AQUIND Limited

AQUIND INTERCONNECTOR

HDD Position Statement Note

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

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1 PROJECT – HDD – DESCRIPTION

1.1 PROJECT INTRODUCTION

This Technical Information Note (TIN) is to summarise the six trenchless crossings in the UK. It outlines standard practices in the HDD industry and specifics at the project locations.

1.1.1 Land crossings

Drill Location	Name	Method	Rig	Length	Proposed Compound Dimensions	Estimated Duration	Comments	Typical Excavations
Land Crossings								
UK-HDD-2	Allotments	HDD	Midi	4 x 420 m	861m²	12 weeks		4 entry and exit pits, 1.5m w x 1.5m l x 1.5m d
UK-HDD-3	Portsea Island to Mainland	HDD	Maxi	4 x 1480 m	4703m²	31 weeks		4 entry and exit pits, 1.5m w x 1.5m l x 1.5m d
UK-HDD-4	Railway Crossing	Micro Tunnel	TBM	2 x 90 m	2300m²	26 weeks (131days)	Network Rail Crossing - 2 drives of 90m x 1.2m OD tunnel	2 entry and 2 exit shafts
UK-HDD-5	Kings Pond	HDD	Maxi	4 x 500 m	2883m²	13 weeks		4 entry and exit pits, 1.5m w x 1.5m l x 1.5m d
UK-HDD-6	Milton Common	HDD	Midi	4 x 65m	995m²	3 weeks		4 entry and exit pits, 1.5m w x 1.5m l x 1.5m d

1.1.2 Marine Crossings

Drill Location	Name	Method	Rig	Length	Proposed Compound Dimensions	Estimated Duration	Comments	Typical Excavations
Marine Crossings								
UK-HDD-1A	UK Landfall	HDD – Drill from marine to land	Maxi	4 x 1450m	3359m²	44 weeks	Two rigs, marine environment	4 entry and exit pits, 1.5m w x 1.5m l x 1.5m d
UK-HDD-1B	UK Landfall	HDD – Drill from land to marine	Maxi	4 x 1450m	3359m²	-		4 entry and exit pits, 1.5m w x 1.5m l x 1.5m d

1.1.3 Techniques

There are a variety of trenchless techniques available to the construction of a project. The most commonly used is Horizontal Directional Drilling (HDD). Other available techniques include auger bores, micro tunnels and direct pipe. HDD is favoured as the operation can be carried out from ground level, and requires very little temporary works. Whilst the others require entry and exit pits in varying degrees of size and depth (please see table below).

COMPARISON CRITERIA	SELECTING A TRENCHLESS TECHNIQUE - SUMMARY			
Geology	Horizontal Directional Drill	Micro Tunneling	Auger Bore	Open Cut
Clay, Silt & Sand	Easy	Easy	Easy	Easy
Gravel, Boulders & Rock (<300mm)	Difficult	Easy	Medium	Medium
Hard Rock (50-100 mpa)	Easy	Easy	Medium	Difficult
Very Hard Rock (100-200 mpa)	Medium	Medium	Difficult	Difficult
Variable - soil to rock etc	Difficult	Medium	Medium	Medium
High ground water	Medium	Easy	Easy	Difficult
Low ground water	Easy	Easy	Easy	Easy
Comments	Pipe stringing area required	Drill hole is permanently supported by jacking pipes, no risk of bore collapse	Drill hole is permanently supported by product pipe, no risk of bore collapse	Can handle all geologys, rock becomes time consuming and expensive, bulking, transport,
Installation Of Product Pipe	Easy	Difficult	Easy	Easy
Comments	After pilot bore and reaming, product pipe will be directly inserted into the bore. Ensure correct coating is selected	Jacking of product steel pipes is very difficult and costly (welding, coating the field joints). Generally casing used	Product pipe inserted directly into the drill hole, coating of pipe to be appropriately selected	Traffic Management
Quality Control	Easy	Medium	Medium	Easy
Comments	Pipeline will be prepared outside of hole, easy to handle and control	Work to be completed in confines of excavation	Work to be completed in confines of excavation	Pipeline will be prepared outside of hole, easy to handle and control
Crossing Length Achievable	Easy	Easy	Easy	Unlimited (within reason)
Comments	Proven at this length	Proven at this length	Proven at this length	Limited only by cost

Frequency Of Occurences				
	6	6	5	5
	2	3	4	2
	2	1	1	3

Figure 1 Selecting a Trenchless Technique

COMPARISON CRITERIA	OUTFALL CONSTRUCTION TECHNIQUE				
Geology	Horizontal Directional Drill	Micro Tunneling	Direct Pipe	Open Cut / Onshore	Open Cut / Offshore
Clay, Silt & Sand	Easy	Easy	Easy	Easy	Easy
Gravel, Boulders & Rock (<300mm)	Difficult	Easy	Medium	Medium	Medium
Hard Rock (50-100 mpa)	Easy	Easy	Medium	Difficult	Medium
Very Hard Rock (100-200 mpa)	Medium	Medium	Difficult	Difficult	Difficult
Variable - soil to rock etc	Difficult	Medium	Medium	Medium	Medium
High ground water	Medium	Easy	Easy	Difficult	Difficult
Low ground water	Easy	Easy	Easy	Easy	Difficult
Comments		Drill hole is permanently supported by jacking pipes, no risk of bore collapse	Drill hole is permanently supported by jacking pipes, no risk of bore collapse	Can handle all geologys, rock becomes time consuming and expensive, bulking, transport,	Slow in hard geology, very good value in aluvial deposits if it is possible to keep the trench open
Installation Of Product Pipe	Easy	Difficult	Easy	Easy	Medium
Comments	After pilot bore and reaming, product pipe will be directly inserted into the bore. Ensure correct coating is selected	Jacking of product steel pipes is very difficult and costly (welding, coating the field joints). Generally casing used	Product pipe inserted directly into the drill hole	Onshore section very simple, off shore section more techical	Requires good weather
Quality Control	Easy	Medium	Easy	Easy	Easy
Comments	Pipeline will be prepared outside of hole, easy to handle and control	Work to be completed in confines of excavation	Pipeline will be prepared outside of hole, easy to handle and control	Pipeline will be prepared outside of hole, easy to handle and control	Pipeline will be prepared outside of subsea excavation, easy to handle and control
Crossing Length Achievable	Easy	Medium	Difficult	Unlimited (within reason)	Unlimited (within reason)
Comments		Limited by size of machine (see second tab)	Not proven technology at 900m,	Limited only by cost	Limited by sea bed depth

Frequency Of Occurences					
	6	5	5	5	3
	2	4	3	2	4
	2	2	2	3	3

Figure 2 Selecting a Landfall / Outfall Technique

All trenchless crossing lengths proposed in relation to the Proposed Development are readily achievable using industry standard trenchless equipment (Mini / maxi HDD rigs or micro tunnelling machines.)

Greater distances could be achieved if required, although the increased distances do not benefit the project, principally due to increased associated costs.

During hours of darkness, sites for trenchless techniques will need to be lit to enable safe working, lighting will be via tower lights and festoon lighting along site walk ways (see Appx 1 - specification for tower lights).

The lighting will be set up over the work site, however some light will inevitably escape the immediate sites.

Lighting will follow the BS EN 12464-2: 2014- Lighting of Work Places (Outdoor work places) – This guidance is important as it contains guidance for task lighting of Industrial based tasks.

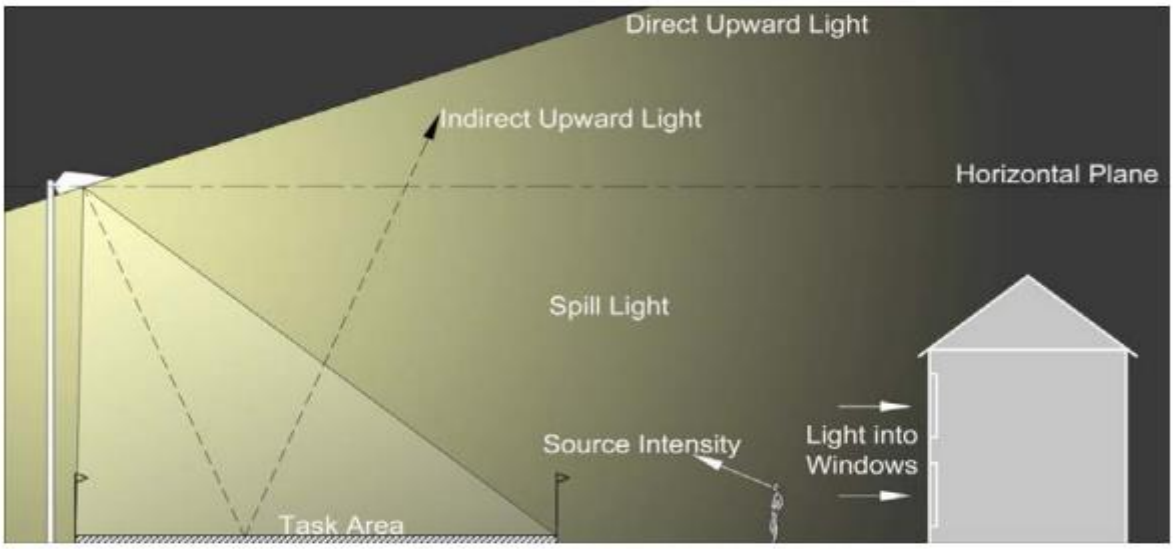


Figure 3 Light Obtrusion Characteristics

Good practice guidance documents prepared by the Construction Industry Research and Information Association (CIRIA) note that lighting on construction sites is typically required for onsite security and health and safety requirements during the night-time period and is temporary and short-term in nature.

