A30 Chiverton to Carland Cross

6.4(E) ES Appendix 16.1 Outline CEMP Annexes

HA551502-ARP-EGN-SW-RP-LE-000013

P19.1 | S0

Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended)
APFP Regulation 5(2)(a)

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LEGEND

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SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommission / Demolition
NONE

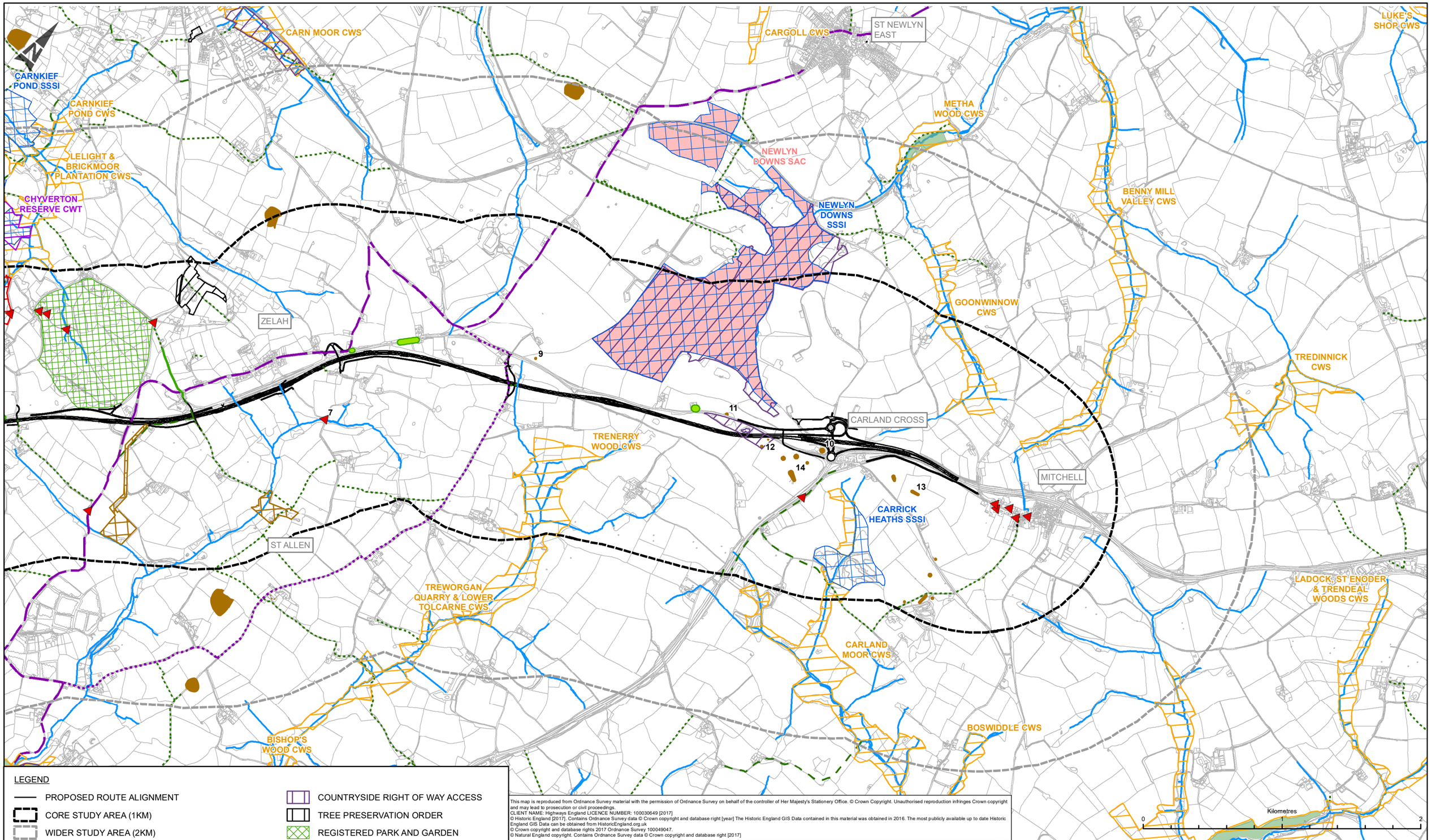
Rev	Date	Description	By	Chk'd	App'd
C02	22/08/18	FIRST ISSUE	AH	AM	JP

Suitability	A3
Drawing Status	STAGE COMPLETED
Designer	ARUP
Client	highways england; European Union, European Regional Development Fund
Project Title	A30 CHIVERTON TO CARLAND CROSS
Drawing Title	FIGURE 1.3 - ENVIRONMENTAL CONSTRAINTS PLAN SHEET 1 OF 2

Scale	Designed / Drawn	Checked	Approved	Authorised
1:25,000	AH	AM	JP	IM
Original Size	**Date**	**Date**	**Date**	**Date**
A3	22/08/18	22/08/18	22/08/18	22/08/18

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HA551502-ARP-EGN-SW-DR-LE-000032

Revison: C02



LEGEND

- PROPOSED ROUTE ALIGNMENT
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SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommission / Demolition
NONE

Rev	Date	Description	By	Chk'd	App'd
P04	07/08/18	FIRST ISSUE	AH	AM	JP

Suitability: A3
Drawing Status: STAGE COMPLETED

Designer: ARUP

Client: highways england

European Union
European Regional Development Fund

Project Title: A30 CHIVERTON TO CARLAND CROSS

Drawing Title: FIGURE 1.3 - ENVIRONMENTAL CONSTRAINTS PLAN SHEET 2 OF 2

Scale	Designed / Drawn	Checked	Approved	Authorised
1:25,000	AH	AM	JP	IM

Original Size	Date	Date	Date	Date
A3	07/08/18	07/08/18	07/08/18	07/08/18

Drawing Number: Project | Originator | Volume
HA551502-ARP-EGN-SW-DR-LE-000033
Location | Type | Role | Number

Revison: C01

Annex B: Outline Site Waste Management Plan

1 Introduction

1.1 Purpose

1.1.1 The purpose of the Outline Site Waste Management Plan (SWMP) is to set out proposals for the identification, segregation, handling and storage of different types of wastes identified as arising from the works. These wastes (by quantity/type/chemical composition/EWC code, etc.) will be recorded and their disposal route, including the place of their final disposal shall be reported in the Construction Environmental Management Plan.

1.1.2 The aim of using a SWMP is to minimise the amount of waste produced due to activities as a result of the project, minimising environmental impacts and maximising cost savings. The client and contractor as named in this document shall take all reasonable steps to ensure all waste from this site shall be dealt with in accordance with the waste duty of care in section 34 of the Environmental Protection (Duty of Care Regulations 1991 (b) and materials will be handled efficiently, and waste managed appropriately.

1.2 Structure and Scope of the Outline Site Waste Management Plan

1.2.1 This Outline SWMP has been prepared during the outline design and environmental assessment period, in preparation of the Development Consent Order submission. Detailed information on the waste arisings is not yet available. This information would become available during the detailed design stage upon appointment of the contractor.

1.2.2 The Outline SWMP considers the type and volume of waste that is likely to be generated from the construction of the new A30 from Chiverton to Carland Cross. In particular, it sets out:

- The waste regulation framework;
- The types of waste that would be generated;
- How the waste would be managed;
- The waste management facilities available; and
- The methods used to measure and record the quantity of waste generated from the construction of the new road.

1.2.3 The SWMP is a ‘live’ document that will be reviewed and updated to incorporate the detailed waste information.

1.3 Responsibilities

1.3.1 The key roles and associated responsibilities with regard to this plan are outlined below.

1.3.2 Highways England will be responsible for the following:

- appointing the contractors for the purpose of the SWMP;
- ensuring that the SWMP is implemented effectively; and

- reviewing, revising and refining the SWMP (where necessary) in conjunction with the contractor.

1.3.3 The contractor has the overall responsibility for:

- updating and delivering this SWMP on behalf of the client;
- ensuring all procedures in this SWMP and followed;
- ensuring all contractors are suitably qualified and experienced in implementing the measures within this SWMP. These measures would be contained within the terms of contracts to ensure understanding and accountability;
- making and maintaining arrangements that enable those engaged in construction and demolition to co-operate effectively in promoting measures to manage waste in accordance with the terms of the SWMP;
- ensuring, so far as is reasonably practicable, that waste produced during construction is re-used, recycled or recovered;
- regularly reviewing (every three months as a minimum) the SWMP and update where necessary;
- reporting on the performance of the SWMP within three months of the work being completed (see Section 6.3);
- establishing procedures for the regular review and recording of the quality of the works as part of it Quality Management System; and
- maintaining records relevant to this SWMP.

Table 1-1 Annex B Responsibilities details

Name	Position/Responsibility	Contact Details
	Highways England Project Manager	
	Contractor Environmental Manager	
	Site manager	
	SHE manager	

2 Regulatory Framework

2.1 Definition of Waste

2.1.1 For the purpose of this document, the definition of "waste" is taken from Article 3(1) of the revised European Waste Framework Directive (WFD) (2008/98/EC), which states that waste is "any *substance or object which the holder discards or intends or is required to discard*". Once it has been discarded, the substance or object remains a waste until fully recovered.

2.1.2 "Discard" includes the recovery and recycling of a subject or object as well as its disposal. The decision on whether something is discarded must take account of all the circumstances (for example, the nature of the material, how it was produced and how it would be used) and must have regard to the aims of the WFD: "*the protection of human health and the environment against harmful*

effects caused by the collection, transport, treatment, storage and tipping of waste".

2.1.3 Guidance on the interpretation of the WFD definition of waste is taken from Defra's recently published 'Guidance on the legal definition of waste and its application[1]', which provides a practical guide to help organisations make decisions about whether a material is a waste or not.

2.1.4 The document also takes into account CL:AIRE's Definition of Waste: Development Industry Code of Practice (CoP) (CL:AIRE, 2011)[2]. The CoP is voluntary and applies to England and Wales only. The CoP sets out good practice for the development industry to use on a site-specific basis when assessing if excavated materials are classified as waste or not and, when treated, excavated waste can cease to be a waste for a particular use. If materials are dealt with in accordance with the CoP, the EA considers that those materials are unlikely to be waste if they are used for the purposes of "*land development*".

2.1.5 The scope of the CoP relates to "excavated materials", which include:

- soil, both top soil and sub soil, parent material and underlying geology;
- soil and mineral based dredgings (following appropriate dewatering);
- ground based infrastructure that is capable of reuse within earthworks projects, for example road base, concrete floors any processing would have to be in-line with permitted controls before considered suitable for reuse);
- made ground;
- source segregated aggregate material arising from demolition activities, such as crushed brick and concrete, to be reused on the site of production within earthworks projects or as sub-base or drainage materials; and
- stockpiled excavated materials that include the above.

2.1.6 The management of these materials has been set out in Annex C Materials Management Plan, and in the case of soils, this is detailed in Annex P Outline Soils Management Plan.

2.2 Legislation and Guidance

2.2.1 The EU Waste Framework Directive 2008/98/EC[3] provides the overarching legislative framework for the collection, transport, recovery and disposal of waste, and mandates the Waste Hierarchy which requires that where waste is unavoidable, products and materials should, subject to regulatory controls, be used again, for the same or a different purpose (re-use). Otherwise, resources should be recovered from waste through recycling. Value can also be recovered by generating energy from waste but only if none of the above offer an appropriate alternative solution.

[1] Defra, 2012. Guidance on the legal definition of waste and its application
[2] CL:AIRE, 2011 Definition of Waste: Development Industry Code of Practice
[3] European Commission, 2016. Directive 2008/98/EC on Waste (EU Waste Framework Directive)

3 Waste arisings

3.1 Waste Forecasting

3.1.1 In order to identify the types of waste generated by the proposed development, the construction programme is divided into its key stages. The key programme stages that have the potential to generate waste include:

- Site clearance
- Site remediation/preparation
- Demolition
- Construction

3.1.2 The quantities of waste are not yet available.

3.2 Waste Types

3.2.1 The key waste streams produced on site can be classified as:

- INERT – wastes that would not cause adverse effects to the environment when disposed of, or do not decompose and they have no potentially hazardous content when placed in a landfill. Examples of inert wastes are rocks, concrete, mortar, glass, uncontaminated soils and aggregates.
- NON HAZARDOUS – wastes that would decompose when buried resulting in the production of methane and carbon dioxide. Examples of non-hazardous wastes include timber, paper and cardboard.
- HAZARDOUS – wastes that are harmful to human health or the environment (for example, pollution of watercourses) if they are inappropriately contained, treated or disposed of. Hazardous wastes may have one or more of the following properties: explosive, corrosive, flammable, highly flammable, infectious, oxidising or sensitising.

3.2.2 The following materials would be removed as part of the site clearance/demolition phase:

- Vegetation surface strip, kerbs, trees, traffic signs, safety barriers, lighting, etc.
- Bridge demolition which would result in concrete, steel beams, metal parapets, etc.

3.2.3 The waste generated during construction would be assigned a European Waste Catalogue code. A list of relevant codes is provided in Table 3-1. These codes would be provided on each waste transfer note that would accompany every movement of waste from the site.

Table 3-1 List of Waste Categories for Construction Wastes

17 Construction and demolition wastes (including excavated soil from contaminated sites)
17 01 Concrete, bricks, tiles and ceramics
17 01 01 Concrete
17 01 02 Bricks
17 01 03 Tiles and ceramics
17 01 06* Mixtures of, or separate fractions of concrete, bricks, tiles and ceramics containing dangerous substances
17 01 07 Mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06
17 02 Wood, glass and plastic
17 02 01 Wood
17 02 02 Glass
17 02 03 Plastic
17 02 04* Glass, plastic and wood containing or contaminated with dangerous substances
17 03 Bituminous mixtures, coal tar and tarred products
17 03 01* Bituminous mixtures containing coal tar
17 03 02 Bituminous mixtures other than those mentioned in 17 03 01
17 03 03* Coal tar and tarred products
17 04 Metals (including their alloys)
17 04 01 Copper, bronze, brass
17 04 02 Aluminium
17 04 03 Lead
17 04 04 Zinc
17 04 05 Iron and steel
17 04 06 Tin

17 Construction and demolition wastes (including excavated soil from contaminated sites)
17 04 07 Mixed metals
17 04 09* Metal waste contaminated with dangerous substances
17 04 10* Cables containing oil, coal tar and other dangerous substances
17 04 11 Cables other than those mentioned in 17 04 10
17 05 Soil (including excavated soil from contaminated sites), stones and dredging spoil
17 05 03* Soil and stones containing dangerous substances
17 05 04 Soil and stones other than those mentioned in 17 05 03
17 05 05* Dredging spoil containing dangerous substances
17 05 06 Dredging spoil other than those mentioned in 17 05 05
17 05 07* Track ballast containing dangerous substances
17 05 08 Track ballast other than those mentioned in 17 05 07
17 06 Insulation materials and asbestos–containing construction materials
17 06 01* Insulation materials containing asbestos
17 06 03* Other insulation materials consisting of or containing dangerous substances
17 06 04 Insulation materials other than those mentioned in 17 06 01 and 17 06 03
17 06 05* Construction materials containing asbestos
17 08 Gypsum – based construction material
17 08 01* Gypsum–based construction materials contaminated with dangerous substances
17 08 02 Gypsum–based construction materials other than those mentioned in 17 08 01
17 09 Other construction and demolition wastes
17 09 01* Construction and demolition wastes containing mercury
17 09 02* Construction and demolition wastes containing PCB (for example PCB–containing sealants, PCB–containing resin–based floorings, PCB– containing sealed glazing units, PCB–containing capacitors)

17 Construction and demolition wastes (including excavated soil from contaminated sites)
17 09 03* Other construction and demolition wastes (including mixed wastes) containing dangerous substances
17 09 04 Mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03

3.3 Estimated Waste Arisings

3.3.1 The type and quantities of waste likely to arise at each stage of the project have been listed in Table 3-2. The intended use of each waste arising has been identified, based on the current available information at Design Fix 3. It is not an exhaustive list of waste types and may be extended as the detailed design develops.

3.3.2 There will be an intention to reuse materials on site where possible. In particular, the earthworks strategy is currently anticipated to result in a surplus of 25,000m3. It is expected that this will be reused in localised landscape bunding and essential landscape mitigation areas.

Table 3-2 Estimated waste arisings

Project Activity	Waste arisings from the project	Quantities of waste arisings	Additional information on waste arisings
Site remediation/ preparation/ earthworks	Vegetation surface strip and trees	Estimated habitat loss[1] indicates the loss of 7.7ha of woodland, 100 individual trees, 4.49km of Cornish hedgerow, 7.09m of soft hedgerow, 0.41ha of heathland, 15.73ha of semi-improved and poor semi-improved grassland, 1.49ha of marshy grassland, 13.88ha of dense scrub, scattered scrub, introduced shrub, and tall ruderal, 0.03ha of bracken, 43.59ha of arable, 77.01ha of improved grassland, and 2.17ha of amenity grassland.	Likely to be a combination of local recycling facilities, disposal at an inert or non-hazardous landfill site. There is the potential to create habitat log piles from wood over 250mm in diameter in discreet locations along the scheme, and to reuse stone from the Cornish hedgerow.
	Traffic signs, lighting columns and foundations, safety barriers and kerbs	350m^3 steel 680m^3 concrete 320m^3 brick	

Project Activity	Waste arisings from the project	Quantities of waste arisings	Additional information on waste arisings
		40m^3 wood	
Demolition	Bridge, house and road demolition including supports, rails, voids	1120m^3 concrete 33200m^3 asphalt 35000m^3 aggregate 10m^3 aluminium	Likely to be a combination of local recycling facilities, disposal at an inert or non-hazardous landfill site.
Site construction	Surface planings	Not available at this stage.	Likely to be a combination of local recycling facilities, disposal at an inert or non-hazardous landfill site.
	Site won material (hazardous)	~72,750m^3 (≤5% of total excavated material)	This is a worst case ≤5% assumption. Any hazardous material will be taken to a licensed waste management facility such as the Biffa site 315km from the proposed scheme.
Operation	Over the course of a 40-year design life, this will involve: • Removal of surface course on a 10 year cycle • Removal of kerbs, drainage system, road signs on a 20 year cycle	Not available at this stage.	This will be managed by the Overseeing Organisation and is likely to consist of a combination of local recycling facilities, disposal at an inert or non-hazardous landfill site.

4 Management of waste

4.1 Waste Hierarchy

4.1.1 Construction waste generated from the scheme will be managed according to the principles of the waste hierarchy which ranks waste management options according to environmental impact. The waste hierarchy indicates “waste prevention” as the best outcome for the environment and “disposal” as the least favoured.

4.1.2 The SWMP will set out how waste will be managed throughout each stage of the project. Prior to the commencement of site development, the contractor will identify suitable waste management contractors and investigate opportunities to recycle other materials.

Prevention

4.1.3 The contractor will ensure that waste is prevented where possible by using less material in design and manufacture and only ordering quantities of material required.

4.1.4 The SWMP will record identified measures to be implemented to prevent and minimise the quantity of waste produced during the project. The following measures have been identified as ways of preventing and minimising the quantity of waste produced during this project:

- All waste arisings to be segregated on site;
- Re-usable materials to be identified on site and removed for storage and re-sale;
- Recyclable materials to be removed from site for processing in licenced facilities; and
- Recoverable materials will be removed from site for processing in licenced facilities.

4.1.5 The Outline Materials Management Plan (Annex C) sets out the procedure for managing the materials and identifies how the materials will be managed in order to minimise the amount of waste generated.

4.1.6 The Outline Soils Management Plan (Annex P) sets out the principles and procedures for how soils on land affected by permanent and temporary works associated with the scheme are to be managed by the contractor. It ensures the quality of soil resources won from the site is maintained during construction so that they remain suitable for re-use, and ensures agricultural land used temporarily during construction is restored satisfactorily and avoid incurring compensation claims from landowners.

Re-use

4.1.7 The contractor will ensure that any waste generated on site will be re-used where possible in accordance with the waste hierarchy. The materials that have the potential to be re-used on site have been identified to include earthwork material, demolition material. Reuse is subject to confirmation of materials at the next design phase. The SWMP will detail the estimated quantities of waste material and the opportunities for reuse, recycling, recovery or disposal.

Recycling

4.1.8 Recycling facilities in the vicinity of the proposed scheme location will be identified by the contractor. Only appropriately qualified and licensed waste management facilities would be used as a requirement of this SWMP. There is potential for the available sites for recycling, reprocessing and disposal to change and it is the responsibility of the contractor to evaluate the waste management market and identify suitable options.

Recovery

4.1.9 Opportunities for the recovery of waste generated by the scheme will be considered by the contractor.

Disposal

4.1.10 Any waste that cannot be prevented, re-used, recycled or recovered, will be disposed of in a responsible manner.

4.1.11 Local waste management facilities will be identified and assessed to ensure adequate capacity for the waste generated by the proposed scheme. It is not anticipated that there will be a large amount of waste associated with the proposed scheme.

4.2 Storage of Waste

4.2.1 Waste will be stored in line with best practice measures, which include Pollution Prevention Guidelines. Whilst these guidelines have now been withdrawn and are undergoing a review, a replacement guidance series, Guidance for Pollution Prevention (GPPs) are available in addition to some PPGs which remain the most up to date guidance. In particular PPG 6 will be followed which sets out general measures for storing waste. Further details associated with storage of waste on-site will be confirmed at detailed design stage.

4.3 Waste Management Facilities (on-site)

4.3.1 Waste management facilities will be provided at construction compounds throughout the site. The two main compounds will comprise a waste segregation area. There will also be compounds for each junction and side road overbridge and underbridge which will contain areas for the temporary storage of waste.

5 Implementation

5.1 Training

5.1.1 A training regime focused on the provisions of the SWMP would be implemented for all relevant members of the construction team, including those carrying out demolition works to ensure their competence in carrying out their duties on the Scheme.

5.1.2 Any SWMP training would be additional to the mandatory training requirements on site Health and Safety.

5.1.3 A general site induction would be developed to introduce all site personnel to the main provisions of the SWMP, important environmental controls associated with the construction of the Scheme and effective delivery of the SWMP (for example, waste storage arrangements, waste segregation at source). A full register of induction attendance would be maintained on site.

5.1.4 Toolbox talks and method statement briefings would be given to the construction (and demolition) teams as work proceeds and would cover the types of wastes produced at each key build stage, and the SWMP controls related to specific activities undertaken during the works. A full register of toolbox talks and method statement briefing attendance would be maintained on site.

5.1.5 All training records would be maintained and filed on site. The records would include the content of the training courses (induction and toolbox training), record of attendance and schedule of review.

6 Monitor, review and report

6.1 Monitoring

6.1.1 Monitoring of the SWMP would principally be achieved through the completion of the Waste Management Data sheets and regular inspections of the works areas by the contractor to ensure that the provisions of this SWMP and control measures outlined in relevant method statements are being implemented.

6.1.2 Duty of Care paperwork documenting the movements of waste from the site (i.e. Waste Transfer Notes) and the registered carriers' details would be retained.

6.2 Review

6.2.1 During the construction process, the SWMP would be reviewed as often as necessary or at least once every three months to ensure that the plan accurately reflects the progress of the Scheme in terms of waste estimates and targets. As part of the review, the contractor must record the following:

- The types and volumes of waste produced;
- Identify on the plan the work area where the waste was removed from; and
- The types and volumes of waste that have been:
  - re-used (and whether this was on or off site);
  - recycled (and whether this was on or off site);
  - sent for another form of recovery (and whether this was on or off site);
  - sent to landfill; or
  - otherwise disposed of.

6.3 Report

6.3.1 Within three months of the end of construction, the contractor will report on the performance of the SWMP. This would include confirmation that the plan has been monitored on a regular basis to ensure compliance with the provisions of the SWMP, that the plan was updated accordingly and that any deviations from the plan would be explained. The contractor would continue to report on the performance of the SWMP on an annual basis throughout the construction period.

6.3.2 In addition to the above, the report would include a comparison of the estimated quantities of each waste type against the actual quantities of each waste type, performance against the scheme standards and an estimate of the cost savings achieved by and costs incurred in completing and implementing the plan.

Annex C: Outline Materials Management Plan

1 Introduction

1.1.1 The contractor shall include within the Construction Environmental Management Plan (CEMP) a Materials Management Plan (MMP).

1.2 Purpose

1.2.1 The purpose of the MMP is to manage the reuse of site won materials in accordance with Contaminated Land: Applications in Real Environments (CL:AIRE) Guidelines

1.3 Structure and Scope of the Outline Materials Management Plan

1.3.1 This MMP has been prepared in order to support the requirements of the CL:AIRE Definition of Waste: Industry Code of Practice (DoW CoP), Version 2 (CL:AIRE, 2011).

1.3.2 CL:AIRE is the current management organisation for the DoW CoP:

- It sets out good practice for the development industry to use when:
  - Assessing on a site specific basis whether excavated materials are classified as waste or not; and;
  - Determining on a site specific basis when treated excavated waste can cease to be waste for a particular use; and
  - It describes an auditable system to demonstrate that this DoWCoP has been adhered to.

1.3.3 This MMP has been prepared in order to support scheme. It will identify the information from the scheme design and construction documentation to demonstrate that the requirements of the CL:AIRE DoW CoP can be met.

1.3.4 The earthworks strategy for the scheme, and hence this outline MMP, is at an outline stage and will be developed further during detailed design.

1.4 Responsibilities

1.4.1 This Outline MMP provides the framework which will be used as a basis from which to develop the scheme's MMP. The MMP will be developed and implemented by the appointed contractor.

Table 1-1 Annex C Responsibilities details

Name	Position/Responsibility	Contact Details
	Highways England Project Manager	
	SHE Manager	
	Contractor Environmental Manager	
	Suitable Qualified Person registered under CL:AIRE (if the Environmental Manager is not)	

2 Materials Management Plan

2.1 Material Resources to be Used

2.1.1 A variety of different materials will be required for the scheme. The scheme will be designed to prevent where possible the volumes of both the waste materials generated and the imported construction materials by reusing or recycling the available existing materials along the scheme.

2.1.2 Site won materials would only be reused on site if assessed as being suitable for reuse based on engineering requirements and without causing unacceptable impacts on the end users and the environment. A specification for suitable material to be used in construction will be developed, in accordance with the Specification for Highway Works. Where appropriate, testing shall be undertaken during construction to confirm that the materials used meet the specification requirements.

2.1.3 The estimated material resources required for the project and the quantities and sourcing of materials has been listed in Table 2-1.

2.1.4 Earthworks estimates predict a surplus of 15,000 m³ of general earthworks materials. It will be necessary to import aggregates, asphalt, concrete and manufactured products. Where possible these materials will be sourced locally.

Table 2-1 Material resources required

Project Activity	Material resources required for the project	Quantities of material resources required	Additional information on material resources
Site remediation/ preparation/ earthworks	Topsoil required for new verges and earthworks	280,000m^3 (based on 450mm depth)	Sourced from site. Stored on-site before re-use on the new embankment and cutting slopes and within landscape areas.
Site construction:			
• Cut and fill	General fill, including earth embankments (mainline and side roads)	1,175,000m^3	Sourced from material won on site
		10,000m^3	This will be sourced from local quarries due to programme requirements (within 15 miles radius)
• Installation of pavement	• Type 1 sub-base • Base • Binder • Surface course	• 148,000 m3* • 82,000 m3* • 25,000 m3* • 17,000 m3*	Sourced from local suppliers
• Installation of manufactured products	Drainage, kerbs, traffic signs, lighting, safety barriers etc.	Various quantities relative to road length and necessary safety measures	Sourced from local/national suppliers, dependent upon material required.

Project Activity	Material resources required for the project	Quantities of material resources required	Additional information on material resources
• Structures	Concrete, including pre-cast structures	Various quantities relative to road length and necessary safety measures	Local batching plants (3 plants exist in Redruth and Indian Queens which only produce 30-60m^3/hour) therefore need to supplement with national industry. Majority of precast factories in the UK are situated in the Midlands so likely to be sourced from outside Cornwall.
	Steel		Likely to be sourced from a national supplier. Closest availability would be Somerset/South Wales.

2.1.5 The contractor shall ensure that materials are treated and used as set out in the outline MMP and, at the completion of the works, shall complete all lines of evidence in relation to suitability for reuse, certainty of use and quantity required in the CL: AIRE Materials Management Plan form which will be submitted to the Qualified Person along with all supporting information.

2.2 Supporting Documentation

2.2.1 The following provides a list of the expected documentation requirements to support the completion of an MMP for the scheme:

- Invasive Species Management Plan (Annex D);
- Earthworks Strategy;
- Land Contamination Management Strategy;
- Remediation Strategy including a verification plan;
- Earthworks Specification;
- Cut/Fill requirements and earthworks movements plan;
- Design Statement;
- Qualified Person Declaration;
- Verification Report;
- Proforma MM; and
- Soils Management Plan (Annex P).

2.2.2 The other supporting documentation referenced will be prepared separately and references incorporated into the MMP as regulator agreement is obtained. The outline MMP will be reviewed and updated during detailed design of the proposed scheme.

2.3 Summary

2.3.1 There is an intent to maximise the reuse of any materials used on site for the construction of the proposed scheme. There is understood to be a net surplus of materials with an intention to reuse these on site. Where residual materials arise, the contractor will be required to make arrangements for reuse through design and, if not, disposal.

Annex D: Outline Invasive Species Management Plan

1 Introduction

1.1 Purpose

1.1.1 The purpose of the outline Invasive Species Management Plan is to set out the requirements and management of invasive species to prevent the spread of species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

1.1.2 All works in the vicinity of or affecting invasive species shall be managed to prevent the spread of such plants.

1.2 Structure and Scope of the Invasive Species Management Plan

1.2.1 This outline Invasive Species Management Plan sets out the scope of the general measures and specific control measures that may be potentially used for the invasive species which have been identified on the A30 scheme. Exact methods of removal and disposal will be decided at detailed design. The invasive species identified on site comprise:

- Montbretia Crocosmia x crocosmiiflora which was located at numerous positions within the survey area. This species was recorded in 42 locations across the survey area, they were often associated with residential gardens or roadside verges.
- Rhododendron which was located at numerous positions within the survey area. This was recorded in six locations across the survey area, this included Chyverton Park within the woodland where it was a dominant species.
- Japanese knotweed which was located at two positions within the survey area to the south west of Chiverton Cross.
- Japanese rose which was located at several positions within the survey area. This was associated with residential gardens near to Chiverton Cross.
- Cotoneaster which was located south of Chiverton Cross.
- Three-cornered garlic to the east of Zelah.
- Variegated archangel within the woodland at Chyverton Park.
- New Zealand pigmyweed within Pond 13.3 (located northeast of Zelah, see Figure 2-2 in Volume 6, Document Ref 6.4, Appendix 8.9 for pond survey locations).

1.2.2 In addition to the control measures set out below, a pre-construction survey should be undertaken of all areas within construction footprint to identify the location of any invasive species not already identified. The invasive species that were identified during ecological surveys, and are therefore considered within this outline CEMP are detailed within Section 2 below.

1.2.3 A detailed Construction Environmental Management Plan (CEMP) will be produced during the detailed design stage of the scheme and agreed with Statutory Environmental Bodies prior to construction, which will include a Method Statement for preventing the spread of any invasive species. Implementation of these requirements should be undertaken through site set up and provision of Toolbox Talks for all personnel prior to works commencing.

1.3 Responsibilities

- Contractor – to ensure effective management of the works in line with their Employer's, legal and any other requirements/agreements regarding invasive species. Also to ensure any requirements are communicated on to sub-contractors.
- Site agents – to provide information on programme and timing of works, and issue to the Environmental advisor.
- Environmental Manager – responsible for liaising with all parties and ensuring that they are aware of the requirements of this control plan. The environmental manager shall report the results and progress to the project management team and employer's site representative.
- Subcontractors – to undertake works in accordance with the control plan.
- Operatives – to follow any instruction from the project management team and conduct works in accordance with method statements.

Table 1-1 Annex D Responsibilities details

Name	Position/Responsibility	Contact Details
	Highways England Project Manager	
	SHE Manager	
	Contractor Environmental Manager	
	Ecological Clerk of Works	
	Site Manager	

1.4 Consent Requirements

1.4.1 All works affecting invasive species shall be completed in accordance with the Environment Agency's Treatment and disposal of invasive non-native plants: regulatory position statement (RPS) 178 and Waste Regulation (England and Wales 2011).

2 General Control Measures

2.1.1 Details of invasive species shall be included within the project induction and toolbox talks given to operatives working in areas where the species are or have known to grow. Any early regrowth shall be reported and dealt with as detailed above. If the cells have been completed when new growth is discovered this shall be excavated and taken for offsite disposal at licenced facilities.

2.1.2 There shall be a vehicle cleaning area adjacent to the burial zone and all vehicles used shall be cleaned prior to leaving this area. This area shall not be greater than 7m from the burial zone, material left in the clean down zone shall be collected and deposited into the burial cell.

2.1.3 The excavation shall and transfer of invasive species contaminated material and haulage to the holding area shall be supervised.

2.1.4 Areas where invasive contaminated material is buried shall be accurately recorded and details of this included within the Handover Environmental Management Plan (HEMP).

2.1.5 Excavation is to begin from the furthest point of the works and move backwards to avoid traffic on excavated, potentially contaminated ground.

2.1.6 Vehicles collecting and removing material should be positioned over part of the geotextile prior to loading. Any material that may be dropped by the hopper will be caught by the geotextile.

2.1.7 Once the works have been completed, the excavator is to be thoroughly cleaned and all arisings placed into the final load of contaminated material.

2.1.8 In the event of material requiring storage prior to burial this shall be stored in a designated location on an impermeable membrane to prevent spread of the plants. This area will also have a clean down zone.

2.1.9 If any material is to be removed for offsite disposal this will only be performed once a disposal location has been identified and this location has confirmed that will accept the waste. This will require ground investigation data and may need up to 10 days to obtain this information.

3 Specific Identification and Control Measures

3.1 Montbretia Crocosmia x crocosmiiflora

3.1.1 Identification:

- Smooth upright bright green leaves less than 3cm wide are present from spring to autumn, these form dense stands which can cover large areas. The plant grows to 60cm tall.
- During the winter leaves die and are brownish in colour, with dead flowering stems and seed heads.
- Flowers are orange in colour forming nodding clusters.
- Corms are present underground at the base of the plant, and can be used to identify the species from other similar looking plants.

3.1.2 Physical removal:

- Plants can be dug out but it is essential that all the plant material and corms are removed. If corms are broken up or accidentally left they can produce new plants potentially making the problem worse.
- Excavated material should be removed from site to licensed landfill as controlled waste, or dealt with on site in waste management areas or buried.

3.1.3 Chemical removal:

- Infestations can be effectively treated with herbicide whilst the plants are actively growing.

3.2 Rhododendron

3.2.1 Identification:

- Evergreen shrub or small tree up to 8m tall.
- Long oval shaped leaves, 10 – 20cm long, dark green above, paler and hairless beneath with a leaf stem 1 – -3cm long.
- At the end of the branchlets with up to 15 flowers on a stalk opening in late spring.
- It has flowers which appear around May – June. Calyx very small, with 5 blunt teeth c.25 mm long; corolla bell-shaped, c. 5cm wide, 3.5 – 5cm long, lilac, often with a pinkish or purplish tinge, and with green-yellow spots in throat; individual flower stalks c. 2 – 4cm long, hairless or slightly glandular-hairy; 10 stamens, filaments hairy at base, ovary and style hairless.

3.2.2 Prior to any works commencing a bespoke management plan should be constructed to ensure that the correct works are undertaken.

3.2.3 Physical removal:

- This involves physically clearing all the plants from the designated plants by hand or with machinery. The strategy is often dependent on the topography, with the plants being often found on craggy areas inaccessible to heavy machinery an element of intense labour is often required.
- All plants should be cleared down to ground level, stumps appropriately treated, debris chipped or burnt and small growth chemically treated.
- Typically methods of clearance are via chainsaws and forestry mulchers although larger forestry machinery can be used in certain situations should the tree density allow it.
- Stumps can often be winched out of the ground to remove the most viable sections of the plants root system however this can present issues to man and animals. An on-going monitoring and chemical treatment regime or hand pulling should then be implemented for a number of years until both the seed bank and root system are depleted.

3.2.4 Chemical removal:

- It is feasible on some sites to implement a chemical control programme to achieve eradication of this species. Herbicides are applied to all plants below 1.3m in height via knapsack sprayers, all plants above this are injected with herbicide at specific points. When undertaking injection works some element of hand clearance will obviously be necessary to create access to the relevant sections of the plants.
- The treatment programme should be regularly reviewed to ensure that the herbicides are been applied at the correct growth stage and in the correct manner. Any amendments can then be easily made to suit the sites specific needs.
- Eradication can take a number of years to be achieved depending on the size of the seed bank and root system.

3.3 Japanese knotweed

3.3.1 Identification:

- Fleshy red tinged roots when first breaking ground.
- Large oval green heart shaped leaves.
- Silver tinge to underside of leaves.
- Hollow stem - bamboo like.
- Begins to grow in early Spring.
- Grows at a rate of 3cm per day.
- Reaches height of 1.5/2m by May.
- 3m by June.
- Leathery leaves.
- Dense clumps.
- Clusters of creamy white flowers.
- Dies back between September and November leaving dead brown stems.
- Grows in any type of soil – no matter how poor.

3.3.2 Physical removal:

- Demarcate the area of excavation, up to 7m from the edge of plant growth. It is assumed that excavations will not extend greater than 3m. Actual excavation depth shall be dependent on the depth of rhizome penetration. Accurate Rhizome identification will help minimise the amount of excavation.
- Rhizome is to be removed with care; usually the crowns are located within the top 500mm. Therefore 0-500mm should be removed in one scrape to minimise the potential for breaking crowns and lessen potential risk of spread. This material should be stored separately from the rest of the excavation material.
- Excavation down to 3m (or as appropriate when identifying rhizome) and use this excavation material as the base or top layer in the burial pit. The middle layer should be that containing the material excavated in the top 0-500mm.
- A haulage route from the excavation to the storage area will be agreed and if necessary demarcated.
- Excavation material shall be taken directly to the position of burial.
- All vehicles used to transport Japanese knotweed material are to contain a system to cover the hopper during transport to minimise the potential for spread.
- Japanese knotweed is to be buried and covered with a membrane. The upper level of the cell must be at least 2m below ground level to minimise risk of damage. Material to be treated with glysophate solution prior to covering.

3.3.3 Chemical removal:

- It usually takes at least three to four seasons to eradicate Japanese knotweed using weedkiller. Professional contractors, however, will have access to more powerful weedkiller that may reduce this period by half.
- When using weedkiller, always follow the instructions on the pack to make effective and economic use of the product while minimising risks to people and the environment.
- Glyphosate-based herbicide application can effectively control infestation.

- Glyphosate-treated knotweed will often produce small-leaved, bushy regrowth 50-90cm (20in-3ft) in height the following spring. This is very different in appearance to the normal plant and it is essential that this regrowth is treated.

3.4 Japanese rose

3.4.1 Identification:

- Japanese rose is a woody perennial shrub, it suckers readily producing new shoots from the roots.
- Upright stems are covered in numerous straight thorns.
- Flowers are large, usually solitary and vivid purplish pink (but can vary from white to red) in colour, measuring 6-9cm across.
- Fruits (hips) are present from late autumn, they are 2-3cm in diameter and are rounder than our native species of rose.
- The leaves are 8-15cm long and have a distinctive corrugated appearance.

3.4.2 Physical removal:

- Cutting Japanese rose several times a year over a number of years can reduce infestations.
- Plants and root system can be excavated however it is important that all the root system is removed. Excavated material must be disposed of at licensed landfill.

3.4.3 Chemical removal:

- Herbicide application can effectively control infestations.

3.5 Cotoneaster

3.5.1 Identification:

- A large group of shrubs and small trees, some deciduous and some evergreen.
- Wall Cotoneaster is the most widespread of the species in the UK and has distinctive flattened branches which spread horizontally in a ‘herringbone’ shape.
- Himalayan cotoneaster is an erect deciduous shrub which grows to 3-4 metres in height, the leaves of this species are 1.5-2.5 cm long.
- Small-leaved cotoneaster is an evergreen species with very small leaves 0.5-0.8cm long.
- All Cotoneaster species are thorn-less, leaves are shiny and hairless on the upper surface and slightly hairy on the underneath of the leaf.
- The plants produce small white of pink flowers in spring and summer followed by red/orange berries in cluster.

3.5.2 Physical removal:

- Young seedlings can be effectively pulled however larger plants will develop multiple stems from the large root mass making it difficult to remove the whole plant.
- Root mass can be excavated to remove entire plant and prevent regrowth.

- Material should be chipped or burnt on site or removed to licensed landfill as controlled waste.

3.5.3 Chemical removal:

- It is possible to spray smaller plants with herbicide however chemical uptake in larger plants is reduced.
- Addition of wetting agents improve uptake of herbicide.
- Larger plants should be stump treated after cutting to prevent regrowth.

3.6 Three-cornered Garlic

3.6.1 Identification:

- A perennial herb, with white bulbs. The leaves are green, hairless and narrow with 2-5 leaves per bulb. Leaves die back once the plant has flowered around May - June.
- Flower stems measure 10 – 45cm in height with white flowers, with a strong green stripe, similar in shape to bluebells. Stems have a triangular cross section giving rise to its common name.
- The plant prefers shadier areas but will grow in numerous habitats.

3.6.2 Physical removal:

- Infestations can be removed mechanically by digging, this is easiest done in spring when surface vegetation is present, ensuring that all plant material and bulbs are removed. This may need to be followed by mechanical cutting over a number of years to exhaust the seed bank.
- Waste materials containing the Three cornered garlic are considered ‘controlled’ waste and must be disposed of appropriately.

3.6.3 Chemical removal:

- Herbicide application can by successful at reducing the spread of the plant. Applications of herbicide should be made in spring before flowering.
- Multiple applications may be required due to the persistence of bulbs and of the soil seed bank.
- When treating large areas, a suitable grass and forb mix should be sown to prevent bare ground and colonisation of other unwanted species.

3.7 Variegated Archangel

3.7.1 Identification:

- An erect hairy perennial. The green variegated leaves have characteristic and distinctive silvery patches, they are hairy with toothed edges, growing in opposing pairs to a length of 4-7cm. In cooler conditions, the centre of the leaves can appear purplish in colour.
- Flower are yellow in colour, and like other deadnettle species, the flowers are lipped and hooded. The plant flowers from April to June. The flowers are self-fertilised or cross pollinated by insects.
- The plant prefers shadier areas but will grow in numerous habitats including gardens, woodland and woodland edges and hedgerows.

3.7.2 Physical removal:

- The plant is shallow rooting and can be mechanically removed although care should be taken to remove all of the plant material as the runners easily break up when disturbed and have the potential to propagate new colonies.
- Waste materials containing the Variegated yellow archangel are considered 'controlled' waste and must be disposed of appropriately.

3.7.3 Chemical removal:

- Herbicide application can successfully control the plant. Applications of herbicide should be made while the plant is actively growing to ensure maximum effectiveness.

3.8 New Zealand pigmyweed

3.8.1 Identification:

- A perennial with yellowish-green opposite and/or succulent leaves, less than 20 millimetres long and solitary white or pale pink flowers on pedicels, more than 2 millimetres in the leaf axils.
- Grows in ponds, lakes, reservoirs, canals, and ditches, as well as on damp mud on the margins of ponds and reservoirs. It tolerates a wide range of conditions, from basic to acidic and oligotrophic to eutrophic.
- Spread is vegetative, by stem fragments; a new plant can generate from a fragment as small as 5 millimetres. These can be spread by flowing water, in mud, attachment to animals and equipment, and as a contaminant of compost when purchasing or moving other water plants.
- Can be submerged, emergent, and terrestrial:
  - Submerged plants grow with elongated stems with sparse flat leaves, which are able to form extensive mats on the bed of the water body.
  - Emergent plants grow with densely packed leaves in water (less than 0.6 metres deep), intermediate between terrestrial and submerged form.
  - Terrestrial plants grow away from the water's edge or are left stranded as the water level falls, with creeping stems and aerial, fleshy leaves.

3.8.2 The best time to carry out pond maintenance to minimise the impact on wildlife is during late autumn. Removal of New Zealand pigmweed is more successful if carried out during the early stages of establishment. Repeated control may be required.

3.8.3 Physical removal:

- New Zealand pigmyweed is shallow rooted so hand pulling or dredging marginal and emergent material can be effective.
- Cutting is not recommended as this has the potential to spread stem fragments.
- Shading terrestrial or emergent forms with an opaque material such as thick black polythene or carpet for at least three months may be effective for small areas. Be careful that this does not deplete the water of oxygen by only partially shading the pond. Always ensure that nutrient levels are controlled to prevent excessive growth.

3.8.4 Chemical removal:

- Avoid the use of herbicides as they also target native species.
- If necessary, only use products approved for use on or near water and always follow the product label.
- Agreement must be obtained from the Environment Agency before herbicides are applied in, on or near controlled waters.

3.9 Monitoring and Measurement

3.9.1 Weekly Safety Health and Environmental (SHE) walks and monthly SHE inspections shall be conducted where the general management techniques shall be reviewed.

3.9.2 Material movement shall be monitored through the Material Management Plan.

3.10 In the event of an Emergency

3.10.1 If during site works previously unidentified stands of an invasive species is suspected, then works in that area must stop and the Environmental Manager or Environmental Clerk of Works must be contacted reporting the location of discovery and works being undertaken.

Annex E: Outline Ecological Management Plan

1 Introduction

1.1 Purpose

1.1.1 The purpose of the outline Ecological Management Plan is to set out appropriate measures to protect the ecology of the site with special attention to specified ecological resources, as identified in the Environmental Statement. The Outline Ecological Management Plan will:

- Specify measures that will be implemented during construction to ensure that impacts on sensitive ecological features are reduced;
- Outline principles for the monitoring and maintenance of the above features.

1.1.2 If significant new ecological information comes to light, then the plan should be revised accordingly by the scheme ecologist. Upon obtaining the DCO, this outline plan will be superseded by a final Ecological Management Plan which will elaborate on the information presented herein.

1.2 Structure and Scope of the Outline Ecological Management Plan

1.2.1 Management measures for potential ecological impacts are addressed in other sections of the Outline CEMP and are not repeated here. These include measures relating to:

- Invasive species control and management (see Annex D);
- Pollution prevention and control management (see Annex H).

1.2.2 A detailed Construction Environmental Management Plan (CEMP) will be produced during the detailed design stage of the scheme and agreed with Statutory Environmental Bodies prior to construction.

1.2.3 The following important receptors will be considered and protected through the implementation of the detailed CEMP:

- statutory designated sites including SSSIs, SACs and non-statutory designated sites including County Wildlife Sites (CWS);
- protected and notable species (e.g. including bats, badger, otters, invertebrates, amphibians and fish;); and
- other habitats and features of ecological importance (tree and hedgerow root protection is considered within Annex I).

1.2.4 Where reasonably practicable, environmental mitigation will be provided via the design and implemented by the contractor within the works. This will require preparatory work to be undertaken ahead of the start of construction to permit timely progress of the programme.

1.2.5 Detailed measures to deal with ecological constraints will be prepared including the following, as appropriate:

- summary of features of interest for all known areas of nature conservation interest which may be affected due to construction;

- provision of guidance on ecological best practice methods to be followed to mitigate potential ecological effects during construction;
- procedures to be adopted in the event of unanticipated discovery or disturbance of protected species;
- reference to the relevant procedures, including any special measures, to be implemented in the event of a pollution incident, where this occurs on or adjacent to an area where protected and/or notable species are known to be present; and
- individual species or habitat management plans to include the information above (where appropriate) for:
  - terrestrial habitats;
  - European Protected Species (otter and bats);
  - badger;
  - breeding birds;
  - invertebrates
  - freshwater fish, including migratory species;
  - common reptiles; and
  - other protected and/or notable species, e.g. amphibians.

1.2.6 Species or habitat management plans will be prepared by the contractor.

1.2.7 The contractor will, where reasonably practicable, reduce any habitat loss within the land provided for the scheme by keeping the working area to the minimum required for construction of the Scheme.

1.3 Responsibilities

- Contractor – to ensure effective management of the works in line with their Employer's, legal and any other requirements/agreements regarding invasive species. Also to ensure any requirements are communicated on to sub-contractors.
- Site agents – to provide information on programme and timing of works, and issue to the Environmental advisor.
- Environmental Manager – responsible for liaising with all parties and ensuring that they are aware of the requirements of this control plan. The environmental manager shall report the results and progress to the project management team and employer's site representative.
- Subcontractors – to undertake works in accordance with the control plan.
- Operatives – to follow any instruction from the project management team and conduct works in accordance with method statements.

Table 1-1 Annex E Responsibilities details

Name	Position/Responsibility	Contact Details
	Highways England Project Manager	
	Contractor Environmental Manager	
	Ecological Clerk of Works	
	Site Manager	

2 Measures to reduce potential impacts on ecological resources

2.1 Birds

2.1.1 During construction, mitigation for the temporary loss of habitat will include the provision of new nesting habitat including bird boxes in trees and buildings to be retained.

2.1.2 Procedures for vegetation clearance to minimise the impact on birds are described below.

2.2 Barn Owl

2.2.1 During construction, night working would be avoided where possible. If it cannot be avoided, it should be restricted in the vicinity of known commuting routes and valuable areas of foraging habitat (i.e. commuting hedgerows should not be illuminated nor have generators placed next to them).

2.3 Badger

2.3.1 A scheme-wide badger licence from Natural England will be obtained which will detail mitigation for any impacts including disturbance to any badger sett. This will be drawn up in consultation with Natural England.

2.3.2 Licensable activities include:

- Artificial setts will be provided to replace any main setts which will be lost to the scheme or which will need to be temporarily closed to accommodate the scheme.
- Any sett closures can only be carried out during the licensable period - July to December, with 21 clear days from badger activity before construction can commence.

2.3.3 Any holes/excavations created during construction period which badgers or other mammals could fall into must be covered and a ramp provided.

2.4 Otter

2.4.1 Where otters are known to be present, work by the contractor would be done under a precautionary method of working as direct by a suitably qualified ecologist/ Ecological Clerk of Works.

2.4.2 In addition no steep-sided, deep and/or water-filled excavations would be left unguarded overnight as otters could fall in and become trapped. Any major excavations that need to be left uncovered overnight would have their slopes battered. If it is necessary to leave small deep, steep-sided or water-filled excavations open overnight they would be protected with suitable fencing.

2.4.3 Night working should be avoided where possible. If it cannot be avoided, it should be restricted in the vicinity of known commuting routes and valuable areas of foraging habitat.

2.4.4 The following measures should be considered within the construction stage lighting design:

- No known commuting routes, or important foraging should be directly illuminated.
- Lighting levels should be as low as current standards and guidelines allow.
- Lighting should only be provided only in essential areas.
- Lighting should be directed to where it is needed and light spill avoided.
- LED lighting produces no ultraviolet component and therefore is ideally suited as it greatly reduces the attraction of insects.
- The height of lighting columns in general should be as low as possible. However, there are cases where taller columns will enable light to be directed downwards at a more acute angle and therefore reduce horizontal spill light.

2.5 Bat

2.5.1 European protected species (EPS) mitigation licences from Natural England will be obtained to cover any loss or disturbance of bat roosts as a result of the scheme. These will be drawn up in consultation with Natural England. The details in the method statements of the licences must be adhered to. Mitigation measures will include the replacement of roosts which are to be lost to the scheme including Building 35 at NFH, and the provision of new roosting habitat including bat boxes in trees and buildings to be retained.

2.5.2 The eight important hotspot areas for bat activity comprising linear features identified during field surveys including the hedgerows at Tresawsen, the tree-lined lane either side of Tolgroggan bridge and the hedgerow at Journey's End will be retained in order to maintain connectivity for bats for as long as possible during the construction phase.

2.5.3 Following the severance of these features to accommodate the works, dead hedges will be installed during the remainder of construction stage to maintain the flight paths. These must be in place from dusk until dawn during the bat activity season.

2.5.4 A Toolbox Talk regarding bats and foraging and commuting routes should be given by the ECoW prior to any works commencing.

2.5.5 Where potential presence of roosting bats in any building or tree cannot be ruled out after the full suite of field surveys and pre-construction surveys (undertaken in accordance with best practice guidance), these must be precautionary measures must be carried out including the soft-felling of trees and the soft-stripping of buildings or other built structures.

2.5.6 Where possible planting for the scheme will take in to account general habitat requirements for bats and seek to create habitat and to replace severed linkages/ commuting corridors such as hedgerows through translocations and/ or new planting through habitat creation.

2.5.7 As a general precaution, tree felling would only be undertaken in autumn, between late August and October/early November. This is because bats do not have dependent young at this time and are not hibernating and should therefore be active enough to escape harm if proper precautions are taken.

2.5.8 Night working should be avoided where possible. If it cannot be avoided, it should be restricted in the vicinity of known bat commuting routes and valuable areas of foraging habitat (i.e. commuting routes should not be illuminated nor have generators placed next to them).

2.5.9 Production of a construction stage lighting strategy to limit the use of construction lighting and ensure all essential lighting is specified and designed to reduce light spill. This is to include locations of lighting and lighting levels details. The following measures should be considered within the construction stage lighting strategy:

- No bat roosts, or important foraging and commuting habitat should be directly illuminated.
- Lighting levels should be as low as current standards and guidelines allow.
- Lighting should only be provided only in essential areas.
- Lighting should be directed to where it is needed and light spill avoided.
- LED lighting produces no ultraviolet component and therefore is ideally suited as it greatly reduces the attraction of insects.
- The height of lighting columns in general should be as low as possible. However, there are cases where taller columns will enable light to be directed downwards at a more acute angle and therefore reduce horizontal spill light.

2.6 Fish

2.6.1 Where instream work is required, fish relocation should take place in watercourses where fish where recorded in order to move fish from impacted reaches to suitable habitat elsewhere. This would only be done under licence from the Environment Agency.

2.6.2 Pollution could negatively impact species, such as pollution intolerant salmonid fish. This will be mitigated by the implementation of best practice construction techniques for pollution prevention and control, as detailed within the Outline CEMP Annex H.

2.7 Section 41 Species

2.7.1 Method statements will be drawn up at the detailed design stage comprising a series of mitigation measures including timing of works, to prevent adverse impacts on Section 41 species which have been identified as potentially being present throughout the scheme including:

- hedgehog,
- harvest mouse,
- brown hare,
- polecat,
- pine martin, and
- common toad

2.8 Biosecurity

2.8.1 During the construction of the works, the contractor should prevent the introduction or spread of pests and diseases with measures including:

- Assess risk, manage supply chains, inform all construction personnel, and manage and inspect vehicles and machinery coming onto site;
- Contain and control identified animal and crop pests and diseases and prevent introduction, spread and/or proliferation;
- Mitigate adverse impacts of any control and eradication actions on pests and diseases;
- Report and record any infestation or disease incidents;
- Mitigate any pest or disease impacts;
- Monitor the effectiveness of mitigation to reduce the introduction and/or spread of significant pest or diseases;
- Identify performance standards in the CEMP; and
- Undertake a review of the CEMP and identify the need for any further actions.

