



AQUIND Limited

AQUIND INTERCONNECTOR

Onshore Outline Construction Environmental Management Plan

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

WSP House

70 Chancery Lane

London

WC2A 1AF

+44 20 7314 5000

www.wsp.com

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Prepared By	H. Jenner and C. Middleton
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Approved By	U. Stevenson
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1. INTRODUCTION

1.1. PURPOSE OF THE ONSHORE OUTLINE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

- 1.1.1.1. This Onshore Outline Construction Environmental Management Plan ('CEMP') has been prepared on behalf of AQUIND Limited ('The Applicant') to support the application for a Development Consent Order ('DCO'). The application for the DCO is made in respect of the UK elements of AQUIND Interconnector Project which will operate between France and the UK.
- 1.1.1.2. The DCO Application for the UK elements covers the parts of the Project located onshore in the UK ('Onshore Components'); and in the UK Marine area, defined as all of that part of the Project from the Mean High Water Spring ('MHWS') mark in the UK out to the limit of the UK/France Exclusive Economic Zone ('Marine Components'). Together the Onshore Components and the Marine Components comprise the 'Proposed Development', in respect of which the DCO Application is made. References to the Order Limits and the Site in this document, and within any of the appendices or plans enclosed within, are only in relation to the Order Limits and the Site, as applicable, to the Onshore Components of the Proposed Development.
- 1.1.1.3. This Onshore Outline CEMP covers the Onshore Components:
- Works at the existing National Grid Lovedean substation in Hampshire to facilitate the connection of the Project to the Great Britain electrical transmission network, the National Grid;
 - Underground High Voltage Alternating Current ('HVAC') Cables each of which is paired with a smaller diameter fibre optic cables, connecting the National Grid Lovedean substation to the proposed Converter Station;
 - The construction of a Converter Station comprising a mix of buildings, outdoor electrical equipment and telecommunications equipment and a Works Compound and Laydown Area; Access Road, associated haul roads, attenuation features and landscaping;
 - Up to two Telecommunications Buildings (one for each circuit) to be located outside the main Converter Station security fence;
 - Two pairs of underground High Voltage Direct Current ('HVDC') Cables each of which is paired with a smaller diameter fibre optic cables to run from the Converter Station to the Landfall site in Eastney (near Portsmouth); and

- Infrastructure to join the Onshore and Marine HVDC Cables together at the Landfall, and two Optical Regeneration Stations ('ORS') (one for each cable circuit).

1.1.1.4. The purpose of a CEMP is to establish good management practices to ensure that the construction work considers aspects of environmental protection within the context of compliance with local legislation and minimise impacts on both the general public and the environment. The CEMP will set out the overarching principles for environmental management of the onshore construction of the Proposed Development. The Environmental Constraints Plans in Appendix 1 illustrate the relevant environmental constraints for the Proposed Development.

1.1.1.5. Assuming the DCO is granted, the Applicant will appoint a Contractor (or lead contractor for each work package) who will have demonstrated that they are competent in managing the effects of construction on the environment. This is important as it will be the duty of the appointed contractor and its subcontractors to follow the environmental management and mitigation arrangements prescribed in the relevant CEMP, to minimise environmental risks and ensure compliance with relevant requirements of the DCO.

1.1.1.6. This Onshore Outline CEMP reflects environmental requirements, which have been identified for action as part of the DCO Application. CEMPs would be produced in accordance with this Onshore Outline CEMP for each of the relevant parts of the Proposed Development. Each CEMP would explain how the activities of contractors and sub-contractors would comply with its requirements, including where necessary the production of subsidiary plans in relation to specific construction matters.

1.1.1.7. Once a contractor is appointed and during construction for the relevant part of the Proposed Development, CEMPs will be live documents and will be periodically reviewed and updated by the appointed contractor every six months, or as required, to satisfy all contractual and legislative requirements and ensure environmental risks are managed and mitigated throughout. In particular, it will be updated to take account of the following:

- Changes in detailed design;
- Changes in external factors such as regulations and standards;
- Any unforeseen circumstances as they arise such as new protected species or new archaeological finds and provide a mitigation framework for this;
- Good construction practices and ensure these are adopted and maintained throughout;
- The results of audits and inspections; and
- Learning points from environmental near misses and accidents.

1.1.1.8. This Onshore Outline CEMP is solely for the environmental management associated with the Onshore Components, with a separate Outline CEMP provided for the Marine Components in the Marine Outline CEMP (APP-488).

1.1.1.9. The Onshore Outline CEMP outlines mitigation that will be applied in some cases 'where practicable'. The final routing of the Onshore Cable Route within the order limits will be determined following the grant of the DCO, due to routing constraints associated with environmental constraints, including utilities. For example, in some instances it may prove not possible to avoid certain tree root protection areas. However, measures which are "practicable" must be applied where they reasonably can be applied.

1.2. LEGAL COMPLIANCE

1.2.1.1. Relevant legislation applies to the works to be undertaken. The expectation is that all relevant legislation, including requirements for licences, permits and/or consents shall be identified and information provided on how compliance is to be achieved, as part of the construction process, through the use of a Project Consents Register.

1.2.1.2. The relevant applicable legislation and regulations will be identified from, but not limited to, the list provided in Appendix 2. The list of relevant legislation and its applicability to the Site and the construction works will be reviewed and updated whenever necessary.

1.3. STRUCTURE OF THE ONSHORE OUTLINE CEMP

1.3.1.1. This Onshore Outline CEMP is based on established good management practice through British Standards and Construction Industry Research and Information Association ('CIRIA') guidance, and includes the following information:

- **Site Information and the Proposed Development:** including site and the surrounding area and a summary of the key environmental receptors associated with the construction of the Proposed Development.
- **Roles and Responsibilities:** An outline of the project roles and responsibilities required as part of a CEMP.
- **General Environmental Requirements:** Requirements for audits and inspections, consents and health and safety, competence, training and awareness, internal and external communication including communication with the Client, statutory authorities and other stakeholders, public relations, complaints procedures, method statements and incident response.
- **General Environmental Control Measures:** General methods for managing environmental risks, including mitigation, relevant and current environmental legislation, good practice.

- **Location Specific Environmental Control Measures** – Location specific methods for managing environmental risks, including mitigation, and objectives, targets and commitments outlined in the 2019 Environmental Statement (APP-116 to APP-145) and the ES Addendum (REP1-139).
- **Monitoring:** Framework for monitoring receptors and environmental impacts.

2. SITE INFORMATION AND THE PROPOSED DEVELOPMENT

2.1. SITE AND THE SURROUNDING AREA

- 2.1.1.1. The Order Limits have been defined as the limits within which the Authorised Development may be carried out.
- 2.1.1.2. The Onshore Components are described in sections. The sections are broken down further to provide a description of different options, where relevant.
- 2.1.1.3. The current baseline of the sections of the Site includes:
- Section 1, the Converter Station Area, located to the west of the existing National Grid Lovedean Substation, a rural area and surrounded by agricultural fields. The section is located within the administrative boundaries of Winchester City Council and East Hampshire District Council.
 - Section 2 is a predominantly rural area comprising agricultural land. The section is located wholly within the administrative boundary of Winchester City Council.
 - Section 3 is a predominantly rural area comprising open land, located to the east of the settlement of Denmead and west of the settlement of Anmore with a number of dispersed rural properties. The majority of the area forms part of the Denmead Gap (a planning policy designation to prevent the coalescence of Denmead and Waterlooville), with the area immediately south of Anmore Road referred to as Denmead Meadows which includes both Kings Pond Meadow and Soake Farm Meadows Sites of Importance for Nature Conservation ('SINCs'). The section is located wholly within the administrative boundary of Winchester City Council.
 - Section 4 is a predominantly urban area encompassing the B2150 Hambledon Road and A3 London Road running southwards. At the southern end, the section includes the junction of the A3 London Road and the B2177 Portsdown Hill Road as well as land between this junction and the northern part of Farlington Avenue, including the Portsdown Hill Road Car Park which also incorporates the northern area of the Meadow West of Farlington Avenue SINC. The section spans the administrative areas of Winchester City, Havant Borough and Portsmouth City Councils.

- Section 5 is located within the urban areas of Drayton and Farlington, suburbs of Portsmouth, and encompasses the highway of Farlington Road, Eveleigh Road (south of Solent Infant School), Havant Road, the area of open land known as Scoutlands (between Eveleigh Road and Havant Road), and the northernmost section of Eastern Road. The section is located wholly within the administrative boundary of Portsmouth City Council.
- Section 6 is located within the urban area of Portsmouth, and includes the A2030 Eastern Road and the western half of Zetland Field, and western edge of the Sainsburys Car Park to the north of the railway line. The section is located wholly within the administrative boundary of Portsmouth City Council.
- Section 7 is located within the urban area of Portsmouth, and includes a large area of Farlington Playing Fields on the mainland. The Onshore Cable Corridor then extends south-westerly across Langstone Harbour (a SSSI, SPA, SAC and Ramsar site) to the yard south of Kendalls Wharf before extending further south around Baffins Rovers football ground re-joining at the northern edge of the southern football pitch. The section is located wholly within the administrative boundary of Portsmouth City Council.
- Section 8 is within the urban area of Portsmouth and comprises the A2030 Eastern Road running south with Great Salterns Golf Course to the west and Langstone Harbour to the east towards the northern edge of Milton Common. The Corridor then takes multiple route options across Milton Common, a designated SINC and public open space, to Moorings Way encompassing the southern edge of Milton Common to the junction with Furze Lane. The section is located wholly within the administrative boundary of Portsmouth City Council.
- Section 9 continues south around the built edges of the University of Portsmouth Langstone Campus to Locksway Road and the Thatched House Public House (incorporating the western edge of the Milton Locks Conservation Area and the full extent of Milton Locks SINC). The Onshore Cable Corridor then continues southwest encompassing the south-eastern area of Milton Allotments to the Kingsley Road open space, and onwards to Bransbury Park routing south to Henderson Road in Eastney. The section is located wholly within the administrative boundary of Portsmouth City Council.
- Section 10 runs south-westerly along Fort Cumberland Road to the Fort Cumberland Road Car Park, adjacent to the Land West of Fort Cumberland SINC (further east lies Fort Cumberland SINC and Scheduled Ancient Monument). From the Car Park the route runs south to the Marine Section of the Cable Corridor and incorporates a section of Eastney Beach, a designated SINC. The section is located wholly within the administrative boundary of Portsmouth City Council.

2.1.1.4. The current environmental conditions are described in Chapter 3 (Description of the Proposed Development) of the Environmental Statement ('ES') Volume 1 (APP-118). For further details of the baseline description, please see Chapters 6 to 28 of the ES Volume 1 (APP-121 to APP-143).

2.2. SUMMARY OF KEY ENVIRONMENTAL RECEPTORS

2.2.1.1. A summary of the key environmental receptors for the Site are contained within Table 2.1 below and are shown in Appendix 1 Figure 2.

Table 2.1 – Key Environmental Receptors during Construction

Topic	Key Environmental Receptors
Landscape and Visual Amenity	<p>Converter Station</p> <ul style="list-style-type: none"> • Landscape character, associated landscape features and the setting of the South Downs National Park; and • Visual receptors: residents, recreational and transport within 8 km study area. <p>Onshore Cable Route</p> <ul style="list-style-type: none"> • Landscape character and associated features; and • Visual receptors: residents, recreational, transport, commercial/ retail/ industrial/ education/ church/ religious facilities and public house facilities within the 120 m buffer on either side of the Onshore Cable Route. <p>Landfall</p> <ul style="list-style-type: none"> • Landscape character and associated features of the Landfall; and • Visual amenity of surrounding visual receptors, including from residential properties and recreational users within 300 m study area of the Landfall.
Onshore Ecology	<ul style="list-style-type: none"> • Chichester and Langstone Harbour SPA; Wintering Intertidal Birds; • Solent Waders and Brent Goose Strategy Sites; • Crabdens Copse and Crabdens Row SINC; • Stoneacre Copse Ancient Woodland; • Denmead Meadows comprising; <ul style="list-style-type: none"> • Kings Pond Meadows SINC; • Soake Farm Meadows SINC; • Unimproved grassland; • Milton Common SINC;

Topic	Key Environmental Receptors
	<ul style="list-style-type: none"> • Broadleaved trees; • Species-rich hedgerows with/without trees; • Species-poor hedgerows with/without trees; • Semi-improved neutral and calcareous grassland; • Unimproved grassland; • Badgers; • Bats; • Reptiles; • Hedgehog; and • Wildlife and Countryside Act Schedule 9 plants.
Soils and Agricultural Land Use	<ul style="list-style-type: none"> • Agricultural land, including that classed as best and most versatile ('BMV') defined as land classified as Grades 1,2, and 3a of the Agricultural Land Classification ('ALC') system associated with the Converter Station Area and Onshore Cable Corridor Sections 1, 2, 3 and 4; • Farmable land area and farming businesses associated with the Converter Station Area and Onshore Cable Corridor Sections 1, 2, 3 and 4; and • Soil resources associated with non-agricultural land within Sections 6, 7 and 9.
Ground Conditions	<ul style="list-style-type: none"> • Geology (Mineral Safeguarding Area ('MSAs')); • Human Health (construction and maintenance workers and adjacent land users); • Controlled Waters (Principal, Secondary A and Secondary Undifferentiated Aquifers); and • Below Ground Services (potable water supply pipes and buried services).
Groundwater	<ul style="list-style-type: none"> • Head Aquifer; • Chalk Aquifer; • Water Users; • Lambeth Group Aquifer; • Portsdown Chalk Formation; • Spetisbury Chalk Member; • Tarrant Chalk Member; • Newhaven Chalk Formation; • Bognor Sand Member; • Wittering Formation; • Lambeth Group; • Head Deposits; • Undifferentiated Chalk;

Topic	Key Environmental Receptors
	<ul style="list-style-type: none"> • River Terrace Deposits; • Raised Marine Deposits; • Beach and Tidal Flats Deposits; • Portsmouth Sand Member; • Tidal Flat Deposits; • Storm Beach Deposits; • Groundwater Source Protection Zones; • Lovedean Source (Public Water Supply) and; • Havant and Bedhampton Source (Public Water Supply).
Surface Water Resources and Flood Risk	<ul style="list-style-type: none"> • Surface Water Drainage Patterns; • Public Foul Sewer Networks; • Public Water Supply Network; • Surface Waterbodies; • Surface water drainage patterns; • Public Surface Water and Combined Wastewater Networks; • Surface waterbodies flood plains; • Construction Workers; and • Residents, users and associated infrastructure of the surrounding area.
Heritage and Archaeology	<ul style="list-style-type: none"> • Prehistoric activity in the form of isolated pits and enclosure ditches with possibility for burials; • Roman settlement activity; • Early Medieval activity; • Cropmark evidence of a later medieval field systems visible as cropmarks or ridge and furrow cultivation; • Prehistoric activity; • Roman activity; • Roman settlement activity and remains of Roman road; • Early medieval burials; • Palaeoenvironmental remains (Raised Marine Deposits); • Roman remains; • Prehistoric activity relating to exploitation of intertidal resources; and • Below ground remains associated with the early 19th century Portsmouth and Arundel Canal. • Above Ground Heritage Assets adjacent or close to the Order Limits, including curtilage of listed buildings (i.e. associated boundary walls)
Traffic and Transport	<ul style="list-style-type: none"> • Highway network impacted by the Converter Station Construction Traffic;

Topic	Key Environmental Receptors
	<ul style="list-style-type: none"> • Highway network impacted by the Onshore Cable Corridor; • Highway Network impacted by Traffic Redistribution; • Local Highway Network (Hampshire County Council ('HCC')); • Local Highway Network (Portsmouth City County ('PCC')); • Public Transport Services; and • Pedestrians and Cyclists.
Air Quality	<ul style="list-style-type: none"> • Human Health receptors up to 250 m from the Onshore Cable Corridor; • Ecological Receptors. • Human Receptors
Noise and Vibration	<p>Converter Station Area</p> <ul style="list-style-type: none"> • The Haven and Old Mill Cottage; • Hillcrest; • Millfield Farm; • Kimberley House; • Little Denmead Farm; • Holme and Highfield Cottages; • Lower Chapters; • The Arrows; • Broadways; • Broadway Farm House; • Broadway Farm Cottages; • Hinton Daubnay; • Ludmore Cottages; • Old Mill House and The Shieling; and • The Ranch. <p>Onshore Cable Corridor Sections 2 - 10</p> <ul style="list-style-type: none"> • Residential properties and other sensitive receptors up to 280 m from the Onshore Cable Corridor (e.g. schools, hospitals etc).
Socio-economics	<ul style="list-style-type: none"> • Local residents and commercial businesses; • Community facilities; and • Recreation, leisure facilities and open space.
Human Health	<ul style="list-style-type: none"> • Population within Winchester, East Hampshire, Havant and Portsmouth; • Residents, users of community facilities and greenspace within the population of Winchester, East Hampshire, Havant and Portsmouth; and

Topic	Key Environmental Receptors
	<ul style="list-style-type: none"> Site users and adjacent site users within Winchester, East Hampshire, Havant and Portsmouth.
Waste and Material Resources	<ul style="list-style-type: none"> Primary materials sources; and Landfill capacity.
Carbon and Climate Change	<ul style="list-style-type: none"> Atmospheric Greenhouse Gas Components of the Proposed Development

2.3. TIMING OF ACTIVITIES

2.3.1. WORKING HOURS

2.3.1.1. The description of the assumed programme for the construction of the Proposed Development is based on the working hours in Table 2.2.

Table 2.2 – Onshore working hours

Activity	Working hours per day	Working days per week
Converter Station Area Construction	08:00 - 18:00 (Monday - Friday), 08:00 - 13:00 (Saturday)	6 days*
Marine Cable Installation	24 hour shifts	7 days
Onshore Cable Installation	07:00 - 17:00 (Monday - Friday); 08:00 - 13:00 (Saturday)	6 days*
Landfall Installation (including HDD-1, TJB and ORS)	12 hour shifts	7 days
HDD-2, HDD-5 and HDD-6 Installation	07:00 - 19:00	6 days*
HDD-3 and HDD-4 Installation	12 to 24 hour shifts	7 days

*Day 6 is Saturday working which is typically a 5-hour shift 08:00 to 13:00.

- 2.3.1.2. No working hours within this table preclude:
- (a) start-up and shut down activities up to an hour either side of the core working hours; and
 - (b) the receipt of oversized deliveries to the site, the arrival and departure of personnel to and from the site, on-site meetings or briefings, and the use of welfare facilities and non-intrusive activities.
- 2.3.1.3. Start-up and shut-down activities means at the start of the working day the opening up of the site, the arrival of site staff and contractors, changing into appropriate PPE wear, pre-shift briefings, site inductions, tool box talks, and all associated site safety checks and at the end of the working day the cleaning and tidying of work areas, changing out of PPE wear, post-shift debrief, the departure of site staff and contractors, and closing and securing the sites.
- 2.3.1.4. The following Onshore Cable Installation operations may take place outside the working hours detailed above, subject to agreement with the Local Planning Authority ('LPA'):

Trenched Areas

- Section 4 – a c.90 m section of the A3 London Road in Purbrook near Stakes Road:
 - 08:00 to 18:00, Saturday and Sunday, for eight weekends (four per circuit which could be consecutive or non-consecutive).
- Section 5 – Havant Road near Drayton between Farlington Avenue and Eastern Road:
 - Between Saturday sunrise until Sunday sunset, with the noisiest activities (road cutting/breaking and re-surfacing) not to be carried out at night (22:00-07:00), for one weekend per circuit (two weekends in total which could be consecutive or non-consecutive); or
 - 07:00 to 22:00 for two weekends per circuit (up to four weekends in total which could be consecutive or non-consecutive).
- Section 6 – Sainsbury's Car Park:
 - Works within the car park will only be permitted between 18.30 and 07.00.
 - The noisiest activities (road cutting/breaking and re-surfacing) not to be carried out at night (22.00 – 07.00). Refer to section 6.2.8 for further detail regarding the road cutting/breaking and re-surfacing restriction.
 - Seasonal restrictions will apply with no works during an Easter and Christmas embargo.
- Section 8 – Eastern Road between Airport Service Road and the north of Milton Common (c.350 m south of Tangier Road):

- Up to 24 hour working, seven days per week for up to six weeks per circuit. Noisiest activities (road cutting/breaking and re-surfacing) will not be carried out at night (22:00-07:00) outside the Harbourside Caravan Park and the residential flat above the Great Salterns Mansion Harvester. Refer to section 6.2.8 for further detail regarding the road cutting/breaking and re-surfacing restriction.
- Section 8 – Eastern Road between HDD-6 and Eastern Avenue
 - There is a potential for seven day working between 07:00-17:00 if cable ducts are required to be installed within the Eastern Road between HDD-6 and Eastern Avenue.

2.3.2. PUBLIC EVENTS

2.3.2.1. Public activities and events that are planned in proximity to the Converter Station site and Onshore Cable Corridor, including but not limited to the following;

- School term time (as required);
- Football season;
- Coastal Waterside Marathon;
- Cowes Week;
- Great South Run; and
- Victorious Festival.

2.3.2.2. These will be taken into consideration by the appointed contractor during the phasing of the of construction works for the Proposed Development.

3. ROLES AND RESPONSIBILITIES

- 3.1.1.1. Personnel with defined environmental responsibilities are detailed in Table 3.1 below.
- 3.1.1.2. Each assigned responsible individual will sign to confirm that they understand and accept their designated duties and responsibilities. A signed copy of each CEMP will be retained and made available on request. All personnel will sign a project induction which will confirm the acceptance of their environmental/sustainability responsibilities.

Table 3.1 – Roles and Responsibilities

Role	Responsibilities
Client	<ul style="list-style-type: none"> • Ensures that the construction project is set up so that it is carried out from start to finish in a way that adequately controls the risks to the health and safety of those who may be affected.
Principal Contractor	<ul style="list-style-type: none"> • Manages the Construction Stage of a Project. This involves liaising with the Client and Principal Designer throughout the project, including during the pre-Construction Stage. • Required to adhere to all measures detailed within the Outline CEMP and FTMS. They will also be responsible for managing the working activities and the gangs working along the route; which aligns with the Health and Safety responsibility under CDM regulations.
Project Manager/ Director	<ul style="list-style-type: none"> • Overall environmental management of the Proposed Development, ensuring that all works are carried out in accordance with the CEMP.
Environmental Advisor/Manager	<ul style="list-style-type: none"> • Responsible for the review and authorisation of the detailed management plans from contractors, including the CEMP, to ensure compliance with the Development Consent Order Requirements and the framework/outline management plans. This is to ensure a consistent, coordinated and compliant approach. This will include ensuring relevant reviews and approvals from LPAs and other stakeholders are undertaken. • Work with programme planners and project managers to ensure consents are embedded within the programme. • Monitor submission of consent applications and ensure their timely delivery. • Provide input to consultation with consent granting bodies, commitment holders and other third parties. • Co-ordinate and manage all required scheduled consents and property notifications.

Role	Responsibilities
	<ul style="list-style-type: none"> • Ensure environmental consents are obtained in line with the programme. • Maintain and update the consents register in line with requirements and ensure review of individual deliverables by project specialists. • Monitor and report progress on consents and commitments. • Monitoring construction works including the sub-contractors for compliance against Environmental Risk Assessment and method statement control measures. • Co-ordination of all environmental documentation. • Monitoring environmental training, consultation and implementation of sub-contractor procedures. • Attending site Health and Safety Executive ('HSE') committee meetings. • Monitoring of all site environmental incidents and ensuring they are reported and investigated. • Undertaking site inspections. • Accompanying HSE Managers and Environment Agency ('EA') inspections. • Compliance with duty of care, the Site Waste Management Plan ('SWMP') or any permits and/or exemptions. • Monitoring and measurement of waste. • Communicate sustainability good practice, innovation and targets to the project team and supply chain. • Keep a record of key performance indicators ('KPIs'). • Act as the main point of contact on environmental matters relating to the Proposed Development. • Will have the overall responsibility for the implementation and management of the Communication Strategy as outlined in 4.4.3. This will include liaison with the Public Relations Officer defined below.
Environmental Clerk of Works¹	<ul style="list-style-type: none"> • Support the Environmental Manager in delivering the environmental component of the Proposed Development. • Monitor construction activities and performance to ensure control measures are effective. • Maintain full records of the progress of the Environmental Works. • Implement an auditable environment record filing system.

¹ The Environmental Clerk of Works role may be covered by a suitably experienced and qualified Landscape Clerk of Works with an arboriculturalist called in to cover specific issues associated with trees and RPAs.

Role	Responsibilities
	<ul style="list-style-type: none"> • Maintain regular contact and liaison with the Environmental Specialists. • Carry out further monitoring as required by the CEMP.
Ecological Clerk of Works	<ul style="list-style-type: none"> • Monitoring and management of the ecological-related control measures. • Pre-construction ecological checks for habitats and species. • Implement and maintain exclusion zones. • Oversee provision of ecological mitigation measures. • Provide ecological information for site inductions, tool-box talks and meetings.
Public Relations Officer	<ul style="list-style-type: none"> • To track complaints from members of the public and respond within reasonable time frames. • To liaise with members of the public regarding issues such as any specific anticipated nuisance. • Report to the Environmental Manger for the implementation of the Communication Strategy.
Engineering Manager	<ul style="list-style-type: none"> • Raise innovation at team meetings. • Capture good ideas/innovations/lessons learnt. • Track progress of improvements and support if needed. • Grow the culture of innovation by effective means of communication e.g. presentations, site visits, engagement with our supply chain. • Ensure environmental issues and constraints are included in individual designs, in accordance with environmental design procedures.
Planning Manager	<ul style="list-style-type: none"> • Plan works to avoid sensitive times of year. • Plan works to avoid working unsociable hours. • Plan into the project consents/surveys required and the time scales in which they take to obtain.
Construction Manager	<ul style="list-style-type: none"> • Advising appointed contractor representative on the implementation of the EMS. • Monitoring construction works including the sub-contractors for compliance against the various environmental risk assessment and any method statement control measures. • Monitoring environmental training, consultation and implementation of sub-contractor procedures. • Accompanying site Environment Inspections where required and any environmental authority inspections.

Role	Responsibilities
	<ul style="list-style-type: none"> • Attending Environmental co-ordination meetings.
Works Supervisors/Site Manager	<ul style="list-style-type: none"> • Ensuring that all site work is carried out in accordance with method statements, task briefings and activity briefings. • Ensure that staff under their supervision is aware of their environmental responsibilities. • Ensure key risks are identified and brief operatives on environmental topics. • Carry out site inspections to identify any environmental issues.
General Operatives	<ul style="list-style-type: none"> • Ensuring environmental mitigation measures are carried out during the course of their duties, in line with work package plans, task briefings and activity briefings. • Working considerately with a good working ethic in order to minimise adverse environmental impacts and follow all site rules communicated during briefings and project training sessions. • Informing their line management of any environmental issues they have on site, so that these can be communicated to the project management team for further investigation. • Attending the project induction prior to commencing work where details of the site environmental rules will be provided.
Waste Champion	<ul style="list-style-type: none"> • The effective communication of the Site Waste Management Plan ('SWMP') to their operatives and ensures enforcement of the SWMP at an operational level e.g. identifying areas for improvement where segregation is not being followed. • For the delivery of relevant toolbox talks where necessary.

4. GENERAL ENVIRONMENTAL REQUIREMENTS

4.1. REQUIREMENTS AND CONSENTS

4.1.1.1. The Proposed Development shall be carried out within the requirements (but not limited to) of the relevant legislation (see Appendix 2).

4.1.2. AUDITS AND INSPECTIONS

4.1.2.1. Regular inspections of the Site shall occur to ensure compliance with each CEMP, check compliance with the legal and contractual requirements and to minimise the risk of damage to the environment. All environmental incidents shall be reported to the Environmental Manager.

4.1.2.2. The Environmental Manager shall carry out weekly inspections and complete an assessment of the works' environmental performance measured against KPIs, environmental standards, relevant legislation and the CEMP objectives.

4.1.2.3. Document control shall be in accordance with a Quality Management System and copies of all environmental audit reports, consents and licences shall be maintained by the appointed contractor's Environmental Advisor/Manager. They will be held on Site for review at any time.

4.1.2.4. The Project Manager shall be responsible for investigating and addressing any non-conformances raised by the inspection within an agreed time frame and ensuring that corrective and preventative actions have been fully implemented and closed out.

4.1.2.5. The Environmental Manager and the Client representative shall be responsible for updating and reviewing each CEMP on a regular basis to ensure continual improvements.

4.1.3. CONSENTS AND HEALTH AND SAFETY

4.1.3.1. All staff employed must have regard to the Health and Safety at Work Act 1974 – that all persons employed will take reasonable care for the health and safety of themselves and other persons who may be affected by their acts or omissions.

Electricity safety

4.1.3.2. National Grid Electricity Safety Rules are mandatory. All staff who works on or near to the transmission system at the Lovedean Substation must understand and be familiar with the detail of the safety rules and appropriate supporting documents (National Grid UK Electricity Transmission Plc , 2018) (Fifth Edition).

- 4.1.3.3. Works at Section 1 Lovedean (Converter Station Area) will be undertaken in line with the overarching legal framework Electricity Safety, Quality and Continuity Regulations (Health and Safety Executive, 2002), and the *Third-party guidance for working near National Grid Electricity Transmission equipment* (National Grid, 2016).
- 4.1.3.4. Before works are undertaken on site, all relevant site staff will be made aware of and made sure they understand the HSE Guidance Note “*Avoiding danger from underground services*” (HSE, 2014).
- 4.1.3.5. Works will be planned to avoid underground services. Where this is not possible, plans will be developed to minimise the risk of damage to those services in the work area.
- 4.1.3.6. When carrying out excavations in the vicinity of electricity assets, the safe system of work will be employed:

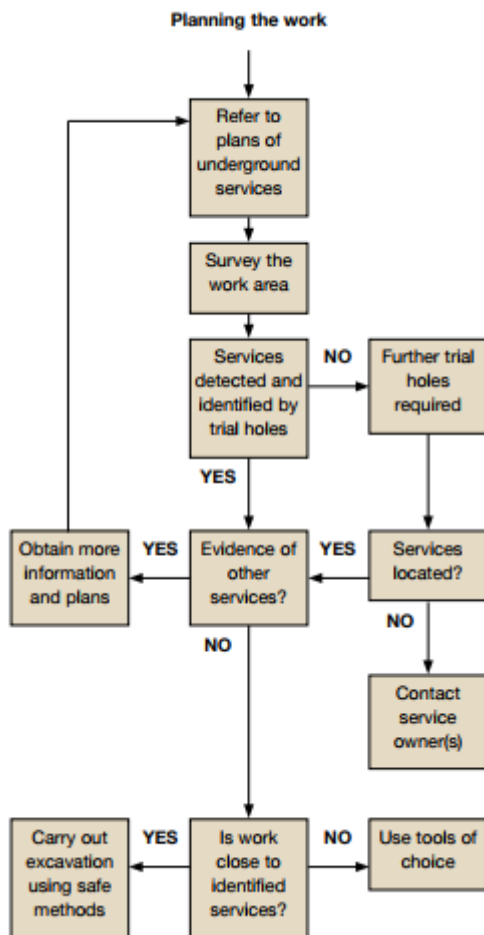


Plate 4.1 – A safe system of work (HSE, 2014)

- 4.1.3.7. Minimum clearances from the Overhead Line Clearance Technical Specification 43-8 will be adhered to onsite in relation to overhead lines (Energy Networks Association, 2004) (as amended). Plant, machinery, equipment, buildings or scaffolding will not encroach within the minimum clearance specified (dependent on-site conditions) of any high voltage conductors when those conductors are under their

worse conditions of maximum “sag” and “swing” and overhead line profile (maximum “sag” and “swing”) drawings should be obtained.

Electric and Magnetic Fields

4.1.3.8. The Onshore Cable Route alignment considered the advice provided by the National Radiological Protection Board on recommending the adoption in the UK of public exposure guidelines published in 1998 by the International Commission on Non-Ionizing Radiation Protection (International Commission on Non-Ionizing Radiation Protection, 1998) in terms of the 1999 EU Recommendation (The Council of the European Union, 1999) when the time of exposure is significant.

4.1.3.9. The relevant electrical infrastructure of the Proposed Development at Operational Stage will comply with the current public exposure guidelines, and in line with Appendix 3.7 (Onshore Electric and Magnetic Field Report) of the ES Volume 3 (APP-361) will include:

- Earthed shielding of the HVAC Cables and HVDC Cables along the Onshore Cable Route;
- Earthed perimeter fencing at the Converter Station compound;
- The Converter Station electrical equipment must be designed to meet the guideline levels; and
- The electrical field within the Converter Station at 1 m above ground level will not exceed 10 kV/m.

4.1.3.10. The assessed components of the Proposed Development produce field strengths which are less than the public exposure limit.

4.1.3.11. The electric and magnetic fields generated by the HVAC and HVDC cables will comply with public exposure guidelines.

4.1.3.12. The Engineering Manager will ensure through design and verification that the Proposed Development complies with guidelines and the Code of Practice (Department of Energy & Climate Change , 2012).

Register of Consents

4.1.3.13. A register of consents covering: planning, highway and environmental has been prepared within Other Consents and Licences (REP6-024) which will be reviewed and the need for any further consents or licenses tracked by the appointed contractor to keep track of any progress. This will enable the project team to plan for consents to be applied for and obtained prior to the relevant works activity commencing.

4.1.3.14. The progress of the preparation, submission and internal approval of the consents identified as being required will be tracked using a consents register.

Health and Safety File

- 4.1.3.15. The Health and Safety File will be prepared by the Client, with information supplied from the Principal Contractor. The Client and Principal Contractor will take responsibility for the Health and Safety File.
- 4.1.3.16. The Health and Safety File will include information about all the following topics, where they may be relevant to the health and safety of any future construction work. The level of detail to be provided would be proportional to the likely risks involved.
- Details of the project – Brief description of the work carried out;
 - Residual hazards and how they have been dealt with including:
 - Details of all areas at risk of flooding, their form and detail of the associated danger;
 - If maintenance activities need to be undertaken in areas at risk of flooding staff should be signed up to flood warnings (rainfall, tidal, fluvial, reservoir) and check the weather forecast to be able to plan ahead and avoid attending site if there is a risk of flooding; or
 - If flooding is identified when out on site: – an appropriate level of training to staff should be in place to ensure staff are aware to stay away from flood water, abandon any work that needs to be undertaken in flooded areas and report the incident or request appropriately trained operatives to work if a maintenance activity needs to be undertaken.
 - A detailed management plan for future maintenance and entry to below ground access chambers will be required (e.g., personal gas alarms, emergency recovery hoists, etc.) particularly in locations where there is a risk of the presence of ground gases such as at Milton Common.
 - Key structural principles incorporated in the detailed design of the structures;
 - Information regarding the removal or dismantling of installed plant and equipment;
 - The nature, location and marking of significant services, including firefighting services; and
 - Information and as built drawings of the structure, its plant and equipment.

4.2. COMPETENCE, TRAINING AND AWARENESS

- 4.2.1.1. The Project Manager shall identify the training needs of their employees and subcontractors so that they can implement the requirements of this Onshore Outline CEMP into the induction, start of shift briefings, Toolbox talks, Construction Phase Plan and construction method statements.

- 4.2.1.2. Specific training needs will be developed for individuals to reflect the work to be carried out on the Proposed Development and the significant risks and opportunities identified.
- 4.2.1.3. The requirement is for all personnel to be aware of their general environmental management responsibilities, and for those whose work may cause, or have the potential to cause, a significant impact on the environment, to receive specific environmental awareness briefings. Environmental awareness will be reinforced through information, such as poster campaigns, environmental/sustainability performance indicator reports and environmental alerts available onsite notice boards.
- 4.2.1.4. All contractors are responsible for ensuring the competency of their environmental staff. In the event that environmental training is needed for staff, a contractor is responsible for ensuring this requirement is fulfilled. Any training provided to members of the project team will be logged via a Project Training Matrix and any certification documents will be produced by the relevant members of staff as evidence that they hold the required competencies.

4.3. INTERNAL COMMUNICATION

- 4.3.1.1. Communication on environmental issues within the project team will take place through face-to-face conversations, e-mails and telephone calls. The project management team will be made aware of all environmental issues at the earliest possible opportunity. Communication on environmental matters will be maintained through construction meetings chaired by the Environmental Advisor/ Manager or a senior manager.
- 4.3.1.2. Environmental issues identified by any member of the project team will be communicated to the relevant personnel to ensure any required actions are carried out. Dissemination of information will take place in several forms, as appropriate, including meetings to discuss particular project issues, method statements, task/activity briefings, toolbox talks, inductions, environmental notices and environmental alerts. Records that these have been carried out and who received them will be documented via the use of attendance logs or distribution lists. The Environmental Advisor/Manager will notify Works Supervisors of any legislation changes which may affect working practices on Site.
- 4.3.1.3. Any unexpected finds/occurrences by site staff are to be reported to their Works Supervisors, which will then give notification to the relevant member of the Environmental team (described in Section 4) who will advise on the course of action to be taken.

4.4. EXTERNAL COMMUNICATION

4.4.1. COMMUNICATION WITH THE CLIENT

4.4.1.1. The Planning Manager will liaise regularly with the Client and its representatives regarding the programme of works, nature of the operations and methods to be employed to minimise adverse environmental impacts. This will include progress meetings as well as the production and submission of progress reports which will cover environmental/sustainability issues. The Environmental Manager will also supply all relevant supporting information and documentation to the Client for matters concerning consents and the environment in accordance with the appropriate timescales.

4.4.2. STATUTORY AUTHORITIES AND OTHER STAKEHOLDERS

4.4.2.1. In the event of stakeholder liaison being required with local authorities or other stakeholders, the Environmental Manager will identify the requirement and seek authorisation from the Client to undertake the task. Where consultation is required, a representative from the Client will be invited to attend alongside the relevant appointed contractor personnel.

4.4.2.2. Project staff will keep an archive of any e-mail correspondence between themselves and statutory authorities and other stakeholders concerning the activities taking place. In the event that any complaints are received a log of correspondence and complaints will be kept up to date by the Environmental Manager.

4.4.3. PUBLIC RELATIONS

4.4.3.1. It is good practice to inform interested parties when works are due to commence. The Public Liaison Officer will not communicate with residents unless approval has been granted by the Client. A member of the appointed contractor's team will be provided with the Public Relations Officer role (see Section 3).

4.4.3.2. Regular stakeholder and traffic management meetings will be held as part of project governance requirements.

4.4.3.3. Any letters issued to interested parties will be drafted and issued by the Client, with inputs from the Public Relations Officer.

Communications Strategy

4.4.3.4. A Communications Strategy will be developed for the Construction Stage of the Proposed Development. The Communications Strategy will provide the framework for engaging and communicating with stakeholders in relation to the associated construction works of the Proposed Development. The strategy will consider both onshore and marine stakeholders, taking into account preferred communication channels depending on the location and stakeholder. Stakeholder engagement will

be comprehensively and regularly measured throughout the Construction Stage. The strategy will be implemented and managed by the Environmental Manager.

4.4.3.5. The Strategy will identify the key stakeholders and confirm agreed methods for engagement and communication. Key stakeholders include, but are not limited to Local Planning Authorities and Parish Councils, emergency services, residents, businesses, developers, community groups and recreational users where they are potentially affected by the works, and also consultees such as East Solent Coastal Partnership ('ESCP'), EA and Portsmouth Water ('PW'). A 'Register for Updates' service would also be made available for any individual to request that they be informed of works in certain geographical area(s).

4.4.3.6. The purpose of the Communications Strategy is to provide a framework to:

- Be clear, timely, meaningful, open, honest, consistent, and accountable;
- Promote and raise awareness of the construction period (including timings, disruptions and diversions) and the methods for contacting the Applicant;
- Ensure transparency by providing access to technical information related to construction, where required;
- Use plain language;
- Be equally accessible to all;
- Continue to review the strategy against any change in general situation e.g. Covid-19, etc;
- Use best practice engagement methods;
- Engage with the community; and
- Explain how the Applicant plans to respond to stakeholder queries and feedback.

4.4.3.7. In delivering the Communications Strategy, all communications will be accessible and in non-technical language. Where necessary, communications will provide a hotline and email address should anyone wish to provide feedback or raise a query regarding construction works. Communication will be targeted to the specific stakeholders identified, and the appropriate mode of communication would be adopted depending on the specific needs of the particular stakeholder. Wider communication would predominantly consist of:

- Media releases;
- Public notices in local papers;
- Targeted letters to residents (including regular Community Update Newsletter(s) containing relevant information split geographically into Section 1-10 of the Proposed Development, or similar);
- Signposting; and
- Updates on a dedicated 'Construction' section of the website.

4.4.3.8. The Communications Strategy will also include information on the following key matters:

- Concerns over health and wellbeing from electric and magnetic fields (see paragraphs 4.1.3.8 to 4.1.3.12);
- Access to properties (see Section 5.9 Traffic and Transport);
- Open space restoration timescales (see Section 6.2.9 Socio-economics);
- Public Rights of Way ('PRoW') diversions (see Section 6.2.9 Socio-economics); and
- Recreational impacts (see Section 6.2.9 Socio-economics).

4.4.3.9. In order to evaluate the Communications Strategy, the established objectives will be regularly reviewed by the Client against a number of metrics, including:

- Enquiries received via email / freephone / freepost;
- Visits to the 'Construction' section of the Proposed Development website;
- Enrolments through 'Register for updates' website form (and similar requests via email / freephone / freepost); and
- Readership of monthly/bi-monthly Community Update Newsletter(s).

4.4.4. COMPLAINTS PROCEDURE

4.4.4.1. As part of the Site set-up process, site notice boards will be erected, maintained and clearly visible to third parties. A telephone number for environmental complaints will be published local to the Site. The Public Relations Officer will be responsible for liaising with appropriate individuals forming part of the project team to address any complaints and will have the appropriate authority to resolve any issues that may occur. Should it be required, an 'out of hours' telephone number will be available.

4.4.4.2. The Environmental Manager/ Advisor will maintain a close liaison with the relevant LPA Environmental Health Officer ('EHO') at all times and should any complaints regarding environmental nuisance (e.g. dust or noise) be received by the Public Relations Officer the details will be passed to the EHO for verification purposes.

- 4.4.4.3. Should any unforeseen event occur within the construction site that has the potential to cause off-site pollution then the Environmental Advisor/ Manager will immediately notify the EHO by phone and e-mail. As timely as possible, notice will be issued to the EHO for dealing with any unforeseen activity which may give rise to a particular problem.
- 4.4.4.4. During any site work, if any complaints are received directly to the appointed contractor or its subcontractors, the Client will be notified as soon as is practicable but within twelve hours of the complaint being received. It will be the responsibility of the Site Manager to brief any staff responsible for unacceptable working conduct in relation to worksite neighbours whilst working on this project.

4.5. METHOD STATEMENTS

- 4.5.1.1. The implementation of Method Statements for the different activities of the Proposed Development works shall be completed by the Site Manager and General Operatives) and/ or subcontractor by trained staff or other appropriate experienced personnel, in consultation with specialists. Their production shall include a review of the environmental/ health and safety risks and commitments, so that appropriate control measures are developed and included within the construction process.
- 4.5.1.2. Method Statements will be reviewed and approved by the appointed contractor's Project Manager and, where relevant, by an appropriate environmental specialists. Where appropriate, and if required or necessary, method statements will be submitted to the regulatory authorities (EA, Natural England, the relevant LPA EHOs and Emergency Planning Officer etc.), as required.
- 4.5.1.3. Method statements must contain as a minimum:
- Location and duration of the activity, and vehicular access/egress arrangements (if applicable);
 - Work to be undertaken and methods of construction;
 - Plant and materials to be used;
 - Labour and supervision requirements;
 - Health, safety and environmental considerations (including relevant control measures); and
 - Permit or consent requirements.
- 4.5.1.4. Deviation from approved method statements (where this is a statutory requirement) will be permitted only with prior approval from the LPA, and other relevant parties. This will be facilitated by formal review before any deviation is undertaken.

4.6. ENVIRONMENTAL INCIDENTS

4.6.1.1. The Environmental Manager will respond to any reported incidents within 24 hours, or as soon as reasonably practicable. In the event of working practices being deemed dangerous either by the Council or the HSE, immediate remedial action will be taken.

4.6.1.2. A formal procedure for handling Environmental Incidents will be developed and agreed by the Project Manager, Environmental Advisor and appointed contractor/Construction Manager, which may include a procedure similar to that detailed below:

- Environmental Incidents are to be reported to the Construction Manager;
- The Construction Manager (or nominated representative) will record full details of the Environmental Incident and ensure that they are responded to as soon as reasonably practicable (preferably within one hour but always within 24 hours; and
- The Construction Manager (or nominated representative) will undertake an investigation to assess what corrective and preventative action, or further investigation is necessary to avoid recurrence of the Environmental Incident.

4.6.2. EMERGENCY POLLUTION AND SPILL RESPONSE PLAN

4.6.2.1. In the event of a spill or leak, the following process shown in Plate 4.2 will be followed. This will be briefed to the workforce and displayed on site notice boards.

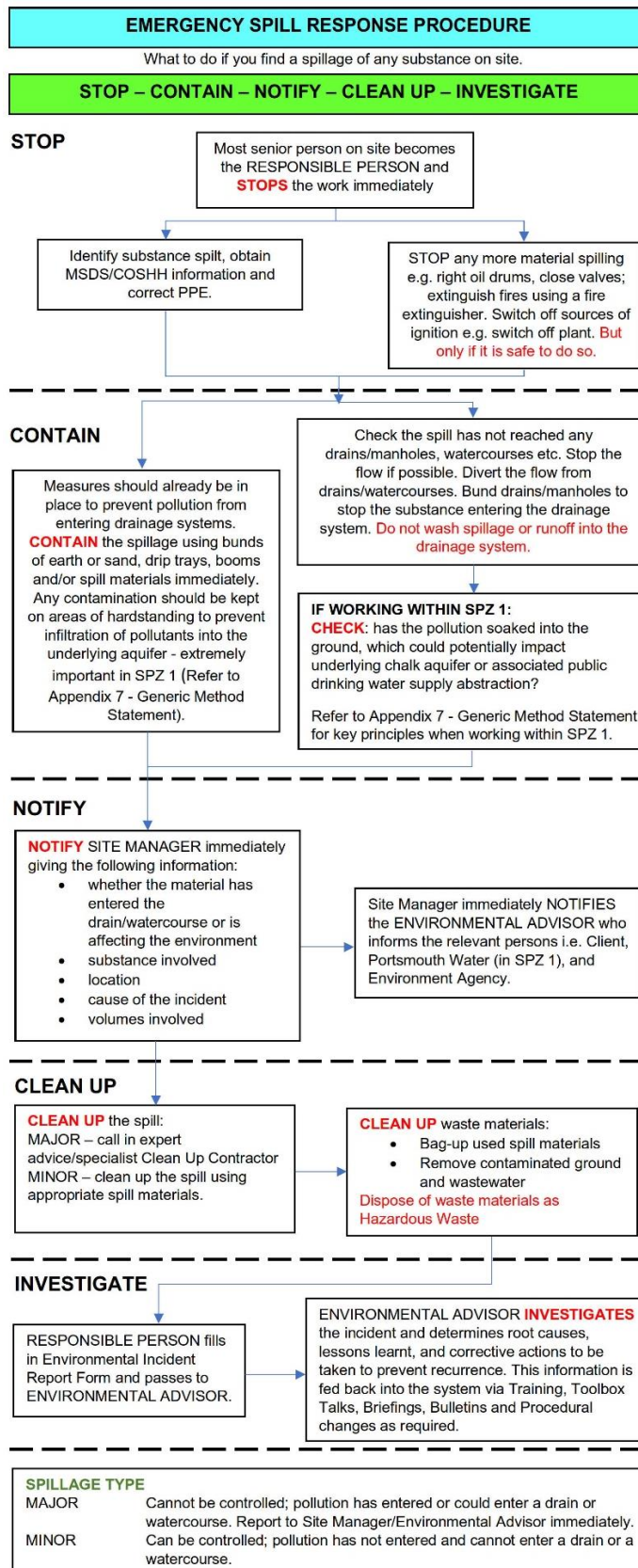


Plate 4.2 - Emergency Spill Response Procedure

5. GENERAL ENVIRONMENTAL CONTROL MEASURES

5.1. INTRODUCTION

5.1.1.1. This section sets out the environmental control measures to be adopted during construction. The appointed contractor will ensure that all sub-contractors adhere to the environmental good practice guidelines for implementation during all site activities.

5.2. LANDSCAPE AND VISUAL AMENITY

5.2.1.1. The following measures must be considered during construction works to ensure protection of the existing landscape setting and views to the construction site:

- Temporary screening for sensitive visual receptors through implementation of solid construction hoardings whilst using natural existing screens (topsoil and existing vegetation). Hoardings would be attractive (visually recessive and sensitive in design), used to screen low level “clutter” and reduce noise;
- Appropriate location, organisation and phasing of construction activities;
- Maintenance of a tidy and contained site compound to reduce visual clutter;
- Large plant /equipment would be located away from most sensitive receptors where there are viable alternatives; and
- Measures to control working hours in specific locations to avoid disturbance to residential receptors both in terms of light and noise.

5.2.1.2. The hoarding to be erected around the Converter Station will visually contain many of the construction activities from the surrounding character areas in terms of influencing their visual setting.

5.2.1.3. Hoardings would be well lit in poorly lit walkways and any gates should be positioned to minimise noise transmitted to nearby sensitive receptors.

5.2.2. LIGHTING SCHEME

5.2.2.1. The appointed contractor will develop a Lighting Scheme for the Construction Stage of the Converter Station Area. This will, after consultation with the South Downs National Park Authority, be submitted for approval to the relevant Local Planning Authority. The Lighting Scheme will be developed in accordance with the SDNPA Technical Advice Note 2018, Dark Skies. The general principles will include, but not be limited to consideration of:

- Angle lights downwards – no unnecessary light above or near the horizontal;
- Lamps above 500 lumens should be installed in dark sky friendly fixtures that prevent unnecessary upward light;
- Point where the light is needed not in a direction that causes a nuisance to neighbours or wildlife;
- Switch off lighting when not needed. Consider the use proximity sensors and avoid dusk-till-dawn sensors;
- Light to the appropriate illuminance;
- Avoid bright white and cooler temperature LED's; and
- Install at the lowest possible height to achieve required lighting levels.

5.2.2.2. For the HDD compounds the Engineering Manager will undertake a lighting assessment to manage light impacts. Temporary site lighting will be restricted to meet on-site safety and security requirements.

5.3. ONSHORE ECOLOGY

5.3.1.1. The following measures will be taken during construction works to ensure ecological disturbance is minimised:

- Where practicable, any mature trees and hedgerows which are within the site boundary will be retained. Highway trees will only be removed as a last resort, where retention in the presence of the scheme would be contrary to sound arboricultural practice as confirmed in writing by the relevant local planning authority Arboriculture professional and with agreement on compensation / mitigation (dependant on LPA position) values for each highway tree prior to its removal. There will be no third-party tree planting within the highway without express permission from the Highway Authority. Where agreed, the Local Highway Authority will undertake any highway tree mitigation planting required, to be funded from the highway tree compensation monies;
- Tree root protection zones will be identified and clearly marked with fencing and signage;
- Where trees and hedgerows are removed the contractor will consider creating habitat log piles, where practicable. This will only be where suitable land is available after the Construction Stage.
- During the construction period, care should be taken to avoid creation of artificial habitats and temporary resting places within works areas, such as turf, spoil and rubble piles. Stored materials are best located away from areas of vegetation on hardstanding or bare ground. Stored materials can be raised off the ground by using storage bags on pallets;

- Water sprays will be used to manage dust and prevent it drifting from the construction site to surrounding areas where sensitive habitats are present;
- No waste or waste water should be discharged into the watercourses and management procedures to avoid contamination and pollution of waterways should be following and implemented at all times;
- Standard best practice methods that minimise the risk of pollution through accidental spillage of materials or surface runoff during construction works will be implemented. These measures will follow those within measures are described in the “Pollution Prevention for Businesses” guidance published by the UK Government. When working near water, pollution prevention methods will be incorporated into site-specific guidance notes provided to the site operatives as part of their site induction. All vehicles will carry spill kits and all staff be trained in how to use emergency response equipment. A contingency plan in the event of contamination of watercourses will be established and strictly adhered to in such an event. Where appropriate, site compound, HDD compounds and any storage of soil stockpiling or plant must be in accordance with measures outlined in Section 5.7 below. Potentially contaminating materials will be stored appropriately in accordance with current guidelines to minimise pollution risk, including bunding fuel and chemical storage areas and generators. Site procedures will be carefully managed to avoid discharges to watercourses, in particular those involving cement and concrete;
- Restriction of night working – construction work will be restricted to daylight hours between dawn and dusk within areas without public street lighting (e.g. Denmead Meadows, Farlington Playing Fields and the Converter Station Area) during the bat active season (April to October) to avoid disturbance effects of noise and lighting on bats. Surveys have identified and assessed potential impacts and their effects on ecological features. However, the mobile nature of many protected and notable species is acknowledged. The Environmental Clerk of Works will monitor the site and be aware of the possibility of unexpected finds of protected and notable species. With support of appropriately experienced technical specialists, the Clerk of works will monitor the Proposed Development for species including badgers, water voles and otters that are known to be present in the wider area. In the event of an unexpected find of such a species, an ecologist will advise the Clerk of Works on a course of action to offset potential effects and maintain legislative compliance;

- Wildlife and Countryside Act Schedule 9 plants are present close to the Proposed Development, specifically Japanese knotweed that was recorded on the boundary of the Order Limits at allotments at Lock Lake (Section 9). It is an offence to cause Schedule 9 plants to grow in the wild. Prior to vegetation clearance within the Order Limits a survey for Schedule 9 plants will be undertaken to identify their locations, and appropriate control measures to either remove and eradicate them, or localise them (e.g. fencing), will be put in place. Regular checks of the works area by the Ecological Clerk of Works will be undertaken to ensure risks associated with Schedule 9 plants are controlled and works will not cause their spread in the wild. Appendix 16.2 (Preliminary Ecological Appraisal) of the ES Volume 3 (APP-410) notes the location; and
- Any required scrub, hedgerow and/or tree clearance should be timed to avoid the main nesting season for birds between 1 March and 31 August. If scheduled within this period a suitably experienced ornithologist will be present to advise on any necessary protective measures and confirm that the works are not likely to cause disturbance to nesting birds.

5.3.2. PRECAUTIONARY METHODS TO AVOID EFFECTS ON HEDGEHOGS

- To avoid killing or injury to hedgehogs that may be present hedgehogs, scrub and other dense vegetation within Sections 1-3 where suitable habitat is present will be hand search for hedgehogs prior to its clearance. Piles of cut vegetation such as brush piles will also be searched as the can harbour sheltering hedgehogs.
- Hedgehogs found will be moved to a suitable release site away from the development within scrub, hedgerow or other dense cover.
- In addition, open excavations will be fitted with mammal ladders (planks of wood at either end) to allow animals to climb out if they fall in, and prevent the trapping of animals including hedgehogs.

5.3.3. PRECAUTIONARY METHODS TO AVOID EFFECTS ON REPTILES AND STAG BEETLES

5.3.3.1. To avoid killing or injury to reptiles that may be present, a Precautionary Method of Works ('PMoW') will precede vegetation clearance and earthworks in habitats which could support these animals. created which will detail how working methods during the Construction Stage of the Proposed Development can minimise the risk of killing or injury to reptiles.

5.3.3.2. Such working methods likely to feature in a PMoW may include, but are not limited to, the following:

- Two stage vegetation clearance of fields, whereby areas of suitable habitat for reptiles are cut down to a height of 300 mm, left for a period to enable reptiles to disperse, and then cut to ground level under ecological supervision;
- Removal of natural refugia by hand where safe to do so, or otherwise undertaken methodically using plant under ecological supervision;
- Plant and machinery to be kept to defined access routes around the survey area which are unsuitable for reptiles, until suitable habitat in the works area has been removed; and
- Open excavations will be fitted with mammal ladders (planks of wood at either end) to allow animals to climb out if they fall in and prevent the trapping of animals including reptiles.

5.3.3.3. Stag beetles are primarily a woodland species associated with dead wood namely fallen trees. Whilst not identified within the Order Limits, on a precautionary basis to avoid mortality of this species should they incidentally be found within the Onshore Cable Corridor, the above methodology of removal of natural refugia will apply.

5.3.3.4. The appointed contractor will comply with relevant legislation and should maintain habitats intact and undisturbed, where practicable. If protected species are unexpectedly discovered, work should cease and advice should be sought immediately from a suitably qualified ecologist.

5.3.3.5. Implementation of the measures identified will be monitored by an Environmental Clerk of Works with the power to stop work and change site practices as required.