However, it also notes that potential affects towards surrounding receptors will need to be minimised through the controlled application of lighting in accordance with current best practice standards. It is anticipated that the key potential sources of lighting during the construction phase will be the trenchless crossings if work is conducted 24hours a day.

The impact of any obtrusive light effects on the nocturnal environment will be reduced by the application of the following measures:

- Adhere to best practice measures as recommended by the Institution of Lighting Professionals (ILP), CIRIA, Health and Safety Executive (HSE) and International Commission on Illumination (CIE) guidance;
- The use of temporary works lighting will be minimised in terms of frequency and duration;
- Floodlights will be orientated away from any dwellings, as necessary;
- Use lower power security lighting where possible (to ensure minimal horizontal/vertical light spill);
- Operating during normal working hours (where 24-hour working is not required);
- The lowest powered light sources possible in the content of the operations will be specified;
- No luminaires will be allowed to emit light above the horizontal plane and will kept local to the task.;
- All lighting will be aimed to where it is required utilising and chose precision optics which keep the light where it's needed;

- Plant lighting needs to be shielded from view of neighbouring dwellings and sensitive habitats;
- Low key security lighting, where appropriate, will use movement sensor controlled or uses 'part-night' dimming;
- Use of site cabins etc. to provide shielding of the lighting from beyond the sites;
- The height of lighting columns will be minimised to what is necessary in accordance with technical and health and safety requirements;

The temporary site lighting will be restricted to meet on-site life safety and security requirements. The overall residual effect on sensitive receptors during the construction phase of the trenchless crossings is considered to be of minor adverse to negligible significance by Stockton Drilling Ltd (Note that SDL have not conducted an lighting assessment for the project, which is to be contained within the Construction Environmental Management Plan and conducted by suitably licensed and experienced persons).

2 PROJECT CONSTRAINTS – GENERIC

2.1 CONFIRMATION OF VIABLE HDD LENGTH AND DUCT DIAMETERS

In general, rigs are sized according to their available pull force and rotary torque that can be applied to the drill string and pipe string. The following are samples of rig sizes and the respective ranges of projects that can be completed (Table 4).

Figure 4 Rig Torque and Respective drill ranges

Rig Torque	Length of Drill	Diameter of Pipe
0-20,000 Nm	Up to 200 m	Up to 300mm
0 – 30,000 Nm	Up to 400 m	Up to 400mm
0 – 50,000 Nm	Up to 800 m	Up to 500mm
70,000+ Nm	Over 800 m	Up to 1500mm

It is also possible to try to categorise by the commonly available type of drilling rig, see Table 5.

Figure 5 Rig size and Respective Ranges

Rig Type	Length of Drill m	Diameter of Pipe
Mini	200 m	Up to 300mm
Midi	Up to 600 m	Up to 500mm
Maxi	Up to 2000 m	Up to 1500mm

The above list is intended as a guide only as geology and the radius of the drilled profile can increase or decrease the required drilling rig.

2.2 DRILLING FLUID SPECIFICATION

Drilling fluid is used for a number of tasks in the HDD process including:

- cooling and lubricating the drill stem, mud motor and bit
- providing hydraulic power to the mud motor which in turn converts hydraulic power to mechanical power
- carrying cuttings out of the bore hole
- stabilising the bore hole during the drilling process; and sealing fractures in the formation.

In both the marine and onshore environments, the drilling fluid comprises of bentonite as the primary base (a mined clay) which is delivered to site as a dried and finely ground powder. This is rehydrated in the mix tank with potable water. In addition to the bentonite, the drilling fluid contains carefully chosen additives to control its rheological properties. All additives for marine works shall be CEFAS (Centre for Environment, Fisheries and Aquaculture Science) rated, generally members of the starch family - made from potato peelings or walnut husks.

Drilling fluid is usually a shear thinning non-newtonian thixotropic fluid of variable viscosity. When it is under more shear, such as in the drill pipe to the bit and through the bit nozzles, viscosity is lower which reduces pumping-power requirements. When returning to the surface through the much roomier annulus it is under less shear stress and becomes more viscous, and hence able to carry the drilled cuttings. Bentonite is commonly used as an additive to control and maintain viscosity, and also has the additional benefit of forming a filter cake on the bore-hole wall, preventing fluid invasion into any surrounding rock or soil. This filter cake is built up as the solids from the drilling mud are pressed up against the bore hole wall. Bentonite is exceptionally effective in this role as it rapidly deposits a thin slick clay filter cake on the bore hole wall sealing any permeable formations and preventing any fluid ingress or drilling fluid egress from the bore.

A drilling fluid design plan will be established before the start of the project for all HDD locations. This plan should also be modified, when warranted, throughout the project to ensure the drilling fluid is fulfilling its function.

Drilling fluids will be monitored by the mud engineer who will carry out the following duties:

- Monitor all fluid properties and levels to track for losses and make additions
- Keep the fluid properties within specification -perform a full test of fluid loss, rheometer viscosity, mud weight, solids content and filter press at least 4 times per 12 hour shift, or more if there is a geology change
- A marsh funnel viscosity test should be performed every 30 minutes (If the marsh funnel viscosity is changing then the full test will be performed more frequently, whilst adapting the mix, until the drilling fluid parameters match all requirements)

The HDD contractor should install a downhole PWD – pressure while drilling sub, to monitor any downhole pressure changes, with the parameters set as part of the drilling fluid management system. Any fluid loss will trigger an immediate halt in drilling to monitor hole volume.

2.3 DRILLING FLUID DISPOSAL

Samples should be acquired of the drilling fluid/cuttings and analysed for contamination before disposal. Approvals are provided to waste carrier and disposal facility.

Drilling fluid and cuttings can be disposed of in three ways:

1. Mix and bury onsite
2. Land spread
3. Haul to an approved site or disposal facility.

It is expected that option 1 would not be acceptable due to the location, however option 2 may be preferential as bentonite is essentially a fertilizer and welcomed by farmers due to this.

Further this then follows the waste hierarchy of reuse > recycle.

2.4 HIGH LEVEL DESCRIPTION OF DIRECT PIPE/MICROTUNNELLING AND REASONS FOR ELIMINATION

Horizontal Directional Drilling (HDD) is both a cost effective solution when looking at rate/£ per metre and environmentally sensitive technique, in comparison with micro tunnelling and direct pipe. Generally HDD is explored first and then if proven unfeasible due usually to geology other trenchless or open cut options are explored.

The HDD technique is suitable for five of the six locations crossings. Unfeasible for directional drilling is Railway Crossing (UK-HDD-4) located between Farlington Playing Field and Sainsbury's car park.

Due to the relatively short length of crossing at this location, micro-tunnelling is favoured over HDD. The occurrence of beds of flint and nodular chalk could also prove problematic for HDD, resulting in difficulties with maintaining an open hole during reaming and pipe pulling operations.

Auger bore was considered as an alternative to micro-tunnelling, but the required crossing length is relatively long for this technique and the potential presence of beds of flint and nodular chalks may result in difficulties with maintaining alignment. Micro-tunnelling is therefore the preferred option at feasibility stage.

Please see below photos showing examples of pits for HDD, Direct Pipe and micro tunnel.

