:

- Test and Itchen – Western end of the preferred pipeline corridor (west of Lower Upham) [53]
- East Hampshire – The remainder of the preferred pipeline corridor (from Havant to Lower Upham) [54]

2.1.2 The Test and Itchen CAMS covers the Test and Itchen catchments in Hampshire and covers an area in the order of 1,675 $km^2$. Large portions of the catchments are underlain by chalk which influences the flow regimes and drainage patterns. Many of the tributaries are bournes (intermittent streams flowing from springs) which only flow during high groundwater conditions.

2.1.3 For the groundwater units within the study area of the Proposed Development:

- The groundwater balance for the 'Itchen Chalk' has restricted water available (no new consumptive licenses would be granted);
- The groundwater balance for the 'Central Hants Bracklesham Group' has water available (new licenses would be considered on a case-by-case basis).
- (Note that the Central Hants Lambeth Group is not included within the CAMS)

2.1.4 The East Hampshire catchment covers an area in the order of 517 $km^2$ consisting of rolling chalk downlands to the north and a heavily urbanised coastal plain to the south. As with the Test and Itchen CAMS, the chalk plays an important role, being an important source of water for many of the streams and wetlands.

2.1.5 The CAMS identifies that for the groundwater units located within the study area of the Proposed Development:

- The groundwater balance for the 'East Hants Chalk' has restricted water available (no new consumptive licenses would be granted).
- The groundwater balance for the 'South East Hants Bracklesham Group' is illustrated as having water available (new licenses will be considered on a case-by-case basis). However, the CAMS notes that '*it is unlikely that there will be any potential for significant, reliable abstractions from these units. There is no specific policy for these aquifers. Decisions about an application will be made on a case-by-case basis'*.
- The 'East Hants Lambeth Group' and 'South Hants Lambeth Group' are illustrated as having restricted water available. However, the CAMS notes that '*it is unlikely that there will be any potential for significant, reliable abstractions*

*from these units. There is no specific policy for these aquifers. Decisions about an application will be made on a case-by-case basis*'.

### Water Framework Directive

2.1.6 The Proposed Development is located over a single River Basin District; the South East River Basin District.

2.1.7 The status and objectives of features are based on those set out in the 2022 River Basin Management Plan (RBMP).

2.1.8 The study area of the Proposed Development crosses seven groundwater bodies. A summary of the WFD groundwater bodies is presented in Table 2-1 and are shown in Figure 18.2 within Volume III.

2.1.9 The superficial deposits are not specifically designated as WFD groundwater bodies. However, it is anticipated that they are hydraulically connected to the relevant underlying designated WFD groundwater bodies.

Table 2-1: WFD groundwater bodies summary [51]

| | River Itchen Chalk | East Hants Chalk | Central Hants Bracklesham Group | South East Hants Bracklesham Group | Central Hants Lambeth Group | East Hants Lambeth Group | South Hants Lambeth Group |
|---|---|---|---|---|---|---|---|
| Groundwater Body ID | GB40701G505000 | GB40701G502700 | GB40702G500900 | GB40702G503000 | GB40702G503800 | GB40702G500800 | GB40702G503700 |
| River Basin District | South East | South East | South East | South East | South East | South East | South East |
| Current Overall Status | Poor | Poor | Good | Poor | Good | Good | Good |
| Current Quantitative | Poor | Poor | Good | Good | Good | Good | Good |
| Current Chemical Status | Poor | Poor | Good | Poor | Good | Good | Good |
| Quantitative Objective | Good | Good | Good | Good | Good | Good | Good |
| Chemical Objective | Good | Good | Good | Good | Good | Good | Good |
| Protected areas | Nitrate Directives, Drinking Water Protected Areas and Safeguard Zones | Nitrate Directives, Drinking Water Protected Areas and Safeguard Zones | Nitrate Directives and Drinking Water Protected Areas | Nitrate Directives and Drinking Water Protected Areas | Nitrate Directives and Drinking Water Protected Areas | Nitrate Directives and Drinking Water Protected Areas | Nitrate Directives and Drinking Water Protected Areas |

### Aquifer designations

2.1.10 Aquifers within the study area of the preferred pipeline corridor that have been classified by the EA are listed in the following paragraphs and are presented in Figure 18.3 and Figure 18.4 within Volume III.

2.1.11 The various chalk members of the White Chalk Subgroup are designated by the EA as a Principal aquifer. No superficial deposits are designated as principal aquifers. Principal aquifers have high permeability, meaning they usually provide a high level of water storage and transmission, supporting water supply and river base flow on a strategic scale.

2.1.12 The Lambeth Group, Bracklesham Group and sand members of the London Clay (e.g., Durley Member and Bognor Member) together with the River Terrace Deposits and Alluvium superficial deposits are designated by the EA as Secondary A aquifers. This designation indicates that the aquifers are 'permeable layers that can support local water supplies and may form an important source of base flow to rivers'.

2.1.13 No bedrock or superficial deposits are designated by the EA as a Secondary B aquifer. This designation indicates that 'aquifers are mainly lower permeability layers that may store and yield limited amounts of groundwater through characteristics like thin cracks (called fissures) and openings or eroded layers'.

2.1.14 No bedrock is designated as a Secondary undifferentiated aquifer, however, Raised Marine Deposits, Beach and Tidal Flats and Head superficial deposits are designated as Secondary undifferentiated. This designation indicates that 'it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These have only a minor value'.

### Geology

#### *Superficial deposits*

2.1.15 The superficial geology underlying the Proposed Development is presented in Figure 11.3 within Volume III.

2.1.16 Superficial deposits are located intermittently along the preferred pipeline corridor, and comprise of:

- Alluvium
  - Holocene Epoch (0.01Ma – Present). Alluvium is a general term for clay, silt, sand, and gravel. It is the unconsolidated detrital material deposited by a river, stream, or other body of running water as a sorted or semi-sorted sediment in the bed of the stream or on its floodplain or delta, or as a cone or fan at the base of a mountain slope. Synonym: alluvial deposits. Normally soft to firm consolidated, compressible silty clay, but can contain layers of silt, sand, peat, and basal gravel. A stronger, desiccated surface zone may be present.
- River Terrace Deposits

- Quaternary Period (2.59Ma – Present). Sands and gravels, locally with lenses of silt, clay or peat.

- Head Deposits
  - Holocene Epoch (0.01Ma – Recent). Head is poorly sorted and poorly stratified, angular rock debris and/or clayey hillwash and soil creep, mantling a hillslope and deposited by solifluction and gelifluction processes. Solifluction is the slow viscous downslope flow of waterlogged soil and other unsorted and unsaturated superficial deposits. The term gelifluction is restricted to the slow flow of fluidized superficial deposits during the thawing of seasonally frozen ground. The flow is initiated by meltwater from thawing ice lenses. Polymict deposit: comprises gravel, sand and clay depending on upslope source and distance from source. Locally with lenses of silt, clay or peat and organic material.
- Raised Marine Deposits
  - Holocene Epoch (0.01Ma – Recent). Raised marine and coastal zone deposits are isostatically uplifted marine and coastal zone deposits which crop out in part above high-water mark. Variable lithology. Gravel (shingle), sand, silt and clay; commonly charged with organic debris (plant and shell).
- Beach and Tidal Flat Deposits
  - Quaternary Period (2.59Ma – Recent). Composite of 'Beach deposits': Shingle, sand, silt, and clay; may be bedded or chaotic; beach deposits may be in the form of dunes, sheets, or banks, and 'Tidal Flat Deposits': commonly silt and clay with sand and gravel layers; possible peat layers; from the tidal zone.
- Clay with Flints
  - Palaeogene Period to Pleistocene Epoch (66.0 – 0.012Ma). A residual deposit formed from the dissolution, decalcification, and cryoturbation of bedrock strata of the Chalk Group and Palaeogene formations and, in the extreme west of the outcrop, the Upper Greensand Formation. It is unbedded and heterogenous. The dominant lithology is orange-brown and red-brown sandy clay with abundant nodules and rounded pebbles of flint. Angular flints are derived from the Chalk, and rounded flints, sand, and clay from Palaeogene formations. There is commonly a discontinuous basal layer up to 10 cm thick, with dark brown to black matrix, stiff, waxy, and fissured, with relatively fresh flint nodules stained black or dark green with manganese or glauconite. The deposit locally includes bodies of yellow fine- to medium- grained sand, reddish brown clayey silt, and sandy clay with beds of well-rounded flint pebbles, derived from Palaeogene formations.

2.1.17 Alluvium and River Terrace Deposits are mapped along the preferred pipeline corridor, primarily in association with surface water bodies and flood zones and are crossed by the Proposed Development in several locations.

2.1.18 Head Deposits are also mapped along the preferred pipeline corridor, primarily corresponding to topographic lows at the base of hills and within valleys and would be crossed by the Proposed Development in several locations.

2.1.19 Raised Marine Deposits and Beach and Tidal Flat Deposits are mapped extensively to the south of the preferred pipeline corridor in association with the

coastline, although are only anticipated to be encountered at surface in the area of the proposed WRP and Budds Farm WTW.

2.1.20 Clay with Flints are primarily mapped north-west of the preferred pipeline corridor within the southern extent of the Chalk Downs. The deposits are only mapped at the north-western extreme of the study area (north-west of Otterbourne).

*Bedrock*

2.1.21 The bedrock geology underlying the Proposed Development is presented in Figure 11.2 within Volume III.

2.1.22 The Proposed Development is underlain by four main bedrock geological groups, from youngest to oldest:

- Bracklesham Group
  - Ypresian to Lutetian age (56.0 – 41.2Ma). The Bracklesham Group comprises interbedded and interlaminated clays, silts and mostly fine or medium grained sands. Minor coarse grained sands, gravelly sands, gravels, sandstones or ironstone concretions occur in places.
- Thames Group
  - Ypresian Age (56.0Ma - 47.8Ma) mainly silty clays and clays, with occasional silts, sands, gravels, and calcareous mudstones. Includes the London Clay Formation.
- Lambeth Group
  - Thanetian to Ypresian Age (59.2 – 47.8Ma) variable sequences mainly of clay with some sands and gravels, minor limestones and lignites and occasional conglomerates and sandstones. Variable depositional environments including fluvial, estuarine, lagoonal and near-shore marine.
- White Chalk Subgroup
  - Late Cretaceous (100.5 - 66.0Ma) Chalk with discrete marl seams, nodular chalk, sponge-rich and flint seams throughout.

2.1.23 The Bracklesham Group is anticipated to underlie various sections of the Proposed Underground Pipeline between the proposed WRP and Otterbourne WSW.

2.1.24 The Thames Group is anticipated to underlie sections of the Proposed Underground Pipeline between the proposed WRP and Otterbourne WSW and the Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir.

2.1.25 The Lambeth Group is anticipated to sections of the Proposed Underground Pipeline between the proposed WRP and Otterbourne WSW and the Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir.

2.1.26 The White Chalk Subgroup is found to the north-east of the preferred pipeline corridor in the chalk hills of the South Downs and may be encountered below the superficials at the north-western end of the study area (north-west of Otterbourne). The Portsdown anticline also leads to the chalk subgroup being observed directly below the superficials in the area north of Portsmouth (e.g., Portsdown hill) and may be encountered below the superficials along south-eastern sections of the

Proposed Underground Pipeline between the proposed WRP and Otterbourne WSW, as well as the proposed WRP and connecting underground pipelines. Chalk in the Hampshire area is commonly 80-150m thick but can be as thick as 400m where uneroded and confined by Palaeogene deposits.

*Structural geology*

2.1.27 During the Cenozoic, the region was impacted by direct south to north compression related to the alpine mountain building event in southern Europe. In general, the exposed uplands of chalk to the north are broadly anticlinal in structure, whilst thicker deposits of Paleogene sands, silts and clays are encountered in the Hampshire basin where the chalk forms a syncline.

2.1.28 In the study area, the main geological structures include the Winchester anticline in the South Downs where chalk exposures are encountered, the Chichester syncline where Paleogene deposits are encountered between the two chalk outcrops (e.g., from Horndean to Bedhampton and Havant), the Portsdown anticline to the north of Portsmouth (e.g. the Portsdown Hill chalk ridge) and the Hampshire basin in the south [56].

## Hydrogeology

*Superficial deposits*

2.1.29 Flow through the superficial deposit aquifers is dominated by intergranular flow where the permeability will support it. Groundwater flow through the superficial deposits will be locally variable and limited to more permeable zones.

2.1.30 Superficial deposit aquifers are generally anticipated to be unconfined; however, heterogeneity of deposits means localised confinement of water bearing, coarse grained units is likely.

2.1.31 Alluvium and River Terrace Deposits are present across the Proposed Development, associated with main surface watercourses, and are likely to comprise a mixture of clays, silts, sands, and gravels. Deposits can be complex with interdigitations of deposits which may develop separate piezometric levels, although they are generally anticipated to be permeable. Due to their permeability, the deposits are anticipated to be in continuity with associated surface watercourses and features and the chalk bedrock where they directly overlie. River Terrace Deposits generally comprise less fines than Alluvium and thus will generally be more permeable.

2.1.32 Head, Raised Marine Deposits and Beach and Tidal Flat Deposits are likely to more variable and heterogenous (which results in their Secondary Undifferentiated designation) although high permeability beds may be encountered. Deposits will be complex with interdigitations of deposits which may develop separate piezometric levels.

2.1.33 The Clay with Flints deposits are anticipated to generally have a low permeability with limited water bearing potential.

*Bedrock*

2.1.34 The chalk bedrock is of hydrogeological significance, providing an important source of supply to public water supply abstractions and surface water features (including environmentally significant chalk streams).

2.1.35 Chalk is generally referred to as a dual porosity aquifer, where main storage of water occurs in the low-transmissivity porous matrix, whilst flow and transport occur primarily in a pervasive high-transmissivity fractures (or solution features) network.

2.1.36 Regional groundwater flow within the chalk bedrock is generally southerly from the elevated chalk hills of the South Downs in the north towards the shallow Langstone Harbour and Solent in the south. The hydraulic heads from the groundwater source in the north result in groundwater flowing beneath the Palaeogene deposits of the Chichester syncline and emerging as springs to the south of the Chichester syncline, as discussed in further detail in the Karst section (section 842.1.45).

2.1.37 The hydrogeology of the Portsdown anticline is less studied but is becoming better understood. Groundwater is considered to generally flow radially from the anticline supplying springs along the north coast of Portsmouth Harbour and springs feeding the River Wallington [57].

2.1.38 Transmissivity and storage coefficient data from the Hampshire area indicates [56]:

- Transmissivities ranging from 0.55 to 29,000 m2/d
- A geometric mean transmissivity of 1,600 m2/d and median transmissivity of 2,600 m2/d
- 25 and 75 percentiles of the transmissivity data of 840 m2/d and 6,100m2/d respectively, and
- Storage coefficients ranging from 7x10-5 to 0.06 with a geometric mean of 0.008 and median of 0.009.

2.1.39 It should be noted that these measurements may trend towards higher values because of the intensity of testing undertaken in high yielding sites used for river augmentation schemes.

2.1.40 Investigations in the region also illustrated variability of aquifer properties with depth, with studies indicating the majority of flow is within the top 40-50m corresponding with fracture locations with flow generally significantly less below this depth.

2.1.41 The weathered chalk may locally play an important role on the hydrogeology and continuity between the chalk and overlying aquifers and receptors. Where weathered, it is common for the chalk to be weathered to a form of chalk clay known as ‘Putty Chalk’ which can act as an aquitard. Elsewhere, harder chalk deposits may be weathered to a chalk gravel known as ‘Chalk Bearings’ which can be highly transmissive.

2.1.42 The Lambeth Group comprises a mixture of clays, silts and sands. In some areas of the Hampshire basin, the formation is predominantly clay and unproductive for water supply. Other areas, consist of sandy strata which can yield flows in the order of 100 m3/d. Where sandy basal layers within the group are present, they can be

important in relation to the underlying chalk as they are thought to lead to enhanced development of dolines (also known as sinkholes) and other solution features [58].

2.1.43 The London Clay Formation of the Thames Group is generally of little significance as an aquifer due to its clayey natures. However, a number of lenticular beds of fine to medium grained sands are present which may constitute useful aquifers including the Bognor and Whitecliff sand members. Yields of 500m3/d have been observed from the Whitecliff Sand, although other areas have been significantly less productive [58].

2.1.44 Lateral and vertical heterogeneity in the sand and clay content of the Bracklesham Group have a corresponding effect on aquifer properties. Where sandy beds are developed, reasonable yields may be experienced from wells, although the water may be ferruginous [58].

### *Karst*

2.1.45 Chalk is an unusual karst aquifer in that cave development can be limited, but extensive networks of smaller solutional conduits and fissures that enable rapid groundwater flow are present.

2.1.46 Dolines, stream sinks, dissolution pipes and springs are common in chalk bedrock with the Bedhampton and Havant spring complex in Hampshire (within our study area) being one of the best examples of karstic springs in the UK, producing a combined flow rate in the order of 600 – 2,000 l/s (Allen and Crane, 2019).

2.1.47 Up to 45 stream sinks have been mapped to the north of the study area in the Horndean and Rowlands Castle areas. These are found in the area close to the boundary between the chalk and Palaeogene formations and are critical point sources of recharge for the aquifer, as there are no permanent streams in the area. The water that enters the stream sinks is considered to flow through the chalk beneath the Chichester Syncline and then emerge in the Bedhampton and Havant spring complex to the south (circa 5-6km distance) (Matheson et al, 2019). Tracer testing undertaken in the 1970s indicated significant groundwater velocities in the order of 2-3 km/d and supported the presence of a well-developed conduit system linking the stream sinks north of the Chichester Syncline to the spring complex, with low attenuation and dilution.

2.1.48 Rapid flow has also been detected at Otterbourne (Allen et al, 1997). Rapid flow supports the presence of karst features, which has implications for pollution and groundwater quality risks (such as turbidity).

### *Rainfall and recharge*

2.1.49 Average rainfall at a number of the closest climate stations to the study area are summarised in Table 2-2 below.

Table 2-2: Average rainfall at proximal climate stations

| | Average Rainfall (mm) [Climate Period 1991-2020] | | |
|---|---|---|---|
| **Month** | **Thorney Island E: 476113 N: 102160** | **Solent MRSC E: 455902 N: 101126** | **Southampton W.C E: 442078 N: 111450** |
| January | 84.47 | 73.86 | 89.37 |
| February | 57.67 | 52.32 | 63.86 |
| March | 49.85 | 45.44 | 56.01 |
| April | 49.64 | 41.45 | 52.27 |
| May | 43.26 | 41.06 | 47.37 |
| June | 48.20 | 48.25 | 56.90 |
| July | 46.88 | 48.30 | 44.01 |
| August | 57.17 | 55.74 | 58.90 |
| September | 61.40 | 53.27 | 60.45 |
| October | 85.95 | 83.40 | 92.55 |
| November | 90.56 | 90.78 | 99.93 |
| December | 92.62 | 89.61 | 96.94 |
| Annual | 767.67 | 723.48 | 818.56 |

2.1.50 Recharge to groundwater is anticipated to be predominantly to the north in the South Downs where infiltration rates would be greater, and karst stream sinks are identified (particularly to the north of the Scoping Area in the east, above Havant Thicket Reservoir). The lower permeability deposits (e.g., London Clay and the Lambeth Group) and extensive urbanisation that underlies significant sections of the preferred pipeline corridor are anticipated to retard groundwater infiltration rates in these areas.

2.1.51 Due to the karstic nature of the chalk, rainfall in the South Downs is known to have an impact on the groundwater quality with turbidity a particular issue at the Havant Springs and Otterbourne following rainfall (implying rapid recharge or a connection with surface water) [56].

2.1.52 A number of more proximal EA monitoring stations are located within the study area which record climatic data, with precipitation data provided by the EA for these sites. This data would be incorporated into future iterations of the HIA.

## 2.2 Local understanding

2.2.1 A summary of the local conditions and receptors within the study area for each section of the Proposed Development are detailed below.

### Proposed Water Recycling Plant

2.2.2 The proposed WRP would be located in the vicinity of Budds Farm WTW and would have a peak output of approximately 60Ml/d. The proposed WRP uses advanced treatment techniques to turn highly treated wastewater that is usually pumped to the water environment into purified recycled water. The proposed HLPS

would be located at the site of the proposed WRP or along the underground pipeline between Havant Thicket Reservoir and Otterbourne WSW.

### *Topography*

2.2.3 The Water Recycling Plant site is located at an elevation in the order of 5 to 15 metres Above Ordnance Datum (m AOD).

2.2.4 The topography in the wider study area generally increases gently towards the north towards the Chalk Downs, and steeply to the north-west of the site, where the Portsdown Hill chalk ridge is located. Langstone Harbour is located to the south of the site (circa 200-300m) and has an elevation in the order of 2m AOD, which is submerged at high tide.

### *Designated sites*

2.2.5 A SPZ is located circa 350m north of the proposed WRP site associated with the chalk springs at Bedhampton which are used for potable water supply by Portsmouth Water. The area is an SPZ1 zone (inner zone) which indicates a zone where there is a 50-day travel time of pollutant to source. This SPZ1 zone is approximately 300m wide north to south, north of which is SPZ 1c – which refers to an area with a protective cover of low permeability sat above a unit of high permeability, which if mined or tunnelled into would be representative of SPZ1. In this case, London Clay provides much of the cover above chalk members.

2.2.6 Langstone Harbour circa 200 to 300m south of the site is an environmentally significant site and has a number of statutory environmental designations including:

- SSSI – ‘Langstone Harbour’ (also noted as a GWDTE)
- SPA – ‘Chichester and Langstone Harbour’
- Ramsar site – ‘Chichester and Langstone Harbours’
- SAC – ‘Solent Maritime’

2.2.7 Environmental designations within the study area are illustrated in Figure 8.1 within Volume III, with SPZ shown in Figure 18.5 within Volume III.

### *Surface watercourses*

2.2.8 The proposed WRP study area (proposed WRP site plus 1km buffer) includes three surface water catchment areas, as summarised in Table 2-3. The Langstone Harbour transitional water body is immediately adjacent to the proposed WRP site, whilst the Hermitage Stream and Lavant (Hants) catchments are at distance.

**Table 2-3: Surface water catchments in study area**

| | Langstone Harbour Transitional Water Body | Hermitage Stream | Lavant (Hants) Catchment |
|---|---|---|---|
| **Water Body ID** | **GB580705130000** | **GB107042016370** | **GB107042016420** |
| River Basin District | South East | South East | South East |

| | Langstone Harbour Transitional Water Body | Hermitage Stream | Lavant (Hants) Catchment |
|---|---|---|---|
| **Water Body ID** | **GB580705130000** | **GB107042016370** | **GB107042016420** |
| Hydromorphological Designation | Heavily Modified | Heavily Modified | Not designated artificial or heavily modified |
| Current Ecological | Moderate | Moderate | Poor |
| Current Chemical | Fail | Fail | Fail |
| Ecological Objective | Good | Good | Good |
| Chemical Objective | Good | Good | Good |
| Protected areas | Nitrate Directives, Habitats and Species Directives (SAC), Shellfish Water Directives, Conservation of Wild Birds Directives (SPA), Urban Waste Water Treatment Directive | Nitrate Directives, Shellfish Water Directive | Nitrate Directives, Shellfish Water Directive |

2.2.9 On the eastern side of the proposed WRP, the EA Main River 'Hermitage Stream' flows south towards the Langstone Harbour. The Hermitage is fed by a number of smaller watercourses in the area, including Brockhampton Stream, which are anticipated to be primarily groundwater fed by Chalk springs. At the eastern edge of the study area, the EA main river 'Lavant (Hants)' also flows south towards the Langstone Harbour. No surface watercourses are mapped in the western half of the study area.

2.2.10 Surface water catchments and main rivers are illustrated in Figure 18.1 within Volume III.

*Superficial deposits*

2.2.11 Table 2-4 details the superficial geology in the proposed WRP study area. The proposed WRP is located on landfill, which would be considered by the Land quality and ground conditions topic.

**Table 2-4: Superficial deposits within study area**

| Geology | Description | Location and prevalence | Mapped within study area |
|---|---|---|---|
| Head | Clay, Silt, Sand and Gravel | Mapped at distance to north of site (e.g. at base of Portsdown Hill) and north-east associated with surface watercourse valleys (e.g. Lavant river) | No |
| River Terrace Deposits (Undifferentiated) | Sand, Silt and Clay | Mapped north and east of the site. | Yes - Northern edge of site |

| Geology | Description | Location and prevalence | Mapped within study area |
|---|---|---|---|
| Alluvium | Clay, Silt, Sand and Gravel | To east of site, associated with Hermitage, and Lavant watercourses | No |
| Raised Marine Deposits | Sand and Gravel | Site mapped as being underlain by Raised Marine Deposits which extend to west of site along the coast. | Yes - Majority of site underlain by Raised Marine Deposits |
| Beach and Tidal Flat Deposits (Undifferentiated) | Clay, Silt, Sand and Gravel | Mapped to south of site associated with the sea (e.g. Langstone Harbour) | No |
| No superficial cover | | No superficials mapped to the north of the study area, where the topography increases (e.g. Portsdown Hill) | No |

### *Bedrock geology*

2.2.12 Table 2-5 details the bedrock geology in the proposed WRP study area.

**Table 2-5: Bedrock geology within study area**

| Geology | Description | Location and prevalence | Mapped within study area |
|---|---|---|---|
| Undifferentiated Chalk (Lewes Nodular, Seaford Chalk, Newhaven Chalk, Sulver Chalk and Portsdown Chalk Formations) | Chalk | Underlying circa three quarters of the study area included directly beneath the site | Yes |
| Newhaven Chalk Formation | Chalk | Mapped in north-west of study area | No |
| Tarrant Chalk Member | Chalk | Mapped in north-west of study area | No |
| Spetisbury Chalk Member | Chalk | Mapped in north-west of study area | No |
| Portsdown Chalk Formation | Chalk | Mapped in north-west of study area | No |
| Lambeth Group | Clay, Silt and Sand | Mapped in north of study area overlying the chalk | No |
| London Clay | Clay, Silt and Sand | Mapped in north of study area overlying the Lambeth Group | No |

*Groundwater-surface water interactions (springs, sinks, karst and GWDTE)*

2.2.13 The Bedhampton and Havant springs complex is one of the best examples of karst-fed Chalk springs in the UK, with a number of the springs being used for potable water supply as documented in the abstractions section below.

2.2.14 It is anticipated that additional springs are present within the area around Bedhampton and Havant. Springs and seepages are also likely to be present below and in the banks of local surface watercourses.

2.2.15 Springs in the area have not been mapped at the EIA Scoping stage, and no data on any sinks, karst features or GWDTE (non-designated GWDTE; designated GWDTE noted in Designated sites section) in the area has been ascertained at this time. Data would be collated for future revisions of the HIA.

*Groundwater levels*

2.2.16 At this time no site-specific groundwater levels have been collated and reviewed for the area. However, it is anticipated that groundwater levels in the Chalk bedrock would be shallow or flowing artesian, due to the presence of numerous springs in the area.

2.2.17 Due to the proximity to the sea, it is anticipated that groundwater levels at the site may be tidally influenced.

*Groundwater quality*

2.2.18 At this time no site-specific groundwater quality data has been ascertained for the area.

2.2.19 The groundwater within the Chalk is not anticipated to be saline, due to the dominant flow paths and heads from the north. Regionally the vast majority of unconfined groundwaters within the Wessex Basin Chalk are of the Calcium Bicarbonate (Ca-HCO3) type.

2.2.20 The proximity to the sea, means that shallow groundwater within the superficial deposits may be brackish or saline.

*Groundwater flooding*

2.2.21 Hampshire has a known history of groundwater flooding, with over 100 towns and villages across the County suffering significant flooding during the winter of 2000/2001.

2.2.22 Due to the significant groundwater flooding risk in the county, HCC has developed a groundwater management plan [59] to identify the areas at risk and put in place measures to mitigate risk. The plan identifies key settlements at risk including Hambledon, Rowlands Castle and Finchdean to the north (located at the southern boundary of the Chalk Downs, outside the proposed WRP study area). These areas at risk are monitored by the EA with flood risk alerts issued, as required.

2.2.23 The groundwater flooding risk in the proposed WRP study area has not been assessed in detail in this report.

*Abstractions*

2.2.24 Three licensed groundwater abstraction are located within the study area of the proposed WRP to the north east, as documented in Table 2-6 below.

**Table 2-6: Licensed groundwater abstractions**

| License Holder | License No. | Use | Point Name |
|---|---|---|---|
| Portsmouth Water | 11/42/36.2/1 | Public Water Supply | Bedhampton PS Spring No 1 |
| Portsmouth Water | 11/42/36.2/1 | Public Water Supply | Bedhampton PS Spring No 2 |
| Portsmouth Water | 11/42/36.2/1 | Public Water Supply | Havant PS |

2.2.25 HBC were contacted in regard to unlicensed abstractions (<20 m3/day) within the area, but no data was available for the area.

2.2.26 Abstractions within the study area are illustrated in Figure 18.5 within Volume III.

*Discharges*

2.2.27 Five consented (by the Environment Agency) discharges are located within the study area of the proposed WRP to the east, as documented in Table 2-7.

**Table 2-7: Consented discharges**

| Consent Holder | Permit No. | Discharge Type | Discharge Site Name | Receiving Water |
|---|---|---|---|---|
| De La Rue Systems | P00174 | Undefined or Other | High Technology Campus | Freshwater River |
| Southern Water Services Ltd | A00752 | WTW | Budds Farm Havant CSO | Brockhampton Creek |
| North Shore Yacht Yards Ltd | N01265 | Undefined or Other | Boshampton Lane | Saline Estuary |
| Southern Water Services Ltd | A00751 | WTW | Budds Farm WTW | The Solent/Langstone Harbour |
| Scottish and Southern Energy PLC | P05514 | Undefined or Other | Land East of Southmoor Lane | Unnamed Tributary of Lavant Stream |

2.2.28 Discharges within the study area are illustrated in Figure 18.5 within Volume III.

### Proposed Underground Pipeline between Budds Farm Water Treatment Works and the proposed Water Recycling Plant

2.2.29 A Proposed Underground Pipeline from the proposed WRP to the existing Budds Farm WTW that crosses below the Hermitage, together with the Budds Farm WTW site

### *Topography*

2.2.30 To the west of the Hermitage, the topography ranges from 5-9m OD. On the east of the Hermitage, the topography ranges from 4-7mOD. The topography/bathymetry at the location of the Hermitage is unknown from LiDAR data alone, but is expected to be close to 0mOD, due to the proximity to the sea.

### *Designated sites*

2.2.31 A SPZ is located circa 550m north of the north-western end of the underground pipeline and is associated with the chalk springs at Bedhampton which are used for potable water supply by Portsmouth Water. The area is an SPZ1 zone (inner zone) which indicates a zone where there is a 50-day travel time of pollutant to source. This SPZ1 zone is approximately 300m wide north to south, north of which is SPZ 1c – which refers to an area with a protective cover of low permeability sat above a unit of high permeability, which if mined or tunnelled into would be representative of SPZ1. In this case, London Clay provides much of the cover above Chalk members.

2.2.32 Langstone Harbour is immediately adjacent to the southern half of the Scoping Area, and is an environmentally significant site with a number of statutory environmental designations including:

- SSSI – 'Langstone Harbour' (also noted as a GWDTE)
- SPA – 'Chichester and Langstone Harbour'
- Ramsar site – 'Chichester and Langstone Harbours'
- SAC – 'Solent Maritime'

2.2.33 The Scoping Area partly encroaches onto the Langstone Harbour designated site in the south-west.

2.2.34 Environmental designations along the preferred pipeline corridor are illustrated in Figure 8.1 within Volume III, with SPZ shown in Figure 18.5 within Volume III.

### *Surface watercourses*

2.2.35 The Proposed Underground Pipeline between Budds Farm WTW and the proposed WRP study area includes three surface water catchment areas, as summarised in Table 2-8 below. The underground pipeline passes through the Langstone Harbour transitional water body and at other points is immediately adjacent to the underground pipeline study area, whilst the Hermitage Stream and Lavant (Hants) catchments are at distance (0.7 km and 0.8 km at closest to the underground pipeline respectively).

**Table 2-8: Surface water catchments in study area**

| | **Langstone Harbour Transitional Water Body** | **Hermitage Stream** | **Lavant (Hants) Catchment** |
|---|---|---|---|
| **Water Body ID** | **GB580705130000** | **GB107042016370** | **GB107042016420** |
| River Basin District | South East | South East | South East |

| | Langstone Harbour Transitional Water Body | Hermitage Stream | Lavant (Hants) Catchment |
|---|---|---|---|
| **Water Body ID** | **GB580705130000** | **GB107042016370** | **GB107042016420** |
| Hydromorphological Designation | Heavily Modified | Heavily Modified | Not designated artificial or heavily modified |
| Current Ecological | Moderate | Moderate | Poor |
| Current Chemical | Fail | Fail | Fail |
| Ecological Objective | Good | Good | Good |
| Chemical Objective | Good | Good | Good |
| Protected areas | Nitrate Directives, Habitats and Species Directives (SAC), Shellfish Water Directives, Conservation of Wild Birds Directives (SPA), Urban Waste Water Treatment Directive | Nitrate Directives, Shellfish Water Directive | Nitrate Directives, Shellfish Water Directive |

2.2.36 Passing across the underground pipeline study area is the EA main river 'Hermitage Stream' which flows south towards the Langstone Harbour. The Hermitage is fed by a number of smaller watercourses in the area, including Brockhampton Stream, which are anticipated to be primarily groundwater fed by Chalk springs. At the eastern part of the study area, the EA main river 'Lavant (Hants)' also flows south towards the Langstone Harbour. No surface watercourses are mapped in the western part of the study area.

2.2.37 Surface water catchments and main rivers are illustrated in Figure 18.1 within Volume III.

*Superficial deposits*

2.2.38 The route of the proposed WRP to Budds Farm WTW underground pipeline (from the ground in the north-west to the south-east) is underlain by Raised Marine Deposits, Beach and Tidal Flat Deposits and Alluvium. Table 2-9 details the superficial geology in the underground pipeline study area.

**Table 2-9: Superficial deposits in study area**

| Geology | Description | Location and prevalence | Mapped within Corridor |
|---|---|---|---|
| Head | Clay, Silt, Sand and Gravel | Thin band in the north of the study area, smaller strips in the east of the study area adjacent to Alluvium | No |
| River Terrace Deposits (Undifferentiated) | Sand, Silt and Clay | Half of the north of the study area underlain by RTD when not underlain by Alluvium or Head | No |

| Geology | Description | Location and prevalence | Mapped within Corridor |
|---|---|---|---|
| Alluvium | Clay, Silt, Sand and Gravel | Adjacent to the surface watercourses in the north and east of the study area. | Yes – South-eastern end of underground pipeline route |
| Raised Marine Deposits | Sand and Gravel | Narrow strip in the west of the study area and a smaller area in the south-east of the study area | Yes –North-western end of underground pipeline route |
| Beach and Tidal Flat Deposits (Undifferentiated) | Clay, Silt, Sand and Gravel | Majority of southern half of study area | Yes – Where the underground pipeline crosses the Hermitage |
| No superficial cover | | Small area on northern edge of study area | No |

### *Bedrock geology*

2.2.39 The proposed WRP to Budds Farm WTW underground pipeline is mapped as being underlain by Undifferentiated Chalk (Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation). The northern edge of the underground pipeline study area is underlain with narrow bands of four Chalk formations: Newhaven Chalk Formation, Tarrant Chalk Member, Spetisbury Chalk Member and Portsdown Chalk Formation, in addition to a narrow band of Lambeth Group – Clay, Silt and Sand, and a small area of London Clay Formation – Clay, Silt and Sand. Table 2-10 details the bedrock geology in the underground pipeline study area.

**Table 2-10: Bedrock geology in study area**

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| Undifferentiated Chalk (Lewes Nodular, Seaford Chalk, Newhaven Chalk, Culver Chalk and Portsdown Chalk Formations) | Chalk | Underlying circa three quarters of the study area included directly beneath the site | Yes |
| Newhaven Chalk Formation | Chalk | Mapped in north-west of study area | No |
| Tarrant Chalk Member | Chalk | Mapped in north-west of study area | No |
| Spetisbury Chalk Member | Chalk | Mapped in north-west of study area | No |
| Portsdown Chalk Formation | Chalk | Mapped in north-west of study area | No |
| Lambeth Group | Clay, Silt and Sand | Mapped in north of study area overlying the Chalk | No |

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| London Clay | Clay, Silt and Sand | Mapped in north of study area overlying the Lambeth Group | No |

*Groundwater-surface water interactions (springs, sinks, karst and GWDTE)*

2.2.40 The Bedhampton and Havant springs complex is one of the best examples of karst-fed chalk springs in the UK, with a number of the springs being used for potable water supply as documented in the abstractions section below.

2.2.41 It is anticipated that additional springs are present within the area around Bedhampton and Havant. Springs and seepages are likely to be present below and in the banks of local surface watercourses.

2.2.42 Springs in the area have not been mapped at scoping stage, and no data on any sinks, karst features or GWDTE (non-designated GWDTE; designated GWDTE noted in Designated sites section) in the area has been ascertained at this time. Data would be collated for future revisions of the HIA.

*Groundwater levels*

2.2.43 At this time no site-specific groundwater levels have been collated and reviewed for the area. However, it is anticipated that groundwater levels in the Chalk bedrock would be shallow due to the presence of numerous springs in the area.

2.2.44 Due to the proximity to the sea, it is anticipated that groundwater levels at the site may be tidally influenced.

*Groundwater quality*

2.2.45 At this time no site-specific groundwater quality data has been ascertained for the area.

2.2.46 The groundwater within the Chalk is not anticipated to be saline, due to the dominant flow paths and heads from the north. Regionally the vast majority of unconfined groundwaters within the Wessex Basin Chalk are of the Ca-HCO3 type.

2.2.47 The proximity to the sea, means that shallow groundwater within the superficial deposits may be brackish or saline.

*Groundwater flooding*

2.2.48 Hampshire has a known history of groundwater flooding, with over 100 towns and villages across the county suffering significant flooding during the winter of 2000/2001.

2.2.49 Due to the significant groundwater flooding risk in the county, HCC has developed a groundwater management plan to identify the areas at risk and put in place measures to mitigate risk. The plan identifies key settlements at risk including Hambledon, Rowlands Castle and Finchdean to the north (located at the southern

boundary of the Chalk Downs, outside the proposed WRP study area). These areas at risk are monitored by the EA with flood risk alerts issued, as required.

2.2.50 The groundwater flooding risk in the Budds Farm to proposed WRP study area has not been assessed at this time.

*Abstractions*

2.2.51 Three licensed groundwater abstraction are located within the study area of the Budds Farm to proposed WRP Underground pipeline to the north-east, as documented in Table 2-11 below.

**Table 2-11: Licensed groundwater abstractions**

| Licensee | License No. | Use | Point Name |
|---|---|---|---|
| Portsmouth Water | 11/42/36.2/1 | Public Water Supply | Bedhampton PS Spring No 1 |
| Portsmouth Water | 11/42/36.2/1 | Public Water Supply | Bedhampton PS Spring No 2 |
| Portsmouth Water | 11/42/36.2/1 | Public Water Supply | Havant PS |

2.2.52 HBC were contacted in regard to unlicensed abstractions (<20 m3/day) within the area, but no data was available for the area.

2.2.53 Abstractions within the study area are illustrated in Figure 18.5 within Volume III.

*Discharges*

2.2.54 Six consented discharges are located within the study area of the Budds Farm to proposed WRP underground pipeline to the east, as documented in Table 2-12 below.

**Table 2-12: Consented discharges**

| Consent Holder | Permit No. | Discharge Type | Discharge Site Name | Receiving Water |
|---|---|---|---|---|
| De La Rue Systems | P00174 | Undefined or Other | High Technology Campus | Freshwater River |
| Southern Water Services Ltd | A00752 | WTW | Budds Farm Havant CSO | Brockhampton Creek |
| North Shore Yacht Yards Ltd | N01265 | Undefined or Other | Boshampton Lane | Saline Estuary |
| Southern Water Services Ltd | A00751 | WTW | Budds Farm WTW | The Solent/Langstone Harbour |
| Scottish and | P05514 | Undefined or Other | Land East of Southmoor Lane | Unnamed Tributary of Lavant Stream |

| Consent Holder | Permit No. | Discharge Type | Discharge Site Name | Receiving Water |
|---|---|---|---|---|
| Southern Energy PLC | | | | |
| Fasset Limited | N01162 | Making of Computers/Electronics /Optical Products | Langstone Road | Freshwater River |

2.2.55 Discharges within the study area are illustrated in Figure 18.5 within Volume III.

### Proposed Underground Pipeline between the proposed Water Recycling Plant and Havant Thicket Reservoir

2.2.56 The underground pipeline between the proposed WRP and Havant Thicket Reservoir is anticipated to be constructed within a underground pipeline that runs northwards from the proposed WRP towards Havant Thicket Reservoir where the pipeline would ultimately terminate. The feasibility of having part of the pipeline above ground is also being assessed.

#### *Topography*

2.2.57 The topography from the south-western end of the underground pipeline (at the proposed WRP) falls from around 14mOD to around 4mOD. It then gradually rises up to around 20mOD before falling into the valley of a tributary of the Hermitage stream. It then follows along the eastern side of this valley, rising up at the north-eastern end towards Havant Thicket Reservoir.

#### *Designated sites*

2.2.58 The underground pipeline between the proposed WRP and Havant Thicket Reservoir is situated within a SPZ for all but the most southern 500m of the alignment. This SPZ is associated with the Chalk springs at Bedhampton which are used for potable water supply by Portsmouth Water. The most southern area is an SPZ1 zone (inner zone) which indicates a zone where there is a 50-day travel time of pollutant to source. This SPZ1 zone is approximately 300m wide north to south, north of which is SPZ 1c – which refers to an area with a protective cover of low permeability sat above a unit of high permeability, which if mined or tunnelled into would be representative of SPZ1. In this case, London Clay provides much of the cover above Chalk members.

2.2.59 Langstone Harbour circa 400m south of the southern end of the alignment and is an environmentally significant site and has a number of statutory environmental designations including:

- SSSI – ‘Langstone Harbour’ (also noted as a GWDTE)
- SPA – ‘Chichester and Langstone Harbour’
- Ramsar site – ‘Chichester and Langstone Harbours’
- SAC – ‘Solent Maritime’

2.2.60 Environmental designations along the preferred pipeline corridor are illustrated in Figure 8.1 within Volume III, with SPZ shown in Figure 18.5 within Volume III.

*Surface watercourses*

2.2.61 The underground pipeline between the proposed WRP and Havant Thicket Reservoir study area includes three surface water catchment areas, as summarised in Table 2-13 below. The underground pipeline passes through the Hermitage Stream water body catchment in the northern half of the alignment, whilst the Langstone Harbour Transitional Water Body and Lavant (Hants) catchments are at distance (circa 100m and 700m respectively at their closest).

**Table 2-13: Surface water catchments in study area**

| | Langstone Harbour Transitional Water Body | Hermitage Stream | Lavant (Hants) Catchment |
|---|---|---|---|
| Water Body ID | GB580705130000 | GB107042016370 | GB107042016420 |
| River Basin District | South East | South East | South East |
| Hydromorphological Designation | Heavily Modified | Heavily Modified | Not designated artificial or heavily modified |
| Current Ecological | Moderate | Moderate | Poor |
| Current Chemical | Fail | Fail | Fail |
| Ecological Objective | Good | Good | Good |
| Chemical Objective | Good | Good | Good |
| Protected areas | Nitrate Directives, Habitats and Species Directives (SAC), Shellfish Water Directives, Conservation of Wild Birds Directives (SPA), Urban Waste Water Treatment Directive | Nitrate Directives, Shellfish Water Directive | Nitrate Directives, Shellfish Water Directive |

2.2.62 Passing across the underground pipeline study area is the EA main river 'Hermitage Stream' which flows south towards the Langstone Harbour. The Hermitage is fed by a number of smaller watercourses in the area, including Brockhampton Stream, which are anticipated to be primarily groundwater fed by Chalk springs. The underground pipeline alignment crosses The Hermitage having been routed alongside one of its tributaries. At the eastern part of the study area, the EA main river 'Lavant (Hants)' also flows south towards the Langstone Harbour.

2.2.63 Surface water catchments and main rivers are illustrated in Figure 18.1 within Volume III.

### *Superficial deposits*

2.2.64 The route of the Proposed Underground Pipeline from south-west to north-east is underlain by Raised Marine Deposits, Beach, River Terrace Deposits and Alluvium in the south west, much of the mid-section of the study area is underlain by Head deposits, with a ~0.2km section of no superficial cover, the north-eastern end has no superficial cover whilst large parts of Havant Thicket Reservoir are also underlain by Head deposits. Table 2-14 details the superficial geology in the study area.

**Table 2-14: Superficial deposits in study area**

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| Head | Clay, Silt, Sand and Gravel | Much of the central part of study area (when viewing area as north to south) is underlain with Head deposits, with more sparse coverage in the north of the study area. Large parts of Havant Thicket Reservoir mapped as being underlain by Head. | Yes |
| River Terrace Deposits (Undifferentiated) | Sand, Silt and Clay | A band extending from the south-west of the study area to midway up the eastern side of the study area | Yes |
| Alluvium | Clay, Silt, Sand and Gravel | Adjacent to the surface watercourses in the south of the study area. | Yes |
| Raised Marine Deposits | Sand and Gravel | Narrow strip in the south of the study area | Yes |
| Beach and Tidal Flat Deposits (Undifferentiated) | Clay, Silt, Sand and Gravel | Covers all of the most southerly end of the study area | Study area only |
| No superficial cover | | Areas in south-west of study area, a small section directly on the underground pipeline corridor halfway along and much of the northern end of the study area | Yes |

### *Bedrock geology*

2.2.65 The study area is underlain from south-west to north-east by Undifferentiated Chalk (Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation) at its south-western end, then a narrow band of Lambeth Group, before a larger area of London Clay Formation (Clay Silt and Sand). A couple of more granular members of the London Clay are mapped along the preferred pipeline corridor: Bognor Sand Member and London Clay Formation (Sand). Most of the north-eastern end of the study area is underlain by the Bognor Sand Member before returning to London Clay at the extreme northern end of the underground pipeline corridor. Table 2-15 details the bedrock geology in the study area.

Table 2-15: Bedrock geology in study area

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| Undifferentiated Chalk (Lewes Nodular, Seaford Chalk, Newhaven Chalk, Culver Chalk and Portsdown Chalk Formations) | Chalk | Majority of south-western third of study area | Yes |
| Lambeth Group | Clay, Silt and Sand | Narrow band directly north of Lewes Nodular, Seaford Chalk, Newhaven Chalk, Culver Chalk and Portsdown Chalk Formations Chalk | Yes |
| London Clay Formation | Clay, Silt and Sand | Much of the central area and part of the north-easter end of the study area | Yes |
| London Clay Formation | Sand | Small area directly on the preferred pipeline corridor halfway along | Yes |
| Bognor Sand Member | Sand | Narrow band across study area a third of the way along the study area from the south-west heading north-east, and a larger area covering half of the north-eastern third of the study area | Yes |
| Newhaven Chalk Formation | Chalk | Narrow band on western edge of south-western end of study area | Study area only |
| Tarrant Chalk Member | Chalk | Narrow band on western edge of south-western end of study area | Study area only |
| Spetisbury Chalk Member | Chalk | Narrow band on western edge of south-western end of study area | Study area only |
| Portsdown Chalk Member | Chalk | Narrow band on western edge of south-western end of study area | Study area only |

*Groundwater-surface water interactions (springs, sinks, karst and GWDTE)*

2.2.66 The Bedhampton and Havant springs complex is one of the best examples of karst-fed Chalk springs in the UK, with a number of the springs being used for potable water supply as documented in the abstractions section below.

2.2.67 It is anticipated that additional springs are present within the area around Bedhampton and Havant. Springs and seepages are likely to be present below and in the banks of local surface watercourses.

2.2.68 Springs in the area have not been mapped at scoping stage, and no data on any sinks, karst features or GWDTE (non-designated GWDTE; designated GWDTE noted in Designated sites section) in the area has been ascertained at this time. Data would be collated for future revisions of the HIA.

### *Groundwater levels*

2.2.69 At this time, no site-specific groundwater levels have been collated and reviewed for the area. However, it is anticipated that groundwater levels in the Chalk bedrock in the south would be shallow due to the presence of numerous springs in the area.

2.2.70 Due to the proximity to the sea in the south, it is anticipated that groundwater levels in the south may be tidally influenced.

### *Groundwater quality*

2.2.71 At this time no site-specific groundwater quality data has been ascertained for the area.

2.2.72 The groundwater within the Chalk is not anticipated to be saline, due to the dominant flow paths and heads from the north. Regionally the vast majority of unconfined groundwaters within the Wessex Basin Chalk are of the Ca-HCO3 type. The groundwater quality of the superficial deposits and London Clay are likely to be more variable, with shallower groundwaters in the superficials more susceptible to anthropogenic activities.

2.2.73 The proximity to the sea in the south, means that shallow groundwater within the superficial deposits may be brackish or saline towards the coast.

### *Groundwater flooding*

2.2.74 Hampshire has a known history of groundwater flooding, with over 100 towns and villages across the county suffering significant flooding during the winter of 2000/2001.

2.2.75 Due to the significant groundwater flooding risk in the county, HCC has developed a groundwater management plan to identify the areas at risk and put in place measures to mitigate risk. The plan identifies key settlements at risk including Hambledon, Rowlands Castle and Finchdean to the north (located at the southern boundary of the Chalk Downs, outside the study area). These areas at risk are monitored by the EA with flood risk alerts issued, as required.