3 Pre-construction Surveys

3.1.1 Prior to the construction phase of the Scheme pre-construction surveys will be undertaken in accordance with best practice guidelines. These surveys will include surveys of:

- Bat surveys of buildings and trees up to 50m from any construction activities to determine if roosts are present.
- Otter surveys on waterbodies and associated habitat within the construction area and up to 1km (500m either side of the scheme) to determine any breeding or resting sites.
- Barn owl surveys up to 50m from any construction activities.
- Badger surveys up to 50m from any construction activities.

3.1.2 The results of the pre-construction surveys will be reviewed to determine if any protected species licences (or changes to the Draft licences as provided for the application) are required and shared with the statutory environmental bodies.

4 Procedures for Vegetation Clearance

4.1 General Site Clearance

4.1.1 Any site clearance activities must be in accordance with any mitigation licences from Natural England including European Protected Species mitigation licences (for bats or otter), and licences to disturb a badger sett.

4.2 Birds

4.2.1 Where possible vegetation clearance will be undertaken outside of the breeding bird season (March to August inclusive). If this is not possible, an Ecological Clerk of Works (ECoW) should be appointed to carry out a nesting bird check on any vegetation to be cleared, or vegetation directly adjacent to major works, no more than 48 hours prior to works commencing. If an active nest is identified, an appropriate exclusion zone will be decided by the ECoW based on the construction activity taking place. This exclusion zone will be marked out and protected from any clearance activity until the young are fully fledged and have left the nest.

4.3 Bats

Soft felling of trees

4.3.1 If during the pre-construction surveys, any new confirmed tree roosts are identified within or in close proximity to the construction footprint, not already covered by the draft EPS licences, these must also be subject to mitigation licensing.

4.3.2 For any tree roosts where the potential presence of bats remains as low, moderate or high following all levels of presence /likely absence survey, i.e. where the possibility of roosting bats cannot be ruled out, these will require soft felling.

4.3.3 Soft felling must be undertaken in suitable weather conditions (above 10 degrees Celsius) and during the bat activity season (April to October inclusive). It involves removing the top branches first and working down the tree removing it in sections. Cutting through cavities/other potential roost features is avoided. Any sections of the tree identified as having bat roost potential will be lowered carefully using ropes to ground level. These sections will be laid on the ground with holes and cracks facing upward for as long as possible (at least 24 hours under suitable weather conditions is advisable). This gives bats/any other wildlife a chance to vacate the feature.

Dead Hedging

4.3.4 Dead hedges can be used to allow bats to continue using a favoured flight line during construction after tree lines/hedgerows/other structures are removed to accommodate the development.

4.3.5 Dead hedges may comprise a line of herras fencing panels or similar with hessian or netlon fencing stretched across them to provide a solid feature along which bats can commute during the construction phase. Such structures are only really suitable to maintain connectivity for bats across short distances and are only required during the bat activity season. If they need to be moved during the day due to construction activities, they must be put back before dusk so that the mitigation is effective between dusk and dawn every night.

4.4 Amphibians and Reptiles

4.4.1 Amphibians, reptiles or Section 41 mammal encountered will be carefully moved out of the construction areas to suitable receptor areas outside of the construction footprint.

4.4.2 Within grassland and heathland areas the following methods will be considered:

- The height of the vegetation sward will be reduced in stages (Phased habitat manipulation) within works footprint to encourage reptiles to move out of these areas - strimming to 300mm above ground level. The use of this method may vary depending on the time of year and ambient temperatures.
- Installation of exclusion fencing and placement of artificial refugia (roofing felt, corrugated tin) installed at a density of at least 100 per hectare.
- Capture and translocation of reptiles to receptor area.

- Any drift fencing can be removed prior to construction but exclusion fencing to remain in place throughout construction.
- Inspection of reptile fencing, if required, throughout construction period and maintenance where necessary.

4.4.3 Habitat manipulation methods should be used first, but if reptile translocation programme is required due to numbers, at least 60 visits, with 5 clear days at the end will be required.

4.4.4 Reptile enhancement features such as stone and/or log pile hibernacula's will be provided in the habitat adjacent to that being removed. If required one-way exclusion fencing will be used to prohibit amphibians and reptiles returning to the construction area.

5 Procedure for instream works (if required)

5.1.1 Where instream works are required in waterbodies where fish were identified, they will be drained down under the supervision of an Ecological Clerk of Works. As water levels decrease the speed of dewatering will be slowed to allow any fish or amphibians to be removed to suitable receptor locations. Where possible aquatic vegetation from drained waterbodies will be placed on the banks of retained waterbodies for a minimum of 24 hours to allow invertebrates to move out of the vegetation.

5.1.2 Care will be taken during the draining of waterbodies to adhere to the requirements of the invasive species management plan as outlined in Annex D in relation to invasive aquatic plant species.

5.1.3 One pond may be dewatered during construction of the cutting for Pennycomequick side road (amend above). No fish were found during surveys in this pond.

Annex F: Outline Written Scheme of Investigation

1 Introduction

1.1.1 The Development Consent Order includes a requirement that secures the implementation of this Outline Written Scheme of Investigation (WSI). HBMCE have advised at all stages of the DCO process in their capacity as statutory consultee on NCIP projects.

1.1 Purpose

1.1.1 This Outline WSI provides a general overview of the standards and guidance under which the archaeological mitigation, including post-excavation analysis and publication would be undertaken.

1.1.2 This Outline WSI would inform a detailed WSI which would be produced by the archaeological contractor appointed to undertake the archaeological mitigation. No archaeological works will commence until the Detailed WSI has been approved by the Senior Development Officer (Historic Environment) at Cornwall Council (SDOHE), and in the event that remains of potentially national importance be affected, HBMCE (Historic England).

1.1.3 This Outline WSI should be read in conjunction with Annex S: Outline Archaeological Framework Strategy, which provides details of the mitigation being discussed with the SDOHE at the time of writing. It also sets out the proposed lines of communication and responsibilities at the mitigation delivery stage.

1.2 Structure and Scope of the Outline Written Scheme of Investigation

1.2.1 This document comprises an Outline Written Scheme of Investigation (WSI) and is based on the information available at the preliminary design stage. As the detailed design progresses, the plan would be reviewed and updated accordingly.

1.2.2 The detailed WSI will outline the methods and procedures for the identification and treatment of any archaeological remains that may be discovered during construction. Including any mitigation of effects on archaeological remains through archaeological excavation and preservation of archaeological remains.

1.2.3 The WSI would be implemented prior to and during the construction of the scheme and all construction staff would be required to follow its provisions.

1.2.4 The Written Scheme of Investigation must be read in conjunction with the detailed Construction Environmental Management Plan (CEMP).

1.2.5 The contractor will manage the impact of construction works on cultural heritage assets.

1.3 Responsibilities

1.3.1 The Archaeological Contractor (AC) will be responsible for undertaking the fieldwork and post-excavation assessment, analysis, reporting and archiving.

The AC will be a Registered Organisation (RO) with the Chartered Institute for Archaeologists (CIfA) and will provide a project manager to direct the survey work who has CIfA membership (or equivalent experience) to at least Associate level, and with demonstrable experience of managing large-scale archaeological projects. The AC will adhere to the Detailed WSI approved under Requirement 9 of the DCO, and will be responsible for staffing the project, following suitable standards of recording and reporting.

1.3.2 The AC will work in accordance with the relevant guidance documents listed in Section 2.2.

1.3.3 The Consultant Archaeologist will be responsible for monitoring the AC to ensure compliance with the Detailed WSI on behalf of Highways England.

1.3.4 The SDOHE will be responsible for approval of the Detailed and site-specific WSIs and for monitoring the works to ensure compliance with DCO Requirements.

1.3.5 HBMCE will advise the SDOHE at Cornwall Council in the event that archaeological remains of potentially national significance are encountered, and with respect to specialist scientific requirements.

2 Cultural heritage general provisions

2.1 Pre-construction requirements

2.1.1 All archaeological works shall be governed by a Detailed Written Scheme of Investigation (WSI). This will be produced and agreed with the SDOHE to manage the pre-construction archaeological investigations required as mitigation for the direct impacts of the scheme. This will include:

- An overarching Written Scheme of Investigation (WSI) which will describe common standards and approaches to the recording of archaeological deposits that will be applied on the project;
- Site-specific WSIs for areas of detailed archaeological excavation and ‘Strip-Map- Sample’, which will include detailed research objectives for the works;
- Clear commitments for post excavation analysis, archiving, reporting, and where appropriate, publication; and
- A list of specialists and their qualifications.

2.2 Relevant Guidance

2.2.1 As a minimum, the archaeological mitigation will be undertaken according to the following professional standards and guidance:

- DMRB Volume 10, Section 6: Archaeology (DfT 2008);
- Standard and guidance for archaeological excavation (CIfA 2014);
- Standard and guidance for an archaeological watching brief (CIfA 2014);
- Code of Conduct (CIfA 2014);
- Standard and guidance for the creation, compilation, transfer and deposition of archaeological archives (CIfA 2014);
- Archaeological Archive: A guide to best practice in creation, compilation, transfer and curation (Archaeological Archives Forum 2011);

- Preserving Archaeological Remains (Historic England 2016)
- Guidelines on the X-radiography of Archaeological Metalwork (Historic England 2006);
- Management of Research Projects in the Historic Environment (MoRPHE) (Historic England 2006);
- Investigative Conservation (Historic England 2008);
- Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation (2nd Ed) (Historic England 2011);
- Animal Bones and Archaeology: Recover to Archive (Historic England 2019);
- Digital Image Capture and File Storage: Guidelines for Best Practice (Historic England 2015);
- Metric Survey Specifications for Cultural Heritage (Historic England 2015);
- Updated Guidelines to the Standards for Recording Human Remains (CIfA, 2017).

2.2.2 The Detailed Site-Specific WSIs will set out explicitly the application of the above standards and guidance for each mitigation area.

2.3 Contents of Detailed WSI

2.3.1 The Detailed WSIs will include the following:

- Location of site(s) covered by the WSI
- Requirement for the Work
- Background to the Scheme (DCO history).
- Archaeological and Historical Background.
- Research Design: This should demonstrate a clear understanding of the archaeological work's academic aims and objectives and clear research questions that are site/area specific.

2.3.2 Archaeological recording methodology:

- The archaeological contractor should examine information held by the Cornwall & Scilly Historic Environment Record (HER), the Cornwall Records Office at Truro and the Cornwall Centre at Redruth (all to become part of Kresen Kernow from September 2019), where appropriate, and the results of any previous archaeological assessments or investigations.
- An archaeologist shall be present during all ground works associated with the development, unless circumstances dictate a different approach.
- The archaeological recording method should be defined for each separate working site or area within the overall scheme, such as area excavation, strip-map-and record, sampling, or watching brief, and the reasons specified in each case.
- A toothless grading bucket can be used for the removal of any overburden until the first archaeological horizon is exposed. This will then be hand cleaned as appropriate.
- Surviving remains which will be disturbed or destroyed by the development shall be archaeologically excavated and/or recorded by the stated method.
- A methodology for the excavation, survey, recovery and recording of archaeological contexts and artefacts shall be provided.

- The site will be tied into the national grid.
- Site planning policy shall be given in the WSI. The normal preferred policy for the scale of archaeological site plans is 1:20 and sections 1:10, unless circumstances indicate that other scales would be more appropriate.
- Photographic record shall be a comprehensive record to archive standard of all the features and artefacts revealed.
- The photographic record shall consist of either, a) chemical prints in both black and white and colour together with the negatives, or b) digital photography in un-compressed TIFF format following the guidelines set out in 'Digital Image Capture and File Storage: Guidelines for Best Practice' (Historic England, July 2015). Digital images may be used for report illustration.
- For both general and specific photographs, a photographic scale shall be included.
- In the case of detailed photographs it may be appropriate to include a north arrow.
- The photographic record shall be accompanied by a photographic register detailing as a minimum, feature number, location and direction of shot.

2.3.3 Finds methodology:

- the detailed WSI will state the circumstances in which the Treasure Act 1996 and the Treasure (Designation) Order (2002) apply and how will this be actioned.
- All artefacts, will be retained from each archaeological context excavated.
- Artefacts will be cleaned, conserved, marked, bagged and boxed in accordance with best professional practice (E.g. First Aid for Finds; HE Guidance; Museum Standards; Chartered Institute for Archaeologist's 'Standard and guidance for the collection, documentation, conservation and research of archaeological materials' (CIfA, December 2014)).
- All artefacts will be treated in a proper manner and to standards agreed in advance with the recipient museum.
- Artefacts will be cleaned, conserved, marked, bagged and boxed in accordance with best professional practice (E.g. First Aid for Finds; HE Guidance; Museum Standards).
- The WSI shall include an agreed list of specialist consultants, who may be required to conserve and/or report on finds, and advise or report on other aspects of the work including environmental sampling or the development of specific excavation methods for the recovery of artefacts.
- Provision should be made for the project conservator to visit site and to advise where appropriate.
- Conservation of artefacts and objects will be undertaken in line with relevant standards and guidance and provision should be made for investigative conservation as a contingency.
- There will be a requirement for X-Radiography of metal objects in line with Historic England's 'Guidelines on the X-radiography of archaeological metalwork' (2006).
- Conservation and storage shall be agreed with the Royal Cornwall Museum prior to the start of work, and confirmed in writing to the SDOHE.
- Finds work should be to accepted professional standards and adhere to the Chartered Institute for Archaeologist's 'Standard and guidance for the

collection, documentation, conservation and research of archaeological materials' (CIfA, December 2014).

2.3.4 Scientific analyses and research:

- A scientific dating strategy will be developed and included within all WSIs, in consultation with a scientific dating specialist or chronological modelling specialist. Development of this strategy at an early stage will ensure that the excavation methods employed are selected or targeted to ensure recovery of appropriate material for scientific dating and that adequate research questions are developed to target this. The Historic England Science Advisor will be able to provide further advice if required.
- Where waterlogged or organic remains, or mineralised remains, are identified or suspected, a detailed strategy for sampling and assessment shall be produced in consultation with the relevant appointed specialist.
- A targeted fit for purpose whole earth sampling strategy will be developed in the Written Scheme of Investigation, site specific targeted strategies will be developed within the site specific WSIs to address the aims and objectives of the project. The appointed specialists will input to the development of the strategy.
- Site specific research questions shall be developed in consultation with relevant specialists, drawing on the results of assessment of artefacts, ecofacts and archaeological deposits from evaluation stage, to ensure that specialist sampling strategies are considered, devised and included within the Written Scheme of Investigation and Site Specific WSIs.
- Provision should be made for specialist sampling to be undertaken for palaeoenvironmental assessment and analysis.
- Whole earth samples shall be taken from discrete features, layers and deposits in a targeted manner in order to address specific research questions or project aims and objectives, and should comprise 100% of features <40L in volume or a 40-60L sample should be taken where this is feasible.
- Provision shall be made for archaeological and geoarchaeological assessment and dating of buried soil horizons or buried land surfaces.
- Preparation, taking, processing and assessment of environmental samples will be in accordance with Historic England's 'A Guide to the Theory and Practice of Methods, from Sampling and Recovery to Post-excavation (2nd ed.)' (2011).
- Provision should be made for processing of all environmental samples during the fieldwork stage of the project, with samples processed and assessed within two-three weeks of collection. The results should be fed back to the fieldwork project team.
- Recovery of faunal remains should be considered in consultation with the relevant specialist and Historic England's Animal Bones and Archaeology Handbook (2019) and a strategy should be presented within the WSI and Site Specific WSIs where appropriate.

2.3.5 Human Remains:

- Human remains must not be excavated without the appropriate licence.
- Human remains must initially be left in situ and reported to the SDOHE and the appropriate authorities.

- If the human remains are archaeological and greater than 100 years old, the Ministry of Justice must be contacted for the appropriate licence before excavation may commence. The coroner or the police need not be informed of the discovery of human remains if they are properly interred in a recognised burial ground or if there is reason to suppose that the burial is more than 100 years old.
- If human remains are to be preserved in situ, this should be carefully considered and the methods by which the remains will be preserved and by which their security will be secured, should be discussed and agreed with the SDOHE.
- If human remains are to be removed this must be done with due reverence and in accordance to current best practice and legal requirements. The site must be adequately screened from public view.
- Current best practice available is: 'Guidance for Best Practice for the Treatment of Human Remains Excavated from Christian Burial Grounds in England' (Advisory Panel on the Archaeology of Burials in England (APABE), February 2017) irrespective of religion or period (see also HE Guidance & CIfA guidance).
- The WSI will describe a detailed strategy for the investigation, treatment, recovery, and assessment/ analysis of human remains (inhumations, cremations, disarticulated / charnel remains) which will be developed in consultation with an Osteoarchaeologist (e.g. Historic England, 2018; APABE, 2017; Historic England, 2013; and McKinley and Roberts, 1993).It is expected that human remains will be excavated and assessed by an Osteoarchaeologist, that remains will be lifted and subject to full assessment and analysis.
- Provision should be made for the project Osteoarchaeologist to visit site during excavation.
- Human remains should be interred in the relevant archive repository following assessment and analysis.

2.3.6 Staffing, legislation and programme:

- Provide details of the senior project staff, specialists (whether in house or sub-contractors) and the intended on-site archaeologists, indicating their suitability to undertake the project (CVs may be requested) - the on-site archaeological project staff must have relevant and appropriate experience of at least three years.
- Demonstrate that the recording work will be undertaken in accordance with all relevant health and safety legislation.
- Demonstrate an understanding of the relevant legislation pertaining to human burial.
- Define and account for non-archaeological constraints; these include: live services, access routes and rights of way, the presence of statutory and non-statutory ecological areas, protected species and tree preservation orders.
- Provide a provisional programme outlining relevant aspects of post-fieldwork analysis, the completion of the project archive and the submission of a project report. This will include to include specific overarching post-excavation principles and an outline the basic principles for processing of artefacts or environmental samples; treatment of artefacts (including treasure), human

remains, ecofacts or archaeological materials; or the conservation of archaeological materials.

2.4 Reporting

2.4.1 A programme of archaeological reporting, post excavation and publication will be required.

2.4.2 A technical report will be produced that would be commensurate to the findings of the mitigation. This will describe the findings of the archaeological works, with detailed consideration and assessment of finds. The scope of analysis and contents of the report will require the approval of the SDOHE. As a minimum it will include:

- A concise, non-technical summary.
- The aims and methods adopted in the course of the archaeological works.
- The detailed description and specialist interpretation of all archaeological material recorded by the archaeological investigations (the report should propose an interpretation for the dating and development of the site on the basis of the information collected and should provide an appropriate level of discussion of the evidence presented within the report).
- Appropriate illustrative material such as maps, plans, sections, drawings and photographs and including site location plan at 1:2500; site plan at 1:1250, and additional plans as appropriate (adequate photographic coverage (properly captioned) should be included regardless of whether the project produced positive or negative results; the report should also include photographs that place the site in context).
- Specialist report(s) in full (e.g. human remains, finds, environmental assessments) with the author(s) acknowledged; significant finds, including pottery, should be illustrated (drawn or photographed, as appropriate).
- An HER entry summary sheet.
- A detailed record of the contents of the project archive, including physical archive.
- Information on the arrangements for the long-term deposition of the archive.

2.4.3 The report must place the findings of the archaeological works in their local and regional context, having made a comprehensive assessment of the regional context within which the archaeological evidence rests, and made reference to relevant research agendas (South West Archaeological Research Framework) and to cartographic, documentary and other research.

2.4.4 It is envisaged that in addition to a technical report on the specific findings of the archaeological works, a ‘popular’ report would also be produced. This would set the results of the A30 mitigation within a local context and describe the archaeological development of the A30 as a historical routeway. The scope of this publication would be agreed with SDOHE and HBMCE in light of the findings of the archaeological mitigation.

2.5 Archive Deposition

2.5.1 An ordered and integrated site archive will be prepared in accordance with ‘Management of Research Projects in the Historic Environment: The MoRPHE

Project Managers' Guide' (Historic England, April 2015) upon completion of the project.

2.5.2 The requirements for archive storage shall be agreed with the Royal Cornwall Museum (RCM).

2.5.3 There is considerable benefit to engaging with the Royal Cornwall Museum from an early stage. It is recommended that early consideration be given to engaging with the accessioning museum, particularly considering artefact retention policies.

2.5.4 The archive, including a copy of the written report, shall be deposited with the Royal Cornwall Museum within two months of the completion of the full report and confirmed in writing with the SDOHE.

2.5.5 If finds are to remain with the landowner, a full copy of the documentary archive shall be housed with the Royal Cornwall Museum.

2.5.6 Should deposition of archaeological archives be temporarily suspended (e.g. due to space restrictions) by the RCM, then other arrangements will be agreed with the RCM for the temporary retention of the archive by the archaeological contractor until such time as long-term deposition can be resumed. The current location (at time of writing) of the archive shall be made explicit in the project report.

2.5.7 Copy of the report(s) will be supplied to the National Monuments Record (NMR) in Swindon, a digital copy supplied to the Archaeological Data Service (ADS), York, and an OASIS report submitted.

2.5.8 Summary of the contents of the archive shall be supplied to the SDOHE.

2.6 Integrated interpretation strategy

2.6.1 The scheme will deliver environmental benefits to offset the impacts of the junction design, in addition to benefits already embedded in the design. These will include, but are not limited to:

- Interpretation boards will be installed in consultation with HBMCE.
- The contractor will clear the scrub at Warren's Barrow during construction to aid the barrow to be removed from the Heritage at Risk register.
- The contractor will provide cultural heritage interpretation in the underpass at Newlyn Downs in consultation with Historic England.

2.7 Monitoring

2.7.1 The Consultant Archaeologist would be responsible for all liaisons with the SDOHE.

2.7.2 SDOHE will monitor the work and should be kept regularly informed of progress.

2.7.3 Notification of the start of work shall be given preferably in writing to the SDOHE at least one week in advance of its commencement.

2.7.4 Variations to the WSI shall be agreed with the SDOHE, preferably in writing, prior to them being carried out.

2.7.5 Significant new or unexpected deposits are discovered not covered by the approved WSI, all works must temporarily cease and a meeting convened with the archaeological contractor and the SDOHE to discuss the most appropriate way forward.

Annex G: Outline Ground and Surface Water Management Plan

1 Introduction

1.1 Purpose

1.1.1 The purpose of this Outline Ground and Surface Water Management Plan is to set out the construction measures to prevent the risk of pollution and contamination to ground and surface water. The contractor will manage risk in accordance with best practicable means which include general site management procedures, and control and measures to mitigate any effects of potential adverse effects caused by the construction works.

1.2 Structure and Scope of the Outline Ground and Surface Water Management Plan

1.2.1 This document is an Outline Ground and Surface Water Management Plan and is based on the information available at the outline design stage. As the detailed design progresses, the plan would be reviewed and updated accordingly. The Outline Ground and Surface Water Management Plan would be developed in consultation with Natural England (NE) and would be agreed prior to the start of construction.

1.2.2 The final Ground and Surface Water Management Plan (GSWMP) will consider all drainage required during the construction phase and will reference all industry and regulatory pollution prevention guidelines. It shall describe the design of each element of surface water management system required to manage surface water runoff during construction and potential risks to surface waters. This shall include consideration of temporary storage and settlement requirements to manage sediment load of waters. The GSWMP shall define the water quality criteria to ensure any discharge to receiving watercourses meets regulatory requirements.

1.2.3 With regard to groundwater, the GSWMP shall consider all activities to be undertaken during the construction phase that may require groundwater control through pumping. The GSWMP will reference all relevant industry and regulatory pollution prevention guidelines. The GSWMP shall consider excavations within borrow pits, structures required for managing groundwater in areas of cut and excavations required for subsurface structures/utilities that may encounter shallow groundwater. The GSWMP shall define the nature and approach for groundwater management following its abstraction, including monitoring to determine the acceptability of chemical and physical quality with respect to discharge to the surface water system.

1.3 Responsibilities

1.3.1 Competent managers and key team members will be appointed to work on this plan and support it along the project duration. Additional roles and responsibilities will be developed as the detailed design progresses.

Table 1-1 Annex G Responsibilities details

Name	Position/Responsibilities	Contact Details
	Highways England Project Manager	
	Contractor Environmental Manager	
	Site Manager	
	SHE Manager	
	Agricultural Liaison Officer	

Consents

1.3.2 The treatment of waters arising from construction activities, including point source discharges resulting from the treatment of materials regulated by mobile plant licence will require regulation by the EA. An application for an environmental permit (Discharge Consent) will be submitted prior to works commencing. The permit will regulate the discharge of treated contaminated waters to ground, via re-injection (or possibly soakaway). A separate environmental permit will be required for each location.

1.3.3 An abstraction licence will be in place for de-watering operations on site. A separate licence may be required for each location or activity. An impoundment of water in any watercourse or abstraction exceeding 20 cubic metres a day will be controlled by means of an EA consent (Abstraction Licence).

1.3.4 Construction works carried out over, under or near a main river, or in a flood plain or flood defence (including a sea defence) will require a Flood Risk Activity Permit. A permit will be required for each location.

1.3.5 An Ordinary Watercourse Consent is required for all works carried out over, under or near an ordinary watercourse. Ordinary watercourses include non-main rivers and all ditches, drains, cuts, culverts, dikes, sewers (other than public sewers) and passages through which water flows. The consenting authority for this scheme will be Cornwall Council.

2 Mitigation Measures

2.1 General Measures

2.1.1 Temporary surface water management systems will be installed early in the construction sequencing and carefully managed to prevent localized flooding or pollution of surface and groundwater from silt and other contaminants.

2.1.2 In areas where potentially contaminated land has been identified, specific mitigation measures will be designed to manage and contain potential contamination. Detailed method statements will be prepared for works in these areas.

Induction of site personnel

2.1.3 All personnel will attend a site induction before commencing work on site. The briefing will emphasise the sensitivity of the watercourses, surrounding habitat and methods and working practices employed to protect the water environment.

Emergency Response Planning

2.1.4 An emergency response plan will be developed in accordance with EA Guidance PPG21- Pollution Incidence Response Planning. The plan will be communicated to all personnel. Emergency spill control equipment such as spill kits, oil booms and absorbent materials, will be held at appropriate locations on site and within site compounds.

Climate Change Resilience Planning

2.1.5 The contractor should consider the potential impacts of extreme weather events during construction. To ensure resilience of the scheme to such extreme weather events, the contractor should use a short to medium-range weather forecasting service from the Met Office or other approved weather forecast provider to manage climate-related risks and inform programme management and impact mitigation measures. The contractor should register with the Environment Agency's Floodline Warnings Direct service.

2.1.6 The contractor's Environmental Management System (EMS) should consider all measures deemed necessary and appropriate to manage extreme weather events and should specifically cover training of personnel and prevention and monitoring arrangements.

General mitigation measures

2.1.7 An outline of the main work activities to be carried out throughout the scheme as well as relevant water management proposals currently being considered are described in Table 2-1.

Table 2-1 Ground and Surface Water Management - Main work activities and mitigation proposals

Construction Risks	Mitigation
Concrete wash water reaching controlled waters	• Work involving concrete and cement will be carried out in accordance with EA Guidance PPG 5 'Works in, near or liable to affect a watercourse'. Controls will be implemented to ensure that wet cement does not come into contact with controlled waters. • Waters that have come into contact with wet concrete/cement will be captured and treated accordingly (e.g. using Siltbusters, pH control and coagulants) before being returned to the surface water management system. Any waste material recovered during this process should be re-used onsite where possible or otherwise it should be removed from site by a licensed waste carrier for disposal to an appropriately licensed facility. • An adequately sized and lined washout area to be developed and maintained. • Investigate concrete supplier's use of concrete socks.
Excavation activities	• No materials or topsoil will be stockpiled within the floodplain or near any watercourse. • Silt fencing, capture ditches and bunds will be constructed around the site and along the edges of all watercourses and other watercourses to prevent the ingress of silt contaminated water.
Site Compound Facilities (including Car Parks)	• Site compounds will be located away from all surface water features and watercourses and outside of the flood plain. • A site drainage plan will be prepared in advance of construction works to identify the location of all watercourses and drains/drainage paths. • All drainage on site will be identified and colour coding will be used to distinguish between surface water, foul sewer and combined drainage. This will ensure that all those working on site are aware of the type of drain in the event of a pollution incident. Pollution control measures such as the use of oil interceptors, the placement of bunds or silt traps will be used to prevent silt run-off entering drains.
Vehicle/Plant Movements	• Haul routes will be regularly inspected and maintained to minimise silty run-off. • Areas of hard standing will be provided at site access and egress points, where practicable. The areas will be regularly inspected and cleaned and road sweepers/cleaners will be employed on existing highways near the construction area. • During the earthworks mass haul operation, damping down of the haul roads to minimise dust being generated by plant movements would be required. This would minimise dust pollution causing nuisance to neighbouring properties and businesses along the route of the scheme. • All vehicles, plant and equipment will be regularly inspected and maintained in accordance with manufacturers' recommendations. Records of inspections will be maintained on site.

Construction Risks	Mitigation
Wheel wash facilities	• Site wheel washing facilities will be established at designated locations, away from watercourses and the floodplain. Cleaning will be carried out in a bunded area and wastewater will either be recycled or discharged to foul sewer (with consent from the sewerage undertaker). • Any contaminated waste will be removed from site by a licensed waste carrier for disposal to an appropriately licensed facility. • Guidance from PPG13 will be used to put in place good practice for vehicle washing and cleaning.
Aquatic Protection	• Any instream works or works close to watercourses may result in a change of aquatic conditions downstream. Such works would be designed taking into account Annex H: Outline Pollution Prevention and Control Management Plan • Advice will be sought from all specialists involved in the project and will be entered into control documents and issued through to the workforce and management ahead of works affecting watercourses. • Appropriate precautions will be taken when working instream, or adjacent to, watercourses; to appropriately manage the potential for deposition of silt or release of other forms of suspended material or pollution within the water column. • Instream prevention and control measure to reduce or avoid sediment ingress into the watercourse, include (but not exclusively): o Avoiding instream activity during wet weather, o Stilling ponds, o Sediment absorbent matting, and o Bank reinstatement / stabilisation. • The use of construction materials on site will be free from contaminated material so as to avoid potential contamination of the watercourse.
Storage of fuels, oils and other chemicals	• Spill kits to be available near all points of work and personnel trained in their use. • COSHH store to be bunded and locked when not in use. • In areas of limited footprint, settlement tanks and oil separators will be used to treat contaminated water from the work areas. • Physical barriers to stop material overspill. • No fuels, oils or other chemicals will be stored in high- risk locations such as: – within 50 metres of a spring, well or borehole; – within 10 metres of a watercourse; – places where spills could enter open drains or soak into groundwater; or – on a floodplain.

Construction Risks	Mitigation
	• Storage tanks will be sited on an impermeable base, surrounded by an impermeable bund, and inspected regularly for leaks. Any valve, filter, sight gauge, vent pipe or ether ancillary equipment must be kept within the bund when not in use. • Associated pipework should be situated above ground and protected from accidental damage. • All bulk fuels storage must be contained within a double skinned bowser/container or have a bund. Double skinned tanks or bowsers must also be bunded unless the outer skin would provide secondary containment. The bund must have sufficient volume to contain 110% of the contents of the largest fuel/pipe container or 25% of the total storage capacity of all the containers, whichever is the greater. • All fuel containers, including those containing waste fuels, must be stored on a drip tray/bunded area away from vehicle traffic within a designated storage area, where possible, to avoid damage. • Guidance from the PPG3 will be followed for the use and design of oil separators for the surface water drainage systems and guidance from PPG2 will be used regarding to ground storage oil. • Plant will be regularly inspected, serviced and maintained to minimise the risk of leaks/spills. At the end of each working day, driveable plant will be removed from any areas of floodplain.
Surface water run-off/Silt from earthworks and bridge abutment works.	• Where possible permanent drainage will be incorporated into the works at the earliest opportunity in preference to temporary drainage systems. • Oil interceptors, bunds or silt traps will be used to prevent polluted run-off entering drains, additional guidance from PPGs will also be followed. • Areas of exposed sediment deemed at risk of erosion during heavy rainfall or flood inundation should be protected using either temporary measures (e.g. sheeting) or semi-permanent measures (for example coir matting) until vegetation is able to establish on these surfaces. • Use of cut-off drains or ditches to channel water around the site and/or prevent silty water entering excavations and watercourses. These should be constructed along the downstream site boundary to prevent silted water leaving site. These should discharge to settling ponds/tanks. • Silty water will be treated to allow suspended solids to settle out before disposal. • Settling ponds or tanks should be constructed to promote the removal of silt from site runoff. Ponds should be designed for the maximum predicted site runoff using a 1 in 100 year event and should be large enough to ensure sufficient residence time for particulates to settle out, prior to discharge of the water. • Wherever practicable, grey water systems will be used at site compounds to reduce run-off from site, improve water efficiency and reduce the potential for polluting discharges to surface watercourses.

Construction Risks	Mitigation
	• All water pumped from excavations would be pumped via a pipe and gravel sump in order to prevent silt being agitated from the base of the excavation and to provide rudimentary filtration to the water prior to abstraction. • For low volume pumping, water would either be pumped into a vegetated area remote from surface water drainage or into a small attenuation lagoon prior to being directed into the drainage system. For high volume pumping (100mm or above) water would be passed through an attenuation tank with a capacity of not less than 8m3. The outlet from the tank could be placed directly into site drainage, provided the water is free from silt contamination.
In-channel working	• Temporary works to divert watercourses during culvert construction, either by gravity flumes or over pumping will include suitable provisions to pass high flows.
Topsoil Stripping and Storage	• Refer to Annex P Outline Soils Management Plan for further details. • Wherever possible, topsoil will be left in place to minimise the amount of unprotected ground exposed to runoff. Where topsoil removal is required it would take place as late as possible prior to other works in the area. Topsoil will be stored outside of the floodplain. • In advance of vegetation clearance and soil stripping operations commencing within 10m of a watercourse, appropriate control measures would be implemented to prevent contamination. • Topsoil stockpiles would be created and managed in accordance with best practice guidance. The sides of stockpiles would be graded to prevent ponding and to help shed rainwater. Exposed stockpiles that are to remain for long periods would be seeded with a standard Rye Grass seed mix immediately upon completion and in suitable weather conditions. This would minimise soil erosion during the soil storage period and to help reduce colonisation of nuisance weeds. • Silt fencing would be installed around the margins of topsoil mounds to minimise the risk of sediment-laden runoff reaching watercourses.
Field Drainage - Irrigation	• Details of the irrigation system on each land holding will be gathered during the detailed design stage and irrigation plans will be developed to inform the management of agricultural land drainage during construction. • The Agricultural Liaison Officer will be responsible for consulting with each individual landowner to obtain the relevant information and to be a point of contact to report concerns regarding irrigation systems during construction. The plans will include the following information: – Location of boreholes and water supplies used by each farmer; – Irrigation or impoundment licence granted by the EA; and – System of irrigation applied and the location of irrigation network for each field.

Construction Risks	Mitigation
Field Drainage -Agricultural Land Drainage	• Particular care will be taken to ensure that the existing land drainage system is not compromised as a result of construction. Land drainage systems will be maintained during construction and reinstated on completion. • The Agricultural Liaison Officer (ALO) will coordinate drainage surveys to establish the existing drainage position including any related farm drainage that may be affected by the scheme. The services of a suitably qualified drainage consultant will be employed by the contractor to act as a drainage expert during the detailed design process and liaise with landowners or occupiers (through the ALO) to consult on the pre and post drainage schemes required. This will include the design of any land drainage works required during construction, and on the design and timing of any land drainage works required for the subsequent restoration of the land. This process will take due regard of any local and site-specific knowledge. • Existing agricultural land drains, where encountered during the construction of each phase, will be appropriately marked. The location of drains cut or disturbed by the construction works will be photographed, given a unique number and logged using GPRS coordinates. The actual condition and characteristics (e.g. depth of installation, pipe type and diameter) of the existing drainage will also be recorded upon excavation. • During the construction works, temporary drainage will be installed to intercept existing field drains and ditches to maintain the integrity of the existing field-drainage system during construction. Such measures will also assist in reducing the potential for wet areas to form during the works, thereby reducing the impact on soil structure and fertility. Drainage systems however will not be installed into areas where they are not currently present, e.g. environmental wetlands. • Any field drainage intercepted during construction will either be reinstated following reinstatement of the land or diverted to a secondary channel. Landowners and occupiers will be informed of the design of drainage works required during construction. The drainage would be reinstated in a condition that is at least as effective as the previous condition and will follow best practice for field drainage installations taking into account site specific conditions. • Where it is reasonable for the reinstatement of drainage to involve works outside of the order limits it will be done subject to the agreement of the landowner. • Landowners and occupiers will be provided with the opportunity to inspect land drainage works as they progress, subject to health and safety considerations. Furthermore, records of existing and remedial drainage will be maintained by the contractor with copies provided to the Landowner (and the Occupier, if applicable) following the completion of construction works in each phase. • A dispute resolution process will be established including the appointment of a jointly agreed Independent Expert for drainage design and implementation, if required.

Annex H: Outline Pollution Prevention and Control Management Plan

1 Introduction

1.1 Purpose

1.1.1 Measures for minimising pollution risks to prevent pollution incidents occurring as a result of the proposed construction activities are required. This pollution control and prevention plan has been developed to manage these risks.

1.1.2 The purpose of the plan is to identify the main risks of pollution occurring on the site, to identify and implement appropriate pollution prevention measures, and to reduce the effects of any pollution incidents that may occur. The plan should be read in conjunction with Annex G Outline Ground and Surface Water Management Plan and the Outline CEMP.

1.2 Structure and Scope of the Outline Pollution Prevention and Control Management Plan

1.2.1 The document comprises an Outline Pollution Control and Prevention Plan and is based on the information available at the outline design stage. As the detailed design progresses, the Plan would be reviewed and updated accordingly. The final Pollution Control and Prevention Plan would be agreed with Natural England (NE) prior to the start of construction.

1.2.2 The plan would be implemented throughout the construction process of the scheme and all construction staff would be required to follow its provisions.

1.3 Responsibilities

1.3.1 The project manager would have overall responsibility for the construction of the new Scheme. A full-time Environmental Co-ordinator (ECO) would be appointed before construction commenced. Their main responsibility would be managing the environmental issues through construction. The specific tasks of the Environmental Co-coordinator are set out in CEMP.

1.3.2 For the purpose of the Outline Pollution Control and Prevention Plan, the key roles are set out in Table 1-1 below. Additional roles and responsibilities will be developed as the detailed design progresses.

Table 1-1 Annex H Responsibilities details

Name	Position/Responsibilities	Contact Details
	Highways England Project Manager	
	Contractor Environmental Manager	
	Site Manager	

2 Pollution Risk Assessment

2.1 Preliminary pollution risk assessment

2.1.1 A preliminary pollution risk assessment has been undertaken to identify the main risks from the construction process. During the detailed design stage, the risk assessment would be updated as required.

2.1.2 The risk assessment will consider:

- The materials stored or transported and the condition of storage containers.
- Effects of accidents, flooding, vandalism and failure of containment.
- Location and proximity to local water courses, sensitive groundwater location and sites of special scientific interest.
- Surface water drains that flow off the site.
- Areas of unsurfaced ground.
- Operations and layout of the site.

2.1.3 Table 2-1 below sets out the materials that would be handled on site and activities that may be a hazard.

Table 2-1 Possible materials hazards on site

Materials	Activities
Fuels/chemicals	Spillage during refilling (overfilling or poor handling) Damaged or leaking storage containers Equipment and containment failure
Sediment	Failure of pre-earthworks drainage Failure of lateral bunds Working too close to watercourse
Cementitious Dust	Inappropriate storage containers

2.2 Site Design

Location and Layout of Construction Compounds

2.2.1 Site compounds and car-parks will be located away from all surface water features and watercourses and outside of the floodplain.

2.2.2 Water pollution, storage of fuels, oils, wheel wash facilities, drainage and surface water run-off are detailed in the Annex G: Outline Ground and Surface Water Management Plan.

2.3 Pollution Incident Response Plan

Response Plan

2.3.1 A pollution incident response plan will be designed for every construction compound. The plan will set out the actions to be taken in the event of a pollution

incident and identify the pollution control equipment and the control devices and where they should be located.

2.3.2 The Response Plan would contain the following key information:

- External and internal list containing contacts 24 hour contact details for organizations that may need to be involved during or after an incident, for example, the emergency services, NE, or Cornwall Council.
- Chemical and waste inventory: an up-to-date record of all substances stored on site would be maintained together with an estimate of the likely quantities stored and product data sheets. The location of drums, containers or bulk storage vessels used for storing potentially polluting chemicals would be identified on the site plan. The inventory would be made accessible to emergency responders.
- Pollution prevention equipment inventory. This would include equipment and materials on site to deal with pollution incidents (for example spill kits, drain mats/covers, pipe blockers, absorbents) and contact details of staff trained in the use of specialist equipment (where relevant).
- Site plan showing access routes and meeting points for emergency services; areas or facilities used to store raw materials, products and wastes; watercourses located within or near the site; and site drainage.

2.3.3 Key actions for the response plan would include:

- stop the works immediately;
- contain the spillage to avoid escalation of the problem (refer to Pollution Control Hierarchy);
- notify the Environmental Coordinator immediately and any other key staff;
- evacuate staff if necessary;
- call for emergency services if necessary;
- implement pollution control equipment;
- document the cause of the incident and the action take;
- replace pollution control equipment where required.

Practice

2.3.4 Staff will be trained in the procedures which to follow if there is a pollution incident, in particular:

- where the personnel protective equipment and pollution control equipment is stored;
- how to use the equipment; and
- the location of pollution incident response plan.

2.3.5 In the development of the pollution incident response plan, drafts will be sent to NE, and/or Cornwall Council, as relevant, for comment, including advice on when to notify the regulators of a spill.

2.4 Fire Plan

2.4.1 Action to be taken in the event of fire:

- Raise the alarm.
- Call the Fire Brigade.

- On hearing the alarm, the area must be evacuated immediately and staff to assemble at the Muster point.
- Visitors, clients and contractors to be escorted to the same assembly point.
- Turn off generators, compressors and other powered equipment.
- Turn off heat producing equipment and shut cylinder valve.
- Attack fire with the equipment if it is safe to do so.
- Obey instructions from the Office Fire Marshall or supervisory staff.
- Do not re-enter the working area until told it is safe to do so. If necessary inform others who may be affected by effects of the fire (smoke near hospitals, schools etc.)

2.4.2 The capacity of the construction surface water management system will be sufficient to contain within the site boundaries the water rejected by a fire truck, avoiding direct spillage of potentially contaminated material into the natural watercourses within the SSSI.

2.5 Pollution Control Options

Pollution Hierarchy

2.5.1 This section identifies the options that may be used to manage a pollution incident. The options are presented in the order of the preferred response.

2.5.2 Preferred response in order of priority:

1. Contain at Source
2. Contain close to the Source
3. Contain on the Surface
4. Contain in the Drainage
5. Contain on or in the watercourse

2.5.3 System Least Preferred response

Spill Response Plans

2.5.4 The preliminary pollution risk assessment has identified that the most likely causes of a pollution incident would involve:

- spillage of oils or chemicals;
- a discharge of sediment-laden water or other pollutant into a watercourse; or
- firewater runoff.

2.5.5 Pollution control equipment would be appropriate for the location of the site and the chemical/substance targeted. For example, absorbent materials such as sand, spill granules, absorbent pads and booms will be kept at each site compound, on plant working near water courses and particularly at refuelling areas and where fuel or oil is stored.

2.5.6 Following a pollution incident, used pollution control equipment (for example, spill kits) would be disposed of appropriately and new/replacement equipment would be provided.

2.5.7 Some of the key actions that would be included in the action plans are as follows:

- Priority action plan to be implemented when possible:

  - Stop at source or as close as possible from the source (especially prior to the drainage system).
  - Stop pollutant spreading by using oil booms, terram wrapped barriers, hay bales as applicable.
  - Trace impacts further downstream to establish extent of pollution.
  - Review the activity that caused the pollution prior to restarting work.
- Least action plan to be implemented when it is impossible to contain the spill at source and it has entered a watercourse:
  - Stop the flow at point of discharge;
  - Stop the flow spreading;
  - Dam the flow with earth/sand/polythene/absorbent material;
  - Divert the flow from drains/watercourses where possible;
  - Black off drains with drain covers or sandbags;
  - Check the site drainage plan- where will spill end up?

Discovery of Contaminated Land

- The following will need to be adhered to in relation to encountering previously unidentified chemical contamination and asbestos during construction works.
- Ensure personnel involved in the earthworks are briefed on the likely nature and type of soils that could indicate the presence of contamination (e.g. asbestos, discolouration, oils, odours, ash and clinker materials).
- If such material is encountered, the Environmental Co-ordinator would be immediately contacted to inspect the material.
- Testing of the material will be undertaken and the material will not be reused or removed until the results of the tests have been reviewed.

2.5.8 Contaminated materials will be handled and managed in line with the Remediation Strategy Report.

2.6 Training

2.6.1 This procedure will be discussed in the Site induction. It will be displayed on noticeboards along with contact details of relevant individuals.

- All personnel must attend a site induction before commencing work on the site. The induction will discuss the Pollution Control and Prevention Plan and also include key environmental issues on the project including the sensitivity of the watercourses, contamination, and air quality management. The briefing will emphasise the methods and working practices employed for protection, including emergency procedures for reporting and dealing with environmental incidents.
- All staff will receive relevant training on environmental issues throughout the construction of the project.
- All method statements will include an environmental section and any specific pollution control and prevention information.
- Drills of this emergency response plans will be carried out regularly to ensure understanding.

2.7 Monitoring, Review and Reporting

2.7.1 In accordance with the Environment Agency's Pollution Prevention Guidelines (PPGs) (although revoked they still maintain relevant as best practice guidance until updates are made available), and relevant construction industry guidance including CIRIA, best practice measures to prevent pollution will be implemented during the construction of the Scheme.

2.7.2 Should a situation arise where our proposed mitigation is not adequate, this plan will be reviewed. It will also be reviewed quarterly by the Environmental Co-ordinator to ensure it is up to date and accurate.

2.7.3 Specific monitoring requirements will be detailed. Nominated staff will carry out regular site inspections to control measures are in place and adhered to during the works.

2.7.4 Any instances of pollution or spill will be reported immediately to the Environmental Co-ordinator who will investigate and communicate investigation's conclusions to the project team to aid continuous improvement and to prevent reoccurrence of the event.

2.7.5 Records will be produced to show compliance with our Pollution Control and Prevention Plan, including inspections records, site plans and progress reports.

2.7.6 Surface water monitoring will be undertaken to demonstrate no adverse effects on water quality during construction works. An appropriate monitoring schedule and programme will be agreed with the Environment Agency.

Annex I: Outline Arboricultural Method Statement and Tree Protection Plan

1 Introduction

1.1 Purpose

1.1.1 The Arboricultural Method Statement must ensure the safe and healthy retention of all trees and hedges to be retained on this scheme.

1.1.2 The arboricultural method statement will describe how trees and hedges will be protected and managed during construction. It will be based on the information available at the DCO application stage and will need to be updated. The purpose of the arboricultural method statement will be to explain:

- how and when the protection measures should be installed; and
- how they will be maintained for the duration of construction.

1.1.3 Integral to achieving this goal is the implementation of the special construction details and protection methods detailed within this report.

1.2 Structure and Scope of the Outline Arboricultural Method Statement and Tree Protection Plan

1.2.1 This document comprises an Outline Arboricultural Method Statement and is based on the information available at the preliminary design stage. As the detailed design progresses, the plan would be reviewed and updated accordingly.

1.2.2 The plan would be implemented through the construction of the scheme and all construction staff would be required to follow its provisions.

1.2.3 The arboricultural method statement must be read in conjunction with the tree protection plan.

1.2.4 A Tree Protection Order (TPO) is present at chainage 3737 to 3850. This is illustrated on the “Tree Protection Plan – Sheet 3” of Volume 6, Document Ref 6.4 Appendix 7.6 Arboricultural Impact Assessment. It is proposed that the drainage ditch be designed such that only scrub and small trees are removed and all large trees are retained.

1.2.5 Due to the presence of the TPO, no works can commence until Cornwall Council has granted its approval to a site specific Arboricultural Method Statement (AMS) for temporary works located at chainage 3737 to 3850.

1.3 Responsibilities

1.3.1 It is the contractor’s responsibility to ensure that the details of this arboricultural method statement and any agreed amendments are known and understood by all site personnel. Copies of the agreed documents will be available on site and the site manager will brief all personnel who could have an impact on trees on the specific tree protection requirements. This will be a part of the site induction procedures and written into appropriate site management documents.

1.3.2 Following detailed design of the drainage ditch at Chainage 3737 to 3850, a detailed Arboricultural Method Statement (AMS) and Tree Protection Plan will be

produced in accordance with BS 5837:2005 'Trees in relation to Construction – Recommendations'. Input will be provided by an arboricultural consultant. During construction a watching brief will also be required.

1.3.3 The Arboricultural Method Statement will ensure the safe and healthy retention of all trees to be retained on this scheme. Integral to achieving this goal is the implementation of the special construction details and protection methods to be detailed within the Arboricultural Method Statement (AMS) and Tree Protection Plan.

1.3.4 The key responsibilities for tree related issues on this site are provided below.

Table 1-1 Annex I Responsibilities details

Name	Position/Responsibilities	Contact Details
	Highways England Project Manager	
	Site Manager	
	Contractor Environmental Manager	
	Local Authority Arboricultural Officer	
	Ecological Consultant	
	Arboricultural Consultant	
	Landscape Architect	

1.3.5 The Method Statement must be made available to all contractors and operatives on the site during the construction process so that they fully understand the importance of the measures set out for tree protection.

1.3.6 The relevant local authority is Cornwall Council.

2 Outline Arboricultural Method Statement

2.1.1 The detailed Arboricultural Method Statement will provide an instruction manual and work schedule for the site manager to inform tree and hedge root protection measures prior to and during construction. The method statement will include information regarding the following:

- A schedule of remedial tree surgery and tree removal works to be completed prior to the commencement of all other operations on site.
- The final location, specifications and installation details of the construction exclusion zones to include both tree protection fencing and ground protection measures.
- The final details and specifications for the special engineering measures where works are proposed to take place within the RPAs of trees to be retained.
- Arrangements for works at the tree protection orders in order to undertake special engineering measures.
- The location of site compounds, site offices and facilities, including parking arrangements, and areas for the storage of materials. Access routes for heavy

plant and machinery, delivery vehicles and issues related to lifting plans for proposed crane use or access to site where aerial tree crown parts may affect intended operations.

- Positions of responsibility on site, communication channels and details of intended contractors to be employed to undertake all arboricultural-related operations.
- A programme setting out the sequence and timing for all works related to the trees on the site.
- The system to be employed for monitoring the completion of each stage of the works and the protection measures specified.
- The appointment of an Arboricultural Clerk of Works. This will be an appropriately qualified and experienced person charged with the supervision and monitoring of the works related to trees and the reporting of satisfactory completion of operations to the client and the Local Planning Authority.

Annex J: Methodology for the Milestone Protection Management Plan

1 Introduction

1.1 Purpose

1.1.1 This purpose of this methodology is to protect the historic carved milestones which will be affected by the A30 Chiverton to Carland Cross Scheme. The locations of the individual stones are shown on the map below.

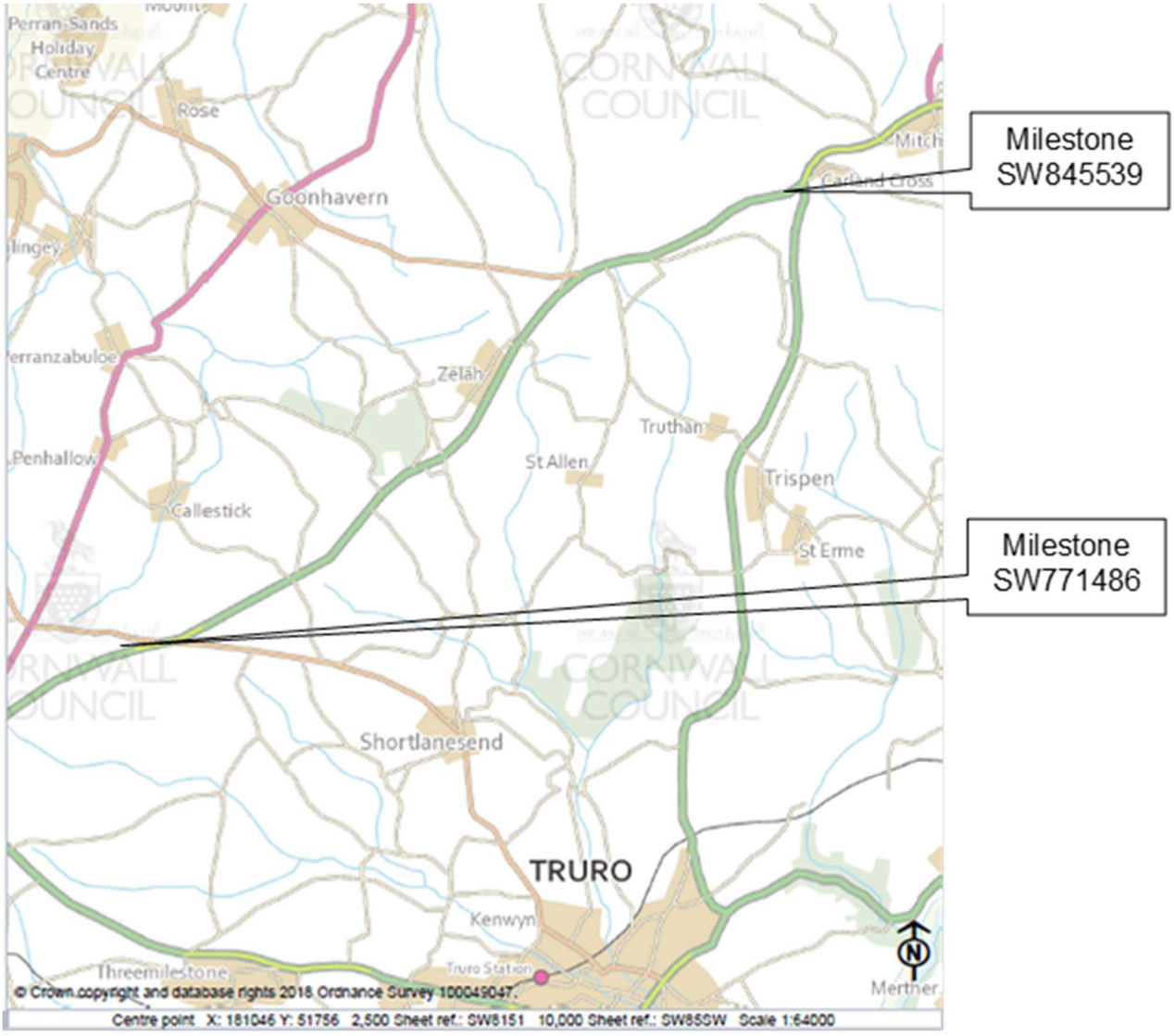


Figure 1-1 Milestone Location

1.2 Structure and Scope of the Outline Milestone Protection Management Plan

1.2.1 This method statement has been compiled to ensure the safe removal, storage and replacement of the two milestones affected by the construction works for the scheme.

