

Network Rail

**Portway Station Park & Ride
GRIP 2**

Feasibility Report

REP/203/14

Draft 3 | 13 March 2015

Draft

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 239240-00

Ove Arup & Partners Ltd
63 St Thomas Street
Bristol BS1 6JZ
United Kingdom
www.arup.com

ARUP

Document Verification

ARUP

Job title		Portway Station Park & Ride GRIP 2		Job number	
				239240-00	
Document title		Feasibility Report		File reference	
Document ref		REP/203/14			
Revision	Date	Filename	Feasibility Report D1.docx		
Draft 1	10 Dec 2014	Description	First draft		
			Prepared by	Checked by	Approved by
		Name	Rory Deuchar	Chris Woodman	Phil Harrison
		Signature			
Draft 2	3 Mar 2015	Filename	Feasibility Report D2.docx		
		Description	Second draft		
			Prepared by	Checked by	Approved by
		Name	Rory Deuchar	Chris Woodman	Phil Harrison
		Signature			
Draft 3	13 Mar 2015	Filename	Feasibility Report D3.docx		
		Description	Third draft for NR comment		
			Prepared by	Checked by	Approved by
		Name	Rory Deuchar	Chris Woodman	Phil Harrison
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
Issue Document Verification with Document					
<input checked="" type="checkbox"/>					

Contents

	Page	
1	Executive Summary	1
2	Introduction	1
3	Business Objective	2
4	Business Case	2
5	Project Scope and Requirements	3
6	Condition of Existing Infrastructure	4
	6.1 Track	5
	6.2 Civils	7
	6.3 Signalling	10
	6.4 Level Crossing	11
7	Operations (including Timetable Studies)	12
8	Options Considered	13
	8.1 Options	13
	8.2 Track	17
	8.3 Signalling	19
	8.4 Civils	23
	8.5 Telecoms	33
	8.6 Mechanical & Electrical	36
	8.7 Electrification and Plant	39
	8.8 Station	41
	8.9 Level Crossing	42
9	Environmental Considerations	45
	9.1 Sustainability	45
	9.2 Ecology	46
10	Risks and Opportunities	47
	10.1 Risks	47
	10.2 Opportunities	47
11	Maintenance Strategy & Requirements	48
	11.1 Current situation	48
	11.2 Proposed situation	48

12	Constructability	49
13	Consents and Land Issues	50
13.1	Land Ownership	50
13.2	Consents	50
14	Other Project Interfaces	51
15	Actions for following GRIP stages	51
16	Conclusions and Recommendations	51

Appendices

Appendix A

Site Photographs

Appendix B

Geotechnical and Geo-environmental Desk Study

Appendix C

Signalling Sketches

Appendix D

Drawings

Appendix E

Level Crossing Assessment

Appendix F

Sustainability Appraisal

Appendix G

Matrix

Appendix H

CDM & CSM Hazard Log

1 Executive Summary

2 Introduction

This commission with Network Rail is for the GRIP 2 study to assess options for Bristol City Council's aspiration for a new platform plus associated station facilities at Portway Park and Ride, Bristol, approximately 500m to the north west of Shirehampton Station on the Severn Beach branch line (ELR: CNX).

This will serve the existing local authority operated Park & Ride (P&R) site on the A4 Portway near junction 18 of the M5 and M49 motorways. The station has been an aspiration of Bristol City Council (BCC) since the P&R site opened (in 2000). It will provide P&R users with an alternative mode of transport to the existing bus service. There are also a number of stations, such as Clifton Down and those within the inner north Bristol, which are not served by the bus service and the City's parking strategy proposes changes to create residential parking areas, which will further reduce the ability to park around the city.



Figure 1 – Aerial Image (Google Maps, 2015)

3 Business Objective

The proposed Station will;

- provide alternative transport for car users entering the centre of Bristol;
- reduce road congestion, airborne pollution and car parking demand in inner Bristol, particularly at peak times;
- provide improved connectivity through an additional station and rail service at the Portway Park & Ride site near Avonmouth;
- improve connectivity to other stations in north and inner Bristol and the Temple Quarter Enterprise Zone at Temple Meads;
- complement the existing bus based Park & Ride service which primarily serves the city centre;
- provide direct connections to the wider rail network via Bristol Temple Meads;
- aim to be deliverable in 2016;
- meet the required BCR set for CP5 projects;
- deliver the required capacity for passenger services;
- be capable of interface with other projects;
- identify Safety by Design opportunities.

4 Business Case

The Network Rail Economic Appraisal Team will be responsible for a business case appraisal. This feasibility report will provide information to enable the appraisal to take place.

5 Project Scope and Requirements

The project scope is detailed in the Project Requirements Specification (Ref: OP 140671 Version 1.1) and includes the following summarised key requirements:

The proposed station is to meet the following requirements:

- The station shall have sufficient passenger capacity to meet the forecast usage demands of the P&R facility
- The station shall be a safe environment for its users (as is reasonably practicable) without the presence of on-site staff
- Provision of sufficient lighting in all public accessible places
- Provision of CCTV coverage with no ‘blind spots’
- The station shall allow all users of the P&R facility to safely board stopping trains (i.e. must be Equality Act compliant)
- Station should be designed in accordance with “Accessible Train Station Design for Disabled People: A Code of Practice”
- The station shall allow for 5 carriage sets
- The platform length shall be sufficient for 4-car DMU (c105m)
- The scheme shall allow passive provision for 5-car length
- The station shall provide customers with train service status updates – this may be a ‘Help Point’ facility as provided at Clifton Downs station
- The scheme shall be BREEAM ‘Excellent’
- The station shall have a basic shelter
- The station shall be as close to Avonmouth dock Level Crossing as possible
- The station shall be accessed at grade to the car park
- The station shall have minimal impact for signalling system alterations
- The scheme shall be a minimum cost initiative

6 Condition of Existing Infrastructure

For each of the key rail engineering disciplines, we have generally considered the existing infrastructure between the outer limits of Shirehampton Station and the Avonmouth Dock Level Crossing. Note that this section does not report on the existing M&E, Station Comms equipment or infrastructure as none are currently present on site.

Sources of information used for the following summary of condition include:

- 5-mile diagrams
- Quail maps
- Google maps and other internet sources
- Sectional appendix
- Hazard directory
- Network Rail LiDAR survey
- Additional LiDAR survey
- Engineering Site Visits
- Ecology Surveys
- Published environmental information (EA, 2015);
- Published geological mapping (British Geological Survey, 2015);
- Buried Services Information provided by Network Rail
- Network Rail Scheme Review Presentation
- Portway Park & Ride: Proposed Platform Transport Statement undertaken by Halcrow Group Ltd (Halcrow Group Ltd, 2013)
- A GroundSure EnviroInsight and MapInsight report (GroundSure Ltd, 2014);
- A previous desk study of the site undertaken for Bristol City Council by Halcrow Group Ltd (Halcrow Group Ltd, 2013);
- Part of a previous Station Platform report by Tata (Tata, 2012)
- Ecology Report undertaken by Wessex Ecological Consultancy (Wessex Ecological Consultancy, 2013)
- Car park construction drawings from Bristol City Council

In addition, the Arup design team and Network Rail staff attended site on 15 January 2015 to assess the existing infrastructure and to consider the impact of the proposed new station. Refer to Appendix A for relevant photographs from the site visit.

6.1 Track

6.1.1 Track Configuration & Alignment

The existing track between the existing Shirehampton Station (7m 50ch) and Avonmouth Dock Level Crossing (8m 29ch) is a bi-directional non-electrified single track, known as the Severn Beach Single.

The track (ELR: CNX) generally follows the River Avon as it continues to Severn Beach, and in this particular section is orientated from south east (Shirehampton) to north west (Avonmouth).

To the immediate north of the aforementioned Level Crossing, the track splits (via 101 points) into two tracks – the Up Main and Down Main – to form a passing loop.

The existing line speed between 7m 52ch and 8m 29ch is 30/50.

The track alignment is straight between 7m 75ch and 8m 10ch with zero cant. Between 8m 10ch and 8m 29ch, at Avonmouth Dock Level Crossing, the track follows a right hand curve of c. 800m radius in the direction of increasing mileage, with approximately 50mm of cant. Between 7m 50ch (Shirehampton Station) and 7m 75ch, the track follows a right hand curve of c. 600m radius in the direction of increasing mileage, with approximately 50mm of cant. This would suggest that the optimal location of a new station would be on the straight track between 7m 75ch and 8m 10ch, a length of 300m.

6.1.2 Track Componentry and Condition

The track through the length of the potential station locations is generally NR56 E1 rail (56kg per metre length) on steel sleepers. The rails appear to have been manufactured in 2006, and due to the current light use and speed of the section of route, the condition is considered to be fair.

No significant side-wear, headloss or cracking of rails was identified during visual inspections. The sleepers were generally solid under foot with no noticeable voiding or missing clips.

No wetbeds were identified during visual inspections.

6.1.3 Lineside Equipment

Existing track furniture and physical assets were identified on site and are outlined in the table 1 below, and shown on civil engineering drawings CX-001 to CX-005 in Appendix D. Please note that this list should not be considered as exhaustive, and further checks will be required at subsequent GRIP stages.

The equipment denoted as being in the Up cess is unlikely to be affected by the proposed station platform. Any equipment identified in the Down cess may be affected by the proposed platform, depending on the chosen position.

Table 1 – Lineside Equipment

Asset	Mileage	Up/Down/4ft	Main Discipline
Signal SA3R	7m23ch	Up cess	Signalling
Speed Board (30/50)	7m42ch	Down Cess	Signalling
Speed Board (30/35)	7m42ch	Up Cess	Signalling
Speed Board (30/50)	7m53ch	Up Cess	Signalling
Speed Board (30/35)	7m54ch	Down Cess	Signalling
Location cabinet	7m72.5ch	Up cess	Signalling
AWS	7m75.5ch	4ft	Signalling
Dis Box	7m75.5ch	Up cess	Signalling
Cable Joint	7m77ch	Up cess	Multi-disciplinary
Cable Joint	7m79ch	Up cess	Multi-disciplinary
Lineside cabinet	8m00ch	Up cess	Telecoms
8 mile marker post	8m00ch	Down cess	Civils
Historic concrete signal base	8m1.75ch	Up cess	Civils
Location cabinet F11	8m02ch	Up cess	Signalling
Lineside telephone	8m04.25ch	Up cess	Telecoms
Location cabinet F11B	8m04.25ch	Up cess	Signalling
Orange pipes	8m04.25ch	Up/Down/4ft	Signalling
TPWS	8m04.25ch	4ft	Signalling
Signal SA3	8m04.5ch	Up cess	Signalling
Loose cables	8m05ch	Up/Down/4ft	Signalling
IBJ - 6 Hole	8m05ch	4ft	Track/Signalling
HP Gas Main Marker	8m13ch	Down cess / Car park	Civils
IBJ - 6 Hole	8m18.25ch	4ft	Track/Signalling
Loose cables	8m18.25ch	Up/Down/4ft	Signalling
Location cabinet F12	8m018.25ch	Up cess	Signalling
Concrete chippings bin	8m24.75ch	Up cess	Civils
2 No. oil pipeline markers	8m25.75ch	Up cess	Civils
Power cabinet	8m25.75ch	Up cess	E&P
Adjustment switch	8m25.75ch	4ft	Track
Speed board (30/40)	8m26ch	Up cess	Signalling
Level Crossing REB	8m26.75ch	Up cess	Multi-disciplinary
Lighting column	8m26.75ch	Up cess	E&P
CCTV column	8m26.75ch	Up cess	Telecoms
Power cabinet	8m26.75ch	Up cess	E&P
Orange Pipes	8m26.75ch	Up/Down/4ft	E&P/Signalling
UTX	8m26.75ch	Up/Down/4ft	E&P/Signalling
Power cabinets	8m26.75ch	Down	E&P/Signalling

Asset	Mileage	Up/Down/4ft	Main Discipline
LC Operator's Hut	8m26.75ch	Down	Civils
Avonmouth Dock LC	8m27ch	Up/Down/4ft	Multi-disciplinary
101 Points	8m28ch	4ft	Track / Signalling
Speed board (30/40)	8m35.5ch	Dn cess	Signalling
Signal SA8	8m40ch	Dn cess	Signalling
Signal SA6 (Avonmouth Stn)	9m00ch	Dn Platform	Signalling

6.2 Civils

6.2.1 Cable Route

There is a UTX located at 8m26.75ch, the low mileage side of the level crossing, from which a cable troughing route runs in the up cess (opposite the car park and proposed platform locations) towards Shirehampton Station. Visual inspections were carried out on the 15th January 2015, and the troughing appears to be in fair condition with approximately 30 – 40% available capacity.

6.2.2 Buried Services

Initial buried service returns were provided to Arup by Network Rail on 19 November 2014 and further information on 21 November 2014 and 11 December 2014. The information was used to produce a digitised CAD model showing approximate locations of known buried services across the site. The following outlines these buried services, please also refer to drawing CU-001.

- A Bristol Water mains supply which runs in the Portway (A4) footpath crosses through the main car park away from the proposed platform locations and into the commercial properties south east of the level crossing.
- From Wales and West drawings, low pressure (LP) gas mains have been identified to run along the Portway (A4) and to cross the CNX line at Station Road near Shirehampton Station. There are no LP gas mains identified in the proximity of the proposed platform locations.
- From Wales and West drawings, a high pressure (HP) gas main has been identified to run through the car park and the commercial properties south east of the level crossing into the down cess at approximately 8m25ch. The HP gas main appears to run along the down cess within Network Rail property boundary to approximately 8m17ch where it diverts back into the car park before again changing direction and cross over the CNX line at approximately 8m12ch. A HP gas main marker post was identified during site visits confirming the presence of this buried service.
- Western Power low voltage (LV) and high voltage (HV) buried cables have been identified to run in and along the Portway (A4). LV cables enter to car park at various points presumed to service the commercial properties and the car park lighting. An HV cable enters the main car park from the Portway (A4) before splitting in two directions, running through the commercial properties south east of the level crossing and crossing the CNX line at approximately 8m20ch and 8m24ch.

- HV overhead lines have been identified to cross the CNX line at approximately 8m36ch which is sufficiently distant from the car park to not affect any proposed works.
- BT communications cables have been identified to run within the Portway (A4) and down West Town Road which crosses the CNX line at Avoumouth Dock LC. A cable has also been identified to run along the up cess from the level crossing to approximately 8m23ch before changing direction away from the track towards the River Avon.
- A Wessex Water foul sewer runs through the car park roughly parallel to the railway with an approximate offset of 10m and 15m from the railway boundary fence. At approximately 8m15ch the sewer alignment shifts to follow the boundary between the car park and the commercial buildings south east of the level crossing before crossing West Town Road. Associated foul sewer pipes cross through the commercial properties and subsequently cross the CNX line at approximately 8m24ch. A foul sewer network connected to the main sewer mentioned above has been identified in the bus stop/turn around area which appears to act as a combined sewer.
- A Wessex Water storm sewer enters the car park from West Town Road and runs along the boundary fence between the car park and the commercial properties south east of the level crossing, ending at the south eastern end of the fence line.

Note that this information is dated December 2013, so it is recommended that a new buried services application is made and up to date information is used for later GRIP stages.

6.2.3 Topography

Ground levels at the site appear to be relatively constant along the line of the railway with an approximate range between 10m AOD at the western extent (8m17ch) of the proposed development site and rising to 11m AOD at the eastern extent (7m78ch) which is approximately 600m away.

Along the boundary with the railway the park & ride car park levels at the western extent of the proposed platform locations (8m17ch) are at c.10m AOD and approximately at grade with the track levels. The car park levels rise to approximately 13m AOD (8m09ch) before falling again to a level of c.10m AOD 8m02ch.

The difference in levels between the elevated park and ride site and the proposed platform location is retained by a timber crib retaining wall. Visual inspection of the timber on the 15th January 2015 wall was limited due to thick vegetation at the base, however the parts that were observed appear to be in fair condition. There is an approximate 3m width of vegetated land between the base of the crib wall and a palisade fence which is presumed to be the land ownership boundary.

The palisade fence runs along the railway for the full length of the car park and beyond. Between approximately 8m14ch and 8m17ch the carpark and railway is separated by the palisade fencing and a trief kerb. At approximately 8m14ch the kerb line, which runs adjacent to the palisade fence, steps out into the car park allowing for an area of planted vegetation approximately 6m wide and 30m long. The timber crib wall construction begins at the low mileage end of this planted area

and continues to approximately 8m²ch. The car park is separated from the crib wall by a kerbed footpath, a trief kerb and a green fence.

The car park levels generally fall from the boundary with the Portway (A4) toward the railway.

6.2.4 Geology

A Geotechnical and Geo-environmental Desk Study was carried out by Arup which is provided in Appendix B and summarised below.

Previous ground investigations undertaken on the neighbouring park and ride site have indicated that the weathered mantle of the Mercia Mudstone Group is located relatively close to the surface (0.0 to 0.7 m bgl). In addition, drawings of the crib wall construction indicate that shallow strip foundations were potentially utilised. Photographs of the crib wall construction also suggest that strip footings were adopted. The location of the crib wall toe is relatively close to the proposed locations of the platform, and therefore shallow depth foundations may be an option for the proposed platform. However, the available BGS mapping for the site indicates that the location of the proposed platform is close to the boundary between the Mercia Mudstone Group and the overlying tidal flat deposits increasing the possibility that the site will be underlain by a thickness of softer lower strength soils. Depending on their thickness, strength and stiffness characteristics, these softer tidal flat deposits may preclude the use of shallow foundations and a deeper foundation option may be required. Suitable intrusive ground investigation will be required to confirm the localised soil strengths and thicknesses on site once the design of the platform has been developed. It is recommended that a piled foundation is assumed for the purposes of the business case appraisal, as this will provide a more robust price.

The site is not in an area believed to be affected by underground mining. In general a negligible to low risk of ground instability is recorded for the site, however, a moderate risk is listed for compressible deposits and running sand.

The potential for contamination to be present on site has been identified to be low. It is considered that the majority of potentially contaminative processes are located at Avonmouth Docks and are therefore too distal from the site to have impacted on it.

The results of the Preliminary Risk Assessment indicate that for potential site users the risks are considered to be low. The risk to construction workers and maintenance workers are considered to be moderate to low and should be confirmed during a suitable site investigation. However, there are some higher risk areas which should be investigated further at later GRIP stages –

- The likelihood of aggressive ground conditions for concrete.
- Ground or landfill gas migration into confined spaces has been deemed to be high and requires assessment.
- The risk to the groundwater and surface waters in the vicinity of the site.
- Groundwater at the site is likely to be relatively shallow and will therefore need management during deeper excavations.

6.2.5 Access

Vehicular access and egress to the car park is made from West Town Road which leads from a traffic light operated junction on the Portway (A4). Bus access and egress to the pick-up / drop-off point is via a traffic light operated junction and bus lane on the Portway (A4). Pedestrian access is possible from both of the above.

Pedestrian access to the railway is obtainable from Avonmouth Dock Level Crossing at 8m29ch and Shirehampton Station at 7m50ch as listed in the Hazard Directory.

6.2.6 Drainage

There is no obvious sign of track drainage along this section of route. It is assumed that rain water is allowed to run-off into the cess on both sides and permeate into the ground. The car park surfacing appears to be largely permeable, with drainage gullies present at the bottom of the car park adjacent to the boundary with the railway. It is possible that car park gullies drain into the foul water sewer which runs through the car park 10 – 15m from the boundary with the railway as identified from the buried services returns.

6.2.7 Flooding

The site does not lie in a Source Protection Zone, no groundwater abstraction licenses are listed in the vicinity of the site. The site is not within a Floodplain, however the land immediately to the south and south west of the Severn Beach Branch line is within a Zone 2 and Zone 3 floodplain, a flood risk assessment is recommended. The superficial deposits on site are listed by the British Geological Survey as being susceptible to potential groundwater flooding at the surface.

6.3 Signalling

The current signalling infrastructure includes the following assets:

Table 2 – Signalling assets

Asset	Mileage	Up/Down/4ft	Main Discipline
Signal SA3R	7m23ch	Up cess	Signalling
Speed Board (30/50)	7m42ch	Down Cess	Signalling
Speed Board (30/35)	7m42ch	Up Cess	Signalling
Speed Board (30/50)	7m53ch	Up Cess	Signalling
Speed Board (30/35)	7m54ch	Down Cess	Signalling
Location cabinet	7m72.5ch	Up cess	Signalling
AWS	7m75.5ch	4ft	Signalling
Dis Box	7m75.5ch	Up cess	Signalling
Location cabinet F11	8m02ch	Up cess	Signalling
Location cabinet F11B	8m04.25ch	Up cess	Signalling
Orange pipes	8m04.25ch	Up/Down/4ft	Signalling

Asset	Mileage	Up/Down/4ft	Main Discipline
TPWS	8m04.25ch	4ft	Signalling
Signal SA3	8m04.5ch	Up cess	Signalling
Loose cables	8m05ch	Up/Down/4ft	Signalling
IBJ - 6 Hole	8m05ch	4ft	Track/Signalling
IBJ - 6 Hole	8m18.25ch	4ft	Track/Signalling
Loose cables	8m18.25ch	Up/Down/4ft	Signalling
Location cabinet F12	8m18.25ch	Up cess	Signalling
Speed board (30/40)	8m26ch	Up cess	Signalling
Level Crossing REB	8m27ch	Up cess	Multi-disciplinary
Avonmouth Dock LC	8m27ch	Up/Down/4ft	Multi-disciplinary
101 Points	8m28ch	4ft	Track / Signalling
Speed board (30/40)	8m35.5ch	Dn cess	Signalling
Signal SA8	8m40ch	Dn cess	Signalling
Signal SA6 (Avonmouth Stn)	9m00ch	Dn Platform	Signalling

6.4 Level Crossing

The level crossing potentially affected by the proposed new station is the existing Avonmouth Dock Level Crossing at 8m 29ch (to the north west of the proposed platform locations). The level crossing is an MCB-CCTV type currently, controlled from St Andrews Road Junction Signal Box.

There are no known proposals to alter or upgrade the level crossing.

It is understood that the level crossing is protected by an advance signal on Avonmouth station platform for trains heading to Bristol and the signal SA3 at 8m 05ch for trains heading towards Severn Beach.

7 Operations (including Timetable Studies)

Arup have not been commissioned to provide any timetabling input to this GRIP2 Study. It is understood that previous timetabling work has been undertaken, reference is to be made to these reports for details.

To allow the impact of the new station to be understood indicatively, Arup have carried out a short exercise to assess the existing time-table, using available data in RailSys (timetabling software). The following summarises the results of this short exercise, and would require further assessment in greater detail at subsequent GRIP stages. Using Platform location Option D (worst case scenario for operations) the running time for a Class 150 train changes as per the indicative table below:. The current timetable allows 3 minutes (180 seconds) in both directions between Avonmouth and Shirehampton.

Table 8 – Avonmouth to Shirehampton

From	To	Current (without Portway Station)	Future (with Portway Station stop)
Avonmouth	Portway	114 seconds (non-stop)	126 seconds
Portway	Shirehampton	45 seconds (non-stop)	74 seconds
Sub-total		156 seconds	200 seconds
Portway Station Dwell Time		N/A	30 seconds
Total		156 seconds	230 seconds

Table 9 –Shirehampton to Avonmouth

From	To	Current (without Portway Station)	Future (with Portway Station stop)
Shirehampton	Portway	57 seconds	68 seconds
Portway	Avonmouth	89 seconds	120 seconds
Sub-total		146 seconds	188 seconds
Portway Station Dwell Time		N/A	30 seconds
Total		146 seconds	218 seconds

The RailSys output suggests that the addition of Portway Station will lead to an increase to the section running time (as shown in tables above). In addition, 30 seconds would need to be included for station dwell time at Portway Station. Therefore, it is expected that the current journey time would be increased by 1 minute in both directions.

The morning peak service frequency is currently (December 2014 timetable) approximately half-hourly from Avonmouth to Bristol Temple Meads, with some trains continuing to Severn Beach, and vice versa. The rolling stock turnaround time at the terminating station varies from approximately 8 to 20 minutes at Avonmouth and Severn Beach.

Typically, it would be expected that the minimum turnaround for would be around 4 or 5 minutes, so it should be possible to accommodate the change as a result of Portway Station in the current timetable. There may be a performance implication as a result of the reduced turnaround times, and additional timetabling / modelling / assessment should be carried out to verify this at subsequent GRIP stages.

8 Options Considered

This GRIP 2 Feasibility Report has considered four location options which are described more fully in Section 8.1 below.

For each location, we have considered the impacts and risks for each of the key engineering disciplines:

- Track
- Civils (including car parking and platform drainage)
- Signalling
- Telecoms (lineside and station)
- Electrification and Plant (non-station)
- Mechanical & Electrical (station equipment)
- Level Crossing

The main differentiator between options will be signalling and track and it is these engineering disciplines which are likely to have the largest impact on project cost, risk and feasibility. Although in principle the Civil Engineering, Telecoms, E&P and M&E will not differ substantially between each option, these are still commented on for all options.

In Appendix G, we provide a table of the four options to show a summary of the engineering and non-engineering feasibility considerations.

8.1 Options

Four locations for a new station platform in the Up cess have been outlined for consideration. These are illustrated in the figures below, and are described thus:

- Option A – New platform located as close to the car park entrance as possible between mileages 8m11ch and 8m17ch, this option is on curved track and is closest to Avonmouth Dock Level Crossing.
- Option B – New platform located almost central to the car park between mileages 8m06ch and 8m12ch, this option is on straight track to align with the existing car parking and is located between the existing signal SA3 and Avonmouth Dock Level Crossing.
- Option C – New platform located just east but with some overlap of Option B between mileages 8m04ch and 8m10ch, this option is on straight track to align with the existing car parking and is located between the existing signal SA3 and Avonmouth Dock Level Crossing.
- Option D - New platform located at the eastern end of the car park between mileages 7m77ch and 8m03ch, this option is on straight track to align with the existing car parking and is located before the existing signal SA3, and is furthest from Avonmouth Dock Level Crossing.



