Volume 6.0

A303 Sparkford to Ilchester Dualling Scheme TR010036

6.3 Environmental Statement Appendix 9.2 Annex A to the Preliminary Sources Study Report (July 2017)

APFP Regulation 5(2)(a)
Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009
July 2018

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

A303 Sparkford to Ilchester Dualling Scheme

Development Consent Order 201[X]

6.3 Environmental Statement
Appendix 9.2 Annex A to the Preliminary Sources Study Report (July 2017)

Regulation Number:	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference:	TR010036
Application Document Reference:	6.3
Author:	A303 Sparkford to Ilchester Dualling Scheme Project Team, Highways England

Version	Date	Status of Version
Rev 0	July 2018	Application Issue

Table of Contents

A1. Introduction

A.1.1.1 The A303/A30 forms part of the Strategic Road Network (SRN) and a strategic link between the south west peninsula (SWP) and the rest of the south, south east and London. The route is comprised of multiple road standards, including; dual 2 lane All Purpose and single carriageway 2 lane and single carriageway sections with overtaking lanes together with associated varying speed limits (from 40mph to 70mph). A Statement of Intent is available as HA GDMS Report Number 28567.

A.1.1.2 The project is to provide a dual carriageway on the A303 between Sparkford and Ilchester in Somerset. Four route options were initially proposed for the scheme (A2, E4, F1 and B4), with Route Options 1 and 2 (formerly A2 and F1 respectively) taken forward into Stage 2 for further consideration.

A.1.1.3 Route Option 1 follows the existing corridor of the A303 very closely. It is generally considered to be the online option although it is often deliberately aligned just to the side of the existing carriageway to allow re-use of the existing route for local access, avoid property or facilitate construction. At its maximum offset the route is typically 100m either north or south of the existing A303.

A.1.1.4 Route Option 2 takes an offline course to the north of the existing route. At its maximum offset the route is approximately 1km north of the existing A303.

A.1.1.5 This document is to be read in conjunction with Appendix 9.1 Preliminary Sources Study Report (PSSR) (Volume 6.3). Further information regarding the layout of the existing carriageway and the two proposed alignments can be found within this report**.**

A.2 Objectives and format of any investigation

A.2.1 General

A.2.1.1 A PSSR and supplementary ground investigation for a proposed route broadly similar to that of Route Option 1 was undertaken in 2003 by Mott MacDonald. Two historic ground investigations were carried out prior to this in 1992 and 1993, and have provided a significant amount of geotechnical data along the Option 1 route. The site investigations undertaken in 1992, 1993 and 2003 are hereafter called the Mott MacDonald site investigations (MM-SI) for the purposes of this report.

A.2.1.2 In addition, several historical exploratory hole records were obtained from the British Geological Survey online GeoIndex website. The exploratory holes are recorded to be predominantly related to a site investigation undertaken in 1985 (hereafter called 'historical exploratory holes' for the purposes of this report).

A.2.1.3 Route Option 2 is generally considered to be the offline option and as such there is a distinct lack of existing ground investigation data across much of the proposed alignment.

A.2.1.4 Additional supplementary ground investigation is proposed to complement the existing data (Refer to section A2.1.1) and detailed ground investigation is proposed in areas where existing ground investigation information is absent (Refer to Section A2.1.2). These are discussed in sections A2.1.1 and A2.1.2 under this cover.

Proposed supplementary exploratory hole locations

A.2.1.5 The 2 proposed route options overlap with the existing route at the start of each route at Ilchester and at the end of the route near Sparkford at chainages provided in Table A2.1.

Table A2.1: Areas of Overlap between Existing and Proposed Routes

Route options	Location	Chainage (m)
Route Option 1	West	0 – 800
	East	5700 – 6200
Route Option 2	West	0 – 600
	East	5900 – 6200

A.2.1.6 The MM-SI does not provide any geotechnical data between the chainages presented in Table A2.1, however several exploratory holes related to the Historical Site Investigation were recorded to be present.

A.2.1.7 The exploratory holes obtained from the MM-SI are only relevant to the proposed route options at the Mainline (ML) chainages provided in Table A2.2.

Table A2.2: Chainages with Relevant Existing Site Investigation Information

Route option	ML chainage (m)	Comments
Route Option 1	850-1450 & 1900-5600	MM-SI only relevant to proposed westbound carriageway, limited existing data for eastbound carriageway. Only around the existing A303 and Hazlegrove Roundabout between Ch. 5000m to 5600m
Route Option 2	5500 – 5800	Only around the existing A303 and Hazlegrove Roundabout between Ch. 5500m to 5800m

A.2.1.8 Supplementary exploratory holes are proposed along the mainline alignments and around proposed structures and earthworks of both proposed routes options.

Proposed detailed exploratory hole locations

A.2.1.9 Detailed site investigation is proposed along the ML chainages presented in Table A2.3 to provide geological, geotechnical and geo-environmental information at each proposed route option, in the absence of any existing exploratory holes.