Milestone at SW771486 (adjacent to Chybucca Junction)

1.2.2 This milestone will remain alongside the 'old A30' in its current position. This aligns with the suggestion from Ian Thompson of the Milestone Society, maintaining the integrity of the group of milestones.

Milestone at SW845539, approx. 253m south-west of Carland Cross (adjacent to Carland Cross)

1.2.3 The expectation is that the remaining section of the existing A30 to the old Carland Cross roundabout would be retained for use by walkers, cyclists and horse-riders (non-vehicular users). There will be a change to the surface of the old A30 which will complement the setting of the milestone. Furthermore, this will make it accessible for those wanting to follow the milestones.

1.2.4 During construction, the contractor may choose to temporarily remove the milestones to avoid them being damaged in any way.

1.3 Responsibilities

Table 1-1 Annex J Responsibilities details

Name	Position/Responsibilities	Contact Details
	Highways England Project Manager	
	Site Manager	
	Contractor Environmental Manager	
	Local Authority Cultural Heritage Officer	
	Archaeologist Consultant	
	Milestone Society	honsec@milestonesociety.co.uk
	Historic England	southwestcasework@historicengland.co.uk

2 Methodology for protection and movement of milestones

2.1 General

2.1.1 Two Grade II listed milestones (NHLE Nos. 1140923 and 1394843) will require protection from damage during construction. The scheme is a Nationally Significant Infrastructure Project which means Listed Building Consent from Cornwall Council planning authority is not needed. Instead, the scheme is subject to a Development Consent Order, which will provide all the necessary permissions for the scheme to be constructed including any works or impacts on listed features.

2.1.2 The contractor must take care when moving any stone, to ensure that it is not damaged in any way. The stone should be lifted using webbing strops, should be carried rather than dragged along the ground, and should be laid down on pieces of timber, rather than directly onto the ground.

2.2 The Sites

Milestone at SW771486

https://www.britishlistedbuildings.co.uk/101140923-milestone-at-sw-771486-ne-perranzabuloe#.Ww19A0gvxaQ

2.2.1 This is an 18th Century non-turnpike milestone.

- Tall slender painted dressed granite monolith square-on-plan with pyramidal head.
- Shallow recessed panel to 3 sides with inscription facing road (south) intact with Arabic numerals 34 over the letter L all in relief.
- West and east panels defaced and with recut inscriptions. West face has BODMIN over 23M in simple incised lettering. Below this is vestige of relief letter R for Redruth. East side has horizontal inscription in simple incised lettering of PENZANCE 24.

Milestone at SW845539

2.2.2 This Grade II listed milestone is approximately 1m in height and comprises square on plan with a pyramidal head, made from granite stone and painted white.

2.3 Methodology for movement of milestones

Recording before stones are moved

2.3.1 For stones that are to be removed, recording and labelling is important, to make sure that the stones can be repositioned as accurately as possible. The following approach should be taken:

- Using a hand-held GPS, record the grid reference. Do not assume that the grid reference given in this document is accurate (mistakes can be made!).
- Record the orientation of the main inscribed faces using a compass.
- Take photos of the stone from several angles, to record the setting and show how deeply buried it is, its condition prior to removal, and its setting in relation to any features that may help in repositioning it accurately (as far as possible, given the major changes to setting that are about to happen).
- Measure the height of the stone above ground level so that it can be restored to the correct height.
- Ensure that this data is stored securely for the duration of the duelling project.

2.3.2 This recording should be done by a suitable qualified archaeologist employed by the contractor.

Lifting Individual Stones

2.3.3 The contractor will:

- Dig carefully around the stone to loosen before lifting.
- Lift the stone with webbing strops, not a chain or rope.
- Lift using a machine (tractor or digger) with fore-loader.
- Place the stone carefully in a trailer on 3x3 inch timber posts or similar to protect it from damage or abrasion during transport to store **or** place the stone

in a trailer on a pallet so the once in store, the pallet can be lifted from the trailer using a fork lift.
- Label the stone with its site number, to ensure that the right stone is put back in the right place. This can be done using chalk; or with a label tied securely around the stone.

2.3.4 A suitable qualified archaeologist will be present throughout to ensure there is no damage to the stone.

Storing Stones

2.3.5 Stones should not be laid directly on the ground but should be laid on pallets or 3x3 inch timber posts, and covered with tarpaulin to protect from damage.

Replacing stones

General

2.3.6 The two stones should be replaced in their exact original positions or as close to this as possible. This should be determined with the advice of the employer's archaeologist and using GPS.

2.3.7 Before they are repositioned, the archaeologist should consult the initial recording to make sure that the stone is put back in the correct orientation and at the right depth. All inscriptions should be visible and the depth will be indicated by the finish of the worked masonry.

2.3.8 If for any reason a stone cannot be put back in the same place, it should be repositioned as close as possible to the original location –

- On the same *side* of the road as previously.
- To the same orientation as previously.
- Where the stone will be visible.
- Where there will be safe access for maintenance.
- Where the stone will be as safe as possible from traffic collision.

Methodology for re-erection

2.3.9 The contractor will:

- Dig a hole of appropriate size. This will be advised by the suitably qualified archaeologist and will be as close as possible to the stone's measurements across at ground level, and to a depth which reflects the level to which it should be buried.
- Lift the stone with webbing strops.
- Lift the stone from the trailer using a tractor or digger with fore-loader.
- Lower the stone gently into the hole.
- Check that it is upright, trigging with wooden wedges, small stones or pieces of slate if necessary.
- Backfill hole, tamping well to ensure the stone is stable and secure. Do not use cement to fix it.
- Brush the stone lightly to remove any soil and debris.

Note: the stones should not be set in cement.

Gravel Margins

2.3.10 The contractor, in discussion with the suitably qualified archaeologist, will consider whether to install a gravel margin, to prevent vegetation from growing back too quickly and to maintain the visibility of the stones in the future, especially if future maintenance is likely to be a difficulty. This may depend on the final positioning of the stones in relation to the new road.

2.3.11 The following specification for forming a gravel margins around a stone is from English Heritage Guidance on the Conservation of Milestones (Parry 2006, 12).

"In areas of vegetation the purpose of the margin is to reduce the rate at which new vegetation colonises the ground around the stone. Therefore the margin needs to be as wide as possible, 900 mm from the face of the stone on all sides would be a good starting point if space is available. In paved areas, the margin is intended as a 'breather zone' and 300 mm will be sufficient. The margin should be excavated to a depth of 100 mm, exposing the natural substrate, lightly compacted. A treated timber edge board should be fixed on timber stakes to define the perimeter of the margin. The excavated area should be treated with weed killer and overlaid with a geotextile membrane. The margin should then be backfilled with clean pea gravel to the full depth of the excavation."

Final Recording

2.3.12 To be undertaken by the employer's archaeologist.

- Using a hand-held GPS, record the new grid reference (where it is known to have changed).
- Take a photo of the stone to record its final restoration. This will be archived and sent to Historic England and the Milestone Society with the location.

2.4 References

Websites

http://www.heritagegateway.org.uk/gateway/

English Heritage's online database of Sites and Monuments Records, and Listed Buildings

http://www.milestonesociety.co.uk/conservation.html

Annex K: Outline Noise and Vibration Management Plan

1 Introduction

1.1 Purpose

1.1.1 The purpose of this Outline Noise and Vibration Management Plan is to set out measures for the contractor to control and manage noise and vibration from machinery and construction.

1.1.2 The effects of noise and vibration from construction sites will be controlled by introducing management and monitoring processes to ensure that best practicable means (BPM) are planned and employed during construction.

1.2 Structure and Scope of the Outline Noise and Vibration Management Plan

1.2.1 As part of the contractors' detailed CEMP, a noise and vibration management plan will be prepared and will set out these processes. The plan will include management and monitoring processes to ensure as a minimum:

- Integration of noise control into the preparation of method statements;
- Ensuring proactive links between noise management activities and community relations activities;
- Preparing details of site hoardings, screens or bunds that will be put in place to provide acoustic screening during construction, together with an inspection and maintenance schedule for such features;
- Developing procedures for the installation of noise insulation or provision of temporary re-housing and to ensure such measures are, where required, in place as early as reasonably practicable;
- Preparing risk assessments to inform structural surveys of buildings and structures which may be affected by vibration from construction;
- Developing a noise and vibration monitoring protocol including a schedule of noise and vibration monitoring locations and stages during construction of the scheme when monitoring will be undertaken;
- Preparing and submitting Section 61 consent applications;
- Undertaking and publishing all monitoring required to ensure compliance with all acoustic commitments and consents; and
- Implementing management processes to ensure ongoing compliance, improvement and rapid corrective actions to avoid any potential non-compliance.

1.3 Responsibilities

Table 1-1 Annex K Responsibilities details

Name	Position/Responsibilities	Contact Details
	Highways England Project Manager	
	Site Manager	
	Contractor Environmental Manager	

1.4 Measures to reduce potential noise and vibration impacts

Best practicable means

1.4.1 The contractor will assess, consider and implement BPM at all times in order to control noise and vibration from the works.

1.4.2 BPM is defined in Section 72 of the *Control of Pollution Act 1974* and Section 79 of the *Environmental* Protection *Act 1990* as those measures which are 'reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to financial implications'.

1.4.3 The contractor will consider mitigation in the following order:

- BPM, including:
  - Noise and vibration control at source - for example the selection of quiet and low vibration equipment, review of construction programme and methodology to consider quieter methods (including non-vibratory compaction plant, where required), location of equipment on site, control of working hours, the provision of acoustic enclosures and the use of less intrusive alarms, such as broadband vehicle reversing warnings; and
  - Screening - for example local screening of equipment, perimeter hoarding or the use of temporary stockpiles.
- Then, if situations arise where despite the implementation of BPM, the noise exposure exceeds the criteria defined in this Noise and Vibration Management Plan (NVMP), the contractor may offer:
  - Noise insulation; or ultimately
  - Temporary re-housing.

1.4.4 The recommendations of BS 5228-1:2009+A1:2014 - Code of practice for noise and vibration control on construction and open sites – Noise[4], and BS 5228-2:2009+A1:2014 - Code of practice for noise and vibration control on construction and open sites – Vibration[5], will be implemented, together with the specific requirements of this NVMP.

2 Noise and vibration management

2.1 Section 61 consents

2.1.1 The contractor will seek to obtain consents from the relevant local authority under Section 61 of the *Control of Pollution Act 1974* for the proposed construction works, excluding non-intrusive surveys. Applications will be made to the relevant local authority for a Section 61 consent at least 28 days before the relevant work is due to start or earlier if reasonably practicable.

2.1.2 Details of construction activities, prediction methods, location of sensitive receivers and noise and vibration levels will be discussed with the relevant local authority, or authorities, both prior to construction work and throughout the construction period. Prediction, evaluation and assessment of noise and vibration

[4] Hereafter referred to as BS5228-1
[5] Hereafter referred to as BS5228-2

as well as discussion between the employer's representative and its contractor and the relevant local authority will continue throughout the construction period.

2.1.3 Unless otherwise agreed with the relevant local authority, noise levels will be predicted in accordance with the methods set out in BS 5228 – 1.

2.1.4 All construction noise levels will be predicted or measured at a distance of 1m from any affected eligible facade, which must have windows to bedrooms or living rooms.

2.1.5 Annex A of BS 5228-1 provides a flow diagram demonstrating the process of a Section 61 application.

2.1.6 The employer's representative and/or the contractor will seek to agree with local authorities a common format and model consent conditions for Section 61 applications or any dispensations and variations to an existing consent. An example application form is included in Section 1.7 at the end of this Annex.

2.1.7 The application for a Section 61 consent will require noise (and where appropriate vibration) assessments to be undertaken and BPM measures set out to manage noise associated with construction of the scheme. The contractor will submit the assessment initially to the employer's representative for review, prior to submission to the relevant local authority.

2.1.8 The contractor will carry out noise (and vibration where appropriate) predictions for Section 61 applications.

2.1.9 In the event that works for which Section 61 consent has been applied for have to be rescheduled or modified (e.g. method or working hours) for reasons not envisaged at the time of submitting the Section 61 consent application, the contractor will apply for a dispensation or variation from the appropriate local authority, before commencing those works, at the time specified within the *Control of Pollution Act 1974.*

2.1.10 The dispensation will be sought by means of an application to vary the agreed matters, setting out the revised construction programme or method and the relevant noise calculations.

2.2 Noise insulation and temporary re-housing policy

2.2.1 Highways England/employer's representative will implement a noise insulation and temporary rehousing policy. The policy is intended to provide additional protection to residents in the event that it is not practicable to mitigate airborne noise, or reduce their exposure to it, to levels that are tolerable during certain intensive construction phases.

2.2.2 The contractor will submit a noise insulation/temporary rehousing appraisal at least six[6] months prior to starting that phase of work on site or such time appropriate to the scale and nature of the works. It is essential that the assessment is carried out early enough so that noise insulation can be installed before the start of the works predicted to exceed noise insulation or temporary re-housing criteria.

[6] Where noise insulation is potentially required at a listed building the appraisal shall be submitted at least nine months prior to starting of the phase of work on site.

2.2.3 Typically, a noise insulation package will include secondary glazing, an alternative method of ventilation and, on certain aspects, venetian blinds.

2.2.4 The contractor will use BPM to minimise the extent to which noise insulation work or temporary re-housing of occupiers of dwellings adjacent to the works needs to be considered.

2.2.5 Notwithstanding the measures set out in this NVMP and any Section 61 consents, noise insulation or temporary re-housing will be offered to qualifying parties when:

- noise levels are predicted or measured by the contractor to exceed the relevant trigger level defined in Table 2-1 at that property for at least ten days out of any period of fifteen consecutive days or alternatively 40 days in any six month period;
- the property complies with all other requirements of the *Noise Insulation (Amendment) Regulations 1988*;
- the property is lawfully occupied as a permanent dwelling; and
- in respect of insulation, noise insulation does not already exist that is of an equivalent standard to that which would be allowed for under the *Noise Insulation (Amendment) Regulations 1988*.

Table 2-1 Noise thresholds for noise insulation/temporary re-housing

Day	Time (hrs)	Average period (T)	Noise insulation trigger level $L_{pAeq,T}$(dB)*/**	Temporary re-housing trigger level $L_{pAeq,T}$(dB)*/**
Monday-Friday	07:00-08:00	1 hr	70	80
	08:00-18:00	10 hrs	75	85
	18:00-19:00	1 hr	70	80
	19:00-22:00	1 hr	65	75
Saturday	07:00-08:00	1 hr	70	80
	08:00-13:00	5 hrs	75	85
	13:00-14:00	1 hr	70	80
	14:00-22:00	1 hr	65	75
Sunday and public holidays	07:00-22:00	1 hr	65	75
Any day	22:00-07:00	1 hr	55	65

*Proposed Scheme construction sound only. Trigger levels are defined as 1m in front of the closest facade of a habitable room.

**Where the current ambient noise level is greater than the noise insulation trigger level:

a) the ambient noise level shall be used as the noise insulation trigger level, and

b) the ambient noise level +10dB shall be used as the temporary rehousing trigger level.

2.2.6 Highways England/employer's representative will develop and seek to agree with local authorities a noise insulation and temporary rehousing policy that will set out all roles, responsibilities and actions required in respect of these measures.

2.2.7 Highways England/employer's representative will consider at its discretion applications supported by evidence for noise insulation or temporary rehousing from occupiers who may have special circumstances. Special circumstances could include night workers, those working in home occupations, local businesses or buildings that provide community facilities requiring a particularly quiet environment and those with a medical condition which will be seriously aggravated by construction noise, and provide noise insulation or temporary rehousing where it is demonstrated that this is necessary.

2.3 Vibration thresholds and actions

2.3.1 Criteria and/or procedures for vibration control are specified for three purposes and assessed using three different sets of parameters:

- To protect the occupants and users of buildings from disturbance, for which vibration dose values are assessed (vibration dose values (VDVs) are defined and their application to occupants of buildings is discussed in *BS 6472- 1 Guide to evaluation of human exposure to vibration in buildings – vibration sources other than blasting, 2008*);
- To protect buildings from risk of physical damage, for which peak component particle velocities are assessed in accordance with *BS 7385-2 Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration, 1993*; and
- To protect particularly vibration-sensitive equipment and processes from damage or disruption, for which peak component acceleration, velocity or displacement are assessed as appropriate to each process or item of equipment.

2.3.2 In some buildings, two or three of the above parameters may apply, and in those cases Highways England will require its contractor to evaluate the criteria separately. In establishing criteria, controls and working methods, the contractor will take account of guidance in *BS 6472-1 Guide to evaluation of human exposure to vibration in buildings – Part 1: Vibration sources other than blasting 2008*: BS 5228 – 1 and BS 5228 – 2, *ISO 4866: Mechanical vibration and shock, vibration of fixed structures. Guidelines for the measurement of vibrations and evaluation of their effects on structures* and *BS 7385- 2 Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from groundborne vibration 1993.*

2.3.3 In the following sections vibration thresholds are set out. The thresholds are trigger levels at which a set of actions will be carried out by the contractor. Except where stated otherwise, they are not designed to be maximum permitted levels.

Protection of building occupants from disturbance

2.3.4 To protect the occupants and users of buildings from disturbance, BPM will be used by the contractor to control vibration levels so that the vibration dose values in Table 2-2, as measured in accordance with *BS6472-1 Guide to evaluation of human exposure to vibration in buildings – Part 1: Vibration sources other than blasting* (2008) are not routinely exceeded (considered to be ten days in any 15 consecutive days) as a result of the works.

Table 2-2 Vibration trigger levels for protection of occupants of buildings from disturbance[7]

Building type	Time (hrs)	VDV ($ms^{-1.75}$)
Eligible dwellings[8]	07:00-23:00	0.4
	23:00-07:00	0.2

[7] Based upon the professional judgement of suitably qualified and experienced specialists, as listed in Appendix 11 Competent expert evidence.
[8] Measured on a normally-loaded floor of any bedroom or living room. For this purpose, eligible dwellings include dwelling houses, residential institutions, hotels, and residential hostels.

Education buildings, offices and similar[9]	Over normal period of use (daytime)	0.8
Commercial[10]	Over normal period of use (daytime)	1.6

2.3.5 The vibration thresholds in Table 2-3 will be weighted in accordance with BS6472-1 Guide to evaluation of human exposure to vibration in buildings – Part 1: Vibration sources other than blasting, 2008.

2.3.6 For application of threshold levels, it will be assumed that people are standing or sitting during daytime, and lying down during night-time hours as defined in the table.

2.3.7 The orientation of the person is important as it determines the vibration weighting factor to be applied.

2.3.8 When considering human response to vibration BS 5228 – 2 provides other guidance levels in terms of peak particle velocity (PPV), which are presented in Table 2-3. Where information is not available to complete an assessment against the trigger levels in Table 2-2, an assessment shall be undertaken using the guidance in BS5228-2.

Table 2-3 Guidance on effects of vibration levels[11]

Vibration level[12] [13] [14]	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 mm/s	Vibration might be just perceptible in residential environments.
1.0 mm/s	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10 mm/s	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments.

2.3.9 Temporary respite will be provided by the contractor if the following levels are triggered (using the same temporal scope as the noise insulation and temporary rehousing policy):

- The predicted or measured vibration exceeds the following trigger values set at the centre of any floor inside the property (highest vibration):

[9] Measured on a normally-loaded floor of areas where people normally work. This category of receiver will include all areas where clerical work meetings and consultations are regularly carried out (e.g. Doctors' surgeries, day-care centres but not shop floors of industrial premises).
[10] Measured on a normally-loaded floor of areas where people normally work. Commercial premises include retail and wholesale shops.
[11] Based upon the professional judgement of suitably qualified and experienced specialists, as listed in Volume 6 Document Ref 6.4 Appendix 11 Compentent expert evidence.
[12] The magnitudes of the values presented apply to a measurement position that is representative of the point of entry into the recipient.
[13] A transfer function (which relates an external level to an internal level) needs to be applied if only external measurements are available.
[14] 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.

  - Daytime (7am to 11pm): a vibration dose value (VDV_b) of 0.8ms$^{-1.75}$; and
  - Night-time (11pm to 7am): a vibration dose value (VDV_b) of 0.4ms$^{-1.75}$.
- The predicted or measured groundborne noise exceeds as 45 dB L_{ASmax} measured near, but not at, the centre of any room in a property.
- The predicted or measured groundborne noise or vibration exceeds the relevant trigger value for a period exceeding one day.

2.3.10 Details of the temporary respite process will be included within the noise insulation and temporary rehousing policy.

Protection of buildings from damage

2.3.11 To protect buildings from damage, Highways England/employer's representative will require its contractor to use BPM to control vibration levels so that the peak particle velocity (PPV) in Table 2-4, as measured in accordance with *BS6472-1 Guide to evaluation of human exposure to vibration in buildings – Part 1: Vibration sources other than blasting 2008*, are not exceeded as a result of the works at the building foundation unless agreement is sought from the local authority.

Table 2-4 Vibration trigger levels for building damage15

Category of building	Impact criteria: (PPV at building foundation)	
	Transient vibration	Continuous vibration
Structurally sound buildings	≥12 mm/s	≥6 mm/s
Potentially vulnerable buildings	≥6 mm/s	≥3 mm/s

2.3.12 To determine whether a detailed assessment needs to be undertaken or whether the levels in Table 2-4 are likely to be exceeded, or whether there is a potential for building damage, the contractor will carry out a scoping vibration assessment. Activities requiring an assessment could include vibratory compaction, impact or vibratory piling and other driven processes.

2.3.13 If predicted vibration levels exceed 1mm/s component PPV at occupied residential buildings or 3mm/s PPV at occupied commercial buildings more detailed assessment should be carried out in accordance with *BS 7385-2 Evaluation and measurement for* vibration *in* buildings – *Part 2: Guide to damage levels from groundborne vibration 1993*. If this identifies that people occupying buildings may experience levels in excess of the threshold values in Table 2-4 those potentially affected will be notified as soon as practicably possible in advance of the works. The notification will describe the nature and duration of the works and any associated proposals for vibration monitoring.

2.3.14 Highways England/employer's representative will require its contractor to be cognisant of the advice given in BS ISO 4866 Mechanical vibration and shock, vibration of fixed structures. Guidelines for the measurement of vibrations and evaluation of their effects on structures and BS 7385-2 Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from groundborne vibration 1993.

[15] Based upon the professional judgement of suitably qualified and experienced specialists, as listed in Volume 6 Document Ref 6.4 Appendix 11 Compentent expert evidence. .

2.3.15 Highways England/employer's representative will require its contractor to notify and consult it and the relevant local authority regarding any works predicted to generate a PPV above 10mm/s. Where it is agreed that there is no reasonable or practicable means to reduce predicted or measured vibration then the contractor will:

- Agree with Highways England/employer's representative and seek to agree with the local authority under the relevant Section 61 consent(s), monitoring for vibration and strain induced in the building during the works;
- Seek to agree with occupiers of properties;
- The surveys to be carried out and any consequent actions;
- Any additional reasonable and practicable mitigation to be provided for occupants;
- Carry out a condition survey before and after the relevant works; and
- Advise the local authority through the relevant Section 61 consent application.

2.3.16 In addition, any old buildings, or buildings that may be unusually vulnerable to vibration, that are located within 50m of any activities that may give rise to significant vibration shall be identified.

2.3.17 Where the predicted vibration at the foundations of such buildings exceeds 5mm/s PPV then Highways England/employer's representative will require its contractor to undertake an initial structural survey of the building. Based on the survey, the level of vibration above which condition surveys and continuous vibration monitoring are required will be confirmed and agreed with the building owner. The local authority will be notified through the relevant Section 61 consent application.

2.3.18 Where the condition and vibration monitoring surveys demonstrate that vibration from the works has given rise to building damage then Highways England/employer's representative will require its contractor to make good that damage.

Protection of particularly vibration-sensitive equipment/processes

2.3.19 The contractor will endeavour to avoid any impact on sensitive equipment. Any actions to control or mitigate impacts will be agreed between its contractors and the operator of the equipment. The local authority will be notified through the relevant Section 61 consent application.

2.4 Monitoring

2.4.1 Monitoring will include physical measurements and observational checks/audits.

2.4.2 The contractor will undertake and report noise and vibration monitoring, including real time noise and vibration monitoring, as is necessary to ensure and demonstrate compliance with all noise and vibration commitments, the requirements of this Outline CEMP and any Section 61 consent(s).

2.4.3 Regular on site observation monitoring and checks/audits will be undertaken to ensure that BPM is being employed at all times. The site reviews will be logged and any remedial actions recorded. Such checks will include:

- hours of working;

- presence of mitigation measures, equipment (engines doors closed, airlines not leaking, etc.) and screening (location and condition of local screening, etc.);
- number and type of plant;
- construction method; and
- where applicable, any specific Section 61 consent conditions.

2.4.4 The monitoring and compliance assurance process will be set out in the contractors' noise and vibration management plan, as part of their CEMP.

2.4.5 The Section 61 applications will include a detailed description of the monitoring and monitoring locations proposed for the particular works covered by the consent application.

2.5 Example application form for Section 61

CONTROL OF POLLUTION ACT 1974

EXAMPLE APPLICATION FORM FOR SCTION 61 CONSENT

To be developed further (with explanatory notes) in consultation with the relevant local authorities

Submission No:	
Local Authority Reference	

To the[1]

I/WE HEREBY MAKE APPLICATION for prior consent in respect of works to be carried out on the [construction] site(s) specified below, under section 61 of the Control of Pollution Act 1974.

Signed[2] ……

Date ……

Name and address of applicant[2]

(in block letters please)

……
……

Telephone No: ……..

email: ……

[1] Insert name of Local Authority

[2] Where application made by a Company the signature of a Director or the Company Secretary and the address should be the Company's registered office.

(Note: Supplementary sheets should be used for fuller descriptions and additional information as required)

Address or location of proposed works	
Name and address contractor Telephone No.	
Particulars of works to be carried out	
Methods to be used in each stage of development	
Hours of Work	
Number, type and make of plant and machinery (including heavy vehicles) stating Sound Power Levels	

Proposed steps to manage noise and vibration	
Predicted noise levels	
Approximate duration of works	
Site plan (attached, yes/no)	
Other Information	
List of Plans and documents attached	

Annex L: Outline Air Quality Management Plan

1 Introduction

1.1 Purpose

1.1.1 The purpose of the Outline Air Quality Management Plan (AQMP) is to set out the management of dust, air pollution, odour and exhaust emissions during the construction works. The contractor will manage dust, air pollution, odour and exhaust emissions in accordance with best practicable means (BPM), which include the following:

- reference to the general site management and good housekeeping procedures (relevant to limiting dust and air pollution);
- controls and measures to control or mitigate the effect of potential adverse effects caused by the construction works; and
- dust and air pollution monitoring measures to be employed during construction of the project.

1.2 Structure and Scope of the Outline Air Quality Management Plan

1.2.1 This is an outline AQMP which will be developed by the contractor as the detailed design progresses.

1.2.2 The scope of the plan will comprise:

- Best practical means for site management;
- Measures to limit emissions from construction plant and vehicles
- Measures to limit pollution from transportation, storage and handling of materials;
- Measures to manage dust from Haul roads;
- Measures to limit dust pollution from demolition activities
- Measures to limit dust pollution from excavations and earthworks activities
- Measures to limit dust pollution from drilling activities; and
- Measures to limit dust pollution from processing, crushing, cutting and grinding activities.

1.3 Responsibilities

Table 1-1 Annex L Responsibilities details

Name	Position/Responsibilities	Contact Details
	Highways England Project Manager	
	Site Manager	
	Contractor Environmental Manager	

2 Air Quality Management

2.1 Legislation and guidance

2.1.1 The contractor will reference, as appropriate, national/industry standards and codes of best practice and guidance when developing the AQMP including the following:

- Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites - Institute of Air Quality Management (IAQM, 2012);
- Guidance on the assessment of dust from demolition and construction - Institute of Air Quality Management (IAQM, 2014); and
- Statutory Process Guidance Notes PG3/01(12), PG3/08(12) and PG3/16(12).

2.2 Site management

2.2.1 Obligations for the contractors in relation to using best practicable means to prevent or counteract the effects of any nuisance are set out below.

2.2.2 The contractor will plan the site layout to locate machinery and dust-causing activities away from sensitive receptors, where reasonably practicable. The contractor will also use appropriate methods, such as the erection of hoardings or other barriers along the site boundary, where appropriate, to mitigate the spread of dust to any sensitive buildings or other environmental receptors.

2.3 Construction plant and vehicles

2.3.1 Measures will be implemented by the contractor to limit emissions from construction plant and vehicles, including the following, as appropriate:

- The contractor will operate construction plant in accordance with the manufacturer's written recommendations;
- All vehicles and plant will be switched off when not in use;
- Vehicle and construction plant exhausts should be directed away from the ground and be positioned at a height to facilitate appropriate dispersal of exhaust emissions;
- On plant likely to generate excessive quantities of dust beyond the site boundaries, enclosing, shielding or provision of filters will be employed. Items such as dust extractors, filters and collectors on drilling rigs and silos will be used;
- The movement of construction traffic around the site will be kept to the minimum reasonable for the effective and efficient operation of the site and construction of the scheme;
- Construction plant will be located away from site boundaries which are close to sensitive receptors where reasonable and practicable;
- Site access points will be designed to avoid queuing traffic;
- The use of diesel or petrol powered generators will be reduced by using mains electricity or battery powered equipment where reasonable and practicable;
- All non-road mobile machinery will use ultra-low sulphur tax exempt diesel where available and machinery with power outputs of over 37kW will be fitted with appropriate exhaust after-treatment from approved Energy Saving Trust list (achieving filtration efficiency of over 85%);

- Cutting and grinding operations will be conducted using equipment and techniques which incorporate appropriate dust suppression measures; and
- Vehicle, plant and equipment maintenance records will be kept on site and these will be made available to the employer's representative upon request.

2.4 Transportation, storage and handling of materials

2.4.1 Measures will be implemented by the contractor to limit pollution due to the transportation and storage of materials, including the following, as appropriate:

- Materials deliveries or loads entering and leaving the construction site will be covered by a fixed cover or sheeting appropriately fixed and suitable for the purposes of preventing materials and dust spillage. This will apply to the transport of materials by road, rail or waterway;
- Vehicles transporting materials within or outside the construction site will not be overloaded;
- Stockpiles and mounds will be kept away from sensitive receptors, watercourses and surface drains and sited to take into account the predominant wind direction;
- Stockpiles and mounds will be at a suitable angle of repose and avoid sharp changes in shape to prevent material slippage;
- Materials stockpiles will be enclosed or securely sheeted or kept watered by the contractor;
- Surfaces of long-term stockpiles, which give rise to a risk of dust or air pollution, will be stabilised or be covered with appropriate sheeting;
- Fine dry material will be stored inside buildings or enclosures;
- Mixing of large quantities of concrete or bentonite slurries will be undertaken in enclosed or shielded areas;
- The number of handling operations for materials will be kept to the minimum practicable;
- Materials handling areas will be maintained to constrain dust emissions and appropriate measures such as watering undertaken to reduce or prevent escape of dust from the site boundaries; and
- Mixing of grout or cement-based materials will be undertaken using a process suitable for the prevention of dust emissions.

2.5 Haul routes

2.5.1 Haul routes will be provided on site by the contractor for use by construction vehicles to access works areas. The construction and maintenance of haul routes will include the following measures, as appropriate:

- The maintenance of haul routes to control dust emissions as far as reasonably practicable, taking into account the contractors intended level of traffic movements;
- Inspection of haul routes regularly and their prompt repair if required;
- Reuse of haul route materials where the locations of haul routes change during the course of construction;
- Provision of areas of hard-standing at site access and egress points to be used by any waiting vehicles;
- Methods to clean and suppress dust on haul routes (including watering) and in designated vehicle waiting areas. The frequency of cleaning will be suitable for the purposes of suppressing dust emissions from the site boundaries; and

- Enforcement of speed limits on haul routes for safety reasons and for the purposes of suppressing dust emissions.

2.6 Demolition activities

2.6.1 Measures to limit dust pollution from demolition activities will be implemented by the contractor through the use of the following measures, as appropriate:

- The contractor will spray any buildings or structures to be demolished with water prior to and during demolition;
- Appropriate screening of buildings or structures to be demolished will be used;
- Waste chutes will be shielded and skips covered and secured; and
- Where reasonable, the contractor will avoid prolonged storage of waste materials on site.

2.7 Excavations and earthworks activities

2.7.1 Measures by the contractor to limit dust pollution from excavations and earthworks activities will include the following, as appropriate:

- Topsoil will be stripped as close as reasonably practicable to the period of excavation or other earthworks activities to avoid risks associated with run-off or dust generation;
- Drop heights from excavators to vehicles involved in the transport of excavated material will be kept to the minimum practicable to control dust generation associated with the fall of materials;
- Suppressing dust emissions by spraying with water or using other appropriate measures;
- Compacting deposited materials, with the exception of topsoil, as soon as possible after deposition; and
- Soiling, seeding, planting or sealing of completed earthworks will be undertaken by the contractor as soon as reasonably practicable following completion of the earthworks.

2.8 Drilling activities

2.8.1 Measures by the contractor to limit dust pollution associated with drilling activities will include the following, as appropriate:

- On plant likely to generate excessive quantities of dust beyond the site boundaries measures such as enclosing, shielding or provision of filters will be employed. Items such as dust extractors, filters and collectors on drilling rigs and silos will be used, as appropriate;
- Where appropriate dust will be extracted at source to prevent exposure of workers to excessive dust inhalation;
- Where drilling is used for the purposes of excavating within rock, the exposed surfaces will be watered to limit dust emissions as necessary;
- Materials used such as cements or pulverised fuel ash, will be stored in accordance with the requirements of for materials storage to prevent them becoming an airborne hazard; and
- Mixing of grout or cement based materials will be undertaken using a process suitable for the prevention, as far as reasonably practicable, of dust emissions.

2.9 Processing, crushing, cutting and grinding activities

2.9.1 Appropriate measures will be used by the contractor for any processing, crushing, cutting and grinding activities as required to limit dust pollution. Permits will be sought for concrete crushing and batching plant operations as required.

2.10 Monitoring

2.10.1 The contractor will implement inspection and monitoring procedures to assess the effectiveness of measures to prevent dust and air pollutant emissions. Relevant local authorities will be consulted regarding the monitoring procedures to be implemented which will include the following measures, as appropriate:

- Site inspections covering the establishment of operation of the construction site.
- Inspection procedures for areas adjacent to the construction site to visually assess any dust and air pollution which may be generated.
- Reference to inspection and maintenance schedules for construction vehicles, plant and machinery.
- Inspection procedures relating to the level of trafficking, use and condition of haul routes.

Annex M: Public Rights of Way Management Plan

1 Introduction

1.1 Purpose

1.1.1 As with any linear infrastructure scheme of this size/nature, the scheme interacts with a number of Public Rights of Way (PRoW) and this document presents Highway England's approach to managing these interactions during both the construction and operational phases of the scheme.

1.2 Structure and Scope of the Outline Public Rights of Way Management Plan

1.2.1 The Public Rights of Way Management Plan includes:

- A description of the method of identifying the PRoWs, local routes and associated surveys that were carried out on them alongside relevant stakeholder engagement exercises (Section 2); and
- A list of the PRoWs and a description of the management plan for PRoWs affected. It then lists the local routes and described the management plan for the local routes affected (Section 3).

1.3 Responsibilities

Table 1-1 Annex M Responsibilities details

Name	Position/Responsibilities	Contact Details
	Highways England Project Manager	
	Site Manager	
	Contractor Environmental Manager	
	Local Authority PRoW Officer	

1.4 Public Rights of Way

1.4.1 For the purpose of this document, a Public Right of Way (PRoW) is defined as one of the following[16]:

- a footpath, being a Highway over which the public have a right of way on foot only and which is not a footway[17];
- a bridleway, being a Highway over which the public have a right of way on foot and on horseback or leading a horse (horse is taken to include pony, ass or mule), and by pedal cycle[18];
- a cycle track, being a way over which the public has the right of way by pedal cycle (with or without a right of way on foot);

[16] Definitions follow those created in Section 329 of the Highways Act 1980 except for a byway open to all traffic
[17] A footway is a way over which the public have a right of way on foot only alongside a carriageway over which the public have a right of way for the passage of vehicles
[18] The Countryside Act 1968 permits this but does not impose an obligation for the highway authority to facilitate its use by pedal cycles (for example by providing a suitable surface

- a byway open to all traffic (BOAT), being a way over which the public have the right of way on foot, horseback etc., pedal cycle or motor vehicle but over which the Highway Authority has no obligation to provide a surface suitable for the passage of vehicles[19]; and
- a restricted byway, being a way over which the public have the right of way on foot, horseback etc. and pedal cycle.[20]

1.4.2 In the area covered by the proposed development the majority of PRoWs are bridleways, with a small number of footpaths and byways. The type of PRoW is identified in the first column of Table 2-1 below.

1.5 Local Routes

1.5.1 For the purposes of this document, a local route is a footpath, cycle track or bridleway that is not a designated route with a public right of way over it, but is one that has been identified as being of local value to walkers, cyclists and horse-riders.

1.5.2 These include routes signed as 'quiet lanes'[21] and/or routes identified through stakeholder engagement as having a local value as a recreational resource.

1.6 Assumptions made in this document

1.6.1 PRoWs would only be stopped up without a substitute provided where unavoidable and/or where they are considered to have limited or low value to access and/or recreation when taking into account their remaining length, destination or usage.

1.6.2 For PRoWs, where they are to be stopped up for construction and subsequently reinstated, a condition survey would help ensure that any reinstated route would be of similar or better quality. For new or diverted routes, it is assumed that the condition would be the same or better than that stopped up.

1.6.3 For local routes, they have been identified and considered as part of a Walking, Cycling and Horse-riding Assessment and Review, undertaken in accordance with the Design Manual for Roads and Bridges (DMRB). Those documents have helped inform the design development but do not form part of the DCO application. Within this document, local routes are considered given their local value as part of the wider access and recreational network. It is assumed that local routes are permissive by nature, with no legal or public right of way. Therefore, should a landowner decide to restrict access across their land to walkers, cyclists and horse-riders, the use or nature of the identified local routes may change.

1.6.4 This document includes reference to local routes where they currently interact with the A30 in order to identify how they will be managed or diverted during construction and operation of the proposed scheme.

[19] As defined in the Countryside and Rights of Way Act 2000
[20] As defined in the Countryside and Rights of Way Act 2000
[21] Defined in Cornwall's Traffic Engineering Manual (Cornwall Council April 2008) as "Minor rural roads which have been treated appropriately to enable shared use by cyclists, walkers, horse riders and motorised users".

1.7 This Document

1.7.1 In relation to PRoWs, the works summarised above require:

- Permanent extinguishment/stopping-up of PRoW (or sections of); and/or
- Diversion/re-provision of PRoW to enable continued access; and/or
- Temporary stopping-up and/or diversions during the construction stage to provide access to the works and safeguard PRoW users.

1.7.2 Given the nature of the proposed highway scheme, the majority of PRoWs that interact with the route and its works will be permanently extinguished with a new PRoW provided (e.g. via a new overbridge/underbridge). There are small sections of the existing PRoW network which will be extinguished without re-provision.

1.7.3 In addition, the proposals include some new sections of PRoW, which make use of new side roads or private means of access in an attempt to better connect the existing PRoW network.

1.7.4 This PRoW Management Plan has been prepared to support the Development Consent Order (DCO) application by demonstrating a planned approach to the management of PRoWs during the construction and operation of the proposed development, helping to ensure public safety while minimising disruption to users.

1.7.5 The DCO for the proposed development grants all necessary powers to extinguish/stop up, alter or divert PRoWs affected by the proposed development as specified in the relevant Schedule of the DCO.

2 Method

2.1 Identification of PRoW/Local Routes

2.1.1 PRoW mapping data[22] was provided by Cornwall Council (Cornwall Council) and has been taken to represent the definitive record of PRoW in the study area. PRoW potentially affected by the proposed development were identified through examination of this data and site walkover work undertaken by the consultant team.

2.1.2 In addition to the definitive PRoW network a number of local routes have been identified through both site work (e.g. picking up signed cycle routes), review of the National Cycle Network (NCN) map and through workshops and consultation events that have highlighted a number of routes used and valued by local people and groups (e.g. walking and cycling groups).

2.2 Surveys and Assessments

2.2.1 As part of the Walking, Cycling and Horse-Riding Assessment Report, surveys were undertaken at 13 locations along the A30 corridor at crossing points such as overbridges or at key junctions. These surveys were carried out over three days, Friday-Sunday, 25-27 August 2017 between 7am and 7pm and recorded walking, cycling and horse-riding movements.

[22] https://www.cornwall.gov.uk/environment-and-planning/countryside/public-rights-of-way/public-rights-of-way-interactive-mapping/ and https://www.cornwall.gov.uk/environment-and-planning/countryside/public-rights-of-way/definitive-map-and-statement/viewing-cornwalls-definitive-map-online/

2.2.2 In addition, and as part of their grading system for Gold, Silver and Bronze PRoWs, Cornwall Council has undertaken their own surveys of PRoW in the study area. This includes information and criteria about the use, accessibility, connections to promoted national or regional trails, links to settlements and links to tourism attractions and public transport.

2.2.3 The results of the site surveys and Cornwall Council data and advice has helped inform an appraisal of the value of PRoW and local routes. In turn, this has helped inform the proposed approach to management of those routes during construction and operation in relation to the proposed A30 scheme.

2.2.4 Part of the context for the appraisal of PRoW and local routes also includes transport data. In particular, accident and traffic data has been collected, which shows:

- On average, more than 44,000 vehicles use the A30 between Chiverton and Carland Cross every day, with insignificant variation between the AM, PM and Inter Peak period – suggesting traffic volumes are relatively similar across the day.
- Average daily traffic flows over a year show peak months in July and August, which coincides with an increase in tourists visiting Cornwall in the summer.
- The latest accident data we have for 1 January 2012 to 31 December 2016 shows there were 111 accidents between Chiverton and Carland Cross, of these there was one fatality, 17 serious collisions and 93 slight collisions.
- Police records attribute two of those accidents involving cyclists and one involving a pedestrian only.
- With the scheme in place, the existing A30 would be much more attractive to walking, cycling and horse-riding. The upper bound percentage forecast reduction in traffic in any direction along any section of the A30 Chiverton to Carland Cross is 97%[23]. (i.e. up to 97% of traffic would transfer onto the new route, making the existing A30 significantly less trafficked).
- The average forecast peak period traffic flows on local roads near the A30 as a result of the scheme, show a reduction. The upper bound percentage forecast reduction in traffic in any direction along any local roads in the vicinity of the A30 is 40%[24]. (i.e. traffic on local roads would reduce by up to 40%, making the local roads less trafficked).
- By 2038 with forecast traffic growth, there would be up to an average 9 minute journey time saving between Chiverton and Carland Cross as a result of the scheme[25].

[23] Maximum forecast reduction occurs westbound along the existing A30 between Chybucca and Marazanvose between 2023 do minimum and 2023 do something model results

[24] Forecast traffic flows on some local roads could see reductions by up to 38% by 2023, and 40% by 2038.
The maximum reduction applies to the A390 between Chiverton and Threemilestone westbound in the PM peak: with 488 less vehicles in 2023 and 520 less vehicles in 2038. NB: Whilst the majority of local roads would benefit from the scheme, traffic flows on some local roads will increase (e.g. on the B3284 through Shortlanesend where traffic could increase by 51% in the peaks in 2023.

[25] Forecast journey times show that there could be up 5m46s savings in average journey time in 2023 (WB, AM peak), rising to up to 8m50s saving in average journey time savings by 2038 (EB, PM peak) between Chiverton and Carland Cross

2.3 Stakeholder Engagement

2.3.1 Prior to the current project and its associated DCO application (and associated work), public engagement exercises took place in March 2015 to raise awareness of the need for the project. It aimed to help manage expectation on when detailed proposals would be available for public comment as well as highlighting the timescales required in the delivery of the Scheme. Some of the findings of the associated public engagement exhibitions included a lack of provision for non-motorised users due to the A30 severing inter-urban cycle trips. Furthermore, 58.8% of attendees suggested they would be interested in an improved cycle network in the study area. A full report on the engagement exercise provides the early engagement findings[26].

2.3.2 Following an optioneering stage, a significant amount of consultation has been undertaken to help develop the preferred route and its opportunities in relation to walkers, cyclists and horse-riders (previously referred to as Non-Motorised Users (NMUs)). This has included:

- A workshop on 10 November 2015 focussed on cycling;
- A Non-Motorised User workshop held on 12 April 2016;
- A cycling stakeholder meeting held on 10 November 2016;
- A public consultation in from 15 October to 2 December 2016;
- A cycling workshop held on 17 December 2017;
- A walking and horse-riding workshop held on 17 December 2017;
- A statutory consultation on the proposed scheme between 29 January and 12 March 2018; and
- A focused meeting with Cornwall Council Countryside Access officers held on 11 May 2018;
- A further focused cycling workshop held on 24 May 2018.

2.3.3 Those who have been engaged in the project as part of the above activities, include representatives from:

- Cornwall Countryside Access Team;
- Cornwall Countryside Access Forum;
- Cornwall Ramblers;
- Cornwall Council Transport and Infrastructure;
- Highways England and its Walking, Cycling & Horse-Riding Assessors;
- Cycling UK;
- Truro Cycle Campaign;
- Aggie Cycles;
- Truro Cycling Club;
- Sustrans; and
- The British Horse Society.

[26] http://assets.highways.gov.uk/roads/road-projects/A30+Carland+Cross/file+transfer+from+Cornwall+Coucil/01-edg0769-public-engagement-report-final-23-07-15.pdf

2.3.4 The walking, cycling and horse riding meetings and workshops held, although not specific to the PRoW network, have raised a number of issues and opportunities, including in summary:

- Concerns were raised that the proposed scheme could make the existing severance experienced along the A30 worse.
- The expressway standard and prohibition orders would restrict access for cyclists on the proposed scheme. Some considered this would be an inconvenience for cyclists on long distance routes along the A30.
- The de-trunking of the existing A30, which would be reclassified with the proposed scheme, would result in a significant reduction in traffic compared to existing levels. Those conditions would be attractive to cyclists who could continue to use the existing A30 route and would benefit from the reduction in vehicles using the route.
- Some concerns were raised that vehicles leaving the new A30 and joining the old A30 could maintain high speeds with less traffic using it, potentially posing a safety risk for other users. It was however noted that the existing cycling movements typically involve north-south crossings of the A30 corridor, rather than east-west movements along the A30 corridor.
- Chiverton Cross junction is perceived to be an important commuter route between St Agnes and Truro although counts at Chiverton Cross have previously suggested that this is not heavily used.
- A crossing at Chiverton Cross could link into the cycle improvements on the A390 on the western approach to Truro.
- There is no significant desire line at Church Lane, Zelah although a facility is proposed there as part of the scheme options. Cycling is often faster on that route when compared to driving.
- Facilities for pedestrians and horse-riders could be provided at Chybucca junction.
- Any stopping up of routes at Nancarrow could result in a long diversion. Commuters use those routes to cycle to Truro via Shortlanesend. The absence of any north-south link at Nancarrow could cause an objection.
- North of Chybucca junction there is a section of path that is regularly used although not formally designated as a PRoW where it could be advantageous to link two sections of existing bridleway to create a circular route.
- The bridleway south of Tresawen could link through to the underbridge or be removed entirely or linked to another route. It was suggested that stopping up bridleways could lead to objections, and that the British Horse Society would likely support an additional link.
- A short section of footpath could be stopped up just south of the Trevalso underbridge and it was agreed that this makes sense, as it is not possible to use the footpath whilst a Trevalso underbridge provides an alternative connection.
- Where the junction between the A30 and quiet lanes (east of Penny-come-Quick) could be stopped up, a new section could be added between the two quiet lanes to provide continuation of the through-route.

2.3.5 As part of the scheme development, Highways England held a public consultation in from 15 October to 2 December 2016 to raise awareness and understanding of the need and rationale for the proposed improvements, obtain objective feedback to enable the scheme design to be refined and developed, and identify any opportunities to improve the proposal[27]. A consultation exercise outlined Highways England's strategic ambition to improve provision for walkers, cyclists and other users. An aim is to deliver an accessible and integrated network, which encourages the use of non-motorised modes of transport for commuting and social enjoyment. As such, the statutory consultation asked participants about their use and ambitions for those modes as part of the proposed A30 scheme.

2.3.6 Questionnaire responses have been reported in full[28], whilst a summary is provided below in relation to NMU travel.

2.3.7 There were 523 responses to its Question 4 'Have you previously travelled along or across this section of A30 by any of the following, and if so how often?'. Its associated Figure 3-10 clearly shows the limited number of non-motorised users travelling along or across this section of the A30. Cycling is the most popular mode of NMU travel with nearly 30 travelling along the A30 a week and 45 indicating they use the A30 on a bicycle once a year.

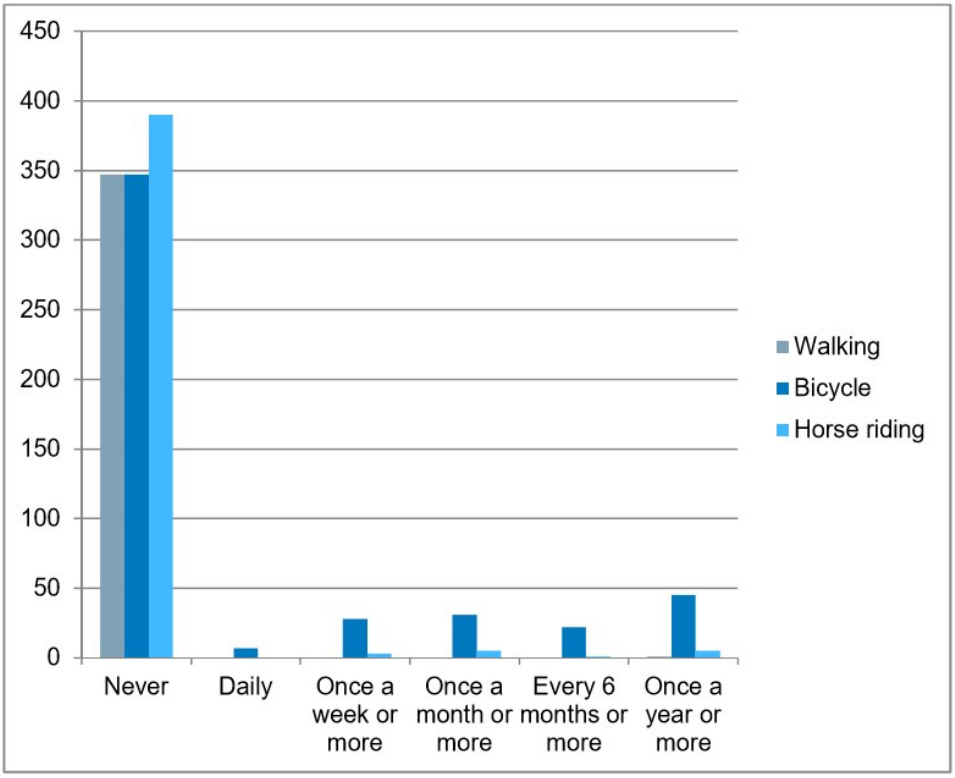


Figure 3-10: Question 4 - frequency of non-motorised travel.

2.3.8 The feedback also clarified that, of those who do cycle along or across this section of the A30, the majority live within 1 km of the scheme, demonstrating that local cycle routes are of some importance to the local area.

[27] https://highwaysengland.citizenspace.com/he/a30-chiverton-cross-to-carland-cross-statutory-con/
[28] https://highwaysengland.citizenspace.com/he/a30-chiverton-to-carland-cross-improvement-scheme/results/ropc-report-only.pdf

2.3.9 Of the 586 responded that answered Question 8 'Are there any improvements to these proposals that you would like to see for non-motorised users?', 70% felt that there were no improvements to the proposals for non-motorised users. Significantly more respondents living further from the scheme, elsewhere in Cornwall, felt that the proposals did not require NMU improvements, or did not answer the question. As shown in its Figure 3-12, this correlates with current NMU figures from Question 4, as described above.

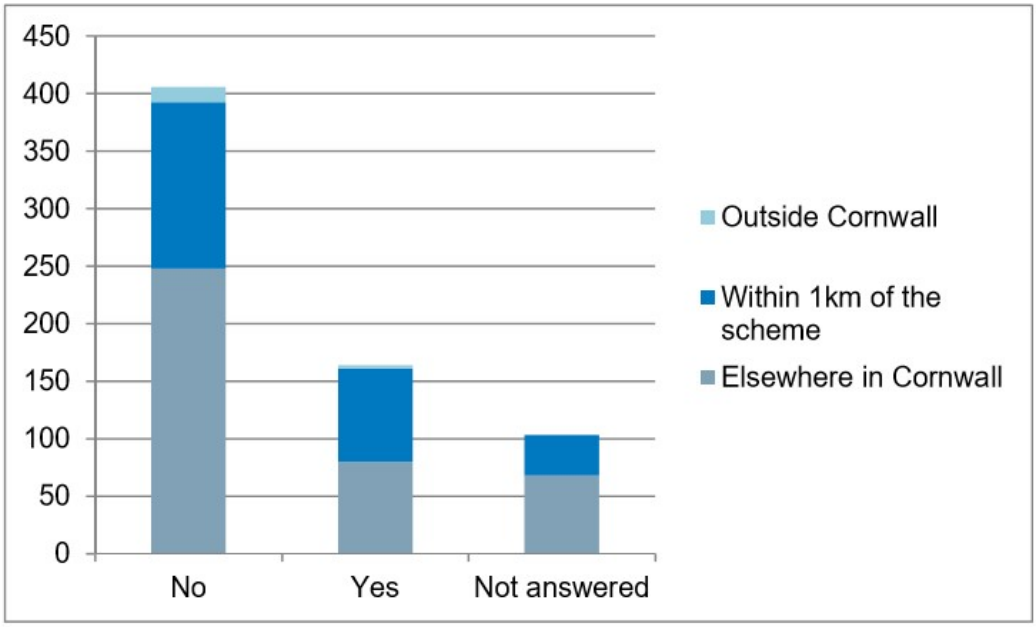


Figure 3-12: Compound bar chart for Question 8 showing whether people wanted to see improvements for non-motorised users.