5.3.4. ARBORICULTURE

5.3.4.1. Adherence to British Standards 5837:2012 Trees in relation to design, demolition and construction – Recommendations (BS 5837) when laying cables shall be adhered to. Root Protection Areas ('RPA's') shall be avoided.

5.3.4.2. Mitigation of impacts can be achieved by avoiding high value features through considering the use of alternative trenching or installation methods where practicable.

5.3.4.3. Where features are to be removed, consideration for replanting with like for like species in the locality is required. Hedgerow trees will require repositioning to at least 5 m away from the Onshore Cable Route within the Order Limits. Mitigation may also be achieved by appropriate compensatory tree planting within the locality. The Highway Authority will replant highway trees in the highway where it is deemed appropriate and through the CAVAT compensation process.

5.3.4.4. Arboricultural Method Statements with associated RPA plans would be submitted as part of the detailed CEMPs and would accompany the detailed landscaping scheme. These would cover in detail the protection of root areas, protective barriers, precautions in respect of temporary works, sequence of activities, utilities, post construction and emergency remedial works. An updated Generic Arboricultural

Method Statement ('AMS') (document reference 7.7.21) states the Hierarchy of working near trees is:

- Unless a tree is structurally impaired, dead, or diseased, such that it would need to be removed for sound arboricultural management within the next five years;
Then,
- ensure that cable trenching and any associated construction work, storage and traffic is excluded from the RPA as recommended by BS5837:2012^[1] or canopy spread, whichever is largest.
If this is not possible then,
- Work within the RPA must only be done in accordance with the Arboricultural Method Statement.
If this is not possible then,
- As a last resort remove the tree(s) and provide compensation for the loss at the appropriate CAVAT value. This must be agreed with the relevant LPA Highways Arboriculture prior to tree removal.

5.3.4.5. Ground protection shall be used where RPA's are encroached upon. For example, use of a no-dig construction for access routes shall be employed.

Converter Station Area

5.3.4.6. Under no circumstances should any construction works or storage take place within 15 m of ancient woodland. When storing materials, particularly liquids, slopes and drainage channels must be considered to prevent spillages and flow into the buffer zone. The 15 m buffer around the ancient woodland will be marked with suitable exclusion fencing and signage to ensure the 15 m buffer is clear to site operatives. The only activity permitted within the 15 m buffer is woodland management in relation the management of ash dieback as outlined in the OLBS.

Onshore Cable Corridor

5.3.4.7. The Onshore Cable Corridor, within the highway, is constrained by buildings, under and over ground services, street furniture and traffic considerations. Therefore, options for avoiding trees will need to be carefully considered.

5.3.4.8. The general design principles for working around trees are as follows:

^[1] BS5837:2012 trees in relation to design, demolition and construction - Recommendations

- Onshore Cable Route will be diverted around or under RPAs, where practicable.
- Onshore Cable Route will avoid higher value trees as indicated in the Arboriculture Report of the Environmental Statement Appendix 16.3 (APP-411). In particular, Category A trees will be avoided.
- Onshore Cable Route will avoid existing soft landscape areas containing RPA of arboricultural features, where practicable. In accordance with the required standoff for overhead and underground cables, the use of soft landscape resources such as grass verges, particularly in highway, will limit any future mitigatory tree planting opportunities and can permanently detrimentally affect the local landscape.
- Tree roots are likely to be infrequent within the carriageway construction due to lack of soil available for root growth. However, roots may persist at greater depths where conditions are favourable. Where practicable, cable routing in the carriageway to avoid tree roots will be undertaken.
- Significant tree roots are likely to be frequent within footway, verge areas and other soft landscape where trees are present. Where present, works in these areas shall be avoided, where practicable.

5.4. SOILS AND AGRICULTURAL LAND USE

- 5.4.1.1. Development of a Soil Resources Plan ('SRP'). A SRP is prepared prior to the commencement of construction and confirms the different soil types and depths (based on the soil surveys already undertaken); the most appropriate re-use for the different types of soils within the detailed design; and the proposed methods for handling, storing and replacing soils on site. For the Onshore Cable Corridor, the SRP will confirm the different soil types and depths to be disturbed, the proposed methods for handling, storing and replacing soils, and provide specifications for the restored soil profiles to match the original profiles as closely as possible. An Outline SRP has been prepared (see Appendix 5 of this Onshore Outline CEMP).
- 5.4.1.2. Mitigation to ensure that the temporary requirement for land will not affect the ability to farm other land within the holding that is not affected by construction works will form part of each relevant CEMP. This would include the continuation of farm access to temporarily severed land, as required for normal agricultural activities, the replacement of temporarily severed water supplies, and the installation of temporary stockproof fencing, as required.

5.5. GROUND CONDITIONS

- 5.5.1.1. The following methods should be implemented during construction to ensure the safety of construction workers, visitors and to avoid any potential pollution of surface and groundwater:

- The Proposed Development will adhere to Environment Agency ('EA') pollution prevention guidance and best practice during the construction works which will be incorporated into and managed through the CEMP.
- All construction personnel would be required to wear appropriate PPE and to only undertake work following a Health and Safety risk assessment and a Health and Safety Induction. Hygiene and welfare facilities would need to be provided for use by construction personnel during the works. A watching brief would be implemented during excavation to ensure that any unexpected contamination within the Made Ground (if present) is rapidly identified, risk assessed and dealt with appropriately.
- An earthwork watching brief as per the Earthworks Management Plan would be implemented during excavation to ensure that any unexpected contamination within the Made Ground (if present) is rapidly identified, risk assessed and dealt with appropriately.
- Regular monitoring visual inspections during construction.
- If remediation is deemed necessary, requirements will be assessed on a site-specific basis and the works carried out, supervised, validated and verified in accordance with current best practice. All decisions to remediate and validate works will be made under the management of an Environmental Manager and appropriate specialists.
- A site-specific risk register shall be produced prior to works commencing, this shall include geotechnical and ground risks which shall be considered when agreeing methods of working and where necessary suitable control measures/mitigation incorporated.
- Good working practices and housekeeping during construction such as sealing or covering stockpiles of contaminated soils and treating water removed from excavations prior to discharge are considered likely to reduce identified impacts.

- Water/surfactant will be sprayed onto material being worked to damp down any potentially contaminated dust and prevent it from becoming airborne. Chemicals and surfactants will be Centre for Environment Fisheries and Aquaculture Science (CEFAS) rated products and included within the contractor's method statements. Temporary surface water drainage and vehicle wheel washes will further reduce the risk of dust generation. Precautions should also be taken while transporting excavated materials off-site to ensure that any risk of fugitive dust emissions are prevented. Construction Stage dust monitoring will be used to check the effectiveness of the damping down of the dust on site. The monitoring would be agreed with the relevant Environmental Health Officer by the Environmental Manager. This is anticipated to be through deposition pads and directional pads during high risk activities as per Table 5.1 (Row 9 to 12)..
- Vehicle movements will be restricted to an agreed travel plan and construction activities on site will not exceed standard working hours.
- Water removed from any excavations will be disposed of or discharged in accordance with EA requirements.
- The reuse of soil on Site will be governed by the production of a Materials Management Plan ('MMP') in which chemical criteria are specified for the import of soils/fill material from off-site and for the reuse of site won material (see Appendix 4 for the Outline MMP). The stripping, storage and reuse of subsoil should be carried out in accordance with BS 8061:2013.
- Foundations for structures at the Converter Station (Section 1) will require piles that will extend down into the chalk groundwater aquifer. A Preliminary Piling Works Assessment ('PRA') has been prepared in Appendix 6 Preliminary Piling Risk Assessment, following accepted, best practice EA Guidance 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention' (Environment Agency, 2001)). This PRA will ensure that piling operations do not form a pathway for the migration of contamination at the surface (either existing contaminants, those that form part of the piling process or those that might be introduced during the operation of the Converter Station) to the aquifer. Piling for the launch pit of the Kings Pond Horizontal Directional Drilling ('HDD') will not interact with the Chalk and therefore the aquifer is not at risk from these specific piling operations.
- Construction activities should also be undertaken in accordance with appropriate CIRIA guidance. Specifically, this should include:
 - CIRIA C741. Environmental Good Practice on site (4th Edition): (CIRIA C741, 2015); and

- CIRIA C532. Control of Water Pollution from Construction Sites (CIRIA C532, 2001).

5.6. GROUNDWATER

5.6.1.1. Standard mitigation measures, including a variety of good environmental site practices, will be undertaken at the Proposed Development during the site preparation, earthworks and installation phases to minimise the risk of site runoff transmitting contaminants and sediment into surface water and groundwater bodies water and groundwater bodies via the surface water drainage system.

5.6.1.2. A variety of good environmental site practices will be implemented to avoid or minimise impacts at the source. Such measures include, but are not limited to, the following:

- Working areas shall be clearly defined to ensure the disturbance of soils is minimised as far as practicable;
- Haul routes and accesses shall be clearly defined to minimise the risk of accidents. Construction vehicles will be regularly inspected and maintained to reduce the risk of hydrocarbon contamination associated with leaks and spillage and will only be active when required;
- The cleaning of vehicle wheels prior to leaving site;
- Dust suppression (i.e. damping down);
- Installation of systems such as silt traps and swales designed to trap silty water including adequate maintenance and monitoring of these to ensure effectiveness, particularly after adverse weather conditions;
- Designated areas for the storage of hazardous materials, fuels and chemicals. All designated areas will be appropriately bunded to at least 110% capacity and all filler points/valves will be located within the extent of bund or appropriate drip trays provided;
- On-site availability of oil spill clean-up equipment including absorbent material and inflatable booms for use in the event of an oil spill or leak;
- Use of drip trays under mobile plant;
- Provision of environmental awareness training for site workers;
- Use of inert, uncontaminated material during construction; and

- The Karstic Dissolution Feature Watching Brief will be implemented during construction within the SPZ 1 (as part of the Earthworks Management Plan) to ensure that any unanticipated karst dissolution features are rapidly identified, and that works are temporarily paused so that any risk to groundwater, is minimised as far as possible. Work will continue when the issue is deemed to be sufficiently mitigated. Portsmouth Water to be notified of any instances of karst dissolution features being identified;
- Specific training for drilling contractor/teams on the importance of the Source Protection Zones/Principal Aquifer and protecting them for the duration of the works.

5.6.1.3. The risk of pollution to surface and groundwater can be significantly reduced by the adoption of good working practices and strict adherence to guidance provided by the EA on Gov.uk. The current guidance on gov.uk explains how to:

- Report an environmental incident;
- Get permission to discharge to surface water and groundwater;
- Manage business and commercial waste;
- Store oil and any oil storage regulations;
- Discharge sewage with no mains drainage; and
- Work on or near water and manage water on land

5.6.1.4. Guidance is also available in the following CIRIA publications;

- C532 - Control of Water Pollution from Construction Sites;
- C698 Site handbook for the construction of Sustainable Drainage System ('SuDS'); and
- C648 - Control of Water Pollution from Linear Construction Projects.

5.6.1.5. Additional guidance regarding the protection of groundwater is provided by the EA in their publication 'Groundwater Protection Position Statements, February 2018, Version 1.2', and will be consulted.

5.6.1.6. Best practice recommendations for the prevention of contamination will be outlined in the relevant CEMP or equivalent, and agreed with relevant statutory consultees prior to commencement of construction works. This will include measures to comply with relevant legislation and guidance (including the EA's Guidance online) and best practice measures in line with the Considerate Contractors Scheme and 'Site handbook for the construction of SUDS' (CIRIA C698). It will include an erosion prevention and sediment control plan to reduce the quantity of sediment entrained in runoff.

- 5.6.1.7. It is recommended that surface runoff from the various construction areas within the site is managed by the use of temporary bunding and settlement ponds to protect the receiving water environment. Settlement ponds are beneficial in that they allow for isolation and on-site treatment of sediment laden or chemically contaminated surface water runoff prior to discharge, following agreement with the appropriate authority, or use of other appropriate means of disposal.
- 5.6.1.8. Movement of materials around the site will be managed under an appropriate MMP.
- 5.6.1.9. A UK Source Protection Zone 1 Generic Method Statement, which forms Appendix 7 of this Onshore Outline CEMP, will be implemented. This method statement outlines the construction principles for the approved contractor when working within the Source Protection Zone 1 (SPZ1).

5.7. SURFACE WATER RESOURCES AND FLOOD RISK

5.7.1. GENERAL PRINCIPLES

- 5.7.1.1. Consents or exemptions are expected to be required for the following consents/ permits, which should be further reviewed and confirmed during detailed design process:
- Temporary dewatering consent;
 - Ordinary watercourse consent;
 - Flood risk activities permit – environmental permits; and
 - Discharges to surface water and groundwater: environmental permits.
- 5.7.1.2. Activities expected to require the above noted additional permits and consents are summarised below:
- Works within 16m and 8m of tidal and fluvial flood defences;
 - Works within the flood plain;
 - Works through, under or above a watercourse;
 - Works requiring diversions or alterations to Ordinary Watercourses or extreme event surface water overland flow routes; and
 - Works requiring temporary dewatering of surface water or groundwater.
- 5.7.1.3. The overarching principles required to obtain these approvals are summarised below, however specific methodologies are not defined to allow flexibility for the appointed contractor to conduct works in accordance with their preferred practices.
- 5.7.1.4. Measures to be undertaken include:

- The appointed contractor (and any sub-contractors) must take precautions during the Construction Stage to protect all surface water bodies including watercourses and drainage patterns from erosion, siltation or pollution in accordance with industry best practice. To prevent fine sediment entering the watercourses, construction activities should take place away from the watercourses and extreme event overland flow routes, where practicable. Should vegetation clearance be required, the extent should be limited to the areas necessary to reduce the amount of sediment released during clearance and the potential release of sediment from bare ground following clearance. Further pollution prevention mitigation measures for adoption include:
 - All operatives to be made aware of the need to protect the watercourse from contamination, including EA guidance and legal obligations.
 - When construction activities, including stock piling (not permitted within fluvial flood zone 2 or 3 unless otherwise agreed with EA) and plant and vehicle washing, occur in close proximity to a watercourse they should be separated from the watercourse with barriers (e.g. sediment fences) to prevent surface water runoff from these sites entering the watercourse.
 - Geotextile-material silt fences should be installed to filter suspended solids from runoff.
 - Timing of works should be carefully considered around areas at risk of flooding and adjacent to watercourses. Where practicable, construction should be carried out during periods of low flow and rainfall (typically during summer months) to reduce the risk of pollution and erosion.
 - The works should be carried out in accordance with established best practice and environmental permitting requirements.
 - Pollution spill kits should be kept on site. In the event of an incident these would be used.
 - Any soils contaminated will be removed immediately to a suitable landfill site or appropriately managed/ reinstated in accordance with ground contamination/ remediation requirements.
 - Waste facilities to be provided on site for debris away from areas at risk of flooding.
 - Cleaning of tools and shuttering will be carried out in water not draining directly to the watercourse.
 - In any event of expected heavy rain pouring concrete and other activities which increase the risk of contaminating runoff should not be undertaken.

- The control on invasive non-native species should be managed through best practice guidance and by implementing the Wildlife Law: Control of Invasive Non-native Species HC1039 (Law Com No. 342).
- The appointed contractor (and any sub-contractors) must obtain approval through appropriate consents and permits to undertake any construction activity or appropriate exception prior to commencement of that activity and is responsible for agreeing the construction methodologies in association to these consents and permits based on the principles defined hereafter.
- The appointed contractor (and any sub-contractors) must ensure that existing Main River, Ordinary Watercourses, extreme event surface water overland flow routes are maintained within no increase to flood risk, on or off site, through appropriate temporary works and subject to approval or exemption of relevant environmental permits (flood risk activities permit/ ordinary watercourse consent).
- The appointed contractor (and any sub-contractors) must ensure any works over, under or directly adjacent to watercourses/watercourse structures (culvert/ sewer) and flood defences are subject to approval or exemption of environmental permits (flood risk activities permit/ordinary watercourse consent), where the contractor will need to develop appropriate design and construction methodologies to ensure that flood risk is not increased, the integrity of these features (e.g. flood defence or structure) are not negatively impacted, flow conveyance is not impacted and there is suitable pollution prevention measures in place during construction and operation.
- The appointed contractor (and any sub-contractors) will manage any potential surface water ingress or groundwater emergence that is deemed of a quantity unsafe to work in or that may create a pollution pathway. Any temporary dewatering or discharge of water must be in accordance with an exemption or Environmental Permit and discharged at a controlled discharge rate to an agreed discharge location through an appropriate pollution treatment mechanism. Dewatering quantities for trench construction will be determined at detailed design. The designer must ensure the discharge quantities are accurate or conservative to ensure no flood risk is not increased due to surplus groundwater being encountered during construction.
- Best practice methodology, in accordance with EA, Lead Local Flood Authority ('LLFA') guidance and other recommendations, should be implemented during construction to minimise the potential impacts of the Proposed Development on flood risk and potential contamination of surface waters.

- All construction activities will be undertaken in accordance with legislation and the gov.uk/EA Environmental Permits, Regulatory Position Statements and Guidance and other relevant documentation.
- The appointed contractor (and any sub-contractors) must ensure that works within flood zone 2 or 3 do not introduce significant structures (i.e. temporary site compounds) or spoil storage in the fluvial flood plain.
- The appointed contractor (and any sub-contractors) for works within flood zone 2 or 3, or directly adjacent to, should ensure a flood warning/ evacuation plan will be in place to halt works and make safe if there is an immediate risk of flooding.
- The majority of the cable route throughout Portsea Island/ Farlington is within Flood Zone 2 and 3. The joint bays, link pillars and link boxes to be located along the Onshore Cable Route are watertight when constructed and therefore their position in areas which are identified as being in Flood Zones 2 and 3 is acceptable. Due to the limited scale and size the above ground infrastructure associated with link boxes/link pillars the positioning of these in Flood Zones 2 and 3 is not expected to have any significant impact on the flood risk environment. Nonetheless, where practicable locations for joint bays and link pillars/link boxes are to be located outside of flood zones 2 and 3 or areas at risk of surface water flooding. Where this is not practicable any works in the Flood Zone 2 or 3 will be subject to approval of a flood risk activities permit or an exemption, and works within areas at risk of surface water flooding may be subject to approval of an ordinary watercourse consent or an exemption. No impediments are foreseen to any such approvals or exemptions being obtained, taking into account the nature of the works and infrastructure proposed.
- If the appointed contractor decides to use temporary bunds to protect the trench or construction works, these would be in small localised areas and any impacts on existing drainage regime will need to be managed to ensure the impact of flooding is not increased subject to approval or exemption of relevant environmental permits (flood risk activities permit/ordinary watercourse consent).
- The detailed design of the HDDs is proposed to be developed post application and any specific provisions to protect the HDD construction works from the tidal flood risk will be developed by the contractor prior to works, if required. Any pathways under a flood defence created through the HDD during construction and operation will require appropriate bunding to the same standard of protection (e.g. defence crest level) to ensure a pathway is not created around the flood defence subject to approval or exemption of a flood risk activities permit. HDD alignments should pass below or avoid, with appropriate clearance, any below ground features (e.g. sheet piling, concrete structures) associated to flood defences.

- During operation, at the transition between the HDD and open cut trenching, a fully sealed transition collar will be used to connect the ducts to the HDD pipe. This will prevent the ingress of water into the ducted system at these locations and limit the risk of the HDD duct providing a route for flood water to enter the protected areas behind the flood defence.
- Site earthworks and site clearance (including vegetation clearance) activities must ensure that impacts to the current drainage regime in relation to surface water drainage, water quality and flood risk are appropriately managed through proportionate temporary and permanent drainage measures in accordance with industry best practice. This may include pre-construction surveys, temporary surface water management, pollution control and post-construction reinstatement works
- The general design principles for crossing existing Portsmouth Water underground assets shall be in accordance with following guidance;
 - Guidance for working near Distribution Apparatus; and
 - Guidance for working near or over Trunk Water Main.

5.8. HERITAGE AND ARCHAEOLOGY

5.8.1.1. The archaeological and cultural heritage mitigation outlined here comprises high-level general measures to minimise or reduce adverse effects arising from disturbance from the works on the surrounding historical assets. Where impacts have been identified and subject to the nature of the asset and the potential impact, consideration has been given to a range of mitigation measures, these include but are not limited to:

- Archaeological monitoring during construction to ensure appropriate recording of any remains encountered; and
- Proximity to Designated Heritage Assets must be taken into consideration during construction.

5.8.1.2. When undertaking construction works the contractor should take into account nearby Designated Heritage Assets, such as listed buildings, including curtilage structures (i.e. associated assets with the property extent such as boundary walls, which may not be mentioned specifically in the listing description). The types of Designated Assets are identified in Table 2.1 above. Where the Order Limits are in close proximity to those assets, care should be taken to prevent accidental strike damage from plant movement and construction activities. The Onshore Cable Route will be located in the existing highway and not in the pavement adjacent to nearby Designated Heritage Assets where vibration could cause damage.

- 5.8.1.3. The mitigation strategy proposed to mitigate predicted archaeological construction related impacts identified is set out below. Three strategies are presented:
- Strategy 1: Greenfield areas (i.e. open rural or undeveloped land) – archaeological evaluation and mitigation;
 - Strategy 2: Brownfield areas (i.e. Joint Bays ('JB'), Transition Joint Bays ('TJB') and HDD entry/exit points) – archaeological evaluation (where practicable) and mitigation; and
 - Strategy 3: Brownfield area (i.e. along existing roads, pavements and hardstanding) – mitigation.

Strategy 1: Greenfield area evaluation and mitigation

- 5.8.1.4. Within the greenfield areas of the Order Limits (Sections 1-3), proposed ground disturbance would be extensive due to the preliminary topsoil strip. This is assumed to be site-wide for the Converter Station Area and also within the Onshore Cable Corridor working width, along with temporary access routes and temporary compounds (approximately 23 m wide).
- 5.8.1.5. Within these areas, the presence, nature, date, extent and significance of any archaeological remains present would need to be clarified by trial trench evaluation as the potential for such remains, as assessed by the desk-based and Stage 1 Geophysical Survey, is uncertain. These will be targeted to geophysical anomalies of potential archaeological interest, along with any remains identified by the desk-based research, but will also include sampling of 'blank areas'.
- 5.8.1.6. The results of the evaluation will enable the Applicant to formulate with the relevant statutory consultees an appropriate mitigation strategy for any significant archaeological remains that could be affected.
- 5.8.1.7. Mitigation could take the form of a targeted archaeological excavation (preservation by record) well in advance of the commencement of ground works and/or an archaeological watching brief (a programme of 'strip, map and sample) carried out alongside the preliminary topsoil removal. This would ensure that archaeological remains were not removed without record. This would need to be programmed with adequate time for the recording of archaeological remains.
- 5.8.1.8. There is a very small chance that archaeological remains of very high (national) significance will be encountered. In the unlikely event that such remains are uncovered then design changes could be considered, through modifications to the design, e.g. modification in design of foundations and formation levels for the Converter Station, or avoidance in the adjustment of the position of the Converter Station and/or the line of the Onshore Cable Route), but only where this would accord with the consented design parameters. If it is not feasible and practicable in the design parameters however, due to engineering or other reasons (i.e. due to

elevation/location), preservation by record (e.g. targeted excavation and recording) would be necessary.

- 5.8.1.9. Any archaeological work would need to be undertaken in consultation with the relevant Archaeological Advisor, in accordance with an approved archaeological Written Scheme of Investigation ('WSI') outlining the scope and method of investigation, along with the post-excavation reporting and dissemination strategy.

Strategy 2: Brownfield area evaluation and mitigation

- 5.8.1.10. JBs, TJBs and HDD compounds in brownfield areas would entail more than the localised disturbance of the proposed cable trench, with the excavation of larger and deeper trenches, approximately 15 m x 5 m, to a depth of 3 m (JBs) and up to 1.75 mbgl. For such areas, archaeological trial trench evaluation may be appropriate depending on the depth of modern made ground.
- 5.8.1.11. As with the greenfield evaluation, this would aim to clarify the presence, nature, date, extent and significance of any archaeological remains within the area of excavation and would enable the formulation of an appropriate mitigation strategy.
- 5.8.1.12. In areas where evaluation trial trenching is not considered feasible, the proposed strategy will revert to Strategy 3 (see below).

Strategy 3: Brownfield area mitigation of the cable trench

- 5.8.1.13. The majority of the Onshore Cable Corridor passes through urban areas along existing roads, pavement and hardstanding. For these areas, the proposed archaeological impact would be highly localised and restricted to the approximate 1.0 m wide by 1.3 m deep cable trench, with no impacts from a 'working width' (i.e. no topsoil strip). Modern made ground is anticipated to be present, possibly to a depth of 0.5 m or greater. Archaeological remains in such areas are also likely to have been partially or wholly truncated by modern infrastructure development.
- 5.8.1.14. For this reason, the preliminary surveys proposed for the greenfield parts of the Order Limits would be neither feasible nor appropriate. In order to mitigate the localised impact of the cable trench on any potential archaeological remains, an archaeological watching brief would be required *in areas with potential for significant surviving archaeological remains*, and where the cable corridor would divert away from existing highways (i.e. on adjacent roadside verges/hardstanding). This would ensure that any archaeological assets were not removed without record.
- 5.8.1.15. The archaeological watching brief would be carried out during the Construction Stage during the excavation of the cable trench, with work halted to allow sufficient time to excavate, sample, and record any archaeological remains exposed.
- 5.8.1.16. The level of archaeological watching brief attendance is likely to vary depending on the predicted sensitivity along the Onshore Cable Corridor. The future WSI would present the approach, ranging from continuous attendance in sensitive areas to regular attendance for areas with low to moderate potential. For areas where there

would be no impact (i.e. landfill zones/modern highways), no attendance would be required.

- 5.8.1.17. The archaeological watching brief would need to be undertaken in accordance with an approved archaeological WSI outlining the scope and method of investigation, along with the post-excavation reporting and dissemination strategy.

Palaeoenvironmental sampling

- 5.8.1.18. The archaeological strategies proposed above would require an element of palaeoenvironmental sampling, where the potential for such has been identified. This might include proposed disturbance in coastal alluvial/fluvial zones adjacent to Langstone Harbour and in areas of raised marine deposits, where they would be affected.
- 5.8.1.19. This would typically entail sampling during the intrusive fieldwork discussed above (and set out in the WSI), and geoarchaeological analysis in order to develop an understanding of past environmental conditions of the local area.
- 5.8.1.20. In light of the shallow nature of the proposed impact along the Onshore Cable Corridor, deep sampling through the use of purposive geoarchaeological boreholes, along with the creation of a geoarchaeological deposit model, is not considered appropriate.

5.9. TRAFFIC AND TRANSPORT

- 5.9.1.1. The construction of the Proposed Development will be required to comply with each Traffic Management Strategy ('TMS') and Construction Traffic Management Plan ('CTMP'). A Framework TMS and Framework CTMP are provided as appendices to the Environmental Statement (REP1-068, Rev003 and REP1-070, Rev003).
- 5.9.1.2. The Framework TMS provides details of traffic management measures to be deployed to facilitate construction of the Onshore HVDC Cables. The Framework TMS includes details of temporary traffic signals, lane closure and road closure requirements and a programme that aims to minimise disruptions of the construction works through timing of works at key locations to avoid constraints such as school terms and major events. The Onshore Cable Route Construction Impacts on Access to Properties and Car Parking and Communication Strategy included in Appendix 1 of the FTMS also sets out principles for mitigation, including:

- Access to residences, businesses and community facilities - including access to driveways outside working hours and three-way signals for business premises with their own access onto affected highways; and maintenance of side road access; and
- A communication strategy to allow stakeholders such as residents, businesses, the emergency services and community facilities to keep up to date with construction works.

5.9.1.3. The Framework CTMP provides an overarching plan of how construction traffic and site operations will be managed across the Onshore Components of the Proposed Development. The Framework CTMP sets out the parameters within which contractors will be required to work, including hours of operation, traffic routing, safe vehicular access and requirements to minimise traffic impacts. The Framework CTMP also includes a Framework Construction Worker Travel Plan, which sets out the strategy to be employed by the Contractor to reduce the number of single-occupancy vehicle trips made to the Converter Station Area by construction workers.

5.9.1.4. Prior to commencement of works in the highway, the Project Manager will submit detailed designs for the works and associated traffic management measures and a Travel Plan for approval to the relevant Highway Authority.

5.9.1.5. The Contractor will seek to locate Joint Bays in locations off carriageway, unless (a) such positioning is unavoidable taking into account environmental and other constraints/considerations and (b) requires no different traffic management measures than are required for cable trenching in that part of the highway. No Link Pillars will be located within the carriageway.

5.9.2. HIGHWAY WORKING GANG RESTRICTIONS

5.9.2.1. The construction of the Onshore Cable Route on-carriage way will be undertaken by a maximum of six gangs working concurrently. The management and separation of working gangs is secured via the FTMS (REP1-068, Rev003), including a series of working restrictions.

5.9.2.2. The appointed Principal Contractor for the construction of the Onshore Cable Route is required to adhere to all measures. It will also be responsible for managing the working activities and the gangs working along the route, which aligns with the Health and Safety responsibility under CDM regulations.

5.10. AIR QUALITY

5.10.1.1. The dust risk for each Onshore Cable Corridor section is described in Table 5.1. The mitigation measures shown in Table 5.2 are to be implemented on site dependent on the risk presented in Table 5.1 and in line with best practice, IAQM guidelines. The mitigation required is commensurate with the assessed level of dust risk for each section.

- 5.10.1.2. The contractor must implement those measures which are ‘highly recommended’ by the IAQM guidelines at High and Medium Risk sites as outlined in Table 5.2. The requirement for those measures described as ‘Desirable’ by the IAQM guidelines at High and Medium Risk Sites, the contractor will agree the required implementation of these measures with the LPA as part of the approval of the detailed CEMP for those works as per Requirement 15 of the dDCO.

Table 5.1– Summary table of Dust risk results per Onshore Cable Corridor Section

Section	Overall Dust Risk
1 Lovedean (Converter Station Area)	High
2 Anmore	High
3 Denmead/Kings Pond Meadow	High
4 Hambledon Road to Farlington Avenue	High
5 Farlington	High
6 Zetland Field to Sainsbury’s Car Park	High
7 Farlington Junction to Airport Service Road	High
8 Eastern Road (adjacent to Great Salterns Golf Course) to Moorings Way	High
9 Moorings Way to Bransbury Road	Medium
10 Eastney (Landfall)	Medium

Table 5.2 - IAQM Mitigation resulting from the Construction Dust Assessment

Mitigation Measure	High Risk Site Sections 1 to 8	Medium Risk Site Sections 9 to 10
Communications		

Mitigation Measure	High Risk Site Sections 1 to 8	Medium Risk Site Sections 9 to 10
<p>1. Develop and implement an Air Quality Stakeholder Communication plan (including a specific plan for the emergency services) that includes community engagement before work commences on site.</p>	Highly Recommended	Highly Recommended
<p>2. Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.</p>	Highly Recommended	Highly Recommended
<p>3. Display the head or regional office contact information.</p>	Highly Recommended	Highly Recommended
<p>4. Develop and implement a Dust Management Plan ('DMP'), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in the IAQM Guidance. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real-time PM₁₀ continuous monitoring and/or visual inspections.</p>	Highly Recommended	Highly Recommended
<p>Site Management</p>		

Mitigation Measure	High Risk Site Sections 1 to 8	Medium Risk Site Sections 9 to 10
<p>5. Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.</p>	Highly Recommended	Highly Recommended
<p>6. Make the complaints log available to the local authority when asked.</p>	Highly Recommended	Highly Recommended
<p>7. Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.</p>	Highly Recommended	Highly Recommended
<p>8. Hold regular liaison meetings with other high-risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.</p>	Highly Recommended	Not required
<p>Monitoring</p>		
<p>9. Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.</p>	Highly Recommended	Desirable

Mitigation Measure	High Risk Site Sections 1 to 8	Medium Risk Site Sections 9 to 10
<p>10. Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.</p>	Highly Recommended	Highly Recommended
<p>11. Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.</p>	Highly Recommended	Highly Recommended
<p>12. Agree dust deposition, dust flux, or real-time PM₁₀ continuous monitoring locations with the Local Authority. Where practicable, commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.</p>	Highly Recommended	Highly Recommended
<p>Preparing and Maintaining the Site.</p>		
<p>13. Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is practicable.</p>	Highly Recommended	Highly Recommended
<p>14. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.</p>	Highly Recommended	Highly Recommended
<p>15. Fully enclose site or specific operations where there is a high potential</p>	Highly Recommended	Highly Recommended

Mitigation Measure	High Risk Site Sections 1 to 8	Medium Risk Site Sections 9 to 10
for dust production and the site is active for an extensive period.		
16. Avoid site runoff of water or mud.	Highly Recommended	Highly Recommended
17. Keep site fencing, barriers and scaffolding clean using wet methods.	Highly Recommended	Highly Recommended
18. Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.	Highly Recommended	Highly Recommended
19. Cover, seed or fence stockpiles to prevent wind whipping.	Highly Recommended	Highly Recommended
Operating vehicle/machinery and sustainable travel		
20. Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London Non-Road Mobile Machinery ('NRMM') standards, where applicable.	Highly Recommended	Highly Recommended
21. Ensure all vehicles switch off engines when stationary – no idling vehicles.	Highly Recommended	Highly Recommended
22. Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.	Highly Recommended	Highly Recommended

Mitigation Measure	High Risk Site Sections 1 to 8	Medium Risk Site Sections 9 to 10
<p>23. Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).</p>	Highly Recommended	Desirable
<p>24. Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.</p>	Highly Recommended	Highly Recommended
<p>25. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).</p>	Highly Recommended	Desirable
<p>Operations</p>		
<p>26. Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.</p>	Highly Recommended	Highly Recommended
<p>27. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where practicable and appropriate.</p>	Highly Recommended	Highly Recommended
<p>28. Use enclosed chutes and conveyors and covered skips.</p>	Highly Recommended	Highly Recommended

Mitigation Measure	High Risk Site Sections 1 to 8	Medium Risk Site Sections 9 to 10
29. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	Highly Recommended	Highly Recommended
30. Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	Highly Recommended	Highly Recommended
Waste management		
31. Avoid bonfires and burning of waste materials.	Highly Recommended	Highly Recommended
Measures Specific to Hard Surface Removal (e.g. asphalt)		
33. Ensure effective water suppression is used during Hard Surface Removal operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	Highly Recommended	Highly Recommended
34. Avoid explosive blasting, using appropriate manual or mechanical alternatives.	Highly Recommended	Highly Recommended
35. Bag and remove any biological debris or damp down such material before Hard Surface Removal.	Highly Recommended	Highly Recommended

Mitigation Measure	High Risk Site Sections 1 to 8	Medium Risk Site Sections 9 to 10
Measures Specific to Earthworks		
36. Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable	Highly Recommended	Desirable
37. Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as is practicable.	Highly Recommended	Desirable
38. Only remove the cover in small areas during work and not all at once.	Highly Recommended	Desirable
Measures Specific to Construction		
39. Avoid scabbling (roughening of concrete surfaces) if possible.	Highly Recommended	Desirable
40. Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	Highly Recommended	Highly Recommended
41. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	Highly Recommended	Desirable

Mitigation Measure	High Risk Site Sections 1 to 8	Medium Risk Site Sections 9 to 10
42. For smaller supplies of fine powder materials, ensure bags are sealed after use and stored appropriately to prevent dust.	Desirable	Desirable
Measures Specific to Trackout		
43. Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	Highly Recommended	Highly Recommended
44. Avoid dry sweeping of large areas.	Highly Recommended	Highly Recommended
45. Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	Highly Recommended	Highly Recommended
46. Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.	Highly Recommended	Highly Recommended
47. Record all inspections of haul routes and any subsequent action in a site log book.	Highly Recommended	Highly Recommended
48. Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	Highly Recommended	Highly Recommended

Mitigation Measure	High Risk Site Sections 1 to 8	Medium Risk Site Sections 9 to 10
49. Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	Highly Recommended	Highly Recommended
50. Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	Highly Recommended	Highly Recommended
51. Access gates to be located at least 10 m from receptors where practicable.	Highly Recommended	Highly Recommended

5.11. NOISE AND VIBRATION

5.11.1. BEST PRACTICABLE MEANS

- 5.11.1.1. At all stages of the construction, Best Practicable Means ('BPM'), as defined in the Control of Pollution Act 1974 must be followed. This will comprise employing reasonably practicable noise and vibration mitigation measures, with simultaneous regard to local conditions and circumstances (e.g. proximity of sensitive receptors) and current technical knowledge (e.g. utilising quietest equipment available) and to financial implications. Details of specific BPM to be employed during the construction works are included below and in Appendix 24.2 of Chapter 24 (Noise and Vibration).
- 5.11.1.2. The BPM measures below may be reviewed and supplemented by location or activity specific mitigation measures following the appointment of a contractor and the production of detailed works plans.
- 5.11.1.3. The following mitigation measures should be adopted at all times during construction activities. These measures will be most important to observe at the following times:
1. Where works are being undertaken close to the extremities of the Order Limits and, therefore, closest to sensitive receptors; and
 2. When works are being undertaken during periods when surrounding sensitive receptors are highly sensitive to noise (e.g. at night-time for residential receptors).
- 5.11.1.4. Those responsible for the preparation of Construction Environmental Management Plans must refer to Other Consents and Licenses (REP6-024), and in particular row 8 of Table 2.1 of this document. Applications for consent pursuant to Section 61 of the Control of Pollution Act 1974 must be carefully considered, particularly for any works which may require night-time working as detailed in section 6.2.8.

5.11.2. BPM MEASURES TO BE EMPLOYED DURING ALL CONSTRUCTION ACTIVITIES

General

- 5.11.2.1. The contractor will comply with the requirements of the Control of Pollution Act 1974 (with particular reference to Part III), the Health and Safety at Work Act 1974, the Control of Noise at Work Regulations 2005 and the Control of Vibration at Work Regulations 2005.
- 5.11.2.2. The appointed contractor(s) for construction should consider registering their site(s) under the Considerate Constructors Scheme, which is recognised by industry and the Government for encouraging construction firms to be sensitive to the environment.
- 5.11.2.3. Site personnel should be instructed on Best Practice Mitigation Measures to reduce noise and vibration as part of their site induction training. See section 4.2 for further information.

- 5.11.2.4. Shouting and raised voices shall be kept to a minimum. Use of radios is to be limited to where two-way communication is required for safety reasons.
- 5.11.2.5. Deviation from approved method statements will only be permitted with prior approval from the appointed contractor and other relevant parties. This will be facilitated by formal review before any deviation is undertaken. See section 4.5 for further information

Community Liaison

- 5.11.2.6. Correspondence (e.g. letter drop) should be sent to occupiers of all sensitive receptors likely to be affected by construction activities well in advance of construction activities taking place. The correspondence should contain the following information:
- A brief description of the proposed activities and reasons why the works are required.
 - The dates and times of proposed construction activities, and in particular when the loudest activities will take place. This includes the specific timings of road cutting/breaking activities for out-of-hours works in the Onshore Cable Corridor (see Section 6.2.8).
 - Contact details (phone number and emails address) for the Client and contractor undertaking the works, which can be used by the public to ask questions or raise complaints.
- 5.11.2.7. Should works be delayed or re-programmed, local residents should be informed of the revised programme of works as soon as possible.
- 5.11.2.8. Further information on public relations and the communications strategy is contained in section 4.4.3.
- 5.11.2.9. Any noise complaints received by the public relations officer, Environmental Health Officer or Environmental Manager will be reported to the appointed contractor and immediately investigated, including a review of mitigation measures for the activity that caused the complaint. Temporary noise monitoring could be employed as one of the means for investigating and resolving valid noise complaints. Where necessary, mitigation measures will be revised to ensure BPM is being followed. Further information on the complaints procedure is contained in section 4.4.4.

Equipment

- 5.11.2.10. Modern, silenced and well-maintained plant will be used at all times, conforming to standards set out in EU Directives.
- 5.11.2.11. Consideration will be given to avoiding the use of percussive plant where non-percussive methods are available for a given activity.
- 5.11.2.12. Pneumatic tools will be fitted with silencers or mufflers.

- 5.11.2.13. Equipment and vehicles should be shut down or turned off when not in use so that plant is not left running unnecessarily.
- 5.11.2.14. Engine covers will be kept closed when machines are in use.
- 5.11.2.15. Stationary plant and equipment will be positioned to minimise the noise/vibration impact at sensitive receptors.
- 5.11.2.16. Plant which is known to emit noise directionally will be orientated, where possible to direct noise away from the nearest sensitive areas.

Deliveries

- 5.11.2.17. Where practicable, construction plant should access construction areas via arterial roads or main carriageways, in order to minimise noise and vibration at dwellings on the rural or local road network.
- 5.11.2.18. Unless agreed in advance, all deliveries will be during the agreed construction working hours for each activity and on a “just-in-time” basis to minimise idling vehicles.
- 5.11.2.19. Loading and unloading of vehicles, dismantling of equipment such as scaffolding or moving equipment or materials around the construction sites will be conducted in such a manner as to minimise noise.

Screening

- 5.11.2.20. Where necessary, any noise screening around construction compounds would be constructed as early as possible in the construction programme.
- 5.11.2.21. Semi-static equipment is to be sited and oriented as far away as is reasonably practicable from noise sensitive receptors and will utilise localised screening if feasible and required.
- 5.11.2.22. Further information on location specific screening is contained in section 6.2.8.

5.12. SOCIO-ECONOMICS

5.12.1. EMPLOYMENT GENERATION

- 5.12.1.1. Measures should be put in place, where practicable, to maximise the potential for the workforce and Proposed Development’s supply chain to be sourced locally. These measures could include:

- Working with local people and local business to ensure that, investment in the South East, stays in the South East.
- Engaging with Jobcentre Plus to ensure local job opportunities are advertised to local unemployed people and identifying opportunities to help people get back into employment through work placements, education and skills training.
- Upskill people working on the Proposed Development that, through experience, training and development programmes.

5.12.2. DISRUPTION TO BUSINESSES AND RESIDENCES

5.12.2.1. Measures must be put in place to reduce disruption to businesses during the construction period. These include:

- Businesses, residents and community facilities who are likely to be impacted during construction will be consulted about access requirements.
- Where construction activities impact on the ability for customers to determine whether or not a business is still open, signage will be erected such as 'Business as Usual signs' to publicise that the business is still open.

5.12.2.2. A Framework CTMP has been produced to reduce effects from construction traffic outlining:

- Construction traffic routing and embargoed routes;
- Types of construction vehicles to be used for different purposes;
- Avoidance of peak commuting hours;
- Site access and designated parking; and
- Management of loading, waste management and abnormal loads.

5.12.2.3. The appointed contractor will need to develop these measures so that communication methods are effective during construction.

5.12.2.4. There will be occasions where vehicular access to residential or commercial properties would be needed at different times and in this situation, road plates can be used to bridge the longitudinal excavations to open the carriageway to provide access with full vehicular access being reinstated overnight. This will be determined by the appointed contractor on a case-by-case basis.

5.12.3. DISRUPTION TO COMMUNITY FACILITIES

5.12.3.1. Similar to the mitigation applied above, Community Facilities should be consulted prior to construction where access arrangements will be directly affected. Traffic management systems and diversion routes should be put in place to maintain accessed to identified community facilities.

5.12.3.2. Vehicular access will be maintained at all times to community facilities which perform emergency service activities. Specific measures are outlined in the Framework Traffic Management Strategy and include road plates.

5.12.3.3. Works adjacent to Solent Infant School on Eveleigh Road and Mooring Way Infant School, Moorings Way will be programmed within school holidays, in accordance with the Framework Traffic Management Strategy.

5.12.4. EFFECTS ON USERS OF RECREATIONAL AND OPEN SPACE, LEISURE FACILITIES AND PEDESTRIAN ROUTES

5.12.4.1. To ensure that negative effects on amenity value and disruption are reduced as far as practicable during the Construction Stage of the Proposed Development, the following mitigation measures can be implemented:

- The community groups who utilise the areas of recreational and open space which will be impacted by the construction of the Proposed Development will be informed of the nature, timing and duration of particular articular activities during the Construction Stage;
- If alternative routes or spaces are required to be utilised in and around areas of open and recreational space, directions will be clearly communicated at the appropriate place; and
- Joint Bays will not be located within sports pitches

5.12.4.2. The construction programme will be reviewed by the contractor(s) to see where there are opportunities to reduce effects on open space, for example by reducing construction programme though concurrent working on single or multiple spaces (including car parks) and avoiding key events. This would also apply to where there may be potential for cumulative effects with North Portsea Island Coastal Flood Defence Scheme at Kendall's Wharf if construction is concurrent. Site liaison is required to ensure construction site management minimises disturbance in this area.

5.12.4.3. The areas required for longer- term construction works, such as Trenchless methods, within the Order Limits will also be reviewed by the construction contractors to determine whether there are any opportunities to reduce areas of open space required for long-term works.

5.12.4.4. The Fort Cumberland Road Car Park is currently unsurfaced. As part of reinstatement works following construction, the car park will be required to be improved to a better condition in liaison with PCC. Areas of open space will be restored, as far as practicable, to the same condition as they were in prior to construction.

5.12.4.5. Where the Order Limits are crossed by off-road PRoW or cycle routes, there is the potential for the route to be closed temporarily during construction for safety purposes. To mitigate this disruption, an alternative route will be provided along with signage in advance of the temporary closure.

5.12.5. DISRUPTION TO TOURISM

5.12.5.1. Prior to construction, the Contractor will review the events programme to determine where it may be possible for construction on key transport routes and relevant areas of open space to avoid one-off events. Where this is not possible, the Contractor will liaise with event organisers to implement additional traffic management or other measures to minimise disruption and congestion, such as screening of compounds and provision of security. The Framework Traffic Management Strategy and the timings for works included within it has taken into account known annual events in the locality of the works.

5.12.6. EFFECTS ON NON-MOTORISED USERS, RECREATION AND OPEN SPACE

5.12.6.1. The Fort Cumberland Road car park is currently unsurfaced. As part of reinstatement works following construction, the Applicant will resurface the car park. This can encourage better parking and greater capacity use of the remaining car park area.

5.13. WASTE AND MATERIAL RESOURCES

5.13.1.1. All waste will be managed in accordance with the Waste Hierarchy (in order of preference):

- Prevention;
- Minimisation;
- Reuse;
- Recycle;
- Energy recovery; and
- Disposal.

5.13.1.2. The appointed contractor will be responsible for the correct storage and management of the earthworks material excavated for the works. This material will be used where it meets re-use criteria within the Site (as part of the works) to mitigate the environmental effects of the works. The use of recycled materials will be maximised.

5.13.1.3. Monitoring measures to be adopted across the Proposed Development would include, as a minimum, the implementation of a CEMP, incorporating a Materials Management Plan ('MMP') and Site Waste Management Plan ('SWMP') by the contractor, once appointed. Associated data, information and reports will be used to evidence monitoring undertaken.

5.13.1.4. The SWMP will be prepared in accordance with best practice guidance (Waste and Resource Action Programme ('WRAP')) and will be kept up to date and will be delivered. Associated data, information and reports will be used to evidence monitoring undertaken. An Outline SWMP is provided in Appendix 3.

5.13.1.5. The key matters of the SWMP are to:

- Identify the volume of waste streams likely to be produced during the works to establish the potential for reuse and recycling;
- Identify possible options for waste to be 'designed out';
- Identify opportunities for waste minimisation and management;
- Identify the most significant opportunities to increase re-use and recycling rates;
- Identify suitable waste management contractors and record appropriate licences, permits, waste transfer notes and hazardous waste consignment notes;
- Consider appropriate site practices such as how materials will be segregated and the measures that will be used for raising awareness among site operative for waste reduction, reuse and recycling; and
- Set out the method for measuring and auditing Construction, Demolition and Excavation ('CD&E') waste to enable more effective waste management through the setting of performance targets for segregation, recycling and monitoring sub-contractors.

5.13.1.6. The following waste related documentation will be held on-site:

- SWMP;
- Relevant Duty of Care documentation, including waste transfer notes and exemptions;
- A Control of Substances Hazardous to Health ('COSHH') Register; and
- Site compound plan showing potentially contaminative and COSHH substances.

5.13.1.7. The following actions in relation to Material Resources are considered sufficient:

- Completion of ground and local environment inspections and surveys will be undertaken to determine the nature of the ground, to identify its potential to be diverted from landfill.
- Spoil and waste segregation and containment will be provided on temporary laydown areas within the Converter Station Area.
- Sufficient storage space will be allocated by the construction contractor to allow waste to be properly segregated.
- The detailed design and construction aspects will follow British Standard 8895 (Designing for material efficiency in building projects) and other published guidance such as BRE materials resource efficiency in construction.
- Off-site fabrication will be utilised, where practicable.
- The construction contractor will be encouraged, to order material with less or returnable packaging.

5.13.1.8. The following further actions are recommended to ensure good and best practice are achieved:

- Identification and specification of material resources that can be acquired responsibly, in accordance with BES 6001 Responsible Sourcing of Construction Products.
- Design for resource optimisation: simplifying layout and form, using standard sizes, balancing cut and fill, maximising the use of renewable materials, and materials with recycled or secondary content.
- Design for off-site construction: Maximising the use of pre-fabricated structures and components, encouraging a process of assembly rather than construction.
- Identify opportunities to minimise the export and import of material resources.
- Detailed design for recovery and reuse: identifying, securing and using material resources at their highest value, whether they already exist on site, or are sourced from other schemes.
- Ensure arisings are properly characterised before or during design, to maximise the potential for highest value reuse.
- Working to a proximity principle, ensuring arisings generated are handled, stored, managed and re-used or recycled as close as practicable to the point of origin.

5.14. CARBON AND CLIMATE CHANGE

5.14.1.1. General mitigation measures for carbon and climate change to be adopted by the Contractor include:

5.14.2. GREENHOUSE GAS EMISSIONS

Construction Measures

- Minimise energy consumption including fuel usage by, for example, reducing the requirement for earth movements to/from and within the construction site;
- Maximise the local sourcing of materials and local waste management facilities, where practicable;
- Use efficient construction processes, such as design for manufacture and assembly; and

5.14.3. CLIMATE RESILIENCE

Materials:

- Ensuring site and compound temporary drainage infrastructure has sufficient capacity for extreme flood events and that silt traps are in use/regularly emptied and maintained.
- Ensure any materials on site are stored safely and covered with waterproof materials.
- Dust control measures would be in place, for example speed limits on site, water available for dampening down, excavated materials to be removed from site as soon as practicable, and backfilling materials installed immediately after delivery.
- Allowing extra time for materials to dry out in the programme of works.
- Using mould inhibiting paint.
- Safe storage of spoil heaps, storage of spoil is not permitted in the fluvial floodplain.

Plant and Equipment and working method:

- Using rainwater recycling to support other facilities (e.g. washing of machinery etc.).
- Reviewing wind speed before commencing work at height.
- Ceasing work at height during storms.
- Switching machinery off when not in use.
- Use of machinery which is likely to get hot during cooler periods.
- Completed sections of the cable ducts are to be sealed at each end against water ingress. Joint bay chambers are only to be excavated immediately before cable pulling and jointing, where practicable. It may be necessary, for programming reasons, to excavate a cable and pull one section of cable, then temporarily backfill. In this case, temporary water seals would be fitted around the pulled cables.

Workforce:

- PPE to be suitable for hot weather conditions, lightweight vests/jackets, two piece rather than coveralls.
- Regular breaks to be taken, additional supply of drinking water and sun cream to be made available.
- Areas of shade to be made available for workforce, where practicable.

- Ensuring welfare facilities are available and sufficiently cool. Ensure rest breaks are taken, particularly during the hottest part of the day (generally, 11am – 3pm) or when temperatures rise above 24oC (TUC, 2019).
- An appropriate level of training to staff should be in place to ensure workforce are aware to stay away from flood water and working near watercourses. Workforce should be signed up to flood warnings (rainfall, tidal, fluvial, reservoir) and check the weather forecast to be able to plan ahead and avoid attending site if there is a risk of flooding.

Site Compound:

- Storing chemicals, hazardous materials and plant on high ground above predicted flood water levels or protecting with appropriate bunds/flood barriers above the predicted flood water level
- Where appropriate, site compound, and any storage of soil stockpiling or plant must be in accordance with measures outlined in Section 5.7 above.
- Using pumps to ensure water levels in excavations do not exceed critical levels, in accordance with an exemption or subject to agreement and approval of a de-watering environmental permit.
- Reducing the area of impermeable surface, where practicable e.g. permeable paving.
- Using vegetation to slow down the movement of surface water e.g. vegetating compound, where practicable, with grass and minimising impermeable area.
- Dust control measures e.g. water spraying, covering spoil heaps.
- Installing lightening protection for site buildings.

Traffic:

- Ensure the access road and roads used during construction are monitored during periods of heavy rainfall and appropriate traffic management put in place to avoid areas of potential flooding.

6. LOCATION SPECIFIC CONSTRUCTION ENVIRONMENTAL CONTROL MEASURES

6.1.1.1. This section of the Onshore Outline CEMP outlines specific environmental management in relation to the construction of the Proposed Development. The structure of this section is broken down into individual route sections.

6.2. GENERAL

6.2.1. ONSHORE ECOLOGY

Winter Restriction of Works Adjacent to Chichester and Langstone Harbour SPA

6.2.1.1. A winter working restriction applies to the following elements where appropriate:

- Chichester and Langstone Harbour SPA; and
- Solent Waders and Brent Goose Strategy (SWBGS) Sites.

6.2.1.2. Effects of the Construction Stage on Chichester and Langstone Harbour SPA and SWBGS sites with their associated wintering intertidal bird community will be avoided by restricting works within the winter season, defined as October to March (the period when SPA birds such as brent goose arrive from their breeding grounds; Snow and Perrins, 1998). Details of the working restriction are provided in the ES Addendum (REP1-139) and ES Addendum Appendix 18 Construction Noise Impacts on SWBGS Sites (REP1-149). The restrictions are informed by six principles (that updated those previously provided in Appendix 16.14 (APP-422)) that will be incorporated into working methods:

- **Principle 1:** Construction works cannot take place in SWBGS (those categorised as either core, primary support, secondary support, low use or candidate) sites that overlap with the Proposed Developments Order Limits during October – March. An exception is the gravel car park within site P11 that is already disturbed by movements of cars, lorries and plant, and offers no functional habitat for brent geese or other waterbirds associated with Chichester and Langstone Harbour SPA.
- **Principle 2:** Where HDD works are to take place underneath the SWBGS site (e.g. at Eastney Landfall) no direct impacts are considered to occur and the restriction does not apply.

- **Principle 3:** Elements of the Onshore Cable Route that are over 400 m from the SPA are not subject to any restriction.
- **Principle 4:** Construction noise events of <55 dB can occur unrestricted.
- **Principle 5:** Construction works of 55 – 72 dB LAFmax immediately adjacent to a major road and/or adjacent to industrial sites with notable levels (>60 dB) of existing noise can be undertaken unrestricted. It is considered that noise levels from the Proposed Development would be masked (i.e. indistinguishable from the baseline) in these instances.
- **Principle 6:** Percussive piling or works with heavy machinery (i.e. plant resulting in a noise level in excess of 69 dB LAFmax – measured at the sensitive receptor) should be avoided during the bird overwintering period (i.e. October to March inclusive). The sensitive receptor is the nearest point of the SPA or any SPA supporting habitat (e.g. high tide roosting site). P54 and P29 are excluded from this principle. Buildings that are situated between them and the construction works will buffer noise such that it will not be in excess of 69 dB LAFmax within either site.

6.2.1.3. Adoption of these principles will offset direct effects on SWBGS sites (as these sites will not be subject to works in the winter period when they are used by SPA birds), and effects of noise on birds within the SPA itself.

Restoration of SWBGS Sites

6.2.1.4. SWBGS sites affected by the Proposed Development will be restored to their original condition. The restoration of SWBGS sites is needed to be complete and grass established to provide a suitable food resource by October when birds such as dark-bellied brent Geese, which feed on the grasses, return to the Solent to winter.

6.2.1.5. The following two approaches are considered for restoration of SWBGS sites:

- **Re-seeding.** Reinstatate areas within SWBGS with grass seed before the end of May where practicable. This is the easiest and most cost-effective option;
- **Re-turfing.** Where not practicable to re-seed, turf will be laid and established. This is a more costly option but allows re-establishment and good sward growth in a shorter timescale.

6.2.1.6. The choice of restoration approach is primarily dependent on the time available within the summer growing season for implementation. Re-seeding is not likely to be the optimal technique after May so that for any restoration works after this month, re-turfing would be implemented.