Figure 6 Example of HDD entry pit

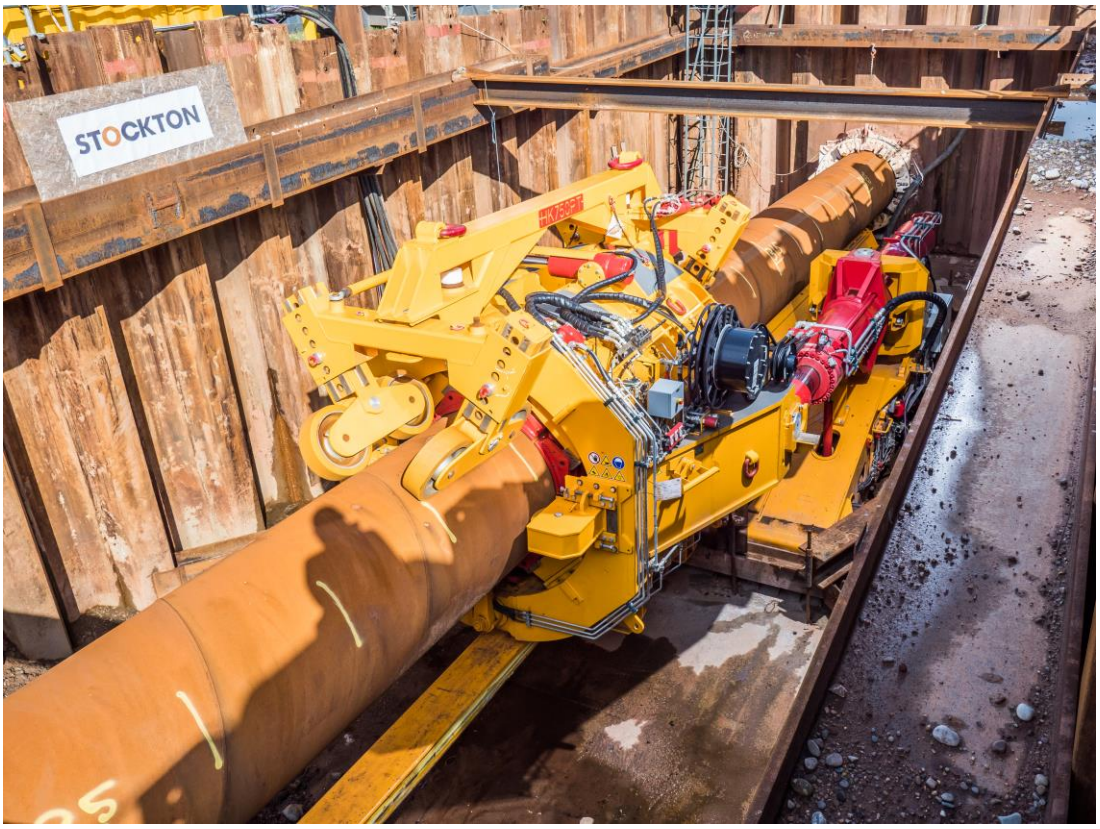


Figure 7 Example of Direct Pipe entry pit

Figure 8 Example of micro tunnel entry pit

2.5 THE SITE

The main equipment items at the onshore site locations comprising of: HDD rig, high pressure mud pump, drillers/steering engineers cabin, recycling plant, mixing plant, tool stores, COSHH stores, mud lab, welfare and storage of drillpipe and drilling consumables.

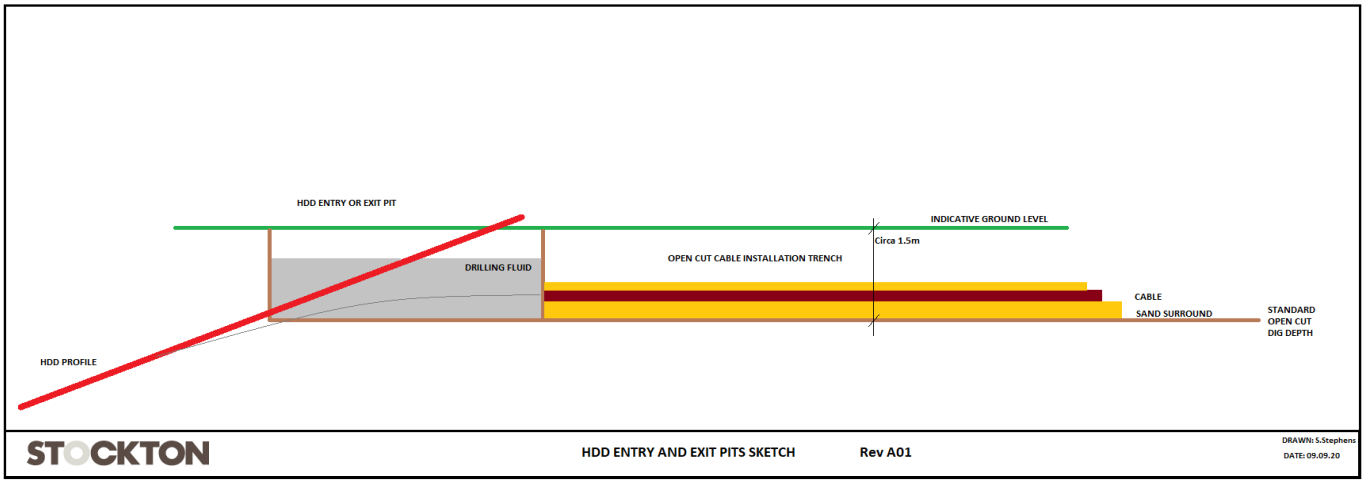
The marine operations will require in addition: jack-up barge, multicat, a safety vessel, a crew transfer vessel, and workboats to tow out the ducts, connect the end caps and provide other operational support.

Figure 9 Example of equipment positioning on site

Figure 10 Example of equipment positioning on site

Required entry pits sizes for UK crossings can be found in section 1.1.1 and 1.1.2 and on the below sketch.

Figure 11 HDD Entry & Exit Pits Sketch



2.6 DELIVERIES

Restrictions to be included within the overall Construction Traffic Management Plan for the project.

Deliveries will require the Contractor's attendance to ensure the safe offloading of materials. A delivery plan is to be in place detailing where the unloading will take place and the protection methods used. The Plan should also include the frequency of deliveries and sensitivity around the time of deliveries.

2.7 NOISE & VIBRATIONS

Noise and vibration restrictions will be detailed in the overall Construction Environmental Management Plan (CEMP) for the project.

Contractor shall prepare a written management plan for control of noise during the site operations, based on the CEMP provided by the Employer.

2.8 WORKING HOURS

The standard site working hours for HDD works shall be 07.00-19.00hrs, Monday to Friday.

This applies to all operations and personnel, including deliveries and working in site offices.

Landfall construction may require working 24/7, due to marine operations and to avoid bore collapse.

Where 7 days working and 24hour working is available it can help to minimise the following risks:

- Reduced programme
- No start / stop of machinery
- Drilling / tunnelling fluids always moving
- Reduces risk of hole collapse

2.9 PARKING

Provision of parking for site personnel and visitors is the responsibility of HDD Contractor. The Site Compound shall be made at a sufficient size to accommodate the vehicles attending the site in accordance with the Subcontractor's Traffic Management Plan.

3 SPECIFIC REQUIREMENTS – HDDS

3.1 UK-HDD-1

The UK coastal landfall is proposed at Eastney, on the south coast of Portsea Island, Portsmouth (Figures 12 and 13). Options for this landing include drilling from marine to land, designated as UK-HDD-1A; or drilling from land to marine, designated UK-HDD-1B.

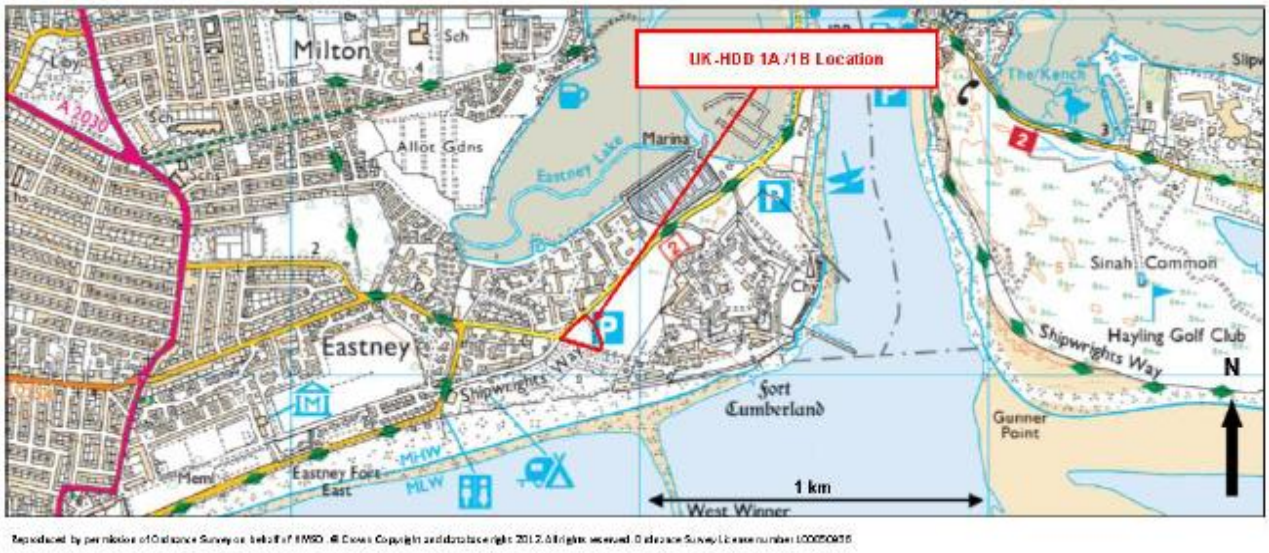


Figure 12 UK-HDD-1A/1B compound location

The primary factor in determining which of these options is the favoured option to progress is driven primarily by the offshore ground conditions at the offshore entry / exit point, with a requirement for steel casing if there is a significant thickness of soft alluvial deposits. This would necessitate drilling from offshore to onshore (UK-HDD-1A Figure 13). Both options are presented as part of the Feasibility Study.