Figure 2 – Portway Park & Ride Station Options Plan

8.1.1 Option A

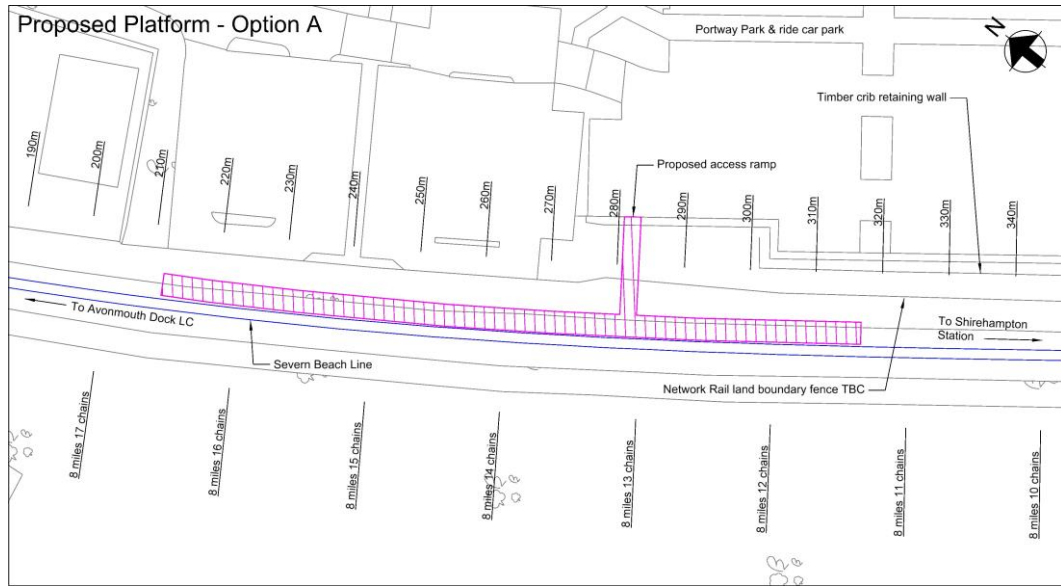


Figure 3 – Portway Park & Ride Station Option A Plan

8.1.2 Option B

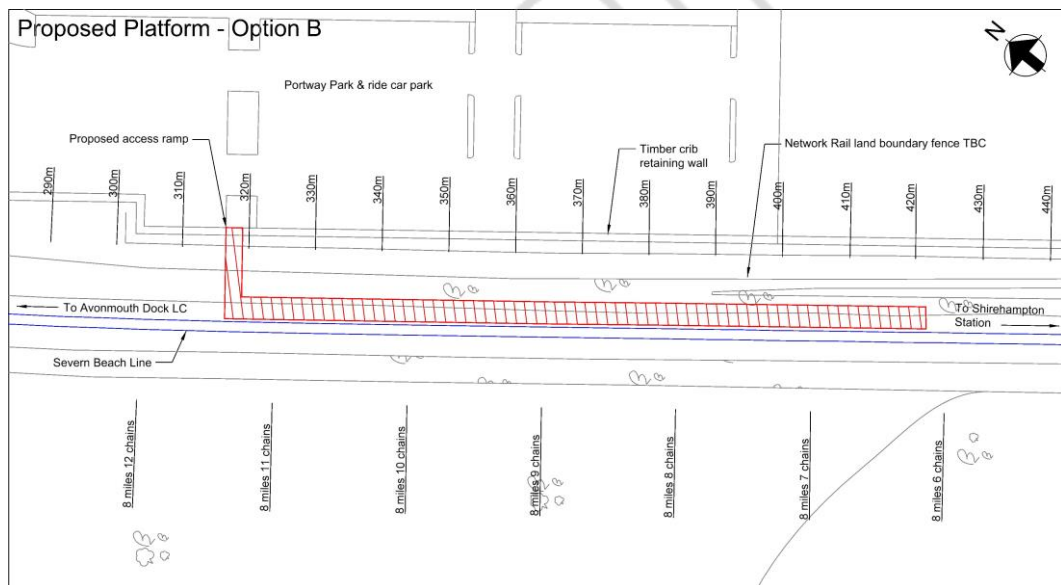


Figure 4 – Portway Park & Ride Station Option B Plan

8.1.3 Option C

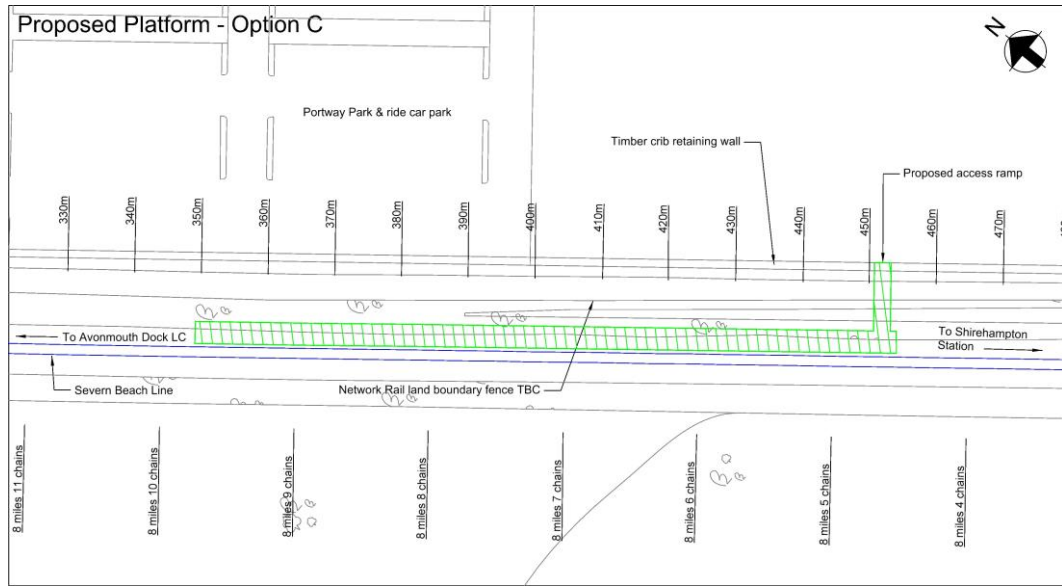


Figure 5 – Portway Park & Ride Station Option C Plan

8.1.4 Option D

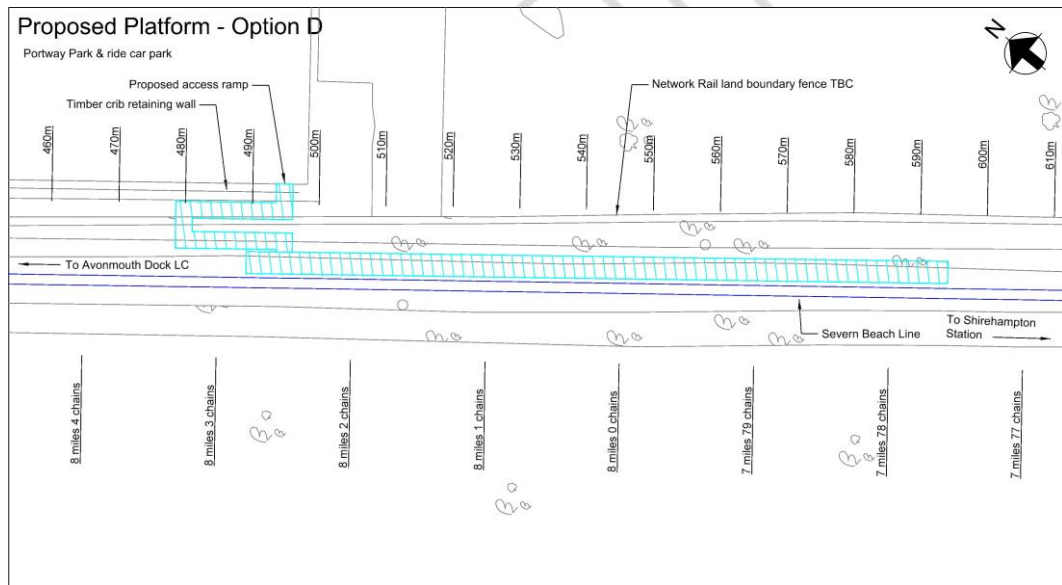


Figure 6 – Portway Park & Ride Station Option D Plan

8.2 Track

8.2.1 Option A

From a track design point of view this option is the least desirable due to the existing track being c. 800m radius. In accordance with Railway Group Standard GI/RT7016 clause 2.1.2, the minimum radius on which a new station can be located is 1000m radius. Therefore to enable a platform to be positioned at the location for Option A, the track would need to be realigned significantly which would be difficult to achieve with steel sleepers. This work would impact on the alignment of the track over hundreds of metres, and may require work on the level crossing given the close proximity of the existing cant transition to the crossing surface.

Between the platform ends for Option A, no track assets have been identified, however should the track alignment be changed and track further up and down the line affected, it is likely that the track will need to be re-stressed and any adjustment switches present will need to be reset.

This option would require the relocation of signal SA3 and associated signalling cables and equipment such as IBJs and TPWS.

No lineside equipment has been identified within the mileage of platform option A.

It is therefore considered that Option A is **not** feasible from a track perspective.

8.2.2 Option B

Option B is the first platform location for which the existing track alignment may be satisfactory for the placement of a platform. The track alignment is generally straight, and it should be possible to place the platform on straight track with zero cant, however the location of the cant transition associated with the 800m curve is uncertain. There is a risk that the alignment of the platform copers may require careful consideration at the western (Avonmouth) end as the track from the west would be on a curve, which could impact on platform gauging.

Between the platform ends for Option B no track assets have been identified, however, this option would require the relocation of signal SA3 and associated signalling cables and equipment such as IBJs and TPWS.

No lineside equipment has been identified within the mileage of platform option B.

It is therefore considered that Option B is not feasible, due to the proximity of the existing cant transition.

8.2.3 Option C

For Option C, the existing track alignment is fully into the straight, and therefore the placement of the platform would be straightforward and, in principle, the horizontal and vertical offsets would be the standard 730mm and 915mm respectively (subject to gauging check at subsequent design stages).

Between the platform ends for Option C, the following lineside equipment has been identified:

Table 3 – Lineside Equipment in vicinity of Platform Location Option C

Asset	Mileage	Up/Down/4ft	Consequence
Lineside telephone	8m04.25ch	Up cess	Not affected
Location cabinet F11B	8m04.25ch	Up cess	Not affected
Orange pipes	8m04.25ch	Up/Down/4ft	Affected
TPWS	8m04.25ch	4ft	Affected
Signal SA3	8m04.5ch	Up cess	Affected
Loose cables	8m05ch	Up/Down/4ft	Affected
IBJ - 6 Hole	8m05ch	4ft	Affected

This option would require the relocation of signal SA3 and associated signalling cables and equipment such as IBJs and TPWS.

It is therefore considered that Option C is feasible from a track perspective.

8.2.4 Option D

For Option D, the existing track alignment is also fully into the straight, and therefore the placement of the platform would be straightforward and, in principle, the horizontal and vertical offsets would be the standard 730mm and 915mm respectively (subject to gauging check at subsequent design stages).

Between the platform ends for Option D, the following lineside equipment has been identified:

Table 4 – Lineside Equipment in vicinity of Platform Location Option D

Asset	Mileage	Up/Down/4ft	Consequence
AWS	7m75.5ch	4ft	Consequence
DIS Box	7m75.5ch	Up cess	Not affected
Cable Joint	7m77ch	Up cess	Not affected
Cable Joint	7m79ch	Up cess	Not affected
Lineside cabinet	8m00ch	Up cess	Not affected
8 mile marker post	8m00ch	Down cess	Affected – Relocate to Up cess
Historic concrete signal base	8m1.75ch	Up cess	Not affected
Location cabinet F11	8m02ch	Up cess	Not affected

It is therefore considered that Option D is feasible from a track perspective.

8.3 Signalling

The objective of this project is to locate the new Portway station as close as possible to Avonmouth Dock crossing (MCB CCTV). Four locations for a new station platform in the Up cess have been outlined for consideration please see the signalling sketches in Appendix C for details. The Avonmouth Dock level crossing (MCB CCTV) is manually controlled from St Andrews signal box. The auto raised facility has not been provided, setting forward route from SA3 or SA8 signals will require crossing local control normal (crossing clear, barriers down, boom intact and hydraulic cupboard door closed, non-replacing).

8.3.1 Options

8.3.1.1 Option A

The new Portway station is to be located at approximately 8m10ch between Shirehampton station at 7m48ch and Avonmouth Dock crossing (MCB CCTV) at 8m28ch in the up cess. This requires a protecting signal to be provided between the new station and Avonmouth level crossing (MCB CCTV). Therefore the existing SA3 signal is to be moved between the Avonmouth crossing and the new Portway station, if signal SA3 was left in its existing place and the new station built between the signal and level crossing, the crossing would have extended closures time when trains stop at the new station in the Up direction. Please see signalling scheme sketch DRG No. 239240-00/SIG/SKT/001A

Therefore the following signalling amendment will be required to accommodate the new station.

- Signal 3: Signal to be moved by 267m towards Severn Beach to 8m0404yds. As the existing signal spacing is over braked by more than 100%, risk assessment has to be undertaken to comply with the current standard.
- Signal 3 TPWS: TPWS and its associated equipment's to be moved by 271m towards Severn Beach (TPWS risk assessment to be undertaken as the safe over run distance is reduced to 203m if the TSS is not effective then OSS needs to be provided).
- Signal 3 AWS: AWS and its associated equipment to be moved by 267m towards Severn Beach.
- Signal 3R: Signal to be moved by 913m towards Severn Beach to 7m1508yds (this move is mandated by excessive baking), the existing location case to be abolished and new location case to be provided.
- Signal 3R AWS: AWS to be moved 913m towards Severn Beach.

8.3.1.2 Option B

The new Portway station is to be located at approximately 8m17ch between Shirehampton station at 7m48ch and Avonmouth Dock crossing (MCB CCTV) at 8m28ch in the up cess. This requires a protecting signal to be provided between the new station and Avonmouth level crossing (MCB CCTV). Therefore the existing SA3 signal is to be moved between the Avonmouth crossing and the new Portway station, if signal SA3 is left in its existing place and the new station built between

the signal and level crossing, the crossing would have extended closures time when trains stop at the new station in the Up direction. Please see signalling scheme sketch DRG No. 239240-00/SIG/SKT/001B

Therefore the following signalling amendment will be required to accommodate the new station.

- Signal 3: Signal to be moved by 267m towards Severn Beach to 8m0404yds. As the existing signal spacing is over braked by more than 100%, risk assessment has to be undertaken to comply with the current standard.
- Signal 3 TPWS: TPWS and its associated equipment to be moved by 271m towards Severn Beach (TPWS risk assessment to be undertaken as the safe overrun distance is reduced to 203m if the TSS is not effective then OSS needs to be provided).
- Signal 3 AWS: AWS and its associated equipment to be moved by 267m towards Severn Beach. It should be noted that this will place the AWS Magnet within the footprint of the station which would mean that maintenance would be difficult. Also there is a risk that the train could be stopped with its receiver directly over the AWS which may cause operational issues and may require a derogation.
- Signal 3R: Signal to be moved by 913m towards Severn Beach to 7m1508yds (this move is mandated by excessive braking), the existing location case to be abolished and new location case to be provided.
- Signal 3R AWS: AWS to be moved 913m towards Severn Beach.

8.3.1.3 Option C

The new Portway station is to be located at approximately 8m10ch between Shirehampton station at 7m48ch and Avonmouth Dock crossing (MCB CCTV) at 8m28ch in the up cess. This requires a protecting signal to be provided between the new station and Avonmouth level crossing (MCB CCTV). Therefore the existing SA3 signal is to be moved between the Avonmouth crossing and the new Portway station, if signal SA3 is left in its existing place and the new station built between the signal and level crossing, the crossing would have extended closures time when trains stop at the new station in the Up direction. Please see signalling scheme sketch DRG No. 239240-00/SIG/SKT/001C

Therefore the following signalling amendment will be required to accommodate the new station.

- Signal 3: Signal to be moved by 267m towards Severn Beach to 8m0404yds. As the existing signal spacing is over braked by more than 100%, risk assessment has to be undertaken to comply with the current standard.
- Signal 3 TPWS: TPWS and its associated equipment to be moved by 271m towards Severn Beach (TPWS risk assessment to be undertaken as the safe overrun distance is reduced to 203m if the TSS is not effective then OSS needs to be provided).
- Signal 3 AWS: AWS and its associated equipment to be moved by 267m towards Severn Beach. It should be noted that this will place the AWS Magnet within the footprint of the station which would mean that maintenance would be difficult. Also there is a risk that the train could be stopped with its receiver

directly over the AWS which may cause operational issues and may require a derogation.

- Signal 3R: Signal to be moved by 913m towards Severn Beach to 7m1508yds (this move is mandated by excessive baking), the existing location case to be abolished and new location case to be provided.
- Signal 3R AWS: AWS to be moved 913m towards Severn Beach.

8.3.1.4 Option D

The new Portway station is to be located at approximately 8m3ch between Shirehampton station at 7m48ch and Avonmouth Dock crossing (MCB CCTV) at 8m28ch in the up cess. There is already an existing protecting signal SA3 between the new Portway station and Avonmouth crossing (MCB CCTV).

There are no changes required to the existing signalling arrangements. Please see signalling scheme sketch DRG No. 239240-00/SIG/SKT/001D

8.3.2 Signal Sighting

A site visit undertaken by Arup and Network Rail on the 9th March 2015 identified the following approximate sighting distances to the proposed signal locations for Option A, B and C:

Approximately 170m sighting to SA3R signal



Figure 7 - Looking towards high mileage and proposed SA3R signal location

Approximately 350m sighting to protecting SA3 signal



Figure 8 - Looking to low mileage from proposed SA3 signal location

Draft

8.4 Civils

In this section we outline civil engineering considerations including:

- Access
- Platform Type
- Cable Route
- Buried Services
- Drainage

Firstly we outline a number of the design criteria, constraints and assumptions applicable to the civil engineering elements of the project.

8.4.1 Criteria, Constraints and Assumptions

The following design constraints have been considered as part of this study, however, these can be considered further during later GRIP stages:

- The single bi-directional Up and Down line will remain operational throughout the construction phase, with some elements of the works requiring possessions.
- All structural supports to be located a minimum of 4.5m from the nearest running rail (NR/L3/CIV/020), unless protected by the new platform.
- 2.5m minimum platform width (NR/L2/TRK/2049).
- A minimum of one obstacle free route of desirable width 2.0m (PRM:TSD) must be provided. A minimum width of 1.6m is allowable through pinch points.
- Platform edge to be 730mm from inside or nearest running rail (NR/L2/TRK/2049).
- Platform to be a height of 915mm above running rail (NR/L2/TRK/2049).
- If possible the platform should be built with as few possessions as possible.
- Stairs and Ramps – Landings to be a minimum of 2.0m in length (BS8300).
- Ramps – We will aim to ensure that ramps exceed a 1:20 gradient, as this will result in less onerous lighting requirements (reduced LUX levels)
- Ramps – No individual flight to have a length greater than 10m or a rise greater than 0.5m (BS8300).
- Ramps – 2.0m width between handrails, 2.5m structural width (NR/SD/CIV/400).
- Ramps – Change of direction (30°) every 3.5m rise (BD29/04)
- The rail height and horizontal alignment has been based on the LiDAR data provided to Arup by Network Rail on 6th January 2015
- Structures to be in line with Network Rail standard designs wherever practicable.

8.4.2 Access to the Proposed Platforms

It is proposed to provide a footpath for access to the new platform from the existing car park. The access route is required to be Equality Act compliant. The following

option for each of the proposed platform locations has been based on sections produced from received LiDAR data, and considers ramp gradients, ramp lengths, maximum rise and interface with existing crib wall and car park. Refer to drawings CX-002 to CX-005 in Appendix D.

8.4.2.1 Option A

For platform option A, the access to the platform would be central to the car park approximately 85m from the high mileage end of the platform at 8m12.5ch. The key considerations are listed below –

- Nearest to bus pick up
- Short length of ramps
- 2 x 6.3m ramps separated by a single 2m long landing
- 1:20 gradient falling towards the car park
- Minimal disruption to car park layout
- No interface with crib retaining wall
- Potential clash with HP gas main

8.4.2.2 Option B

For platform option B, the access to the platform would be almost central to the car park at the high mileage end of the platform at approximately 8m11ch.

- Nearest to bus pick up
- Short length of ramps
- 1 x 8.4m ramp
- 2m landing at interface with car park
- 1:29 gradient rising towards the car park
- Car park levels generally fall towards the platform
- Minimal disruption to car park layout
- Minimal interface with crib retaining wall

8.4.2.3 Option C

For platform option C, there are two options for access to the platform as follows:

Option 1 - Located at the low mileage end of the platform at approximately 8m05ch.

- Furthest from bus pick up
- 1 x 5.4m ramp
- A landing is not required
- 1:38 gradient falling towards the car park
- Car park levels generally fall towards the platform
- Minimal disruption to car park layout

- Interface with crib retaining wall is at a minimum

Option 2 – Due to existing car park levels, a ramped footpath located anywhere else along the platform, whilst being closer to the bus terminus, would result in long sections of ramp running parallel to the platform and turning back on itself before intersecting with the crib wall and finally interfacing with the car park.

8.4.2.4 Option D

For platform option D, a ramped footpath would be located at the end of the hard standing car park at approximately 8m02.5ch.

- Nearest to bus pick-up
- 1:22 gradient rising towards the car park
- 34m ramp length required to achieve gradient
- Interface with crib retaining wall is at a minimum
- The required ramp length could be reduced with steeper ramps, however this would require acceptance from wheelchair user groups.

8.4.3 Platform construction

The following options for platform construction have been considered and would be applicable to any of the Platform Locations (A to D inclusive):

- Traditional front wall (Network Rail standard design).
- Cross fall platforms 1 & 2 (Network Rail standard design).
- Modular platform options (Steel and FRP).
- Polystyrene block infill platform system

Based on the geological conditions at the site and GI from the adjacent P&R site, it is anticipated that all options will be able to utilise a pad foundation, although Options 4 and 5 could also potentially utilise a lightweight piled foundation as part of the modular system if preferred.

Each option shall be described and discussed in this section and each option shall be assessed based on the following criteria:

1. Initial cost
2. Constructability
3. Construction time
4. Disruption
5. Maintenance

8.4.3.1 Option 1 - Traditional Front Wall

Traditional front wall construction consists of a wall built of brickwork founded on a ground bearing slab. The void directly behind the front wall is then backfilled and the platform surfacing is laid on top.

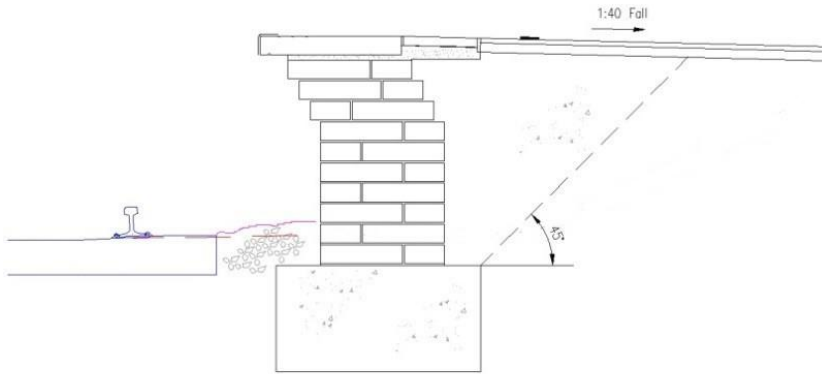


Figure 9 - Cross-section of Network Rail standard design for a traditional front wall platform

Advantages

- Simple to construct.
- No crane is required to lift in parts.
- The appearance can be designed to match the other platforms.
- Standard Network Rail design.
- Minimal amount of materials reducing cost.
- Low maintenance.
- Cheap platform option.

Disadvantages

- Temporary work required to install foundation within track influence zone.
- A large amount of infill would be required due to the existing ground profile, although there would be potential for re-use from the foundation excavations.
- Brickwork construction would be relatively slow and would need a line block / possession.

8.4.3.2 Option 2 - Cross fall platform type 1

The cross fall platform is a standard Network Rail design of which there are two types. Type 1 consists of a large pad foundation with brickwork dwarf walls on top. Steel beams cantilever from the wall on which pre-cast concrete planks are placed. On top of the planks the surfacing is then placed. The area between each dwarf wall is left open with protective fencing.

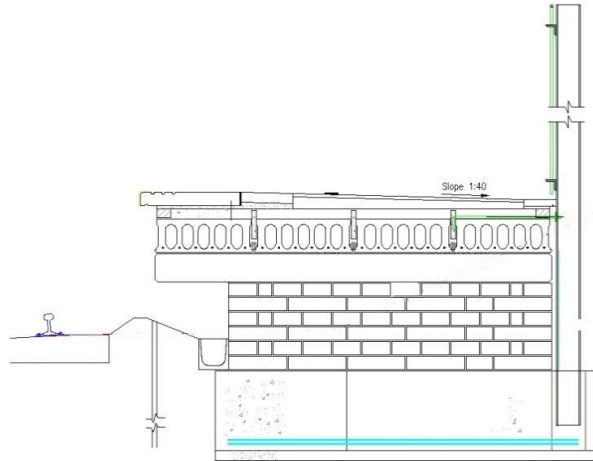


Figure 10 - Cross-section of Network Rail standard design for a Type 1 Cross-fall platform

Advantages

- Platform supports itself with no reliance on fill.
- Standard Network Rail design.
- Foundation has less impact on the track influence zone.

Disadvantages

- Difficulty in lifting in pre-cast concrete units / steel members.
- If cranes are used to lift parts then it cannot be built in green zone working.
- Large amounts of excavation required.
- Large variation in construction materials will increase cost.
- Many stages of construction increasing construction time.
- Large voids underneath the platform that will increase maintenance costs.