6.2.1.7. The restoration measures proposed will comprise the following:

- **Site preparation** - the seedbed will be prepared in accordance with best practice guidance and the detailed landscaping scheme. Depending on site conditions this may include ripping, rotovating, weed control and rolling.
- **Establishment** - Sowing; spread seed on a properly prepared seedbed at suppliers suggested rate. In the first year of establishment sown grassland areas will be cut repeatedly up until October to maintain at 35mm to promote vigorous sward development and reduce weed germination. Irrigation will be used as required to aid establishment.
- **Establishment** – Turfing; turves to be laid on a properly prepared seedbed to suppliers’ specification. Top dressing with washed sand or other appropriate material will be considered. In the first year of establishment sown grassland areas will be cut repeatedly up until October to maintain at 35mm to maintain sward development and reduce weed germination. Irrigation will be used as required to aid establishment.
- **Aftercare** - The desired sward condition in October is that these areas have a close cropped 30-60mm tight sward of green grass, so the last cut of the season should be timed to ensure enough time to green up before the arrival of brent geese. Irrigation will be used as required to aid establishment and particularly in dry periods. The grassland is to be inspected every three months during the first two years. Where grass areas have become worn areas should be re-seeded with the prescribed seed mix or turf.

6.2.1.8. SWBGS sites P11, P23A, P23B and P23R will be restored before October applying the above measures.

6.2.1.9. In SWBGS P08A, Farlington Playing Fields, it is unlikely that the CCT1 & CCT2 HVDC trench route and cabling works (See Appendix 1) would be fully reinstated for the commencement of the non-breeding season on 1st October. It is anticipated that the remainder of the works will allow appropriate time for restoration of habitat. re-turfing will likely only be possible at the start of October and is estimated that a minimum of 2-3 weeks would be required for re-establishment of the grass sward required for geese grazing.

Avoidance and Mitigation for Habitats

6.2.1.10. To avoid loss of important habitats within the Order Limits, HDD is proposed to avoid the need for open trenching and to preserve habitats. Key locations where HDD will be used are at Denmead Meadows (Soake Farm Meadows SINC and lowland meadow habitat within Field 3) (HDD-5), between Farlington and Kendall’s Wharf (Langstone Harbour) (HDD-3) and at Milton Common (HDD-6). HDD requires entrance and exit sites and associated construction compounds but for the duration of the drill has no impact on habitats or species above ground.

- 6.2.1.11. Following construction, hedgerow planting will be undertaken to repair gaps where the corridor required their removal. Replanting will use native plant species of local provenance and will provide a diverse range of woody species to maintain the species-rich nature of hedgerows.

Bats and Lighting

Lighting design for works at Farlington Playing Fields:

- 6.2.1.12. Lighting of construction work will be designed with reference to recommendations issued by The Bat Conservation Trust (2014) and Institute of Lighting Engineers (2009), and be cowled/hooded to avoid extraneous light spill, and focussed onto works areas only to maintain dark corridors on the edge of the playing fields and avoid disturbance of commuting and foraging bats. Farlington Playing Fields is unlit and construction lighting could result in disturbance of bat commuting routes and foraging areas located around the site's edge where scrub and woodland are located. These habitats are used by bats to navigate and find food; open areas are avoided as no physical features are present to reflect echolocation calls. Thus, to avoid effects on bats trenching areas and compounds for HDD work will be set back from the edge of the playing field by at least 10 m to maintain habitats there and preserve bat flight lines

Soil Horizon Preservation

- 6.2.1.13. Mitigation for temporary loss of grassland will be to maintain soil horizons and preserve grassland turf. Mitigation will be put in place at Kings Pond Meadow SINC, Milton Common SINC and unimproved and semi-improved grasslands along the Onshore Cable Corridor.
- 6.2.1.14. Although growing vegetation would be lost to trenching work and the installation of construction compounds/access points, removal and preservation of turves so that they can be replaced when work is finished will retain the seed bank within them allowing regrowth. Maintaining soil conditions by maintaining soils structure (turf, top soil, subsoil) will maintain soil conditions for re-growth of meadow vegetation.
- 6.2.1.15. The following measures will be put in place:
- Separate turves, top soil and sub soil. Each will be stored separately with no mixing during works;
 - Replace soil structure following completion of work with turves on top;
 - Use low ground pressure machinery also to avoid compaction;
 - Works areas will be securely fenced and procedures put in place to prevent damage to grassland habitats adjacent to them (e.g. by the use of herras fencing); and

- Works to be monitored by an Ecological Clerk of Works who will provide toolbox talks to contractors and staff working at the site.

6.2.1.16. At Kings Pond Meadow SINC where vegetation has a wet meadow character, work will avoid the plant growing season and winter wet season as both these are important for maintaining the conditions within the habitat. Work in this area will be undertaken in late summer/autumn to facilitate this.

Ground Protection

6.2.1.17. Use of bog matting, temporary membranes with Type 1 aggregate or similar ground protection solutions will be used to prevent compaction of grassland soils at:

- Kings Pond Meadow SINC;
- Milton Common SINC;
- Unimproved neutral grassland; and
- Semi-improved neutral and calcareous grassland.

6.2.1.18. This mitigation measure will promote regrowth of vegetation to its original state.

6.2.1.19. Ground protection measures apply to the Construction Stage of the Proposed Development. Maintenance will be infrequent and use light vehicles that would not lead to effects above those of regular use and management of the land as farmland.

6.2.2. ARBORICULTURE

6.2.2.1. The general design principles for working around trees are as follows:

- Where practicable the works shall be organised to avoid the root protection areas (RPA) of trees and hedges to be retained, including those along the Works Order boundaries.
- All excavations shall follow an arboricultural method statement included within the relevant CEMP to minimise risk to root protection areas¹.
- Works affecting high value trees shall be carried out under the direct supervision of a suitably experienced Clerk of Works.
- Ground protection shall be used where RPAs are encroached upon and it is practicable to retain the relevant feature. For example, use of a no-dig construction for access routes must be employed.
- Where works need to be undertaken near retained trees, such works shall be in accordance with best practice:
 - British Standard ('BS') 5837:2012 trees in relation to design, demolition and construction – recommendations.

- Highway trees will only be removed as a last resort where their retention in the presence of the Proposed Development would be inconsistent with sound arboricultural practice as confirmed by the relevant local planning authority Arboriculture professional and with agreement on compensation / mitigation (dependant on LPA position) values for each highway tree prior to its removal. There will be no third-party tree planting within the highway without express permission from the Highway Authority. Where agreed, the Local Highway Authority Arboriculture Team will undertake any highway tree mitigation planting required, to be funded from the highway tree compensation monies.
- Arboricultural Method Statements with associated RPA plans shall be submitted as part of the relevant CEMP. These shall cover in detail the protection of root areas, protective barriers, precautions in respect of temporary works, sequence of activities, utilities, post construction and emergency remedial works.
- Pruning outside of the Order Limits to allow abnormal loads shall be designed to comply with The Highways Act 1980 section 154 requirements. This is a statutory obligation for the person who owns / is responsible for the trees to prune trees to remove an obstruction to the safe use of the highway. Where the abnormal load requires additional clearance, this shall be targeted pruning at specific points to be agreed with the haulier, landowner, project team and where appropriate, the local planning authority prior to the works being carried out. All tree works are to be carried out in accordance with British Standard 3998:2010 “Tree Work - Recommendations”.
- Within the Order limits lopping and felling of trees may only be carried out where absolutely necessary and will be prescribed in accordance with British Standard 3998: 2010 “Tree Works – Recommendations” and industry best practice. All pruning and felling works shall be specified by a suitably trained and experienced Arboriculture consultant and shall be carried out by a suitably trained and experienced arboriculture contractor

6.2.3. LANDSCAPE AND VISUAL AMENITY

- 6.2.3.1. Measures which form an important part of efforts to control Construction Stage impacts on landscape character and visual amenity (Section 1 to 10) are outlined below. These include general mitigation measures for all of the Proposed Development and more specific measures which apply to the Onshore Cable Corridor including those sections of the Onshore Cable Route that lie within Sections 1 and 10.
- Appropriate location, organisation and phasing of construction activities.
 - Maintenance of a tidy and contained site compound to reduce visual clutter.

- Design and layout of site construction areas to reduce adverse impacts arising from temporary security fencing and lighting.
- Measures to control working hours in specific locations to avoid disturbance to residential receptors both in terms of light and noise.
- Agreed site access points to limit impacts on existing vegetation both above and below ground.
- Retention and protection of existing vegetation considering temporary fencing to demarcate the construction footprint in accordance with Section 6.2 of BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations, (BSI Standards Publication, 2012 British Standards Limited).
- Careful siting of temporary topsoil storage areas considering use as a physical buffer between the construction works and more sensitive receptors, where practicable.
- Careful management and storage of topsoil and subsoil in accordance with Construction Code of Practice for the Sustainable Use of Soil on Construction Sites (Department for Environment, Food and Rural Affairs, 2009).
- Where construction works obstruct a footway an absolute minimum unobstructed width of 1 m shall be provided alongside the construction corridor and where this is not possible a safe alternative route shall be provided. This shall include provision of suitable crossing facilities where required, including the temporary replacement of existing pedestrian crossings that may need to be closed to facilitate construction see the Transport Assessment.
- During construction of the Onshore Cable Route reasonable access shall be made for pedestrians going to or from premises abutting a street
- In some locations, a footway closure may be required without a suitable alternative route being available nearby or on the opposite side of the carriageway. In these instances, a pedestrian route shall be provided within the carriageway.
- Some temporary footway closures may be required to facilitate delivery and collection of materials. Where necessary this shall be mitigated through alternative footway links being available or other measures stipulated in the Traffic Management Strategy
- Temporary screening for sensitive visual receptors shall be provided through implementation of solid construction hoardings whilst using natural existing screens (topsoil and existing vegetation) where practicable. Hoardings shall be attractive, used to screen low level “clutter” and reduce noise.

- Hoardings shall be well lit in poorly lit walkways and any gates should be positioned to minimise noise transmitted to nearby sensitive receptors.
- Large plant /equipment shall be located away from most sensitive receptors where there are viable alternatives. Temporary structures and stockpiles shall be removed when no longer required.
- Prompt reinstatement of temporary construction areas (including trenches, laydown and construction (including haul road) corridor and all other land impacted through the installation of the Onshore Cable Route as soon as practicable after sections of work are complete. Reinstatement shall involve the careful handling of soils and a return to the existing habitat type.
- Implementation of mitigation planting alongside the construction programme where works would not affect planting and during winter (November – February) as per Appendix 15.7 (Landscape Schedules, Planting Heights and Image Board) of the ES Volume 3 (REP6-029).
- Mitigation planting to replace hedgerows and trees lost following completion of the construction works. All planting lost shall be replaced with like for like species of a similar size and in agreement with the relevant discharging authority.
- New tree planting shall be offset at least 5 m away from the Onshore Cable Route, and more specifically the cable trench, within the Order Limits.
- There will be no third-party tree planting within the highway without express permission from the Highway Authority. Where requested, tree mitigation planting will be undertaken by the Highway Authority through CAVAT funding.
- Where hedgerows are lost these shall be replanted with like for like species; on the basis that a concrete duct block will be provided underground to protect the cables from roots and the drying out of the duct surround.
- The micrositing of embedded landscape mitigation measures will be subject to the results of archaeological trial trenching.
- All PRoW / footpaths / car parks affected by the Proposed Development shall be reinstated to at least the condition and quality prior to works being carried out.
- Any street furniture removed or damaged during the installation of the Onshore Cable Route shall be replaced with street furniture of the same quality.
- Any landscaping associated with Portsmouth City Council's Coastal Defence Scheme (considered in cumulative effects) and referred to in paragraph 15.5.4.8 of Chapter 15 of the ES (APP-130) which is impacted by the works shall be reinstated to the same quality and finish as the future baseline.

6.2.5. AGRICULTURAL SOILS AND LAND USE

- 6.2.5.1. Within the current design for the Onshore Cable Route, trenches within agricultural land will be excavated to a typical depth of 1300 mm (depth dependent on the existing utilities). The contractor will ensure that topsoil and subsoil resources are kept separate and placed either side of the exposed trenches. The cables ducts will be laid within approximately 400 mm of cement-bound sand and the remainder of the void is to be backfilled with the excavated soil. Priority should be given to full use of the topsoil resource in the reinstatement of soils above the cable: the surplus material should all be subsoil.
- 6.2.5.2. As stated in Waste and Material Resources above, the current design of the Converter Station seeks to balance cut and fill, and excess material (estimated at 45,325 tonnes) will be available for use in reprofiling the landform, pond fill and screening. Outstanding surplus will be suitable for off-site general or landscaping fill.

6.2.6. GROUNDWATER

- 6.2.6.1. Any groundwater or rainwater that collects in a trench will be pumped into locations agreed with the landowners, local authorities, EA or drain operators (Highways Authorities). The method of water discharge has yet to be determined.
- 6.2.6.2. The water management permitting, licenses and agreements will be completed by the appointed contractor, with the quantities of groundwater management determined at the detailed design stage. This applies to all sections. The groundwater collected will either be discharged to surface water, sewer, disposed of off-site or a combination of these three methods. This applies to all sections.
- 6.2.6.3. If the water is to be discharged to sewer or a surface waterbody then a discharge consent(s) may be required. The permitting process will be completed by the contractor, after detailed design, once a dewatering and discharge management methodology has been agreed upon. This applies to all sections.
- 6.2.6.4. Should groundwater dewatering be substantial (greater than or equal to 20m³/day) an abstraction licence and discharge consent will be required from the EA. At present the requirement for a groundwater abstraction for trench installation is not confirmed, the quantities of groundwater removal will be determined at detailed design stage. The appointed contractor will be responsible for acquiring the relevant consents and adhering to the conditions of said consents. All groundwater abstraction licensing and discharge permits will not be disapplied but obtained during the detailed design Stage, as agreed upon with the EA.

HDD Groundwater Level and Flow

- 6.2.6.5. To ensure drilling fluids do not break out into the groundwater environment nor groundwater seeps into the bore, a mud engineer will be present at all times during the HDD drilling process to monitor drilling fluid viscosity, density, annual pressure,

solids contents, filter cake quality and total mud volume and thereby ensuring the filter cake remains intact and that drilling fluid is not lost to the ground and that groundwater does not seep into the bore annulus. In addition, a review of the proposed drilling fluid and inert polymers will also be completed before ground is broken. All drilling fluids, including polymers, will be CEFAS rated products.

- 6.2.6.6. Drilling fluid losses to groundwater can occur in high permeability ground materials, which are areas with intense fracturing/dissolution features. This is a particular concern in areas which are designated as groundwater Source Protection Zone 1 (SPZ1). These are assigned to the Portsmouth Water public water supply abstractions, the protection of which is of the utmost importance.
- 6.2.6.7. The scheme design in the first instance ensures that the trenchless construction avoids karst dissolution features (in the Chalk) as much as possible. At HDD-5 (Kings Pond), the drilling will be kept in the overlying Lambeth Group only. The contractor will ensure that when drilling HDD-5 there will be at least a 5m standoff between the proposed HDD alignment and the Chalk at all times. Karst dissolution features can also be present in ground materials overlying the Chalk, in the form of voided overburden.
- 6.2.6.8. The drilling team will also need to be briefed on the environmental sensitivity of the SPZ1 and the importance of identifying karst dissolution features prior to work commencing and during the works. They will need to monitor the fluid pressures and observe for significant pressure drops throughout the works. A significant pressure drop would indicate that loss of fluid, potentially to fractures/dissolution features, may be occurring. The Karstic Dissolutions Feature Watching Brief will be implemented in accordance with the Earthworks Management Plan to identify any elements of karst dissolution features at any time during the works.
- 6.2.6.9. Should such features be detected, drilling should be paused temporarily, until the Engineer on site can determine the most suitable course of action for mitigation, from a catalogue of actions already agreed with Portsmouth Water and the EA. A number of actions can be taken to seal the area of loss, for example increasing the drilling fluid viscosity or introducing a cement grout. Real time downhole annular pressure monitoring should be completed to allow for these observations. The exact pressure change parameters and procedures to evaluate mitigation would need to be agreed with Portsmouth Water and the EA at detailed Design Stage. Portsmouth Water and the EA will also be notified immediately of any loss of drilling fluid. Once the risk from the dissolution feature has been satisfactorily mitigated (i.e. to no risk of contamination), works will then resume. The complete methodology which should be adhered to for these works, detailing the mitigations described and sequence of actions, is presented in the UK Source Protection Zone 1 Generic Method Statement (Appendix 7 of this Onshore Outline CEMP).

- 6.2.6.10. The launch and receptor pits for the HDD-4 (Farlington Railway Crossing (Trenchless)) will include perimeter sheet piled walls toed into the Chalk to reduce groundwater ingress from the superficial River Terrace Deposits. Groundwater seepage at the base of the pits could occur and this will be sump pumped during operation. The potential consents and permits required to manage this water will be completed by the appointed contractor. The method of discharge has yet to be determined. The groundwater collected will either be discharged to surface water, sewer, disposed of off-site or a combination of these three methods. If the water is to be discharged to sewer or a surface waterbody then a discharge consent(s) may be required. The permitting process will be completed by the contractor, after detailed design, once a dewatering and discharge management methodology has been agreed upon. The appointed contractor will be responsible for acquiring the relevant consents and adhering to the conditions of said consents. Any contaminated water would require off-site disposal. The tunnel will have a lower permeability drilling material when drilled to ensure water does not ingress, then the tunnel will have an impermeable ducting to ensure no ingress into the tunnel itself. The ingress of groundwater at the entrance and exit pit will be managed.
- 6.2.6.11. The required groundwater dewatering quantities for HDD-4 pits will be determined at detailed design. The designer must ensure the discharge quantities are accurate or conservative to ensure no flood risk should be increased due to surplus groundwater encountered during construction.
- HDD Groundwater Quality**
- 6.2.6.12. All drilling equipment will be checked and cleaned before use. This will prevent cross contamination. A review of the drilling fluid and inert polymers will also be completed before ground is broken. All drilling fluids, including polymers, will be Cefas rated.
- 6.2.6.13. Drilling through alternative geologies can transfer existing contamination from one source to another. Drilling can also generate fines which can increase sediment in the water column, creating turbidity contamination. The Filter Cake will prevent the mobilisation of contaminants from one groundwater body to another, as the cake 'self-seals' as the drilling progresses. Therefore, no cross contamination is anticipated. Following the embedded mitigation measures the drilling fines and fluids will be contained in the drilling cake, preventing contamination from spreading between sources and drilling fines entering the local groundwater receptors.
- 6.2.6.14. To ensure surface breakout is not lost to the environment a flexible hose pump will be contained at the exit compound site so breakout fluid can be retained on site. A sufficiently sized Intermediate Bulk Container or similar will be stored on site to store such a breakout.

Onshore Cable Route Trench Excavation Works

- 6.2.6.15. A catalogue of potential mitigation measures is to be developed for the Onshore Cable Route Trench Excavation Works, to deal with potential areas of insufficient Head deposits in Sections 1, 2 and 3 (designated as a Groundwater Source Protection Zone 1). This is driven by the possible presence of unidentified karst dissolution features in the areas outside of the Converter Station Area but within the Order Limits. These have been raised as a topic of a concern by Portsmouth Water and the EA, due to their potential ability to act as rapid contamination pathways directly to Portsmouth Water's public water supplies (at Lovedean and H&B Springs). Based on the available information, it is considered likely that sufficient Head deposit cover is present throughout the proposed route in these sections.
- 6.2.6.16. The types of proposed mitigation measures are discussed in Section 6.4.3 below.

6.2.7. SURFACE WATER RESOURCES AND FLOOD RISK

Surface Water Drainage Patterns

- 6.2.7.1. A number of Main River and Ordinary Watercourse crossings are located within the Order Limits, as detailed within Table 6.1. To limit the impact to the surface water environment alongside other environmental and design constraints the development will pass under a number of these open channel watercourses using HDD or Trenchless techniques to pass under the watercourses open channel. HDD / Trenchless techniques are proposed at:
- Kings Pond (HDD) (Soake Farm - Main River) – HDD-5;
 - Farlington Railway Crossing (Trenchless) (Farlington Marshes Gutter - Ordinary Watercourse) – HDD-4; and
 - Langstone Harbour (HDD) (Broom Channel - Transitional/ Tidal Watercourse) – HDD-3.
- 6.2.7.2. The other Main Rivers and Ordinary Watercourses identified, as detailed within Table 6.1, are proposed to be crossed within the public highway where the watercourses are confined to a culvert and works within the cable corridor will not impact on the watercourses drainage patterns.

Water Supply and Surface Water Wastewater Infrastructure – Quantity

- 6.2.7.3. During construction it is proposed that any temporary requirements for water supply and foul wastewater throughout the Order Limits are to be provided through temporary site compounds and construction set up that would not utilise the existing local networks.
- 6.2.7.4. Notwithstanding the above, an in-principle connection agreement with Portsmouth Water has been obtained for the proposed permanent connection for the Converter Station Area with agreement for temporary use during construction, if required,

subject to detailed design and to be determined by the appointed contractor. This in-principle agreement is for a connection point at Broadway Lane and has been obtained from Portsmouth Water for an assumed demand requirement of 105 'loading units' based on Portsmouth Waters application for water supply calculations.

6.2.7.5. Any changes to the assumed demand and construction demand shall be agreed with Portsmouth Water prior to connection, with the contractor responsible to account for any head loss when sizing the supply.

6.2.7.6. If the contractor determines, during detailed design, that it would be appropriate to utilise a local water infrastructure network throughout the Onshore Cable Corridor, the anticipated quantities are likely to be variable depending on its specific use. Furthermore, a proposed temporary connection for either clean water supply, surface water and foul water discharge would be subject to approval from Portsmouth Water (clean water supply) and Southern Water (wastewater).

Surface Water Features Water Quality

6.2.7.7. To avoid disruption to the Main Rivers and Ordinary Watercourses (Table 6.1) located within the Order Limits all installed ducts and trenching across watercourses should be undertaken within the highway carriageway. By remaining within the carriageway any existing watercourses are expected to pass under the carriageway within a watercourse structure (e.g. culvert or sewer).

6.2.7.8. Where open channel watercourses are present within the Order Limits HDD or Trenchless techniques are to be used to pass under the watercourses open channel.

Human Receptors and Infrastructure as a Consequence of Flood Risk

6.2.7.9. The Converter Station Area is located on high ground and away from any watercourse and is located within Flood Zone 1.

6.2.7.10. Proposed watercourse crossings detailed within Table 6.1 are to be via HDD/ Trenchless techniques or within the carriageway around a watercourse structure (culvert or sewer). Other minor ditches and dry watercourses, also defined as Ordinary Watercourses, have not been individually identified at this stage; however, it is anticipated that a number of additional Ordinary Watercourse crossings may be required within the Onshore Cable Corridor. Identification of any other Ordinary Watercourse crossings will be further investigated post-application as part of the detailed design undertaken by the appointed contractor once the specific Cable Route is confirmed within the Onshore Cable Corridor. It is anticipated that this would include ditches to the side of roads and extreme weather overland flow routes that are typically dry known as 'winterbourne or dry watercourse'. The overall principles of crossing these open watercourses will be subject to an Ordinary Watercourse Consent and in principle, any works going through these features will need to ensure that: watercourse flow is maintained, there is no increase to the local flood risk, and appropriate pollution prevention measures are in place.

- 6.2.7.11. Works within the Onshore Cable Corridor adjacent to the coastal flood defences have been developed alongside consultation with ESCP' and should avoid works to existing or proposed coastal flood defence and where appropriate HDD or Trenchless techniques are to be used to pass under the coastal flood defences.
- 6.2.7.12. It should be noted that the implementation of above principles will be the responsibility of the appointed contractor to develop during detailed design and be subject to relevant environmental consents prior to construction.

Table 6.1 – Summary of Watercourses within the Order Limits

Code	Watercourse Name	Classification	Typical Form with Onshore Order Limit	Structures within Onshore Order Limit	Proposed Watercourse Crossing	Water Environment Consent Regulator	Overview
WC.01	Soake Farm North	Main River	Open channel*	None	No	EA	No proposed crossing
WC.02	Soake Farm South	Main River	Open channel	None	Yes	EA	Proposed to horizontal directional drill under watercourse
WC.03	Unnamed	Ordinary Watercourse	Open channel/ culvert	Culvert	Yes	SW, LLFA	Proposed crossing culvert within carriageway build up
WC.04	Old Park Farm	Main River	Culvert	Twin culvert	Yes	SW, LLFA, EA	Proposed crossing culvert within

Code	Watercourse Name	Classification	Typical Form with Onshore Order Limit	Structures within Onshore Order Limit	Proposed Watercourse Crossing	Water Environment Consent Regulator	Overview
							carriageway build up
WC.05	Unnamed	Ordinary Watercourse	Culvert	Culvert	Yes	SW, LLFA	Proposed crossing culvert within carriageway build up
WC.06	Unnamed	Ordinary Watercourse	Culvert	Box Culvert	Yes	SW, LLFA	Proposed crossing culvert within carriageway build up
WC.07	Unnamed	Ordinary Watercourse	Swales*	None	No	LLFA	No proposed crossing
WC.08	Unnamed	Ordinary Watercourse	Culvert	Culvert	Yes	SW, LLFA	Proposed crossing culvert

Code	Watercourse Name	Classification	Typical Form with Onshore Order Limit	Structures within Onshore Order Limit	Proposed Watercourse Crossing	Water Environment Consent Regulator	Overview
							within carriageway build up
WC.09	North Purbrook Heath (North)	Main River	Culvert	Twin box culvert	Yes	EA	Proposed crossing culvert within carriageway build up
WC.10	North Purbrook Heath (South)	Main River	Open channel	None	No	EA	No proposed crossing
WC.11	Unnamed	Ordinary Watercourse	Open channel	None	Yes	LLFA	Proposed Trenchless techniques under watercourse

Code	Watercourse Name	Classification	Typical Form with Onshore Order Limit	Structures within Onshore Order Limit	Proposed Watercourse Crossing	Water Environment Consent Regulator	Overview
WC.12	Farlington Marshes Gutter	Main River	Open channel	None	No	EA	No proposed crossing
WC.13	Broom Channel	Main River	Channel	None	Yes	EA, HE, ESCP	Proposed horizontal directional drill under watercourse and defences
WC.14	Great Salterns Drain	Main River	Culvert	Culvert	Yes	EA, HE, ESCP	Proposed crossing culvert within carriageway build up

Other minor Ordinary Watercourses not identified in the list above may also be crossed, any such crossing will also require an Ordinary Watercourse Consent or exemption and shall follow the principles set out in Section 5.7

- 6.2.7.13. Land affected by open trenching will be reinstated with native soil and or surfacing, typically with no infrastructure left above ground.

6.2.8. NOISE AND VIBRATION

Environmental Control Measures to be employed for specific activities

Trenching

- 6.2.8.1. The majority of duct laying activities via trenching are will take place during weekdays between the hours of 07:00 and 17:00 and Saturdays from 08:00 to 13:00 hours. Due to the transient nature of the duct laying works, and the substantial space constraints anticipated, noise mitigation in the form of screening is unlikely to be feasible.
- 6.2.8.2. However, there are some locations where trenching may take place outside of core working hours (i.e. during evenings, weekends and at night-time) to mitigate negative traffic effects on the surrounding road network and minimise disruption to businesses (e.g. Sainsbury's supermarket). The potential works locations outside of core working hours are as follows:
1. Section 4 – a c.90m section of the A3 London Road in Purbrook near Stakes Road;
 2. Section 5 – Havant Road between Farlington Avenue and Eastern Road;
 3. Section 6 –Sainsbury's Car Park;
 4. Section 8 – Eastern Road between Airport Service Road and the north of Milton Common (c. 350m south of Tangier Road); and
 5. Section 8 – Eastern Road between HDD-6 and Eastern Avenue.
- 6.2.8.3. For further information, see section 2.3.1 and the Framework CTMP (REP6-032).
- 6.2.8.4. The following mitigation measures will be employed during the trenching works outside of core working hours:
- All locations**
- 6.2.8.5. Mitigation for trenching works outside of core working hours will incorporate screening achieving at least 5 dB attenuation. The exact form that this screening would take is unknown at this stage, and will be confirmed following the contractor appointment and the production of detailed works plans It could, for example, comprise solid (e.g. timber) 2 m high site hoarding around the construction works. All gaps (e.g. knot holes, cracks and other joints) will be sealed to minimise the escape of noise. Alternatively, if this is not possible due to time or space constraints, Heras fencing around the compounds will be fitted with acoustic quilts, and combined with further localised screening of particularly noisy equipment items. Acoustic quilts must be fitted to fencing with no gaps underneath or between the panels. Screening is considered an important mitigation measure at these locations because of receptors

being more sensitive to noise during the night-time period when stricter criteria apply. Plate 6.1 provides some examples of potential screening solutions.

- 6.2.8.6. In addition to the community liaison measures outlined in sections 4.4.3 and 5.11.2, nearby residents will be informed of the specific timings during the daytime when road cutting/breaking and re-surfacing activities are expected to take place outside of their property so that they can make alternative arrangements, if they wish, whilst the noisiest works are taking place.
- 6.2.8.7. Road cutting/breaking and re-surfacing activities shall not be carried out at night (22:00-07:00) in the vicinity of sensitive receptors. The exact distance from sensitive residential receptors that this mitigation measure will be applied to must be confirmed in a CEMP submitted at the detailed design stage, when works plans and equipment specifications to be used on-site are confirmed. The distance from sensitive residential receptors that the road cutting/breaking and re-surfacing restriction will apply to must ensure that the noise level from works beyond this distance does not exceed 50dB $L_{Aeq,9h}$ between 22:00 – 07:00 externally at the façade of any residential receptor. This will ensure that works not subject to the night-time cutting/breaking and resurfacing restriction will result in, at worst, a minor adverse effect (not significant).
- 6.2.8.8. Works in these areas should be completed as quickly as possible to minimise the duration of residents' exposure to high noise levels, whilst minimising the duration of works during the most sensitive periods (i.e. night-time).

Section 4 – a c.90m section of the A3 London Road in Purbrook near Stakes Road

- 6.2.8.9. Aim to complete duct laying for each circuit over eight weekends (four weekends per circuit). It is most likely that each circuit would be completed in four c.22-23m sections, one per weekend. At this stage, it has not been confirmed if these would be consecutive weekends. However, completing the works across non-consecutive weekends would reduce negative noise impacts through respite periods.
- 6.2.8.10. Work will be completed between 08:00 and 18:00 on Saturday and Sunday.

Section 5 - Havant Road between Farlington Avenue and Eastern Road

- 6.2.8.11. There are three potential options for the out-of-hours works in section 5:

- Option 1 – Works for each circuit could be completed in a single weekend per circuit (two weekends in total which could be consecutive or non-consecutive). Works would commence at sunrise on Saturday morning and continue until sunset on the Sunday evening. Whilst this would include night-time working on Saturday, to minimise sleep disturbance in the immediate area, the noisiest activities (road cutting/breaking and re-surfacing) shall not be carried out at night (22:00-07:00), and this restriction applies to the entire length of these works on Havant Road between Farlington Avenue and Eastern Road.
- Option 2 – Works for each circuit could be completed in two consecutive weekends per circuit (four weekends in total) during the daytime and evening (from 07:00 to 22:00).
- Option 3 – Works for each circuit could be completed in two non-consecutive weekends per circuit (four weekends in total) during the daytime and evening (from 07:00 to 22:00).

6.2.8.12. Whilst the option that will be chosen cannot be confirmed until a contractor is appointed, avoiding night-time working, and/or completing the works across non-consecutive weekends would reduce negative noise impacts by avoiding the most sensitive time periods and providing respite.

Section 6 - Sainsbury's Car Park

6.2.8.13. The installation of the cable ducts at Sainsbury's car park and associated access road may need to take place during the evening and at night to minimise disruption to the supermarket.

6.2.8.14. To minimise sleep disturbance in the immediate area, the noisiest activities (road cutting/breaking and re-surfacing) shall not be carried out at night (22.00 – 07.00). The distance from the sensitive receptors (Marshfield House and dwellings on Lealand Road) that this restriction applies must be determined at detailed design stage in accordance with the control described in Paragraph 6.2.8.7 above.

Section 8 - Eastern Road between Airport Service Road and the north of Milton Common (c. 350m south of Tangier Road)

6.2.8.15. In order to minimise traffic disruption, 24-hour working seven days per week may be undertaken.

6.2.8.16. To minimise sleep disturbance, the noisiest activities (road cutting/breaking and re-surfacing) shall not be carried out outside the Harbourside Caravan Park and the residential flat above the Great Salterns Mansion Harvester at night (22:00-07:00). The distance from Harbourside Caravan Park and the residential flat that this restriction applies must be determined at detailed design stage in accordance with the control described in Paragraph 6.2.8.7 above.

- 6.2.8.17. Until a contractor is appointed, and detailed work plans are produced, it is not feasible to identify further specific physical mitigation measures that could be employed. However, the contractor appointed will engage with local residents affected by the works and the environmental health department at the local planning authorities to agree additional mitigation to reduce the significant effects as far as reasonably practicable.

Section 8 – Eastern Road between HDD-6 and Eastern Avenue

- 6.2.8.18. To minimise traffic disruption, there is a potential for seven day working between 07:00-17:00 if cable ducts are required to be installed within the Eastern Road between HDD-6 and Eastern Avenue.
- 6.2.8.19. There are other preferential options for the installation of the cable ducts in section 8 which would avoid the need for works outside of core working hours on Eastern Road between HDD-6 and Eastern Avenue. There are as follows:
- Installing the cable route along the other two options through Milton Common;
 - Installing the cable route within the open ground adjacent to the south of Eastern Road; or
 - Installing the cable route within Eastern Road during Core Working Hours only.

Joint Bays

- 6.2.8.20. Mitigation for Joint Bays which are predicted to have any more than a negligible impact at surrounding receptors will be in the form of screening achieving at least 5 dB attenuation. Generally, Joint Bays located in rural areas distant from sensitive receptors would not require screening, whereas those in more urban areas in close proximity to sensitive receptors would require screening. Example noise screening solutions are illustrated in Plate 6.1.

HDD sites

- 6.2.8.21. Screening achieving at least 5 dB attenuation will be required at all HDD compounds. As work associated with HDD compounds will be scheduled for longer relative to trenching and Joint Bay activities, this screening is likely to require solid (e.g. timber) hoarding around the HDD compounds. The screening must provide noise mitigation to surrounding residential receptors and/or Solent Wader Brent Goose Strategy (SWBGS) sites.-Example noise screening solutions are illustrated in Plate 6.1.
- 6.2.8.22. At HDD-1 (Landfall), HDD-3 (Portsea Island), HDD-4 (Railway), HDD-5 (Kings Pond) and HDD-6 (Milton Common), hoarding around the HDD compound should be at least 2m high. At HDD-2 (Eastney and Milton Allotments), hoarding around the compound should be at least 3m high, to provide sufficient mitigation to the Thatched House public house.



Plate 6.1 – Example noise screening solutions

6.2.9. SOCIO-ECONOMICS

- 6.2.9.1. HDD will be used at Landfall, Eastney and Milton Allotments/ Milton Locks Nature Reserve and Milton Common. This avoids direct impacts on Eastney Beach, the Allotments and Milton Locks Nature Reserve respectively.
- 6.2.9.2. Where the Onshore Cable Corridor crosses open space, the Onshore Cable Route would be designed to avoid key recreational facilities. This includes avoiding:
- Two cricket squares at Farlington Playing Fields and the cricket square at Langstone Harbour Sports Ground; and
 - A football pitch and, skate park at Bransbury Park.
- 6.2.9.3. The Framework Traffic Management Strategy (REP6-030), including Appendix 1, Onshore Cable Route Construction Impacts on Access to Properties and Car Parking and Communication Strategy also sets out principles for mitigation, including:

- Traffic Management to keep one lane open including temporary traffic signals on single carriageways and lane closures on wider roads including dual carriageways;
- Access to residences, businesses and community facilities - including access to driveways outside working hours and three-way signals for business premises with their own access onto affected highways; and maintenance of side road access;
- A communication strategy to allow stakeholders such as residents, businesses and community facilities to keep up to date with construction works;
- Access principles for pedestrians and cyclists; public transport; school access; and emergency services; and
- Programme constraints, taking into consideration major events.

6.2.9.4. Prior to construction commencement on recreation facilities, temporary works will be implemented to protect existing drainage. Land drains will be protected from point loading pressure caused by plant and equipment with the use of track mats. For protection under stone haul roads a geogrid mesh material will be used to reinforce the underlying soil which in turn will mitigate damage caused by wheel loading pressures. Alternatively track matting may also be used as a suitable geogrid / stone haul road alternative. Any land drains damaged by trenching activities, during construction of HDD pits and joint bays must ensure flood risk is not increased during construction and will be repaired ahead of subsoil back filling in accordance with the reinstatement plan. Land drains damaged by trenching activities must be repaired in the same working day ahead of subsoil back filling where the situation is considered an emergency (i.e. if relevant action is not taken, there will be adverse health, safety, security or environmental consequences that in the reasonable opinion of the undertaker would outweigh the adverse effects to the public of taking that action). Land drains damaged during construction of HDD pits and joint bays must be repaired on completion of the works ahead of back filling. Temporary drainage will be provided during construction if pitches still in use are indirectly affected by interruption or damage to the drainage system

Disruption to Residences and Local Businesses

6.2.9.5. Overall, residential and business access will be maintained, wherever practicable, albeit with different traffic management approaches applied depending upon the circumstances as described in the Framework Traffic Management Strategy, Appendix 1, Onshore Cable Route Construction Impacts on Access to Properties and Car Parking and Communication Strategy.

6.2.9.6. Along the majority of the roads within the Order Limits, a single lane will remain open to traffic and access will be maintained for cyclists and pedestrians at all times.

Pedestrian and cycle routes along the Onshore Cable Corridor will be maintained wherever practicable, with full closure considered as the last resort, such as where it would prevent full closure of a major road. In all cases the construction works will ensure that pedestrians and cyclists can pass the corridor in a safe manner, with suitable barriers between the construction works.

- 6.2.9.7. Access to junctions with roads affected by the Order Limits, business premises and retail parks will be maintained using three-way traffic lights.

Disruption to Community Facilities

- 6.2.9.8. As set out in the Framework Traffic Management Strategy, to avoid disturbance to schools, construction of the Cable Corridor will not take place outside of the school holidays where they there are schools located directly adjacent to the Onshore Cable corridor. These include:

- Solent Junior School on Solent Road and Solent Infant School on Eveleigh Road, adjacent to Farlington Avenue; and
- Mooring Way Infant School, Moorings Way.

- 6.2.9.9. The Framework Traffic Management Strategy Transport Strategy also includes measures to continue to provide access to emergency services adjacent to the Order Limits.

Effects on Users of Recreation, Leisure Facilities and Open Space and Non-Motorised User Routes

- 6.2.9.10. A Framework Management Plan for Recreational Impacts (REP4-026) has been developed to demonstrate ways in which the general mitigation principles described in Section 5.12 above can be applied to construction to minimise effects with a particular focus on carefully timing the works and minimising the working areas in the open spaces affected. In addition, specific mitigation (for example relocation of pitches) has been explored and would be adopted where necessary and practicable.

- 6.2.9.11. A detailed method statement will be prepared and agreed with the University of Portsmouth prior to works to the University Pitches within the redline boundary. The method statement will comprise arrangement of temporary works, programme and reinstatement.

- 6.2.9.12. For works through the University of Portsmouth land the contractor will keep the works as far to the eastern extent as practical to minimise impacts on sports facilities. This will take into account other environmental and engineering restrictions and considerations.

- 6.2.9.13. Seven PRoW are potentially affected by the Onshore Cable Corridor The PRoW are listed below:

- PRow 4 (and PRow 16) – Section 1, farm track between Broadway Farm and Little Denmead Farm a temporary diversion would be required;
- PRow 41 – Section 2, bridleway between Anmore Road and Edney Lane a temporary diversion would be required;
- PRow 11– Section 4, starting/ending at Maurepas Way, no diversion required as route terminates at the public highway;
- PRow 17 – Section 4, located along Milk Lane, no diversion required as route terminates at the public highway;
- PRow 24 – a short length of footpath connecting Drayton Lane and the B2177 to the south west of the Order Limits for the Proposed Development, temporary diversion required;
- PRow 31 – Section 5, a small section of footpath which provides a link between Eastern Road and Copsey Grove, no diversion required as route terminates at the public highway; and
- PRow 33 – Section 6, Zetland Fields, temporary diversion required.

6.2.9.14. Additionally, there are a number of permissive paths including four Long Distance Walking Routes (Monarchs Way in Section 1, Wayfarers Walk in Section 3- 4, The Solent Way in Sections 7-10, and Shipwrights Way in Section 10) within the Order Limits. Diversions will be provided at Milton Common and at Bransbury Park.

6.2.9.15. The Transport Assessment programmes work outside key periods, such as including December for Christmas Shopping and the Victorious Festival on Farlington Playing Fields.

6.2.10. HUMAN HEALTH

- To minimise disruption, a single lane closure would be used, where practicable, rather than a full road closure. Road closures (70 m distance in total) are anticipated at:
 - Broadway Lane (one days per circuit, two days total);
 - Anmore Road (one day to two weeks);
 - A3 London Road between Poppy Fields and Ladybridge Roundabout (one weekend for both circuits);
 - Farlington Avenue between Sea View Road and Solent Road (one - two weeks for both circuits);
 - Farlington Avenue between Solent Road and Havant Road (one - two weeks for one or both circuits, therefore up to two – four weeks for both circuits);

- Eveleigh Road (one - two weeks for one circuit, therefore three - four weeks total);
 - The entirety of Yeo Court within Section 9;
 - Havant Road between Farlington Avenue and Waterworks Road (one - two days for one circuit, therefore up to four days total);
 - Eastern Avenue (two - three weeks per circuit, therefore four - six weeks for both circuits);
 - Furze Lane Bus Link (two weeks); and
 - Yeo Court (one week per circuit therefore up to two weeks).
- Where construction works do obstruct a footway an absolute minimum unobstructed width of 1.0 m will be provided alongside the construction corridor and where this is not possible a safe alternative route will be provided. This will include provision of suitable crossing facilities where required, including the temporary replacement of existing pedestrian crossings that may need to be closed to facilitate construction.
 - During construction of the Onshore Cable Route, where existing bus stops need to be closed, a temporary bus stop will be provided as close as practicable to the original location, taking into account highway safety of all road users.
 - While residents will be informed of construction works and encouraged to make alternative arrangements where practicable, such as parking on-street, steel plating over the trench will be available during working hours in the case of emergencies. Outside of these times road plates will be installed and construction fences removed to allow access over the construction zone. Where the construction zone falls on the opposite side of the carriageway to driveways access will be maintained at all times, but drivers will be made aware of construction works/traffic signal control, as appropriate.
 - Access to business premises will be maintained using either three-way traffic signals, with excavation of the trench taking place in two phases to allow a 3 m access to be maintained at all times, or through use of road plates.

6.2.10.1.

It is expected that there will be a programme of community liaison to ensure that the potentially effected receptors are provided with early warning of construction activities (including targeted leafleting at affected properties and community facilities). Signage and advanced warning will be provided in advance of the temporary closure. Any diversions will be suitable to accommodate all users.

6.2.11. HORIZONTAL DIRECTIONAL DRILLING POSITION STATEMENT

- 6.2.11.1. The HDD Position Statement (REP1-132) outlines the requirements on the contractor for the HDD locations, setting out the constraints and specific requirements for construction at each HDD location. HDD/Trenchless installation will be used in the locations identified in the Horizontal Directional Drilling Position Statement and provides indicative information outlining the requirements for the compounds and work methodology for the HDD works at these locations.
- 6.2.11.2. The mitigation measures that will be employed for HDD works involve:
- Monitoring of drilling fluid returns and volumes to warn of inadequate hole cleaning. If drilling fluids are returning to the injection point there will be an immediate warning that there is a breakout and drilling will cease to correct;
 - Drilling fluid to be of sufficient viscosity and properties for the ground being drilled. It will be ensured that the cuttings are carried to surface to prevent blockages, Mud man to monitor rheology of muds;
 - Real time downhole annular pressure monitoring to warn of over pressurising by drilling fluid. Pressures will be kept within hydro fracture calculations limits.
 - A visual drilling fluid 'spotter' will be employed to undertake daily visual checks of the drilling route.
- 6.2.11.3. The drilling fluids which are to be used are constructed of naturally occurring bentonite. We can be sure of the products safety as the drilling products (Bentonite) are listed on the British Governments CEFAS (Centre for Environmental Fisheries and Aquatic Science) website and PLONOR (Pose Little Or No Risk) list
- 6.2.11.4. In the rare event of any break out of bentonite drilling fluid, any such break out of bentonite drilling fluid would be remediated.
- 6.2.11.5. Once the bentonite has been removed the area can be reinstated to original condition.

6.3. SECTION 1 – LOVEDEAN (CONVERTER STATION AREA)

6.3.1. LANDSCAPE AND VISUAL

- 6.3.1.1. Construction cranes will be retracted when not in use. The height of the cranes when not in use will be dependent on the crane manufacturer, but is likely to be approximately 5m. Tower cranes will not be used on site.

6.3.2. ONSHORE ECOLOGY

- 6.3.2.1. The 15m buffer between construction works and Stoneacre Copse, Crabden's Copse and Crabden's Row required to avoid direct effects on this feature must be protected from works at all times.

Closure of badger setts under licence

- 6.3.2.2. The two badger setts to be lost to the converter station footprint (Option B(i)) will be closed using badger gates outside of the badger breeding season (June-November inclusive).
- 6.3.2.3. Setts will be closed using one-way gates so badgers can leave but cannot return to the sett. Following a period of monitoring to ensure badgers are not within them, the setts will be dug out.
- 6.3.2.4. This process will avoid potential death or injury to badgers as a result of development, and work must be undertaken under a Natural England licence to allow legal sett closure.
- 6.3.2.5. In addition, open excavations will be fitted with mammal ladders (planks of wood at either end) to allow animals to climb out if they fall in and prevent the trapping of animals including badgers.

6.3.3. ARBORICULTURE

6.3.3.1. The following measures are required:

- Works Compound and Laydown Area shall be prohibited within the RPA of woodland retained trees and hedgerows. When storing materials, particularly liquids, slopes and drainage channels shall be used to prevent spillages and flow into the RPA of woodland retained trees and hedgerows. Temporary fencing in accordance with British Standard 5837:2012 “Trees in relation to design demolition and construction recommendations” shall be erected at the periphery of the RPA allocated to woodland retained trees and hedges to exclude construction workers other than workers delivering the site specific management activities associated with those features.
- Works shall be prohibited within 15m of the ancient woodland and follow the same measures as identified above.
- Design shall avoid positioning apparatus in conflict with the above (stem and canopy) and below ground (RPA’s) elements of existing trees. Where significant incursion is unavoidable, trees shall be appropriately replaced.
- Mitigation for the loss of hedgerows and hedgerow trees will involve replacement with like for like species of a similar size with hedgerow trees repositioned at least 5 m away from the Onshore Cable Route within the Order limits.
- In line with the proposed Generic Arboricultural Method Statement (see document reference 7.7.21), the process of construction of the Converter Station must minimise encroachment on the west side of the Converter Station and impacts on the existing hedgerow and hedgerow trees.

6.3.4. CONSTRUCTION SURFACE WATER MANAGEMENT

6.3.4.1.

In addition to the General Environmental Control Measures contained within Sections 5.5, 5.6 and 5.7, the following shall also be prepared and implemented and shall be discussed and agreed with the statutory authorities and other stakeholders to avoid potential pollution of the surface and ground water:

- Construction Surface Water Management Plan ('CSWMP'). Area with prevalent run-off shall be identified and drainage shall be actively managed, e.g. through bunding and/or temporary drainage. Temporary drainage works shall be designed and constructed to relevant statutory guidance in consultation with statutory authorities and other stakeholders.
- The Emergency Pollution and Spill Response Plan shall be prepared in compliance with Section 4.6.
- Earthwork Management Plan ('EWMP'). EWMP shall be prepared in conjunction with CSWMP to ensure the risk of flooding and contamination of SPZ1 is not increased during bulk earthworks. These shall be formed part of the CEMP.
- To mitigate any potential impact of the known and unknown karst features to the ground water receptors, the Contractor shall prepare a project specific Method Statement and Communication Plan detailing mitigation for bulk earthworks in compliance with the UK SPZ 1 Generic Method Statement (Appendix 7).
- SPZ1 protection measures shall be agreed by put in-place by the appointed contractor for any further site investigation. Any further site investigation shall be undertaken in accordance with Environment Agency guidance as outlined in "Technical Report P5-065/TR" (Environment Agency, 2000).
- The appointed contractor shall design and construct a temporary low permeable construction compound to house the heavy vehicles and construction works and shall take all steps necessary to avoid cross contamination and shall use appropriate water management techniques during the ground work to control potential pollution of the surface water and ground water.
- All temporary diesel generator(s) shall be bunded with drainage design to be undertaken by the contractor and complying with the treatment and flow control principles of the Operational Stage and contractor's carpark.
- Refuelling of machinery shall be undertaken within designated areas where spillages can be easily contained. Machinery shall be routinely checked to ensure it is in good working condition.
- Any tanks and associated pipe work containing hazardous substances shall be double skinned and be provided with intermediate leak detection equipment.

- Area at risk of spillage, such as vehicle maintenance areas and hazardous substances stores (including fuel, oils, and chemicals) shall be bunded and carefully sited to minimise the risk of hazardous substances entering the drainage system to the local watercourses, additionally the bunded areas shall have impermeable base to limit the potential for migration of contaminants into ground.
- It is recommended that the excavation works in the proposed areas of “cut” (in approximately the northern third of the Converter Station area) be undertaken outside of the winter wet season and in the summer dry season if feasible. This will significantly help in reducing the likelihood of infiltration of surface runoff water containing suspended sediments (turbidity) into the exposed Chalk aquifer. If the works are undertaken in the wet season, the works should be undertaken using a staged approach, where any exposed Chalk is covered over as soon as possible to prevent the ingress of turbid runoff. This runoff should be collected by the temporary water management system. This approach should be undertaken regardless of time of year, however, is especially critical should the undertaking of the works in the winter wet season be unavoidable (due to programme constraints).

6.3.5. NOISE AND VIBRATION

- 6.3.5.1. The following best practice noise and vibration mitigation measures will be employed at the Converter Station Area.
- 6.3.5.2. Throughout the Construction Stage, the Converter Station access road will be maintained in a good condition (i.e. free from bumps/potholes) to minimise the generation of noise or vibration from vehicles.
- 6.3.5.3. The layout and form of the laydown areas, vehicle parking and works compounds at the Converter Station will be planned carefully to minimise noise at nearby sensitive receptors (including The Haven, Hillcrest, Millfield Farm, Kimberley House, Little Denmead Farm, Broadway Farm House and Broadway Farm Cottages) as far as practicably possible through best practice measures including the following:
- The noisiest activities will be planned to take place as far as practicably possible from nearby sensitive receptors.
 - Careful positioning of site cabins and other equipment to provide screening between site activities and nearby sensitive receptors. Where appropriate, this could be supplemented by localised noise barriers in the areas adjacent to sensitive receptors (see Plate 6.1 for illustrative examples).

6.4. SECTION 2 – ANMORE AND SECTION 3 – DENMEAD/KINGS POND MEADOW

6.4.1. ONSHORE ECOLOGY

6.4.1.1. HDD work already avoids much of the impacts of the Onshore Cable Route through a substantial part of Denmead Meadows, and as the cables will be buried there will be no permanent habitat loss within Soake Farm Meadows SINC and other lowland meadow habitat. However, as work is proposed within the Kings Pond Meadow SINC part of Denmead Meadows measures are proposed to avoid potential effects through controlling working practices. , The detailed measures which the Contractor must comply with are more fully set out in section 1.5.3 of the Outline Landscape and Biodiversity Strategy.

Avoidance and General Measures

6.4.1.2. The size of working areas, including compounds, will be kept to a minimum to reduce the effects of grasslands.. Works areas will be securely fenced and procedures put in place to prevent damage to grassland habitats adjacent to them (e.g. by the use of Heras fencing).

6.4.1.3. To avoid the potential effects to Soake Farm Meadows SINC and Denmead Meadows SINC, access by foot will be permitted only with no vehicular access.

6.4.1.4. Works will be monitored by an Ecological Clerk of Works that is experienced in management of priority habitats who will provide toolbox talks to contractors and staff working at the site.

Timing of Work

6.4.1.5. The growing season and winter wet season will be avoided as both these are important for maintaining the conditions within the habitat; work will therefore be undertaken in late summer/autumn (August to November).

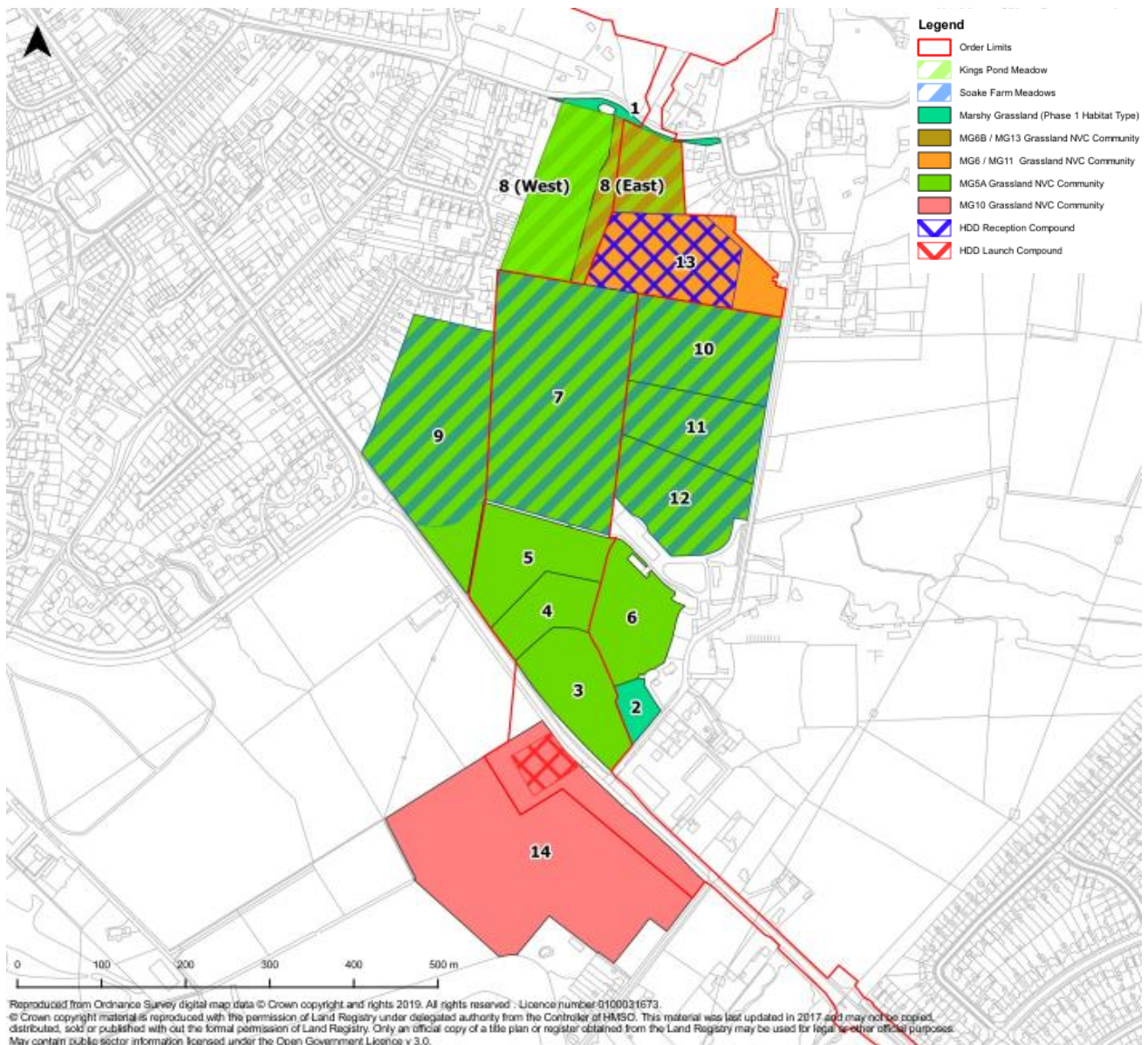


Plate 6.2 - - Denmead Meadows Mitigation Strategy Map

Protection of Soil Structure and Avoidance of Soil Compaction

- 6.4.1.6. Top soil and sub soil removed from Fields 8 and 13 as part of works will be stored during works with no mixing of soils from different locations. Resultant soil piles will not be stored on HPI quality habitat.
- 6.4.1.7. The replacement of soil structure will follow completion of work. Ground protection (temporary membrane + type 1 aggregate or bog matting, decision to be informed by contractor) will be implemented to prevent soil compaction.