Table A2.3: Locations of Further Proposed Site Investigation

Route option	ML chainage (m)	No. of proposed boreholes	No. of proposed trial pits
Route Option 1	450 – 5750	61	95
Route Option 2	200 – 6175	64	71

A.2.1.10 Further site investigation may be required for any additional structures such as gantries and where works relevant to diversion/protection of the underlying services is projected.

A.2.2 Route Option 1

Objectives and format of investigation

A.2.2.1 The 1992 and the 1993 ground investigations undertaken by Exploration Associates and Oakley Soils and Concrete Engineering Limited respectively provided information in the following areas:

- Determination of ground conditions along the route of the scheme through 125 exploratory hole locations;
- 21 No. cable percussion boreholes;
- 15 No. rotary boreholes;
- 22 No. cable percussion boreholes with rotary follow on;
- 57 No. trial pits;
- 8 No. cores through the existing pavement;
- 2 No. rotary boreholes at Traits Lane underpass;
- In situ permeability testing at 3 locations adjacent to the fault;
- In situ redox and resistivity testing in 6 No. trial pots in the Lower Lias Clay (now known as Charmouth Mudstone Formation) and made ground;
- Installation and monitoring of 49 No. piezometers over a period of between one month (EA, 1992) and 1 year (Veryard & Partners, 1993);
- Laboratory testing on soil and rock samples;
- 165 No. natural moisture content tests on samples of the Lower Lias Clay;
- 105 No. Atterberg limits determination on samples of Lower Lias Clay;
- 116 No. particle size distribution tests, principally on samples of Lower Lias Clay;
- 103 No. bulk density determinations on samples of the Lower Lias Clay, White Lias and Blue Lias;
- 37 No. one dimensional consolidation tests on samples of the Lower Lias Clay;
- 5 No. suites of moisture condition value tests at different moisture contents and 35 No. tests at single moisture contents, all on samples of the Lower Lias Clay;
- 70 No. moisture content / dry density relationship tests on samples of the Lower Lias Clay;
- 69 No. CBR tests on samples of Lower Lias Clay;
- 25 No. unconsolidated undrained triaxial tests on samples of Lower Lias Clay;
- 19 No. consolidated undrained triaxial tests on samples of Lower Lias Clay, the White Lias and the Blue Lias;
- 74 No. unconfined compressive strength on samples of limestone and mudstone from the undrained triaxial tests on samples of Lower Lias Clay;
- 392 No. point load determinations on samples from all strata; and
- 136 Hoek shear box tests on rock joints from all strata.

A.2.2.2 However, the 2003 PSSR concludes that the existing ground investigation data was insufficient in a number of areas and therefore, a supplementary ground investigation was proposed.

A.2.2.3 The supplementary investigation was commissioned by Mott MacDonald and undertaken by Soil Mechanics in 2003. The supplementary investigation included:

- 5 No. cable percussion boreholes;
- 4 No. rotary boreholes;
- 3 No. cable percussion boreholes with rotary follow on;
- 28 No. trial pits;
- Installation and monitoring of 6 No. 19mm standpipe piezometers;
- 10 No. suites of earthworks relationship tests comprising multi-point CBR, compaction and MCV test suites.
- 13 No. suites of chemical testing on soil samples and 5 No. suites of chemical testing on water samples in accordance with BRE Special Digest 1.
- 6 No. particle size distribution analyses on samples of granular material.
- 4 No. UCS tests and 7 No. Point Load Tests (based on the maximum number of suitably dimensioned core sub-samples).
- 4 No. sets of three small shear box tests on samples of shear surfaces taken during the investigation.
- One four stage ring shear test carried out on a sample of gleying collected from a solifluction shear surface.

A.2.2.4 However, whilst the MM-SI and the historical site investigations cover the majority of the proposed Route Option 1 (Refer to Table A2.2, under this cover), many of the exploratory holes are located along the westbound section of the proposed route option and do not provide sufficient data along the eastbound section of the route. In addition, these exploratory holes lack information relating to the possible presence of relic shear surfaces within the underlying Lower Lias clays. Therefore, further supplementary site investigation is required and is therefore proposed at locations presented in Table A2.4.

Table A2.4: Proposed site investigation along Route Option 1

ML chainage (m)	Supplementary / detailed	Comments
450-1700	Supplementary	Includes low level embankments and cuttings, and Podimore Westbound On-Slip
1700-3400	Supplementary	Includes Camel Cross Junction Roundabout, Downhead Junction Overbridge, and Steart Hill Overbridge. In addition to relatively deep cuttings. Shallow groundwater is anticipated along Ch. 2000m to 3200m

ML chainage (m)	Supplementary / detailed	Comments
3400-4000	Supplementary	Relatively large embankments
4000-4200	Supplementary	Traits Lane Underbridge, relatively deep cuttings and historical quarry
4200-5300	Supplementary	Hazlegrove Junction, including Roundabout, Underbridge, and Large earthworks
5300-5600	Supplementary	Low level embankments
5600-5800	Supplementary	Hazelgrove House NMU Bridge, and historic landfill site

A.2.2.5 The ground investigations proposed will be more comprehensive at the location of key highway structures and at locations where geological, geo-environmental and/or hydrogeological constraints are present. Refer to Section A3, under this cover for further information about these constraints.