2.3.10 However, the feedback does indicate that although there is little NMU use of the A30 at present, people do feel strongly about the prospect of being able to use the route more safely in the future when it is no longer a main trunk road. The emphasis on crossing the existing A30 indicated that there are other routes in the area that people are already using, or are in a mind to use, and feel that improvements can be made to make these other routes safer and more attractive.

2.3.11 The statutory consultation on the proposed scheme held between 29 January and 12 March 2018 did not seek feedback on walking, cycling and horse-riding in particular, but some comments did relate to those issues. For example, respondents submitted that:

- A lack of direct access across the A30 for motorists and NMUs will result in the severance of communities such as Blackwater, St Agnes, Silverwell and Chacewater.
- The construction of the A30 will act as a barrier to north/south travel within in Cornwall, severing community links and NMU connectivity.
- Additional underbridges should be constructed under new A30 to improve north/south connections, preserving community connectivity and the local road network.
- Public wellbeing, both physical and mental, would be improved by an increased provision of walking, cycling and horse riding infrastructure due to increased participation in physical activity.

2.3.12 Many of those issues and opportunities have been captured within the Walking, Cycling and Horse-Riding Assessment Report and Review Report[29], which have been undertaken as part of design development work in accordance with the relevant sections of the Design Manual for Roads and Bridges[30].

2.3.13 Specifically, in relation to the PRoW network and the DCO application, more focused consultation has since been undertaken with Cornwall Council's Open Space and Countryside and Access Teams. A meeting on 11 May 2018 was held in relation to proposals to consider the existing situation, potential impacts and how best to manage the PRoW network and local routes during both construction and operation of the proposed scheme.

2.3.14 Specifically, the meeting and associated discussions have considered an early draft of this PRoW Management Plan and the proposals have been refined and finalised as a result of that collaborative approach. There were no disagreements with the methodology or proposed management measures. Agreement is documented within the Statement of Common Ground (SoCG) with Cornwall Council[31].

2.4 Locations and Value

2.4.1 PRoW that intersect with the proposed scheme and are therefore affected by works are shown on the Figures in Annex M of this document and summarised in Table 2-1 below.

2.4.2 In total, the scheme has the potential to effect 17 PRoW as follows:

- 6 Byway Open to All Traffic (BOAT);
- 6 Bridleways; and
- 5 Footpaths

2.4.3 Cornwall Council has designated their PRoW in three categories (Gold, Silver or Bronze) according to their status and priority for attention[32]. They form the appropriate local maintenance priorities.[33]

2.4.4 Taking those categories and priorities into account, each PRoW has been assigned a sensitivity value accordingly. It should be noted that the Design Manual for Roads and Bridges categories (Very High, High, Medium, Low or Negligible) have been applied in the Environmental Impact Assessment. Taking both into account, professional judgement and engagement with Cornwall Council has informed decision making on appropriate sensitivities.

[29] ES Appendix 12.X
[30] See http://www.standardsforhighways.co.uk/ha/standards/dmrb/. Whilst the named DMRB Reports have helped inform this PRoW Management Plan that forms part of the DCO application, their scope extends beyond the PRoW and any local routes to which works require consents to be secured as part of the DCO.
[31] Submitted separately and as part of the DCO application
[32] https://www.cornwall.gov.uk/media/5830903/Cornwall-Council-Gold-Silver-and-Bronze-Criteria.pdf
[33] http://www.cornwall.gov.uk/environment-and-planning/countryside/public-rights-of-way/local-maintenance-partnership-lmp/

Table 2-1 Existing PRoW that interact with the scheme

PRoW	Location	Cornwall Designation	Assumed sensitivity for assessment
BOAT 309/25/2	West of Chiverton Cross, running east-west between BOAT 309/25/3 and BOAT 309/25/4	Gold	Medium
BOAT 309/25/3	West of Chiverton Cross roundabout and BOAT 309/25/2	Gold	Medium
BOAT 309/25/4	West of Chiverton Cross roundabout running north – south	Gold	Medium
BOAT 309/25/5	West of Chiverton Cross roundabout running between BOAT 309/25/4 and BOAT 309/25/3	Gold	Medium
BOAT 309/25/6	West of Chiverton Cross roundabout running north – south from BOAT 309/25/4	Gold	Medium
BOAT 309/25/7	West of Chiverton Cross roundabout running north – south from BOAT 309/25/6	Gold	Medium
Bridleway 314/64/1	North – south from B3284 to Callestick Vean where it connects to Footpath 314/64/2	Silver	Low
Bridleway 314/65/1	North – South from existing A30 on track leading to Creegmeor Farm	Silver	Low
Bridleway 309/3/1	North – South from existing A30 to the B2384	Silver	Low
Footpath 314/67/1	East west between the existing A30 and Lower Ventongimps	Silver	Low
Footpath 319/16/1	South west from the A30 at Marazanvose and east at NFH	Gold	Medium
Bridleway 319/9/1	North – south to Hill House prior to running parallel with the existing A30 before joining with Footpath 319/1/2 and Bridleway 319/1/1 south of the existing A30	Gold	Medium
Bridleway 319/1/1	East – west across the existing A30 via an overbridge between Zelah Lane Farm and Footpath 319/1/2	Gold	Medium
Footpath 319/1/2	Meets the A30 and Bridleways 319/1/1 and 319/9/1 opposite Zelah Lane Farm.	Gold	Medium
Footpath 319/12/1	East of the A30 adjacent to Trevalso Cottage	Bronze	Negligible
Footpath 319/11/1	East – west south of the existing A30 at Pennycomequick and north of Honeycombe Farm	Bronze	Negligible
Bridleway 321/14/2	North – south adjacent to the A39 south of the Carland Cross roundabout	Gold	Medium

2.4.5 Table 2-2 below includes other routes known to be used by walkers, cyclists and horse-riders, including Quiet Lanes and NCN routes.

2.4.6 In terms of sensitivity, it has been assumed that local routes are of low value given their informal/permissive nature. However, for routes of regional importance e.g. the National Cycle Network, it has been assumed that there will be a medium sensitivity. High sensitives are associated with National Trails or similar, of which there are not any in the study area.

Table 2-2 Local Routes that intersect with the scheme

Local Route	Location	Assumed sensitivity for assessment
Quiet Lane	Route crosses current A30 at Chybucca	Negligible
Quiet Lane	Route crosses current A30 west of NFH	Negligible
National Cycle Network – Route 32 (the Cornish Way)	Route crosses the existing A30 at Chyverton Lodge.	Medium
Unnamed path (not designated on Definitive Map)	Crosses the existing A30 from the southern end of Church Lane in Zelah	Negligible
Quiet Lane	South of Trevalso Farm	Negligible
Link to National Cycle Network – Route 32 (the Cornish Way)	Route crosses the existing A30 at Pennycomequick	Negligible

3 Management Plan

3.1 General Provisions

3.1.1 The DCO grants the necessary powers to stop up PRoW affected by the proposed development and put in place alternative/substitute routes as listed in the relevant Schedule of the DCO.

3.1.2 Highways England is committed to the highest levels of safety for the proposed construction and operation of the scheme, and also to minimise disruption to the public. Where a potential conflict between these two objectives has been identified, a pragmatic approach to safety has been taken, balancing the risks to the public and users of PRoW against the disruption that removing the risk will cause (e.g. through stopping up a PRoW). Where possible, Highways England have worked to retain access for the public through phasing/timing of works but where this has not been possible necessary closures have been identified in the subsequent sections of this Plan.

3.2 Signage and Information

3.2.1 At all points where PRoWs intersect or cross the proposed development, appropriate signage will be erected to advise of planned works and dates of any planned closures. Signage will also, where applicable, provide information on any alternative routes/diversions and new routes. The location and details of these signs will be discussed and agreed with Cornwall Council PRoW Officers.

3.2.2 Information signs detailing works and giving the project Community Relations team contact number details will be maintained across the construction site.

3.2.3 A high-level programme of PRoW closures and alternative/new routes will be produced and the Cornwall Council PRoW Officers, affected Parish Councils and if required, Land Agents and/or Persons with Interest in Land (PILs) will be notified at least seven days in advance of any closure. A separate notification will be issued when the closure has ceased or an alternative/new route has been provided. Advance notice will include planned dates of any closures and the programmed dates for reopening/re-providing PRoW.

3.3 Forms of Managed Closure

3.3.1 Exact details of the forms of closure will be developed by Highways England and its contractor and will be subject to further discussions and agreements with Cornwall Council.

3.3.2 Highways England will make every effort to minimise disruption along the PRoW network and will follow the following decision-making process which sets out a hierarchy of actions, starting with those that create the minimum impact:

- Use of signage where PRoW can remain open but users need to be warned of the presence of construction vehicles (local management);
- Implementation of short, temporary closures where local works might affect safety of users (local closures);
- Closure of/extinguishment of a PRoW following the early implementation of an alternative/new route (e.g. via a new overbridge/underbridge) (early re-provision);
- Closure of/extinguishment of a PRoW without re-provision (e.g. where works sequencing will not provide a new crossing in advance on the carriageway works) and/or permanent extinguishment of a PRoW (full closure).
- Provision of new crossings/routes as part of the scheme (new routes).

3.3.3 All such interventions will be developed in liaison with Cornwall Council PRoW Officers and will be confirmed upon the appointment of a contractor.

3.3.4 The following paragraphs provide more detailed examples of key forms of intervention that are likely to be required.

Local Management

3.3.5 Where it is considered safe to do so, PRoW in close proximity to construction works or that adjoin roads that may be affected by works will remain open with appropriate signage to warn of the presence of construction vehicles, and to warn drivers of the presence of walkers, cyclists and horse riders. It is considered that it would be disproportionally disruptive to close PRoW in this instance, particularly when works may only be taking place for short periods of time and risk to the public is likely to be low.

3.3.6 In certain instances, a banks person could be used to hold users of the PRoW network for short periods to allow for safe passage of construction traffic (e.g. where a PRoW is to be used for construction access).

Local Closures

3.3.7 Where works are predicted to affect the safety of PRoW users to an extent that cannot be controlled by local management, local closures would be sought. Such closures would be temporary and short-term in order to facilitate periods of construction works that are discrete in nature and can be completed in a matter of days/weeks, rather than months.

3.3.8 Where it is not considered safe to keep PRoW open with appropriate signage during construction works, the need for a diversion, signage and other relevant details will be discussed and agreed with Cornwall Council.

Early Re-provision

3.3.9 Where possible, Highways England have utilised design development to consider where early works may allow them to retain safe access for PRoW users during the construction period. In such cases, it may be necessary for Highways England to seek extinguishment of a PRoW or section of, alongside the provision of an alternative route (in general via an underbridge or overbridge which is to be constructed in advance of the mainline works).

3.3.10 This early re-provision would therefore overcome potential construction effects as well as seeking to provide a new PRoW more permanently into the operational phase of the development.

Full Closure

3.3.11 Given the linear nature of the proposed scheme, and the programme of works, it will not always be possible for Highways England to retain access across the works for the full extent of construction. In these instances, Highways England are seeking a full closure of certain PRoW to enable construction. Where possible, access across the new road has subsequently been provided via new structures, however, there are a few instances where no re-provision is planned.

New Routes

3.3.12 The provision of new routes to enhance the current PRoW network or new routes to facilitate access across the proposed scheme.

3.4 Proposed PRoW Management

3.4.1 This section details the planned management of PRoW during both the construction and operational phases of the proposed scheme.

Construction

3.4.2 The construction phase of the scheme is anticipated to lead to a variety of effects on the PRoW network, ranging from increased construction traffic on or in close proximity to PRoW, through to a need to extinguish a PRoW in order to enable construction works.

3.4.3 In summary, the following PRoW management is anticipated during construction and further detail is provided in Table 3-1 through to Table Table 3-4 below:

- Local management/closures along five BOATs, one bridleway and one footpath to enable construction access and to warn both users of the PRoW network and construction workers of the interaction with these PRoW.

- Permanent closure of one BOAT, one Bridleway and two Footpaths to enable the construction of the proposed scheme.
- Permanent closure of one Footpath and two Bridleways with alternative/diversion routes provided.

3.4.4 On appointment of a contractor, diversion routes for traffic as part of a Traffic Management Plan would be prepared and agreed with Cornwall Council. For the purposes of this Mitigation Plan (prior to the appointment of a contractor) it is assumed that where any PRoW forming part of or interacting with a traffic management route, appropriate local management and signage would be provided as agreed.

Operation

3.4.5 Where it is necessary to stop-up PRoW for construction activities, the provision of alternatives routes/diversions will ensure that access across the new A30 is maintained at key points during operation.

3.4.6 Seven new routes are proposed, utilising private means of access and seeking to improve connectivity between existing and proposed PRoW. These seek to provide enhancement/improved linkages (see Table 3-4).

3.4.7 Appropriate design parameters and materials will be provided for substituted and new PRoW, taking into account the proposed type and nature of the proposed PRoW.

3.4.8 Classifications of substituted and new PRoW have been discussed with Cornwall Council, who will update their Definitive Maps as necessary, following notification of completion of works by Highways England and its contractor.

3.4.9 Surfaces would be restored/be as per existing post construction. Suitable surfaces for different types and classification of routes will be provided, taking into account relevant guidance, for example from the British Horse Society[34]. For multipurpose routes (e.g. routes providing private means of access and a bridleway) details of surfaces and access restrictions features (e.g. demountable bollards) will be agreed with the landowner and/or third party responsible for maintenance and/or use of that surface and/or route.

3.4.10 Highways England and its contractor will provide appropriate signage for re-provided and new PRoW in agreement with Cornwall Council.

3.4.11 Details and specifications for substituted and new PRoW, including scale, surface materials, access features and signage will be set out in Chapter 2 of the Environmental Statement.

3.4.12 Relevant ownership and maintenance agreements will be detailed in the relevant section of the Statement of Common Ground with Cornwall Council[35], following associated discussions.

[34] http://www.bhs.org.uk/~/media/bhs/files/pdf-documents/access-leaflets/surfaces.ashx?la=en
[35] Submitted separately and as part of the DCO application

Table 3-1 PRoW subject to local management/closures

PRoW Type/Ref	Location	Timing	Type of Management and/or Closure	Reason for Management and/or Closure	Details of diversion/re-provision
BOATs 309/25/3, 309/25/4, 309/25/5, 309/25/6 and 309/25/7	West of Chiverton Cross roundabout	During construction	Local management/short-term closures	Local management/short-term closures are likely to be required in order to facilitate construction of attenuation ponds in this area.	It is currently anticipated that access along these routes could be retained through local management.
BR 314/64/1	Off the B3284 adjacent to Callestick Vean	During construction	Local Management	Local management may be required when construction works are occurring to create the new side road which connects to this section of the B3284.	It is currently anticipated that access from the bridleway to the B3284 could be retained through local management.
FP 319/1/2	South of existing A30 at Zelah Lane Farm	During Construction	Local Management	Local management may be required during works to provide the new overbridge and new private means of access to Hill House.	It is currently anticipated that access along the footpath could be retained through local management. A temporary diversion using the NCN32 route during short-term construction works would be made if required, subject to discussions and agreement with Cornwall Council as appropriate.

Table 3-2 PRoW to be stopped up for which a substitute is to be provided

PRoW Type/Ref	Location	Timing	Type of Management and/or Closure	Reason for Management and/or Closure	Details of diversion/re-provision
FP 319/16/1	Nancarrow Farm/Marazanvose	Prior to construction of the new A30	Early re-provision	A short section of FP 319/16/1 is to be permanently extinguished where the new A30 crosses its currently alignment.	Re-provision/new footpath with steps which routes alongside the south of the new A30 before crossing via a new 'green bridge' as a bridleway onto the existing road to Higher Ventongimps Farm.
BR 319/9/1	Near to Hill House	Prior to construction of the new A30	Early re-provision	Eastern section of BR319/9/1 from Hill House to intersection with BR 319/1/1 to be permanently extinguished.	BR 319/9/1 to be diverted onto new private means of access to Hill House to allow continued access.
BR 319/1/1	Zelah Lane Farm	Prior to construction of the new A30	Early re-provision	Southern section of BR 319/1/1 to be permanently extinguished where it currently routes onto the existing overbridge.	Section of BR 319/1/1 to be extinguished to be diverted/re-provided on new overbridge which will form a private means of access to Zelah Lane Farm.

Table 3-3 PRoW to be stopped up for which no substitute is to be provided

PRoW Type/Ref	Location	Timing	Type of Management and/or Closure	Reason for Management and/or Closure	Details of future access
BOAT 309/25/2	West of Chiverton Cross, running east-west between BOAT 309/25/6 and BOAT 309/25/3	Prior to construction	Full closure/extinguishment along entire length	Construction of attenuation ponds to serve the new A30 – access will no longer be possible.	Users will retain access along BOAT 309/25/3, 309/25/5 and 309/25/4
BR 309/3/1	East of Chybucca junction running North – South from existing A30 to the B2384	Prior to construction of the new A30	Full closure/extinguishment of a section of the BR	The proposed route of the new A30 bisects the current bridleway.	The bridleway will continue along its current route from the B2384 and stop prior to meeting the new A30. It is understood that the existing bridleway does not have access onto the current A30 at this location due to lack of maintenance over the long term.
FP 319/12/1	East of the A30 adjacent to Trevalso Cottage	Prior to construction of the new A30	Full closure/extinguishment along entire length	This short section of footpath is almost entirely removed given the proposed alignment of the new A30.	N/A
FP 319/11/1	East – west south of the existing A30 at Pennycomequick and north of Honeycombe Farm	Prior to construction of the new A30	Full closure/extinguishment along entire length	This short section of footpath is almost entirely removed given the proposed alignment of the new A30.	N/A

Table 3-4 New PRoW to be provided

PRoW Type	Location	Timing	Type of Management and/or Closure	Reason for Management and/or Closure	Details of new PRoW
New Restricted Byway	Via a new underbridge allowing movements across the Chiverton Cross Junction	To be implemented prior to main construction	New Route	Users will be able to utilise new shared footway/cycleway adjacent to the carriageway connecting a new underbridge provided to facilitate north – south movements across the new junction at Chiverton Cross.	A new underbridge with mounting blocks each end, appropriate width for passing users, lighting and access restrictions to prevent use by vehicles as necessary, with sealed surface unless otherwise agreed by Highways England and Cornwall Council
New Restricted Byway	Between arms of the new Chiverton Cross grade separated junction	To be implemented prior to main construction	New Route	Users will be able to navigate the new junction through utilising new footway/cycleway links, removing the need for users to cross numerous arms of the new roundabout. This would help enable safe movements around the new roundabout junction, in combination with the new underbridge to the west.	New restricted byways to north and south of new Carland Cross junction, providing east-west movements around the roundabout, with access restrictions to prevent use by vehicles as necessary, with sealed surface unless otherwise agreed by Highways England and Cornwall Council
New Bridleway	Between existing BR 314/64/1 and BR 314/65/1 utilising new private means of access	Alongside construction of the new private means of access	New Route	Opportunity to connect two existing bridleways, providing improved recreational routes within the area.	New bridleway connection between two existing bridleways on private means of access with unsealed surface unless otherwise agreed by Highways England and Cornwall Council
New Footpath	South of Creegmeor Farm and BR 314/65/1	Alongside construction of the new junction/side road	New Route (Steps)	Proposed steps to provide a connection up to the new side road and onto the new junction connecting into the existing local route (quiet lane) at Chybucca	Steps to provide access to the side road, with adjacent hard slope surface should cyclists wish to dismount to use the steps

PRoW Type	Location	Timing	Type of Management and/or Closure	Reason for Management and/or Closure	Details of new PRoW
New Bridleway	West of Nancarrow Farm, south of the A30	Alongside construction of the new private means of access	New Route	To provide new connection between FP319/16/1, Quiet Lane and new side road at Tresawsen	New bridleway joining and along new private means of access and over new green bridge, with access restrictions to prevent use by vehicles as necessary, with unsealed surface unless otherwise agreed by Highways England and Cornwall Council
New Bridleway	Crosses the existing A30 from the southern end of Church Lane in Zelah	To be implemented prior to main construction	New underbridge to allow continued access across the A30	Existing alternatives access severed by proposed scheme mainline and would provide north-south access across the A30	New bridleway connection, with unsealed surface unless otherwise agreed by Highways England and Cornwall Council
New Footpath	West of Carland Cross	Alongside construction of the new bridleway South of Carland Cross	New Route	To provide access to the area of open access land and proposed viewing area	New footpath connection, with unsealed surface unless otherwise agreed by Highways England and Cornwall Council
New Bridleway	South of Carland Cross	Alongside construction of the new junction/side road	New Route	To provide safe crossing of the A30 via a new underbridge and a safe crossing of the A39 at grade level	New bridleway utilising a section of the existing A30, with a new underbridge under the new A30 and junction crossing of the A39 with equestrian holding areas, with unsealed surface unless otherwise agreed by Highways England and Cornwall Council
New Bridleway	South East of Carland Cross	Alongside construction of the new junction/side road	New Route	To provide new connection between existing side roads, footpaths and bridleways in surrounding area	New bridleway adjacent to the new private means of access, with access restrictions to prevent use by vehicles as necessary, with unsealed surface unless otherwise agreed by Highways England and Cornwall Council

Additional Closures

3.4.13 Table 3-5 sets out Highways England's expectations of the required closures and new provision in relation to the PRoW network as a result of the scheme. However, if additional temporary or permanent diversions are required of other PRoW not set out in this plan, these will be agreed with Cornwall Council and the landowners prior to implementation. Further, in such cases, the relevant Article of the DCO requires Highways England to obtain the consent of the relevant highway authority, which may attach reasonable conditions to such consent. As with the closures outlined in Table 3-5, signage would be used and similar principles to management of closures adopted for any additional requirements.

Safety Measures

3.4.14 Where appropriate, suitable fencing will be erected by the contractor in order to form safe corridors for users of PRoW, especially where it is proposed to retain access in areas adjacent to construction works.

3.4.15 The type and size of fencing will be agreed with the individual landowners and Cornwall Council PRoW Officers prior to the start of construction. Regular inspections of the fencing would take place to ensure that all fencing and signage along the PRoW remain in place and that the condition of the PRoW is suitable for its intended use.

3.4.16 Where construction routes adjoin a PRoW or where a PRoW crosses a construction access, appropriate signage would be installed as necessary to ensure the safety of the public, road users and workforce. Appropriate traffic management measures for all works affecting highways are covered in the draft Traffic Management Plan (Volume 6 Document Ref 6.4 Appendix 2.1).

Inspections

3.4.17 Inspections of any installed temporary diversions or alternative routes and any required action relating to non-conformance, will be undertaken at timescales to be determined/agreed with Cornwall Council PRoW Officers. Regular inspections of such routes will be undertaken and short-term damage repaired where necessary.

3.4.18 During construction, Highways England will also operate a Community Relations team and contact details will be provided on any signs located along the PRoW network. Concerns around condition can therefore be flagged through this facility and Highways England will explore any short-term reinstatement work where necessary. Any concerns raised will be shared with Cornwall Council PRoW Officers.

3.5 Proposed Local Route Management

3.5.1 This section details the planned management of local routes during both the construction and operational phases of the proposed scheme.

Construction

3.5.2 The construction phase of the scheme is anticipated to lead to a variety of effects on the local walking, cycling and horse-riding network, as a result of the proposed scheme mainline or side roads severing existing routes.

3.5.3 In summary, the following local routes are anticipated to be severed and further detail about the proposed management is provided in Table 3-5:

- 4 no. sections of the 'Quiet Lanes' network;
- A short section of NCN32, The Cornish Way; and
- A short section of the Link to NCN32.

3.5.4 In all cases, realignment or diversion of these local routes is proposed, utilising new side roads, overbridges and junctions where possible to maintain access for users.

Operation

3.5.5 Where the proposed scheme severs local routes, the provision of alternative routes/diversions will ensure that access across the new A30 is maintained at key points during operation.

Table 3-5 Local routes subject to local management/closures

Route Type	Location	Timing	Type of Management and/or Closure	Reason for Management and/or Closure
Quiet Lane	Route crosses current A30 at Chybucca	Alongside construction of proposed Chybucca junction	Quiet Lane to be diverted through proposed Chybucca junction	Quiet Lane severed by proposed scheme mainline
Quiet Lane	Route crosses current A30 west of NFH	Alongside construction of proposed private means of access and green bridge around NFH	Quiet Lane to be diverted across new green bridge to the east, or along new private means of access to the west connecting into Tresawsen	Quiet Lane severed by proposed scheme mainline
National Cycle Network – Route 32 (the Cornish Way)	Route crosses the existing A30 at Chyverton Lodge.	Alongside construction of side road at Two Barrows	NCN to be realigned with staggered junction to cross the proposed scheme	NCN severed by proposed scheme side road
Quiet Lane	South of Trevalso Farm	Alongside construction of proposed overbridge	Quiet Lane to be diverted across new overbridge at Trevalso Farm	Quiet Lane severed by proposed scheme mainline
Link to National Cycle Network – Route 32 (the Cornish Way)	Route crosses the existing A30 at Pennycomequick	Alongside construction of proposed overbridge	Link to NCN to be diverted across new overbridge at Pennycomequick	Link to NCN severed by proposed scheme mainline

Figure 3-1 Public Rights of Way Directly Affected By The Scheme Sheet 1 of 4

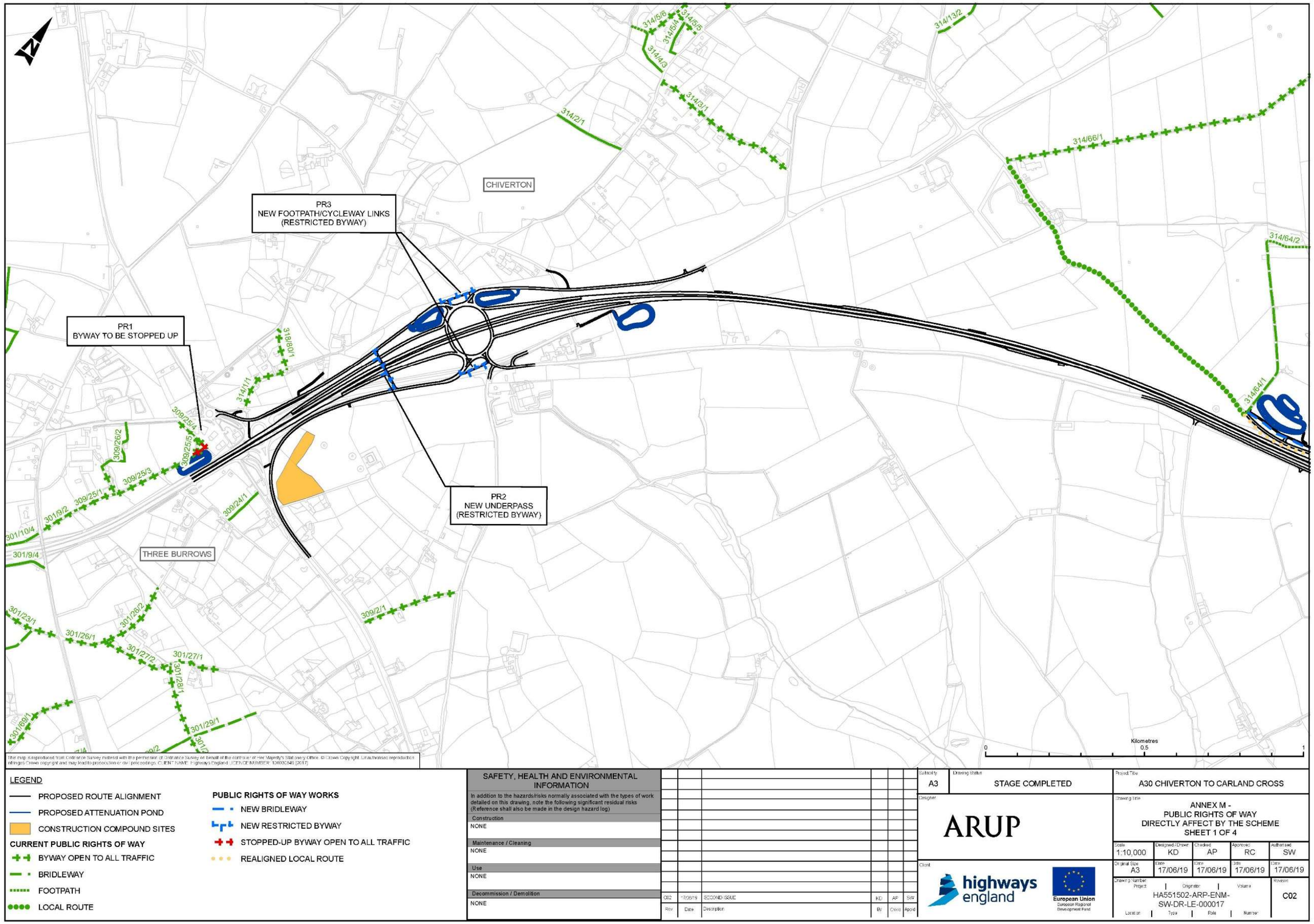
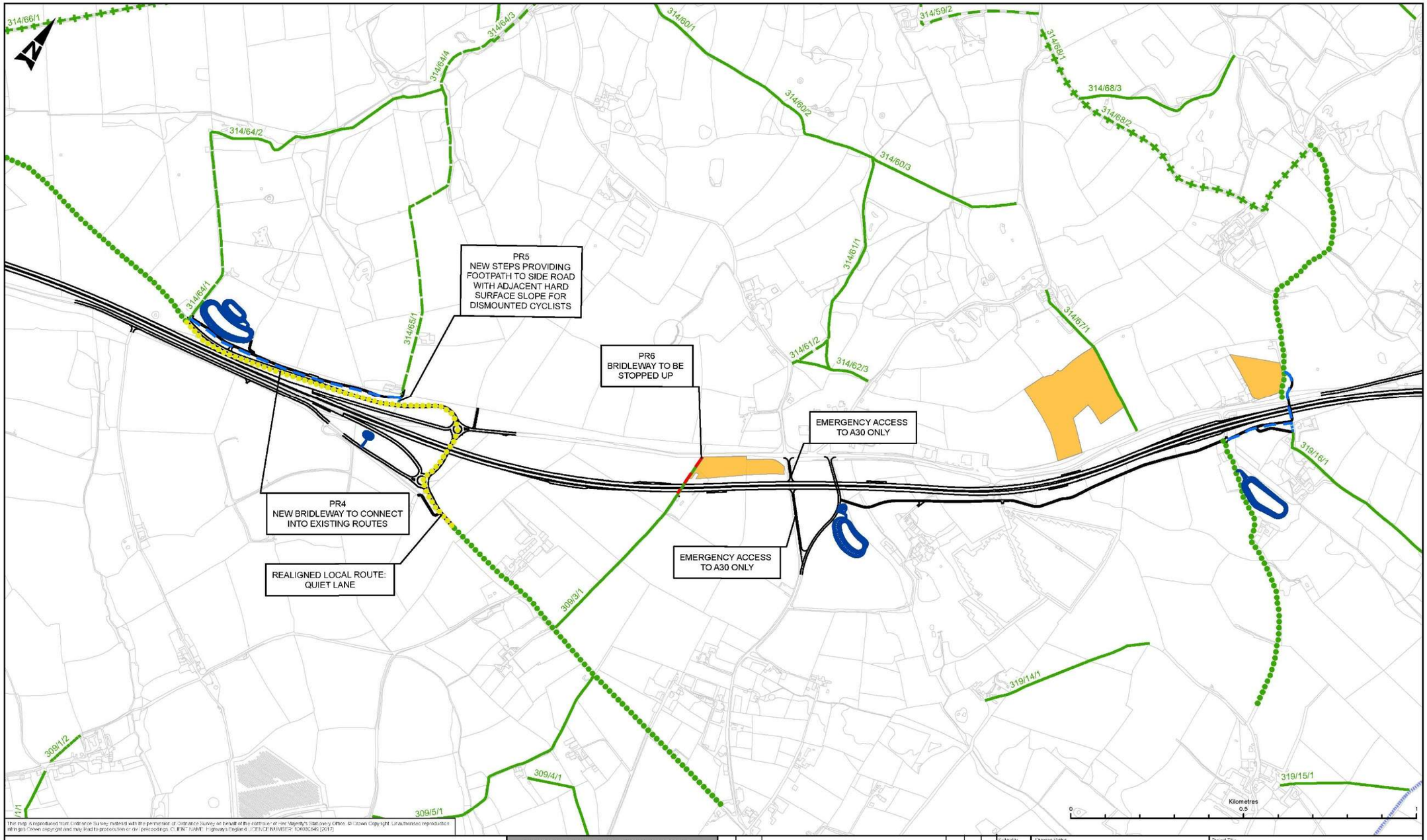


Figure 3-2 Public Rights of Way Directly Affected By The Scheme Sheet 2 of 4



LEGEND

- PROPOSED ROUTE ALIGNMENT
- PROPOSED ATTENUATION POND
- NATIONAL CYCLE NETWORK ROUTE 32
- CONSTRUCTION COMPOUND SITES

CURRENT PUBLIC RIGHTS OF WAY

- BYWAY OPEN TO ALL TRAFFIC
- BRIDLEWAY
- FOOTPATH
- LOCAL ROUTE

PROW WORKS

- NEW BRIDLEWAY
- NEW FOOTPATH
- STOPPED-UP BRIDLEWAY
- REALIGNED LOCAL ROUTE

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made in the design hazard log)

Construction	NONE
Maintenance / Cleaning	NONE
Use	NONE
Decommission / Demolition	NONE

Rev	Date	Description	By	Chkd	Apvd
C02	17/06/19	SECOND ISSUE	KD	AP	RC

Suitability: A3 | Drawing Status: STAGE COMPLETED

Designer: ARUP

Client: highways england | European Union European Regional Development Fund

Project Title: A30 CHIVERTON TO CARLAND CROSS

Drawing Title: ANNEX M - PUBLIC RIGHTS OF WAY DIRECTLY AFFECT BY THE SCHEME SHEET 2 OF 4

Scale	Designed / Drawn	Checked	Approved	Authorised
1:10,000	KD	AP	RC	SW
Original Size: A3	Date: 17/06/19	Date: 17/06/19	Date: 17/06/19	Date: 17/06/19

Drawing Number: Project: HA551502 | Originator: ARP | Volume: ENM | Location: SW | Type: DR | Role: LE | Number: 00018 | Revision: C02

Figure 3-3 Public Rights of Way Directly Affected By The Scheme Sheet 3 of 4

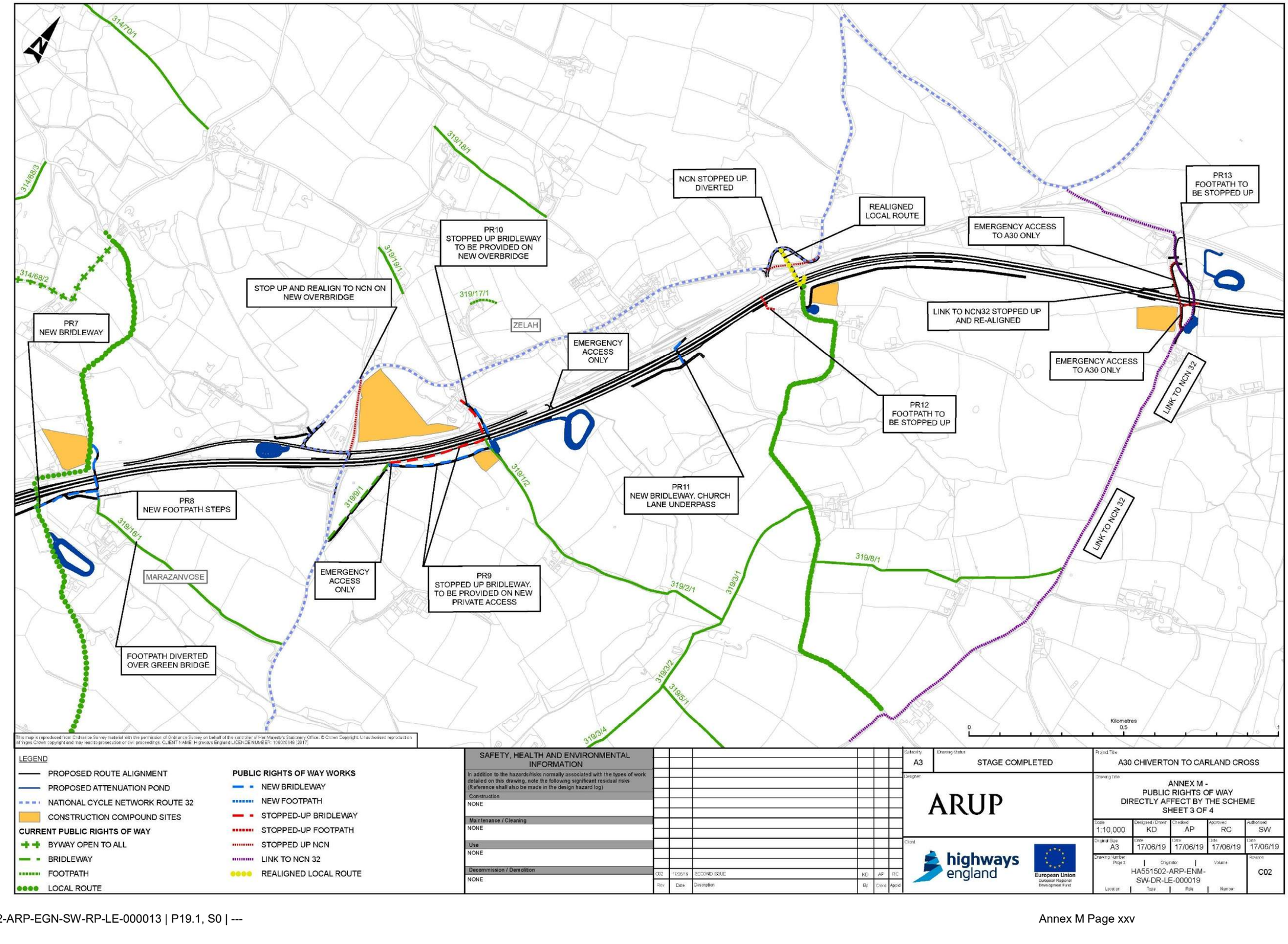
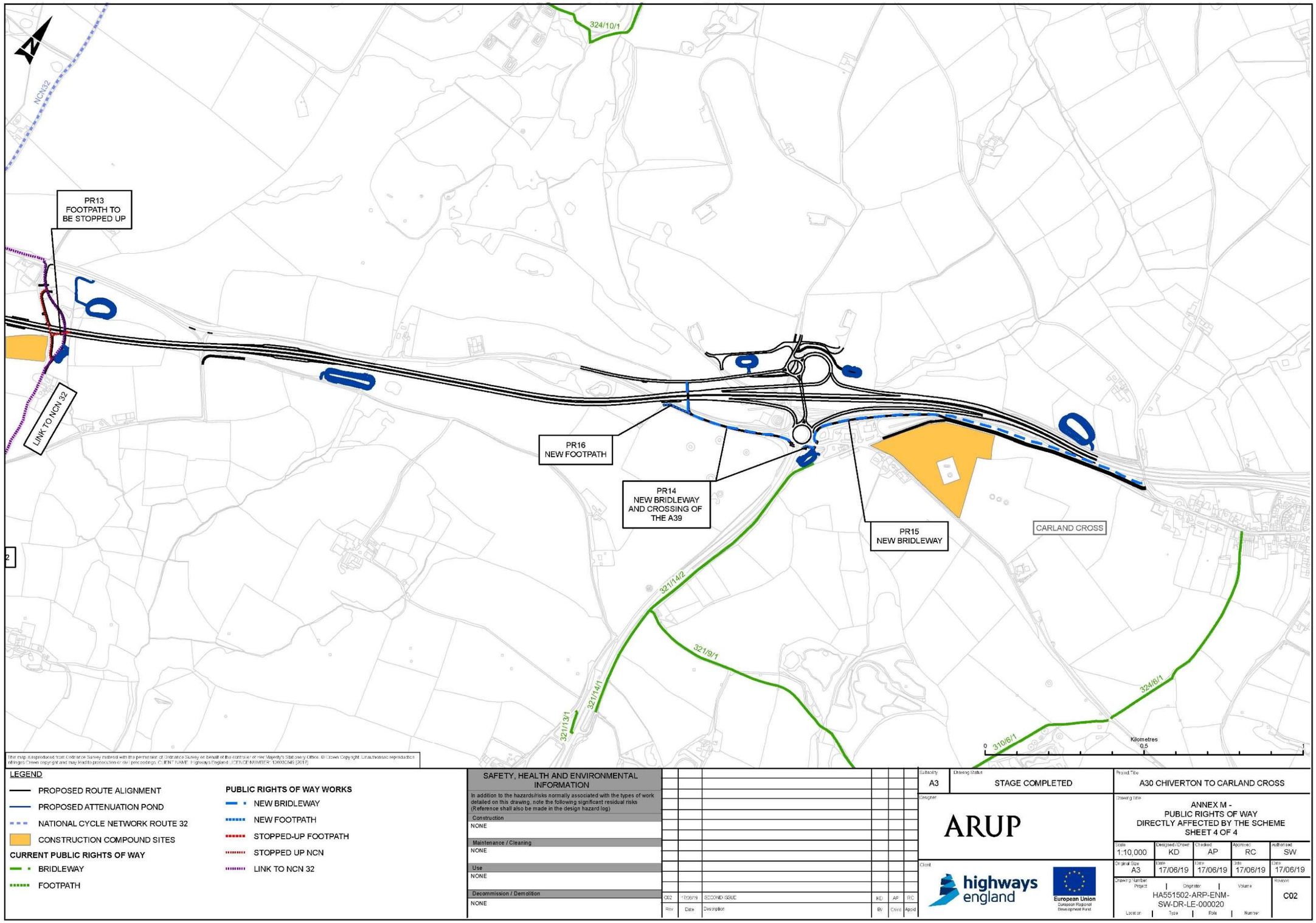


Figure 3-4 Public Rights of Way Directly Affected By The Scheme Sheet 4 of 4



Annex N: Outline method statement for the translocation of heathland

1 Introduction

1.1 Purpose

1.1.1 The purpose of the translocation of healthland is to:

- mitigate the effects associated with the loss of the heathland HPI;
- mitigate the effects associated with the loss of habitat currently supporting an invertebrate population of national value; and
- to provide heathland habitat contiguous or close to the existing with Newlyn Downs which could be colonised by species associated with the SAC.

1.2 Structure and Scope of the Outline method statement for the translocation of heathland

1.2.1 The method statement sets out measures to mitigate the translocation of heathland. The method statement will be developed at detailed design and agreed with Natural England.

1.2.2 The heathland receptor will be within the scheme, and most likely adjacent to the eastern edge of Newlyn Downs SAC. Methods will be set out including:

- soil sampling
- site preparation for translocation
- translocation method; and
- aftercare.

1.3 Responsibilities

Table 1-1 Annex N Responsibilities details

Name	Position/Responsibilities	Contact Details
	Highways England Project Manager	
	Site Manager	
	Contractor Environmental Manager	
	Ecological Clerk of Works	

1.4 Receptor Site

1.4.1 The proposed heathland translocation receptor site will be within the scheme, and most likely adjacent to the eastern edge of Newlyn Downs SAC, which will then form the heathland connection from the isolated heathland to the SAC, as detailed within the Environmental Masterplan (Figure 7.6 of Volume 6, Document Ref 6.3). Comparative soil sampling in both the existing heathland area to be translocated, and the proposed heathland translocation receptor site suggested that soil nutrient levels are currently at a suitable level in the receptor site.

Therefore, substantial pre-translocation soil treatment is not expected to be required to allow successful heathland translocation and growth.

1.5 Receptor and Donor Site Preparation

1.5.1 The methodology for these elements will be agreed with Natural England and the contractor at detailed design.

1.6 Translocation Method

1.6.1 As above, the methodology will be agreed with Natural England and the contractor at detailed design.

1.7 Aftercare and Monitoring

1.7.1 The aftercare and monitoring will be agreed with Highways England at detailed design.

Annex O: Asbestos Management Plan

1 Introduction

1.1 Purpose

1.1.1 The purpose of this Scheme Asbestos Management Plan (SAMP) is to demonstrate how the Major Project Provider shall plan for delivery of Asbestos Action Plans (AAPs) for the A30 Carland Cross to Chiverton scheme. GD 5/16 *Asbestos Management in Trunk Road Assets* (Highways England, 2016) guides the content and format of this report.

1.1.2 Asset List – all assets affected by the scheme

1.1.3 The following tables list the existing assets that will be affected by the scheme within its limits:

- highway structures as they appear in the Structures Management Information System (SMIS);
- brief description and length of carriageway types including assets such as: drainage, signs, etc;
- brief description of buildings; and
- brief description of other assets.

1.1.4 Only two existing Highways England structures plus some culverts will be affected by the scheme because the new road is largely being built off-line. The existing A30 is being retained where off-line of the new scheme.

1.1.5 At this time, it is not known how much of the existing drainage network will be affected by the scheme, nor if any of the drainage assets have ACM. Until a survey confirms otherwise, we can assume any drainage assets may include ACM (e.g. asbestos cement pipes, pitch fibre pipes (often used in bridge substructure drainage systems etc).

Table 1-1 Highway Structures

Structure	Number	Special Features/Comments
Overbridges	1 No.	To be demolished and replaced.
Underbridges	1 No.	To be reused with minor modification (on-line).
Culverts	4 No.	To be retained. Ch: 0+150 450mm ø culvert on Mr Heller's Land Ch: 8+900 900mm ø culvert south of Zelah Ch: 9+250 900mm ø culvert south of Zelah Ch: 13+600 900mm ø culvert at the Carland Cross

1.1.6 The following table contains the Highways Agency Pavement Management System (HAPMS) link and section chainages within the A30 Chiverton to Carland Cross scheme. The HAPMS information on link and section references and their lengths were taken from the Area 1 Network Plans.

Table 1-2 Highway Lengths (as held on HAPMS)

Route	Carriageway Standard	Length (km)	Comments
A30	D2AP	Ch 500-700	Tie-in resurfacing
A30	S2	Ch 700-1000	Carriageway to be broken out and replaced off-line
A30	S2	Ch 1000-1300	Tie-in resurfacing
A30	S2	Ch 1300-1500	Carriageway to be broken out and replaced off-line
A30	S2	Ch 1500-1600	Tie-in resurfacing
A30	S2	Ch 3700-4800	Carriageway to be broken out and replaced off-line
A30	S2	Ch 4800-5000	Tie-in resurfacing
A30	S2	Ch 6300-6700	Carriageway to be broken out and replaced off-line
A30	S2	Ch 7200-7500	Carriageway to be partially broken out
A30	S2	Ch 7500-8700	Carriageway to be broken out and widened on-line
A30	S2	Ch 8700-8900	Tie-in resurfacing
A30	S2	Ch 12500-14000	Carriageway to be broken out and replaced off-line
A30	D2AP	Ch 14000-14300	Tie-in resurfacing

1.1.7 Various sections of highway for which Cornwall Council is the authority would be affected by the proposed A30 scheme, as tabled below.

Table 1-3 Highway Lengths (Cornwall Council)

Route	Carriageway Standard	Length (km)	Comments
B3277 to St Agnes	S2	50m	Tie-in to new link road
A390 to Truro	S2	100m	Tie-in to new link road
Silverwell		130m	To be broken out and stopped-up and carriageway returned to pasture
A3075 Trevissome Park	S2	860m	To be broken out and realigned
A3075 to Newquay	S2	300m	Tie-in to new link road
B3284 to Perranporth	S2	150m	To be broken out and tie-in to new link road
B3284 to Truro	S2	50m + 160m	To be broken out and tie-in to new junction
Creegmeor Farm	S2	90m	To be broken out and stopped-up
Little Tresawsen	Bridleway	70m	To be broken out and stopped-up
Allet	S2	50m + 50m	To be broken out and stopped-up and tie-in to new road
Nanteague Farm	S2	220m	To be broken out and realigned
Marazanvose	S2	60m	To be broken out and stopped-up
Nancarrow	S2	50m	To be stopped up (proposed culvert)
Chiverton Farm	S2	510m	To be realigned and stopped up

St Freda	S2	100m	To be broken out and stopped-up and tie-in to new link road
Hill House to Tolgroggan	S2	360m	To be broken out and stopped-up
Tolgroggan	S2	310m	To be broken out and realigned
Church Lane	S2	70m	To be broken out and stopped-up
Trevalso	S2	120m	To be broken out and stopped-up (proposed culvert)
Penny-come-quick	S2	350m	To be broken out and realigned
Ventonteague	S2	70m	To be broken out and stopped-up
Carland Cross Wind Farm	S2	310m	To be broken out and stopped-up and replaced with a new access track
Carland Cross to Mitchell	S2	800m	New access track in place of stopped up road

Table 1-4 Traffic Technology (as held on TPMS)

Route	Technology Asset Type	Number of Similar Items	Comments
The current A30 between Chiverton and Carland Cross roundabouts. Inc roundabouts.	Cabinets and Boxes	13	To be removed – collision with the new A30 carriageway / side roads
	CCTV	4	At Chiverton Junction only.
	Message sign	0	N/A
	Outstations	0	N/A
	Traffic signals	0	N/A
	Structures - cantilevers	0	N/A
	Structures - portal gantries	0	N/A
	Structures - posts	0	N/A
	Telephone	4	Descriptive Location: 415/B, 418/A, 420/B, 421/A.

Table 1-5 Buildings, maintenance compounds, discrete ‘off network assets’

Name and Location	Purpose	Brief Description of Assets
Shed New A30 Ch: 1+000	Shed	To be demolished – in foot print of a new section of A3075
Buildings New A30 Ch: 5+550	Gun club	To be demolished – in foot print of the new A30 carriageway
Telecommunication Mast New A30 Ch: 6+500	Telecoms	To be demolished – in foot print of the new A30 carriageway
Marazan Farm New A30 Ch: 7+150	Farmhouse and other farm buildings	To be demolished – in foot print of the new A30 carriageway
Building New A30 Ch: 7+300	Barn at Nancarrow Farm	To be demolished – in foot print of the new A30 carriageway

1.2 Works Programme

1.2.1 The scheme programme is summarised in the table below.

Table 1-6 Scheme Programme Overview

Brief Description	Asset/Lengths	Start Date	Finish Date
PCF Stage 3	Scheme	03-Jul-17	31-Aug-18
PCF Stage 4	Scheme	03-Sep-18	17-Oct-19
PCF Stage 5	Scheme	08-Nov-19	20-Feb-20
Start on site	Scheme	31-Mar-20	

Note: the above dates are based on the current programme, correct as at April 2018, which is subject to change prior to works commencement.

1.2.2 Assets/lengths that will be subject to major works during the delivery of the scheme are tabled below. The construction start date is that for the scheme as a whole, which will be updated once the construction programme is available.

Table 1-7 Works Programme for Affected Assets

Brief Description	Asset/Lengths	Start Date	Comments
Underbridges	Twobarrows	31-Mar-20	Simply supported RC deck slab on cantilevered abutments. Potential strengthening works required to the longitudinal joint running through the deck. Existing parapets should be upgraded and it is likely that the bridge deck waterproofing system will be in need of replacement when the existing deck is exposed.
Overbridge	Tolgroggan Bridge	31-Mar-20	To be demolished and replaced.
Culverts	Culvert 1	31-Mar-20	Ch: 0+150 450mm ø culvert on Mr Heller's Land - to be retained.
	Culvert 2	31-Mar-20	Ch: 8+900 900mm ø culvert south of Zelah - to be retained.
	Culvert 3	31-Mar-20	Ch: 9+250 900mm ø culvert south of Zelah - to be retained.
	Culvert 4	31-Mar-20	Ch: 13+600 900mm ø culvert at the Carland Cross – to be retained.
Shed New A30 Ch: 1+000	Building	31-Mar-20	To be demolished
Buildings New A30 Ch: 5+550	Building	31-Mar-20	To be demolished
Telecommunication Mast New A30 Ch: 6+500	Mast	31-Mar-20	To be demolished
Marazan Farm New A30 Ch: 6+500	Building	31-Mar-20	To be demolished
Building New A30 Ch: 7+300	Building	31-Mar-20	To be demolished

Note: the above dates are based on the current programme, correct as at April 2018, which is subject to change prior to works commencement.

1.3 AAP Programme

1.3.1 A current Area Asbestos Management Plan has not been provided. Further to this, the Pre-Construction Information (Revision 1, 23 June 2017) states that no action plans for existing structures were provided during PCF Stage 2.

1.3.2 Asbestos Action Plans (AAPs) have been received from Highways England for the highway assets (pavement, barriers, sign posts, lighting pylons and drains). These were carried out in 2012 by Enterprise Mouchel, Area 1 MAC at that time.

1.3.3 Any structure with asbestos highlighted as being present and that will be disturbed during construction will be required to have had a refurbishment or demolition survey, as appropriate, prior to commencement of work, in accordance with the programme summarised in section 2 above.

1.3.4 The following table summarises the asbestos survey works required for each asset that will be affected by the scheme. All surveys are to be completed prior to works commencement.

1.3.5 The programme for completing AAPs shall be agreed with the Scheme Project Manager. The AAPs must be in place prior to the start of any works.

1.3.6 All assets affected by the proposed scheme will need to be covered by an existing, or new AAP including drainage assets.

1.3.7 No works will be undertaken that may disturb a known or assumed ACM until the ACM has been removed (in accordance with) or protected in accordance with the approved AAP.

1.3.8 Provision will need to be made for monitoring / management surveys for known or assumed ACMs that will not be affected by the works, but are within the scheme extents.

Table 1-8 Surveys Programme

Asset Type	Asset Description	Programme
Overbridge	Tolgroggan Accommodation Bridge	Requires an asbestos R&D* survey prior to any works.
Underbridge	UB4 Twobarrows	Requires an asbestos R&D survey prior to any works.
3 No. culverts	900mm ⌀ south of Zelah/church lane	Requires an asbestos R&D survey prior to any works.
Existing highway	Existing dual carriageway pavement, barriers, sign posts, street lights and drains.	AAPs completed by Enterprise Mouchel (MAC) in 2012. No asbestos identified.
Shed New A30 Ch: 1+000	Shed	Requires an asbestos R&D* survey prior to any works.
Buildings New A30 Ch: 5+550	Gun club buildings	Requires an asbestos R&D survey prior to any works.
Telecommunication Mast New A30 Ch: 6+500	Mast	Requires an asbestos R&D survey prior to any works.
Marazan Farm New A30 Ch: 7+150	Farmhouse and other farm buildings	Requires an asbestos R&D survey prior to any works.