6.4.2. ARBORICULTURE AND LANDSCAPE

- 6.4.2.1. Impacts on higher value features including mature trees, those subject to TPOs and deciduous copse should be avoided where practicable. The Contractor must comply with section 1.5.4 of the Outline Landscape and Biodiversity Strategy. For Section 2 no trees shall be lost. For section 3 where features are to be removed, replanting is required with like for like species of a similar size at least 5 m from the Onshore Cable Route within the Order Limits. Works running close to the edge of specific tree groups subject to TPOs must be reviewed at detailed design to minimise impacts through Onshore Cable Micrositing, in accordance with BS 5837 and under the supervision of a suitably qualified clerk of works.
- 6.4.2.2. Sections of hedgerows bounding the edge of the Order Limits are to remain unaffected. Hedgerows and hedgerow trees where lost must be replaced with like for like species where practicable in agreement with the LPA, with hedgerow trees repositioned at least 5 m away from the Onshore Cable Route within the Order Limits.

6.4.3. GROUNDWATER

- 6.4.3.1. Trenching in Section 3 and parts of Section 2, in the vicinity of the Kings Pond and Denmead Meadows, will avoid the wet winter season. The trenches will be installed at end of the summer to ensure groundwater is at its lowest elevation. If the trenches were to be installed during the peak winter months, groundwater dewatering would likely be required, and this could potentially impact upon Kings Pond which is considered to have a proportion of groundwater dependency. This applies to Section 3 and the southerly 100 m of Section 2 adjacent to Kings Pond.
- 6.4.3.2. The required groundwater dewatering quantities for trench construction will be determined at detailed design. The designer must ensure the discharge quantities are accurate or conservative to ensure no flood risk should be increased due to surplus groundwater encountered during construction. This applies to all sections.

6.4.3.3. Sections 1, 2 and 3 have been identified as areas which may contain dissolution features. Such features would represent potential contaminant transport pathways (directly to public water abstractions) and have been raised as a particular concern by Portsmouth Water and the EA. Although no dissolution features have been identified within the Order Limits, there may be features present which are as yet unidentified. The karstic features identified across Route Section 1, 2 and 3 have been commonly infilled and have rarely been greater than 25 m in diameter. Therefore, the nature of the features are considered low risk to the project especially in areas where the Order Limits are of such width to allow micro-siting to bypass features. Where the order limits are narrower industry standard engineering solutions can be used to stabilise the feature and control potential contamination pathways, these included but are not limited to grouting, geotextiles and geomembranes, any remedial solution will be agreed with Portsmouth Water and the Environment Agency prior to construction.

6.4.3.4. A catalogue of detailed descriptions of mitigation measures will be agreed with Portsmouth Water and the EA prior to construction of Sections 1, 2 and 3. Typically, such measures could include:

- Ensuring wherever practical that the Onshore Cable Route trench excavation works are undertaken in the superficial Head deposits and not in the Chalk;
- If the Head deposits are of insufficient thickness (or not present), making excavating in the Chalk unavoidable, then extra care will be taken to avoid fracture zones and karst features. The appearance of any sudden increase in thickness of Head deposits during trenching could indicate the presence of a karst dissolution feature.
- During the construction works the Karstic Dissolution Feature Watching Brief as part of the Earthworks Management Plan will be employed to detect any unknown karst dissolution features when works are taking place;
- Any detection of karst dissolution features may result in a temporary pause of the works for the engineer on site to determine which of the agreed actions in the catalogue of mitigations agreed with Portsmouth Water and the EA should be applied;
 - Portsmouth Water and the EA will be notified should such an instance occur;
 - The engineer on site may determine that the karst dissolution feature is sufficiently filled by low-permeability overburden that it presents little or no risk of acting as a pathway for potential contaminants during construction, and therefore works can continue;

- A possible course of action could be the Onshore Cable Micrositing in order to alter the course of the Onshore Cable Route locally, just enough to avoid the dissolution feature (within the Order Limits and dependent of other constraints);
- Another possible action could be to fill the karst dissolution feature with impermeable grout before continuing the works;
- A drainage strategy during the works will be put in place, which will ensure that no untreated runoff is allowed to flow freely and potentially entering karst dissolution features;
- Drip trays and spill kits will be utilised throughout the works to prevent fuel spillages,
- If required to support the discharge of Requirement 13, the appointed contractor may decide to undertake more GI (prior to the main works starting) to confirm ground conditions and identify the Onshore Cable Route (i.e. trenching strategy by the contractor as part of detailed design) in Sections 1, 2 and 3 to determine the thickness of the Head superficial deposits and check for the presence of karst dissolution features; and
- The complete methodology which should be adhered to for these works, detailing the mitigations described above and sequence of actions, is presented in the UK Source Protection Zone 1 Generic Method Statement (Appendix 7 of this Onshore Outline CEMP).

6.5. SECTION 4 – HAMBLEDON ROAD TO FARLINGTON AVENUE

6.5.1. ARBORICULTURE AND LANDSCAPE

- 6.5.1.1. Detailed design of the Onshore Cable Route and detailed analysis of impacts shall be required as the route is refined through Onshore Cable Micrositing overseen by a suitably qualified clerk of works. All works must be carried out within the carriageway, avoiding the use of footways or verges to minimise impacts on structural roots except where technical constraints make this unavoidable. The Contractor must comply with section 1.5.4 of the Outline Landscape and Biodiversity Strategy.
- 6.5.1.2. High and medium value features including trees subject to TPOs shall be avoided where practicable, and design and construction shall follow BS 5837 as a minimum.
- 6.5.1.3. The design of the scheme will have avoided positioning cables in conflict with RPAs of existing trees. Where significant incursion is unavoidable, replanting in the locality is required with like for like species of a similar size positioned a minimum of 5 m away from the Onshore Cable Route in discussion with the relevant LPA. Where the siting of new trees cannot be accommodated, replanting in the locality is required.

6.6. SECTION 5 - FARLINGTON

6.6.1. ARBORICULTURE AND LANDSCAPE

- 6.6.1.1. High/medium value features including impacting on trees subject to TPOs must be avoided where practicable, and design and construction shall follow BS 5837 as a minimum. The Contractor must comply with section 1.5.4 of the Outline Landscape and Biodiversity Strategy.
- 6.6.1.2. Hedgerows, hedgerow trees and ornamental trees lost must be replaced with like for like species subject to agreement with PCC with trees positioned a minimum of 5 m away from the Onshore Cable Route within the Order Limits.
- 6.6.1.3. In agreement with PCC, in the event that TPO feature H896 (201/1997) requires replacement, other than the poplar (T925), these features must be replaced with like for like species of a similar size. For T925, alternative species such as beech, sweet chestnut or yew would be considered.

6.7. SECTION 6 – ZETLAND FIELD AND SAINSBURY'S CAR PARK

6.7.1. ARBORICULTURE AND LANDSCAPE

- 6.7.1.1. High value features must be avoided construction must follow BS 5837 as a minimum. Where medium value features are at risk of removal, impacts must be minimised to secure the retention of as many features as practical through detailed design measures considering Onshore Cable Micrositing and overseen by a suitably qualified clerk of works. The Contractor must comply with section 1.5.4 of the Outline Landscape and Biodiversity Strategy.
- 6.7.1.2. Trees and shrubs shall be replaced with like for like species of a similar size and trees repositioned at least 5 m away from the Onshore Cable Route within the Order Limits. Where the siting of new trees cannot be accommodated within the Order Limits, replanting in the locality is required.

6.8. SECTION 7 – FARLINGTON JUNCTION TO AIRPORT SERVICE ROAD

6.8.1. ARBORICULTURE AND LANDSCAPE

- 6.8.1.1. In this Section, the Contractor must comply with section 1.5.4 of the Outline Landscape and Biodiversity Strategy and should ensure that the impact on tree and scrub planting along the railway line is minimised. Should the access track to the Farlington Playing Fields and hotel car park not be sufficient to withstand heavy vehicular loading (and in consequence insufficient to avoid impact on the adjacent Category B tree groups G680, G783, G706, G671 and G582), bog matting or similar techniques must be used to avoid compaction of the RPAs.

- 6.8.1.2. If any trees are likely to be affected by construction traffic, they must be pruned back sufficient to avoid accidental damage and monitored. If it becomes necessary to remove any trees, they shall be replaced like for like and of a similar size (subject to agreement with PCC).
- 6.8.1.3. Where significant incursion is unavoidable and the siting of new trees cannot be accommodated, replanting in the locality is required.
- 6.8.1.4. Planting around Baffins Milton Rovers Football Ground is a key landscape feature which serves an important contribution to visual amenity and screening and conflict with the RPAs of existing trees should be avoided.
- 6.8.1.5. The Order Limits include an access road to the east of the Baffins Milton Rovers Football Ground which runs to Andrew Simpson Watersports Centre past Kendall's Wharf and existing vegetation to the north. The cable corridor will impact on Category C trees G663, W885 and W886. Where significant incursion is unavoidable, trees must be replaced on either side of the access road allowing for easements associated with the Onshore Cable Corridor.

6.8.2. SURFACE WATER RESOURCES AND FLOOD RISK

Artificial land drainage at Farlington Playing Fields

- 6.8.2.1. Farlington Playing Fields have a history of surface water and groundwater flooding due to artificial land. A Land Drainage survey at pre-Construction Stage, reinstatement plan and post-Construction Survey must be undertaken in order to monitor the impacts of the Proposed Development.

6.8.3. SOCIO-ECONOMIC EFFECTS

- 6.8.3.1. Opportunities to minimise impacts on sports pitches will be required to be discussed with relevant stakeholders. This includes ongoing discussions with the Chairman of the Baffins Milton Rovers Football Club on timing of construction and reinstatement requirements, which will be in the summer (outside playing season) within this section. It also includes discussion with Portsmouth City Council to minimise impacts to pitches at Farlington Fields and Langstone Harbour Sports Ground.

6.9. SECTION 8 – EASTERN ROAD (ADJACENT TO GREAT SALTERNS GOLF COURSE) TO MOORINGS WAY

6.9.1. ARBORICULTURE AND LANDSCAPE

- 6.9.1.1. Works should avoid the footway or verge where there are mature trees except where existing constraints make this unavoidable. The Contractor must comply with 1.5.4 of the Outline Landscape and Biodiversity Strategy in this Section.

6.9.1.2. Detailed design measures must be undertaken to minimise the impact on mature Category B trees, TPO tree T59, trees within Milton Common and the eastern edge of Portsmouth College/Eastern Road. Through design and construction, measures should avoid positioning cables in conflict with RPA's of existing trees and follow BS 5837 as a minimum overseen by a suitably qualified clerk of works. Trees shall be replaced with like for like species of a similar size and trees repositioned at least 5 m away from the Onshore Cable Route within the Order Limits. Where the siting of new trees cannot be accommodated within the Order Limits, replanting in the locality is required

6.9.2. GROUND CONDITIONS

6.9.2.1. Mitigation measures required specifically where the route traverses Milton Common include:

- The works will be carefully and sensitively managed and executed to minimise impact on the local environment through the use of appropriate mitigation measures outlined below.
- There is a potential for noise, dust and odour impacts in the immediate vicinity of the proposed excavations within Milton Common. The appointed contractor will prepare a detailed specification of the proposed excavation and installation methodology in this location outlining the measures to be put in place to monitor and mitigate such impacts.
- the introduction of an exclusion zone in the immediate area of the excavation to keep members of the public at distance.
- excavation of the trench in short lengths to minimise odour and dust impacts.
- a programme of noise, dust and odour monitoring with agreed red/amber/green alerts and associated actions to reduce impacts.
- odour control such as the installation of a perimeter fog and misting system.
- agreed limits on hours of working.
- A programme of community engagement will be carried out before and during the works to inform the local community of the nature of the works and to provide comfort and reassurance that the works will be carried out in a way that minimises impacts as far as is reasonably practicable. This may include local notices, mail drops, liaison with the LPA.
- The excavated waste will be carefully segregated and handled so as not to contaminate areas away from the works themselves. Excavated materials will be removed from site and disposed of or treated for reuse at a suitably licensed waste receiving facility. Full details and records of the movement of excavated soils will be presented in a Verification Report upon completion of the works.

- Reinstatement of an engineered landfill cap to its existing condition or better.
- Clay stanks (or similar) will be installed at regular intervals along the trench to prevent migration of landfill gas along the route and beyond the existing gas vent trench around Milton Common.
- Appropriate gas protection measures will be applied to access chambers or jointing pits to prevent ingress of landfill gas.
- Should significant unexpected contamination be encountered this will be managed appropriately and reported to the EA. If required, the contamination risk assessment and remediation strategy will be updated.

6.10. SECTION 9 – MOORINGS WAY TO BRANSBURY ROAD

6.10.1. ARBORICULTURE AND LANDSCAPE

6.10.1.1. Works should avoid the footway or verge where there are mature trees except where existing constraints make this unavoidable. The Contractor must comply with section 1.5.4 of the Outline Landscape and Biodiversity Strategy for this Section.

6.10.1.2. Impacts on tree group G900 within Milton Locks Nature Reserve and tree group G697 within Bransbury Park shall be minimised. Measures shall be taken to avoid positioning cables in conflict with RPAs of existing trees, following BS 5837 as a minimum, and overseen by a suitably qualified clerk of works. Liaison shall take place with the site manager at Milton Locks Nature Reserve to agree the most appropriate form of mitigation.

6.10.1.3. In general, high and medium value features shall be avoided. Detailed design measures must be undertaken to avoid positioning cables in conflict with RPAs of existing trees. Where significant incursion is unavoidable, trees should be replaced with like for like species of a similar size subject to agreement with PCC and planted 5 m beyond the Onshore Cable Route within the Order Limits. Where the siting of new trees cannot be accommodated within the Order Limits, replanting in the locality is required. Opportunities shall also be explored to remove trees in poor condition and, where appropriate, replace with other ornamental species in agreement with PCC.

6.10.1.4. The long-term impact on retained trees within Bransbury Park must be minimised through Onshore Cable Micrositing within the Onshore Cable Corridor, under the supervision of a suitably qualified clerk of works.

6.10.2. MAINTENACE AT THE ALLOTMENTS

6.10.2.1. Operational maintenance of the cable under the allotment will involve visual inspections only, which will not be intrusive. There would be a negligible impact to allotment users. Any maintenance of the cable under the allotments would be

completed from the entrance and exit pits located outside of the allotments and therefore will not affect the users.

6.11. SECTION 10 – EASTNEY (LANDFALL)

6.11.1. ARBORICULTURE AND LANDSCAPE

- 6.11.1.1. Impacts on medium value trees including trees subject to TPO should be avoided. The Contractor must comply with section 1.5.5 of the Outline Landscape and Biodiversity Strategy for this Section. Measures shall be taken to avoid positioning cables in conflict with RPA's of existing trees and follow BS 5837 as a minimum overseen by a suitably qualified clerk of works. Where significant incursion is unavoidable, trees shall be replaced with like for like of a similar size species subject to agreement with PCC and planted at least 5 m beyond the Onshore Cable Route within the Order Limits. Where the siting of new trees cannot be accommodated, replanting in the locality is required. The northern (east bound) side of Henderson Road and Fort Cumberland Road would be a preferred choice to avoid impact on existing street trees in this section.

7. MONITORING

7.1. MONITORING AND REVIEW

- 7.1.1.1. The Environment Manager will hold the responsibility for maintaining a register of all environmental monitoring, which will be made available for auditing and inspection.
- 7.1.1.2. Reporting procedures will be defined by the Environment Manager who will hold overall responsibility for providing feedback to the appointed contractor on the environmental performance of the construction works.
- 7.1.1.3. A framework for environmental monitoring on site is set out in Table 7.1. Records of environmental inspections and audits will be kept and appended to the CEMP.

Table 7.1 - AQUIND Onshore Monitoring Plan

Discipline	Monitoring Requirement / Commitment	Responsibilities	Construction / Operation Stage	Location in Control Document	Trigger leading to Non-Compliance	Further Action / Remedial Measures
Landscape and Visual Amenity	Management of Vegetation Management of vegetation through a detailed landscaping scheme which would form part of the draft DCO's requirements and implemented following approval by the host authority.	The appointed contractor to appoint a specialist contractor.	Construction / Operation	Onshore Outline Construction Environmental Management Plan ('OOCEMP') (APP-505) Section 7 - Table 7.1 AQUIND Onshore Monitoring Plan	Actions do not accord with the Outline Landscape and Biodiversity Strategy ('OLBS') (APP-506) and the approved detailed landscaping scheme.	Review of role and responsibilities of appointed farmer / contractor and reappointment if deemed necessary.
	Monitoring of Planting New planting would be subject to a five-year liability period to secure successful establishment, commencing on completion of landscaping works associated with each phase. All plants found dead or dying would be replaced in the first available planting season.	Local farmer with agreed management plan - existing planting (hedgerows and hedgerow trees). External landscape contractor - all new planting. Appointed Ecological Clerk of Works - undertaking ecological monitoring surveys, advising Applicant. Environmental Clerk of Works - specialist site supervision for walkover assessments, analysis of impacts associated with RPAs, monitoring effectiveness of the first 5 years following completion of the development, ensures review of landscape features every 5 years, reviews against aims and objectives of Outline Landscape and Biodiversity Strategy and the approved detailed landscaping scheme. It is currently suggested that the local farmer (following assurance of good horticultural experience, and awareness of invasive species, diseases and	Construction / Operation	OLBS - Sections 1.7.1 Monitoring of Planting; 1.7.2 Management Responsibilities;	New planting: An unapproved contractor proceeding with works. Implementation of works not in accordance with the approved detailed landscaping scheme considering agreed specification and programme covering implementation, planting and management including watering, planting schedule and planting plans, changes in stock, species and size. Changes taking place without written agreement, not in accordance with relevant Codes of Practice and British Standards, a lack of communication over activities which require support / supervision and not enacting on recommendations made by the Clerks of Work, landscape architect and /or arboriculturalist. Existing and replacement planting: A change of appointed farmer without agreement, an absence of / or incorrect management practices, lack of compliance with the OLBS and detailed landscaping	Review of role and responsibilities of appointed farmer / contractor and reappointment if deemed necessary. Regular reviews will be undertaken by a Clerk of Works every five years to ensure works accord with the OLBS and the approved detailed landscaping scheme.

Discipline	Monitoring Requirement / Commitment	Responsibilities	Construction / Operation Stage	Location in Control Document	Trigger leading to Non-Compliance	Further Action / Remedial Measures
	<p>Management Plan Reviews</p> <ul style="list-style-type: none"> - Site walkover following any extreme weather event to inspect health of landscape features and trees. Any trees that have suffered damage would be subject to an arboricultural survey by an arboriculturalist. - The OLBS and detailed landscaping scheme and its objectives will be reviewed against current environmental conditions to consider unforeseen circumstances. - The OLBS, detailed landscaping scheme and detailed management plans will be reviewed annually. Any significant changes must be agreed between the project landscape architect, arboriculturalist, ecologist and appointed contractor. 	<p>pests) undertakes existing management practices, with a specialist contractor overseeing the new planting to ensure compliance with OLBS objectives in terms of long term planting.</p> <p>An update to the OLBS and management responsibilities is submitted as APP-506 Rev002.</p>	Operation	OLBS - Section 8.4 Management Plan Reviews	<p>scheme and lack of communication over activities which require support / supervision and not enacting on recommendations made by the Clerks of Works, landscape architect and arboriculturalist and not keeping a record of measures taken to deliver actions.</p> <p>Health and Safety incidents resulting from inclement weather and a lack of action / notification to the Clerks of Works, arboriculturalist and landscape architect and need for support / supervision. Non adherence to detailed landscaping scheme including specification and management plans and recommendations made by Clerks of Works, arboriculturalist / landscape architect and record of measures taken to deliver recommendations.</p>	Review of role and responsibilities of appointed farmer / contractor and reappointment if deemed necessary. Regular reviews will be undertaken by Environmental Clerk of Works every five years to ensure works accord with the OLBS and the approved detailed landscaping scheme.
Onshore Ecology	<p>Closure of badger setts under licence</p> <ul style="list-style-type: none"> - Setts will be closed using one-way gates so badgers can leave but cannot return to 	Named ecologist responsible for badger licence.	Construction	OOCEMP - Section 6.3.3.6	<ul style="list-style-type: none"> - One-way gates not installed for the 21 day monitoring period; and - 21 day period not completed. 	Review of situation by Environmental Clerk of Works. Installation of gates and/or additional days of monitoring to

Discipline	Monitoring Requirement / Commitment	Responsibilities	Construction / Operation Stage	Location in Control Document	Trigger leading to Non-Compliance	Further Action / Remedial Measures
	the sett. Following a period of monitoring to ensure badgers are not within them, the setts will be dug out.					be undertaken until 21 days is reached.
	<p>Post-construction monitoring of vegetation re-establishment at Denmead Meadows</p> <ul style="list-style-type: none"> - Monitoring at years 1, 3 and 5 post-development will be undertaken to inform potential management interventions at the site. - It will comprise botanical survey of the reseeded areas, and will allow interventions that may be necessary to maintain HPI-quality grassland remains in the long-term. 	Appointed contractor and Environmental Advisor/Manager	Operation	OOCEMP – Section 6.2.1.8	<ul style="list-style-type: none"> - Monitoring not undertaken during years 1, 3 and 5; and - Habitats start to change from their state prior to construction and no interventions are made to return them to the correct status. 	Review of monitoring work by appointed contractor and monitoring surveys commissioned to replace those missed. Management of site habitats put in place to return them to their baseline condition.
Arboriculture	<p>Ancient Woodland</p> <p>Works Compound and Laydown Area would be prohibited within 15 m of the ancient woodland and hedgerows. When storing materials, particularly liquids, slopes and drainage channels would be used to prevent spillages and flow into the buffer zone of the ancient woodland and hedgerows.</p>	Environmental Clerk of Works to lead, with specialist input from an arboriculture consultant where required, to be appointed by the appointed contractor.	Construction	OOCEMP - Section 6.3.4.4	Protective measures not in place or tampered with / works within Root Protection Area ('RPA') not agreed with Project Arboriculture consultant	Remedial work may involve de-compaction of RPA, tree condition assessment to understand impact to long term retention
	<p>Protection of trees and RPA</p> <ul style="list-style-type: none"> - Where practicable design would avoid positioning cables in conflict with RPAs of existing trees. Where significant incursion is 		Construction	OOCEMP - Section 6.5.1.1 and 6.5.1.2	Protective measures not in place or tampered with / works within Root Protection Area not agreed with Project Arboriculture consultant	Remedial work may involve de-compaction of Root Protection Area, tree condition assessment to understand impact to long term retention

Discipline	Monitoring Requirement / Commitment	Responsibilities	Construction / Operation Stage	Location in Control Document	Trigger leading to Non-Compliance	Further Action / Remedial Measures
	<p>unavoidable, trees would be appropriately replaced.</p> <p>Hedge removal - Hedge removal in the Converter Station Area would be minimised by only removing what is required to lay the Access Road. - Mitigation for the loss of hedgerows and hedgerow trees will be replaced with like for like species, where practicable, with hedgerow trees repositioned at least 5 m away from the Onshore Cable Route.</p> <p>Replanting of trees - - Where significant incursion is unavoidable, consideration for replanting in the locality is required with like for like species positioned a minimum of 5 m away from the Onshore Cable Route in discussion with the relevant LPA. - Opportunities should also be explored to remove trees in poor condition and, where appropriate, replace with other ornamental species in agreement with PCC.</p>					
			Construction	OOCEMP - Section 6.5.1.3 and 6.10.1.2	Replanting and after care not completed or not completed in accordance with best practice / British Standard.	"Beating up" or snagging planting may be required.
			Construction	OOCEMP - Section 6.5.1.3 and 6.10.1.2	Replacement trees not provided or not planted in accordance with best practice or British Standard. Alternatively, incorrect species may be selected if Portsmouth City Council not consulted correctly.	Incorrect trees or trees planted incorrectly to be made good.
Soils and Agricultural Land Use	<p>Construction Impacts to soil, waste and material resources</p> <p>- Implementation of a Construction Environmental Management Plan ('CEMP'),</p>	Appointed contractor and Environmental Advisor/Manager	Construction	OOCEMP Section 7 Table 7.1	The absence of a contractor prepared CEMP, SWMP and MMP prior to construction works commencing, and failure to update / record outputs from	Review of contractor prepared CEMP, SWMP and MMP by suitably qualified and experienced personnel prior to and during construction works. This will ensure

Discipline	Monitoring Requirement / Commitment	Responsibilities	Construction / Operation Stage	Location in Control Document	Trigger leading to Non-Compliance	Further Action / Remedial Measures
	incorporating a Materials Management Plan ('MMP'), Soil Resources Plan ('SRP') and Site Waste Management Plan ('SWMP').				these documents during on site activity.	documents have been prepared and are suitable for the Proposed Development, and arisings are managed in accordance with legal and best practice requirements.
Ground Conditions	Contaminated Land at Milton Common - Detailed management plan for future maintenance and entry to below ground access chambers. - Prepared during detailed design stage and will form part of the Health and Safety File.	Appointed contractor and Environmental Advisor/Manager	Construction / Operation	OOCEMP Section 7 Table 7.1	The absence of a contractor prepared Construction Phase Plan ('CPP') (needed for all intrusive works), and absence of a management plan for future maintenance works and entry to below ground access chambers. These documents must be included in the Health and Safety File. Also, failure to update / record outputs from these documents during on-site activity.	Review of contractor management plans including CPP and the Health and Safety File by suitably qualified personal prior to and during the works in the construction / operational and decommissioning stages. This will ensure documents have been prepared and are suitable for the proposed works to minimise risks to receptors particularly Human Health due to the exposure of contaminated soils / groundwater and potential landfill gases.
Heritage and Archaeology	Archaeological Monitoring - Depending on the results of the Trial Trench evaluation, mitigation could take the form of targeted archaeological excavation (preservation by record) in advance of construction and/or an archaeological watching brief. - Archaeological watching brief (a programme of strip, map and sample) carried out alongside the preliminary topsoil removal.	Any archaeological work would need to be undertaken in consultation with the local authority's archaeological advisor in accordance with an approved archaeological Written Scheme of Investigation ('WSI').	Construction	OOCEMP Section 7 Table 7.1	- The programme of archaeological and heritage mitigation that is set out in the DCO submission is an Applicant's commitment that would need to be carried out to mitigate the adverse effects identified. If this is not the case it would be non-compliant. Irreplaceable heritage assets, which are a finite resource and which form part of our collective heritage, would be permanently removed without record. - All required historic environment site-based investigation should be carried	Supervision of works for compliance against the WSI by a suitably qualified archaeologist

Discipline	Monitoring Requirement / Commitment	Responsibilities	Construction / Operation Stage	Location in Control Document	Trigger leading to Non-Compliance	Further Action / Remedial Measures
					<p>out in accordance with a WSI for each element. The WSI sets out the scope of work, aims and objectives, methodology and reporting requirements. Each WSI will need to be approved by the Archaeological Advisor to the relevant local planning authority (LPA) prior to undertaking the work. The lack of an approved WSI would be non-compliant.</p> <p>- The Construction programme will need to allow sufficient time to undertake the required historic environment investigations, whether it is preliminary work in advance of the main construction stage, or during construction. The lack of sufficient time to meet the professional standards required by the Chartered Institute for Archaeologists and the LPA Archaeological Advisor would be non-compliant.</p> <p>- All work should be carried out by a suitably qualified historic environment organisation. The organisation and/or staff should be recognised by the Chartered Institute for Archaeologists, to ensure appropriate professional standards. If this is not the case, it might be seen as non-compliant by the LPA Archaeological Advisor.</p>	
Traffic and Transport	Travel Plan monitoring of construction worker journeys to the Converter Station Area.	Appointed Contractor Travel Plan Coordinator.	Construction	Framework Construction Worker Travel Plan ('FCTMP')	The Travel Plan will set modal share targets for construction workers, which are to be agreed	The likely forms this remedial action are set out in the Construction Worker Travel

Discipline	Monitoring Requirement / Commitment	Responsibilities	Construction / Operation Stage	Location in Control Document	Trigger leading to Non-Compliance	Further Action / Remedial Measures
	To be completed at 6-months, 1 -year and 2-years into site occupation.			(APP-450) / Requirement 21 of dDCO	with Hampshire County Council as the relevant Highway Authority. These targets will need to be agreed between The Applicant and the Highway Authority and will be used as the basis to determine the performance of the Travel Plan. Failure to meet these targets will be the trigger leading to non-compliance.	Plan at Appendix 7 of the Updated Framework Construction Traffic Management Plan (APP-450 Rev002) - includes further promotion of sustainable transport alternatives / extension of shuttle bus service provision to nearby train / bus stations and hotels
Air Quality	<p>Risk of fugitive emissions of dust and air emissions</p> <ul style="list-style-type: none"> - Undertake daily on-site and off-site inspections where receptors are nearby to monitor dust. Should include regular dust soiling checks of surfaces within 100 m of the construction site boundary, with cleaning to be provided if necessary. - Regular site inspections to monitor compliance with the Dust Management Plan; increasing the frequency of site inspections on site when activities have a high potential to produce dust and during prolonged dry or windy conditions. - Agree dust deposition, dust flux or real-time PM10 continuous monitoring locations with the Local Authority. Where practicable, commence baseline monitoring at least three months before work commences on site or, if it a 	Appointed contractor and Environmental Advisor/Manager	Construction	OOCEMP Section 7 Table 7.1	<p>All triggers are to be agreed following consultation with the local Environmental Health Officer. Sample triggers according to the Institute of Air Quality Management ('IAQM') Guidance on Monitoring in the Vicinity of Demolition and Construction Sites include:</p> <ul style="list-style-type: none"> - Dust complaint from a member of the public; - Dust complaint from the local authority Environmental Health Officer; - Dust complaint from a member of the public via the local authority; - Visible dust observed at the locations of nearby receptors and on surfaces within 100m of the construction site boundary during routine inspections; - Visible dust emission from an on-site process that, in the judgement of a trained individual, constitutes an excessive emission; 	<p>All site monitoring and recording should be implemented with the full cooperation and in consultation with the local Environmental Health Officer. Detailed monitoring requirements will be in place at each location of the Proposed Development in agreement with the EHO.</p> <p>Where a complaint is issued, this should be fully investigated, including records of activities undertaken on-site at the time the complaint relates to and accompanying meteorological conditions, and a judgement issued to the relevant party and the local authority. All complaints should be recorded in a complaints log, recorded in the site log book, and all records kept and made available on request to the local authority.</p> <p>Where dust is observed during routine inspections of the</p>

Discipline	Monitoring Requirement / Commitment	Responsibilities	Construction / Operation Stage	Location in Control Document	Trigger leading to Non-Compliance	Further Action / Remedial Measures
	large site, before work on a phase commences.				<p>- A recorded 1-hour average PM concentration of 190 µg/m³ where continuous monitoring is undertaken;</p> <p>- A 4-week average of 200 mg/m²/day where deposition monitoring is undertaken; and</p> <p>- An Effective Area Coverage ('EAC') of 5% per day averaged over 1-week where dust flux is monitored.</p> <p>All triggers will require agreement from the local Environmental Health Officer on a site-by-site basis.</p>	<p>surrounding area, and investigation of the activities on site since the last inspection and the prevailing meteorological conditions during that period, and additional on-site measures undertaken or a review of working practises as appropriate, and the investigation and results recorded in the site log book.</p> <p>Where short-term (1-hour) monitoring exceeds 190 µg/m³ of PM, then the dust-causing activities being undertaken should be immediately stopped and on-site conditions and the effectiveness of mitigation reviewed before restarting works, and the results recorded in the site log book.</p> <p>Where excessive dust emission is, in the judgement of a trained individual, observed on-site during a dust-causing process, then the related activity should be immediately stopped and the effectiveness of mitigation, on-site conditions and/or working methods reviewed prior to re-starting the activity. The event should be recorded in the site log book.</p> <p>Where a longer-term monitoring average is exceeded, a review of activities</p>

Discipline	Monitoring Requirement / Commitment	Responsibilities	Construction / Operation Stage	Location in Control Document	Trigger leading to Non-Compliance	Further Action / Remedial Measures
						undertaken, meteorological conditions and the effectiveness of on-site mitigation should be undertaken, with the results recorded in the site log book.
Noise and Vibration	<p>Control of noise during operational period</p> <p>A noise monitoring scheme for testing the attenuation and mitigation measures required to achieve the broadband and octave band noise criteria.</p>	Appointed contractor responsible for installation of noise producing equipment at Converter Station Area and Optical Regeneration Station(s).	Operation	Requirement 20 of the dDCO.	Significant exceedance of the noise criteria specified in the broadband and octave band noise criteria document.	Investigation of the exceedance and identification of cause. If required, proportionate rectification of noise attenuation or mitigation measures.
Socio-economics	N/A					
Human Health	N/A					
Waste and Material Resources	N/A					
Climate Resilience	<ul style="list-style-type: none"> - Reviewing wind speed before commencing work at height. - Ensuring welfare facilities are available and sufficiently cool. Ensure rest breaks are taken, particularly during the hottest part of the day. 	Appointed contractor and Environmental Advisor/Manager	Construction	OOCEMP Section 5.14.3	Health risks to construction workers.	Review of contractor management plan including CPP and the Health and Safety file by suitably qualified personnel prior to and during the works in the construction / operational and decommissioning stages. This will ensure documents have been prepared and are suitable for the proposed works to minimise risks to construction workers.
	Regular clearing and maintenance of drainage infrastructure to prevent blockage.	Appointed contractor and Environmental Advisor/Manager	Operation	OOCEMP Section 5.14.3	Blockage of drainage infrastructure.	Investigation of source of blockage and emergency clearance of drains to be undertaken. Review of

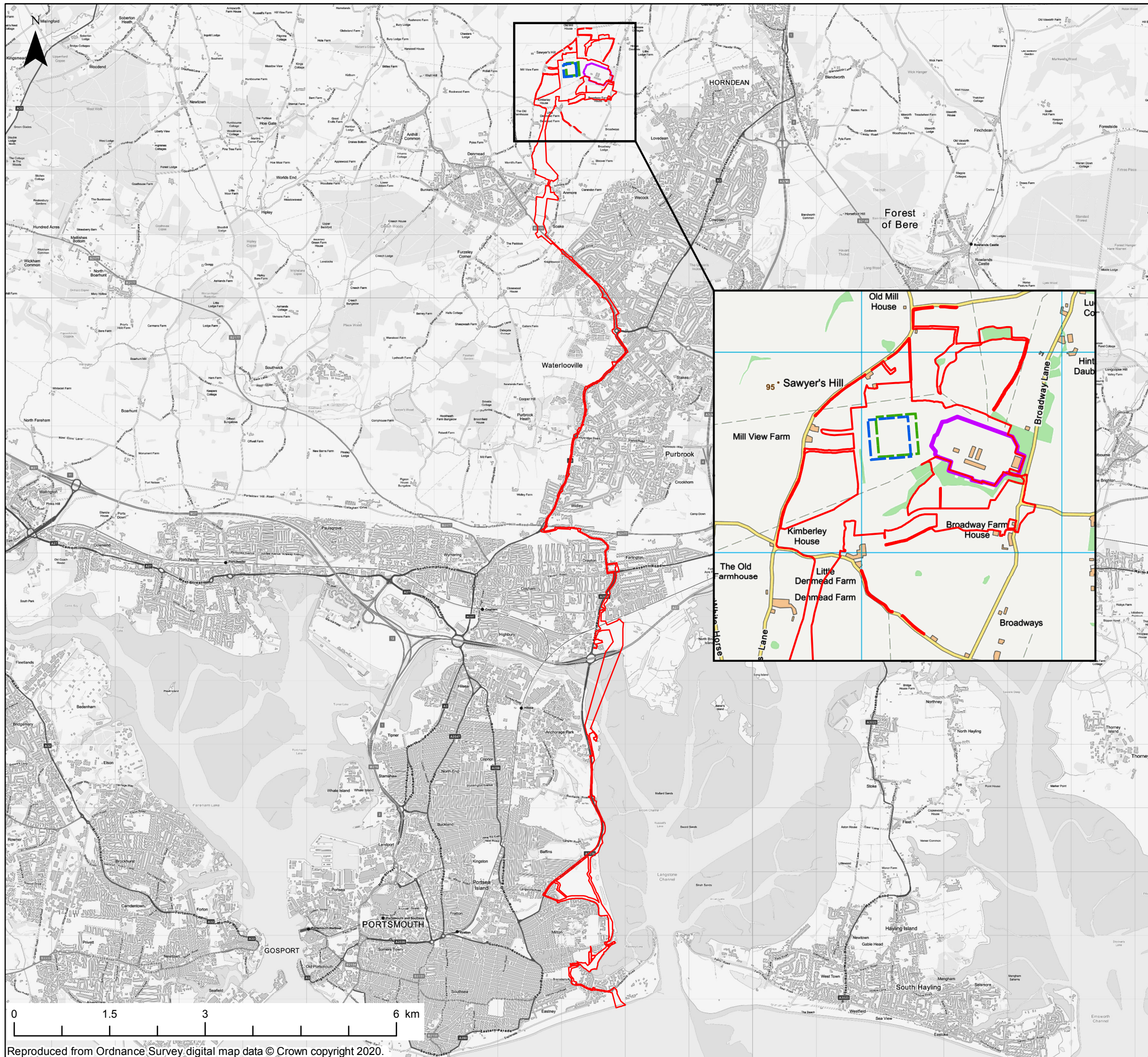
Discipline	Monitoring Requirement / Commitment	Responsibilities	Construction / Operation Stage	Location in Control Document	Trigger leading to Non-Compliance	Further Action / Remedial Measures
						maintenance plans to identify cause and to prevent further blockages.

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Appendix 1 – Site Drawings and Environmental Constraints



Key

- Order Limits
- Converter Station Perimeter Option B (i)
- Converter Station Perimeter Option B (ii)
- Existing Substation Boundary

The Infrastructure Planning (Applications: Prescribed Forms and Procedures) Regulations 2017 – Regulation 5(2)(a)

REV	DATE	BY	DESCRIPTION	CHK	APP
02	16/12/2020	JT	Second Issue	HJ	CM
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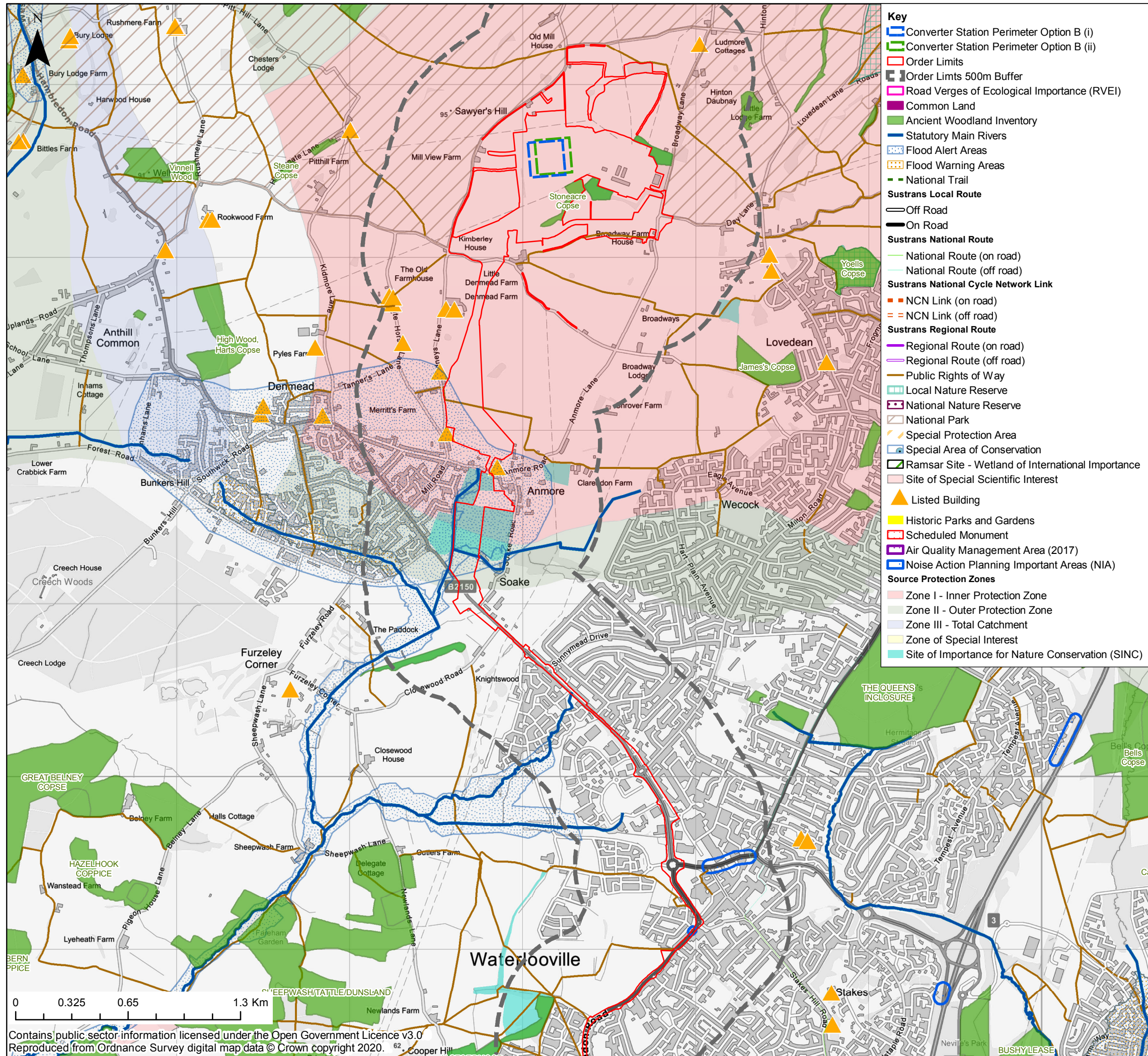
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PROJECT: **AQUIND Interconnector**

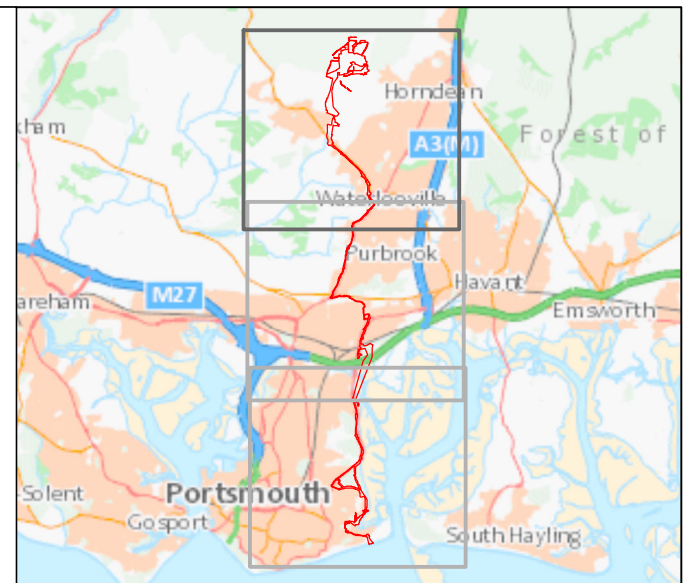
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Order Limits (Onshore)**

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PROJECT NO: EN020022	DESIGNED: JT	DRAWN: JT
DRAWING NO: EN020022-ES-3.2		REV.NO. 02

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- Key**
- ▬ Converter Station Perimeter Option B (i)
 - ▬ Converter Station Perimeter Option B (ii)
 - Order Limits
 - Order Limits 500m Buffer
 - Road Verges of Ecological Importance (RVEI)
 - Common Land
 - Ancient Woodland Inventory
 - ▬ Statutory Main Rivers
 - Flood Alert Areas
 - Flood Warning Areas
 - ▬ National Trail
 - Sustrans Local Route**
 - ▬ Off Road
 - ▬ On Road
 - Sustrans National Route**
 - ▬ National Route (on road)
 - ▬ National Route (off road)
 - Sustrans National Cycle Network Link**
 - ▬ NCN Link (on road)
 - ▬ NCN Link (off road)
 - Sustrans Regional Route**
 - ▬ Regional Route (on road)
 - ▬ Regional Route (off road)
 - ▬ Public Rights of Way
 - Local Nature Reserve
 - National Nature Reserve
 - National Park
 - Special Protection Area
 - Special Area of Conservation
 - Ramsar Site - Wetland of International Importance
 - Site of Special Scientific Interest
 - ▲ Listed Building
 - Historic Parks and Gardens
 - Scheduled Monument
 - Air Quality Management Area (2017)
 - Noise Action Planning Important Areas (NIA)
 - Source Protection Zones**
 - Zone I - Inner Protection Zone
 - Zone II - Outer Protection Zone
 - Zone III - Total Catchment
 - Zone of Special Interest
 - Site of Importance for Nature Conservation (SINC)



The Infrastructure Planning (Applications: Prescribed Forms and Procedures) Regulations 2017 – Regulation 5(2)(l)

REV	DATE	BY	DESCRIPTION	CHK	APP
03	16/12/2020	JT	Third Issue	HJ	CM
02	28/08/2020	JT	Final	GI	US
01	23/10/2019	JT	Final	GI	US

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PROJECT: **AQUIND Interconnector**

TITLE: **Figure 3.13
Environmental Constraints Map
Sheet 1 of 3**

SCALE AT A3 1:22,000	CHECKED: HJ	APPROVED: CM
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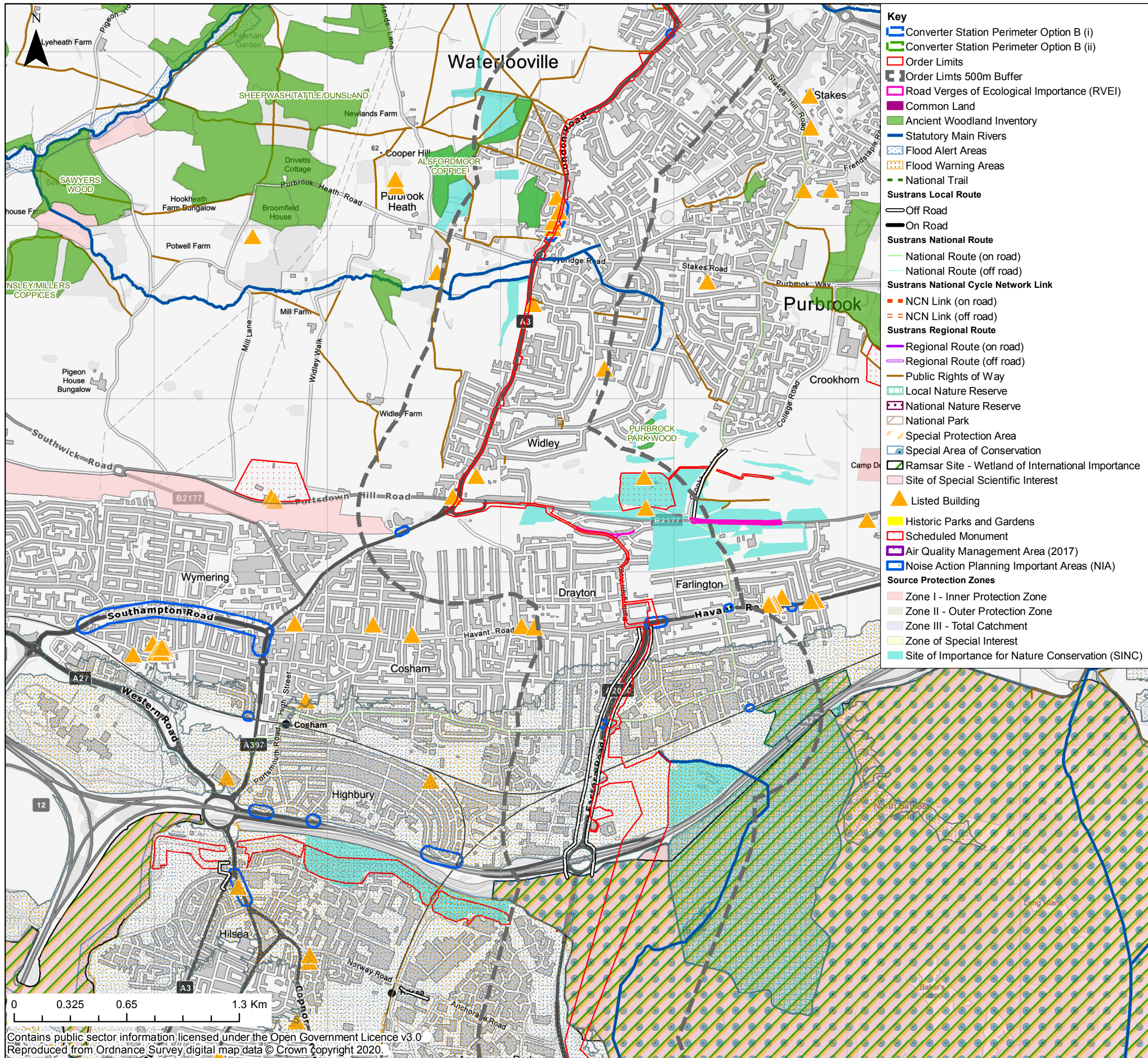
PROJECT NO: EN020022	DESIGNED: JT	DRAWN: JT	DATE: 16/12/2020
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DRAWING NO: EN020022-ES-3.13-Sheet1	REV.NO: 03
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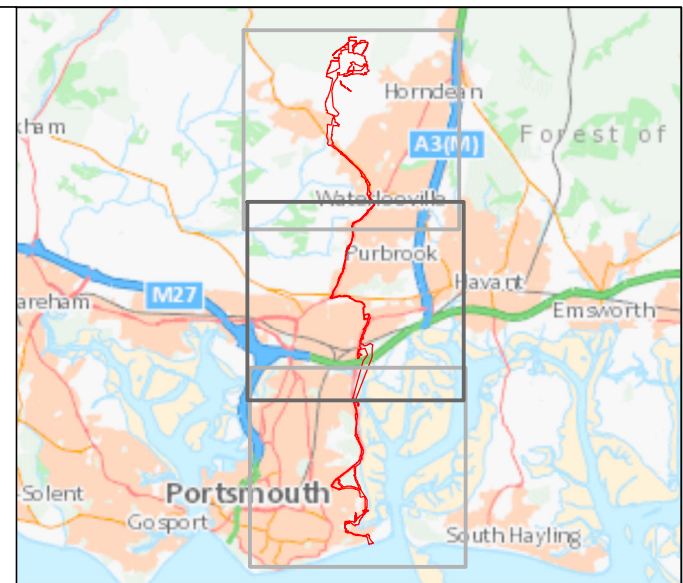
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- Key**
- ▬ Converter Station Perimeter Option B (i)
 - ▬ Converter Station Perimeter Option B (ii)
 - ▬ Order Limits
 - Order Limits 500m Buffer
 - Road Verges of Ecological Importance (RVEI)
 - Common Land
 - Ancient Woodland Inventory
 - ▬ Statutory Main Rivers
 - Flood Alert Areas
 - Flood Warning Areas
 - ▬ National Trail
 - ▬ Sustrans Local Route
 - ▬ Off Road
 - ▬ On Road
 - ▬ Sustrans National Route
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 - ▬ National Route (off road)
 - ▬ Sustrans National Cycle Network Link
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 - ▬ Regional Route (off road)
 - ▬ Public Rights of Way
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 - ▬ Special Protection Area
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The Infrastructure Planning (Applications: Prescribed Forms and Procedures) Regulations 2017 – Regulation 5(2)(l)

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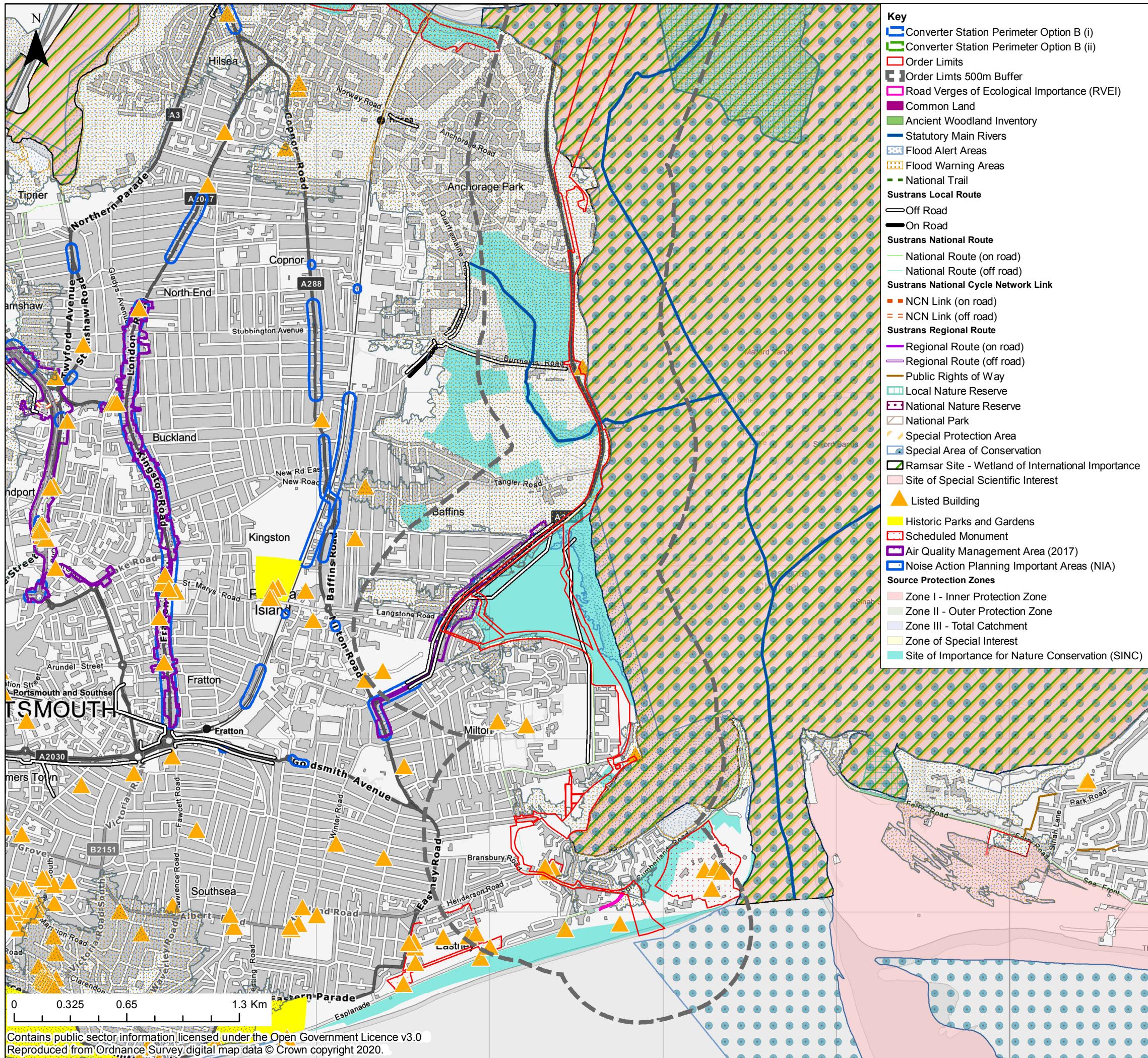
PROJECT: **AQUIND Interconnector**

TITLE: **Figure 3.13
Environmental Constraints Map
Sheet 2 of 3**

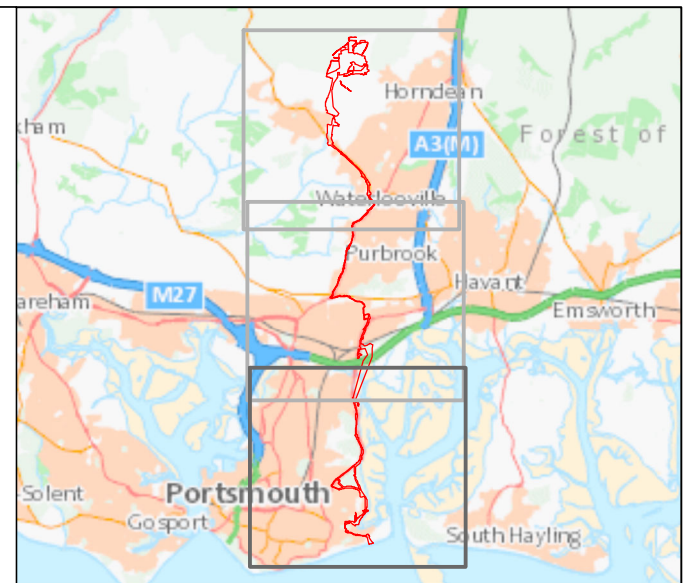
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DRAWING NO: EN020022-ES-3.13-Sheet2	DATE: 16/12/2020	REV.NO: 03

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- Key**
- ▭ Converter Station Perimeter Option B (i)
 - ▭ Converter Station Perimeter Option B (ii)
 - ▭ Order Limits
 - Order Limits 500m Buffer
 - Road Verges of Ecological Importance (RVEI)
 - Common Land
 - Ancient Woodland Inventory
 - Statutory Main Rivers
 - Flood Alert Areas
 - Flood Warning Areas
 - National Trail
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The Infrastructure Planning (Applications: Prescribed Forms and Procedures) Regulations 2017 – Regulation 5(2)(l)

REV	DATE	BY	DESCRIPTION	CHK	APP
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CLIENT: **AQUIND**

PROJECT: **AQUIND Interconnector**

TITLE: **Figure 3.13
Environmental Constraints Map
Sheet 3 of 3**

SCALE AT A3 1:22,000	CHECKED: HJ	APPROVED: CM
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PROJECT NO: EN020022	DESIGNED: JT	DRAWN: JT	DATE: 16/12/2020
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DRAWING NO: EN020022-ES-3.13-Sheet3	REV.NO: 03
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Appendix 2 – Relevant Legislation

Environmental Legislation	Summary of Relevance to the Site
Hazardous substances	
Control of Substances Hazardous to Health (COSHH) Regulations 2002 (and amended 2003, 2004)	<p>The COSHH regulations provide a legal framework for controlling people’s exposure to all ‘very toxic, toxic, harmful, corrosive or irritant’ substances and apply to all places of work. There are various requirements including an assessment of the risk to the health of employees arising from their work and what precautions are needed, introduction of appropriate measures to prevent or control the risk (ensuring that measures of control do not increase the overall risk to health and safety), use of control measures and maintenance of equipment.</p>
Waste	
Control of Waste (Dealing with Seized Property) (England and Wales) Regulations Statutory Instrument (‘SI’) 2015/426	<p>This legislation provides powers to control fly-tipping and prevents the unlicensed transport of waste materials.</p> <p>All carriers of controlled waste including the producers of building and demolition waste are required to be registered with the EA. Controlled waste is defined as household, industrial, radioactive or commercial waste other than agricultural, mineral/ quarrying or explosive wastes.</p> <p>This registration must be renewed every 3 years.</p>
The Environmental Permitting (England and Wales) Regulations 2010 (amended 2011, 2012, 2013, 2014, 2015 and 2016)	<p>The Regulations consolidate the Pollution Prevention and Control and waste Management Licencing regulations to provide a more streamlined approach to environmental regulations, by allowing for a number of different activities to be regulated under one permit by the EA.</p>
Hazardous Waste (England and Wales) Regulations 2005 (amended 2009)	<p>The Regulations ensure the sound management, storage and safe disposal of hazardous wastes, to prevent environmental pollution and harm to human health. ‘Hazardous’ waste applies to wastes which contain any substance which:</p> <p>is listed a hazardous waste in the List of Waste Regulations 2005 (see below);</p>

	<p>is exceptionally classified as hazardous by the Secretary of State or any of the National Executives; or is declared hazardous by virtue of any regulations under section 62 of the Environmental Protection Act (EPA) 1990.</p> <p>All hazardous waste movements require pre-notification to the EA prior to any hazardous waste being produced (where possible).</p> <p>Producers are required to know and document the quantity, nature, origin and final destination of the Hazardous Waste and to certify that the waste carrier is registered under the Controlled Waste (Registration of Carriers and Seizure of Vehicles) Regulations 1991.</p> <p>Copies of the completed consignment notes must be retained for at least 3 years by all those in the waste chain.</p>
<p>Hazardous Waste (England and Wales) Regulations 2005 and Hazardous Waste (Miscellaneous Amendments) Regulations SI 2015/1360</p>	<p>These regulations relate to environmental permitting, landfill allowances, hazardous and non-hazardous waste. The definitions of Waste Framework Directive and the WEEE Directive have been updated within amended legislation to refer to the current legislation; Directives 2008/98/EC and 2012/19/EU.</p>
<p>Environmental Protection (Duty of Care) Regulations 1991 (as amended, SI 1991/2839)</p>	<p>A legal duty of care is imposed on anyone – from producers, to carriers and disposers of waste, to ensure that:</p> <p>Waste is not illegally disposed of or dealt with without a licence or in breach of a licence or in any way that causes pollution or harm;</p> <p>Waste is transferred only to an ‘authorised person’, i.e. a local authority, registered carrier or a licensed disposer; and</p> <p>When waste is transferred, it is accompanied by a full written description which forms part of a waste transfer note (or consignment note for hazardous wastes).</p> <p>All persons subject to duty of care are required to ensure that neither they nor any other person commit an offence under the Regulations.</p>
<p>Environmental Protection Act (EPA) 1990: Part 2 –</p>	<p>This Act builds on the system put in place by the Control of Pollution Act with stricter licensing controls and other provisions aimed at ensuring waste handling, disposal</p>

Waste on Land (amended 2010 and 2019)	<p>and recovery operations do not harm the environment. It reorganised Local Authority responsibilities for waste management, introduced a duty of care for producers and handlers of waste and described the offences of unauthorised storage, treatment and disposal of waste.</p>
Environmental Protection Act (EPA) 1990: Part 2a (as amended)	<p>The section of the EPA created by the Environment Act 1995 setting out the legislative framework for identifying and dealing with contaminated land.</p>
Environment Act 1995 (as amended)	<p>Inserted Part '2a' to the EPA 1990 giving powers and responsibilities to Local Authorities regarding contaminated land.</p>
Discharge to Water / Land	
Anti-Pollution Works Regulations 1999 SI 1999 / 1006	<p>Aimed at ensuring that site owners pay for the prevention and remediation of pollution arising from their activities. Notices can be served by the EA directing a site owner to carry out anti-pollution works where any poisonous, noxious or polluting matter is likely to enter, or to be, or to have been present in any controlled waters.</p>
Water Industry Act 1999	<p>The Act prohibits certain discharges to sewers including:</p> <ul style="list-style-type: none"> Any matter likely to injure the sewer or interfere with the free flow of its contents or to affect the treatment, disposal of its contents; Liquid waste or steam at a temperature higher than 110°F or any other chemical waste which is dangerous, a nuisance or prejudicial to health; Any petroleum spirit; and Calcium carbide. <p>Trade effluents may be discharged into public sewers only with the consent, or by agreement with, the sewerage undertaker (i.e. local water company). The consent may stipulate conditions relating to:</p> <ul style="list-style-type: none"> Nature or composition of the effluent; Maximum daily volume allowed; Maximum daily rate of flow; and Sewer into which the effluent is discharged.