Route Option 1 proposed investigation

A.2.2.6 The position of the proposed supplementary exploratory holes is shown on the drawings contained in Appendix 9.3 Ground Investigation Location Plan and Schedule of Investigations (Volume 6.3) and is detailed in Table A2.5.

A.2.2.7 It is anticipated that the existing standpipes and standpipe piezometers on site along the route of the existing road, where they can be detected, can be used in addition to the proposed standpipe and standpipe piezometers.

A.2.2.8 Abbreviations used in subsequent tables are shown in Table A2.6.

Table A2.5: Proposed exploratory holes – Route Option 1

ML chainage (m)	Type	No. of exploratory hole	Target depth (m)*	Rationale	Suggested lab testing **	Likely installation requirements*
450-750	TP	3	3	Embankment Shallow Groundwater Solifluction Surfaces	Clss, CBR, Chem	
750-1400	BH	1	10	Cutting	Clss, CBR, MCV, UUT, CU, 2.5kg, Chem	S
	TP	6	3	Solifluction Surfaces		
1400-1800	BH	1	10	Shallow Cutting EB, Embankment WB Shallow Groundwater	Clss, CBR, MCV, UUT, CU, 2.5kg, Chem	P
	TP	3	3	Solifluction Surfaces		
1800-2000	BH+RC	1	15	Camel Cross Junction Roundabout, and Embankments Solifluction Surfaces	Clss, CBR, UUT, Oed, Chem	S
	TP	4	3	Shallow Groundwater		
2000-2400	BH+RC	4	15-20	Deep Cutting EB and WB ML EB Downhead Lane Junction off-slip	Class, CBR, MCV, UUT, CU, 2.5kg, PLT, RMC, UCS, Chem	P
	TP	8	3	WB Camel Cross Junction off-slip Solifluction Surfaces Shallow Groundwater		
2400-2500	BH+RC	6	20	Downhead Lane Junction Overbridge ML Deep Cutting	Class, CBR, MCV, UUT, CU, 2.5kg, PLT, RMC, UCS, Chem	S
	TP	2	3	Shallow Groundwater		

ML chainage (m)	Type	No. of exploratory hole	Target depth (m)*	Rationale	Suggested lab testing **	Likely installation requirements*
				Solifluction Surfaces		
2500-2800	BH+RC	4	20	Downhead EB on-slip ML Cutting Shallow Groundwater Solifluction Surfaces	Clss, CBR, MCV, UUT, 2.5kg, PLT, RMC, Chem	-
	TP	5	3			
2800-3000	BH+RC	9	20	Steart Hill Overbridge/Embankment ML Cutting Shallow Groundwater Solifluction Surfaces	Class, CBR, MCV, UUT, CU, 2.5kg, PLT, RMC, UCS, Chem	S
	TP	4	3			
3000-3300	BH	2	5	Steart Hill Link/Embankment Shallow Groundwater Fuel Filling Station Solifluction Surfaces ML Cutting	Clss, CBR, MCV, 2.5kg, UUT, Oed, Chem	S
	BH+RC	1	15			P
	TP	10	3			
3300-4000	BH	3	15	ML Cutting EB ML Embankment Shallow Groundwater Solifluction Surfaces	Clss, UUT, CU, Oed, Chem	P
	TP	9	3			

ML chainage (m)	Type	No. of exploratory hole	Target depth (m)*	Rationale	Suggested lab testing **	Likely installation requirements*
4000-4300	BH+RC	4	20-25	Traits Lane Underbridge/Cutting ML Embankment ML Cutting Historical quarries Solifluction Surfaces	Clss, Oed, UUT, CU, Chem, MCV, 2.5kg, PLT, UCS, RMC	S
	BH	1	10			S
	TP	11	4.5			
4300-4800	BH	3	5-10	ML Embankment EB Hazlegrove Off-Slip/Embankments Solifluction Surfaces	Class, UUT, Oed	P
	TP	7	3			
4800-5000	BH	1	10	ML Embankment EB Hazlegrove Off/On-Slip/Embankments Solifluction Surfaces	Clss, UUT, Oed, RMC, PLT, UCS, Chem	S
	TP	7	3			
5000-5100	BH+RC	2	15-20	ML Embankment EB Hazlegrove Off/On-Slip/Embankments Hazlegrove Junction Roundabout (North)/Embankment Shallow Groundwater Solifluction Surfaces	Clss, UUT, CU, Oed, RMC, PLT, UCS	P
	TP	2	3			