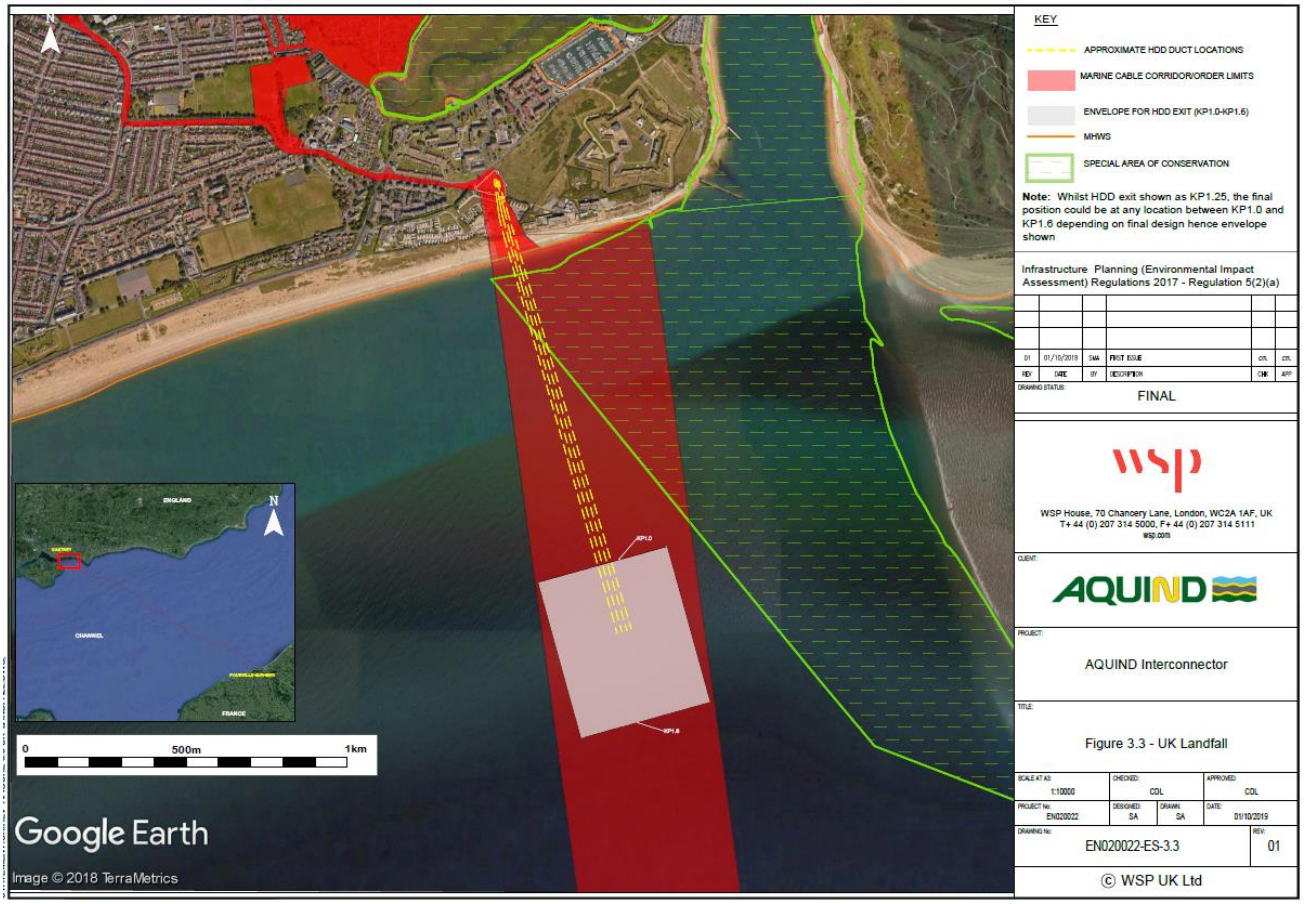


Figure 13UK-HDD-1A Work Area location

The particular constraint for the UK-HDD-1A and UK-HDD-1B is the alignment of the Eastney to Budd Farm Tunnel, a Southern Water rising main with a 1.4m diameter. The tunnel crosses the car park area and then turns southwards into the Solent Strait. Therefore, the alignment of the HDD bores will cross under the rising main within the carpark area. At this time the invert level is not confirmed, but has been assumed to be at a maximum depth of 5m bgl (bgl-below ground level). Based on a 12° entry angle, and assuming an invert level of 5m bgl for the rising main, the proposed HDD alignment will lie 2m below the assumed invert of the main at 7m bgl.

The depth of the main must be confirmed prior to final design and construction and it is critical that the invert level of the rising main is accurately established as part of design development, and that design is progressed in consultation with Southern Water. The potential impact of the HDD on the rising main will require to be assessed, and may require the repositioning of the proposed entry points within the constraints of the entry compound.

3.2 UK-HDD-2

The entry point for UK-HDD-2 will be positioned within the car park of the Thatched Public House which is located northeast of the Allotments. The alignment of the HDD bores will be from the northeast to the southwest. Both the Entry and Exit Pit locations are indicated on Figure 14.

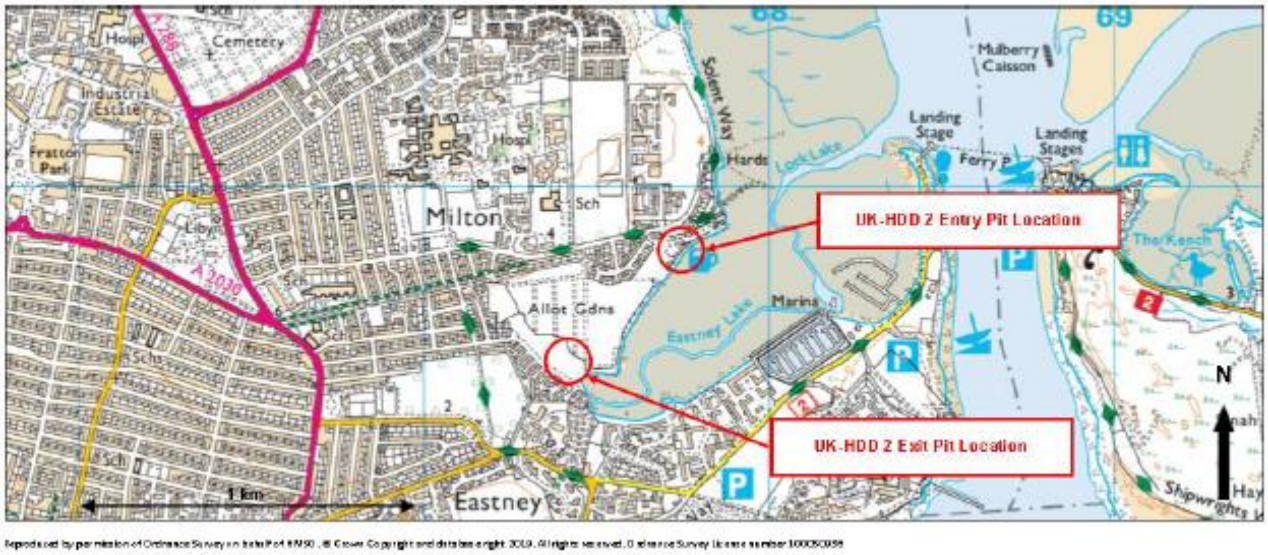


Figure 14 UK-HDD-2 Location at the Allotments

The particular constraint for the UK-HDD-2 is the alignment of the Eastney to Budd Farm Tunnel, a Southern Water rising main with a 1.4m diameter, which crosses above the proposed alignment. At the time the invert level has not been confirmed, but has been assumed to be at a maximum of 5m bgl.