<p>Water Resources Act 1991 (amended 2009)</p>	<p>The Act requires water abstractions to be licensed and certain discharges into controlled waters to be subject to EA consent.</p> <p>It is an offence under the Act 'to cause or knowingly permit':</p> <p>Poisonous, noxious or polluting matter, or any solid waste matter, to enter controlled waters</p> <p>Matter, other than trade or sewage effluent, to be discharged from a sewer in contravention of a relevant prohibition;</p> <p>Trade or sewage effluent to be discharged into controlled waters or through a pipe into the sea (beyond the controlled waters)</p> <p>Unauthorised work in a water protection zone;</p> <p>Trade or sewage effluent to be discharged onto land or into a lake or pond in contravention of a relevant prohibition or;</p> <p>Any matter to enter inland waters so as to cause or aggravate pollution by impeding flow.</p> <p>Pollution from individual discharges into water is controlled by a system of discharge consents which set legal limits on the type, concentration and total volume of discharge which can be released. If a pollution incident occurs, a description of the nature and extent of harm must be produced.</p>
<p>Water Act 2003 and 2014</p>	<p>The Water Act replaces parts of the Water Resources Act 1991 and will be fully implemented by 2012. The Water Act introduces a new abstraction licence system which reduces the number of licences and encourages the development of Catchment Abstraction Management Strategies (CAMS).</p>
<p>Groundwater (England and Wales) Regulations 2009</p>	<p>The Regulations transpose the requirements of the Groundwater Directive into UK legislation. The Regulations aim to prevent and limit the pollution of groundwater by certain listed substances or groups of substances. The listed substances are the same as those in the Groundwater Directive. The Regulations aim to prevent entry of List I substances into groundwater and prevent groundwater pollution by List II substances.</p>

	<p>The direct or indirect discharge of List I or II substances must be subject to prior investigation and authorisation. The Regulations also allow notices to be served to control activities which might lead to an indirect discharge of List I substances or groundwater pollution by an indirect discharge of substances in List II.</p>
<p>Control of Pollution (Oil Storage) (England) Regulations 2001</p>	<p>These Regulations require a person having custody or control of oil to carry out certain works and to take certain precautions and other steps for preventing pollution of any waters which are controlled waters for the purposes of Part III of the Water Resources Act 1991.</p> <p>The Regulations impose general requirements in relation to the storage of oil and the types of container used. Where the EA considers that there is a significant risk of pollution of controlled waters from the oil in question it has the power to serve a notice on the person having custody or control to minimise the risk.</p>
<p>Contaminated Land (England) Regulations 2000 (as amended 2006 and 2012)</p>	<p>Local Authorities have a duty to inspect land, to identify contamination and to decide whether any such land should be designated a 'special site'. Public registers of contaminated land and special sites are kept by the local authority and the EA. Following designation of land as contaminated or a special site, the enforcing authority can serve a remediation notice on the appropriate person(s) specifying what needs to be done and the period within which remedial work should be completed. The appropriate person will be the person(s) who caused or permitted the contamination of the land. If this person cannot be identified, then responsibility falls to the current occupier or owner of the land.</p>
<p>Building Regulations 2010 SI 2010 / 2214</p>	<p>The Regulations impose requirements upon people carrying out certain building operations, including new buildings, building extensions and a material change of use of land or a building. Building work must comply with schedule 1 of the Regulations which include minimum standards for various aspects including site preparation, toxic substances, drainage etc.</p>
<p>Emissions to Air / Noise</p>	

<p>Control of Pollution Act (COPA) 1974 (Sections 60, 61) (amended 1989)</p>	<p>Section 60 of COPA gives powers to the Local Authority to control noise and vibration from construction sites. The basis of the COPA legislation is that Best Practical Means should be used to control noise and vibration pollution.</p> <p>Control is by service of an abatement notice (under S60) on the person responsible for the noise requiring specific controls to minimise noise and vibration. The notice may specify types of plant and machinery, hours of work, boundary noise levels, etc.</p> <p>Section 61 provides for the Contractor to apply to the Local Authority for consent before works commence. This protects the contractor from action by the local authority under S60, but not from individual residents' complaints.</p>
<p>Clean Air Act 1993</p>	<p>The Act prohibits, subject to certain conditions, the emission of dark and black smoke from chimneys serving boilers and other industrial plant. Limits also apply to dust, grit, sulphur and car fume emissions. All new furnaces shall be so far as practicable, smokeless. The Local Authority is empowered to undertake an examination of a plant likely to be causing air pollution, taking into account the possible relevance of statutory exemptions.</p>
<p>Noise and Statutory Nuisance Act 1993</p>	<p>This Act amends the Environmental Protection Act (EPA) 1990 to make noise emitted from vehicles, machinery or equipment in the street a statutory nuisance. It gives the Local Authority powers to serve an abatement notice on the person responsible.</p>
<p>Noise Act 1996</p>	<p>Introduces a new procedure for Local Authorities to seize noisy equipment, in relation to statutory nuisance offences under the EPA 1990.</p>
<p>Control of Noise at Work Regulations 2005</p>	<p>Requires that all employers must conduct an assessment of the exposure and therefore of the risk of their employees to noise where they have reason to believe that any of the specified action levels for various noise exposures is or could be exceeded.</p>
<p>Construction Plant and Equipment (Harmonisation of Noise Emission)</p>	<p>Provides for examination and certification of construction plant that comply with noise emission standards. The Regulations require that plant is certified by approved bodies. Various types of plant</p>

Standards) Regulations 1985 (as amended 1995)	manufactured after the dates of the regulations are to meet noise emission standards and are certified as such.
Environmental Protection Act (EPA) 1990: Part 3 – Statutory Nuisance (section 80)	When a complaint of statutory nuisance is made to the Local Authority by a person living in its area, the Authority has to take steps to investigate the nuisance. Statutory nuisances include any premises maintained in such a state to be prejudicial to health or a nuisance; any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance. Noise emitted from premises so as to be prejudicial to health or a nuisance.
Vehicles	
Road Vehicles (Construction and Use) Regulations 1986 (as amended 2015)	It is an offence to use a vehicle if it is emitting ‘smoke, visible vapour, grit, sparks, cinders or oily substances’ in such a way as is likely to cause ‘damage to any property or injury to any person’. It is an offence to use a vehicle in such a way as to cause excessive noise.
Road Traffic (Vehicle Emissions) (Fixed Penalty) Regulations 1997 (as amended 2002 and 2003)	<p>These Regulations give powers to Local Authorities to enforce vehicle emission standards at the roadside as part of the implementation of the national air quality strategy.</p> <p>Under the Regulations, Local Authorities may issue fixed penalty notices to users of vehicles that do not comply with emissions standards set in the Road Vehicles (Construction and Use) Regulations 1986 as amended. Appropriately trained Local Authority officers can test emissions from vehicles with the help of a uniformed police officer to stop the vehicle. The Local Authority officer may also issue a fixed penalty notice to drivers who leave their engines running unnecessarily.</p>

Appendix 3 – Outline Site Waste Management Plan

OUTLINE SITE WASTE MANAGEMENT PLAN

INTRODUCTION

- 1.1.1.1. This Outline Site Waste Management Plan ('SWMP') defines the procedure by which waste will be managed during the lifetime of the Proposed Development, with all relevant information relating to waste going off site via an authorised waste contractor.
- 1.1.1.2. The Site Waste Management Regulations (2008) were repealed in December 2013 and therefore no legal obligation to provide a SWMP is required. However, these regulations are now commonly used as best practice guidance and provide a useful tool for helping demonstrate the management of waste on a project and to inform the technical assessments at the time of the planning application and in anticipation of the likely planning conditions. The 15 steps of the SWMP are outlined in Section 1.2 and have been written in conjunction with the following documentation:
- Outline Construction Environmental Management Plan ('CEMP');
 - Site Waste Management Regulations 2008 (Repealed December 2013*);
 - Waste & Resources Action Programme ('WRAP') Construction guidance (www.wrap.org.uk/construction);
 - Waste Hierarchy;
 - The Waste Regulations 2011;
 - The European Waste Catalogue ('EWC'); and
 - Other relevant legislation.
- 1.1.1.3. The aim of this Outline SWMP is to:
- Identify the volume of waste streams likely to be produced during the works to establish the potential for reuse and recycling;
 - Identify possible options for waste to be 'designed out';
 - Identify opportunities for waste minimisation and management;
 - Identify the most significant opportunities to increase re-use and recycling rates;
 - Identify suitable waste management contractors and record appropriate licences, permits, waste transfer notes and hazardous waste consignment notes;

- Consider appropriate site practices such as how materials will be segregated and the measures that will be used for raising awareness among site operative for waste reduction, reuse and recycling; and
- Set out the method for measuring and auditing Construction and Excavation waste to enable more effective waste management through the setting of performance targets for segregation, recycling and monitoring sub-contractors.

1.1.1.4. This Outline SWMP shall be developed into a full SWMP once the Appointed Contractor has been appointed. It is the Appointed Contractor's responsibility to produce the full SWMP and develop the required information in the steps outlined below.

1.1.1.5. This Outline SWMP will evolve during the project as and when information becomes available, and as a result of periodic reviews to ensure continual improvement, compliance and the best cost-effective solutions are in place.

1.1.1.6. The key benefits of having a SWMP for the Client and Appointed Contractor(s) include:

- Providing a structured and forward-thinking approach to waste management and sustainability onsite;
- Collate all Duty of Care information, waste data etc. from the whole supply chain;
- Identifying savings through improved design, resource efficiency, ordering, material storage and handling to eliminate waste at source;
- Assisting with compliance of internal Environment Management Systems ('EMS'), objectives and targets, and associated Key Performance Indicators ('KPIs');
- Greater control of regulatory risks relating to virgin materials, waste storage, handling and disposal at site level;
- Saves environmental resources and money;
- Greater transparency with interested parties including BREEAM, Local Planning Authorities ('LPAs'); Portsmouth City Council ('PCC'), Havant Borough Council ('HBC'), Winchester City Council ('WCC'), East Hampshire District Council ('EHDC') and Hampshire County Council ('HCC'), and the Environment Agency ('EA'); and
- Enhance waste storage and segregation practices to facilitate higher recycling and recovery onsite.

1.1.1.7. All waste will be managed by the Appointed Contractor in accordance with the Waste Hierarchy (see Plate 1 below) (European Parliamentary Research Service Blog, 2016). This principle shall be incorporated by the Appointed Contractor whenever practical, into all stages of work during the course of this project.

- 1.1.1.8. The hierarchy gives top priority to preventing waste in the first instance, but where waste is created, it gives priority to preparing it for re-use, then recycling, then recovery, and last of all disposal (e.g. landfill).

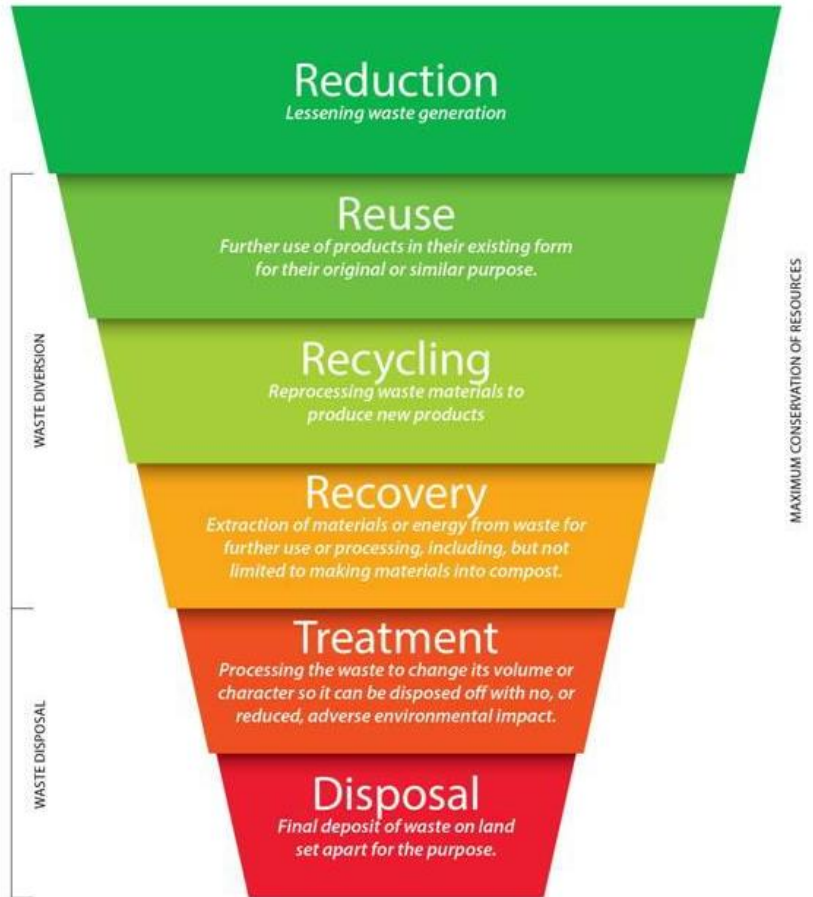


Plate 1 – Waste Hierarchy

1.2. 15 STEPS

- 1.2.1.1. The following section outlines the 15 steps of the Outline SWMP. These steps provide a framework and should be developed further by the nominated Appointed Contractor once appointed and when further information is available.

1.2.2. STEP 1: ADMINISTRATION AND PLANNING

- 1.2.2.1. Step 1 identifies basic information about the project and the key individuals involved. This includes both Client and the Appointed Contractor(s).

1.2.3. STEP 2: ACTION LOG

- 1.2.3.1. The Action Log provides a framework for recording the outcome of project meetings on waste management. An Action Log will help to maintain a record of agreed actions throughout the projects and therefore, will inform waste forecasts.

Table 1 - Action Log

Action Log	Date	Organiser	Attendance Record (name & company)	Notes taken by	List of Actions

1.2.4. STEP 3: KEY PERFORMANCE INDICATORS AND TARGETS

- 1.2.4.1. Step 3 provides a means to report progress against a series of KPIs. The Appointed Contractor is responsible for establishing a series of KPI's based on UK industry standards outlined in Table 2.
- 1.2.4.2. Waste Operators will be asked at the tender stage to outline how they will achieve above the UK industry standards and will be required to report monthly on the KPI's in Table 2.

Table 2 – Key Performance Indicators

KPIs
Amount of excavated material produced
Amount of excavated material recycled
Amount of excavated material sent to landfill
Amount of construction waste produced
Amount of construction waste recycled

Amount of construction waste sent to landfill

Total amount of waste produced

Total amount of waste recycled

Total amount of waste sent to landfill

Amount of waste classified as hazardous, including proportion resulting from contaminated soils

Amount of contaminated soil cleaned

1.2.5.

STEP 4: DESIGN MEASURES AND COST SAVINGS FROM DESIGN

1.2.5.1.

The following step is to enable the recording of all waste reduction opportunities adopted during design. Table 3 below records a series of design decisions and helps quantify the impact of these.

Table 3 – Design Measures

Nature of Project		
Primary Waste Stream	Opportunity for Waste Reduction	Implemented? (If not why?)
Design		
Construction Method		
Materials Employed		

1.2.6. STEP 5: RESPONSIBILITIES FOR WASTE MANAGEMENT

1.2.6.1. Step 5 documents the waste management responsibilities. It is vital for the SWMP to be successfully implemented, that key roles and responsibilities for waste management are clearly defined, documented and communicated.

1.2.6.2. The Client is responsible for the production of the Proposed Development's SWMP via instruction to the Project Manager, with the Appointed Contractor(s) responsible for developing and maintaining the project SWMP and for making available the necessary resources to ensure that the SWMP is fully implemented. A series of key roles have been identified and are as follows:

The Client

1.2.6.3. The Client understands the responsibility to prepare a SWMP for the project, and that it is passed down to the Design Team(s) and Appointed Contractor(s) using the SWMP template and standards. The resulting SWMP will then form part of the contract between the Client and the relevant personnel/organisations involved in the project (see Tables 4 and 5).

1.2.6.4. The project roles are set in Table 4 below.

Table 4 - Project Roles

Responsibility	Actions
Client	Instruct the Design Team to initiate a suitable SWMP/ data to be collated at tender stage.
Client	Instruct the Appointed Contractor for the project.
Client	Review and approve targets suggested by the Appointed Contractor.
Client	Sign off of the project once completed in conjunction with the Appointed Contractor.
The Project Manager	Coordinate the estimation of total volumes of waste expected to be generated by the project with the Appointed Contractor, and relay and review the targets with the Client.
The Project Manager	Identify key SWMP related issues to contractors at Tender stage, including

	information required to complete the site waste matrix.
The Project Manager	Effective relay of the SWMP to the Appointed Contractor to enable successful implementation of the SWMP on site.
The Appointed Contractor / The Project Manager	Estimation of the total volumes of waste expected to be generated by the project with the Project Manager, and the setting of targets relating to reuse, recycling, and disposal of wastes on and off site prior to approval by the Environmental Manager.
The Appointed Contractor	Ensuring suitable resources are made available during the construction phase in relation to working towards the requirements of the SWMP.
The Appointed Contractor	Ensuring the implementation and ongoing monitoring of the SWMP.
The Appointed Contractor	Ensuring, so far as is reasonably practicable, that waste produced during construction is reused, recycled or other form of recovery.
The Appointed Contractor	The production and issue of the site waste matrix and implementation of the Site Waste Policy.
The Appointed Contractor	Signing Waste Transfer Notes and assigning responsibility for this to nominated persons on site in their absence.
The Appointed Contractor	The identification and support of a suitable Waste Champion who will deal with the ongoing monitoring and enforcement of the SWMP at an operational level.

<p>The Appointed Contractor</p>	<p>Ensuring the collation of data relating to waste management and the input of data into the nominated monitoring tool.</p>
<p>The Appointed Contractor</p>	<p>The sign off of the project once completed with the Client.</p>
<p>The Appointed Contractor</p>	<p>So far as is reasonably practicable, ensure coordination of the work and cooperation amongst contractors at work during the construction phase.</p>
<p>The Appointed Contractor</p>	<p>The Appointed Contractor must:</p> <ul style="list-style-type: none"> Plan, manage, monitor and coordinate the entire construction phase Take account of the health and safety risks to everyone affected by the work (including members of the public), in planning and managing the measures needed to control them Liaise with the client and principal designer for the duration of the project to ensure that all risks are effectively managed Prepare a written construction phase plan PDF before the construction phase begins, implement, and then regularly review and revise it to make sure it remains fit for purpose Have ongoing arrangements in place for managing health and safety throughout the construction phase Consult and engage with workers about their health, safety and welfare Ensure suitable welfare facilities are provided from the start and maintained throughout the construction phase

	<p>Check that anyone they appoint has the skills, knowledge, experience and, where relevant, the organisational capability to carry out their work safely and without risk to health</p> <p>Ensure all workers have site-specific inductions, and any further information and training they need</p> <p>Take steps to prevent unauthorised access to the site</p> <p>Liaise with the principal designer to share any information relevant to the planning, management, monitoring and coordination of the pre-construction phase</p>
<p>The Appointed Contractor</p>	<p>Must make and maintain arrangements that will enable the workers engaged in the construction work to cooperate effectively in promoting and developing measures to ensure that any waste arising on site is managed within the terms of the SWMP and in checking the effectiveness of such measures.</p>
<p>Principal Designer, Client and Appointed Contractor</p>	<p>The Principle Designer is to liaise directly with the Client and Appointed Contractor regarding Health & Safety related issues and the SWMP.</p>
<p>Waste Champion</p>	<p>The effective communication of the SWMP to their operatives and ensures enforcement of the SWMP at an operational level e.g. identifying areas for improvement where segregation is not being followed.</p>
<p>Waste Champion</p>	<p>For the delivery of relevant toolbox talks where necessary.</p>

1.2.6.5. Table 5 below will require completion once the Appointed Contractor is appointed and subcontractors known as the majority of projects are delivered by a range of sub-contractors, each of which will need to manage their waste in line with the project SWMP. The table below provides a framework to be developed by the Appointed Contractor to allocate responsibility to individuals/ organisations for different elements of the work.

Table 5 – Assignment of waste management responsibility by site activity/sub-contractor (once appointed)

Site Activity/ Sub contractor workplace	Primary waste stream	EWC Code	Waste Management responsibility	Relevant Specification/ Contract Clause for Waste Management
Groundworks				
Foundations, Piling				
Structure				
Dryliners				
Building Envelope/Cladding				
Mechanical Electrical				
Trades (Joinery, painting, Plastering, Rendering, Plumbing, Heating etc.)				
Landscaping & habitat creating/ restoration				
Removal of site offices, temporary works & final clear away				
Cable civils and Cabling works (installation and jointing / terminating and HDD)				

1.2.7. STEP 6: COMMUNICATION, TRAINING AND DISTRIBUTION OF THE SWMP

1.2.7.1. Copies of the SWMP will be made available to all principal and sub-contractors at tender stage for reference. The SWMP will also assist in defining terms and conditions through the implementation and monitoring of this plan relating to waste management on site during the project lifetime. In addition to these key project partners, the Construction Design Manager ('CDM') coordinator will have full access to this SWMP in order for comments to be made with regard to any additional Health and Safety requirements envisaged as part of the development of this project.

1.2.7.2. A waste planning meeting will be scheduled for all key project team members (see distribution list) at the tender stage to formulate a waste management strategy to optimise best practice waste management through the lifetime of the project.

Date Waste Planning Meeting set	___/___/___
Date Waste Planning Meeting held	___/___/___

1.2.7.3. A copy of the latest version of the SWMP will be displayed in a prominent location on site including the site office and the signing in area (if applicable).

1.2.7.4. Training and communication of this SWMP will be made by the following means:

- Within the Appointed Contractor's site induction;
- Formal training course on waste management; or
- The delivery of Toolbox Talks by Principal/ Sub Contractor or waste champion.

1.2.7.5. Training and communication will be provided to all personnel working on the project. This will be implemented in order to highlight the importance of the SWMP and individual responsibility in ensuring effective waste minimisation and management on site.

1.2.7.6. The Appointed Contractor is responsible for the distribution of the latest version of the SWMP to all parties on the distribution list. Each will be responsibility for distributing updated versions and removing superseded copies (hard and electronic format) in their particular work field. The Appointed Contractor must ensure that every contractor knows where the SWMP is kept, and must make it available to any contractor carrying out work described in the plan.

1.2.8. STEP 7: FORECASTING WASTE PRODUCTION AND PLANNING REUSE AND RECYCLING

- 1.2.8.1. Step 7 forecasts the waste streams, sub divided by material type (inert, non-hazardous and hazardous) and project phase (e.g. enabling, construction). Waste forecasting is an essential part of the SWMP. Forecasting waste allows a clear strategy to be established to effectively manage the waste.
- 1.2.8.2. The Client and Project Team shall investigate all likely waste streams to be generated from this project, approximate volumes of material and assigned relevant targets. Targets will set by the Appointed Contractor (with final approval by the Environmental Manager/Waste Champion) and will go beyond the UK industry standards to maximise reuse and recycling of material both on and offsite, and opportunities for both financial savings and environmental sustainability.
- 1.2.8.3. Table 6 shall be completed by the Appointed Contractor once appointed including type of each material, the volume of that material, the % target from diversion to landfill and the method of treatment or disposal.

Table 6 - Waste Forecasts

Waste Category	Type of Material	Estimated volume	% Target	Method of treatment/ disposal
Enabling Works and Reinstatement				
Inert				
Non-hazardous				
Hazardous				
–Construction Works				
Inert				
Non-hazardous				
Hazardous				

1.2.8.4. The assessment shall include site generated wastes (e.g. arisings and construction specific waste such as concrete break out/ re-bar) and imported waste materials (e.g. imported secondary aggregates/ soils from other client or third-party construction sites).

1.2.8.5. The project team shall ensure the principles of the Waste Hierarchy will be applied to the SWMP to enable best practice onsite to improve the overall sustainability of the project. It is intended that the SWMP should evolve during the course of the project. Regular monitoring and reviews will be undertaken (see Section 1.7) to ensure continual improvement, legal compliance and that cost-effective solutions are in place.

Recycling & Reuse Initiative

1.2.8.6. As part of the development of the SWMP the Appointed Contractor and Project Team shall review and agreed upon initiatives to reduce the amount of waste produced in the first instance, and assisting in the recycling and reuse of waste as an alternative to offsite disposal as outlined in Table 7.

Table 7 - Recycling & Reuse Initiatives

Material	Legislation/ Notes
Recycling Offsite	
Plastic packaging	
Paper & Cardboard	
Plasterboard via British Gypsum/ Knauf	
Concrete wastes (processed)	
Recycling Onsite	
Concrete waste (processed)	Environmental Permit Regulations 2010. Schedule 3. Chapter 2*. i.e.: -Use waste under exemption U8; -Treat waste to make it suitable for use in construction under exemption T5; -Treat bricks, tiles, concrete by crushing T7.

	* if not in this chapter will require permit.
Reuse Onsite	
Arisings, uncontaminated¹	Environmental Permit Regulations 2010
Wood	
<i>¹If the excavated material does not prove to be contaminated in accordance with the WAC testing and Soil Guideline Values (SGVs), then there are a number of reuse and recycling opportunities that exist.</i>	

1.2.9. STEP 8: WASTE STORAGE AND DISPOSAL OPTIONS

- 1.2.9.1. Suitable waste storage facilities/arrangements must be made onsite to ensure effective segregation of wastes onsite to aid higher rates of recovery (e.g. through recycling or reuse initiatives. See Section 1.4).
- 1.2.9.2. The placing of waste management contracts will, where possible, consider the implications of long distance travel in terms of health and safety risk, commercial terms and increased emissions from vehicles. Wherever possible, contracts will be awarded as locally as possible.
- 1.2.9.3. It is essential that the construction work is carried out closely with the waste management contractors, in order to determine the best techniques for managing waste and ensure a high level of recovery of materials for recycling.
- 1.2.9.4. A specific area shall be laid out and labelled to facilitate the separation of materials for potential recycling, salvage, reuse and return. Recycling and waste bins are to be kept clean and clearly marked in order to avoid contamination of materials. Skips for segregation of waste identified currently are:
- Metal (e.g. copper and iron);
 - Inert (e.g. inert plastics, concrete and rubble);
 - Hazardous (e.g. asbestos, Poly Chlorinated Bi-phenols);
 - Mixed non-hazardous (biodegradable waste); and
 - Waste Electrical and Electronic Equipment ('WEEE').
- 1.2.9.5. All waste management contracts are listed within the Waste Carrier and Destination Register in Table 8. This is to be updated regularly with any additional service providers, changes in destination sites or additional waste streams being generated. The responsibility for ensuring the register is completed and kept up to date is with the Appointed Contractor.
- 1.2.9.6. Both the Client and Appointed Contractor will take reasonable steps to ensure site security measures are in place to prevent illegal disposal of waste at the site.

1.2.10. STEP 9: REGISTER OF LICENCES, PERMITS AND MOVEMENTS

- 1.2.10.1. This step documents the tracking of waste carriers and waste destinations, which are mandatory to comply with the Environmental Protection Act 1990.
- 1.2.10.2. The Environmental Permitting (England and Wales) Regulations 2016 require that disposal sites are classified into one of three categories dependent on the chemical composition of the material; these are hazardous, non-hazardous and inert. Prior to disposal, if material is deemed hazardous it must be pre-treated to meet the Waste Acceptance Criteria. Further stipulations within the Environmental Permitting Regulations 2016 are as follows:
- Higher engineering and operating standards to be followed;

- Hazardous liquids, flammable, corrosive, explosive, oxidising and infectious wastes have been banned from landfill since July 2002;
- Non-hazardous liquids have been banned since 2007;
- Co- disposal has been banned since 16 July 2004;
- Whole tyres were banned from 2003, and shredded tyres have been banned since 2006;
- Waste will be required to be pre-treated prior to landfilling; and
- Operators must demonstrate that they and their staff are technically competent to manage the site, and have made adequate financial provision to cover the maintenance and aftercare requirements.

Table 8 – Waste Carrier and Destination Register

Waste		Waste Carrier			Waste Management Facility					
Waste type and EWC code	Person responsible for disposal	Name of waste carrier	Waste carriers licence no. & expiry date	Validated with EA?	Disposal site name & address	Type of facility (e.g. landfill, transfer station or exempt site)	% recycled	Environmental permit no. or permit exemption no. (& expiry date)	Validated with EA?	Waste type and EWC code
Enabling Works and Reinstatement										
Notes:										
Arising s 17-05- 04	J.Bloggs	R. Plant Hire	SSU/458637/C B 12/05/2008	✓	Foxes Quarry. Daventry Road, Bristol, BS2 3BB	Landfill	10%	45731	✓	Site office



Construction Works										
Notes:										

1.2.11. STEP 10: MONITORING & MEASUREMENT

- 1.2.11.1. Step 10 ensures that the project is being monitored throughout construction.
- 1.2.11.2. The effectiveness of the SWMP will depend upon the enforcement of its requirements on site and include monitoring to be made by the Waste Champion and Site Manager on site. Responsibility for the formal recording of all waste movements shall be with the Site Manager and is to be recorded on a weekly basis using an approved nominated system (e.g. weekly monitoring sheet). It is the responsibility of the Appointed Contractor to ensure the data is collated and that this is inputted into the nominated monitoring tool, and that all waste transfer notes/ Hazardous waste consignment notes are forwarded to the waste champion weekly.
- 1.2.11.3. A 'spot check' will be made by the Site Manager in relation to the completeness of the weekly monitoring sheet, any waste transfer note and any hazardous waste consignment note against the Waste Carrier and Destination Register. (see Table 9). This will ensure both the accuracy of data entered in to the monitoring tool.
- 1.2.11.4. The skips will be monitored to ensure that cross-contamination of segregated skips does not occur. This will be covered in the toolbox talks – reviewing how the onsite waste management system is working and point out the extra costs associated with contamination. The Appointed Contractor will continually review the type of surplus materials being produced and change the site set up to maximise on reuse or recycling and the use of landfill will be the last option.
- 1.2.11.5. If any problems are identified during the lifetime of the project in relation to exceeding the expected SWMP waste stream volumes, failure to meet stated targets or issues relating to cost effective and legal transfer of waste materials, then they are to be escalated to the Project Manager for further discussion on the best solution. This may trigger a review of the SWMP in relation to adjustment of targets, however, any change would need to be documented and justified.

Table 9 - Deviations

Issue	Details
[waste forecast – exceeded]	
[waste forecast – not met]	

- 1.2.11.6. The SWMP will be reviewed at least every six months (but monthly is recommended) during the lifetime of the project by the Project Manager and the Appointed Contractor to ensure that estimated targets are being achieved and that realistic solutions are provided for unplanned events or abnormal wastes.

1.2.12. STEP 11: ACTUAL WASTE ARISING

1.2.12.1. This step provides a framework for recording the actual waste arisings from the project, allowing a comparison with earlier estimates. Actual waste quantities will be obtained from the monthly reports. These will be spot checked against paper Waste Transfer Notes.

1.2.12.2. The Environmental Permitting Regulations 2016 also require that waste is described by European Waste Catalogue ('EWC') codes on Transfer Notes required under the Duty of Care Regulations. The EWC categorises wastes into 20 main groups and approximately 900 codes. The EWC also identifies Hazardous Wastes, many of which are currently Special Waste and dealt with by the Special Waste Regulations, but some of which are not, such as fluorescent tubes, certain batteries and cathode ray tubes.

1.2.13. STEP 12: PROJECT COMPLETION

1.2.13.1. Upon completion of the project, the Client and Appointed Contractor(s) will review the SWMP and ensure that it is updated to and review the targets originally set.

1.2.14. STEP 13: OVERALL RECYCLED CONTENT

1.2.14.1. Step 13 is not a requirement of the SWMP Regulations 2008, although it demonstrates the project is meeting requirements for recycled content as defined by the KPI's for total amount of waste recycled, amount of excavated material recycled and amount of construction waste recycled.

1.2.15. STEP 14: IMPLEMENTATION

1.2.15.1. Step 14 provides a checklist to ensure that the necessary arrangements have been made to ensure effective SWMP implementation on site as presented in Table 10. This includes additional tasks outlined in the SWMP Regulations 2008 to ensure the effective operation, monitoring and reporting of the SWMP.

1.2.15.2. Prior to implementation of the SWMP, the Site Manager(s) or Appointed Contractor(s) should complete all necessary checks as outlined in the worksheet below. The checklist covers recommended best practice actions.

1.2.15.3. The checklist should be signed off by the Client and Appointed Contractor(s) every time the SWMP is updated.

Table 10 – SWMP Checklist

	Yes	No	Section
Client Checks			
The Client should give reasonable directions to any contractor to enable the Appointed Contractor(s) to complete the SWMP.			Section 1.2.6
Appointed Contractor(s) Checks			
The Appointed Contractor(s) should ensure that so far as reasonably practical coordination of the work and cooperation among contractors at work during the construction phase.			Section 1.2.6
The Appointed Contractor(s) should ensure that so far as reasonably practical every worker carrying out construction work is provided with a suitable site induction.			Section 1.2.6
The Appointed Contractor(s) should ensure that so far as reasonably practical every worker carrying out construction work is provided with any further information and training needed for the particular work to be carried out within the terms of the SWMP.			Section 1.2.6

The Appointed Contractor(s) should make and maintain arrangements which will enable the Appointed Contractor and workers to engage in construction work to cooperate effectively in promoting and developing measures to ensure any waste arising on site is managed within the terms of the SWMP and in checking the effectiveness of such measures.			Section 1.2.6, 1.2.7, 1.2.8
The Appointed Contractor(s) should ensure so far as reasonably practical that waste produced during construction is reused, recycled or recovered.			Section 1.2.8
Have terms and commercial rates been agreed with waste management contractors?			Section 1.2.8, 1.2.9
Have data reporting procedures been agreed with waste management contractors?			Section 1.2.10
For offsite waste management or disposal- Are all the waste destination details verified?			Section 1.2.8
Has a waste segregation/collection area been prepared?			Section 1.2.9
Has the waste management area been adequately sign posted?			Section 1.2.9
Has a waste management planning meeting been set?			Section 1.2.7
Has the waste management document control/ filing system been set up?			Section 1.2.7, 1.2.11

Have all necessary staff and contractors read and signed the SWMP?			Section 1.2.6
Have the waste management targets/ KPIs been set?			Section 1.2.4
Has the SWMP been approved by the Client?			Section 3.6
Client & Appointed Contractor(s) Checks			
Have the Client and Appointed Contractor(s) reviewed, revised and refined the SWMP as necessary, and ensured that any changes in respective roles and responsibilities are clearly communicated to those affected?			Section 1.2.6, 1.2.7
Have the Client and Appointed Contractor(s) taken reasonable steps to ensure sufficient site security measures are in place to prevent the illegal disposal of waste?			Section 1.2.9

1.2.16. STEP 15: DOCUMENT DECLARATION

FINAL SIGN OFF:

By signing this box, I confirm that I have understood the content and requirements outlined in this document.

Appointed Contractor(s)	././....	
Client	././....	

1.3. SITE WASTE MANAGEMENT GUIDANCE

1.3.1. INTRODUCTION

1.3.1.1. The following section acts to serve as guidance to all persons involved in the waste management of the project proposals.

1.3.2. CLASSIFICATION OF WASTE

1.3.2.1. The overarching requirement of classifying waste is to ensure that it is adequately described such that it can be disposed of at the appropriate disposal facilities. The responsibility for classification of waste resides with the producer of the waste, this could be classed as the Client or the Appointed Contractor, and will depend upon the specific circumstance.

1.3.2.2. Waste Transfer Notes and Hazardous Waste Consignment Notes must contain a written description of the waste and also a specific six figure code from the European Waste Catalogue ('EWC') (implemented in the UK by the List of Wastes (England) Regulations 2005 (SI 2005 No. 895). The EWC is a list of wastes divided into 20 chapters. Chapter 17 is the most relevant section for classifying waste produced on construction sites.

Inert Waste

1.3.2.3. Inert Waste is waste that does not:

- Undergo any significant physical, chemical or biological transformations;
- Dissolve burn or otherwise physically or chemically react;
- Biodegrade or adversely affect other matter with which it comes into contact; and
- its leachability is insignificant.
- Examples include: Glass, concrete, bricks, tiles, and arisings excluding peat and topsoil).

Non-Hazardous Waste

- 1.3.2.4. Non-hazardous waste is simply defined as waste that is not hazardous waste, which does not feature on the list of hazardous waste in the EWC. Examples include general mixed construction waste.

Hazardous Waste

- 1.3.2.5. Waste is generally considered to be hazardous if it (or material or substances it contains) could cause harm to humans or the environment (e.g. asbestos, batteries and solvents) (UK Government, n.d.).
- 1.3.2.6. Should you produce or hold hazardous waste the following steps must be followed:
- Waste must be classified to check if it is hazardous;
 - Waste must be separated and stored safely;
 - Authorised businesses must be used to collect, recycle and dispose of your waste (check that waste carriers are registered and waste sites have environmental permits);
 - Fill in the parts of a Waste Consignment Note ('WCN') that apply to you (keeping one copy and giving two copies to the carrier collecting the waste); and
 - Keep a register for 3 years at the premises that produced or stored the waste.
- 1.3.2.7. Each movement of hazardous waste has to be accompanied by a Hazardous Waste Consignment note (see Plate 3). These must be uniquely referenced but otherwise contain the same information as a standard WTN. To fill this out you will need to know the Standard Industrial Classification (SIC code (2007) which describes the business activity that produced the waste and the Waste Classification Code referred to as LoW (List of Waste) or WC (European Waste Catalogue) code which describes the waste.
- 1.3.2.8. Guidance on determining whether material is hazardous is provided in Technical Guidance WM2: Hazardous waste – Interpretation of the definition and classification of hazardous waste. It outlines the methodology for assessing wastes, determination of dangerous substances within waste and provides a hazardous waste assessment methodology.

1.4. WASTE ACCEPTANCE CRITERIA

- 1.4.1.1. Before waste can be accepted by a landfill, the operator must be able to show that it can be accepted in accordance with its Waste Acceptance Criteria ('WAC') (Environment Agency, 2011). Under this regime, it is the waste producer that has the responsibility for basic characterisation which uses a standard suite of leachate testing to ascertain the potential for the wastes to cause water pollution. There are published maximum leachate criteria for the following categories of waste, and are available from the landfill site you intend to use.

- Hazardous waste (numerical limits for leachable substances and organic content, along with standards for physical stability);
- Non-reactive hazardous waste;
- Non-hazardous waste (no numerical limits for non-hazardous waste); and
- Inert waste.

1.4.1.2. Certain materials meet the definition of inert waste without the need for further analysis or need for testing to show they meet the WAC for inert landfill sites. These are outlined in Table 11 as follows:

Table 11 – Inert Wastes not requiring WAC

Description	Exclusions	EWC code
Waste glass		10 11 12
Waste glass based fibrous materials		10 11 03
Glass packaging		15 11 07
Concrete		17 01 01
Bricks		17 01 02
Tiles and ceramics		17 01 03
Glass		17 02 02 20 01 02
Soil and stones		20 02 02

1.4.1.3. All other waste needs to meet the total chemical concentration and leachability levels of the WAC and therefore will need to be tested. It should be noted that individual landfill sites may have additional acceptance criteria to the standard WAC and consequently operators should be consulted before finalising the decision on disposal site.

1.5. DISPOSAL AND MOVEMENT OF WASTE OFFSITE

1.5.1. TRANSFER OF WASTE

1.5.1.1. When removing waste from site, a waste transfer note (or consignment note for hazardous wastes) must be completed prior or at the point of removal from any site as specified in the Waste (England and Wales) Regulations 2011 (See Plate 2). Waste Transfer Notes must be used for all shipments of inert and non-hazardous wastes. These documents are completed in three parts and include details for the following three parties: waste producer; waste carrier; and receiving site. The following details must be included on all Waste Transfer Notes:

- Producer site address;

- Written description of waste and EWC code;
- The quantity of waste and how it is contained (e.g. 8-yard skip);
- Waste carrier details and licence number;
- Receiving site address and licence number; and
- Confirmation that the holder of waste has fulfilled their duties under the waste hierarchy.

1.5.1.2. However, if the waste composition changes (e.g. degree of contamination, or different type of waste), or it is to be sent to a different site, or moved by a different carrier, then a new Waste Transfer Note has to be completed.

1.5.2. PRE-TREATMENT

1.5.2.1. If the material is non-hazardous and it is destined for disposal directly to landfill, pre-treatment must have been applied and a declaration detailing the treatment applied attached to the Waste Transfer Note.

1.5.2.2. All hazardous and non-hazardous wastes will be pre-treated prior to disposal to landfill. The methods of pre-treatment will enable the waste to meet the 'three-point test' as follows:

- It must be a physical, thermal, chemical or biological process (including sorting);
- It must change the characteristic of the waste;
- It must do so in order to:

1.5.2.3. Reduce its volume; or

- Reduce its hazardous nature; or
- Facilitate its handling, or
- Enhance its recovery.

1.5.2.4. Source segregation is seen as a pre-treatment option. This can be applied to waste generation on site, including general waste and arisings.

1.5.2.5. A declaration stating the pre-treatment method applied to the waste must be attached to any WTN for non-hazardous waste being disposed of to a landfill, the Appointed Contractor's Site Manager will ensure this accompanies the WTN.

Duty of care: waste transfer note Keep this page and copy it for future use. Please write as clearly as possible.

Section A – Description of waste

A1 Description of the waste being transferred

 List of Waste Regulations code(s)

A2 How is the waste contained?
 Loose Sacks Skip Drum
 Other

A3 How much waste? For example, number of sacks, weight

Section B – Current holder of the waste – Transferor

By signing in Section D below I confirm that I have fulfilled my duty to apply the waste hierarchy as required by Regulation 12 of the Waste (England and Wales) Regulations 2011 Yes

B1 Full name
 Company name and address

 Postcode SIC code (2007)

B2 Name of your unitary authority or council

B3 Are you:
 The producer of the waste?
 The importer of the waste?
 The local authority?
 The holder of an environmental permit?
 Permit number
 Issued by
 Registered waste exemption?
 Details, including registration number
 A registered waste carrier, broker or dealer?
 Registration number
 Details (are you a carrier, broker or dealer?)

Section C – Person collecting the waste – Transferee

C1 Full name
 Company name and address

 Postcode

C2 Are you:
 The local authority?

C3 Are you:
 The holder of an environmental permit?
 Permit number
 Issued by
 Registered waste exemption?
 Details, including registration number
 A registered waste carrier, broker or dealer?
 Registration number
 Details (are you a carrier, broker or dealer?)

Section D – The transfer

D1 Address of transfer or collection point

 Postcode
 Date of transfer (DD/MM/YYYY)

D2 Broker or dealer who arranged this transfer (if applicable)

 Postcode
 Registration number
 Time(s)

Transferor's signature
 Name
 Representing

Transferee's signature
 Name
 Representing

Plate 2 – Waste Transfer Note Form

1.5.3. HAZARDOUS WASTE CONSIGNMENT NOTES

1.5.3.1. Hazardous Waste Consignment Notes must contain all the information identified above in section 1.4.11 for standard Waste Transfer Notes, however, they must also contain the following elements:

- Hazardous Waste Producer Premise Code;
- Details of what makes the consignment note hazardous;
- % concentration of contaminant; and
- The relevant hazard code (H1-H14).

1.6. ENVIRONMENTAL PERMIT EXEMPTIONS

- 1.6.1.1. Environmental permit exemptions (detailed in Schedule 3 of the Environmental Permitting (England and Wales) Regulations 2016) have been developed to provide a lighter regulatory touch in order to promote the recovery of waste, as opposed to waste being disposed of directly to landfill. These exemptions take up to 25 working days to be approved, and each registration lasts 3 years. The relevant forms need to be completed by the Appointed Contractor to the Environment Agency.

1.7. LANDFILL TAX

- 1.7.1.1. The tax is charged by weight. There are 2 rates. You pay the lower rate on 'inactive waste' - for example rocks or soil. The lower rate is £2.90 per tonne (April 2019) and you pay the standard rate of £91.35 per tonne (April 2019) for 'active' waste. This rate is set to increase from the 1st April 2020 to £3.00 for inactive waste and to £94.15 for active waste.

Appendix 4 – Outline Materials Management Plan

Materials Management Plan (MMP) Form - October 2014

This form should be completed once the lines of evidence have been marshalled in relation to suitability for use, certainty of use and quantity required.

The answers to the questions posed within this form, together with the supporting information will constitute the MMP and must be provided to the Qualified Person.

A Qualified Person may comment on draft versions of this MMP, but will not complete the Declaration until all the relevant documents, demonstrating lines of evidence have been provided for each site.

The person / organisation who will pay the Declaration fee should confirm that they have read and understand the Terms and Conditions relating to the payment of the Declaration fee to CL:AIRE. These can be found on the CL:AIRE website.

The person / organisation agreeing to pay the Declaration Fee - Name, organisation and contact details inc. email address -	
--	--

I confirm I have read and understood the Terms & Conditions.

Each question must be answered. If the question is not applicable please state this and provide a brief explanation.

1. Specify the scenario to which this MMP relates, as described in the Definition of Waste: Development Industry Code of Practice (DoW CoP) (1, 2, 3 or 4):

- 1. Reuse on the Site of Origin
- 2. Direct Transfer of clean naturally occurring soil / mineral materials
- 3. Cluster Project
- 4. Combination of any of the above

In the case of a combination of reuse scenarios, please describe it below (e.g. (i) Reuse on Site of Origin and Direct Transfer of clean naturally occurring unpolluted soils, (ii) Reuse on the Site of Origin with Direct Transfer of clean naturally occurring soil to x number of development sites etc:

(NB: A Declaration is required for reuse on the Site of Origin and for any 2 site arrangement i.e. there is no facility for a combination Declaration)

2. Organisation and name of person preparing this MMP	(Full address and contact details)
---	------------------------------------

Document Control

Date issued	
Revision date	
Summary of revision 1	
Summary of revision 2	

Insert additional lines to the table above for any subsequent revisions.

Note - revisions to the MMP do not trigger an additional Declaration by a Qualified Person, unless an additional site is added to the project.

Revisions to the MMP must be recorded and summarised in the Document Control box above.

Site Details

3. Site / Project name(s)	
Reuse / receiving site name :	
Donor site name (if Direct Transfer)	

Landowners

4a. Name of Landowner(s) (full address and contact details) – where excavated materials are to be reused	
4b. Name of Landowner(s) (full address and contact details) – where excavated materials are arising from	

Summary and objectives

5a. Provide a brief description of the planned project and how excavated materials are to be reused.	
--	--

General Plans and Schematics

<p>6. Attach a location plan for the site(s) and a plan of the site(s) which identifies where different materials are to be excavated from, stockpile locations (if applicable), where materials are to be treated (if applicable) and where materials are to be reused.</p>	<p>Plan Document Reference(s):</p>
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<p>7. Attach a schematic of proposed materials movement. Where there is only one source area and one placement area briefly describe it. For all other projects a schematic is required.</p>	<p>Description & Schematic Document Reference:</p>
---	--

Parties Involved and Consultation – if more than one party please provide additional details for them and identify the location that they will be working e.g. where a site is zoned

<p>8a. Main earthworks contractor(s) (full address and contact details) – Where excavated materials are to be reused</p>	
<p>8b. Main earthworks contractor(s) (full address and contact details) - Where excavated materials are arising from</p>	

9. Treatment contractor(s) (full address and contact details) – for treatment on site of origin, or at a Hub site within a fixed STF / Cluster Project	
10. Where wastes and materials are to be transported between sites, provide details of the transport contractor(s) (full address, contact details and waste carriers registration details (if applicable))	
11. Provide Local Authority contact details (full address and named contacts) where excavated materials are to be reused	
12a. For the site where materials are to be reused and for Hub Site locations provide Environment Agency contact details (full address and named contacts):	
For all Cluster Projects: 12b. Attach any relevant documentation	EA references:

<p>from the EA relating to the excavation and reuse of the materials to demonstrate no objection to the proposals (see 3.37 of DoW CoP)</p> <p>If the EA has not been consulted please explain why (see paragraph 3.39 of the DoW CoP).</p>	
---	--

Lines of Evidence

There is no one single factor that can be used to decide that a substance or object is waste, or when it is, at what point it ceases to be waste; as complete a picture as possible has to be created.

The following sections require completion to ensure the correct decision is made.

If a requested item is not relevant it is important to clearly state why this is so (e.g. no planning permission required because permitted development status exists).

Suitable for use criteria

13. Please describe or provide copies of the required specification(s) for the materials to be reused on each site.	Document Reference(s):
<p><i>Where contamination is suspected or known to be present</i></p> <p>14a. Please provide copies of or relevant extracts from the risk assessment(s) that has been used to determine the specification for use on the site. This must relate to the place where materials are to be used. This must be in terms of (i) human health (ii) controlled waters and (iii) any other relevant receptors. If a risk assessment is not relevant for a particular receptor given the site setting please explain why below:</p>	Document Reference(s):
14b. Please attach any relevant documentation from the LA relating to the excavation and reuse of the materials to demonstrate no objection (see 3.37 of the CoP)	LA Document references:
14c. Please attach any relevant	EA Document references:

documentation from the EA relating to the excavation and reuse of the materials to demonstrate no objection (see 3.37 and Table 2 of the CoP)	
14d. Please attach any relevant documentation from any other regulators (if relevant) relating to the excavation and reuse of the materials to demonstrate no objection (see 3.37 of the CoP)	Document Reference(s):

<i>Where contamination is not suspected</i>	Document Reference(s)
15a. Please attach copies or relevant extracts from the Desk Top Study that demonstrates that there is no suspicion of contamination.	
15b. Please attach copies of or relevant extracts from the site investigation/testing reports that adequately characterise the clean materials to be used (if appropriate).	Document Reference(s)
15c. Please attach copies of any other relevant information (if available) confirming that land contamination is not an issue.	Document Reference(s)

NB: It is your responsibility to assess the nature of the material to be used and that it fits within the limitations of the scenario under which it is to be used

Certainty of use

Various lines of evidence are required to demonstrate that the materials are certain to be used. This includes:

- The production of this MMP
- An appropriate planning permission (or conditions that link with the reuse of the said materials)
- An agreed Remediation Strategy(ies)
- An agreed Design Statement(s)
- Details of the contractual arrangements

Please identify in the following sections what lines of evidence relate to the site(s) **where the materials are to be used**.