8.4.3.3 Option 3 - Cross wall platform type 2

The type 2 cross wall platform, as shown in the figure above is similar to the type 1 cross wall design but does not use cantilever beams. Instead, the dwarf walls are built closer to the track with the precast planks placed directly on the walls. Due to the reduced distance between the dwarf walls and track, it is not possible to install troughing adjacent to the tracks.

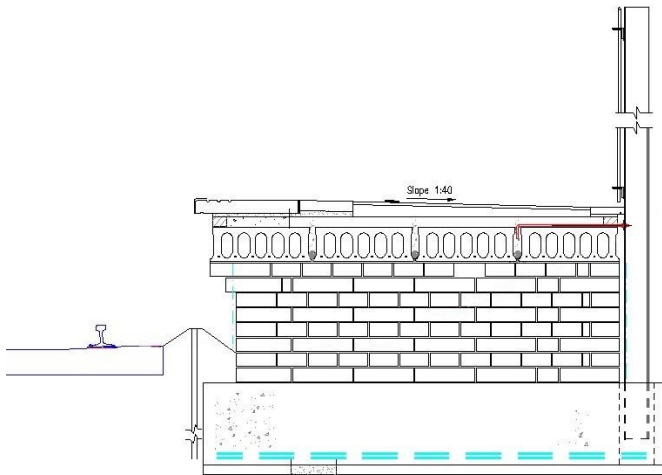


Figure 11 - Cross-section of Network Rail standard design for a Type 2 Cross-wall platform

Advantages

- Platform supports itself with no reliance on fill.
- Standard Network Rail design.
- Less temporary works required to construct than foundation option 1.
- Majority of cross walls can be constructed green zone.

Disadvantages

- Difficulty in lifting in pre-cast concrete units / steel members.
- If cranes are used to lift parts then it cannot be built in green zone working.
- Large variation in construction materials may increase cost.
- Higher maintenance – more elements to inspect than option 1.

8.4.3.4 Option 4 - Modular steel platform

There are a number of modular platform systems available on the market, such as the Tata system, which come in a variety of lengths. Depending on ground conditions they are either founded on concrete pads or piles.

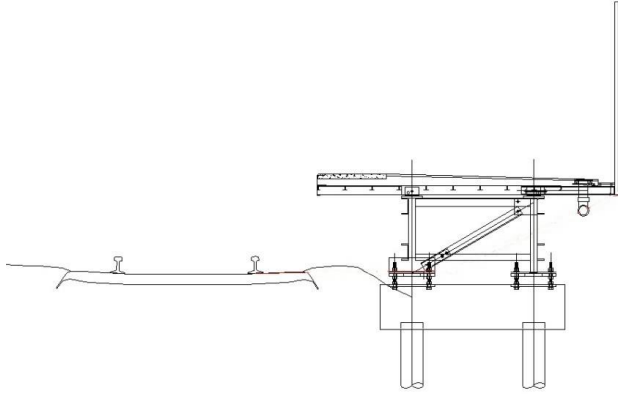


Figure 12 - Cross-section of a typical Rail Modular Platform System.

Advantages

- Can be fitted in pre-fabricated sections leading to quick construction times.
- Platform can be easily altered if the track alignment changes in the future.
- Option to construct in smaller sections – assembled on site by hand.
- Less temporary works required to construct foundation than option 1.

Disadvantages

- If larger modular units are used, weight of materials will require crane, which will require possession.
- Steel structure will have to be inspected regularly which will require a possession or line blockages.
- Higher maintenance liability than traditional form of construction.

8.4.3.5 Option 5 - Modular FRP platform

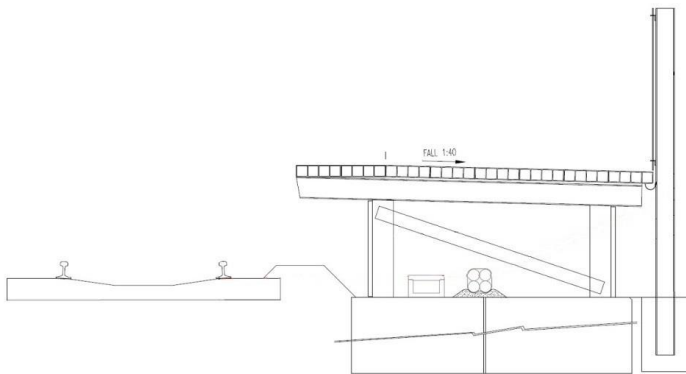


Figure 13 - Cross-section of a typical Rail Modular Platform System.

Advantages

- Low weight of sections means they can be carried / built by hand.
- Sections can be built offline and carried to site.
- Lower dead load will lead to smaller foundations.
- Less temporary works required to construct foundation than option 1.
- Platform can be easily altered if the track alignment changes in the future.
- Modular sections lead to quick construction times.

Disadvantages

- FRP may have a higher capital cost than steel (although, potentially lower whole life cost).
- Inspections will require a possession or line blockages.

8.4.3.6 Option 6 - Polystyrene block infill platform system

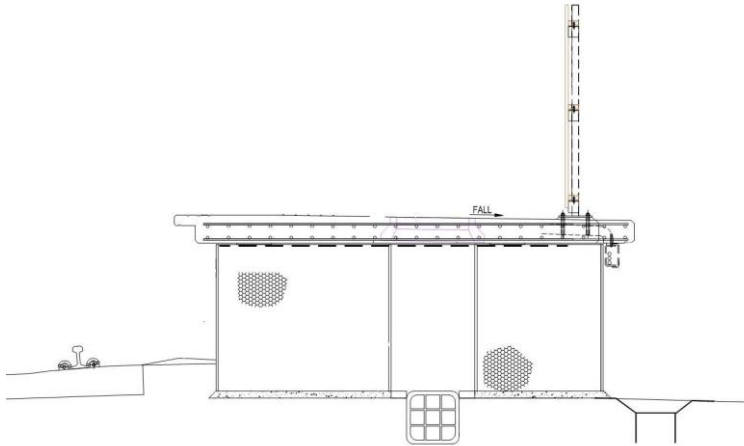


Figure 14 - Cross-section of a typical Expanded Polystyrene Block Infill Platform System.

Advantages

- Short construction time
- Reduced spoil/waste
- Light weight
- Reduced excavation for foundations
- Sustainable solution
- Standard Network Rail design

Disadvantages

- Expensive material costs
- Off-site preparation preferred – Application of protective membrane
- Pre-planned duct routes required
- Less future flexibility with station furniture

8.4.3.7 Platform construction assessment matrix

The following table provides a qualitative assessment of each of the above platform options, to provide an indicative choice for the option selection stage of the project.

Table 4 – Platform construction assessment matrix

	Traditional Front Wall	Cross-fall Platform Type 1	Cross-fall Platform Type 2	Modular Steel Platform	Modular FRP Platform	Polystyrene Block Platform
Initial Cost	5	4	3	2	1	4
Ease of construction	4	2	3	4	5	3
Construction Time	1	2	3	5	5	5
Maintenance	5	3	4	1	3	5
Totals	15	11	13	12	14	18
Scoring	1 = Poor	2 = Fair	3 = Good	4 = Very Good	5 = Excellent	

8.4.4 Drainage

Drainage will not be significantly different between the platform location options; however option 1 will provide more flexibility as surface water could be drained into the platform backfill. Evidence suggests that surface water is currently allowed to run-off into the cess and ultimately into the watercourse.

A cross-fall away from the tracks with a gradient of 1:40 for the new platform would allow surface water to run-off the back of the platform into the vegetated area between the platform and car park. This would require the inclusion of a drip detail at the back of the platform at detailed design stage. Alternatively, a channel drain could be provided at the back of the platform to allow the collection of surface water run-off and positively discharge at the ends of the platform.

8.5 Telecoms

In this section we outline the different telecommunication systems that shall be provided at the station as follows:

- Closed Circuit Television (CCTV)
- Customer Information System (CIS)
- Passenger Help Points (PHP)
- 1No. Telecoms cabinet at Platform level
- At GRIP 2, the impact on GSM-R has not been considered

The design criteria, constraints and assumptions applicable to telecoms and the different options that shall be considered for the above-mentioned telecom systems have been outlined in the subsequent sections.

No provision for a ticket machine has currently been provided.

8.5.1 Criteria Constraints and Assumptions

The following design constraints/assumptions have been considered as part of this study, however, these shall be considered further during later GRIP stages.

- Public Address (PA) system shall not be provided at the station.
- An IP-based CCTV system shall be provided where the cameras are powered over the Ethernet (PoE).
- Based on site survey, there is an existing cable route running parallel to the tracks opposite the proposed station platform. There are no signal post telephones (SPTs) or location cases in the immediate area of the proposed platform locations. Hence, it is assumed that the operational telecoms shall not be affected by the proposed works. However, this shall be verified once the platform location has been selected.
- 1No. shelter shall be provided on the platform. Two options are being considered for the shelter namely, a basic open shelter and a closed shelter.
- The platform width shall be a minimum of 2.5m

The telecom system outlined above shall comply with the Network Rail Standard tabulated below:

8.5.2 Standards

The telecom system outlined above shall comply with the Network Rail Standard tabulated below:

Table 5: Telecoms Design Network Rail Standards

Standard No.	Issue Date	Title
NR/L2/TEL/30135	Issue 3 March 2010	Technical Requirements for Security CCTV Systems on Network Rail Infrastructure
NR/GN/TEL/50017	Issue 1 August 2006	CCTV for Stations – Functional, Technical and Operational Requirements

Standard No.	Issue Date	Title
NR/L2/TEL/30130	Issue 3 September 2009	Electronic Visual Customer Information Systems

8.5.3 CCTV

CCTV cameras shall be provided on the platform to ensure the safety and security of the passengers. The different areas and the corresponding required level of CCTV coverage are shown in Table 2 below.

Table 6: Camera Field of View

Camera Location	Rotakin [%R]	Area of Floor Covered, %
Help Point	50	100
Platform Length	10	90
Waiting Room / Shelter	50	95
Entrance/Exit	50-120	100

All the CCTV cameras shall be cabled back to a telecoms cabinet with a cable length not exceeding 90m.

The CCTV images might either be viewed from the Train Operating Company (TOC, e.g. First Great Western) control centre or locally in the Park and Ride car park. Hence, provision shall be made for a fibre link to connect the telecoms cabinet to either the TOC control centre or car park.

The number of CCTV cameras shall vary depending on the type of shelter that shall be provided at the platform level as described in the following sub-sections.

8.5.3.1 Option 1 – Open Shelter

In the case of an open shelter and assuming that the PHP unit shall be located within close proximity of the shelter, then it is estimated that 4No. cameras shall be required to provide an adequate level of CCTV coverage at the platform level as follows:

- 2No. cameras for covering the entire length of the platform
- 1No. camera for covering the entrance to the platform
- 1No. camera for covering the shelter and the PHP unit.

8.5.3.2 Option 2 – Closed Shelter

In the case of a closed shelter, it is estimated that 5 number cameras shall be required to provide an adequate level of CCTV coverage at the platform level as follows:

- 2No. cameras for covering the entire length of the platform
- 1No. camera for covering the entrance to the platform
- 1No. camera for covering the PHP unit.
- 1No. camera inside the shelter.

During the next GRIP stages, once the type of shelter is selected, a CCTV design shall be undertaken to locate the CCTV cameras and ensure the field of view comply with the Network Rail standards listed in Table 1.

8.5.4 Customer Information System

A customer information system shall be provided at the station to provide customers with train departure and arrival information and any service disruptions (e.g. train cancelled, train delayed etc.). The two options for the CIS are described in the following sub-sections.

8.5.4.1 Option 1 – CIS LED Screen

A Next Train Indicator (NTI) LED multi-row screen at the platform level shall be used to provide train departure and arrival information. An example of an NTI is shown in Figure 6.



Figure 15: LED Multi-Row NTI

8.5.4.2 Option 2 – CIS integrated in PHP

Help point units are also capable of providing customer information via a screen located in the middle of the help point unit. This type of help point can be used to provide train and service information.

An example of a help point with a CIS screen is shown in Figure 7 below:



Figure 16: PHP Unit with LED Screen

8.5.5 Passenger Help Points

1No. PHP unit shall be provided on the platform. Two options shall be considered for the PHP unit:

8.5.5.1 Option 1 – Traditional PHP Unit

The traditional PHP unit which is shown in Figure 8 consisting of two buttons – one for information and one for emergency can be considered. However, with this option, an NTI shall be necessary as part of the CIS.



Figure 17: Traditional PHP Unit

8.5.5.2 Option 2 – PHP with CIS Screen

The second option is to consider a PHP unit which in addition to the traditional PHP unit functions also include an LED screen which can be used to display train and service information as shown in Figure 2.

This PHP unit is currently used at the Clifton Down station. Since Clifton Down station and the new Park and Ride Portway station are likely to be operated by the same TOC this PHP unit is the recommended option. Furthermore, since it has an integrated CIS screen, a separate CIS display may not be necessary.

8.5.6 Telecoms Cabinet

A telecoms cabinet with an outdoor Ingress Protection rating shall be provided at the platform level to accommodate the active and passive equipment supporting the CCTV, CIS and PHP systems. The location of the telecoms cabinet shall be explored in the next GRIP stages.

8.6 Mechanical & Electrical

During discussions with the Network Rail project team, it was considered that Clifton Down Station in Bristol would be an appropriate example station to use a benchmark to ascertain the platform infrastructure required for the proposed Portbury Station.

Having surveyed Clifton Down Station, we would recommend the existing light source, white Cosmopolis lamps, are not considered for Portbury Station, and would recommend the use of an LED lamp source due their improved energy efficiency, maintainability, longer life expectancy etc.

Platform lighting and power requirements will essentially be the same for each platform option under consideration.

8.6.1 Platform Incoming Power Supply

There are currently four options being considered as indicated below:

- Option 1 - Extend the existing Western Power Distribution (WPD) Low Voltage (LV) electrical service from the existing P+R facility for each proposed platform location. The LV supply would be metered at a WPD LV distribution cubicle located on or adjacent to the platform.
- Option 2 - Utilise the existing Bristol City Council (BCC) Park & Ride (P&R) electrical LV distribution cubicle to supply the proposed platform locations. The LV supply would be metered at the BCC LV distribution cubicle within the P&R boundary. This option would be subject to the availability and spare capacity of the existing BCC LV cubicle.
- Option 3 - Provide a new WPD LV electrical service emanating from their local LV network identified from record information as being located in the adjacent public footpath. The LV supply would be metered at the WPD LV distribution cubicle located on or adjacent to the platform.
- Option 4 - Utilise the existing Network Rail Level Crossing LV distribution infrastructure and supply each proposed platform locations. The LV supply would be sub-metered at the Level Crossing LV distribution cubicle.

With each of the aforementioned options we recommend an electrical load assessment is carried out during the next GRIP stage to ascertain which option is viable and the most cost effective for the scheme.

New buried ducted routes and cable chamber locations should be considered during coordination with existing buried services, rail infrastructures and platform civil engineering designs.

A new LV distribution board would be installed integral to a Network Rail LV cubicle to supply the platform services.

At this stage it is estimated a 100A single phase electrical supply would be sufficient for the electrical demand envisaged. The electrical systems for a new platform of this type would generally include, but not limited to, the following systems:

- Lighting
- CIS
- Help Point
- CCTV
- Public address

Quantities of equipment would be assessed for costing purposes during the next design stage. There is currently no requirement for a Ticket Vending Machine (TVM) facility.

8.6.2 Platform and Access Route Lighting

8.6.2.1 Lighting Levels

Lighting levels would comply with Network Rail Safety Requirements and Standards for the illumination of platforms and access routes. Increased lighting levels would be provided for compliance with DDA legislation as applicable e.g. stairs and access ramps.

8.6.2.2 Luminaires

The recommendation is to use LED column mounted lighting to illuminate the platform and access routes from the P&R.

8.6.2.3 General Criteria and GRIP 2 Assumptions

The following list identifies design criteria and assumptions to be considered from the outset and throughout the project design stages.

- Limitations to glare providing no upward light component.
- Guidance notes for the reduction of obtrusive light defining Lux level limits to the surrounding areas for certain categories.
- Environmental Zone e.g. E2 – Low district brightness area rural, small village, or relatively dark urban locations.
- Light trespass – controlling light levels to the boundary of Portbury Station and adjacent public spaces.
- Lamp source intensity.
- Pre and Post curfew arrangements for the control of lighting levels if required.

8.6.2.4 Column Type

Luminaires would generally be mounted on 6m low-hinge steel columns with a base to house the control gear and fuse cut-out. The base compartment would be accessible without lowering the column.

8.6.2.5 Column Foundation Type

The columns would be installed based on the approved platform option. The columns may consist of flange mounted bases that are fixed direct to the platform structure e.g. modular platform, or root mounted bases that are buried direct into the ground.

8.6.2.6 Shelter Lighting

A basic shelter is being considered at this stage and therefore no lighting requirement is envisaged.

8.6.2.7 Lighting Controls

At this stage we would consider the lighting being controlled via two separate control strategies. All lighting would generally be switched on via a photocell, contactor and time switch arrangement. Platform lighting may include dimmable control gear to lower the illumination levels if necessary. In addition, we recommend consideration for using movement sensors activated by the presence of the general public and oncoming trains.

8.6.2.8 Platform LV Power

Power supplies for platform equipment would emanate from a local distribution board located integral to the Network Rail LV cubicle. The cubicle would be positioned on or adjacent to the proposed platform.

A series of cable ducts would be necessary to allow the routing of the LV supply cable(s) from the respective supply source. The source of supply would terminate within the Network Rail LV cubicle.

Appropriately sized cable ducts and chambers would be provided to allow a flexible and future proofed cabled infrastructure.

A cable containment system would also be provided emanating from the local distribution board. The extent and type of containment system will depend on the approved platform option. It's envisaged either a series of buried ducts or cable containment affixed to the underside or rear of the platform will be the desired methods.

8.7 Electrification and Plant

As part of the GRIP 2 study to assess options for Bristol City Council's aspirations for a new platform at Portway the impact and risks on trackside electrical plant have been considered with the preferred option highlighted below. The Electrical and Plant equipment under review is:

- Signalling Power Supplies
- Level Crossing REB Supplies
- Points Heating

8.7.1 Signalling Power Supplies

8.7.1.1 Platform Location Options A, B and C

Platform location options A, B and C are exactly the same with regards to the re-location of signalling location cabinets and signals which are shown on the signalling scheme sketch DRG No. 239240-00/SIG/SKT/001B in Appendix C.

The existing 650V signalling supply feeder cable currently runs in a cable troughing route in the up cess and loops directly in and out of signalling location cabinets where a 650V supply is required.

Options A, B and C will require that the 650V feeder cable is disconnected and re-terminated by pulling back, jointed or replaced (if found short) into each signalling location cabinet that has been relocated by the signalling designer. All re-located signalling location cabinets are to remain in the up cess and the feeder cable will continue to run in the cable troughing route also in the up cess.

From site information obtained, the existing 650V signalling power system appears close to life expired and is assumed does not to conform to current Network Rail safety requirements and standards. Further investigation should be carried out at the next design stage to clarify the condition and safety of the existing installation. Based on these findings a decision should be made by Network Rail as to the extent of any feeder renewal to ensure safety and compliance to standards of the modified part of the system.

Based on the fact that for Options A, B and C modifications of the feeder are required which could result in a full or partial upgrade of the existing system these options are not favoured.

8.7.1.2 Platform Location Option D

For Option D no signalling location cabinets are to be relocated therefore there will be no change to the existing signalling power supply installation. It should be noted though that existing 650V signalling power system appears close to life expired and is assumed does not to conform to current Network Rail safety requirements and standards. A survey should be conducted by Network Rail to ensure safety of the system.

It is considered that Option D is the most favoured from a signalling power perspective as no additional work is required for the project if the system is confirmed safe in its current condition.

8.7.2 Level Crossing REB Supplies

The Avonmouth Dock Level Crossing Signalling REB is located adjacent the level crossing in the up cess. The REB is supplied from a distribution cubicle located opposite in the down cess which powers the level crossing and domestic power in the REB. There are no proposed design changes to the level crossing therefore no changes or modifications are anticipated in the electrical design.

It should be noted however that it has been proposed that the new station could be supplied from the Level Crossing REB electrical supply. Refer to the M&E Platform Services Section in this report for options on the new station electrical supplies.

Therefore assuming that the REB will not supply the new station there will be no requirement for any electrical design changes for either Option A, B, C or D.

8.7.3 Points Heating

The existing track between Shirehampton Station and the Avonmouth Dock Level Crossing is a bi-directional non-electrified single track. There are no existing, or proposed changes to the p-way layout as part of the project. Therefore there is no requirement for any points heating equipment in either Option A, B, C or D.

8.8 Station

8.8.1 General

The key requirements for the station at Portway are for a Category F un-manned Station to be provided at the existing Park & Ride facility at one of four proposed platform locations.

The station platform length shall be sufficient for 4-car DMU (circa 105m), and the scheme shall allow for passive provision of 5-car length. For the platform furniture and equipment requirements, refer to Section 5 and 8.4.1.

8.8.2 Operational Assessment

There are likely to be different options for the specific operations of the new station at Portway. The chosen platform location (A to D) could influence whether additional car parking is constructed or made available to allow optimal segregation of bus and rail car-parking.

The method to be used for ticketing, car parking, access routes and interchange with car and/or bus would need to be reviewed and assessed by others, during the Option Selection phase.

Each platform location option allows for compliant access ramps from the existing operational or non-operational car parking areas. Options A, B and C are all able to link to the currently operational car park area. Option D would be best serviced from the car park extension which has not been brought into use to date.

The station is proposed to include a simple shelter only, and will be un-manned. No ticket machine is proposed currently. There may be options for the ticketing to be coordinated with the Park & Ride kiosk, and this should be considered during Option Selection.

It is proposed to provide full CCTV coverage, and the options for how this might operate are discussed in Section 8.5.3.

It is considered that a train dwell time of 30 seconds is appropriate for this station. The design of the full signalling and operational arrangements are to be undertaken at subsequent GRIP stages and will need to include how the Train Manager, Train Driver and signalling system will interact with each other – e.g. availability of sighting of the starting signal for the Train Manager.

8.9 Level Crossing

8.9.1 General

Avonmouth Dock Level Crossing is situated in-between Shirehampton Station (low mileage) and Avonmouth Station (high mileage), at 8m29ch on the single bi-directional line of the Severn Beach Line (ELR: CNX). The railway crosses West Town Road, a public highway, just North West of the Portway Park & Ride car park at OS Grid reference ST521771. On inspection the highway surface appears to be in fair condition with no significant gradient.



Figure 18 - looking towards high mileage at Avonmouth Dock Level Crossing

8.9.2 Operational Assessment

8.9.2.1 Current Operations

A study of the level crossing was carried out by Network Rail on 30th August 2012, refer to Appendix E for the detailed study results. Information from the study was provided to Arup by Network Rail on 2nd March 2015, and from this it is understood that the current level crossing operations are as follows:

- The level crossing is controlled manually from St Andrews Road signal box using MCB-CCTV surveillance, and is protected by signals in each direction.
- Inbound trains are controlled by signal SA6 which is located at 9m00ch Avonmouth Station.
- A block circuit showing as occupied on the signalling diagram indicates the presence of an inbound train on route section [AN].
- The signaller is able to refer to the timetable and the track diagram, and is also able to see the train on its approach from Severn Beach.
- The principle is to clear the signals approximately 30 seconds before departure time from Avonmouth station. In the event of a delay, the driver should contact the signaller who can then reset the signals to danger allowing the road crossing

to open for traffic. There is a locking device which prevents the signal being unlocked for 2 to 3 minutes after being re-set, as a precaution against human error.

- Outbound trains are controlled by signal SA3 which is located at 8m04.5ch.
- A block circuit showing as occupied on the signalling diagram indicates the presence of an outbound train on the track section [track circuit KM].
- The signaller will only know of the presence of a train between Clifton Down and Shirehampton on the track section [track circuit KM].
- Visibility problems throughout the seasons such as fog and foliage are not considered to be problematic.
- 1566 road vehicles use the level crossing per day with a large proportion being HGVs, vans and small lorries.
- 27 pedestrians/cyclists use the level crossing per day
- 62 trains use the level crossing per day
- Maximum train speed is 50mph
- The current ALCRM category for the level crossing is J6

During a site visit undertaken by Arup and Network Rail on the 9th March 2015, the following barrier down times were recorded:

Table 7 – Recorded barrier down times

Direction of train	Time	Duration of barrier down time	Published timetable departure time	Comments
Outbound – towards Avonmouth	10:26	3 minutes and 10 seconds	10:26 – Leaving Shirehampton Station	7 vehicles backed up on West Town Road towards the Portway (A4) – approximately $\frac{3}{4}$ of the road length.
Inbound – towards Shirehampton	10:35	2 minutes and 2 seconds	10:34 – Leaving Avonmouth Station	2 vehicles backed up on West Town Road towards the Portway (A4)

8.9.2.2 Future Operations

There are two options with regard to operations of the level crossing. For platform location options A, B and C, SA3 and SA3R signals are relocated as per the signalling sketches in Appendix C. For platform location option D, the current signal positions are maintained. The impact on the operations is considered to be as follows.

For platform location options A, B and C – where signals are being relocated:

- The protecting signal SA3 must be between the new platform and the level crossing
- There must be advanced warning that the next signal is at danger, hence the relocation of signal SA3R

- A minimum of 40 seconds is required for the level crossing warnings and barriers to operate from the train being at a stand before moving towards the crossing – This is achievable due to the distance between the level crossing and the proposed location of the protecting signal being circa 220m
- A time saving of approximately 17 seconds in barrier down time has been estimated by Network Rail, if the signal relocation works include a timer/sensor on the proposed platform

For platform location options D – where signals remain in current locations:

- Minimal impact on the level crossing

Draft

9 Environmental Considerations

9.1 Sustainability

The sustainability of the project was considered based on the latest CEEQUAL criteria (version 5.1), this includes consideration of design, construction and operational phases of the project. These are summarised below, and a more details are included in the Sustainability Appraisal Section 6 of the Environmental Appraisal which is provided in Appendix F.