Based on the assumed invert level for the main of 5m bgl, the proposed HDD alignment will lie 2m below at 7m bgl. In the event that the water main is shallower, additional cover between the HDD and the water main will be afforded. In the event that it is deeper, the vertical alignment can be reviewed to pass above the water main. This should be confirmed as part of detailed design.

3.3 UK-HDD-3

The UK-HDD-3 Entry point will be positioned at a car park at Kendalls Wharf. The alignment of the HDD bores will be from the southwest to the northeast, crossing below the Broom Channel with the Exit Pit located within a playing field north of the A27. The Entry and Exit Pit locations are indicated on Figure 15.

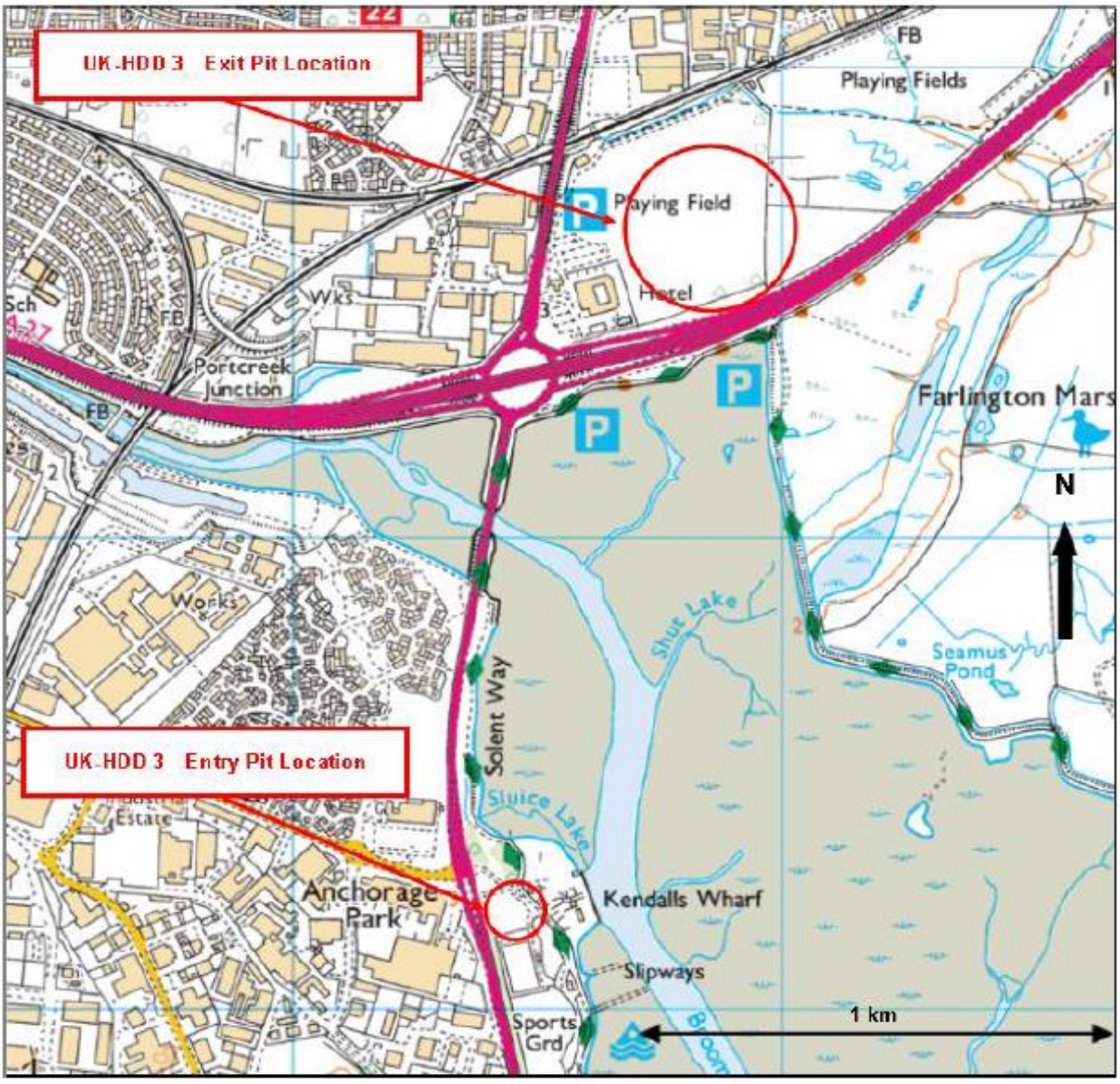


Figure 15 UK-HDD-3 Location at Portsea Island to Mainland

UK-HDD-3 bore path was chosen to avoid the piled foundations associated with a flyover / bridge on the A27. However, the extent of the A27 embankment piles are to be confirmed. If present a horizontal turn to the HDD bore path may be required, but would not impact on the proposed exit or entry locations. If horizontal turn required it needs to consider the Order Limits and the TCE Lease limits.

Vegetation and trees located on the entry area (at the boundary with the A2030) will likely have to be removed to provide sufficient space for HDD compound and Car Park.

An additional constraint is the presence of bats at Farlington Playing Fields (exit site). Due to required 10m buffer around the fields edge, compounds for HDD works will be set back from the edge of the playing fields to avoid effects on bats commuting routes. Please see Figure 16.

Figure 16 Farlington Playing Fields 10m Perimeter Buffer

3.4 UK-HDD-4

Due to the relatively short length of crossing at this location, micro-tunnelling is favoured over HDD. The occurrence of beds of flint and nodular chalk could also prove problematic for HDD, resulting in difficulties with maintaining an open hole during reaming and pipe pulling operations.

The UK-HDD-4 Launch Pit will be positioned within a playing field south of the Brighton to Southampton railway and east of A2030 Eastern Road. The Reception Pit will be located within the southern extents of Sainsbury's car park and east of A2030 Eastern Road. The alignment of the bores will be from the southeast to the northwest, crossing will be done at approximately 90° following confirmation of the engineering solution. The Launch and Reception Pit locations are indicated on Figure 17.

Figure 17 UK-HDD-4 Location Railway Crossing

As the Reception Pit is required to be positioned at the southern boundary of Sainsbury's car park, this has subsequently controlled the location of the Launch Pit in the Playing Field south of the Railway Line. The HDD operations compound has been placed east of the Pavilion.

The works will require approval from Network Rail.

3.5 UK-HDD-5

UK-HDD-5 will be positioned at Denmead, where the cable route crosses below the environmentally sensitive area referred to as Kings Pond. The UK-HDD-5 entry and exit positions are located approximately 500m apart, with the preferred Entry Pit in the south located off Hambledon Road (B2150) and the Exit Pit in the north located south west at Anmore (see Figure 18)

Figure 18 UK-HDD-5 Location at Kings Pond

The chalk bedrock in this area is an aquifer and water extracted is used as a source for drinking water. Consequently, HDD works will not be allowed to create a pathway between the overburden and underlying Chalk aquifer. The HDD will therefore be required to be entirely located within the overburden, and targets clays within the Lambeth Group.

As the rockhead level rises to the north, with overburden thickness reducing, UK-HDD-5 is proposed to be completed between Soake and Anmore only. A longer HDD terminating north of Anmore, in the vicinity of Shafters Farm, was considered but discounted due to the significant shallowing-up of the chalk to the north of Anmore. This creates a high risk of puncturing the chalk aquifer, which deemed to not be an acceptable environmental risk.

3.6 UK-HDD-6

UK-HDD-6 will be positioned at Milton Common where the cable route crosses below the existing Sea Path Defence. The UK-HDD-6 entry and exit positions are located approximately 50m apart, with the Entry Pit in the north located off Eastern Road (A2030), with the Exit Pit in the south located north west of the Frog Lake (see Figure 19).