<p>16a. Planning Permission(s) relating to the site where materials are to be reused</p> <p>Please provide a copy of the relevant planning permission</p>	<p>Document Reference:</p>
<p>16b. Explain how the reuse of the excavated materials fits within the planning</p>	

permission(s) for each site.	
16c. If planning permission is not required for any one site please explain why below e.g. permitted development, clean up of a chemical spill, surrender of an Environmental Permit, re-contouring within the existing permission.	
<p><i>Where contamination is suspected or is known to be present</i></p> <p>17. Please provide a copy of any Remediation Strategy(ies) that have been agreed with relevant regulators.</p>	Document Reference(s):
<p><i>Where contamination is not suspected</i></p> <p>18. Please provide a copy of any Design Statement(s) that have been agreed (e.g. with the planning authority or in the case of permitted developments the client).</p>	Document Reference(s):

Quantity of Use

<p>19. Please provide a breakdown of the excavated materials for each site and how much will be placed at each site or sub area of each site.</p> <p>Where this is not specific to a single readily identifiable source refer to an annotated plan, schematic or attach a tabulated summary.</p>	<p>Document Reference(s):</p>
<p>20a. How has consolidation/compaction being considered in the above mass balance calculations?</p>	
<p>20b. How has loss due to treatment being considered in the above mass balance calculations (if applicable)?</p>	
<p>20c. How has the addition of treatment materials being considered in the above mass balance calculations (if applicable)?</p>	
<p>Note - An exact figure is not required but</p>	

one that is reasonable in the circumstances and can be justified if challenged.	
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Contingency arrangements

Explain what is to happen in the following situations and **identify the appropriate clauses** in the contract(s) (Such clauses must be provided to the Qualified Person, preferably as a summary document): or

21a. What is to happen to, and who is to pay for out of specification materials?	Reference:
21b. What is to happen to, and who is to pay for any excess materials?	Reference:
21c. What happens if the project programme slips in relation to excavated materials or materials under -going treatment?	Reference:
21d. Other identified risk scenarios for the project (relating to excavated materials)?	Reference:

The Tracking System

Where contamination is suspected or known to be present, state the procedures put in place to:

<p>22a. For all sites please describe the tracking system to be employed to monitor materials movements.</p>	
<p><i>Where contamination is suspected or known to be present, state the procedures put in place to:</i> 22b. Prevent contaminants not suitable for the treatment process being accepted</p>	
<p><i>Where contamination is suspected or known to be present, state the procedures put in place to:</i> 22c. Prevent cross contamination of materials not in need of treatment, wastes awaiting treatment and treated materials</p>	
<p><i>Where contamination is suspected or known to be present, state the procedures put in place to:</i> 22d. Demonstrate that materials that do not require treatment and successfully treated materials reach their specific destination</p>	
<p><i>Where contamination is suspected or known to be present, state the procedures put in place to:</i></p>	

<p>22e. Ensure that waste for off-site disposal or treatment is properly characterised and goes to the correct facility</p>	
<p>23. Please attach a copy of the tracking forms / control sheets that are to be used to monitor materials movements.</p> <p>To include transfer of loads on site into stockpiles prior to treatment (if applicable), stockpiled after treatment (if applicable), stockpiled awaiting use (as appropriate) and final placement.</p>	<p>Document reference(s)</p>
<p><i>For Hub Sites within Cluster Projects & where materials need treatment before reuse</i></p> <p>24. Please attach a copy of the Environmental Permit covering the treatment process.</p> <p>Alternatively if the treatment is covered by a</p>	<p>Permit reference / EA letter reference:</p>

Mobile Plant Permit and associated Deployment Form, attach a copy of the EA agreement to the Deployment Form.	
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Records

<p>25. Where, and in what form, are records to be kept?</p> <p>Note – records e.g. transfer notes, delivery tickets, Desk Top Study, Site Investigation, Risk Assessment(s), Verification Report(s) need to be kept for at least 2 years after the completion of the works and production of the Verification Report</p>	
--	--

Verification Plan

26. Provide or explain the Verification Plan which sets out how you will record the placement of materials and prove that excavated materials have been reused in the correct location and in the correct	Document Reference
---	--------------------

quantities within the development works (see 3.4 of the DoW CoP).	
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Appendix 5 – Outline Soil Resources Plan

OUTLINE SOIL RESOURCES PLAN

1.1. INTRODUCTION

- 1.1.1.1. This Outline Soil Resources Plan ('Outline SRP') has been prepared on behalf of AQUIND Limited ('The Applicant') to support the application for a Development Consent Order ('DCO'). The application for the DCO is made in respect of the UK elements of AQUIND Interconnector Project which will operate between France and the UK.
- 1.1.1.2. The DCO Application for the UK elements covers the parts of the Project located onshore in the UK ('Onshore Components') and in the UK Marine area, defined as all of that part of the Project from the Mean High Water Spring Tide ('MHWS') in the UK out to the limit of the UK/France EEZ ('Marine Components'). Together the Onshore Components and the Marine Components comprise the 'Proposed Development', in respect of which the DCO Application is made.
- 1.1.1.3. This document sets out the Outline SRP that will be developed by the main works contractor and applied to all soil resources that are disturbed either permanently or temporarily for the Proposed Development.
- 1.1.1.4. A Scoping Opinion was received by the Applicant from the Planning Inspectorate (on behalf of the Secretary of State for Business, Energy and Industrial Strategy) on 7 December 2018. The Inspectorate commented that the Scoping Report refers to the intention to implement a Soil Resources Plan and that this plan should be appropriately secured. The Inspectorate recommended that an Outline Plan be provided with the DCO Application.
- 1.1.1.5. The purpose of a Soil Resource Plan is to:
- accurately record the existing soil resources within each Onshore Cable Route Section that are to be used temporarily in the construction of the Proposed Development. This will then be used to provide a specification for its restoration following the construction period; and
 - identify the volume of each type of soil that will be available for re-use in the detailed design of the Proposed Development from land parcels that are affected by the permanent works and that will not be returned to agricultural use.
- 1.1.1.6. This Outline SRP sets out the requirements of the detailed SRP that will be developed by the Principal Contractor.

1.2. SOIL RESOURCE PLAN

1.2.1. CONTENT

A detailed SRP shall be produced and submitted to the relevant Local Planning Authority prior to the commencement of each phase of the Proposed Development in which the soil resource will be disturbed for either temporary or permanent works.

1.2.1.1. Within each Onshore Cable Route Section, the SRP shall identify:

- the texture of each soil horizon present;
- the depth of each soil horizon;
- the colour of each soil horizon by reference to the Munsell Soil Color Charts (Munsell Color, 2009);
- the stone content of each soil horizon;
- the pH, organic matter and major nutrients of the topsoil horizon;
- the pH, organic matter and major nutrients of the subsoil horizon (upper and lower, as present); and
- the Agricultural Land Classification ('ALC') grade.

1.2.1.2. Soil texture describes how the mineral element of soil comprises a mixture of mineral particles of different sizes, and a different texture class can be ascribed according to the proportions of sand, silt and clay. According to the BSI specifications for topsoil (British Standards Institution, 2015) and subsoil (British Standards Institution, 2013), the size ranges of these particles are:

- clay (<0.002mm);
- silt (0.002mm to 0.06mm);
- sand (0.06mm to 2.00mm) comprising:
 - fine sand (0.06mm to 0.2mm);
 - medium sand (0.2mm to 0.6mm); and
 - coarse sand (0.6mm to 2.0mm).

1.2.1.3. Physical soils data is available for the majority of the land within the Order Limits that will be disturbed. The Principal Contractor shall be responsible for identifying that the available data is adequate in scope and nature to meet the above requirements of a SRP. The Principal Contractor shall be responsible for collecting the data on organic matter content and major nutrients, and remedying any deficiencies identified in the spatial scope of the data on soil physical characteristics.

1.2.1.4. Where required, the data on the physical attributes (texture, depth and stone content) shall be collected at an observation density of one observation per hectare ('ha'). The data on organic matter content and major nutrients shall be collected at a density of one sample per 3ha or, if the land parcel is smaller than 3ha, one sample per land parcel.

1.2.1.5. The physical and nutrient data will be recorded on a GIS proforma (format to be agreed) to enable the Principal Contractor to identify the areas and volumes of different soil types within each land parcel.

1.2.2. SOIL HANDLING

1.2.2.1. As part of the SRP, the main works contractors shall prepare a Soil Handling Strategy for each phase of the Proposed Development where there is the potential for the significant disturbance of soil resource. There will be negligible disturbance of soils in Onshore Cable Route Sections 5, 8 and 10: a handling strategy is not required for these Sections.

1.2.2.2. Soils that are disturbed temporarily during the construction of the Proposed Development are associated with:

- site compounds and working areas;
- temporary haul roads;
- temporary roads; and
- topsoil and subsoil stockpiles.

1.2.2.3. All method statements will need to comply with the mitigation commitments made in Chapter 17 of the ES, namely:

- to ensure that topsoil and subsoil resources are kept separate and placed either side of the exposed cable route trenches;
- the void above within the cable ducts (within cement-bound sand) will be backfilled with the excavated soil; and
- full use will be made of the topsoil resource in the reinstatement of soils above the cable ducts: the surplus material will be subsoil.

1.2.2.4. For land parcels affected by temporary works, the Soil Handling Strategy shall set out detailed Method Statements for protecting the agricultural assets of the soil resource in each Onshore Cable Route Section during the construction period. This will be determined on a case-by-case basis and will depend on:

- the resilience of the existing topsoil and subsoil resources to the loads to be imposed by construction activities, which will depend on the depth, texture and structure of each soil horizon;

- the ability to restore land to its current condition following the removal of construction platforms and works.

1.2.2.5. For land parcels affected by temporary works, the detailed Method Statements shall identify (as relevant):

- the anticipated loads on the soils from construction activities;
- the methods to be used to return agricultural land to good agricultural condition following the removal of the construction platform;
- the area in each land parcel in which the topsoil and subsoil will be stripped and placed in store during the construction period;
- the working methods and plant to be used to strip topsoils and subsoils and place them in temporary stockpiles;
- the methods to be used to construct temporary soil stockpiles;
- the locations of temporary soil stockpiles;
- the methods to be used to maintain temporary stockpiles according to the length of time the soil is in storage; and
- the methods to be used to replace soils from the temporary stockpiles within each land parcel.

1.2.2.6. In all cases the Principal Contractor shall have regard to and comply with good practice guidance on stripping, handling and restoring soils.

1.2.2.7. Good practice guidance for stripping and handling topsoil and subsoil is contained in:

- BS 3882:2015, Annex A, A.1;
- BS 8601:2013, Clause 6, 6.1;
- Defra Construction Code of Practice for the Sustainable Use of Soils (Department of Environment, Food and Rural Affairs, 2009), sections 5.2 and 5.3; and
- MAFF Good Practice Guide for Handling Soils (MAFF, 2000), Sheet 1.

1.2.2.8. Good practice guidance on building topsoil and subsoil stockpiles, and maintaining soils in storage is contained in:

- BS 3882:2015, Annex A, A.2;
- BS 8601:2013, Clause 6, 6.2;
- Defra Construction Code of Practice for the Sustainable Use of Soils, section 5.4; and
- MAFF Good Practice Guide, Sheets 2 and 14.

- 1.2.2.9. Good practice guidance on excavating soils from stockpiles is contained in the MAFF Good Practice Guide, Sheet 3.
- 1.2.2.10. Good practice guidance on replacing topsoil and subsoil, including guidance on decompaction, is contained in:
- BS 3882:2015, Annex A, A.3 and A.4;
 - BS 8601: 2013, Clause 6, 6.3, 6.4 and 6.5;
 - Defra Construction Code of Practice for the Sustainable Use of Soils, section 6.1; and
 - MAFF Good Practice Guide, Sheets 4, 15, 18 and 19.
- 1.2.2.11. The SRP will include provisions for topsoils and subsoils that are permanently displaced for the construction of the Proposed Development to be re-used within the Order Limits in reprofiling the landform and screening. Proposals will be set out for the most appropriate re-use of any surplus topsoil or subsoil. The topsoils and subsoils within the area of permanent works, in Section 1, are of moderate to poor quality and there is no requirement to import any topsoils or subsoils to the Proposed Development.
- 1.2.2.12. For land parcels affected by permanent works, the detailed Method Statements shall also identify:
- the working methods and plant to be used to strip topsoils and subsoils following the good practice guidance set out in paragraph 1.2.2.7;
 - the volumes of soils that will be placed in temporary stockpiles or directly re-used within or outside the Order Limits;
 - the locations of temporary stockpiles;
 - the specification for each land use or design element within the Order Limits requiring topsoil and subsoil resources, in terms of soil texture, depth, organic matter content and nutrient status; and
 - the working methods and plant to be used to place topsoils within the detailed design of the Proposed Development, following the good practice guidance set out in paragraph 1.2.2.10.

- 1.2.2.13. Where land is to be used temporarily and returned to the landowner, as will be required along the Onshore Cable Route in areas in which the cable will be laid in an excavated trench and subsequently backfilled, there shall be liaison with the relevant landowners on working methods and restoration. Site inspections shall be undertaken to monitor working practices and compliance of the contractors with their obligations to landowners and occupiers. Should remedial actions become necessary following soil reinstatement, these shall be undertaken as agreed prior to handover back to the landowner

REFERENCES

British Standards Institution. (2013). *BS 8601:2013 Specification for subsoil and requirements for use.*

British Standards Institution. (2015). *BS 3882:2015 Specification for Topsoil.*

Department of Environment, Food and Rural Affairs. (2009). *Construction Code of Practice for the Sustainable Use of Soils on Construction Sites.*

MAFF. (2000). *Good practice guide for handling soils.* Retrieved from <https://webarchive.nationalarchives.gov.uk/20090306103114/http://www.defra.gov.uk/farm/environment/land-use/soilguid/index.htm>.

Munsell Color. (2009). *Munsell Soil Color Chartss.*

Appendix 6 – Preliminary Piling Risk Assessment



AQUIND Limited

AQUIND INTERCONNECTOR

Appendix 6 - Preliminary Piling Risk Assessment

AQUIND Limited

AQUIND INTERCONNECTOR

Appendix 6 - Preliminary Piling Risk Assessment

DATE: 01 JULY 2020

WSP
WSP House
70 Chancery Lane
London
WC2A 1AF
+44 20 7314 5000
www.wsp.com

DOCUMENT

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Document Owner	Aquind Limited
Prepared By	Joshua Kaufmann
Date	01/07/2020
Approved By	Tristan Morgan
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LIMITATIONS OF REPORT

WSP has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed and outlined in the body of the report. This report has been prepared under WSP standard Terms and Conditions, as included within our proposal to the Client.

The report needs to be considered in the light of the WSP proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report. The report is only valid for its originally intended purpose as set out in either our report or the proposal.

The opinions given in this report have been dictated by the finite data on which they are based and are relevant only for the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, WSP reserves the right to review such information and, if warranted, to modify the opinions accordingly.

It should be noted that any risks identified in this report are a combination of actual and perceived risks based on the information reviewed.

WSP does not warrant data or work undertaken or provided by others.

1. INTRODUCTION

1.1. AUTHORISATION AND CONTEXT

Following meetings with key stake holders (Portsmouth Water and Environment Agency) WSP has prepared a piling risk assessment for the UK Converter Station West. This Preliminary Piling Risk Assessment is to support the Development Consent Order process, it is envisaged the detailed designer/piling contractor will provide a final/detailed design piling risk assessment.

This report provides the context for piling within the source protection zone 1 (SPZ1), the preliminary choice of piling methodology for the proposed development and mitigation measures to be adopted (if required).

The limitations of the report are identified before the contents page, the limitations should be understood before using or interpreting this report.

1.2. OBJECTIVES

This report has been prepared to provide information on the following:

- Background of the site setting and contamination;
- Summary of the Conceptual Site Model;
- Details of the proposed development and the preliminary foundation methodology;
- A preliminary piling risk assessment in accordance with Environment Agency Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention ref NC/99/73 (Ref (1)); and
- Justification of preliminary foundation methodology selection and measures required to mitigate against associated risks.

1.3. INFORMATION SOURCES

This report has been prepared with reference to the following reports:

Initial desk study reviewing of various cable routes, landfalls and Converter Station locations.

- Report No 20170202-TJM-AQUIND-UK Cable Route Desk Study Report – Issued V0, February 2017. (Ref (2))

Detailed desk study reviewing Route 3 including Converter Station locations, this report also details the proposed targeted ground investigation works and should be read in conjunction with this report.

- Report No 20170622-TJM-AQUIND-UK Cable Route Detailed Desk Study-Report-Issued V0, June 2018. (Ref (3))

Converter Station Optioneering and Constructability reports were used to build preliminary design assumptions for Converter Station sizes, locations, cuttings, embankments, earthwork volumes and foundation platform levels.

- Aquind Interconnector - UK Converter Station Constructability Addendum, WSP, 62100616, January 2019. (Ref (4))
- Aquind Interconnector - UK Converter Station Optioneering Report, WSP, 62100616, November 2018. (Ref (5))

Ground investigation Factual Reports.

- Geotechnics Ltd, 2018, UK - France HVDC Interconnector Onshore Work Package 1 (Option South), PE181480, Ref (6)
- Geotechnics Ltd, 2018, UK - France HVDC Interconnector Onshore Work Package 1A (Option West and Access Track), PE181477, Ref (7)

Environmental impacts due to the scheme proposal were reviewed within the Preliminary Environmental Information Report and the Environmental Statement.

- Preliminary Environmental Information Report, WSP, PINS Ref: EN020022, 2019. (Ref (8))
- Environmental Statement – Appendix 18.1 Preliminary Risk Assessment and Generic Quantitative Risk Assessment, WSP, PINS Ref: EN020022, 2019. (Ref (9))

The findings of the ground investigation undertaken at the proposed converter station locations is discussed in the GIDDR for Route Section 1 (Converter Station).

- Converter Station Geotechnical Interpretative Design Development Report, WSP, 70019402-GIDDR, 2019. (Ref (10))

2. THE SITE

2.1. SITE LOCATION

The site is located near Lovedean, Hampshire, England. The site currently consists of predominately agricultural fields. The land is gently sloping from north to south, with the central area approximately 85.4m above ordnance datum. The centre of the site is located at approximately the National Grid Reference 467149 (Easting) 113488 (Northing). An aerial photograph of the site is shown in Plate 2-1.

Plate 2-1 - Approximate Site Boundary and location for the proposed UK Converter Station (Image: Google Earth, 2018 Ref (11))



2.2. SITE DESCRIPTION AND BOUNDARIES

The site predominantly consists of fields and hedgerows, the majority of the fields are used for agriculture; both animals and crops were present during site visits. The east the site is bounded by the National Grid (NG) Lovedean Substation and other land owned and maintained by NG. Access to the site is currently by the public right of way from Broadway Lane.

The northern boundary can be approximately marked by the overhead lines crossing west to east. The southern boundary is broadly categorised by the ancient woodland and the western boundary by the field hedgerows.

The southern and northern boundaries encounter overhead lines in close proximity. Subsurface drainage for the Lovedean Substation is also considered likely within the site. A series of hedgerows and treelines are present within the site, these are reviewed within the Preliminary Environmental Information Report (Ref (8)).

2.3. SITE HISTORY

In summary, the site of the proposed Converter Station has undergone limited changes over time, remaining predominantly as agricultural land. However, several historical Chalk pits (subsequently backfilled) were noted around the area during the desk study.

Lovedean Substation was first shown on the 1969 historical map with a series of associated overhead electrical lines also shown.

Table 2-1 - Chalk pits in close vicinity to the Converter Station and within Route Section 1

Historical Chalk Pit	Dates of Mapping	Position Relation to Cable Route
Denmead Farm Chalk Pit	1868 to 1932	On route
Lovedean Substation	1979 to present	On route
Stonemere Copse Chalk Pit	1868 to 1932	Adjacent
Old Chalk Pit	1932 to present	

2.4. SITE GEOLOGY

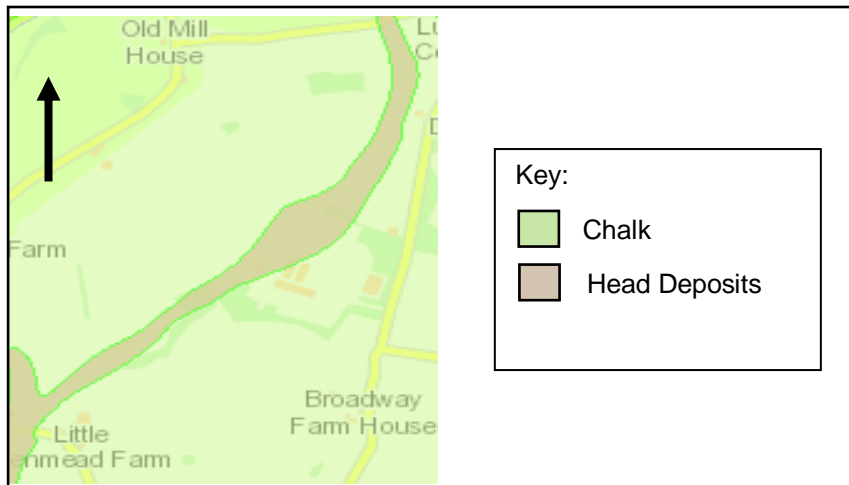
The published geological information was reviewed in detail as part of the desk study report (Ref (3)). As summarised in the desk study, the Converter Station location is characterised by a thin layer of Head Deposits overlaying Upper and Middle Chalk (Undivided) (Ref (11)). The GeoIndex mapping in **Error! Reference source not found.** indicates Head Deposits are only present in an isolated band.

The desk study report also highlighted potential ground risks at the proposed Converter Station location. These risks included potential dissolution features (also known as karstic features).

Summary plans of the geological information are included in the Detailed Desk Study Report for Route 3D (Ref (3)).

In addition to the above the desk study also highlighted that the proposed Converter Station sites were located within an aquifer protection zone associated with the Chalk and the area has been designated as a groundwater source protection **zone (SPZ1)**.

Plate 2-2 - BGS GeoIndex Geological Map (Ref (12))



The ground investigation found the Converter Station West site area is directly underlain by Head Deposits consisting predominantly of gravelly Clays; sometimes becoming clayey Gravel. Generally, underlying the Head Deposits was Structureless Grade D Chalk predominately described as Grade Dm (matrix-dominated) with occasional interbedded layers of Dc (clast-dominated). Below the Structureless Grade D Chalk, Chalk quality and grade broadly improved with depth becoming Structured Chalk Grades C to A. Two Karstic features were identified within the potential location of the Converter Station, as identified in Plate 2-3, both are indicated to be infilled from CPT testing.

Table 2-2 - Converter Station West Ground Model

Strata	Ground model (m AOD) (unit average thickness (m))	Description based on preliminary ground investigation findings
Head Deposits	85.00-84.20 (0.80)	Firm to stiff red brown CLAY with gravel and cobble content. Occasionally gravel content becomes such it is clayey GRAVEL.
Structureless Chalk (Grade D)	84.20-76.90 (7.30)	Consisting of both Grade Dm and DC Chalk, interbedded throughout with no distinguishable boundary or profiling.
Structured Chalk (Grade C – A)	76.90-55.00 (21.90+)	<p>Very low to medium density, density increasing with depth.</p> <p>Flint bands were noted during drilling, these were often thin (0.10-0.30m thick) and occurred between change of grades. There were six notable grade changes. Zones of core loss were recorded within BH29 and BH30, this is considered to be due to flint bands marking the transition from Grade B to C Chalk, with the flint causing loss of recovery.</p> <p>Grade A was noted between 79.06-74.56m AOD and 64.06-58.06m AOD.</p>
Groundwater	40.00-30.00m AOD Informed by Portsmouth Water	<p>The groundwater depth was informed by the Portsmouth Water representatives, who have a monitoring well within 1.00km of the site and detailed groundwater mapping records.</p> <p>Groundwater is known to become shallower from north to south.</p>

Table 2-3 - Converter Station West Identified Potential Karstic Features via Geophysical Techniques

Karstic Feature	Coordinates (Approximate Centre Point)	Geophysics Interpretation (Geophysical Report available within GIDDR1 (Ref. (10)))	CPT Probing
SD2 (Also referred to as Karstic Feature 2) Identified in cross section in Figure A3-7 of the GIDDR1 (Ref. (10)).	467180 E 113479 N Located in option west	A circular feature identified to be approximately 25.00m in diameter and extending to 6.00m bgl Identified in ERT Line 7 and 8.	Six CPTs were conducted in a cross pattern, approximately north-south and east-west. The CPTs achieved between 7.90-14.70m bgl, where they encountered refusal (possible competent rock). The feature appears infilled, approximately 20.00-25.00m wide and 5.00m in height, with the feature present from 4.00m bgl to 9.00m bgl.
SD3 (Also referred to as Karstic Feature 3) Identified in cross section in Figure A3-6 the GIDDR1 (Ref. (10)).	467209 E 113656 N Located in option west	The feature is identified to be circular. The full geometry is difficult to determine from the geophysics due to the feature being identified at the end of the ERT line. Identified in ERT Line 9.	Six CPTs were conducted in a cross pattern, approximately north-south and east-west. The CPTs achieved between 8.80-12.00m bgl, where refusal was encountered (possible competent rock). The feature appears infilled, approximately 10.00m wide and 6.00m in height, with the feature present between 3.00m bgl to 9.00m bgl.

Table 2-3 is an extract from the Converter Station Geotechnical Design Development Note (GIDDR) (Ref (10)), below is an extract from the geophysical reports available in the Factual Reports (Ref (6) & (7)).

Plate 2-3 - Karstic Features identified via Geophysical Surveys (Extract from Factual Reports (Ref (6) & (7)))

A site constraints map is available in Appendix A; and shows the locations of the karstic features, infilled pits, exploratory hole locations and other site features.

2.5. HYDROGEOLOGY

It should be noted that the underlying shallow Chalk bedrock, approximately between ground surface and two metres depth to the top depth, is defined as a Source Protection Zone (SPZ1) Class A aquifer with the groundwater table at approximately 45m bgl (below ground level). Therefore, the SPZ1 requires a considered approach to mitigate any potential contamination, turbidity or groundwater issues caused by construction and final design. Proposed developments will need to be approved by local and national statutory bodies (including Portsmouth Water and the Environment Agency) due to the regional importance of the aquifer.

2.6. HYDROLOGY

Hydrological features are identified within the Detailed Desk Study; in summary there is no surface water mapped on site.

Groundwater is located at approximately 45m bgl, informed by Portsmouth Water.

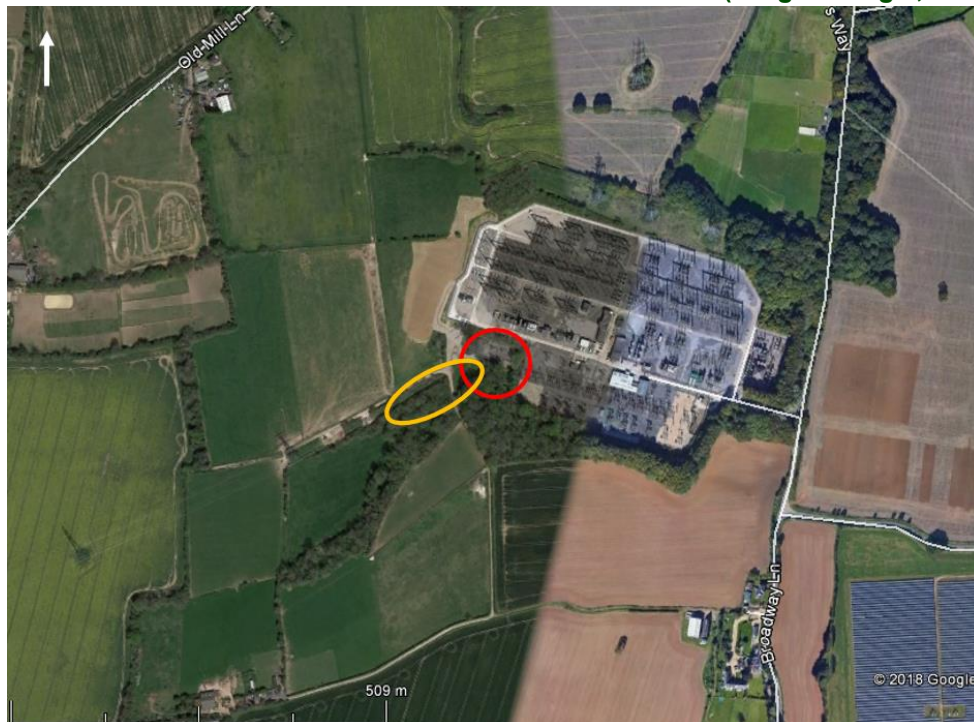
2.7. CONTAMINATION

There were no significant sources of contamination noted during the desk study phase, besides the site being agricultural land, which can incur chemical and hydrocarbon contamination. The potential for Chalk pits to be infilled with Made Ground which potentially contains contaminants was also noted.

During a site walkover with Portsmouth Water a historical hydrocarbon spill (between the two-potential Converter Station locations on the northern border of the ancient woodland) was noted - see area ringed red in Plate 2-4. This is not located within any planned Aquind development areas.

Fly-tipping and old farming plant was noted in the ancient woodland between the two potential Converter Stations, also shown (orange ring) in Plate 2-4.

Plate 2-4 - Site Walkover Identification of Potential Contamination (Image: Google, 2018 Ref (11))



2.8. GROUND GAS

No potential sources of ground gas were identified during the desk study or ground investigation.

2.9. SUMMARY OF THE CONCEPTUAL SITE MODEL

The plausible pollutant linkages of significance to piling works have been preliminarily assessed in Table 2-4.

Receptors of potential contamination were identified including:

Human Health

- Workers during construction and maintenance; and
- Surrounding general public during construction and maintenance.

Controlled Waters

- Groundwater within identified Principal, Secondary (A) and Secondary (Undifferentiated) Aquifers; and
- Identified surface water features.

Below Ground Services

- The cable itself;
- Buried concrete; and
- Potable water supply pipes.

Plausible contaminant pathways were identified including:

- Human health (Pathway 1):
 - Dermal contact;
 - Direct ingestion;
 - Direct exposure to impacted shallow groundwater and/or surface water; and
 - Consumption of home-grown produce.
- Human health (Pathway 2)
 - Inhalation of particulates/fibres and/or soil/water derived vapours; and
 - Asphyxiation by accumulation of ground gases in internal/confined spaces.
- Groundwater (Pathway 3)
 - Leaching of contaminants through the unsaturated zone and subsequent impact on groundwater; and
 - Lateral migration of impacted groundwater.
- Surface water features/ecologically sensitive areas (Pathway 4)
- Solution/karstic features rapidly transmitting groundwater (Pathway 5)
 - Surface water runoff; and
 - Migration of immiscible contaminants.
- Below ground services (Pathway 6):
 - Direct contact with corrosive substances (e.g. sulphates and hydrocarbons) in the soil and shallow groundwater.

Table 2-4 - Section 1 (Convertor Station) Conceptual Site Model

Source	Potential Contaminants	Pathways	Comment on Hazard Realisation	Risk Rating
Infilled Land	PAHs, cyanide, metals, hydrocarbons, VOCs, SVOCs, asbestos, PCBs, sulphates, phenols and ground gases.	1-6	<p>There are numerous identified historical mineral extraction sites on-route or within the surrounding area of the Convertor Station, the infilled material is unknown. There is the potential for these to be infilled with Made Ground. However only five are on the proposed route. it is unlikely that the proposed route will directly disturb these, therefore the infilled land is unlikely to pose a significant risk.</p> <p>There are no surface water receptors within 500m of the area.</p> <p>The FOC infrastructure is likely to be above ground therefore no significant risk.</p> <p>No exceedances were identified in the soil or groundwater samples.</p>	LOW

Historical and current agricultural land uses	Pesticides	1-6	<p>It is unknown what chemicals the farmers use or have used. Inorganic pesticides (e.g. containing arsenic) could have been used, however, this is unlikely to cause a significant risk.</p> <p>No exceedances were identified in the soil or groundwater samples.</p>	LOW
Pollution incidents to controlled waters (oil leak)	PAHs, VOCs, SVOCs, and hydrocarbons	1-6	The pollution incident occurred in 1998 therefore unlikely to pose a significant risk.	LOW

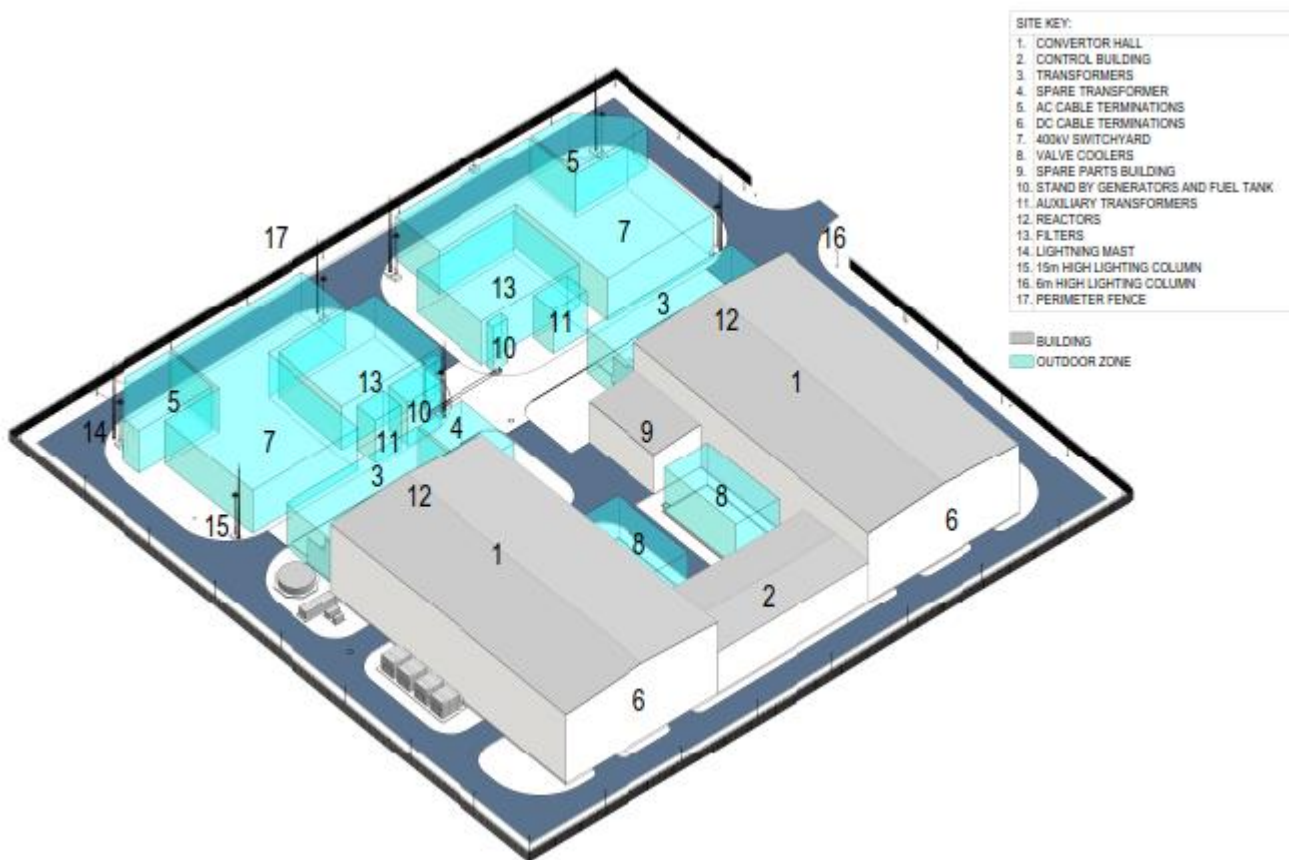
3. PROPOSED DEVELOPMENT

3.1. PROPOSED DEVELOPMENT DESCRIPTION

The proposed development at the of the Converter Station is over a 200 m x 200 m area (approximately 4 ha) and would be within a securely fenced compound. The proposed access to the Converter Station for Construction and Operational Stages will be taken from Broadway Lane in the vicinity of Day Lane. The access track is not envisaged to require piled foundations. The access road to the Converter Station will be approximately 1.2 km in length, and is expected to be a standard width of 7.3 m.

The Converter Station layout is not confirmed as it will be subject to the contractor and detailed designer input, however the components are to be similar the typical Converter Station presented in Plate 3-1.

Plate 3-1 - Indicative Converter Station Layout



The outdoor equipment, which forms part of the proposed Converter Station, will be similar to the equipment that is found within typical electrical substations, such as the adjacent Lovedean Substation. The 400 kV switchyard (item 7 in Plate 3-1), transformers (item 3 in Plate 3-1)) and AC/DC filters (item 13 in Plate 3-1)) will be located outdoors.

Power electronics are required to convert the power between AC and DC or vice versa. This equipment is housed indoors, within the two converter hall buildings (item 1 in Plate 3-1)), each of which will measure approximately 90 m in length, 50 m in width and 22 m in height. The maximum height of the building may be increased to up to 26 m, dependent on the preferred architectural and roof design solution.

A control building (item 2 in Plate 3-1)) is also required. This would be at a reduced height compared to the converter hall buildings and is likely to be a two-storey arrangement. The spares building (item 9 in Plate 3-1)) would be a similar height.

The lightning masts, which could be up to 4 m taller than the tallest building, are tall, narrow structures, with catenary wiring potentially strung between them to shield the outdoor equipment from direct lightning strikes.

Lighting columns, approximately 6m and 15m high (see items 15 and 16 in Plate 3-1)) are proposed to illuminate the outdoor areas of the Converter Station during emergency situations, such as an intruder or unplanned maintenance work. The lights will not be used during normal operation.

Auxiliary power supplies will be provided in the event of a power failure at the Converter Station to ensure continuity of operation. Back-up sources such as standby diesel generators will be only used if other sources of auxiliary supply are unavailable during construction and operational timescales.

Cooling systems will be required to remove heat generated within the Converter Station building. These systems will be located outside the Converter Station building.

Up to two Telecommunication buildings associated with the FOC (potentially one for each circuit) are anticipated to be located outside the main Converter Station security fence and within Converter Station Area, so that they can be accessed by third parties. Further details regarding this infrastructure are set out in section 3.3.6 of the Preliminary Environmental Information Report (Ref (8)). This infrastructure is anticipated to be located outside the 4ha area indicated for the Converter Station footprint, although is likely to be immediately adjoining it.

3.2. FEASIBILITY STAGE PILING METHODOLOGY

The final foundation design solution, sequencing and depths will be determined by the detailed designer/piling contractor. A full review of piling techniques will need to be conducted by the contractor/designer, with consultation with statutory bodies. Protection to and consideration of the SPZ1 aquifer will be a contractual requirement of the detailed designer/piling contractor. Therefore, it is envisaged that the final foundation solution will be of equal or lesser impact than proposed in this report.

Precast Driven Piles

Pre-cast driven piles are currently envisaged as they are of relatively minimal or equal impact, compared to other techniques, in relation to the turbidity and other potential impacts on the SPZ1 aquifer within the Chalk bedrock. Limiting the pile lengths to 10m clearance from the groundwater table is advised; the groundwater table is approximately 45m bgl to 55m bgl (informed by Portsmouth Water), however a review of the unsaturated zone of influence should be conducted for detailed design. It is currently assumed a pile length of 10 to 25m will suffice for the majority of loading and ground condition scenarios, for the end bearing to achieve sufficient embedded depth within the Structured Chalk. The length of each driven pile cannot be confirmed for driven piles till installations; this is due to the pile requirement to achieve a specification rather than a set length. The impact of open or closed piles is considered of similar influence on the SPZ1.

The detailed designer/piling contractor is to provide a detailed risk assessment for all piling/foundation works within the SPZ1, in addition to a piling specification to Portsmouth Water, Environment Agency and Hampshire County Council for review and approval in-advance of construction.

Pre-cast driven piles allow for both small and large displacement pile option and avoid the injection of concrete or other cast in place alternatives within the SPZ1. Small displacement methods relative to driven pile options, could decrease the likelihood of potential pathways forming along the soil-foundation interaction. The Head Deposits and Topsoil above the Chalk Aquifer has not been identified as contaminated therefore the potential of driven materials to depth are not considered a contamination risk.

Design Responsibility

Specific pile design should remain the responsibility of the detailed designer/piling contractor based on the available ground information, the loads to be carried, the preferred construction sequence and their own propriety techniques. All information relating to the site should be provided to the detailed designer/piling contractor including historical drawings.

The detailed designer/piling contractor should provide an adequate methodology for dealing with potential changes in Superficial Deposit or Earthwork Fill material across the site and undertake any further testing and investigation as required to complete the design.

The detailed pile design will follow regulatory guidelines and take full cognisance of the potential for contaminated soils and groundwater on site.

3.3. EXISTING INFRASTRUCTURE

Consideration should be given to the safeguarding or diversion of existing buried services. All appropriate and reasonable measures including liaison with relevant asset and utility managers shall be incorporated into pile installation to avoid damage to buried services.

A competent contractor shall ensure that piling works do not impact on the third-party utilities, and we would expect this to be included within the method statement of the piling contractor.

4. PILING RISK ASSESSMENT

4.1. GENERAL

The piling risk assessment has been undertaken in accordance with guidance by the Environment Agency, namely, Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention ref NC/99/73 (Ref (1)). In particular the risk assessment refers to the six pollutant scenarios detailed within NC/99/73 which are summarised in **Error! Reference source not found.**

Table 4-1 - Generic Pollution Scenarios (Ref (1))

Scenario	Details
1	Creation of preferential pathways, through a low permeability layer (an aquitard), to allow potential contamination of an underlying aquifer.
2	Creation of preferential pathways, through a low permeability surface layer, to allow upward migration of landfill gas, soil gas or contaminant vapours to the surface.
3	Direct contact of site workers and others with contaminated soil arisings which have been brought to the surface.
4	Direct contact of the piles or engineered structures with contaminated soil or leachate causing degradation of pile materials (where the secondary effects are to increase the potential for contaminant migration).
5	The driving of solid contaminants down into an aquifer during pile driving.
6	Contamination of groundwater and, subsequently, surface waters by concrete, cement paste or grout.

4.2. RISK ASSESSMENT

The piling risk assessment for the Aquind UK Converter Station is contained within Table 4-2, the risk has been assessed in accordance with CIRIA C552 (Ref (12)). The risk descriptors are explained in Appendix B.

Table 4-2 - Piling Risk Assessment for Aquind UK Converter Station

Pollution Scenario	Source (S) Pathway (P) Receptor (R)		Review
Creation of preferential pathways, through a low permeability layer (an aquitard), to allow potential contamination of an underlying aquifer.	S	Infilled Land	<p>Impact: Medium - Pollution of sensitive Source Protection Zone 1 aquifer.</p> <p>Probability: Unlikely - There is no record of infilled land or contamination within the area of the SPZ1. The pile lengths are also proposed to have a 10m clearance from the groundwater table and is anticipated to be far greater than 10m.</p> <p>Comment: The groundwater table is at approximately 45m to 55m bgl with pile lengths anticipated to be between 10-25m bgl. The platform level is raised by approximately 6m via an embankment at the southern end of the site, the longest piles are anticipated at the southern end of the site.</p> <p>Risk: Low</p>
P	Pile/soil interface		
R	SPZ1 Aquifer		
Creation of preferential pathways, through a low permeability surface layer, to allow upward migration of landfill gas, soil gas or contaminant vapours to the surface.	S	Soil Gas / Vapours	<p>Impact: Medium – Chronic (long-term) risk to human health.</p> <p>Probability: Unlikely – It is considered highly unlikely for ground gasses to have accumulated naturally within the Chalk</p> <p>Comment: - Carbon dioxide is likely to be present as a result of natural process in the weathering of chalk. However, the flow rates are likely to be insignificant and there is no recorded impact in the UK from natural gases within the Chalk.</p> <p>Risk: Low</p>
P	Pile/soil interface		
R	Buildings, construction workers and End Users		
Direct contact of site workers and others with contaminated soil arisings which have been brought to the surface.	S	Contaminated infilled/Made Ground	<p>Impact: Minor – Requirement for protective equipment during site works to mitigate health effect.</p> <p>Probability: Unlikely – No infilled or Made Ground was identified within the area of the converter station footprint, and no exceedances were identified in the soil or groundwater samples.</p> <p>Comment: - Usual construction practices outline in the CEMP will mitigate this risk fully.</p> <p>Risk: Very Low</p>
P	Direct contact, inhalation and ingestion of dust		
R	Construction workers		
	S	Contaminants is soil and groundwater	

Pollution Scenario	Source (S) Pathway (P) Receptor (R)		Review
Direct contact of the piles or engineered structures with contaminated soil or leachate causing degradation of pile materials (where the secondary effects are to increase the potential for contaminant migration).	P	Direct contact and aggressive attack	<p>Impact: Medium - Degradation of piles and structures.</p> <p>Probability: Unlikely – Sulphate conditions are not anticipated to be of significant degradation levels. Piles are currently considered to be steel.</p> <p>Comment: The piles are envisaged to be steel. However, if concrete is used the design sulphate and aggressive chemical environment for concrete (ACEC) classifications of DS-1 and AC-1^d respectively are considered appropriate for preliminary design of concrete, in accordance with BRE Special Digest 1 (Ref (13)), to be confirmed by the contractor/designer.</p> <p>Risk: Low Risk</p>
	R	Below ground structures i.e. piles	
The driving of solid contaminants down into an aquifer during pile driving.	S	Contaminated infilled/Made Ground	<p>Impact: Medium – Pollution of sensitive Source Protection Zone 1 aquifer.</p> <p>Probability: Low Likelihood – The driven pile method has the capability of driving surface material downward. However, no contaminants were detected on site to be driven down and there is an advised minimum 10m clearance of the pile end bearing to the groundwater table.</p> <p>Comment: In parts the site will be cut to achieve platform level, therefore removing superficial deposits and any potential infilled/Made Ground. The earthworks have the potential to remove any areas of concern before piling. Made Ground/infilled ground is considered unlikely to be present on site. The use of open ended piles could reduce surface area contact with any potential contaminants, therefore reducing probability of transferal to depth.</p> <p>Risk: Moderate / Low*</p> <p>*Anticipated to be low risk as no Made Ground or elevated contaminants detected on site from the preliminary ground investigation.</p>
	P	Pile/soil interface	
	R	Principal SPZ1 Aquifer	
	S	Construction materials	

Pollution Scenario	Source (S) Pathway (P) Receptor (R)	Review				
Contamination of groundwater and, subsequently, surface waters by concrete, cement paste or grout.	<table border="1"> <tr> <td data-bbox="533 394 592 696">P</td> <td data-bbox="592 394 780 696">Migration via permeable strata Rapid migration via solution/karstic features</td> </tr> <tr> <td data-bbox="533 696 592 1258">R</td> <td data-bbox="592 696 780 1258">Groundwater</td> </tr> </table>	P	Migration via permeable strata Rapid migration via solution/karstic features	R	Groundwater	<p>Impact: Medium – Pollution of sensitive Source Protection Zone 1 aquifer.</p> <p>Probability: Unlikely - Precast driven piles are currently proposed to be used to avoid the requirement for grouting or concrete casting in-situ methods. Clean drilling techniques will be required for any breaking of ground. Suitable testing and surveying for potential contaminants before works to identify any potential areas of contaminates. Piling in the vicinity of a karstic feature will have further considerations, the karstic features are relatively shallow and have a sufficient clearance from the saturated zone limiting the rapid transmittance into the aquifer and thus reducing turbidity.</p> <p>Comment: The treatment of identified infilled karstic features on-site require a separate risk assessment and specification before or during detailed design. Grouting or piling are currently considered potential acceptable solutions, being two of six potential treatments options, in accordance with CIRIA C574 Engineering in Chalk (Ref (14)). The identified infilled karstic features are a minimum of 30 metres above the groundwater level, therefore it is considered that the aquifer is unlikely to be directly affected by grouting activities if correctly methodologies are adopted.</p> <p>Risk: Low</p>
P	Migration via permeable strata Rapid migration via solution/karstic features					
R	Groundwater					

5. CONCLUSIONS & RECOMMENDATIONS

5.1. CONCLUSIONS

The foundations solution for Aquind UK Converter Station is currently proposed to consist of driven piles; the sequencing, grouping, length, diameter and quantity is to be confirmed by the detailed designer/piling contractor. A full review of piling techniques will need to be conducted by the contractor/designer, with consultation with statutory bodies.

As part of this assessment a number of potential adverse environmental impacts have been considered and assessed on a qualitative basis. The overall risk associated with the proposed foundation works are considered to be low and the use of driven piles is considered appropriate for the ground conditions at the site. However, the environmental and ground conditions onsite are suitable for alternative piling solutions which may be considered by the detailed designer/piling contractor.

If the detailed designer/piling contractor considers alternative piling techniques to be more appropriate due to detailed review it is currently considered the overall risk should not be of higher than that of driven piles. It is considered that other solutions are unlikely to be categorised higher than low risk due to no Made Ground or elevated contaminants identified on site and the groundwater table being at sufficient depth (~45m bgl) to avoid pile interaction. However, any detailed design will require an updated or new 'piling risk assessment' as defined by Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention ref NC/99/73 (Ref (1)).

5.2. RECOMMENDATIONS

On the basis of this assessment, the following recommendations are made:

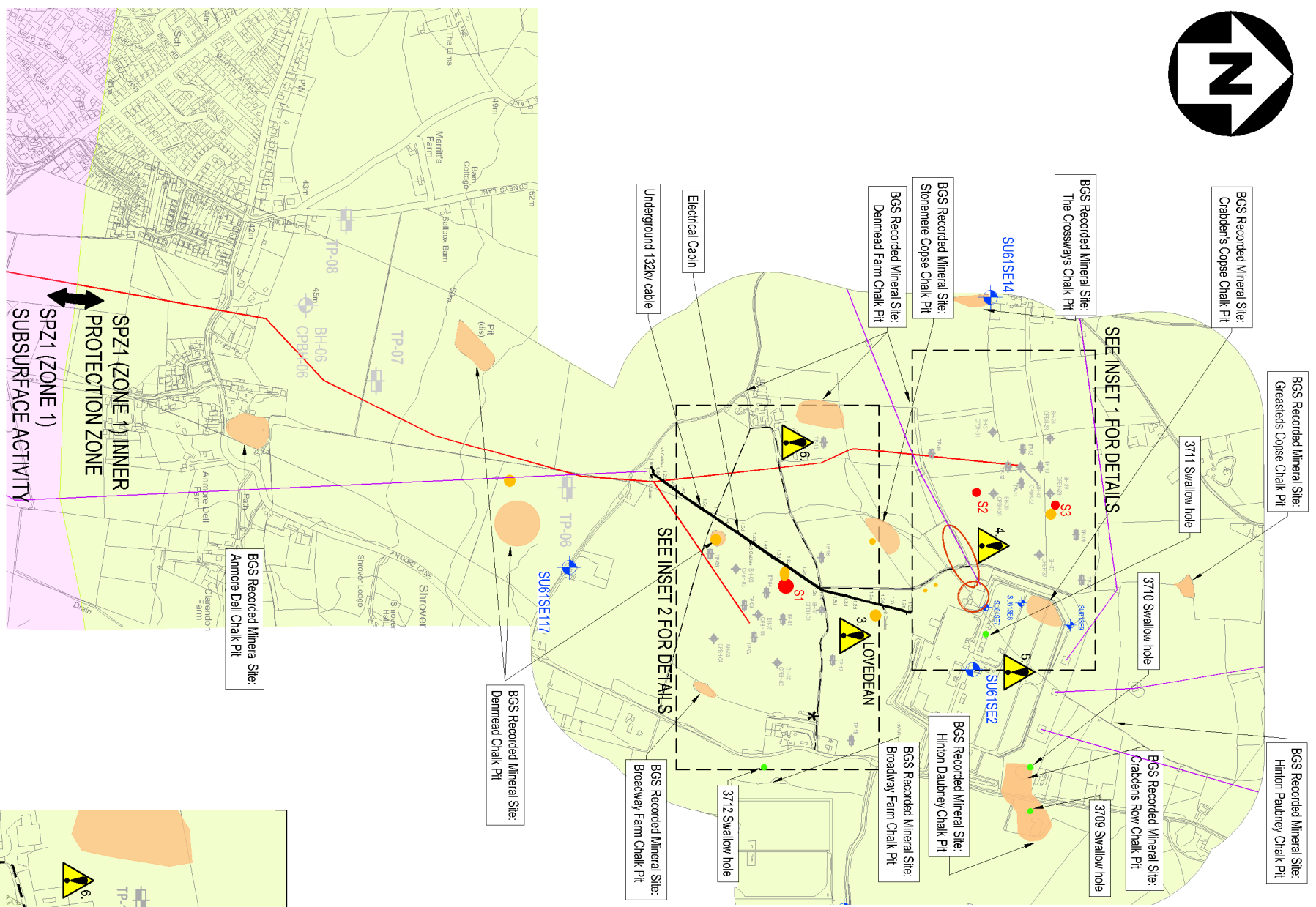
- Upon detailed design an updated or new 'piling risk assessment' to NC/99/73 is to be undertaken (Ref (1)).
- Obtain groundwater data from Portsmouth Water, if available, feasible and practicable.
- Further ground investigation to support the detail/final design is potentially required at the discretion of the detailed designer/piling contractor.
- Three-dimensional ground model production, at the discretion of the detailed designer.
- Detailed review of the extent of the unsaturated zone of the SPZ1 and commented on in the final 'piling risk assessment'.
- Consultation with local authorities, notably Portsmouth Water and Environment Agency, for approval of construction techniques within the SPZ1 designations (notably acceptable earthworks and foundation techniques).
- Quality Assurance and Quality Control (QA/QC) measures should be identified and adopted prior to piling works being undertaken. These are primarily for construction quality and structural performance. However, they are also equally relevant to mitigate environmental risk. The relevant measures should ensure that the foundation pile solution techniques are carried out correctly and in an appropriate manner so that the risk assessment and conclusions remain valid. Such QA/QC procedure will normally be agreed between contractor, client and relevant regulators.

The detailed designer/piling contractor should be provided with copies of the previous reports relating to the ground conditions, so that they can be incorporated into method statements and risk assessments, which should be approved by the appropriate person.