Project Management: The project will need to ensure that its management criteria includes environmental and social aspects from the outset. Set environmental and social performance targets early in project for all stages of the project. Consideration of a whole life approach to the design of the project, and also set sustainability targets should be undertaken.

Peoples and community: The project should be part of the Considerate Constructors Scheme, undertake early public consultation with a robust system for collected feedback (especially since it is in close proximity with a residential area). The Environmental Management Plan should consider the potential effects and their mitigation for neighbours at all phases of the project (including the effects of noise, vibration and visual impact of construction and operational phases). A robust community engagement programme, establishment of partnership links with other local organisations and appointing local contractors where possible should also be considered.

Land-use and Landscape: Consideration should be given to flood risk, landscape character, contamination risk and soil conservation. Also a long term planting and management plan should be drawn up.

Historic environment: Consultation with local government, national government agencies, and other groups should be undertaken. A baseline historic environment report could be considered.

Ecology and biodiversity: Suitable ecological surveys and mitigation suggested in the Ecology Note should be undertaken, and Japanese Knotweed should be dealt with appropriately. Habitat enhancement measures should be considered.

The Water Environment: Impacts on the water environment need to be controlled, pollution prevented, and appropriate consultation and enhancement measures undertaken.

Physical resources use and management: Consideration of undertaking Life Cycle Analysis and Embodied Water Assessments. Use of renewable energy generation for both construction and operational phases should be considered as should energy efficiency. Efficient water use and responsible sourcing of materials should also be considered, and a site waste management plan will need to be drawn up.

Transport: A travel plan and travel assessment should be undertaken to assess the effects on neighbours, for construction and operational traffic, mitigation may be required.

9.2 Ecology

An ecological inspection was carried out on 15 January 2015 to check the site for ecological constraints within the proposed locations. Furthermore, desk study data was requested and reviewed to check if known ecological receptors are near to the site and could potentially be impacted by construction works. At present the exact location of the station and platform has yet to be decided and four location options are being assessed.

The desk study highlighted the presence of seven statutory designated sites nature conservation sites within 4km of the study area. However, the site boundary does not overlap any of these statutory designated sites. In addition, 27 non-statutory Sites of Nature Conservation Interest (SNCIs)/Wildlife Sites were returned from the BRERC search, of which Lamplighter's Marsh falls within the study area. Eight priority habitat exists within 2km of the study area.

The main focus areas of concern at this stage of design were the historic Portway Landfill site, located to the South East of the site, which is a 1970s commercial and household waste landfill site. This means that contaminated land effects should be anticipated relating to migration of landfill gas, excavation of contaminated land causing contaminated arisings and runoff and the creation of contamination pathways for existing contaminated material. Appropriate management measures will need to be undertaken.

Three stands of the invasive Japanese knotweed *Fallopia japonica* found on/immediately adjacent to site. The site was found to have amphibian breeding potential including great crested newt due to presence of water bodies and foraging habitats. The habitats on/immediately adjacent to site have reptile potential, such as vegetated sidings and scrub. The trees and scrub on site have potential for breeding birds. Presence of mammal tracks characteristic of badgers were found on site and the presence of suitable habitat where setts may be present, such as dense scrub. The ecology works suggested in the Ecology Note, including Reptile and Amphibian surveys, and low level vegetation and Japanese Knotweed clearance, should be undertaken.

The Ecology File note in Appendix F provides further details regarding the ecological constraints identified on site at the time of survey and recommendations for further surveys. Refer to the Environmental Survey Plans in Appendix F which highlight the potential ecological constraints.

10 Risks and Opportunities

10.1 Risks

A combined CDM and CSM Hazard Log has been produced for the GRIP 2 stage of the project which is provided in Appendix H. The list below outlines some of the high level risks that have been identified in the Hazard Log.

- Derogations to track radius for construction of platform location options A and B
- There may be a requirement for TSI compliance with platform location options A and B due to the existing track radius
- Buried services in location of proposed construction, in particular the high pressure gas main which crosses the track at approximately 8m13ch
- Due to the national importance of Avonmouth Docks, it has been suggested that strategic oil pipelines may be present in the vicinity of the proposed works
- The guard's visibility of the protecting signal SA3 from the station platform when the train is stopped in the station needs to be considered.
- Signal sighting to proposed SA3 and SA3R signal locations require further investigation
- The potential presence of amphibians, reptiles, mammals and breeding birds could require mitigation measures
- It is likely that vegetation clearance will be required for all options
- It is likely that Japanese Knotweed clearance will be required for platform location option D
- Historic landfill site adjacent to platform location option D
- Land purchase may be required depending on the chosen option and access requirements
- Increased access ramp lengths may be required to achieve acceptable gradients depending on the chosen option and access location

10.2 Opportunities

The following opportunities have been identified:

- The DNO supply could be shared with the Park & Ride
- CCTV operations could be shared with the car park
- Additional revenue from opening up additional car parking area
- Improvement to the local environment through the removal of Japanese knotweed
- Improvement to the local environment though planting/landscaping associated with the works

11 Maintenance Strategy & Requirements

11.1 Current situation

Pedestrian access to the railway is obtainable from Avonmouth Dock Level Crossing at 8m29ch and Shirehampton Station at 7m50ch as listed in the Hazard Directory. The cess on both sides of the single bi-directional line was identified from the site walkout undertaken on the 15th January 2014, to have sufficient space to allow for a position of safety and safe walking route for most of the length of track adjacent to the proposed platform locations subject to vegetation growth.

The Hazard Directory does not identify any 'Red Zone Prohibited' areas between Avonmouth Dock LC and Shirehampton Station.

The current arrangement allows maintenance access to the lineside identified in section 6.1.3.

11.2 Proposed situation

The proposed station platform will be located in the down cess adjacent to the car park. This does not affect the cable route or any lineside equipment which is located on the other side of the track in the up cess. A safe walking route would still be available in the up cess, therefore the new platform does not result in the introduction of a red zone prohibited area.

The new platform itself could be used as a walking route should access along the down cess be required. Steps or a ramp would be provided at each end of the platform to allow access to track level. The new station access would provide a new access point, with parking available in the P&R, which is an improvement over the current arrangement.

The access points at Avonmouth Dock LC and Shirehampton Station will not be affected.

The station assets and facilities itself will create additional maintenance requirements and it is assumed that access for station maintenance will be made from the P&R car park.

12 Constructability

As designers, the following forms our view on the constructability for the new Portway Station. Installation Contractor view needs to be included at subsequent GRIP stages, e.g. through ECI (Early Contractor Involvement) contract.

The site is easily accessible from the M4 and M5 motorways and the Portway (A4) with no major height restrictions identified from the AA Truckers Atlas Britain 8th Edition. There is a height restriction barrier of 2.1m limiting entry into the Park & Ride car park which will likely need to be temporarily removed.

RRV access is assumed to be achievable from Avonmouth Dock Level Crossing should this be required.

It is likely that proposed works will have minimal if any affect to the up cess, and therefore access along this cess for maintenance or other works should be achievable throughout the majority of the works.

The width of the down cess between the base of the crib wall and the nearest running rail is approximately 10m and largely at grade. This should allow sufficient room for a worksite and suitable segregation from the public. Depending on which Option is taken forward, de-vegetation and a temporary access route may be required along the toe of the crib-wall. Further assessment of the loadings imposed to the crib wall from construction traffic and plant will need to be carried out in subsequent GRIP stages.

The low mileage end of the car park offers a suitable location for site compound and hardstanding area with minimal impact to the operation of the Park & Ride. The provision for a separate access for construction should be considered to reduce delays and health and safety impact on Park & Ride users.

Although there have been no vandalism and security risks identified in the Hazard Directory, site security should be a key consideration during construction as the site is off the main road and out of sight. It is understood that the Park & Ride facility is closed by means of a locked gate and fencing outside operational hours. Agreement with the Park & Ride operator should be sought to agree optimal means of access and security.

It is expected that the largest plant required for the proposed station would be a crane sufficiently large enough to lift platform panels and surfacing (possibly pre-cast reinforced concrete), platform shelter, access ramps (could be fabricated steel) etc. The good highway access suggests that any muck-away or spoil delivery operations should be manageable on site with careful segregation from the Park & Ride facility. It is possible that a piling rig would be required if the design of the platform necessitates this, however the wide Down cess should provide sufficient width. Adjacent Line Open (ALO) working procedures would need to be adhered to. Possessions would need to be considered by the ECI contractor.

As mentioned in Section 9.1, early public consultation with local residents should be undertaken, however the impact from construction noise and vibration is not expected to be of major concern at this stage as the nearest property is more than 100m away. It is expected that some construction work will be carried out at night due to possession requirements, and the effect of light pollution should be considered. The provision of site hoarding is suggested to reduce light and noise pollution and provide additional security.

13 Consents and Land Issues

13.1 Land Ownership

From initial general arrangements, the platform fits in Network Rail land, with the access ramp being the only exception for all options. The need for land purchase or land swap would need to be discussed between relevant parties during subsequent stages of the project.

13.2 Consents

Depending on the drainage strategy for the proposed platform, land drainage consent may be required from Bristol City Council and/or the Environment Agency. Requirement to be confirmed at the next GRIP stage.

The proposed platform does not impact on the existing highway, however if a temporary access is required for construction, this will have to be agreed with the local highway authority.

Numerous consents may be required for the ecological constraints on or within close proximity to the site. Depending on the final site footprint and the associated works, consents may be required to work in protected habitat sites such as Sites of Nature Conservation Interest (SNCIs) and Wildlife Network Sites (WNS) which lie within the study area. This would be in the form of an official agreement with the statutory authority who manage these sites including the Local Planning Authority (LPA) Bristol City Council (BCC).

Furthermore, a number of protected species could be present and/or use the habitats on site. These species include great crested newts and badgers which both required a specific species licence consent if effected. These licences need to be applied for and approved from Natural England (NE). Additionally, reptile and breeding bird species could also use habitats on site. These do not require a specific licence but if a reptile population is found and would be isolated by proposed works a NE Method Statement consent would be required as well as approval and agreement with BCC in advance in order to move reptiles to a new undisturbed location.

Breeding birds do not require a consent but in order to stay legally compliant all active nests must not be disturbed during works. If an active nest is found suitable mitigation procedures should be put in place e.g. exclusion zones around nests until birds have fledged. Works can only continue once birds have fledged.

Finally, a number of Japanese knotweed stands have been found to be present on and within close proximity to site. Japanese knotweed is an invasive species and as such would require a consent to disturb and dispose of a controlled waste at a registered disposal site. Please refer to the Ecological Constraints Note (Arup, 2015) for further information.

14 Other Project Interfaces

The following projects local to the proposed Portway Station have not been identified to have interface concerns:

- BASRE
- GWRM
- Sita

The MetroWest Phase 1 project which does interface with the project has a requirement for 4 trains per hour each way.

Network Rail have identified that Avonmouth Dock Level Crossing has a SICA (Signalling Infrastructure Condition Assessment) date of 09/05/2022, with an ERD (Engineers Renewal Date) of 17/07/2021 and that the wiring requires replacement.

A full Interface Management Plan should be prepared at GRIP3 to allow comprehensive management of the key project interfaces.

15 Actions for following GRIP stages

In addition to standard design deliverables, the following actions have been identified for the following GRIP stages:

- Assess and consider the impact of the project on the current GSM-R arrangements
- TOC agreement to CCTV options to be established
- Ground investigation to be carried out to confirm soil properties within area of selected platform option location
- Flood risk assessment to be carried out including ground water monitoring
- Topographic survey to be undertaken
- Signal sighting committee to undertake signal sighting assessment
- Latest buried services search to be carried out
- Oil pipeline search to be carried out
- Full timetabling assessment and RailSys modelling
- Interface Management Plan for local project interfaces management
- ECI phase to confirm constructability and consider construction constraints

The above list is not considered to be exhaustive.

16 Conclusions and Recommendations

Appendix A

Site Photographs

Draft

Appendix B

Geotechnical and Geo- environmental Desk Study

Draft

Network Rail

Portway Station

Geotechnical and Geo-environmental
Desk Study

REP/018/15

Issue | 4 February 2015

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.



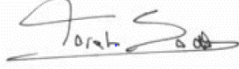
Job number 239240-00

63 St Thomas Street
Bristol BS1 6JZ
United Kingdom

ARUP

Document Verification

ARUP

Job title		Portway Station		Job number	
				239240-00	
Document title		Geotechnical and Geo-environmental Desk Study		File reference	
Document ref		REP/018/15			
Revision	Date	Filename	239240 Desk Study DRAFT.docx		
Draft 1	5 Jan 2015	Description	First draft		
			Prepared by	Checked by	Approved by
		Name	Stuart Tillett	Paul Dennis	Tarek Sadek
		Signature			
Issue	4 Feb 2015	Filename	239240 Desk Study Issue.docx		
		Description	For Issue		
			Prepared by	Checked by	Approved by
		Name	Stuart Tillett	Paul Dennis/Tarek Sadek	Paul Dennis/Tarek Sadek
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			

Issue Document Verification with Document



Contents

	Page
Executive Summary	1
1 Introduction	3
2 Reviewed information sources	4
3 Site setting	5
3.1 Location and Description	5
3.2 Proposed Development	5
3.3 Site History	6
3.4 Published Geology	8
3.5 Hydrogeology	9
3.6 Hydrology and Flooding	9
3.7 Mining and other geo-hazards	10
3.8 Environmental permits, incidents and registers	11
3.9 Unexploded ordnance	13
4 Previous Investigations	14
4.1 Summary of the 2000 Investigations	14
4.2 Summary of the 2007 Investigations	15
5 Geo-environmental: Conceptual Site Model	19
5.1 Introduction	19
5.2 Outline Conceptual Model	19
5.3 Potential Contamination Sources	21
5.4 Receptors	22
5.5 Pathways	22
5.6 Conceptual Site Model Summary	24
6 Geo-environmental: Preliminary Risk Assessment	25
6.1 Preliminary Risk Assessment Conclusions	29
7 Engineering Discussion and Recommendations	31
7.1 Geotechnical recommendations	31
7.2 Outline ground investigation scope	32
8 References	33

Figures

Figure 1 – Site Location Plan

Figure 2 - Proposed Platform Location Options

Figure 3 - Crib Wall Design

Appendices

Executive Summary

Ove Arup & Partners Ltd (Arup) have been commissioned by Network Rail to carry out a Desk Study and Preliminary Risk Assessment on the site of a proposed new platform on the Severn Beach branch line.

At present the exact location of the station and platform has yet to be decided and four location options are being assessed. The area encompassing the proposed station options is located between the Severn Beach branch line and the existing park and ride facilities to the south of the A4 Portway Road, approximately 8km to the north west of Bristol City centre.

The area of the proposed station options represents a thin ribbon of land running along the eastern edge of the Severn Beach branch line, measuring some 300m north west to south east and approximately 6m north east to south west and currently occupied by rough vegetation.

Review of the historic mapping indicates that the site has been partially occupied by the Severn Beach branch line since the earliest edition Ordnance Survey mapping of 1880. The north eastern part of the site was occupied by open agricultural land until the early 1900's when this was replaced with allotments. The neighbouring park and ride facility was added during the period from 2000 to 2010. The area surrounding the site was predominantly comprised of open agricultural land until the early 1900's when residential development was undertaken in the area. Avonmouth docks to the north of the site has seen numerous industrial land uses including a bottle works, iron works, mill buildings, depots, warehouses and most notably as a petroleum storage works.

Review of the published geology and information gained from previous investigations indicates that the site is likely to be underlain by a thickness of Made Ground. Beneath this there is potential for recent tidal flat deposits, with possible head deposits beneath these. The bedrock at the site has been identified as comprising the Mercia Mudstone Group.

The site does not lie in a Source Protection Zone, no groundwater abstraction licenses are listed in the vicinity of the site. The site is not within a Floodplain, however the land immediately to the south and south west of the Severn Beach Branch line is within a Zone 2 and Zone 3 floodplain, a flood risk assessment is recommended. The superficial deposits on site are listed by the British Geological Survey as being susceptible to potential groundwater flooding at the surface.

The site is not in an area believed to be affected by underground mining. In general a negligible to low risk of ground instability is recorded for the site, however, a moderate risk is listed for compressible deposits and running sand.

No radon protective measures are required for new developments.

Review of the environmental database search has in general indicated a low potential for contamination to be present on site. It is considered that the majority of potentially contaminative processes are located at Avonmouth Docks and are therefore too distal from the site to have impacted on it. The exception to this is a landfill listed as being present on Daisy Field recreation ground which is present to the south of the site and may give rise to landfill gas and migration of contaminants in the sub surface. There is considered to be a potential for contamination to be present on site from the general use of the railway and also

from the use of chemicals on the allotments, although the risk from this is considered to be relatively low.

The results of the Preliminary Risk Assessment indicate that for potential site users the risks are considered to be low. The risk to construction workers and maintenance workers are considered to be moderate to low and should be confirmed during a suitable site investigation. The likelihood of aggressive ground conditions for concrete and of ground or landfill gas migration into confined spaces has been deemed to be high and requires assessment as does the risk to the groundwater and surface waters in the vicinity of the site.

The following advice on geotechnical aspects is preliminary only and will need to be revised following a suitable intrusive ground investigation on site and once the design of the platform has been developed. On the basis of the likely ground conditions at the site it is considered that shallow foundations may be a potential option at the site since investigations on the neighbouring park and ride site showed the bedrock to be at relatively shallow depth. In addition, drawings of the crib retaining wall neighbouring the site suggest that shallow foundations were used.

Should the shallow depth soils not be of sufficient strength and stiffness then a deeper foundation solution will be required and given the proximity of the neighbouring railway a replacement piling system will be most appropriate. At present loading information for the platform is not available, however a mini pile or screw pile option for lighter weight structures or a larger diameter pile for heavier precast, cast Insitu or blockwork structures. Alternatively ground improvement techniques may also be feasible, enabling the adoption of shallow footings on a platform of improved ground.

Groundwater at the site is likely to be relatively shallow and will therefore need management during deeper excavations.

1 Introduction

Ove Arup & Partners Ltd (Arup) have been commissioned by Network Rail to assess options for Bristol City Council for the proposed development of a new platform and associated station facilities on the Severn Beach branch line near Shirehampton, Bristol. As part of these services, Arup have been commissioned to carry out a Desk Study and Preliminary Risk Assessment as part of the (expand acronym) GRIP 2 Stage study.

The proposed platform and station facilities will be located approximately 500m to the north of the existing Shirehampton Station and will serve the existing local authority Park and Ride (P&R) site situated on the Portway (A4 road) near Junction 18 of the M5 and M49 motorways. The station and platform is intended to provide an alternative mode of transport to the existing bus service and to allow greater connectivity with areas of inner Bristol served by the Severn Beach branch line. At present the exact location of the station and platform has yet to be decided and four location options are being assessed.

This Desk Study and Preliminary Risk Assessment presents an overview of the setting of the site and potential risks associated with its development. As part of the report, a review of the site history, geology, surrounding land use and previous investigations on site has been undertaken, and preliminary geotechnical engineering advice has been provided with respect to the proposed development.

The findings of these assessments have been used to develop a site Conceptual Model and Preliminary Risk Assessment for the site, on the basis of which recommendations for further works have been made.

This Desk Study and Preliminary Risk Assessment has been prepared for and on behalf of Network Rail in response to their particular instructions. Except as for in our agreement with Network Rail, any other party using this information for any purpose whatsoever does so at their own risk and any duty to that party is excluded. The following report is based largely on a review of publically available historical and current information pertaining to the site and its surrounds, Arup accept no responsibility for the accuracy of these records.

2 Reviewed information sources

The following information has been reviewed in the preparation of this report:

- Published geological mapping (British Geological Survey, 2015);
- Published environmental information (EA, 2015);
- A GroundSure EnviroInsight and MapInsight report (GroundSure Ltd, 2014);
- A previous desk study of the site undertaken for Bristol City Council by Halcrow Group Ltd (Halcrow Group Ltd, 2013);

3 Site setting

3.1 Location and Description

The site of the proposed station options is located between the Severn Beach branch line and the existing park and ride facilities to the south of the A4 Portway Road, approximately 8km to the north west of Bristol City centre at approximate National Grid Reference ST 352385, 176829, see **Figure 1**.

The area of the proposed station options represents a thin ribbon of land running along the eastern edge of the Severn Beach branch line, measuring some 300m north west to south east and approximately 6m north east to south west. At present the site is predominantly covered with railway ballast along the boundary with the railway to the west and increasingly thick vegetation consisting of mature to semi mature trees and shrubs, brambles and rough grass towards its eastern boundary with the existing car park, which is separated from the site by a metal palisade fence.

Ground levels at the site appear to be relatively constant along the line of the railway, approximately 0.5 to 1.0m below the railway track level to the west. To the east the existing park and ride car park is approximately 2.0 to 3.0m higher than the site in the south and central portion of the site while to the north the car park site grades down to approximately the same level of the site. The difference in levels between the neighbouring park and ride site and the proposed platform locations is accommodated by a timber crib retaining wall.

The site is bounded to the north by further areas of vegetated trackside along the Severn Beach branch line, further to the north is West Town Road and level crossing, beyond which are the M5 flyover and an industrial park. To the north west of the site is a gravel covered depot/compound understood to be used by a crane hire firm. To the east the site is bounded by the existing park and ride services beyond which are the A4 Portway and residential areas of Shirehampton. To the south west the site is bounded by an area of mature to semi mature trees beyond which is Daisy Field, an open area of grassland and park. To the south the site is bounded by further areas of vegetated trackside along the Severn Beach branch line. To the west the site is immediately bound by the Severn Beach branch line railway, beyond this is an area of scrub vegetation and mud flats along the bank of the River Avon.

3.2 Proposed Development

At present only outline development proposals are in place. Bristol City Council desire a new railway platform and associated infrastructure to be sited along the Severn Beach branch line in a location easily accessible from the existing park and ride facilities on the A4 Portway. Currently four location options are being appraised, position A is the most northern location, and positions B, C, and D are progressively southwards of this location. The main driver for the location of the platform is understood to be signalling requirements, however ease of access from the park and ride is also a consideration. The proposed platform locations are presented on **Figure 2**.

3.3 Site History

The history of the site and surrounding area has been traced by reference to various editions of the Ordnance Survey maps.

A summary of the relevant features and changes on the first and subsequent editions of the OS is given in Table 1 below and relevant extracts are included with the GroundSure mapping in Appendix A.

Table 1 - Summary of Site History

Dates	On-site	Off-site
1880-1888	The site is partially occupied by a railway embankment in the west carrying the Bristol Port & Pier Railway in a north west to south east orientation and partially by fields and field boundaries marked with trees in the east. Four small ponds are noted south of the centre of the site. A mile post and signal post are noted on the railway embankment south of the centre of the site.	The area immediately surrounding the site is predominated by open agricultural land. Approximately 100m to the north of the site is an old clay pit. Three air shafts are noted approximately 700m to the north and northwest. Approximately 500m to the east of the site is the village of Shirehampton, while 200m to the south east is the village of Lamplighters. Immediately to the south west of the site is the Bristol Port & Pier railway which runs in a north west to south east direction, branching into numerous sidings approximately 500m to the north west where it serves the docks and wharfs of Avonmouth port. Immediately to the west a single railway track is situated at the top of the embankment. Beyond the railway are further fields and the River Avon running south east to north west. Approximately 100m to the north west of the site are several old clay pits and the Crown Bottle and Brick Works.
1902-1920	No significant change.	The area immediately surrounding the site is largely unchanged. By 1912 a larger clay pit is situated approximately 150m to the north of the site. The buildings and railways surrounding the docks and wharfs in Avonmouth have been expanded and a petrol storage works is now indicated approximately 500m to the north west of the site. Avonmouth iron works is now noted approximately 250m to the north west of the site on the banks of the River Avon. Some residential development has taken place in the area surrounding Shirehampton and in Avonmouth further to the north. From 1915 two railway tracks are indicated on the embankment to the west.
1938-1955	The fields forming the north eastern edge of the site are now marked as allotment gardens and the ponds in the central portion of the site are no longer shown.	Significant residential development has been undertaken in the area around Shirehampton, specifically in the area to the north and north east of the site. Among the numerous additions to the local road network, the A4 Portway is now indicated on the map. The petroleum storage works to the north of the site at Avonmouth docks is no longer shown and in its place a Mill building has been constructed, and further sidings have been added in the docks area. By 1951 two additional rail sidings are located on the embankment to the west.

1970	No significant change.	Little change is noted with the exception that the M5 is shown as being under construction approximately 500m to the north of the site.
1979-2002	No significant change.	Further residential development has been undertaken in the surrounding area. The major change has been the addition of the M5 motorway located approximately 150m to the north of the site running in a north east to south west direction and crossing the River Avon. Additional buildings have been constructed as part of Avonmouth docks/industrial area approximately 100m to the north west of the site on the bank of the River Avon. These include a works building with associated tanks or silos, a mill and warehouses. Further works buildings and industrial units are shown approximately 700m to the north of the site. By 1991 the railway sidings through the docks are no longer shown and additional industrial buildings are indicated in their place. In addition, the 1991 mapping shows that an area of housing immediately to the north east of the site has now been removed and the outline of the current northernmost park and ride car parks are indicated. By the late 1970's only a single rail track is located on the embankment to the west of the site, the others and sidings have been removed.
2002	No significant change.	Further additions have been made to the M5 junction and roundabout approximately 750m to the north of the site. The surrounding area has seen additional residential developments. Immediately to the north west of the site, beyond the railway, three long thin buildings are shown, it is considered that this represents the current crane company storage yard. The mill located 100m to the north west is no longer shown, but a depot is shown just to the north of its former location.
2010-2014	No significant change.	Little change is noted, the park and ride car park is now labelled immediately to the north east of the site.

3.4 Published Geology

The British Geological Survey – Map Sheet 264 Scale 1:50000 (British Geological Survey, 2004) indicates that artificial ground is present in the vicinity of the site. The mapping indicates that beyond the Severn Beach Branch line to the west and south west of the site the land bordering the River Avon is underlain by Made Ground. In addition, an area approximately 150m to the north west of

the site is incited as filled ground while an area approximately 250m to the north is indicated as worked ground.