2.2.76 The groundwater flooding risk in the Water Recycling Plant to Havant Thicket Reservoir study area has not been assessed at this time. The risk of groundwater flooding is more likely in areas where the Chalk bedrock or permeable superficial deposits are observed.

### *Abstractions*

2.2.77 Three licensed groundwater abstraction are located within the study area of the underground pipeline to the south west, as documented in Table 2-16 below.

**Table 2-16: Licensed groundwater abstractions**

| Licence Holder | License No. | Use | Point Name |
|---|---|---|---|
| Portsmouth Water | 11/42/36.2/1 | Public Water Supply | Bedhampton PS Spring No 1 |
| Portsmouth Water | 11/42/36.2/1 | Public Water Supply | Bedhampton PS Spring No 2 |

| Licence Holder | License No. | Use | Point Name |
|---|---|---|---|
| Portsmouth Water | 11/42/36.2/1 | Public Water Supply | Havant PS |

2.2.78 HBC and EHDC were both contacted in regard to unlicensed abstractions (<20 m3/day) within the area. HBC and EHDC noted that no data was available for the area.

2.2.79 Abstractions within the study area are illustrated in Figure 18.5 within Volume III.

*Discharges*

2.2.80 Five consented discharges are located within the study area of the underground pipeline alignment, as documented in Table 2-17 below.

**Table 2-17: Consented discharges**

| Consent Holder | Permit No. | Discharge Type | Discharge Site Name | Receiving Water |
|---|---|---|---|---|
| De La Rue Systems | P00174 | Undefined or Other | High Technology Campus | Freshwater River |
| Southern Water Services Ltd | A00752 | WTW | Budds Farm Havant CSO | Brockhampton Creek |
| North Shore Yacht Yards Ltd | N01265 | Undefined or Other | Boshampton Lane | Saline Estuary |
| Southern Water Services Ltd | A00751 | WTW | Budds Farm WTW | The Solent/Langstone Harbour |
| Southern Water Services Ltd | A01016 | Storm Tank/CSO on Sewerage Network (water company) | Priorsdean Crescent Havant CSO | Hermitage Stream |

2.2.81 Discharges within the study area are illustrated in Figure 18.5 within Volume III.

## Proposed Underground Pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

2.2.82 This component of the Proposed Development includes the 'Proposed Underground Pipeline between the proposed WRP and Havant Thicket Reservoir' study area, of which the baseline is documented in the previous section.

2.2.83 For ease of reference the Proposed Underground Pipeline between the proposed WRP and Otterbourne WSW has been split into shorter sections:

- Proposed WRP to land west of London Road (A3)
- Land west of London Road (A3) to A32 Road

- A32 to Shirrel Heath
- Shirrel Heath to Bishop's Waltham
- Bishop's Waltham to Otterbourne

### Proposed Water Recycling Plant to Land West of London Road (A3)

2.2.84 The proposed WRP to land west of London Road (A3) study area comprises two potential pipeline corridors.

*Topography*

*Northern pipeline corridor*

2.2.85 The main feature of the topography is the increase in ground level elevation from around 20mOD to 70mOD over a relatively short distance (~1km) corresponding to Portsdown Hill. Before and after this incline, the ground level elevation has undulations, but is generally fairly uniform.

*Southern pipeline corridor*

2.2.86 The main feature of the topography is the increase in ground level elevation from around 20mOD to 50mOD over a relatively short distance (~1km) before a more gradual increase in elevation to 90m, before finally going downhill to an elevation of ~50m at the northern end. The higher topographical elevation corresponds to the chalk Portsdown Hill.

*Designated sites*

*Northern and southern pipeline corridors*

2.2.87 The northern pipeline corridor is situated within a SPZ for about half of underground pipeline alignment, from the middle to the north-western end. The southern pipeline corridor is situated within a SPZ for only the most northern 150m of the underground pipeline alignment.

2.2.88 This SPZ is associated with the Chalk springs at Bedhampton which are used for potable water supply by Portsmouth Water. In the north-east of the study area but not on the underground pipeline alignment itself (around 100m at closest to underground pipeline alignment) is an SPZ1 zone (inner zone) which indicates a zone where there is a 50-day travel time of pollutant to source. This SPZ1 zone is approximately 200m wide north to south at closest, north, and west of which is SPZ 1c – which refers to an area with a protective cover of low permeability sat above a unit of high permeability, which if mined or tunnelled into would be representative of SPZ1. In this case, London Clay provides much of the cover above Chalk members. The SPZ which is crossed by the underground pipeline alignment is all SPZ 1c.

2.2.89 Langstone Harbour circa 400m south of the south-eastern end of the alignment and is an environmentally significant site and has a number of statutory environmental designations including:

- SSSI – 'Langstone Harbour' (also noted as a GWDTE)

- SPA – 'Chichester and Langstone Harbour'
- Ramsar site – 'Chichester and Langstone Harbours'
- SAC – 'Solent Maritime'

2.2.90 Environmental designations along the preferred pipeline corridor are illustrated in Figure 8.1 within Volume III, with SPZs shown in Figure 18.5 within Volume III.

*Southern pipeline corridor*

2.2.91 Portsdown SSSI is circa 400m south-west of the southern pipeline corridor where it diverts northwards near the A3. The site is designated a SSSI owing to the Chalk Grassland Habitat.

*Surface watercourses*

*Northern and southern pipeline corridors*

2.2.92 The northern and southern pipeline corridor study area includes three surface water catchment areas, as summarised in Table 2-18 below. The pipeline corridors pass through the Potwell Trib water body catchment in the western end of the study area, whilst the Langstone Harbour Transitional Water Body and Hermitage Stream catchments are at distance.

**Table 2-18: Surface water catchments in study area**

| | Potwell Trib Water Body | Langstone Harbour Transitional Water Body | Hermitage Stream |
|---|---|---|---|
| Water Body ID | GB107042016400 | GB580705130000 | GB107042016370 |
| River Basin District | South East | South East | South East |
| Hydromorphological Designation | Heavily Modified | Heavily Modified | Heavily Modified |
| Current Ecological | Moderate | Moderate | Moderate |
| Current Chemical | Fail | Fail | Fail |
| Ecological Objective | Good | Good | Good |
| Chemical Objective | Good | Good | Good |
| Protected areas | Nitrates Directive | Nitrate Directives, Habitats and Species Directives (SAC), Shellfish Water Directives, Conservation of Wild Birds Directives (SPA), Urban Waste Water Treatment Directive | Nitrate Directives, Shellfish Water Directive |

2.2.93 No main rivers are crossed by either pipeline corridor. Passing across the underground pipeline study area is the EA main river 'Hermitage Stream' which

flows south towards the Langstone Harbour. The Hermitage is fed by a number of smaller watercourses in the area, including Brockhampton Stream, which are anticipated to be primarily groundwater fed by Chalk springs. At the western part of the study area, the EA main river Potwell Trib also flows east towards Southwick Park Lake.

2.2.94 Surface water catchments and main rivers are illustrated in Figure 2.1 within Volume III.

*Superficial deposits*

*Northern and southern pipeline corridors*

2.2.95 Both pipeline corridors are underlain by Raised Marine Deposits, River Terrace Deposits and Head in the south-east, much of the mid-section and north-western section of the pipeline corridor have no superficial cover, other than small areas of Head.

2.2.96 In the study area, most of the north of the study area has no superficial deposits, with discrete areas of Head deposits and a small amount of Alluvium. Most of the southern and south-eastern region of the study area has superficial cover, with a band of Head north of a band of River Terrace Deposits, north of an area of Raised Marine Deposits, which is north of Beach and Tidal Flat Deposits. East of the underground pipeline within the study area exists an area of Alluvium, Head and River Terrace deposits. Table 2-19 details the superficial geology in the underground pipeline study area.

**Table 2-19: Superficial deposits in study area**

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| Head | Clay, Silt, Sand and Gravel | A wide band south of the east – west section of the underground pipeline, and irregularly shaped areas in the north of the study area. Underground pipeline crosses in south-east and five small sections in the north. | Yes |
| River Terrace Deposits (Undifferentiated) | Sand, Silt and Clay | A band south of the band of Head. Underground pipeline crosses in the south-eastern end. | Yes |
| Alluvium | Clay, Silt, Sand and Gravel | Small section in north-west of study area and larger area in south-east. | No |
| Raised Marine Deposits | Sand and Gravel | Small area in south-east of study area, underground pipeline crosses at south-eastern end. | Yes |
| Beach and Tidal Flat Deposits (Undifferentiated) | Clay, Silt, Sand and Gravel | Small area in south-east of study area. | No |
| No superficial cover | | Much of the northern half of the study area has no superficial cover, including most of the pipeline corridor. | Yes |

*Bedrock geology*

*Northern and southern pipeline corridors*

2.2.97 Both pipeline corridors are underlain from south-east to north-west by Undifferentiated Chalk (Lewes Nodular Chalk Formation, Seaford Chalk Formation, Newhaven Chalk Formation, Culver Chalk Formation and Portsdown Chalk Formation), narrow bands of Newhaven Chalk Formation, Tarrant Chalk Member, Spetisbury Chalk Member, Portsdown Chalk Member and Lambeth Group. The underground pipeline subsequently goes into a larger area of London Clay Formation (Clay Silt and Sand) broken up by the narrow bands of the Bognor Sand Member and the Wittering Formation (Sand, Silt and Clay).

2.2.98 Table 2-20 details the bedrock geology in the underground pipeline study area.

**Table 2-20: Bedrock geology in study area**

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| Undifferentiated Chalk (Lewes Nodular, Seaford Chalk, Newhaven Chalk, Culver Chalk and Portsdown Chalk Formations) | Chalk | Majority of the south-eastern end of the study area. | Yes |
| Lambeth Group | Clay, Silt and Sand | Narrow band directly north of the Chalk formations, running east to west, directly south of the London Clay Formation. | Yes |
| London Clay Formation | Clay, Silt and Sand | Half of the study area north of the Lambeth Group is underlain by London Clay Formation. | Yes |
| Wittering Formation | Sand, Silt and Clay | A large amount of the north of the study area is underlain by Wittering Formation, including two sections which the northern pipeline corridor passes over. | Yes |
| Bognor Sand Member | Sand | A narrow band east to west, parallel but north of the Lambeth Group and the southern area of London Clay Formation | Yes |
| Newhaven Chalk Formation | Chalk | A narrow band east to west, underground pipeline crosses in eastern end. Directly south of the Tarrant Chalk Member. | Yes |
| Tarrant Chalk Member | Chalk | A narrow band east to west, underground pipeline crosses in eastern end. Directly south of the Spetisbury Chalk Member. | Yes |
| Spetisbury Chalk Member | Chalk | A narrow band east to west, underground pipeline crosses in eastern end. Directly south of the Portsdown Chalk Member. | Yes |
| Portsdown Chalk Member | Chalk | A narrow band east to west. Directly south of the Lambeth Group. | Yes |

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| Whitecliff Sand Member | Sand | Small area in the north of the study area, north of the underground pipeline, and to the south of the north-western area of Wittering Formation. | No |
| Wittering Formation | Sand, Silt and Clay | Two main areas of Wittering Formation in the study area, one in the extreme north of the study area, and the second in near the northern end of the underground pipeline and north of study area (in 5 distinct sections). Two of these underlies the underground pipeline at the extreme northern end. | Yes |
| Wittering Formation | Sand | Small section in the extreme north of the study area, in between areas of Wittering Formation (Sand, Silt and Clay) | No |

*Groundwater-surface water interactions (springs, sinks, karst and GWDTE)*

*Northern and southern pipeline corridors*

2.2.99 The Bedhampton and Havant springs complex is one of the best examples of karst-fed Chalk springs in the UK, with a number of the springs being used for potable water supply as documented in the abstractions section below.

2.2.100 It is anticipated that additional springs are present within the area around Bedhampton and Havant. Springs and seepages are likely to be present below and in the banks of local surface watercourses.

2.2.101 Springs in the area have not been mapped at scoping stage, and no data on any sinks, karst features or GWDTE (non-designated GWDTE; designated GWDTE noted in Designated sites section) in the area has been ascertained at this time. Data would be collated for future revisions of the HIA.

*Groundwater levels*

*Northern and southern pipeline corridors*

2.2.102 At this time no site-specific groundwater levels have been collated and reviewed for the area. However, it is anticipated that groundwater levels in the Chalk bedrock in the south-east would be shallow due to the presence of numerous springs in the area.

2.2.103 In the Portsdown Hill area, the Chalk groundwater levels are anticipated to be more susceptible to rainfall and seasonal conditions.

2.2.104 Due to the proximity to the sea in the south, it is anticipated that groundwater levels in the south may be tidally influenced.

*Groundwater quality*

*Northern and southern pipeline corridors*

2.2.105 At this time no site-specific groundwater quality data has been ascertained for the area.

2.2.106 The groundwater within the Chalk is not anticipated to be saline, due to the dominant flow paths and heads from the north. Regionally the vast majority of unconfined groundwaters within the Wessex Basin Chalk are of the Ca-HCO3 type. The groundwater quality of the superficial deposits and London Clay are likely to be more variable, with shallower groundwaters in the superficial deposits more susceptible to anthropogenic activities.

2.2.107 The proximity to the sea in the south, means that shallow groundwater within the superficial deposits may be brackish or saline towards the coast.

*Groundwater flooding*

*Northern and southern pipeline corridors*

2.2.108 Hampshire has a known history of groundwater flooding, with over 100 towns and villages across the county suffering significant flooding during the winter of 2000/2001.

2.2.109 Due to the significant groundwater flooding risk in the county, HCC has developed a groundwater management plan to identify the areas at risk and put in place measures to mitigate risk. The plan identifies key settlements at risk including Hambledon, Rowlands Castle and Finchdean to the north (located at the southern boundary of the Chalk Downs, outside the proposed WRP study area). These areas at risk are monitored by the EA with flood risk alerts issued, as required.

2.2.110 The groundwater flooding risk in the proposed WRP to land west of London Road (A3) study area has not been assessed at this time. The risk of groundwater flooding is more likely in areas where the Chalk bedrock or permeable superficial deposits are observed.

*Abstractions*

*Northern and southern pipeline corridors*

2.2.111 Three licensed groundwater abstraction are located within the study area of the proposed WRP to land west of London Road (A3) study area to the south-east, as documented in Table 2-21 below.

**Table 2-21: Licensed groundwater abstractions**

| License Holder | License No. | Use | Point Name |
|---|---|---|---|
| Portsmouth Water | 11/42/36.2/1 | Public Water Supply | Bedhampton PS Spring No 1 |
| Portsmouth Water | 11/42/36.2/1 | Public Water Supply | Bedhampton PS Spring No 2 |
| Portsmouth Water | 11/42/36.2/1 | Public Water Supply | Havant PS |

2.2.112 HBC and PCC were contacted in regard to unlicensed abstractions (<20 m3/day) within the area, but no data was available for the area.

2.2.113 Winchester Council has provided details on unlicensed abstraction within their area, but none are recorded within the proposed WRP to Purbrook study area.

2.2.114 Abstractions within the study area are illustrated in Figure 18.5 within Volume III.

*Discharges*

2.2.115 Twelve consented discharges are located within the study area of the proposed WRP to land west of London Road (A3) pipeline corridors, as documented in Table 2-22 below.

**Table 2-22: Consented discharges**

| Consent Holder | Permit No. | Discharge Type | Discharge Site Name | Receiving Water |
|---|---|---|---|---|
| De La Rue Systems | P00174 | Undefined or Other | High Technology Campus | Freshwater River |
| Southern Water Services Ltd | A00752 | WTW | Budds Farm Havant CSO | Brockhampton Creek |
| North Shore Yacht Yards Ltd | N01265 | Undefined or Other | Boshampton Lane | Saline Estuary |
| Southern Water Services Ltd | A00751 | WTW | Budds Farm WTW | The Solent/Langstone Harbour |
| Southern Water Services Ltd | A01017 | Storm Tank/CSO on Sewerage Network (water company) | Lone Valley Waterlooville CSO | Tributary of River Wallington |
| Lift & Shift Skip Hire Ltd | P10535 | Making of Machinery/Engine/Pump/ Furnace/Tractor | Farlington Redoubt | Into Land |
| Winchester City Council | P06856 | Domestic property (single) (incl. farm house) | Field adjacent to No 1 Widley Walk | Freshwater River |
| J Heath Esq. | H01544 | Undefined or Other | Purbrook Heath Farm | Freshwater River |
| Exec's of Mrs E Borthwick-Norton | H01607 | Undefined or Other | The Southwick Estate | Freshwater River |

| Consent Holder | Permit No. | Discharge Type | Discharge Site Name | Receiving Water |
|---|---|---|---|---|
| Mr D M Daniels | H01543 | Domestic property (single) (incl. farm house) | Tudor Cottage | Freshwater River |
| Warnings Contractors Ltd. | P02509 | Undefined or Other | Warnings Contractors Ltd. | Into Land |
| Southern Water Services Ltd | A01278 | Pumping Station on Sewerage Network (water company) | Westbrook Grove Purbrook CSO | Wallington River via Drain |

2.2.116 Discharges within the study area are illustrated in Figure 18.5 within Volume III.

### Proposed Break Pressure Tank to A32 Road

#### *Topography*

2.2.117 The topography along the preferred pipeline corridor, undulates with a general fall in elevation from east to west; from circa 90m OD in the east to circa 30m OD at the Wallington crossing.

2.2.118 The topography also reduces at a steep gradient from south to north away from the Portsdown Chalk hill.

#### *Designated sites*

2.2.119 In the west, the preferred pipeline corridor crosses a SPZ 2, 2c and 3. Zone 1 of the SPZ is located to the south of the corridor and is associated with the Maindell Pumping Station (PS) (see abstractions section).

2.2.120 The SPZ 1c in relation to the Bedhampton springs is located in the north-eastern extreme of the corridor.

2.2.121 A number of SSSI's are located outside the corridor but within the specified study area, including:

- Lye Heath Marsh SSSI – north of the corridor adjacent to Potwell Trib and a GWDTE
- Hook Heath Meadows SSSI – north of the corridor adjacent to Potwell Trib and a GWDTE
- Portsdown SSSI – south of corridor.

2.2.122 Environmental designations along the preferred pipeline corridor are illustrated in Figure 8.1 within Volume III, with SPZs shown in Figure 18.5 within Volume III.

#### *Surface watercourses*

2.2.123 The study area includes a number of surface water catchment areas, as summarised in Table 2-23 below.

Table 2-23: Surface water catchments within study area

| | Wallington below Southwick | Upper Wallington | Potwell Trib | Meon |
|---|---|---|---|---|
| Water Body ID | GB107042016360 | GB107042016350 | GB107042016400 | GB107042016640 |
| River Basin District | South East | South East | South East | South East |
| Hydromorphological Designation | Not Designated | Not Designated | Heavily Modified | Not Designated |
| Current Ecological | Moderate | Moderate | Moderate | Good |
| Current Chemical | Fail | Fail | Fail | Fail |
| Ecological Objective | Good | Good | Good | Good |
| Chemical Objective | Good | Good | Good | Good |
| Protected areas | Nitrates Directive, Shellfish Water Directive | Nitrates Directive | Nitrates Directive | Nitrates Directive, Conservation of Wild Birds Directive, Shellfish Water Directive |

2.2.124 Potwell Tributary flows westerly north of the corridor and joins with the Wallington near Southwick. The river continues to flow westerly before diverting south and through the western end of the proposed corridor.

2.2.125 Surface water catchments and main rivers are illustrated in Figure 18.1 within Volume III.

*Superficial deposits*

2.2.126 Table 2-24 details the superficial geology in the study area.

Table 2-24: Superficial deposits in study area

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| Head | Clay, Silt, Sand and Gravel | Some Head deposits in the northern half of the preferred pipeline corridor which extends to a fair amount of the north of the study area. An additional band of Head deposits in the south-east of the study area. | Yes |
| River Terrace Deposits | Gravel, Sand and Silt | Crosses the proposed corridor in the west, alongside Wallington River. A few other isolated areas in the west of the study area | Yes |

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| River Terrace Deposits (Undifferentiated) | Sand, Silt and Clay | Very small area in extreme south-east of study area. | No |
| Alluvium | Clay, Silt, Sand and Gravel | Crosses the proposed corridor in the west, alongside Wallington River. Extends alongside the watercourse in the north of the Scoping Area and within the wider study area to the north of the proposed corridor | Yes |
| No superficial cover | | Most of the proposed corridor and much of the southern half and western end of the wider study area has no superficial cover, also sporadic no cover in the north. | Yes |

### *Bedrock geology*

2.2.127 Table 2-25 details the bedrock geology in the study area.

**Table 2-25: Bedrock geology in study area**

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| Undifferentiated Chalk (Lewes Nodular, Seaford Chalk, Newhaven Chalk, Culver Chalk and Portsdown Chalk Formations) | Chalk | Area on southern edge, at eastern end of the study area. | No |
| Lambeth Group | Clay, Silt and Sand | Narrow band directly north of the Chalk formations, approximately east to west and underlies the proposed corridor for its length (but not its width) other than the most western end, where the band is north of the corridor. | Yes |
| London Clay Formation | Clay, Silt and Sand | Directly north of the Lambeth Group is the London Clay Formation, most of the northern part of the eastern two thirds of the proposed corridor is underlain with this formation. Coverage extends for much of the northern half of the study area. | Yes |
| Bognor Sand Member | Sand | A narrow band east to west, parallel but north of the Lambeth Group and the southern area of London Clay Formation. Underlies the proposed corridor for the eastern 2 thirds. | Yes |
| Newhaven Chalk Formation | Chalk | A band approximately east to west and parallel to the south of the eastern half of the proposed | No |

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| | | corridor. Directly south of the Tarrant Chalk Member. | |
| Tarrant Chalk Member | Chalk | A narrow band approximately east to west and parallel to the south of the eastern half of the proposed corridor. Directly south of the Spetisbury Chalk Member. | No |
| Spetisbury Chalk Member | Chalk | A band approximately east to west and parallel to the south of the eastern half of the proposed corridor with some of the formation underlying the corridor. A larger area in the west of the study area underlies the entire width of the proposed corridor. | Yes |
| Portsdown Chalk Member | Chalk | A band approximately east to west and underlying most of the length of the corridor, but not underlying the entire width other than at the western end where the band is thicker. Much of the southern side of the western end of the study area is underlain with Portsdown Chalk Member. | Yes |
| Whitecliff Sand Member | Sand | In the north of the study area | Yes |
| Wittering Formation | Sand, Silt and Clay | Very small area in north-eastern corner of proposed corridor is underlain with Wittering formation. There are some larger areas of Wittering Formation on the northern edge of the study area along the east to west preferred pipeline corridor. | Yes |
| Wittering Formation | Sand | Some small areas in the north-east of the study area, in between areas of Wittering Formation (Sand, Silt and Clay) | No |

*Groundwater-surface water interactions (springs, sinks, karst, GWDTE)*

2.2.128 Springs and seepages are likely to be present below and in the banks of local surface watercourses.

2.2.129 Springs in the area have not been mapped at scoping stage, and no data on any sinks, karst features or GWDTE (non-designated GWDTE; designated GWDTE noted in Designated sites section) in the area has been ascertained at this time. Data would be collated for future revisions of the HIA.

*Groundwater levels*

2.2.130 At this time no site-specific groundwater levels have been collated and reviewed for the area.

2.2.131 In addition to the proposed site investigation works, a number of EA groundwater monitoring installations are located within the study area, south of the corridor:

- EA monitoring well Portsdown BH
- EA monitoring well Pinsley Lodge
- EA monitoring well Downbarn Farm N Fare.

*Groundwater flooding*

2.2.132 Hampshire has a known history of groundwater flooding, with over 100 towns and villages across the county suffering significant flooding during the winter of 2000/2001.

2.2.133 Due to the significant groundwater flooding risk in the county, HCC has developed a groundwater management plan to identify the areas at risk and put in place measures to mitigate risk.

2.2.134 The groundwater flooding risk in the study area has not been assessed at this time. The risk of groundwater flooding is more likely in areas where the Chalk bedrock or permeable superficial deposits are observed.

*Abstractions*

2.2.135 Two licensed groundwater abstractions are located within the study, as documented in Table 2-26 below.

**Table 2-26: Licensed groundwater abstractions**

| License Holder | License No. | Use | Point Name |
|---|---|---|---|
| Portsmouth Water Ltd | 11/42/33.9/20 | Public Water Supply | Maindell PS |
| Southwick Estate | 11/42/33.5/5 | Private Water Supply | Offwell Farm, Southwick |

2.2.136 A surface water abstraction (Southwick Lake on the River Wallington – License No. 11/42/33.5/23) is located north of the preferred pipeline corridor, operated by Southwick Park Naval Recreational Centre Management Committee. The abstraction is utilised for direct spray irrigation in the summer months.

2.2.137 HBC, PCC and FBC were contacted in regard to unlicensed abstractions (<20 m3/day) within the area, but no data was available for the area.

2.2.138 WCC provided details on a number of licensed and unlicensed abstractions within their area. Two private water supplies were provided within the study area including:

- The Southwick Estate abstraction which is licensed (see Table 2-26)
- 1 & 2 The Cottage to the north of the Scoping Area adjacent to Wickham Common

2.2.139 Abstractions within the study area are illustrated in Figure 18.5 within Volume III.

*Discharges*

2.2.140 38 consented discharges are located within the study area, as documented in Table 2-27 below.

Table 2-27: Consented discharges

| Consent Holder | Permit No. | Discharge Type | Discharge Site Name | Receiving Water |
|---|---|---|---|---|
| Mrs Wetherill | dcfs | Domestic property (single) (incl farm house) | Marling | Groundwater via a borehole |
| D Parrett | H01960 | Undefined or other | Ashley Down Farm House | Freshwater river |
| Warings Contractors Ltd. | P02509 | Undefined or other | Warings Contractors Ltd. | Into land |
| Southern Water Services Ltd | A01308 | Storm tank/CSO on sewerage network (water company) | Newmans Bridge Southwick CSO | River Wallington |
| Knightsgate (UK) Ltd | Eprlp3225xg | Domestic property (single) (incl. farm house) | Plot 2 former Hoads Hill Service St | Trib of River Wallington |
| J Heath Esq. | H01544 | Undefined or other | Purbrook Heath Farm | Freshwater river |
| Mr Nicholas Roberts | EPRDB3398EE | Domestic property (single) (incl farm house) | 7 Forest Lane | Groundwater via borehole |
| Veolia es Hampshire Ltd | G01170 | Waste collection/treatment/disposal/materials recovery | Warren Farm waste transfer station | Groundwater via soakaway |
| Southern Water Services Ltd | H01073 | Pumping station on sewerage network (water company) | Sewage pumping station | Freshwater river |
| C D E Bazalgette | H01605 | Undefined or other | Potwell house | Freshwater river |
| C G Poole | H01697 | Undefined or other | Hook heath farm | Freshwater river |
| Knightsgate (uk) Ltd | EPRLP3226GV | Domestic property (single) (incl. farm house) | Plot 4 former Hoads Hill Service St | Trib of River Wallington |
| Royal Armouries | P02737 | Domestic property (single) (incl. farm house) | Hampshire C.C. | Into land |
| Winchester City Council | P06856 | Domestic property (single) (incl. farm house) | Field adjacent to No 1 Widley walk | Freshwater river |
| Mr D M Daniels | H01543 | Domestic property (single) (incl. farm house) | Tudor cottage | Freshwater river |

| Consent Holder | Permit No. | Discharge Type | Discharge Site Name | Receiving Water |
|---|---|---|---|---|
| Southwick & Roche Court Estate Co. | N02579 | Domestic property (single) (incl. farm house) | 1 & 2 Ashley Down cottages | Into land |
| Veolia es Hampshire Ltd | G01169 | Waste collection/ treatment/ disposal/materials recovery | Warren Farm Waste Transfer Station | Groundwater via soakaway |
| Southern water services Ltd | A01278 | Pumping station on sewerage network (water company) | Westbrook Grove Purbrook CSO | Wallington river via drain |
| Knightsgate (uk) limited | EPRLP3226XT | Domestic property (single) (incl. farm house) | Plot 3 former Hoads Hill Service St | Trib of river Wallington |
| Veolia es Hampshire Ltd | G01172 | Waste collection/treatment/disposal/materials recovery | Warren farm waste transfer station | Groundwater via soakaway |
| Exec's of Mrs E Borthwick-norton | H01607 | Undefined or other | The Southwick estate | Freshwater river |
| Exec's of Mrs E Borthwick-norton | H01608 | Undefined or other | The Southwick estate | Freshwater river |
| Veolia es Hampshire Ltd | G01171 | Waste collection/treatment/disposal/materials recovery | Warren farm waste transfer station | Groundwater via soakaway |
| Southern water services ltd | A01017 | Storm tank/CSO on sewerage network (water company) | Lone valley Waterlooville CSO | Tributary of river Wallington |
| Knightsgate (uk) limited | EPRJP3924XW | Domestic property (single) (incl. farm house) | Plot 1 former Hoads Hill Service st | Trib of river Wallington |
| Mr Stephen Spencer | EPRYP3825GE | Domestic property (single) (incl. farm house) | Birchfrith | Groundwater via borehole |
| Southern Water Services Ltd | W00248 | WTW/sewage treatment works (water company) | Southwick WTW | River Wallington |
| Southern Water Services Ltd | A01308 | Storm tank/CSO on sewerage network (water company) | Newmans Bridge Southwick CSO | River Wallington |
| Knightsgate UK Ltd | EPRNP3621XT | Domestic property (single) (incl. farm house) | Whitethorn | River Meon |

| Consent Holder | Permit No. | Discharge Type | Discharge Site Name | Receiving Water |
|---|---|---|---|---|
| SGC Projects Limited | EPRJP3726GP | Domestic property (single) (incl. farm house) | 2 The Cottages | Ditch tributary of River Wallington |
| L Ross | EPRNP3622XF | Domestic property (single) (incl farm house) | Southern Cross | Wallington River |
| M R Stares Esq. | N03391 | Domestic property (single) (incl farm house) | Dunroamin | Into Land |
| Royale Park Home Estates Ltd | N00023 | Holiday Accom/Camp Site/Caravan Site/Hotel/Hostel | Wickham Court | Tributary of Wallington River |
| Mr & Mrs Longstaff | H01470 | Domestic property (single) (incl farm house) | Danetree | Freshwater River |
| W Holdaway Esq | N03034 | Domestic property (single) (incl farm house) | Winecross Farmhouse | Into land/ Infiltration system |
| T Copsey Esq | H01673 | Undefined or other | Russells Place | Freshwater River |
| Mr A Bower | EPRHB3593VX | Domestic property (single) (incl farm house) | Meadow View/Trampers Lane STP | Surface Drain |
| Winchester City Council | P06370 | WwTW (not water co) (not STP at a private premises) | Wine Cross Sewage Treatment Works | Tributary of the Wallington |

2.2.141 Discharges within the study area are illustrated in Figure 18.5 within Volume III.

### A32 to Shirrel Heath

#### *Topography*

2.2.142 The southern end of the study area is at an elevation of 30mOD rising north to a hill at 45mOD before plateauing at around 40mOD. Heading northward, the corridor descends to 15mOD and rises to 50mOD after crossing the River Meon. The preferred pipeline corridor then covers an area with elevation between 40mOD and 60mOD, straddling the top of a ridge between two river valleys, before descending into the northern valley and crossing it, down to 35mOD and then up to 65mOD at the most northern end.

#### *Designated sites*

2.2.143 SDNP is to the north-east of the corridor. Botley Wood and Everett's and Mushes Copses SSSI (a GWDTE) is to the west of the corridor.

2.2.144 The most south easterly 200m of the Scoping Area is located within SPZ3 associated with the Maindell PS abstraction south-east of the corridor. SPZ Zones 2 and 2c are within the study area, but Zone 1 is outside the study area.

2.2.145 Environmental designations along the preferred pipeline corridor are illustrated in Figure 8.1 within Volume III, with SPZs shown in Figure 18.5 within Volume III.

### *Surface watercourses*

2.2.146 The study area includes a number of surface water catchment areas, as summarised in Table 2-28 below.

**Table 2-28: Surface water catchments in study area**

| | Wallington below Southwick | Meon |
|---|---|---|
| Water Body ID | GB107042016360 | GB107042016640 |
| River Basin District | South East | South East |
| Hydromorphological Designation | Not Designated | Not Designated |
| Current Ecological | Moderate | Good |
| Current Chemical | Fail | Fail |
| Ecological Objective | Good | Good |
| Chemical Objective | Good | Good |
| Protected areas | Nitrates Directive, Shellfish Water Directive | Nitrates Directive, Conservation of Wild Birds Directive, Shellfish Water Directive |

2.2.147 The River Meon is a Chalk stream, which rises at East Meon before flowing circa 34km in a generally south or south-westerly direction towards the sea. The corridor crosses the River Meon north of Knowle.

2.2.148 The Wallington is in the east of the study area (crossing the corridor in the land west of London Road (A3) to A32 area).

2.2.149 Surface water catchments and main rivers are illustrated in Figure 18.1 within Volume III.

### *Superficial deposits*

2.2.150 Table 2-29 details the superficial geology in the study area.

**Table 2-29: Superficial deposits in study area**

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| Alluvium | Clay, Silt, Sand and Gravel | Underlies the preferred pipeline corridor at the point the River Meon passes through the corridor. Alluvium is present within the study area along the River Meon which passes through north-east to south-west, and at the south-eastern end along the Wallington River. | Yes |

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| River Terrace Deposits | Gravel, Sand and Silt | Underlies the preferred corridor for many parts of the north-south section of the corridor. Present along the River Meon which passes through north-east to south-west, and at the south-eastern end along the Wallington River. | Yes |
| Head | Clay, Silt, Sand and Gravel | Underlies the preferred corridor in the northern end in two places, alongside the River Meon at the crossing point. Some more areas within the study area of Head deposit coverage are in the west of the study area and extreme south-east. | Yes |
| No superficial cover | | Half of the study area has no superficial cover. Most of the southern part of the corridor has no superficial cover. | Yes |

### *Bedrock geology*

2.2.151 Table 2-30 details the bedrock geology in the study area.

**Table 2-30: Bedrock geology in study area**

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| Lambeth Group | Clay, Silt and Sand | Surrounds chalk members in the south of the study area. Underlies the preferred corridor in the southern end of the corridor, on the bend as the corridor heads north from the east. | Yes |
| London Clay Formation | Clay, Silt and Sand | Formation underlies preferred corridor in the northern end and a small area directly north of the northern part of Lambeth Group in the middle of the preferred corridor. Most of the eastern side of the study area is underlain with London Clay Formation, with a very small area on the southern edge and a small area in the west of the study area, west of the southern underlying part. | Yes |
| Bognor Sand Member | Sand | Very small area in the south of the study area. | No |
| Tarrant Chalk Member | Chalk | Underlies very small area in north of southern square of corridor, which extends a small distance within the study area. | Yes |
| Spetisbury Chalk Member | Chalk | Underlies most of the southern square of corridor and a small area as the corridor heads north. Formation extends east to the edge of the study area with an increasing band thickness from the square of corridor, and south to the edge of the study area from the crossing as the corridor heads north. | Yes |

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| Portsdown Chalk Member | Chalk | Underlies southern edge of proposed corridor and extends for a larger area in south of study area. | Yes |
| Whitecliff Sand Member | Sand | Underlies preferred corridor in a small area of the middle of the corridor, and a couple of small areas in the north of the corridor. Surrounds the Wittering Formation and covers half of the northern end of the study area. | Yes |
| Wittering Formation | Sand, Silt and Clay | Preferred corridor crosses bands of the Wittering Formation 4 times in the northern half of the study area. Forms a large area in the lower half of the northern half of the study area. | Yes |
| Wittering Formation | Sand | Preferred corridor crosses bands of the Wittering Formation (Sand) twice in the northern half of the study area. This circular band underlies a small part of the wider study area in the lower half of the northern half of the study area. | Yes |
| Earnley Sand Formation | Sand, Silt and Clay | Forms an area in the lower half of the northern half of the study area, just under half of which underlies the preferred corridor, in the centre of the circular bands of Wittering Formation, | Yes |

*Groundwater-surface water interactions (springs, sinks, karst, GWDTE)*

2.2.152 Springs and seepages are likely to be present below and in the banks of local surface watercourses.

2.2.153 Springs in the area have not been mapped at scoping stage, and no data on any sinks, karst features or GWDTE (non-designated GWDTE; designated GWDTE noted in Designated sites section) in the area has been ascertained at this time. Data would be collated for future revisions of the HIA.

*Groundwater levels*

2.2.154 At this time no site-specific groundwater levels have been collated and reviewed for the area.

2.2.155 In addition to the proposed site investigation works, an EA groundwater monitoring installation is located within the study area at the northern end of the corridor:

2.2.156 Frith Lane End Groundwater Monitoring BH.

*Groundwater flooding*

2.2.157 Hampshire has a known history of groundwater flooding, with over 100 towns and villages across the county suffering significant flooding during the winter of 2000/2001.

2.2.158 Due to the significant groundwater flooding risk in the county, HCC has developed a groundwater management plan to identify the areas at risk and put in place measures to mitigate risk.

2.2.159 The groundwater flooding risk in the study area has not been assessed at this time. The risk of groundwater flooding is more likely in areas where the Chalk bedrock or permeable superficial deposits are observed.

### *Abstractions*

2.2.160 A single licensed groundwater abstraction is located within the study area, as documented in Table 2-31 below.

**Table 2-31: Licensed groundwater abstractions**

| License Holder | License No. | Use | Point Name |
|---|---|---|---|
| Golfpartners International Limited | 29/058/R01 | Spray Irrigation - Direct | Borehole at Wickham Park Golf Club |

2.2.161 Winchester County Council provided details on a number of licensed and unlicensed abstractions (<20 m3/d) within their area. Two unlicensed abstractions are located within the study area, as summarised below:

- Lone Cottage Unlicensed abstraction within SSSI to south-west of corridor.
- The Bungalow (now The Garden House) unlicensed abstraction west of corridor

2.2.162 Fareham Council were contacted in regards to unlicensed abstractions (<20 m3/day) within the area, but no data was available for the area.

2.2.163 Abstractions within the study area are illustrated in Figure 18.5 within Volume III.

### *Discharges*

2.2.164 18 consented discharges are located within the study area of the A32 to Shirrel Heath corridor, as documented in Table 2-32 below.

**Table 2-32: Consented discharges**

| Consent Holder | Permit No. | Discharge Type | Discharge Site Name | Receiving Water |
|---|---|---|---|---|
| Mrs Bev Wetherill | Eprgp3929xp | Domestic property (single) (incl. farm house) | Marling | Groundwater via a borehole |
| Knightsgate (uk) limited | Eprlp3225xg | Domestic property (single) (incl. farm house) | Plot 2 former Hoads Hill Service St | Trib of River Wallington |
| Mr David Crossley | H01930 | Undefined or other | Double lodge | Freshwater river |
| Mr Nicholas Roberts | Eprdb3398ee | Domestic property (single) (incl farm house) | 7 forest lane | Groundwater via borehole |

| Consent Holder | Permit No. | Discharge Type | Discharge Site Name | Receiving Water |
|---|---|---|---|---|
| Knightsgate (uk) limited | Eprlp3 226gv | Domestic property (single) (incl farm house) | Plot 4 former hoads hill service st | Trib of River Wallington |
| Albion water limited | Eprjb3 697ay | WTW/sewage treatment works (water company) | Knowle STW | River Meon |
| Albion water limited | H0051 5 | Dentist/hospital/nursing home (medical)/human health | Knowle hospital | Unnamed trib of River Meon |
| Mr David Crossley | H0135 1 | Undefined or other | Mayles lodge | Freshwater river |
| H L Gamblin & Sons | H0188 6 | Undefined or other | Little Tapnage farm | Freshwater river |
| Mr David Crossley | H0192 8 | Domestic property (single) (incl farm house) | Deer lodge | Freshwater river |
| J Potts esq | N0309 2 | Domestic property (single) (incl farm house) | Mayles house | Into land |
| Mr Rob Davies | Eprlb3 797ra | Domestic property (single) (incl farm house) | Great pecks stp | Ditch leading to River Hamble |
| Knightsgate (uk) limited | Eprlp3 226xt | Domestic property (single) (incl farm house) | Plot 3 former Hoads Hill Service St | Trib of River Wallington |
| Southern Water Services Limited | A0130 9 | Storm tank/CSO on sewerage network (water company) | Fareham road Wickham CSO | River Meon |
| Knightsgate (uk) limited | Eprjp3 924xw | Domestic property (single) (incl farm house) | Plot 1 former Hoads Hill Service St | Trib of River Wallington |
| Mr Stephen Spencer | Epryp 3825g e | Domestic property (single) (incl farm house) | Birchfrith | Groundwater via borehole |
| Mr David Crossley | H0193 1 | Undefined or other | Northfields farm house | Freshwater river |
| Knightsgate uk limited | Eprnp 3621xt | Domestic property (single) (incl farm house) | Whitethorn | River Meon |

2.2.165 Discharges within the study area are illustrated in Figure 18.5 within Volume III.

### Shirrel Heath to Bishop's Waltham

#### *Topography*

2.2.166 The south-eastern end of the study area is at an elevation of 60mOD and the elevation of the southern half of the corridor undulates between 65mOD and 45mOD crossing two small streams. The corridor then descends to 20mOD

crossing the River Hamble before rising to 40mOD on the northern side of the river, following a tributary of the River Hamble north.

*Designated sites*

2.2.167 Waltham Chase Meadows SSSI (a GWDTE) is located north-east of the corridor.

2.2.168 SDNP is located at the northern tip of study area.

2.2.169 Bishops Waltham Branch Line and Claylands LNR are located to the north-east of the corridor at the north-west end of the corridor.

2.2.170 No SPZ's are located within the study area.

2.2.171 Environmental designations along the preferred pipeline corridor are illustrated in Figure 8.1 within Volume III, with SPZs shown in Figure 18.5 within Volume III.

*Surface watercourses*

The study area includes a number of surface water catchment areas, as summarised in Table 2-33 below.

**Table 2-33: Surface water catchments in study area**

| | Main River Hamble | Moors Stream | Horton Heath Stream | Upper Hamble | Meon |
|---|---|---|---|---|---|
| Water Body ID | GB107042016250 | GB107042016260 | GB107042016270 | GB107042016280 | GB107042016640 |
| River Basin District | South East | South East | South East | South East | South East |
| Hydromorphological Designation | Not Designated | Not Designated | Heavily Modified | Not Designated | Not Designated |
| Current Ecological | Moderate | Good | Good | Moderate | Good |
| Current Chemical | Fail | Fail | Fail | Fail | Fail |
| Ecological Objective | Moderate | Good | Good | Good | Good |
| Chemical Objective | Good | Good | Good | Good | Good |
| Protected areas | Nitrates Directive, Shellfish Water Directive, Urban Waste Water Treatment Directive | Nitrates Directive | Nitrates Directive | Nitrates Directive | Nitrates Directive, Conservation of Wild Birds Directive, Shellfish Water Directive |

2.2.172 The proposed corridor crosses the Main River Hamble which flows south-west towards the coast. The Main River Hamble is formed from the confluence of the

Upper Hamble and Moors stream which is located just north-east of the Main River Hamble crossing (just outside the corridor).

2.2.173 Surface water catchments and main rivers are illustrated in Figure 18.1 within Volume III.

### *Superficial deposits*

2.2.174 Table 2-34 details the superficial geology in the study area.

**Table 2-34: Superficial deposits in study area**

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| Alluvium | Clay, Silt, Sand and Gravel | Alluvium underlies preferred corridor in locations where watercourses pass across the corridor. Within the study area, Alluvium is located along the River Hamble and its tributaries in the northern end of the study area, and along Shawfords Lake. | Yes |
| River Terrace Deposits | Gravel, Sand and Silt | Small area underlying the preferred corridor at the extreme northern end, and then in the north alongside the River Hamble. Some more area of cover within the study area in the north and on the western edge. | Yes |
| Head | Clay, Silt, Sand and Gravel | Head underlies preferred corridor in four distinct locations along the corridor, with larger areas of cover extending from the underlying locations to the south-western edge of the study area. | Yes |
| No superficial cover | | Most of the preferred corridor has no superficial cover, most of the study area, especially the north-eastern side, has no superficial cover. | Yes |

### *Bedrock geology*

2.2.175 Table 2-35 details the bedrock geology in the study area.

**Table 2-35: Bedrock geology in study area**

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| London Clay Formation | Clay, Silt and Sand | Covers most of the north of the proposed corridor and half of the remaining area. Underlies corridor for most of the northern third, and smaller amounts at 1/3 along from the south-eastern end. | Yes |
| London Clay Formation | Sand | A few very small areas in the north of the study area, two of which underly the proposed corridor. | Yes |
| Whitecliff Sand Member | Sand | Half of the southern half of the study area is underlain by Whitecliff Sand Member. The south-eastern end of the corridor and part of the | Yes |

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| | | middle of the study area is underlain by this formation. | |
| Wittering Formation | Sand, Silt and Clay | Small amount of the Wittering Formation underlies the preferred corridor in the middle of the corridor, this area extends to the west of the study area and is more prevalent than the Wittering Formation (Sand). | Yes |
| Wittering Formation | Sand | Small amount of the Wittering Formation underlies the preferred corridor in the middle of the corridor, this area extends to the west of the study area and is less prevalent than the Wittering Formation (Sand, Silt and Clay) – forming lots of small bands of Wittering Formation – Sand. | Yes |
| Lambeth Group | Clay, Silt and Sand | Very small area in extreme north of study area | No |

*Groundwater-surface water interactions (springs, sinks, karst, GWDTE)*

2.2.176 Springs and seepages are likely to be present below and in the banks of local surface watercourses.

2.2.177 Springs in the area have not been mapped at scoping stage, and no data on any sinks, karst features or GWDTE (non-designated GWDTE; designated GWDTE noted in Designated sites section) in the area has been ascertained at this time. Data would be collated for future revisions of the HIA.

*Groundwater levels*

2.2.178 At this time no site-specific groundwater levels have been collated and reviewed for the area.

2.2.179 In addition to the proposed site investigation works, a number of EA groundwater monitoring installations are located within the study area:

- Frith Lane End Groundwater Monitoring BH at the eastern end of the study area
- Multiple groundwater monitoring BH's (Sandboils Sand, Sandboils Chalk, North Pond Bishops, Northbrook Bishops) at the northern end of the study area, proximal to the Upper Hamble

*Groundwater flooding*

2.2.180 Hampshire has a known history of groundwater flooding, with over 100 towns and villages across the county suffering significant flooding during the winter of 2000/2001.

2.2.181 Due to the significant groundwater flooding risk in the county, HCC has developed a groundwater management plan to identify the areas at risk and put in place measures to mitigate risk.

2.2.182 The groundwater flooding risk in the study area has not been assessed at this time. The risk of groundwater flooding is more likely in areas where the Chalk bedrock or permeable superficial deposits are observed.

*Abstractions*

2.2.183 No licensed groundwater abstractions are mapped within the study area.

2.2.184 A surface water abstraction is located within the study area that is utilised for agriculture/irrigation; River Hamble at Durley (License No. 11/42/25.2/54).

2.2.185 Winchester County Council provided details on a number of licensed and unlicensed abstractions (<20 m3/d) within their area. Unlicensed abstractions are located within the study area, as summarised below:

- The Bungalow (now The Garden House) unlicensed abstraction south-east of corridor
- Yewtree Cottage unlicensed abstraction north-east of corridor
- Woodmans Farm House unlicensed abstraction within corridor
- The Granary unlicensed abstraction south-west of corridor (proximal to Main River Hamble)

2.2.186 Abstractions within the study area are illustrated in Figure 18.5 within Volume III.

*Discharges*

2.2.187 12 consented discharges are located within the study area, as documented in Table 2-36 below.

**Table 2-36: Consented discharges**

| Consent Holder | Permit No. | Discharge Type | Discharge Site Name | Receiving Water |
|---|---|---|---|---|
| Mrs E M Warwick | H01657 | Undefined or other | Gravel Hill House | Freshwater river |
| Messrs F.J. Knowles & J.A. Geale | H01925 | Undefined or other | Brooklands Farm House | Saline estuary |
| Mr Richard Daniel | Eprlp3125gc | Domestic property (single) (incl. farm house) | Spencer place | Unnamed trib Shawfords lake |
| Southern Water Services Ltd | W00006 | WTW/sewage treatment works (water company) | Bishops Waltham WTW | The river hamble |
| Mr Paul Mifsud | Eprub3697ny | Domestic property (multiple) (incl. farm houses) | Middle Barn The Tree Nursery | Tributary of Shawfords lake |
| D m Gamblin | H01692 | Undefined or other | Conifers | Freshwater river |
| Mr & Mrs Mclean | H01958 | Undefined or other | Underwath | Saline estuary |

| Consent Holder | Permit No. | Discharge Type | Discharge Site Name | Receiving Water |
|---|---|---|---|---|
| Sandy Acres Girl Guide Group | Eprtb3392vc | Holiday accom/camp site/caravan site/hotel/hostel | Sandy Acres girl guide group STP | Tributary of Shawfords lake |
| M.m. Moore esq. | H02003 | Domestic property (single) (incl farm house) | Premises at Curdridge lane | Freshwater river |
| Mrs Paula Hayward | Eprtb3393vn | Domestic property (single) (incl farm house) | Black Horse farm | Trib of Shawfords lake |
| Mrs Sarah Byfield | Eprsb3690wn | Domestic property (single) (incl farm house) | 1 Lyons cottage | Ditch trib of Shawfords lake |
| C Morgan and sons (motors and spares) ltd | G00388 | Warehousing + support activities for transportation | C Morgan and sons ltd | Shawford lake trib of Hamble |

2.2.188 Discharges within the study area are illustrated in Figure 18.5 within Volume III.

### Bishop's Waltham to Otterbourne

#### *Topography*

2.2.189 The south-eastern end of the study area is on the side of a small stream valley, with an elevation of 30mOD – 50mOD. At Wintershill, the corridor passes along the side of a hill, with a maximum elevation of 75mOD. Heading north-west, north of Fair Oak, the preferred corridor passes over a much flatter area with elevation between 30mOD and 45mOD. The north-western end of the corridor has elevation of 15mOD to 35mOD, passing over Hill's Farm at Brambridge (35mOD) and the River Itchen (15mOD).