ML chainage (m)	Type	No. of exploratory hole	Target depth (m)*	Rationale	Suggested lab testing **	Likely installation requirements*
5100-5200	BH+RC	4	15-25	ML Embankment Roundabout (North)/Embankment Hazlegrove Junction Underbridge/Link	Clss, CBR, UUT, CU, Oed, RMC, PLT, UCS, Chem	S+P
	TP	4	3	Historic Saw Pit Shallow Groundwater Solifluction Surfaces		
5200-5300	BH	1	10	ML Embankment Hazlegrove Link/Cutting Hazlegrove House Link/Embankment	Clss, UUT, Oed. RMC, PLT	S
	TP	4	3	Shallow Groundwater Solifluction Surfaces		
5300-5600	TP	3	4.5	Mainline Embankment Hazlegrove House Link Hazlegrove Junction WB On Slip Solifluction Surfaces	Clss, CBR, Chem	
5600-5650	BH	2	10	ML Cutting Hazlegrove House NMU Overbridge/Embankment	Clss, 2.5kg, MCV, PLT, UCS, RMC, CU	S

ML chainage (m)	Type	No. of exploratory hole	Target depth (m)*	Rationale	Suggested lab testing **	Likely installation requirements*
	BH+RC	4	20	Historic Landfill Solifluction Surfaces		S+P
	TP	1	3			
5650-5900	BH	2	10	ML Cutting Hazlegrove House NMU Embankment Historic Landfill Solifluction Surfaces	Clss, CBR, MCV, 2.5kg, UUT, Oed, Chem	S
	BH+RC	3	15			P
	TP	2	3			

*To be confirmed by the Investigation Supervisor.
**4.5kg compaction testing to be undertaken where material is anticipated to be reused.
**Refer to Table A2.6 for the definition of abbreviations

Table A2.6: Table of abbreviations

Abbreviation	Definition
BH	Cable Percussive Borehole
RC	Rotary Core Follow On
TP	Trial Pit
S	Standpipe
P	Piezometer
Clss	Moisture Content, Plastic Limit, Liquid Limit, Grading
CBR	Californian Bearing Ratio
MCV	Moisture Conditions Value
MC	Moisture Content
UUT	Unconsolidated Undrained Shear Strength
CU	Consolidated Undrained Shear Strength
Oed	Oedometer
2.5kg	Compaction Test
PLT	Point Load
RMC	Rock Moisture Content
UCS	Uniaxial Compressive Strength
Chem	Contamination Suites and pH, Sulphates and Chlorides

A.2.2.9 As ground investigation work is by nature exploratory, it must be noted that the location, depth and type of the exploratory holes are likely to evolve on site, depending on the geometry and topography of the site and the ground conditions encountered during the site investigations. The sampling techniques, frequency and the testing proposed may vary during the site investigations depending on the encountered ground conditions on site.

A.2.3 Route Option 2

Objectives and format of investigation

A.2.3.1 The existing site investigation information obtained from the MM-SI and the historical site investigation are only relevant to Route Option 2 across Ch. 0m to 450m and Ch. 5500m to 6250m. Locations where supplementary and detailed site investigation are proposed are presented in Table A2.7.

Table A2.7: Proposed site investigation along Route Option 2

ML chainage (m)	Supplementary / detailed	Comments
0-200	Not anticipated to be required at this stage as existing carriageway to be maintained	-
400-5500	Detailed	Includes Podimore Junction Overbridge, Downhead Lane Overbridge, Steart Hill Overbridge, and Vale Farm Overbridge and Hazlegrove Junction
5500-6250	Supplementary	Includes Hazlegrove Junction, Hazlegrove House NMU, Historic Landfill Site, and historic Timer Yard

A.2.3.2 The ground investigations proposed will be more comprehensive at locations where key highway structures are to be positioned; and where geological, geo-environmental and/or hydrogeological constraints are present. Refer to Section A3, under this cover for further information about these constraints.

Route Option 2 proposed investigation

A.2.3.3 The position of proposed new exploratory holes is detailed in Table A2.8.

Table A2.8: Proposed exploratory holes – Route Option 2

ML chainage (m)	Type	No. of exploratory hole	Target depth (m)*	Rationale	Suggested lab testing**	Likely installation requirements*
0-600	TP	3	3	ML Embankment Podimore EB Off Slip Podimore Link Solifluction Surfaces	Clss, CBR, UUT, Oed, Chem	
600-800	TP	3	3	ML Cutting Podimore Link Solifluction Surfaces	Clss, CBR, MCV, UUT, CU, 2.5kg, Chem	
800-1000	BH	2	10	EB Cutting / WB Embankment Podimore Overbridge/Embankment Podimore Link Solifluction Surfaces	Clss, UUT, CU, Oed, PLT, UCS, RMC, 2.5kg, Chem	S
	BH+RC	4	20-25			S+P
	TP	3	3			
1000-1400	BH	1	10	ML Embankment (WB) Solifluction Surfaces	Clss, CBR, Oed, UUT, Chem	P
	TP	4	3			
1400-1800	BH	2	10	EB Cutting / WB Embankment Shallow Groundwater Solifluction Surfaces	Clss, CBR, MCV, 2.5kg, UUT, CU, PLT, RMC, Chem	S
	TP	3	3			