Building New A30 Ch: 7+300	Barn at Nancarrow Farm	Requires an asbestos R&D survey prior to any works.
Drainage assets	TBC	Requires an asbestos R&D survey prior to any works.

*Refurbishment and demolition

1.4 Arrangements for Monitoring and Review

1.4.1 This SAMP is programmed for review as tabled below.

Table 1-9 SAMP Reviews during PCF Stage 3

Brief Description	Asset/Lengths	Start Date	Finish Date
PCF Stage 3	Scheme	21-Mar-17	13-Sep-18
Produce SAMP	Scheme	19-Feb-18	23-Feb-18
Receive Asbestos Register from HE		13-Feb-18	
Client Review of SAMP	Scheme	26-Feb-18	30-Apr-18
Final SAMP Based on Received Responses	Scheme	30-Apr-18	04-May-18
Client Sign Off of SAMP	Scheme	08-May-18	14-May-18
Design Fix B	Scheme		11-Dec-17
Design Fix C	Scheme		23-Apr-18
Stage 3 Planned Completion	Scheme		10-Aug-18

Note: the above dates are based on the current programme, correct as January 2018, which is subject to change prior to works commencement.

1.4.2 Future reviews will be undertaken as part of the PCF deliverables at SGAR 6 and SGAR 7.

1.4.3 Updates to AAPs arising from additional survey work, or new AAPs required as a result of the scheme works, shall be produced with agreement from the MPD Scheme Project Manager and Highways England Service Delivery Team Leader.

1.4.4 Any mitigation measures required to prevent delays to works commencement as a result of delays to surveys are to be agreed with the MP Scheme Project Manager and Highways England Service Delivery Team Leader.

1.4.5 The Principal Designer is to be made aware of the changes to the SAMP and the production of any AAPs.

1.5 Procurement of Asbestos Services

1.5.1 All asbestos surveys shall be procured by Highways England in accordance with the requirements of GD 5/16, reproduced as follows.

A6.6.1	The HSE recommends, and Highways England requires, that asbestos surveying and laboratory testing organisations shall be accredited to ISO 17020 and 17025 respectively (UKAS or other). The Major Project Service Provider will let the appropriate contract with the Surveying and Testing Organisation. Furthermore, the AAPs may state a requirement to undertake Management Surveys and/or Refurbishment/Demolition Surveys.
A6.6.2	Major Project Provider shall obtain approval from the MPD Scheme Project Manager prior to awarding any contract for the proposed specialist services.

A6.6.3 All surveys shall comply with the requirements of HSG 264.

A6.6.4 In planning for surveys the following issues shall be considered:

- Whether records indicate a strong likelihood of ACM or not.
- The risk posed by working under traffic management compared to the likely risk of disturbing ACMs during planned maintenance work.
- Known consistency of materials/components based on contract limits during the original construction work and the repeated detailing on bridges and culverts. This will allow representative sampling and assessment work to take place. However, previous modifications to Asset need to be considered.
- Similarity in the appearance of construction details in buildings and other similar structures.
- Combining survey work for asbestos with other maintenance activities within planned traffic management measures.
- Whenever possible combine asbestos surveys with any planned inspections to take advantage of shared access arrangements.

A6.6.5 The survey specification shall comply with HSG 264 and requires the surveyor to recommend actions for each known or presumed ACM. Recommended actions must be produced by the surveyor in conjunction with the Service Provider to make sure decisions on actions are appropriate for the Asset in question. These actions form the 'action plan' column on the asbestos register required for inclusion in the AAP format.

A6.6.6 The following survey types will be appropriate in the following general circumstances in the table below.

Asset Type	Element/Feature included in the Survey	Survey Type (As HSG 264)
Buildings, compounds, miscellaneous structures	All visible components or materials in roofs, ceilings, walls, floors etc where no intrusive maintenance work is planned to hidden components.	Management Survey.
	All components where intrusive work is planned during refurbishment, modification, demolition, reconstruction or extension of a building structure.	Refurbishment/Demolition Survey unless works deemed to be minor.
Highway Structures	All visible materials in structure – no intrusive work planned.	Management Survey.
	All materials/components in the structure which would be affected by intrusive work e.g. waterproofing or joint repairs.	Refurbishment/Demolition Survey.
	Any demolition or reconstruction.	Refurbishment/Demolition Survey.
Highways Generally	All visible surface features – no work planned which could affect ACMs in the ground, e.g. in ducts and surface water drains.	Management Survey.
	All elements which could be affected by major construction work – e.g. ducts, chambers, surface water drains, buried joints, utilities infrastructure.	Refurbishment/Demolition Survey.
	Any demolition or reconstruction – e.g. major widening, new slip roads or junctions.	Refurbishment/Demolition Survey.

Annex O: Asbestos Management Plan: Appendix A

Management Asbestos Surveys of mainline carriageway pavement and verge.

The reports below have been provided by Highways England Area 1 Team. No asbestos was identified.

Management Asbestos Survey Conducted on the 6th December 2012. Of the following areas: 0800A30/321.

Management Asbestos Survey Conducted on the 6th December 2012. Of the following areas: 0800A30/328.

Management Asbestos Survey Conducted on the 6th December 2012. Of the following areas: 0800A30/322.

Management Asbestos Survey Conducted on the 6th December 2012. Of the following areas: 0800A30/326.

Management Asbestos Survey Conducted on the 3rd December 2012. Of the following areas: 0800A38/680.

Management Asbestos Survey Conducted on the 6th December 2012. Of the following areas: 0800A30/324.

Management Asbestos Survey Conducted on the 6th December 2012. Of the following areas: 0800A30/330.

Management Asbestos Survey Conducted on the 6th December 2012. Of the following areas: 0800A30/331.

Management Asbestos Survey Conducted on the 6th December 2012. Of the following areas: 0800A30/333.

Management Asbestos Survey Conducted on the 6th December 2012. Of the following areas: 0800A30/336.

Management Asbestos Survey Conducted on the 6th December 2012. Of the following areas: 0800A30/339.

Management Asbestos Survey Conducted on the 6th December 2012. Of the following areas: 0800A30/337.

Management Asbestos Survey Conducted on the 6th December 2012. Of the following areas: 0800A30/338.

Management Asbestos Survey Conducted on the 6th December 2012. Of the following areas: 0800A30/340.

Management Asbestos Survey Conducted on the 6th December 2012. Of the following areas: 0800A30/341.

Management Asbestos Survey Conducted on the 6th December 2012. Of the following areas: 0800A30/343.

Management Asbestos Survey Conducted on the 6th December 2012. Of the following areas: 0800A30/344.

Management asbestos survey carried out on the 27th February 2012. Of the following areas: 0800A30/304 A30.

Management asbestos survey carried out on the 27th February 2012. Of the following areas: 0800A30/302 A30.

Management asbestos survey carried out on the 27th February 2012. Of the following areas: 0800A30/315 A30.

Management asbestos survey carried out on the 27th February 2012. Of the following areas: 0800A30/314 A30.

Management asbestos survey carried out on the 27th February 2012. Of the following areas: 0800A30/318 A30.

Management asbestos survey carried out on the 27th February 2012. Of the following areas: 0800A30/320 A30.

Management asbestos survey carried out on the 28th February 2012. Of the following areas: 0800A30/387 A30.

Management asbestos survey carried out on the 28th February 2012. Of the following areas: 0800A30/388 A30.

Management asbestos survey carried out on the 28th February 2012. Of the following areas: 0800A30/396 A30.

Annex P: Outline Soil Management Plan

1 Introduction

1.1 Overview of the scheme

1.1.1 The scheme comprises of a new A30 rural all-purpose dual carriageway approximately 14km (8.7 miles) between Chiverton Cross roundabout and Carland Cross junction on the A30. It is predominantly off-line from the existing single carriageway route. The existing Chiverton Cross and Carland Cross roundabouts are to be replaced with grade separated all-movement gyratory junctions to provide connections to the local highway network.

1.1.2 To accommodate the new dual carriageway, the existing A30 will be retained to provide a local route. The existing A30 will connect to a number of minor side roads leading to and from Truro to the south of the A30, and to and from Perranporth and Newquay to the north.

1.1.3 An outline of the works is provided in Section 16.1 of the Outline CEMP (Document Reference 6.4) [APP-375].

1.2 Purpose of the soil management plan

1.2.1 This document presents the Outline Soil Management Plan (SMP) for land affected by permanent and temporary works associated with the scheme and forms Annex P of the Outline Construction Environmental Management Plan (Outline CEMP) (Document reference 6.4) [APP-375 and APP-376].

1.2.2 The purpose of the Outline SMP for this scheme is to:

- Mitigate the potential effects of the scheme on the nature and quality of soil resources;
- Set out principles and procedures for how soils are to be managed by the contractor;
- Ensure the quality of soil resources won from the site is maintained during construction so that they remain suitable for re-use;
- Ensure agricultural land used temporarily during construction is restored satisfactorily.

1.2.3 The Outline SMP is based upon guidance contained in the Department for Environment, Food, and Rural Affairs' (DEFRA) Construction Code of Practice (CoP) for the Sustainable Use of Soils on Construction Sites[36]; the Ministry of Agriculture, Fisheries and Food's (MAFF's) Good Practice Guide for Handling Soils[37] and professional experience.

1.2.4 The DEFRA Construction CoP is a *"practical guide to assist anyone involved in the construction industry to protect the soil resources with which they work"*. The DEFRA Construction CoP is not legislatively binding, but following it will help protect and enhance the soil resources on site, achieve cost savings, achieve

[36] Department for Environment, Food, and Rural Affairs 2009. Construction Code of Practice for the Sustainable use of Soils on Construction Sites. Defra: London. Accessed on 28/03/2019. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716510/pb13298-code-of-practice-090910.pdf

[37] MAFF (2000). Good Practice Guide for Handling Soils. Accessed on 28/03/2019. Available at: https://webarchive.nationalarchives.gov.uk/20090317221756/http://www.defra.gov.uk/farm/environment/land-use/soilguid/index.htm

wider sustainability objectives and achieve legal obligations regarding waste controls.

1.2.5 This Outline SMP aims to provide the following information based on the current scheme:

- The areas of soil to be protected from earthworks and construction activities;
- The areas and types of topsoil and subsoil to be stripped, and stockpile locations; and
- The methods for stripping, stockpiling, transporting and reinstating soils to ensure that the structure, function, nutrient content and biological activity of the soil is maintained; and importantly that they remain suitable for reuse on or off site.

1.3 Content of the soil management plan

1.3.1 The Outline SMP contains the following:

- A summary of soil specific construction activities relevant to the scheme.
- Requirements for pre-construction survey of soils and record of condition.
- Details of the best practice methods and guidance for soil management on-site.
- An overview of the baseline soil and environmental conditions at the site and immediate surroundings.
- Provides recommendations and guidance on the protection, handling, storage, and reinstatement of soil on-site.

1.4 Implementing the SMP

1.4.1 This Soils Management Plan (SMP) is to be used as a live document throughout the development of the scheme. It should be updated with site-specific data following detailed design.

1.4.2 The contractor shall incorporate the Outline SMP requirements into the works. They will update and submit the Soils Management Plan as part of the final CEMP.

1.4.3 The Outline SMP sets out the management systems and approach to soil management that will be implemented during construction. This is secured by Requirement 3 of the draft DCO.

1.4.4 The contractor shall refer to the relevant requirements of the mitigation strategy and the DCO when developing the SMP.

1.4.5 Mitigation measures are detailed within the Outline CEMP (Document reference 6.4) [APP-375 and APP-376]. This is secured through Requirement 3 of the draft DCO.

1.4.6 The Outline CEMP (Document Reference 6.4) [APP-376] will be developed into a final CEMP once the detailed design and construction plans have been finalised. This is secured through part 2 of Requirement 3 of the draft DCO:

1.4.7 Schedule 2, Requirement 3.— *(2) The CEMP must*—

(a) be substantially in accordance with the outline construction environmental management plan certified under article 45 (certification of plans etc.);

1.4.8 Highways England will require their contractors to adopt and implement the CEMP during the construction of the scheme. This will be secured through contractual agreement between Highways England and the appointed contractor.

1.5 Roles and responsibilities

1.5.1 The effective implementation of the SMP requires that roles and responsibilities are clearly defined and understood. Specific job titles, roles and responsibilities will be defined by the contractor; however, in specific relation to soil management and the implementation of the SMP, the contractor will appoint an Agricultural Liaison Officer (ALO), or similar, whose roles and responsibilities are expected to be similar to those described below.

Agricultural Liaison Officer (ALO)

1.5.2 The Agricultural Liaison Officer (ALO) will be will be appointed by the contractor prior to the commencement of pre-construction activities and will be the prime contact for ongoing engagement about practical matters with landowners, occupiers and their agents before and during the construction process. There may be more than one ALO if required.

1.5.3 The ALO will have relevant experience of working with landowners and agricultural businesses and will have knowledge of the compulsory acquisition process and working on a linear infrastructure project.

1.5.4 The ALO (or their company) will be contactable from 7am to 7pm during the construction phase to landowners, agents and occupiers and will provide 24-hour team or company contact details for use in the event of emergency.

1.5.5 Post-construction the ALO will remain in place for up to one year in order to manage remediation issues.

1.5.6 After that year, Highways England will ensure that ongoing contact details are provided in order for landowners and occupiers to seek consent, if required, in respect of restrictive covenants for the lifetime of the project or to highlight any defects. Information in relation to the process of management of restrictive covenants will be issued to landowners and occupiers upon any change in the person/s responsible for the process on behalf of Highways England.

1.5.7 The ALO will have responsibility for liaising with landowners, agents and occupiers in respect of the following:

- Coordinating drainage surveys and sharing pre and post-construction drainage schemes with landowners or occupiers in advance for their consideration;
- Discussing the location, grouping and marking of link boxes (if required), including why they are subject to overriding constraints (such as cable lengths and environmental constraints), with the landowner/occupier;
- Coordinating the provision of a detailed pre-construction condition survey to include a soil survey, as well as a record of condition of the following elements:
  - existing crop regimes;
  - the position and condition of field boundaries;
  - the condition of existing access arrangements;

  - the location of private water supplies (as far as reasonable investigations allow);
  - the type of agricultural use taking place;
  - the yield of crops;
  - the quality of grazing land; and
  - the existing weed burden.

- Advising on risks relating to the translocation of soil diseases and ensuring appropriate protective provisions are implemented;
- Ensuring that landowners and occupiers are consulted in respect of requirements relating to field entrances and accesses across the construction strip and land-locked or severed land parcels;
- Arrange quarterly meetings with agent representatives of landowners;
- Undertake pre-construction and day-to-day discussions with affected parties to minimise disruption, where possible, to existing farming regimes and timings of activities;
- Undertake site inspections during construction to monitor working practices and ensure landowners' and occupiers' reasonable requirements are fulfilled;
- Discussing and agreeing temporary fencing requirements whilst the permanent Cornish hedgerow establishes and when this temporary fencing would be installed; and
- Discussing and agreeing reinstatement measures following completion of the works.

2 Summary of soils specific construction activities

2.1 Sequence of construction activities

2.1.1 The construction activities for the scheme would be typical of a major road scheme and consist of the following:

- Advance/preparatory works to be undertaken prior to construction including advanced ecology mitigation (moving of badger setts and vegetation clearance etc.) and archaeological investigation;
- Site establishment and any further vegetation clearance;
- Main construction works involved in the scheme drainage and bulk earthworks and where needed statutory utility diversions;
- Junction bridge structure construction at Chiverton, Chybucca and Carland Cross;
- Road works and other associated side road, Non-Motorised User and ecology structures; and
- Final tie-ins and soft landscape works.

Chiverton Junction

2.1.2 This is a large fill operation and would require the material from the cut areas local to this area i.e. Ch2+500 – Ch3+100 and also cut area east of Chybucca at Ch4+800 – Ch5+900 and Ch6+400 – Ch7+900. It is also likely that some import would be required. It is possible that the twin bridges at Chiverton Junction would be built at the same time as the earthworks is ongoing. The early construction of the Chybucca Junction and associated overbridge structure is critical to allow the A30 traffic to be diverted up and over the new structure, creating an uninterrupted haul road from east of Chybucca to Chiverton. It is estimated that only part of the bulk earthworks would be completed at Chiverton in the first earthworks season, whilst the Chybucca crossing is being created, and then the remainder would be completed in the second season when site won material can be brought from east of Chybucca.

Carland Cross Junction

2.1.3 This is another large fill area and there are no large cut areas nearby. The side road is programmed to be constructed in the first earthworks season with material acquired from west of Pennycomequick. The majority of the works are estimated to be completed in the second earthworks season when material can be brought in from Pennycomequick. The Carland Cross junction under bridge would be constructed at the same time as earthworks are ongoing.

Chybucca Junction

2.1.4 The programme would aim to construct the Junction overbridge as early as possible so that the connection road for the two roundabouts can be completed. The remainder of the scheme construction would have to fit in around these three main junctions with pockets of cut/fill to be completed after the bridges have been completed. i.e. Allet Road underbridge, Tolgroggan Farm overbridge, Trevalso Lane and the Pennycomequick underbridge.

Programme

2.1.5 The construction programme would be finalised in advance of the works. The duration of the works is currently estimated to require a construction period of at least 30 months, including two full earthworks seasons and excluding advance works/vegetation clearance/major utility diversions, archaeological testing and detrunking of the existing road.

2.1.6 Following construction there will be a 24-month environmental aftercare maintenance and monitoring period.

2.2 Temporary works to facilitate the construction of the scheme

Site compounds and storage areas

2.2.1 Temporary construction compounds would be established to provide designated areas to support advance preparatory works and construction operations.

2.2.2 Temporary construction compounds and temporary land for construction have been indicated on the General Arrangement and Section Plans (Document Reference 2.6) [APP-125 to APP-134].

2.2.3 The site compounds would be prepared by the removal of vegetation and overlaying with geotextile membrane prior to placement of temporary granular fill material. Car parking and pedestrian areas would be bolstered with asphalt surfacing. On completion of the scheme, these compound areas would be restored to their original condition, before being returned to the landowner or incorporated into the environmental mitigation proposals.

Main site compounds

2.2.4 It is currently proposed there are two main compounds located at each end of the scheme; Chiverton Junction underbridges will be known as the Eastern compound and Carland Cross Junction underbridge will be known as the Western compound. These will include with the main office buildings / welfare facilities, car parking / mini bus parking and the induction centre. Both compounds will provide traffic management / maintenance, material storage, satellite offices, fuel storage, washout pits for concrete and sweepers, waste segregation area and topsoil subsoil storage.

Additional Compounds

2.2.5 There will also be compounds for each junction and side road overbridge and underbridge. These will be located at the following locations:

- Chybucca Junction overbridge
- Allet Road underbridge
- Green overbridge at Marazanvose
- Tolgroggan Farm overbridge
- Trevalso Lane underbridge
- Pennycomequick underbridge

2.2.6 These compounds are to include welfare facilities, site office, storage for piling, formwork and reinforcement materials, fabrication area for bridge beams, plant lay down area, storage for highway materials and local topsoil / subsoil storage.

2.2.7 Areas have also been identified for bulk stone and topsoil stockpiling and storage in addition to the areas within the compounds. These are located at: Ch5+600, Ch6+600 and Ch8+300.

Temporary haul routes

2.2.8 A haul road will be established through the site, so it is assumed that all the site won material will be moved within the site using the haul road rather than the existing A30, with plant crossings required on some of the side roads.

2.2.9 Construction traffic will be restricted to operating on the designated haul road and not on the unprotected soils.

2.2.10 The haul route would be placed along sections of the scheme which would likely consist of single sized stone on a geotextile membrane. This would generate dust and would need regular watering.

2.2.11 The bulk earthworks will be constructed with typical earthworks moving plant such as excavators and dump trucks, track loaders and towed rollers.

2.3 Construction

Site clearance

2.3.1 Prior to the commencement of the construction works, the Outline CEMP (Document Reference 6.4) [APP-375] will be refined and expand into a Construction Environmental Management Plan (CEMP) which shall include a series of construction method statements covering the full range of construction activities to be carried out during the works including site clearance, bulk earthworks, road works and landscaping.

2.3.2 As detailed in Section 2.7 of Chapter 2 - The Project of the Environmental Statement (Document Reference 6.2) [APP-055], site clearance would commence in each area following the completion of any required ecological translocation activities identified during pre-construction surveys (moving of badger setts and vegetation clearance etc.) and archaeological investigation. Areas of vegetation clearance and top soil strip would be limited to that which is necessary for the construction of the scheme and would be phased to minimise the areas of exposed ground at any given time to reduce the potential risk for runoff.

2.3.3 Location of the construction compounds has been determined to prevent pollution, minimise waste and to encourage ease of use, and has taken into account environmental considerations including the potential for leakage and contamination. It is currently assumed that there will be minimal earthworks material unsuitable/unavailable for reuse (working assumption of approximately ≤5%). Storage of any contaminated material prior to treatment or disposal off site will be in a designated, bunded area on an impermeable surface, in line with Pollution Prevention Guidelines.

Earthworks

2.3.4 The earthworks slopes are generally 1:2.5 except for on the realigned B3277 and on the eastbound off-slip slip, where there are adjacent constraints and the slopes steepen to 1:2.

2.3.5 The combination of earthworks slopes of 1:2 and 1:2.5 and over ten large drainage ponds, the scheme earthworks are estimated to be close to a balance between the excavated and fill material.

2.3.6 A bulking factor of 5% has been assumed for the site won material for the purposes of transporting and placement of any site-won material within the site.

2.3.7 The earthworks strategy splits the site up into five zones. It is estimated that approximately 1.2 million cubic metres of site won material will be excavated with the works, with a maximum haul distance estimated to be approximately 5km, through internal site haul roads. The movement of site won material can be summarised as follows:

- Surplus from Zone 2 (Ch 3000 to 6500) to Zone 1 (Ch 0 to 3000);
- Surplus from Zone 3 (Ch 6500 to 9500) to Zones 1 (Ch 0 to 3000), 2 (Ch 3000 to 6500) and 5 (Ch 11940 to 14300); and
- Surplus from Zone 4 (Ch 9500 to 11940) to Zone 5 (Ch 11940 to 14300).

2.3.8 In addition to the structural fill, the scheme is estimated to generate a topsoil volume of approximately 400,000m^3, which will need to be stored before being re-used on the new verge and earthworks slopes and within the adjacent essential landscaping areas. This figure has been generated using an average depth of topsoil across the site of 350mm.

2.3.9 Where possible, the permanent earthworks drainage will be installed early, with cut-off ditches and filter drains, and these will manage the surface water run-off towards and within the site and discharge it into the existing watercourses via the temporary/permanent ponds as required.

2.3.10 Prior to the commencement of the construction works, the Outline CEMP (Document reference 6.4) [APP-375 and APP-376] will be refined and expand into a Construction Environmental Management Plan (CEMP) which shall include a series of construction method statements covering the full range of construction activities to be carried out during the works including site clearance, bulk earthworks, road works and landscaping.

Site Waste Management Plan

2.3.11 The generation and handling of waste materials from the construction phase is an important aspect of the environmental assessment and environmental control and management during construction. To ensure compliance with legislative requirements in relation to the management of waste, and to demonstrate a Duty of Care, the Outline CEMP includes an Outline Site Waste Management Plan (SWMP) in Annex B (Document Reference 6.4) [APP-376]. This will be developed further at detailed design.

3 Requirements

3.1 Summary of soils specific mitigation

3.1.1 The Environmental Statement provides mitigation measures for the area influenced by the scheme. Mitigation measures specifically relating to the management of the scheme soils are summarised Table 3-1 below.

Table 3-1 Summary of soil specific mitigation measures

Reference	Mitigation measures
Chapter 9 – Geology and Soils of the Environmental Statement (Document Reference 6.2) [APP-062]	• Mitigation measures will be implemented to reduce the impacts of construction activities within areas of potentially contaminated land or unexpected contamination in line with current best practice set out in a detailed Site Waste Management Plan (SWMP). This include measures to minimise the spread or release of contamination by suitably storing contaminated materials and appropriate waste disposal procedures. • A contamination risk assessment is to be undertaken prior to works. • Implementation of the Materials Management Plan (MMP) to manage the reuse of site won materials. This is to include a specification for suitable material to be used. • Prevent contamination being introduced into the environment and prevent existing contamination being mobilised or pathways to contamination being present during operation. • Undertake a contamination risk assessment in respect of controlled waters prior to works. This should outline existing sources of contamination, protective measures and remediation measures. • Carry out additional investigation/studies of mining area based on the results of surface geophysical studies.
Chapter 10 – Materials of the Environmental Statement (Document Reference 6.2) [APP-063]	• Reuse materials on site where possible following the Site Waste Management Plan and Materials Management Plan to implement, measure and monitor. • Material to be reused on site where possible. • Any excess materials to be sorted and where practical disposed of to local recycling facilities.
Chapter 12 – People and Communities of the Environmental Statement (Document Reference 6.2) [APP-065]	• Land required for construction compounds would be returned to its original use and condition as per before the works. The majority of that land will be agricultural use. As such, crop loss will aim to be reduced by giving advanced warning to enable farmers to plan ahead and consideration of field drainage impacts during the design phase. In areas of land which would be temporarily acquired, soils would be managed in accordance with DEFRA (2009) 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites' with Highways England and its contractor discussing and agreeing with Cornwall Council how agricultural land would be restored at the end of construction. • Holdings where temporary land take is anticipated to be higher are those where temporary construction compounds or material storage areas are proposed on their land. Best practice construction mitigation would be

	employed throughout this stage of the project and all temporary land take would be returned to the land owner in a restored state following the completion of construction activities. • In areas of land which would be temporarily acquired, soils would be managed in accordance with DEFRA (2009) 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites.' • The Outline Soils Management Plan must be developed to include details of how agricultural land will be restored at the end of construction.

3.2 Best practice and standards

Guidance

3.2.1 The main guidance and best practice which this document follows is the DEFRA Construction Code of Practice for the Sustainable use of Soils on Construction Sites[38] (CoP):

"Although there is various existing guidance on the care and use of soil for supporting the soft landscaping of construction projects, there is no overarching guidance on soil use and management at each stage of the construction process."

3.2.2 The main items of related guidance considered are listed within the DEFRA Construction CoP (up to 2009).

3.2.3 In addition to this, the Ministry of Agriculture, Fisheries and Food's (MAFF's) Good Practice Guide for Handling Soils[39] is used.

3.2.4 Highways England's "Manual of Contract Documents for Highway Works: Volume 1 Specification for highway works (Highways Agency, 1998 plus a series of amendments 1998-2016) – *Series 600 Earthworks* and *Series 3000* Landscape *and Ecology* deal with issues relating to the use and management of soil on highway schemes. These include: topsoil stripping methods, stockpiling methods and heights, subsoil preparation, depths of respread topsoil, treatments to topsoil, soil handling restrictions, seeding and planting and the management of landscape habitats.

British Standards

3.2.5 The British Standard BS3882:2015 - *Specification for Topsoil* sets out requirements for topsoil classification and composition, specifying characteristics such as texture, acidity and contaminants. It includes information on sampling and analysis and gives guidance on handling and site preparation so that soil is not degraded during excavation, delivery or placement.

3.2.6 The British Standard BS 8601:2013 –*Specification for subsoil and requirements for use* specifies requirements for the classification, composition and use of subsoils which are moved or traded to create soil profiles intended to support plant growth. It specifies requirements for multipurpose subsoil which is fit for the

[38] Department for Environment, Food, and Rural Affairs 2009. Construction Code of Practice for the Sustainable use of Soils on Construction Sites. Defra: London.
[39] MAFF (2000). Good Practice Guide for Handling Soils. Accessed on 28/03/2019. Available at: https://webarchive.nationalarchives.gov.uk/20090317221756/http://www.defra.gov.uk/farm/environment/land-use/soilguid/index.htm

majority of needs and also specific purpose subsoils that are acidic or calcareous for specialist use where acidic or calcareous soil profiles are required. It also specifies requirements for sampling and analysing subsoil.

3.2.7 These British Standards outline best practice methods of soil management which align with those included in DEFRA's Construction CoP.

4 Environmental baseline

4.1 Sources of information

4.1.1 The identification of baseline conditions in relation to site geology, geomorphology and land contamination is primarily based on desk study information prepared for the scheme and information obtained during the Phase 1, Phase 2 and Phase 2 Additional GI.

4.1.2 A detailed list of information sources of other reports used for baseline conditions and gap analysis can be found in Section 9.6 of Chapter 9 Geology and Soils of the Environmental Statement (Document Reference 6.2) [APP-062].

4.1.3 The sources of information used include previous reporting that has been prepared as the scheme has been developed, historical and geological mapping and other data sources. These are provided in Table 4-1.

Table 4-1 Sources of Information

Source	DCO Reference	Description
Preliminary Sources Study Report (PSSR)	Environmental Statement Appendix 9.1 (Document Reference 6.4) [APP-351]	This defines the key findings of a desktop study, including topography, geology and current ground conditions where known.
Ground Investigation Report	Environmental Statement Appendix 9.2 (Document Reference 6.4) [APP-352]	This provides details of the ground conditions across the scheme following the first phase of ground investigation (GI), completed between January 2017 and March 2017.
Ground Investigation Report Addendum	Appendix 9.3, Document Reference 6.4) [APP-353]	This provides details of the ground conditions across the scheme following the second phase of GI completed in October 2017
Agricultural Land and Soil Resources Report	Environmental Statement Appendix 12.4 (Document Reference 6.4) [APP-365]	This provides an independent review of Agricultural Land Classification (ALC) for the Order limits. It assesses the quality of farmland.
Agricultural Impact Assessment (AIA)	Environmental Statement Appendix 12.5 (Document Reference 6.4) [APP-366]	This provides further information about agricultural land and soils.

4.2 Geological setting

Geological designated sites

4.2.1 There are no statutory or non-statutory designated geological sites within the scheme study area.

Artificial ground

4.2.2 Artificial ground is only indicated to be present underlying the scheme between chainage 12+675m and 12+775m.

Superficial geology

4.2.3 Head deposits are present within the base of fluvial valleys, consisting of a stratum that is largely heterogenous comprising sandy clay with quartz pebbles and small angular local rock fragments with dispersed blocks.

4.2.4 Active fluvial deposition by streams has resulted in the presence of Alluvium at valley bottoms, this is very thin and therefore generally absent on published geological maps.

4.2.5 In the vicinity of Carland Cross, Zelah and Marazanvose, superficial deposits of glacial Head are mapped. These deposits may include poorly sorted gravel, sand and clay.

Structural geology

4.2.6 The thrust fault separating successions to the north is cross cut, impacting the geological boundary between the Grampound Formation and the overlying Porthtowan Formation. A zone of degraded rock quality and a significantly deep weathering zone was encountered within BH-220 and BH-306 at approximate chainage 9+250m.

4.2.7 The underlying bedrock mapped by the British Geological Survey[40] in the north of the survey area, between Carland Cross and north of Marazanvose, is the Grampound Formation, comprising thinly interlaminated slaty mudstone and siltstone. Sporadic beds of sandstone and limestone may also be present. South of Marazanvose, interbedded slaty mudstone and sandstone of the Porthtowan Formation is mapped. East of Carland Cross the bedrock is Trendrean Mudstone Formation.

4.3 Soils baseline

4.3.1 The 1:100000 scale Mineral Resources map of Cornwall[41] indicates the scheme alignment to be underlain by a sandstone resource. The Cornwall Council Interactive Map[42] does not indicate the presence of any Mineral Safeguarding Areas within the scheme study area. The Air Photo Interpretation Report[43] indicates areas of mottled soil between chainage 1+320m and 2+830m, resulting in poor drainage.

Soil Parent Material and Soil Type

4.3.2 The Soil Survey of England and Wales soil association mapping[44](1:250,000 scale) shows the Denbigh 2 association to be present throughout the survey area. This association consists of well drained, fine loamy soils overlying slate or slate rubble. In south Cornwall, some slates are locally more weathered to slowly permeable clays, though most soils are of Wetness Class (WC) I.

4.3.3 Around Carland Cross, Chybucca and Three Burrows, there are pockets of the Sportsmans association. These soils occur on ridge tops and valley sides over sandstones, slates and shales and are characterised by slowly permeable and compact subsoil overlain by more permeable loamy material. Sportsmans soils are typically of WC III[45]

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40 British Geological Survey (2017). Geology of Britain viewer, http://mapapps.bgs.ac.uk/geologyofbritain/home.html

41 Air Photo Interpretation Consultancy, "A30 Three Burrows to Carland Cross, Cornwall - second carriageway Air Photo Interpretation Report," 2017.

42 Cornwall Consultants, "Metalliferous Mineral Mining Search, A30 Carland Cross to Chiverton Cross, Report Ref DB/CMS/122430.," 2017.

43 British Standard , *BE EN 1997-2:2007 Eurocode 7: Geotechnical design. Ground investigation and testing (incorporating corrigendum June 2010),* 2010.

44 Soil Survey of England and Wales (1984). Soils of South West England (1:250,000), Sheet 5

45 Findlay et al. (1984). Soils and Their Use in South West England, Soil Survey of England and Wales, Bulletin 14. Harpenden

Agricultural land

4.3.4 The Agricultural Land Classification (ALC) system provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use. This offers a useful way of considering the sensitivity of receptors, sharing a five-point scale (with Grade 1 being of a very high sensitivity and Grade 5 negligible sensitivity).

4.3.5 Environmental Statement Appendix 12.4 Agricultural Land and Soil Resources Report (Document Reference 6.4) [APP-365] provides details of the land required and the associated ALC Grade. Approximately 147.5 hectares of the land within the 211.8 hectares redline boundary is believed to be used for agricultural production. Of this 69.9 hectares is Grade 2 (Very good quality), 44.3 hectares is Grade 3a (Good quality), 31.4 hectares is Grade 3b (Moderate quality) and 1.9 hectares is Grade 5 (Very poor quality).

4.4 Hydrogeological setting

Bedrock

4.4.1 Environment Agency hydrogeological mapping provides information on the hydrogeology of England. The entire site is classed as a 'Secondary A' aquifer for bedrock geology. All the aquifers in this superficial geology are either 'Secondary A' or 'Secondary undifferentiated' and these correspond to the Head and Alluvium positions.

Groundwater Vulnerability

4.4.2 The Environment Agency Groundwater Vulnerability Map[46] identifies the vulnerability of groundwater to contamination. These maps indicate most of the scheme lies within minor aquifer low and minor aquifer intermediate Groundwater Vulnerability Zones. A high minor aquifer groundwater vulnerability zone overlaps the scheme approximately 500m south-west of Two Barrows Junction.

4.4.3 Approximately 600m of the current A30, northeast of Carland Cross lies within a 'Zone 2' groundwater source protection zone. Two 'Zone 1' groundwater source protection zones directly underlie the scheme alignment. These source protection zones are for domestic and agricultural use.

Groundwater

4.4.4 Design groundwater levels vary from 1.1m to over 6m below existing level, therefore shallow groundwater may be encountered within excavations in the central third of the site.

Groundwater flooding

4.4.5 BGS data contained with the Groundsure report[47][48] shows the scheme alignment to traverse areas having moderate to high susceptibility to groundwater flooding within superficial deposits

[46] Environment Agency. (2016) Interactive Maps. [Online] Available from: www.environment-agency.gov.uk.
[47] Groundsure, "Groundsure Enviroinsight A30 Carland Cross to Chiverton Cross, GS62105222ENV_A," 2016.
[48] Groundsure, "Geoinsight A30 Carland Cross to Chiverton Cross, GS62105222GEO_A," 2016.

4.5 Hydrological setting

4.5.1 On a review of OS mapping, Chapter 13 – Road Drainage and Water Environment of the Environmental Statement (Document Reference 6.2) [APP-066] indicates that there are approximately 26 watercourses and surface water features within the 500m study area.

4.5.2 The alignment of the existing A30 broadly follows a ridgeline and, as such, surface water runoff generally falls to the north and south of the A30 and all existing and proposed crossings are close to the head of any watercourses. All surface water features are presented in Figure 9.4 of the Environmental Statement (Document Reference 6.3) [APP-238].

4.5.3 Environmental Agency hydrogeological mapping provides information on the hydrogeology of England. The entire site is classed as a 'Secondary A' aquifer for bedrock geology. All the aquifers in this superficial geology are either 'Secondary A' or 'Secondary undifferentiated' and these correspond to the Head and Alluvium positions.

4.5.4 The Environmental Agency Groundwater Vulnerability Map[49] identifies the vulnerability of groundwater to contamination. These maps indicate most of the scheme lies within minor aquifer low and minor aquifer intermediate Groundwater Vulnerability Zones. A high minor aquifer groundwater vulnerability zone overlaps the scheme approximately 500m south-west of Two Barrows Junction.

4.5.5 Approximately 600m of the current A30, northeast of Carland Cross lies within a 'Zone 2' groundwater source protection zone. Two 'Zone 1' groundwater source protection zones directly underlie the scheme alignment. These source protection zones are for domestic and agricultural use.

4.6 Ground quality (contaminated land)

4.6.1 The Groundsure report[5051] indicates that 2 fuel stations, 2 new vehicle sales units and a vehicle servicing centre are present along the site. Many of the entries within 250m of the route alignment relate to electrical infrastructure such as pylons, turbines, substations and solar electricity generation. Numerous tanks were also indicated though many if not all of them are in relation to agricultural irrigation, private water supply, or livestock/farm use.

4.6.2 Review of the historic uses listed in the Groundsure report[5051] indicate that the majority of features within the study area are in relation to the historic mining.

4.6.3 Review of records of Environment Agency Recorded Pollution incidents indicate 3No. incidents have occurred within the study area. All three did not surpass the category 3 minor land impact.

4.6.4 Numerous Environment Agency discharge consents are noted within the study area. Many of these relate to domestic and farm property drainage and discharge systems. A soakaway at the Shell petrol station is also noted as defects with the fuel interceptor could result in potential contaminants being released.

[49] DEFRA, "Magic Map," [Online]. Available: http://magic.defra.gov.uk/MagicMap.aspx. [Accessed 21 08 2017]
[50] Groundsure, "Groundsure Enviroinsight A30 Carland Cross to Chiverton Cross, GS62105222ENV_A," 2016.
[51] Groundsure, "Geoinsight A30 Carland Cross to Chiverton Cross, GS62105222GEO_A," 2016.

4.6.5 Review of Designated Environmentally Sensitive Sites indicates that much of the scheme lies within a DEFRA designated Nitrate Vulnerable Zone.

4.6.6 In general, soils encountered show little evidence of contamination.

5 Soil survey and record of condition

5.1.1 A pre-construction detailed soil survey work would be undertaken by a competent person (e.g. a soil scientist) in order to produce specific soil resource topsoil and subsoil unit plans and restoration specifications for areas of agricultural land within individual land holdings that will be occupied by the contractor. These surveys will form the basis of the pre-construction condition assessments of the land prior to soil stripping operations and will be used to monitor the progress of soil handling and restoration operations.

5.1.2 The survey work will include the identification of the physical characteristics of profiles at a standard density of 100 m intervals (with additional profiles examined where the 100 m grid sampling does not enable a suitable density of sampling in an agricultural enclosure that will otherwise be missed.). Soil pits will also be examined at appropriate locations to provide additional detail on soil structure and stoniness. The survey will provide information on the following soil physical characteristics:

- Soil horizon depths for topsoil and subsoil horizons;
- Soil textures of all horizons;
- Soil colour;
- Stone contents, estimated from augering, confirmed by soil pit excavation/and or sample
- analysis;
- Presence and characteristics of mottling, a soil wetness indicator;
- Presence of manganese concretions, a soil wetness indicator;
- Identification of gleyed horizons;
- Identification of slowly permeable layers; and
- Identification of impenetrable rock layers.

5.1.3 Record of Condition will be undertaken and will include the following:

- Existing crop regimes
- The position and condition of existing field boundaries
- The condition of existing access arrangements
- The location and type of existing private water supplies
- The yield of crops
- The quality of grazing land
- The existing weed burden

5.1.4 Photographs and section drawings should be included in the record of condition and it should be provided to the landowner and occupier, for agreement, prior to entry to the landholding.

6 Soil protection, soil handling and soil stripping

6.1.1 Topsoil stripping will be restricted to the width of the permanent and temporary elements of the scheme. Based on the assumed estimates of area which would be permanently affected, that is the area of the main line and side roads, approximately 801,956m^2 (square metres or 80 hectares), and the estimates of average depth of topsoil 250mm, the calculated estimate of the volume of topsoil affected is 200,489m^3 (cubic metres). Note: As this is a live document, volumes are subject to change as the scheme progresses.

6.1.2 Temporary land-take in the vicinity of the proposed dual carriageway is required for construction, storage of materials, compound areas, welfare units, and haul routes. An estimate has been made for the temporary land-take using the extent of the temporary working areas. The estimated temporary land-take area is approximately 266,147 square metres (26 hectares) [to be updated by the contractor during detailed design]. For the area of temporary land-take, topsoil volume estimates of 64,914 metres cubed [to be updated by the contractor during detailed design] for the compound area, and 1623 metres cubed [to be updated by the contractor] for the haul routes are estimated. Actual volumes are likely to vary as works begin.

6.2 In-situ soil protection measures

6.2.1 Land which will not be disturbed by the scheme during construction (e.g. around features like retained trees) will be fenced off, clearly marked and not traversed by machinery.

6.2.2 Areas of soil that are to be protected and not be disturbed are assumed to be both those at the red line boundary and those located on land located within the red line boundary but within areas which would not be utilised as part of the permanent or temporary land-take. These areas would be protected and a drawing would be produced by the contractor to show these locations. These areas should be fenced off, clearly marked by barrier tape and exclusion signs, and not traversed by machinery.

6.2.3 Haul routes should be no wider than necessary to accommodate two passing vehicles and should be stripped of soil down to a firm base, with indiscriminate vehicle movements across soil must be avoided.

6.2.4 Changes to haul routes or alterations to the areas to be protected or stripped would not be undertaken unless given approval by the scheme Environmental Clerk of Works, and once approved, alterations must be clearly marked on plans readily accessible by relevant site personnel.

6.2.5 Tracked vehicles are to be used where soil trafficking is unavoidable.

6.2.6 Areas of temporary land-take that would have topsoil and subsoil reinstatement would have a protective geotextile membrane covering the underlying surface.

6.3 Soil handling

6.3.1 Large construction vehicles will not be driven or hauled within the land required for the scheme from which topsoil/ subsoil has not been stripped (except for the purposes of stripping) unless protective temporary surfaces are used. Wheeled

machinery will not go over soil stockpiles, unless necessary for seeding, sward maintenance or weed control.

6.3.2 All soil materials will be handled under suitable weather and soil conditions using appropriate machinery.

6.3.3 The sources, locations, contents and approximate volumes of soil stockpiles will be available from the pre-construction detailed soil survey work (in line with section 5) compiled prior to the stripping and storage of soils. These records will form part of the baseline information and will be made available. In defining target restored profiles the volumes of available soils in storage will be related to the areas of each parcel of land to be restored.

6.3.4 Soils will be handled when least susceptible to damage, and in accordance with DEFRA's Construction CoP. The MAFF Good Practice Guide, 2000 (Sheets 1 to 4) describes the typical machinery that will be used in most cases to strip and transport soil materials into and out of store, and to reinstate topsoils and subsoils. For example, alternative specialised machinery will be used for landscape planting on areas with steeper slopes (see section 8.4). Soil handling machinery will be restricted to marked haul routes and will not traverse undisturbed or replaced soils, except where such trafficking is essential for the permitted operations agreed with the nominated undertaker.

6.4 Soil stripping measures

Topsoil stripping

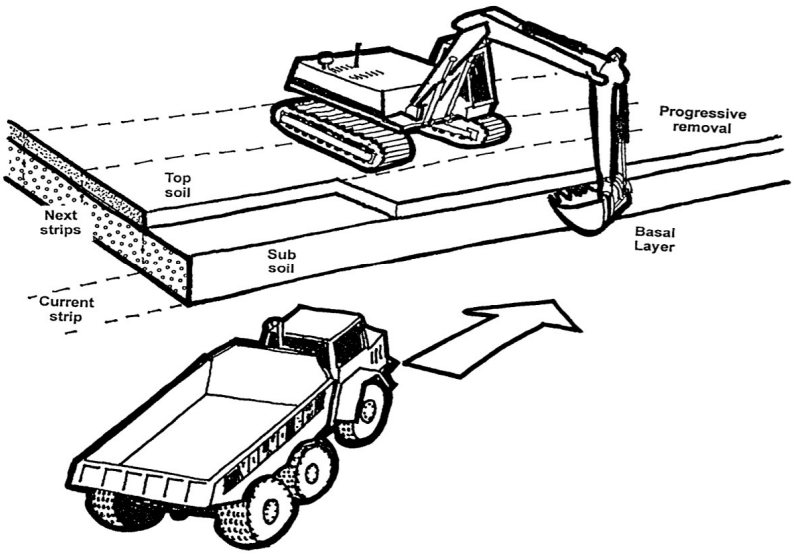
6.4.1 Before the commencement of work on-site, topsoil from all areas that are to be disturbed by permanent or temporary works would be stripped by earthmoving plant that is appropriate to the size of the site, volume of soil to be stripped, and haul distances.

6.4.2 Topsoil would normally be stripped to a thickness defined by depth below the surface and / or a distinct colour change. Stripping topsoil too deeply so that subsoil becomes incorporated will reduce its quality and fertility. See Table 6-1 for the measures to be employed on site.

Table 6-1 Topsoil stripping guidance

Details	Description of measures
Aim	• To ensure topsoil as a finite resource is stripped to enable future reuse, and not wasted.
Specification	• Surface vegetation would be removed by blading off, scarification and raking, or killed off using suitable non-residual herbicide applied not less than two weeks before the commencement of stripping. • Soil that is Soil Association certified must be handled in accordance with the organic standards of the Soil Association52 that come into effect April 2019. • Vegetation above 100mm would be cut (considering any ecological precautionary method of working) and removed from the land surface prior to topsoil stripping. This would help minimise the risk of anaerobic zones developing in the soil stockpiles.

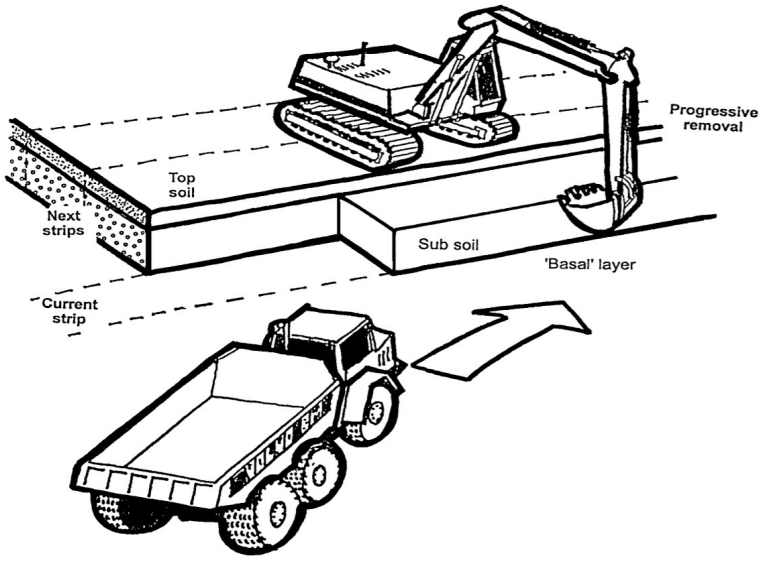
[52] Soil Association (2019). Soil Association Standards - Farming and growing https://www.soilassociation.org/media/17199/preview-soil-association-farming-and-growing-standards.pdf

	• Topsoil would be carefully stripped from all areas being returned to agriculture and placed in soil storage within the same area (to minimise the risk of spreading animal diseases and soil borne plant pests) which would be used in the restoration of that land. • It is not necessary to strip topsoil from the areas where topsoil would be stored. • The preferred method of minimising the damage to topsoil would be the use of a tracked excavator on the surface of the topsoil (minimising soil compaction) and digging to the topsoil's maximum depth and loading it onto site or transport vehicles. Transport vehicles would be driven on the subsoil, or basal layer if the subsoil is to be stripped, and confine movements to designated temporary haul routes. • Other methods of stripping which offer the same level or more protection of topsoil are acceptable. • Topsoil stripping depth at areas of permanent land-take, temporary haul routes and compounds is estimated to be an average of 300mm, it is likely to vary on-site. • Topsoil stripping should be performed in the driest condition possible. If periods of sustained heavy rainfall (for example. >10mm in 24 hours) occurs during soil stripping operations, work must be suspended and not restarted until the ground has had at least one full dry day or agreed moisture criteria (for example, a specified soil moisture content) can be met. • Over deep stripping would mix topsoil and subsoil and must be avoided. Colour differences would help identify the layers in conjunction with the recommended topsoil stripping depths. If it is unclear the depth of subsoil advice should be sought from the scheme Environmental Clerk of Works. • Once topsoil has been stripped from temporary land-take areas, the contractor would survey the extent of any exposed land drains and have their condition assessed and recorded.
Diagram	 Source: MAFF (2000). Good Practice Guide for Handling Soils. Sheet 1: Soil Stripping with Excavators and Dump Trucks Accessed on 28/03/2019. Available online at: https://webarchive.nationalarchives.gov.uk/20090318025503/http://www.defra.gov.uk/farm/environment/land-use/soilguid/sheet01.pdf

Subsoil stripping

6.4.3 As with topsoil, subsoil from all areas that are to be disturbed by permanent or temporary works would be stripped by earthmoving plant that is appropriate to the size of the site, volume of soil to be stripped, and haul distances prior to the commencement of work. Guidance for subsoil stripping is summarised in Table 6-2.

Table 6-2 Subsoil stripping guidance

Details	Description
Aim	• To ensure subsoil is not damaged or wasted, allowing its reuse.
Specification	• Topsoil would first be stripped from all areas from which subsoil is to be removed for reuse. • The preferred soil stripping method is the removal of each soil unit the soil layers above the base/formation layer are removed in sequential strips that can be up to 6m wide (the reach of a 360 excavator). • Using an excavator bucket with teeth is preferable to using one without; • Where there is a cover of topsoil, that layer is removed first before stripping subsoil to the specified depth. The soil transport vehicle runs on the layer beneath the subsoil. • Subsoil is to be stripped to a depth of approximately 350mm (upper subsoil layer, estimated depths range from 250mm and 450mm) actual depths will depend upon the nature of subsoil encountered and may be informed by trial holes. • Other methods of stripping which offer the same level or more protection of topsoil are acceptable. • Subsoil stripping should be performed in the driest condition possible. If periods of sustained heavy rainfall (for example >10mm in 24 hours) occurs during soil stripping operations, work must be suspended and not restarted until the ground has had at least one full dry day or agreed moisture criteria (for example a specified soil moisture content) can be met.
Diagram	 Source: MAFF (2000). Good Practice Guide for Handling Soils. Sheet 1: Soil Stripping with Excavators and Dump Trucks Accessed on 28/03/2019. Available online at: https://webarchive.nationalarchives.gov.uk/20090318025503/http://www.defra.gov.uk/farm/environment/land-use/soilguid/sheet01.pdf

Source Defra

7 Soil stockpiling and storage

7.1 Soil stockpiling

7.1.1 The contractor must ensure soils are protected from damage and remain suitable for reuse on or off site.

7.1.2 Soils stripped during construction are to be stored in temporary stockpiles. The aims of storing soil materials in temporary stockpiles are to:

- Prevent their damage from the weather and construction activities.
- Minimise the surface area occupied.
- Maintain soil quality and minimise damage to the soils physical (structural) condition so that it can be easily reinstated.
- Avoid the mixing of different soil materials to the detriment of their overall quality - topsoils and subsoil should be stockpiled separately.
- Minimise soil erosion, pollution to watercourses and increased flooding risk to the surrounding area.
- Avoid additional and unnecessary remediation, compensation and materials costs by achieving all the above.

7.2 Soil stockpile location

7.2.1 Locations that are currently being reviewed for mass storage or processing of soils are detailed in Table 7-1.

Table 7-1 Locations for mass storage or processing of soils

Compound Location	Chainage	Purpose of Site Compound
Chiverton storage area	Ch. 700	Material storage and processing area - office cabin / welfare facilities, wheel wash
Marazanvose storage area	Ch. 6,700	Material storage and processing area - office cabin / welfare facilities, wheel wash
Shortlanesend road	Ch. 8,300	Material storage and processing area - office cabin / welfare facilities wheel wash.

7.2.2 Where appropriate, topsoil and any subsoil material would be stockpiled as close as possible to where it arises. Soil stripped to create the haul routes would be stockpiled in a linear bund adjacent to the routes. Soil stripped for compound areas would be stockpiled in adjacent bunds, which can also be used to provide a visual and acoustic screen.

7.2.3 Stockpiles must not be positioned within the root or crown spread of trees, or adjacent to ditches, watercourses or existing or future excavations.

7.3 Soil segregation measures

7.3.1 Soils of different Soilscape classifications and ALC classifications would be segregated and stored separately.

7.3.2 Topsoil and subsoil would need to be stored separately, to minimise contamination and loss of suitable material. Topsoil should only be stored on topsoil, and should be removed from any areas where subsoil is to be stored.

7.3.3 In addition, if any unanticipated materials such as Made Ground are encountered during stripping these should be separated from both topsoil and subsoil and stockpiled separately. Anticipated Made Ground as identified during the intrusive ground investigaton (GI) should be segregated and stored separately following the guidance within the scheme Remediation Strategy (to be produced following completion of the currently ongoing intrusive GI and subsequent contaminated land interpretative reporting).

7.4 Soil stockpiling measures

7.4.1 Guidance outlined in the DEFRA's Construction CoP suggests stripped soil materials (topsoil and distinct subsoil layers) are to be stockpiled according to the following method:

- Ground to be used for storing the topsoil must be cleared of vegetation and any waste arising from the development (for example, building rubble and fill materials).
- Topsoil must be stripped from under subsoil / Made Ground stockpile locations.
- Individual topsoil and distinct subsoil are to be stockpiled separately and different materials must not be mixed either with each other, or with contaminated materials or organic materials arising from vegetation clearance.