#### *Designated sites*

2.2.190 The River Itchen in the west of the preferred pipeline corridor is a SSSI (a GWDTE) and SAC designated Chalk river.

2.2.191 The SDNP is located to the north-west of the corridor (immediately adjacent to the corridor where the corridor crosses Horton Heath Stream) and within the corridor at the western end.

2.2.192 Bishops Waltham Branch Line and Claylands LNR are located to the north-east of the corridor at the southern end of the corridor.

2.2.193 The corridor study area crosses a number of SPZs. At the eastern end, the study area slightly encroaches into a SPZ1c and SPZ2 related to the Portsmouth Water Northbrook groundwater abstractions (located outside the study area).

2.2.194 Moving west, the corridor crosses through a SPZ1c and 2c (east of Horton Heath stream) associated with the Portsmouth Water public water supply abstraction at Lower Upham. The SPZ1 is located just to the south-west of the corridor, with the SPZ2 present in the north-east towards the edge of the study area.

2.2.195 Travelling further westwards, the northern half of the corridor and study area moves into an SPZ1c associated with the numerous Chalk abstractions in the area. Where the underground pipeline begins to route northwards towards Otterbourne, the SPZ1c becomes an SPZ1.

2.2.196 Environmental designations along the preferred pipeline corridor are illustrated in Figure 8.1 within Volume III, with SPZs shown in Figure 18.5 within Volume III.

*Surface watercourses*

2.2.197 The study area includes a number of surface water catchment areas, as summarised in Table 2-37 below.

**Table 2-37: Surface water catchments in study area**

| | Main River Hamble | Moors Stream | Horton Heath Stream | Upper Hamble | Monks Brook | Bow Lake | Itchen |
|---|---|---|---|---|---|---|---|
| **Water Body ID** | GB10704 2016250 | GB10704 2016260 | GB10704 2016270 | GB10704 2016280 | GB10704 2016310 | GB10704 2016650 | GB10704 20225 |
| **River Basin District** | South East | South East | South East | South East | South East | South East | South East |
| **Hydromorphological Designation** | Not Designated | Not Designated | Heavily Modified | Not Designated | Heavily Modified | Not Designated | Not Designated |
| **Current Ecological** | Moderate | Good | Good | Moderate | Moderate | Bad | Good |
| **Current Chemical** | Fail | Fail | Fail | Fail | Fail | Fail | Fail |
| **Ecological Objective** | Moderate | Good | Good | Good | Good | Good | Good |
| **Chemical Objective** | Good | Good | Good | Good | Good | Good | Good |
| **Protected areas** | Nitrates Directive, Shellfish Water Directive, Urban Waste Water Treatment Directive | Nitrates Directive | Nitrates Directive | Nitrates Directive | Nitrates Directive | Nitrates Directive | Nitrates Directive, Drinking Water Protected Area, Urban Waste Water Treatment Directive, Shellfish Water Directive |

2.2.198 The preferred pipeline corridor crosses a number of surface watercourses:

- River Itchen (a highly designated chalk stream) and Itchen Navigation
- Bow Lake
- Horton Heath stream
- Upper Hamble

2.2.199 Surface water catchments and main rivers are illustrated in Figure 18.1 within Volume III.

### *Superficial deposits*

2.2.200 Table 2-38 details the superficial geology in the study area.

**Table 2-38: Superficial deposits in study area**

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| Alluvium | Clay, Silt, Sand and Gravel | Small areas of cover in the south-east of the study area underlying the corridor, more cover around the River Itchen in the north-west of the study area, some of with underlies the corridor, and additional cover underlying the corridor 1/3 from the north-western end. | Yes |
| Tufa | Tufa, Calcareous | Very small area of Tufa underlying corridor at northern end, Tufa extends north along the river Itchen out of the study area. | Yes |
| River Terrace Deposits | Sand and Gravel | Underlies corridor in north-western end, near River Itchen. Additional area in the northern side of the centre of the study area. | Yes |
| River Terrace Deposits | Gravel, Sand and Silt | Small areas in the south-east of the study area. | No |
| Head | Clay, Silt, Sand and Gravel | Very small area underlying the corridor 1/3 from the north-western end. Small narrow bands of Head deposits on the north-eastern side of the study area. | Yes |
| Clay-With-Flints-Formation | Clay, Silt, Sand and Gravel | Very small area in the extreme north underlies the corridor, small amount of coverage in the north end of the study area. Wider coverage along the north-eastern edge of the study area. | Yes |
| No superficial cover | | Most of the study area (other than north-western end of corridor) has no superficial cover. Nearly all of the corridor has no superficial cover. | Yes |

### *Bedrock geology*

2.2.201 Table 2-39 details the bedrock geology in the study area.

Table 2-39: Bedrock geology in study area

| Geology | Description | Location and prevalence | Mapped Within Corridor |
|---|---|---|---|
| London Clay Formation | Clay, Silt and Sand | Covers most of the study area and nearly all of the proposed corridor, all but the northern end and very small areas along the corridor. Coverage extends south of the proposed corridor to the edge of the study area in the majority of places, but not very far north. | Yes |
| London Clay Formation | Sand | Very small area in south of study area. | No |
| Whitecliff Sand Member | Sand | Small amount of coverage along the southern edge of the study area. | No |
| Whitecliff Sand Member | Sand and Gravel | Very small area at extreme western end of study area. | No |
| Wittering Formation | Sand, Silt and Clay | Two isolated areas along the south-western edge of the study area. | No |
| Lambeth Group | Clay, Silt and Sand | Very small area at two locations along proposed corridor is underlain by this formation, with a larger area at the northern end of the study area. Thick band extends roughly parallel to the north of the preferred pipeline corridor for the entirety of the study area. | Yes |
| Lambeth Group | Sand | Underlies corridor in northern end, where it forms a band south for the Lambeth Group (Clay, Silt and Sand). There is another area on the north-eastern edge, towards the south-eastern end of the study area. | Yes |
| Durley Sand Member | Sand | Two very small areas on the south-western edge of the study area. | No |
| Nursling Sand Member | Clay, Silt and Sand | Very small area at extreme western end of study area. | No |
| Tarrant Chalk Member | Chalk | A small area in the northern end underlies the proposed corridor. This formation also is found on much of the north-eastern edge of the study area. | Yes |
| Culver Chalk Formation | Chalk | In the northern end of the study area, a very small amount underlies the proposed corridor. | Yes |
| Newhaven Chalk Formation | Chalk | North of the Culver Chalk Formation and Tarrant Chalk Member, in the extreme north of the study area. | No |

*Groundwater-surface water interactions (springs, sinks, karst, GWDTE)*

2.2.202 Springs and seepages are likely to be present below and in the banks of local surface watercourses.

2.2.203 Springs in the area have not been mapped at scoping stage, and no data on any sinks, karst features or GWDTE (non-designated GWDTE; designated GWDTE noted in Designated sites section) in the area has been ascertained at this time. Data would be collated for future revisions of the HIA.

*Groundwater levels*

2.2.204 At this time no site-specific groundwater levels have been collated or reviewed for the area.

2.2.205 In addition to the proposed site investigation works, a number of EA groundwater monitoring installations are located within the study area:

2.2.206 Multiple groundwater monitoring BHs (Sandboils Sand, Sandboils Chalk, North Pond Bishops, Northbrook Bishops) at the south-eastern end of the study area, proximal to the Upper Hamble.

- Multiple groundwater monitoring BHs (Wintershill Tertiary, Wintershill Chalk) within the corridor at Winters Hill
- Durley Hall Road groundwater monitoring BH south-west of corridor
- Alma Lane groundwater monitoring BH south-east of corridor, proximal to Horton Heath Stream and Lower Upham abstraction
- Stakes Lane groundwater monitoring BH north-east of corridor
- Hatchley Lane groundwater monitoring BH within corridor
- Oakwood Copse groundwater monitoring BH north-west of corridor
- Twyford Moors groundwater monitoring BH north-east of corridor
- Highways Road groundwater monitoring BH at north-western end of study area

*Groundwater flooding*

2.2.207 Hampshire has a known history of groundwater flooding, with over 100 towns and villages across the county suffering significant flooding during the winter of 2000/2001.

2.2.208 Due to the significant groundwater flooding risk in the county, HCC has developed a groundwater management plan to identify the areas at risk and put in place measures to mitigate risk.

2.2.209 The groundwater flooding risk in the study area has not been assessed at this time. The risk of groundwater flooding is more likely in areas where the Chalk bedrock or permeable superficial deposits are observed.

*Abstractions*

2.2.210 Thirteen licensed groundwater abstractions are located within the study area, as documented in Table 2-40: Licensed groundwater abstractions below. Note that Otterbourne PS Point F is within the corridor.

Table 2-40: Licensed groundwater abstractions

| License Holder | License No. | Use | Point Name |
|---|---|---|---|
| Portsmouth Water | 11/42/25.2/50 | Public Water Supply | Lower Upham |
| Fishers Pond Ltd | 11/42/22.9/160 | Agriculture – Fish Farm/Cress Pond Throughflow | Fishers Pond Point A |
| Fishers Pond Ltd | 11/42/22.9/160 | Agriculture – Fish Farm/Cress Pond Throughflow | Fishers Pond Borehole C |
| Hampshire Carp Hatcheries | SO/042/0031/030 | Agriculture – Fish Farm/Cress Pond Throughflow | Bowlake Fish Farm Borehole at Point A |
| Southern Water Services | 11/42/22.7/94 | Environmental – Make-up or top up water | Otterbourne PS Point E |
| Southern Water Services | 11/42/22.7/94 | Environmental – Make-up or top up water | Otterbourne PS Point F |
| Southern Water Services | 11/42/22.7/94 | Public Water Supply | Otterbourne PS Point G |
| Southern Water Services | 11/42/22.7/94 | Environmental – Make-up or top up water | Otterbourne PS Point H |
| Southern Water Services | 11/42/22.7/94 | Environmental – Make-up or top up water | Otterbourne PS Point A |
| Southern Water Services | 11/42/22.7/94 | Environmental – Make-up or top up water | Otterbourne PS Point B |
| Southern Water Services | 11/42/22.7/94 | Environmental – Make-up or top up water | Otterbourne PS Point C |
| Southern Water Services | 11/42/22.7/94 | Environmental – Make-up or top up water | Otterbourne PS Point K |
| Southern Water Services | 11/42/22.7/94 | Environmental – Make-up or top up water | Otterbourne PS Point D |

2.2.211 A number of licensed surface water abstractions are also located within the study area, as follows:

- License 11/42/25.2/54: Peter Taplin - River Hamble at Durley – For agriculture/irrigation
- License SO/042/0031/007: Fishers Pond Ltd – Point A, Marwell Manor Farm, Fishers Pond - Agriculture: Fish Farm/Cress Pond Throughflow

- License 31/090: Fishers Pond Ltd – Thompson Lane, Fishers Pond (Points A and B) - Agriculture: Fish Farm/Cress Pond Throughflow
- License 11/42/22.9/159: Fishers Pond Ltd – Trib of Bow Lake Stream at Fishers Pond - Agriculture: Fish Farm/Cress Pond Throughflow
- License 11/42/22.9/163: Patrick Haughton (T/A Hampshire Carp Hatcheries) – Bow Lake Stream at Stoke Common – Agriculture: Fish Farm/Cress Pond Throughflow
- License 31/110: Henry Russell – Black Dyke, Point A - Environmental: Transfer between sources
- License SO/042/0031/023: Mr D Bronks East Lodge Fisheries – Itchen Navigation at Brambridge - Environmental: Remedial River/Wetland Support (Transfer between sources)
- License 11/42/22.6/93: Southern Water Services – River Itchen at the Otterbourne Intake - Public Water Supply
- License SO/042/0031/020: Malms House Ltd – Lower Itchen Navigation at Shawford – Environmental: Non-remedial water/wetland support, Transfer between sources

2.2.212 WCC and EBC provided details on a number of licensed and unlicensed abstractions (<20 m3/d) within their area. Three unlicensed abstractions are located within the study area, as summarised below:

- Lowhill Farmhouse unlicensed abstraction within Scheme Area
- Marwell Manor unlicensed abstraction north-east of preferred pipeline corridor
- Stoke Park Farm unlicensed abstraction south-west of preferred pipeline corridor

2.2.213 Abstractions within the study area are illustrated in Figure 18.5 within Volume III.

### *Discharges*

2.2.214 50 consented discharges are located within the study area, as documented in Table 2-41 below.

**Table 2-41: Consented discharges**

| Consent Holder | Permit No. | Discharge Type | Discharge Site Name | Receiving Water |
|---|---|---|---|---|
| Southern Water Services Ltd | A01399 | Pumping station on sewerage network (water company) | Ashton Corner CSO | Tributary of the River Hamble |
| Fishers Pond Limited | EPRAB 3296EX | Fish + aquaculture/fish farm/cress farm | Fish farm at Marwell pond | Trib of Bow Lake Stream |
| Mr Clive Paice | EPRBB 3796NS | Domestic property (single) (incl farm house) | Property at Kisatorari Stables | Groundwater |
| Mr Peter Jackson | EPRDB 3999D M | Domestic property (single) (incl farm house) | The Chilterns | Infiltration field |

| Consent Holder | Permit No. | Discharge Type | Discharge Site Name | Receiving Water |
|---|---|---|---|---|
| Mr Brian Butler | EPRDP 3325XB | Domestic property (single) (incl farm house) | Jardini | Tributary of Colden Common |
| Hazardous waste management limited | EPREB 3096RR | Offices admin + support | Otterbourne farm | Groundwater |
| Mr Peter Nash | EPREB 3193DB | Domestic property (single) (incl farm house) | Malmsmead | Discharged to ground |
| Mr Robert Eburn | EPREB 3198VU | Domestic property (single) (incl farm house) | The summerhouse | Groundwater |
| Mr James Marshall | EPREB 3299WH | Domestic property (single) (incl farm house) | Calvi | Groundwater |
| Mr Phiroz & Mrs Elizabeth Daruvalla | EPREB 3592NW | Domestic property (single) (incl farm house) | Greenlaw | Groundwater |
| Hideaway (lu) limited | EPREB 3594RB | Domestic property (multiple) (incl farm houses) | Torbay farm | Unnamed trib of Ford Lake |
| Mr Derek Blake | EPREB 3899DL | Domestic property (single) (incl farm house) | Chinook lodge | Groundwater |
| Miss Majorie Wells | EPRFB 3091NX | Domestic property (single) (incl farm house) | Bridle way | Groundwater |
| Dr Justin Turner | EPRFB 3390AY | Domestic property (single) (incl farm house) | Yi shui ge | Trib of Itchen Navigation |
| Dr Justin Turner | EPRFB 3390DP | Domestic property (single) (incl farm house) | Qing ya xi | Kingfisher stream |
| Mr Mike Baird | EPRHB 3994NK | Domestic property (single) (incl farm house) | Malms farm | River Itchen |
| Mrs Carol Salmon | EPRJB 3694NM | Domestic property (single) (incl farm house) | Nythfa | Tributary of Ford Lake river |
| Mr Richard Girdlestone | EPRLP 3422GC | Domestic property (single) (incl farm house) | Moat cottage | Unnamed trib River Itchen |
| Various names | EPRNB 3235AG | Fish + aquaculture/fish farm/cress farm | Bowlake fish farm | Bow lake & a trib of Bow lake |
| Swifts property limited | EPRUB 3299RY | Wholesale trade (not motor vehicles) | Swifts farm | Ditch trib of Fisher's Pond |
| Mr Leigh Knowles | EPRZP 3929XR | Domestic property (single) (incl farm house) | Laurel cottage | Trib of River Hamble |
| Mr N J Spencer | H01467 | Domestic property (single) (incl farm house) | Rose tree cottage | Freshwater river |
| J. Pugh esq. | H01471 | Domestic property (single) (incl farm house) | Arbour cottage | Freshwater river |

| Consent Holder | Permit No. | Discharge Type | Discharge Site Name | Receiving Water |
|---|---|---|---|---|
| H. Howe esq. | H01896 | Domestic property (single) (incl farm house) | Oak tree cottage | Saline estuary |
| Messrs F.J. Knowles & J.A. Geale | H01925 | Undefined or other | Brooklands farm house | Saline estuary |
| Sandyfields nurseries | H02504 | Farms (not house)/crop + animal rearing/plant nursery | Sandyfields nursery | Into land |
| Messrs Pink & Arnold | H02836 | Domestic property (single) (incl farm house) | Marwell manor | Freshwater river |
| R.B. Dunford & son | N01642 | Undefined or other | Stoke Park farmhouse & | Underground strata |
| Mrs P J Walker | N02930 | Domestic property (single) (incl farm house) | House at Upham Farm | Into land |
| Ms Diana Porter | N03013 | Domestic property (single) (incl farm house) | Nutwood house | Into land |
| Mr Peter Wheeler | N03056 | Domestic property (single) (incl farm house) | Timbers | Into land |
| Mrs Gillian Denly | N03057 | Domestic property (single) (incl farm house) | Septic tank serving Mallards Point | Into land |
| Dr. A k Coleman | N03260 | Domestic property (single) (incl farm house) | Dell copse | Into land |
| Mrs Susanne Spencer | NPSW QD003411 | Domestic property (single) (incl farm house) | Lambs hill | To soakaway |
| Fishers Pond Limited | NPSW QD005981 | Fish + aquaculture/fish farm/cress farm | Fishers pond fishery | A tributary of Bow lake |
| New Deeps Farm | P010526 | Farms (not house)/crop + animal rearing/plant nursery | New Deeps farm | Into land |
| Brendoncare foundation | P01097 | Undefined or other | The Old Parsonage | Freshwater river |
| Mr Michael West | P01146 | Domestic property (single) (incl farm house) | Swimming pool at Iolanda | Into land |
| S.Hennessy esq. | P02918 | Domestic property (single) (incl farm house) | Otterbourne grange | Into land |
| T.Clay esq. | P03199 | Domestic property (single) (incl farm house) | Leylands farm | Into land |
| Priory cc 101 limited | P04382 | Food+beverage services/café/restaurant/pub | The Queens Head | Freshwater river |
| The Meadows (Upham) Management Limited | P06216 | WTW (not water co) (not stp at a private premises) | Upham Street STW | Underground strata |

| Consent Holder | Permit No. | Discharge Type | Discharge Site Name | Receiving Water |
|---|---|---|---|---|
| Edmund Nuttall ltd | P07187 | Undefined or other | Edmund Nuttall ltd | Freshwater river |
| Southern Water Services Ltd | W00006 | WTW/sewage treatment works (water company) | Bishops Waltham WTW | The River Hamble |
| Mr Chris Russell | EPREB 3199AH | Domestic property (single) (incl farm house) | Crantock | Groundwater |
| Mr Gary Little | NPSW QD0053 79 | Domestic property (single) (incl farm house) | Avonmore | Groundwater via soakaway |
| Mr Ian Glenday | EPREB 3692NR | Domestic property (multiple) (incl farm houses) | Little Ropers | Groundwater |
| Mr Simon Allen | EPREB 3499VZ | Domestic property (single) (incl farm house) | Blencathra | Groundwater |
| Mr Andrew Bruce | EPREB 3496W K | Domestic property (single) (incl farm house) | Copthorne | Groundwater via soakaway |
| Mr Alvin Barrett | EPREB 3992VT | Domestic property (single) (incl farm house) | Combpyne | Groundwater via infiltration |

2.2.215 Discharges within the study area are illustrated in Figure 18.5 within Volume III.

# 3 Conceptualisation

3.1.1 Based on the regional and local understanding documented in the previous sections, Table 3-1 to Table 3-9 below summarise the hydrogeological conceptualisation of each area. Cross sections through key trenchless sections of the preferred pipeline corridor are illustrated in Appendix A: Figure A1 to Figure A8.

**Table 3-1: Conceptual model for proposed Water Recycling Plant**

| Model element | Study area description |
|---|---|
| Surface topography | Proposed WRP has elevation in the order of 5-15m AOD. Langstone Harbour located to the south of the Scoping Area at an elevation in the order of 2m AOD (submerged at high tide). General increase in topography to north towards Chalk Downs and steep increase to north-west towards Portsdown Hill Chalk Ridge. |
| WFD groundwater catchment | Underlain by East Hants Chalk (GB40701G502700) – Poor overall status |
| Main groundwater bodies | Superficial Deposits: Site underlain primarily by Raised Marine Deposits (secondary undifferentiated aquifer) with some River Terrace Deposits (secondary A aquifer) mapped towards the north.<br>[Significant made ground/land fill on site. Landfill considered by Land quality and ground conditions topic]<br>Bedrock: Site underlain by Chalk bedrock (principal aquifer). |
| Groundwater flow direction | Main groundwater table generally flowing south towards the sea. Some localised south-easterly groundwater flow from the Portsdown Hill possible. Localised flow in the superficials likely to be controlled by tidal interaction and surface watercourses. |
| Approximate groundwater level in Proposed Development study area | No groundwater levels collated to date. Groundwater level anticipated to be shallow or potentially flowing artesian in the area, due to the numerous springs. Tidal behaviour may be observed due to proximity to the sea. |
| Regional faults | No significant regional faults identified. |
| Surface water bodies | To the south of the site lies the Langstone Harbour Transitional Water Body. Langstone Harbour designated as a SSSI, SPA, Ramsar and SAC.<br>Hermitage stream flows towards the sea on the eastern edge of the site. |
| Groundwater Abstractions Licenses (within 1km) | Portsmouth Water public water supply abstractions from the Bedhampton-Havant springs to the north of the proposed WRP site |
| SPZs | SPZ 1 located circa 350m north, associated with the Bedhampton-Havant abstractions noted above. |
| Groundwater -surface water | Numerous springs to the north of the site; the Bedhampton-Havant springs are utilised for public water supply and feed some of the minor watercourses in the area. |

| Model element | Study area description |
|---|---|
| Interactions (GWSWI) | Langstone Harbour to the south is designated as a groundwater dependent terrestrial ecosystem. |
| Recharge | Low permeability Palaeogene and urbanisation retard recharge in the area. Aquifer recharge predominantly anticipated to occur to north in the South Downs. |

**Table 3-2: Conceptual model for Proposed Underground Pipeline between Budds Farm Water Treatment Works and the proposed Water Recycling Plant (including the Budds Farm Water Treatment Works site)**

| Model element | Study area description |
|---|---|
| Surface topography | Relatively shallow topography (4-9m AOD), with higher elevations to the north-west of the alignment (around the proposed WRP). |
| WFD groundwater catchment | Underlain by East Hants Chalk (GB40701G502700) – Poor overall status. |
| Main groundwater bodies | Superficial Deposits: Site underlain by Raised Marine Deposits (secondary undifferentiated aquifer), beach and tidal flat deposits (secondary undifferentiated aquifer) and alluvium (secondary A aquifer).<br>[Landfill to be considered by Land quality and ground conditions topic]<br>Bedrock: Site underlain by Chalk bedrock (principal aquifer). |
| Groundwater flow direction | Main groundwater table generally flowing south towards the sea. Localised flow in the superficials likely to be controlled by tidal interaction and surface watercourses. |
| Approximate groundwater level in Proposed Development study area | No groundwater levels collated to date. Groundwater level in the Chalk anticipated to be shallow or potentially flowing artesian in the area, due to the numerous springs.<br>Tidal behaviour may be observed due to proximity to the sea. |
| Regional faults | No significant regional faults identified. |
| Surface water bodies | The Proposed Underground Pipeline passes through the Langstone Harbour transitional water body.<br>The underground pipeline crosses beneath the Hermitage stream which flows south into Langston Harbour. |
| Groundwater Abstractions Licenses (within 1km) | Portsmouth Water public water supply abstractions from the Bedhampton-Havant springs to the north of the proposed WRP site |
| SPZs | SPZ 1 located circa 550m north, associated with the Bedhampton-Havant abstractions noted above. |
| GWSWI | Numerous springs to the north of the site; the Bedhampton-Havant springs are utilised for public water supply and feed some of the minor watercourses in the area.<br>Langstone Harbour to the south is designated as a groundwater dependent terrestrial ecosystem. Scoping Area partly encroaches onto designated site. |
| Recharge | Low permeability Palaeogene and urbanisation retard recharge in the area. Aquifer recharge predominantly anticipated to occur to north in the South Downs. |

Table 3-3: Conceptual model for Proposed Underground Pipeline between the proposed Water Recycling Plant and Havant Thicket Reservoir

| Model element | Study area description |
|---|---|
| Surface topography | Fall in elevation from the northern end of the underground pipeline towards Havant (Chichester Syncline), an increase in elevation (Portsdown anticline) before falling again towards the coast (Hampshire basin). |
| WFD groundwater catchment | At southern end, underlain by East Hants Chalk (GB40701G502700) – Poor overall status.<br>As travels north, goes into South Hants Lambeth Group (GB40702G503700) – Good overall status.<br>Northern half of preferred pipeline corridor not within WFD groundwater catchment (within unproductive London Clay) |
| Main groundwater bodies | Superficial Deposits: Preferred pipeline corridor underlain by Head (secondary undifferentiated aquifer), River Terrace Deposits (secondary A aquifer), Alluvium (secondary A aquifer), Raised Marine Deposits (secondary undifferentiated), as well as areas with no superficial cover.<br>[Landfill considered by Land quality and ground conditions topic]<br>Bedrock: Preferred pipeline corridor underlain by Chalk bedrock (principal aquifer) in the south. Moving north the preferred pipeline corridor is underlain by Lambeth Group (secondary A) and London Clay (predominantly unproductive, with some granular bands designated secondary A) |
| Groundwater flow direction | Main groundwater table generally flowing south towards the sea. Localised flow in the superficials likely to be controlled by tidal interaction (in the south) and surface watercourses. |
| Approximate groundwater level in Proposed Development study area | No groundwater levels collated to date. Groundwater level in the Chalk anticipated to be shallow or potentially flowing artesian in the southern part of the alignment, due to the numerous springs in the area.<br>Variable groundwater levels are anticipated in the superficial deposits, as well as the Lambeth Group and London Clay deposits, with a general trend of higher groundwater levels towards the north.<br>Tidal behaviour may be observed towards the south due to proximity to the sea. |
| Regional faults | No significant regional faults identified. |
| Surface water bodies | Much of the underground pipeline alignment is within the Hermitage Stream catchment, with the underground pipeline crossing beneath the stream north-east of Barncroft Way. |
| Groundwater Abstractions Licenses (within 1km) | Portsmouth Water public water supply abstractions from the Bedhampton-Havant springs to the east of the preferred pipeline corridor, in the southern half of the alignment. |
| SPZs | The underground pipeline is situated within a SPZ1 and SPZ1c (within London Clay deposits overlying the Chalk SPZ) for the majority of the preferred pipeline corridor, with the exception of the most southern 500m. This SPZ is associated with the Portsmouth Water public water supply abstractions noted above. |
| GWSWI | Numerous springs in the Bedhampton-Havant area.<br>Langstone Harbour to the south is designated as a groundwater |

| Model element | Study area description |
|---|---|
| | dependent terrestrial ecosystem.<br>Limited groundwater-surface water interactions anticipated in the northern half of the preferred pipeline corridor, due to the anticipated low permeability of the underlying geology. |
| Recharge | Low permeability Palaeogene and urbanisation retard recharge in the area. Aquifer recharge predominantly anticipated to occur to north in the South Downs. |

**Table 3-4: Conceptual model for proposed Water Recycling Plant to proposed land west of London Road (A3) (northern pipeline corridor)**

| Model element | Study area description |
|---|---|
| Surface topography | Shallow topography at the south-eastern end of the northern pipeline corridor (circa 10m AOD), before rising steeply to circa 60m AOD) in the area of the Portsdown Hill Chalk ridge. |
| WFD groundwater catchment | In east, underlain by East Hants Chalk (GB40701G502700) – Poor overall status. As travels north, goes into South Hants Lambeth Group (GB40702G503700) – Good overall status.<br>Northern half of northern pipeline corridor not within WFD groundwater catchment (within unproductive London Clay) |
| Main groundwater bodies | Superficial Deposits: Northern pipeline corridor underlain by Head (secondary undifferentiated aquifer), River Terrace Deposits (secondary A aquifer), and Raised Marine Deposits (secondary undifferentiated), as well as areas with no superficial cover (predominantly in the north-west).<br>[Landfill considered by Land quality and ground conditions topic]<br>Bedrock: Northern pipeline corridor underlain by Chalk bedrock (principal aquifer) in the south. Moving north the northern pipeline corridor is underlain by Lambeth Group (secondary A) and London Clay (predominantly unproductive, with some granular bands designated secondary A). Underground pipeline anticipated to be predominantly within the Chalk. |
| Groundwater flow direction | Main groundwater table generally flowing south towards the sea. Localised flow in the superficials likely to be controlled by tidal interaction (in the south) and surface watercourses. |
| Approximate groundwater level in Proposed Development study area | No groundwater levels collated to date. Groundwater level in the Chalk anticipated to be shallow or potentially flowing artesian in the southern part of the alignment, due to the numerous springs in the area. Chalk in the Portsdown Hill area is likely to be deeper, due to the topography, and is likely to be more susceptible to seasonal and rainfall variations.<br>Variable groundwater levels are anticipated in the superficial deposits, as well as the Lambeth Group and London Clay deposits, with a general trend of higher groundwater levels towards the north.<br>Tidal behaviour may be observed towards the south due to proximity to the sea. |
| Regional faults | No significant regional faults identified. |
| Surface water bodies | The underground pipeline alignment is within the catchment of Potwell Tributary and the coast. No surface water bodies are crossed by the underground pipeline alignment. |

| Model element | Study area description |
|---|---|
| Groundwater Abstractions Licenses (within 1km) | Portsmouth Water public water supply abstractions from the Bedhampton-Havant springs to the east of the northern pipeline corridor, at the eastern end of the alignment. |
| SPZs | The underground pipeline is situated within a SPZ for approximately half of the alignment (from the middle to the north-western end). This SPZ is associated with the Portsmouth Water public water supply abstractions noted above. |
| GWSWI | Numerous springs in the Bedhampton-Havant area, north-east of the proposed WRP end of the northern pipeline corridor.<br>Langstone Harbour to the south of the eastern end of the alignment is designated as a GWDTE. |
| Recharge | Low permeability Palaeogene and urbanisation retard recharge in the area. Aquifer recharge predominantly anticipated to occur to north in the South Downs, although some localised recharge of the Chalk may occur on Portsdown Hill. |

**Table 3-5: Conceptual model for proposed Water Recycling Plant to proposed land west of London Road (A3) (southern pipeline corridor)**

| Model element | Study area description |
|---|---|
| Surface topography | From the proposed WRP the ground elevation increases from circa 10m AOD to 50m AOD over a relatively short distance, before a more gradual increase to 90m AOD. The topography then falls to circa 50m AOD at the northern end. The higher topography corresponds to Portsdown Hill. |
| WFD groundwater catchment | Underlain by East Hants Chalk (GB40701G502700) – Poor overall status. North-west of southern pipeline corridor within South Hants Lambeth Group (GB40702G503700) – Good overall status, and London Clay (not designated a WFD groundwater catchment). |
| Main groundwater bodies | Superficial Deposits: Southern pipeline corridor underlain by Head (secondary undifferentiated aquifer), River Terrace Deposits (secondary A aquifer), and Raised Marine Deposits (secondary undifferentiated), as well as areas with no superficial cover (predominantly in the north-west). [Landfill considered by Land quality and ground conditions topic]<br>Bedrock: Southern pipeline corridor underlain by Chalk bedrock (principal aquifer) in the south. Moving north the southern pipeline corridor is underlain by Lambeth Group (secondary A) and London Clay (predominantly unproductive, with some granular bands designated secondary A). Underground pipeline anticipated to be predominantly within the Chalk. |
| Groundwater flow direction | Main groundwater table generally flowing south towards the sea. Localised flow in the superficials likely to be controlled by tidal interaction (in the south) and surface watercourses. Infiltration into the Portsdown Hill Chalk may locally influence groundwater flow directions, particularly during wetter periods. |
| Approximate groundwater level in Proposed | No groundwater levels collated to date. Groundwater level in the Chalk anticipated to be shallow or potentially flowing artesian in the southern part of the alignment, due to the numerous springs in the area. Chalk in the |

| Model element | Study area description |
|---|---|
| Development study area | Portsdown Hill area is likely to be deeper, due to the topography, and is likely to be more susceptible to seasonal and rainfall variations.<br>Variable groundwater levels are anticipated in the superficial deposits, as well as the Lambeth Group and London Clay deposits, with a general trend of higher groundwater levels towards the north.<br>Tidal behaviour may be observed towards the south due to proximity to the sea. |
| Regional faults | No significant regional faults identified. |
| Surface water bodies | The underground pipeline alignment is within the catchment of Potwell Tributary and the coast. No surface water bodies are crossed by the underground pipeline alignment. |
| Groundwater Abstractions Licenses | Portsmouth Water public water supply abstractions from the Bedhampton-Havant springs to the east of the southern pipeline corridor, at the eastern end of the alignment. |
| SPZs | The underground pipeline is situated within a SPZ1 for only the most northern 150m of the underground pipeline alignment. This SPZ is associated with the Portsmouth Water public water supply abstractions noted above. |
| GWSWI | Numerous springs in the Bedhampton-Havant area, north-east of the proposed WRP end of the southern pipeline corridor.<br>Langstone Harbour to the south of the eastern end of the alignment is designated as a groundwater dependent terrestrial ecosystem.<br>Portsdown SSSI is circa 400m south-west of the underground pipeline alignment where it diverts northwards near the A3. The site is a Chalk Grassland Habitat, although not designated a GWDTE. |
| Recharge | Low permeability Palaeogene and urbanisation retard recharge in the area. Aquifer recharge predominantly anticipated to occur to north in the South Downs, although some localised recharge of the Chalk may occur on Portsdown Hill. |

**Table 3-6: Conceptual model for land west of London Road (A3) to A32 Road**

| Model element | Description |
|---|---|
| Surface topography | The topography along the preferred pipeline corridor undulates with a general fall from east to west. |
| WFD groundwater catchment | Preferred pipeline corridor generally underlain by East Hants Chalk (GB40701G502700) – Poor overall status.<br>Close to Chalk-Lambeth boundary, with preferred pipeline corridor occasionally underlain by South Hants Lambeth Group (GB40702G503700) – Good overall status, |
| Main groundwater bodies | Superficial Deposits: Corridor underlain by Head (secondary undifferentiated aquifer), River Terrace Deposits (secondary A aquifer) and Alluvium (secondary A aquifer), as well as large areas with no superficial cover.<br>Bedrock: Corridor underlain by Chalk bedrock (principal aquifer), Lambeth Group (secondary A) and London Clay (predominantly unproductive, with some granular bands designated secondary A). |

| Model element | Description |
|---|---|
| Groundwater flow direction | Main groundwater table generally flowing south towards the sea. Localised flow in the superficials likely to be controlled by topography and surface watercourses (e.g. flow towards the Wallington). |
| Approximate groundwater level in Proposed Development study area | No groundwater levels collated to date.<br>Variable groundwater levels are anticipated in the superficial deposits, with a general trend of higher groundwater levels towards the north. |
| Regional faults | No significant regional faults identified. |
| Surface water bodies | The preferred pipeline corridor lies within the catchment of Potwell Tributary and the catchment of Wallington below Southwick. The Wallington River is crossed in the west of the corridor. |
| Groundwater Abstractions Licenses (within 1km) | Portsmouth Water public water supply abstraction Maindell PS is located to the south of the corridor on the western end of the preferred pipeline corridor.<br>Private water supply abstraction located at Offwell Farm, Southwick within the centre of the corridor |
| SPZs | The preferred pipeline corridor crosses the SPZ2 and SPZ3 associated with the Maindell public water supply abstraction to the south of the corridor. |
| GWSWI | A number of springs are anticipated in the study area.<br>Hook Heath Meadows SSSI and Lye Heath Marsh SSSI are located to the north of the corridor, adjacent to Potwell Tributary. Both of these are designated GWDTE.<br>Portsdown SSSI is circa 400m south-west of the underground pipeline alignment where it diverts northwards near the A3. The site is a Chalk Grassland Habitat, although not designated a GWDTE. |
| Recharge | Low permeability Palaeogene and urbanisation retard recharge in the area. Aquifer recharge predominantly anticipated to occur to north in the South Downs. |

Table 3-7: Conceptual model for A32 to Shirrel Heath

| Model element | Description |
|---|---|
| Surface topography | The topography along the preferred pipeline corridor undulates as it crosses river valleys. |
| WFD groundwater catchment | South-east of preferred pipeline corridor underlain by East Hants Chalk (GB40701G502700) – Poor overall status.<br>As moves north, small section of preferred pipeline corridor is underlain by South Hants Lambeth Group (GB40702G503700) – Good overall status,<br>Majority of northern half of preferred pipeline corridor underlain by South East Hants Bracklesham Group (GB40702G503000) – Poor overall status. |
| Main groundwater bodies | Superficial Deposits: Corridor underlain by Head (secondary undifferentiated aquifer), River Terrace Deposits (secondary A aquifer) and Alluvium (secondary A aquifer), as well as large areas with no superficial cover.<br>Bedrock: Corridor underlain by Chalk bedrock (principal aquifer), Lambeth Group (secondary A), Bracklesham Group (secondary A) and London Clay |

| Model element | Description |
|---|---|
| | (predominantly unproductive, with some granular bands designated secondary A). |
| Groundwater flow direction | Main groundwater table generally flowing south towards the sea. Localised flow in the superficials likely to be controlled by topography and surface watercourses (e.g. flow towards the Meon). |
| Approximate groundwater level in Proposed Development study area | No groundwater levels collated to date.<br>Variable groundwater levels are anticipated in the superficial deposits and low permeability bedrock, with a general trend of higher groundwater levels towards the north. |
| Regional faults | No significant regional faults identified. |
| Surface water bodies | The preferred pipeline corridor lies within the catchment of Wallington below Southwick and the catchment of Meon. The preferred pipeline corridor crosses the River Meon; a Chalk stream which flows south-westerly towards the sea. |
| Groundwater Abstraction Licenses (within 1km) | Licensed abstraction borehole at Wickham Park Golf Club utilised for irrigation at eastern edge of corridor.<br>Two unlicensed abstractions (Lone Cottage and The Bungalow) are located within the study area, but outside the corridor. |
| SPZs | The eastern extent of the preferred pipeline corridor is within the SPZ3 of the Maindell PS abstraction. |
| GWSWI | A number of springs are anticipated in the study area.<br>Botley Wood and Everett's and Mushes Copses SSSI is located to the west of the corridor where the Meon trenchless crossing is proposed. The SSSI is designated as a GWDTE. |
| Recharge | Low permeability Palaeogene and urbanisation retard recharge in the area. Aquifer recharge predominantly anticipated to occur to north in the South Downs. |

**Table 3-8: Conceptual model for Shirrel Heath to Bishop's Waltham**

| Model element | Description |
|---|---|
| Surface topography | Undulating topography with a general decrease towards the Hamble before rising again. |
| WFD groundwater catchment | Preferred pipeline corridor underlain by London Clay (non-designated WFD groundwater body) and South East Hants Bracklesham Group (GB40702G503000) – Poor overall status. |
| Main groundwater bodies | Superficial Deposits: Corridor underlain by Head (secondary undifferentiated aquifer), River Terrace Deposits (secondary A aquifer) and Alluvium (secondary A aquifer), as well as large areas with no superficial cover.<br>Bedrock: Corridor underlain by Bracklesham Group (secondary A) and London Clay (predominantly unproductive, with some granular bands designated secondary A). |
| Groundwater flow direction | Main groundwater table generally flowing south towards the sea. Localised flow in the superficials and bedrock likely to be controlled by topography and surface watercourses (e.g., flow towards the Hamble). |

| Model element | Description |
|---|---|
| Approximate groundwater level in Proposed Development study area | No groundwater levels collated to date.<br>Variable groundwater levels are anticipated in the superficial deposits and low permeability bedrock, with a general trend of higher groundwater levels towards the north. |
| Regional faults | No significant regional faults identified. |
| Surface water bodies | The preferred pipeline corridor crosses a number of surface water catchments including the Main River Hamble, Moors Stream, Horton Heath Stream, Upper Hamble and Meon.<br>The preferred pipeline corridor crosses the Main River Hamble which flows south-westerly. |
| Groundwater Abstractions Licenses (within 1km) | No licensed abstractions are mapped within the study area.<br>Three unlicensed abstractions (Yewtree Cottage, The Granary and The Bungalow) are located within the study area, but outside the corridor.<br>Unlicensed abstraction Woodmans Farm House located within the extent of the corridor |
| SPZs | None in area. |
| GWSWI | A number of potential springs are anticipated in the study area.<br>Waltham Chase Meadows SSSI is located north-east of the corridor, and is designated as a GWDTE. |
| Recharge | Low permeability Palaeogene and urbanisation retard recharge in the area.<br>Aquifer recharge predominantly anticipated to occur to north in the South Downs. |

Table 3-9: Conceptual model for Bishop's Waltham to Otterbourne

| Model element | Description |
|---|---|
| Surface topography | The topography undulates as the preferred pipeline corridor passes along the side of hills, before lowering in the area of the River Itchen. |
| WFD groundwater catchment | Majority of preferred pipeline corridor underlain by London Clay (not designated WFD groundwater body).<br>Small section underlain by East Hants Lambeth Group (GB40702G500800) – Good overall status.<br>In west, towards Otterbourne, underlain by Central Hants Lambeth Group (GB40702G503800 – Good overall status) and River Itchen Chalk (GB40701G505000 – Poor overall status) |
| Main groundwater bodies | Superficial Deposits: Corridor underlain by Tufa, Head (secondary undifferentiated aquifer), River Terrace Deposits (secondary A aquifer) and Alluvium (secondary A aquifer), Clay with Flints (unproductive) as well as large areas with no superficial cover.<br>Bedrock: Corridor underlain by Chalk (principal aquifer), Lambeth Group (secondary A) and London Clay (predominantly unproductive, with some granular bands designated secondary A). |
| Groundwater flow direction | Main groundwater table generally flowing south towards the sea. Localised flow in the superficials and bedrock likely to be controlled by topography, abstractions, and surface watercourses. |
| Approximate groundwater level | No groundwater levels collated to date. |

| Model element | Description |
|---|---|
| in Proposed Development study area | Variable groundwater levels are anticipated in the superficial deposits and low permeability bedrock, with a general trend of higher groundwater levels towards the north. Groundwater levels in the Chalk are anticipated to be shallow and influenced by the local groundwater abstractions and surface watercourses. |
| Regional faults | No significant regional faults identified. |
| Surface water bodies | The preferred pipeline corridor crosses a number of surface water catchments including the Main River Hamble, Moors Stream, Horton Heath Stream, Upper Hamble, Monks Brook, Bow Lake and Itchen.<br>The preferred pipeline corridor crosses a number of watercourses including the environmentally designated River Itchen and Itchen Navigation Bow Lake, Horton Heath Stream and the Upper Hamble (twice). |
| Groundwater Abstractions Licenses (within 1km) | A number of licensed abstractions are located within the study area including nine Southern Water abstractions around Otterbourne, the Portsmouth Water Lower Upham public water supply abstraction, and a number of agricultural abstractions (Fishers Pond Point A, Fishers Pond Borehole C and Bowlake Fish Farm Borehole at Point A).<br>Two unlicensed abstractions are also noted within the study area including Lowhill Farmhouse (within the corridor extents) and Marwell Manor (north-east of the corridor). |
| SPZs | The corridor crosses a number of SPZs, including a SPZ1c and 2c east of Horton Heath Stream associated with the Portsmouth Water public water supply abstraction at Lower Upham. Moving further west, the corridor lies partly within SPZ1c and 2c zones associated with the numerous Chalk abstractions in the area (including Southern Water's Otterbourne abstractions). As the underground pipeline begins to route northwards, the SPZ1c becomes an SPZ1. |
| GWSWI | A number of potential springs are anticipated in the study area, primarily in the north-west around the Itchen.<br>The River Itchen in the west of the preferred pipeline corridor is a SSSI and SAC designated Chalk river and GWDTE. |
| Recharge | Low permeability Palaeogene and urbanisation retard recharge in the area. Aquifer recharge predominantly anticipated to occur to the north in the South Downs. |

# 4 Preliminary assessment of impacts

## 4.1 Construction impacts

4.1.1 A summary of the main construction impacts that are to be considered within the Preliminary HIA are summarised below.

### Direct disturbance of groundwater

4.1.2 Construction activities have the potential to directly impact upon the water quantity and quality of the groundwater bodies identified, together with other hydraulically linked receptors. Direct effects on the quantitative and chemical WFD parameters for the underlying groundwater bodies are possible.

4.1.3 Disturbance could occur from the proposed construction activities including the installation of the buried pipelines and associated infrastructure along the preferred pipeline corridor. Any temporary groundwater control, if required, for tunnel or pipeline construction would cause drawdown of the local water table resulting in reduced groundwater levels, which could impact groundwater dependent receptors (e.g. streams, abstractions, springs or GWDTE) within the zone of influence.

4.1.4 Direct disturbance could also occur from unplanned events (e.g. accidental release of drilling fluid during tunnelling operations).

### Supply of contaminants to groundwater

4.1.5 The operation of construction machinery has the potential to accidentally release lubricants, fuels and oils on to the ground which could migrate into the underlying groundwater. This could also be caused by spillage, leakage and in-wash from vehicle storage areas following rainfall, accidental release of foul waters (e.g., from welfare facilities) and construction materials, such as concrete, grout and inert drilling fluids from trenchless crossings or tunnelling.

4.1.6 Any activities that disturb the ground, such as excavation, tunnelling or piling, could discharge contaminants below ground and potentially adversely affect groundwater quality or locally alter the hydraulic properties of the aquifer, which may in turn impact groundwater dependent features such as abstraction points or GWDTEs. (Note that mobilisation of contaminants following disturbance of contaminated ground or groundwater, or through uncontrolled site runoff in areas impacted by contamination is not considered within this assessment).

### Changes to groundwater flow paths

4.1.7 Groundwater flows and levels may be impacted by temporary physical modifications (e.g. excavations, tunnelling or infilling followed by compaction), which would interrupt the natural groundwater flow pathways.

4.1.8 Below ground infrastructure installed below the water table has the potential to permanently act as a barrier to flow, leading to mounding upstream of the feature which could result in groundwater flooding upstream or drawdown impacts downstream. Conversely infrastructure installed below the groundwater table may

act as a preferential pathway creating connections between currently hydraulically disconnected aquifers and/or receptors. This has the potential to impact upon the quality and quantity of receptors.

## 4.2 Operational impacts

4.2.1 A summary of the main operational impacts that are to be considered within the Preliminary HIA are summarised below.

### Supply of contaminants to groundwater

4.2.2 There is the potential for accidental release of contaminants to groundwater during planned and unplanned operational maintenance. Activities could lead to accidental release of fine sediment, treatment chemicals, oils, fuels and lubricants to groundwater bodies and associated receptors.

4.2.3 Leakage of water from/into the pipeline(s) or associated infrastructure could also impact the groundwater quality, particularly if the leakages are large or long term.

### Changes to groundwater flows

4.2.4 Permanent above ground infrastructure is likely to increase the impermeable area across the catchments. This could decrease infiltration rates and permanently change surface runoff pathways impacting recharge of the underlying aquifers.

4.2.5 Once constructed the underground infrastructure will not have any further effect on groundwater flows to those assessed during the construction phase, and as such will be considered in the construction impacts assessment.

## 4.3 Receptor value

4.3.1 The importance or value (hereafter referred to as value) assigned to receptors has been determined with reference to ‘Table 3.70’ of DMRB LA 113, whereby value is assigned based on the quality indicators of a receptor. It should be noted that ‘value’ in this context has the same definition and use as ‘importance’ does within DMRB LA 113. To align with other chapters within the Environmental Impact Assessment, the values range from High to Very Low (within Table 3.70 of LA 113 the values range from Very High to Low).

4.3.2 Table 4-1below documents all potential groundwater receptors identified within the Proposed Development study area, together with their assigned value and location(s).

4.3.3 Minor watercourses (non-WFD) have been excluded at this stage of the assessment; this would be revisited as additional baseline data, site specific data and surveys become available. Groundwater flooding has also been excluded as this would be assessed separately within the Flood Risk Assessment document.