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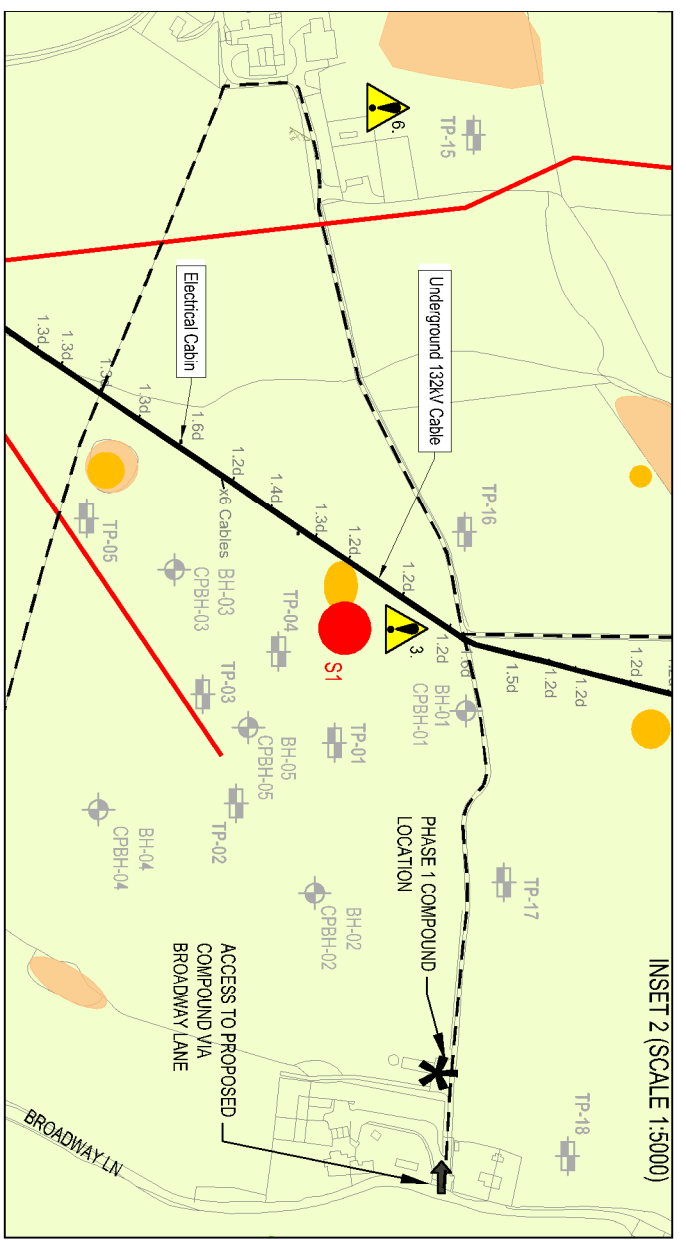
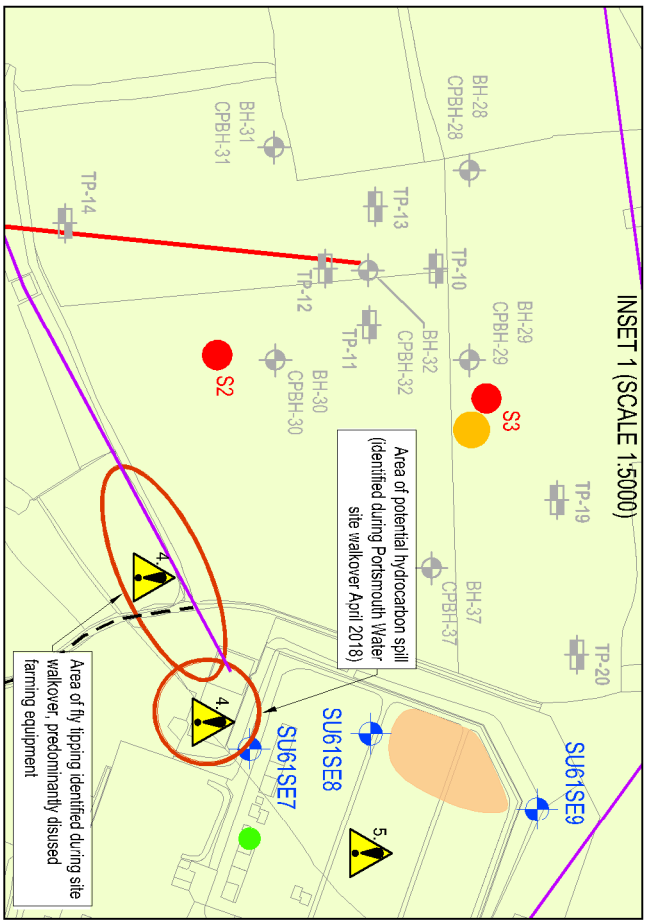
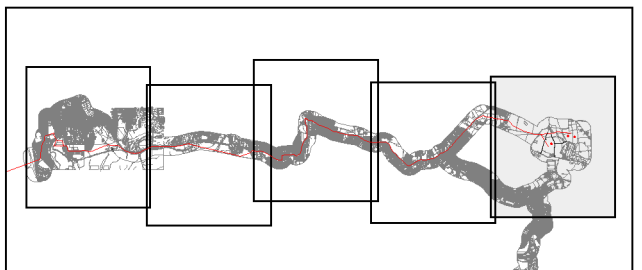
**APPENDIX A - CONVERTER STATION CONSTRAINTS PLAN
(EXTRACT FROM GIDDR (REF (10)))**



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HEALTH AND SAFETY INFORMATION	
SIGNIFICANT OR EXCEPTIONAL RISKS ARE IDENTIFIED BELOW	
1.	POSSIBLE SOFT GROUND
2.	OVERHEAD HIGH VOLTAGE TRANSMISSION LINES
3.	UNDERGROUND HIGH VOLTAGE 132kV CABLE
4.	POTENTIAL AREAS OF CONTAMINATION
5.	SUSTAINMENT OF NATIONAL SIGNIFICANCE
6.	KNOWN STABLE YARD AND HORSE EXERCISE AREA



DO NOT SCALE

G1 KEY	
	PROPOSED CABLE ROUTE
	BOREHOLE AND OPT LOCATION AND NUMBER
	TRIAL PIT AND OPT LOCATION AND NUMBER
	WINDOW SAMPLE AND OPT LOCATION AND NUMBER
	HISTORICAL BOREHOLE LOCATION
	HISTORICAL SAND OR CHALK PIT
	KARSTIC FEATURE (GEOPHYSICAL REPORT)
	WSP KARSTIC MAPPING. AREAS OF DEPRESSION OR APPARENT FILLING. THEREFORE ARE POTENTIAL SOLUTION FEATURES PROPAGATED TO SURFACE OR HISTORICAL PIT
	PBA KARSTIC FEATURE AS DETAILED IN THE MEMO PBA NATURAL CAVITIES AND MINING CAVITIES DATABASES SEARCH FOR THE SITE AT AQUIND CONW/ENTER STATION, BROADWAY LANE, P09 OSJ
	OVERHEAD TRANSMISSION LINES
	TRACK/FOOTPATH

REV	DATE	BY	DESCRIPTION	CHK	APP
P03	28/02/2019	SMA	KARSTIC FEATURES ADDED, SPZ ZONES ADDED	JK	
P02	10/07/2018	SMA	EXPLORATORY HOLE POSITIONS AMENDED	JK	
P01	02/03/2018	SMA	FIRST ISSUE	TA	

DRAWING STATUS: S0 - WORK IN PROGRESS



Amber Court, William Armstrong Drive, Newcastle upon Tyne, NE4 7YQ, UK
T+ 44 (0) 191 226 2000, F+ 44 (0) 191 226 2104
wsp.com

CLIENT: AQUIND LIMITED

ARCHITECT:

PROJECT: UK FRANCE INTERCONNECTOR

TITLE: UK CABLE ROUTE
ROUTE OPTION 3D
EXPLORATORY HOLE LOCATIONS AND CONSTRAINTS
SHEET 5 OF 5

SCALE @ A3:	CHECKED:	APPROVED:
1:12500	TM	
PROJECT No:	DESIGNED:	DRAWN:
70019402	JK	SA
	DATE:	DATE:
	March 19	
DRAWING No:		REV:
		P03

APPENDIX B – RISK DESCRIPTORS

The identification of potential “pollutant linkages” is a key aspect of the evaluation of potentially contaminated land. An approach based on the UK CIRIA report C552 (Contaminated Land Risk Assessment: A Guide to Good Practice, 2001) has been adopted within this report. For each of the pollutant linkages, an estimate is made of:

- The potential severity of the risk; and
- The likelihood of the risk occurring.

Table B-1 presents the classification of the severity of the risk:

Table B-1: Severity of Risk

Severe	Acute risks to human health; Major pollution of controlled waters (watercourses or groundwater)
Medium	Chronic (long-term) risk to human health; Pollution of sensitive controlled waters (surface waters or aquifers)
Mild	Pollution of non-sensitive water resources.
Minor	Requirement for protective equipment during site works to mitigate health effects; Damage to non-sensitive ecosystems or species

The probability of the risk occurring is classified by criteria given in Table B-2.

Table B-2: Probability of Risk Occurring

High Likelihood	Pollutant linkage may be present, and risk is almost certain to occur in the long term, or there is evidence of harm to the receptor.
Likely	Pollutant linkage may be present, and it is probable that the risk will occur over the long term.
Low Likelihood	Pollutant linkage may be present and there is a possibility of the risk occurring, although there is no certainty that it will do so.
Unlikely	Pollutant linkage may be present but the circumstances under which harm would occur are improbable.

An overall evaluation of the level of risk is gained from a comparison of the severity and probability as presented in Table B-3

Table B-3: Comparison of Severity and Probability

		Severity			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very high risk	High risk	Moderate risk	Moderate / low risk
	Likely	High risk	Moderate risk	Moderate/ low risk	Low risk
	Low Likelihood	Moderate risk	Moderate/ low risk	Low risk	Very low risk
	Unlikely	Moderate / low risk	Low risk	Very low risk	Very low risk

Table B-4 then provides a description of the typical consequences and potential actions required following each risk definition.

Table B-4: Qualitative Risk Assessment - Classification of Consequence

Classification	Definition
Very High Risk	Severe harm to a receptor may already be occurring, or a high likelihood severe harm will arise to a receptor, unless immediate remedial works / mitigation measures are undertaken.
High Risk	Harm is likely to arise to a receptor, and is likely to be severe, unless appropriate remedial actions / mitigation measures are undertaken. Remedial works may be required in the short-term, but likely to be required over the long-term.
Moderate Risk	Possible that harm could arise to a receptor, but low likelihood that such harm would be severe. Harm is likely to be mild. Some remedial works may be required in the long-term.
Moderate / Low Risk	Possible that harm could arise to a receptor, but where a combination of likelihood and consequence results in a risk that is above low, but is not of sufficient concern to be classified as mild. Limited further investigation may be required to clarify the risk. If necessary, remediation works are likely to be limited in extent.
Low Risk	Possible that harm could arise to a receptor. Such harm, at worst, would normally be mild.
Very Low Risk	Low likelihood that harm could arise to a receptor. Such harm is unlikely to be any worse than mild.

Appendix 7 – UK Source Protection Zone 1 Generic Method Statement



AQUIND Limited

AQUIND INTERCONNECTOR

Onshore Outline Construction Environmental Management Plan – Appendix 7 – UK Source Protection Zone 1 Generic Method Statement

The Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations
2009 – Regulation 5(2)(a)

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

PINS Ref.: EN020022

Document Ref: 6.9.1

AQUIND Limited

AQUIND INTERCONNECTOR

Onshore Outline Construction Environmental Management Plan – Appendix 7 – UK Source Protection Zone 1 Generic Method Statement

PINS REF.: EN020022

DOCUMENT: 6.9.1

DATE: 25 JANUARY 2021

WSP

WSP House

70 Chancery Lane

London

WC2A 1AF

+44 20 7314 5000

www.wsp.com

DOCUMENT

Document	UK Generic Method Statement
Revision	002
Document Owner	Aquind Limited
Prepared By	J. Kaufmann, K. Rose, J. Chapman and Stockton Drilling
Date	25 January 2021
Approved By	R. Bayliss, H. Mojtabavi, S. Thite, N. Macdonald, T. Eckhardt
Date	25 January 2021

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LIMITATIONS OF REPORT

This report shall be read alongside the information submitted in support of the Development Consent Order (DCO) application for AQUIND Interconnector (PINS Ref: EN020022).

This report outlines the construction principles for the approved contractor when working within the Source Protection Zone 1 (SPZ1).

This report is intended to be read as a high-level outline method statement. Detailed method statements will be provided by the approved contractor prior to construction commencing.

This report applies to construction activities only within the groundwater Source Protection Zone 1 (SPZ1) and outlines the construction method and principles to be adopted by the contractor (if required).

The report is not considered to be exhaustive and is written with the information available at the time of drafting.

To the extent there are any conflicts with the application documents, information within the 'Surface Water Drainage and Aquifer Contamination Mitigation Strategy' (Ref (1)) and 'Onshore Outline Construction Environmental Management Plan' (Ref (2)) take precedence over this report.

1. INTRODUCTION

1.1. AUTHORISATION AND CONTEXT

- 1.1.1.1. Following meetings on the 5th August and 20th November 2020 with relevant planning authorities (RPAs) (Portsmouth Water (PW), Environment Agency (EA) and Hampshire County Council Lead Local Flood Authority (HCC LLFA)), the Applicant has prepared this UK Method Statement for water management and earthwork management activities within the groundwater Source Protection Zone 1 (SPZ1).
- 1.1.1.2. The relevant planning authorities are identified in paragraph 1.1.1.1, and are referred to throughout this document as the 'RPAs'. The requirement to consult with the RPAs is secured under Requirements 12 and 15 of the Development Consent Order.
- 1.1.1.3. This report outlines the construction principles for the approved contractor when working within the Source Protection Zone 1 (SPZ1).
- 1.1.1.4. The SPZ1 is located within Sections 1, 2 and 3 of the Order Limit.
- 1.1.1.5. The following elements of the Proposed Development are present in Sections 1, 2 and 3 of the Order Limits:

SECTION 1:

- The converter station and associated infrastructure (drainage and access road),
- alternating-current (AC) cable trenches
- direct-current (DC) cable trenches

SECTION 2:

- DC cable trenches

SECTION 3:

- DC cable trenches
- Kings Pond HDD (HDD-5)

- 1.1.1.6. This report provides the context for construction within the SPZ1 and the outline construction method and principles to be adopted by the contractor (if required), to protect the aquifer from turbidity and/or contamination.
- 1.1.1.7. The limitations of the report are identified above and should be understood before using or interpreting this report.

1.2. OBJECTIVES

- 1.2.1.1. The main objectives of this report are to provide information on the following:
- Method statements and environmental incidents

- Outline construction earthworks method statement
- Outline construction water management method statement
- Outline construction karstic dissolution feature method statement
- Outline construction sequencing and seasonal impact
- Communication statement and strategy

1.3. INFORMATION SOURCES

1.3.1.1. This report has been informed by the following reports as at the date of this report. Updates to these documents may be made during the course of the Examination:

- Converter Station foundation preliminary risk assessment.
 - The Preliminary Piling Risk Assessment – Converter Station, contained within Appendix 6 of the Onshore Outline Construction Environmental Management Plan (REP5-019)). (Ref (3))
- Development Consent Order Submission Documents:
 - The Surface Water Drainage and Aquifer Contamination Mitigation Strategy as set out in Appendix 7 of the Onshore Outline Construction Environmental Management Plan (REP5-019) (Ref (1))
 - The Onshore Outline Construction Environmental Management Plan (OOCEMP) (REP5-019) (Ref (2))
 - The Environmental Statement Addendum (REP1-139) (Ref (4))
- The karstic dissolution feature risk associated with the SPZ1 is discussed within the Supplementary Karst Report.
 - The Supplementary Karst Report as set out in Appendix 7 of the Environmental Statement Addendum (REP1-156) (Ref (5)).

2. METHOD STATEMENTS AND ENVIRONMENTAL INCIDENTS

2.1.1. METHOD STATEMENTS

- 2.1.1.1. Requirement 15 of the Development Consent Order requires a construction environmental management plan (“CEMP”) to be submitted and approved by the relevant planning authority before works in a phase are carried out. The CEMP must be in accordance with the Outline Construction Environmental Management Plan (“OCEMP”) (Ref (2)). This Generic Method Statement will be an Appendix to the OCEMP and therefore the measures contained within it will be secured under Requirement 15 of the DCO (REP1-021).
- 2.1.1.2. As explained in paragraph 4.5 of the OCEMP, Method Statements will be implemented during construction of the Proposed Development by the Site Manager and General Operatives and/or subcontractors, trained staff or other appropriate experienced personnel, in consultation with specialists. Their production shall include a review of the environmental/ health and safety risks and commitments, so that appropriate control measures are developed and included within the construction process.
- 2.1.1.3. **Summary of method statements required in respect of construction activities within SPZ1**
- 2.1.1.4. **Error! Reference source not found.** below provides a list of the method statements and other documentation required to be produced by the contractor as part of the CEMP (in respect of construction activities within SPZ1).
- 2.1.1.5. The considerations outlined in section 3 to 7 of this report in respect of construction earthworks, water management, karstic dissolutions features, seasonal impact, sequencing and communication in SPZ1 should be included as part of the method statements and documentation in **Error! Reference source not found.**, and therefore they will ultimately form part of the CEMP. Where the considerations in section 3 to 7 warrant an individual documentation or method statements this will be required in addition to those listed in **Error! Reference source not found.**
- 2.1.1.6. The following watching briefs and permit system will likely be required as part of the relevant method statements in **Error! Reference source not found.** and are to be agreed between the contractor and the RPAs:
- Earthworks Watching Brief; and

2.1.1.7. The summary of the method statements and documentations required for construction works within the SPZ1 are summarised within **Error! Reference source not found.**

Contractors Method Statement and Documentation Approval Remit

2.1.1.8. The contractor is responsible for producing the method statements, documentation and associated watching briefs in **Error! Reference source not found.**

2.1.1.9. Once appointed the contractor shall take responsibility of the communication strategy and the dynamic contact list as discussed in Section 7.

2.1.1.10. The contractor will undertake method statements and risk assessments in compliance with Construction Design and Management Regulations 2015. Method statements must be inclusive of environmental risk as well as the health and safety risk.

2.1.1.11. The contractor will abide by the Applicant's internal auditing and approval systems.

2.1.1.12. The contractor will provide the RPAs with the method statements, documentation and watching brief information in **Error! Reference source not found.** The contractor will also set timeframes for RPAs to review and comment on the provided information, the timeframes shall be no less than 10 working days and no more than 20 unless otherwise agreed.

RPAs Method Statement and Documentation Agreement Remit

2.1.1.13. The RPAs are to respond within the mutually agreed timeframes to reach agreement on the method statements, documentation and watching brief information as listed in Table 1.

2.1.1.14. The RPAs agreement conditions shall be within industry standards and comply with standard practice.

Table 1 - Required Documentation and/or Method Statement

Required Documentation and/or Method Statement ⁽³⁾	Requirements Identified within this Report	Requirements Identified within Other Reports	Required Agreement	Approver
Arboriculture Method Statements	-	OOCEMP (Ref (2))	-	Appointed contractor ⁽²⁾
Earthworks Management Plan (Including Communication Plan and Earthworks Watching Brief)	Section 2, 3, 4, 5, 6 & 7	OOCEMP (Ref (2)) REP5-019 (Ref (1))	RPAs ⁽¹⁾	
Environmental Risk Assessment and Method Statement	Section 2 & 3	OOCEMP (Ref (2))		
Construction Phase Plan and Construction Method Statements	Section 2, 3 & 4	OOCEMP (Ref (2))		
HDD Management Plan	Section 3 & 5	OOCEMP (Ref (2))		
Construction Surface Water Management Plan	Section 4	OOCEMP (Ref (2)) REP5-019 (Ref (1))		
Materials Management Plan	Section 3	OOCEMP (Ref (2))		
Site Waste Management	Section 3	OOCEMP (Ref (2))		
Silt Management Plan	Section 3 & 4	OOCEMP (Ref (2))		
Piling Risk Assessment	Section 3	OOCEMP (Ref (2)) OOCEMP Appendix 6 (Ref (3))		

⁽¹⁾ One or all the following; Portsmouth Water, Environment Agency and Hampshire County Council. The required RPAs to lead the agreement for each documentation and/or method statement in **Error! Reference source not found.** is to be confirmed by the RPAs within 5 days of receiving the document.

⁽²⁾ The contractor is still to be appointed.

⁽³⁾ This is not an exhaustive list and other requirements can be added by Applicant and RPAs prior to DCO consent.

2.1.1.15. All method statements and risk assessments must consider and satisfy the provided information in this report and the OCCEMP (REP1-087) (Ref (2)).

2.1.1.16. The method statements and associated documentation must take into account the SPZ1 is sensitive with regards to controlled water, and the practises identified in this report and OCCEMP (REP1-087) should be applied, where relevant, across the Principal Aquifer.

2.1.2. ENVIRONMENTAL INCIDENTS

2.1.2.1. The response to environmental incidents should be carried out in accordance with section 4.6 of the OOCCEMP (Ref (2)).

3. OUTLINE CONSTRUCTION EARTHWORKS METHOD STATEMENT

3.1. SPZ1 SITE-WIDE GUIDING PRINCIPLES

3.1.1.1. The following outline principles and communication plan shall be included in the Earthworks Management Plan to mitigate any potential contamination and turbidity to the aquifer during the earthworks. The contractor would provide a detailed method statement taking into consideration the principles and communication plans outlined in this section. Method statements must be inclusive of environmental risk as well as the health and safety risk.

3.1.1.2. The contractor is to adhere to the following guiding principles to further mitigate any potential contamination and turbidity risk to the aquifer during earthworks construction works within the SPZ1, the following outline principles and communication plan shall be taken into account:

- Appropriate measures to protect SPZ1 saturated zone (see definition in 3.2.1.2) shall be communicated and agreed with RPAs in advance of construction works. These may comprise silt control membranes or barriers etc.
- Any excavation into Structured Chalk, or the discovery of a previously unknown karstic dissolution feature during the excavation works, will result in a temporary pause in the works on site for the designated capable person on site (who is to be confirmed by the contractor) to notify the Project Manager for the works and to determine which of the agreed actions in the catalogue of mitigations agreed with Portsmouth Water and the Environment Agency should be applied. The area of exposure should be recorded by visual inspection and RPAs notified by the Project Manager for the works.
- An activity specific earthworks silt management plan will be followed during all earthwork operations, the details of the plan are to be provided by the Principal Contactor and agreed with relevant RPAs.
- Confine traffic movement to designated routes, using tracked equipment where possible to reduce compaction. This will be for the benefit of earthwork management, soil protection and prevention of spills and accidents.

- During construction, as part of the Earthworks Management Plan an Earthworks Watching Brief will be employed to inspect excavations, confirm ground conditions, record any excavations into the Structured Chalk, record any revealed karstic dissolution features and record any localised contamination in the excavated materials.
- The seasonal considerations in in Section 6 will be adopted where possible.
- Any excavated contaminated material on site would be segregated and disposed appropriately off-site.
- Where possible, double-handling of the excavated materials would be avoided. However, where there is a need to temporarily store excavated materials on site, it would be stored at safe distances from slopes/excavations on site within the Order limits - to not compromise stability - or be washed into excavations. Temporary storage of materials shall have appropriate silt management plans and should not be positioned within the root or crown spread of trees. Any proposal for temporary storage of excavated materials shall be confirmed and agreed with RPAs in advance of the works.
- Site drainage plans would consider both short-term drainage requirement i.e. during earthwork construction and long-term drainage requirements i.e. during operation, to minimise infiltration into the aquifer and ensure no untreated contaminated run-off can infiltrate into the aquifer. Stockpiles shall not block any overland flow paths. This is further considered in the outline construction water management statements which is available in Section 4.
- Appropriate treatment would be employed to limit any disturbance to the upper sections of the exposed Structureless Chalk due to movement of plant and equipment. Such treatment could take the form of suitably compacted clean granular material with geotextile underlay as a fine's separator. The proposed treatment shall be confirmed and agreed with the relevant bodies in advance of the works. Source approval tests shall be carried out on any proposed imported fill materials at frequencies to be confirmed and agreed with RPAs.
- Drip trays and spill kits will be utilised throughout the earthworks to prevent fuel spillages. Spill incidents shall follow the emergency spill response procedure specified in the OOCEMP Plate 4.2 (Ref (2)).

3.2. CONVERTER STATION AREA & ACCESS TRACK SPECIFIC GUIDING PRINCIPLES

3.2.1. SUMMARY GROUND CONDITIONS

- 3.2.1.1. The ground conditions at the site, based on the completed ground investigation, comprise Topsoil (average thickness of 0.30m) overlying Head Deposits. Head Deposits (average thickness of 0.75m) consist predominantly gravelly Clays; sometimes becoming clayey Gravel. Head Deposits are generally underlain by Structureless Grade D Chalk (average thickness of 7.30m), generally described as grade Dm (matrix-dominated) with occasional interbedded layers of Dc (clast-dominated). Beneath the Structureless grade D chalk, chalk quality and grade will broadly improve with depth and become Structured Chalk Grades C to A. The completed ground investigation did not indicate the presence of contamination in the site materials.
- 3.2.1.2. Groundwater was not encountered during the ground investigation, which included a borehole to 30m bgl (metres below ground level). Portsmouth Water have advised that groundwater can be expected at approximately 40-50m bgl at this location.
- 3.2.1.3. The appointed contractor may decide to undertake further ground investigation (GI) to further assess the ground conditions at the site in advance of the construction works.
- 3.2.1.4. Based on CIRIA C574 groundwater mobility has been identified to be lower within the Head Deposits and the Structureless Chalk which includes Putty Chalk than the Structured Chalk (Ref (6)).

3.2.2. PROPOSED EARTHWORKS

- 3.2.2.1. The proposed Converter Station site slopes gradually from the north to the south. The earthworks at the site would mainly comprise cutting into the existing slope in the north of the site, and site raising (embankment construction) in the south of the site to achieve the indicative site platform level of 84.8m AOD (metres above Ordnance Datum).
- 3.2.2.2. Prior to cutting and embankment construction at the site, stripping of the Topsoil at the Converter Station Location is likely to be required. The anticipated earthworks are illustrated in drawings AQ-WSP-UK-CS-DR-Z-200815 (Indicative Earthworks Plan Option B(i)), AQ-ITT-UK-SEC-102 (UK Converter Station Platform North-South Section 1) and AQ-ITT-UK-SEC-103 (UK Converter Station Platform West-East Section 2) presented in Appendix A and Appendix B.
- 3.2.2.3. The cutting in the north of the site is expected to be within the Structureless Grade D Chalk as shown in the platform section drawings AQ-ITT-UK-SEC-102 and AQ-ITT-UK-SEC-103 in **Appendix B**

3.2.3. OUTLINE CONSTRUCTION COMPOUND AND ACCESS ROAD CONSTRUCTION PRINCIPLES

- 3.2.3.1. The contractor is to adhere to guiding principles in Section 3.1.1.2.

3.2.4. OUTLINE CONVERTER STATION PLATFORM MANAGEMENT PRINCIPLES

3.2.4.1.

The contractor is to adhere to guiding principles in Section 3.1.1.2 and the following additional guiding principles to further mitigate any potential contamination and turbidity risk to the aquifer during earthworks construction works for the converter station platform within the SPZ1, the following outline principles and communication plan shall be taken into account:

- The anticipated level of excavation would be within the Structureless Chalk strata. Based on the findings of the ground investigations, the indicative platform level is expected to be around 2.0m (minimum) above the Structured Chalk. Should the ground conditions encountered during construction be different to that encountered in the ground investigation i.e. should Structured Chalk be encountered within the proposed excavation depths, work should stop temporarily. A detailed survey record of the exposure shall be undertaken, RPAs shall be duly informed of the exposure and any agreed mitigation measures shall be implemented on site.
- Excavation would be completed in stages and/or in “bay sections” to allow separation of excavated materials, to minimise as much as is practicable the direct infiltration into the Chalk of any surface runoff water which may be high in turbidity, to better manage any exposure of the Structured Chalk and to make it easier to identify any potential localised contamination. The stages of excavation as well as section details e.g. length and width of the sections, would be confirmed and agreed with RPAs in advance of the works.
- All excavations works should be battered back to safe angles during the works in accordance with the relevant temporary or permanent works design. Any hard engineering in the form of retaining walls or slope strengthening e.g. soil nails and rock bolts should be avoided.
- Where practicable, suitable excavated materials from the proposed cutting in the north of the site will be re-used as general fill to raise site levels i.e. to construct the proposed embankment in the south. Suitability should be assessed as part of earthworks specification requirements - including confirmatory tests agreed with RPAs. If the site-won material is not suitable the proposed embankment fill material is to be agreed with the RPAs.
- Following Topsoil stripping in the south of the site where ground would be raised, any area of exposed Made Ground shall be surveyed in detail. Localised digging out of any Made Ground exposed in the south of the site and replacement with suitably compacted site-won or imported clean fill material should be carried out prior to site raising. Karstic dissolution features will be surveyed and treated as required, see further detail in Section 5.

- The embankment fill materials (site-won or imported) would be benched into the existing site materials and appropriately compacted in accordance with the designer's earthworks specification (which it is expected will follow methods and guidance given in CIRIA 574 Engineering in Chalk Section 5.2.5 (Ref (6))). Fines separators in the form of geotextile membranes or similar would be employed in between the different material layers to mitigate against the movement of fines across the layers.
- Permanent cut slope and embankment slope faces should be protected from erosion. The form of protection shall be confirmed and agreed with RPAs in advance of the works.
- It should be noted turbidity can also be caused by the infiltration of clean water into the aquifer mobilising fines, this should be reflected within method statements.
- Surface water runoff will be prevented/limited from entering the excavation by means identified in Section 4, these shall include but are not limited to the use of the water pumps and sand bags/barriers.

3.2.5. FOUNDATION CONSIDERATIONS

- 3.2.5.1. It has been considered based on the anticipated loads from the proposed Converter Station structures and ground conditions at the site that piled foundations would be required to support the anticipated loads.
- 3.2.5.2. Further to the Converter Station GIDDR, a Preliminary Piling Risk Assessment (PPRA) (Ref. (3)) has been prepared and it contains the feasibility stage piling methodology. The PPRA envisaged pre-cast driven piles end-bearing or H-piles in Structured Chalk would be required as they avoid the placement of cast-in-place alternatives within the SPZ1. Pre-cast low-displacement driven piles are also considered to be of very low risk in relation to increasing the turbidity of the SPZ1. Based on the ground conditions at the site and the indicative platform level (see platform section drawings AQ-ITT-UK-SEC-102 and AQ-ITT-UK-SEC-103 in **Appendix B**), the pre-cast driven piles are likely to be driven through natural materials comprising Structureless Chalk and Structured Chalk in the northern half of the site, and through proposed embankment fill (likely to comprise natural site-worn materials), Head Deposits, Structureless Chalk and Structured Chalk in the southern half of the site. The ground investigation did not record/encounter any contamination at the site. It is therefore expected that there is a very low to negligible risk that pre-cast driven piles would introduce contamination into the SPZ1.
- 3.2.5.3. The indicated pre-cast piles 15-25m long from the Converter station proposed formation level. This is subject to the detailed design by the approved contractor.
- 3.2.5.4. If pre-cast driven piles are determined not to be feasible at detailed design stage by the contractor, a revised risk assessments and method statements will be required for approval by the RPAs.

3.2.6. OUTLINE FOUNDATION CONSTRUCTION MANAGEMENT PRINCIPLES

3.2.6.1. To further mitigate any potential contamination and turbidity risk to the aquifer during the foundation construction works at the Converter Station, the following outline principles and communication plan shall be taken into account.

3.2.6.2. The contractor would prepare a detailed method statement which adheres to guiding principles in Section 3.1.1.2 and the following additional guiding principles:

- The contractor shall provide a detailed risk assessment for all piling/foundation works within the SPZ1, in addition to a piling specification to RPAs for review and approval in advance of construction.
- The piling operations method will be agreed and designed to mitigate against formation of pathways for the migration of contamination at the surface (either existing contaminants, those that form part of the piling process or those that might be introduced during the operation of the Converter Station) to the aquifer.
- Any piling platform material (if required) would comprise clean suitably compacted granular material with geotextile underlay as a fine separator. Any proposed piling platform shall be confirmed and agreed with RPAs in advance of the works. Piling platform design and source approval tests shall be carried out on any proposed imported fill to be used for the piling platform construction at frequencies to be confirmed and agreed with RPAs.
- Consideration would be given to limiting the pile length to depth of 55m AOD. However, it is acknowledged that piles are driven to achieve a “set”, rather than to a specified length. A record of final pile depths shall be taken during construction. RPAs shall be consulted for agreement during the site works should the piles need to be driven deeper than 55m AOD.
- Piling cap and/or ground beam construction should use of permanent formwork (i.e. peccafil or similar approved alternative) to avoid loss of grout through the ground.
- Any proposed treatment of karstic dissolution features at the site shall be carried out in advance of piling. Karstic dissolution features identification and mitigation is considered within Section 5.
- The appointed contractor may decide to undertake further ground investigation to further assess the ground conditions at the site in advance of the foundation construction works. Such further GI proposals would need to consider the groundwater SPZ1 constraints and shall be agreed with the relevant bodies in advance of the works.

3.3. ALTERNATING-CURRENT AND DIRECT-CURRENT CABLE TRENCHING SPECIFIC GUIDING PRINCIPLES

3.3.1. ONSHORE CABLE ROUTE TRENCH EXCAVATION CONSIDERATIONS

- 3.3.1.1. The ground conditions encountered during the completed GI in Section 1 and Section 2 of the Onshore Cable Corridor confirmed the following:
- Chalk bedrock to be present at shallow depths.
- 3.3.1.2. The ground conditions encountered during the completed GI in Section 3 of the Onshore Cable Corridor confirmed the following:
- No Chalk bedrock was confirmed during the GI.
 - It is considered due to its proximity to Section 2 that there is a potential for Chalk bedrock to be present in Section 3 as well, particularly in the extreme northern parts.
- 3.3.1.3. Where Chalk bedrock is present at shallow depths, there is a potential that it could be encountered in cable trench excavations and such works could impact the SPZ1 hence the need for mitigation against any potential contamination and increased turbidity to the aquifer during the works.
- 3.3.1.4. It is considered that the Chalk bedrock is at significant depth below ground level along other sections of the Onshore Cable Corridor and would not be impacted by the proposed trenching works.
- 3.3.1.5. Summary ground conditions along Sections 1, 2 and 3 of the of the onshore cable route is presented below:
- Onshore Cable Corridor Section 1 – This covers proposed cable trenching works within the Converter Station Area. Summary of ground conditions in this area are presented in Section 3.2.1.1 of this report.
 - Onshore Cable Corridor Section 2 – The ground conditions generally comprise Topsoil (0.10 – 0.30m thickness) underlain by Head Deposits (1.10 – 2.90m thickness). The Head Deposits is underlain by Structureless Grade Chalk to the end of the exploratory holes which were terminated between 4.50m bgl and 5.00m bgl. Made Ground is locally present along this section. Up to 1.20m thick Made Ground of variable composition was recorded in a single exploratory hole within this section during the ground investigation. Head deposits was also recorded to be underlain by slightly gravelly clay of the Lambeth Group in that single borehole.
 - Onshore Cable Corridor Section 3 - The ground conditions generally comprise Topsoil (0.20 – 0.40m thickness) underlain by Head Deposits (0.50 – 3.00m thickness). The Head Deposits is underlain by slightly gravelly clay of the Lambeth Group up to 5.00m bgl where the exploratory holes were terminated. Topsoil and Head Deposits are absent and replaced by Made Ground of variable composition (recorded thickness ranging between 0.50m and 2.00m) in some of the exploratory holes completed in this section.

3.3.2. OUTLINE TRENCH EXCAVATION MANAGEMENT PRINCIPLES

3.3.2.1.

The following outline principles and communication plan shall be followed to mitigate any potential contamination and turbidity to the aquifer during the trench excavation works in Sections 1, 2 and 3 of the Onshore Cable Corridor. The approved contractor should prepare a detailed method statement that adheres to the guiding principles in Section 3.1.1.2 and the following additional guiding principles:

- All trenches should be battered back to safe angles during the works, or close support provided. Safe angles for temporary slopes in the materials on site or temporary trench support would be assessed as part of the contractor's temporary works design.
- Wherever practicable, trench excavation works will be undertaken in the superficial Head deposits in Sections 1, 2 and 3, and not the Chalk. If the Head deposits are of insufficient thickness (or not present), making excavating in the Chalk unavoidable, then extra care will be taken to avoid fracture zones and karst features (see Outline Karstic dissolution features Management Plan in Section 5). It is considered from the ground investigation information any excavation into Chalk in the trenches would be in the Structureless Chalk.
- Where design permits excavated materials to be re-used as trench backfill would be clean materials. If excavated material is not suitable for reuse as trench backfill it is to be used elsewhere on site or disposed of appropriately. Further confirmatory tests would be carried out on the materials prior to re-use at frequencies to be confirmed and agreed with RPAs. Any excavated contaminated material on site would be segregated and disposed appropriately off-site.
- Excavated materials from the trenches would be temporarily stored at safe distances to the trenches where it will not compromise the stability of trench slopes or washed into the trenches. Temporary storage of materials shall have appropriate silt management plans and should not be positioned within the root or crown spread of trees.

3.3.2.2.

The appointed contractor may decide to undertake further GI prior to trenching to confirm ground conditions and identify trenching strategy in Sections 1, 2 and 3, to determine the thickness of the Head superficial deposits and check for the presence of karst dissolution features as part of detailed design. Such further GI proposal shall be confirmed and agreed with the relevant bodies in advance of the works.

3.4. HORIZONTAL DIRECTION DRILLING SPECIFIC GUIDING PRINCIPLES

3.4.1. HDD CONSIDERATIONS

3.4.1.1. In certain areas the Onshore Cables will be installed in ducts using HDD or other Trenchless installation methods.

3.4.1.2. There are two types of excavations for Horizontal Direction Drilling ('HDD') operations, Haul road construction whereby just the topsoil is stripped, and entry and exit pits where the subsoil Head Deposits and Lambeth Group bedrock is excavated.

3.4.2. HDD MANAGEMENT PRINCIPLES

3.4.2.1. Where the HDD technique is used along the Onshore Cable Corridor, the appointed contractor will adhere to the following guiding principles:

3.4.2.2. Stockpiles should not be positioned within the root or crown spread of trees, or adjacent to ditches, watercourses or existing or future excavations. Soil will have a natural angle of repose depending on texture and moisture content but, if stable stockpiles are to be formed, slope angles will normally need to be less than that.

3.4.2.3. The soil management requirements are:

- Prepare a Soil Resource Plan showing the areas and type of topsoil and subsoil to be stripped, haul routes, the methods to be used, and the location, type and management of each soil stockpile.
- When stripping, stockpiling or placing soil, do so in the driest condition possible and use tracked equipment where possible to reduce compaction.
- Confine traffic movement to designated routes.
- Keep soil storage periods as short as possible.
- Clearly define stockpiles of different soil materials.

3.4.2.4. A Soil Resource Plan, which will often accompany a Material Management Plan, shall be prepared by the appointed contractor and shall include the following:

- Maps showing topsoil and subsoil types, and the areas to be stripped and left in-situ.
- Methods for stripping, stockpiling, rereading and ameliorating the soils.
- How the stockpile will be managed:
 - Position of silt screens to trap silt run off
 - Allowing of stockpiles to vegetate to minimise dust and run off
 - Stockpiles shall not block any overland flow paths
- How water shall be directed away from stockpiles:
 - Use of bunds, berms and attenuation areas as appropriate
- Location of soil stockpiles and content (e.g. Topsoil type A, subsoil type B).
- Schedules of volumes for each material.

- Expected after-use for each soil whether topsoil to be used on site, used or sold off site, or
- Subsoil to be retained for landscape areas, used as structural fill or for topsoil manufacture.
- Identification of person responsible for supervising soil management.

3.4.2.5. The contractor is to provide an HDD Construction Phase Plan which will form part of the HDD Management Plan.

3.4.2.6. The contractor is to provide an HDD Method Statement and Communication Plan (Earthworks Methodology) which will form part of the HDD Management Plan.

3.4.2.7. Included within the relevant Method Statements should be a datasheet for the proposed drilling fluids.

3.4.3. **OUTLINE HDD TECHNIQUE AND METHOD**

Where the HDD technique is used along the Onshore Cable Corridor, the contractor would adhere to the following techniques and methods:

- HDD drilling in soft non-rock material such as clay will be via jetting head.
- The HDD rig and drilling fluid equipment will mobilise to site.
- The drill will be aligned and anchored down via anchor block or other approved method.
- The pilot hole is drilled using standard drilling techniques.
- Drilling mud (see Section 5.4) is pumped through the centre of the drill pipe to provide hydraulic power to the down-hole steerable mud motor or jetting assembly. As the drill bit is larger in diameter than the drill pipes, the drilling fluid laden with cuttings will return to the entry point along the annulus of the bore.
- The position of the drill is monitored by directional guidance equipment (gyroscopic and magnetic steering tool) positioned behind the steerable mud motor assembly or jetting head.
- The signal from the steering tool is transmitted up the centre of the drill string via an internal wire-line to a read-out in the drilling control unit. Data collected from the down-hole instruments includes the azimuth and inclination of the drill head, rotational position of the offset bent housing at the drill head, as well as down-hole annular pressure measurement.
- The 'down-hole assembly' has a bent housing to give the drill a bias in one direction. By rotating the drill string, the tool face of the down hole drilling bit is rotated, altering the drilling bias and so altering the drilling direction. In this way the direction of the drill can be controlled.

- The appointed contractor shall determine the size of the bore, with a product pipe of 400mm it is anticipated that the ream would be to 26” (660mm).
- The appointed contractor will undertake best working practice measures to ensure no surface run off material is caused by HDD outside the management and mitigations proposed in the Construction Method Statement.

4. OUTLINE CONSTRUCTION SURFACE WATER MANAGEMENT METHOD STATEMENT

4.1. SPZ1 SITE-WIDE GUIDING PRINCIPLES

- 4.1.1.1. A detailed construction surface water management plan (CSWMP) is to be developed by suitably qualified and experienced staff, in accordance with the principles of the operational phase drainage design and water quality treatment, with an emphasis on protection of the underlying aquifer. This requires all water to be collected, conveyed and discharged in a controlled and predictable manner to ensure pollution prevention, water quality treatment and prevention of flooding.
- 4.1.1.2. Water is to be managed in accordance with industry best practice, other sections of this Generic Method Statement and the literature underlying the operation phase SuDS design, including but not limited to:
- Silt Management Plan (to be proposed by the Principal Contactor once appointed);
 - Environment Agency Guidance on Pollution Prevention for Businesses;
 - The Environment Agency's approach to groundwater protection (Version 1.2, 2018)
 - Ciria Industry Guidance:
 - C649 & C648D Control of water pollution from linear construction projects;
 - C532 Control of water pollution from construction sites;
 - C762 Environmental Good Practice on Site;
 - C753 SuDS Manual; and
 - C698 Site handbook for the construction of SuDS;
 - Non-statutory technical standards for sustainable drainage systems;
 - SNIFFER UEUW01: Source control pollution in Sustainable Drainage (Final Report, February 2008);
 - SNIFFER UEUW01: Source control pollution in Sustainable Drainage: Supplementary Report (Draft Report, September 2008);
 - SNIFFER UEUW02: SuDS Pollution Degradation (Final Report, October 2008);

- Napier, F.; Jefferies, C; Heal, KV; Fogg, P; D’Arcy, BJ; Clarke, R. (2008) Evidence of traffic-related pollutant control in soil-based Sustainable Urban Drainage Systems (SUDS). Edinburgh, Scotland. (Referenced below as Napier et al 2008a);
- Napier, F.; D’Arcy, B.J.; Jefferies, C.; Fogg, P.; Lowe, W.; Clarke, R.; (2008) Oil and SUDS: managing a priority urban pollutant. 12th International Conference on Integrated Diffuse Pollution Management, Khon Kaen University, Thailand. (Referenced below as Napier et al 2008b);

- 4.1.1.3. As per the operational phase, discharge of clean water during construction will be via infiltration, with surface water attenuation storage made available. Pollution prevention and water quality treatment will ensure all discharge meets the requirements of Portsmouth Water (PW) and the Environment Agency (EA), while any water not sufficiently treated will be tankered away from the site with full details of its intended treatment and discharge to be included in the CSWMP.
- 4.1.1.4. A source-pathway-receptor (SPR) model shall be provided as the basis of the CSWMP and used to develop all subsequent controls, management and mitigation measures. The SPR must identify all possible pollutant sources, all pathways by which they could reach receptors and all types of water receptors, including but not limited to rainwater, surface water, shallow subsurface flows, fluvial flows, groundwater, dewatering and all types of ‘introduced water’ used as part of the construction process then discarded. ‘Introduced water’ and dewatered fluids may be considered both a pollutant source and a pollutant receptor.
- 4.1.1.5. The CSWMP shall focus on preventing water pollution as a first step with measures implemented to intercept and divert surface and subsurface runoff around works areas; followed by capture of direct rainfall and runoff for treatment. Treatment procedures will be provided in detail with supporting evidence to demonstrate their suitability to specific site conditions.
- 4.1.1.6. Passive discharge of water, such as infiltration of rainfall directly through an excavation, or infiltration of runoff from exposed soils, chalk or polluted surfaces, must also be identified in the SPR with prevention measures included in CSWMP. The Silt Management Plan should be adhered to, with additional measures identified as required.
- 4.1.1.7. It is anticipated that the construction phase will utilise the operational phase drainage infrastructure, however the CSWMP must also address the following points:
1. Water management will be required prior to, and during, construction of the drainage network. Drainage design for the collection, conveyance and treatment of water during this period must be developed by the CSWMP.

2. Suitability of the operational phase drainage for collection and treatment of construction phase water must be assessed. Additional construction phase drainage controls shall be designed and implemented as required.
3. Methods for cleaning and restoring the operational phase drainage network prior to handover must be included in the CSWMP;

- 4.1.1.8. Operational phase drainage infrastructure will be utilised during the construction period and installed in phases with the wider project. It is anticipated that the roadside swale and southern infiltration basin will be constructed concurrently with the access road and temporary contractor's carpark. The drainage will then be utilised to capture, treat, convey and discharge surface water subject to the requirements listed in 4.1.1.7. The contractor's carpark will also contain surface water management measures for water quality and controlled discharge as identified in Section 6.3.5 and Appendix 6 (AQ-ITT-UK-LAY-101) of the OOCEMP (Ref (2)).
- 4.1.1.9. Subsequent construction phases will install the northern detention basin concurrently with the converter station. The converter station drainage will collect and convey surface water to the detention basin for attenuation and treatment subject to the requirements in Section 4.1.1.7.
- 4.1.1.10. The design of the operational phase northern detention basin is that it will be impermeable, providing treatment and attenuation prior to discharging to a soakaway. A high-level overflow from the detention basin will also connect to the adjacent roadside swales which convey flow to the southern infiltration basin. During the construction phase, the basin is not proposed to connect to the soakaway. It is still proposed that the detention basin will be impermeable with its invert level collection and discharge pipes installed, but with a downstream temporary connection pipe to the roadside swale instead of the soakaway. This design will address the difference in levels between the bed of the basin and the swale, by utilising the discharge pipe and an additional temporary pipe to connect further south along the swale. The temporary connection pipe will be removed for the operational phase and the detention basin discharge pipe will connect to the operational phase soakaway. The interceptor and dump-tank have shut-off valves to capture the majority of a spill. The detention basin is designed to contain a treatment filter media for the removal of hydrocarbons and which will also help reduce sediment loading. A high-level overflow from the detention basin will connect to roadside swales and an infiltration basin, both containing the same treatment filter media and therefore equally suited for water quality treatment prior to discharge. Monitoring and maintenance of the drainage, SuDS features, and treatment filter media will be required following construction phase to ensure its suitability for the operational phase.
- 4.1.1.11. A monitoring program shall be included in the CSWMP specifying how its requirements are to be checked and tested onsite. This may take the form of daily checks, audits, visual assessments and/or water quality monitoring if required.

- 4.1.1.12. An assessment, reporting and response procedure shall be included in the CSWMP, which allows staff to identify incidents or potential future risk to water receptors and to report and remediate these immediately. The procedure is to identify all relevant parties, including PW and the EA and provide contact details to all staff.
- 4.1.1.13. A communication plan shall prepared be in accordance with the communication strategy in Section 7 and included in the CSWMP specifying how its requirements will be explained and adopted by all staff members. All staff shall have the responsibility for understanding, identifying and addressing water pollution risks and events; and all staff shall have a copy of contact details for the EA and PW for reporting incidents. The plan should also identify named individuals responsible for the implementation, management and monitoring to ensure works are in accordance with the CSWMP.
- 4.1.1.14. Crossing of watercourses, management of groundwater ingress and surface water resources and flood risk is further discussed within the information presented in the OOCEMP namely Section 5.6 and 5.7 (Ref (2)). Method statements and documentation should consider the information presented in the OOCEMP namely Section 5.6 and 5.7.

4.2. CONVERTER STATION SPECIFIC GUIDING PRINCIPLES

- 4.2.1.1. The contractor is to adhere to the following guiding principles during construction of the Converter Station:
- Operational phase drainage will be utilised during construction to provide water quality treatment, attenuation and controlled discharge subject to the sequencing and additional requirements identified in Section 4.1.1.7.

4.3. CABLE TRENCHING SPECIFIC GUIDING PRINCIPLES

- 4.3.1.1. The contractor is to adhere to the following guiding principles during cable trenching:
- Where practicable sandbags to be placed along both sides of trench. Sandbags also to be placed between the cable route excavation and existing watercourses to maintain separation in the event of flooding.
 - Temporary drainage to be provided along both sides of trench during construction.
 - Crossing of watercourses, management of groundwater ingress and surface water resources and flood risk is further discussed within the information presented in the OOCEMP namely Section 5.6 and 5.7 (Ref (2)). Method statements and documentation should consider the information presented in the OOCEMP namely Section 5.6 and 5.7.
 - Water pumps to be on stand-by, pipes to discharge at the agreed distances or locations from trenches in case of adverse weather or localised incident of excessive water entering the trench.

4.4. HORIZONTAL DIRECTION DRILLING SPECIFIC GUIDING PRINCIPLES

4.4.1.1. The contractor is to adhere to the following guiding principles during HDD:

- HDD drilling utilises large volumes of water to mix bentonite drilling fluid, Consumption can be over 40m³ per day especially if building fresh mud or having losses. Water is normally taken from a water course via abstraction licence or standpipe though it can be tankered in. Ultimately all options are viable, and the appointed drilling contractor may utilise a mixture of all the water options
- The water is stored onsite in ISO size mix tanks before being mixed into drilling fluid, pumped down the drill and returns to surface via the drilled bore.
- Drilling fluid where possible is cleaned via shakers and de-sanding and de-silting hydro cyclones, if necessary, the contractor may utilise a centrifuge.
- Where practicable sandbags to be placed along sides of excavation. Sandbags also to be placed between excavations and existing watercourses to maintain separation in the event of flooding.
- Temporary drainage to be provided for excavations during construction.
- Water pumps to be on stand-by, pipes to discharge at the agreed distances or locations from trenches in case of adverse weather or localised incident of excessive water entering the excavation.
- Crossing of watercourses, management of groundwater ingress and surface water resources and flood risk is further discussed within the information presented in the OOCEMP namely Section 5.6 and 5.7 (Ref (2)). Method statements and documentation should consider the information presented in the OOCEMP namely Section 5.6 and 5.7.

5. OUTLINE CONSTRUCTION KARSTIC DISSOLUTION FEATURE METHOD STATEMENT

5.1. SPZ1 SITE-WIDE GUIDING PRINCIPLES

5.1.1.1. Flow diagrams have been produced for each infrastructure element within the SPZ1 which will inform the site operatives, and in particular the designated responsible person supervising the works (which is likely to be a Hydrogeologist or Engineer). The responsible person will also act as the Earthworks Watching Brief for detecting karst dissolution features (as stipulated in the Onshore Outline Construction Environmental Management Plan or OOCEMP).

5.1.1.2. The contractor is to adhere to the following guiding principle during construction:

- A Earthworks Watching Brief will be present on site, whose role will principally be to watch for dissolution features during the works and ask for the works to temporary cease should any be detected. Training will also be provided to the works crew on karst dissolution features, the Groundwater Source Protection Zone 1, and associated risks to Portsmouth Water sources and the Chalk aquifer. The sequence of action flow diagram detailing what needs to happen should an unknown karst dissolution feature be detected during works is provided in **Appendix C**.
- Remedial solutions for karstic dissolution features shall be agreed with RPAs as specified in Appendix C. Notably, if grouting is required, volumetric assessments and tolerances to these should be confirmed and agreed with the RPAs prior to works commencing. If the grouting exceeds the calculated estimate tolerances RPAs will be consultation to determine an agreed solution.
- As part of the karstic feature assessment in **Appendix C** an additional assessment of proposed overlying, nearby, land use and potential pathway relating to the identified karstic feature and the proposed remediation shall take place. This will require the updating of the conceptual model which will inform a risk assessment, if risks are perceived to increase the appropriate management and mitigation of these risks shall be agreed with the RPAs.

5.2. CONVERTER STATION SPECIFIC GUIDING PRINCIPLES

5.2.1.1. The majority of the mitigation measures for karst dissolution features at the Converter Station have already been detailed in the revised OOCEMP and also the Surface

Water Drainage and Aquifer Contamination Mitigation Strategy (Ref (1) & (2)). The preferential mitigation measures (as confirmed by the EA and Portsmouth Water) are grouting of the feature, to prevent runoff entering the feature, and piling if necessary. The sequence of action flow diagram detailing what needs to happen should an unknown karst dissolution feature be detected during the Converter Station works is provided in **Appendix C**.

- 5.2.1.2. There are additional considerations which concern the northern third of the Converter Station area at which Chalk bedrock is expected to be exposed during the works. The works should be undertaken with the seasonal considerations as considered in Section 6, to reduce the likelihood of rainfall and excess surface runoff carrying suspended sediments (turbidity) infiltrating directly into the exposed Chalk. This carries a particular risk for Portsmouth Water's sources due to the rapid travel time through the fractured aquifer which also contains karst dissolution features.
- 5.2.1.3. The excavation works should also be undertaken in stages, where the exposed Chalk is covered as quickly as possible with a low permeability covering which also directs runoff into the temporary site drainage system, again with the aim of minimising any infiltration into the Chalk. Exposed Chalk should not be left uncovered for any extended period i.e. overnight or when works cease for any reason.
- 5.2.1.4. Some consideration also should be given to the chemistry of the water being discharged into the Chalk via an infiltration pond (part of the temporary and also permanent drainage system). As this water will derive from rainfall it will be low in carbonate concentrations. Over time this would cause dissolution of the Chalk at the drainage pond location and would likely result in the formation of another karst dissolution feature. This is more of a long term (i.e. operational phase) consideration, however the surface water drainage system should make some provision for the carbonate content of the water to be increased before it infiltrates into the Chalk (e.g. a chalk gravel layer in the pond), which would significantly reduce the amount of dissolution in the Chalk.

5.3. CABLE TRENCHING SPECIFIC GUIDING PRINCIPLES

- 5.3.1.1. The sequence of action flow diagram detailing what needs to happen should an unknown karst dissolution feature be detected during the cable trench excavation works is provided in **Appendix C**.
- 5.3.1.2. During the works the Earthworks Watching Brief will be watching for any evidence of karst features, which is likely to be in the form of a sinkhole. Sinkholes are depressions found at ground surface, normally conical in shape (though can be other shapes such as having vertical sides). They are the result of chemical dissolution of the Chalk by rainfall runoff infiltrating over time.
- 5.3.1.3. It is highly unlikely that any such unknown open features, which have not already been filled with a superficial material (i.e. Head deposits) will be detected during the

works. However, it is possible that such features could be present and are filled with superficial deposits. Past ground investigation (GI) information indicates that the majority of the works in Sections 2 and 3 are anticipated to remain within the Head deposits. As the cable trenching works are anticipated to be shallow, it is possible that a karst dissolution feature which is completely filled in with superficial deposits and is structurally stable may not be detected at all during the works. However, if there is an indication of a depression present, and that the superficial deposits are unstable, then these would indicate the presence of a karst dissolution feature.

5.3.1.4.

If such a feature is detected, the preferential mitigation method would be to implement a geotextile membrane in order to stabilise the overburden in the cable route. It would also prevent suspended sediment from infiltrating into the karst dissolution feature or exposed Chalk. Exposed Chalk bedrock should be considered as a likely contamination pathway (in addition to karst dissolution features), in the event of a rainfall event resulting in runoff carrying suspended sediment and subsequent infiltration. Chalk bedrock should not be left exposed for any extended periods i.e. overnight, without a geotextile covering preventing infiltration of turbid runoff into the exposed Chalk.

5.4. HORIZONTAL DIRECTION DRILLING SPECIFIC GUIDING PRINCIPLES

5.4.1.1.

The contractor that is responsible for the completion of the directionally drilled trenchless crossing across the SPZ1 shall be required to prepare a specific HDD Management Plan that explains in detail how the crossing is to be built and managed, this shall include but not be limited to:

- The drilling fluid is a slurry or ‘mud’ produced by properly mixing, ground and refined bentonite and polymers with water. Bentonite is a natural clay and is harmless to the environment.
- The drilling products (Bentonite and additives) are listed on the British Governments CEFAS (Centre for Environmental Fisheries and Aquatic Science) website and PLONOR (Pose Little or No Risk) list. Industry standard material datasheets are available in Appendix D, these are example only and principal contractor will confirm materials and subsequent datasheets construction.
- If karstic dissolution features are encountered, then all attempts will be made to seal up these features with grout or lost circulation material.
- In certain areas the sealing effect of the mud may cause problems when spreading over a surface. It must be agreed with the client, before the drilling operations start, which actions must be taken in case of a breakout. Below listed are possible actions.

5.4.1.2. Drilling fluid (bentonite) can sometimes break out of the bore through highly fissured clays, gravels or where there are large interconnected fissures in the ground. Breakouts may also occur where manmade features are present (e.g. old SI boreholes). Old boreholes in the vicinity of the HDD-5 were limited to a maximum of 7.5m depth and were within the Lambeth Group. The following management procedures will be undertaken if drilling fluid spills and breakout occurs:

- In the event of egress of drilling fluid from the bore the drilling fluid is only likely to reach ground surface where there is a continuous flow path available to the surface. The risk of a drilling fluid breakout during drilling cannot be fully assessed before the work starts; however, any decrease in the mud volume returning to the entry pit will trigger the need for personnel to closely monitor the area around the drilling head.
- For this reason, a close watching brief during drilling activities and a detailed contingency plan is essential to ensure that any drilling fluid breakout is contained, banded and pumped back to the entry pit with minimum disturbance to the surrounding environment.

5.4.1.3. The following site monitoring will be undertaken:

- Drilling mud breakouts are only likely to happen when the fluid is under pressure, so during drilling, site monitoring will be carried out by dedicated personnel.
- The site to be monitored will include an area of 100m in front or behind the drill head and 25m either side of the centre line of the drill route. The site will be divided into three areas which will be checked regularly.
- Records shall be maintained of inspections. In addition, a down hole annular pressure sensor will be used during drilling.
- The maximum allowable annular pressure according to the design calculations will be plotted on screen with an alarm sounding if it reaches 90% of the allowable limit. If this happens, the drilling contractor will stop drilling and retract the drilling assembly until the blockage has been cleared before continuing to drill.
- If a breakout were to occur the drill crew would know instantaneously as the drill entry drilling fluid lagoon would lose its contents into the bore.
- Behind the mud motor there is a pressure sensor that will also alert the control cabin to a loss of pressure in real time.
- The rate at which the lagoon would drain is determined by the size of the fracture.