7.4.2 The proposed methodologies for construction of soil stockpiles in accordance with the DEFRA’s Construction CoP and professional experience are set out below:

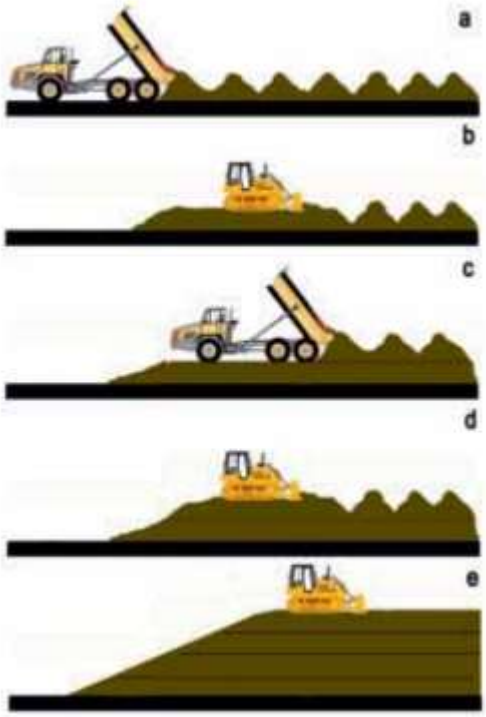
- Topsoil required for agricultural restoration would be stored as close to the farm of origin as possible to present the spread of disease.
- Topsoil and subsoil would be stored separately and 'like on like' to minimise contamination and loss of suitable material. For example, topsoil should only be stored on topsoil. Topsoil shall be stripped and removed from any areas where subsoil is to be stored.
- Records would be maintained of the origin and storage location of all topsoil and subsoils to enable restoration in the correct place and sequence.
- Areas of soil storage on-site would be signed with the type of soil and protected from machine incursion;
- Soil storage locations would be positioned away from tree canopies and hedges (at least 10 metres).
- Soil stockpiles along the haul road would be 2 metres in height.
- No materials would be stored on top of soil stockpiles and the operation of construction plant on storage mounds would be restricted to placement and removal of soils.
- Soil stockpiles would be constructed with a slope angle normally not be less than 40 degrees, as that is the natural angle of repose (dependent on texture and moisture content).
- Where stockpiles are to be long term (>3 months) consideration of seeding to control potential dust generation would be considered;
- Seeding would also minimise soil erosion and help reduce infestation by nuisance weeds.
- The temporary storage of soil in agreement with local interested parties can be positioned as such to act as a temporary screen of the construction activities.

7.4.3 There are two principal methods for forming soil stockpiles, based on their soil moisture and consistency.

7.4.4 Method 1 should be applied to soil that is in a dry and non-plastic state. Details are provided in Table 7-2. The aim is to create a large core of dry soil, and to restrict the amount of water that can get into the stockpile during the storage period. Dry soil that is stored in this manner can remain so for a period of years and it is reuseable within days of respreading.

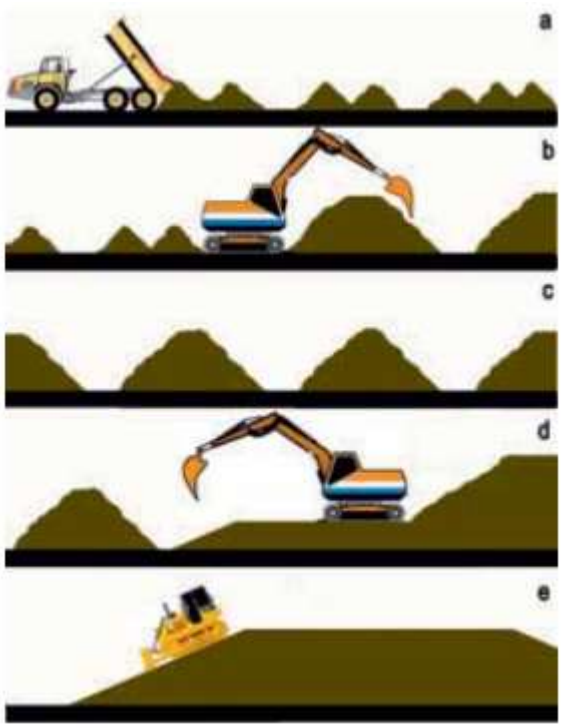
7.4.5 Method 2 should be applied if the construction programme or prevailing weather conditions result in soil having to be stockpiled when wet and/or plastic in consistency. Details are provided in Table 7-3. This method minimises the amount of compaction, while at the same time maximising the surface area of the stockpile to enable the soil to dry out further. It also allows the soil to be heaped up into a 'Method 1' type stockpile, once it has dried out.

Table 7-2 Stockpiling method for dry non-plastic soils

Details	Description – Method 1	
Aim	The aim is to create a large core of dry soil, and to restrict the amount of water that can get into the stockpile during the storage period. Dry soil that is stored in this manner can remain so for a period of years and it is reuseable within days of respreading.	
Diagram and Specification		• The soil is loose-tipped in heaps from a dump truck (a), starting at the furthest point in the storage area and working back toward the access point. • When the entire storage area has been filled with heaps, a tracked machine (excavator or dozer) levels them (b) and firms the surface in order for a second layer of heaps to be tipped. • This sequence is repeated (c & d) until the stockpile reaches its planned height. • To help shed rainwater and prevent ponding and infiltration a tracked machine compacts and re-grades the sides and top of the stockpile (e) to form a smooth gradient.

Source Defra

Table 7-3 Stockpiling method for wet plastic soils

Details	Description – Method 2	
Aim	This method minimises the amount of compaction, while at the same time maximising the surface area of the stockpile to enable the soil to dry out further. It also allows the soil to be heaped up into a 'Method 1' type stockpile, once it has dried out.	
Specification and diagram		• The soil is tipped in a line of heaps to form a 'windrow', starting at the furthest point in the storage area and working back toward the access point (a). • Any additional windrows are spaced sufficiently apart to allow tracked plant to gain access between them so that the soil can be heaped up to a maximum height of 2m (b). • To avoid compaction, no machinery, even tracked plant, traverses the windrow. Once the soil has dried out and is non-plastic in consistency (this usually requires several weeks of dry and windy or warm weather), the windrows are combined to form larger stockpiles, using a tracked excavator (d). • The surface of the stockpile is then regraded and compacted (e) by a tracked machine (dozer or excavator) to reduce rainwater infiltration.

Source Defra

7.5 Soil stockpile maintenance

7.5.1 The stockpiles would be maintained by the following method:

- Once the stockpile construction has been completed, the area must be cordoned off with secure fencing to prevent any disturbance or contamination by other construction activities.
- Each soil stockpile must be clearly signed / labelled as to the type of material present (for example, topsoil, subsoil A, subsoil B) and its origin.
- Should they appear, management of weeds must be undertaken regularly during the summer months either by spraying or by mowing or strimming to prevent their seeds being shed.
- Soil stockpiles must not be disturbed by unnecessary trafficking or other activities during the storage period.

7.6 Stockpiling of non-soil materials

7.6.1 Stockpiling of materials is only to take place on areas which have been stripped of topsoil and subsoil. The underlying material would be overlain by geotextile to prevent mixing of materials.

8 Soil preparation and reinstatement

8.1.1 Adequate preparation is essential to enable successful re-use of the site-won soils, allowing successful revegetation and landscaping in accordance with the proposed landscaping scheme. This has significant sustainability benefits by minimising requirements for disposal and importation of soils.

8.1.2 Reinstatement will involve topsoil being placed above subsoil. Where upper subsoil is to be replaced, it will be placed above lower subsoil. The methodology used will be based on DEFRA's Construction CoP to minimise damage to soils. Approaches may be modified to suit particular soil types or local circumstances. The completed restoration will be cultivated to a seed bed appropriate to the first crop or vegetation, as agreed with landowners, farmers or tenants. Aftercare and subsequent monitoring will then be carried out.

8.2 Locations

8.2.1 Soils stripped from areas of temporary land-take (compounds, storage areas and haul routes) would be reinstated on-site.

8.2.2 Soils stripped from areas of permanent works earthworks if not needed to be reused on-site would be removed off-site as a material for re-use elsewhere.

8.3 Methods

Decompaction Specification

8.3.1 The receiving substrate must be de-compacted prior to the receipt of subsoil or topsoil resources for agricultural land restoration. Guidance from DEFRA Construction CoP states that the receiving basal layer is likely to have been compacted during construction activities, temporary use of compound areas, or soil stockpile storage. The purpose of de-compaction is to break up any panning to reduce flood risk and promote deeper root growth.

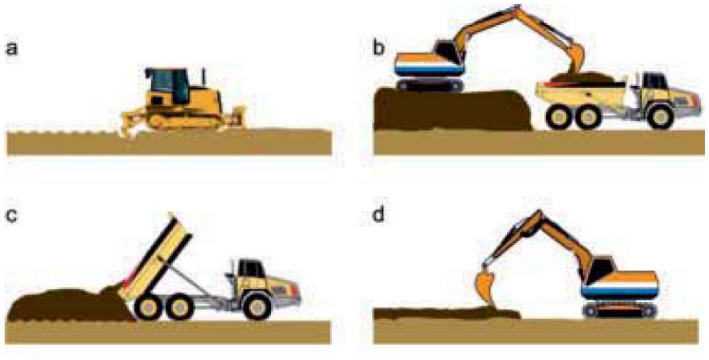
8.3.2 The type of de-compaction method employed in an area of the site is dependent on the amount of space available and the extent of compaction observed:

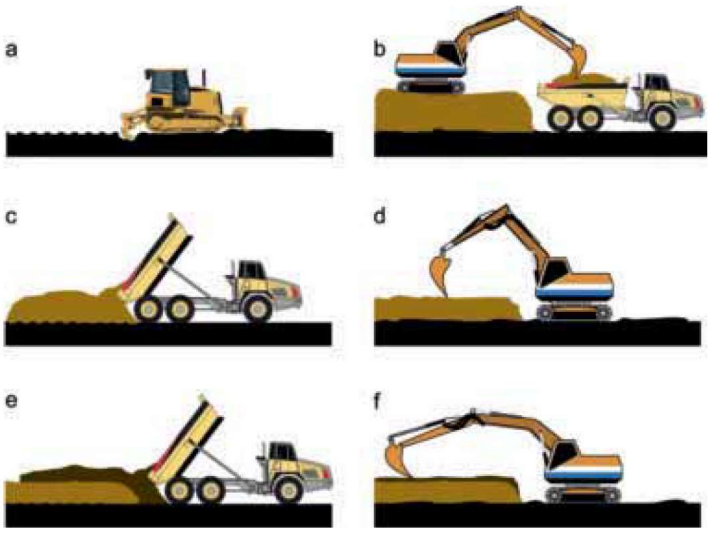
- A small (1-5 tonne) to medium sized (13 tonne) tracked excavator, fitted with a single rigid tine is effective in restricted areas, such as in planting beds and road verges.
- In more open areas, a tractor-drawn subsoiler is capable of loosening soil that is not too heavily or deeply compacted and compressed air injection can also be used to de-compact the soil profile in such locations.
- Deep compaction can only be effectively relieved using heavy duty ripper equipment, such as a single rigid tine device.
- For loosening to be most effective, it must be carried out when the soil is sufficiently dry to the full depth of working (otherwise the tine merely cuts and smears the subsoil rather than lifting, fracturing and loosening it).
- A toothed excavator bucket is not an appropriate tool for ripping soil and must not be used.

Soil spreading Specification

8.3.3 Specification set out in DEFRA Construction CoP and professional experience are incorporated and presented in Table 8-1.

Table 8-1 Loose-tipping soil spreading method

Details	Description	
Aim	To respread stockpiled soil material to provide a structured, uncompacted, and well-aerated soil profile for successful establishment and subsequent growth of plants and grass. Preventing over-compaction which leads to waterlogging, and anaerobic environment which leads to poor establishment or failure of vegetation growth, and increase surface runoff.	
Specification	• When all structures, machinery, and materials (including any protective membranes installed above the subsoil) have been removed grading would take place to ensure the necessary drainable levels are achieved. • The subsoil would be thoroughly loosened but only in dry conditions. Suitable rotary equipment (for example winged tine subsoiler) shall be used to working to a depth of 250mm in the subsoil. Subsoil loosening shall be carried out before topsoil replacement taking care around buried services and shallow drains. • If sustained heavy rainfall (for example >10mm in 24 hours) occurs during or immediately prior to spreading operations, work must be suspended and not restarted and the soil must not be trafficked until the receiving ground has had at least a full dry day to dry. • A hydraulic excavator, fitted with a toothed-bucket to avoid excessive smearing, would be used to load the soil materials from the source area or stockpile into a dump truck which then discharges them onto the receiving surface. • An excavator would then spread newly dropped soil to the required thickness. If there is to be more than one soil layer (in other words if both topsoil and subsoil are being replaced) then the whole length of the strip is restored with subsoil before the process is repeated with topsoil. • The topsoil would be lifted onto the subsoil without the excavator travelling on the newly placed subsoil. Only when the strip has been completed is the next one started. • Topsoil would be replaced to the original depth (as identified prior to earthworks commencing) whilst minimising compaction of the loosened subsoil and limiting work to dry conditions. • Ideally topsoil should be loose tipped and levelled without re-compacting the subsoil. If this cannot be achieved further loosening would be carried out once the topsoil has been replaced. • Any stones greater than approximately 100mm in diameter should be removed. • If the soil is cloddy (lumpy) in structure, the excavator bucket can be used to break up the clods. Large stones can be removed during the operation. • Modified versions of the loose-tipping method, for use when both subsoil and topsoil are to be placed, include spreading the subsoil as described above but then spreading the topsoil layer out using a low ground pressure dozer. Providing that soil conditions are suitably dry and dozer movements are minimised, this can gently consolidate the placed soil without causing over-compaction	
Topsoil		a) loosening the subsoil of the receiving ground b) loading of topsoil from stockpile c) backtipping topsoil onto loosened subsoil d) levelling topsoil

Topsoil and subsoil		a) loosening the substrate of the receiving ground b) loading of subsoil from stockpile c) backtipping subsoil onto loosened substrate d) levelling subsoil e) backtipping topsoil f) spreading topsoil over subsoil using excavator working on substrate

Source Defra

8.4 Restoration for Landscape and Ecology

8.4.1 Similar soil reinstatement methods will be applied to land reinstated for landscape planting on land with shallow to moderate gradients, and where access permits. Alternative methods using specialised machinery will be applicable for landscape planting on areas with steeper slopes, particularly for cuttings and embankments. Soil placement on inward-facing railway slopes will be in accordance with DMRB. Soil depths and fertility requirements will be specified for different planting or habitats. For the translocation of soils from sensitive donor sites efforts will be made to match the soils in donor and receptor sites.

8.5 Biosecurity

8.5.1 During construction there is the potential for disease, pathogens and harmful/non-native weed transfer between different areas of agricultural land (i.e. a biosecurity risk). The movement of soil resource is considered as a main cause of disease, pathogen and weed transfer, due to the transfer of soil from infected to uninfected areas. Therefore, the use of the best practice measures set out in this Soil Management Plan, will minimise soil loss and soil movement.

8.5.2 To avoid the spread of invasive non-native species, pests and pathogens during construction; and ensure legal compliance an outline invasive Species Management Plan (Annex D) has been produced detailing specific control procedures and will be developed further during detailed design.

8.6 Monitoring and aftercare

8.6.1 During construction on-site inspections of works will be carried out to monitor progress and standards of restoration. Completed works will be inspected by a suitably qualified and experienced soil scientist or practitioner to certify that the land has been restored to the specifications required.

8.6.2 The schedule of aftercare maintenance is to include soil testing, appropriate to the target specification, for a period of up to five years following completion of the relevant construction work.

8.6.3 Should the target specification not be met by the expiry of the period of five years for aftercare maintenance mentioned in paragraph 23.1 (“the initial period”), then,

if the landowner has fully complied with a schedule of aftercare, the Contractor, informed by a suitably qualified agricultural soils scientist or practitioner, has reasonable grounds to believe that the target specification could be met within a further period (being no longer than a further period of two years), and the initial period shall be extended by that period.

8.6.4 The reasonable cost of compliance by the relevant landowner with the schedule of aftercare shall be borne by the Contractor save where such cost has been compensated under the compensation code.

8.6.5 The following actions would be undertaken during monitoring and aftercare:

- Continuing communication with the landowner shall be maintained to keep them informed of progress and to deal with any matters arising.
- A before and after survey of levels to ensure correct drainage and soil depths, as detailed in Chapter 5 of this Soil Management Plan.
- Cropping as soon as possible is strongly advised with a crop that has a good rooting system (grass or cereals). This would help minimise soil slumping and erosion in the event of heavy rainfall.
- Cultivation - The reinstated soils will be cultivated to enable the initial aftercare crop to be established. The cultivations required will vary according to soil type, site and weather conditions at the time but could include the use of plough, power harrow and roll. In addition, stone picking may also be required where excessive stone volumes have become incorporated in reinstated topsoil areas. The specified cultivations will be subject to discussion with the landowner prior to implementation. During the aftercare period, there will be annual monitoring of physical soil characteristics and soil nutrient levels to set aftercare management requirements for the following year. The land will be handed back to the owner at the earliest opportunity once the restored land is in a suitable condition to be returned to its former use.
- The landowner shall approve and agree the reinstatement works before and after soil replacement.
- A final report to determine the final handover condition of the agricultural soil will be produced.

Annex Q: Outline Landscape and Ecology Management Plan

1 Introduction

1.1 Scope and purpose of Outline LEMP

1.1.1 This Outline Landscape and Ecology Management Plan (OLEMP) provides a framework for achieving the 'vision' of the Environmental Masterplan (Environmental Statement (ES) Document Reference 6.3, Figure 7.6) [APP-180 – APP-200] for the A30 Chiverton to Carland Cross scheme (the scheme).

1.1.2 The management plans within this OLEMP are draft and would be further developed during detailed design and described within the final Landscape and Ecology Management Plan (LEMP) and Landscaping Scheme.

1.1.3 The A30 Chiverton to Carland Cross scheme passes through largely arable and pastoral farmland areas (predominantly improved grassland), with hedgerows and belts of trees bisecting the fields. A small number of fields are more species-rich, and some areas of woodland would be affected by the scheme, along with a small isolated area of heathland, marshy grassland, scrub and wet areas such as streams and ponds.

1.1.4 The OLEMP forms part of the strategy for successfully integrating the scheme within this landscape and ensuring the mitigation of many of the related impacts identified within the Environmental Statement (ES).

1.1.5 Schedule 2 of the draft DCO includes Requirements relevant to Landscape and Ecology, namely:

- Requirement 3 (Construction Environmental Management Plan (CEMP))
- Requirement 5 (Landscaping)
- Requirement 6 (Implementation and maintenance of landscaping)
- Requirement 7 (Fencing)
- Requirement 10 (Protected species)
- Requirement 12 (Detailed design)

1.1.6 These Requirements have been used to inform the management and monitoring plans as detailed within this OLEMP.

1.1.7 The OLEMP should be read in conjunction with the **Outline CEMP** and the **Outline CEMP Annexes** (Document Reference 6.4) [APP-375 and APP-376], with reference to:

- Annex D: Outline Invasive Species Management Plan
- Annex E: Outline Ecological Management Plan
- Annex H: Outline Pollution Prevention and Control Management Plan
- Annex I: Outline Arboricultural Method Statement and Tree Protection Plan
- Annex N: Outline Method Statement for the Translocation of Heathland
- Annex P Outline Soils Management Plan

1.1.8 There is considerable analogy between Annex E: Outline Ecological Management Plan (OEMP) of the **Outline CEMP Annexes** (Document Reference 6.4) [APP-376] and the requirements within the OLEMP; such analogies are referenced in

this document. The contractor should consider these two outline management plans in combination when preparing the final LEMP for approval.

1.1.9 For the initial five-year period following completion of construction, the detailed landscape management proposals shall be set out by the contractor in a Handover Environmental Management Plan (HEMP), responsibility for which would be taken on by Highways England.

1.1.10 The HEMP would then be subject to a process of ongoing review and amendment during the lifetime of the scheme to ensure it remains relevant. Highways England's *Landscape Management Handbook*[53] states that the landscape management plans would be updated annually and formally reviewed every five years.

1.1.11 The OLEMP should be read in conjunction with the following:

- Appendices 30/1 to 30/11 of the Manual of Contract Documents for Highway Works (MCHW) Specification for Landscape Works[54];
- Highways England Routine and Winter Service Code[55];
- Highways England Network Management Manual[56];
- Highways England DMRB (Vol10 Section 1) Integration with Rural Landscapes[57];
- Highways England DMRB (Vol10 Section 3 Part 2) Landscape Management Handbook[58]; and
- Highways England DMRB (Vol10 Section 3 Part 1) Wildflower Handbook[59].

1.1.12 This document begins by setting out the approach and a summary of the landscape and ecological requirements within the context for the scheme. Three sections then discuss the pre-construction plans, construction / habitat creation plans and post-construction / monitoring and maintenance plans required for landscape and biodiversity across the scheme. These plans range from ground preparation to long-term management, maintenance and monitoring, including safeguarding flora and fauna, legal compliance, habitat creation and wildlife structures.

1.2 Approach

1.2.1 Biodiversity conservation and improvement is a core objective of the scheme. The scheme offers the opportunity to create an attractive setting for the dual carriageway, reflecting valued landscape characteristics which would integrate

[53] Highways England, Design Manual for Roads and Bridges, Volume 10, Environmental Design and Management, Section 3 Landscape Management, Landscape Management Handbook: http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol10/section3/ha10804.pdf, accessed August 2018

[54] Highways England, Manual of Contract Documents for Highways Works, Volume 1 Specification for Highways Works, Series 3000 Landscape and Ecology, May 2001: http://www.standardsforhighways.co.uk/ha/standards/mchw/vol1/pdfs/series_3000.pdf, accessed August 2018

[55] Highways England, Design Manual for Roads and Bridges, Routine and Winter Service Code, 2009: http://www.standardsforhighways.co.uk/ha/standards/nmm_rwsc/docs/rwsc.pdf, accessed August 2018

[56] Highways England, Design Manual for Roads and Bridges, Network Management Manual, Issue 1, Amend No. 8, July 2009: http://www.standardsforhighways.co.uk/ha/standards/nmm_rwsc/index.htm, accessed August 2018

[57] Highways England, Design Manual for Roads and Bridges, Integration with Rural Landscapes, February 2001: http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol10/section1/ha5792.pdf, accessed August 2018

[58] Highways England, Manual of Contract Documents for Highways Works, Volume 1 Specification for Highways Works, Series 3000 Landscape and Ecology, May 2001: http://www.standardsforhighways.co.uk/ha/standards/mchw/vol1/pdfs/series_3000.pdf, accessed August 2018

[59] Highways England Design Manual for Roads and Bridges, Volume 10 Section 3, Part 1 Wildflower Handbook: http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol10/section3/ha6793.pdf, accessed August 2018

within the landscape and respect the National Character Area (NCA) 152: Cornish Killas[60] for which the scheme and its landscape context are located wholly within.

1.2.2 Highways England's *The Road to Good Design*[61] outlines ten design principles for roads. Design principle no.4 – 'fits in context' states:

"The aesthetic quality of a road and its design in relation to the places through which it passes, is integral to its function and the experience of those that use it. Good road design demonstrates sensitivity to the landscape, heritage and local community, seeking to enhance the place while being true to structural necessities. It builds a legacy for the future."

1.2.3 This OLEMP has been developed to ensure that the scheme would reflect the existing landscape character and context of this part of the A30, whilst accommodating mitigation principles established within the ES. The landscape strategy has been prepared to address mitigation requirements for both ecology and landscape assets. The design rationale has focused on replacement of vegetation lost during construction, enhancing natural habitats, providing screening vegetation and integrating the scheme into the landscape. Where planting is proposed, it would include native species reflecting those currently on site and would be of local provenance.

1.2.4 This design rationale also sits in line with the requirements of Cornwall Council's Cornwall Design Guide (2013)[62] where proposed landscaping would be based on locally sourced species native to Cornwall and appropriate to the specific locality.

1.2.5 The overarching objectives of the OLEMP are:

- To promote the conservation, protection and improvement of the physical, natural and historic environment within the scheme and its setting.
- To diversify ecological value through the retention, so far as reasonably practicable, of the existing hedgerows, Cornish hedgerows, trees and high conservation value habitats and to enhance these through restoration and creation of diverse habitats offering greater botanical and faunal interest to the scheme.
- To ensure design and maintenance of landscape components that preserve and enhance the character of the landscape and the local distinctiveness through creation of a rich mosaic landscape features and habitats, including Cornish hedgerows, woodland areas and scattered trees, species-rich grasslands and heathland.
- To provide a positive road user experience and appreciation of the surrounding landscape.
- To protect, where reasonably practicable, the woodlands, Cornish hedgerows and hedgerows within the scheme.
- To create new structural planting which links with existing habitats and to take account of species that are locally appropriate.
- To use indigenous species of local provenance wherever appropriate.

[60] Natural England, "National Character Area Profile: 152 Cornish Killas," 2014.

[61] Highways England, The Road to Good Design, 2018: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/672822/Good_road_design_Jan_18.pdf, accessed August 2018

[62] Cornwall Council's Cornwall Design Guide (2013) https://www.cornwall.gov.uk/media/13042641/CDG-Main-Contents.pdf

- To provide a variety of foraging, nesting and roosting opportunities for protected and notable species, including bats, badgers, invertebrates, reptiles and birds.
- To protect species from road collisions and provide abundant suitable crossing locations for a multiple of species.
- To create floristically rich habitats, to support a greater assemblage of species and give rise to enhanced foraging opportunities.
- To provide a framework for monitoring and reviewing the landscape implementation and establishment.

1.2.6 The final mitigation measures during construction would be detailed within the Construction Environmental Management Plan (CEMP) which would include the Landscape and Ecological Management Plan (LEMP).

1.3 Roles and responsibilities

1.3.1 A full-time Environmental Manager would be responsible for developing the Outline CEMP into the CEMP and implementing the CEMP during construction.

1.3.2 The effective implementation of the OLEMP requires that roles and responsibilities are clearly defined and understood. Specific job titles, roles and responsibilities will be defined by the contractor. The key environmental management roles involved in the delivery of the OLEMP are identified in Table 1-1.

Table 1-1 Environmental management key site personnel

Role	Contact	Organisation
Environmental Manager	TBC	Contractor
Environmental Clerk of Works	TBC	HE/Arup/Contractor
Environmental Specialists	TBC	Arup/Contractor
Agricultural Liaison Officer	TBC	Contractor
Environmental Manager (South West Team)		Highways England

[Note: Individual names and contact details (primary and secondary) for each will be confirmed and inserted by Highways England and the contractor in the final CEMP]

1.3.3 The Ecological Clerk of Works (ECoW) would be responsible for ensuring construction mitigation measures are correctly deployed, monitored and maintained, including, but exclusively, vegetation clearance, species exclusion, dead hedging, light spill and pollution prevention.

1.3.4 At the start of the works contractors would be informed what to look for during works via Toolbox Talks by the ECoW. Should any protected or notable species be found during any tree planting activities works would stop immediately and an ecologist / ECoW would be contacted. The ecologist would advise how the works should proceed and measures to be taken to minimise disturbance to protected or notable species and hence avoid potential legal infringement, and as set out in Requirement 10 of the draft DCO.

1.3.5 In specific relation to soil management, the contractor will appoint an Agricultural Liaison Officer (ALO). A description of the role is provided in Outline CEMP Annexes: Annex P Outline Soils Management Plan.

2 Requirements

2.1 Summary of landscape context and mitigation

2.1.1 The scheme lies along a gently undulating ridge forming a 'spine' along the length of the peninsular. Along the more elevated parts of the ridge the landscape is exposed with long views across farmland of predominantly larger arable fields, frequently edged by Cornish hedges. In the lower lying parts of the ridge the landscape is more enclosed with more tree cover and soft hedges enclosing smaller fields generally laid to pasture.

2.1.2 There are a number of important designated landscapes and heritage assets in the area including the Cornwall and West Devon Mining Landscape World Heritage Site and Chyverton Registered Park and Garden.

Effects

2.1.3 The construction phase would give rise to significant adverse effects on the character of the landscape within the scheme. Due to the presence of existing infrastructure along the ridge, including the existing A30, temporary and reversible construction of the scheme is not likely to give rise to significant effects on the character of the wider landscape.

2.1.4 There would be significant but temporary short term and reversible adverse effects on nearby views from sensitive receptors during construction.

2.1.5 The scheme would not give rise to significant permanent effects on the character of the local landscape or to the setting of designated landscapes during the operation of the scheme. However, there would likely be significant permanent visual operational effects on the visual amenity for a number of residential, recreational, and outdoor worker receptors.

Mitigation

2.1.6 The landscape design for the scheme is shown in Volume 6 Document 6.3 Figure 7.6 Environmental Masterplans. The environmental scheme has been designed to improve the quality and condition of the roadside landscape, to replace features lost by the scheme and to connect and enhance habitats. This mitigation has been designed to integrate the scheme into the landscape, by complementing and reinforcing the characteristics of the local landscape, reflecting the varying type and degree of cover or openness as the scheme passes through the landscape. Over 12km of new Cornish hedgerows are proposed as part of the scheme where appropriate to reinforce the character of the local landscape. Planting is proposed to manage views through filtering or screening negative views, whilst retaining and enhancing attractive views out from and towards the scheme.

2.2 Summary of ecology context and mitigation

2.2.1 The scheme passes through largely arable and pastoral farmland areas (predominantly improved grassland), with hedgerows and belts of trees bisecting the fields. A small number of fields are more species-rich, and some areas of woodland would be affected by the scheme, along with a small isolated area of heathland, marshy grassland, scrub and wet areas such as streams and ponds.

Effects

2.2.2 As detailed in **Chapter 8 Ecology and Nature Conservation** of the Environmental Statement (Document Reference 6.2) [APP-061] moderate to slight adverse effects have been identified during construction relating to habitat loss of high quality habitats such as woodlands, hedgerows and heathland. This temporary loss of vegetation is difficult to mitigate during construction, and, although habitat translocation can help reduce the impacts, they are not avoidable.

2.2.3 Moderate to slight adverse effects have also been identified during construction relating to the temporary severance of Annex II bat species foraging and commuting habitats.

Mitigation

2.2.4 Habitats planted throughout the scheme would however provide a moderate to slight beneficial effect, when established and functionable. Outline information is provided within **Figure 7.6 Environmental Masterplans** of the Environmental Statement (Document Reference 6.3) [APP-180 – APP-200].

2.2.5 Impacts to protected species, including bats, otters and badgers, during construction and operation have been avoided or reduced through embedded design measures, such as 33 multi-species crossings, including a green-bridge, and wildlife fencing throughout the entire length of the scheme, designed to funnel mammals through the crossings.

3 Pre-Construction Plans

3.1 Species Protection (Pre-Construction Surveys)

3.1.1 Protected species protection for any pre-construction works would be fully detailed within the Natural England Protected Species Licences, which for this scheme include bat and badgers, the full extent of measures are not repeated here.

3.1.2 Pre-construction surveys for protected species would be required before any construction or vegetation removal is conducted. These surveys would include surveys of:

- Bat surveys of buildings and trees up to 50m from any construction activities to determine if roosts are present.
- Otter surveys on waterbodies and associated habitat within the construction area and up to 1km (500m either side of the scheme) to determine any breeding or resting sites.
- Barn owl surveys up to 50m from any construction activities.
- Badger surveys up to 50m from any construction activities.
- Schedule 9[63] Invasive Species surveys up to 10m from any construction activities.

3.1.3 These surveys would follow best practice survey guidance and be conducted at suitable times of year, for bats, barn owls and plants that would be within the closest bat activity and breeding bird season (May to September) and growing season for plants (May to September) to the start of construction to inform the bat licence, mitigation requirements and invasive management plans. For badgers and otters, survey of which are not constrained by season, these would be within three months of the start of construction.

3.1.4 The results of the pre-construction surveys would be reviewed to determine if any protected species licences (or changes to the Draft licences as provided for the DCO) are required.

[63] Schedule 9 of the Wildlife and Countryside Act 1981 (as amended)

4 Construction / Habitat Creation Plans

4.1 Species Protection

4.1.1 Protected species safe guarding and mitigation during construction would be fully detailed within the Natural England Protected Species Licences these measures are not repeated here.

4.1.2 Measures to reduce potential impacts on protected species during construction in relation to breeding birds, barn owl, badger, otter, bats, fish and Section 41 species have been detailed within Annex E: Outline Ecological Management Plan (OEMP) of the **Outline CEMP Annexes** (Document Reference 6.4) [APP-376]. These measures are not repeated here but include guidance on night working and lighting for bats, otters and badgers, covering or ramping holes/excavations for badgers and otters, dead hedging for bats, and instream work for fish.

4.1.3 Procedures for vegetation clearance and removal for the protection and legal compliance relating to breeding birds, bats, amphibians and reptiles, have been detailed within Annex E: Outline Ecological Management Plan (OEMP) of the **Outline CEMP Annexes** (Document Reference 6.4) [APP-376], and are not repeated here.

4.1.4 Requirement 10 of the draft DCO also relates to vegetation clearance and construction works stating procedures to follow if protected species found, including exclusion procedures surrounding nesting birds. These would be worked into the LEMP.

4.1.5 Similarly, requirements and management of invasive species to prevent the spread of species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), are provided within Annex D: Outline Invasive Species Management Plan of the **Outline CEMP Annexes** (Document Reference 6.4) [APP-376], and are not repeated here.

4.1.6 For trees in which bat roosts have been identified or which are identified as having bat roost potential, then the measures set out in the Natural England Protected Species Licence would be followed.

4.1.7 Annex E: Outline Ecological Management Plan (OEMP) of the **Outline CEMP Annexes** (Document Reference 6.4) [APP-376], makes reference to and recommendations for two stage vegetation clearance methods to provide protection of amphibians and reptiles, habitat manipulation methods to move individuals out of the clearance area, as well as capture and translocation of reptiles if required.

4.1.8 Habitat manipulation and natural dispersal methods for reptile would be used first, as requested and agreed in point 5.1 of the **Statement of Common Ground with Natural England** (Document Reference 7.4.2) [REP2-018]. However, fencing maybe required in areas where exclusion and construction area are adjacent to prime reptile habitat, such as within the heathland area at the southern end of the scheme near Carland Cross.

4.1.9 If reptile fencing is required, an appropriate one-way exclusion fencing would be used to prohibit amphibians and reptiles returning to the construction area and would require regular checks during the construction to ensure it is functionable and not deteriorated or damaged during construction activities.

4.1.10 Fencing within the scheme would need to fulfil the requirements under Requirement 7 of the draft DCO which states:

"Any permanent and temporary fencing and other means of enclosure for the authorised development must be constructed and installed in accordance with the Manual of Contract Documents for Highway Works except where any departures from that manual are agreed in writing by the Secretary of State in connection with the authorised development."

4.2 Wildlife Structures

4.2.1 Badger setts and bat roosts exclusion and the creation of appropriate artificial replacements within the scheme would be detailed within the relevant Natural England Protected Species Licences. Once licences have been granted, works would be conducted in adherence with the terms and conditions of the Licence document and those contained within the application documentation.

4.2.2 Mammal tunnels have been incorporated into the scheme, as near as practicable to known badger paths. Where tunnels cannot be aligned with existing badger paths or field boundaries badger fencing would be installed to help guide badgers and other species to the tunnels in so far as this can be done without conflicting with other scheme requirements including access.

4.3 Landscape and Habitat Protection and Creation

Woodland, Trees and Scrub

4.3.1 A tree survey has been conducted and the root protection zone for all trees has been established, as detailed within Sheet 3 in the **Arboricultural Impact Assessment** in Appendix 7.6 of the Environmental Statement (Document Reference 6.4) [APP-330].

4.3.2 Further details on how individual trees would be protected and construction methods to safeguard trees and their roots are provided in the **Arboricultural Impact Assessment** in Appendix 7.6 of the Environmental Statement (Document Reference 6.4) [APP-330]) and in Annex I: Outline Arboricultural Method Statement of **Outline CEMP Annexes** (Document Reference 6.40[APP-376] and are not repeated here.

4.3.3 Appropriate fencing or marking would be installed to ensure no construction or construction traffic goes within the root protection zones as detailed within Tree Protection Plan.

4.3.4 All fences or markers to ensure the protection of existing and planted trees would be regularly checked to ensure they have not been moved and that construction activities do not occur within the areas to be protected.

4.3.5 Facilitation pruning may be necessary where tree crowns are at risk from impact by machinery or high sided vehicles.

4.3.6 Trees and scrub are to be planted under the following landscape and environmental elements from the **Environmental Masterplans** of the Environmental Statement (Document Reference 6.3) [APP-180 – APP-200]:

- Deciduous Native Woodland
- Mixed Oak Rich Woodland

- Mixed Pine Rich Woodland
- Scattered Tree (Deciduous and Pine)
- Woodland Edge / Scrub Buffer
- Bracken / Fern Scrub

4.3.7 Trees and scrub would be planted under best practice standards as prescribed within Requirement 6 (1)[64].

4.3.8 The ground would need to be de-compacted, graded, topsoiled and cultivated in line with Outline CEMP Annexes: Annex P Outline Soils Management Plan, and in accordance with the detailed design and specification prior to planting trees and scrubs.

4.3.9 The contractor would remove rubbish, concrete, metal, glass, decayed vegetation and any contaminated or deleterious matter from site. Following cultivation, stones exceeding 50mm in any one dimension would be removed. Contamination includes substances injurious to plant growth including subsoil, rubble, fuel, and lubricants. Large roots would be grubbed up and disposed of without undue disturbance of soil and adjacent areas.

4.3.10 The depth of soil for planting would range between 150mm to 600mm. Where woodland and scrub areas border grassland, the scrub edges of woodland areas would have a reduced depth of soil, such that the depth transitions evenly over a distance of 3m to meet the depth of the soil in the adjacent grassland area.

4.3.11 Soil for cultivating and planting would be moist, friable and not waterlogged.

4.3.12 The contractor would undertake the work while soil and weather conditions are suitable. Planting would not be carried out during periods of frost or strong winds or any other climatic condition deemed to be inclement, including drought, waterlogged, frozen or snow-covered conditions.

4.3.13 Bare root trees and shrubs would be planted from November to March (inclusive) although waterlogged conditions which are more likely in January and February would be avoided. Planting of bare root plants would take place immediately after delivery, unless weather conditions are poor, or inclement as identified above.

4.3.14 Storage of plants would be in accordance with best practice and industry guidelines.

4.3.15 Excavation of pits would be in accordance with best practice and industry guidelines.

4.3.16 Where planting is proposed in undisturbed areas the ground would be cleared of vegetation that would otherwise compete with planted species. Vegetation clearance, turf-stripping and/or herbicide application would provide bare ground which is the ideal condition for cultivation and planting. If herbicide application is undertaken this must be done away from any other existing vegetation and water courses, i.e. by using a handheld sprayer with knapsack to provide a concentrated application. This would be completed in late summer/early autumn prior to commencement of any planting.

[64] "6 (1) All landscaping works must be carried out to a reasonable standard in accordance with the relevant recommendations of appropriate British Standards or other recognised codes of good practice."

4.3.17 Planting would take place in the first available planting season following construction activities in any area.

4.3.18 The tree and scrub planting specifications, including species numbers, sizes and spacings would be designed during the detailed design stages and detailed with the Landscaping Scheme which would form part of the final LEMP and worked into the Handover Environmental Management Plan (HEMP), and as required under Requirement 5 (1) and 5 (3) of the draft DCO which state:

"—(1) No part of the authorised development is to commence until a written landscaping scheme for that part has been submitted to and approved in writing by the Secretary of State following consultation with the relevant planning authority and the local highway authority."

" (3) The landscaping scheme prepared under sub-paragraph (1) must include details of hard and soft landscaping works, including—

location, number, species, size and planting density of any proposed planting;

...

4.3.19 Trees would be disease free and of local provenance, where possible. It may be necessary to order plant material early, in case some material needs to be contract grown specifically to ensure local provenance. Where it is not possible to get material of local provenance, plants may need to be sourced from elsewhere in the UK.

4.3.20 Watering of trees and shrubs would take place immediately after planting, thoroughly and without damaging or displacing plants or soil. The soil would then be lightly firmed around plants and forked and/or raked, without damaging roots, to a fine tilth with gentle cambers and no hollows.

4.3.21 Feathered trees would be tied to a single stake installed on the windward side of the tree at an angle of 45 degrees. Trees to be tied to the stake with a buckle type tree tie or reinforced rubber belting and rubber spacer fixed to prevent chaffing of the stem.

4.3.22 Any heavy standard and extra heavy standard trees would be double low staked and tied to a cross bar. Stakes would be FSC certified softwood, peeled chestnut, larch or oak, straight, free from projections, large and edge knots and with a pointed lower end. Minimum stake sizes to be 1.8m x 75mm diameter. Trees to be tied to cross bar with a flat back rubber block spacer located between the tree and cross bar and secured with reinforced rubber belting crossed over and fixed onto cross bar with nails.

4.3.23 To protect all trees, shrubs and hedgerow plants from strimming and animals following planting, individual clear recycled plastic spiral guards (600 mm high x 63 mm diameter) would be fitted to each plant or tree. Where spiral guards are fitted to shrubs they would be supported using a bamboo cane.

4.3.24 If any areas are grazed to aid grassland management then the stock fencing of newly planted trees would be considered. Such stock fencing would be monitored regularly to ensure that it remains in stock-proof condition. This would be carried out at least once per year for life time of the development.

Cornish Hedgerows and hedgerows

4.3.25 During construction existing hedgerows shall be protected, retained and inspected by measures set out by the contractor's final Arboricultural Method Statement and Tree Protection Plan.

4.3.26 This would also include managing the structure and integrity of the hedgerows during the construction period, with any trimming undertaken outside of the bird breeding season.

4.3.27 Ground preparation prior to planting and planting prescriptions of the Native Species Hedges and Cornish Hedgerows and would follow as described above for Woodland, Trees and Scrub.

4.3.28 Best practice horticultural techniques would be used in the planting of hedgerow vegetation to ensure rapid early growth. Rapid attainment of effective screening would be achieved through the autumn planting of both hedgerow and hedgerow with trees with a healthy root structure. Fruit and nut bearing species would provide a food source for birds and small mammals.

4.3.29 Cornish hedgerows wall construction and fill can occur at any time during the year, however the tops of Cornish hedges, especially new ones, are very dry, and unless planted during the months of November and December, plants may have difficulty in surviving.

4.3.30 The hedgerow planting specifications, including species, numbers, sizes and spacings would be produced during the detailed design stages and detailed with the Landscaping Scheme which would form part of the final LEMP and worked into the Handover Environmental Management Plan (HEMP), and as required under Requirement 5 of the draft DCO (see above).

Grasslands

4.3.31 Grasslands to be planted under the following landscape and environmental elements from the **Environmental Masterplans** of the Environmental Statement (Document Reference 6.3) [APP-186] include:

- Species-rich Grassland
- Grassland with Native Bulbs
- Wildflower Pollination Strips

4.3.32 Marsh and Wet Grassland have been considered below in Wetland and Ponds.

4.3.33 The ground would need to be prepared prior to seeding and planting of grasslands and wildflower areas. Surfaces must be finished with subsoil or bare mineral substrate to ensure reduced soil fertile for wildflower growth.

4.3.34 The contractor would remove rubbish, concrete, metal, glass, decayed vegetation and any contaminated or deleterious matter from site. Stones exceeding 50mm in any one direction would also be removed or crushed up using an excavator's toothed bucket. Contamination includes substances injurious to plant growth including rubble, fuel, and lubricants. Large roots would be grubbed up and disposed of without undue disturbance of soil and adjacent areas.

4.3.35 Any consolidated material is to be broken up to 300 mm depth and the top 50 mm of all soil reduced to a tilth suitable for final shaping with a grading blade (particle

size 10 mm and below). When material is reasonably dry and workable it shall be graded in accordance with the Detail Design drawings.

4.3.36 Once material has been spread and/or graded, the area shall not be traversed by machinery or used for storage purposes.

4.3.37 Where stated in Appendix 30/5 of the Manual of Contract Documents for Highway Works (MCHW) Specification for Landscape Works[65], immediately prior to sowing or hydraulic seeding or laying turf the upper 50 mm of soil shall be reduced to a fine tilth by use of a chain harrow or other suitable plant.

4.3.38 If required, soil ameliorants shall be evenly incorporated into the upper 50 mm of soil during final cultivations at the rate stated in Appendix 30/5.

4.3.39 Planting specifications for species-rich grassland and wildflower strips, including species mixes, would be produced during the detailed design stage and fully detailed with the Landscaping Scheme which would form part of the final LEMP and worked into the Handover Environmental Management Plan (HEMP), and as required under Requirement 5 of the draft DCO (see above).

4.3.40 Grass seed mixes of local province, where possible, shall be sown during the period 1 March to 31 May or 1 September to 31 October, unless otherwise stated, at a rate of not less than 10 g/m^2, and should contain a ratio of wildflower seeds to grass seeds of no less than 60%/40%.

4.3.41 Sowing shall be immediately followed by lightly raking the surface of the soil to cover the seeds, by use of a chain harrow or other suitable plant.

4.3.42 Hydraulic seeding may be applied in certain locations as defined in Detailed Design. The hydraulic seeding mixture, any special process requirements and the rate of application shall be as described in the Landscaping Scheme which would form part of the final LEMP.

Heathlands

4.3.43 The ground would need to be landscaped and prepared, including soil pH correction if required, prior to sowing, planting and/or translocating heathland.

4.3.44 The contractor would remove rubbish, concrete, metal, glass, decayed vegetation and any contaminated or deleterious matter from site. Stones exceeding 50mm in any one direction would also be removed. Contamination includes substances injurious to plant growth including, rubble, fuel, and lubricants. Large roots would be grubbed up and disposed of without undue disturbance of soil and adjacent areas.

4.3.45 Unlike as described for Woodland, Trees and Scrub, subsoil is considered advantageous for heathland creation due to its low nutrient content. As such, surfaces must be finished with subsoil or bare mineral substrate to ensure reduced soil fertile for heathland growth.

4.3.46 Heathland requires relatively nutrient poor soil to grow[66]. Soil sampling at the current proposed receptor site suggests that the current nutrient levels in the

[65] Highways England, Manual of Contract Documents for Highways Works, Volume 1 Specification for Highways Works, Series 3000 Landscape and Ecology, May 2001: http://www.standardsforhighways.co.uk/ha/standards/mchw/vol1/pdfs/series_3000.pdf, accessed August 2018

[66] A. Diaz, I. Green and D. Evans, “Heathland restoration techniques: ecological consequences for plant-soil and plant-animal interactions.,” ISRN Ecology, vol. Article ID 961807, p. 8, 2011.

topsoil may be above that suitable for heathland growth, with recommended levels for healthy heathland soils of 4.1 milligrams per litre of phosphorous, 23.2 milligrams per litre of magnesium and 23.9 milligrams per litre of potassium[66]. The translocation site topsoil was recorded to have between 5 to 7 milligrams per litre of phosphorous, between 39 to 60 milligrams per litre of magnesium and 64 to 87 milligrams per litre of potassium; all of which are over the recommended levels although not grossly so, see Appendix B Factual Report of Topsoil Investigation of **Responses to The Examining Authority's Written Questions** (Document Reference 8.4) [REP2-020].

4.3.47 However, the sample taken within the isolated heathland area to be lost to scheme and potentially translocated have higher levels of magnesium and potassium than the receptor site being 70 to 73 milligrams per litre of magnesium and 88 to 110 milligrams per litre of potassium; with slightly reduced phosphorous of 4 milligrams per litre. Therefore, the heathland translocation receptor site may not require pre-translocation treatment to ensure successful heathland translocation and growth.

4.3.48 Nevertheless, further investigations would be required to determine specific ground preparations, soil preparations and location suitability for any translocations of heathlands.

4.3.49 Specific details of any heathland translocation, if further investigation determine appropriate, would be worked up during detailed design and fully detailed with the Landscaping Scheme which would form part of the final LEMP. These details would add to and supersede the outline details provided within Annex N: Outline Method Statement for the Translocation of Heathland within the **Outline CEMP Annexes** (Document Refence 6.4) [APP-376], details of which are not repeated here.

4.3.50 Similar ground preparations are likely required for the heathland creation areas as described for grasslands above, however further investigation is required for specifics. Heathland planting specifications, including species mixes (which is likely to be specialised to include Dorset Heath *Erica ciliaris* which is present within Newlyn Down and the isolated heathland area to be affected), would be produced during the detailed design stages and fully detailed with the Landscaping Scheme which would form part of the final LEMP and worked into the Handover Environmental Management Plan (HEMP), and as required under Requirement 5 of the draft DCO (see above).

Wetland and Ponds

4.3.51 Wetlands and Ponds refers to drainage treatment areas to be constructed as part of the scheme.

4.3.52 The primary purpose of the ponds is control of scheme drainage; to avoid increasing flood risk and to maintain or improve the quality of water infiltrating groundwater. An additional purpose is to provide benefits for biodiversity, creating wetland and grassland habitats.

4.3.53 The habitats to be planted within and surrounding the ponds and ditches under the following landscape and environmental elements from the **Environmental Masterplans** of the Environmental Statement (Document Reference 6.3) [APP-180 – APP-200] include:

- Aquatic and Semi Aquatic

- Banks and Ditches
- Marsh and Wet Grassland

4.3.54 The carriageway drainage would include a two-stage or three-stage treatment train, consisting of filter drains and detention ponds, along with grassed swales (dry) or wet ponds where additional treatment is required. Details of the treatment trains for each area of road drainage are included in **Appendix 13.3 DMRB assessments** of the Environmental Statement (Document Reference 6.4) [APP-370]. The levels of treatment embedded in the scheme design are sufficient to reduce pollutants in road drainage discharges to levels acceptable to HAWRAT.

4.3.55 Attenuation/infiltration basins would be designed to ensure that groundwater levels would not impede their performance.

4.3.56 Excavation would be carried out after any measures required for the protection of species and archaeology have been implemented in accordance with the CEMP and DCO Requirements.

4.3.57 Locally appropriate species of pond margins are likely to be most effectively introduced either as transplanted material from a local source concurrently with seeding, or as stock planted in and around the shallow basin in the second year.

4.3.58 The Wetland and Pond planting specifications, including species mixes, would be produced during the detailed design stages and fully detailed with the Landscaping Scheme which would form part of the final LEMP and worked into the Handover Environmental Management Plan (HEMP), and as required under Requirement 5 of the draft DCO (see above).

5 Post-Construction / Monitoring and Maintenance Plans

5.1 Protected Species

5.1.1 Monitoring of any mitigation measures proposed for bats and badgers would be detailed within the relevant Natural England Protected Species Licences. Once licences have been granted, works would be conducted in adherence with the terms and conditions of the Licence document and those contained within the application documentation.

5.1.2 Monitoring for Schedule 9 invasive species and invasive plants regarded as a threat in Cornwall, such as *Petasites fragrans*, would be covered under the specific habitat monitoring of created habitats and within the Maintenance and Repair Strategy of the scheme which would be detailed within the HEMP.

5.2 Wildlife Structures

5.2.1 Mammal tunnels would require little maintenance other than an annual check to confirm that the entrances are draining appropriately and are not becoming impassably overgrown or being deliberately blocked. If they are, the vegetation would need to be cut back and any blockages impeding drainage or access removed.

5.2.2 Ecological monitoring would also be undertaken to determine whether mammal tunnels and the green bridge are in use post-construction. For the green bridge monitoring is likely to be undertaken through the use of camera traps and monitoring surveys linked to the artificial bat house proposed in this area. For the mammal tunnels monitoring can been undertaken during the annual check as detailed above, to look for evidence of mammal tracks, footprints, latrines / spraints and other field signs.

5.2.1 Annual reports for the first 5 years on evidence of use will feed into the HEMP.

5.3 Habitat Monitoring and Maintenance

5.3.1 Monitoring of the created habitats and landscape features would be required for at least the first five years post creation to identify any further work or remedial measures required to deliver the habitat types committed to and required to deliver the appropriate level of mitigation. Monitoring maybe required beyond this five-year period if habitats have not established sufficiently, and if normal highways soft estate management practices would not be suitable to establish the desired habitats.

5.3.2 Management and maintenance plans would be described in the LEMP and HEMP for each habitat or landscape feature and may require annual changes to help establishment. Monitoring would inform the requirement for adaptation of the management and maintenance plans and where remedial measures may be required. When the habitat is considered established (through broad target community condition monitoring, detailed below), then normal highway soft estate management and maintenance practices would commence. There are variations within these practices depending on the target communities and site-specific requirements. The maintenance and repair strategies for Ecological and Biodiverse Habitats and Landscaping Soft Estate to be created within the Scheme

are shown in Tables 5-1 and 5-2 below. These are draft and evolving tables and would be updated as required.

5.3.3 Monitoring of new habitats would occur annually in the first five years and then likely lessen frequency thereafter until the creation of habitats are considered to be successful. However, it is not the intention to be over-prescriptive with the target habitat community, monitoring would aim to determine broad target communities.

5.3.4 With broad objective target habitats in mind, monitoring criteria would be adapted from the condition assessment methods and checklists as set out in the Guidance for Common Standards Monitoring (CSM) for the relevant created habitats produced by the Joint Nature Conservation Committee (JNCC).

5.3.5 Monitoring and maintenance principles are provided below for each habitat type (or grouping of suitable habitats). Monitoring would inform and identify any further work, change to the maintenance or remedial measures required to deliver the habitat broad target communities as to deliver the appropriate level of mitigation.

5.3.6 Remedial measures, however, are specific to the failure of establishment and are informed by the monitoring. Common and prescriptive remedial measures have been described in some cases, but the final LEMP within the CEMP and the HEMP would be subject to a process of ongoing review and amendment during the lifetime of the scheme to ensure it remains relevant.

5.3.7 Highways England's *Landscape Management Handbook*[67] states that the landscape management plans would be updated annually and formally reviewed every five years. As such, appropriate and specific remedial measures would be updated and captured within the LEMP.

Woodland, Trees and Scrub

Short-term maintenance (0-5 years)

5.3.8 During the first five years trees and shrubs will be monitored to ensure they are surviving and developing in order to deliver the appropriate level of mitigation. Monitoring will determine the level of checking and aftercare for trees, shrubs and woodland areas following planting, however for at least the first two years the following actions would be undertaken, unless stated as five years:

a) The trees and shrubs would be checked on a quarterly basis and maintained as weed free[68] at all times around their bases to a diameter of 1000mm. Bramble and other scrub growth would be cut to ground level so as not to suppress newly planted material.

b) Any dead or damaged trees/ shrubs would be replaced with matching species of the same size during the next planting season after failure for a

[67] Highways England, Design Manual for Roads and Bridges, Volume 10, Environmental Design and Management, Section 3 Landscape Management, Landscape Management Handbook: http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol10/section3/ha10804.pdf, accessed August 2018

[68] The use of herbicides and pesticides would be in strict accordance with current legislation and industry best practice. All operators applying chemicals would hold a recognised Certificate of Competence.

period of five years after planting (as required under Requirement 6 (2) of the draft DCO69).

c) Soil around roots would be re-firmed as necessary to ensure plants are supported and upright especially following periods of extreme winds.

d) Spiral and mesh guards would continue to be checked and straightened so that they do not impede natural movement of trees or restrict growth, until the trees are considered a sufficient size not to be damaged by rabbits or deer. This is likely to be five years for slower growing species but could be two years for faster growing scrubs.