Table 4-1: Receptor value (very low to high)

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| Aquifer - Principal Bedrock (White Chalk Subgroup) | High | Principal aquifer providing regionally important resource and baseflow to numerous designated sites. | Underlying parts of the Proposed Underground Pipeline between the proposed WRP and Otterbourne WSW and the various underground pipeline alignments from the proposed WRP. | |
| Aquifer - Secondary A Bedrock Aquifer (Bracklesham Group) | Medium | Permeable layers capable of supporting water supplies at a local scale. | Underlying parts of the Proposed Underground Pipeline between the proposed WRP and Otterbourne WSW. | |
| Aquifer - Secondary A Bedrock Aquifer (Lambeth Group) | Medium | Permeable layers capable of supporting water supplies at a local scale. | Underlying parts of Proposed Underground Pipeline between the proposed WRP and Otterbourne WSW and from the proposed WRP to Havant Thicket Reservoir. | |
| Aquifer - Secondary A Bedrock Aquifer (London Clay Sand Members) | Medium | Permeable layers capable of supporting water supplies at a local scale. | Underlying parts of the Proposed Underground Pipeline between the proposed WRP and Otterbourne WSW. | |
| Aquifer - Secondary A Superficial Deposits Aquifer (Alluvium) | Medium | Permeable layers capable of supporting water supplies at a local scale. | Underlying parts of the Proposed Underground Pipeline between the proposed WRP and Otterbourne WSW in association with surface watercourses. | |
| Aquifer - Secondary A Superficial Deposits Aquifer (River Terrace Deposits) | Medium | Permeable layers capable of supporting water supplies at a local scale. | Underlying parts of the Proposed Underground Pipeline between the proposed WRP and Otterbourne WSW, in association with surface watercourses. | |

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| Aquifer - Secondary Undifferentiated Superficial Deposits Aquifer (Beach and Tidal Flat Deposits) | Medium | Aquifer providing supply to local agriculture or industry, with limited connection to surface watercourses. | Underlying parts of the Proposed Underground Pipeline between Budds WTW and the proposed south of the proposed WRP. | |
| Aquifer - Secondary Undifferentiated Superficial Deposits Aquifer (Head) | Medium | Aquifer providing supply to local agriculture or industry, with limited connection to surface watercourses. | Underlying parts of the Proposed Underground Pipeline between the proposed WRP and Otterbourne WSW; predominantly in the eastern half of the Proposed Development | |
| Aquifer - Secondary Undifferentiated Superficial Deposits Aquifer (Raised Marine Deposits) | Medium | Aquifer providing supply to local agriculture or industry, with limited connection to surface watercourses. | Underlying parts of the Proposed Development in the area of the proposed WRP. | |
| Aquifer – Unproductive Bedrock Aquifer (London Clay) | Very Low | Unproductive Aquifer | | |
| Consented Discharge | Low | A00751: Southern Water Services - Budds Farm WTW - To the Solent/Langstone Harbour | | |
| Consented Discharge | Low | A00752: Southern Water Services - Budds Farm Havant CSO - To Brockhampton Creek | | |
| Consented Discharge | Low | A01016: Southern Water Services - Priorsdean Crescent Havant CSO - To Hermitage Steam | | |
| Consented Discharge | Low | A01017: Southern Water Services - Lone Valley Waterlooville CSO - To Tributary of River Wallington | | |

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| Consented Discharge | Low | A01278: Southern Water Services Ltd - Westbrook Grove Purbrook - To Wallington River via Drain | | |
| Consented Discharge | Low | A01308: Southern water services limited. - Newmans Bridge Southwick CSO - To River Wallington | | |
| Consented Discharge | Low | A01309: Southern Water Services Ltd - Fareham Road Wickham CSO - To River Meon | | |
| Consented Discharge | Low | A01399: Southern Water Services Ltd - Ashton Corner CSO - To tributary of the River Hamble | | |
| Consented Discharge | Low | APRJB3697AY: Albion Water Ltd - Knowle STW - To River Meon | | |
| Consented Discharge | Low | EPRAB3296EX: Fishers Pond Limited - Fish Farm at Marwell Pond - To tributary of Bow Lake Stream | | |
| Consented Discharge | Low | EPRBB3796NS: Mr Clive Paice - Property at Kisatorari Stables - To groundwater | | |
| Consented Discharge | Low | EPRDB3398CC: Mr Nicholas Roberts - 7 Forest Lane - To groundwater vis borehole | | |
| Consented Discharge | Low | EPRDB3398EE: Nicholas Roberts - 7 Forest Lane - To groundwater via borehole | | |
| Consented Discharge | Low | EPRDB3999DM: Mr Peter Jackson - The Chilterns - To infiltration field | | |

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| Consented Discharge | Low | EPRDP3325XB: Mr Brian Butler - Jardini - To tributary of Colden Common | | |
| Consented Discharge | Low | EPREB3096RR: Hazardous Waste Management Ltd - Otterbourne Farm - To groundwater | | |
| Consented Discharge | Low | EPREB3193DB: Mr Peter Nash - Malmsmead - To ground | | |
| Consented Discharge | Low | EPREB3198VU: Mr Robert Eburn - The Summerhouse - To groundwater | | |
| Consented Discharge | Low | EPREB3299WH: Mr James Marshall - Calvi - To groundwater | | |
| Consented Discharge | Low | EPREB3592NW: Mr Phiroz & Mrs Elizabeth Daruvalla - Greenlaw - To groundwater | | |
| Consented Discharge | Low | EPREB3594RB: Hideaway (lu) Ltd - Torbay Farm - To unnamed tributary of Ford Lake | | |
| Consented Discharge | Low | EPREB3899DL: Mr Derek Blake - Chinook Lodge - To groundwater | | |
| Consented Discharge | Low | EPRFB3091NX: Miss Majorie Wells - Bridle Way - To groundwater | | |
| Consented Discharge | Low | EPRFB3390AY: Dr Justin Turner - Yi Shui Ge - Tributary of Itchen Navigation | | |
| Consented Discharge | Low | EPRFB3390DP: Dr Justin Turner - Qing Ya Xi - To Kingfisher Stream | | |
| Consented Discharge | Low | EPRGP3929XP: Mrs Wetherill - Marling - To groundwater via borehole | | |

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| Consented Discharge | Low | EPRHB3994NK: Mr Mike Baird - Malms Farm - To River Itchen | | |
| Consented Discharge | Low | EPRJB3694NM: Mrs Carol Salmon - Nythfa - To tributary of Ford Lake River | | |
| Consented Discharge | Low | EPRJP3924XW: Knightsgate (uk) limited - Plot 1 Former Hoads Hill Service St - To tributary of River Wallington | | |
| Consented Discharge | Low | EPRKP3924XW: Knightsgate (UK) Ltd - Plot 1 Former Hoads Hill Service St - To tributary of River Wallington | | |
| Consented Discharge | Low | EPRLB3797RA: Rob Davies - Great Pecks STP - To ditch leading to River Hamble | | |
| Consented Discharge | Low | EPRLP3125GC: Mr Richard Daniel - Spencer place - To unnamed tributary of Shawfords lake | | |
| Consented Discharge | Low | EPRLP3225XG: Knightsgate (UK) Ltd - Plot 2 Former Hoads Hill Services St - To Tributary of River Wallington | | |
| Consented Discharge | Low | EPRLP3226GV: Knightsgate (UK) Ltd - Plot 4 Former Hoads Hill Service St - To tributary of River Wallington | | |
| Consented Discharge | Low | EPRLP3226XT: Knightsgate (UK) Ltd - Plot 3 Former Hoads Hill Service St - To tributary of River Wallington | | |
| Consented Discharge | Low | EPRLP3422GC: Mr Richard Girdlestone - Moat Cottage - Unnamed tributary of River Itchen | | |

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| Consented Discharge | Low | EPRNB3235AG: Various Names - Bowlakes Fish Farm - To Bow Lake and tributary of Bow Lake | | |
| Consented Discharge | Low | EPRNP3621XT: Knightsgate UK Ltd. - Whitethorn - To River Meon | | |
| Consented Discharge | Low | EPRSB3690WN: Mrs Sarah Byfield - 1 Lyons Cottage - To ditch tributary of Shawfords Lake | | |
| Consented Discharge | Low | EPRTB3392VC: Sandy Acres Girl Guide Group - Sandy Acres Girl Guide Group STP - To tributary of Shawfords Lake | | |
| Consented Discharge | Low | EPRTB3393VN: Mrs Paula Hayward - Black Horse Farm - To tributary of Shawfords Lake | | |
| Consented Discharge | Low | EPRUB3299RY: Swifts Property Ltd - Swifts Farm - To ditch tributary of Fisher's Pond | | |
| Consented Discharge | Low | EPRUB3697NY: Mr Paul Mifsud - Middle Barn The Tree Nursery - To tributary of Shawfords Lake | | |
| Consented Discharge | Low | EPRYP3825GE: Mr Stephen Spencer - Birchfrith - To groundwater via borehole | | |
| Consented Discharge | Low | EPRYP3825GE: Stephen Spencer - Birchfrith - To groundwater via borehole | | |
| Consented Discharge | Low | EPRZP3929XR: Mr Leigh Knowles - Laurel Cottage - To tributary of River Hamble | | |
| Consented Discharge | Low | G00388: C Morgan and Sons (Motors and Spares) Ltd - C Morgan and Sons | | |

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| | | Ltd - To Shawford Lake tributary of Hamble | | |
| Consented Discharge | Low | G01169: Veolia es Hampshire ltd - Warren Farm Waste Transfer Station - To groundwater via soakaway | | |
| Consented Discharge | Low | G01170: Veolia es Hampshire limited - Warren Farm Waste Transfer Station - To groundwater via soakaway | | |
| Consented Discharge | Low | G01172: Veolia es Hampshire ltd - Warren Farm Waste Transfer Station - To groundwater via soakaway | | |
| Consented Discharge | Low | H00515: Albion Water Ltd - Knowle Hospital - To unnamed tributary of River Meon | | |
| Consented Discharge | Low | H01073: Southern water services ltd - Sewage Pumping Station - To freshwater river | | |
| Consented Discharge | Low | H01351: David Crossley - Mayles Lodge - To freshwater river | | |
| Consented Discharge | Low | H01467: Mr N J Spencer - Rose Tree Cottage - To freshwater river | | |
| Consented Discharge | Low | H01471: J. Pugh Esq. - Arbour Cottage - To freshwater river | | |
| Consented Discharge | Low | H01543: Mr D M Daniels - Tudor Cottage - To Freshwater River | | |
| Consented Discharge | Low | H01544: J Heath Esq - Purbrook Heath Farm - To Freshwater River | | |
| Consented Discharge | Low | H01605: C D E Bazalgette - Potwell House - To freshwater river | | |

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| Consented Discharge | Low | H01607: Exec's of Mrs E Borthwick-Norton - The Southwick Estate - To Freshwater River | | |
| Consented Discharge | Low | H01608: Exec's of Mrs E Borthwick-Norton - The Southwick Estate - To Freshwater River | | |
| Consented Discharge | Low | H01657: Mrs E M Warwick - Gravel Hill House - To freshwater river | | |
| Consented Discharge | Low | H01692: D M Gamblin - Conifers - To freshwater river | | |
| Consented Discharge | Low | H01697: C G Poole - Hook heath farm - To freshwater river | | |
| Consented Discharge | Low | H01886: H L Gamblin & Sons - Little Tapnage Farm - To freshwater river | | |
| Consented Discharge | Low | H01896: H Howe Esq. - Oak Tree Cottage - To saline estuary | | |
| Consented Discharge | Low | H01925: Messrs F.J. Knowles & J.A. Geale - Brooklands Farm House - To saline estuary | | |
| Consented Discharge | Low | H01928: David Crossley - Deer Lodge - To freshwater river | | |
| Consented Discharge | Low | H01930: David Crossley - Double Lodge - To Freshwater River | | |
| Consented Discharge | Low | H01931: David Crossley - Northfields Farm House - To freshwater river | | |
| Consented Discharge | Low | H01958: Mr and Mrs Mclean - Underwath - To saline estuary | | |
| Consented Discharge | Low | H01960: D Parrett - Ashley Down Farm House - To freshwater river | | |

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| Consented Discharge | Low | H02003: M. M. Moore Esq - Premises at Curdridge Lane - To freshwater River | | |
| Consented Discharge | Low | H02504: Sandyfields Nurseries - Sandyfields Nursery - To land | | |
| Consented Discharge | Low | H02836: Messrs Pink and Arnod - Marwell Manor - To freshwater river | | |
| Consented Discharge | Low | N01162: Fasset Limited - Langstone Road - To Freshwater River | | |
| Consented Discharge | Low | N01265: North Shore Yacht Yards Ltd - Boshampton Lane - To Saline Estuary | | |
| Consented Discharge | Low | N01642: R B Dunford & Son - Stoke Park Farmhouse - To underground strata | | |
| Consented Discharge | Low | N02579: Southwick & Roche Court Estate co - 1 & 2 Ashley Down Cottages - To land | | |
| Consented Discharge | Low | N02930: Mrs P J Walker - House at Upham Farm House - Into land | | |
| Consented Discharge | Low | N03013: Ms Diana Porter - Nutwood House - Into land | | |
| Consented Discharge | Low | N03056: Mr Peter Wheeler - Timbers - Into land | | |
| Consented Discharge | Low | N03057: Mrs Gillian Denly - Septic tank serving Mallards Point - Into land | | |
| Consented Discharge | Low | N03092: J Potts Esw - Mayles House - To land | | |
| Consented Discharge | Low | N03260: Dr A K Coleman - Dell Copse - Into land | | |

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| Consented Discharge | Low | NPSWQD003411: Mrs Susanne Spencer - Lambs Hill - To soakaway | | |
| Consented Discharge | Low | NPSWQD005981: Fishers Pond Ltd - Fishers Pond Fishery - To a tributary of Bow Lake | | |
| Consented Discharge | Low | P00174: De La Rue Systems - High Technology Campus - To Freshwater River | | |
| Consented Discharge | Low | P010526: New Deeps Farm - New Deeps Farm - Into land | | |
| Consented Discharge | Low | P01097: Brendoncare Foundation - The Old Parsonage - To freshwater river | | |
| Consented Discharge | Low | P01146: Mr Michael West - Swimming Pool at Iolanda - Into land | | |
| Consented Discharge | Low | P02509: Warings Contractors Ltd - Warings Contractors ltd - To Land | | |
| Consented Discharge | Low | P02737: Royal armouries - Hampshire c.c. - To land | | |
| Consented Discharge | Low | P02918: S Hennessy Esq - Otterbourne Grange - Into land | | |
| Consented Discharge | Low | P03199: T Clay Esq - Leylands Farm - Into land | | |
| Consented Discharge | Low | P04382: Priory CC 101 Ltd - The Queens Head - To freshwater river | | |
| Consented Discharge | Low | P05514: Scottish and Southern Energy PLC - Land East of Southmoor Lane - To unnamed Tributary of Lavant Stream | | |

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| Consented Discharge | Low | P06216: The Meadows (Upham) Management Ltd - Upham Street STW - To underground strata | | |
| Consented Discharge | Low | P06856: Winchester City Council - Field Adj to No 1 Widley Walk - To Freshwater River | | |
| Consented Discharge | Low | P07187: Edmund Nuttall Ltd - Edmund Nuttall Ltd - To freshwater river | | |
| Consented Discharge | Low | P10535: Lift and Shift Skip Hire Ltd - Farlington Redoubt - To Land | | |
| Consented Discharge | Low | W00006: Southern Water Services Ltd - Bishops Waltham WTW - To River Hamble | | |
| Consented Discharge | Low | W00248: Southern water services ltd - Southwick WTW - To River Wallington | | |
| Consented Discharge | Low | EPRJP3726GP: SGC Projects Ltd – 2 The Cottages – To ditch tributary of River Wallington | | |
| Consented Discharge | Low | EPRNP3622XF: L Ross – Southern Cross – To Wallington River | | |
| Consented Discharge | Low | N03391: M R Stares Esq – Dunroamin – Into Land | | |
| Consented Discharge | Low | N00023: Royale Park Home Estates Ltd – Wickham Court – To tributary of Wallington River | | |
| Consented Discharge | Low | H01470: Mr & Mrs Longstaff – Danetree – To Freshwater River | | |
| Consented Discharge | Low | N03034: W Holdaway Esq – Winecross Farmhouse – Into land/ Infiltration system | | |

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| Consented Discharge | Low | H01673: T Copsey Esq – Russells Place – To freshwater river | | |
| Consented Discharge | Low | EPRHB3593VXL: Mr A Bower – Meadow View/Trampers Lane STP – To surface drain | | |
| Consented Discharge | Low | P06370: Winchester City Council – Wine Cross Sewage Treatment Works – To tributary of the Wallington River | | |
| Consented Discharge | Low | EPREB3199AH: Mr C Russell – Crantock – To groundwater | | |
| Consented Discharge | Low | NPSWQD005379: Mr G Little – Avonmore – To groundwater | | |
| Consented Discharge | Low | EPREB3692NR: Mr I Glenday – Little Ropers – To groundwater | | |
| Consented Discharge | Low | EPREB3499VZ: Mr S Allen – Blencathra – To groundwater | | |
| Consented Discharge | Low | EPREB3496WK: Mr A Bruce – Copthorne – To groundwater | | |
| Consented Discharge | Low | EPREB3992VT: Mr A Barrett – Combpyne – To groundwater | | |
| Designated Site - Botley Wood and Everett and Mushes Copses SSSI | High | Designated SSSI - Noted as GWDTE. | West of corridor in A32 to Shirrel Heath area | |
| Designated Site - Hook Heath Meadows SSSI | High | Designated SSSI - Noted as GWDTE. | North of corridor adjacent to Potwell Tributary in proposed Break Pressure Tank to A32 area | |
| Designated Site - Lye Heath Marsh SSSI | High | Designated SSSI - Noted as GWDTE. | North of corridor adjacent to Potwell Tributary in proposed Break Pressure Tank to A32 area | |

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| Designated Site - Portsdown SSSI | High | Designated SSSI - Not designated GWDTE. | Within study area of proposed WRP to land west of London Road (A3) and then to A32 | Chalk Grassland Habitat |
| Designated Site - Waltham Chase Meadows SSSI | High | Designated Site of SSSI - Noted as GWDTE. | North-east of Shirrel Heath to Bishop's Waltham study area | |
| GWSWI - Sinks | Medium | Potential sinks | Within study area | |
| GWSWI - Springs | High | Bedhampton and Havant Springs (locally important public water supply) | In Bedhampton and Havant area | |
| GWSWI - Springs | Medium | Potential springs | Within study area | Springs that feed GWDTE or provide significant baseflow may be of high value |
| GWWSI – GWDTE | High | Potential GWDTE | | |
| Licensed Abstraction – Groundwater (GW) | Medium | Southwick Estate - Offwell Farm, Southwick (Private Water Supply) | Within study area for proposed BPT to A32 | |
| Licensed Abstraction - GW | Medium | Golfpartners International Limited - Borehole at Wickham Park Golf Club (Spray Irrigation) | Within study area for A32 to Shirrel Heath | |
| Licensed Abstraction - GW | Medium | Fishers Pond Ltd - Fishers Pond Point A (Agriculture - Fish Farm/Cress Pond Throughflow) | Within study area for Bishop's Waltham to Otterbourne | |
| Licensed Abstraction - GW | Medium | Fishers Pond Ltd - Fisher Pond Borehole C (Agriculture - Fish Farm/Cress Pond Throughflow) | Within study area for Bishop's Waltham to Otterbourne | |
| Licensed Abstraction - GW | Medium | Hampshire Carp Hatcheries - Bowlake Fish Farm Borehole at Point A (Agriculture - Fish Farm/Cress Pond Throughflow) | Within study area for Bishop's Waltham to Otterbourne | |

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| Licensed Abstraction - GW | High | Portsmouth Water - Bedhampton PS Spring No 1 (Public Water Supply) | Within study area for proposed WRP and preferred pipeline corridors from the proposed WRP to Budds Farm WTW and Havant Thicket Reservoir . | |
| Licensed Abstraction - GW | High | Portsmouth Water - Bedhampton PS Spring No 2 (Public Water Supply) | Within study area for proposed WRP and preferred pipeline corridors from the proposed WRP to Budds Farm WTW and Havant Thicket Reservoir . | |
| Licensed Abstraction - GW | High | Portsmouth Water - Havant PS (Public Water Supply) | Within study area for proposed WRP and preferred pipeline corridors from the proposed WRP to Budds Farm WTW and Havant Thicket Reservoir . | |
| Licensed Abstraction - GW | High | Portsmouth Water - Maindell PS(Public Water Supply) | Within study area for land west of London Road (A3) to A32 | |
| Licensed Abstraction - GW | High | Portsmouth Water - Lower Upham (Public Water Supply) | Within study area for Bishop's Waltham to Otterbourne | |
| Licensed Abstraction - GW | High | Southern Water Services - Otterbourne PS Point E (Environmental Make-up or top-up water) | Within study area for Bishop's Waltham to Otterbourne | |
| Licensed Abstraction - GW | High | Southern Water Services - Otterbourne PS Point F (Environmental Make-up or top-up water) | Within Bishop's Waltham to Otterbourne preferred pipeline corridor | |
| Licensed Abstraction - GW | High | Southern Water Services - Otterbourne PS Point G (Public Water Supply) | Within study area for Bishop's Waltham to Otterbourne | |
| Licensed Abstraction - GW | High | Southern Water Services - Otterbourne PS Point H (Environmental Make-up or top-up water) | Within study area for Bishop's Waltham to Otterbourne | |
| Licensed Abstraction - GW | High | Southern Water Services - Otterbourne PS Point A (Environmental Make-up or top-up water) | Within study area for Bishop's Waltham to Otterbourne | |

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| Licensed Abstraction - GW | High | Southern Water Services - Otterbourne PS Point B (Environmental Make-up or top-up water) | Within study area for Bishop's Waltham to Otterbourne | |
| Licensed Abstraction - GW | High | Southern Water Services - Otterbourne PS Point C (Environmental Make-up or top-up water) | Within study area for Bishop's Waltham to Otterbourne | |
| Licensed Abstraction - GW | High | Southern Water Services - Otterbourne PS Point K (Environmental Make-up or top-up water) | Within study area for Bishop's Waltham to Otterbourne | |
| Licensed Abstraction - GW | High | Southern Water Services - Otterbourne PS Point D (Environmental Make-up or top-up water) | Within study area for Bishop's Waltham to Otterbourne | |
| Licensed Abstraction – Surface Water (SW) | Medium | 11/42/33.5/23: Southwick Park Naval Recreational Centre Management Committee - Southwick Lake on the River Wallington (Spray Irrigation) | Within study area for Bishop's Waltham to Otterbourne | |
| Licensed Abstraction - SW | Medium | 11/42/25.2/54: Peter Taplin - River Hamble at Durley (Agriculture/Irrigation) | Within study area for Bishop's Waltham to Otterbourne | |
| Licensed Abstraction - SW | Medium | 11/42/22.9/159: Fishers Pond Ltd - Trib of Bow Lake Stream at Fishers Pond (Agriculture - Fish Farm/Cress Pond Throughflow) | Within study area for Bishop's Waltham to Otterbourne | |
| Licensed Abstraction - SW | Medium | 31/090: Fishers Pond Ltd - Thompson Lane, Fishers Pond (Points A and B) (Agriculture - Fish Farm/Cress Pond Throughflow) | Within study area for Bishop's Waltham to Otterbourne | |
| Licensed Abstraction - SW | Medium | 11/42/22.9/163: Hampshire Carp Hatcheries - Bow Lake Stream at Soke Common (Agriculture - Fish Farm/Cress Pond Throughflow) | Within study area for Bishop's Waltham to Otterbourne | |

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| Licensed Abstraction - SW | High | 31/110: Henry Russell - Black Dyke, Point A (Environmental - Transfer between sources) | Within study area for Bishop's Waltham to Otterbourne | To be confirmed dependent on what transfer is supporting. |
| Licensed Abstraction - SW | High | SO/042/0031/023: East Lodge Fisheries - Itchen Navigation at Brambridge (Environmental - Remedial River/Wetland Support [Transfer between sources]) | Within study area for Bishop's Waltham to Otterbourne | To be confirmed dependent on what transfer is supporting. |
| Licensed Abstraction - SW | High | SO/042/0031/020: Malms House Ltd - Lower Itchen Navigation at Shawford (Environmental - Non-remedial water/wetland support [Transfer between sources]) | Within study area for Bishop's Waltham to Otterbourne | To be confirmed dependent on what transfer is supporting. |
| Licensed Abstraction - SW | High | 11/42/22.6/93: Southern Water Services - River Itchen At the Otterbourne Intake (Public Water Supply) | Within study area for Bishop's Waltham to Otterbourne | |
| SPZ - SPZ1 and SPZ1c | High | SPZ related to Bedhampton-Havant Springs PWS | Crossed by proposed WRP to Havant Thicket Reservoir and proposed WRP to land west of London Road (A3) preferred pipeline corridors | |
| SPZ - SPZ1 and SPZ1c | High | SPZ related to Maindell PWS | Within study area of land west of London Road (A3) to A32 | |
| SPZ - SPZ1 and SPZ1c | High | SPZ related to Northbrook PWS | Within Bishop's Waltham to Otterbourne study area. | |
| SPZ - SPZ1 and SPZ1c | High | SPZ related to Lower Upham PWS | Crossed by preferred pipeline corridor in Bishop's Waltham to Otterbourne Scoping Area. | |
| SPZ - SPZ1 and SPZ1c | High | SPZ related to Fisher Pond Commercial Abstraction | Within Bishop's Waltham to Otterbourne study area. | |

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| SPZ - SPZ1 and SPZ1c | High | SPZ related to Otterbourne PWS | Crossed by preferred pipeline corridor in Bishop's Waltham to Otterbourne Scoping Area. | |
| SPZ - SPZ2 and SPZ2c | High | SPZ related to Maindell PWS | Crossed by preferred pipeline corridor in land west of London Road (A3) to A32 Scoping Area | |
| SPZ - SPZ2 and SPZ2c | High | SPZ related to Northbrook PWS | Within Bishop's Waltham to Otterbourne study area. | |
| SPZ - SPZ2 and SPZ2c | High | SPZ related to Lower Upham PWS | Crossed by preferred pipeline corridor in Bishop's Waltham to Otterbourne Scoping Area. | |
| SPZ - SPZ2 and SPZ2c | High | SPZ related to Otterbourne PWS | Crossed by preferred pipeline corridor in Bishop's Waltham to Otterbourne Scoping Area. | |
| SPZ - SPZ3 | Medium | SPZ related to Maindell PWS | Crossed by preferred pipeline corridor in land west of London Road (A3) to A32 and A32 to Shirrel Heath Scheme Areas. | |
| Surface water body - Bow Lake | Medium | WFD Classified Watercourse. | Crossed by preferred pipeline corridor in Bishop's Waltham to Otterbourne Scoping Area. | |
| Surface water body - Hermitage Stream | Medium | WFD Classified Watercourse | Within study area of proposed WRP and Proposed Underground Pipeline to Budds Farm WTW. Crossed by proposed WRP to Havant Thicket Reservoir preferred pipeline corridor. | |
| Surface water body - Horton Heath Stream | Medium | WFD Classified Watercourse. | Crossed by preferred pipeline corridor in Bishop's Waltham to Otterbourne Scoping Area. | |

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| Surface water body - Itchen and Itchen Crossing | High | Protected WFD Classified Water Body - SAC, SSSI. Noted as GWDTE. | Crossed by preferred pipeline corridor in Bishop's Waltham to Otterbourne Scoping Area. | |
| Surface water body - Langstone Harbour | High | Protected WFD Transitional Water Body - SSSI, SPA, Ramsar, SAC. Noted as GWDTE. | South of proposed WRP, within study area. | |
| Surface water body - Lavant (Hants) | Medium | WFD Classified Watercourse | Within study area of underground pipelines from proposed WRP to Havant Thicket Reservoir and Budds Farm WTW (eastern extent) | |
| Surface water body - Main River Hamble | Medium | WFD Classified Watercourse. | Crossed by preferred pipeline corridor in Shirrel Heath to Bishop's Waltham Scheme Area | |
| Surface water body - Moors Stream | Medium | WFD Classified Watercourse. | Within study area of Shirrel Heath to Bishop's Waltham and Bishop's Waltham to Otterbourne | |
| Surface water body - Potwell Tributary | Medium | WFD Classified Watercourse | Within study area of proposed WRP to land west of London Road (A3) and then to A32 | |
| Surface water body - River Meon | High | WFD Classified Watercourse. | Crossed by preferred pipeline corridor in A32 to Shirrel Heath Scheme Area | River Meon subject to S.20 Compensation under the SW drought plan. Sections of compensation would be protected as if they were SAC by NE. Long term desire from NE to designate |

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| | | | | the River Meon as SAC. |
| Surface water body - Upper Hamble | Medium | WFD Classified Watercourse. | Potentially crossed by preferred pipeline corridor in Bishop's Waltham to Otterbourne Scheme Area. | |
| Surface water body - Upper Wallington | Medium | WFD Classified Watercourse | Within study area of land west of London Road (A3) to A32 | |
| Surface water body - Wallington below Southwick | Medium | WFD Classified Watercourse | Within study area of land west of London Road (A3) to A32 and A32 to Shirrel Heath. Trenchless crossing of the Wallington in land west of London Road (A3) to A32 Scheme Area. | |
| Unlicensed abstraction – GW | Low | Stoke Park Farm Private Water Supply | Within the Proposed Development study area for Bishop's Waltham to Otterbourne | Eastleigh District Council |
| Unlicensed abstraction - GW | Low | Long Cottage Private Water Supply | Within the Proposed Development study area for A32 to Shirrel Heath | Winchester Council |
| Unlicensed abstraction - GW | Low | The Bungalow (now the Garden House) Private Water Supply | Within the Proposed Development study area for A32 to Shirrel Heath and Shirrel Heath to Bishop's Waltham | Winchester Council |
| Unlicensed abstraction - GW | Low | Yewtree Cottage Private Water Supply | Within the Proposed Development study area for Shirrel Heath to Bishop's Waltham | Winchester Council |
| Unlicensed abstraction - GW | Low | Woodmans Farm House Private Water Supply | Within Shirrel Heath to Bishop's Waltham Scheme Area | Winchester Council |
| Unlicensed abstraction - GW | Low | The Granary Private Water Supply | Within the Proposed Development study area for Shirrel Heath to Bishop's Waltham | Winchester Council |
| Unlicensed abstraction - GW | Low | Lowhill Farmhouse Private Water Supply | Within Bishop's Waltham to Otterbourne Scheme Area | Winchester Council |

| Receptor | Value | Value Rationale | Location(s) | Notes |
|---|---|---|---|---|
| Unlicensed abstraction - GW | Low | Marwell Manor Private Water Supply | Within the Proposed Development study area for Bishop's Waltham to Otterbourne | Winchester Council |

## 4.4 Receptor impacts

4.4.1 The approach used to assess magnitude of impacts on water environment features considers the potential change to the receptors. This includes the severity of the impact, together with the vulnerability of the receptor to change. The magnitude of impact is assigned based on the criteria outlined in Table 4-2 below (based on Table 3.71 of DMRB LA113).

**Table 4-2: Estimating magnitude of impact on an attribute**

| Magnitude | Summary |
|---|---|
| Major Adverse | Permanent/irreversible, or large-scale changes, over the whole receptor affecting usability or value. Causes fundamental changes to key features of the receptor's character or distinctiveness.<br><br>Water resources<br>Permanent changes to geomorphology and/or hydrology that prevent natural processes operating<br>Permanent and/or wide scale effects on water quality or availability<br>Permanent loss or long-term degradation of a water supply source resulting in prosecution<br>Permanent or wide scale degradation of habitat quality |
| Moderate Adverse | Partial loss or noticeable change over the majority of the receptor, and/or discernible alteration to key features of the receptor's character or distinctiveness. Moderate permanent or long-term reversible change affecting usability or value over the medium- term or local area.<br><br>Water resources<br>Medium-term effects on water quality or availability<br>Medium-term degradation of a water supply source, possibly resulting in prosecution<br>Habitat change over the medium-term |
| Minor Adverse | Discernible temporary change over a minority of the receptor, and/or with minimal effect on usability, risk or value. Also, potential discernible alteration to key features of the receptor's character or distinctiveness.<br><br>Water resources<br>Short-term or local effects on water quality or availability<br>Short-term degradation of a water supply source<br>Habitat change over the short-term |
| Negligible | Temporary change, undiscernible over the medium- to long-term, with no effect on usability or value. Slight, or no, alteration to the characteristics or features of the receptor's character or distinctiveness.<br><br>Water resources |

| Magnitude | Summary |
|---|---|
| | Intermittent impact on local water quality or availability<br>Intermittent or no degradation of a water supply source<br>Very slight local changes to habitat that have no observable impact on dependent receptors |
| Minor Beneficial | Some beneficial effect on attribute or reduced risk of negative effect occurring<br><br>Water resources<br>Reduction in existing spillage risk by 50% or more to an aquifer (when existing spillage risk is <1% annually).<br>Reduction of groundwater hazards to existing structures.<br>Reduction in waterlogging and groundwater flooding. |
| Moderate Beneficial | Results in moderate improvement of attribute quality.<br><br>Water resources<br>Reduction in existing spillage risk by 50% or more to an aquifer (when existing spillage risk is >1% annually).<br>Contribution to improvement in water body WFD classification.<br>Improvement in water body CAMS classification.<br>Support to significant improvements in damaged GWDTE. |
| Major Beneficial | Results in major improvement of attribute quality.<br><br>Water resources<br>Removal of existing polluting discharge to an aquifer or removing the likelihood of polluting discharges occurring.<br>Recharge of an aquifer.<br>Improvement in water body WFD classification. |
| No change | No loss or alteration of characteristics, features, or elements; no observable adverse or beneficial impacts. |

4.4.2 At this stage, the design of the preferred pipeline corridor, temporary and permanent works is ongoing. As such, a detailed assessment of impacts to individual receptors is constrained. At this time, a qualitative assessment of the key risks to the receptors has been undertaken which are summarised in the construction impacts and operational impacts sections below. This assessment has considered both the significance of receptors that have the potential to be impacted, together with the likely magnitude of any impacts on those receptors (i.e. impacts that may result in significant effects). Potential mitigation measures of these key risks are highlighted in the Design Considerations and Recommendations section; however, these would need to be considered in relation to other environmental, design and operational constraints.

### Construction impacts

4.4.3 Based on the baseline data collated to date, the following key construction activities are identified which have the potential to cause significant effects to receptors within the study area:

- Underground pipeline shafts are assumed to require dewatering to enable construction. This has the potential to locally reduce the groundwater table; potentially impacting any receptors within the radius of influence. When constructed in the Chalk, the risks of reducing the groundwater table could be significant due to the dependency of the receptors to the Chalk groundwater (e.g., Chalk streams, GWDTE etc).
- The construction of the tunnel within the Chalk has the potential to act as a barrier to flow; in particular if the tunnel cuts across a rapid flow pathway (such as a dissolution feature). Conversely the tunnel has the potential to act as a preferential pathway, enabling continuity between sources and receptors. The permanent impacts from the tunnel installation will be assessed within the construction impacts.
- Underground pipeline shafts constructed into the Chalk would provide a direct pathway for contamination from construction activities to the Principal Aquifer. Where the shafts are located within a SPZ1, this risk is increased due to the potential of impacting the local public water supply.
- Tunnelling within the Chalk also has the potential to impact the groundwater quality, as the underground pipeline would be in direct continuity with the Principal aquifer. Any loss (e.g., slurry) from the tunnel face could migrate to the public water supply (PWS) abstractions, whilst turbidity risks can be present from the creation of suspended sediments [60]. Groundwater quantity impacts could occur if groundwater is not fully excluded from the underground pipeline.
- Crossings of surface watercourses are a risk to both water quality and quantity. Quantity impacts could occur from a reduction in the groundwater table (from dewatering of the drive and reception shafts), which in turn could lead to a reduction in baseflow to the watercourse(s). Quality impacts are most likely from a polluting event (e.g. slurry breakout, spillage, uncontrolled surface run-off). This risk is increased when tunnelling through higher permeability deposits (Principal or Secondary A aquifers).
- On the basis that best practice construction and pollution prevention measures are employed, it is anticipated that water quality and quantity impacts from the open-cut sections of the underground pipeline would be generally limited. Exceptions to this may be where the preferred pipeline corridor is within close proximity to surface watercourses, groundwater-surface water interactions or licensed/unlicensed abstractions. Impacts to individual receptors proximal to the preferred pipeline corridor would need to be reviewed as the design is finalised, with the HIA informing micro-siting and routing works as the design develops.

### Operational impacts

4.4.4 Based on the baseline data collated to date, the following key operational activities are identified which have the potential to cause significant effects to receptors within the study area:

- Accidental release of contaminants to groundwater during planned and unplanned activities.
- Leakage from/into the installed pipeline has the potential to alter the groundwater chemistry or lead to dissolution when within the Chalk.

### Design considerations and recommendations

4.4.5 Based on the baseline data collected to date, the following underground pipeline routes are recommended from a hydrogeological impact perspective:

- A southern Itchen crossing is preferable as it is anticipated to be within London Clay, and not within the Chalk bedrock and SPZ1. By tunnelling through the lower permeability London Clay, the quality and quantity risks to the high value receptors in the area are significantly reduced:
  - The drawdown radius of influence from the launch and reception shafts would be significantly smaller and the required abstraction rates much lower, reducing net abstraction from the water environment and potential impacts to groundwater dependent features.
  - The risks to the water environment from a polluting incident are significantly less when constructing within unproductive/low permeability strata as the pathway to receptors is impeded.
- The southern proposed WRP to land west of London Road (A3) route (via the B2177) is preferable as it would reduce (and preferably remove) the requirement to tunnel through, and install shafts within, the SPZ1.
- The Meon crossing may be within the Principal Chalk aquifer if installed in the south-west of the corridor. Routing the underground pipeline north-east of Wickham Lodge out of the Chalk would reduce risks on the water environment (the bedrock is mapped as the Lambeth Group in the north-eastern half of the corridor).

4.4.6 Based on the potential significant impacts and risks highlighted previously, the following design considerations and recommendations for further works are summarised below:

- Early engagement with key stakeholders including the Water Companies, EA and Natural England.
- Groundwater excluding trenchless solutions should be used (such as closed face tunnelling methods or horizontal directional drilling).
- In addition to standard Risk Assessment and Method Statements (RAMS), a RAMS should be prepared specific to the tunnelling operations within SPZ1 and agreed with key stakeholders (EA and abstraction operators) at an early stage of the design. The RAMS should include a detailed description on the tunnelling selection and methodology, evidence of past successful utilisation

within karstic Chalk and SPZ1, identification of key risks to the aquifer (e.g., slurry loss, turbidity etc) and control measures to reduce risks.

- Underground pipeline shafts within the Chalk should be avoided, where possible. No shafts should be installed within the Chalk in an SPZ1, without due consideration of the risks and only when absolutely necessary. Any shafts within SPZ1 would need to be discussed in detail with the abstraction operator and the EA.
- Trenchless river crossings within the Chalk should be avoided where possible, particularly at the Itchen and Meon crossings.
- The tunnelling methodology and underground pipeline design are to consider the integrity of the underground pipeline should large karstic/dissolution features within the Chalk bedrock be encountered.
- The permanent works design should consider leakage risk during operation (contamination and dissolution risks).
- Site investigation should be undertaken at key locations along the preferred pipeline corridor, with a focus on trenchless sections and in proximity to high value receptors. Site investigation should include permeability testing at locations where groundwater control operations are likely in the future (e.g., shafts). Pumping tests are beneficial to ascertain hydrogeological parameters but may be best undertaken by the main works contractor once the detailed design is finalised so particular horizons/areas can be investigated.
- Site investigations within the SPZ1 would need specific consideration, with a method statement agreed with key stakeholders including the EA and the relevant water company. Specific measures may include a secure well head, limitations on drilling fluids/enhancers and an appropriate drilling technique and flush.
- Groundwater samples within the Chalk should include testing for contaminants that can be indicative of a rapid flow component (i.e., dissolution features) with connectivity to the surface. This can include determinants such as turbidity, coliforms and pesticides that degrade rapidly in the subsurface.
- Site visits to ground truth key receptors identified within the HIA are recommended following receipt of initial site investigation data and as the design is progressed.
- Development of a water monitoring strategy to ascertain the hydrological baseline, identify variations (both natural or anthropogenic) and inform mitigation measures is recommended. This strategy would be agreed with key stakeholders and could be an appendix to the Water environment (including flood risk) chapter of the PEI Report and ES. The strategy should include long term groundwater monitoring in key areas (from installation to post-construction) to ascertain seasonal variability in groundwater levels and monitor groundwater fluctuations pre, during and post construction.
- Quantitative assessment of dewatering impacts (drawdowns and flows) from shafts constructed in Principal and Secondary Aquifers, is undertaken and included in future revisions of the HIA.
- Assessment of potential barrier to flow risk is undertaken and included in future revision of the HIA.

- A voids treatment protocol is developed, to document how voids encountered during construction within the Chalk would be mitigated.
- Best practice (or better) water management and pollution prevention measures to be utilised as per relevant EA and CIRIA guidance and documented within the Construction Environmental Management Plan.

# 5 Mitigation measures and residual impacts

## 5.1 Introduction

5.1.1 This section is to be updated and finalised following receipt of additional site specific information, progression of the design and further engagement with stakeholders.

## 5.2 Embedded mitigation measures

5.2.1 Avoidance and prevention of water impacts will be embedded into the design of the Proposed Development (primary mitigation), where possible in accordance with the hierarchy of mitigation as described in Chapter 5 General EIA approach and methodology within Volume I. The assessment of impacts and likely significant effects will be made with these primary mitigation measures in place.

## 5.3 Significance of effect taking into consideration embedded mitigation

5.3.1 Following further development of the design, assessment of the significance of effect would be undertaken, by taking into consideration the magnitude of impact and value of the receptor.

5.3.2 The significance of effect upon the receptor is assessed using the matrix in Table 5-1 below (based on Table 3.8.1. of DMRB LA 104).

**Table 5-1: Significance matrix**

| | | Magnitude of Impact (Degree of Change) | | | | |
|---|---|---|---|---|---|---|
| | | **No change** | **Negligible** | **Minor** | **Moderate** | **Major** |
| **Environmental Value (Sensitivity)** | High | Neutral | Slight | Moderate or Large | Large or Very Large | Very Large |
| | Medium | Neutral | Slight | Slight or Moderate | Moderate or Large | Large or Very Large |
| | Low | Neutral | Neutral or Slight | Slight | Moderate | Moderate or Large |
| | Very Low | Neutral | Neutral or Slight | Neutral or Slight | Slight | Slight or Moderate |
| | Negligible | Neutral | Neutral | Neutral or Slight | Neutral or Slight | Slight |

5.3.3 Where the assessment indicates the significance (taking into consideration embedded mitigation) would be moderate or above this would be summarised below.

## 5.4 Additional mitigation measures

5.4.1 Additional mitigation measures to reduce the impact to receptors would be highlighted here. Additional mitigation measures are to be confirmed as the design is progressed.

5.4.2 The findings of future iterations of the HIA would feed into management plans to be produced, with iterations as detail design develops, and would be secured and delivered through the DCO.

5.4.3 The management plans would ensure that environmental impacts identified in environmental studies and assessments would be properly managed and that controls would be put in place to reduce the impacts of the Proposed Development on the natural and human environment during construction.

## 5.5 Residual impacts

5.5.1 Residual impacts from the temporary (construction) and permanent (operational) works would be summarised here.

# 6 Conclusions and recommendations

6.1.1 The HIA is a work in progress and has been developed to date to document the conceptual understanding of the hydrogeology based on publicly available records and inform further works and design.

6.1.2 From initial review of the baseline data, key construction activities and risks have been identified which may lead to significant impacts:

- Tunnelling and shaft construction within the Chalk; particularly within SPZ1 areas. The key risks that need further consideration are the contamination risks due to direct continuity with the Principal Aquifer and the quantity/flow impacts from dewatering and installation of the permanent infrastructure.
- Trenchless crossings of surface water features. The key risks that need further considerations are the pollution risks and the quantity/baseflow impacts from dewatering.
- Leakage from the pipeline in the permanent state. The key risks being alteration of groundwater chemistry and dissolution.

6.1.3 Based on the assessment of key risks, the report recommends the following underground pipeline routes from a hydrogeological perspective:

- A southern Itchen crossing
- The southern proposed WRP to land west of London Road (A3) route (via the B2177)
- The Meon crossing is located north-east of Wickham Lodge

6.1.4 In addition, the report highlights the following design considerations and recommendations for further works:

- Early engagement with key stakeholders including the Water Companies, EA and Natural England.
- When trenchless methodologies or tunnelling is to be utilised, groundwater excluding methodologies should be selected (such as closed face solutions or horizontal directional drilling).
- A RAMS should be prepared specific to the tunnelling operations within SPZ1 and agreed with key stakeholders (EA and abstraction operators) at an early stage of the design. The RAMS should include a detailed description on the tunnelling selection and methodology, evidence of past successful utilisation within karstic Chalk and SPZ1, identification of key risks to the aquifer (e.g., slurry loss, turbidity etc) and control measures to reduce risks.
- Underground pipeline shafts within the Chalk should be avoided, where possible. No shafts should be installed within the Chalk in an SPZ1, without due consideration of the risks and only when absolutely necessary. Any shafts within SPZ1 would need to be discussed in detail with the abstraction operator and the EA.
- Trenchless crossings within the Chalk should be avoided where possible, particularly at the Itchen and Meon crossings.

- The tunnelling methodology and underground pipeline design are to consider the integrity of the underground pipeline should large karstic/dissolution features within the Chalk bedrock be encountered.
- The permanent works design should consider leakage risk during operation (contamination and dissolution risks).
- Site investigation should be undertaken at key locations along the Proposed Underground Pipeline route, with a focus on trenchless sections and in proximity to high value receptors. Site investigation should include permeability testing at locations where groundwater control operations are likely in the future (e.g., shafts). Pumping tests are beneficial to ascertain hydrogeological parameters but may be best undertaken by the main works contractor once the detailed design is finalised so particular horizons/areas can be investigated.
- Site investigations within the SPZ1 would need specific consideration, with a method statement agreed with key stakeholders including the EA and the relevant water company. Specific measures may include a secure well head, limitations on drilling fluids/enhancers and an appropriate drilling technique and flush.
- Groundwater samples within the Chalk should include testing for contaminants that can be indicative of a rapid flow component (i.e., dissolution features) with connectivity to the surface. This can include determinants such as turbidity, coliforms and pesticides that degrade rapidly in the subsurface.
- Site visits to ground truth key receptors identified within the HIA is recommended following receipt of initial site investigation data and as the design is progressed.
- Development of a water monitoring strategy to ascertain the hydrological baseline, identify variations (both natural or anthropogenic) and inform mitigation measures is recommended. This strategy would be agreed with key stakeholders. The strategy should include long term groundwater monitoring in key areas (from installation to post-construction) to ascertain seasonal variability in groundwater levels and monitor groundwater fluctuations pre, during and post construction.
- Quantitative assessment of dewatering impacts (drawdowns and flows) from shafts constructed in Principal and Secondary Aquifers, is undertaken and included in future revisions of the HIA.
- Assessment of potential barrier to flow risk is undertaken and included in future revision of the HIA.
- A voids treatment protocol is developed, to document how voids encountered during construction within the Chalk would be mitigated.
- Best practice (or better) water management and pollution prevention measures to be utilised as per relevant EA and CIRIA guidance and documented within the Construction Environmental Management Plan.

6.1.5 The HIA would be updated for the PEI Report (and subsequently the ES), taking into consideration local data received from stakeholders and the initial site investigation works which would be key to refining the conceptual understanding. A more detailed assessment of impacts to receptors can then be undertaken to ascertain if there are any significant effects which require additional mitigation

measures. Receptors not in hydraulic continuity with the scheme can also be scoped out of further assessment.

6.1.6 As further design and stakeholder engagement progresses, opportunities for beneficial impacts and betterment would also be documented.