Review of the historic mapping indicates that the area beyond the Severn Beach Branch line shows a gradual progression of a slope towards the River Avon from 1912 to 1979 possibly indicating progressive filling of this area during this time. In addition, the filled ground to the north west is shown as a clay pit on the 1920 edition map, while the 1938 edition no longer shows this feature suggesting that it was in-filled during this time. The worked ground to the north is likely to be another former clay pit, review of the mapping indicates that this was not in-filled and residential properties were constructed around the perimeter of the feature between 1938 and 1955. In addition, the historical mapping review also indicated that four ponds were present in the central portion of the site until the 1955 edition map where they were no longer shown, suggesting that they were filled.

Review of the superficial and solid geological mapping suggests the site is predominantly underlain by superficial tidal flat deposits comprising clay and silt with a possibility of head deposits underlying these comprising clay, silt, sand and gravel. Underlying the superficial deposits the solid geology is indicated as comprising the Mercia Mudstone Group, likely to be encountered as a stiff red clay in near surface exposures, grading to a red mudstone with subordinate siltstones and sandstones at depth. No faults are noted as being within 500m of the site boundary. An extract of the 1:50,000 Map is included in Appendix A of the Groundsure report.

3.5 Hydrogeology

The site does not lie within a Source Protection Zone and none are listed within 500m of the site boundary. No groundwater abstraction licenses, including potable water, are located within 800m of the site boundary. Abstraction licences listed between 800m and 1km of the site boundary include licenses for non-evaporative cooling and process water all located at Pen Pole, Bristol, due to the distance from site they are not considered to be in the likely zone of influence from site activities.

The superficial deposits on site have been classified by the Environment Agency as Unproductive Strata, these are deposits with low permeability that have negligible significance for water supply or base flow. The underlying bedrock on site has been classified by the Environment Agency as a Secondary B Aquifer indicating that the rock is predominately lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures.

3.6 Hydrology and Flooding

The nearest surface water feature to the site is listed as the River Avon, located approximately 200m to the south west at its nearest point. Numerous other minor surface water features are present as tertiary rivers and streams, feeding into the River Avon on its southern bank.

No surface water abstraction licenses are listed within 2km of the site boundary.

Biological and chemical quality data for the nearby River Avon was not available.

The site is not within a Zone 2 or Zone 3 Floodplain, however the land immediately to the south and south west of the Severn Beach Branch line is within a Zone 2 and Zone 3 floodplain, as is the area of Avonmouth docks to the north, through which the railway passes. In addition, the area of Avonmouth Docks to the north is indicated as an area benefitting from flood defences.

The superficial deposits on site are listed by the British Geological Survey as being susceptible to potential groundwater flooding at the surface. The confidence in this rating is moderate.

Due to the proximity of the site to identified flood plains and the site susceptibility to groundwater flooding, it is advised that a flood risk assessment is conducted for the site.

3.7 Mining and other geo-hazards

3.7.1 Mining activities

The Coal Authority database indicates that the site is not located within 1km of a coal mining area. It is known that the area of Avonmouth was formerly mined for coal, however, on the basis of the Coal Authority records these workings must be beyond 1km from the site boundary. Three air shafts are noted approximately 700m to the north of the site in the earlier editions of the Ordnance Survey mapping. It is unclear if these relate to underground coal mining or not based on the above Coal Authority Records.

Non coal mining activities are noted some 650m to the north east of the site where a local mineral vein was mined. Review of the historic and geological mapping indicates a quarry is present in this area but no mineral veins or workings other than this are shown. It is considered that due to their localised nature these activities will not have impacted on the site.

No mining activities relating to tin or clay mining are present within 1km of the site boundary.

Further details are included in the full report presented in Appendix A.

3.7.2 Cavities

No natural cavities or cavities created by brine or gypsum extraction are listed within 1km of the site.

3.7.3 Natural ground subsidence

The GroundSure report identifies:

- A low risk from shrink-swell clay within the area of the site due to the ground conditions exhibiting predominantly medium plasticity.
- A very low risk of landslides as slope stability problems are unlikely to be present based on the local site topography and ground conditions;

- A negligible risk from soluble rocks although they are present in the area they are unlikely to cause problems except under exceptional circumstances;
- A moderate potential of compressible deposits;
- A negligible risk of collapsible deposits as no indicators for collapsible deposits has been identified; and
- A moderate risk of running sand should water table rise or if sandy strata are exposed to water.

3.7.4 Radon

The GroundSure report indicates that the site is located in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level. However, in line with Buildings Research Establishment (BRE) guidance no radon protection measures are deemed necessary.

3.8 Environmental permits, incidents and registers

3.8.1 Environmental Permits

Two current Part B activities are located within 500m of the site boundary:

- Avonmouth Berths 5 & 6 West Wharf, Unloading Coal, Current Permit under Part B 210m to the east.
- Sevenways Petrol Service Station, Current Permit under Part B 470m to the north-east.

No historical IPPC or current Environmental Permits holders or Radioactive Substances Authorisations are located within 500m of the site.

3.8.2 Discharge Consents

A total of 40 discharge consents are located within 500m of the site boundary. The majority of the discharge consents relate to current and revoked discharge consents held by the local water company for discharge of storm water overflow into the River Avon. Aside from this are one revoked and one current discharge consent for water company pumping stations, one outfall of surface water from the M5, two site drainage discharges and two trade effluent discharges into the River Avon. None of the discharge consents, current or revoked, are considered likely to have impacted the site.

3.8.3 Planning Hazardous Substance Consents and Enforcements

A single Planning Hazardous Substance Consents and Enforcement is listed as being present 295m to the north west of the site. This consent relates to Dalgety Arable Ltd, Avonmouth mill, Victoria Road. Further details are not supplied. These consents are required for sites which hold certain volumes of hazardous substances. Although they indicate that significant volumes of hazardous

substances are held locally to the site, the consent also indicates that the impact of these substances to off site receptors has been assessed and that the substances are being stored and managed correctly. On this basis, the risk to the site is deemed to be minimal.

3.8.4 Pollution Incidents

Ten Environment Agency recorded pollution events are listed as having occurred within 500m of the site. All ten records relate to a location 479m to the north east of the site, predominantly dating from 2001 to 2003, and relate to the discharge of fumes, organic chemicals, inorganic chemicals, sewerage materials, atmospheric pollutants, diesel and non-identified pollutants. All recorded incidents resulted in minor impacts to either air, land or water. On the basis of the minor impacts recorded, the time elapsed since the last incident in 2003, and the distance from the site it is not considered that these incidents would have impacted on the site.

3.8.5 Landfill and Waste Management Sites

Two records of Environment Agency historic landfill sites exist within 1km of the site.

The first is listed as being present on land immediate to the east and south east of the site and is detailed as receiving commercial and household waste during a period from 1977 to 1973 (EA, 2015). This landfill is also listed in the British Geological Survey landfill data as receiving some toxic wastes.

The second is listed as being present 134m to the south west of the site, on land adjoin Station Road, the site was listed as receiving inert waste and operated from 1980 to 1982 when the license was surrendered.

Additional records of Local Authority landfill sites and Environment Agency Licensed waste sites are provided, however these are located at distances in excess of 845m from the site boundary and are therefore not considered likely to impact on the site. Further details of these sites are provided in the Groundsure Report included as Appendix A.

3.8.6 Current Industrial Land Uses

There are 40 current industrial land uses within 250m of the site. The nearest activities, within 100m of the site boundary include:

- Container storage approximately 15m to the north east and 38m to the south west.
- Construction and tool hire approximately 25m to the east.
- Waste storage and processing approximately 25m to the north east.
- An electrical sub station 68m to the north east.
- Vehicle component supply/storage 100m to the west.

Beyond 100m the following activities are considered pertinent to the review of the site surrounds:

- Electrical sub-stations 120m to the west and 127m to the north east.
- Numerous industrial products suppliers between 100 and 177m to the west of the site at Avonbank Industrial Centre.
- Vehicle servicing and repair facilities 145m to the west.

3.8.7 Underground High Pressure Oil and Gas Pipelines

The Government Pipeline Service System (GPSS) Aldermaston Pipeline is located approximately 200m to the north of the site where it passes below the Severn Beach branch line.

3.8.8 Designated sites

The following designated environmentally sensitive sites are listed within 500m of the site boundary:

- Severn Estuary is listed as a Site of Special Scientific Interest (SSSI), a Special Area of Conservation (SAC), a Special Protection Area (SPA), and a Ramsar Site. The nearest point to these areas from the site boundary is 110m to the south west.

3.9 Unexploded ordnance

No military activities have been identified within the site boundaries. However, Avonmouth docks are located approximately 700m to the northwest of the site which was a known target during the Second World War. In addition, it is also known that railways were also targeted during the Second World War and the site runs adjacent to the Severn Beach branch line. On this basis it is considered that there is potential for unexploded ordnance (UXO) to be present on site which will require assessment from a specialist UXO contractor.

4 Previous Investigations

It is understood that the site has not been subject to previous intrusive site investigations. However, the site has been the subject of a desk study previously undertaken as part of the proposed new station works by Halcrow Group Limited on behalf of Bristol City Council in 2013 (Halcrow Group Ltd, 2013). This report was based on factual data included in a previous desk study and environmental report undertaken for Phase I of the neighbouring park and ride site by Stanger Environmental Services in October 2000, and the results from two factual reports on ground investigations undertaken by CJ associates for Phase I and II of the park and ride scheme in 2000 and 2007 respectively.

Much of the desk study data included in the Halcrow report (Halcrow Group Ltd, 2013) was taken from the previous desk studies conducted for the park and ride site it is considered that the information is now out dated and superseded by the previous sections in this report. Nevertheless, the Halcrow report included a summary of the factual information on the ground conditions from the CJ Associates investigations on the park and ride site. It is considered that a review of this information is useful in the characterisation of the likely conditions present on the proposed station site and therefore pertinent information from these investigations is included in the following summary.

It should be noted that the copy of the Halcrow report Arup are in possession of does not include the full factual data from the site investigations undertaken on site. Therefore, the following review is based on a summary of the factual data by Halcrow.

4.1 Summary of the 2000 Investigations

A ground investigation consisting of six cable percussive boreholes (BH1 to BH6) excavated to depths of between 4.5 and 8.4m, and six machine excavated trial pits (TP1 to TP6) excavated to depths of between 0.3 and 1.6m was undertaken by CJ Associated Ltd in June 2000. The investigation was focused on the Phase I area of the park and ride, which comprises the current car park in the north east of the site and the bus pick up and drop off loop.

No groundwater monitoring, chemical or geotechnical testing was reported in the Halcrow report.

4.1.1 Encountered Ground Conditions

The ground conditions revealed by the works were generally as anticipated based on the published geology for the site. The following summary in **Table 2** is based on the geology in boreholes BH1, 3, 4, and 5 since these are closest to the proposed locations of the station platform.

Table 2 – Phase 1 Park and Ride Encountered Ground Conditions

Strata	Depth (m)	Typical thickness (m)	Description
Made Ground	0.0-3.7	3.1-3.7	Dark brown clay with ash, gravel, tarmac, brick, concrete fragments, cobbles and some timber.
Possible Head Deposits	3.3-7.5 (not encountered in BH5)	0.0-4.2	Firm red-brown sandy and silty clay with fine to medium gravel, occasionally more sandy.
Weathered Mercia Mudstone Group	3.1-8.1	0.6-1.1	Stiff to hard red-brown and grey-green silty fine sandy clay.
Mercia Mudstone Group	4.2-8.1	Not proven	Very weak to weak red-brown siltstone.

All boreholes were reported as being dry during the investigation, post site works monitoring was not conducted.

No records of visual or olfactory evidence of contamination were included in the summary presented by Halcrow.

4.2 Summary of the 2007 Investigations

A ground investigation was undertaken on the Phase 2 area of the park and ride site in August and September 2007 by CJ Associates Ltd. The Phase 2 area comprises the most recent car park additions to the park and ride scheme, located immediately to the east of the proposed station platform locations.

The investigation comprised nine window samples (BH1 to BH9) to depths of between 1.3 and 3.3m, 17 machine excavated trial pits (TP1 to TP17) to depths of between 0.8 and 3.65m, ten dynamic probe tests (DP1 to DP10) to depths of between 1.2 and 4.6m and a single soak-away test.

Standpipes for ground gas and groundwater monitoring were installed in WS1, WS2, WS7 and WS8 to depths of between 1.7m and 3.8m; exact details are not provided in the Halcrow review. The investigation included geotechnical and chemical testing of the site soils, the extent and nature of the tests are not provided.

The findings of the investigation were presented in a factual report and discussed in a full interpretive report which Halcrow reviewed but Arup have not been supplied. The following summary is therefore based on the review undertaken by Halcrow.

4.2.1 Encountered Ground Conditions

The encountered ground conditions revealed by the intrusive investigation generally agree with published geology for the site and are summarised in **Table 3**.

Table 3 – Phase 2 Park and Ride Encountered Ground Conditions

Strata	Depth (m)*	Description
Topsoil	0.05-0.69	Topsoil
Made Ground	0.5-1.15	Variable but mainly comprising sand, gravel or sandy gravelly clay with clinker.
Weathered Mercia Mudstone Group	0.0-0.7 (proven to depths of between 0.45 and 3.55)	Red brown sandy clay.
Mercia Mudstone Group	0.45-1.15	Red brown mudstone and siltstone.

*Thickness of strata was not reported in the Halcrow review.

The boreholes were stated as refusing in natural strata at depths of between 1.4m and 3.9m below ground level (bgl).

Groundwater was not encountered during the investigation except for a single seepage recorded in BH8 at 2.3m bgl (strata not detailed). Post site works monitoring indicated groundwater levels ranging between 2.16 and 2.24m bgl in BH7 and BH8, and no groundwater was encountered in BH1 and BH2.

No visual or olfactory evidence of contamination was encountered during the investigation.

4.2.2 Contamination Assessment

Chemical testing of the site soils was undertaken during the 2007 investigations, the factual data of this testing is not available for review. Halcrow summarised that generally low concentrations of contaminants were encountered with the exceptions of slightly elevated levels of arsenic and hydrocarbons. However, it is not clear what screening criteria were used to determine whether concentrations were elevated, the number of samples that were elevated, and the spatial distribution of these samples on site. The report notes that the assessment was based on limited sampling, and that the conclusion of CJ Associates Ltd was that the overall risk to future site visitors was relatively low, and that the materials excavated on site may be re-used for landscaped purposes subject to approval from the Local Authority.

It is understood that groundwater sampling and chemical testing was not undertaken during the investigation or as part of post site work monitoring.

Ground gas monitoring was undertaken following the site works, the number and frequency of monitoring rounds is not known. On the basis of the monitoring, CJ Associates Ltd concluded that there was a low to moderate risk of landfill gas being present on site. However, it is not clear how this conclusion was reached since the factual data from this monitoring is not available for review, or what a low to moderate risk actually represents.

4.2.3 Geotechnical Assessment

The investigation works undertaken by CJ Associates Ltd for the Phase 2 park and ride area included a geotechnical assessment to assist in the design of earthworks and the construction of the existing crib wall along the western boundary of the Phase 2 car park. The following presents a summary of the recommendations CJ Associates provided with respect to geotechnical design:

- Foundations to be placed a minimum of 1m depth into firm sandy gravelly clays of the weathered Mercia Mudstone Group.
- Made Ground, loose or soft ground to be excavated and replaced with compacted granular material or lean mix concrete.
- Allowable bearing capacity calculated for a strip footing as being 100kPa for a 1.5m strip, based on a factor of safety of 3, and undrained shear strength of 55kPa and groundwater at 2.0m depth.
- Assuming foundation loading equal to the allowable bearing pressure, settlement estimated to be between 5 and 20mm for foundations between 0.6m and 1.5m wide.
- Well graded granular backfill to the rear of the crib wall is required, with consideration for drainage of backfill.
- Design sulphate class DS1-ACEC-1s
- Weathered Mercia Mudstone Group classifies as Class 2A to Class 2C in accordance with the Specification For Highways Works Series 600.
- The site materials are susceptible to moisture content, earthworks trials were recommended and works recommended to be undertaken in the drier months.
- The site materials were classed as frost susceptible, a minimum capping layer of 450mm was recommended or the use of geotextiles.
- Underlying soils are unsuitable for use for soak-away drainage.

The above recommendations are as presented in the Halcrow report and based on factual data contained within the CJ Associates report which has not been reviewed by Arup. On this basis no assurance can be given to the accuracy of the above conclusions.

In addition to the above geotechnical recommendations, the Halcrow report includes indicative details of the crib wall construction. As constructed drawings were not available. The drawing is present as **Figure 3** and main elements are summarised below:

- Engineered fill was used to construct the car park platform at a higher elevation than the previous ground level and the proposed station platform site.
- The crib wall was constructed to retain the parking platform above the level of the adjacent railway and site of the proposed station platform.

- Concrete strip footings are indicated on the drawings, lean mix concrete or Type 1 sub base was to be used to replace soft material at foundation formation level.
- A wedge of well graded granular material is indicated to the rear of the crib wall. Halcrow report that Bristol City Council confirmed that this was formed from Class 6N selected granular fill, compacted in line with the Specification for Highways Works Series 600.
- Halcrow report that Bristol City Council confirmed that the general fill for the car park formation was imported fill Class 6F5 comprising recycled aggregates. Existing excavated soils at the site are understood to have been unsuitable for use in compacted earthworks and were disposed off site.

5 Geo-environmental: Conceptual Site Model

5.1 Introduction

A conceptual site model (CSM) describes the scenario in which the risks to human health and the environment (posed by contaminated land) are assessed. It describes the ground and surface conditions, the proposed ground works and the final form of the development. In particular the CSM identifies and describes the sources of the potential contamination, the behaviour of the contamination in the environmental media such as soil and groundwater, surface water and air. It also identifies and characterises potential human health and environmental receptors, and plausible pathways.

The potential risks to human health and the environment have been considered in the context of a conceptual source-pathway-receptor (SPR) model of the site, identifying:

- The principal pollutant hazards associated with the site (the sources);
- The principal receptors at risk from the identified hazards; and
- The existence, or absence, of plausible pathways which may exist between the identified hazards and receptor.

For risks to be present at the site, all three elements (source-pathway-receptor) of a plausible pollutant linkage must be present. Potential SPR linkages are described below based on the proposed site end-use.

5.2 Outline Conceptual Model

This section presents the outline conceptual model for the site of the proposed platform based on the review of all available environmental information.

The site of the proposed platform has not been finalised yet, currently four location options are being appraised along a thin strip of land running between the eastern edge of the Severn Beach branch line and the western edge of the existing park and ride facility on the A4 Portway. The area encompassing the four location options is approximately 300m long in a north west to south east direction and 6m wide in the north east to south west direction. The site is predominantly covered with railway ballast and thick vegetation.

The site is bounded to the north by further areas vegetated track side along the Severn Beach branch line, beyond which is West Town Road level crossing, the M5 flyover and an industrial park. To the north west of the site is a gravel covered compound used by a crane hire firm. To the east the site is bounded by the existing park and ride car park beyond which is the A4 Portway and residential areas of Shirehampton. To the south west the site is bounded by vegetation and Daisy Field recreational ground, to the south by further areas of trackside along the railway. To the west the site is bounded by the railway, beyond which are open areas of vegetation and scrubland, mud flats and the River Avon.

Review of the historic mapping indicates that the site has been partially occupied by the Severn Beach branch line since the earliest edition Ordnance Survey

mapping of 1880. The north eastern part of the site was occupied by open agricultural land until the early 1900's when this was replaced with allotments. The neighbouring park and ride facility was added during the period from 2000 to 2010. With the exception of Avonmouth docks approximately 700m to the north, the area surrounding the site was predominantly comprised of open agricultural land until the early 1900's when the A4 Portway was completed and significant residential development of the surrounding area occurred. Avonmouth docks to the north of the site has seen numerous industrial land uses including a bottle works, iron works, mill buildings, depots, warehouses and most notably as a petroleum storage works.

The proposed works will involve the construction of a new platform and associated station facilities which will provide the park and ride users with an alternative mode of transport to the city centre and its environs. The exact location and construction of the proposed platform is currently being appraised.

A review of the published geology and information gained during previous investigations on the neighbouring park and ride site indicates that the site is likely to be underlain by a thickness of Made Ground associated with former site uses and the construction of the railway embankment. Beneath this Made Ground there is a potential for recent superficial tidal flat deposits to be present on site. Although these were not encountered during the site investigation works on the neighbouring park and ride site, the proposed station site is closer to the River Avon and therefore more likely to exhibit these deposits. Beneath the tidal flat deposits it is possible that head deposits will be encountered, underlying these is the weathered mantle of the Mercia Mudstone Group.

The site does not lie within a Source Protection Zone and none are listed within 500m of the site boundary. No groundwater abstraction licenses, including potable water, are located within 800m of the site boundary.

The superficial deposits have been classified by the Environment Agency as Unproductive Strata while the bedrock at the site is classed as a Secondary B Aquifer indicating that the rock is predominately lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures

The nearest major surface water feature is listed as the River Avon, approximately 200m to the south west. No surface water abstractions are listed within 2km of the site boundary.

At present infiltration is considered to be high due to the majority of the site being covered by either vegetation or railway ballast. It is considered that infiltration will reduce at the site post development due to the proposed site cover

An Environment Agency historic landfill record exists for a landfill immediately to the east and southeast of the site, in the location of the current Daisy Field recreation ground. The landfill is listed as receiving commercial and household waste, however the landfill is also listed under the British Geological Survey records as receiving toxic wastes.

To date, chemical testing of the soils on site for potential contaminants has not been undertaken. However, as part of the CJ Associates investigation of the neighbouring park and ride site limited chemical testing of the site soils was undertaken. The results of the chemical testing are not available for review,

however it has been reported by others (Halcrow Group Ltd, 2013) that elevated levels of arsenic and hydrocarbons were encountered on site.

Based on the site history it is considered that there is a potential for contamination to be present on site. Although for much of its history the site was partially occupied by agricultural land which would not be considered to present a contaminative land use, the neighbouring railway may have impacted the site with contaminants. In addition, the change in use from agricultural land to allotments in the early 1900's may well have introduced a further source of contamination in the form of pesticides and herbicides which may have been used during this time and could be responsible for elevated arsenic levels as seen on the neighbouring park and ride site. Elevated levels of hydrocarbons may be present from the use of ash on the allotments and the periodic burning of waste. More recently the neighbouring park and ride could have introduced additional contaminant loading to the site in the form of leaks and spills from parked vehicles, although given the likely site drainage and low permeability of the site soils this is considered to present a low risk.

Off site sources such as the industrial land uses present in Avonmouth docks are considered unlikely to have impacted the site due to their distance from the site (approximately 700m). Potential for sub surface migration of contaminants from these sources is considered to be low based on the likely low permeability of the soils in this area and the likely direction of groundwater flow towards the River Avon and not up river in the direction of the site. Records for a historic landfill at Daisy Field recreational ground immediately to the east and south east of the site exist, it is considered that this may be a source of subsurface contamination and generation of ground/landfill gas which may impact the site.

5.3 Potential Contamination Sources

From review of the exiting environmental information pertaining to the site, the following potential sources of contamination have been identified:

Potential Source	Potential Contaminants/risks
On Site	
Made Ground (from creation of the railway embankment).	Metals, asbestos, organics including Total Petroleum Hydrocarbons (TPH) and Polycyclic Aromatic Hydrocarbons (PAH).
Railway Sidings and Rail Tracks. General rail land	TPH, PAH, fuel oils, lubricating oils, greases, solvents, paints, heavy metals, asbestos, phenols and creosote considered likely contaminants associated with the site use. Possible historic herbicides used to control growth on tracks and sidings.
Allotment land use	Possibly heavy metals, herbicides and pesticides, TPH and PAH.
Underlying Made Ground and natural geology containing organic deposits. Although not contamination, high sulphate levels may be present in the underlying strata.	Ground gas associated breakdown of organics. Attack on building materials from sulphates.

Off Site	
Spills/Leaks from vehicles on neighbouring car parking, access roads, and migration into possible defective surface water drainage.	Organic contaminants (petrol or diesel) from leaks or spills from vehicles.
Neighbouring landfill on Daisy Field, migration of contaminants in the sub surface, migration of ground gas/landfill gas	Possible leachate generation and migration to include heavy metals, hydrocarbons, inorganics, migration of landfill gas.

It is considered that the above sources are likely to reflect a worst case scenario and that the actual likelihood of contamination being present on site is low.

5.4 Receptors

The receptors considered to be relevant to any contamination on site are as follows:

- Site end users at the station and platform.
- Construction workers involved in the proposed development
- Site maintenance workers post development
- Controlled waters, i.e. groundwater and surface waters.
- Building materials used in the proposed development.
- Off-site workers and park and ride users (residents off site are considered too distal to be of risk).
- Off-site ground waters and surface waters (River Avon).

5.5 Pathways

For a risk to exist the source and receptor must be connected by a viable pathway. Potential pathways by which human and environmental receptors may be impacted upon are as identified below:

Ingestion of contaminated soils and dust: During construction of the proposed development, site workers who are dealing closely with excavated soils may come into contact with contaminants through ingestion of soils and dust.

Site end users; workers, or occupants of the neighbouring areas may be impacted by the ingestion of soils and dust should areas of open soils be present post development, or dust be created during development.

Dermal Contact with soils and Dust: During site development, site workers who are engaged in ground works and handling of excavated soils/earthworks materials may come into skin contact with impacted soils. Following redevelopment, maintenance workers may also come into direct skin contact with shallow soils.

Site end users; workers, guests, or occupants of the neighbouring areas may be impacted by the dermal contact with soils and dust should areas of open soils be present post development, or dust be created after development.