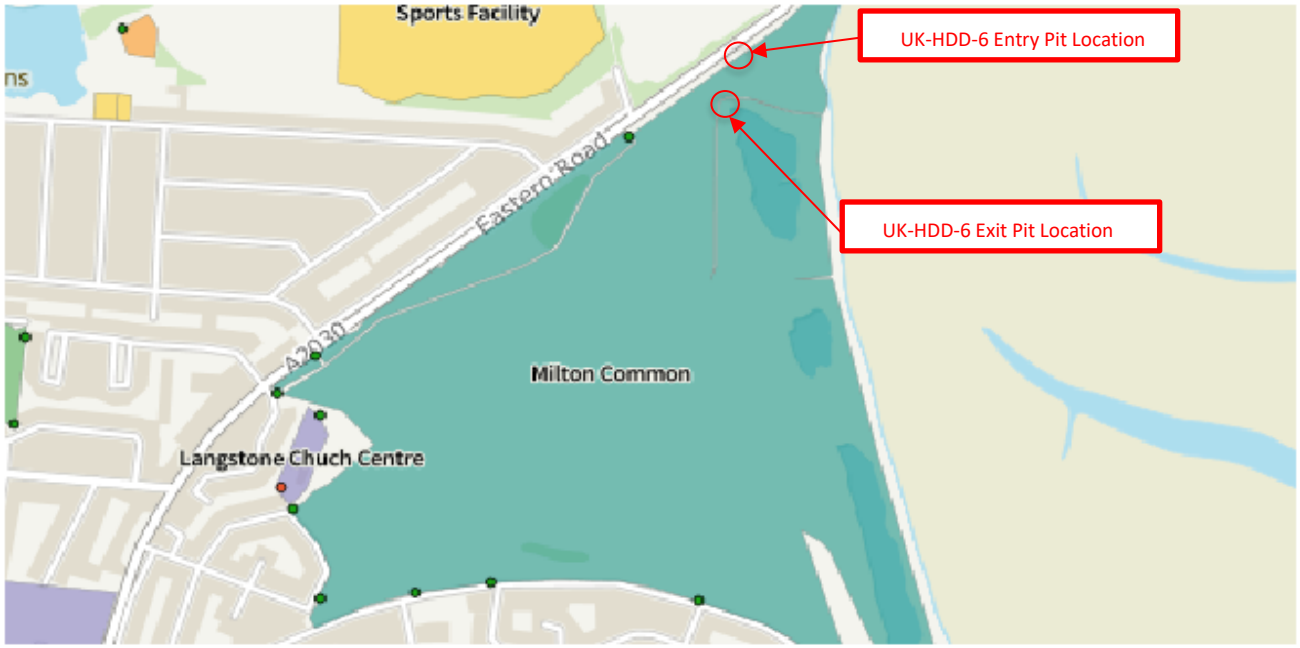


Figure 19 UK-HDD-6 Location at Milton Common

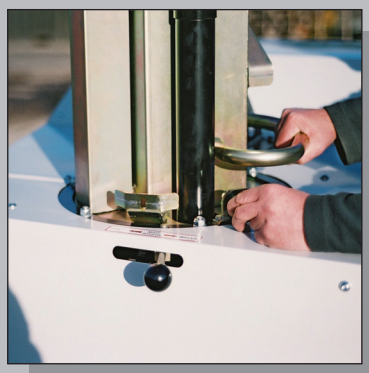
Ground conditions based on results from exploratory bore holes undertaken as a part of ground investigation survey. Additional ground investigation will be required to confirm ground conditions at alignment position during detailed design stage.

Risk of bentonite breakout possible at final stages of bore hence exit pit requires suitable mitigations.

APPENDIX 1 – LIGHTING TOWER SPECIFICATION

APPENDIX 2 – HDD COMPOUND LOCATIONS

TL-90 MOBILE LIGHTING TOWER



360˚ Mast rotation.

Increased access for routine inspection and maintenance.

THE ULTIMATE LIGHTING TOWER

PERFECT FOR RENTAL

NETWORK RAIL APPROVED

Features

- 9m† vertical action hydraulic mast height
- 360˚ mast rotation
- Fully automated mast erection in only 12 seconds
- 4 x 1000W Metal Halide lamps
- Noise level 60dB[A] approx @ 7 metres, 85 LwA
- 130 litre tank, 85 hour-run
- Bio-degradable oil in hydraulic system
- Engine fluids bunded 120%
- Mast deployment alarm and safety system - release park brake and mast descends automatically
- Road lights and reflectors fitted as standard
- Fork pockets & single lift eye
- Easy access fuel fill & sight gauge facility
- Emergency stop

Options

- Powertilt lamps
- 110 volt sockets CTE
- Wind down prop stands
- Auto-run timer module

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Ultra Compact - Saves on Delivery Costs.

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TL-90 LIGHTING TOWER

Engine (Diesel)	Kubota D905-BG, 3cyl water cooled, 7.4kWm @ 1500rpm
Oil Sump Capacity	5.1 Litres
Hydraulic System	Bio-degradable oil
Engine Emergency Stop System	12v Solenoid. Energised To Run
Fuel Pump	12v Electric
Fuel Tank Capacity	130 Litres
Fuel Consumption	2.25 l/hr (at Continuous rating)
Maximum Run Time (4 Lamps Only)	85 Hours
Starting Battery / Alternator Amps	70Ah-V 12volts / 30Amps 12volts
Alternator	Mecce Alte LT3 110 4 Pole, 230v, 50Hz
Continuous Power / Standby Power	5 kW / 5.5 kW
Power Outlet Sockets	2 x 16 Amp, 230v
Mast – Maximum Height (Metres)	9010mm†, Zinc Plated
Number of Sections	9
Mast Rotation	360°
Mast Raise / Lower Time	12 / 18 secs.
Mast Actuation	Hydraulic - 185bar 12v Power Pack
Lamp Specification	4x 1000W 230v Metal Halide
Bunding	120% Engine Liquids & Fuel Tank
Tyres	185/70R 13
Dimensions Transport Mode (LxWxH)	2500 x 1320 x 2100mm
Dimensions Fully Deployed (LxWxH)	2690 x 2630 x 9010mm
Weight Fully Fuelled / Unfuelled	1050kg / 933kg
Noise Level @ 7 Metres	60dB[A] approx.
Sound Power Level LwA	85 dB[A]
Enclosure Protection	IP 23
Stabilisers	4
Road Lights and Reflectors	Standard
Electric PowerTilt Lamp Control	Optional Feature (12v)
Autorun	Optional Feature
115v Power Outlet Sockets	Optional Feature

† *When fitted with PowerTilt™ option. Standard Height 8740mm*

Your SMC distributor is:

SMC has a policy of continuous improvement and therefore reserve the right to change the specification without prior notice.

www.smclightandpower.com

Tel: +44 (0)1775 840020 Fax: +44 (0)1775 843063 Email: info@smclightandpower.com

N

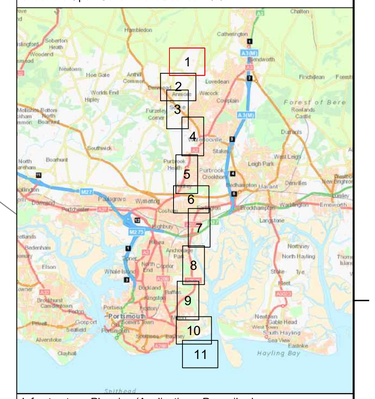
AQUIND Interconnector

Legend:

Order Limits

50 0 50 100 150 200m

ORIGINAL SCALE 1:2500



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01	10/09/2020	SA	FIRST ISSUE	HB	IR

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CLIENT:

PROJECT:

AQUIND Interconnector

TITLE:

HDD Compound Locations
Sheet 1 of 11

SCALE AT A1:	CHECKED:		APPROVED:
1:2500	HB		IR
PROJECT No:	DESIGNED:	DRAWN:	DATE:
EN020022	HB	SA	10-09-2020

DRAWING No: EN020022-7.8.1.X-WQ-SHEET1 REV: 01

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CONTINUED ON SHEET 1

CONTINUED ON SHEET 1

CONTINUED ON SHEET 3

CONTINUED ON SHEET 3

HDD 5- RECEPTION

AQUIND Interconnector

Legend:

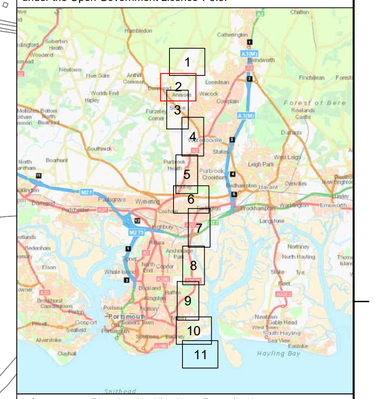
Order Limits

HDD COMPOUND

Indicative HDD Bore Path

50 0 50 100 150 200m

ORIGINAL SCALE 1:2500



Infrastructure Planning (Applications: Prescribed Forms & Procedure) Regulations 2009 - Regulation 5(2)(j)