# Annex A - Conceptual model cross sections

## Figures A1 to A10

Figure A1: General overview of cross sections

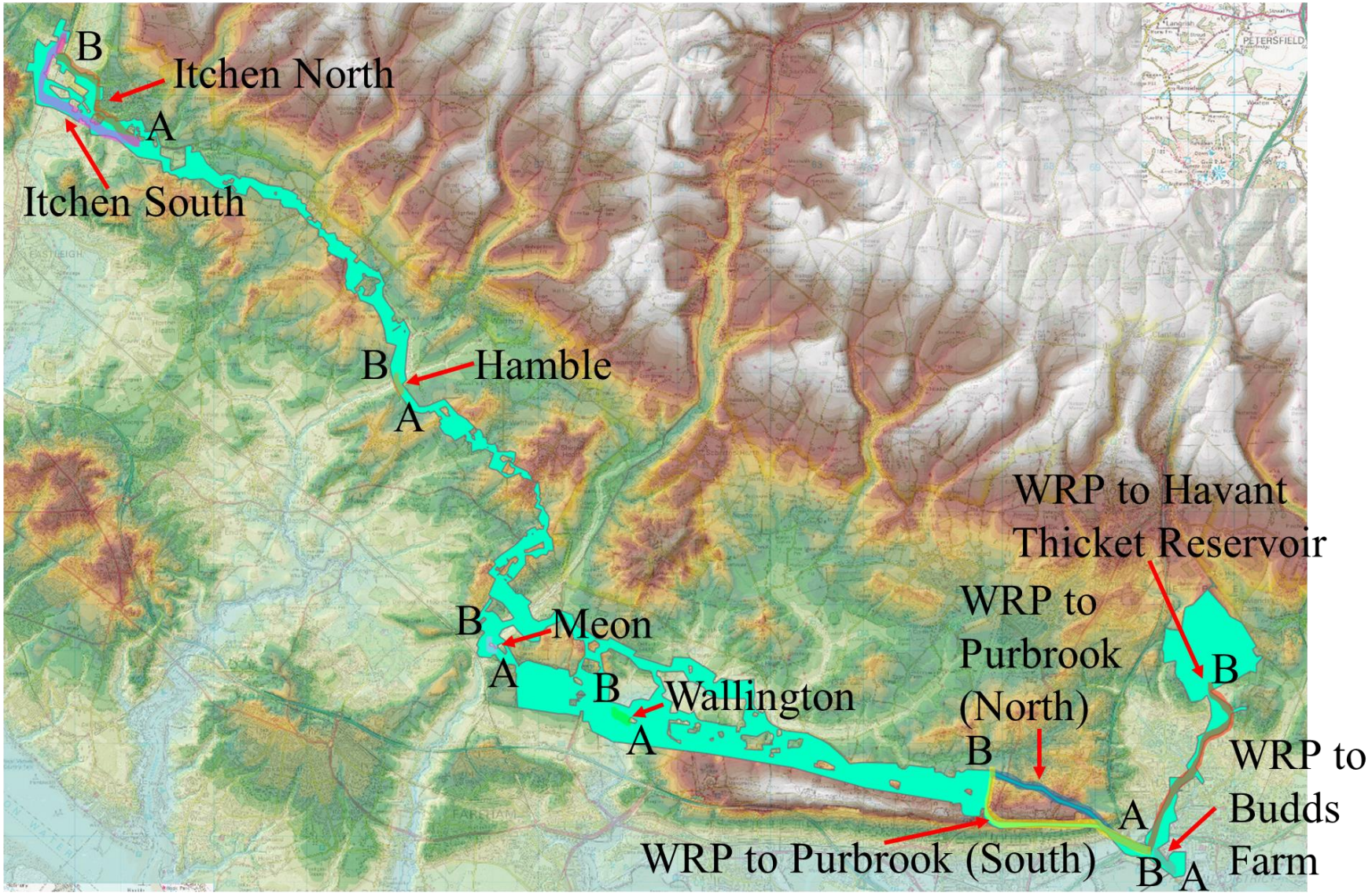


Figure A2: River Itchen North Crossing

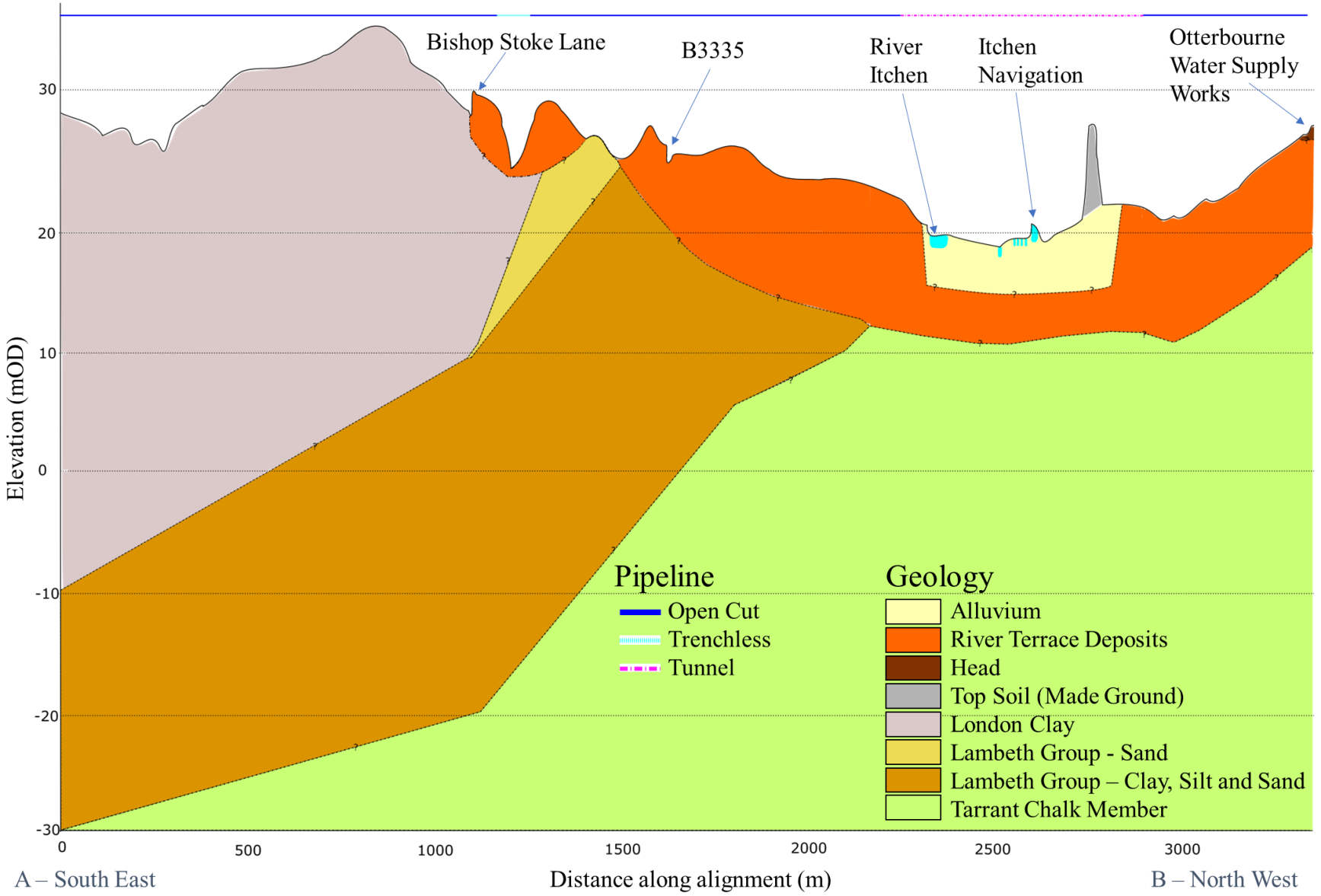


Figure A3: River Itchen South Crossing

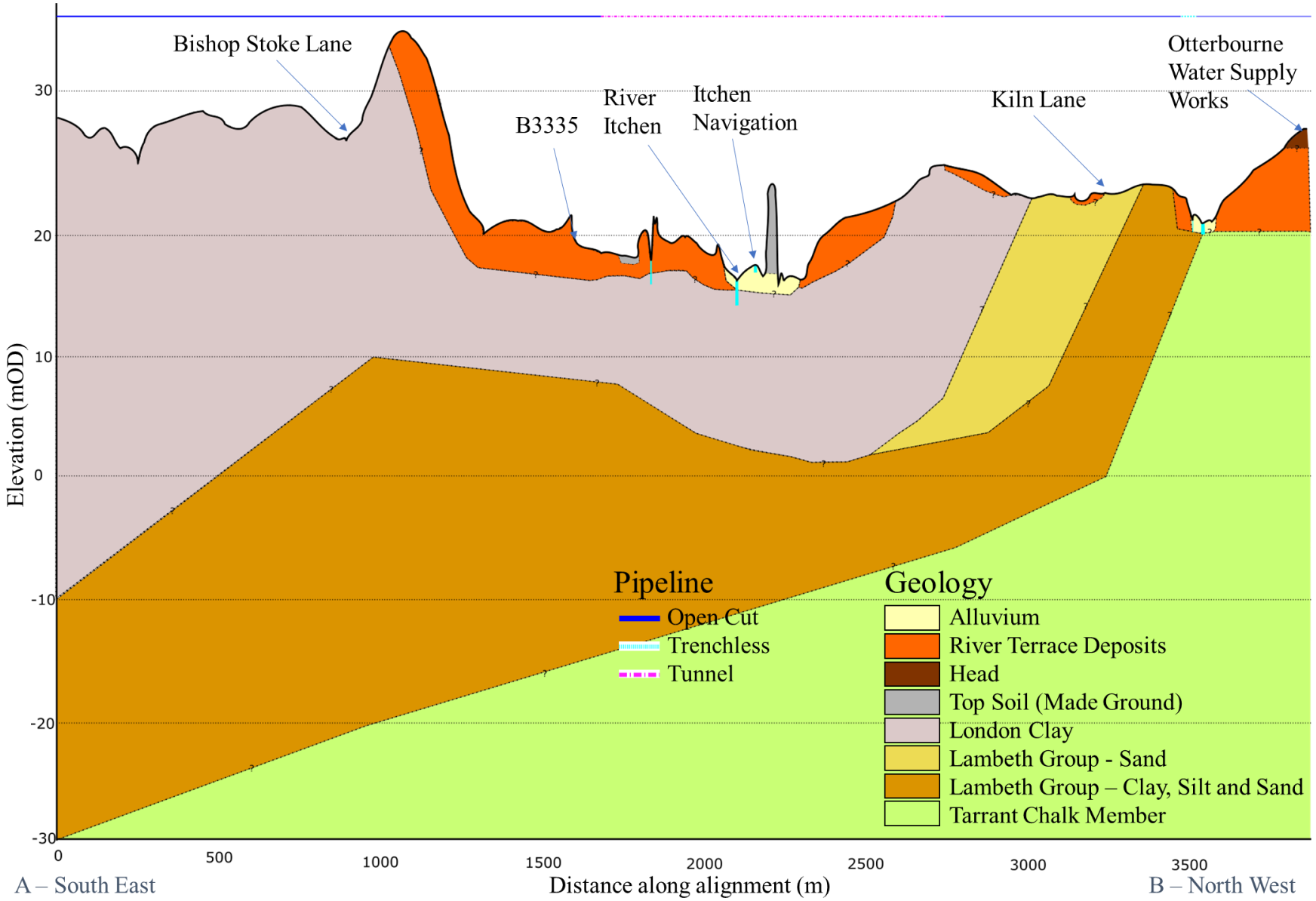


Figure A4: River Meon Crossing

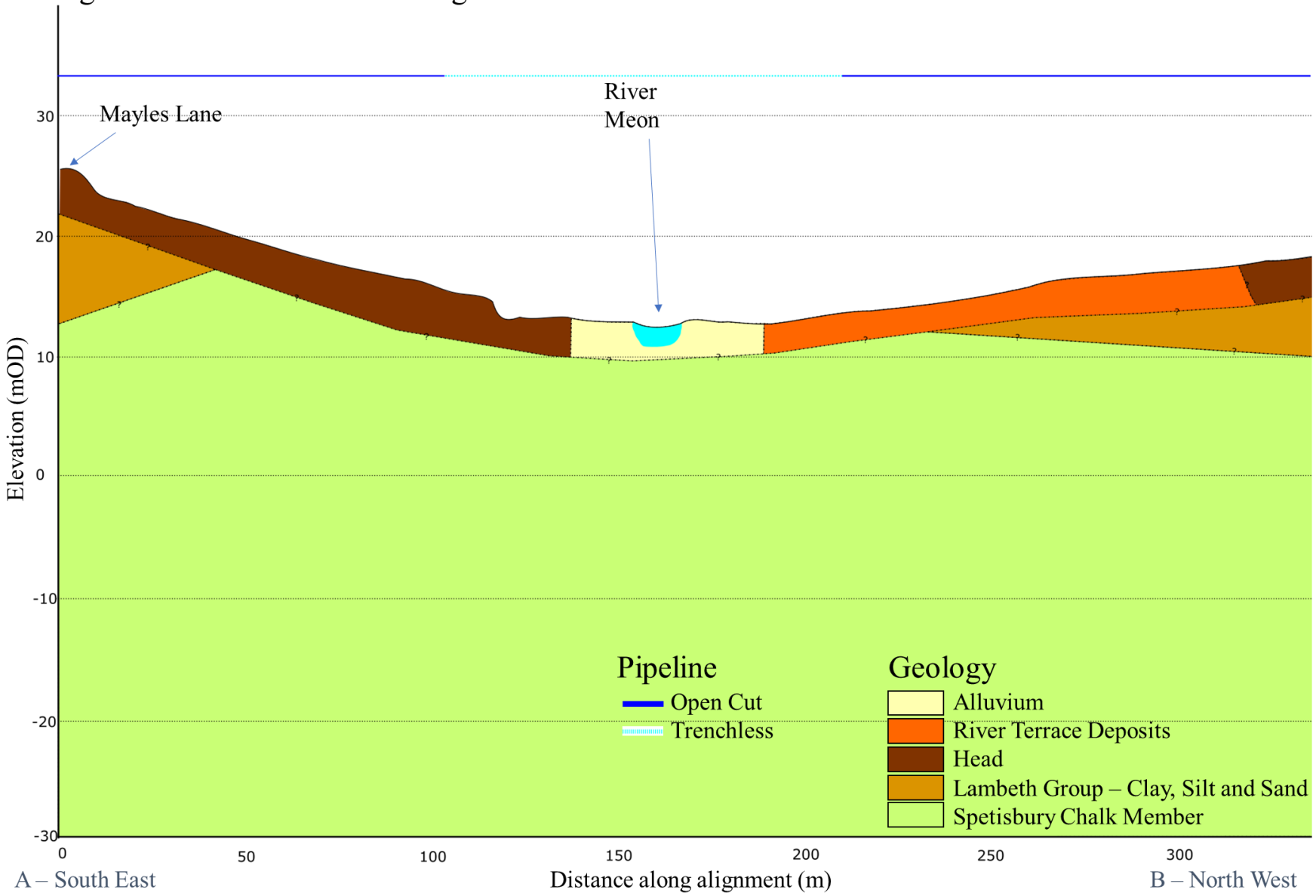


Figure A5: River Hamble Crossing

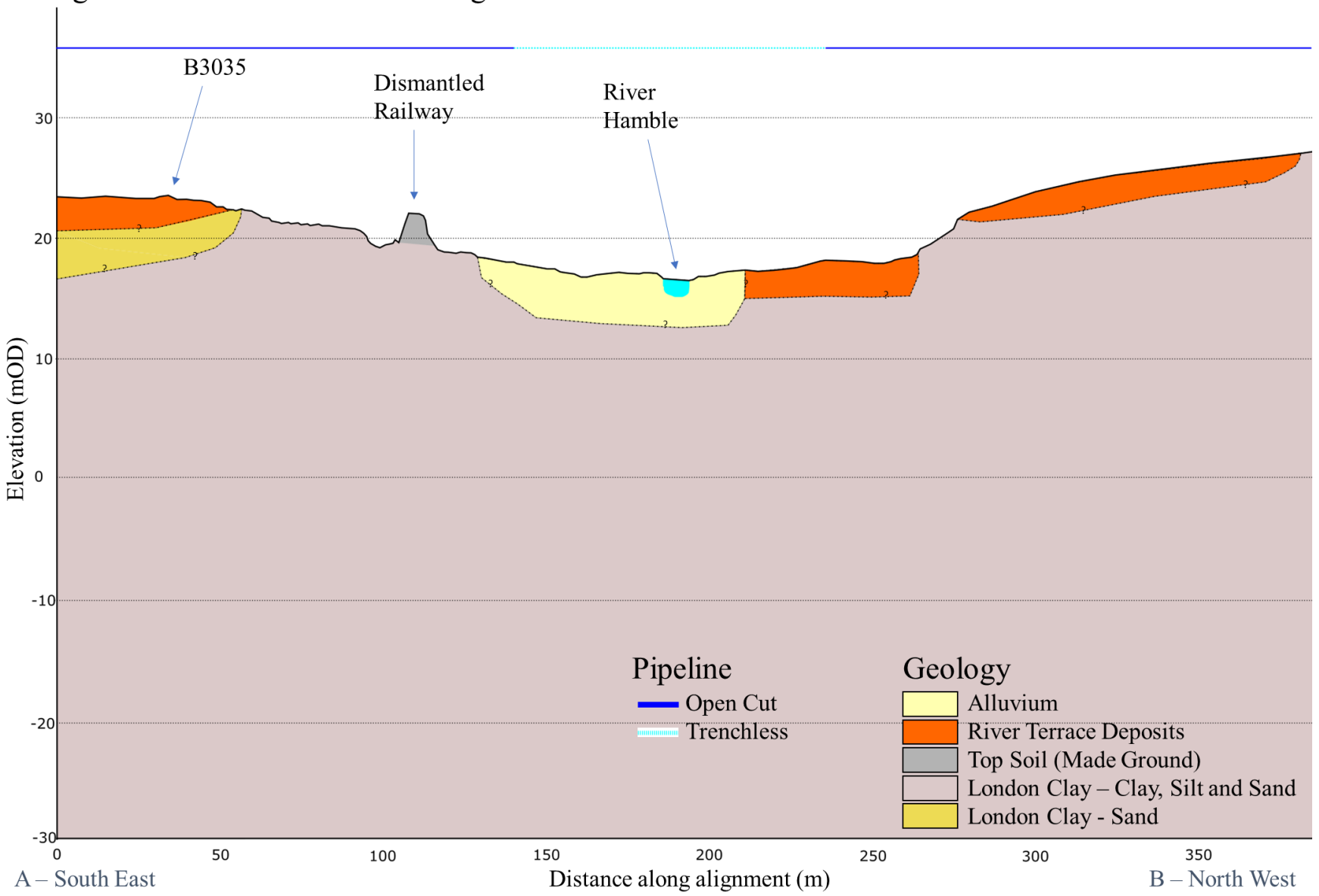


Figure A6: River Wallington Crossing

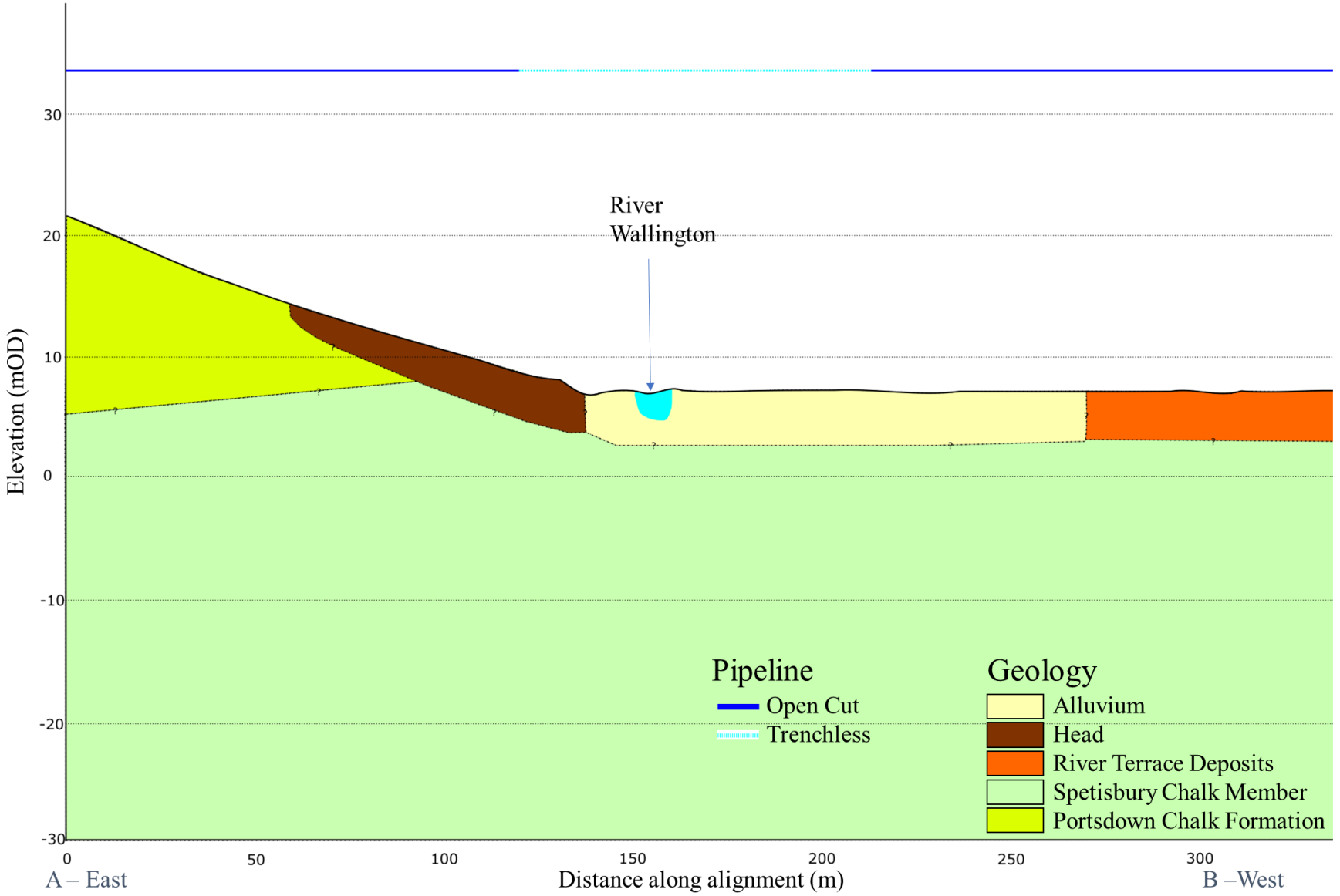


Figure A7: WRP to Havant Thicket Reservoir

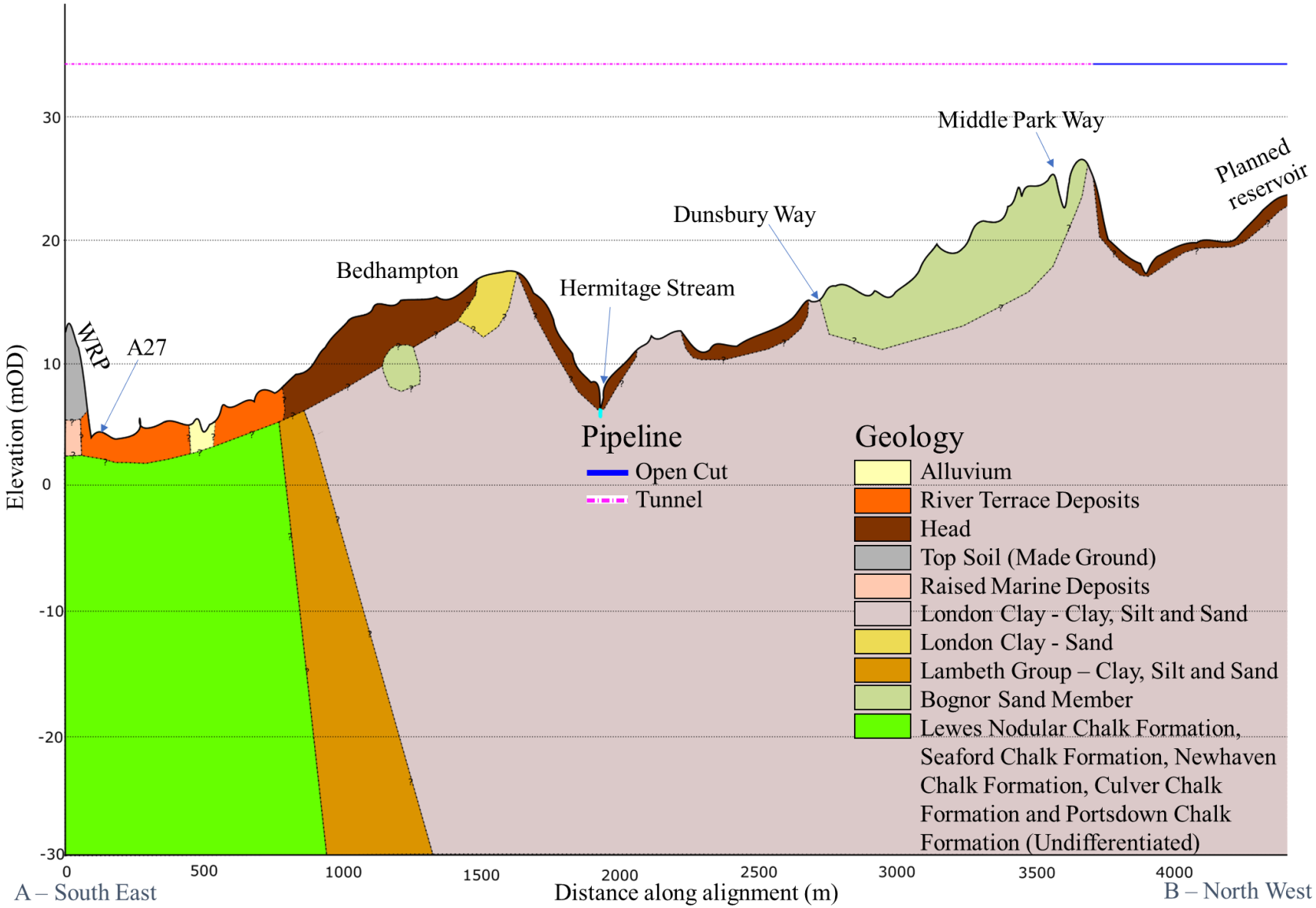


Figure A8: WRP to Budds Farm WTW

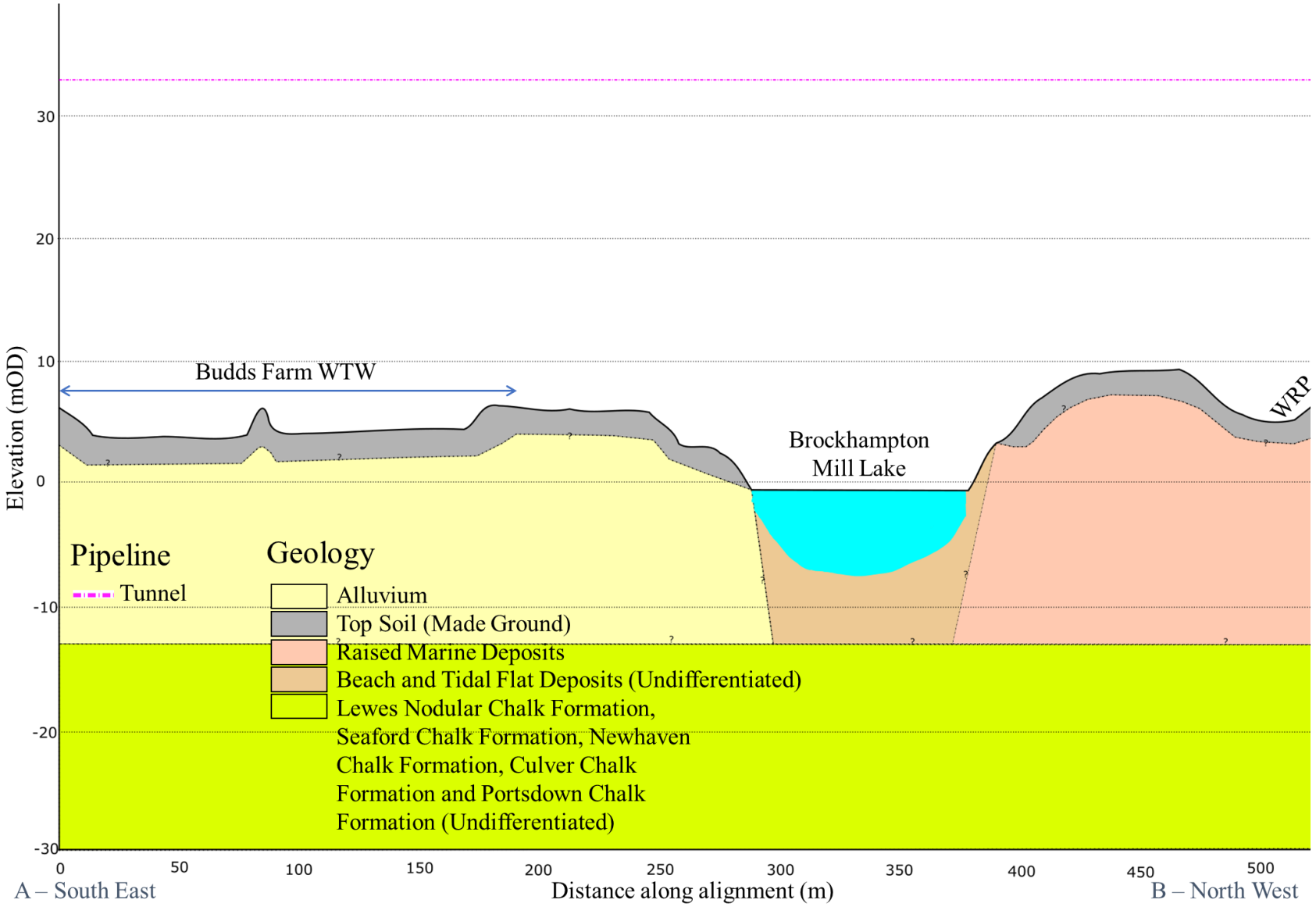


Figure A9: WRP to Purbrook (South)

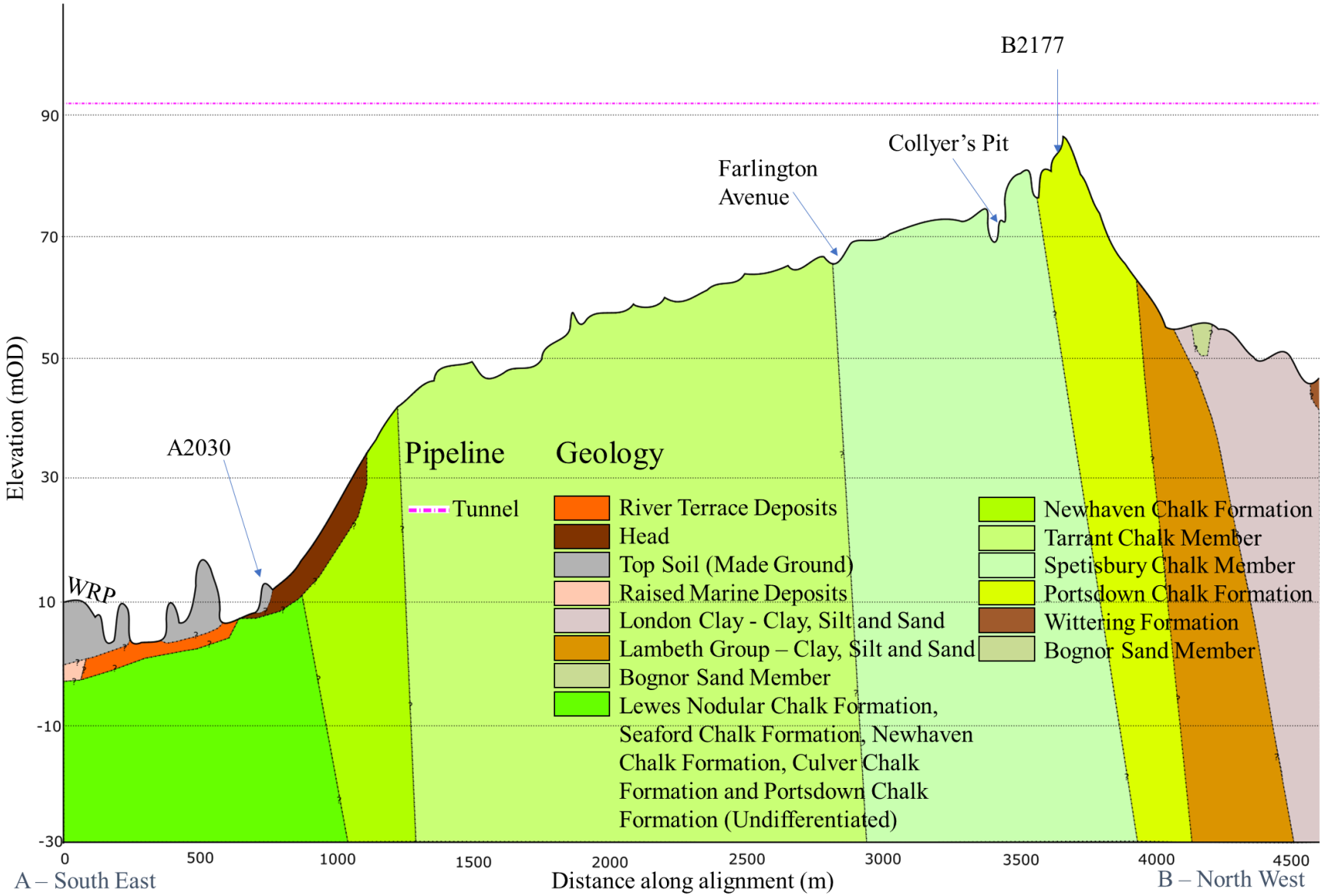
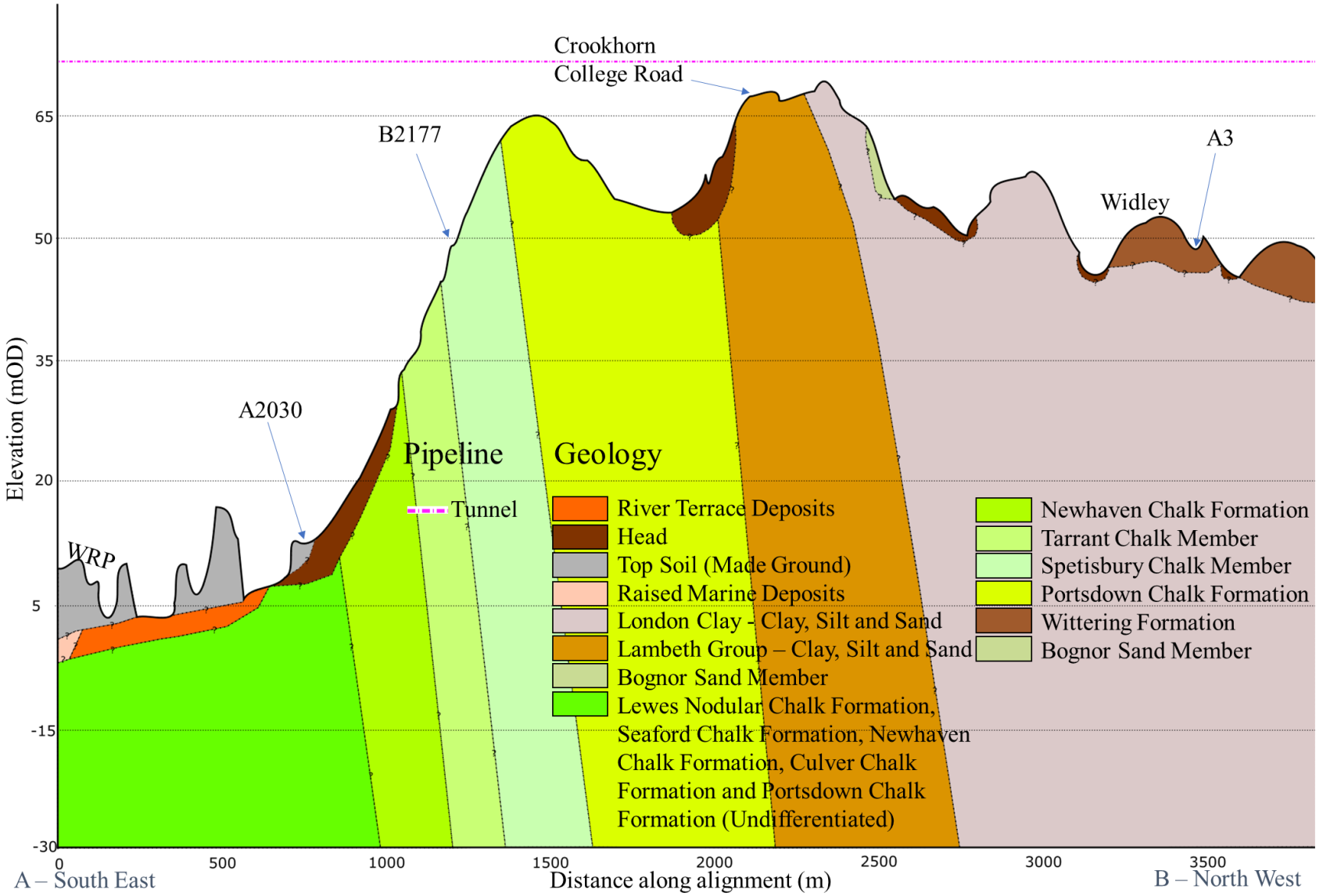


Figure A10: WRP to Purbrook (North)



# Appendix 18.2 Water Body water dependent protected areas

# 1 Water Body water dependent protected areas

## 1.1 River water bodies

| Water body/protected area | ID | Type |
|---|---|---|
| Hermitage Stream (GB107042016370) | | |
| Chichester, Langstone and Portsmouth Harbours Eutrophic Nitrate Vulnerable Zone (NVZ) transitional and coastal (TraC) | ET2 | NVZ |
| Langstone Harbour | UKSW33 | Shellfish Water Directive |
| Lavant (Hants) (GB107042016420) | | |
| Hampshire Chalk | G143 | Nitrates Directive |
| Chichester, Langstone and Portsmouth Harbours Eutrophic NVZ (TraC) | ET2 | Nitrates Directive |
| Langstone Harbour | UKSW33 | Shellfish Water Directive |
| Potwell Tributary (GB107042016400) | | |
| Chichester, Langstone and Portsmouth Harbours Eutrophic NVZ (TraC) ET2 | ET2 | NVZ |
| Wallington below Southwick (GB107042016360) | | |
| Fareham G58 | G58 | NVZ |
| Chichester, Langstone and Portsmouth Harbours Eutrophic NVZ (TraC) ET2 | ET2 | NVZ |
| Portsmouth Harbour | UKSW34 | Shellfish Water Directive |
| Meon (GB107042016640) | | |
| Hampshire Chalk G143 | G143 | NVZ |
| Solent & Southampton Water | UK9011061 | SPA |
| R. Meon NVZ S527 | S527 | NVZ |
| Approaches to Southampton Water | UKSW36 | Shellfish Water Directive |
| Central Solent | UKSW46 | Shellfish Water Directive |
| Main River Hamble (GB107042016250) | | |
| Hamble Estuary Eutrophic NVZ (TraC) ET3 | ET3 | NVZ |
| Approaches to Southampton Water | UKSW36 | Shellfish Water Directive |
| River Hamble | UKENRI122 | Urban Waste Water Treatment |
| Upper Hamble (GB107042016250) | | |
| Hamble Estuary Eutrophic NVZ (TraC) ET3 | ET3 | NVZ |

| Water body/protected area | ID | Type |
|---|---|---|
| Hampshire Chalk G143 | G143 | NVZ |
| Upper Hamble NVZ S810 | S810 | NVZ |
| Moors Stream (GB107042016260) | | |
| Hamble Estuary Eutrophic NVZ (TraC) ET3 | ET3 | NVZ |
| Hampshire Chalk G143 | G143 | NVZ |
| Horton Heath Stream (GB107042016270) | | |
| Hamble Estuary Eutrophic NVZ (TraC) ET3 | ET3 | NVZ |
| Bow Lake (GB107042016650) | | |
| Hamble Estuary Eutrophic NVZ (TraC) ET3 | ET3 | NVZ |
| Bow Lake NVZ S811 | S811 | NVZ |
| Itchen (GB107042022580) | | |
| Hamble Estuary Eutrophic NVZ (TraC) ET3 | ET3 | NVZ |
| Hampshire Chalk G143 | G143 | NVZ |
| Itchen | UKGB107042022580 | Drinking Water Protected Area |
| River Itchen (Hampshire) | UKENRI110 | Urban Waste Water Treatment |
| River Itchen | UK0012599 | SAC |
| Southampton Water | UKSW35 | Shellfish Water Directive |

## 1.2 Canal water bodies

| Water body protected area | ID | Type |
|---|---|---|
| Itchen Navigation (GB70710008) | | |
| Hamble Estuary Eutrophic NVZ (TraC) ET3 | ET3 | NVZ |
| Hampshire Chalk G143 | G143 | NVZ |

## 1.3 Transitional water bodies

| Water body protected area | ID | Type |
|---|---|---|
| Langstone Harbour (GB580705130000) | | |
| Chichester, Langstone and Portsmouth Harbours Eutrophic NVZ (TraC) | ET2 | Nitrates Directive |
| Chichester And Langstone Harbours | UK9011011 | SPA |
| Solent Maritime | UK0030059 | SAC |
| Chichester And Langstone Harbours | UK11013 | Ramsar Site |
| Solent And Dorset Coast | UK9020330 | SPA |
| Langstone Harbour | UKSW33 | Shellfish Water Directive |
| Chichester Harbour (Emsworth Channel) | UKSW30 | Shellfish Water Directive |

| Water body protected area | ID | Type |
|---|---|---|
| Portsmouth Harbour | UKENCA111 | Urban Waste Water Treatment Directive |
| Portsmouth Harbour | UKSW34 | Shellfish Water Directive |
| Langstone Harbour | UKENCA55 | Urban Waste Water Treatment Directive |
| Portsmouth Harbour GB580705140000 | | |
| Chichester,Langstone and Portsmouth Harbours Eutrophic NVZ (TraC) | ET2 | Nitrates Directive |
| Solent And Dorset Coast | UK9020330 | SPA |
| Portsmouth Harbour | UKENCA111 | Urban Waste Water Treatment Directive |
| Portsmouth Harbour | UK11055 | Ramsar Site |
| Portsmouth Harbour | UK9011051 | SPA |
| Spithead and Stokes Bay | UKSW48 | Shellfish Water Directive |
| Portsmouth Harbour | UKSW34 | Shellfish Water Directive |
| Chichester Harbour (GB580705210000) | | |
| Chichester Harbour | UKENCA56 | Urban Waste Water Treatment Directive |
| Chichester,Langstone and Portsmouth Harbours Eutrophic NVZ (TraC) | ET2 | Nitrates Directive |
| Chichester And Langstone Harbours | UK9011011 | SPA |
| Solent Maritime | UK0030059 | SAC |
| Chichester And Langstone Harbours | UK11013 | Ramsar Site |
| Chichester Harbour (Thornham Channel) | UKSW31 | Shellfish Water Directive |
| Langstone Harbour | UKSW33 | Shellfish Water Directive |
| Chichester Harbour (Emsworth Channel) | UKSW30 | Shellfish Water Directive |
| Chichester Harbour (Chichester Channel) | UKSW32 | Shellfish Water Directive |
| Southampton Water | | |
| Hamble Estuary Eutrophic NVZ (TraC) | ET3 | Nitrates Directive |
| Solent Maritime | UK0030059 | SAC |
| Approaches to Southampton Water | UKSW36 | Shellfish Water Directive |
| Solent And Dorset Coast | UK9020330 | SPA |
| Solent & Southampton Water | UK9011061 | SPA |
| Solent & Southampton Water | UK11063 | Ramsar Site |
| Stanswood Bay | UKSW37 | Shellfish Water Directive |
| River Itchen (Hampshire) | UKENRI110 | Urban Waste Water Treatment Directive |
| River Itchen | UK0012599 | SAC |
| Southampton Water | UKSW35 | Shellfish Water Directive |
| River Hamble | UKENRI122 | Urban Waste Water Treatment Directive |

| Water body protected area | ID | Type |
|---|---|---|
| Hamble Estuary | UKENCA123 | Urban Waste Water Treatment Directive |

## 1.4 Coastal water bodies

| Water body protected area | ID | Type |
|---|---|---|
| Solent (GB650705150000) | | |
| Hamble Estuary Eutrophic NVZ (TraC) | ET3 | Nitrates Directive |
| Chichester Harbour | UKENCA56 | Urban Waste Water Treatment Directive |
| Cowes and Medina_M | UKSW45 | Shellfish Water Directive |
| Eastney | UK16500 | Bathing Water Directive |
| Lymington and Sowley_M | UKSW40 | Shellfish Water Directive |
| Chichester,Langstone and Portsmouth Harbours Eutrophic NVZ (TraC) | ET2 | Nitrates Directive |
| Chichester And Langstone Harbours | UK9011011 | SPA |
| Solent Maritime | UK0030059 | SAC |
| Chichester And Langstone Harbours | UK11013 | Ramsar Site |
| Approaches to Southampton Water | UKSW36 | Shellfish Water Directive |
| Solent And Dorset Coast | UK9020330 | SPA |
| South Wight Maritime | UK0030061 | SAC |
| Solent & Southampton Water | UK9011061 | SPA |
| Solent & Southampton Water | UK11063 | Ramsar Site |
| Solent & Isle Of Wight Lagoons | UK0017073 | SAC |
| Pennington | UKSW41 | Shellfish Water Directive |
| Langstone Harbour | UKSW33 | Shellfish Water Directive |
| Ryde | UK17900 | Bathing Water Directive |
| Yarmouth | UKSW42 | Shellfish Water Directive |
| Newtown harbour, Mediina Estuary and Eastern Yar Eutrophic NVZ (TraC) | ET7 | Nitrates Directive |
| Stokes Bay | UK16700 | Bathing Water Directive |
| Lepe Middle Bank | UKSW38 | Shellfish Water Directive |
| Central Solent | UKSW46 | Shellfish Water Directive |
| East Cowes | UK17850 | Bathing Water Directive |
| Stanswood Bay | UKSW37 | Shellfish Water Directive |
| Calshot | UK16900 | Bathing Water Directive |
| Medina Estuary | UKENCA121 | Urban Waste Water Treatment Directive |
| Newtown_M | UKSW43 | Shellfish Water Directive |
| Newtown Harbour | UKENCA124 | Urban Waste Water Treatment Directive |

| Water body protected area | ID | Type |
|---|---|---|
| Colwell Bay | UK17600 | Bathing Water Directive |
| Ryde | UKSW47 | Shellfish Water Directive |
| Beachlands West | UK16400 | Bathing Water Directive |
| Eastoke | UK16300 | Bathing Water Directive |
| Lepe | UK17000 | Bathing Water Directive |
| Lee-on-Solent | UK16800 | Bathing Water Directive |
| Seagrove | UK18000 | Bathing Water Directive |
| Hillhead | UK16850 | Bathing Water Directive |
| Beachlands Central | UK16350 | Bathing Water Directive |
| Spithead and Stokes Bay | UKSW48 | Shellfish Water Directive |
| Cowes | UK17800 | Bathing Water Directive |
| Totland Bay | UK17500 | Bathing Water Directive |
| Gurnard | UK17700 | Bathing Water Directive |
| Southsea East | UK16600 | Bathing Water Directive |
| Isle of Wight (GB650705530000) | | |
| Sandown | UK18400 | Bathing Water Directive |
| Chichester Harbour | UKENCA56 | Urban Waste Water Treatment Directive |
| Chichester,Langstone and Portsmouth Harbours Eutrophic NVZ (TraC) | ET2 | Nitrates Directive |
| Chichester And Langstone Harbours | UK9011011 | SPA |
| Solent Maritime | UK0030059 | SAC |
| Chichester And Langstone Harbours | UK11013 | Ramsar Site |
| Solent And Dorset Coast | UK9020330 | SPA |
| South Wight Maritime | UK0030061 | SAC |
| Solent & Southampton Water | UK9011061 | SPA |
| Solent & Southampton Water | UK11063 | Ramsar Site |
| Chichester Harbour (Emsworth Channel) | UKSW30 | Shellfish Water Directive |
| Newtown harbour, Mediina Estuary and Eastern Yar Eutrophic NVZ (TraC) | ET7 | Nitrates Directive |
| Bracklesham Bay | UK16000 | Bathing Water Directive |
| Ventnor | UK18600 | Bathing Water Directive |
| Yaverland | UK18350 | Bathing Water Directive |
| Whitecliff Bay | UK18300 | Bathing Water Directive |
| Shanklin | UK18500 | Bathing Water Directive |
| West Wittering | UK16100 | Bathing Water Directive |
| Bembridge | UK18200 | Bathing Water Directive |

## 1.5 Groundwater Bodies

| Water body protected area | ID | Type |
|---|---|---|
| East Hants Chalk (GB40701G502700) | | |
| Hamble Estuary Eutrophic NVZ (TraC) | ET3 | Nitrates Directive |
| Hampshire Chalk | G143 | Nitrates Directive |
| Fareham | G58 | Nitrates Directive |
| Chichester,Langstone and Portsmouth Harbours Eutrophic NVZ (TraC) | ET2 | Nitrates Directive |
| Sussex Chalk | G56 | Nitrates Directive |
| Chichester And Langstone Harbours | UK9011011 | SPA |
| Solent Maritime | UK0030059 | SAC |
| R. Meon NVZ | S527 | Nitrates Directive |
| Chichester And Langstone Harbours | UK11013 | Ramsar Site |
| Upper Hamble NVZ | S810 | Nitrates Directive |
| Solent And Dorset Coast | UK9020330 | SPA |
| Solent & Isle Of Wight Lagoons | UK0017073 | SAC |
| Bow Lake NVZ | S811 | Nitrates Directive |
| WARBLINGTON STREAM - NO.2 NVZ | S667 | Nitrates Directive |
| Fareham | GWSGZ0145 | Safeguard Zone |
| Portsmouth Harbour | UK11055 | Ramsar Site |
| North Warnford | GWSGZ0308 | Safeguard Zone |
| Portsmouth Harbour | UK9011051 | SPA |
| Bishops Waltham | GWSGZ0309 | Safeguard Zone |
| Clanfield | GWSGZ0138 | Safeguard Zone |
| Catherington South | GWSGZ0144 | Safeguard Zone |
| East Hants Chalk | UKGB40701G502700 | Drinking Water Protected Area |
| South East Hants Bracklesham Group (GB40702G503000) | | |
| Hamble Estuary Eutrophic NVZ (TraC) ET3 | ET3 | NVZ |
| Chichester, Langstone and Portsmouth Harbours Eutrophic NVZ (TraC) ET2 | ET2 | NVZ |
| Broad Rife NVZ S516 | S516 | NVZ |
| South East Hants Bracklesham Group | UKGB40702G503000 | Drinking Water Protected Area |
| Broad Rifer to Chichester Harbour NVZ S666 | S666 | NVZ |
| East Hants Lambeth Group (GB40702G500800) | | |
| Hamble Estuary Eutrophic NVZ (TraC) ET3 | ET3 | NVZ |
| Hampshire Chalk G143 | G143 | NVZ |
| Chichester, Langstone and Portsmouth Harbours Eutrophic NVZ (TraC) ET2 | ET2 | NVZ |

| Water body protected area | ID | Type |
|---|---|---|
| Sussex Chalk G56 | G56 | NVZ |
| R. Meon NVZ S527 | S527 | NVZ |
| Upper Hamble NVZ S810 | S810 | NVZ |
| East Hants Lambeth Group | UKGB40702G500800 | Drinking Water Protected Area |
| Bow Lake NVZ S811 | S811 | NVZ |
| Central Hants Lambeth Group (GB40702G503800) | | |
| South Wessex G151 | G151 | NVZNVZ |
| R. Blackwater NVZ S687 | S687 | NVZ |
| Hamble Estuary Eutrophic NVZ (TraC) ET3 | ET3 | NVZ |
| Hampshire Chalk G143 | G143 | NVZ |
| Whiteparish Trib NVZ S526 | S526 | NVZ |
| Bow Lake NVZ S811 | S811 | NVZ |
| Central Hants Lambeth Group | UKGB40702G503800 | Drinking Water Protected Area |
| River Itchen Chalk (GB40701G505000) | | |
| Hamble Estuary Eutrophic NVZ (TraC) ET3 | ET3 | NVZ |
| North Wey (Alton to Tilford) NVZ S678 | S678 | NVZ |
| Kingsclere and Greywell G145 | G145 | NVZ |
| Hampshire Chalk G143 | G143 | NVZ |
| R. Meon NVZ S527 | S527 | NVZ |
| Upper Hamble NVZ S810 | S810 | NVZ |
| River Itchen Chalk | UKGB40701G505000 | Drinking Water Protected Area |
| Nun's Walk Stream NVZ S812 | S812 | NVZ |
| Bow Lake NVZ S811 | S811 | NVZ |
| Twyford | GWSGZ0153 | Drinking Water Safeguard Zone |
| Otterbourne | GWSGZ0148 | Drinking Water Safeguard Zone |

# Appendix 20-1 Major accidents and disasters

# 1 Major accidents and disasters

## 1.1 Introduction

1.1.1 This technical annex outlines the reasoning behind the scoping out of the topic of major accidents and disasters for the construction and operation of the Proposed Development EIA in line with Planning Inspectorate (2020) Advice Note Three: EIA Notification and Consultation, (Version 7) [52].