ML chainage (m)	Type	No. of exploratory hole	Target depth (m)*	Rationale	Suggested lab testing**	Likely installation requirements*
1800-2000	BH	2	10	ML Cutting Downhead Lane Overbridge/Embankment Shallow Groundwater Solifluction Surfaces	Clss, CBR, MCV, 2.5kg, UUT, CU, Oed, PLT, UCS, RMC, Chem	S
	BH+RC	4	20-25			P
	TP	3	3			
2000-3000	BH	1	10	ML Embankment/Cutting Shallow Water Level Solifluction Surfaces	Clss, CBR, MCV, 2.5kg, UUT, CU, Oed, Chem	P
	TP	7	3			
3000-3200	BH	2	5	ML Embankment/Cutting Steart Hill Overbridge/Embankment Shallow groundwater Solifluction Surfaces Bulk Fuel Storage Facilities	Clss, Oed, UUT, RMC, PLT, UCS, Chem	S
	BH+RC	5	20-25			S+P
	TP	5	3			
3200-3900	TP	8	3	ML Embankment (EB) / Cutting (WB) Shallow Groundwater Solifluction Surfaces	Clss, CBR, 2.5kg, MCV, Chem	

ML chainage (m)	Type	No. of exploratory hole	Target depth (m)*	Rationale	Suggested lab testing**	Likely installation requirements*
3900-4100	TP	4	3	ML Embankment/Cutting Vale Farm Access (North/South) Shallow Groundwater Solifluction Surfaces	Clss, 2.5kg, CBR, Chem	
4100-4185	BH	1	10	ML Cutting Vale Farm Access/ (North/South) Vale Farm Overbridge/Embankment Solifluction Surfaces	Clss, UUT, CU, Oed, 2.5kg, MCV, Chem	P
	TP	3	3			
4185-4210	BH+RC	6	20-25	ML Cutting Vale Farm Overbridge/Embankment Vale Farm Access (North/South) Solifluction Surfaces	Clss, UUT, CU, Oed, RMC, UCS, PLT, Chem	S+P
4210-4400	BH	1	10	ML Cutting Vale Farm Access (North/South) Vale Farm Overbridge/Embankment Solifluction Surfaces Shallow groundwater	Clss, CU, UUT, CBR, MCV, 2.5kg	S
	TP	5	3			
4400-4900	TP	6	3	ML Cutting Shallow Groundwater	Clss, 2.5kg, CBR, MCV. Chem	

ML chainage (m)	Type	No. of exploratory hole	Target depth (m)*	Rationale	Suggested lab testing**	Likely installation requirements*
4900-5100	BH	2	10	ML Cutting Hazlegrove Junction EB Off Slip/Embankment Shallow Groundwater Solifluction Surfaces	Clss, UUT, CU, 2.5kg, MCV	S
	TP	3	3			
5100-5200	BH	3	10	ML Cutting Hazlegrove Junction EB Off Slip/Embankment Hazlegrove Junction EB On Slip/Embankment Shallow Groundwater	Clss, Oed, UUT, CU, Chem	S+P
5200-5300	BH+RC	4	15-25	ML Cutting Hazlegrove Junction Roundabout (North)/Embankment Hazlegrove Junction Overbridge Shallow Groundwater	Clss, UUT, CU, Oed, RMC, PLT, UCS, CBR, Chem	S+P
	TP	2	3			
5300-5350	BH+RC	4	20-25	ML Cutting Hazlegrove Junction Overbridge/Embankment (South) Hazlegrove Junction Link Hazlegrove House Link/Embankment Shallow Groundwater	Clss, UUT, CU, Oed, RMC, PLT, UCS, CBR, Chem	S+P
	TP	2	3			

ML chainage (m)	Type	No. of exploratory hole	Target depth (m)*	Rationale	Suggested lab testing**	Likely installation requirements*
				Solifluction Surfaces		
5350-5600	BH+RC	6	20	ML Cutting Hazlegrove Junction WB On Slip Hazlegrove Junction Link/Embankment	Clss, UUT, CU, 2.5kg, MCV, PLT, UCS, RMC	S+P
	TP	3	3	Hazlegrove House Link/Embankment Solifluction Surfaces		
5600-5750	BH	1	10	ML Cutting		S
	TP	1	3	Solifluction Surfaces		
5750-5825	BH+RC	5	15-25	ML Cutting Hazlegrove House NMU Overbridge/Embankment	Clss, UUT, CU, Oed, RMC, PLT, UCS, Chem	S+P
	TP	1	3	Historic Landfill		
5825-5950	BH+RC	3	15	ML Cutting Historic Landfill	Clss, UUT, CU, RMC, PLT, UCS, 2.5kg, MCV, CBR, Chem	P
	BH	2	10			S
	TP	2	3	Solifluction Surfaces		
5950-6200	BH+RC	3	15	ML Cutting	Clss, UUT, CU	S
				Historic Timer Yard		