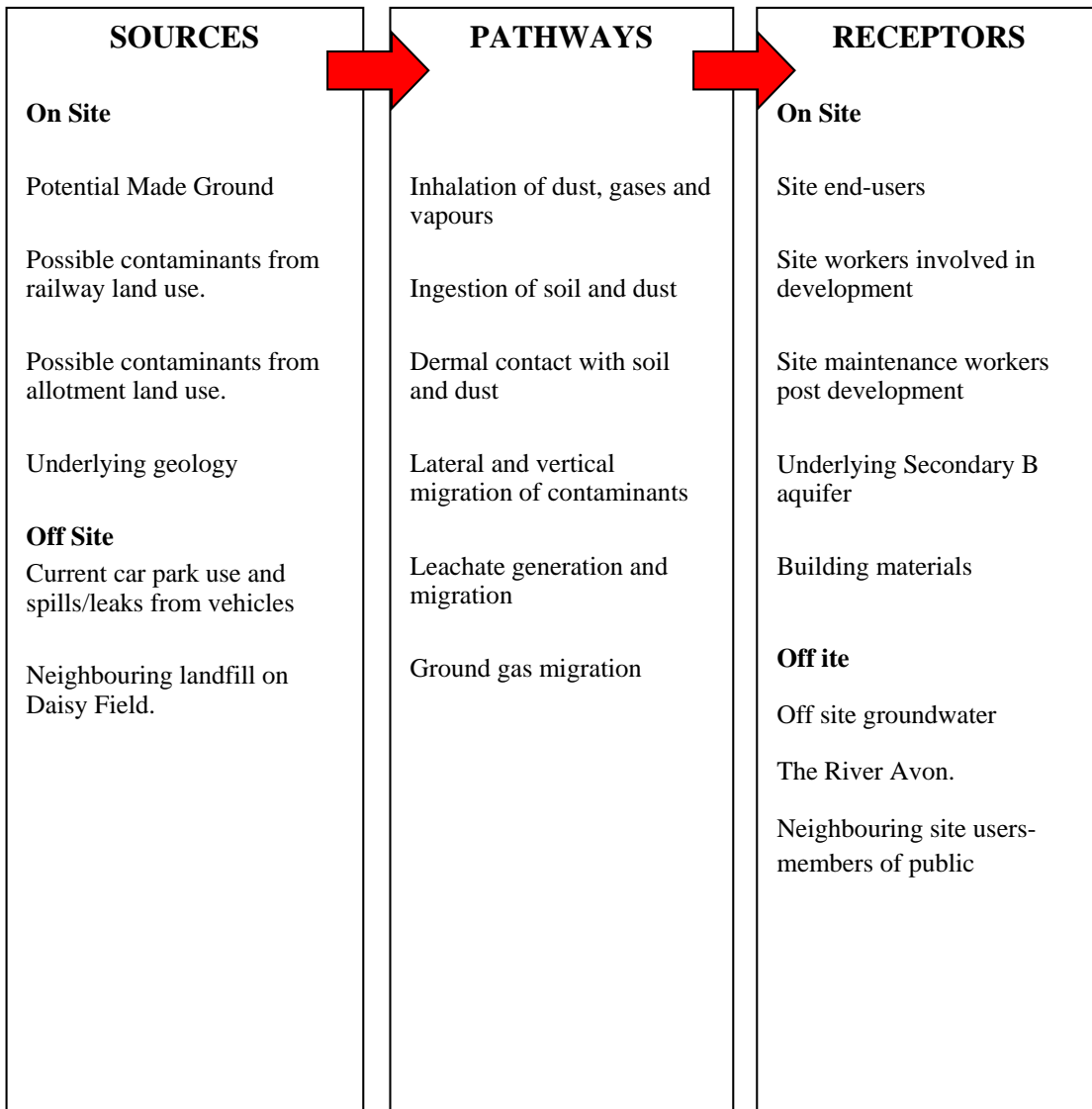
Inhalation of vapours, dust and Gases: Volatilisation of hydrocarbon products and the emission of soil gases including carbon dioxide, methane, or other toxic and explosive gases may occur in the subsurface and be present in both indoor (equipment cases, enclosed station structures) and outdoor air (particularly where organic contamination is present) . Ground gas, potentially generated by any Made Ground and underlying geology beneath the site and the neighbouring landfill may migrate into confined spaces.

Generation of dust through excavation works may impact construction workers and site neighbours.

Lateral and Vertical Migration of Contaminants: Contaminants released to the ground through spillage or leaks may migrate vertically or laterally through the underlying strata; particularly within any granular layers in the tidal flat or head deposits. Service corridors, existing and proposed may provide preferential pathways for such contamination to migrate.

Leachate Generation and Migration: There is potential for the generation and migration of leachate from impacted soils, which may enter and migrate within underlying groundwater bodies and preferential pathways as identified above.

5.6 Conceptual Site Model Summary



6 Geo-environmental: Preliminary Risk Assessment

The purpose of this section is to decide whether or not risks associated with the proposed development of the site are acceptable, and if not to determine the need for further action.

The following method of risk evaluation is a qualitative method of interpreting the SPR linkages identified in the CSM and is based on guidance given in CIRIA C552 (CIRIA, 2001) and involves the classification of the magnitude of the potential consequence (severity) of a risk occurring and the magnitude of the probability of the risk occurring.

Once the consequence and probability have been classified these can then be compared to produce a risk category. The basis of this assessment has been extracted from CIRIA C552 (CIRIA, 2001). The identification and justification of the SPR linkages and the associated risk classification are presented in below.

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
On Site Potential Made Ground Possible residual contamination from railway use. Possible residual contamination from allotment use. Underlying geology	End site users: Passengers	Direct dermal	Unlikely	Medium	Low risk	It is considered that there is a risk of contaminated soils on site. However, post development it is considered that site will be covered with a platform structure and hard landscaping. On this basis the direct dermal and ingestion pathways are not viable. Vapour pathways could be present and could pose a risk to site users, however given the low likelihood of significant levels of volatiles being present on site, and the open air nature of the platform, the likelihood is considered to be low. Ground gas from underlying geology and nearby landfill is a potential and therefore the gas regime on site will require assessment. It is considered unlikely that end site users or maintenance workers will come into contact with potentially contaminated groundwater.
		Ingestion	Unlikely	Medium	Low risk	
		Inhalation of vapours	Low likelihood	Medium	Moderate/low risk	
		Contact with contaminated groundwater	Unlikely	Medium	Low risk	
Off Site Spills/leaks from vehicles on	Construction and maintenance workers	Direct dermal	Likely	Medium	Moderate risk	Constructions workers will be exposed to site soils during site construction works. Maintenance workers may also be exposed should works be required on site that break the surface. However, exposure duration will be short term only. Use of PPE and good hygiene practice throughout the construction phase is considered sufficient to mitigate risks presented.
		Ingestion	Likely	Medium	Moderate risk	
		Inhalation of vapours	Likely	Medium	Moderate risk	

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
neighbouring car parking areas. Neighbouring landfill recorded on Daisy Field.		Contact with contaminated groundwater	Low likelihood	Medium	Moderate/low risk	It is considered possible that shallow groundwater will be encountered during the construction works since previous monitoring has shown it to be at shallow depth below existing site levels. However, works may not be required to this depth (approx. 2.0 m bgl) and therefore the likelihood of contact has been assessed as low. Ground gas from underlying geology and nearby landfill is a potential and therefore the gas regime on site will require assessment.
	Perched / deep groundwater body	Leaching into groundwater and subsequent flow beneath site	Low likelihood	Medium	Moderate/low risk	Currently potential for leaching of soil contaminants into the sub surface and groundwater, however the likely low permeability of the site soils will reduce migration potential. Post development it is considered to be reduced due to the presence of site cover and drainage.
		Preferential pathway for migration through existing and historic service runs	Low likelihood	Medium	Moderate/low risk	
	Building materials	Direct contact with building materials - corrosion and ground gas migration	Likely	Severe	High risk	Possible chemical attack of concrete (sulphates) requires assessment. Corrosion and decay of building materials will result in a severe consequence, as will gas migration and accumulation.

Potential Source	Potential Receptor	Possible Pathway	Likelihood	Severity	Risk	Comment
	Surface water	Surface water run off	Low likelihood	Medium	Moderate/low risk	Considered to be unlikely given the distance to the nearest surface waters and the presence of both current and proposed surface water drainage.
		Leachate and migration within subsurface	Low likelihood	Medium	Moderate/low risk	During construction surface water management procedures will be required. Generation of leachate is considered possible at present due to surface cover but considered to be limited mobility in low permeability soils.
	Off-site residents and workers	Ingestion and inhalation of airborne dust	Low likelihood	Medium	Moderate/low risk	Considered dust suppression measures will be adopted during works to limit this risk.
	Off-site surface waters	Deposition of airborne dust	Unlikely	Medium	Low risk	
	Off-site groundwater	Migration of contaminated site groundwater	Unlikely	Medium	Low risk	Contaminated groundwater beneath the site is considered to be unlikely given the previous and current site use.

6.1 Preliminary Risk Assessment Conclusions

The risk evaluation of what are considered viable SPR linkages indicates that for site end users of the development the risks are generally considered to be low. This consideration is made on the basis that the main sources of contamination on site are considered to be the Made Ground soils and residual contamination from the previous site uses, and that future site users are unlikely to come into contact with these source once the site has been developed. The vapour gas inhalation pathways are still present but are considered unlikely due to the likely open air nature of the site. This would require re-assessment if enclosed structures were proposed.

The risk to construction and maintenance workers have generally been classified as moderate. This is based on the fact that there is a possibility of contamination being present on site and the likelihood of construction and maintenance workers coming into direct contact with the site soils. It is considered that there is a low likelihood of the construction and maintenance workers coming into contact with the site groundwater, although a small possibility does exist if it is encountered during the site works since previous investigations indicated that it was relatively shallow at approximately 2.0 m bgl. The exposure duration is likely to be short term, and the potential risks could be mitigated by the use of PPE and site welfare. Nevertheless, sources of contamination have been identified on site and in the absence of chemical data this risk class cannot be confirmed, hence the moderate/low risk.

The potential for the attack of corrosive contaminants on building materials has been deemed a high risk on the site, due to the severity of consequences of corrosion and deterioration of building materials and the likelihood of encountered high sulphate levels. The likelihood of gas generation is also considered in this scenario, it is considered possible that the underlying geology may contain sources of ground gas, in addition the risk of landfill gas potentially migrating onto site from the neighbouring Daisy Field requires assessment.

The risk to off-site residents and workers from inhalation of airborne dust has been classified as moderate to low as it is anticipated that dust suppression measures will be employed during the site works. For this same reason, the risk to surface waters from deposition of airborne dust is also considered to be moderate to low.

Groundwater beneath the site within the Secondary B Aquifer is considered to be a relatively low sensitivity receptor. In addition, the overlying deposits are classified as Unproductive strata indicating a general low permeability providing some protection to vertical contaminant migration. Lateral migration is also considered unlikely on account of the anticipated low permeability of the underlying clay dominated strata. In addition, the likely impact of contamination on the surface waters in the vicinity of the site are also considered to be low due to the likely low permeability of the underlying strata and the distance to the nearest surface water receptor.

Overall the risk to identified receptors from contamination is considered to be low. However, little is known as to the contaminative nature of the subsurface of the site including the groundwater. This will require investigation and assessment prior to confirmation of the risk class.

An assessment of the site soils for the potential re-use on site or disposal off site to a licenced waste facility will also be required as part of future investigations on site.

7 Engineering Discussion and Recommendations

7.1 Geotechnical recommendations

The following discussion is based on published information on the site geology (British Geological Survey, 2015) and on the factual data from previous intrusive investigations undertaken on the neighbouring park and ride site as reported by Halcrow (Halcrow Group Ltd, 2013). The following discussion and recommendations are preliminary and will be revisited following a suitable intrusive ground investigation.

7.1.1 Foundations

Previous investigations undertaken on the neighbouring park and ride site have indicated that the weathered mantle of the Mercia Mudstone Group is located relatively close to the surface (0.0 to 0.7 m bgl). In addition, drawings of the crib wall construction included in the Halcrow report (Halcrow Group Ltd, 2013) indicate that shallow strip foundations were potentially utilised. Photographs of the crib wall construction supplied to Halcrow by Bristol City Council (Appendix B) also suggest that these strip footings were adopted. The location of the crib wall toe is relatively close to the proposed locations of the platform, and therefore shallow depth foundations may be an option for the proposed platform.

Nevertheless, review of the BGS mapping for the site indicates that the location of the proposed platform is close to the boundary between the Mercia Mudstone Group and the overlying tidal flat deposits increasing the possibility that the site will be underlain by a thickness of softer lower strength soils. Depending on their thickness, strength and stiffness characteristics, these softer tidal flat deposits may preclude the use of shallow foundations and a deeper foundation option may be required.

In case a deep foundation solution is required, it is likely that a replacement piling system will be more appropriate. Given the proximity to nearby rail infrastructure it is considered unlikely that driven piles would be suitable due to the potential vibration and disturbance during installation. At present loading information for the station platform is not available, however, a mini pile or screw pile option for light weight prefabricated structures may be suitable, while heavier precast, cast *in situ*, or blockwork structures may require larger diameter piles.

As an alternative to a piled foundation option, ground improvement may be suitable at the site. Vibratory based methods would need to be avoided due to the sensitivity of nearby rail infrastructure to movement, however non vibratory methods such as Controlled Modulus Columns may be suitable. The principle behind ground improvement is bulk improvement of the soil properties across the site enabling the adoption of shallow depth footings founded in the improved ground.

7.1.2 Earthworks

At present it is not known if significant earthworks will be required. However, spoil resulting from excavations within the Mercia Mudstone Group should be suitable for use as general fill. Spoil resulting from excavations in tidal flat deposits are unlikely to be suitable for use as fill without treatment, however may be suitable for fill to landscaping areas should these be proposed.

7.1.3 Groundwater control

Groundwater monitoring from past investigation suggests that groundwater was encountered regularly within 2.0 m of the ground surface and thus it should be expected that groundwater ingress will occur below this depth.

During the investigation works groundwater was generally not encountered or if encountered was present as a seepage only (BH8). On this basis it is likely that excavations could be kept dry by pumping from a suitably located sump. A discharge consent would be required for discharge of this water from the Environment Agency.

7.1.4 Sulfates and concrete attack

Previous investigations on the neighbouring park and ride site suggest that the soils on this site are not particularly aggressive to concrete and were classified as DS1, ACEC-1s in accordance with BRE guidance (BRE Construction Division, 2005). Nevertheless, the Mercia Mudstone Group are identified as a sulphide and sulphate bearing strata and further testing of the site soils would be recommended to confirm their aggressivity.

7.2 Outline ground investigation scope

Prior to further design development a full ground investigation will be required. An outline scope of investigation is provided below:

- 2No dynamic sampled boreholes with rotary follow on to approximately 10 m depth.
- 3No. window sampler boreholes to approximately 5 m depth along the proposed length of the station platform with combined gas and groundwater standpipes.
- 5No. machine or hand excavated trial pits to investigate the shallow ground conditions.
- *In situ* geotechnical tests including SPT's in all exploratory holes at 1m intervals to a depth of 5 m and 1.5 m intervals below 5 m.
- Samples should be taken where possible for associated geotechnical and geo-environmental laboratory testing.

The exact scope for these can be developed once more detailed plans of the proposals have been received.

The ground investigation will need to be detailed and specified in accordance with current standards and industry best practice.

8 References

- BRE Construction Division. (2005). *Concrete in aggressive ground (Special Digest 1:2005 3rd edition)*. Watford: BRE Bookshop.
- British Geological Survey. (2004). *Geology of Britain Map - Sheet 264 Bristol. Drift and Bedrock Edition 1:50000 scale*. Nottingham, UK: BGS.
- British Geological Survey. (2015, 1 21). *BGS Geology of Britain viewer*. Retrieved from British Geological Survey website: <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>
- CIRIA. (2001). *C552 - Contaminated Land Risk Assessment*. London: CIRIA.
- EA. (2015, 1 21). *EA - What's In Your Backyard*. Retrieved 05 12, 2014, from Environment Agency: <http://apps.environment-agency.gov.uk/wiyby/default.aspx>
- GroundSure Ltd. (2014). *GroundSure EnviroInsight MapInsite*. GroundSure.
- Halcrow Group Ltd. (2013). *Geotechnical Desk Study - Portway Park and Ride Proposed Rail Platform*. Swindon: Halcrow Group Ltd.

Figures

Figure 1 – Site Location Plan

Figure 2 - Proposed Platform Location Options

Figure 3 - Crib Wall Design



bing™

© Getmapping plc © 2015 GeoEye © 2015 Intermap Earthstar Geographics SIO © 2015 Microsoft Corporation

Legend

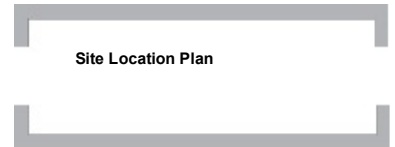
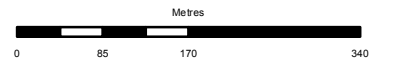
 Site Boundary

P0	2015-02-04	ST	ST	ST
Issue	Date	By	Chkd	Appd

ARUP

Client
Network Rail

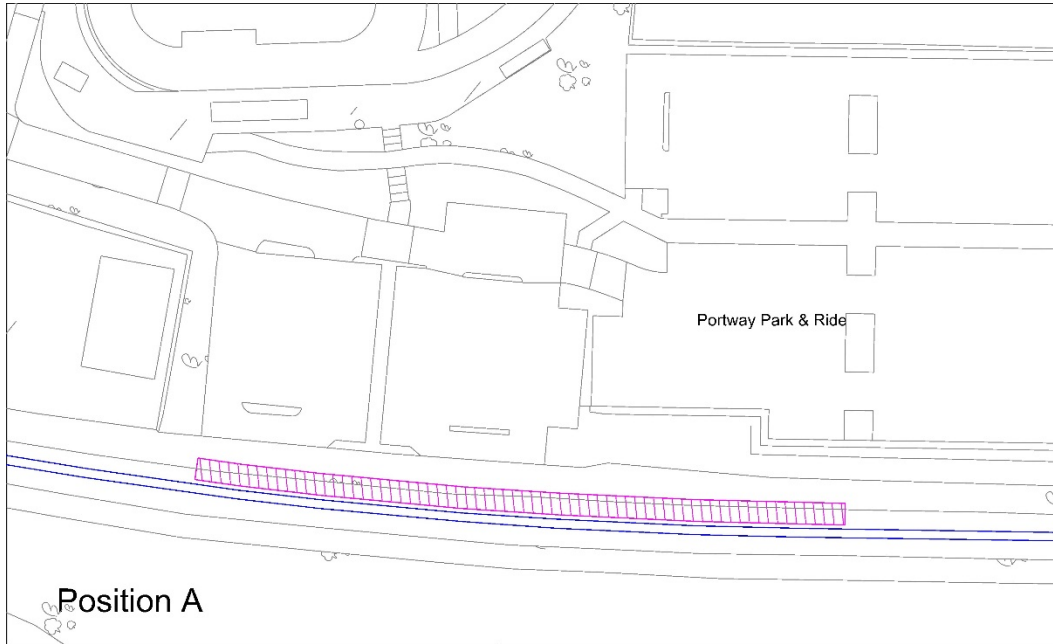
Job Title
Portway Station

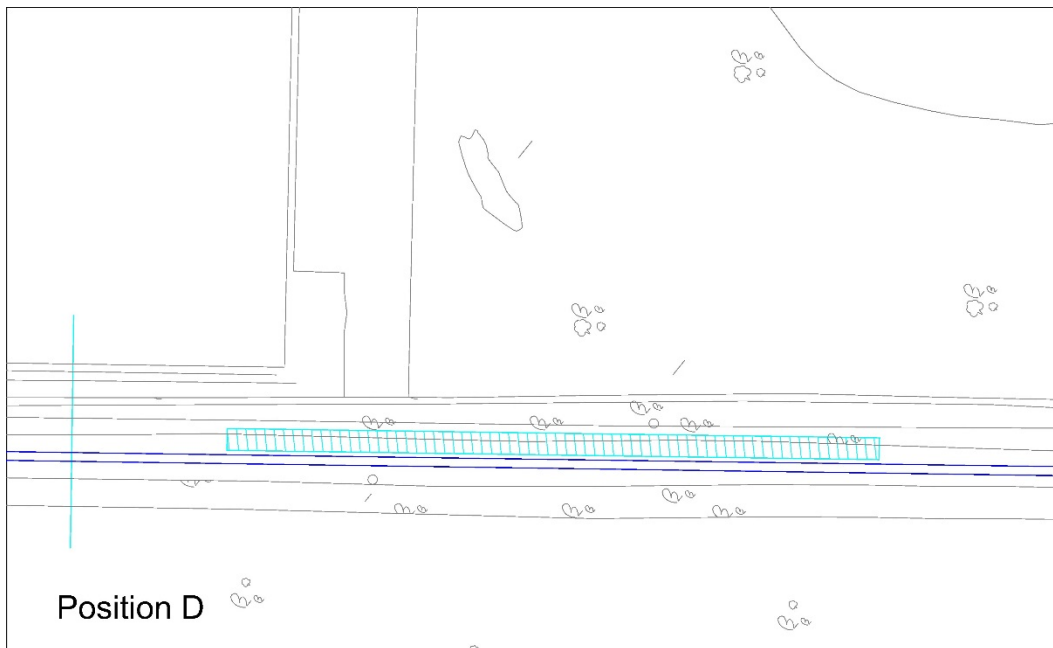


Scale at A4
1:7,500

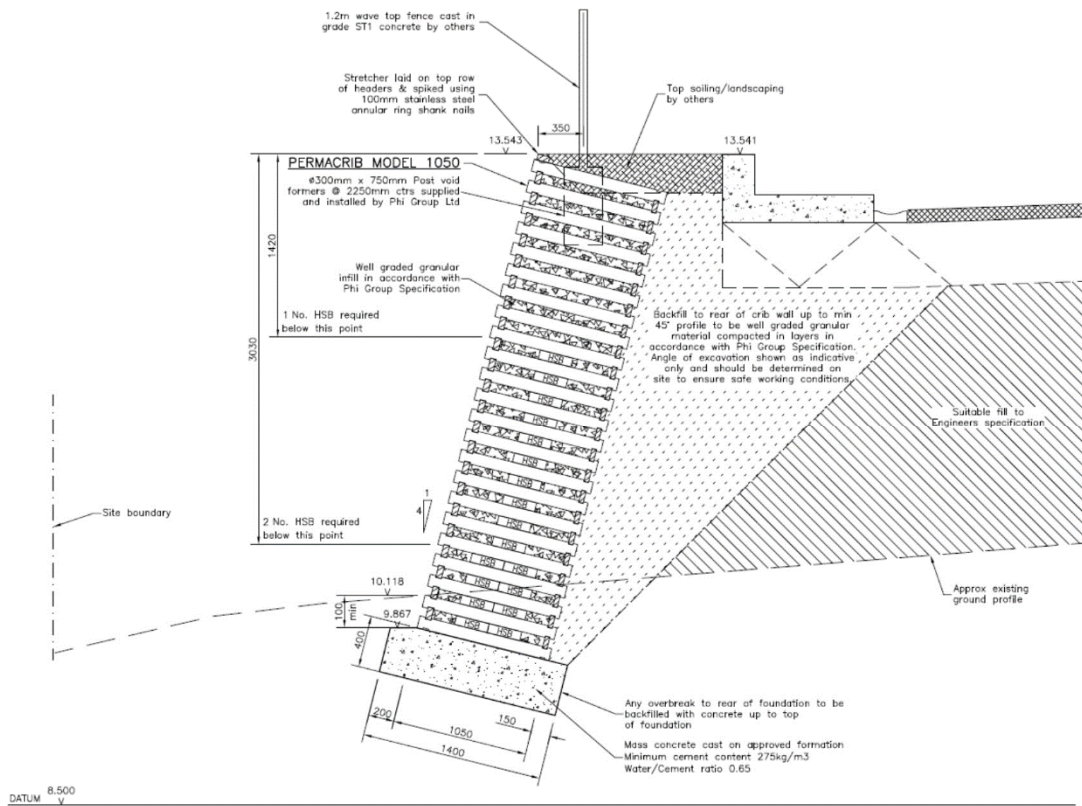
Job No 239240-00	Drawing Status Issue
Drawing No Figure 1	Issue P0

Potential Platform Locations

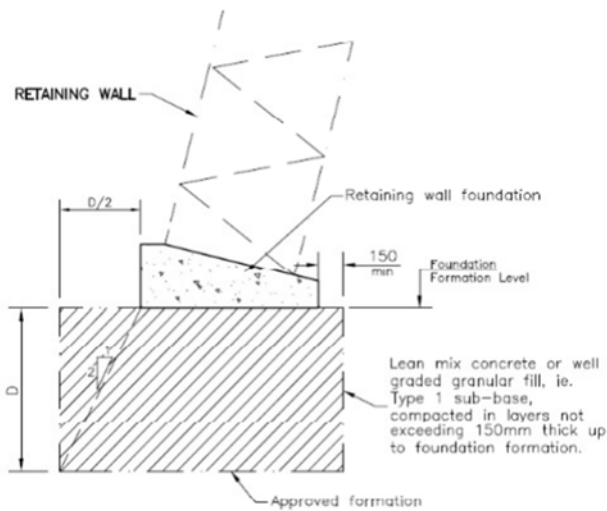




Crib Wall Design Extract



TYPICAL SECTION A-A (MODEL 1050)
SCALE: 1:20



TYPICAL DETAIL SHOWING REPLACEMENT OF SOFT
MATERIAL AT FOUNDATION FORMATION LEVEL
SCALE: 1:20

Appendices

Appendix A – Groundsure Report

Ove Arup & Partners Ltd
OVE ARUP & PARTNERS, 63 ST. THOMAS
STREET,
BRISTOL, BS1 6JZ

GroundSure Reference: GS-1812519

Your Reference: Portway

Report Date 11 Dec 2014

Report Delivery Method: Email - pdf

GroundSure EnviroInsight

Address: 352475 176752,

Dear Sir/ Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure Enviroinsight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above GroundSure reference number.