1.1.2 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the EIA Regulations) (Schedule 4, Section 5(d) and 8) requires the developer to assess '*the expected significant effects (on the environment) arising from the vulnerability of the Proposed Development to "major accidents or disasters" that are relevant to that development*'.

## 1.2 Definitions

1.2.1 For the purpose of this technical annex, the following definitions from the Institute of Environmental Management and Assessment (IEMA) Major Accidents and Disasters in EIA: A Primer [53] (hereafter referred to as the 'IEMA Primer') have been adopted:

- Accident – something that happens by chance or without expectation.
- Disaster – a natural hazard (e.g. earthquake) or a man-made/external hazard (e.g. act of terrorism) with the potential to cause an event or situation that meets the definition of a major accident.
- Major Accident – events that threaten immediate or delayed serious environmental effects to human health, welfare and/or the environment and require the use of resources beyond those of the Applicant or its appointed representatives to manage.
- Risk – the likelihood of an impact occurring, combined with the effect or consequence(s) of the impact on a receptor if it does occur.
- Risk Event – an identified, unplanned event, which is considered relevant to the Proposed Development and has the potential to result in a major accident and/or disaster, subject to its potential to result in a significant adverse effect on an environmental receptor.
- Vulnerability – describes the potential for harm as a result of an event, for example due to the sensitivity or value of receptors. Vulnerability is influenced by sensitivity, adaptive capacity and magnitude of impact.
- Significant environmental effect (in relation to a major accident and/or disaster assessment) – includes the loss of life, permanent injury and temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration.

1.2.2 The aim of the scoping stage of EIA, as described by the IEMA Primer, is 'to determine in more detail whether there is potential for significant effects as a result of major accidents and/or disasters associated with a development, and the resulting scope of and approach to the assessment if required.' As the major

accidents and disasters assessment considers the Proposed Development as a whole, individual elements of the project are assessed within this context.

1.2.3 In order to determine whether any risks have the potential to cause a major accident or disaster, a risk identification screening exercise has been undertaken, in line with the guidance set out in the IEMA Primer. It is included Annex A. This identifies that no credible causal linkages exist between the source of the risk, pathway to the receptor and the receptor and that other risks are able to be mitigated through design and implementation through the DCO process. The outcome of this demonstrates that, as satisfactory evidence has been provided to demonstrate that all potential risks would be mitigated during construction and operation of the Proposed Development, major accidents and/or disasters can be scoped out of the EIA at this stage.

## 1.3 Relevant policy and guidance

### Legislation

1.3.1 The requirement to consider major accidents and disasters as part of the EIA process comes from the EIA Regulations (Schedule 4, paragraph 8), which state that an environmental statement must include:

1.3.2 ‘A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned… Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.’

1.3.3 In addition, the design, construction, management, operation, maintenance and decommissioning of the Proposed Development must adhere to the following UK legislation:

1.3.4 Health and Safety at Work etc. Act 1974 (HSWA) – the HSWA sets out requirements for employers, staff in control of premises, manufacturers and employees and also sets out the framework for the regulation of industrial health and safety in the UK. Health and safety regulations detailed under the legislation set out more comprehensive provisions but the key principle of the HSWA is that potential risks to persons must be reduced as far as is reasonably practicable with satisfactory evidence provided to show that this has been undertaken.

1.3.5 The Management of Health and Safety at Work Regulations 1999 – these regulations contain more specific details about employers’ health and safety duties under the HSWA.

1.3.6 Construction Design and Management (CDM) 2015 Regulations – places duties on clients, designers, and contractors to ensure health and safety is taken into account for the lifecycle of a project from construction to decommissioning. Under CDM Regulations, designers are required to avoid potential risks so far as is reasonably practicable through measures such as: the removal of hazards from construction, cleaning and maintenance and during the proposed use and decommissioning of the project, the reduction of risks from any remaining hazards and ensuring collective safety measures are prioritised over individual measures.

1.3.7 Further relevant legislation is set out within the Seveso III Directive which addresses the control of major accident hazards (on-shore) which involve dangerous substances. This directive is implemented by the Control of Major Accidents and Hazards (COMAH) Regulations 2015.

*Water Industry Act 1991*

1.3.8 The Water Industry Act details the duties and powers of water and sewerage companies in relation to water supply and waste water. This includes licence granting and conditions for water supply and sewerage, enforcement orders and financial penalties, fluoridation and charges.

*Control of Major Accidents and Hazards (COMAH) Regulations 2015*

1.3.9 The aim of the COMAH Regulations is to ensure that relevant businesses 'take all necessary measures to prevent major accidents involving dangerous substances [and] limit the consequences to people and the environment of any major accidents which do occur'.

*Seveso III Directive 2015*

1.3.10 The Seveso III Directive involves the control of onshore major accident hazards involving dangerous substances. The COMAH Regulations 2015 implement this Directive.

*The Planning (Hazardous Substances) Regulations 2015*

1.3.11 The Planning (Hazardous Substances) Regulations details the implementation of the land-use planning requirements on COMAH sites set out under the Seveso III Directive. A consent for hazardous substances is needed for certain specified hazardous substances or when certain substances exceed the specified quantities.

### National policy

*National Policy Statement for Water Resources Infrastructure 2023*

1.3.12 The relevant national policies include:

- National Policy Statement for Water Resources Infrastructure 2023 [59] paragraph:
  - Safety: paragraphs 3.10.5 to 3.10.6. These paragraphs state that 'under the Environmental Impact Assessment regulations there is a requirement to consider the implications of major accidents or disasters' and 'Under the Water Industry Act 1991, water companies have powers to introduce byelaws, which could address operational issues relating to public safety, access and security of facilities.'
  - Security considerations: paragraphs 3.11.1 to 3.11.6. These paragraphs describe how 'proportionate protective security measures' should be designed into infrastructure projects. They also set out considerations for the location of projects in relation to Ministry of Defence sites, sensitive

information restrictions in applications, the grounds for a closed hearing and consultation with Defra in the event of national security implications.

*National Planning Policy Framework 2021*

1.3.13 The NPPF [1] sets out public safety and security in section 97 stating that *"Planning policies and decisions should promote public safety and take into account wider security and defence requirements by:*

*a) Anticipating and addressing possible malicious threats and natural hazards, especially in locations where large numbers of people are expected to congregate. Policies for relevant areas (such as town centre and regeneration frameworks), and the layout and design of developments, should be informed by the most up-to-date information available from the police and other agencies about the nature of potential threats and their implications. This includes appropriate and proportionate steps that can be taken to reduce vulnerability, increase resilience and ensure public safety and security; and*

*b) Recognising and supporting development required for operational defence and security purposes, and ensuring that operational sites are not affected adversely by the impact of other development proposed in the area."*

### Local legislation

1.3.14 All Local Authorities relevant to the Proposed Development (EBC, FBC, HCC, HBC, PCC, WCC and SDNPA) bar SDNPA have emergency plans in place which are available to view on their websites. The plans outline which organisations would be responsible for leading the response to various scenarios and what the community can do to prepare for and during an incident. They are as follows:

- Eastleigh Borough Council Emergency Planning [61]
- Fareham Borough Council Emergency Response Plan [62]
- Hampshire County Council Emergency Planning [63]
- Havant Borough Council Emergency Response Plan [64]
- Portsmouth City Council Emergency Response Plan [65]
- Winchester City Council Emergency Response Plan [66]

### Guidance and standards

1.3.15 At present, there is no recognised standard methodology for the assessment of major accidents and disasters within EIA. The IEMA Primer, which follows a risk identification approach, is the most commonly used approach and has therefore been used to inform the baseline and approach to scoping for this technical annex.

1.3.16 The Cabinet Office National Risk Register (2020 Edition) [67] and Hampshire Community Risk Register [68] have also been used to inform the identification of potential major accidents and natural disasters relevant to the Proposed Development.

## 1.4 Engagement

1.4.1 A Resilience EIA Working Group meeting was held on 14 September 2022. Representatives from the following organisations were invited:

- Health and Safety Executive (HSE)
- Hampshire and Isle of Wight Fire and Rescue Authority
- Hampshire Police and Crime Commissioner
- Hampshire Prepared Local Resilience Forum
- Environment Agency
- Relevant Local Authorities (EBC, FBC, HCC, HBC, PCC, WCC, SDNPA).

1.4.2 It was confirmed in the meeting that all stakeholders who attended are satisfied with the scoping out of all the potential risks for the topic of major accidents and disasters.

1.4.3 As part of Public Consultation 2022, stakeholder feedback was reviewed. No specific feedback was received in relation to major accidents and disasters. Other stakeholder feedback related to topics covered in Appendix A is covered in the relevant topic chapters within Volume I of the Scoping Report. These include:

- Chapter 6 Air quality and odour
- Chapter 8 Terrestrial and freshwater biodiversity
- Chapter 9 Marine biodiversity
- Chapter 10 Carbon and climate change
- Chapter 11 Land quality and ground conditions
- Chapter 17 Traffic and transport
- Chapter 18 Water environment (including flood risk)

1.4.4 Engagement with relevant stakeholders in relation to these topics will continue throughout the EIA process.

## 1.5 Approach to Baseline Review

1.5.1 This section describes the methods used to establish the baseline. As set out in the IEMA Primer, the baseline identifies, for each risk category, if there is a source of the risk and a pathway to a receptor. If this is the case, the presence of existing design measures, compliance with legislation, best practice and/or sufficient coverage by other topic chapters is checked. If no such mitigation exists the risk category will be scoped in to the EIA. The approach is based on the methodology set out within the IEMA Primer and is covered in more detail later in the report.

### Study area

1.5.2 The study area has been determined on the basis of a likely worst case impact area, in the event of a major accident or disaster, informed by the maximum realistic extent of other topic assessment study areas, and includes the extent of the Proposed Development. External sources (including fire, weather events and

so on) which could cause a major accident or disaster to the Proposed Development are also identified and included.

### Sources of baseline data

1.5.3 The following data has been used to inform the baseline:

Table 1-1: Source of baseline data

| Baseline data | Source of data |
|---|---|
| Potential risks | Hampshire and Isle of Wight Community Risk Register [68] and the National Risk Register [67] |
| COMAH sites | HSE website and COMAH search tool [55] |
| Flooding | EA flooding data [69] |
| Fire risk | Fire and Rescue Service statistics [70] and Met Office [71] |
| Storm frequency and severity | Met Office [72] |
| Climate (maximum and minimum temperatures and precipitation) | Met Office [73] |
| Air quality | Defra UK AIR Air Quality Management Area (AQMA) Interactive Map [74] |
| Traffic | Department for Transport traffic counts and County Council collision data |
| Statutory designated sites | Natural England |
| Unexploded Ordnance | Zetica |
| Malicious attacks | Hampshire Local Resilience Forum [68] |

## 1.6 Baseline conditions

### Proposed Development wide conditions

1.6.1 For the topic of major accidents and disasters the baseline is addressed at a Proposed Development wide level rather than examining individual components of the Proposed Development.

1.6.2 As set out in the IEMA Primer, the National and Community risk registers have been used to identify the majority of the potential risks for the Proposed Development. Hampshire Local Resilience Forum have identified the most likely risks for the County (which are also identified at a national scale in the National Risk Register) in the Community Risk Register. These are: snow and cold, pandemic flu, industrial accidents, flooding, terrorism and widespread electricity loss. The table in Annex A. outlines the baseline information for each of these potential risks with the exception of pandemic flu as the Proposed Development is not considered to have a risk pathway. In addition, in line with the IEMA Primer, further risks have been identified based on the specific potential risks to and resulting from the Proposed Development as a result of conversations with the design team.

1.6.3 It should be noted that no COMAH sites have been identified within 4.8km (the set search distance for the HSE webmap) of the Proposed Development. Therefore, COMAH sites are not considered a risk to the Proposed Development and have not been included in the screening exercise in Annex A.

## 1.7 Potential effects

1.7.1 The IEMA Primer states that the major accidents and disasters topic can be scoped out of the EIA if the assessment can demonstrate:

- "there is no source-pathway-receptor linkage of a hazard that could trigger a major accident and/or disaster or potential for the scheme to lead to a significant environmental effect; or
- all possible major accidents and/or disasters are adequately covered elsewhere in the assessment or covered by existing design measures or compliance with legislation and best practice."

1.7.2 However, if the above cannot be demonstrated then the topic must be scoped in.

1.7.3 Unlike other topics within EIA, major accidents and disasters does not scope in potential effects but rather the potential for a risk event to occur.

1.7.4 In order to determine whether the above requirements are met, a risk identification exercise has been undertaken (see Annex A.) in line with the guidance set out in the IEMA Primer. The risk identification considers the current risk profile identified within the Community Risk Register and consideration of specific risks relating to the construction and operation of Proposed Development. It looks at the potential for a source-pathway-receptor linkage in terms of risks to environmental receptors such as designated environmental sites, residents local to the Proposed Development and workers on and in close proximity to the site, local businesses and cultural heritage and archaeology during construction and operation of the Proposed Development. If a source-pathway-receptor linkage is present it then examines to what extent the risk generated is addressed by mitigation and if, with this mitigation in place and secured through the DCO consent process, the risk could lead to a major accident and/or disaster.

1.7.5 To determine the risk of a significant effect the likelihood of an event occurring is considered, followed by the potential consequence should the event occur. When examining the consequence the following is considered:

- The geographic extent of the risks with effects outside the Proposed Development are more likely to be considered significant.
- The duration of the effects from the risks with permanent or long-lasting effects likely to be considered significant.
- The severity of the effects in terms of the number, degree of harm to those impacted and the response effort required with effects requiring the mobilisation of a substantial civil emergency response more likely to be considered significant.
- The sensitivity of the identified receptors.
- The effort required to restore the environment to its previous state with substantial efforts likely to be considered significant.

1.7.6 The IEMA Primer also identifies significance based on criteria adopted from Annex VI of the Seveso III Directive which details the 'criteria for the notification of a major accident to the Commission'. Using this as a reference, the significance threshold for the Proposed Development for major accidents and disasters is determined to be anything which could cause loss of life or permanent injury and/or long-lasting damage to an environmental receptor.

1.7.7 Effects from decommissioning of the Proposed Development are expected to be no greater than those identified during the construction phase, and are therefore assessed as being the same as construction effects as a worst case scenario. Please refer to Chapter 3 Description of the Proposed Development, section 3.7 for further information on decommissioning.

### *Construction effects*

1.7.8 Following the risk identification exercise (see Annex A.), no potential risk events, which could occur during construction, have been scoped into the assessment.

1.7.9 The following potential risk events are considered to be adequately mitigated (for full details see Annex A.):

- Flooding[2]
- Fire
- Severe weather[3]
- Air quality
- Widespread electricity failure[4]
- System failures[5]
- Transport accidents
- Industrial accidents
- Pollution[6]
- Unexploded Ordnance (UXO)[7]
- Attacks[8]

### *Operation effects*

1.7.10 Following the risk identification exercise (see Annex A.), no potential risk events, which could occur during operation, have been scoped into the assessment.

1.7.11 The following potential risk events are considered to be adequately mitigated:

- Flooding[2]
- Fire

[2] Defined as surface water flooding, flash flooding or failure flooding by dam or reservoir.
[3] Including localised flooding, heatwaves, drought, storms, low temperatures and heavy snow.
[4] Defined as power loss.
[5] Defined as loss of and/or damage to services such as mains water, gas pipes and sewage drainage.
[6] Caused by a polluting material, such as fuel or heavy metals, leading to damage a sensitive receptor.
[7] Defined as unknown remnants of explosive weapons which may still be at risk of detonation.
[8] Defined as an act of terrorism or malicious attack on the site.

- Severe weather[3]
- Air Quality
- Widespread electricity failures[4]
- System failures[5]
- Transport accidents
- Industrial accidents[9]
- Pollution incidents[6]
- UXO[7]
- Attacks[8]

## 1.8 Limitations and assumptions

1.8.1 The following assumptions have been applied to the risk identification exercise (Annex A.) when considering risk events:

- Major accidents and/or disasters associated with construction and operation activities that fall within the scope of health and safety legislation (see section 1.3) and associated obligations are not considered.
- The risk identification exercise does not consider risks where there is no 'source-pathway-receptor' linkage.
- The risk identification exercise does not consider major accidents and/or disasters where risk events are not applicable to the geographic location of the Proposed Development e.g. volcanic activity.
- Risk events that are low likelihood/low consequence are not considered as they do not meet the criteria to be classed, within a risk assessment, as a significant environmental effect and therefore do not satisfy the definition of a major accident and/or disaster.
- Risk events that are considered to be high likelihood/high consequence are not present having been already mitigated or design out as these would be considered unacceptable to the viability of the Proposed Development.

## 1.9 Summary

1.9.1 In conclusion, the Proposed Development is not considered to lead to a major accident and/or disaster during its construction or operation as risks will be appropriately mitigated as set out in Annex A.

## 1.10 Glossary and abbreviations

| Term | Definition |
|---|---|
| Accident | Something that happens by chance or without expectation. |

[9] Defined as an incident occurring in a workplace associated with workplace processes and/or infrastructure which, in this instance, includes explosions as a result of the movement of hazardous chemicals and pipe rupture.

| | |
|---|---|
| Disaster | A natural hazard (e.g. earthquake) or a man-made/external hazard (e.g. act of terrorism) with the potential to cause an event or situation that meets the definition of a major accident. |
| Major Accident | Events that threaten immediate or delayed serious environmental effects to human health, welfare and/or the environment and require the use of resources beyond those of the Applicant or its appointed representatives to manage. |
| Risk | The likelihood of an impact occurring, combined with the effect or consequence(s) of the impact on a receptor if it does occur. |
| Risk event | An identified, unplanned event, which is considered relevant to the Proposed Development and has the potential to result in a major accident and/or disaster, subject to its potential to result in a significant adverse effect on an environmental receptor. |
| Vulnerability | Describes the potential for harm as a result of an event, for example due to the sensitivity or value of receptors. Vulnerability is influenced by sensitivity, adaptive capacity and magnitude of impact. |
| Significant environmental effect (in relation to a major accident and/or disaster assessment) | Includes the loss of life, permanent injury and temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration. |
| Flooding | Defined as surface water flooding, flash flooding or failure flooding by dam or reservoir. |
| Severe weather | Includes localised flooding, heatwaves, drought, storms, low temperatures and heavy snow. |
| Widespread electricity failure | Defined as power loss. |
| System failures | Defined as loss of and/or damage to services such as mains water, gas pipes and sewage drainage. |
| Pollution | Caused by a polluting material, such as fuel or heavy metals, leading to damage a sensitive receptor. |
| Unexploded ordnance | Defined as unknown remnants of explosive weapons which may still be at risk of detonation. |
| Attacks | Defined as an act of terrorism or malicious attack on the site. |

| Abbreviation | Definition |
|---|---|
| UXO | Unexploded Ordnance |
| IEMA | Institute of Environmental Management and Assessment |
| HSE | Health and Safety Executive |
| HSWA | Health and Safety at Work etc. Act 1974 |
| CDM | Construction Design and Management |
| COMAH | Control of Major Accidents and Hazards |

# Annex A - Risk identification screening

| Risk Event [67] | Source | Pathway | Receptor | Baseline Information | Reasonable worst consequence if event did occur | Mitigation | Could this lead to a major accident and/or disaster with existing mitigation in place? |
|---|---|---|---|---|---|---|---|
| **Construction stage risks** | | | | | | | |
| Flooding | Extreme weather event | Flood event<br>Surface water flooding<br>Flash flooding<br>Failure flooding by dam or reservoir | Environmental designations<br>Individuals and public health<br>Cultural heritage and archaeology | Chapter 18 Water environment (including flood risk) states that different areas of the Proposed Development pass through Flood Zones 1, 2 and 3.<br><br>The risk of surface water flooding across the Proposed Development varies from low to high risk. A few of the areas are also at risk of failure flooding by a dam or reservoir. See Chapter 18 Water environment (including flood risk) for location specific details. | Fatality/injury to public<br>Damage to habitats and injury/fatality of species individuals<br>Damage to cultural heritage and archaeology | Flood event<br>The construction site compounds would be sited to avoid identified flood risk zones. Where the works occur within a flood risk zone, the Principal Contractor would be obliged to carry out a risk assessment and install necessary control measures to mitigate the risk of flooding. This would be secured through the DCO process. | No |
| Fire | Wildfire<br>Fire caused by construction machinery or other construction activity incident<br>Fire caused from natural source such as lighting strike<br>Fire caused by human act eg. cigarette butt | Dry conditions due to drought and/or heatwave enabling a fire to spread to construction machinery and other machinery and buildings<br><br>Fire spreading from construction machinery to surrounding environment and infrastructure | Environmental designations<br>Local community and businesses<br>Cultural heritage and archaeology | In 2021, there were 147,295 fires attended by the Fire and Rescue Service (FRS) [75] in England. Of these, 5453 were classed as 'other outdoors' primary fires involving people or properties and 86,082 were secondary fires not involving people or properties fires.<br><br>The UK Fire Severity Index [71] produces a map forecast (up to 5 days ahead) showing the risk of fire in locations across the UK, based on measurements including humidity and precipitation.<br><br>Given the Proposed Development is located in the south of England, which experiences higher average temperatures and lower average volumes of precipitation than other parts of the country, the risk of a fire is likely to be greater than in other parts of the country. | Fatality/injury to public<br>Damage to infrastructure<br>Damage to habitats and injury/fatality of species individuals<br>Damage to cultural heritage and archaeology | Fire<br>Contractor should ensure emergency plans are written as part of the development of the Proposed Development which would be agreed with Local Authorities, utilities and blue light authorities.<br>Environmental management plans would set out best practice measures with regards to the storage of fuel and plant. This would be secured through the DCO process. | No |
| Severe weather | Localised flooding<br>Heatwaves<br>Drought<br>Storms | Pollution event (caused by movement of construction related contaminants, such as fuel spillage or movement of | Environmental designations<br>Local community and businesses | Chapter 10 Carbon and climate change states that Thornley Island meteorological station (grid reference 475640, 103025) has been selected for meteorological data as it is considered | Fatality/injury to public<br>Damage to infrastructure | Pollution<br>See pollution section for details of mitigation.<br>Fire | Pollution: No<br>Fire: No<br>Traffic: No |

| Risk Event [67] | Source | Pathway | Receptor | Baseline Information | Reasonable worst consequence if event did occur | Mitigation | Could this lead to a major accident and/or disaster with existing mitigation in place? |
|---|---|---|---|---|---|---|---|
| | Low temperatures and heavy snow | contaminated ground) in hydrologically connected watercourse as a result of flooding<br><br>Wildfire caused by drought, heatwaves or lightning strike spreading to construction machinery, fuel storage, other buildings and the surrounding environment<br><br>Snow and ice causing a construction traffic accident or other construction accident. | Cultural heritage and archaeology | to have appropriate weather conditions for the project.<br><br>Thornley Island annual average maximum temperature (over 12 months) was 14.8°C and the minimum was 7.7°C compared to the UK average of 12.8°C and 5.5°C. Average annual rainfall for Thornley Island is 767.7mm, lower than the UK average of 1163.0mm. The mean wind speed at Thornley Island is slightly higher at 9.6 knots compared to 9.3 knots for the UK average.<br>There were seven weather events categorised as storms by the Met Office in the 2020/2021 storm season in the UK [72].<br><br>The south-east of the UK is also more vulnerable to periods of drought than other regions due to the high population density and higher average annual temperatures and lower precipitation.<br><br>The frequency and severity of extreme weather events, such as storms and droughts, is expected to increase in the future due to climate change. | Damage to habitats and injury/fatality of species individuals<br>Damage to cultural heritage and archaeology | See fire section for details of mitigation.<br>Traffic accident<br>See transport accidents section for details of mitigation.<br>Flooding<br>See flooding section for details of mitigation. | |
| Air quality | Construction dust | Construction dust leading to damage to human health and species and habitats | Environmental designations<br>Local community and businesses | Chapter 6 Air quality and odour states that baseline air quality conditions across the corridor route are generally good with only one AQMA (Eastleigh AQMA No.2 declared for annual mean NO2) within the study area. All maximum background pollutant concentrations within study area are below the respective Air Quality Objectives. | Injury to public<br>Damage to habitats and injury/fatality of species individuals | Chapter 6 Air quality and odour states that, during construction, there could be an increase in dust emissions associated with the Proposed Development. Given that Chapter 6 Air quality and odour proposes to scope in potential impacts from construction dust on human and ecological receptors, this risk is considered to be adequately covered by this section of the EIA and can therefore be scoped out of the major accidents and disasters assessment. | No |

| Risk Event [67] | Source | Pathway | Receptor | Baseline Information | Reasonable worst consequence if event did occur | Mitigation | Could this lead to a major accident and/or disaster with existing mitigation in place? |
|---|---|---|---|---|---|---|---|
| Widespread electricity failure | Construction work causing electricity pylons to fall<br>Electricity failure causing construction machinery to fail<br>Network outage | Damage to electricity cables during construction leading to a widespread outage for the surrounding area and Proposed Development<br>Falling of pylons and wires onto local roads | Local community and businesses | Utilities plans for the study area show that there are underground and overground electricity cables crossing various locations across the Proposed Development. | Fatality/injury to public<br>Damage to infrastructure<br>Damage to habitats and injury/fatality of species individuals<br>Disruption to local networks, infrastructure and community | During construction a standard management plan would be put in place in order to mitigate the risk of damage to utilities. This would include the procurement of detailed utility plans, prior to any ground being broken, to inform the Principal Contractor's Construction Phase Plan and the Permit to Dig. The management plan would also detail emergency response measures which would be employed should a utility be damaged. This would be secured through the DCO process. | No |
| System failures | Accidental strike of a live service connection (e.g. sewer, water main, high pressure gas main) by construction machinery | Pollution event caused by damage to storm or foul water drainage or gas mains<br>Fire risk due to gas leak<br>Health risk due to gas leak | Local community and businesses<br>Environmental designations<br>Cultural heritage and archaeology | Utilities plans for the study area show multiple gas pipes, including high pressure pipes, water mains, wastewater pipes and electricity cables, underground and overground, crossing the corridor. There is also a virtual gas porting facility off Ports Hill Down Road. | Fatality/injury to public<br>Damage to infrastructure<br>Damage to habitats and injury/fatality of species individuals<br>Disruption to local networks, infrastructure and community<br>Damage to cultural heritage and archaeology | During construction a standard management plan would be put in place in order to mitigate the risk of damage to utilities. This would include the procurement of detailed utility plans, prior to any ground being broken, to inform the Principal Contractor's Construction Phase Plan and the Permit to Dig. The management plan would also detail emergency response measures which would be employed should a utility be damaged. This would be secured through the DCO process. | No |
| Transport accidents | Transport accident involving construction vehicles | Collision between construction vehicles and/or non-site related vehicles | Local community<br>Environmental designations | Chapter 17 Traffic and transport states that potential accident and safety risks for local residents and vulnerable road users during the construction stage would be assessed as part of the next stage of assessment. | Fatality/injury to public<br>Disruption to local networks, infrastructure and community | It is considered that Chapter 17 Traffic and transport would address the potential impact of this risk sufficiently and there would therefore be no residual risk of a major accident or disaster. | No |
| Pollution incidents | Flash flooding<br>Surface water flooding<br>Fuel spillage | Pollution event (caused by construction related fuel spillage or movement of | Local community and businesses<br>Environmental designations | There are multiple sensitive receptors nearby which could be affected by pollution events including Chichester and Langstone Harbours SPA and | Fatality/injury to public<br>Damage to habitats and injury/fatality of species individuals | Pollution<br>The Contractor's construction phase plan and environmental management plan would | No |

| Risk Event [67] | Source | Pathway | Receptor | Baseline Information | Reasonable worst consequence if event did occur | Mitigation | Could this lead to a major accident and/or disaster with existing mitigation in place? |
|---|---|---|---|---|---|---|---|
| | Ground contamination | contaminated ground) in hydrologically connected watercourse caused by flooding<br><br>Pollution event related to release of ground contaminants migrating due to construction work eg. via runoff<br><br>Direct damage to surrounding environment by fuel spillage<br><br>Release of ground gases | Cultural heritage and archaeology | Ramsar, Solent Maritime SAC and River Itchen SAC and SSSI (for a full list see Chapter 8 Terrestrial and freshwater biodiversity and Chapter 9 Marine biodiversity). The most likely pollution pathway is through flooding. For information on how flooding is linked to this baseline, see the relevant section within this table and Chapter 18 Water environment (including flood risk).<br><br>Chapter 11 Land quality and ground conditions identifies multiple sources of potential contamination including historic and modern landfills, historic sewage works, contamination associated with the railway and a corn mill, an infilled pond and watercourse, a garage/depot/warehouse, old chalk pits, disused sand pits, water treatment works, an old quarry, a colliers pit, reservoirs, farms, a hospital, an oil fuel reservoir and a former brick works.<br><br>In addition, a geoenvironmental assessment for a previous planning application for an alternative development for Site 72 (a section of the Proposed Development) highlighted contaminants present in the made ground including asbestos, groundwater impacted by ammonium and ground gas composed of elevated concentrations of methane and carbon dioxide. | Damage to cultural heritage and archaeology | contain risk assessments covering any potential pollution hazard and controls to prevent incidents. This would be secured through the DCO process. The Contractors would also adhere to the standards set out in the Guidance for Safe Intrusive Activities on Contaminated or Potentially Contaminated Land. | |
| UXO | Explosions | Disturbance of UXO during construction leading to explosion<br><br>Explosion at submarine port | Local community and businesses<br>Environmental designations<br>Cultural heritage and archaeology | A UXO risk check has been undertaken for Budds Farm WTW and identifies that the land area is classed as low risk for UXO with the marine portion classed as moderate risk. As this is only a small area, a UXO risk check would be undertaken to cover the entire Proposed Development and included within future stages of the EIA. | Fatality/injury to public<br>Damage to infrastructure<br>Damage to habitats and injury/fatality of species individuals<br>Damage to cultural heritage and archaeology | UXO<br>Any UXO mitigation measures would be detailed within a management plan including confirmation of the need for further investigations and safe working procedures. This would be secured through the DCO process.<br>Nuclear submarine<br>It is not considered that the construction of the Proposed | UXO: No<br>Nuclear submarine: No |

| Risk Event [67] | Source | Pathway | Receptor | Baseline Information | Reasonable worst consequence if event did occur | Mitigation | Could this lead to a major accident and/or disaster with existing mitigation in place? |
|---|---|---|---|---|---|---|---|
| | | | | PCC emergency planning documents shows that areas of the Proposed Development are within a 5km buffer of the nuclear submarine port. | | Development is any more vulnerable to the occasional docking of nuclear submarines than any other development within the 5km buffer zone. | |
| Attacks | Terrorist attacks on the Proposed Development | Explosion at Proposed Development caused by Improvised Explosive Device (IED) | Local community and businesses<br>Environmental designations<br>Cultural heritage and archaeology | Hampshire Local Resilience Forum have identified terrorism as a potential risk in the region within the Community Risk Register. | Fatality/injury to public<br>Damage to infrastructure<br>Damage to habitats and injury/fatality of species individuals<br>Damage to cultural heritage and archaeology | Attacks<br>The Principal Contractor (PC) shall be responsible for the setting up of their own compound during construction and shall confirm how this would be secured with an appropriate level of site security.<br>The PC would be responsible for the security of the site at all times during construction. Materials should be placed in safe areas to reduce the risk to the public and workforce. Security measures should be adequate to exclude the public from the site. This would be secured through the DCO process. | No |
| Bird strike | Construction of the lagoons is likely to increase the number of birds at the site at some point during the construction phase. | Increased numbers of birds flying into the flight path for Southampton Airport. Birds flying into the engines of planes could cause them to crash. | Local community and businesses<br>Environmental designations<br>Cultural heritage and archaeology | There are 36 statutory designated sites within the Zone of Influence of the Proposed Development, including SPAs, SACs, Ramsar sites, SSSIs and LNRs. There are internationally important populations of Brent Goose and wading birds and large records of species listed as Annex 1 under the Birds Directive. For further information, see Chapter 8 Terrestrial and freshwater biodiversity. | Fatality/injury to public<br>Damage to infrastructure<br>Damage to habitats and injury/fatality of species individuals<br>Damage to cultural heritage and archaeology | A bird strike risk assessment would be undertaken which would identify if there is the potential for a significant effect. If this is the case, the bird strike risk assessment would recommend measures to reduce the risk which would be secured through the DCO process. It is therefore considered that the risk would be adequately covered by the risk assessment. | No |
| **Operation stage risks** | | | | | | | |
| Flooding | High pressure water pipe leak | Flooding event caused by high pressure pipe leak<br>Explosive force of pipe rupture leading to significant infrastructure damage | Local community<br>Environmental designations<br>Cultural heritage and archaeology | See industrial accidents. | | | No |

| Risk Event [67] | Source | Pathway | Receptor | Baseline Information | Reasonable worst consequence if event did occur | Mitigation | Could this lead to a major accident and/or disaster with existing mitigation in place? |
|---|---|---|---|---|---|---|---|
| Fire | Wildfire<br>Fire caused from natural source such as lighting strike<br>Fire caused by human act e.g. cigarette butt | Dry conditions due to drought and/or heatwave enabling a fire to spread above ground infrastructure and buildings | Environmental designations<br>Local community and businesses<br>Cultural heritage and archaeology | In 2021, there were 147,295 fires attended by the Fire and Rescue Service (FRS) [75] in England. Of these, 5453 were classed as 'other outdoors' primary fires involving people or properties and 86,082 were secondary fires not involving people or properties fires.<br><br>The UK Fire Severity Index [71] produces a map forecast (up to 5 days ahead) showing the risk of fire in locations across the UK, based on measurements including humidity and precipitation.<br><br>Given the Proposed Development is located in the south of England, which experiences higher average temperatures and lower average volumes of precipitation than other parts of the country, the risk of a fire is likely to be greater than in other parts of the country. | Fatality/injury to public<br>Damage to infrastructure<br>Damage to habitats and injury/fatality of species individuals<br>Damage to cultural heritage and archaeology | Fire<br>Operator should ensure emergency plans are written as part of the operation of the Proposed Development which would be agreed with Local Authorities, utilities and blue light authorities. This would be secured through the DCO process. | No |
| Severe weather | Storms leading to high tides and storm surges | Pollution event in hydrologically connected watercourse caused by flooding from high tides and storm surges affected water treatment works | Local community<br>Environmental designations<br>Cultural heritage and archaeology | Chapter 10 Carbon and climate change states that Thornley Island meteorological station (grid reference 475640, 103025) has been selected for meteorological data as it is considered to have appropriate weather conditions for the project. Thornley Island annual average maximum temperature (over 12 months) was 14.8°C and the minimum was 7.7°C compared to the UK average of 12.8°C and 5.5°C. Average annual rainfall for Thornley Island is 767.7mm, lower than the UK average of 1163.0mm. The mean wind speed at Thornley Island is slightly higher at 9.6 knots compared to 9.3 knots for the UK average.<br>There were seven weather events categorised as storms by the Met Office in the 2020/2021 storm season in the UK [72]. The south-east of the UK is also more vulnerable to periods of drought than other regions due to the high population density and higher | Injury to public<br>Damage to habitats and injury/fatality of species individuals<br>Damage to cultural heritage and archaeology | Pollution event<br>A standard environmental management plan would be put in place, for the operation of the Proposed Development, which would mitigate the risk of damage by storm surges and flooding by high tides if this is a risk concluded to be relevant. This would be secured through the DCO process. At the time of writing, it is unknown if this would be a risk as the preliminary Flood Risk Assessment is currently in progress. | No |

| Risk Event [67] | Source | Pathway | Receptor | Baseline Information | Reasonable worst consequence if event did occur | Mitigation | Could this lead to a major accident and/or disaster with existing mitigation in place? |
|---|---|---|---|---|---|---|---|
| | | | | average annual temperatures and lower precipitation. The frequency and severity of extreme weather events, such as storms and droughts, is expected to increase in the future due to climate change. | | | |
| Air Quality | No source of air pollution during operation identified. | As there is no source, there cannot be a pathway to a receptor during operation. | As there is no source or pathway, there cannot be a receptor for potential air quality impacts. | Operational emissions have been scoped out of Chapter 6 Air quality and odour as the operational traffic would not breach any thresholds for air quality assessment. | None identified as source-pathway receptor linkage is not present. | None required. | No |
| Widespread electricity failure | Network outage | General mains network outage causing the Proposed Development to lose power | Local community | In the event of a power outage when the Proposed Development is needed to provide water to the community it serves, bottled water would be provided at various designated locations until the supply is restored. | None identified as source-pathway receptor linkage is not present. | None required. | No |
| System failures | Utilities are present on-site but none are anticipated to be a significant source of a major accident or disaster during the operation of the Proposed Development | As there is no source, there cannot be a pathway to a receptor during operation. | As there is no source or pathway, there cannot be a receptor for potential system failures. | Utilities plans for the study area show multiple gas pipes, including high pressure pipes, water mains, wastewater pipes and electricity cables, underground and overground, crossing the corridor. There is also a virtual gas porting facility off Ports Hill Down Road. | None identified as source-pathway receptor linkage is not present. | None required. | No |
| Transport accidents | Transport accident involving operational vehicles transporting hazardous substances<br>Hazardous chemicals transported to, stored and used on-site<br>Transport accident involving operational vehicles | Explosions on the way to site caused by collisions involving operational vehicles transporting hazardous chemicals<br>Pollution of a watercourse, groundwater and surface water receptors caused by spillage of hazardous chemicals<br>Collision between site vehicles and/or non-site related vehicles | Local community<br>Environmental designations | Chapter 17 Traffic and transport states that traffic accidents and safety during operation would be assessed in the Traffic and Transport ES chapter. However, it is assumed this would purely cover collisions and would not include an assessment of related risks, such as the transportation of hazardous chemicals.<br>For the baseline for the hazardous chemicals to be used on-site see the industrial accidents section. | Fatality/injury to public<br>Damage to infrastructure<br>Damage to habitats and injury/fatality of species individuals | Explosions<br>See industrial accidents section.<br>Pollution incident<br>See industrial accidents section.<br>Transport accident<br>The operator of the Proposed Development would have emergency plans in place to manage a transport accident were one to occur. Details of this would be provided when available and would be secured through the DCO process. | Transport accidents: no<br>Explosions and pollution: no |
| Industrial accidents | Hazardous chemicals transported to, stored and used on-site | Explosions on the way to Proposed Development caused by collisions involving | Local community<br>Environmental designations | Various chemicals would be transported to, stored and used during operation of the Proposed Development. These include: | Fatality/injury to public<br>Damage to infrastructure | Chemical Explosions<br>Southern Water's Wholesale Water Services Manual (WSM) 203.10 and Safety | Chemical explosions: yes<br>Pollution events: no |

| Risk Event [67] | Source | Pathway | Receptor | Baseline Information | Reasonable worst consequence if event did occur | Mitigation | Could this lead to a major accident and/or disaster with existing mitigation in place? |
|---|---|---|---|---|---|---|---|
| | Transport accident involving operational vehicles transporting hazardous substances<br>High pressure water pipe leak | operational vehicles transporting hazardous and flammable chemicals<br><br>Pollution of a watercourse, groundwater and surface water receptors caused by spillage of hazardous chemicals<br><br>Flooding event caused by high pressure pipe leak<br><br>Explosive force of pipe rupture leading to significant infrastructure damage | Cultural heritage and archaeology | antiscalent, hydrochloric acid, hydrogen peroxide, sodium hydroxide, citric acid and sodium bisulphite. A Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) assessment would be carried out to determine their levels of explosiveness but they are all hazardous and explosive to some degree.<br><br>A Hazard and Operability Study (HAZOP) assessment would also be undertaken to assess the risk of any potential issues with the design of the Proposed Development or its processes.<br><br>An underground pipeline approximately 40 kilometres long would transfer approximately 90 million litres of water per day at the peak of a drought, from Havant Thicket Reservoir to Otterbourne WSW via a HLPS located at the proposed WRP. In order to transfer this volume of water quickly the water would need to be pumped under high pressure though exact velocities are not currently known. | Damage to habitats and injury/fatality of species individuals<br>Damage to cultural heritage and archaeology | Instructions Book (SIB) 053 set out the standard for chemical management during their delivery. It includes the following safety measures:<br>All chemicals are tested by a qualified person before discharge into storage tanks;<br>Appropriate PPE is worn by all persons involved in the delivery process;<br>Ensure emergency spillage kit is available on-site; and<br>The delivery procedure in SIB 053 must be followed.<br>Given the risk of transport accidents would be dealt with in Chapter 17 Traffic and transport, it is not considered that there is a significant risk associated with an explosion associated with chemicals caused by a transport accident. If this were to occur,the pollution prevention management plan would be employed as well as the aforementioned safety measures for handling dangerous chemicals.<br><br>Pollution event<br>Once on-site, the chemicals would be stored in accordance with the standards set out in WSM 203.10, Mechanical and Electrical Specifications (MED) 4008, SIB 052 and Environmental Management System Manual (EMS) 234. These include the following measures:<br>maintenance of suitable temperature for the chemical being stored;<br>expiry dates of chemicals clearly recorded; | Flooding and pipe rupture: no |

| Risk Event [67] | Source | Pathway | Receptor | Baseline Information | Reasonable worst consequence if event did occur | Mitigation | Could this lead to a major accident and/or disaster with existing mitigation in place? |
|---|---|---|---|---|---|---|---|
| | | | | | | suitable strong containers and bunds are used for storage;<br>maximum capacity of storage containers must not be exceeded;<br>only compatible chemicals must be stored together;<br>inspections of storage tanks must be undertaken between every 1 to 5 years depending on the chemical being stored; and<br>all above ground containers must be situated on hardstanding, more than 10m from a watercourse or drain within a bund.<br>In the event of a spillage or leak, the following measures would be undertaken, as laid out in WSM 303.06A:<br>no chemicals must be allowed to drain into watercourses unless there is a threat to human life or injury;<br>all appropriate PPE must be worn when dealing with a spillage;<br>spillages less than 25 litres must be contained with sand or earth bunds before being reported to management;<br>larger spillages must be reported to the Regional Control Centre and management;<br>if water quality is threatened by a spillage, the station must be immediately shut; and<br>any concerns regarding leaks from a container or bund must be immediately reported.<br>Flooding and pipe rupture<br>The high pressure pipeline would aim, as far as possible, to design out the risk of a pipe failure or rupture and the | |

| Risk Event [67] | Source | Pathway | Receptor | Baseline Information | Reasonable worst consequence if event did occur | Mitigation | Could this lead to a major accident and/or disaster with existing mitigation in place? |
|---|---|---|---|---|---|---|---|
| | | | | | | associated explosive and flooding damage this could cause. If any section is laid directly in the ground, a maximum 12m buffer would be installed on either side of the pipe, depending on the depth and diameter of the Proposed Underground Pipeline, to mitigate the potential damage caused by a rupture. In addition, a management plan would be put in place which would detail the emergency response procedures which would be carried out should the event occur. This would include liaison with blue light authorities for evacuation of affected residents and businesses, cordoning off of affected areas and temporary housing where necessary for affected residents. This would be secured through the DCO process. | |
| Pollution | Hazardous chemicals transported to, stored and used on-site<br>Transport accident involving operational vehicles transporting hazardous substances | Pollution of a watercourse, groundwater and surface water receptors caused by spillage of hazardous chemicals<br><br>Flooding event caused by high pressure pipe leak | Local community<br>Environmental designations<br>Cultural heritage and archaeology | See industrial accidents section for baseline. | Fatality/injury to public<br>Damage to infrastructure<br>Damage to habitats and injury/fatality of species individuals<br>Damage to cultural heritage and archaeology | See industrial accidents section for mitigation. | No |
| UXO | Explosions | Explosion at submarine port | Local community and businesses<br>Environmental designations<br>Cultural heritage and archaeology | PCC emergency planning documents shows that areas of the Proposed Development are within a 5km buffer of the nuclear submarine port. | Fatality/injury to public<br>Damage to infrastructure<br>Damage to habitats and injury/fatality of species individuals<br>Damage to cultural heritage and archaeology | Nuclear submarine<br>It is not considered that the operation of the Proposed Development is any more vulnerable to the occasional docking of nuclear submarines than any other development within the 5km buffer zone. | No |

| Risk Event [67] | Source | Pathway | Receptor | Baseline Information | Reasonable worst consequence if event did occur | Mitigation | Could this lead to a major accident and/or disaster with existing mitigation in place? |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| Attacks | Terrorist attacks on the Proposed Development | Explosion at Proposed Development caused by IED<br><br>Interference with the water quality | Local community and businesses<br>Environmental designations<br>Cultural heritage and archaeology | Hampshire Local Resilience Forum have identified terrorism as a potential risk in the region within the Community Risk Register. | Fatality/injury to public<br>Damage to infrastructure<br>Damage to habitats and injury/fatality of species individuals<br>Damage to cultural heritage and archaeology | Emergency plans would be developed and agreed with blue light authorities to ensure a coordinated response can be deployed in the event of an attack. For interference with the water supply and/or quality, bottled water stations would be set up to supply affected residents when required. | No |
| Bird strike | Construction of the lagoons is likely to increase the number of birds at the site during the operational phase of the Proposed Development | Increased numbers of birds flying into the flight path for Southampton Airport. Birds flying into the engines of planes could cause them to crash. | Local community and businesses<br>Environmental designations<br>Cultural heritage and archaeology | Chapter 8 Terrestrial and freshwater biodiversity states that there are 28 statutory designated sites within 2km of the Scoping Area of both national and international designation as well as 434 non-statutory designated sites within 2km of the Scoping Area. Many of these sites are listed for the presence of bird species, including Brent goose and Sandwich tern. For further details see Chapter 8 Terrestrial and freshwater biodiversity. | Fatality/injury to public<br>Damage to infrastructure<br>Damage to habitats and injury/fatality of species individuals<br>Damage to cultural heritage and archaeology | A bird strike risk assessment would be undertaken which would identify if there is the potential for a significant effect. If this is the case, the bird strike risk assessment would recommend measures to reduce the risk which would be secured through the DCO process. It is therefore considered that the risk would be adequately covered by the risk assessment. | No |

# Abbreviations

| Abbreviation | Definition |
|---|---|
| AQMA | Air Quality Management Area |
| BGS | British Geological Society |
| CAMS | Catchment Abstraction Management Strategy |
| CDM | Construction Design and Management |
| COMAH | Control of Major Accidents and Hazards |
| Defra | Department for Environment, Food and Rural Affairs |
| EA | Environment Agency |
| EBC | Eastleigh Borough Council |
| EHDC | East Hampshire District Council |
| EIA | Environmental Impact Assessment |
| ES | Environmental Statement |
| FBC | Fareham Borough Council |
| FRS | Fire and Rescue Service |
| GWDTE | Groundwater dependent terrestrial ecosystems |
| GWSWI | Groundwater -surface water Interactions |
| HBC | Havant Borough Council |
| HCC | Hampshire County Council |
| HIA | Hydrogeological Impact Assessment |
| HLPS | High Lift Pumping Station |
| HMWP | Hampshire Minerals and Waste Plan |
| HSE | Health and Safety Executive |
| HSWA | Health and Safety at Work etc. Act 1974 |
| IED | Improvised Explosive Device |
| IEMA | Institute of Environmental Management and Assessment |
| IFCA | Inshore Fisheries and Conservation Authorities |
| LNR | local nature reserves |
| LSO | Long Sea Outfall |
| m AOD | metres Above Ordnance Datum |
| MCZ | Marine Conservation Zone |
| NPPF | National Planning Policy Framework |
| NVZ | Nitrate Vulnerable Zone |
| PC | Principle Contractor |
| PCC | Portsmouth City Council |
| PEI | Preliminary Environmental Information |
| PS | Pumping Station |
| PWS | Public water supply |
| RAMS | Risk Assessment and Method Statements |

| Abbreviation | Definition |
|---|---|
| SAC | Special Area of Conservation |
| SDNP | South Downs National Park |
| SDNPA | South Downs National Park Authority |
| SIB | Safety Instructions Book |
| SINC | Sites of Importance for Nature Conservation |
| SOM | Size of Maturity |
| SPA | Special Protection Areas |
| SPD | Supplementary Planning Document |
| SPG | Supplementary Planning Guidance |
| SPZ | Source Protection Zones |
| SSSI | Sites of Special Scientific Interest |
| TraC | Transitional and coastal |
| UXO | Unexploded Ordnance |
| WCC | Winchester City Council |
| WFD | Water Framework Directive |
| WRP | Water Recycling Plant |
| WSM | Water Services Manual |
| WSW | Water Supply Works |
| WTW | Wastewater Treatment Works |

# References

[1] Ministry of Housing, Communities & Local Government, “National Planning Policy Framework (NPPF),” 20 July 2021. [Online]. Available: https://www.gov.uk/government/publications/national-planning-policy-framework--2.