*To be confirmed by the Investigation Supervisor.
**4.5kg compaction testing to be undertaken where material is anticipated to be reused.
** Refer to Table A2.6 for the definition of abbreviations

A.2.3.4 As ground investigation work is by nature exploratory, the location, depth and type of the exploratory holes may be modified on site, depending on the geometry and topography of the site and the ground conditions encountered during the site investigations. The sampling techniques, frequency and the testing proposed may also vary during the site investigation depending on the ground conditions encountered on site.

A.3 Special problems to be investigated

A.3.1.1 The geotechnical, geo-environmental and hydrogeological constraints anticipated across the site that are considered to require a more comprehensive investigation are listed in Table A3.1.

Table A3.8: Critical areas of investigation (not including proposed bridges and other structures)

Critical locations	Special measures
Across Camel Hill Fault	Geological logging within Trial Pits and adjacent exposures
Westbury Formation	Geological logging within Trial Pits and adjacent exposures Deep exploratory holes around structures/earthworks proposed to overlay this stratum
Lower Lias	Geological logging within Trial Pits and adjacent exposures

A.3.1.2 Further site specific ground investigations may be proposed during the site investigations, where specific problems (e.g. historical undiscovered mining works, voids etc.) are encountered.

A.3.1.3 Potential sources of contamination have been identified in the Envirocheck Report which is contained in appendix B of Appendix 9.1 Preliminary Sources Study Report (Volume 6.3) and are listed in Table A3.2.

A.3.1.4 Land quality investigation by trial pits and boreholes is proposed. On-line identified areas of potential soil and groundwater contamination, and areas of historical quarries and landfill with potentially mobile soil-gas and groundwater contamination present the principal focus. Information requests to the Environment Agency and the Local Authority have been completed and the responses are provided in Appendix A. In addition, liaison with the Petroleum Officer may be required with regard to the fuel filling stations. The results of the further data searches and intrusive investigations will inform the subsequent environmental risk assessments.

A.3.1.5 A UXO pre-desk study assessment of the route by Zetica has identified a likely low Unexploded Ordnance hazard level. The report refers to a WWII aircraft crash site at Camel Cross and a follow-up enquiry has established that this is not within either of the current proposed route options.

Table A3.9: Potential sources of contamination

Potential source of contamination	Location
Historical Landfill Site ‘Land Adjacent to Hazelgrove Park’	On-line between Ch. 5600m and 5900m along route 1, and between Ch. 5800m and 5950m along route 2

Potential source of contamination	Location
Historical Timber Yard	On-line at approximate Ch. 6100m along route 2
Historical Saw Pit	On-line at approximate Ch. 5175m along route 1
Historical Camel Hill Quarry Landfill	Off-line, route 1 approximately 200m to the south of the existing alignment at approximately Ch. 5100m
Current Filling Station	Off-line, route 1 approximately at Ch. 4750m 30m south of the existing alignment
Historical Quarry	Off-line route 1 approximately between Ch. 4700m and 4820m of the existing alignment adjacent to the westbound carriageway
Historical MOD property	Off-line route 1 approximately between Ch. 4240m and 4490m of the existing alignment, adjacent to the westbound carriageway
Historical Quarry	On-line route 1 approximately between Ch. 4190m and 4230m of the existing alignment, adjacent to the westbound carriageway
Historical Quarry	On-line route 1 approximately between Ch. 4050m and 4100m of the existing alignment, adjacent to the eastbound carriageway
Historical Quarry	Off-line approximately between Ch. 4000m and 4120m of the existing alignment, approximately 500m north of the eastbound carriageway
Historical Quarry	On-line route 1 approximately between Ch. 4025 and Ch. 4150 immediately south of the existing alignment.
Fuel station	Approximately at Ch. 100m to 150m of the local access road at Downhead lane (Ch.2450m) overbridge
Historical Quarry	Approximately between Ch. 3300m and 3400m of the existing alignment, approximately 500m away from the eastbound carriageway
Waste Management Licensed Site and Hopkins Developments Grain Store bulk fuel tanks	Off-line route 2 between Ch. 3000m and 3100m of the proposed alignment, approximately 30m from the westbound carriageway

A.4 General notes on all proposed investigation

A.4.1.1 All site investigation related data is to be supplied in AGS Format.

A.4.1.2 In general the following standard sampling sequences shall be adopted in cable percussive boreholes:

A.4.1.3 In granular strata a standard penetration test (SPT) with recovered small disturbed sample at 1m intervals, with bulk samples also recovered at 1m intervals over the same depth range as the SPT, for the first 5m depth. The interval can be increased to every 1.5m thereafter. Water is to be added to the borehole to keep the water level topped up above standing water level when boring in silt, sand and gravel.