5.3.9 Trees found to be diseased or suffering pest damage would be assessed with respect to likelihood of responding to treatment, and a decision of whether to replace dead specimens or treat diseased/damaged hedge plants would be made. The highest mortality is expected in the first two growing seasons.

Long-term management (over 5 years)

5.3.10 Maintenance for trees, woodlands and scrub beyond the initial aftercare period and assumed establishment (over five years) is likely to be in accordance with normal highway soft estate management practices, as detailed in Table 5-1 and 5-2 below.

5.3.11 Between five and ten years after planting, woodland areas would be reviewed and thinned out as necessary, removing poor or weak specimens to allow the best specimens to flourish and give space for trees to establish. Up to 30% of the brash and timber arisings can be kept on site in the form of brash and wood piles for reptiles and invertebrates. Wood would be stacked neatly in piles not exceeding 1m high.

5.3.12 Trees adjacent to any PRoW would require ongoing monitoring and management for health and safety reasons and to maintain access. Trees, shrubs and woodland would so far as reasonably practicable be kept in a good and safe condition, commensurate with their naturalistic context and amenity value to neighbouring residents and public. Any plant which presents a risk to neighbouring properties or to the health and safety of staff and visitors would be dealt with appropriately.

5.3.13 Where appropriate, any tree work would be carried out by an approved member of the Arboricultural Association and would be undertaken in accordance with *BS 3998 British Standard for Tree Work*[70] and HSE *Forestry and arboriculture safety leaflets*[71].

5.3.14 Tree felling and limb management would be undertaken in line with the Forestry Commission guide *Common Sense* Risk *Management of Trees*[72].

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[69] "(2) Any tree or shrub planted as part of the landscaping scheme that, within a period of 5 years after planting, is removed, dies or becomes, in the opinion of the relevant planning authority, seriously damaged or diseased, must be replaced in the first available planting season with a specimen of the same species and size as that originally planted."

[70] BS 3998: 201 Tree Work Recommendation, British Standards

[71] Health and Safety Executive Tree Work Information: http://www.hse.gov.uk/agriculture/forestry.htm, accessed August 2018

[72] National tree Safety Group. 2011. *Common sense risk management of trees. Forestry Commission, Edinburgh*.

Monitoring

5.3.15 Landscape monitoring of newly planted woodland areas, trees and scrub would be undertaken annually for the first five years by a suitably qualified ecologist or landscape architect to ensure the successful establishment of the planting.

5.3.16 After the initial five-year aftercare period, areas of tree planting would be periodically reviewed, weed clearance relaxed and a normal highway soft estate management and maintenance regime established, as shown in Table 5-1 and 5-2 below. The understorey of new woodland areas would be coppiced as required for good woodland management, which would be undertaken in stages to reduce any disturbance of wildlife habitat.

Cornish Hedgerows and hedgerows

5.3.17 The same level of annual condition monitoring and Requirement to replace dead and damaged plants for the first five years would apply for all created hedgerows, including vegetated Cornish Hedgerows, as detailed above for Woodland, Trees and Scrubs, and is not repeated here.

5.3.18 Condition monitoring of Cornish Hedgerows would be informed by specialists and/or the Cornish Hedgerow contractors used to build them. These would be full detailed within the HEMP.

5.3.19 Specific management and maintenance operations would be detailed in the final LEMP and HEMP but are likely to include:

- Non-desirable woody species would be removed during management operations and at other times as necessary, where this does not prejudice screening requirements.
- In order to fulfil the management objectives, each hedgerow would be managed as appropriate, i.e. by trimming, laying, coppicing, bulking up, etc.
- Annual hedge cutting would be undertaken in January or February from around year six or as necessary for the hedges become fully established. A maximum of one-third of the total hedge length would be cut, in interspersed sections and on a three year rotational basis, with adjacent lengths being cut in different years to ensure year-round habitat for hedgerow species and to help develop the desired tall bushy structure.
- If managed by laying, this would be on a rotational basis. This is a traditional management technique and seeks to retain the structural integrity of hedgerows and maintain connections with other habitats. Cutting would be carried out at the end of the winter, thereby retaining berries through the winter months for wildlife, and avoiding the bird breeding season.
- Cutting back undergrowth, overgrowing or overhanging shrubs and minor tree branches from any pathways to maintain an unobstructed width of at least 2m or the existing width of the pathway, whichever is the greater.
- Maintenance of hedges to merge with the surrounding field margins to promote its value as an intact boundary feature, visual screen and for associated fauna.
- Reporting of the existence and location of any hedgerow trees or parts of trees which are suffering from visible defects likely to cause danger, potential danger, obstruction or nuisance to users of adjoining properties, pathways and roadways.

- Retaining dead, over-mature or dying hedgerow trees wherever possible, but those which are considered dangerous for health and safety reasons, for example adjacent to public footpaths or residences, to be felled or lopped as appropriate to maintain safety, and in accordance with protected species constraints.
- In the interests of wildlife, hand weeding, where feasible, would take precedence over the use of herbicides in hedgerows. However, in certain instances, herbicide may be the most effective measure to take in relation to unwanted species.
- Where herbicide application is needed for the removal of unwanted species, it is recommended that an appropriate herbicide is applied in July - August in small controlled areas around the tree base.

Grasslands

5.3.20 Managing a species rich grassland appropriately would, over time, help to increase the range and number of flowers that it supports, increasing the quantity and quality of foraging habitat for insects, including bumblebees and honey bees.

5.3.21 Monitoring of the created grasslands will be key to inform the management and maintenance strategies within the initial five-year aftercare period.

Short-term maintenance (0-5 years)

5.3.22 Species-rich grassland, particularly meadow mixtures, are composed mainly of perennial species which take at least a full year to establish.

5.3.23 For new sowings on bare soil the first summer may be dominated by a flush of annual weeds arising from the soil seed bank and by grass growth. This annual growth would be controlled by mowing or grazing throughout the first year to minimise competition and weed seed production. Cutting would be frequent enough to disperse the cuttings, or if less frequent removal of the cuttings is required.

5.3.24 Chemical spot treatment of weeds, woody and unwanted species with a suitable chemical at the recommended rate would be used in the first and second year of growth.

5.3.25 There would be no cutting in the spring and early summer if the mixture is autumn sown and contains yellow rattle, or if the mixture has been sown with a nurse of cornfield annuals. These sown annuals would be allowed to flower, then in mid-summer the vegetation would be cut and removed. It is important to cut down the annuals before they die back, set seed and collapse; this cut would reveal the young meadow mixture and give it the space it needs to develop.

5.3.26 In the second and subsequent years species-rich grasslands sowings can be managed in a number of ways which, in association with soil fertility, would determine the character of the grassland. The best results are usually obtained by traditional meadow management based around a main summer hay cut, in combination with autumn and possibly spring mowing. The grassland monitoring will determine the appropriate management and maintenance strategies over this period.

5.3.27 Species-rich grassland / meadow grassland is not cut from spring through until summer (August/September) to give the sown species an opportunity to flower and set seeds. After flowering in August cut back with petrol strimmer or tractor

mower to around 50mm. Mow or graze the re-growth through to late autumn/winter to around 50mm in height and again in spring if needed. Arisings need to be collected and removed off site after strimming or mowing. At the design stage, locations for the deposit of arisings will be designated such as the edge of fields, in front of woodland plots, etc. It is important that these locations are level or below grassland plot to avoid nutrient leaching.

5.3.28 The early years of a sown species-rich grassland (years 2/3 from sowing) are characterised by the more quickly establishing pioneer perennials such as oxeye daisy and sorrel, and the growth is vigorous. In following years, the species-rich grassland would become more diverse as slower establishing species like cowslip appear and growth is less vigorous as nutrients become fixed in root systems and herbage.

Long-term maintenance (over 5 years)

5.3.29 The character and composition of the species-rich grassland would continue to change with time. Eventually a relatively stable community would develop, the balance of which would reflect management, soil fertility and the natural environment of the site.

5.3.30 The cutting regime in subsequent years would be determined based on the current condition of the sward, which would be informed by botanical monitoring until the desired sward structure / broad target community is achieved. However, it would be expected to be maintained in accordance with normal highway soft estate management practices for species-rich grasslands of annual cut, as detailed in the draft maintenance regime in Table 5-1 below.

Monitoring

5.3.31 Condition monitoring would be required to confirm that creation of species-rich grassland has been successful. At the same time, it is not the intention to be over-prescriptive. With a broad objective in mind, monitoring criteria would be adapted from the condition assessment checklist for lowland meadows as set out in the *Common Standards Monitoring Guidance*[73] for Lowland Grassland Habitats produced by the JNCC (2004).

5.3.32 Features of the grasslands would be recorded yearly by a suitably qualified ecologist, during the flowering period from May to July. Features including the extent, sward composition (grass:herb ratio), positive and negative indicator species, local distinctiveness and sward structure would be recorded against the agreed targets to determine the success of the species-rich grassland creation.

5.3.33 Monitoring would take place annually for the first five years to assess sward development. The results and any subsequent remedial actions will be reported within the HEMP. The need for monitoring after this period would then be assessed.

5.3.34 Monitoring of the grassland would allow for the consideration of appropriate remedial actions to be sought based on the developing sward compared to the seed mixes sown. Such events are difficult to predict and consequently, the precise remedial action would need to be considered at the time of the event. However, remedial actions may include re-seeding areas in which the grassland

[73] http://jncc.defra.gov.uk/PDF/CSM_lowland_grassland.pdf

has not established, spot herbicide application, or mowing of undesirable weeds. Such actions are detailed further in the Remedial Action section below.

Remedial Action

5.3.35 This section outlines three remedial actions for common problems associated with newly created grassland habitats.

Rank Grassland

5.3.36 A common problem with newly sown species rich grasslands is that rank grassland species, such as cock's-foot and Yorkshire fog, or ruderals, such as creeping thistle and common nettle, dominate the grassland sward.

5.3.37 Dominance of rank species usually occurs due to a) residual nutrients in the soils which favours the growth of competitive rank grassland species, b) persistent seed bank or c) from not correctly managing the grassland allowing rank species to dominant or allowing nutrients to build up in the soil by not removing the arisings.

5.3.38 In this event, additional cuts, strimming and removal of arisings may be required to reduce the growth of these rank species.

Species Dominance of Significant Change in Species Composition

5.3.39 Often due to changes in the soil nutrient levels or pH through natural events such as flooding, some species can flourish and dominate the grassland swards such as red clover. Such events and outcomes could be a one-off event and the grassland may re-cover and re-establish the desired diversity and sward. Nonetheless, if such an event becomes a re-occurring event, remedial actions such as reintroducing early cutting to remove arisings in spring and autumn with the aim to reduce the nutrient may be appropriate. The need for such remedial actions would be informed by annual condition monitoring as above.

Bare Ground

5.3.40 If areas of bare ground appear during the establishment of the grasslands, re-sowing of these areas either in the autumn or spring would be considered and these areas then managed under the first year cutting regime.

Heathlands

5.3.41 Managing a created or translocated heathland appropriately would be critical for its establishment and success. The management of new and translocated heathland within the first five years, would be worked up along a heathland specialist during the detailed design stages and fully detailed with the Landscaping Scheme which would form part of the final LEMP and worked into the Handover Environmental Management Plan (HEMP). No further details are presented within this OLEMP on management and maintenance of the heathlands.

Monitoring

5.3.42 Condition monitoring would be required to confirm that creation and/or translocation of heathland has been successful. At the same time, it is not the intention to be over-prescriptive. With a broad objective in mind, monitoring

criteria would be adapted from the condition assessment checklist for lowland meadows as set out in the *Common Standards Monitoring Guidance*[74] for Lowland Heathland Habitats produced by the JNCC (2009).

5.3.43 Monitoring would take place annually for the first five years to assess habitat development. The need for monitoring after this period would then be assessed.

5.3.44 Features of the heathlands would be recorded yearly by a suitably qualified ecologist, during the flowering period. However, it is worth noting that the ideal monitoring period for dry heathland without Dorset Heath is later between July and September, where as if Dorset Heath is present the ideal monitoring period is between April and June[75]. This would need to be considered when designing the monitoring strategy. Features including:

- Habitat extent.
- Bare ground.
- Vegetation structure: cover of characteristic woody species, and cover of ericaceous species in different growth stages.
- Vegetation composition: frequency of characteristic species (dwarf shrubs, graminoids, forbs), and cover of bryophytes and lichens.
- Indicators of negative trends (percentage of alien or invasive species which may reduce the diversity of the habitat and affect its integrity; presence of artificial drains, soil erosion, trampling; uncontrolled burning; eutrophication).

5.3.45 Monitoring of the heathland would allow for the consideration of appropriate remedial actions to be sought based on the developing habitat compared to the seed mixes sown and/or translocated habitat. Such events are difficult to predict and consequently, the precise remedial action would need to be considered at the time of the event. However, remedial actions may include re-seeding areas in which the heathland has not established, spot herbicide application, or removal of scrub encroachment. Some of these actions are outlined in the Remedial Action for the Grassland section above.

Wetlands and Ponds

5.3.46 After the establishment year, the management of the wet grassland would be carried out by mowing plus removal of arisings. To provide diversity of structure, margins of the detention ponds that have wetland species would be mowed less frequently than other areas. No areas would be left for more than two years without mowing (or grazing if applicable). Natural regeneration of willow (Salix) or other woody species would be controlled as necessary to keep cover of woody vegetation to less than 5% of the area.

5.3.47 Maintenance will be undertaken in accordance with the principles provided in the SuDS Manual 2015 (Ref. 5.7) and the requirements of Highways England.

5.3.48 To maintain the drainage function the proprietary treatment medium will require periodic removal and replacement as required for its continued effective functioning. Grass lined surface water/groundwater filter drains will be reinstated by grass strimming or replaced with either new seeding or new turf. The detention ponds and associated emergent vegetation will tend to trap silt, and may require more frequent maintenance to maintain a combination of open water and

[74] http://jncc.defra.gov.uk/pdf/0902_CSM_lowland_heathlandv2.pdf
[75] http://jncc.defra.gov.uk/pdf/0902_CSM_lowland_heathlandv2.pdf

marginal emergent vegetation. These areas would be monitored to identify any accumulations of litter monthly and after a major storm event in accordance with *Highways Agency 103/6*[76].

Monitoring

5.3.49 Monitoring for encroachment of non-native plant species shall occur at least annually, and when identified non-native species shall be removed as soon as practicable.

5.3.50 Monitoring of condition of vegetation shall occur not less than annually in the first five years and every two years thereafter. Remedial maintenance would be carried out as necessary after monitoring, including control of undesirable species. If dense emergent vegetation extends across more than 80% of the regularly wet area of the ponds, up to 30% of vegetation would be removed from that area.

5.3.51 The tables below set out Highways England's typical cyclical and reactive maintenance schedules for habitats and landscape elements respectively. These prescriptions would apply to the management phase following the initial two-year aftercare maintenance period, unless specifically stated for specialised habitats.

[76] Highways England, Design Manual for Roads and Bridges, Volume 4, Section 2, Part 1, 103/06 Vegetated Drainage Systems for Highways Run-off, 2006: http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol4/section2/ha10306.pdf, accessed August 2008

Table 5-1 Outline Maintenance Strategy for Ecological and Biodiverse Habitats – Post initial 5 year aftercare

Asset Type: 3000 – Ecological and Biodiverse Habitats					
Scope: The natural/semi-natural, improved/semi-improved parts within the Affected Property, including cultural heritage assets.					
Deliverables:					
Sub-Asset Type:	Cyclic:				Repair:
	Item:	**Item Frequency:**			**Item:**
		High	**Medium**	**Low**	
Injurious Weeds	Maintain Affected Property to control the spread or increase of instances of Invasive Plant Species. Presence currently unknown.	4 times per year (May-Sept)	2 times per year (May-Sept)	Annually (May – Sept)	Control spread of previously unidentified populations of Injurious Weeds
Invasive Plant Species	Maintain Affected Property to control the spread or increase of instances of Invasive Plant Species. Presence currently unknown.	4 times per year (May-Sept)	2 times per year (May-Sept)	Annually (May – Sept)	Control spread of previously unidentified populations of Invasive Plant Species
Grassland	Maintain habitat integrity, including removal of scrub encroachment.	**Annually (Sep-Oct)**	Every 3 years	Every 5 years	Rectify Defects as instructed. See comment 2 and 3 in Disclaimer below.
Wetlands	Pond maintenance, clear vegetation and maintain open water.	Annually	**Every 2 years**	Every 3 years	
Heathlands	Maintain habitat integrity, including removal of scrub encroachment.	Annually (Sep-Oct)	**Every 3 years**	Every 5 years	
Cornish Hedges	Maintain habitat integrity, including removal of scrub encroachment.	Annually (Sep-Oct)	**Every 3 years**	Every 5 years	
Wildlife structures and tunnels	Remove all material that could impair operation.	**Annually**	Every 2 years	Every 3 years	

Protected Habitats/ Species or Designated Sites	N/A	N/A	N/A	N/A	Rectify Defects as instructed to meet existing commitments
Nature Improvement Areas	See comment 2 in Disclaimer below	N/A	N/A	N/A	Rectify Defects as instructed. See comment 2 in Disclaimer below.

Procedures:

1. Instances of Invasive Animal Species must be reported to the *Employer*.
2. Undertake cyclic Items commensurate with the particular species present.
3. Provide ecology and biodiversity cyclic and repair maintenance Item data. This includes but is not limited to, the date the Item delivery took place and photographic evidence post Item delivery.
4. In delivering an ecology and biodiversity cyclic or repair maintenance Item, report problems or potential problems of the asset type and of other asset types to the *Employer* for consideration.
5. Make recommendations to the *Employer* to optimise the delivery of the ecology cyclic and repair maintenance Items in order to minimise non-value adding elements.

Table 5-2 Outline Maintenance Strategy for Soft Estate Landscape – Post initial 5 year aftercare

Asset Type: 3100 – Soft Estate Landscape					
Scope: The semi-natural, improved/semi-improved and landscaped parts within the Affected Property including hard landscaping areas. This includes existing landscape, amenity, screening functions and/or other commitments where these have been raised by existing Public Inquiries, Planning Consents, Protected Habitats/Species, Designated Sites (International, National) or cultural heritage assets.					
Deliverables:					
Sub-Asset Type:	Cyclic:				Repair:
	Item:	**Item Frequency:**			**Item:**
		High	**Medium**	**Low**	
Shrubs / Trees	N/A	N/A	N/A	N/A	Rectify Defects as instructed or to any element identified as having the potential to fall on or damage the Affected Property or adjacent land
	Inspect and where necessary carry out trimming, crown thinning or formative pruning to encourage healthy thriving growth, improve asset safety and maintain attractive form/habit	Annually (Sep-Feb)	Every 18 months (Sep – Feb)	**Every 2 years**	
Hedgerows	Inspect intactness and function as a boundary and vitality of vegetation. Trim vegetation where necessary to encourage healthy, thriving, bushy growth and maintain attractive form.	**Annually (Sep-Feb)**	Every 18 months (Sep – Feb)	Every 2 years	
Cornish Hedgerows	Inspect structural integrity of bank and vitality of vegetation. Trim vegetation where necessary to encourage healthy thriving growth and, improve asset integrity and maintain attractive form.	**Annually (Sep-Feb)**	Every 18 months (Sep – Feb)	Every 2 years	
Woodland	Thin / Coppice as necessary to ensure healthy thriving growth and a closed canopy. Use arisings to create habitat piles of deadwood within woodland.	Every 3 years	**Every 5 years**	Every 7 years	
Species rich Wildflower Grassland	Cut and remove arisings off site or to agreed compost pile location.	2 times per year (early June and Sept)	**Annually** **In Sept**	Annually In Sept	

Grass and vegetation in general	Maintain and preserve sight lines and stopping distance, including junctions, access points, curves, bends and central reserve.	**8 times per year (Apr-Sep)**	6 times per year (Apr-Sep)	3 times per year (Apr-Sep)	Rectify Defects as instructed or to any element identified as having the potential to fall on or damage the Affected Property or adjacent land
	Preserve CCTV camera operational visibility splays	**2 times per year (Apr-Sep)**	Annually (Apr-Sep)	Annually (Apr-Sep)	
	Maintain and preserve road users' visibility of road traffic signs and signals.	3 times per year (Apr-Sep)	**2 times per year (Apr-Sep)**	Annually (Apr-Sep)	
	Ensure illumination from lighting is not obscured.	N/A	N/A	Annually (Apr-Sep)	
	Removing obstructions that prevent safe access, inspection and maintenance of technology equipment.	3 times per year (Apr-Sep)	**2 times per year (Apr-Sep)**	Annually (Apr-Sep)	
	Facilitate safe access to and use of footways, cycle tracks, bridleways, footpaths and paved pedestrian areas.	3 times per year (Apr-Sep)	**2 times per year (Apr-Sep)**	Annually (Apr-Sep)	
	Undertake 2m wide amenity cut of amenity grass areas, including gate way features, village verges and special landscape features.	12 times per year (Mar-Oct)	**10 times per year (Mar-Oct)**	8 times per year (Mar-Oct)	
	Undertake 2m wide amenity cut of all highway verges to ensure strip remains unobstructed by vegetation throughout the year (in addition to visibility splay maintenance).	3 times per year (Apr-Sep)	2 times per year (Apr-Sep)	**Annually (Apr-Sep)**	
	Grass cut from road edge to face of barrier on the central reserve spray selective herbicide to control weeds and broad leaf species, spray grass growth retarder after first cut of season.	3 times per year (Apr-Sep)	**2 times per year (Apr-Sep)**	Annually (Apr-Sep)	
	Remove obstructions that prevent use of customer facilities. This includes but not limited to emergency roadside telephones and emergency refuge areas.	N/A	N/A	N/A	
	Remove vegetation affecting the stability, integrity or operation of structures or other Affected Property assets.	N/A	N/A	N/A	

Procedures:

1. Maintain the soft estate in accordance with IAN 172/13.
2. Carry out woodland thin/coppice according to objectives of the specific plots as detailed in the Employer's systems.
3. Provide soft estate landscape cyclic and repair maintenance delivery item data. This includes but is not limited to the date the item delivery took place and photographic evidence post item delivery.
4. In delivering soft estate landscape cyclic or repair maintenance items, report problems or potential problems of the asset type and of other asset types to the Employer for consideration.
5. Make recommendations to the Employer to optimise the delivery of the landscaping/soft estate cyclic and repair maintenance Items in order to minimise non-value adding elements.

6 Handover of Maintenance Obligations

6.1.1 During the construction phase the contractor shall prepare detailed landscape management proposals within the landscaping scheme required under the DCO.

6.1.2 For the initial five-year aftercare period following completion of construction, the landscape and habitat maintenance requirements would be set out in the maintenance contract specification. The landscape management proposals converging the following three-year management period shall be set out by the contractor in a Handover Environmental Management Plan (HEMP).

6.1.3 Whilst the nature of the maintenance operations set out would typically be repeated year on year, the frequency of such operations should be considered to be flexible in order that response can be made to any change in circumstances necessary to achieve the target outcomes. The maintenance schedule would therefore need to be reviewed on an annual basis to determine the exact requirements to suit the longer-term management objectives.

6.1.4 To achieve the objectives of the OLEMP, the landscaping scheme and the HEMP shall incorporate, where appropriate, the detailed requirements set out in Highway England's DMRB Volume 1 Series 3000 Landscape and Ecology Series and accompanying appendices:

a. Appendix 30/2 Weed Control;
b. Appendix 30/3 Control of Rabbits and Deer;
c. Appendix 30/5 Grass Seeding, Wildflower Seeding and Turfing;
d. Appendix 30/6 Planting;
e. Appendix 30/7 Grass, Bulbs and Wildflower Maintenance;
f. Appendix 30/8 Watering;
g. Appendix 30/9 Establishment Maintenance for Planting;
h. Appendix 30/10 Maintenance of Established Trees and Shrubs; and
i. Appendix 30/11 Management of Waterbodies.

6.1.5 In some instances departure from standard specifications may be needed to achieve the target outcomes and advice would be sought from Highways England.

Annex R: Scheduled Monument Protection Plan

1 Introduction

1.1 Overview of the Scheme

1.1.1 The scheme comprises of a new A30 rural all-purpose dual carriageway approximately 14km (8.7 miles) between Chiverton Cross roundabout and Carland Cross junction on the A30. It is predominantly off-line from the existing single carriageway route. The existing Chiverton Cross and Carland Cross roundabouts are to be replaced with grade separated all-movement gyratory junctions to provide connections to the local highway network.

1.1.2 To accommodate the new dual carriageway, the existing A30 will be retained to provide a local route. The existing A30 will connect to a number of minor side roads leading to and from Truro to the south of the A30, and to and from Perranporth and Newquay to the north.

1.1.3 An outline of the works is provided in Section 16.1 of the Outline CEMP (Document Reference 6.4) [APP-375].

1.2 Purpose of Scheduled Monument Protection Plan

1.2.1 The objective of the Scheduled Monument Protection Plan (SMPP) is to ensure that a methodology is in place and followed, that would prevent any accidental damage to scheduled monuments during the construction phase of the scheme.

1.2.2 The construction of the scheme is not expected to affect below-ground archaeological remains associated with the scheduled monuments.

1.2.3 This document applies to all scheduled monuments that have been identified as being at potentially at risk of accidental damage.

2 Scheduled Monument Baseline

2.1.1 Scheduled monuments within 300m of the scheme are shown on the Designated Heritage Assets figures (Figure 6.1, Document Reference 6.3) [APP-167 and APP-168].

2.1.2 Of these barrows, the following are proposed to require demarcation and protection during site preparation and construction.

NHLE no 1016054 - The Four Burrows

2.1.3 The Four Burrows is a Scheduled Monument that includes a group of four Bronze Age barrows situated on a commanding hilltop at Four Burrows and fall into three separate areas. The barrows are situated between the parish boundary of Kenwyn and Perranzabuloe, with two barrows on each side. The four barrows are varying in height (2.5-3.9m) and diameter (16-24m), and two barrows have circular depressions in the centre, indicating possible antiquarian excavations. It is possible that the barrows are the surviving remnants of a Bronze Age barrow cemetery. These barrows form part of a wider visible Bronze Age monument landscape of symbolic value and meaning.

2.1.4 The scheme would realign the A30 as a dual carriageway approximately 50m north of the northernmost barrow of the group. The existing A30 would remain in situ as a local route.

2.1.5 During construction the cemetery would require demarcation from construction activity.

NHLE no 1017050 - Two bowl barrows 290m and 375m north of Higher Ennis Farm

2.1.6 The scheduled monument includes two Bronze Age bowl barrows, situated on the summit of a ridge south-west of Carland Cross. The scheduling is divided into two separate areas of protection. The northern barrow has a mound 9m in diameter and 0.7m high, with an irregular profile: the south and west sides have been cut into, and the top is uneven, possibly due to stone robbing. The mound of the southern barrow is 21.5m in diameter and 1m high, with an irregular rounded profile and a flattened but uneven top. A depression 2m-3m wide, to the north west of the mound, is considered to be the remains of an outer ditch.

2.1.7 The scheme would pass in cutting immediately to the north of the northernmost barrow, which would be retained in place by means of a retaining wall. The setting of the barrows to the east and south would not be affected by the scheme. Views to the north would be interrupted by the immediate proximity of the scheme, as well as new views along the scheme to the north-east and south-west.

2.1.8 During construction, the northernmost barrow would require demarcation and protection whilst the retaining wall is built due to the close proximity of construction works. The southern barrow would require demarcation to ensure avoidance during construction, although it lies outside the construction boundary.

NHLE no 1020758 - Round barrow cemetery 420m north-east of Higher Ennis Farm

2.1.9 This scheduled round barrow cemetery contains five barrows of bowl, bell and platform type. All the mounds are substantially intact despite modern ploughing on a four of the five and evidence for disturbance at two. The northern most barrow has the remains of the enclosed ditch as well as Killigrew Barrow, which is a prominent bell barrow in the cemetery with a mound of 17m in diameter and 2.5m in height, and the enclosed ditch shown by a 3m wide depression in the ground.

2.1.10 During construction, the cemetery would require demarcation and protection from construction activity.

NHLE no 1016888 - Warren's Barrow

2.1.11 The scheduled Warren's Barrow is the most northerly barrow of the scheduled barrow cemetery 420m north-east of Higher Ennis Farm (NHLE no. 1020758), located to the south. The barrow has a stepped appearance with a central mound about 10m in diameter and contains a large central depression thought to be the cause of an antiquarian excavation. The whole barrow stands at a maximum height of 3.6m and is 36m in diameter in total, with a possible surviving ditch underneath the ground surrounding the barrow. The barrow currently has modern material over the top of the barrow due to a temporary track.

2.1.12 During construction, the barrow would require demarcation and protection due to the proximity of the new carriageway located to the north.

NHLE no 1017350 - Prehistoric long barrow and four round barrows 580m and 750m south west of Mitchell Farm

2.1.13 This scheduled monument includes a long barrow and four round barrows within two areas of protection. Together they form the western part of a prehistoric ridge top barrow cemetery located high above the east of Carland Cross. Three of the four round barrows are situated close together, whereas the last barrow is around 150m to their west. They all however share a similar size (15-16m in diameter, 0.2-0.3m in height). The long barrow is located north-west of the western round barrow, the long barrow measures approximately 22m long, 13m across and 0.4m in height. The barrows are no longer visible above the ground.

2.1.14 During construction, the long barrow and western round barrow would require demarcation and protection, as the field containing these will be utilised as a main construction compound (Eastern Compound), in which proposed activities include: main office buildings and welfare facilities, car parking, material storage, satellite offices, fuel storage, washout pits for concrete and sweepers, waste segregation area and topsoil/subsoil storage. The remaining barrows would not be disturbed.

NHLE 1017049 - Bowl barrow 500m north west of Higher Ennis Farm

2.1.15 This Scheduled Monument comprises part of a Bronze Age barrow located on the western edge of a ridge south-west of Carland Cross. The southern part of the barrow has previously been partially segmented by the construction of the A30. The mound is approximately 0.7m in height and 22m in diameter, with a slight 2m wide depression on the ground, thought to represent the barrow's surrounding

ditch. The barrow was possibly part of a cohesive group in the area, which may have formed a round barrow cemetery.

2.1.16 The scheme would realign the A30 approximately 115m southwards from the barrow. The existing A30 would remain as a declassified road for local traffic.

2.1.17 During construction, the barrow would require demarcation and protection from construction activity.

NHLE 1016103 - Bowl barrow 100m south west of Callestick Vean

2.1.18 The bowl barrow is located 100m south-west of Callestick Vean and just north of the A30. The barrow survives as a low-lying mound, which is the result of ploughing, yet the barrow is still 0.5m in height and 20m in diameter. This barrow forms part of a wider visible Bronze Age monument landscape of symbolic value and meaning.

2.1.19 The barrow is partially screened from views of the A30 to the south and east by a dry stone wall, and intermittent hedgerow. A local overhead electricity transmission line runs north-south to the west of the barrow. Views from the barrow to the west and north are rural in nature; however, the northern view is interrupted by the B3284.

2.1.20 The scheme would realign the A30 as a dual carriageway northwards at-grade, bringing it within approximately 5m of the barrow.

2.1.21 During construction, the barrow would require demarcation and protection to ensure avoidance during construction.

NHLE 1016056 - Three Burrows

2.1.22 The Three Burrows is a Scheduled Monument that includes a group of three Bronze Age barrows that have been ploughed and so reduced in height, they are located just east of Chiverton Cross and South East of St Peter's Church at Chiverton Cross. The three barrows are similar in diameter (20-22m) and in height (1-1.5m); only one of the barrows has any trace of a surrounding ditch. They are located within an open field; two barrows are located adjacent to a work yard and covered reservoir to the east.

2.1.23 The barrows were possibly part of a cohesive group, along with the scheduled bowl barrow 125m south of St Peter’s Church, located on a plateau at the top of a ridge. These barrows form part of a wider visible Bronze Age monument landscape of symbolic value and meaning. The broad setting of the barrows consists of predominantly rural views, and this aspect of their settings is considered to contribute to their significance. Although the construction of the existing A30, Chiverton roundabout and A3075 has partially fragmented that setting, especially with the intrusion from lighting that is visible from the barrows at night.

2.1.24 The scheme will remove the existing Chiverton roundabout and associated lighting, and an on/off slip road will replace it. This slip road will be constructed a short distance south-east of the existing junction, which would then run along the northern edge of the barrow field, approximately 10m closer to the barrows than the current A30. The A30 itself will be diverted to the north of its current alignment rising on embankment north-east of the barrows at a distance of 500m

2.1.25 During construction, the barrows would require demarcation and protection, as the field to the west of the barrows will be utilised as a main construction compound (Western Compound), in which proposed activities include: main office buildings and welfare facilities, car parking, material storage, satellite offices, fuel storage, washout pits for concrete and sweepers, waste segregation area and topsoil/subsoil storage.

NHLE 1016887 - Bowl barrow 130m south east of Penglaze

2.1.26 This asset includes a bowl barrow situated at the southern end of Newlyn Downs. The barrow survives as a low lying mound due to cultivation and ploughing. The barrow is still 0.5m in height and has a diameter of 23m despite the ploughing.

2.1.27 The barrow lies approximately 40m to the north of the A30, and views to the south form the barrow are impacted by this and the traffic upon it. The views to the west are foreshortened by the presence of a hedgerow, whilst to the east the barrow has views along the A30 towards Carland Cross, though rural aspects of the landscape still predominate. To the north, the view is largely rural, though punctuated by wind turbines at a distance of approximately 600m.

2.1.28 The scheme would move the alignment of the A30 to the south at a distance of approximately 190m from the barrow; the existing A30 would remain in place as a local access road.

2.1.29 During construction, the barrow would require demarcation from construction activity.

3 Methodology for Protection of Scheduled Monuments

3.1 Development Consent Order

3.1.1 Mitigation measures are detailed within the Outline CEMP (Document reference 6.4) [APP-375 and APP-376]. This is secured through Requirement 3 of the draft DCO (Document Reference 3.1(C)) submitted at Deadline 2.

3.1.2 The Outline CEMP (Document Reference 6.4) [APP-376] will be developed into a detailed CEMP once the detailed design and construction plans have been finalised. This is secured through part 2 of Requirement 3 of the draft DCO (Document Reference 3.1(C)) submitted at Deadline 2:

3.1.3 *Schedule 2*, Requirement 3.— *(2) The CEMP must—*

(a) be substantially in accordance with the outline construction environmental management plan certified under article 45 (certification of plans etc.);

3.1.4 Highways England will require their contractors to adopt and implement the CEMP during the construction of the proposed development. This will be secured through contractual agreement between Highways England and the appointed contractor.

3.1.5 The protection of Archaeology is secured through Requirement 9 of the draft DCO (Document Reference 3.1(C)) submitted at Deadline 2.

3.2 Archaeological Exclusion Zones

3.2.1 Before work commences on any part of the scheme, including the preparation and set up of site compounds, limits must be clearly delineated on site at least five working days prior to the commencement of work. In all instances exclusion zones must be established by means of an on-site inspection visit with Historic England, in which it will be agreed which scheduled monuments, listed in section 2, would require protection.

3.2.2 All scheduled monuments to be avoided by construction will have exclusion zones put in place to ensure the scheduled monuments are not accidentally damaged. These would be fenced with semi-permanent Heras type, or post and wire type fencing.

3.2.3 The exclusion zone fencing will mark a buffer of at least 5m around each scheduled monument. This will be clearly signed and declared an exclusion zone. The exclusion zones shall be fenced off and entry into these areas by plant and all personnel shall be strictly prohibited.

3.2.4 Exclusion fencing will remain in place until construction is completed. Once completed, the exclusion fencing will be removed, and the disturbed ground will be reinstated and made good.

4 Monitoring

4.1.1 Monitoring will be required during construction to ensure that mitigation measures are applied.

4.1.2 Archaeological exclusion zones will be inspected on a weekly basis by the environmental clerk of works, to ensure that all fencing is secure.

4.1.3 Should an exclusion zone be breached during construction, in the first instance this will be reported to the environmental clerk of works, who will then inform Highways England's historic environment specialist for the scheme, to advise on whether further protective measures are required. All damaged fencing will be replaced immediately.

4.1.4 If damage has occurred to a scheduled monument as a result of a breach as described above, the same procedure will be followed, however all works within 30m of the affected monument will be halted until such time as Highways England's historic environment advisor for the scheme and Historic England have visited site and agreed a programme of remediation.

4.1.5 NOTE: Any damage to a scheduled monument, regardless of severity, is a criminal offence in accordance to the Ancient Monuments and Archaeological Areas Act 1979, Part 1, Section 28-32.

Annex S: Outline Archaeological Framework Strategy

1 Introduction

1.1 Overview of the Scheme

1.1.1 The scheme comprises of a new A30 rural all-purpose dual carriageway approximately 14km (8.7 miles) between Chiverton Cross roundabout and Carland Cross junction on the A30. It is predominantly off-line from the existing single carriageway route. The existing Chiverton Cross and Carland Cross roundabouts are to be replaced with grade separated all-movement gyratory junctions to provide connections to the local highway network.

1.1.2 To accommodate the new dual carriageway, the existing A30 will be retained to provide a local route. The existing A30 will connect to a number of minor side roads leading to and from Truro to the south of the A30, and to and from Perranporth and Newquay to the north.

1.1.3 An outline of the works is provided in Section 16.1 of the Outline CEMP (Document reference 6.4) [APP-375].

1.2 Purpose of Outline Archaeological Framework Strategy

1.2.1 The objective of the Outline Archaeological Framework Strategy (OAFS) is to set out the scope, guiding principles and methods for the planning and implementation of essential archaeological mitigation works associated with the design and construction of the scheme.

1.2.2 This document provides a snapshot of the proposed archaeological mitigation strategy for the Scheme. As such it presents proposals current at the time of writing, but that which will evolve as new surveys are completed.

1.2.3 The detailed approach to the OAFS is currently being developed and agreed with the Senior Development Officer (Historic Environment) (SDOHE) at Cornwall Council.

1.3 Roles and Responsibilities

1.3.1 Roles and responsibilities for the archaeological mitigation phase of the Scheme are presented in Figure 1 below.

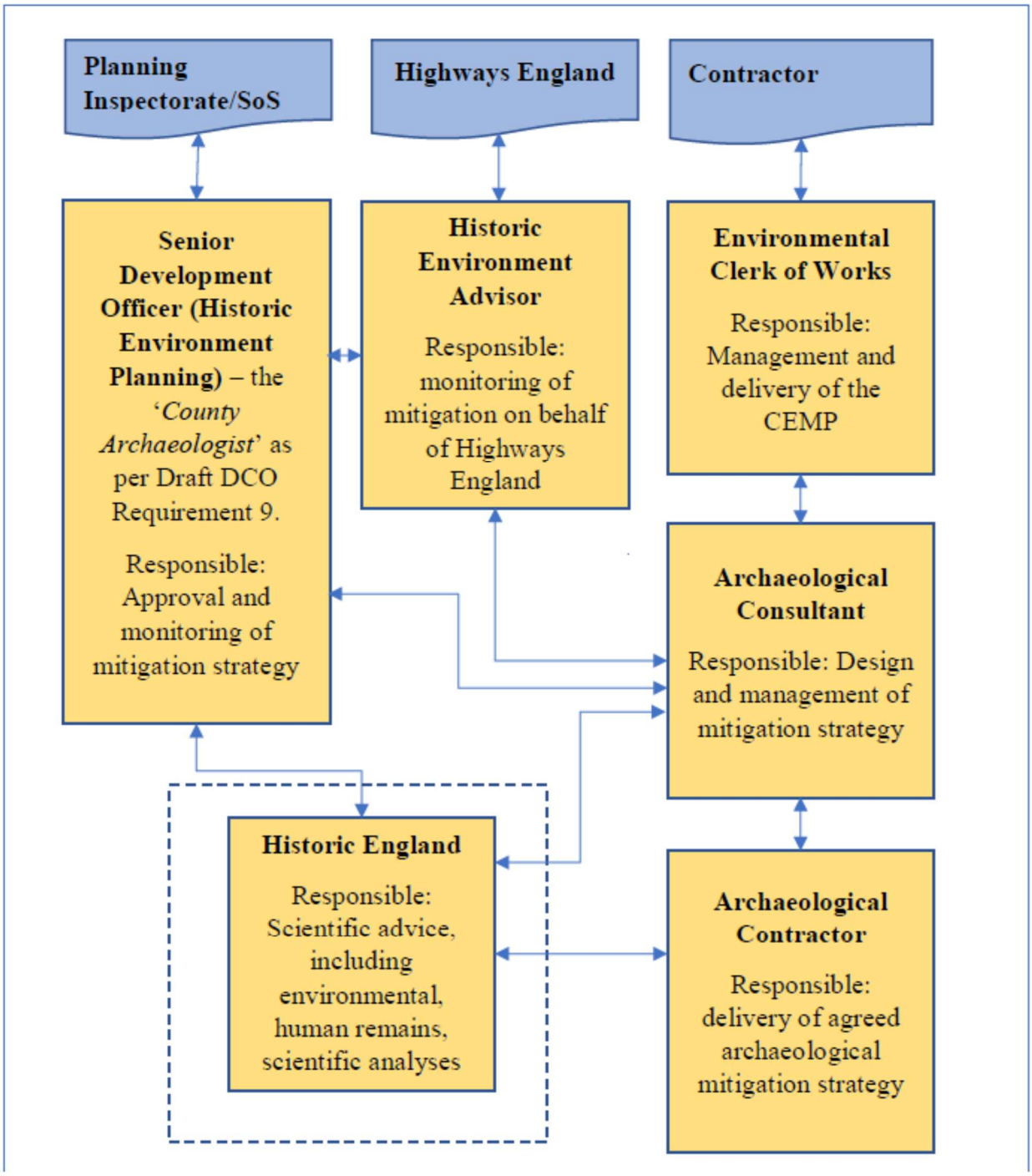


Figure 1 Roles and Responsibilities

2 Principles for Archaeological Mitigation

2.1 General Principles

2.1.1 Archaeological mitigation is required to enable the preservation, either in situ or by record, of buried archaeological deposits that could be impacted by the Scheme.

2.1.2 Archaeological geophysical surveys and trial trenching were undertaken to inform the assessment of the Scheme, and the results of these have informed the initial approach to mitigation described in this document.

2.1.3 Supplementary geophysical surveys are in progress, which will further inform the scope of the archaeological mitigation, and will also be undertaken post-scrub clearance in the vicinity of scheduled barrow NHLE1017050 (see drawings HA551502-ARP-HER-SW-DR-LH-000001 through to HA551502-ARP-HER-SW-DR-LH-000010).

2.1.4 In all circumstances, preservation in situ will be the preferred approach to mitigation. During the Detailed Design phase of the Scheme opportunities will be evaluated to enable this to be achieved where feasible. Proposals for preservation in situ will identify a strategy for preservation that considers site-specific conditions and potential construction impacts.

2.1.5 The areas identified within the Final OAFS will, in conjunction with the Outline Written Scheme of Investigation (Annex F), inform one or more Detailed Written Scheme of Investigation, to be produced by the appointed Archaeological Contractor.

2.1.6 All archaeological mitigation, including post-excavation analyses, technical publication and 'popular publication', is secured by Requirement 9 of the Draft DCO, which states:

> *9.—(1) No part of the authorised development is to commence until for that part a scheme for the investigation and mitigation of areas of archaeological interest, reflecting the mitigation measures included in chapter 6 of the environmental statement, with provision for sub-written schemes of investigation for each area and each phase (evaluation or detailed excavation or watching brief), has been prepared in consultation with the relevant planning authority and the local highway authority, agreed with the County Archaeologist and submitted to and approved in writing by the Secretary of State.*
>
> *(2) The authorised development must be carried out in accordance with the archaeological framework strategy and sub-written schemes of investigation referred to in sub-paragraph (1) unless otherwise agreed in writing by the Secretary of State.*
>
> *(3) A programme of archaeological reporting, post excavation and publication required as part of the archaeological framework strategy and sub-written schemes of investigation referred to in sub-paragraph (1) must be agreed with the County Archaeologist and implemented within a timescale agreed with the County Archaeologist and deposited with the Historic Environment Record of the relevant planning authority within two years of the date of completion of the authorised development or such other period as may be agreed in writing by the relevant planning authority.*

(4) Any archaeological remains not previously identified which are revealed when carrying out the authorised development must be—

(a) retained in situ and reported to the County Archaeologist as soon as reasonably practicable; and

(b) subject to appropriate mitigation as set out in the archaeological framework strategy and mitigation agreed with the County Archaeologist.

(5) No construction operations are to take place within 10 metres of the remains referred to in sub-paragraph (4) for a period of 14 days from the date the remains are reported to the County Archaeologist under sub-paragraph (4) unless otherwise agreed in writing by the Secretary of State.

(6) On completion of the authorised development, suitable resources and provisions for long term storage of the archaeological archive will be agreed with the County Archaeologist.

3 Archaeological Research Strategy

3.1.1 Based on the results of surveys to-date, the following Research Aims (in their entirety, or specific sub-aims), as described in the South West Archaeological Research Framework, could be relevant to the project. These identified aims will require further discussion with SDOHE and HMBCE Regional Scientific Advisor on a site specific basis as the detailed design of archaeological mitigation takes place.

- Research Aim 2: Encourage works of synthesis within and across periods, settlements, monuments and areas.
  - *Syntheses need to be made of existing palaeovegetational data from different zones of the South West.*
  - *Archaeological frameworks for all the earliest prehistoric periods need development and refinement (as appropriate), acknowledging regional and sub-regional patterning in the South West. Such work is heavily (although not exclusively) dependent upon the re-assessment, dating and discovery of stratified sites.*
  - *Landscape use models need development and refinement, principally for the Mesolithic, including raw material transfers, human mobility (including the relative usage of upland, lowland and coastal environments and topographical locations), subsistence strategies, and landscape modification, amongst other factors. In the case of the Mesolithic this goal reflects the relative richness of the archaeological record for this period, especially, but not limited to, Somerset. Although similar approaches can (and should) be applied to the more limited data sets of the Upper Palaeolithic, due regard must be given to the issue of coastline "mobility" during the Pleistocene and the changing "upland/lowland" status of the same location at different periods. Within these models attention should be paid (as appropriate) to the integration of key sites (such as Westward Ho!, Balaam et al. 1987) with their surrounding landscapes and sites.*
  - *Consider existing information on earlier Bronze Age grave assemblages, in order facilitate a better understanding of material sequences, object biographies (such as the presence of heirlooms), the expression of social identity through material culture, and bodily display.*
- Research Aim 3: Address apparent "gaps" in our knowledge and assess whether they are meaningful or simply biases in current knowledge.
  - *Fieldwork and the assessment of extant collections should focus upon the explicit evaluation of apparent regional biases. For example, the relative paucity of Lower and Middle Palaeolithic archaeology in the western half (especially Devon and Cornwall) and the extreme north (e.g. Gloucestershire) of the region, the limited presence of Upper Palaeolithic archaeology in the extreme west, north and east of the region, and the over-emphasis of coastal archaeology for the Mesolithic period in Cornwall.*

- *Apparent gaps in Neolithic-Early Bronze Age settlement across landscapes need testing.*
- *Work to identify different regimes of mobility and sedentism. Work toward understanding of the significance of agriculture at different times and in different places across the region.*
- *Where farming is concerned, local distinctiveness may be the result of social and cultural factors as well as the constraints imposed by geology, soils, topography, aspect, etc. One example is the new finding of the cultivation of Emmer wheat in parts of the Thames valley in the Saxon period (Pelling 2003), but with better data coverage and resolution of radiocarbon dating, other examples showing regional or local distinctiveness could emerge.*
- *Consider regional traditions of pit digging and deposition, and what might these tell us of residency, settlement duration, composition, social relations and relations with places and other agencies.*
- *Consider whether the apparent intensification in plough agriculture during the Early Bronze Age, which is evident at least in the east of the region.*
- *Consider how the ceramic sequences and types of the Neolithic and Early Bronze Age differ across the region and whether there are overlaps.*
- *In the Roman period the South West appears to show several unique features when compared to the rest of the country: the apparent late founding and wealth of the villas, later Roman pagan temples etc. These need to be understood, not just for our understanding of the Roman period but also to understand the way the region developed in succeeding periods.*
- *In the Post-Medieval and Modern periods the South West region has, to some extent, examples of most of the sites, monuments and features of these periods that are found elsewhere in England. But it has some significant groups of national importance such as mining heritage, the remains of textile manufacture and associated housing, telecommunications and military survivals. Also, it has some things that are unique, such as china and ball clay extraction sites. These important topics need further study.*
- *In the Post-Medieval and later periods (if not before) it is also becoming clear that there are real variations in material culture across the region. Without further synthesis, we cannot start to describe more fully what these are and offer reasons for them. There are also cultural similarities outside the region which are evident (with Breton house-types, for example). All of this is masked to an unknown extent by the marked intra-regional biases in recording Post-Medieval and later sites and landscapes. The "real" variations may well, at least in part, be the manifestations of genuine regional and other identities.*

- Research Aim 5: Encourage the study of artefact scatters using innovative methodologies both in the field and on previous collections.

- *Attention should be paid to lithic scatter resources, in particular the specific evaluation and/or re-evaluation of "grey collections", and the development of appropriate interpretive methodologies which maximise the potential value of this landscape-scale, off-site resource. The "grey collections" principally consist of artefact assemblages from both museums and private collections. Emphasis should also be given to assessing the presence and potential size of the non-flint lithic component of the South West's archaeological record.*
- *Lithic scatter artefacts remain problematic, given the frequent absence of independent dating and the tendency of much of the material to be highly undiagnostic. There is therefore a need to review the relationships between the resource, the Portable Antiquities Scheme (PAS), and the local/regional museums, and consider developing or modifying strategies to promote the accurate reporting of lithic material and providing (where possible) artefact identification services.*
- *Approaches to the investigation and interpretation of lithic scatters have become rather mechanical. Regarding potential new forms of interrogation and interpretation, consideration should be given to working within finer temporal and spatial scales.*

- Research Aim 14: Widen our understanding of Later Bronze Age and Iron Age material culture.
  - *With the exceptions of pottery and Bronze Age metalwork, material culture has generally been neglected. Material studies on excavated material are too rare and work on types of materials or specific museum collections has become less popular with research students. This must not, however, obscure the importance of metalwork and metalworking; the huge quantities of Bronze Age metalwork given to the gods attest to that.*
- Research Aim 16: Increase the use and improve the targeting scientific dating:
  - *Widespread application of radiocarbon dating (where possible) to Mesolithic sites, especially in Cornwall and Devon, is urgently required in light of the extremely poor chronological frameworks currently available.*
  - *In the Early Medieval period, where diagnostic material culture is hard to recognise, the centrality of scientific dating cannot be over-emphasised. In particular dates are needed from "undated but probably prehistoric" sites such as enclosed settlements and sites that appear "late Roman" on the basis of their artefacts.*

- Research Aim 17: Improve the quality and quantity of environmental data and our understanding of what it represents:

  - *A range of context types should be sampled for plant macrofossils, especially for the Iron Age where most work has concentrated on pits. For example, sampling only obviously rich deposits misses evidence for crop processing and leads to mis-interpretation of site function and plant use.*

- Research Aim 18: Target specific soil and sediment contexts for environmental information:

  - *Targeted use should be made of pollen analysis to investigate particular archaeological questions or gaps in knowledge and not just carried out on long sequences "because they are there". Examples include the Late Glacial (i.e. the environment of the Late and Final Upper Palaeolithic) from catchments including archaeological sites of this period; the Mesolithic to Neolithic transition; the timing and duration of Neolithic and Bronze Age clearance and reforestation; the development of heathland and the immediate post-Roman to Saxon period (Sub-Roman and Early Medieval). High resolution dating strategies will be needed to allow detailed interpretation and not restricted to top, middle and base of sequences unless judged to be appropriate.*

  - *Little is known about when, how and where soils were artificially improved in the past. Micromorphological studies can begin to address whether there are temporal trends in soil improvement and carbon isotope and geochemical studies can also be used in some circumstances. Areas such as the Isles of Scilly, Gwithian and other island or coastal locations would be particularly amenable to study, but the question is relevant throughout the region.*

  - *Colluvial and alluvial sequences as markers for forest clearance, agricultural intensification and for metal mining and smelting need to be exploited. In order to do this both types of stratigraphy need to be investigated in more detail than present and much better dated, rather than being written off as archaeological and palaeoenvironmentally sterile. Magnetic and geochemical techniques can be used to source such deposits and suggest why deposition occurred, while OSL dating is now a reliable technique (sometimes more so than radiocarbon) for accurately dating the onset of alluviation etc.*

- Research Aim 21: Improve our understanding of the environmental aspects of farming.

  - *Our knowledge of plant use especially remains patchy. This extends beyond food; fibres, building materials, adhesives and drugs should also be considered.*

  - *Better understanding is needed of how the process of agricultural intensification can be detected on archaeological sites. Better use of the evidence should be made by integrating environmental and artefactual evidence to test theory, coupled with comprehensive dating programmes. For example, better understanding of the development of*

field systems and increase in arable between c.2000 and 1500 BC remains important.

- *Later prehistory is often characterised as the domestication of the land, with the appearance of permanent settlements and fields; from wildscape to landscape. The environmental evidence for agriculture, whether charred plant remains or animal ones, remains poorly studied in comparison to structures or ceramics. In this regard archaeological science needs to be taken out of the black box and treated as mainstream.*
- *Site-based studies have provided environmental evidence in the Medieval period but further work is needed to link sites to the wider landscape and better-dated contexts. This will provide opportunities for understanding what happened at documented historical events around the region. Understanding the changing patterns of land use and their environmental impact has yet to be fully realised.*
- *As in other regions, the potential of environmental studies in the Post-Medieval periods remains under-exploited; there is substantial opportunity to enhance our understanding of agricultural, industrial, and urban environments and their development.*

- Research Aim 26: Investigate the changes in landscape and population at the end of the Roman period.
  - *In the Early Medieval period environmental studies have the potential to provide an independent witness to activities which are currently obscured by the lack of site-based evidence. Studies such as the use of pollen to assess woodland regeneration can provide broad indicators of population densities – but they must be dated independently rather than by links to supposed historical events as has sometimes happened in the past.*
- Research Aim 28: Improve our understanding of Neolithic settlements and landscapes.
  - *A greater focus needs to be placed on the landscape surrounding Neolithic sites. Although such an approach has been applied to some areas of Wessex (such as Cranborne Chase, Stonehenge, Durrington Walls etc) there are many areas where sites are studied in isolation.*
  - *The potential of "small-scale" evidence such as pits and stake-holes needs to be realised. Consider whether cumulative patterns emerge.*
  - *We still require a better knowledge of "domestic" architecture, in both ephemeral and more permanent forms.*
  - *More attention should be paid to tree-throws and other "natural" features within which occupation debris occurs.*

- Research Aim 29: Improve our understanding of non-villa Roman rural settlement.