Yours faithfully,



Managing Director
Groundsure Limited

Enc.
GroundSure EnviroInsight



GroundSure Envirolnsight

Address: 352475 176752,
Date: 11 Dec 2014
Reference: GS-1812519
Client: Ove Arup & Partners Ltd

NW

N

NE

W

E



SW

S

SE

Aerial Photograph Capture date: 01-Jun-2009
Grid Reference: 352404,176778
Site Size: 5.54ha

Contents Page

Contents Page	3
Overview of Findings.....	5
Using this report.....	9
1. Environmental Permits, Incidents and Registers Map.....	10
1. Environmental Permits, Incidents and Registers.....	11
1.1 Industrial Sites Holding Licences and/or Authorisations.....	11
1.1.1 Records of historic IPC Authorisations within 500m of the study site:.....	11
1.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:.....	11
1.1.3 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:.....	11
1.1.4 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:.....	11
1.1.5 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:.....	11
1.1.6 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:.....	12
1.1.7 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:	12
1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations:.....	12
1.1.9 Records of Licensed Discharge Consents within 500m of the study site:.....	12
1.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:.....	16
1.2 Dangerous or Hazardous Sites.....	17
1.3 Environment Agency Recorded Pollution Incidents.....	17
1.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:.....	17
1.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:.....	18
1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990.....	18
2. Landfill and Other Waste Sites Map.....	19
2. Landfill and Other Waste Sites.....	20
2.1 Landfill Sites.....	20
2.1.1 Records from Environment Agency landfill data within 1000m of the study site:	20
2.1.2 Records of Environment Agency historic landfill sites within 1500m of the study site:	20
2.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:.....	21
2.1.4 Records of Local Authority landfill sites within 1500m of the study site:.....	21
2.2 Other Waste Sites.....	21
2.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:	21
2.2.2 Records of Environment Agency licensed waste sites within 1500m of the study site:	21
3. Current Land Use Map.....	24
3. Current Land Uses.....	25
3.1 Current Industrial Data.....	25
3.2 Petrol and Fuel Sites.....	27
3.3 Underground High Pressure Oil and Gas Pipelines.....	27
4. Geology.....	28
4.1 Artificial Ground and Made Ground.....	28
4.2 Superficial Ground and Drift Geology	28
4.3 Bedrock and Solid Geology	28
5. Hydrogeology and Hydrology.....	29
5a. Aquifer Within Superficial Geology.....	29
5b. Aquifer Within Bedrock Geology and Abstraction Licenses.....	30
5c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses.....	31
5d. Hydrology Source Protection Zones within confined aquifer.....	32
5 e. Hydrology – Detailed River Network and River Quality.....	33
5. Hydrogeology and Hydrology.....	34
5.1 Aquifer within Superficial Deposits.....	34
5.2 Aquifer within Bedrock Deposits.....	34

5.3 Groundwater Abstraction Licences.....	35
5.4 Surface Water Abstraction Licences.....	37
5.5 Potable Water Abstraction Licences.....	38
5.6 Source Protection Zones.....	38
5.7 Source Protection Zones within Confined Aquifer.....	38
5.8 Groundwater Vulnerability and Soil Leaching Potential.....	39
5.9 River Quality.....	39
5.9.1 Biological Quality.....	39
5.9.2 Chemical Quality.....	39
5.10 Detailed River Network.....	40
5.11 Surface Water Features	42
6. Environment Agency Flood Map for planning (from rivers and the sea).....	43
6. Flooding.....	44
6.1 Zone 2 Flooding.....	44
6.2 Zone 3 Flooding.....	44
6.3 Flood Defences.....	45
6.4 Areas benefiting from Flood Defences.....	45
6.5 Areas benefiting from Flood Storage.....	45
6.6 Groundwater Flooding Susceptibility Areas.....	45
6.6.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site?.....	45
6.6.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?.....	45
6.7 Groundwater Flooding Confidence Areas.....	46
7. Designated Environmentally Sensitive Sites Map.....	47
7. Designated Environmentally Sensitive Sites.....	48
7.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:.....	48
7.2 Records of National Nature Reserves (NNR) within 2000m of the study site:.....	48
7.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:.....	48
7.4 Records of Special Protection Areas (SPA) within 2000m of the study site:.....	49
7.5 Records of Ramsar sites within 2000m of the study site:.....	49
7.6 Records of Ancient Woodland within 2000m of the study site:	50
7.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:.....	50
7.8 Records of World Heritage Sites within 2000m of the study site:.....	50
7.9 Records of Environmentally Sensitive Areas within 2000m of the study site:	51
7.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:	51
7.11 Records of National Parks (NP) within 2000m of the study site:	51
7.12 Records of Nitrate Sensitive Areas within 2000m of the study site:.....	51
7.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:.....	51
8. Natural Hazards Findings.....	52
8.1 Detailed BGS GeoSure Data.....	52
8.1.1 Shrink Swell.....	52
8.1.2 Landslides.....	52
8.1.3 Soluble Rocks.....	53
8.1.4 Compressible Ground.....	53
8.1.5 Collapsible Rocks.....	53
8.1.6 Running Sand.....	54
9. Mining.....	55
9.1 Coal Mining.....	55
9.2 Shallow Mining.....	55
9.3 Brine Affected Areas	55
Contact Details.....	56
Standard Terms and Conditions.....	57

Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Environmental Permits, Incidents and Registers		On-site	0-50m	51-250	251-500		
1.1 Industrial Sites Holding Environmental Permits and/or Authorisations							
1.1.1	Records of historic IPC Authorisations	0	0	0	0		
1.1.2	Records of Part A(1) and IPPC Authorised Activities	0	0	0	0		
1.1.3	Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	0	0	0	0		
1.1.4	Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)	0	0	0	0		
1.1.5	Records of List 1 Dangerous Substances Inventory sites	0	0	0	0		
1.1.6	Records of List 2 Dangerous Substances Inventory sites	0	0	0	0		
1.1.7	Records of Part A(2) and Part B Activities and Enforcements	0	0	1	1		
1.1.8	Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0		
1.1.9	Records of Licensed Discharge Consents	0	2	28	10		
1.1.10	Records of Planning Hazardous Substance Consents and Enforcements	0	0	0	1		
1.2	Records of COMAH and NIHHS sites	0	0	0	0		
1.3 Environment Agency Recorded Pollution Incidents							
1.3.1	National Incidents Recording System, List 2	0	0	0	10		
1.3.2	National Incidents Recording System, List 1	0	0	0	0		
1.4	Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0		
Section 2: Landfill and Other Waste Sites		On-site	0-50m	51-250	251-500	501-1000	1000-5000
2.1 Landfill Sites							
2.1.1	Environment Agency Registered Landfill Sites	0	0	0	0	0	Not searched
2.1.2	Environment Agency Historic Landfill Sites	1	0	1	0	0	2
2.1.3	BGS/DoE Landfill Site Survey	1	0	0	0	0	0
2.1.4	GroundSure Local Authority Landfill Sites Data	0	0	0	0	2	0
2.2 Landfill and Other Waste Sites Findings							
2.2.1	Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
2.2.2	Environment Agency Licensed Waste Sites	0	0	0	0	1	6

Section 3: Current Land Use	On-site	0-50m	51-250	251-500
3.1 Current Industrial Sites Data	0	4	36	Not searched
3.2 Records of Petrol and Fuel Sites	0	0	0	0
3.3 Underground High Pressure Oil and Gas Pipelines	1	0	0	0

Section 4: Geology

4.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	Yes
4.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
4.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 5: Hydrogeology and Hydrology

	0-500m
5.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes
5.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
5.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	4	14
5.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
5.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
5.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
5.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
5.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	1	0	1	4	Not searched	Not searched
	On-site	0-50m	51-250	251-500	501-1000	1000-1500
5.9 Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	No	No	No
5.10 Detailed River Network entries within 500m of the site	0	0	4	15	Not searched	Not searched
5.11 Surface water features within 250m of the study site	No	No	Yes	Not searched	Not searched	Not searched

Section 6: Flooding

6.1 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	Yes
6.2 Are there any Environment Agency Zone 3 floodplains within 250m of the study site?	Yes
6.3 Are there any Flood Defences within 250m of the study site?	Yes
6.4 Are there any areas benefiting from Flood Defences within 250m of the study site?	Yes
6.5 Are there any areas used for Flood Storage within 250m of the study site?	No
6.6 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Potential at Surface
6.7 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Moderate

Section 7: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	2	0	0	2
7.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
7.3 Records of Special Areas of Conservation (SAC)	0	0	2	0	0	0
7.4 Records of Special Protection Areas (SPA)	0	0	4	0	0	0
7.5 Records of Ramsar sites	0	0	4	0	0	0
7.6 Records of Ancient Woodlands	0	0	0	0	3	3
7.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	10
7.8 Records of World Heritage Sites	0	0	0	0	0	0
7.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0
7.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
7.11 Records of National Parks	0	0	0	0	0	0
7.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
7.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0

Section 8: Natural Hazards

8.1 What is the maximum risk of natural ground subsidence?	Moderate
8.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Low
8.1.2 What is the maximum Landslides hazard rating identified on the study site?	Very Low
8.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Negligible
8.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Moderate
8.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Very Low
8.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Moderate

Section 9: Mining

9.1 Are there any coal mining areas within 75m of the study site?	No
9.2 What is the risk of subsidence relating to shallow mining within 150m of the study site?	Negligible
9.3 Are there any brine affected areas within 75m of the study site?	No

Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between GroundSure and the Client. The document contains the following sections:

1. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

2. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

3. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure underground oil and gas pipelines.

4. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

5. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

6. Flooding

Provides information on surface water flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

7. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

8. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence.

9. Mining

Provides information on areas of coal and shallow mining.

10. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, GroundSure provide a free Technical Helpline (08444 159000) for further information and guidance.

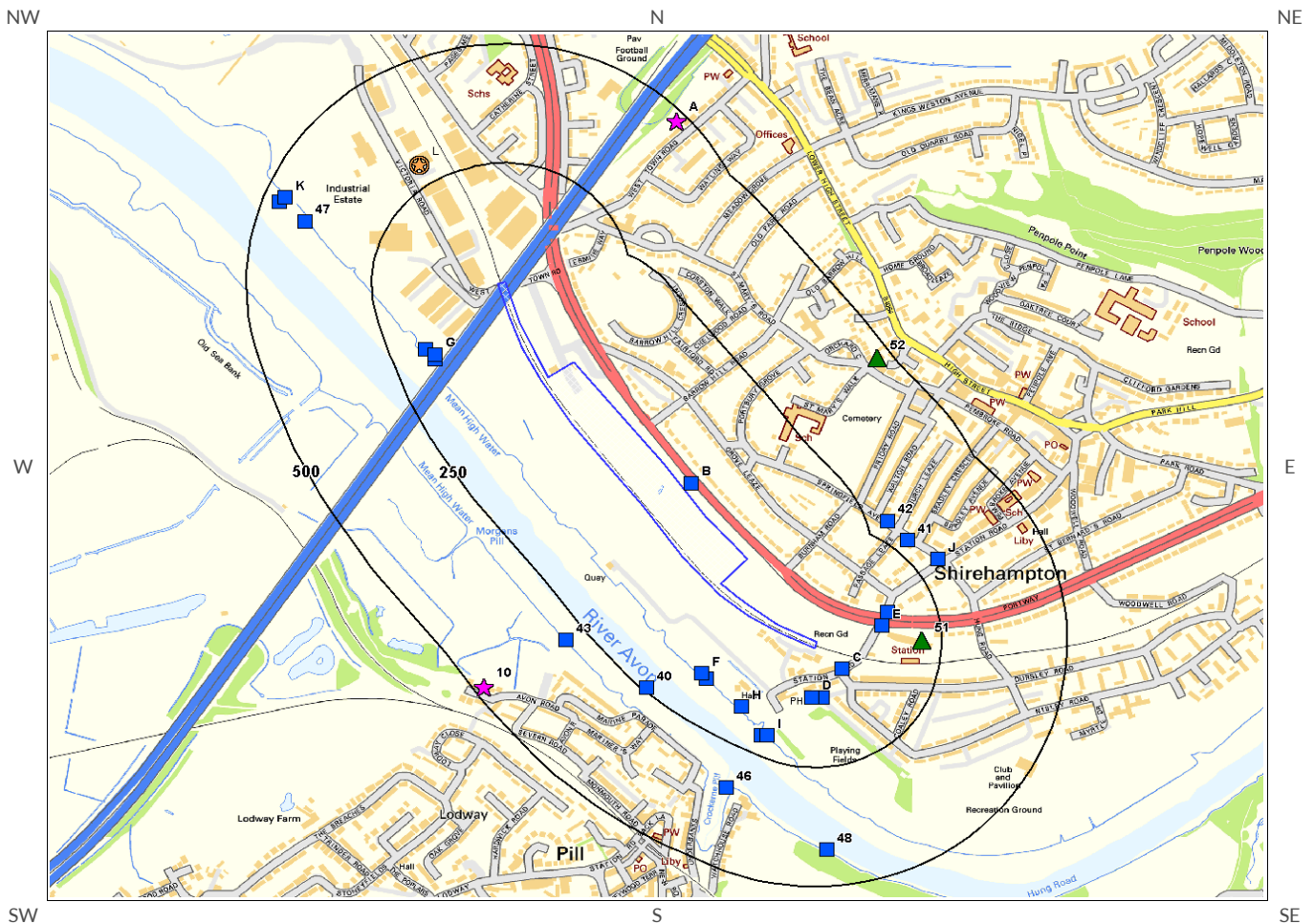
Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier "A" on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.















1. Environmental Permits, Incidents and Registers Map



Environmental Permits, Incidents and Registers Legend

Mapping sourced from 

© Crown copyright and database rights 2014. Ordnance Survey license 100035207.

-  Recorded Pollution Incident
-  Dangerous Substances (List 1)
-  Dangerous Substances (List 2)
-  Licenced Discharge Consents
-  Red List Discharge Consents
-  RAS 3 & 4 Authorisations
-  Part A(1) Authorised Processes and Historic IPC Authorisations
-  Part A(2) and Part B Authorised Processes
-  COMAH / NIHS Sites
-  Sites Determined as Contaminated Land
-  Hazardous Substance Consents and Enforcements
-  Site Outline
-  Search Buffers (m)
-  Water Industry Referrals



1. Environmental Permits, Incidents and Registers

1.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

1.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

1.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

1.1.3 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

1.1.4 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

1.1.5 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

1.1.6 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

1.1.7 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

2

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details
51	210.0	E	352989 176405	Address: The Bristol Port Company, Berths 5 & 6 West Wharf, Avonmouth Docks, Avonmouth, Bristol, BS11 9XQ Process: Unloading Coal Status: Current Permit Permit Type: Part B Enforcement: Data requested, not received. Date of Enforcement: Data requested, not received. Comment: Data requested, not received.
52	470.0	NE	352900 177000	Address: Sevenways Filling Station, 50-52 Sussex Place, St Pauls, Bristol, BS2 9QP Process: Unloading Petrol Status: Current Permit Permit Type: Part B Enforcement: Data requested, not received. Date of Enforcement: Data requested, not received. Comment: Data requested, not received.

1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

1.1.9 Records of Licensed Discharge Consents within 500m of the study site:

40

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details
11 B	19.0	NE	352530 176740	Address: Outside 550 Portway, Bristol, Bristol, BS11 9YN Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 011190 Permit Version: 1 Receiving Water: River Bristol Avon Status: Temporary Consents (water Act 1989, Section 113) Issue date: - Effective Date: 12/9/1989 Revocation Date: 27/9/2010
12 B	19.0	NE	352530 176740	Address: Outside 550 Portway, Bristol, Bristol, BS11 9YN Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 011190 Permit Version: 2 Receiving Water: River Bristol Avon Status: Surrendered Under Epr 2010 Issue date: 28/9/2010 Effective Date: 28/9/2010 Revocation Date: 17/4/2014

ID	Distance	Direction	NGR	Details	
13 C	69.0	SE	352830 176350	Address: Station Road, Junc Dursley Road, Bristol, BS11 9XA Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 011200 Permit Version: 1	Receiving Water: River Bristol Avon Status: Temporary Consents (water Act 1989, Section 113) Issue date: - Effective Date: 12/9/1989 Revocation Date: 27/9/2010
14 C	69.0	SE	352830 176350	Address: Station Road, Junc Dursley Road, Bristol, BS11 9XA Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 011200 Permit Version: 2	Receiving Water: River Bristol Avon Status: Varied Under Epr 2010 Issue date: 28/9/2010 Effective Date: 28/9/2010 Revocation Date: -
15 D	103.0	S	352770 176290	Address: Lane Rear 90 Station Road, Bristol, Bristol, BS11 9XA Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 011197 Permit Version: 1	Receiving Water: River Bristol Avon Status: Temporary Consents (water Act 1989, Section 113) Issue date: - Effective Date: 12/9/1989 Revocation Date: 27/9/2010
16 D	103.0	S	352770 176290	Address: Lane Rear 90 Station Road, Bristol, Bristol, BS11 9XA Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 011197 Permit Version: 2	Receiving Water: River Bristol Avon Status: Surrendered Under Epr 2010 Issue date: 28/9/2010 Effective Date: 28/9/2010 Revocation Date: 17/4/2014
17 D	104.0	S	352790 176290	Address: Lane Rear 82 Station Road, Bristol, Bristol, BS11 9XA Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 011198 Permit Version: 2	Receiving Water: River Bristol Avon Status: Surrendered Under Epr 2010 Issue date: 28/9/2010 Effective Date: 28/9/2010 Revocation Date: 17/4/2014
18 D	104.0	S	352790 176290	Address: Lane Rear 82 Station Road, Bristol, Bristol, BS11 9XA Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 011198 Permit Version: 1	Receiving Water: River Bristol Avon Status: Temporary Consents (water Act 1989, Section 113) Issue date: - Effective Date: 12/9/1989 Revocation Date: 27/9/2010
19 E	135.0	E	352910 176440	Address: Station Road, Junc With Portway Road, Bristol Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 011201 Permit Version: 1	Receiving Water: River Bristol Frome Status: Revoked - Unspecified Issue date: - Effective Date: 12/9/1989 Revocation Date: 18/8/2003
20 F	153.0	SW	352550 176340	Address: Manhole 5276-642 (mh 19), On The Shirehampton, Interceptor Sewer, Shirehampton, Bristol Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 011542 Permit Version: 1	Receiving Water: Trib Of River Avon (s) Status: Revoked - Unspecified Issue date: 8/11/1991 Effective Date: 8/11/1991 Revocation Date: 9/9/2003
21 E	154.0	NE	352920 176470	Address: Outside 64 Station Road, Bristol, Bristol, BS11 9TY Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 011202 Permit Version: 1	Receiving Water: River Bristol Avon Status: Temporary Consents (water Act 1989, Section 113) Issue date: - Effective Date: 12/9/1989 Revocation Date: 27/9/2010
22 E	154.0	NE	352920 176470	Address: Outside 64 Station Road, Bristol, Bristol, BS11 9TY Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 011202 Permit Version: 2	Receiving Water: River Bristol Avon Status: Surrendered Under Epr 2010 Issue date: 28/9/2010 Effective Date: 28/9/2010 Revocation Date: 17/4/2014
23 F	156.0	SW	352560 176330	Address: Portway Cso, Near Railway, 200m West Of Station Road, Avonmouth, Bristol Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 102112 Permit Version: 1	Receiving Water: Tidal River Avon(e) Status: 1961 R(pp)a Application Refused Issue date: 19/8/2003 Effective Date: 19/8/2003 Revocation Date: -

ID	Distance	Direction	NGR	Details	
24 G	166.0	W	352020 177010	Address: 45 Old Park Rd Cso, Shirehampton, Avonmouth, Bristol Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 102090 Permit Version: 1	Receiving Water: River Avon (e) Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 12/8/2003 Effective Date: 12/8/2003 Revocation Date: -
25 G	166.0	W	352020 177010	Address: Watling Way Cso, R/o 27 Watling Way, Avonmouth, Bristol, Avon Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 102071 Permit Version: 1	Receiving Water: River Avon (e) Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 26/3/2003 Effective Date: 31/3/2003 Revocation Date: -
26 G	166.0	W	352020 177010	Address: Avonmouth Way C S O, Jnct With Second Way, Shirehampton, Avonmouth, Bristol Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 102068 Permit Version: 1	Receiving Water: River Avon (e) Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 26/3/2003 Effective Date: 31/3/2003 Revocation Date: -
27 G	166.0	W	352020 177010	Address: Lower High Street Cso, Shirehampton, Avonmouth, Bristol, Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 102066 Permit Version: 1	Receiving Water: River Avon (e) Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 26/3/2003 Effective Date: 31/3/2003 Revocation Date: -
28 G	166.0	W	352020 177010	Address: Portway Cso, Under Mf Avon Bridge, Bristol, BS11 9LS Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 102067 Permit Version: 1	Receiving Water: River Avon (e) Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 26/3/2003 Effective Date: 31/3/2003 Revocation Date: -
29 G	166.0	W	352020 177010	Address: Lower High Street Cso, Jnc With West Town Road And, Avonmouth Road, Avonmouth, Bristol Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 102073 Permit Version: 1	Receiving Water: River Avon (e) Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 26/3/2003 Effective Date: 31/3/2003 Revocation Date: -
30 G	166.0	W	352020 177010	Address: Lower High Street Cso, Jn West Town Rd/avonmouth Rd, Shirehampton, Avonmouth, Bristol Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 102091 Permit Version: 1	Receiving Water: River Avon (e) Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 12/8/2003 Effective Date: 12/8/2003 Revocation Date: -
31 G	166.0	W	352020 177010	Address: Portway Cso, Under Mf Avon Bridge, Bristol, BS11 9LS Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 101997 Permit Version: 1	Receiving Water: Tidal River Avon(e) Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 12/3/2003 Effective Date: 31/3/2003 Revocation Date: -
32 G	170.0	W	352020 177000	Address: Avonmouth 'a' Pumping Station, Underneath M5 Bridge, Avonmouth, Bristol, Avon Effluent Type: Sewage Discharges - Pumping Station - Water Company Permit Number: 012019 Permit Version: 1	Receiving Water: Bristol Avon Status: Revoked - Unspecified Issue date: 27/9/1995 Effective Date: 23/7/1996 Revocation Date: 30/3/2003
33 H	173.0	SW	352630 176270	Address: Outside 30 Station Road, Bristol Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 102094 Permit Version: 1	Receiving Water: River Avon (e) Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 12/8/2003 Effective Date: 12/8/2003 Revocation Date: -

ID	Distance	Direction	NGR	Details	
34 H	173.0	SW	352630 176270	Address: O/s 7 Springfield Avenue Cso, Shirehampton, Avonmouth, Bristol Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 102093 Permit Version: 1	Receiving Water: River Avon (e) Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 12/8/2003 Effective Date: 12/8/2003 Revocation Date: -
35 H	173.0	SW	352630 176270	Address: O/s 5 Springfield Avenue Cso, Shirehampton, Avonmouth, Bristol Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 102092 Permit Version: 1	Receiving Water: River Avon (e) Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 12/8/2003 Effective Date: 12/8/2003 Revocation Date: -
36 H	173.0	SW	352630 176270	Address: Lamplighters Sewage Pumping Station, Shirehampton, Bristol Effluent Type: Sewage Discharges - Pumping Station - Water Company Permit Number: 011540 Permit Version: 1	Receiving Water: Trib Of River Avon (s) Status: New Consent, By Application (wra 91, Section 113 & Sched 12) Issue date: 8/11/1991 Effective Date: 8/11/1991 Revocation Date: -
37 G	181.0	W	352000 177020	Address: Portway Cso, Outfall M5, Bristol Effluent Type: Miscellaneous Discharges - Surface Water Permit Number: 021629 Permit Version: 1	Receiving Water: Trib Of River Bristol Avon Status: Revoked - Unspecified Issue date: - Effective Date: - Revocation Date: 30/3/2003
38I	206.0	SW	352680 176210	Address: Station Road Cso, O/s Lamplighters Pub, Shirehampton, Avonmouth, Bristol Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 102095 Permit Version: 1	Receiving Water: River Avon (e) Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 12/8/2003 Effective Date: 12/8/2003 Revocation Date: -
39I	210.0	SW	352670 176210	Address: Sso Rear Of Lamplighters, Public House, Shirehampton, Bristol Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 021613 Permit Version: 1	Receiving Water: River Avon (e) Status: Revoked - Unspecified Issue date: - Effective Date: - Revocation Date: 18/8/2003
40	244.0	SW	352440 176310	Address: Pill Marine Parade Outfall, Bristol Effluent Type: Miscellaneous Discharges - Surface Water Permit Number: 021617 Permit Version: 1	Receiving Water: - Status: Deemed Consent - 1986 Variation Issue date: - Effective Date: - Revocation Date: 29/6/1994
41	280.0	NE	352960 176620	Address: O/s 5 Springfield Avenue Cso, Shirehampton, Avonmouth, Bristol Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 011204 Permit Version: 1	Receiving Water: River Bristol Avon Status: Revoked - Unspecified Issue date: - Effective Date: 12/9/1989 Revocation Date: 11/8/2003
42	289.0	E	352920 176660	Address: O/s 7 Springfield Avenue Cso, Shirehampton, Avonmouth, Bristol Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 011203 Permit Version: 1	Receiving Water: River Bristol Avon Status: Revoked - Unspecified Issue date: - Effective Date: 12/9/1989 Revocation Date: 11/8/2003
43	292.0	SW	352280 176410	Address: Pill Pumping Station, Avon Road, Pill Effluent Type: Sewage Discharges - Pumping Station - Water Company Permit Number: 011673 Permit Version: 1	Receiving Water: Bristol Avon Estuary(e) Status: New Consent, By Application (wra 91, Section 113 & Sched 12) Issue date: - Effective Date: 24/9/1991 Revocation Date: -
44J	297.0	NE	353020 176580	Address: Outside 52 Station Road, Bristol, Bristol, BS11 9SU Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 011205 Permit Version: 1	Receiving Water: River Bristol Avon Status: Temporary Consents (water Act 1989, Section 113) Issue date: - Effective Date: 12/9/1989 Revocation Date: 27/9/2010

ID	Distance	Direction	NGR	Details	
45J	297.0	NE	353020 176580	Address: Outside 52 Station Road, Bristol, Bristol, BS11 9SU Effluent Type: Sewage Discharges - Sewer Storm Overflow - Water Company Permit Number: 011205 Permit Version: 2	Receiving Water: River Bristol Avon Status: Varied Under Epr 2010 Issue date: 28/9/2010 Effective Date: 28/9/2010 Revocation Date: -
46	340.0	SW	352600 176100	Address: Watchouse Outfall, Pill, BS20 0EP Effluent Type: Sewage Discharges - Unspecified - Water Company Permit Number: 102582 Permit Version: 1	Receiving Water: River Avon (e) Status: Revoked - Unspecified Issue date: 26/4/2004 Effective Date: 26/4/2004 Revocation Date: 1/12/2005
47	406.0	W	351760 177290	Address: Dalgety Agriculture Ltd, Victoria Road, Avonmouth, Bristol, Avon, BS11 9DR Effluent Type: Trade Discharges - Site Drainage Permit Number: 012559 Permit Version: 1	Receiving Water: River Avon Status: New Consent, By Application (wra 91, Section 113 & Sched 12) Issue date: 9/6/1995 Effective Date: 30/5/1995 Revocation Date: -
48	424.0	S	352800 175970	Address: Ham Green Hospital, Pill, Bristol, Avon Effluent Type: Trade Discharges - Process Effluent - Water Company (wtw) Permit Number: 011698 Permit Version: 1	Receiving Water: Avon Status: Consent Expired - Time Limit Issue date: - Effective Date: 9/10/1992 Revocation Date: 1/12/1994
49 K	461.0	NW	351720 177340	Address: Dalgety Agriculture Ltd, Victoria Road, Avonmouth, Bristol, Avon, BS11 9DR Effluent Type: Trade Discharges - Process Effluent - Not Water Company Permit Number: 012559 Permit Version: 1	Receiving Water: River Avon Status: New Consent, By Application (wra 91, Section 113 & Sched 12) Issue date: 9/6/1995 Effective Date: 30/5/1995 Revocation Date: -
50 K	467.0	W	351710 177330	Address: Tip Europe Ltd, Victoria Road, Avonmouth, Bristol Effluent Type: Trade Discharges - Site Drainage Permit Number: 101852 Permit Version: 1	Receiving Water: River Avon Status: New Consent (wra 91, S88 & Sched 10 As Amended By Env Act 1995) Issue date: 5/4/2002 Effective Date: 5/4/2002 Revocation Date: -

1.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

1

The following records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	Application Reference Number	NGR	Application Status	Application Date	Address	Details	Details of Enforcement Action
54L	295.0	NW	No Details	351987 177408	Approved	No Details	Dalgety Arable Ltd, Avonmouth Mill, Victoria Road, Avonmouth, Bristol, BS11 9DB	No Details	Enforcement: Data requested, not received. Date of Enforcement: Data Requested, not received. Comment: Data Requested, not received.