REV	DATE	BY	DESCRIPTION	CHK	APP
IR					
01	10/09/2020	SA	FIRST ISSUE	HB	LF

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CLIENT: AQUIND

PROJECT: AQUIND Interconnector

TITLE: HDD Compound Layout Sheet 2 of 11

SCALE AT A1:	CHECKED:		APPROVED:
1:2500	HB		IR
PROJECT No: EN020022	DESIGNED: HB	DRAWN: SA	DATE: 10/09/2010

DRAWING No: EN020022-7.8.1.X-WQ-SHEET2 REV: 01

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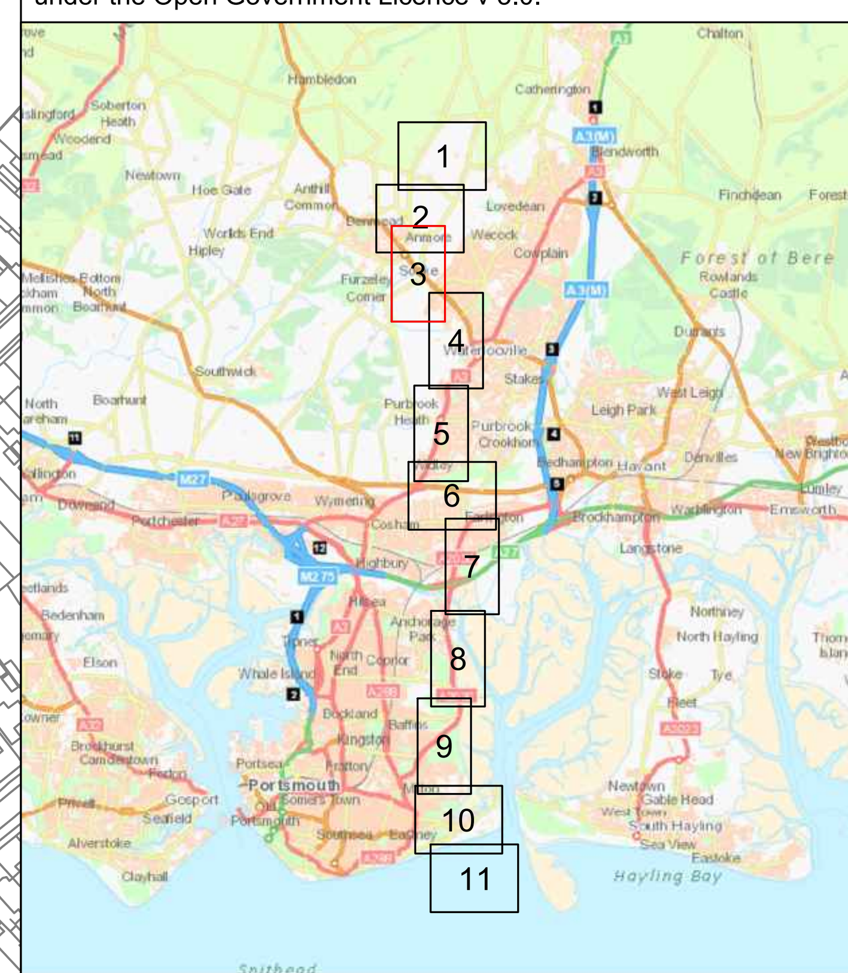
AQUIND Interconnector

Legend:

- Order Limits
- HDD COMPOUND
- Indicative HDD Bore Path

50 0 50 100 150 200m

ORIGINAL SCALE 1:2500



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CLIENT:

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PROJECT:

AQUIND Interconnector

TITLE:

HDD Compound Locations
Sheet 3 of 11

SCALE AT A1: 1:2500	CHECKED: HB	APPROVED: IR
PROJECT No: EN020022	DESIGNED: HB / DRAWN: SA	DATE: 10/09/2020

DRAWING No: EN020022-7.8.1.X-WQ-SHEET3 REV: 01

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CONTINUED ON SHEET 3

CONTINUED ON SHEET 5

CONTINUED ON SHEET 5

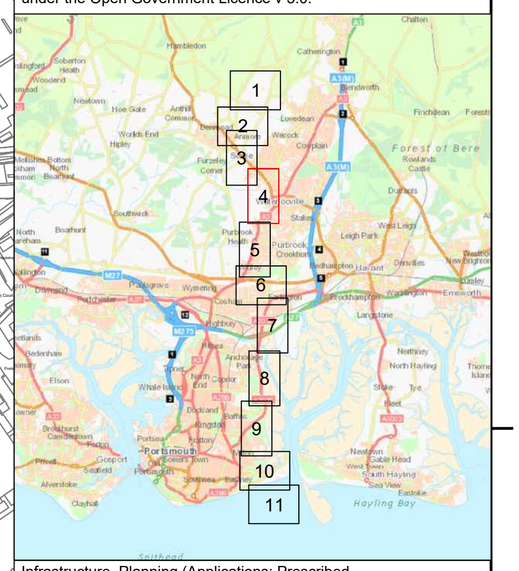
AQUIND Interconnector

Legend:

Order Limits

50 0 50 100 150 200m

ORIGINAL SCALE 1:2500



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PROJECT: AQUIND Interconnector

TITLE: HDD Compound Locations
Sheet 4 of 11

SCALE AT A1:	CHECKED:		APPROVED:
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PROJECT No:	DESIGNED:	DRAWN:	DATE:
EN020022	HB	SA	10/09/2020

DRAWING No: EN020022-7.8.1.X-WQ-SHEET4 REV: 01

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CONTINUED ON SHEET 4

CONTINUED ON SHEET 4

CONTINUED ON SHEET 6

CONTINUED ON SHEET 6

AQUIND Interconnector

Legend:

Order Limits

50 0 50 100 150 200m

ORIGINAL SCALE 1:2500

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01	10/09/2020	SA	FIRST ISSUE	HB	IR

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PROJECT: AQUIND Interconnector

TITLE: HDD Compound Locations Sheet 5 of 11

SCALE AT A1:	CHECKED:	APPROVED:
1:2500	HB	IR

PROJECT No:	DESIGNED:	DRAWN:	DATE:
EN020022	HB	SA	10/09/2020

DRAWING No: EN020022-7.8.1.X-WQ-SHEET5 REV: 01

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CONTINUED ON SHEET 5

Ports Down

Ports Down

Ports Down

Peter Ashley Activity Centre

Filtration Works and Reservoirs

CONTINUED ON SHEET 7

CONTINUED ON SHEET 7

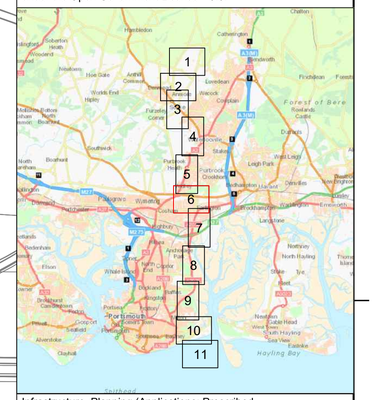
AQUIND Interconnector

Legend:

Order Limits

50 0 50 100 150 200m

ORIGINAL SCALE 1:2500



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PROJECT: AQUIND Interconnector

TITLE: HDD Compound Locations Sheet 6 of 11

SCALE AT A1:	CHECKED:	APPROVED:
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PROJECT No:	DESIGNED:	DRAWN:	DATE:
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DRAWING No: EN020022-7.8.1.X-WQ-SHEET6 REV: 01

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AQUIND Interconnector

Legend:

- Order Limits
- HDD COMPOUND
- Indicative HDD Bore Path

CONTINUED ON SHEET 6

CONTINUED ON SHEET 6

HDD 4- NETWORK RAILWAY
INDICATIVE HDD BORE PATH

HDD 4-RECEPTION

HDD 4- LAUNCH

HDD 3- RECEPTION

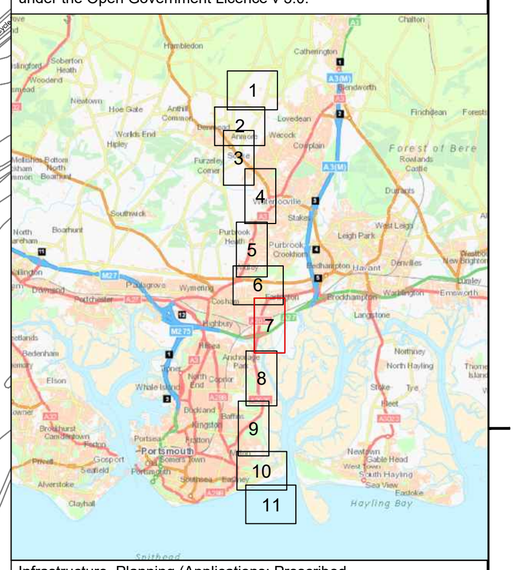
HDD 3- PORTSEA ISLAND
INDICATIVE HDD BORE PATH

CONTINUED ON SHEET 8

CONTINUED ON SHEET 8

50 0 50 100 150 200m

ORIGINAL SCALE 1:2500



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01	10/09/2020	SA	FIRST ISSUE	HB	IR

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PROJECT: AQUIND Interconnector

TITLE: HDD Compound Locations Sheet 7 of 11

SCALE AT A1:	CHECKED:		APPROVED:
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PROJECT No: EN020022	DESIGNED: HB	DRAWN: SA	DATE: 10/09/2020