A.4.1.4 In cohesive strata an undisturbed U100 sample taken at alternating 1m intervals with an SPT undertaken in the intermediary 1m intervals for the first 5m depth. The intervals can be increased to 1.5m thereafter. A small disturbed sample shall be retrieved from the SPT split spoon. Additional small disturbed samples shall be taken on any change of strata.

A.4.1.5 Rotary coring will be carried out using triple tube coring techniques with semi-rigid core-liner and polymer mud flush to provide cores of a 100mm minimum diameter.

A.4.1.6 A minimum of 2No. Hand Shear Vanes (HSVs) shall be undertaken in each trial pit (each set comprising a minimum of 3No. readings).

A.5 Site and working restriction

A.5.1.1 Along Route Option 1, the majority of the investigations will be undertaken near to the existing A303 highway and local access roads. Therefore, consultation with Highways England, the relevant Managing Agent Contractor (MAC) and the local authority is necessary and agreement of any works and permits will be required prior to commencing any site works.

A.5.1.2 The proposed exploratory hole locations for Route Option 1 have been selected to minimise the requirement for traffic management and disruption to drivers using the existing A303. However, some boreholes and trial holes may require traffic management to allow the equipment to gain access onto the position. It is likely that traffic management will also be required at junctions with existing local authority roads at Downhead, Steart Hill, Traits Lane and Vale Farm. The required permissions should be obtained prior to commencement of the works.

A.5.1.3 Along the mainline alignment of Route Option 2, and part of Route Option 1, the majority of the works will be undertaken within open farmlands and thus, liaison with landowners/farmers is required prior to commencement of the works. This may cause restrictions on access and method of investigation. If the Client wishes, statutory powers may be imposed under the Highways Act, 1980.

A.5.1.4 For areas along Route Option 2 where the proposed route will cross the existing roads and pathways, appropriate permissions to investigate these areas should be obtained from the relevant statuary authorities.

A.5.1.5 It is likely that traffic management will be required at junctions with existing roads at Downhead, Steart Hill, Traits Lane, Vale Farm and the existing roundabout at Sparkford Junction.

A.5.1.6 Services may be present along the route of the proposed options. The location of the existing services along the preferred route option should be identified and appropriate specialist groundworks contractor must be used to identify the exact location of the services prior to commencement of the

works. Permissions and liaison with service holders will be required prior to works.

A.5.1.7 Agreement on working hours/days should be made with the relevant authorities prior to commencement of the works and work area should be secure during and outside of the site hours.

A.5.1.8 It is understood that there is a summer moratorium on works directly affecting the A303 (i.e. those requiring traffic management) between early July and early September.

A.5.1.9 Environmental restrictions, particularly those to safeguard any protected species present, on works associated with the ground investigation will be highlighted to the Contractor.

A.6 Specialist consultation

A.6.1.1 In addition to Highways England, Somerset County Council and private property owners in the immediate vicinity of the scheme, the following entities will need to be consulted:

A.6.2 Ecology

A.6.2.1 It is not known whether any protected species exist on the site however, given the large number of water features on or in close proximity to the route, the presence of such species cannot be discounted. It is recommended that an ecological walkover survey is carried out prior to the ground investigation works to determine whether there are any ecological restrictions on working practices.

A.6.3 Archaeology

A.6.3.1 It is recommended that an archaeology survey is undertaken when the preferred route option is selected.

A.6.4 Unexploded Ordnance

A.6.4.1 A UXO pre-desk study assessment of the route by Zetica has identified a likely low Unexploded Ordnance hazard level.

A.7 Programme, cost and contract agreement

A.7.1.1 An indication of the provisional programme and cost and contract arrangement of the proposed ground investigation is outlined below:

A.7.2 Programme

Route Option 1 Ground Investigation

Site Operations (including mobilisation)	8 weeks
Laboratory Testing	8 weeks
Factual Report	2 weeks
Total	**18 weeks**

Route Option 2 Ground Investigation

Site Operations (including mobilisation)	10 weeks
Laboratory Testing	8 weeks
Factual Report	2 weeks
Total	**16 weeks**

A.7.3 Budget estimate

A.7.3.1 Separate indicative budget estimates have been developed for each route option based on similar schemes undertaken. Procurement is expected to be undertaken by Highways England with the ground investigation design and specifications prepared by Mott MacDonald Sweco Joint Venture.

A.7.3.2 Estimates for traffic management have not been obtained. The exploratory hole locations have been selected to minimise traffic management on the existing A303 (see Section A.5).

A.7.3.3 Compensation costs that could be due to landowners affected by the ground investigation works are also not included.