[2] East Hampshire District Council and South Downs National Park Authority, “East Hampshire District Local Plan: Joint Core Strategy,” 8 May 2014. [Online]. Available: https://www.easthants.gov.uk/planning-services/planning-policy/local-plan/adopted-local-plan.

[3] East Hampshire District Council Planning Services, “East Hampshire District Local Plan: Housing and Employment Allocations,” April 2016. [Online]. Available: https://www.easthants.gov.uk/planning-services/planning-policy/local-plan/adopted-local-plan.

[4] East Hampshire District Council, “East Hampshire District Local Plan: Second Review,” March 2006. [Online]. Available: https://www.easthants.gov.uk/planning-services/planning-policy/local-plan/adopted-local-plan.

[5] Eastleigh Borough Council, “Eastleigh Borough Local Plan (2016 - 2036),” April 2022. [Online]. Available: https://www.eastleigh.gov.uk/planning-and-building/planning-policy-and-implementation/local-plan/local-plan-adoption#:~:text=The%20Eastleigh%20Borough%20Local%20Plan%202016%2D2036%20was%20adopted%20on,Adopted%20Local%20Plan%202001%2D2011..

[6] Fareham Borough Council, “Fareham Local Plan 2037: Policies Map,” 2023. [Online]. Available: https://www.fareham.gov.uk/planning/localplan.aspx.

[7] Fareham Borough Council, “Fareham Local Plan 2037,” April 2023. [Online]. Available: https://www.fareham.gov.uk/planning/localplan.aspx.

[8] Hampshire County Council, “Minerals and Waste Plan,” October 2013. [Online]. Available: https://www.hants.gov.uk/landplanningandenvironment/strategic-planning/hampshire-minerals-waste-plan.

[9] Havant Borough Council, “Havant Borough Local Plan (Allocations),” July 2014. [Online]. Available: https://www.havant.gov.uk/local-plan-allocations.

[10] Havant Borough Council, “Havant Borough Core Strategy,” March 2011. [Online]. Available: https://www.havant.gov.uk/local-plan-core-strategy.

[11] Portsmouth City Council, “The Portsmouth Plan,” 24 January 2012. [Online]. Available: https://www.portsmouth.gov.uk/services/development-and-planning/planning-policy/the-portsmouth-plan-adopted-2012/.

[12] Portsmouth City Council, “Portsmouth City Local Plan adopted 2006,” 2006. [Online]. Available: https://www.portsmouth.gov.uk/services/development-and-planning/planning-policy/portsmouth-city-local-plan-adopted-2006/.

[13] Portsmouth City Council, “Southsea Town Centre Area Action Plan: Development Plan Document,” 2007. [Online]. Available: https://www.portsmouth.gov.uk/wp-content/uploads/2020/05/development-and-planning-southsea-town-centre-area-action-plan.pdf.

[14] Portsmouth City Council, “Somerstown and North Southsea Area Action Plan: Development Plan Document (DPD),” 2012. [Online]. Available: https://www.portsmouth.gov.uk/wp-content/uploads/2020/05/development-and-planning-somerstown-and-north-southsea-area-action-plan.pdf.

[15] Milton Plan, “Milton Neighbourhood Development Plan Submission Version 2021 - 2036,” 2022. [Online]. Available: http://miltonplan.org.uk/about/the-plan-process/draft-neighbourhood-plan-june-2018/.

[16] Portsmouth City Council, “Portsmouth Local Plan 2038: 'Regulation 18’ Consultation Document Draft for consultation September 2021,” September 2021. [Online]. Available: https://www.portsmouth.gov.uk/wp-content/uploads/2021/09/207.9-Local-plan-2021-document-FULL-ACCESSIBLE.pdf.

[17] Winchester City Council, “Local Plan Part 1: Joint Core Strategy Adopted 2013,” 2023. [Online]. Available: https://www.winchester.gov.uk/planning-policy/winchester-district-local-plan-2011-2036-

adopted/local-plan-part-1-joint-core-strategy-adopted-march-2013-local-plan-review-2006/local-plan-part-1-joint-core-strategy-adopted-2013.

[18] Winchester City Council, “Winchester District Local Plan (Emerging) 2018-2039,” November 2022. [Online]. Available: https://www.winchester.gov.uk/planning-policy/winchester-district-local-plan-2018-2038-emerging.

[19] South Downs National Park Authority, “South Downs Local Plan,” 2 July 2019. [Online]. Available: https://www.southdowns.gov.uk/planning-policy/south-downs-local-plan/local-plan/.

[20] Hampshire County Council, “Hampshire Minerals and Waste Plan,” 2013. [Online]. Available: https://www.hants.gov.uk/landplanningandenvironment/strategic-planning/hampshire-minerals-waste-plan.

[21] Hampshire County Council, “Local Flood Risk Management Strategy,” October 2020. [Online]. Available: https://www.hants.gov.uk/landplanningandenvironment/environment/flooding/strategies/local-flood-risk-management-strategy.

[22] Hampshire County Council, “Climate Change Strategy 2020-2025,” no date. [Online]. Available: https://www.hants.gov.uk/landplanningandenvironment/environment/climatechange/whatarewedoing/climatechangestrategy#:~:text=This%20strategy%20will%20shape%20our,two%2Ddegree%20rise%20in%20temperature..

[23] Hampshire County Council, “Hampshire Local Transport Plan 2011-2031,” April 2013. [Online]. Available: https://www.hants.gov.uk/transport/strategies/transportstrategies.

[24] Hampshire County Council, “Draft Local Transport Plan 4,” April 2022. [Online]. Available: https://www.hants.gov.uk/transport/localtransportplan.

[25] Hampshire County Council, “Walking Strategy,” January 2016. [Online]. Available: https://www.hants.gov.uk/transport/strategies/transportstrategies.

[26] East Hampshire District Council, “Climate Change and Sustainable Construction Supplementary Planning Document,” April 2022. [Online]. Available: https://www.easthants.gov.uk/planning-services/planning-policy/planning-policy-guidance-documents/supplementary-planning.

[27] Fareham Borough Council, “Open Space Supplementary Planning Guidance,” March 2002. [Online]. Available: https://www.fareham.gov.uk/planning/supplementaryguidance.aspx.

[28] Fareham Borough Council, “Fareham Landscape Assessment,” LDA Design, August 2017. [Online]. Available: https://www.fareham.gov.uk/PDF/planning/local_plan/DraftLocalPlanEvidenceBase/EV40-FarehamLandscapeAssessment_FINAL.pdf.

[29] Fareham Borough Council, “Fareham Borough Design Guidance (excluding Welborne) Supplementary Planning Guidance,” December 2015. [Online]. Available: https://www.fareham.gov.uk/planning/local_plan/farehamdesignguidance.aspx.

[30] Havant Borough Council, “Borough Design Guide Supplementary Planning Document,” December 2011. [Online]. Available: https://www.havant.gov.uk/borough-design-guide.

[31] Portsmouth City Council, “Air Quality and Air Pollution Supplementary Planning Document,” March 2006. [Online]. Available: https://www.portsmouth.gov.uk/services/development-and-planning/supplementary-planning-documents/air-quality-and-pollution-spd/.

[32] Portsmouth City Council, “Achieving Employment and Skills Plans Supplementary Planning Document,” 2013. [Online]. Available: https://www.portsmouth.gov.uk/services/development-and-planning/supplementary-planning-documents/achieving-employment-and-skills-plans/#:~:text=The%20Achieving%20Employment%20and%20Skills,preparing%20and%20implementing%20a%20plan..

[33] Portsmouth City Council, “Parking Standards and Transport Assessments Supplementary Planning Document,” July 2014. [Online]. Available: https://www.portsmouth.gov.uk/services/development-and-planning/supplementary-planning-documents/parking-standards-and-transport-assessments-spd/.

[34] Portsmouth City Council, “Sustainable design and construction: A practical guide for developers,” 2013. [Online]. Available: https://www.portsmouth.gov.uk/services/development-and-planning/supplementary-planning-documents/sustainable-design-and-construction/.

[35] Winchester City Council, “Winchester Movement Strategy,” 25 March 2019. [Online]. Available: https://www.hants.gov.uk/aboutthecouncil/haveyoursay/consultations/winchestermovementstrategy#:~:text=The%20City%20of%20Winchester%20Movement,transport%20challenges%20facing%20the%20city..

[36] Winchester City Council, “High Quality Places Supplementary Planning Document,” March 2015. [Online]. Available: https://www.winchester.gov.uk/planning-policy/winchester-district-local-plan-2011-2036-adopted/supplementary-planning-documents-spds/high-quality-places-spd-adopted.

[37] Winchester City Council, “Landscape Character Assessment Supplementary Planning Document,” April 2022. [Online]. Available: https://www.winchester.gov.uk/planning/landscape---countryside/landscape-character-assessment/.

[38] Winchester City Council, “Air Quality Supplementary Planning Document,” September 2021. [Online]. Available: https://www.winchester.gov.uk/environment/air-quality.

[39] South Downs National Park Authority, “Sustainable Construction Supplementary Planning Document,” August 2020. [Online]. Available: https://www.southdowns.gov.uk/planning-policy/supplementary-planning-documents/supplementary-planning-documents/sustainable-construction-supplementary-planning-document/.

[40] South Downs National Park Authority, “Design Guide Supplementary Planning Document,” July 2022. [Online]. Available: https://www.southdowns.gov.uk/planning-policy/supplementary-planning-documents/supplementary-planning-documents/adopted-design-guide-spd/.

[41] Eastleigh Borough Council, “Biodiversity Supplementary Planning Document,” December 2009. [Online]. Available: https://www.eastleigh.gov.uk/planning-and-building/planning-policy-and-implementation/planning-policy-guidance/supplementary-planning-documents.

[42] Eastleigh Borough Council, “Character Area Appraisals Supplementary Planning Document,” February 2008. [Online]. Available: https://www.eastleigh.gov.uk/planning-and-building/planning-policy-and-implementation/planning-policy-guidance/character-area-appraisals.

[43] Eastleigh Borough Council, “Trees and Development Supplementary Planning Document,” April 2022. [Online]. Available: https://www.eastleigh.gov.uk/planning-and-building/planning-policy-and-implementation/planning-policy-guidance/supplementary-planning-documents.

[44] Eastleigh Borough Council, “Environmentally Sustainable Development Supplementary Planning Document,” March 2009. [Online]. Available: https://www.eastleigh.gov.uk/planning-and-building/planning-policy-and-implementation/planning-policy-guidance/supplementary-planning-documents.

[45] Eastleigh Borough Council, “Quality Places Supplementary Planning Document,” November 2011. [Online]. Available: https://www.eastleigh.gov.uk/planning-and-building/planning-policy-and-implementation/planning-policy-guidance/supplementary-planning-documents.

[46] A. L. Marsden and J. C. Chesworth, “Inventory of eelgrass beds in Hampshire and the Isle of Wight (Version 6),” Hampshire and Isle of Wight Wildlife Trust, Hampshire, 2014.

[47] D. Whitfield, “Solent Waders & Brent Goose Strategy,” Solent Waders and Brent Goose Strategy Hampshire and Isle of Wight Wildlife Trust, Curdridge, 2020.

[48] J. C. Chesworth, V. L. Leggett and E. S. Rowsell, “Solent Seal Tagging Project Summary Report,” Hampshire and Isle of Wight Wildlife Trust, Hampshire, 2010.

[49] Natural England, “Solent and Dorset Coast SPA,” No date. [Online]. Available: https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK9020330&SiteName=Solent%20and%20Dorset%20Coast%20SPA&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=.

[50] Natural England, “Portsmouth Harbour SPA,” No date. [Online]. Available: https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK9011051&SiteName=Portsmouth%20harbour%20SPA&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=.

[51] Natural England, “Designated Sites View,” 2022. [Online]. Available: https://designatedsites.naturalengland.org.uk/.

[52] P. Hollyman, “Age, growth and reproductive assessment of the whelk, Buccinum undatum, in coastal shelf seas,” 2017. [Online]. Available: https://research.bangor.ac.uk/portal/en/theses/age-growth-and-reproductive-assessment-of-the-whelk-buccinum-undatum-in-coastal-shelf-seas(dbbeb0c9-aa78-4e20-a98c-407d9734bbab).html.

[53] M. Robinson, “The abundance, movement and site fidelity of the adult whelk, Buccinum undatum, in the territorial waters of the Isle of Man,” No date. [Online]. Available: www.bangor.ac.uk. [Accessed 13 June 2022].

[54] Southern Inshore Fisheries & Conservation Authority, “Key Species in the Southern IFC District,” No date. [Online]. Available: https://www.southern-ifca.gov.uk/district-key-species. [Accessed 13 June 2022].

[55] T. Bridges, “European lobster stock assessment,” Eastern Inshore Fisheries and Conservation Authority, King’s Lynn, 2021.

[56] Marine Biological Association, “The Marine Life Information Network - Bass (Dicentrarchus labrax),” 14 June 2022. [Online]. Available: https://www.marlin.ac.uk/species/detail/2127.

[57] T. Bridges, “Brown Crab Stock Assessment,” Eastern Inshore Fisheries and Conservation Authority, King’s Lynn, 2020.

[58] E. Hunter, D. Eaton, C. Stewart, A. Lawler, M. T. Smith and M. G. Chapman, “Electronic Tags,” vol. 8, no. 5, 2013.

[59] Marine Biological Association, “The Marine Life Information Network - Great scallop (Pecten maximus),” No date. [Online]. Available: https://www.marlin.ac.uk/species/detail/1398. [Accessed 14 June 2022].

[60] Marine Biological Association, “The Marine Life Information Network - Common cuttlefish (Sepia officinalis),” No date. [Online]. Available: https://www.marlin.ac.uk/species/detail/1098. [Accessed 14 June 2022].

[61] Marine Biological Association, “The Marine Life Information Network - Home,” No date. [Online]. Available: https://www.marlin.ac.uk/. [Accessed 14 June 2022].

[62] Marine Biological Association, “The Marine Life Information Network - Atlantic herring (Clupea harengus),” 14 June 2022. [Online]. Available: https://www.marlin.ac.uk/species/detail/45.

[63] Marine Biological Association, “The Marine Life Information Network - Horse mackerel (or scad) (Trachurus trachurus),” No date. [Online]. Available: https://www.marlin.ac.uk/species/detail/97. [Accessed 14 June 2022].

[64] Marine Biological Association, “The Marine Life Information Network - Atlantic mackerel (Scomber scombrus),” No date. [Online]. Available: https://www.marlin.ac.uk/species/detail/44. [Accessed 14 June 2022].

[65] Marine Biological Association, “The Marine Life Information Network - Bib or Pouting (Trisopterus luscus),” No date. [Online]. Available: https://www.marlin.ac.uk/species/detail/1876. [Accessed 14 June 2022].

[66] North Western Inshore Fisheries and Conservation Authority, “Whiting,” No date. [Online]. Available: https://www.nw-ifca.gov.uk/managing-sustainable-fisheries/whiting/.

[67] Environment Agency, “2021 Remaining Landfill Capacity,” January 2023. [Online]. Available: https://environment.data.gov.uk/portalstg/home/item.html?id=cfcb2ce5bc354d89a8d0c2a85dbe7daa. [Accessed 28 April 2023].

[68] Environment Agency, “Hydrogeological impact appraisal for dewatering abstractions,” 2007. [Online]. Available: https://www.gov.uk/government/publications/hydrogeological-impact-appraisal-for-dewatering-abstractions. [Accessed 20 July 2022].

[69] Environment Agency, “Hydrogeological impact appraisal for groundwater abstractions,” 2007. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/291083/scho0407bmah-e-e.pdf.

[70] Environment Agency, “National LIDAR Programme,” 28 October 2022. [Online]. Available: https://www.data.gov.uk/dataset/f0db0249-f17b-4036-9e65-309148c97ce4/national-lidar-programme.

[71] Environment Agency, “Test and Itchen abstraction licensing strategy,” 8 April 2019. [Online]. Available: https://www.gov.uk/government/publications/test-and-itchen-catchment-abstraction-licensing-strategy#:~:text=Sets%20out%20how%20the%20Environment%20Agency%20manages%20water%20resources%20in%20the%20catchment.. [Accessed August 2022].

[72] Environment Agency, “East Hampshire abstraction licensing strategy,” 8 April 2019. [Online]. Available: https://www.gov.uk/government/publications/east-hampshire-catchment-abstraction-licensing-strategy. [Accessed August 2022].

[73] Environment Agency, “Catchment Data Explorer,” No date. [Online]. Available: https://environment.data.gov.uk/catchment-planning/v/c3-plan.

[74] D. J. Allen, L. J. Brewerton, L. M. Coleby, B. R. Gibbs, M. A. Lewis, A. M. MacDonald, S. J. Wagstaff and A. T. Williams, “The physical properties of major aquifers in England and Wales,” 1997. [Online]. Available: https://nora.nerc.ac.uk/id/eprint/13137/.

[75] D. J. Allen and E. J. Crane, “The Chalk aquifer of the Wessex Basin,” 2017. [Online]. Available: https://nora.nerc.ac.uk/id/eprint/522484/1/RR11002.pdf.

[76] H. K. Jones, B. L. Morris, C. S. Cheney, L. J. Brewerton, P. D. Merrin, M. A. Lewis, A. M. MacDonald, L. M. Coleby, J. C. Talbot, A. A. McKenzie, M. J. Bird, J. Cunningham and V. K. Robinson, “The physical properties of minor aquifers in England and Wales,” British Geological Survey, 2000. [Online]. Available: https://nora.nerc.ac.uk/id/eprint/12663/1/WD00004.pdf.

[77] Hampshire County Council, “Hampshire Groundwater Management Plan Final Draft for Consultation 2013,” 2013. [Online]. Available: https://www.hants.gov.uk/landplanningandenvironment/environment/flooding/strategies/groundwater-management-plan.

[78] P. Burris, C. D. Speed, A. E. Saich, S. Hughes, S. Cole and M. Banks, “Tunnelling, Chalk and turbidity: conceptual model of risk to groundwater public water supplies,” *Quarterly Journal of Engineering Geology and Hydrogeology,* vol. 54, no. 2, 2020.

[79] Planning Inspectorate, “Advice Note Three: EIA Notification and Consultation, (Version 7),” August 2017. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-three-eia-notification-and-consultation-2/#:~:text=The%20purpose%20of%20this%20Advice,accordance%20with%20the%20Infrastructure%20Planning%20(.

[80] Institute of Environmental Management and Assessment, “IEMA Major Accidents and Disasters in EIA Guide,” 23 September 2020. [Online]. Available: https://www.iema.net/resources/blog/2020/09/23/iema-major-accidents-and-disasters-in-eia-primer. [Accessed 08 June 2023].

[81] Department for Environment, Food & Rural Affairs, “National Policy Statement for Water Resources Infrastructure,” 17 April 2023. [Online]. Available: https://www.gov.uk/government/publications/national-policy-statement-for-water-resources-infrastructure.

[82] Eastleigh Borough Council, “Emergency Planning,” No date. [Online]. Available: https://www.eastleigh.gov.uk/council/emergency-planning. [Accessed 08 06 2023].

[83] Fareham Borough Council, “Emergency Response Plan,” August 2018. [Online]. Available: https://www.fareham.gov.uk/PDF/safety/emergencyplan2018.pdf. [Accessed 8 June 2023].

[84] Hampshire County Council, “Emergency Planning,” No date. [Online]. Available: https://www.hants.gov.uk/community/emergencyplanning. [Accessed 8 June 2023].

[85] Havant Borough Council, “Emergency advice,” No date. [Online]. Available: https://www.havant.gov.uk/emergency-advice. [Accessed 8 June 2023].

[86] Portsmouth City Council, “Emergency Response Plan,” April 2018. [Online]. Available: https://www.portsmouth.gov.uk/wp-content/uploads/2020/04/Emergency-Response-Plan-part-1-General-principles.pdf. [Accessed 8 June 2023].

[87] Winchester City Council, “Emergencies,” No date. [Online]. Available: https://www.portsmouth.gov.uk/wp-content/uploads/2020/04/Emergency-Response-Plan-part-1-General-principles.pdf. [Accessed 8 June 2023].

[88] UK Government, “National Risk Register,” 2020. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/952959/6.6920_CO_CCS_s_National_Risk_Register_2020_11-1-21-FINAL.pdf. [Accessed 8 June 2023].

[89] Hampshire and Isle of Wight Local Resilience Forum, “Community Risk Register,” No date. [Online]. Available: https://documents.hants.gov.uk/emergencyplanning/CommunityRiskRegisterbooklet.pdf. [Accessed 8 June 2023].

[90] Health and Safety Executive, “COMAH 2015 Public Information,” No date, [Online]. Available: https://notifications.hse.gov.uk/COMAH2015/Search.aspx. [Accessed 08 June 2023].

[91] Environment Agency, “Flood Risk Map,” No date, [Online]. Available: https://check-long-term-flood-risk.service.gov.uk/postcode. [Accessed 8 June 2023].

[92] UK Government, “Fire and Rescue Incident Statistics: England, year ending December 2021,” December 2021. [Online]. Available: https://www.gov.uk/government/statistics/fire-and-rescue-incident-statistics-england-year-ending-december-2021/fire-and-rescue-incident-statistics-england-year-ending-december-2021. [Accessed 08 June 2023].

[93] Met Office, “England and Wales Fire Severity Index,” No date, [Online]. Available: https://www.metoffice.gov.uk/public/weather/fire-severity-index/#?tab=map&fcTime=1653303600&zoom=5&lon=-4.00&lat=55.74. [Accessed 8 June 2023].

[94] Met Office, “UK Storm Season 2020/21,” [Online]. Available: https://www.metoffice.gov.uk/weather/warnings-and-advice/uk-storm-centre/uk-storm-season-2020-21. [Accessed 8 June 2023].

[95] Met Office, “Existing Climate at the Thornley Island Meteorological Station for the Period 1991 – 2020,” 2022.

[96] Department for Environment Food and Rural Affairs, “UK AIR: Air Information Resource,” March 2023. [Online]. Available: https://uk-air.defra.gov.uk/aqma/maps/. [Accessed 8 June 2023].

[97] Home Office, “Fire and rescue incident statistics: England, year ending December 2021,” 12 May 2022. [Online]. Available: https://www.gov.uk/government/statistics/fire-and-rescue-incident-statistics-england-year-ending-december-2021/fire-and-rescue-incident-statistics-england-year-ending-december-2021.

WATER
for LIFE®
from
Southern
Water®

# Hampshire Water Recycling & Water Transfer Project

# EIA Scoping Report – Volume III Figures

# Part 1 of 5

**VOLUME NUMBER:** III

**DOCUMENT REFERENCE:** 208102-ARU-EGN-XX-DR-L-00001

July 2023 | Issue Rev 01 | The Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017

from Southern Water®

# Contents

## EIA Scoping Report Volume 3 Part 1 of 5 – Figures 1.1 to 7.2

Winchester
HAMPSHIRE
St Cross
Bramdean
Liss
Sheet 6
Winchester Distict
West Meon
Petersfield
East Hampshire District
Crampmoor
Romsey
North Baddesley
Eastleigh
Fair Oak
Sheet 5
Sheet 4
Rownhams
Eastleigh District
Clanfield
Calmore
City of Southampton
Totton
Sheet 2
Sheet 1
Hedge End
Chichester District
Southampton
Marchwood
Waterlooville
Sheet 3
Hythe
Purbrook
Havant
Emsworth
Fareham
Portchester
Drayton
New Forest District
Fareham Distict
Hayling Island
Sheet 7
Hardway
Portsmouth
Gosport
Eastney
South Hayling
Southsea
Sheet 8
Cowes
Ryde
Camp Hill

Location Map

Key to Symbols

- Scoping Area
- Figure 1.2 extent boxes 1:25k
- District boundary

Notes

Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack, Esri UK, Esri, HERE, Garmin, Foursquare, METI/NASA, USGS

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 09/06/2023 | ND | For Information | HDC | |
| 01 | 05/09/2022 | AW | For Information | HDC | |

Client

WATER for LIFE from Southern Water

Title

Figure 1.1
Scoping Area
Sheet 1 of 1

| | | | | | |
|---|---|---|---|---|---|
| Designed | ND | - | Check | SF | - |
| Drawn | ND | - | Review | Core Team | - |
| GIS Check | GC | - | Approved | MP | - |
| Scale at A3 1:150,000 | Status INF | | Rev 02 | Security STD | |

Drawing Number
710166-SWS-XX-XX-DR-Z-00

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 2,000 4,000 6,000 8,000 10,000 Metres

Sheet 2

Havant Thicket Reservoir

Proposed underground pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

Proposed underground pipeline between the Proposed Water Recycling Plant and Havant Thicket Reservoir

Proposed Water Recycling Plant site and expected location of High Lift Pumping Station

Proposed underground pipeline between Budds Farm Wastewater Treatment Works and the proposed Water Recycling Plant

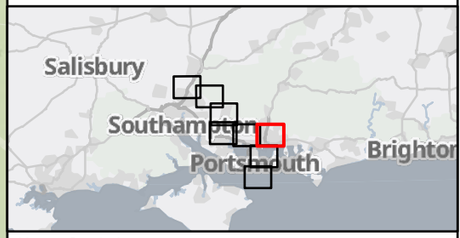
Budds Farm Wastewater Treatment Works

Sheet 7

Cowplain
Waterlooville Golf Club
Silvester Road
Sunnymead Drive
Cowplain Community School
Park Lane
Hambledon Road
Brambles Business Park
Waterlooville
Ferndale
Mill Road
Oaklands Roman Catholic School
Purbrook
Portsmouth Golf Course
Park Avenue
College Road
Bedhampton
Havant
Warblington School
Emsworth
Rowlands Castle
Rowlands Castle St John's Church of England (Controlled) Primary School
Staunton Country Park
The Green
Chichester District
East Hampshire District
Havant Academy
Havant District
Middle Park Way
Dunsbury Way
Barton's Green
Comley Hill
Bartons Road
Horndean Road
Woodberry Lane
Emsworth Common Road
Victoria Road
Marples Way
Birdmarsh Business & Innovation Ctr
Langstone
Farlington Industrial
St John's College Playing
West Street
Barncroft Way
Fitchdean Road

A3(M) B2149 B2150 B2177 A2030 A27 A259 B2147 A3

Location Map




Key to Symbols

- Scoping Area
- Extent boxes 1:25K
- Proposed Water Recycling Plant site and expected location of High Lift Pumping Station
- District Boundaries

Notes

Esri, Intermap, NASA, NGA, USGS, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 12/07/2023 | MCP | For Information | | |
| 01 | 29/09/2022 | MCP | For Information | | |

Client

WATER for LIFE from Southern Water

Title

Figure 1.2
Scoping Area
Sheet 1 of 8

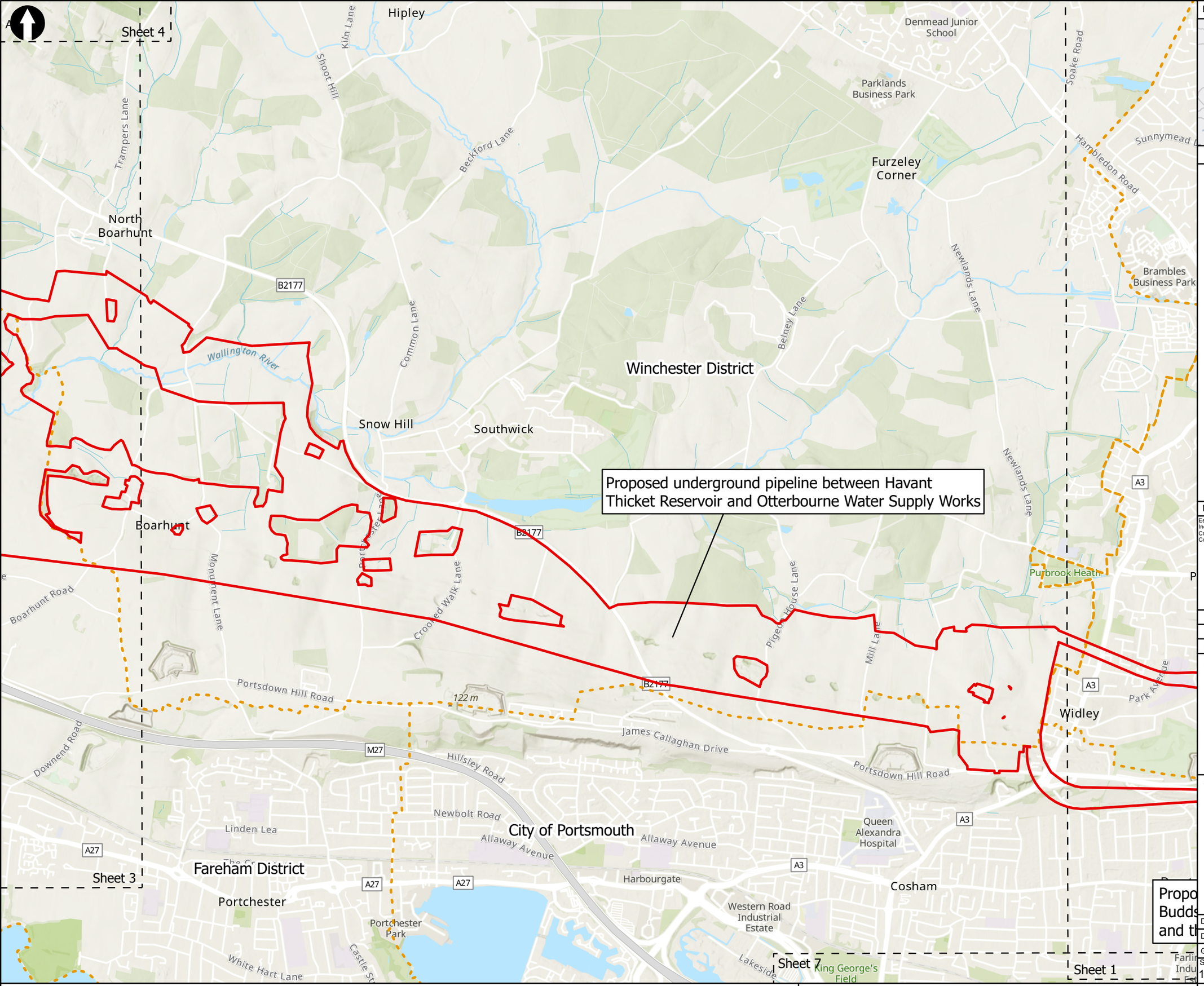
| | | | | | |
|---|---|---|---|---|---|
| Designed | ND | - | Check | MP | MP |
| Drawn | ND | - | Review | Core Team | MP |
| GIS Check | GC | - | Approved | MP | MP |

| Scale at A3 | Status | Rev | Security |
|---|---|---|---|
| 1:25,000 | INF | 02 | STD |

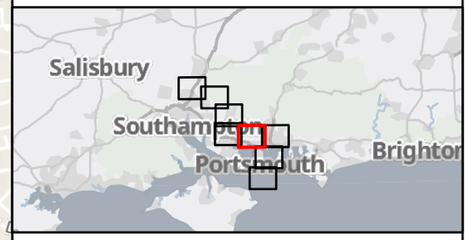
Drawing Number
710166-SWS-XX-XX-DR-Z-00

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 400 800 1,200 1,600 2,000 Metres




Location Map




Key to Symbols

- Scoping Area
- Extent boxes 1:25K
- District Boundaries

Notes

Esri, Intermap, NASA, NGA, USGS, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 12/07/2023 | MCP | For Information | | |
| 01 | 29/09/2022 | MCP | For Information | | |

Client

Water for LIFE from Southern Water

Title

Figure 1.2
Scoping Area
Sheet 2 of 8

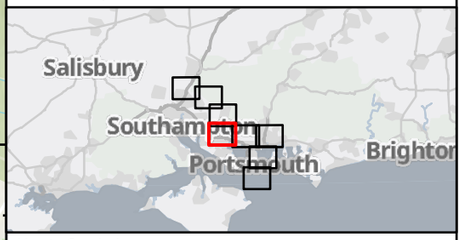
| | | | | | |
|---|---|---|---|---|---|
| Designed | ND | - | Check | MP | MP |
| Drawn | ND | - | Review | Core Team | MP |
| GIS Check | GC | - | Approved | MP | MP |
| Scale at A3 | Status | | Rev | Security | |
| 1:25,000 | INF | | 02 | STD | |

Drawing Number
710166-SWS-XX-XX-DR-Z-00

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 400 800 1,200 1,600 2,000 Metres

Location Map




Key to Symbols

- Scoping Area
- Extent boxes 1:25K
- District Boundaries

Notes

Esri, Intermap, NASA, NGA, USGS, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 12/07/2023 | MCP | For Information | | |
| 01 | 29/09/2022 | MCP | For Information | | |

Client

WATER for LIFE from Southern Water

Title

Figure 1.2
Scoping Area
Sheet 3 of 8

| | | | | | |
|---|---|---|---|---|---|
| Designed | ND | - | Check | MP | MP |
| Drawn | ND | - | Review | Core Team | MP |
| GIS Check | GC | - | Approved | MP | MP |
| Scale at A3 1:25,000 | Status INF | | Rev 02 | Security STD | |

Drawing Number
710166-SWS-XX-XX-DR-Z-00

Sheet 1

Sheet 2

Sheet 3

Sheet 4

Sheet 5

Sheet 6

Sheet 7

Sheet 8

Proposed underground pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

Winchester District

Fareham District

Wickham

Cambridge

Whiteley

Titchfield

Fareham

Knowle

Wickham Church of England Primary School

Rookesbury Park

Wickham Park Golf Club

Wickham Common

Ravenswood House

Albany Business Centre

Fareham Woods Golf Club

Solent Business Park

Vicon Industries

Funtley Industrial Estate

The Henry Cort Community College

Kites Croft Business Park

Blackbrook Recreation Ground

Fareham Leisure Centre

Wallington Industrial Estate

Fort Wallington Industrial Estate

West Hill Park School

Titchfield Lane

Mill Lane

Hundred Acres Road

Southwick Road

Trampers Lane

Broads Hill

Wickham Road

Knowle Road

Funtley Road

River Meon

Whiteley Lane

Cartwright Drive

Hunts Pond Road

Longacres

Kiln Road

Miller Drive

Park Lane

Highlands Road

Oak Road

Gudge Heath Lane

Nine Elms Lane

Boarhunt Road

Downend Road

Eastern Way

A32

A27

M27

A334

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 400 800 1,200 1,600 2,000 Metres

Proposed underground pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

Sheet 5

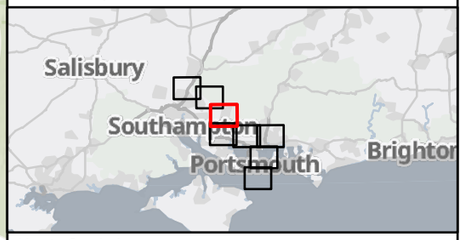
Sheet 3

Sheet 2

Winchester District

Wintershill
Hermitage Heights
Bishops Waltham
Hoe Road
Botley Road
B2177
Mayhill Lane
Hampton Hill
Vicarage Lane
Swanmore Road
A32
Swanmore Church of England (Aided) Primary School
Swanmore College of Technology
Swanmore
Cott Street
River Hamble
Forest Road
Mislingford Road
Waltham Chase
St John the Baptist Church of England (Controlled) Primary School
Swanmore Golf Centre
Gravel Hill
Shirrell Heath
Mislingford
Soberton Heath
Hospital Road
Newmans Hill
Wood End
Lockhams Road
Curdridge
Winchester Road
High Street
St Annes Lane
Shedfield
Shedfield Common
Prickletts Hill
Frith Lane
Outlands Lane
A3051
Culverlands Industrial Estate
Biddenfield Lane
Mill Lane
Wickham Church of England Primary School
Rookesbury Park
Hundred Acres Road
Hundred Acres
Curbridge
Wickham
Droxford Junior School

Location Map




Key to Symbols

- Scoping Area
- Extent boxes 1:25K
- District Boundaries

Notes

Esri, Intermap, NASA, NGA, USGS, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 12/07/2023 | MCP | For Information | | |
| 01 | 29/09/2022 | MCP | For Information | | |

Client

WATER for LIFE from Southern Water

Title

Figure 1.2
Scoping Area
Sheet 4 of 8

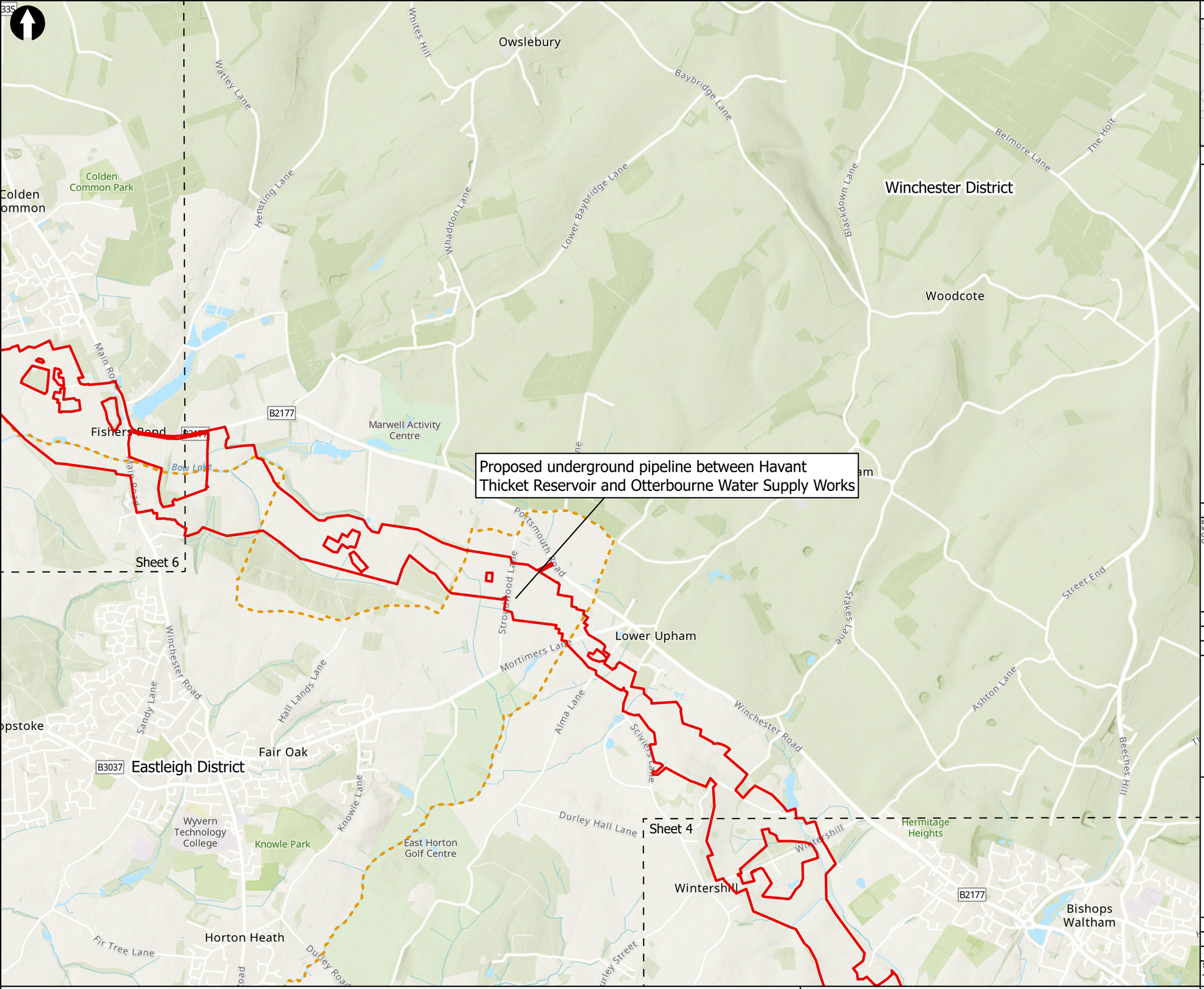
| | | | | | |
|---|---|---|---|---|---|
| Designed | ND | - | Check | MP | MP |
| Drawn | ND | - | Review | Core Team | MP |
| GIS Check | GC | - | Approved | MP | MP |

| Scale at A3 | Status | Rev | Security |
|---|---|---|---|
| 1:25,000 | INF | 02 | STD |

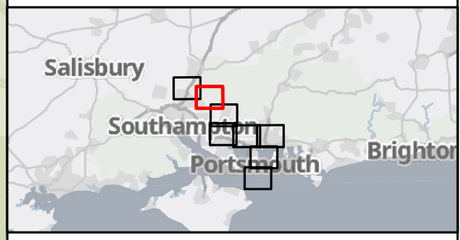
Drawing Number
710166-SWS-XX-XX-DR-Z-00

0 400 800 1,200 1,600 2,000 Metres

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.




Location Map




Key to Symbols

- Scoping Area
- Extent boxes 1:25K
- District Boundaries

Notes

Esri, Intermap, NASA, NGA, USGS, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 12/07/2023 | MCP | For Information | | |
| 01 | 29/09/2022 | MCP | For Information | | |

Client

WATER for LIFE from Southern Water

Title

Figure 1.2
Scoping Area
Sheet 5 of 8

| | | | | | |
|---|---|---|---|---|---|
| Designed | ND | - | Check | MP | MP |
| Drawn | ND | - | Review | Core Team | MP |
| GIS Check | GC | - | Approved | MP | MP |

| Scale at A3 | Status | Rev | Security |
|---|---|---|---|
| 1:25,000 | INF | 02 | STD |

Drawing Number
710166-SWS-XX-XX-DR-Z-00

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 400 800 1,200 1,600 2,000 Metres

Winchester District

Test Valley District

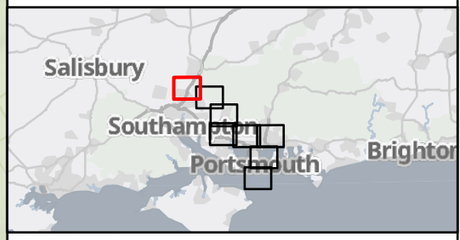
Eastleigh District

Sheet 5

Otterbourne Water Supply Works

Proposed underground pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

Location Map




Key to Symbols

- Scoping Area
- Extent boxes 1:25K
- District Boundaries

Notes

Esri, Intermap, NASA, NGA, USGS, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 12/07/2023 | MCP | For Information | | |
| 01 | 29/09/2022 | MCP | For Information | | |

Client

Title

Figure 1.2
Scoping Area
Sheet 6 of 8

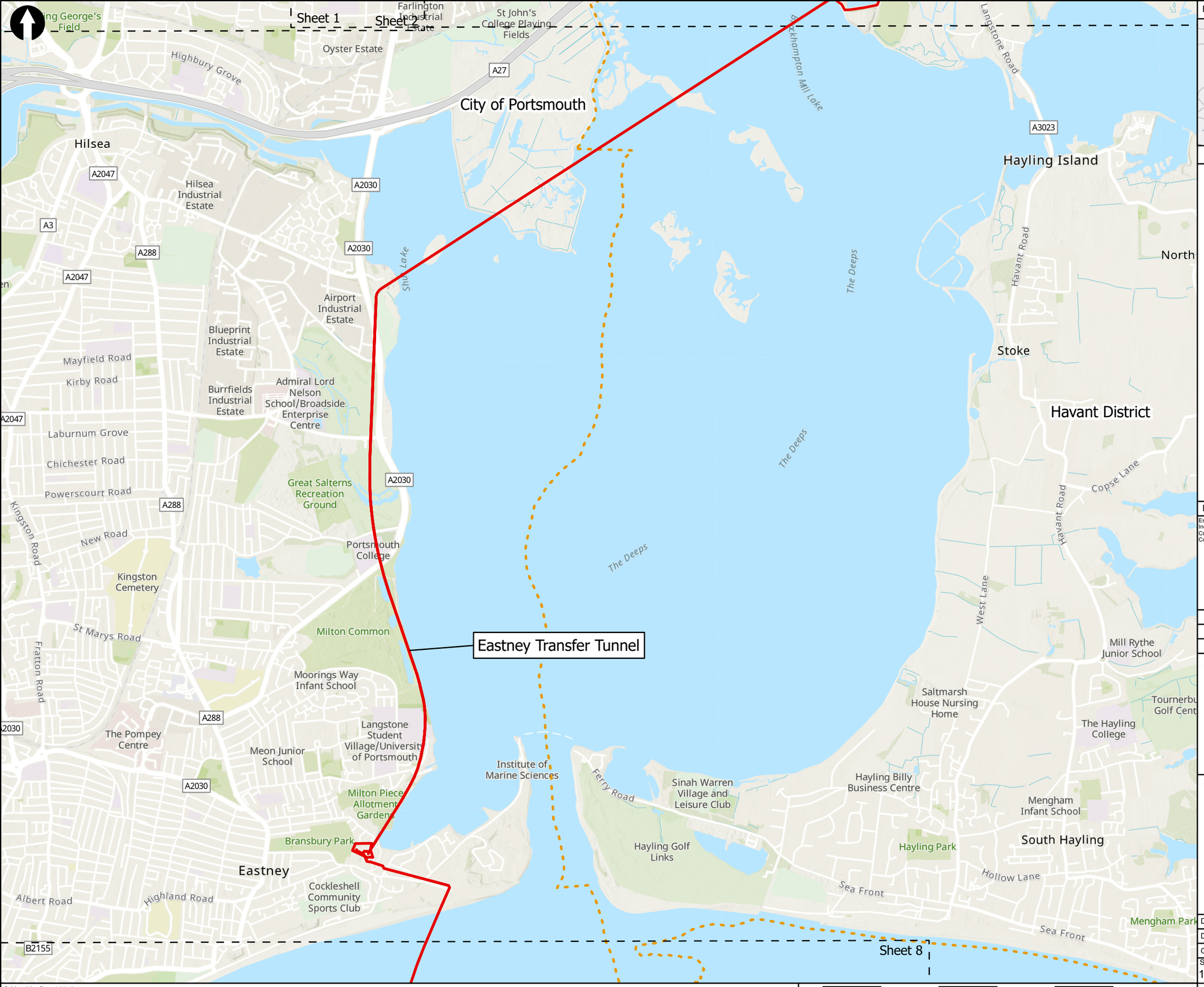
| | | | | | |
|---|---|---|---|---|---|
| Designed | ND | - | Check | MP | MP |
| Drawn | ND | - | Review | Core Team | MP |
| GIS Check | GC | - | Approved | MP | MP |

| Scale at A3 | Status | Rev | Security |
|---|---|---|---|
| 1:25,000 | INF | 02 | STD |

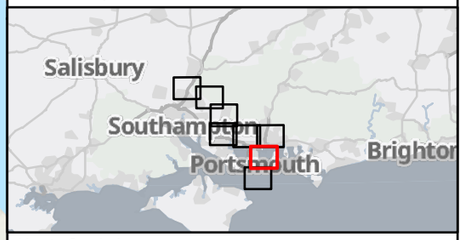
Drawing Number
710166-SWS-XX-XX-DR-Z-00

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 400 800 1,200 1,600 2,000 Metres




Location Map




Key to Symbols

- Scoping Area
- Extent boxes 1:25K
- District Boundaries

Notes

Esri, Intermap, NASA, NGA, USGS, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 12/07/2023 | MCP | For Information | | |
| 01 | 29/09/2022 | MCP | For Information | | |