5.4.1.4. Practicable contingency measures are considered as follows:

- It is proposed that the appointed contractor uses an advanced formula drilling fluid. This is a proprietary-blended product which uses high-yielding sodium

drilling fluid. The drilling fluid forms an impermeable filter cake around the bore annulus due to the alignment of the clay platelets.

- In certain areas the sealing effect of the mud may cause problems when spreading over a surface. It must be agreed with the client, before the drilling operations start, which actions must be taken in case of a breakout. Actions are listed below.

5.4.1.5. The following procedure will be undertaken for breakout on land occurrences:

- 1) Report to the driller and site supervisor
- 2) Stop drilling immediately
- 3) Contain the drilling fluid by constructing a bund with sandbags as prescribed in paragraph 5.4.1.6 and 5.4.1.7.
- 4) Recover the drilling fluid from the bund by using pump sets
- 5) Discharge the drilling fluid into the entry pit for recycling
- 6) Continue to monitor the area closely
- 7) Should it be necessary, pump lost circulation material to seal the fracture. This will be completed by having lost circulation materials on site to seal any breakout. The following principles define what is considered lost circulation and the process that will be followed:
 - Lost circulation is the loss of drilling fluid from the borehole through cracks, crevices, or porous formations to surface or voids and is referred to in the industry as a 'breakout' It can be partial or complete, depending on the conditions. Lost circulation is sometimes referred to as lost returns, either partial or complete, because part or all of the fluid fails to return to the surface. When circulation is lost, the drilling fluid is not performing one of its major functions, that of transporting the cuttings up the hole where they can be released in the mud tank or pit. If the cuttings are not removed from the hole, they will pack around the drill string above the bit, resulting in stuck pipe and possible loss of the bit, collars, part of the string and perhaps, the hole.
 - Lost circulation materials are used to seal breakouts whilst drilling. Industry standard material datasheets are available in Appendix D, these are example only and principal contractor will confirm materials and subsequent datasheets prior to construction.
 - If the formation has large cracks or crevices, the fluid may carry the cuttings into the formation and away where they cannot pack around the drill string, but there is no way of being assured that this is the case. Drilling without circulation is known as drilling blind. Complete loss of circulation usually results in the fluid

level dropping to considerably below the surface with the resultant complete or partial loss of fluid pressure stabilizing the hole walls.

- Lost circulation results in: (1) loss of expensive fluid components, (2) loss of drilling time, (3) use of potentially expensive lost circulation materials.
- Despite the severity of the problems, most experts agree that most lost circulation are driller induced and can be avoided. Proper planning and rig operation are important. The route of all the directional drills has been carefully selected to ensure it is suitable for the trenchless methodology of directional drilling. Calculations have been conducted to select a rig size that minimises the annular pressure that causes frac outs at surface.

8) Continue drilling

5.4.1.6. For containment of break outs, sandbags will be stored where they can be easily and quickly brought to the breakout point, along the line of the proposed bore path. Personnel monitoring the site will be equipped with radios for instant communication with the driller.

5.4.1.7. The following clean-up plans are considered appropriate:

- The breakout will first be known through drill fluid losses as discussed above; this would be almost instantaneous;
- A small bund using available materials shall be built around the breakout point to create a lagoon for the suction hose to pump from;
- The duration for building the bund depends on the size of the breakout fracture but is not expected to take more than 10 minutes;
- If possible, use sandbags / hay bales to create the lagoon;
- Whilst this is occurring the remaining personnel will mobilise the suction pump and hosing;
- The hose will be dropped into the small lagoon at the breakout point and then run up the field to the drill compound to the pump;
- The pump will be turned on and all removed bentonite from the breakout shall be returned to the mud mixing unit, and
- This entire process is not expected to take longer than 30 minutes.

5.4.1.8. Method, management and mitigation for collapse whilst drilling/construction:

5.4.1.9. In general ground collapse caused by HDD is uncommon, the risk of collapse is minimised by:

- Site investigation works to confirm earlier desk top study's
- Creating profile drawings identifying the geological layers

- Drilling in homogenous competent geological structures
- Casing / sleeving through incompetent and loose alluvial type materials
- Keeping the diameter of the bore as small as is practicable, as the risk of collapse is near enough exponential as you increase the diameter with directional drilling technique and is one of the major limiting factors of HDD.

5.4.1.10. Settlement is the vertical movement of the ground caused by stresses within the material. The type of settlement can be broken down into the following categories:

- Large Settlements
 - Occur chiefly as a result of loss of ground due to over-excavation caused by the inability to control adverse ground conditions or operator error. Large ground losses can lead to creation of voids above the bore. The risk of large settlements must be minimized to near enough removed through a comprehensive geotechnical investigation, selection of proper means and methods, use of ground improvement that can control the anticipated ground conditions and good workmanship by the contractor.
- Systematic Settlements
 - Principally caused by the collapse of the overcut or annular space between the new pipe and excavation and to a lesser extent by elastic deformations of the soil ahead of the advancing bore. In HDD installations, the overcut allows drilling fluids to be injected, ensures good circulation, decreases pullback forces and facilitates cooling of cutting tools. During or after pipe installation, soil surrounding the annulus may collapse or squeeze onto the pipe, filling the void created by excavation equipment. Soil collapse continues upward until the void appears at the surface as a trough. Systematic settlements can be controlled by selecting an appropriate depth for the installation and keeping the annulus filled with drilling fluids.

5.4.1.11. Industry and proven observations show that settlement risk reduces:

- decrease as annular overcut decreases
- decrease as soil consistency (density, stiffness) increases
- decrease as bore diameter decreases

5.4.1.12. Summary:

- Borehole collapse is a low risk in HDD drilling and mitigated by using appropriate equipment and drilling through competent ground i.e. rock / stiff clays rather than gravel.

- Drilling fluid management and testing should minimise this risk by keeping the borehole full of fluid giving it support where necessary. In the event of collapse, it may need to be re-drilled or reamed through to clear the blockage.

6. OUTLINE CONSTRUCTION SEQUENCING & SEASONAL IMPACT

6.1. SPZ1 SITE-WIDE

6.1.1. CONSTRUCTION SEQUENCING

- 6.1.1.1. All construction activities require a method statement within the Earthworks Management Plan which should specify a logical sequencing of work.
- 6.1.1.2. Suitable short-term drainage should be considered within method statements to protect the SPZ1 from increased infiltration or concentrated areas of infiltration during construction.
- 6.1.1.3. Operational phase drainage will be utilised during construction subject to the principles and requirements identified in Section 4.1 and 6.2.

6.1.2. SEASONAL IMPACT

- 6.1.2.1. Earthworks adversely increasing infiltration rate or exposing the Structured Chalk within the SPZ1 are preferably undertaken in ‘dry’ months, as defined in 6.1.2.2, and would be planned to avoid periods of significant wet weather conditions where foreseeable. Where works are to be undertaken in ‘wet’ months, as defined in 6.1.2.2, or during wet weather, agreed management and mitigation procedures are to be included in the Earthworks Methodology and are to be agreed with Portsmouth Water. RPAs shall accept management and mitigation measures as recommended by industry guidance and best working practice, in particular these are considered to be the “Fill conditioning” measures given in Section 10.5 of ICE Earthworks A Guide (Ref (7)) and guidance in CIRIA Engineering in Chalk (Ref (6)).
- 6.1.2.2. The definition of ‘dry’ months is considered to be February to October, based on less than 80mm of mean monthly rainfall from the 1981 to 2010 rainfall records for the four sites presented in the Met Office review of Southern England climate (Ref (8)).
- 6.1.2.3. It is considered most critical to ensure elements of construction that are incomplete are prioritised to a safe construction stage, as incomplete construction would have a greater risk when exposed to adverse weather conditions.
- 6.1.2.4. The provision of temporary covering for isolated weather events should be considered within the methodology.
- 6.1.2.5. The placement of the platform starter layer or equivalent protective layer to exposed Chalk should be proposed as soon as practicably possible to sufficiently reduce infiltration rates and manage surface water runoff.

6.1.2.6. The method statements should prescribe a plan for unforeseen high precipitation events occurring during the critical stages of construction which have an increased risk to the SPZ1.

6.2. CONVERTER STATION SPECIFIC GUIDING PRINCIPLES

6.2.1. CONSTRUCTION SEQUENCING

6.2.1.1. The access track is likely to be the first earthwork activity. The ground investigation findings indicate the works are to be undertaken in the Head Deposits, which should act as a low-permeability barrier and protect against exposing the aquifer.

6.2.1.2. The roadside swale and southern infiltration basin will be constructed concurrently with the access road, in order to collect, treat, convey and discharge surface water during the construction phase subject to the requirements in Section 4.1.

6.2.1.3. The temporary contractor's carpark will incorporate drainage for surface water management and treatment, connecting to the roadside swale and southern infiltration basin as described in Section 6.3.5 and Appendix 6 (AQ-ITT-UK-LAY-101) of the OOCEMP (Ref (2)).

6.2.1.4. A topsoil strip is likely to be the first earthwork activity for the converter platform.

6.2.1.5. The northern detention basin and onsite drainage will be constructed concurrently with the converter station for collection, treatment, conveyance and discharge of surface water in accordance with the details and requirements presented in Section 4.1.

6.2.1.6. The temporary storage of materials should not be positioned within the root or crown spread of trees, or adjacent to ditches, watercourses or existing or future excavations and abide to an approved silt management plan.

6.2.1.7. Excavation is likely to be completed in stages and or in bay sections to allow separation of excavated materials, to better manage any exposure of the Structured Chalk and to better able to identify any localised contamination. The stages of excavation as well section details e.g. length and width of the sections, would be confirmed and agreed with RPAs in advance of the works.

6.2.1.8. The materials are to be placed from excavation to the embankment fill as soon as reasonably practicable to avoid temporary storage and double handling.

6.2.2. SEASONAL IMPACT

6.2.2.1. The access track is likely to remain within the Head Deposits therefore it is considered works can happen during all seasons, with a sufficient agreed methodology for any foreseeable high precipitation events.

- 6.2.2.2. The Converter Station platform is the largest planned excavation to interact with the Chalk where possible the cutting should occur in 'dry' months, however, where works have to occur in 'wet' months suitable management and mitigations shall be presented within the earthworks methodology and agreed with RPAs as described in Section 6.1.2.1 and 6.1.2.2.
- 6.2.2.3. The previous ground investigation indicates approximately 2 metres of Structureless Chalk cover. It is recommended the excavation remains within the Structureless Chalk, including drainage and services, as the groundwater mobility is considered reduced within the Structureless Chalk compared to the Structured Chalk.
- 6.2.2.4. Exposure of the Structured Chalk poses greater risk from contamination by turbid runoff and turbidity to the groundwater by increased infiltration rate. A Earthworks Watching Brief will be required to review the excavation and verify ground conditions.
- 6.2.2.5. If the exposure of the Structured Chalk does occur the Earthworks Management Plan will have an agreed methodology to ensure the protection of the exposed aquifer until the protection of the final platform finish is installed.

6.3. CABLE TRENCHING SPECIFIC GUIDING PRINCIPLES

6.3.1. CONSTRUCTION SEQUENCING

- 6.3.1.1. A topsoil strip is likely to be required first followed by the trench excavation which is likely to consist of predominantly Head Deposits and potentially Unstructured Chalk.
- 6.3.1.2. The temporary storage of materials should not be positioned within the root or crown spread of trees, or adjacent to ditches, watercourses or existing or future excavations and abide to an approved silt management plan.
- 6.3.1.3. The excavation of the trenches will be limited to agreed section lengths and will not be left open longer than an agreed period, this period of time is to be agreed between the contractor and the relevant bodies.
- 6.3.1.4. It is envisaged the backfill will consist of the excavated material and be placed as soon as practicably possible, if the excavated material is not suitable an inert sand bound mixture both thermally and chemically stable is likely to be used.

6.3.2. SEASONAL IMPACT

- 6.3.2.1. It is envisaged the trenching works can remain predominantly within the Head Deposits, therefore, should not expose the Chalk.
- 6.3.2.2. The trenching works are of short duration and should have a weather watch to avoid any foreseeable adverse weather.
- 6.3.2.3. Works should be able to happen throughout the year due to Head Deposit coverage and the ability to limit excavation to short periods of time to avoid adverse weather events.

- 6.3.2.4. Suitable mitigation should be proposed within the earthworks methodology and agreed by the RPAs. These should include the provision of temporary coverings for foreseeable adverse weather episodes or a similar management.

6.4. HORIZONTAL DIRECTION DRILLING SPECIFIC GUIDING PRINCIPLES

6.4.1. CONSTRUCTION SEQUENCING

- 6.4.1.1. Haul road construction is likely to be the first activity whereby just the topsoil is stripped and entry, this it to be followed by exit pits where the topsoil and subsoil is excavated. The HDD shall follow the stabilisation of the exit pits.
- 6.4.1.2. Topsoil shall be excavated separately to subsoils.
- 6.4.1.3. The temporary storage of materials should not be positioned within the root or crown spread of trees, or adjacent to ditches, watercourses or existing or future excavations and abide to an approved silt management plan.
- 6.4.1.4. Backfill of the exit pits will consist of the excavated material and be placed as soon as practicably possible, if the excavated material is not suitable an inert sand bound mixture both thermally and chemically stable is likely to be used.
- 6.4.1.5. Works for HDD-5 shall comply with the proposed mitigation measures defined in Section 10.2.5 of the Environmental Statement Addendum (Ref (4)).

6.4.2. SEASONAL IMPACT

- 6.4.2.1. The haul road is likely to remain within the Head Deposits therefore it is considered works can happen during all seasons, with a sufficient agreed methodology and should have a weather watch to avoid any foreseeable adverse weather.
- 6.4.2.2. The HDD is to remain within the Lambeth Group at depth, which is a secondary aquifer. Timing of work should be in accordance with the Environmental Statement Addendum Section 10.2.3.6 (Ref (4)).

7. COMMUNICATION STATEMENT AND STRATEGY

7.1. STATEMENT AND STRATEGY

- 7.1.1.1. Whilst working within the SPZ1 the relevant RPAs will be notified at the start and completion of major construction stages. The major construction stages are to be agreed with relevant RPAs before works begin.
- 7.1.1.2. The construction works shall follow the individual communication strategy outlined in the specific construction activity risk assessments and methods statements, which are to be agreed by the with relevant RPAs prior to construction works commencing.
- 7.1.1.3. When encountering unknown karstic dissolution features, the communication is to follow the same sequence as identified in **Appendix C**.

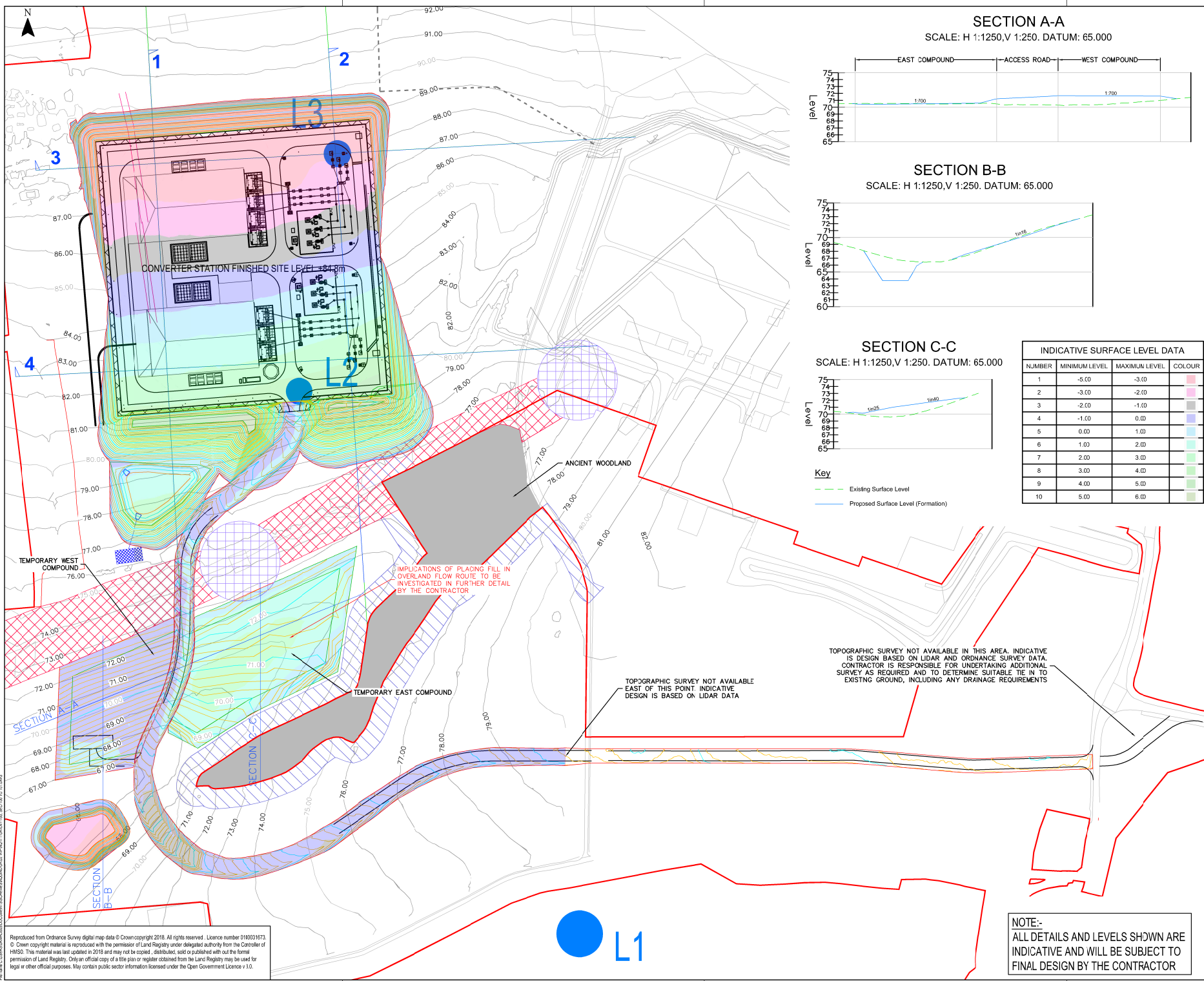
7.2. DYNAMIC CONTACT LIST

- 7.2.1.1. Communication contact information shall be collated into a dynamic contact list using a cloud-based document where all relevant bodies shall have access to update their contact information.
- 7.2.1.2. Once appointed the contractor shall produce and be responsible for administration control of the dynamic contact list, being responsible for sharing/updating documents with relevant RPAs.

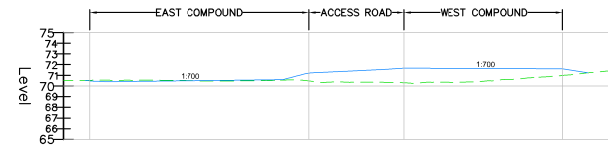
8. REFERENCES

1. *Design and Access Statement - Appendix 3 - Surface Water Drainage and Aquifer Contamination Mitigation Strategy* .
2. *6.9 Onshore Outline Construction Environmental Management Plan (OOCEMP) (REP5-019)*.
3. *Appendix 6 - Preliminary Piling Risk Assessment – Converter Station, contained within Appendix 6 of the Onshore Outline Construction Environmental Management Plan. (REP5-019)*.
4. *7.8.1 – Environmental Statement Addendum (REP1-139)* .
5. *Environmental Statement Addendum - Appendix 7 Supplementary Karst Report (REP1-156)* .
6. CIRIA. *C574 - Engineering in Chalk*. London : CIRIA, 2002. pp. 1-3509.
7. Nowak, Gilbert. *ICE Earthworks A Guide*. Great Britain : ICE Publishing (Thomas Telford), 2015. Second Edition.
8. Met Office . *Met Office (Southern England: Climate)*. [Online] Met Office, 11th October 2016. [Cited: 28th October 2020.]
https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-about/uk-past-events/regional-climates/southern-england_-climate---met-office.pdf.

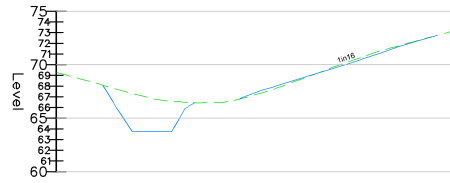
APPENDIX A - INDICATIVE EARTHWORKS PLAN



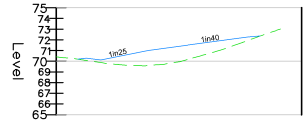
SECTION A-A
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SECTION B-B
SCALE: H 1:1250, V 1:250, DATUM: 65.000



SECTION C-C
SCALE: H 1:1250, V 1:250, DATUM: 65.000



INDICATIVE SURFACE LEVEL DATA			
NUMBER	MINIMUM LEVEL	MAXIMUM LEVEL	COLOR
1	-5.0	-3.0	Light Blue
2	-3.0	-2.0	Light Green
3	-2.0	-1.0	Light Yellow
4	-1.0	0.0	Light Orange
5	0.0	1.0	Light Red
6	1.0	2.0	Light Purple
7	2.0	3.0	Light Blue
8	3.0	4.0	Light Green
9	4.0	5.0	Light Yellow
10	5.0	6.0	Light Orange

Key
 - - - Existing Surface Level
 - - - Proposed Surface Level (Formation)

Key

- Existing Contour 5m Interval
- Existing Contour 1m Interval
- Proposed Contour 1.0m Interval
- Proposed Contour 0.25m Interval
- Exclusion Zone to Services
- Exclusion Zone to Overhead Structure
- Exclusion Zone to Ancient Woodland
- Order Limit

Note's & Assumptions

- This design is provided for information and is to be developed in further detail by the contractor
- Any discrepancies, errors or omissions on this drawing are to be brought to the attention of the design organisation
- Site investigation works indicate an average topsoil depth of 150mm across the site. This figure is used for the indicative levels design.
- Topsoil depth currently unknown, for indicative levels design it has been assumed 300mm is to be provided above earthworks levels.
- For indicative levels design it has been assumed that the landscape drawing is to have a straight grade. Refer to landscape drawings for further information - EN020022-000735-6.2.15.49 ES - Vol 2 - Figure 15.49 Indicative Landscape Mitigation Plan Option B(i)
- Formation to be suitable for site build up and temporary piling mat. It is the Contractors responsibility to determine the final depth to formation.
- The Contractor is to review suitability of cut material for reuse as Engineering Fill.
- The Contractor is to review potential to isolate material which is unsuitable for Engineering Fill for use in landscaped areas.
- The Contractor is to review drainage basin levels in relation to final Geotechnical investigation information and recommendations.
- The access road design is indicative and does not take into account vertical curvature.
- Earthworks objective to achieve balanced cut/fill as far as is reasonably practical.
- To be read in conjunction with drawings AQ-ITT-UK-LAY-100, AQ-ITT-UK-SEC-100 and AQ-ITT-UK-SEC-101

Karstic Features (to be verified by Contractors design team)

- L1 - Located away from the current proposed construction area. Karstic feature height is approximately 6.0m located between a depth of 4m and 10m
- L2 - Located in the fill area of the platform. 1.0 - 4.0m of fill would be required on top of the area identified as a potential caustic feature - total height of caustic feature is approximately 5.0m and located at a depth between around 4m and 9m below existing ground level. The karst appears partially filled.
- L3 - Located in cut area of the platform. 3.0-4.0m of the top of the area identified as a soft area would be required to be removed - total height of caustic feature is approximately 6.0m and located at a depth of around between 3 and 9m below existing ground level. Therefore it is highly likely for the top of the feature to be exposed.

INDICATIVE SUBSTATION FINISHED LEVEL +85.100m

POI	01.0720	MM	Issued for Information	HM	WK
REV	DATE	BY	DESCRIPTION	CHK	APP

INFORMATION

WSP House, 70 Chancery Lane, London, WC2A 1AF, UK
 T: +44 (0) 207 314 5000, F: +44 (0) 207 314 5111
 wsp.com

CLIENT:



PROJECT:
AQUIND INTERCONNECTOR
2 x 1000MW HVDC MONOPOLE
LOVEDEAN - UK

TITLE:
CONVERTER STATION
INDICATIVE EARTHWORKS PLAN
OPTION B(i)

SCALE AT:	NTS	DRAWN:	HM	APPROVED:	MM
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PROJECT NO:	62100616	DESIGNED BY:	DW	MRO	DATE:	JUNE 2020
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DRAWING NO:	AQ-WSP-UK-CS-DR-2-00815	REV:	P01
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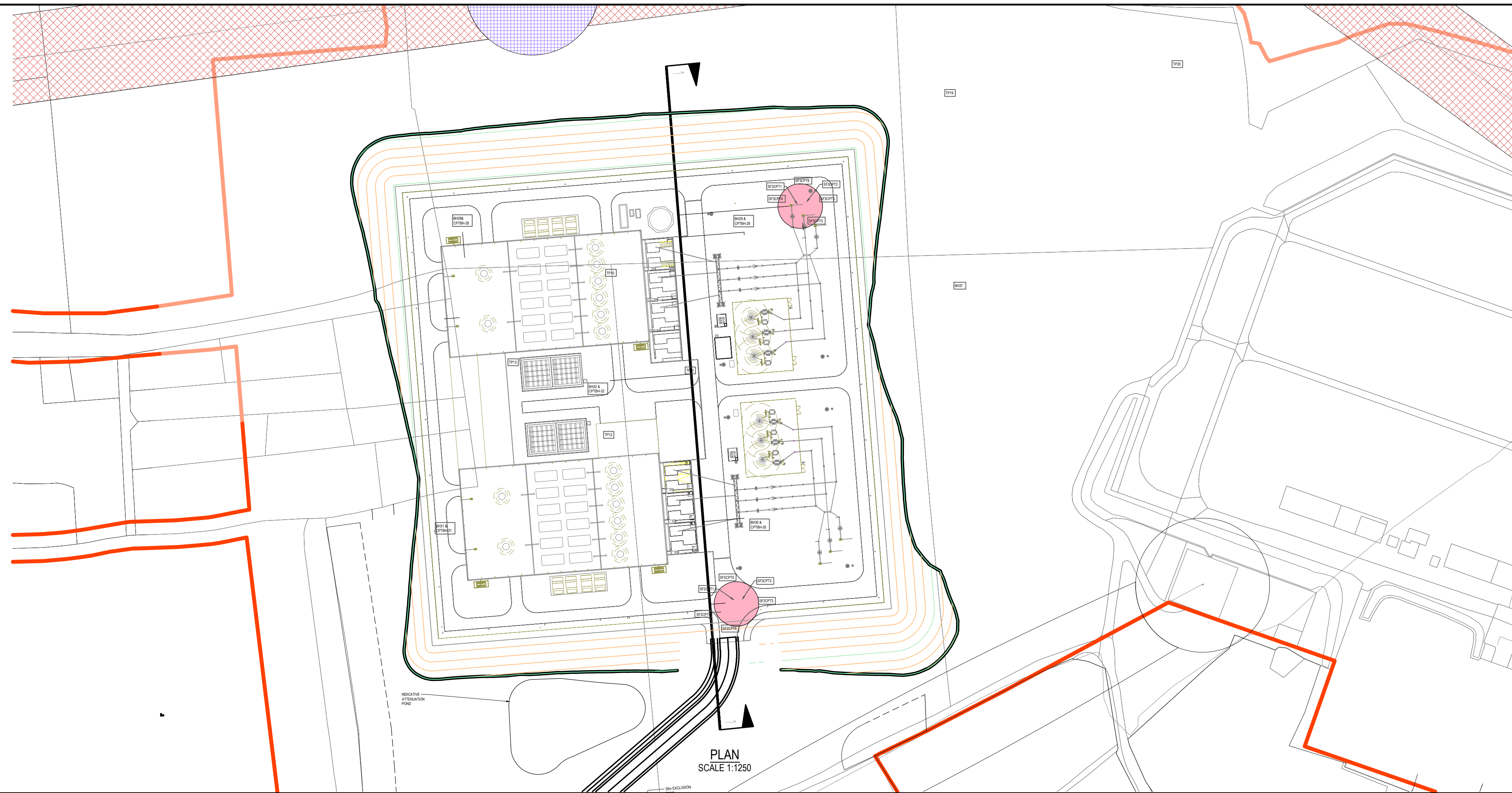
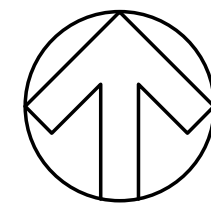
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NOTE:-
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APPENDIX B – UK CONVERTER STATION PLATFORM SECTIONS



DO NOT SCALE

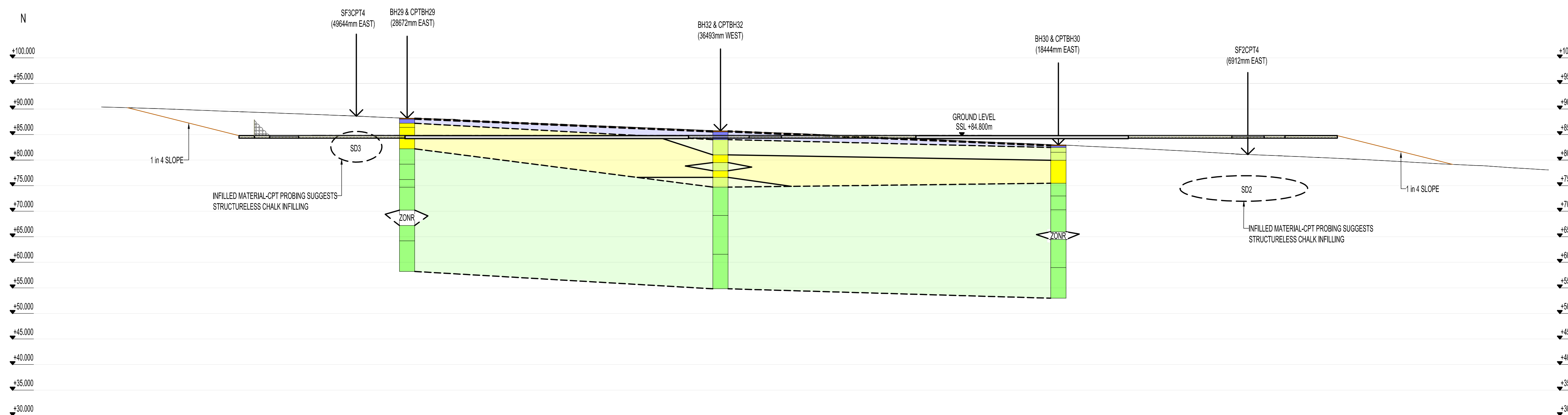
NOTES

1. GEOLOGY SHOWN BETWEEN THE BOREHOLES & BEYOND COMPLETION DEPTH IS INDICATIVE ONLY.
2. BOREHOLE DIAMETER IS NOT TO SCALE.
3. KARSTIC SOLUTION/DISSOLUTION FEATURE LOCATION IS INDICATIVE ONLY.
4. UNDERGROUND SERVICE INCLUDING DRAINAGE, HIGH-VOLTAGE AND LOW-VOLTAGE CABLE DEPTH AND LOCATION ARE TO BE CONFIRMED BY THE CONTRACTOR AT DETAILED DESIGN STAGES.
5. THE PLATFORM LEVEL IS INDICATIVE AND IS TO BE CONFIRMED BY THE CONTRACTOR AT DETAILED DESIGN STAGES.

KEY

- TOPSOIL
- HEAD DEPOSITS
- GRADE Dm
- GRADE Dc
- CHALK - GRADE A, B OR C
- ZONR ZONE OF NO RECOVERY
- SD KARSTIC SOLUTION/DISSOLUTION FEATURE
- KARSTIC FEATURE

IN PROGRESS
04.08.2020



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REV	DATE	BY	DESCRIPTION	CHK	APP

DRAWING STATUS: INFORMATION

wsp

Amber Court, William Armstrong Drive, Newcastle upon Tyne, NE4 7YQ, UK
T+ 44 (0) 191 226 2000, F+ 44 (0) 191 226 2104
wsp.com

AQUIND

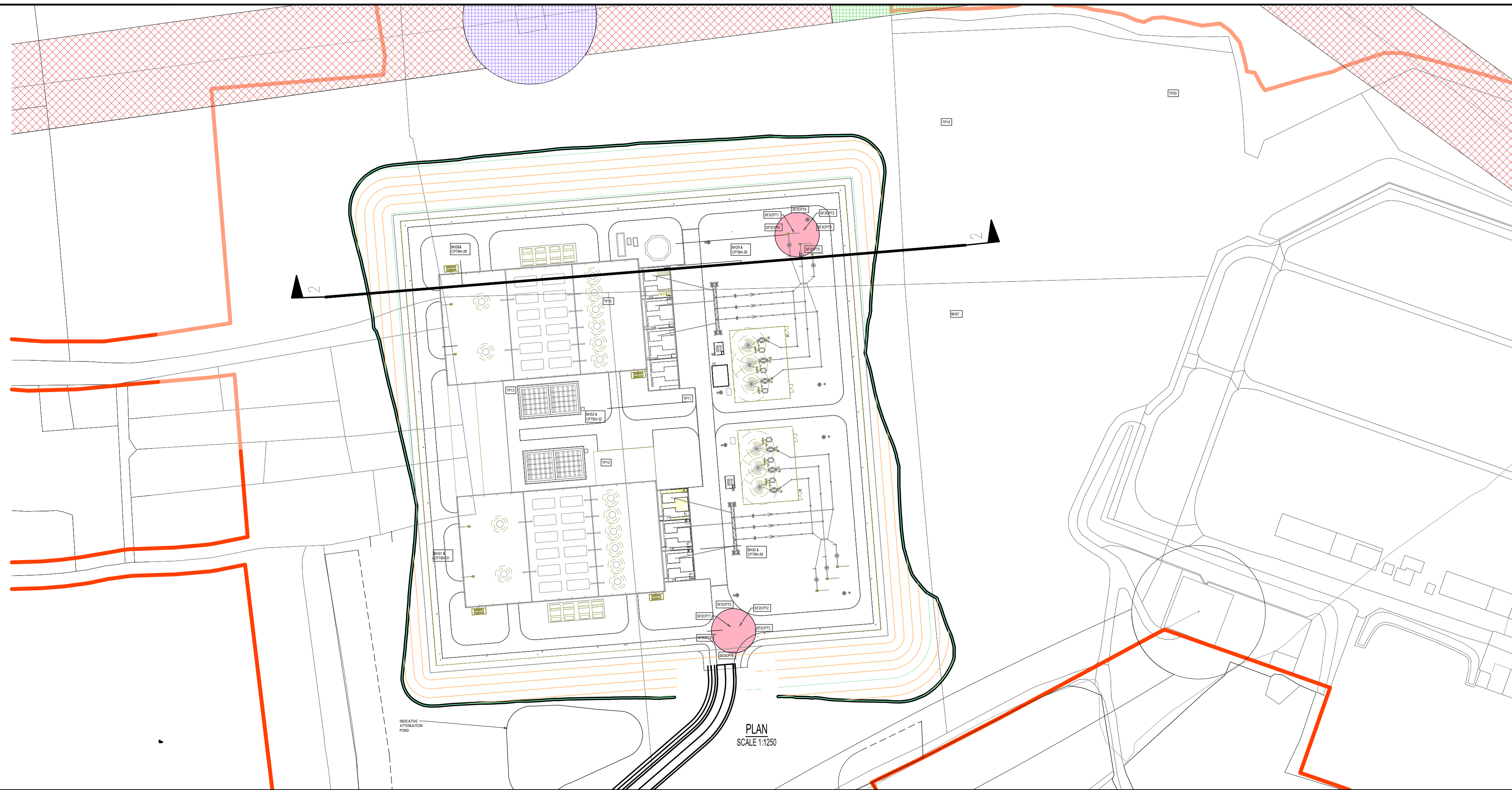
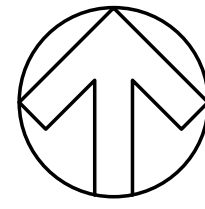
PROJECT:
**AQUIND INTERCONNECTOR
2 x 1000MW HVDC MONOPOLE
LOVEDEAN - UK**

TITLE:
**UK CONVERTER STATION PLATFORM
NORTH-SOUTH SECTION 1**

SCALE AT A1: AS SHOWN	CHECKED: HM	APPROVED: MM	
PROJECT No: 62100616	DESIGNED: JK	DRAWN: GW	DATE: AUGUST 2020

DRAWING No: AQ-ITT-UK-SEC-102	REV: P01
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NOTES

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2. BOREHOLE DIAMETER IS NOT TO SCALE.
3. KARSTIC SOLUTION/DISSOLUTION FEATURE LOCATION IS INDICATIVE ONLY.
4. UNDERGROUND SERVICE INCLUDING DRAINAGE, HIGH-VOLTAGE AND LOW-VOLTAGE CABLE DEPTH AND LOCATION ARE TO BE CONFIRMED BY THE CONTRACTOR AT DETAILED DESIGN STAGES. THE PLATFORM LEVEL IS INDICATIVE AND IS TO BE CONFIRMED BY THE CONTRACTOR AT DETAILED DESIGN STAGES.
5. THE PLATFORM LEVEL IS INDICATIVE AND IS TO BE CONFIRMED BY THE CONTRACTOR AT DETAILED DESIGN STAGES.

KEY

- TOPSOIL
- HEAD DEPOSITS
- GRADE Dm
- GRADE Dc
- CHALK - GRADE A, B OR C
- ZONR ZONE OF NO RECOVERY
- SD KARSTIC SOLUTION/DISSOLUTION FEATURE
- KARSTIC FEATURE

IN PROGRESS
04.08.2020

REV	DATE	BY	DESCRIPTION	CHK	APP
P01	04/08/2020	GW	DRAFT ISSUE	JK	-

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Amber Court, William Armstrong Drive, Newcastle upon Tyne, NE4 7YQ, UK
T+ 44 (0) 191 226 2000, F+ 44 (0) 191 226 2104
wsp.com

CLIENT:

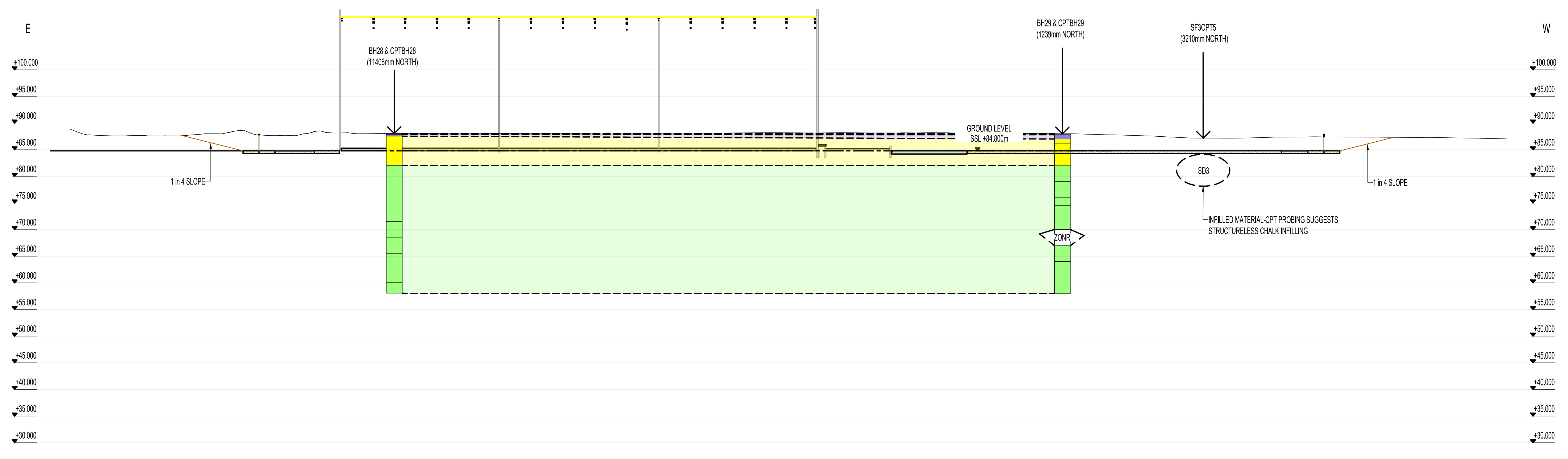
PROJECT: AQUIND INTERCONNECTOR
2 x 1000MW HVDC MONOPOLE
LOVEDEAN - UK

TITLE: UK CONVERTER STATION PLATFORM
WEST-EAST SECTION 2

SCALE AT A1:	CHECKED:	APPROVED:	
AS SHOWN	HM	MM	
PROJECT No:	DESIGNED:	DRAWN:	DATE:
62100616	JK	GW	AUGUST 2020

DRAWING No:	REV:
AQ-ITT-UK-SEC-103	P01

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APPENDIX C – UNKNOWN KARSTIC DISSOLUTION FEATURE WORKS PROCEDURE

1) SPZ1

2) HDD

UNKOWN KARST DISSOLUTION FEATURE – WORKS PROCEDURE

What to do if an unknown karst dissolution feature is detected during works in SPZ 1 – cable trenching and Converter Station.

STOP – NOTIFY – ASSESS – MITIGATE – NOTIFY – RESUME

STOP

The designated capable person⁽⁴⁾ on site orders the work to **STOP**

NOTIFY

The designated capable person on site **NOTIFIES**⁽¹⁾ the Project Manager for the works.

The Project Manager for the works **NOTIFIES**⁽¹⁾ Portsmouth Water and Environment Agency.

The designated capable person **ASSESSES** the karst dissolution feature based on the below feature grading matrix and an additional assessment of proposed overlying, nearby, land use and potential pathways as prescribed in paragraph 5.1.1.2 of the UK Source Protection Zone 1 Generic Method Statement.

ASSESS

	KARST DISSOLUTION FEATURE	ACTION REQUIRED ⁽²⁾
DESCRIPTION	Filled with material – stable (confirmed by in-situ strength test ⁽³⁾)	Verify diameter with excavator - no further action required.
	Filled with material – unstable (confirmed by in-situ shear strength test)	Verify diameter with excavator, or trial pits (if necessary). Choose suitable mitigation method depending on nature of works, e.g. geotextile covering, grouting and/or piling (if necessary).
	Open feature	Verify diameter with measuring tape. Choose suitable mitigation method depending on nature of works. E.g. avoidance of feature, grouting and/or piling (if necessary).

MITIGATE

The designated capable person (likely the watching brief - hydrogeologist or engineer) instructs the works crew to **MITIGATE** the karst dissolution feature (based on the outcome of the assessment above).

If the karst dissolution feature has been stabilised by grouting, there will be verification through a volumetric assessment to inform anticipated grouting quantities. The methodology of the volumetric assessment will be agreed between the Principal Contractor and the relevant statutory

NOTIFY

The designated capable person (likely the watching brief – hydrogeologist or engineer) **NOTIFIES**⁽¹⁾ the Project Manager for the works the outcome of the assessment and the mitigation implemented.

The Project Manager for the works **NOTIFIES**⁽¹⁾ Portsmouth Water and Environment Agency the outcome of the assessment and the mitigation implemented.

RESUME

When karst dissolution feature has been suitably assessed and/or mitigated, and Portsmouth Water and the Environment Agency have been notified, the designated responsible person (likely the watching brief – hydrogeologist or engineer) will instruct the works to **RESUME**.

Notes:

- (1) Notification contact details will be made available through the cloud based dynamic contact list document.
- (2) Any karstic feature mitigation will have an agreed methodology with the relevant statutory bodies prior to work. Notably, if grouting is required, volumetric assessments and tolerances to these should be confirmed and agreed with the RPAs prior to works commencing. If the grouting exceeds the calculated estimate tolerances relevant planning authorities will be consultation to determine an agreed solution.
- (3) The threshold undrained shear strength (Cu) or Internal Friction Angle (Phi) value will vary depending on the asset e.g. converter station component, access track, HDD or trenching. The asset dependent threshold undrained shear strength (Cu) or Internal Friction Angle (Phi) value to determine if it is stable will be included in the works method statement.
- (4) The designated capable person is considered to be a Hydrogeologist, Geotechnical Engineer, Civil Engineer or Site Manager and will be provided by the contractor.

UNKNOWN KARST DISSOLUTION FEATURE – WORKS PROCEDURE

What to do if an unknown karst dissolution feature is detected when undertaking Horizontal Directional Drilling at HDD5

STOP – NOTIFY – MITIGATE – NOTIFY – RESUME

STOP

If the drilling fluid breakout occurs, the works **STOP** immediately.

NOTIFY

The designated capable person⁽³⁾ on site **NOTIFIES**⁽¹⁾ the Project Manager for the works.

The Project Manager for the works **NOTIFIES**⁽¹⁾ Portsmouth Water and the Environment Agency.

MITIGATE

The following mitigation⁽²⁾ steps are proposed to be taken:

1. Contain the drilling fluid by constructing a bund with sandbags, see paragraph 5.4.1.6 of the UK Source Protection Zone 1 Generic Method Statement.
2. Recover the drilling fluid from the bund by using pump sets
3. Discharge the drilling fluid into the entry pit for recycling
4. Continue to monitor the area closely
5. Should it be necessary, pump lost circulation material to seal the fracture, see paragraph 5.4.1.5 of the UK Source Protection Zone 1 Generic Method Statement.

NOTIFY

When stabilisation of drilling fluid losses is established, the designated capable person⁽³⁾ on site will inform the Project Manager for the works who will then **NOTIFY**⁽¹⁾ Portsmouth Water and the Environment Agency.

RESUME

When Portsmouth Water and the Environment Agency have been notified, the designated responsible person⁽³⁾ will instruct the works to **RESUME**.

Notes:

- (1) Notification contact details will be made available through the cloud based dynamic contact list document.
- (2) Any karstic feature mitigation will have an agreed methodology with the relevant statutory bodies prior to work.
- (3) The designated capable person is considered to be a Hydrogeologist, Geotechnical Engineer, Civil Engineer or Site Manager and will be provided by the contractor.

APPENDIX D – INDICATIVE HDD MATERIAL SAFETY DATASHEETS

COSHH Risk Assessment

Product Name: Ultrabore
Product ID: Drilling Fluid Additive

	1	2	3	4	5		Severity	Likelihood
1	1	2	3	4	5		No Injury	1 Almost Never
2	2	4	6	8	10		Minor Injury	2 Seldom
3	3	6	9	12	15		>7 Day Injury	3 Possible
4	4	8	12	16	20		Major Injury	4 Probable
5	5	10	15	20	25		Death	5 Frequently
1-7 (Low) 8-12 (Medium) 13-25 (High)						Severity x Likelihood = Risk Rating		

RISK MATRIX
 The control measures are to ensure that residual risks are reduced to a minimum.
 Where controls fail to reduce from high (red zone) refer risk assessment and safety methodology to your line manager/supervisor – do **NOT** Commence task.

High **Medium** **Low**

Task & Product Use (describe activity or work process and location):
 Product used in drilling fluids to lubricate and cool the cutting tools, to remove cuttings, and to help prevent blowouts. Location: Drilling Site

Elimination
 The use of this product and task cannot be fully eliminated.

Substitution
 This product has the lowest risk factor for the task and cannot be substituted for a product deemed to be of a lesser risk.

Engineering controls
 The only engineered approach will be to ensure this product is only used outdoors, noted that a dedicated supervisor will be in place for the task.

Administrative Controls
 A safety methodology will be in place for all drilling works, this will be briefed to all operatives and nominated supervisors. Drilling works will be monitored by a competent supervisor.

Number of persons at risk: Employees (including trainees) Contractors Public (including visitors)

Classification (state the category of danger)
 No hazard pictogram Hazard Statement: Not Classified as hazardous

<input type="checkbox"/> Toxic	<input type="checkbox"/> Gas under pressure	<input type="checkbox"/> Flammable
<input type="checkbox"/> Serious health Hazard	<input type="checkbox"/> Hazardous to the environment	<input type="checkbox"/> Explosive
<input type="checkbox"/> Health hazard/ Hazardous to the ozone layer	<input type="checkbox"/> Oxidising	<input type="checkbox"/> Corrosive

Hazard Type

Gas
 Vapour
 Mist
 Fume
 Dust
 Liquid
 Solid
 Other (State) _____

Route of Exposure

Inhalation
 Skin
 Eyes
 Ingestion
 Other (State) _____

Frequency & Duration of Exposure

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Amount used: n/a How many times per day: n/a Duration: n/a

Workplace Exposure Limits (WELs) *please indicate n/a where not applicable*

Long term exposure- n/a Short-term exposure level- n/a

Health Monitoring

Health Surveillance Required? No

Monitoring process whilst COSHH is in use? No

State the Risks to Health from Identified Hazards

Ingestion- Non toxic









Eye Contact- Causes irritation due to physical abrasion by dust particles

Skin Contact- Non-toxic, may cause skin dryness and chapping

Inhalation- Long term exposure to bentonite dust in excess of the OES limit may result in fibrosis of the lung tissue. The presence of respirable crystalline silica may lead to silicosis if the MEL is persistently exceeded over a long time.

Personal Protective Equipment *(state type and standard)*

No PPE required under intended use

 <input checked="" type="checkbox"/>	Dust masks	 <input type="checkbox"/>	
Dust mask		Visor	
 <input type="checkbox"/>		 <input checked="" type="checkbox"/>	Safety goggles
Respirator		Goggles	
 <input checked="" type="checkbox"/>	Use barrier creams and rubber gloves	 <input checked="" type="checkbox"/>	Normal workwear- overalls
Gloves		Overalls	
 <input type="checkbox"/>		 <input checked="" type="checkbox"/>	Eyewash station Ensure adequate ventilation and dust control measures
Footwear		Other	

First Aid Measures

Inhalation- Remove person to fresh air, if symptoms persist seek medical attention.

Ingestion- Drink several glasses of water or milk. If large quantities are ingested seek medical attention.

Skin contact- Rinse thoroughly with cold water and seek medical attention if symptoms persist.

Eye contact- Rinse thoroughly with cold water and seek medical attention if symptoms persist

Storage

Handling - Avoid the creation of dust, and ensure adequate ventilation at the point of use.

Storage - Store in a clean, dry environment away from oxidising agents.

Disposal of Substances & Contaminated Containers

Hazardous Waste Skip Return to Depot Return to Supplier Other (If Other Please State)

Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority.

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Fire control & Spillage

Fire- Non combustible, when extinguishing fires bare in mind product becomes slippery when wet.

Spillage- Do not breathe dust, product becomes slippery when wet. Sweep up or vacuum up and dispose of as nn-toxic waste.

Is exposure adequately controlled?

Yes

No

Mixing Chemicals

Is this chemical mixed with other substances during use? Yes, water and other drilling fluid additives.

Chemical/product name	Liquid/solid	R-phrases or H-Statements	Hazardous properties of the substance if mixed or activated by another substance or process

Any Additional Advice: N/A

Risk Rating: Following Control Measures Within This Assessment

High <input type="checkbox"/>	Medium <input type="checkbox"/>	Low <input checked="" type="checkbox"/>
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Project Name:	Line Manager:
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Assessed by: Oliwia Wnek	Date: 26/11/2018
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DRAFT

**CLEAR SOLUTIONS**Performance Drilling Products
The Earth Can Trust**PRODUCT NAME:** Ultrabore®**Safety Data Sheet No:** 5002EC**1. Identification of the Substances and Details of the Company****Product Description:** Drilling Fluid Additive**Company Name and Address:**Clear Solutions International Ltd
Unit B3, Wem Industrial Estate
Soulton Road
Wem
Shropshire SY4 5SD
UK**Date Prepared:** August 2009**Issue No:** 3**Date Reviewed:** March 2016**Tel:** +44 (0) 1939 235754**Fax:** +44 (0) 1939 232399**Email:** info@drilling-products.com**2. Hazards Identification****Classification of the substance**Classification Regulation (EC) No 1272/2008: not hazardous
Classification Directive 67/548/EEC, 1999/45/EC: not classified**Label elements**

Labeling Regulation (EC) No 1272/2008: not classified

Other hazards

Not applicable

3. Composition/Information on Ingredients**Substances**

Chemical nature: Naturally occurring mineral

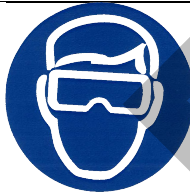
CAS No. 1302-78-9

Consists mainly of montmorillonite with < 10% accessory minerals (quartz, feldspar, mica and calcite). Respirable Crystalline Silica (<7.1µ) may be present at <1% and therefore not classified as hazardous.

4. First Aid Measures**Skin Contact:** Rinse thoroughly with cold water and seek medical attention if symptoms persist.**Eye Contact:** Rinse thoroughly with cold water and seek medical attention if symptoms persist.**Inhalation:** Remove person to fresh air, and if symptoms persist seek medical attention.**Ingestion:** Drink several glasses of water or milk. If large quantities are ingested seek medical attention.**5. Fire Fighting Measures****Non combustible** - when extinguishing fires bear in mind product becomes slippery when wet.**Clear Solutions Group of Companies**

Unit B3, Wem Industrial Estate, Soulton Road, Wem, Shropshire SY4 5SD United Kingdom

T +44 (0) 1939 235 754 F +44 (0) 1939 232 399 E info@drilling-products.com W www.drilling-products.com

PRODUCT NAME: Ultrabore®**Safety Data Sheet No:** 5002EC**6. Accidental Release Measures****Personal precautions:** Do not breathe dust – see section 8. Becomes slippery when wet.**Environmental risk:** Non-toxic.**Cleaning up:** Sweep or vacuum up and dispose of as non-toxic waste.**7. Handling and Storage****Handling:** Avoid the creation of dust, and ensure adequate ventilation at point of use. See section 8.**Storage:** Store in clean, dry environment.**8. Exposure Controls/Personal Protection****Hand Protection:** Use barrier creams and rubber gloves as required.**Skin Protection:** Normal work wear.**Respiratory Protection:** Use dust masks. Ensure adequate ventilation and dust control measures to maintain dust levels below OES* limit.*OES level (Occupational Exposure Standard): Dry bentonite is classed as a nuisance dust with an 8 hour TWA for total dust inhalation of 10mg/m³ and 5 mg/m³ for respirable dust. Quartz present in small quantities in this product has a Maximum Exposure Limit (MEL) of 0.4mg/m³ respirable dust for an 8 hour TWA period. (Respirable dust is that portion with a particle size <7.1µ).**Eye protection:** Wear safety glasses.**9. Physical and Chemical Properties**

Appearance:	Light grey to off-white powder
Odour:	Odourless
pH – 2% suspension:	7 – 9.5
S.G:	2.5
Solubility:	Forms suspension in water
Decomposition Temperature:	Not Evaluated
Flammability:	Non-flammable
Explosive properties:	None
Vapour pressure:	N/A
Flash point:	N/A
Melting point:	N/A
Boiling point:	N/A

10. Stability and Reactivity**Conditions to avoid:** Avoid generation of dust. Slippery when wet.**Materials to avoid:** Oxidising agents.**Hazardous Decomposition Products:** None.**11. Toxicological Information****Ingestion:** Orally non-toxic.

PRODUCT NAME: Ultrabore®

Safety Data Sheet No: 5002EC

Eye contact: Causes irritation due to physical abrasion by dust particles.

Eye contact: Causes irritation due to physical abrasion by dust particles.

Skin contact: Non-toxic may cause skin dryness and chapping.

Inhalation: Long term exposure to bentonite dust in excess of the OES limit may result in fibrosis of the lung tissue. The presence of respirable crystalline silica may lead to silicosis if the MEL is persistently exceeded over a long time.

12. Ecological Information

Toxicity

LC₅₀ (96hrs) Rainbow Trout: 16000 mg/l

LC₅₀ (24hrs) C. dubia and H. limbata: >500 mg/l

13. Disposal Considerations

Dispose of in accordance with local and national regulations using an approved disposal contractor.

14. Transport information

There are no specific transport precautions required as product is classified as not dangerous but product should be kept dry as it becomes slippery when wet and avoid dust creation.

15. Regulatory Information

Dangerous Substances Directive 67/548/EEC and Dangerous Preparations Directive 88/379/EEC do not apply.

Follow safety guidelines S22 – do not breathe dust and use only in well-ventilated areas.

COSHH regulations 2002 apply in the UK.

16. Other Information

Typical uses of this product are civil engineering, oil well drilling, ceramics, foundry applications, land fill barriers, bore hole sealing.

The information herein has been compiled from sources believed to be reliable and is accurate to the best of our knowledge. However, CLEAR SOLUTIONS INTERNATIONAL LTD cannot give guarantees regarding information from other sources, and expressly does not make any warranties, nor assumes any liability, for its use.