Route Option 1 Ground Investigation	
General Items and Preliminaries	£20,000
Ground Investigation Contractor Estimate (incl. 15% contingency)	£220,000
Supervision & GIR reporting to HD22/08	£75,000
Traffic Management (not estimated)	TBC
Compensations costs (not estimated)	TBC
Total Budget Estimate (VAT excl.)	**£315,000**

Route Option 2 Ground Investigation	
General Items and Preliminaries	£20,000
Ground Investigation Contractor Estimate (incl.contingency)	£280,000
Supervision & GIR reporting to HD22/08	£85,000
Traffic Management (not estimated)	TBC
Compensations costs (not estimated)	TBC
Total Budget Estimate (VAT excl.)	**£385,000**

A.7.3.4 The indicative budget estimates provided are based on current commercial rates for ground investigation as tendered by specialist ground investigation contractors on similar schemes. A minimum 15% contingency has been applied to account for fluctuating costs depending on contractor availability; and to allow additional scope during site works to amend the ground investigation proposals if necessary.

A.7.3.5 As ground investigation is exploratory by nature, there are could be value in undertaking additional ground investigation to mitigate geotechnical risks. Also, there are possible design changes during design development that could result in changes to the ground investigation proposed in this Annex A.

A.7.4 Contract arrangements

A.7.4.1 All works will be specified and contracted using the following documents:

- UK Specification for Ground Investigation, 2nd Edition (Site Investigation Steering Group).

- Infrastructure Conditions of Contract (ICC): Ground Investigation, Version Sept 2011.

A.8 Reporting

A.8.1.1 The appointed ground investigation contractor will produce a Factual Report presenting the final findings of the ground investigation. The final version of the report will be provided both as an electronic and a hard copy format.

A.8.1.2 The appointed Ground Investigation Contractor will provide all fieldwork, monitoring and laboratory data in digital form in accordance with the current revision of the Association of Geotechnical and Geo-environmental Specialists (AGS) publication 'Electronic transfer of geotechnical and geo-environmental data AGS4 edition 4.0'.

A.8.1.3 All exploratory holes shall be surveyed on completion, with positions expressed as OS grid coordinates and elevations reduced to Ordnance Datum All drawings shall be prepared in AutoCAD format and are to be provided in both hard copy and electronic format.

A.8.1.4 A Ground Investigation Report (GIR) will be produced by Mott MacDonald Sweco Joint Venture in accordance with Appendix D of DMRB HD22/08 and Eurocode 7 standards. Upon completion of the report it will be provided to the client in both hard copy and electronic format.

A.9 Bill of quantity

A.9.1.1 Bills of Quantities have been prepared for the two route options under consideration.

Appendix A: Local authority and Environment Agency environmental data enquiries

South Somerset District Council

Environmental Health
The Council Offices, Brympton Way, Yeovil, Somerset, BA20 2HT
Telephone: (01935) 462462 Fax: (01935) 462447
website:www.southsomerset.gov.uk

Alasdair Bell
Environmental Health Manager

FAO Charlotte Bithell
Assistant Environmental Consultant
Sweco
Grove House
Mansion Gate Drive
Leeds
LS7 4DN

Date:	5 April 2017
Your Ref:	
Our ref:	SWB/061489
Ask For:	Ms Sally-Anne Webster
Direct Line:	01935 462528
E-mail :	sally-anne.webster@southsomerset.gov.uk

Dear Charlotte
Environmental Information Request – A303 Podimore to Sparkford

I am writing in reply to your email of the 15th March 2017 regarding the above site. The information requested is as follows:

- There is one Private Water Supply within 500m of the route, which is a single domestic supply, Blue Haze,Easting 358113, Northing 125477
- No details available of accidental releases/environmental incidents within 500m of the route
- There are no details held in respect of any known remediation works on or within the vicinity of the route.
- No land in proximity to the route has been inspected under the Part 2A regime or is scheduled for detailed inspection.
- There are 7 former quarries within 500m of the route,
  1. CL1008 E356836 N125500
  2. CL992 E357822 N125734
  3. CL991 E358112 N125510
  4. CL988 E358577 N125713
  5. CL989 E358657 N125521
  6. CL990 E358762 N125449
  7. CL0972 E359366 N125555

  We do not hold any historical information in respect of these sites
- There are 3 Garage sites,
  1. CL1194 West Camel E356690 N124871
  2. CL3068 E353739 N124999
  3. CL4405 No easting or northing available

  We do not hold any further information in respect of these sites.
- Landfill site Queen Camel CL3973 E359667 N125556 – We do not hold any historical information about this site.
- Landfill site, Land near Hazelgrove Park, CL4038, we do not hold any historical information about this site

If you need this information in large print, Braille, audio or another language, please contact me at the above address

- Infilled Land CL1185 E356713 N124892 – We do not hold any historical informatio about this site.
- MOD site CL3397 E355134 N123616 – We do not hold any historical information about this

If you have any queries reagrdingthis letter, please do not hesistate to contact me.

Yours sincerely

Ms Sally-Anne Webster
Environmental Health Officer