Client

WATER for LIFE from Southern Water

Title

Figure 1.2
Scoping Area
Sheet 7 of 8

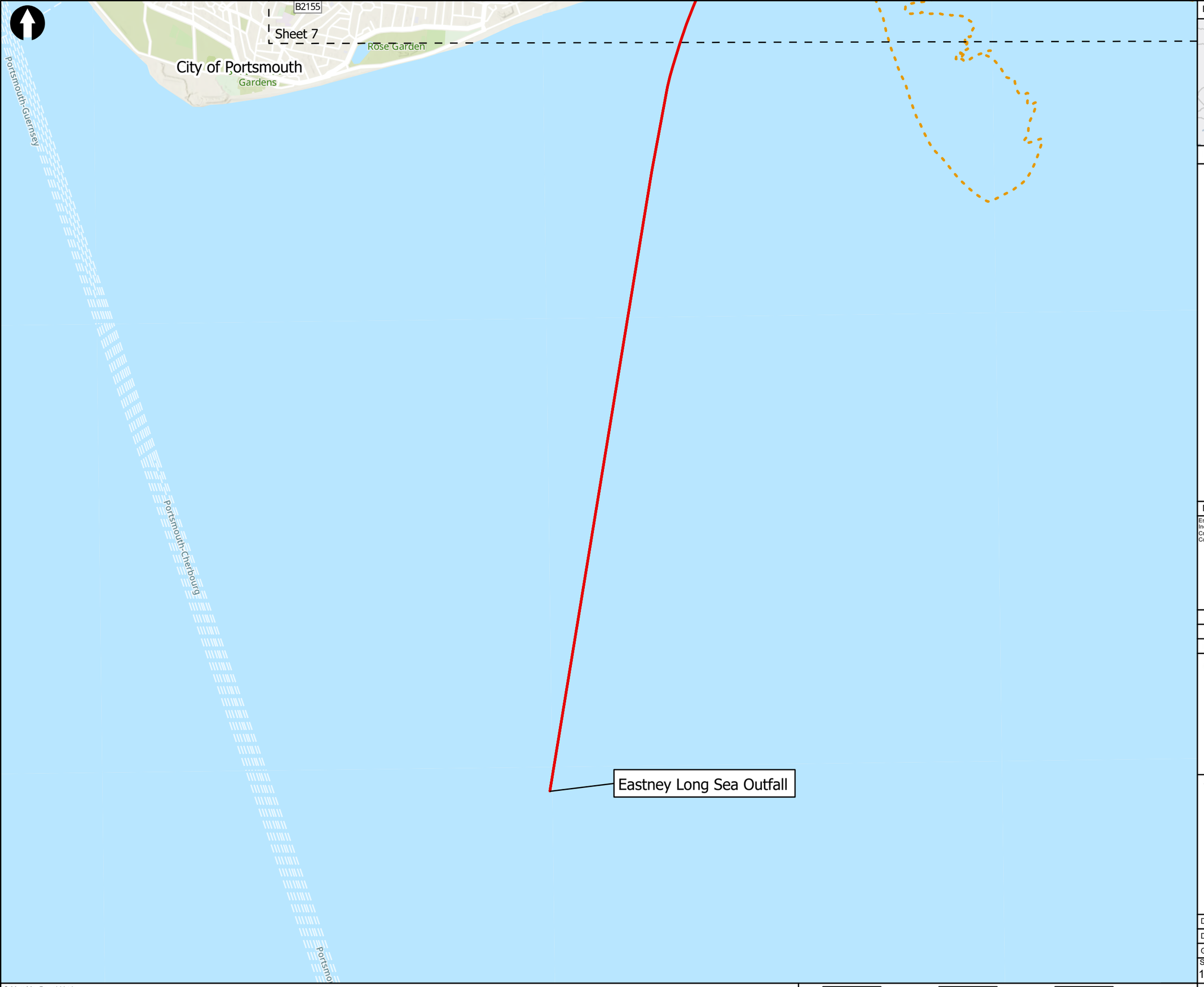
| | | | | | |
|---|---|---|---|---|---|
| Designed | ND | - | Check | MP | MP |
| Drawn | ND | - | Review | Core Team | MP |
| GIS Check | GC | - | Approved | MP | MP |

| Scale at A3 | Status | Rev | Security |
|---|---|---|---|
| 1:25,000 | INF | 02 | STD |

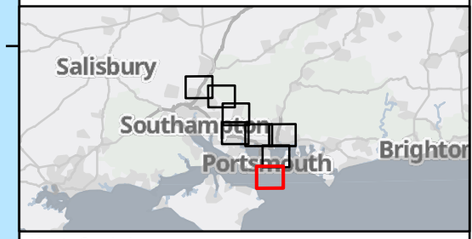
Drawing Number
710166-SWS-XX-XX-DR-Z-00

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 400 800 1,200 1,600 2,000 Metres




Location Map




Key to Symbols

- Scoping Area
- Extent boxes 1:25K
- District Boundaries

Notes

Esri, Intermap, NASA, NGA, USGS, Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 12/07/2023 | MCP | For Information | | |
| 01 | 29/09/2022 | MCP | For Information | | |

Client

WATER for LIFE from Southern Water

Title

Figure 1.2
Scoping Area
Sheet 8 of 8

| | | | | | |
|---|---|---|---|---|---|
| Designed | ND | - | Check | MP | MP |
| Drawn | ND | - | Review | Core Team | MP |
| GIS Check | GC | - | Approved | MP | MP |

| Scale at A3 | Status | Rev | Security |
|---|---|---|---|
| 1:25,000 | INF | 02 | STD |

Drawing Number
710166-SWS-XX-XX-DR-Z-00

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 400 800 1,200 1,600 2,000 Metres

Sheet 2

Cowplain

Waterlooville

Havant Thicket Reservoir

Rowlands Castle

Chichester District

East Hampshire District

Havant District

Purbrook

Proposed underground pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

Proposed underground pipeline between the Proposed Water Recycling Plant and Havant Thicket Reservoir

idley

Bedhampton

Havant

Emsworth

Proposed Water Recycling Plant site and expected location of High Lift Pumping Station

Langstone

Proposed underground pipeline between Budds Farm Wastewater Treatment Works and the proposed Water Recycling Plant

Budds Farm Wastewater Treatment Works

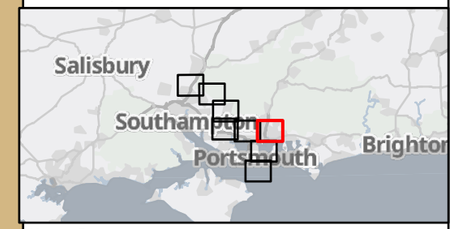
Chichester and Langstone Harbours SPA

Chichester and Langstone Harbours SPA

Sheet 7

Chichester and Langstone Harbours SPA

Location Map




Key to Symbols

- Scoping Area
- Extent Boxes 25K
- Water Recycling Plant and High Lift Pumping Station
- District boundary

Ancient Woodland
- Ancient & Semi-Natural Woodland
- Ancient Replanted Woodland

Designated Sites
- Local Nature Reserve (LNR)
- Ramsar Sites
- Sites of Importance for Nature Conservation (SINCs)
- Areas of Oustanding Natural Beauty (AONB)
- OS Greenspace
- Country Park
- South Downs National Parks

Historic Environment

Listed Building
- Grade I Listed Building
- Grade II Listed Building
- Grade II* Listed Building
- Scheduled Moument

Land Use
- Historic Landfill Sites
- Permitted Waste Sites Authorised Landfill Site

Transport
- Countryside Rights of Way
- National Cycle Network (Sustrans)
- Long Distance National Cycle Routes (Indicative only)
- Byway Open to All Traffic
- Bridleway
- Footpath
- Restricted Byway

Water
- Main Rivers
- Groundwater Dependent Terrestrial Ecosystems

Source Protection Zones
- SPZ 1
- SPZ 1c
- SPZ 2
- SPZ 3
- SPZ 4
- Sites of Special Scientific Interest (SSSI)
- Special Protection Area (SPA)
- Special Areas of Conservation (SAC)

Notes

Source: © Natural England, 2023; © EA, 2023; © Historic England, 2023; © Sustrans, 2023; Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 20/06/2023 | MCP | For Information | | |
| 01 | 01/09/2022 | MCP | For Information | | |

Client

WATER for LIFE from Southern Water

Title

Figure 3.1
Environmental Constraints Plan
Sheet 1 of 8

| | | | | | |
|---|---|---|---|---|---|
| Designed | N/A | - | Check | LG | - |
| Drawn | MCP | - | Review | Core Team | - |
| GIS Check | GC | - | Approved | MP | - |
| Scale at A3 1:25,000 | Status INF | | Rev 02 | Security STD | |

Drawing Number
710166-SWS-XX-XX-DR-Z-00

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 400 800 1,200 1,600 2,000 Metres

Sheet 4

Hipley

North Boarhunt

Furzeley Corner

Winchester District

Snow Hill

Southwick

Proposed underground pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

Boarhunt

Widley

City of Portsmouth

Sheet 3

Fareham District

Portchester

Solent and Dorset Coast SPA

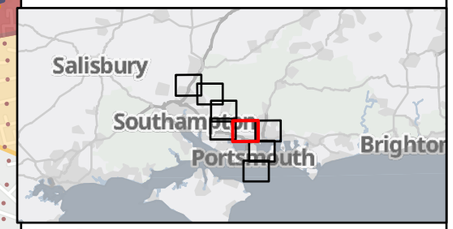
Portsmouth Harbour SPA

Cosham

Sheet 7

Sheet 1

Location Map




Key to Symbols

- Scoping Area
- Extent Boxes 25K
- District boundary

Ancient Woodland
- Ancient & Semi-Natural Woodland
- Ancient Replanted Woodland
- Ramsar Sites
- Sites of Importance for Nature Conservation (SINCs)
- OS Greenspace
- South Downs National Parks

Historic Environment

Listed Building
- Grade I Listed Building
- Grade II Listed Building
- Grade II* Listed Building
- Scheduled Moument

Land Use
- Historic Landfill Sites

Transport
- Countryside Rights of Way
- National Cycle Network (Sustrans)
- Long Distance National Cycle Routes (Indicative only)
- Bridleway
- Footpath
- Restricted Byway

Water
- Main Rivers
- Groundwater Dependent Terrestrial Ecosystems

Source Protection Zones
- SPZ 1
- SPZ 1c
- SPZ 2
- SPZ 2c
- SPZ 3
- SPZ 4
- Sites of Special Scientific Interest (SSSI)
- Special Protection Area (SPA)

Notes

Source: © Natural England, 2023; © EA, 2023; © Historic England, 2023; © Sustrans, 2023; Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 20/06/2023 | MCP | For Information | | |
| 01 | 01/09/2022 | MCP | For Information | | |

Client

from Southern Water

Title

Figure 3.1
Environmental Constraints Plan
Sheet 2 of 8

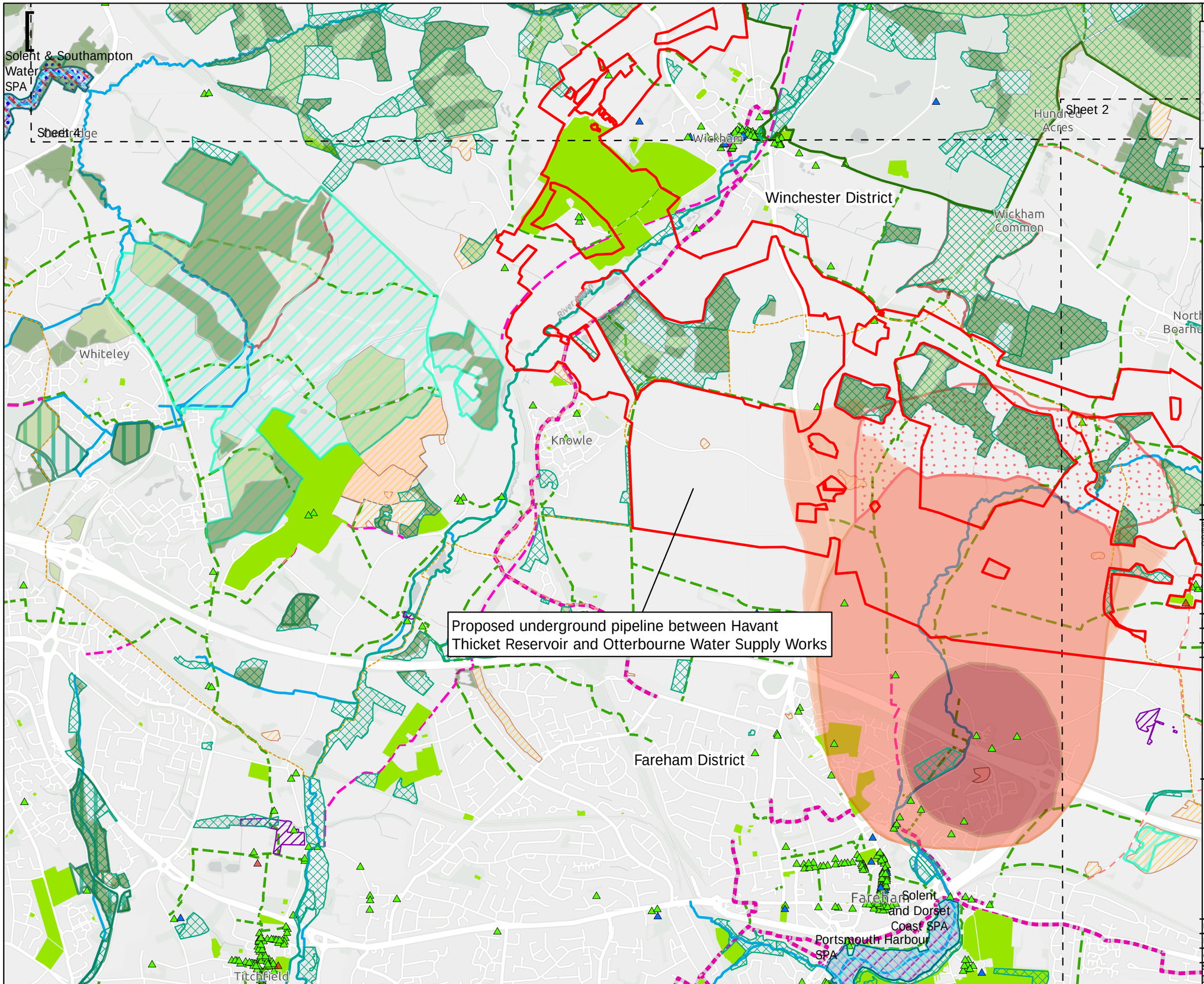
| | | | | | |
|---|---|---|---|---|---|
| Designed | N/A | - | Check | LG | - |
| Drawn | MCP | - | Review | Core Team | - |
| GIS Check | GC | - | Approved | MP | - |

| Scale at A3 | Status | Rev | Security |
|---|---|---|---|
| 1:25,000 | INF | 02 | STD |

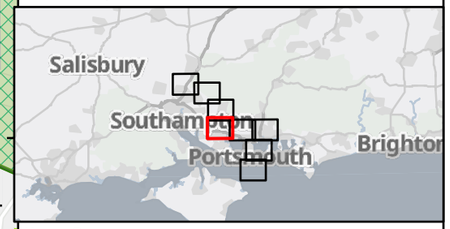
Drawing Number
710166-SWS-XX-XX-DR-Z-00

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 400 800 1,200 1,600 2,000 Metres




Location Map




Key to Symbols

- Scoping Area
- Extent Boxes 25K
- District boundary

Ancient Woodland
- Ancient & Semi-Natural Woodland
- Ancient Replanted Woodland

Designated Sites
- Local Nature Reserve (LNR)
- Ramsar Sites
- Sites of Importance for Nature Conservation (SINCs)
- OS Greenspace
- South Downs National Parks

Historic Environment

Listed Building
- Grade I Listed Building
- Grade II Listed Building
- Grade II* Listed Building
- Scheduled Moument

Land Use
- Historic Landfill Sites
- Permitted Waste Sites Authorised Landfill Site

Transport
- Countryside Rights of Way
- National Cycle Network (Sustrans)
- Long Distance National Cycle Routes (Indicative only)
- Bridleway
- Footpath

Water
- Main Rivers
- Groundwater Dependent Terrestrial Ecosystems

Source Protection Zones
- SPZ 1
- SPZ 2
- SPZ 2c
- SPZ 3
- Sites of Special Scientific Interest (SSSI)
- Special Protection Area (SPA)
- Special Areas of Conservation (SAC)

Notes

Source: © Natural England, 2023; © EA, 2023; © Historic England, 2023; © Sustrans, 2023; Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 20/06/2023 | MCP | For Information | | |
| 01 | 01/09/2022 | MCP | For Information | | |

Client

WATER for LIFE from Southern Water

Title

Figure 3.1
Environmental Constraints Plan
Sheet 3 of 8

| | | | | | |
|---|---|---|---|---|---|
| Designed | N/A | - | Check | LG | - |
| Drawn | MCP | - | Review | Core Team | - |
| GIS Check | GC | - | Approved | MP | - |
| Scale at A3 1:25,000 | Status INF | | Rev 02 | Security STD | |

Drawing Number
710166-SWS-XX-XX-DR-Z-00

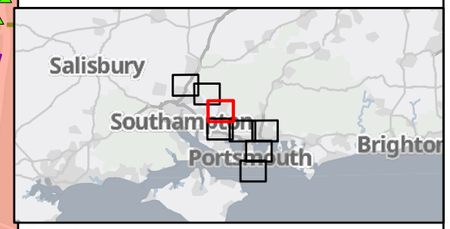
© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 400 800 1,200 1,600 2,000 Metres

Proposed underground pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

Wintershill
Bishops Waltham
Sheet 5
Winchester District
Swanmore
Waltham Chase
Shirrell Heath
Mislingford
Soberton Heath
Curdridge
Shedfield
Wood End
Sheet 3
Solent & Southampton Water SPA
Curbridge
Hundred Acres
Sheet 2

Location Map




Key to Symbols

- Scoping Area
- Extent Boxes 25K
- District boundary

Ancient Woodland
- Ancient & Semi-Natural Woodland
- Ancient Replanted Woodland

Designated Sites
- Local Nature Reserve (LNR)
- Ramsar Sites
- Sites of Importance for Nature Conservation (SINCs)
- OS Greenspace
- South Downs National Parks

Historic Environment

Listed Building
- Grade I Listed Building
- Grade II Listed Building
- Grade II* Listed Building
- Scheduled Moument

Land Use
- Historic Landfill Sites
- Permitted Waste Sites Authorised Landfill Site

Transport
- Countryside Rights of Way
- National Cycle Network (Sustrans)
- Long Distance National Cycle Routes (Indicative only)
- Bridleway
- Footpath
- Restricted Byway

Water
- Main Rivers
- Groundwater Dependent Terrestrial Ecosystems

Source Protection Zones
- SPZ 1
- SPZ 1c
- SPZ 2
- SPZ 2c
- SPZ 3
- SPZ 4
- Sites of Special Scientific Interest (SSSI)
- Special Protection Area (SPA)
- Special Areas of Conservation (SAC)

Notes

Source: © Natural England, 2023; © EA, 2023; © Historic England, 2023; © Sustrans, 2023; Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 20/06/2023 | MCP | For Information | | |
| 01 | 01/09/2022 | MCP | For Information | | |

Client

WATER for LIFE from Southern Water

Title

Figure 3.1
Environmental Constraints Plan
Sheet 4 of 8

| | | | | | |
|---|---|---|---|---|---|
| Designed | N/A | - | Check | LG | - |
| Drawn | MCP | - | Review | Core Team | - |
| GIS Check | GC | - | Approved | MP | - |

| Scale at A3 | Status | Rev | Security |
|---|---|---|---|
| 1:25,000 | INF | 02 | STD |

Drawing Number
710166-SWS-XX-XX-DR-Z-00

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 400 800 1,200 1,600 2,000 Metres

Proposed underground pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

Owslebury

Colden Common

Winchester District

Woodcote

Fishers Pond

Bow Lane

Sheet 6

Lower Upham

Fair Oak

Eastleigh District

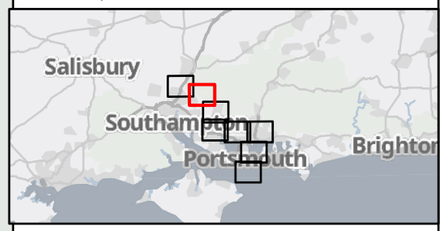
Sheet 4

Wintershill

Bishops Waltham

Horton Heath

Location Map




Key to Symbols

- Scoping Area
- Extent Boxes 25K
- District boundary

Ancient Woodland
- Ancient & Semi-Natural Woodland
- Ancient Replanted Woodland

Designated Sites
- Local Nature Reserve (LNR)
- Sites of Importance for Nature Conservation (SINCs)
- OS Greenspace
- South Downs National Parks

Historic Environment

Listed Building
- Grade I Listed Building
- Grade II Listed Building
- Grade II* Listed Building
- Scheduled Mouument

Land Use
- Historic Landfill Sites
- Permitted Waste Sites Authorised Landfill Site

Transport
- Countryside Rights of Way
- Long Distance National Cycle Routes (Indicative only)
- Bridleway
- Footpath
- Restricted Byway

Water
- Main Rivers
- Groundwater Dependent Terrestrial Ecosystems

Source Protection Zones
- SPZ 1
- SPZ 1c
- SPZ 2
- SPZ 2c
- Sites of Special Scientific Interest (SSSI)

Notes

Source: © Natural England, 2023; © EA, 2023; © Historic England, 2023; © Sustrans, 2023; Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022 Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 20/06/2023 | MCP | For Information | | |
| 01 | 01/09/2022 | MCP | For Information | | |

Client

WATER for LIFE from Southern Water

Title

Figure 3.1
Environmental Constraints Plan
Sheet 5 of 8

| | | | | | |
|---|---|---|---|---|---|
| Designed | N/A | - | Check | LG | - |
| Drawn | MCP | - | Review | Core Team | - |
| GIS Check | GC | - | Approved | MP | - |
| Scale at A3 1:25,000 | Status INF | | Rev 02 | Security STD | |

Drawing Number
710166-SWS-XX-XX-DR-Z-00

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 400 800 1,200 1,600 2,000 Metres

Winchester District

Test Valley District

Eastleigh District

Hursley

Ladwell

Compton End

Compton

South Down

Otterbourne

Twyford

Shawford

Twyford Moors

Colden Common

Highbridge

Brambridge

Fishers Pond

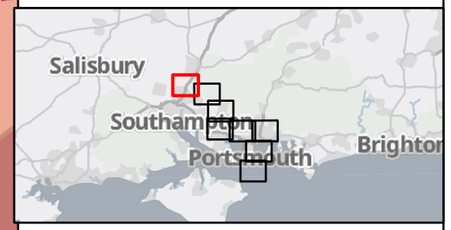
Chandlers Ford

Otterbourne Water Supply Works

Proposed underground pipeline between Havant Thicket Reservoir and Otterbourne Water Supply Works

Sheet 5

Location Map




Key to Symbols

- Scoping Area
- Extent Boxes 25K
- District boundary

Ancient Woodland
- Ancient & Semi-Natural Woodland
- Ancient Replanted Woodland

Designated Sites
- Local Nature Reserve (LNR)
- Sites of Importance for Nature Conservation (SINCs)
- OS Greenspace
- South Downs National Parks

Historic Environment

Listed Building
- Grade I Listed Building
- Grade II Listed Building
- Grade II* Listed Building
- Scheduled Moument

Land Use
- Historic Landfill Sites
- Permitted Waste Sites Authorised Landfill Site

Transport
- Countryside Rights of Way
- National Cycle Network (Sustrans)
- Long Distance National Cycle Routes (Indicative only)
- Bridleway
- Footpath
- Restricted Byway

Water
- Main Rivers
- Groundwater Dependent Terrestrial Ecosystems

Source Protection Zones
- SPZ 1
- SPZ 1c
- SPZ 2
- SPZ 2c
- SPZ 4
- Sites of Special Scientific Interest (SSSI)
- Special Areas of Conservation (SAC)

Notes

Source: © Natural England, 2023; © EA, 2023; © Historic England, 2023; © Sustrans, 2023; Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022 Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 20/06/2023 | MCP | For Information | | |
| 01 | 01/09/2022 | MCP | For Information | | |

Client

WATER for LIFE from Southern Water

Title

Figure 3.1
Environmental Constraints Plan
Sheet 6 of 8

| | | | | | |
|---|---|---|---|---|---|
| Designed | N/A | - | Check | LG | - |
| Drawn | MCP | - | Review | Core Team | - |
| GIS Check | GC | - | Approved | MP | - |
| Scale at A3 | Status | | Rev | Security | |
| 1:25,000 | INF | | 02 | STD | |

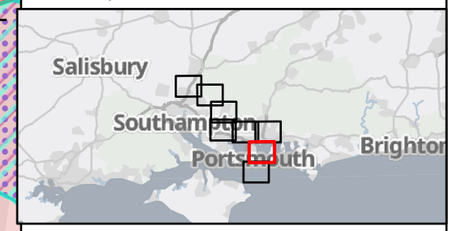
© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 400 800 1,200 1,600 2,000 Metres

Drawing Number
710166-SWS-XX-XX-DR-Z-00

Sheet 1
Sheet 2
Chichester and Langstone Harbours SPA
Portsmouth Harbour SPA
City of Portsmouth
Hilsea
Chichester and Langstone Harbours SPA
Hayling Island
Stoke
Havant District
Chichester and Langstone Harbours SPA
Eastney Transfer Tunnel
Eastney
South Hayling
Solent and Dorset Coast SPA
Sheet 8

Location Map




Key to Symbols

- Scoping Area
- Extent Boxes 25K
- District boundary

Designated Sites
- Local Nature Reserve (LNR)
- Ramsar Sites
- Sites of Importance for Nature Conservation (SINCs)
- Areas of Oustanding Natural Beauty (AONB)
- OS Greenspace

Historic Environment

Listed Building
- Grade I Listed Building
- Grade II Listed Building
- Grade II* Listed Building
- Scheduled Moument

Land Use
- Historic Landfill Sites
- National Cycle Network (Sustrans)
- Long Distance National Cycle Routes (Indicative only)
- Bridleway
- Footpath

Water
- Main Rivers
- Groundwater Dependent Terrestrial Ecosystems
- Sites of Special Scientific Interest (SSSI)
- Special Protection Area (SPA)
- Special Areas of Conservation (SAC)

Notes

Source: © Natural England, 2023; © EA, 2023; © Historic England, 2023; © Sustrans, 2023; Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 20/06/2023 | MCP | For Information | | |
| 01 | 01/09/2022 | MCP | For Information | | |

Client

WATER for LIFE from Southern Water

Title

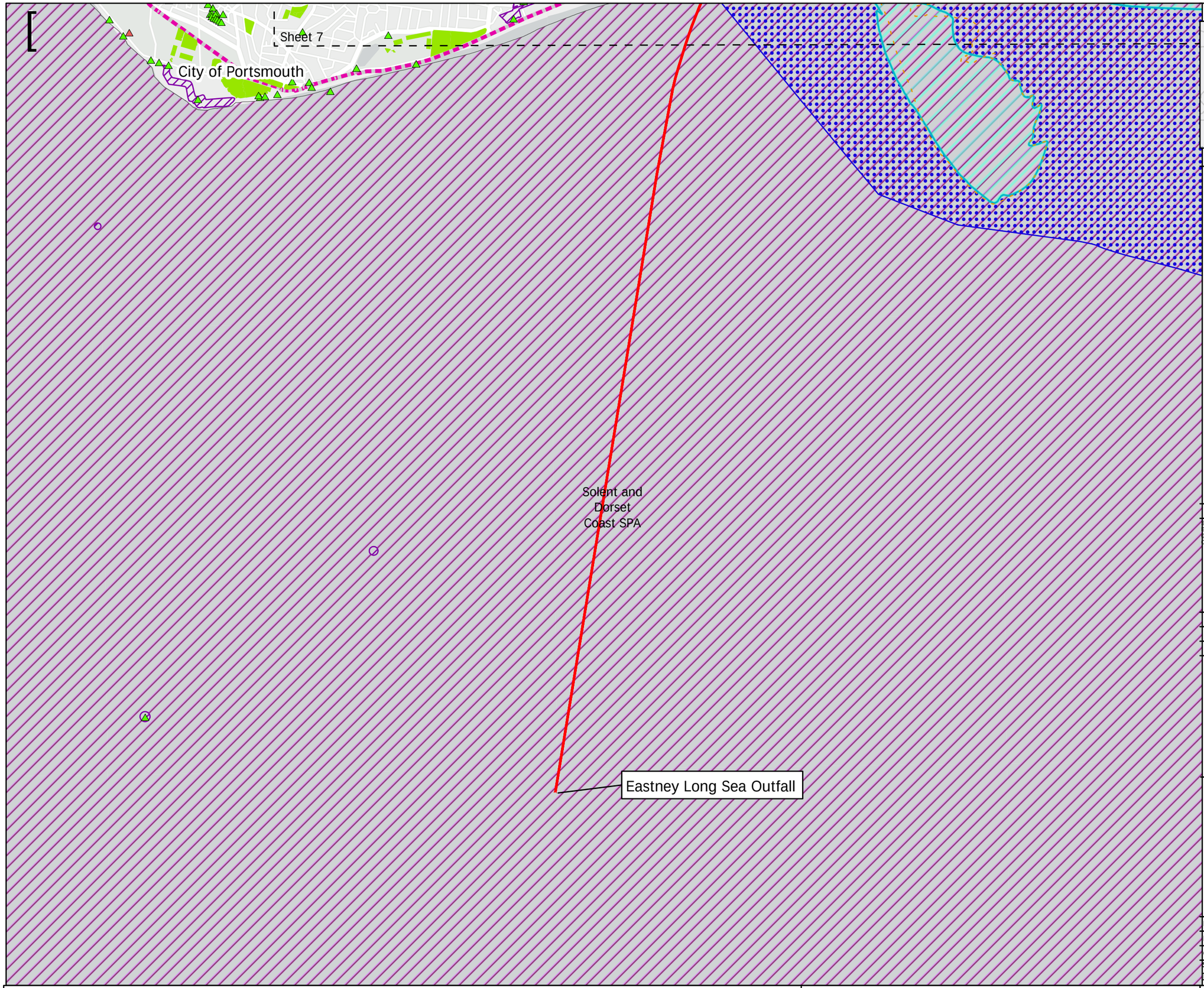
Figure 3.1
Environmental Constraints Plan
Sheet 7 of 8

| | | | | | |
|---|---|---|---|---|---|
| Designed | N/A | - | Check | LG | - |
| Drawn | MCP | - | Review | Core Team | - |
| GIS Check | GC | - | Approved | MP | - |
| Scale at A3 1:25,000 | Status INF | | Rev 02 | Security STD | |

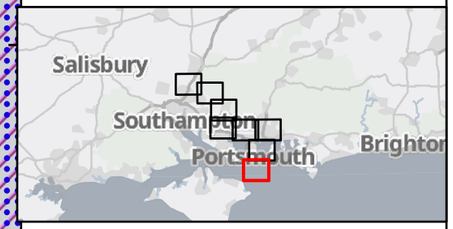
© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 400 800 1,200 1,600 2,000 Metres

Drawing Number
710166-SWS-XX-XX-DR-Z-00




Location Map




Key to Symbols

- Scoping Area
- Extent Boxes 25K
- District boundary
- OS Greenspace

Historic Environment

Listed Building

- Grade I Listed Building
- Grade II Listed Building
- Scheduled Moument
- National Cycle Network (Sustrans)
- Sites of Special Scientific Interest (SSSI)
- Special Protection Area (SPA)
- Special Areas of Conservation (SAC)

Notes

Source: © Natural England, 2023; © EA, 2023; © Historic England, 2023; © Sustrans, 2023; Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 20/06/2023 | MCP | For Information | | |
| 01 | 01/09/2022 | MCP | For Information | | |

Client

WATER for LIFE from Southern Water

Title

Figure 3.1
Environmental Constraints Plan
Sheet 8 of 8

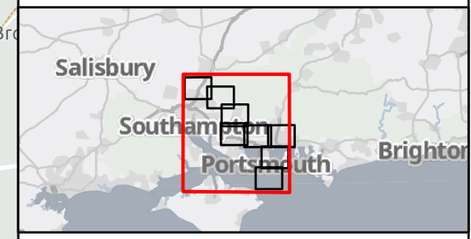
| | | | | | |
|---|---|---|---|---|---|
| Designed | N/A | - | Check | LG | - |
| Drawn | MCP | - | Review | Core Team | - |
| GIS Check | GC | - | Approved | MP | - |
| Scale at A3 | Status | | Rev | Security | |
| 1:25,000 | INF | | 02 | STD | |

Drawing Number
710166-SWS-XX-XX-DR-Z-00

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 400 800 1,200 1,600 2,000 Metres

Location Map




Key to Symbols

Legend

- Scoping Area
- Air Quality 1km Study Area
- Extent boxes 25K
- Otterbourne Water Supply Works
- Local Authority Boundary
- Proposed Water Recycling Plant site and expected location of High Lift Pumping Station
- Air Quality Management Areas

DEFRA PCM Road side $NO_2$ concentrations

- <40 ug/m³
- <40 ug/m³

Diffusion Tubes within Study Area

$NO_2$ Annual Mean Concentration(ug/m$^3$)

- <15
- 15 - 20
- 20 - 30
- >39.5

Designated Sites

- Local Nature Reserve (LNR)
- Ramsar Sites
- Sites of Importance for Nature Conservation (SINCs)
- National Parks
- Ancient Woodland
- Veteran Trees
- Special Protection Area (SPA)
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)

Notes

Source: © AQMA, 2022; Source: © Natural England, 2023; Source: © DEFRA, 2023; Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 12/07/2023 | MCP | For Information | | |
| 01 | 02/09/2022 | MCP | For Information | | |

Client

WATER for LIFE from Southern Water

Title

Figure 6.1
Air Quality 1km Study Area
Sheet 1 of 9

| | | | | | |
|---|---|---|---|---|---|
| Designed | ND | - | Check | SM | - |
| Drawn | ND | - | Review | Core Team | - |
| GIS Check | GC | - | Approved | MP | - |
| Scale at A3 1:136,000 | Status INF | | Rev 02 | Security STD | |

Drawing Number
710166-SWS-XX-XX-DR-Z-00

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 2,000 4,000 6,000 8,000 10,000 Metres

Sheet 3

Cowplain

Havant District

Waterlooville

Rowlands Castle

Chichester District

East Hampshire District

Purbrook

Bedhampton

Havant

Emsworth

HBC-19B

City of Portsmouth

Chichester and Langstone Harbours SPA

Chichester and Langstone Harbours SPA

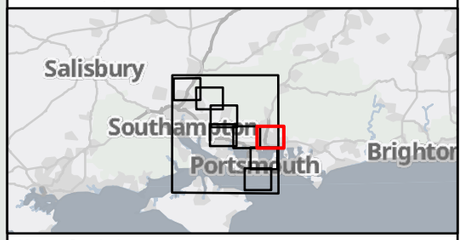
Sheet 2

Sheet 3

Sheet 8

Sheet 2

Location Map




Key to Symbols

Legend

- Scoping Area
- Air Quality 1km Study Area
- Extent boxes 25K
- Local Authority Boundary
- Proposed Water Recycling Plant site and expected location of High Lift Pumping Station

DEFRA PCM Road side $NO_2$ concentrations

- <40 ug/m³
- <40 ug/m³

Diffusion Tubes within Study Area

$NO_2$ Annual Mean Concentration(ug/m³)

- <15
- 15 - 20
- 20 - 30

Designated Sites

- Local Nature Reserve (LNR)
- Ramsar Sites
- Sites of Importance for Nature Conservation (SINCs)
- National Parks
- Ancient Woodland
- Veteran Trees
- Special Protection Area (SPA)
- Special Areas of Conservation (SAC)
- Sites of Special Scientific Interest (SSSI)

Notes

Source: © AQMA, 2022; Source: © Natural England, 2023; Source: © DEFRA, 2023; Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 12/07/2023 | MCP | For Information | | |
| 01 | 02/09/2022 | MCP | For Information | | |

Client

WATER for LIFE from Southern Water

Title

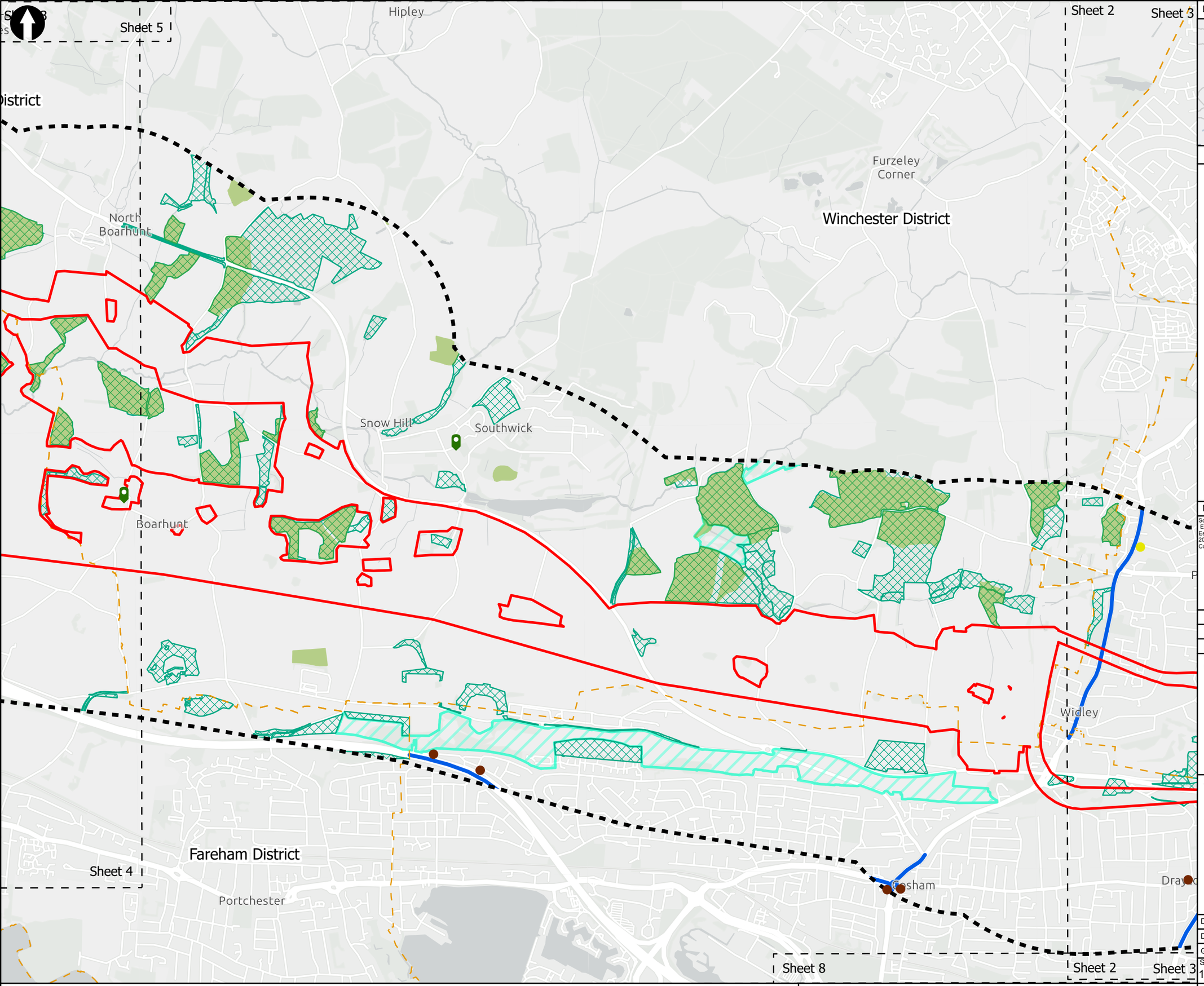
Figure 6.1
Air Quality 1km Study Area
Sheet 2 of 9

| | | | | | |
|---|---|---|---|---|---|
| Designed | ND | - | Check | SM | - |
| Drawn | ND | - | Review | Core Team | - |
| GIS Check | GC | - | Approved | MP | - |
| Scale at A3 1:25,000 | Status INF | | Rev 02 | Security STD | |

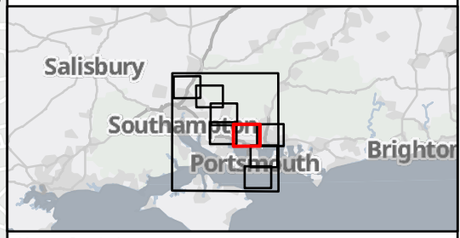
Drawing Number
710166-SWS-XX-XX-DR-Z-00

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 400 800 1,200 1,600 2,000 Metres




Location Map




Key to Symbols

Legend
- Scoping Area
- Air Quality 1km Study Area
- Extent boxes 25K
- Local Authority Boundary

DEFRA PCM Road side $NO_2$ concentrations
- <40 ug/m³

Diffusion Tubes within Study Area
$NO_2$ Annual Mean Concentration(ug/m³)
- 15 - 20
- 20 - 30

- Sites of Importance for Nature Conservation (SINCs)
- Ancient Woodland
- Veteran Trees
- Sites of Special Scientific Interest (SSSI)

Notes

Source: © AOMA, 2022; Source: © Natural England, 2023; Source: © DEFRA, 2023; Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 12/07/2023 | MCP | For Information | | |
| 01 | 02/09/2022 | MCP | For Information | | |

Client

WATER for LIFE from Southern Water

Title

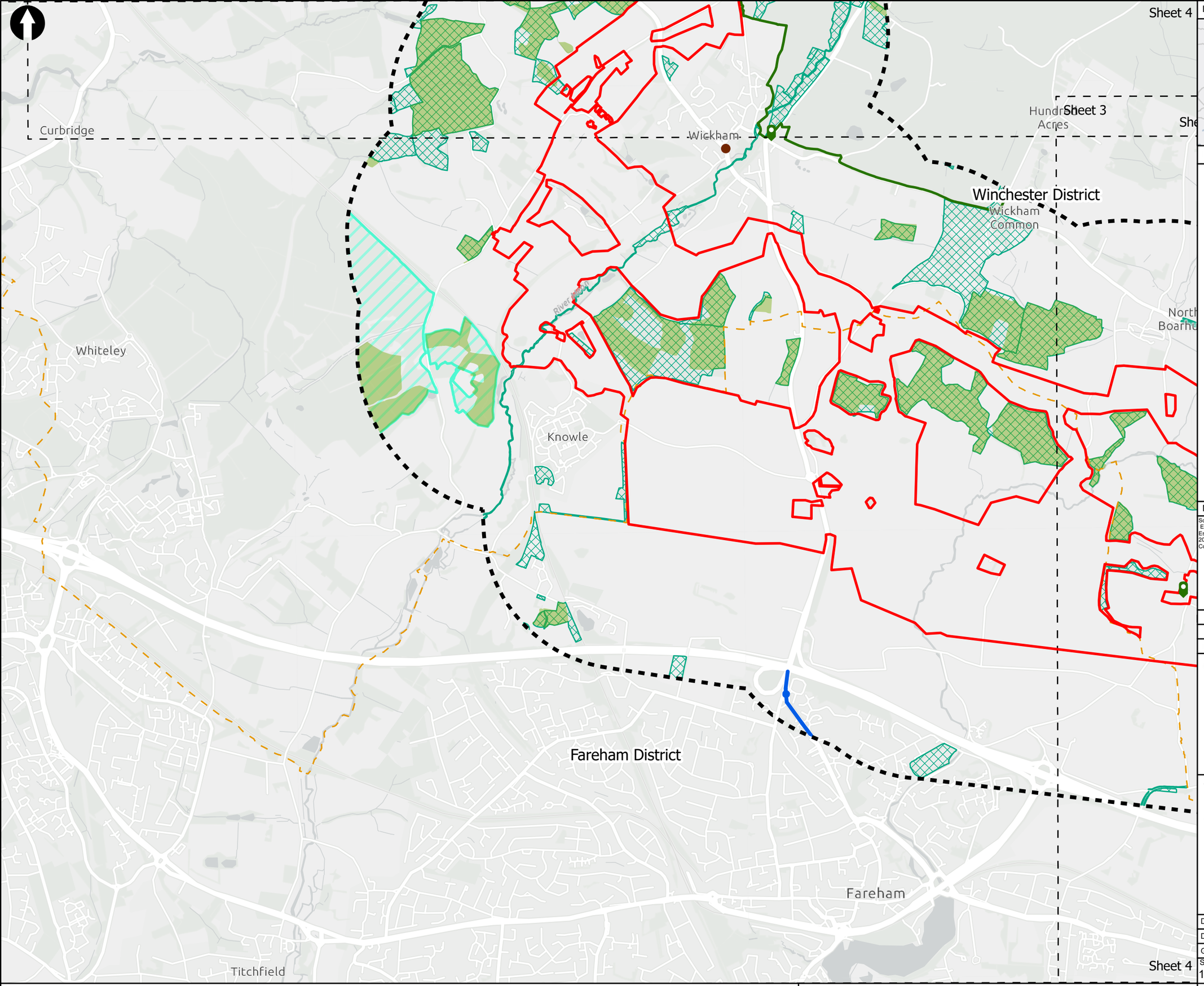
Figure 6.1
Air Quality 1km Study Area
Sheet 3 of 9

| | | | | | |
|---|---|---|---|---|---|
| Designed | ND | - | Check | SM | - |
| Drawn | ND | - | Review | Core Team | - |
| GIS Check | GC | - | Approved | MP | - |
| Scale at A3 1:25,000 | Status INF | | Rev 02 | Security STD | |

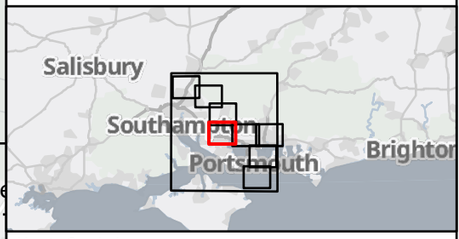
Drawing Number
710166-SWS-XX-XX-DR-Z-00

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 400 800 1,200 1,600 2,000 Metres




Location Map




Key to Symbols

Legend

- Scoping Area
- Air Quality 1km Study Area
- Extent boxes 25K
- Local Authority Boundary

DEFRA PCM Road side $NO_2$ concentrations

- <40 ug/m³

Diffusion Tubes within Study Area

$NO_2$ Annual Mean Concentration(ug/m³)

- 20 - 30

- Sites of Importance for Nature Conservation (SINCs)
- National Parks
- Ancient Woodland
- Veteran Trees
- Sites of Special Scientific Interest (SSSI)

Notes

Source: © AQMA, 2022; Source: © Natural England, 2023; Source: © DEFRA, 2023; Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 12/07/2023 | MCP | For Information | | |
| 01 | 02/09/2022 | MCP | For Information | | |

Client

WATER for LIFE from Southern Water

Title

Figure 6.1
Air Quality 1km Study Area
Sheet 4 of 9

| | | | | | |
|---|---|---|---|---|---|
| Designed | ND | - | Check | SM | - |
| Drawn | ND | - | Review | Core Team | - |
| GIS Check | GC | - | Approved | MP | - |

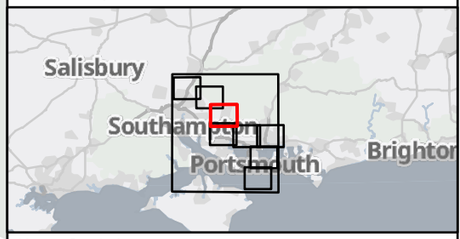
| Scale at A3 | Status | Rev | Security |
|---|---|---|---|
| 1:25,000 | INF | 02 | STD |

Drawing Number
710166-SWS-XX-XX-DR-Z-00

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 400 800 1,200 1,600 2,000 Metres

Location Map




Key to Symbols

Legend

- Scoping Area
- Air Quality 1km Study Area
- Extent boxes 25K
- Local Authority Boundary

Designated Sites

- Local Nature Reserve (LNR)
- Sites of Importance for Nature Conservation (SINCs)
- National Parks
- Ancient Woodland
- Veteran Trees
- Sites of Special Scientific Interest (SSSI)

Notes

Source: © AQMA, 2022; Source: © Natural England, 2023; Source: © DEFRA, 2023; Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 12/07/2023 | MCP | For Information | | |
| 01 | 02/09/2022 | MCP | For Information | | |

Client

WATER for LIFE from Southern Water

Title

Figure 6.1
Air Quality 1km Study Area
Sheet 5 of 9

| | | | | | |
|---|---|---|---|---|---|
| Designed | ND | - | Check | SM | - |
| Drawn | ND | - | Review | Core Team | - |
| GIS Check | GC | - | Approved | MP | - |
| Scale at A3 1:25,000 | Status INF | | Rev 02 | Security STD | |

Drawing Number
710166-SWS-XX-XX-DR-Z-00

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.

0 400 800 1,200 1,600 2,000 Metres

et 6

Owslebury

Winchester District

Woodcote

Upham

Colden Common

Fishers Pond

Bow Lake

Lower Upham

Fair Oak

Eastleigh District

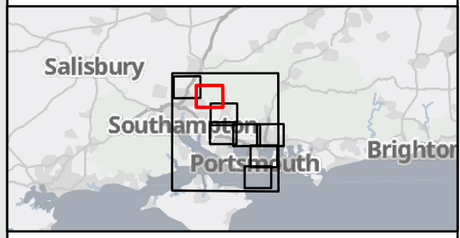
Horton Heath

Wintershill

Bishops Waltham

Sheet 6

## Location Map




## Key to Symbols

Legend

- Scoping Area
- Air Quality 1km Study Area
- Extent boxes 25K
- Local Authority Boundary

Designated Sites

- Local Nature Reserve (LNR)
- Sites of Importance for Nature Conservation (SINCs)
- National Parks
- Ancient Woodland
- Veteran Trees

## Notes

Source: © AQMA, 2022; Source: © Natural England, 2023; Source: © DEFRA, 2023; Esri UK, Esri, HERE, Garmin, Foursquare, GeoTechnologies, Inc, METI/NASA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Contains OS data © Crown Copyright and database right 2022
Contains data from OS Zoomstack

| Rev | Date | Drawn | Description | Ch'k'd | App'd |
|---|---|---|---|---|---|
| 02 | 12/07/2023 | MCP | For Information | | |
| 01 | 02/09/2022 | MCP | For Information | | |

Client

WATER for LIFE from Southern Water

Title

Figure 6.1
Air Quality 1km Study Area
Sheet 6 of 9

| | | | | | |
|---|---|---|---|---|---|
| Designed | ND | - | Check | SM | - |
| Drawn | ND | - | Review | Core Team | - |
| GIS Check | GC | - | Approved | MP | - |
| Scale at A3 1:25,000 | Status INF | | Rev 02 | Security STD | |

Drawing Number
710166-SWS-XX-XX-DR-Z-00

0 400 800 1,200 1,600 2,000 Metres

© Mott MacDonald Ltd.
This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purpose.
We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by other parties.