DRAWING No: EN020022-7.8.1.X-WQ-SHEET7 REV: 01

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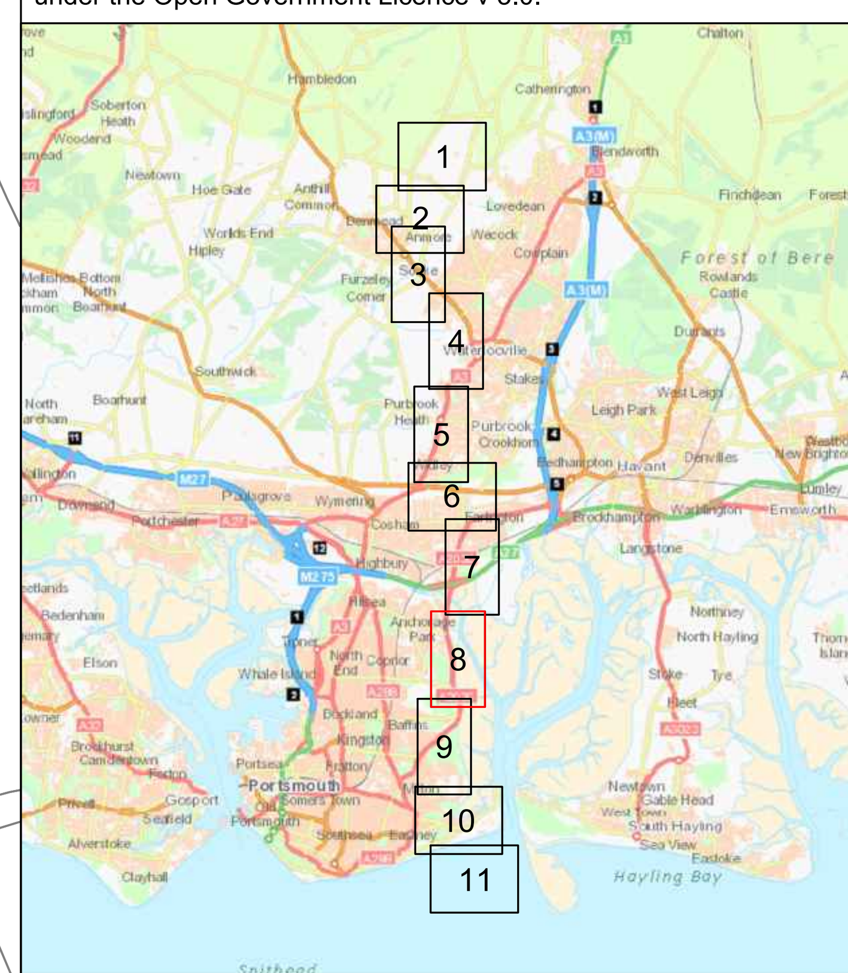
AQUIND Interconnector

Legend:

- Order Limits
- HDD COMPOUND
- Indicative HDD Bore Path
- CABLE STORAGE & MATERIAL COMPOUND

50 0 50 100 150 200m

ORIGINAL SCALE 1:2500



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PROJECT: AQUIND Interconnector

TITLE: HDD Compound Locations Sheet 8 of 11

SCALE AT A1:	CHECKED:		APPROVED:
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PROJECT No:	DESIGNED:	DRAWN:	DATE:
EN020022	HB	SA	10/09/2020

DRAWING No: EN020022-7.8.1.X-WQ-SHEET8 REV: 01

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CONTINUED ON SHEET 8

Pond

Golf Driving Range

Great Salterns Recreation Ground
(Playing Field)

Great Salterns Lake

Mud and Shingle

Outfall

Gas
Distribution Sta

MHW

Shingle

Shingle

Sports Facility

Portsmouth College

Bowling Green

Stagg Woods

TANGIER ROAD

EASTERN ROAD

Shingle

Shingle

Shingle

Langstone Harbour

HDD 6- LAUNCH

HDD-6 MILTON COMMON
INDICATIVE HDD BORE PATH

HDD 6- RECEPTION

FS

The Peoples Memorial

Frog Lake

Milton Common

Duck Lake

Swan Lake

Pond

MOORINGS WAY

CONTINUED ON SHEET 10

CONTINUED ON SHEET 10

St James
Hospital

University of Portsmouth
Langstone Student Village

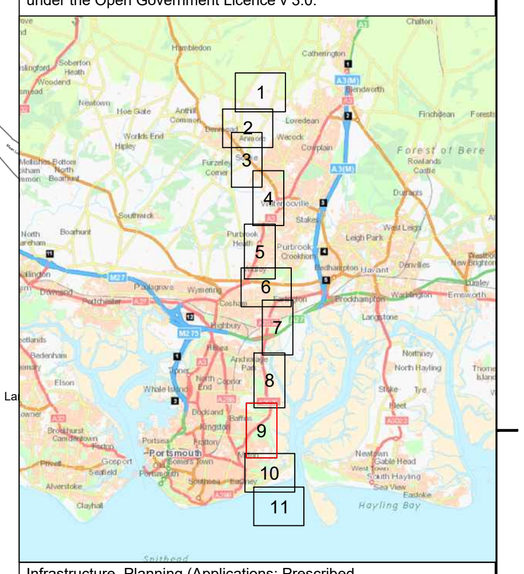
AQUIND Interconnector

Legend:

- Order Limits
- HDD COMPOUND
- Indicative HDD Bore Path

50 0 50 100 150 200m

ORIGINAL SCALE 1:2500



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PROJECT: AQUIND Interconnector

TITLE: HDD Compound Locations
Sheet 9 of 11

SCALE AT A1:	CHECKED:	APPROVED:
1:2500	HB	IR

PROJECT No:	DESIGNED:	DRAWN:	DATE:
EN020022	HB	SA	10/09/2020

DRAWING No: EN020022-7.8.1.X-WQ-SHEET9 REV: 01

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CONTINUED ON SHEET 9

CONTINUED ON SHEET 9

HDD 2 - LAUNCH

HDD-2 ALLOTMENTS
INDICATIVE HDD BORE PATH

HDD 2- RECEPTION

HDD 1- RECEPTION/ LAUNCH

HDD-1 LANDFALL
INDICATIVE HDD BORE PATH

CABLE CONSTRUCTION COMPOUND

CONTINUED ON SHEET 11

CONTINUED ON SHEET 11

St James Hospital

University of Portsmouth
Langstone Student Village

Mud

Langstone Harbour

Shingle

Sand and Shingle

Lock Lake

Fort Cumberland

Cockleshell Community Sports Club

Mean High Water

Mean Low Water

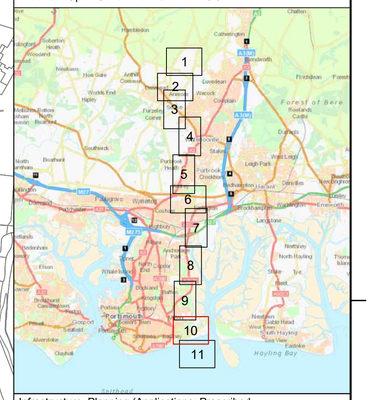
50 0 50 100 150 200m

ORIGINAL SCALE 1:2500

AQUIND Interconnector

Legend:

- Order Limits
- HDD COMPOUND
- Indicative HDD Bore Path
- CABLE STORAGE & MATERIAL COMPOUND



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CLIENT: AQUIND

PROJECT: AQUIND Interconnector

TITLE: HDD Compound Locations Sheet 10 of 11

SCALE AT A1:	CHECKED:		APPROVED:
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PROJECT No:	DESIGNED:	DRAWN:	DATE:
EN020022	HB	SA	10/09/2020

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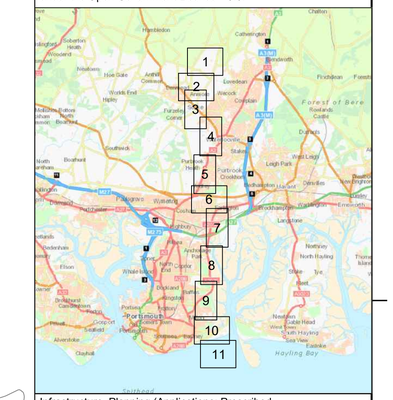
AQUIND Interconnector

Legend:

- Order Limits
- APPROXIMATE HDD DUCT LOCATIONS
- HDD-1A WORK AREA



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REV	DATE	BY	DESCRIPTION	CHK	APP
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CLIENT: AQUIND

PROJECT: AQUIND Interconnector

TITLE: HDD Compound Locations Sheet 11 of 11

SCALE AT A1:	CHECKED:		APPROVED:
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PROJECT No: EN020022	DESIGNED: HB	DRAWN: SA	DATE: 10/09/2020

DRAWING No: EN020022-7.8.1.X-WQ-SHEET11 REV: 01

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