  - *Whilst work in the past has concentrated on villa buildings, developer funded work has made considerable advances in the study of non-villa rural settlement in certain parts of the region, such as the M4/M5 corridors, the Upper Thames valley and the outskirts of the Bristol conurbation. Elsewhere the record is very patchy and there has been little study of the environmental/economic data such as bones and seeds which ought to provide information on the agricultural base in different parts of the region.*
  - *Some areas, such as West Dorset and North and West Devon, currently have very little evidence for settlement in the Roman period. This needs to be assessed by extensive field survey (such as the National Mapping Programme) and targeted excavation to test whether this is a reflection of a real absence or only a lack of archaeological work.*
  - *Apart from in these areas, the visibility of Roman sites should allow more geographical approaches to their study, such as the identification of differing settlement densities and types across the region (and perhaps beyond). This would provide a useful counterbalance to earlier studies of villa distributions and provide a greater understanding of the nature of the Roman countryside. Developer-funded work associated with linear schemes such as roads and pipelines provides raw data which requires further synthesis before it can be used to address such questions*

- Research Aim 30: Develop and test methodologies to identify Early Medieval rural settlement.

  - *The lack of visibility of smaller rural sites has led to a reliance on more visible elite settlements. The known sites (of all types) are so few in number that it is impossible to assess how "typical" a site such as Trethurgy or Cadbury Castle is. This needs to be addressed by wider landscape studies and careful targeting of fieldwork.*

- Research Aim 38: Widen our understanding of the extraction, processing and transportation of minerals, stone and aggregates.

  - *Given the importance of exploitation of metal ores in the South West in both prehistoric and historic times, alluvial and peat sequences can be used to provide a chronology for and to assess the impact of mining activity (see, for example, Thorndycraft et al. 2004). A combination of geochemistry and OSL dating can be used.*
  - *Mining remains themselves have the potential for well-dated and stratified deposits which may also exhibit technological change with wider implications.*
  - *More work is required on the exploitation of flint, chert and other stone sources, and the transportation of these materials in prehistory.*

- *The scale and organisation of metalworking during the earlier Bronze Age remain poorly defined as are the reasons why metal objects are comparatively rare in those areas which have ores when compared to those that don't.*
- *The apparent lack of evidence for Bronze Age mining (now clearly demonstrated in Ireland, Wales, and Cheshire) is very surprising in view of the region's rich and well-exposed mineral resources. While tin extraction may have been entirely by streaming, this should not be uncritically assumed, and copper ores do not accumulate in stream deposits. The main site indicator in other regions has proved to be the hammerstones (though these do not in themselves prove a prehistoric date); their apparent absence from the South West may possibly indicate a different mining technology in which hammerstones were not used, in which case other site indicators will need to be identified. Prehistoric streaming sites would also be of considerable importance. A genuine absence of Bronze Age mining, for tin and/or copper, would itself be of considerable interest if the "negative" results of substantial well-designed research allowed this to be argued with any confidence.*
- *Although the massive Medieval and Post-Medieval rise of the tin and copper industries in Devon and Cornwall is relatively well-known archaeologically, its sheer scale, importance, and variety means that there is still much important work to be done.*
- *Quarrying has been a further major extractive industry of the region, ranging from the Medieval and later freestone quarries of the Jurassic belt in the east to the granite quarries of Dartmooor and Cornwall, and also including underground "stone mines" such as Chilmark and Combe Down. These quarries, and their associated infrastructure in their wider cultural and economic setting, remain under-studied.*

- Research Aim 54: Widen our understanding of monumentality in the Neolithic and Early Bronze Age.

  - *Certain kinds of monumental construction within the region (such as the diminutive Exmoor stone settings) remain very poorly understood.*
  - *All areas of the region contain monuments that challenge "conventional" categories and sequences. Rather than being relegated to the status of "oddities", we should acknowledge and seek to better understand non-conventional monument forms.*
  - *Likewise, there is a need to better interpret differences in scale, complexity and histories of use in what are seemingly single "categories" of monument.*
  - *Consider the understanding of the emergence of ceremonial centres (clusters of monuments).*
  - *Consider the evidence for Late Neolithic and Early Bronze Age enclosure in the south-west peninsula where henges are rare. Consider whether there are equivalents elsewhere for sites, such as Bartinney, with a non-defensive enclosure around ceremonial monuments.*

- *Consider the commonality and spread of Neolithic round barrows.*
- *Approaches to Bronze Age round barrow cemeteries as "communal monuments" potentially have much to offer.*

- Research Aim 57: Widen our understanding of Neolithic and Early Bronze Age mortuary practice.

  - *The simplified, traditionally understood sequence of earlier Neolithic collective burial, replaced by single burial (cremation or inhumation) by the earlier Bronze Age, clearly masks a reality of considerable diversity in mortuary treatment. The full complexity of treatment in time and space needs addressing, and within single monument contexts (such as Cotswold-Severn and earthen long barrows), in part through synthesis of existing information.*
  - *We need to address the problem of later Neolithic mortuary practices in view of the extreme rarity of human remains from the period.*
  - *More dates are needed on cremated bone, with and without direct material associations, so that this aspect of mortuary behaviour can be fitted into established chronologies.*
  - *Greater attention needs to be paid to the occurrence of isolated human bone finds within a range of contexts, both for the information they might provide of mortuary and ancestor rites, and, via direct scientific analysis, as a source of information on diet, health and mobility.*
  - *Consider the presence of human bone in barrow sites and other monuments, and whether it always equates with funerary activity or ancestral rites per se, or whether in some cases human bone was just another form of symbolic resource.*

- Research Aim 58: Widen our understanding of Roman burial traditions.

  - *Inhumation burial occurs in a number of areas of the South West in the Late Iron Age and early Roman period (areas such as Dorset and the Cotswold/Severn valley) and study of these may throw light on changes in belief brought about by the conquest. Similarly large later Roman urban cemeteries occur (as at Dorchester, Gloucester and Cirencester) as do rural ones which frequently span into the post Roman period (Cannington, Henley Wood, Bradley Hill etc.) which provide a similar resource at the end of the period. Museum collections also represent a considerable resource to which new scientific techniques can be applied such to provide information on geographic origins and family associations. The very poor burial record in Devon and Cornwall needs to be remedied.*

4 Previous Archaeological Surveys

4.1 Overview

4.1.1 In June 2017, a non-intrusive geophysical survey was undertaken by SUMO Survey[77], within 69 areas along the scheme corridor. Further geophysical survey was undertaken on compound areas at Carland Cross and Chiverton Cross in 2018[78].

4.1.2 The 2017 survey identified numerous anomalies of probable and possible archaeological interest, scattered along the length of the survey corridor but with concentrations to the south of Newlyn Downs (areas 8-10), approximately 1.4km north-east of Zelah (areas 14-15), directly south of Zelah (areas 23-24) and approximately 850m south-west of Chyverton Park (areas 26-32).

4.1.3 By far the most common features identified were linear anomalies, which may represent enclosures or field systems. Possible ring ditches were also detected. Elsewhere, occasional lengths of linear anomalies and isolated pit-like anomalies were recorded. Pipes and anomalies of natural origin were also identified, and past agriculture was visible throughout the survey area. The result of this survey is provided in Geophysical report (Volume 6 Document Ref 6.4 ES Appendix 6.3). The 2018 survey identified a pit alignment and other possible archaeological features at the Carland Cross compound site. The result of this survey is provided in Geophysical Survey Report (Volume 6, Document Ref 6.4 Appendix 6.5).

4.1.4 Archaeological Trial Trenching was undertaken in 2017 to investigate geophysical anomalies, where site constraints enabled access. Features identified included a Late Mesolithic/Early Neolithic flint scatter and a possible Middle Neolithic structure, at Ventonteague, potential Bronze Age barrows or cairns at Ennis Farm, Ventonteague, and Trevalso. Evidence of Bronze Age settlement, including a pit containing a whole Trevisker urn, was identified at Nancarrow and Marazanvose. Iron Age and/or Romano-British field ditches were identified at Tolgroggan, Nancarrow, and Marazanvose. Medieval ridge and furrow cultivation was identified at various locations along the route and field ditches of medieval date were found at Marazanvose and Nanteague, the former possibly representing a settlement. Medieval iron smelting was identified at Nancarrow. Post-medieval enclosure was identified in many of the former areas of downland along the route, and 19th century mining remains were found at Ennis Farm.

4.1.5 Further information is provided in Trial trenching report (Volume 6 Document Ref 6.4 ES Appendix 6.4). In 2018 further evaluation was undertaken in response to the discovery of the Middle Neolithic remains at Ventonteague in order better understand their significance and the potential impact upon them from the proposed scheme. This investigation identified ‘post-rings’ which possibly represent the remains of temporary Neolithic structures, pits containing Neolithic pottery, and ditches representing the remains field boundaries.

[77] Gater, J. and Tanner, J. Geophysical Survey Report, A30 Carland to Chiverton, Cornwall, 2017
[78] Wessex Archaeology A30 Chiverton to Carland Cross, Cornwall Detailed Gradiometer Survey report, Ref:203520.04 June 2018

5 Strategy for Archaeological Mitigation

5.1.1 The results of geophysical survey and trial trenching undertaken to inform the EIA have been reviewed, and as a result, 21 areas have been initially selected for investigation by Strip-Map-Sample. Areas in which trenching has taken place, but no archaeological deposits were encountered, are not proposed for further investigation.

5.1.2 Areas for Strip-Map-Sample are shown on drawings HA551502-ARP-HER-SW-DR-LH-000001 through to HA551502-ARP-HER-SW-DR-LH-000010 and are described in the table below.

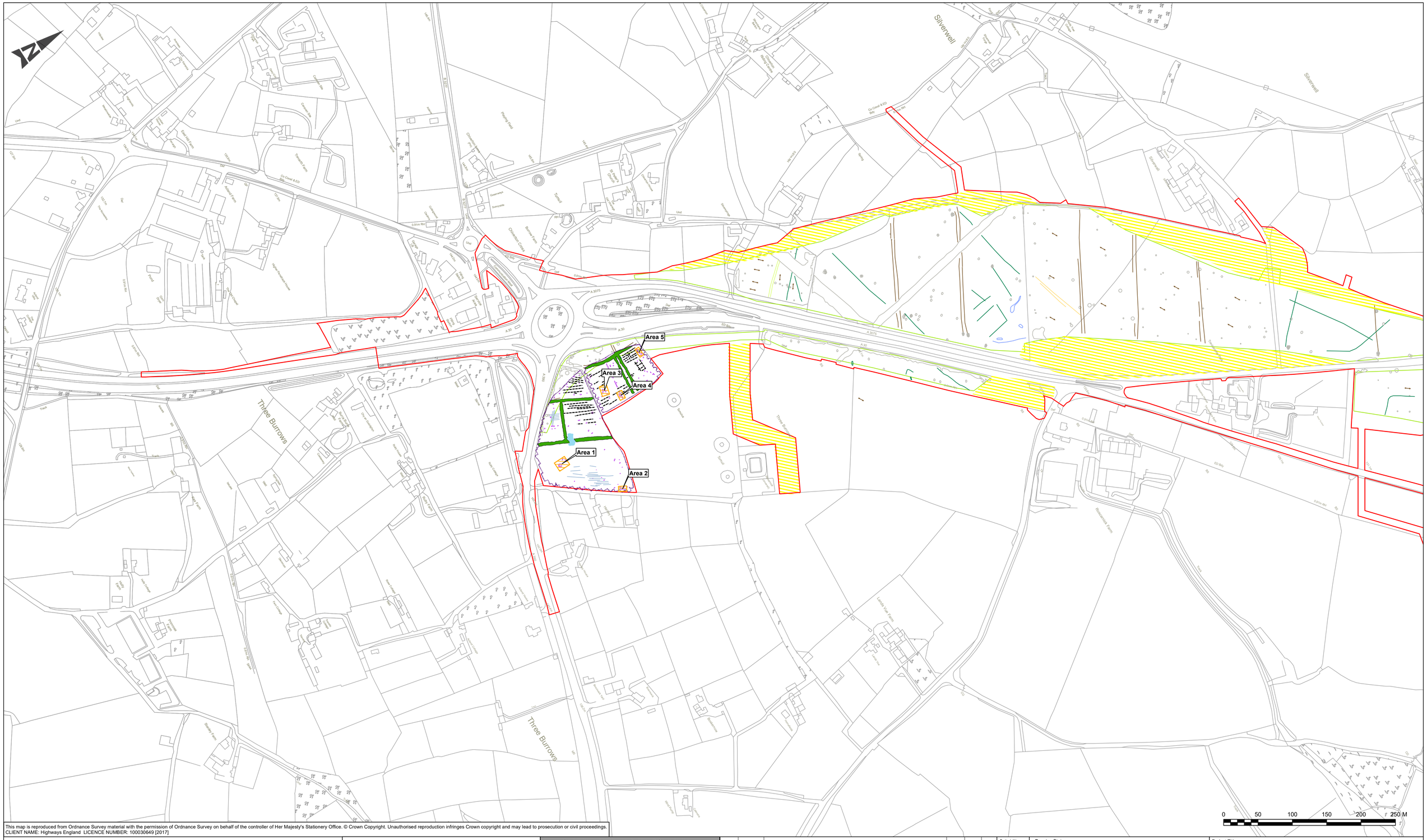
Table 5.1 Areas for Strip-Map-Sample

Area No.	Area (m^2)	Description	Research Aim (where specifically relevant)
1	250	Targeted on a geophysical anomaly, possibly representing a ring ditch/barrow.	18, 28, 54, 57
2	90	Targeted on a geophysical anomaly of probable archaeological origin, though of no clear form.	18
3	160	Targeted on a grouping of pit-like anomalies.	18
4	100	Targeted on a segment of geophysical linear anomaly, and two possible associated pit-like anomalies.	18
5	80	Targeted on a grouping of pit-like anomalies.	18
6	1,090	Targeted on a number of linear termini and intersections.	18,21
7	92	Targeted on the intersection of 2 linear features.	18,21
8	8,260	Targeted on a number of linear features and an area of possible early medieval and Bronze Age activity	14,18,21
9	345	Targeted on the intersection of 2 linear features.	18,21
10	1,750	Targeted on a number of linear termini and intersections.	18,21

Area No.	Area (m^2)	Description	Research Aim (where specifically relevant)
11	5,660	Targeted on an area of Bronze Age activity, gully, curvilinear ditch	14,18,21
12	20,680	Targeted on a Romano-British settlement	18,21,29
13	1,855	Extension to Area 12	18,21,29
14	1,600	Targeted to investigate prehistoric sub-oval ditch.	18, 28, 54, 57
15	620	Targeted to investigate prehistoric sub-circular ditch.	18, 28, 54, 57
16	575	Targeted to investigate prehistoric oval ring ditch, found to be rich in charcoal deposits.	18, 28, 54, 57
17	1,175	Targeted to investigate an area of mining related archaeological deposits.	38
18	18,265	Targeted to investigate geophysical anomalies, possibly representing a prehistoric pit alignment.	18,54
19	220	Targeted to investigate a small square geophysical anomaly.	18,54
20	265	Targeted to investigate a small square geophysical anomaly.	18,54
21	370	Targeted to investigate a linear geophysical anomaly.	18,21

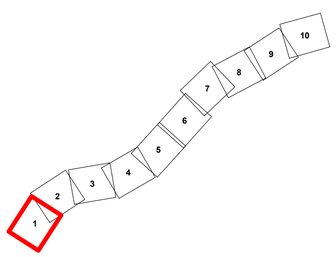
5.1.3 During trial trenching, a possible flint scatter was observed to the south of Area 15. Flint scatters are fragile, topsoil-dispersed features that are not appropriate for investigation by means of Strip-Map-Sample. Therefore, this area will be investigated through gridded, hand-dug test pits. The detailed methodology for this is to be agreed with SDOHE.

5.1.4 An Archaeological Watching Brief will be maintained in areas to be agreed with SDOHE.



LEGEND

- STRIP, MAP AND SAMPLE
- RIDGE FURROW LINE
- PLOUGHING LINE
- DETAILED SURVEY EXTENT
- POSSIBLE ARCHAEOLOGY
- ARCHAEOLOGY
- INCREASED MAGNETIC RESPONSE
- FORMER FIELD BOUNDARY
- TRIAL PIT ON GRID
- DCO FENCELINE
- ADDITIONAL GEOPHYSICS REQUIRED



KEY PLAN

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks
(Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission/ Demolition
None

Rev	Date	Description	By	Chk'd	App'd
C01	10/07/19	FIRST ISSUE	AC	JK	JP

Suitability: A3
Drawing Status: STAGE COMPLETED

Designer: ARUP

Client: highways england

European Union
European Regional Development Fund

Project Title: A30 CHIVERTON TO CARLAND CROSS

Drawing Title: ARCHAEOLOGICAL MITIGATION SCOPING SHEET 1 OF 10

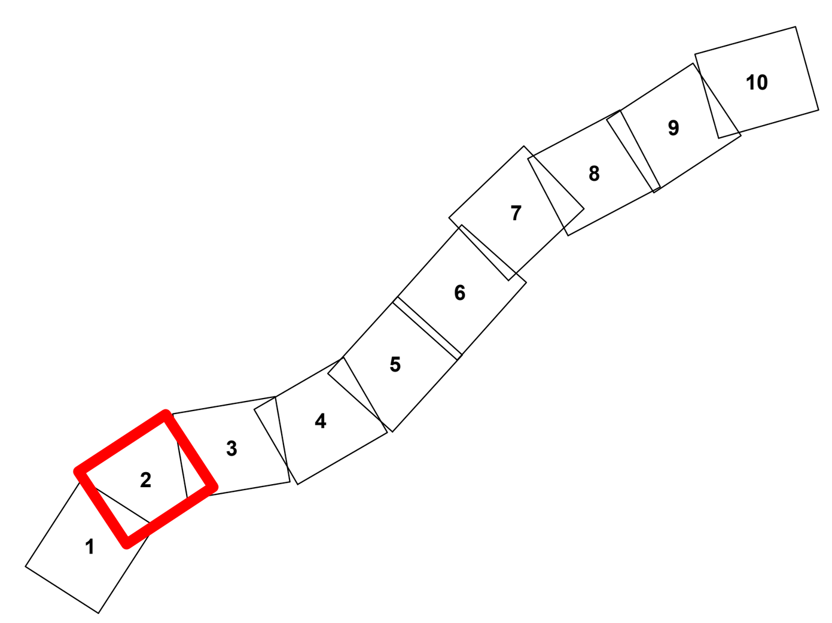
Scale	Designed / Drawn	Checked	Approved	Authorised
1:2,500	AC	JK	JP	RC
Original Size	Date	Date	Date	Date
A1	10/07/19	10/07/19	10/07/19	10/07/19

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HA551502-ARP-EHR-SW-DR-LH-000001

Revison: C01

LEGEND

- STRIP, MAP AND SAMPLE
- RIDGE FURROW LINE
- PLOUGHING LINE
- DETAILED SURVEY EXTENT
- POSSIBLE ARCHAEOLOGY
- ARCHAEOLOGY
- INCREASED MAGNETIC RESPONSE
- FORMER FIELD BOUNDARY
- TRIAL PIT ON GRID
- DCO FENCELINE
- ADDITIONAL GEOPHYSICS REQUIRED



KEY PLAN

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks
(Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission/ Demolition
None

Rev	Date	Description	By	Chk'd	App'd
C01	10/07/19	FIRST ISSUE	AC	JK	JP

Suitability	Drawing Status	Project Title
A3	STAGE COMPLETED	A30 CHIVERTON TO CARLAND CROSS

Designer: ARUP

Drawing Title: ARCHAEOLOGICAL MITIGATION SCOPING SHEET 2 OF 10

Scale	Designed / Drawn	Checked	Approved	Authorised
1:2,500	AC	JK	JP	RC
Original Size	**Date**	**Date**	**Date**	**Date**
A1	10/07/19	10/07/19	10/07/19	10/07/19

Client: highways england; European Union European Regional Development Fund

Drawing Number (Project | Originator | Volume / Location | Type | Role | Number): HA551502-ARP-EHR-SW-DR-LH-000001

Revison: C01

LEGEND

- STRIP, MAP AND SAMPLE
- RIDGE FURROW LINE
- PLOUGHING LINE
- DETAILED SURVEY EXTENT
- POSSIBLE ARCHAEOLOGY
- ARCHAEOLOGY
- INCREASED MAGNETIC RESPONSE
- FORMER FIELD BOUNDARY
- TRIAL PIT ON GRID
- DCO FENCELINE
- ADDITIONAL GEOPHYSICS REQUIRED

KEY PLAN

1 2 3 4 5 6 7 8 9 10

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks
(Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission/ Demolition
None

Rev	Date	Description	By	Chk'd	App'd
C01	10/07/19	FIRST ISSUE	AC	JK	JP

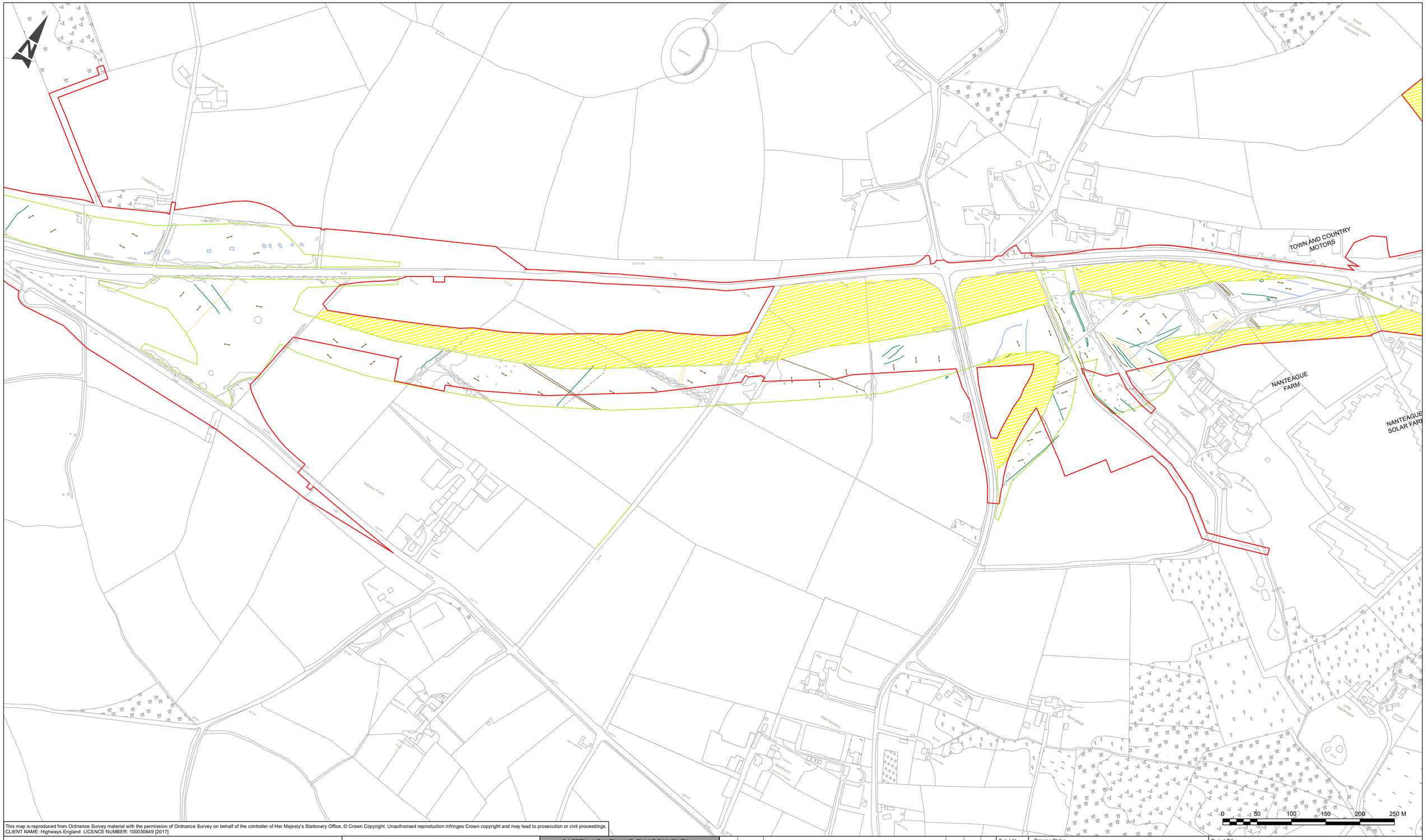
Suitability	A3
Drawing Status	STAGE COMPLETED
Project Title	A30 CHIVERTON TO CARLAND CROSS
Designer	ARUP
Drawing Title	ARCHAEOLOGICAL MITIGATION SCOPING SHEET 3 OF 10
Client	highways england; European Union European Regional Development Fund

Scale	Designed / Drawn	Checked	Approved	Authorised
1:2,500	AC	JK	JP	RC

Original Size	Date	Date	Date	Date
A1	10/07/19	10/07/19	10/07/19	10/07/19

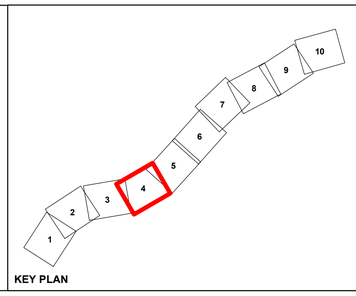
Drawing Number (Project | Originator | Volume / Location | Type | Role | Number): HA551502-ARP-EHR-SW-DR-LH-000001

Revison: C01



LEGEND

- STRIP, MAP AND SAMPLE
- RIDGE FURROW LINE
- PLOUGHING LINE
- DETAILED SURVEY EXTENT
- POSSIBLE ARCHAEOLOGY
- ARCHAEOLOGY
- INCREASED MAGNETIC RESPONSE
- FORMER FIELD BOUNDARY
- TRIAL PIT ON GRID
- DCO FENCELINE
- ADDITIONAL GEOPHYSICS REQUIRED



KEY PLAN

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks
(Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission/ Demolition
None

Rev	Date	Description	By	Chk'd	App'd
C01	10/07/19	FIRST ISSUE	AC	JK	JP

Suitability: A3
Drawing Status: STAGE COMPLETED

Designer: ARUP

Client: highways england

European Union
European Regional Development Fund

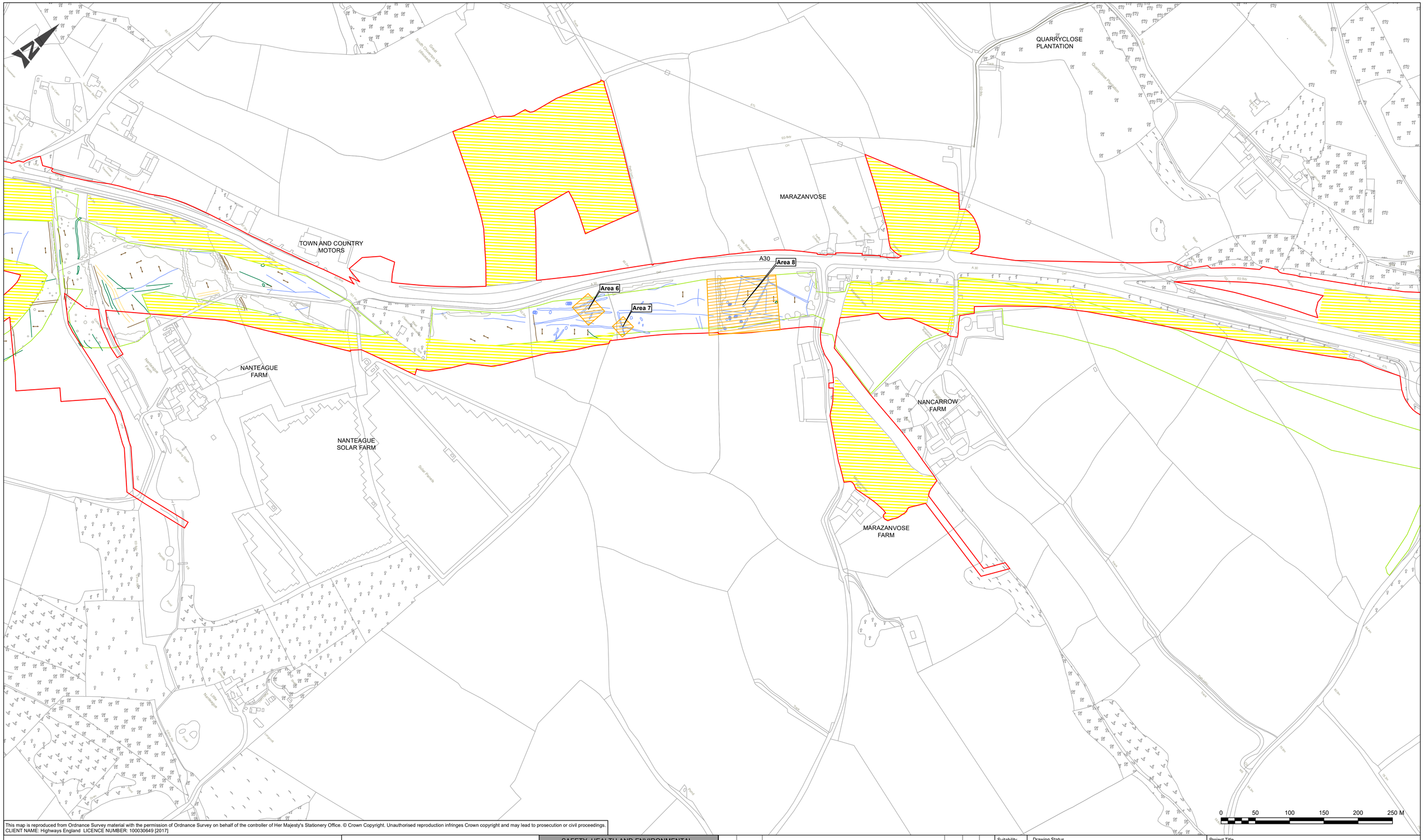
Project Title: A30 CHIVERTON TO CARLAND CROSS

Drawing Title: ARCHAEOLOGICAL MITIGATION SCOPING SHEET 4 OF 10

Scale	Designed / Drawn	Checked	Approved	Authorised
1:2,500	AC	JK	JP	RC
Original Size	**Date**	**Date**	**Date**	**Date**
A1	10/07/19	10/07/19	10/07/19	10/07/19

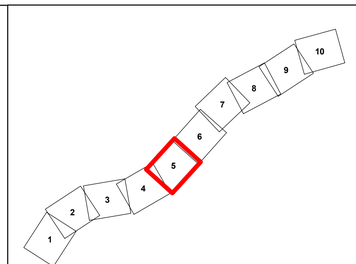
Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HA551502-ARP-EHR-SW-DR-LH-000001

Revison: C01



LEGEND

- STRIP, MAP AND SAMPLE
- RIDGE FURROW LINE
- PLOUGHING LINE
- DETAILED SURVEY EXTENT
- POSSIBLE ARCHAEOLOGY
- ARCHAEOLOGY
- INCREASED MAGNETIC RESPONSE
- FORMER FIELD BOUNDARY
- TRIAL PIT ON GRID
- DCO FENCELINE
- ADDITIONAL GEOPHYSICS REQUIRED



KEY PLAN

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks
(Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission/ Demolition
None

Rev	Date	Description	By	Chk'd	App'd
C01	10/07/19	FIRST ISSUE	AC	JK	JP

Suitability: A3
Drawing Status: STAGE COMPLETED

Designer: ARUP

Client: highways england
European Union
European Regional Development Fund

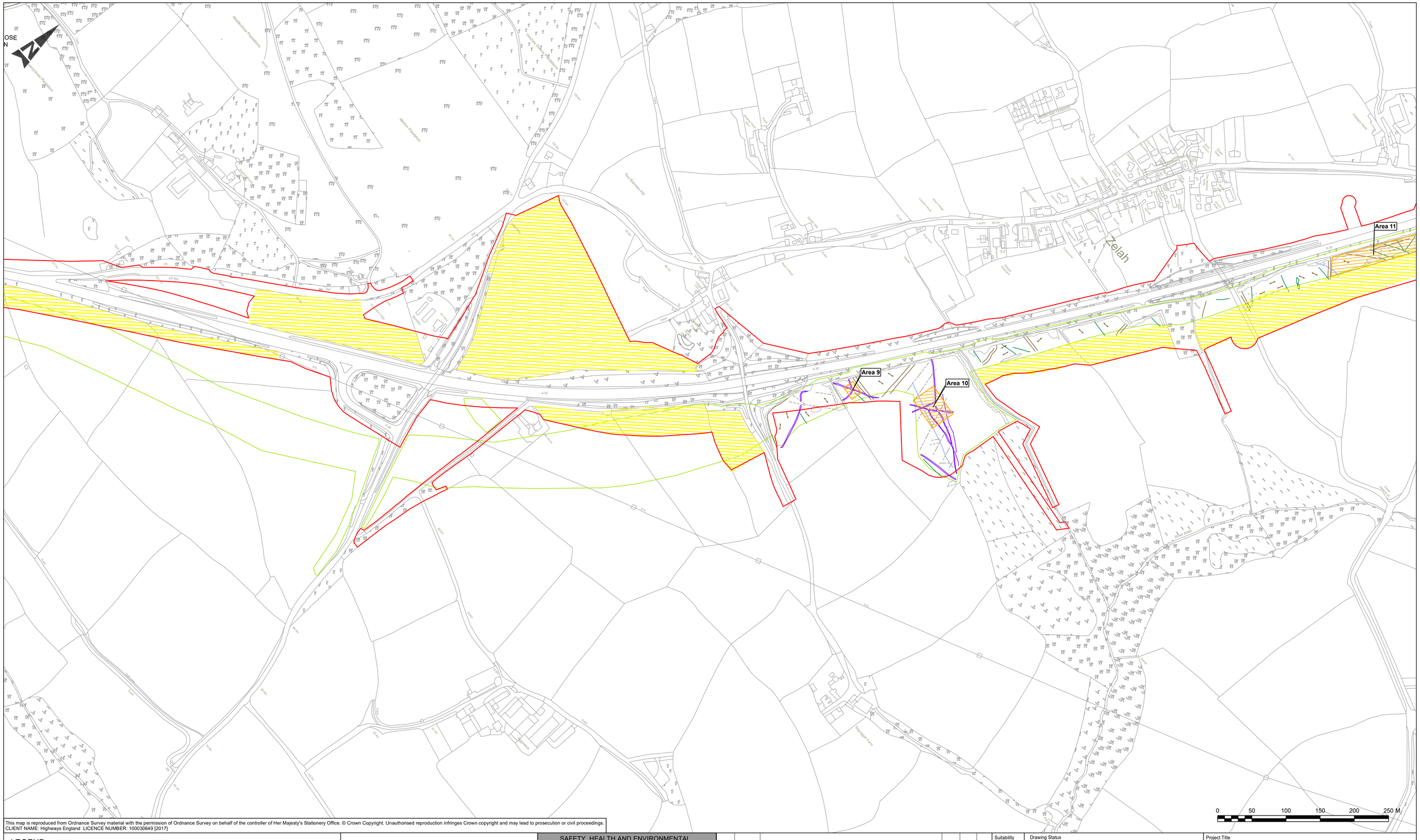
Project Title: A30 CHIVERTON TO CARLAND CROSS

Drawing Title: ARCHAEOLOGICAL MITIGATION SCOPING SHEET 5 OF 10

Scale	Designed / Drawn	Checked	Approved	Authorised
1:2,500	AC	JK	JP	RC

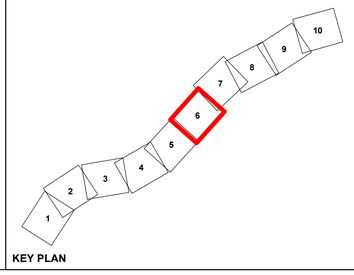
Original Size	Date	Date	Date	Date
A1	10/07/19	10/07/19	10/07/19	10/07/19

Drawing Number
Project | Originator | Volume | Revison
HA551502-ARP-EHR-SW-DR-LH-000001 | C01
Location | Type | Role | Number



LEGEND

- STRIP, MAP AND SAMPLE
- RIDGE FURROW LINE
- PLOUGHING LINE
- DETAILED SURVEY EXTENT
- POSSIBLE ARCHAEOLOGY
- ARCHAEOLOGY
- INCREASED MAGNETIC RESPONSE
- FORMER FIELD BOUNDARY
- TRIAL PIT ON GRID
- DCO FENCELINE
- ADDITIONAL GEOPHYSICS REQUIRED



KEY PLAN

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks
(Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission/ Demolition
None

Rev	Date	Description	By	Chk'd	App'd
C01	10/07/19	FIRST ISSUE	AC	JK	JP

Suitability: A3
Drawing Status: STAGE COMPLETED

Designer: ARUP

Client: highways england

European Union
European Regional Development Fund

Project Title: A30 CHIVERTON TO CARLAND CROSS

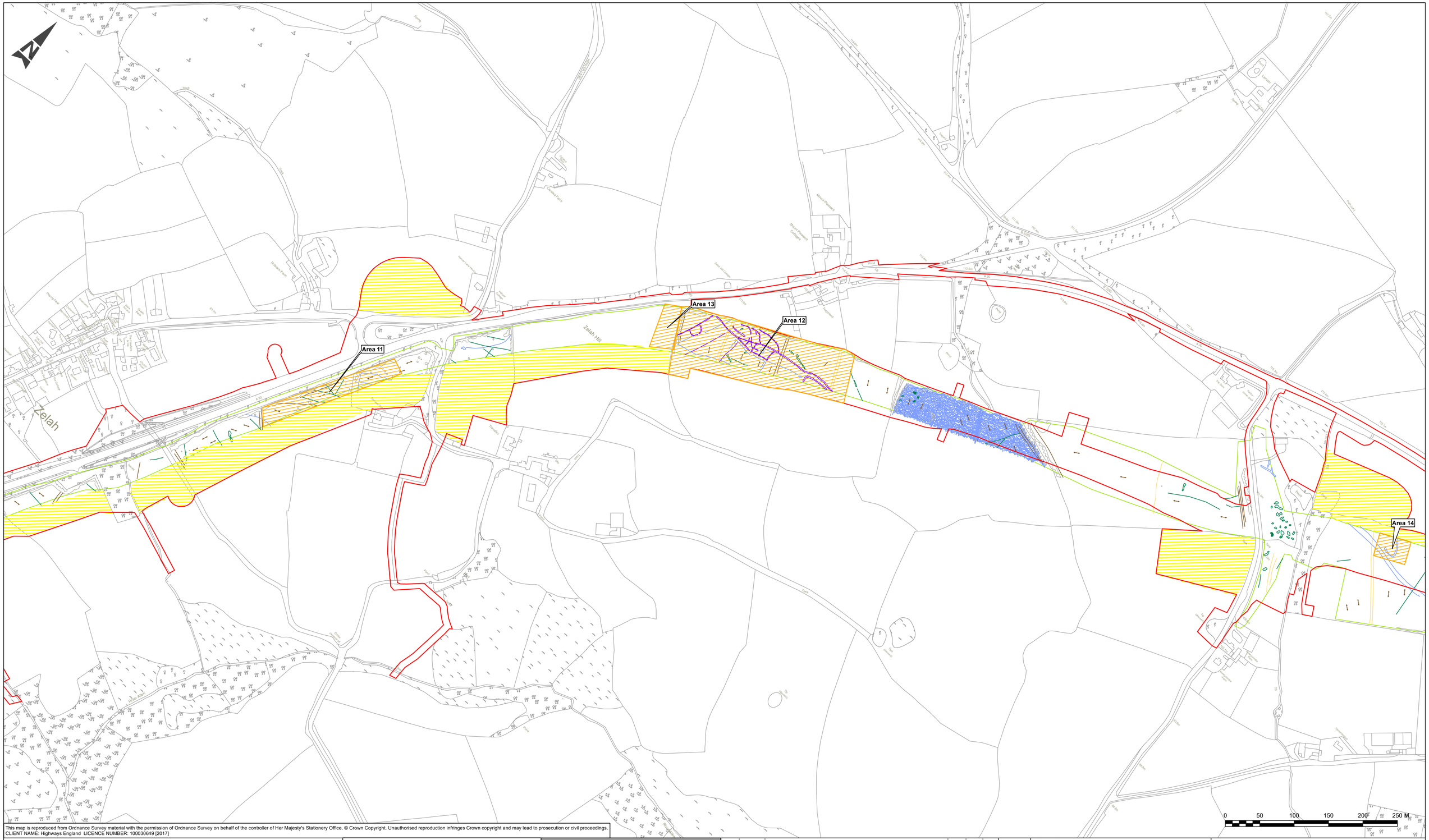
Drawing Title: ARCHAEOLOGICAL MITIGATION SCOPING SHEET 6 OF 10

Scale	Designed / Drawn	Checked	Approved	Authorised
1:2,500	AC	JK	JP	RC

Original Size	Date	Date	Date	Date
A1	10/07/19	10/07/19	10/07/19	10/07/19

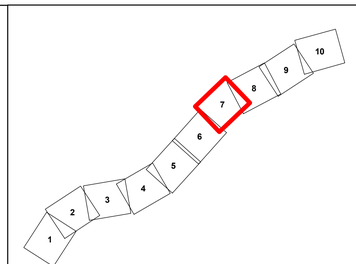
Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HA551502-ARP-EHR-SW-DR-LH-000001

Revison: C01



LEGEND

- STRIP, MAP AND SAMPLE
- RIDGE FURROW LINE
- PLOUGHING LINE
- DETAILED SURVEY EXTENT
- POSSIBLE ARCHAEOLOGY
- ARCHAEOLOGY
- INCREASED MAGNETIC RESPONSE
- FORMER FIELD BOUNDARY
- TRIAL PIT ON GRID
- DCO FENCELINE
- ADDITIONAL GEOPHYSICS REQUIRED



KEY PLAN

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks
(Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission/ Demolition
None

Rev	Date	Description	By	Chk'd	App'd
C01	10/07/19	FIRST ISSUE	AC	JK	JP

Suitability: A3
Drawing Status: STAGE COMPLETED

Designer: ARUP

Client: highways england
European Union
European Regional Development Fund

Project Title: A30 CHIVERTON TO CARLAND CROSS

Drawing Title: ARCHAEOLOGICAL MITIGATION SCOPING SHEET 7 OF 10

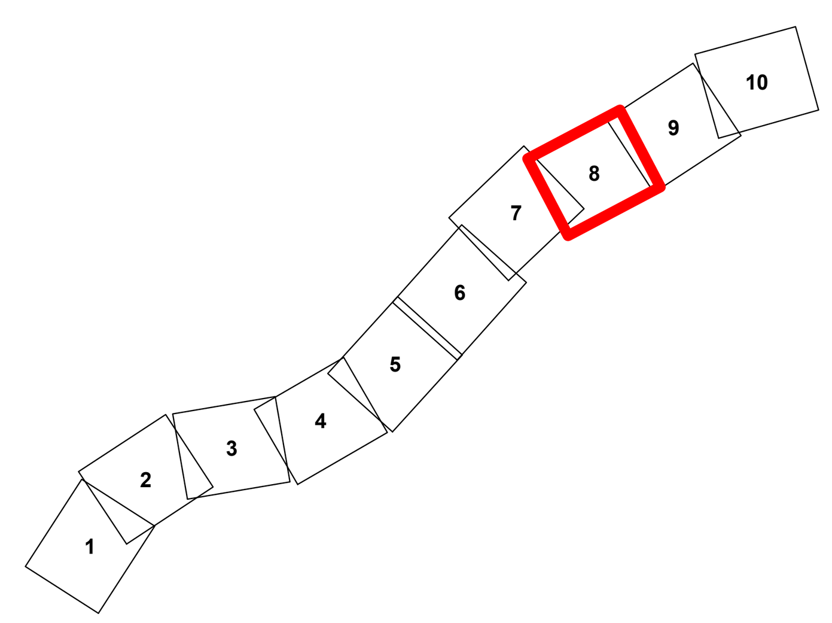
Scale	Designed / Drawn	Checked	Approved	Authorised
1:2,500	AC	JK	JP	RC
Original Size	Date	Date	Date	Date
A1	10/07/19	10/07/19	10/07/19	10/07/19

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HA551502-ARP-EHR-SW-DR-LH-000001

Revison: C01

LEGEND

- STRIP, MAP AND SAMPLE
- RIDGE FURROW LINE
- PLOUGHING LINE
- DETAILED SURVEY EXTENT
- POSSIBLE ARCHAEOLOGY
- ARCHAEOLOGY
- INCREASED MAGNETIC RESPONSE
- FORMER FIELD BOUNDARY
- TRIAL PIT ON GRID
- DCO FENCELINE
- ADDITIONAL GEOPHYSICS REQUIRED



KEY PLAN

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks
(Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission/ Demolition
None

Rev	Date	Description	By	Chk'd	App'd
C01	10/07/19	FIRST ISSUE	AC	JK	JP

Suitability	Drawing Status	Project Title
A3	STAGE COMPLETED	A30 CHIVERTON TO CARLAND CROSS

Designer: ARUP

Drawing Title: ARCHAEOLOGICAL MITIGATION SCOPING SHEET 8 OF 10

Scale	Designed / Drawn	Checked	Approved	Authorised
1:2,500	AC	JK	JP	RC
Original Size: A1	Date: 10/07/19	Date: 10/07/19	Date: 10/07/19	Date: 10/07/19

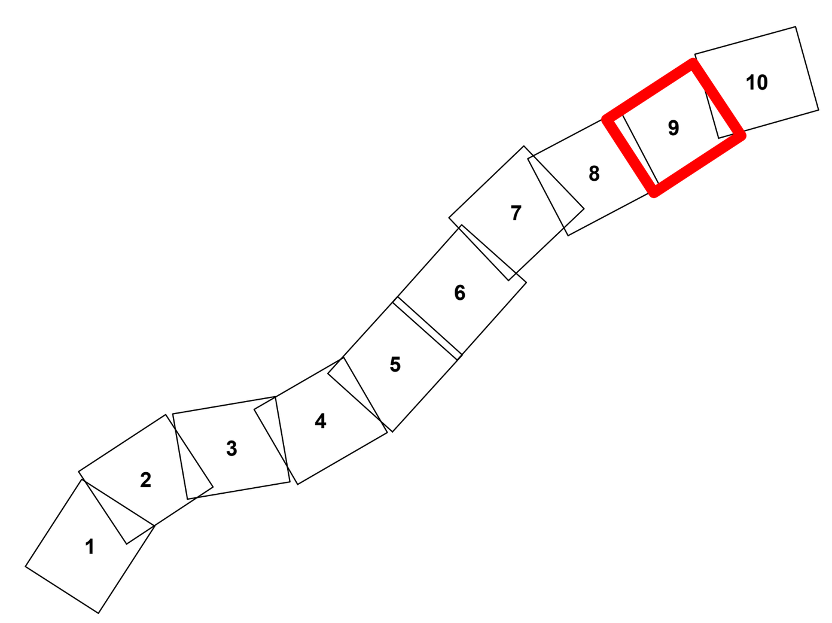
Client: highways england; European Union European Regional Development Fund

Drawing Number (Project | Originator | Volume | Location | Type | Role | Number): HA551502-ARP-EHR-SW-DR-LH-000001

Revison: C01

LEGEND

- GEOPHYSICS POST CLEARANCE
- STRIP, MAP AND SAMPLE
- RIDGE FURROW LINE
- PLOUGHING LINE
- DETAILED SURVEY EXTENT
- POSSIBLE ARCHAEOLOGY
- ARCHAEOLOGY
- INCREASED MAGNETIC RESPONSE
- FORMER FIELD BOUNDARY
- TRIAL PIT ON GRID
- DCO FENCELINE
- ADDITIONAL GEOPHYSICS REQUIRED



KEY PLAN

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks
(Reference shall also be made in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission/ Demolition
None

Rev	Date	Description	By	Chk'd	App'd
C01	15/07/19	FIRST ISSUE	AC	JK	JP

Suitability: A3
Drawing Status: STAGE COMPLETED

Project Title: A30 CHIVERTON TO CARLAND CROSS

Designer: ARUP

Drawing Title: ARCHAEOLOGICAL MITIGATION SCOPING SHEET 9 OF 10

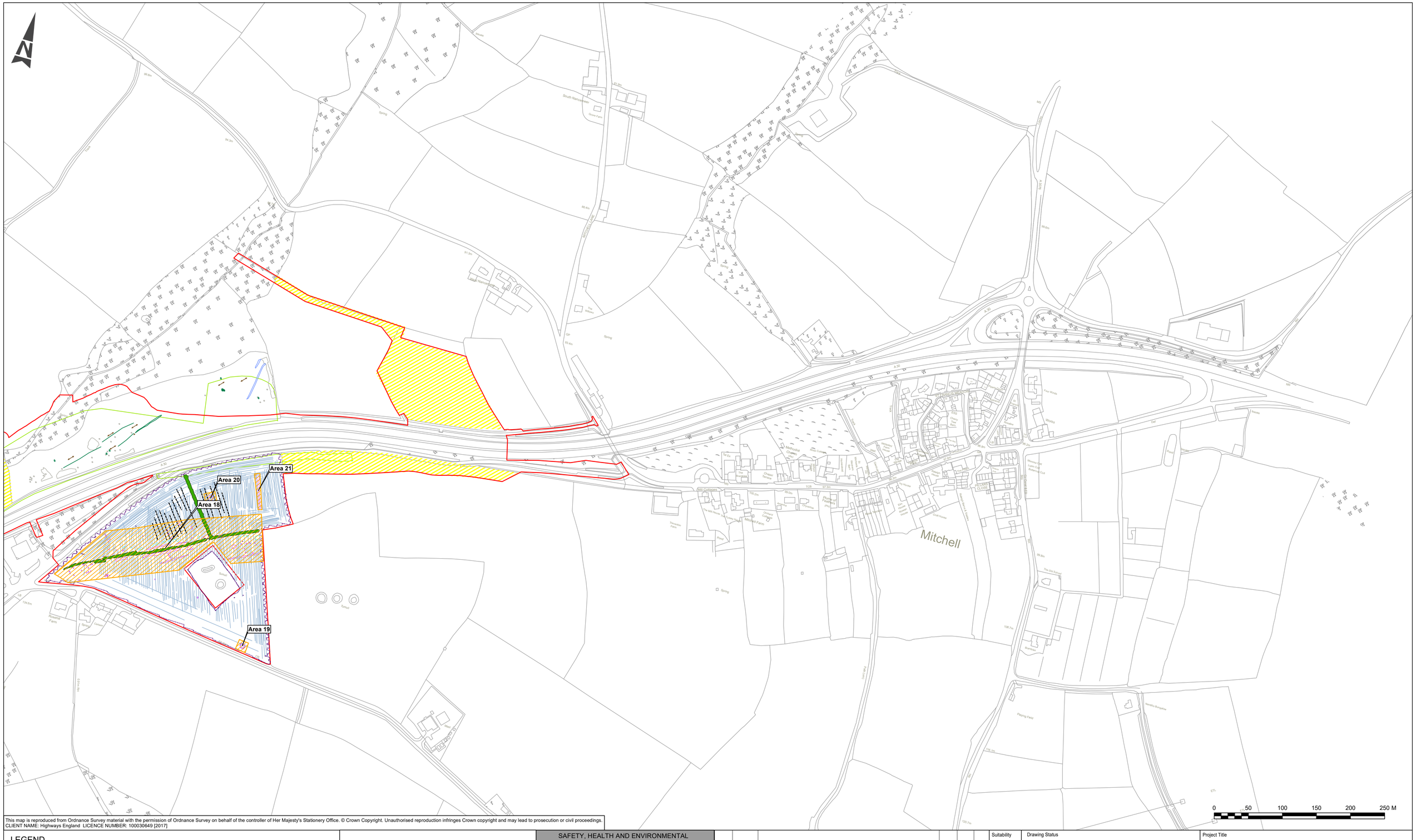
Scale	Designed / Drawn	Checked	Approved	Authorised
1:2,500	AC	JK	JP	RC

Original Size	Date	Date	Date	Date
A1	15/07/19	15/07/19	15/07/19	15/07/19

Client: highways england
European Union
European Regional Development Fund

Drawing Number (Project | Originator | Volume / Location | Type | Role | Number): HA551502-ARP-EHR-SW-DR-LH-000001

Revison: C01



LEGEND

- STRIP, MAP AND SAMPLE
- RIDGE FURROW LINE
- PLOUGHING LINE
- DETAILED SURVEY EXTENT
- POSSIBLE ARCHAEOLOGY
- ARCHAEOLOGY
- INCREASED MAGNETIC RESPONSE
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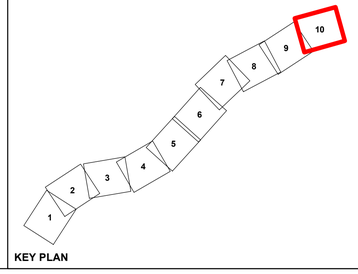
- ADDITIONAL GEOPHYSICS REQUIRED



KEY PLAN

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks
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Maintenance / Cleaning
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Use
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Decommission/ Demolition
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Rev	Date	Description	By	Chk'd	App'd
C01	10/07/19	FIRST ISSUE	AC	JK	JP

Suitability: A3
Drawing Status: STAGE COMPLETED

Designer: ARUP

Client: highways england

European Union
European Regional Development Fund

Project Title: A30 CHIVERTON TO CARLAND CROSS

Drawing Title: ARCHAEOLOGICAL MITIGATION SCOPING SHEET 10 OF 10

Scale	Designed / Drawn	Checked	Approved	Authorised
1:2,500	AC	JK	JP	RC

Original Size	Date	Date	Date	Date
A1	10/07/19	10/07/19	10/07/19	10/07/19

Drawing Number: Project | Originator | Volume
HA551502-ARP-EHR-SW-DR-LH-000001
Location | Type | Role | Number

Revison: C01

Abbreviations List

AAP	Asbestos Action Plan
CCTV	Closed circuit television
HAPMS	Highways Agency Pavement Management System
HSE	Health and Safety Executive
MPD	Major Projects Directorate
PCF	Project Control Framework
SAMP	Scheme Asbestos Management Plan
SGAR	Stage Gate Assurance Review
SMIS	Structures Management Information System
TTD	Traffic Technology Division
UKAS	United Kingdom Accreditation Service

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