1.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site:

0

Database searched and no data found.

1.3 Environment Agency Recorded Pollution Incidents

1.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

10

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details
1A	479.0	NE	352500 177500	Incident Date: 03/05/2001 Incident Identification: 4226 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Fumes Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
2A	479.0	NE	352500 177500	Incident Date: 29/04/2001 Incident Identification: 3753 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Fumes Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
3A	479.0	NE	352500 177500	Incident Date: 04/05/2001 Incident Identification: 4374 Pollutant: Organic Chemicals/Products Pollutant Description: Other Organic Chemical or Product Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
4A	479.0	NE	352500 177500	Incident Date: 10/07/2003 Incident Identification: 172437 Pollutant: Inorganic Chemicals/Products Pollutant Description: Other Inorganic Chemical or Product Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
5A	479.0	NE	352500 177500	Incident Date: 15/05/2001 Incident Identification: 5662 Pollutant: Inorganic Chemicals/Products Pollutant Description: Other Inorganic Chemical or Product Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
6A	479.0	NE	352500 177500	Incident Date: 18/05/2001 Incident Identification: 5968 Pollutant: Sewage Materials Pollutant Description: Other Sewage Material Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
7A	479.0	NE	352500 177500	Incident Date: 27/06/2001 Incident Identification: 11919 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Other Atmospheric Pollutant or Effect Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
8A	479.0	NE	352500 177500	Incident Date: 14/06/2001 Incident Identification: 9229 Pollutant: Oils and Fuel Pollutant Description: Diesel Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
9A	479.0	NE	352500 177500	Incident Date: 20/10/2001 Incident Identification: 37969 Pollutant: Pollutant Not Identified Pollutant Description: Not Identified Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

ID	Distance	Direction	NGR	Details	
10	483.0	SW	352115 176312	Incident Date: 22/09/2003 Incident Identification: 191750 Pollutant: Pollutant Not Identified Pollutant Description: Not Identified	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 3 (Minor)

1.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

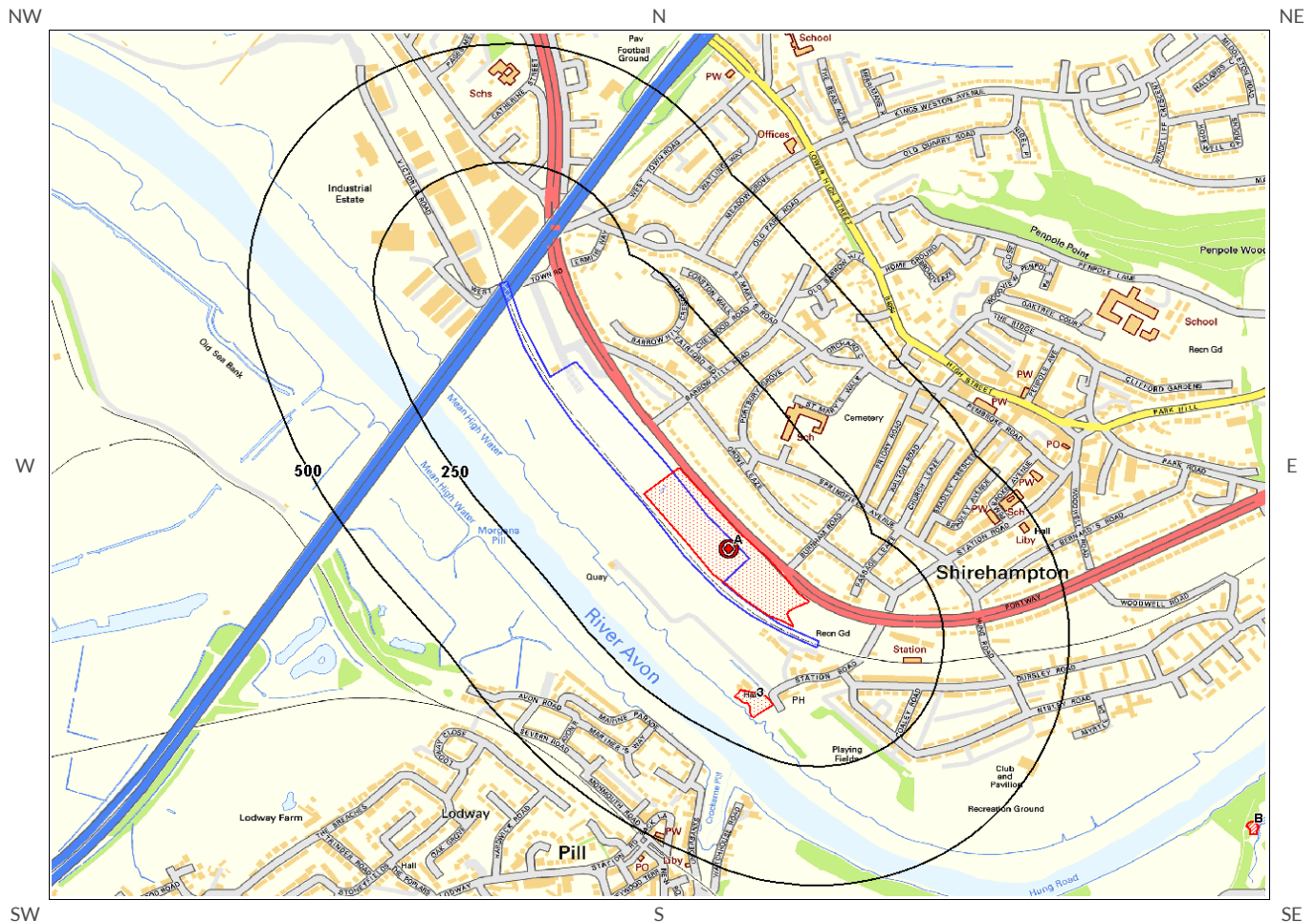
1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site?

0

Database searched and no data found.




2. Landfill and Other Waste Sites Map



Landfill and Other Waste Sites Legend



© Crown copyright and database rights 2014.
Ordnance Survey license 100035207.

- | | | | | | |
|---|--------------------|---|--------------------------|---|----------------------------------|
|  | Site Outline |  | E.A. Active Landfill |  | Historic and Planned Waste Sites |
|  | Search Buffers (m) |  | E.A. Historic Landfill |  | E.A. Licensed Waste Site |
| | |  | Local Authority Landfill |  | BGS / DoE Survey Landfill |



2. Landfill and Other Waste Sites

2.1 Landfill Sites

2.1.1 Records from Environment Agency landfill data within 1000m of the study site:

0

Database searched and no data found.

2.1.2 Records of Environment Agency historic landfill sites within 1500m of the study site:

4

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
2A	0.0	On Site	352500 176600	Site Address: Portway, Bristol, Avon Waste Licence: - Site Reference: A 012 Waste Type: Commercial, Household, Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: Bristol Corporation
3	134.0	SW	352600 176200	Site Address: Land Adjoining Station Road, Station Road, Shirehampton, Bristol Waste Licence: Yes Site Reference: L/BL/T/94 Waste Type: Inert, Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 18-Nov-1980 Licence Surrendered: 17-Jun-1982 Licence Hold Address: 420 St Johns Lane, Bedminster, Bristol Operator: -
Not shown	1001.0	N	352800 178500	Site Address: T. Farm, Avonmouth, Bristol, Avon Waste Licence: - Site Reference: - Waste Type: Inert, Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: Bristol Corporation
Not shown	1492.0	NW	350900 178100	Site Address: Avonmouth Dock Entrance Channel, Avonmouth, Bristol Waste Licence: Yes Site Reference: B/BL/T/44B Waste Type: Inert, Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 19-Dec-1978 Licence Surrendered: 07-Feb-1990 Licence Hold Address: St Andrews Road, Avonmouth, Bristol Operator: -

2.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

1

The following landfill records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
1A	0.0	On Site	35260 0.0 17660 0.0	Address: Portway, Bristol BGS Number: 2581.0 Risk: No risk to aquifer Waste Type: Some toxic waste

2.1.4 Records of Local Authority landfill sites within 1500m of the study site:

2

The following landfill records are represented as points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Site Address	Source	Data Type
13B	934.0	SE		Refuse Tip	1987 mapping	Polygon
14B	935.0	SE		Refuse Tip	1973 mapping	Polygon

2.2 Other Waste Sites

2.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

0

Database searched and no data found.

2.2.2 Records of Environment Agency licensed waste sites within 1500m of the study site:

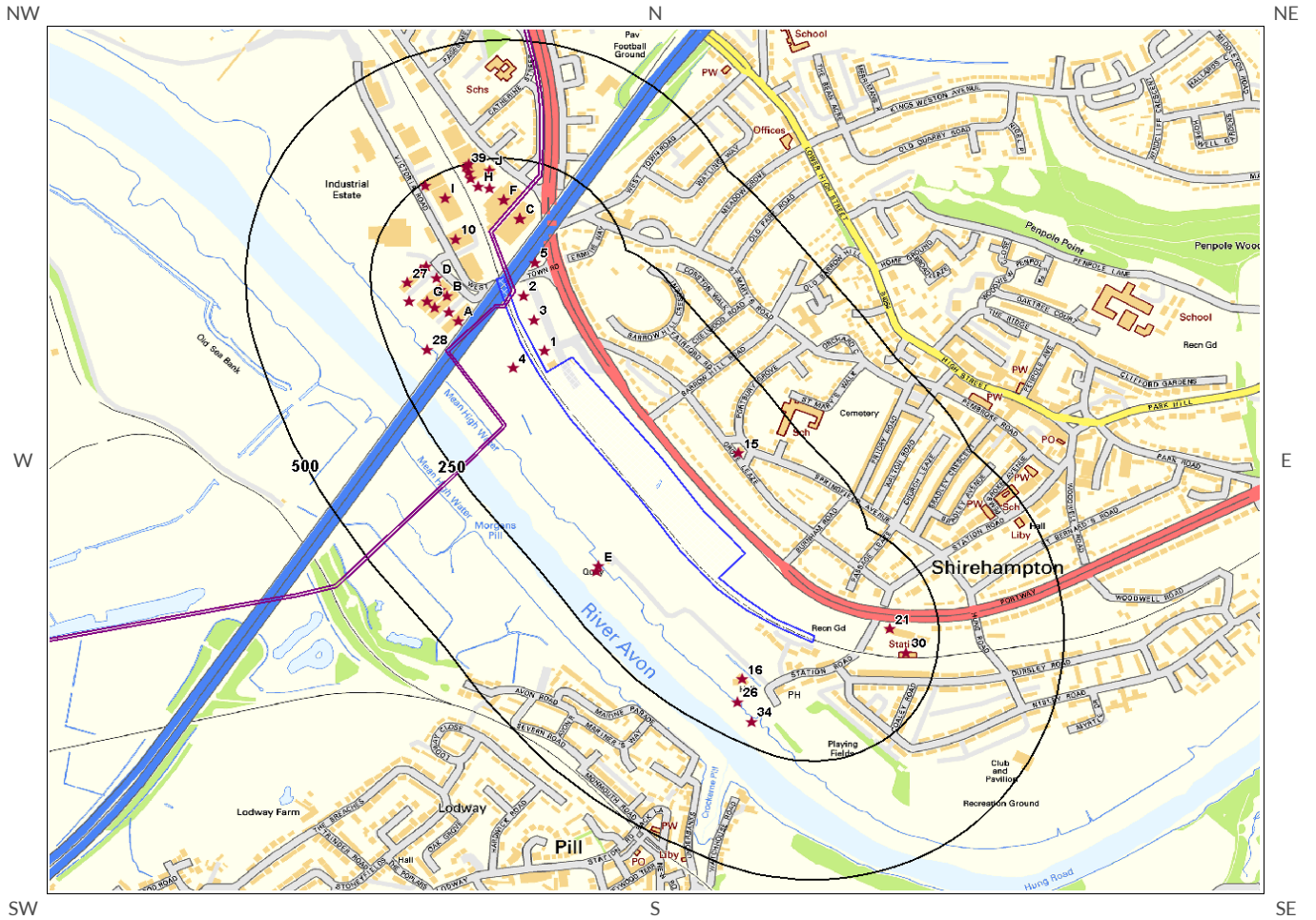
7

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
Not shown	845.0	NW	351519 177727	Site Address: N Berth, Avonmouth Docks, Bristol, Avon, BS11 9DL Type: Physical Treatment Facility Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SBP004 EPR reference: EA/EPR/DB3239AU/A001 Operator: Stobart Biomass Products Limited Waste Management licence No: 103584 Annual Tonnage: 74999.0 Issue Date: 10/05/2012 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: N Berth Correspondence Address: -, -

ID	Distance (m)	Direction	NGR	Details
Not shown	1283.0	N	352500 178400	<p>Site Address: Avonmouth Way, Avonmouth, Bristol, Avon, BS11 8DE Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: TQL001 EPR reference: EA/EPR/MP3490FE/S002 Operator: T Quality Ltd Waste Management licence No: 26208 Annual Tonnage: 0.0</p> <p>Issue Date: 11/05/2007 Effective Date: - Modified: - Surrendered Date: 11/08/2010 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Avonmouth Correspondence Address: -, -</p>
Not shown	1370.0	NE	352910 178310	<p>Site Address: Land / Premesis At, Fourth Way, Avonmouth, Bristol, Avon, BS11 8DX Type: ELV Facility Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: A&M002 EPR reference: EA/EPR/DP3193FX/A002 Operator: A & M Motors Ltd Waste Management licence No: 26099 Annual Tonnage: 2500.0</p> <p>Issue Date: 13/09/2004 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: A & M Motors E L V Correspondence Address: -, -</p>
Not shown	1385.0	N	351800 178500	<p>Site Address: Unit 7, St Brendans Trading Estate, Avonmouth Way, Bristol, Avon, BS11 9HD Type: Special Waste Transfer Station Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: PUR005 EPR reference: EA/EPR/AP3393FG/V002 Operator: Pure Clean Environmental Ltd Waste Management licence No: 26057 Annual Tonnage: 4999.0</p> <p>Issue Date: 05/12/2002 Effective Date: - Modified: 16/07/2008 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Pure Clean Enironmental Ltd Correspondence Address: -, -</p>
Not shown	1385.0	N	351800 178500	<p>Site Address: Unit 7, St Brendans Trading Estate, Avonmouth Way, Avonmouth, Bristol, BS11 9HD Type: Special Waste Transfer Station Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: PUR005 EPR reference: - Operator: Pure Clean (uk) Ltd Waste Management licence No: 26057 Annual Tonnage: 0.0</p> <p>Issue Date: 05/12/2002 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Pure Clean (uk) Ltd Correspondence Address: -, Old Moor Road, Bredbury, Stockport, SK6 2QE</p>
Not shown	1392.0	NW	351194 178175	<p>Site Address: H Berth, Junction Cut, Avonmouth Docks, Avonmouth, Bristol, BS11 9DH Type: Metal Recycling Site (Vehicle Dismantler) Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: DUN017 EPR reference: EA/EPR/AP3295EK/A001 Operator: Dunn Bros (1995) Ltd Waste Management licence No: 100142 Annual Tonnage: 74999.0</p> <p>Issue Date: 28/03/2008 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Dunn Bros (1995) Ltd Correspondence Address: -, -</p>
Not shown	1392.0	NW	351194 178175	<p>Site Address: H Berth, Junction Cut, Avonmouth Docks, Avonmouth, Bristol, BS11 9DH Type: Metal Recycling Site (Vehicle Dismantler) Size: >= 25000 tonnes < 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SIM127 EPR reference: EA/EPR/AB3035DW/S002 Operator: Sims Group U K Ltd Waste Management licence No: 100142 Annual Tonnage: 74999.0</p> <p>Issue Date: 28/03/2008 Effective Date: 07/07/2011 Modified: 07/10/2011 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: Sims Group U K Ltd Correspondence Address: -, -</p>

3. Current Land Use Map



Current Land Use Legend



© Crown copyright and database rights 2014. Ordnance Survey license 100035207.



Site Outline



Current Industrial Sites



Search Buffers (m)



Petrol & Fuel Sites



Underground High Pressure Oil & Fuel Pipelines



3. Current Land Uses

3.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site:

40

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	15.0	NE	Depot	352240 177007	BS11	Container and Storage	Transport, Storage and Delivery
2	25.0	E	J P Crane Hire Ltd	352198 177123	The Camp Avonbank Industrial Centre, West Town Road, Bristol, BS11 9DE	Construction and Tool Hire	Hire Services
3	25.0	NE	Stenner Waste Transport Ltd	352219 177072	The Camp Avonbank Industrial Centre, West Town Road, Bristol, BS11 9DE	Waste Storage, Processing and Disposal	Infrastructure and Facilities
4	38.0	SW	Depot	352178 176971	BS11	Container and Storage	Transport, Storage and Delivery
5	68.0	NE	Electricity Sub Station	352221 177193	BS11	Electrical Features	Infrastructure and Facilities
6A	100.0	W	Automotive Control	352067 177070	Unit 23 Avonbank Industrial Centre, West Town Road, Bristol, BS11 9DE	Vehicle Components	Industrial Products
7B	104.0	W	Dantek Environmental Services UK Ltd	352046 177123	Unit 2 Avonbank Industrial Centre, West Town Road, Bristol, BS11 9DE	Air and Water Filtration	Industrial Products
8A	111.0	W	Avonbank Industrial Estate	352050 177089	BS11	Business Parks and Industrial Estates	Industrial Features
9B	114.0	W	Press2print	352032 177136	Unit 8-9 Avonbank Industrial Centre, West Town Road, Bristol, BS11 9DE	Published Goods	Industrial Products
10	117.0	NW	DHL Global Forwarding	352062 177242	Unit 1-2 Avon Riverside Estate, Victoria Road, Avonmouth, Bristol, BS11 9DB	Distribution and Haulage	Transport, Storage and Delivery
11D	120.0	W	Electricity Sub Station	352024 177160	BS11	Electrical Features	Infrastructure and Facilities
12C	127.0	N	Import Export Services	352192 177286	Unit 1 Portway Trading Estate, 1 Portview Road, Bristol, BS11 9LS	Distribution and Haulage	Transport, Storage and Delivery
13C	127.0	N	I E S	352192 177286	1, Portview Road, Bristol, BS11 9LS	Electrical Production and Manipulation Equipment	Industrial Products
14C	127.0	N	Oak International Freight Ltd	352192 177286	1, Portview Road, Bristol, BS11 9LS	Distribution and Haulage	Transport, Storage and Delivery
15	127.0	NE	Electricity Sub Station	352627 176792	BS11	Electrical Features	Infrastructure and Facilities

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
16	130.0	SW	Sea Cadet Corps Avonmouth & Shirehampton Unit	352636 176316	Station Road, Shirehampton, Bristol, BS11 9XA	Armed Services	Central and Local Government
17B	136.0	W	M R Control Ltd	352020 177097	Unit 5 Avonbank Industrial Centre, West Town Road, Bristol, BS11 9DE	Electronic Equipment	Industrial Products
18D	143.0	W	M Barnwell Services Ltd	352003 177184	Unit 13 Avonbank Industrial Centre, West Town Road, Bristol, BS11 9DE	Seals, Tapes, Taps and Valves	Industrial Products
19G	145.0	W	Brown Brothers	352006 177111	Unit 11 Avonbank Industrial Centre, West Town Road, Bristol, BS11 9DE	Vehicle Repair, Testing and Servicing	Repair and Servicing
20E	152.0	SW	Pontoon	352348 176554	BS11	Moorings and Unloading Facilities	Water
21	152.0	E	Fraikin Ltd	352930 176421	Highway House, Station Road, Shirehampton, Bristol, BS11 9XA	Vehicle Hire and Rental	Hire Services
22D	153.0	W	Rateavon	351992 177177	Unit 14 Avonbank Industrial Centre, West Town Road, Bristol, BS11 9DE	Construction Completion Services	Construction Services
23E	161.0	SW	Sludge Loading Quay	352345 176542	BS11	Moorings and Unloading Facilities	Water
24F	162.0	N	Puracore	352159 177325	3, Portview Road, Bristol, BS11 9LQ	General Construction Supplies	Industrial Products
25F	162.0	N	Portishead Engineering & Construction Ltd	352159 177325	Unit C 3, Portview Road, Bristol, BS11 9LQ	Industrial Engineers	Engineering Services
26	177.0	SW	Outfall	352626 176267	BS11	Waste Storage, Processing and Disposal	Infrastructure and Facilities
27	177.0	W	Signs Express Bristol	351966 177151	Unit 17 Avonbank Industrial Centre, West Town Road, Bristol, BS11 9DE	Signs	Industrial Products
28	179.0	W	Outfall	352006 177010	BS11	Waste Storage, Processing and Disposal	Infrastructure and Facilities
29G	180.0	W	Pylon	351970 177111	BS11	Electrical Features	Infrastructure and Facilities
30	187.0	E	Shirehampton Rail Station	352963 176371	BS11	Railway Stations, Junctions and Halts	Public Transport, Stations and Infrastructure
31F	189.0	N	Avon Gorge Industrial Estate	352130 177350	BS11	Business Parks and Industrial Estates	Industrial Features
32H	198.0	N	Pylon	352109 177354	BS11	Electrical Features	Infrastructure and Facilities
33I	199.0	NW	Promec Engineering Ltd	352041 177329	Unit 5 Avon Riverside Estate, Victoria Road, Avonmouth, Bristol, BS11 9DB	Cutting, Drilling and Welding Services	Construction Services
34	203.0	SW	Slipway	352654 176226	BS11	Moorings and Unloading Facilities	Water
35H	219.0	N	Ben Shaws Western	352092 177371	Unit 5 Avon Gorge Industrial Estate, Portview Road, Bristol, BS11 9LQ	Distribution and Haulage	Transport, Storage and Delivery

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
36J	227.0	N	Spot on Supplies Hygiene Ltd	352131 177388	Unit 1-2 Avon Gorge Industrial Estate, Portview Road, Bristol, BS11 9LQ	Cleaning Equipment and Supplies	Industrial Products
37H	232.0	N	The Cooks Kitchen	352088 177383	Unit 5/A Avon Gorge Industrial Estate, Portview Road, Bristol, BS11 9LQ	Food and Beverage Industry Machinery	Industrial Products
38I	244.0	NW	Concordia International	352001 177356	Unit 7 Avon Riverside Estate, Victoria Road, Avonmouth, Bristol, BS11 9DB	Distribution and Haulage	Transport, Storage and Delivery
39	244.0	N	Aumuller UK Ltd	352082 177394	Unit 6 Avon Gorge Industrial Estate, Portview Road, Bristol, BS11 9LQ	Construction Completion Services	Construction Services
40J	247.0	N	Stancold	352089 177400	Avon Gorge Industrial Estate, Portview Road, Bristol, BS11 9LQ	Container and Storage	Transport, Storage and Delivery

3.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site: 0

Database searched and no data found.

3.3 Underground High Pressure Oil and Gas Pipelines

Records of high pressure underground pipelines within 500m of the study site: 1

The following Underground High Pressure Oil and Gas pipeline records provided by Linewatch are represented as linear features on the Current Land Use map:

ID	Distance (m)	Direction	Address	Operator	Telephone
41	0.0	On Site	GPSS, PO Box 7273, Ashby De La Zouch, LE65 2BY	GPSS Aldermaston pipelines	0845 070 1245



4. Geology

4.1 Artificial Ground and Made Ground

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

4.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
TFD-CLSI	TIDAL FLAT DEPOSITS	CLAY AND SILT
HEAD-CSSG	HEAD	CLAY, SILT, SAND AND GRAVEL

4.3 Bedrock and Solid Geology

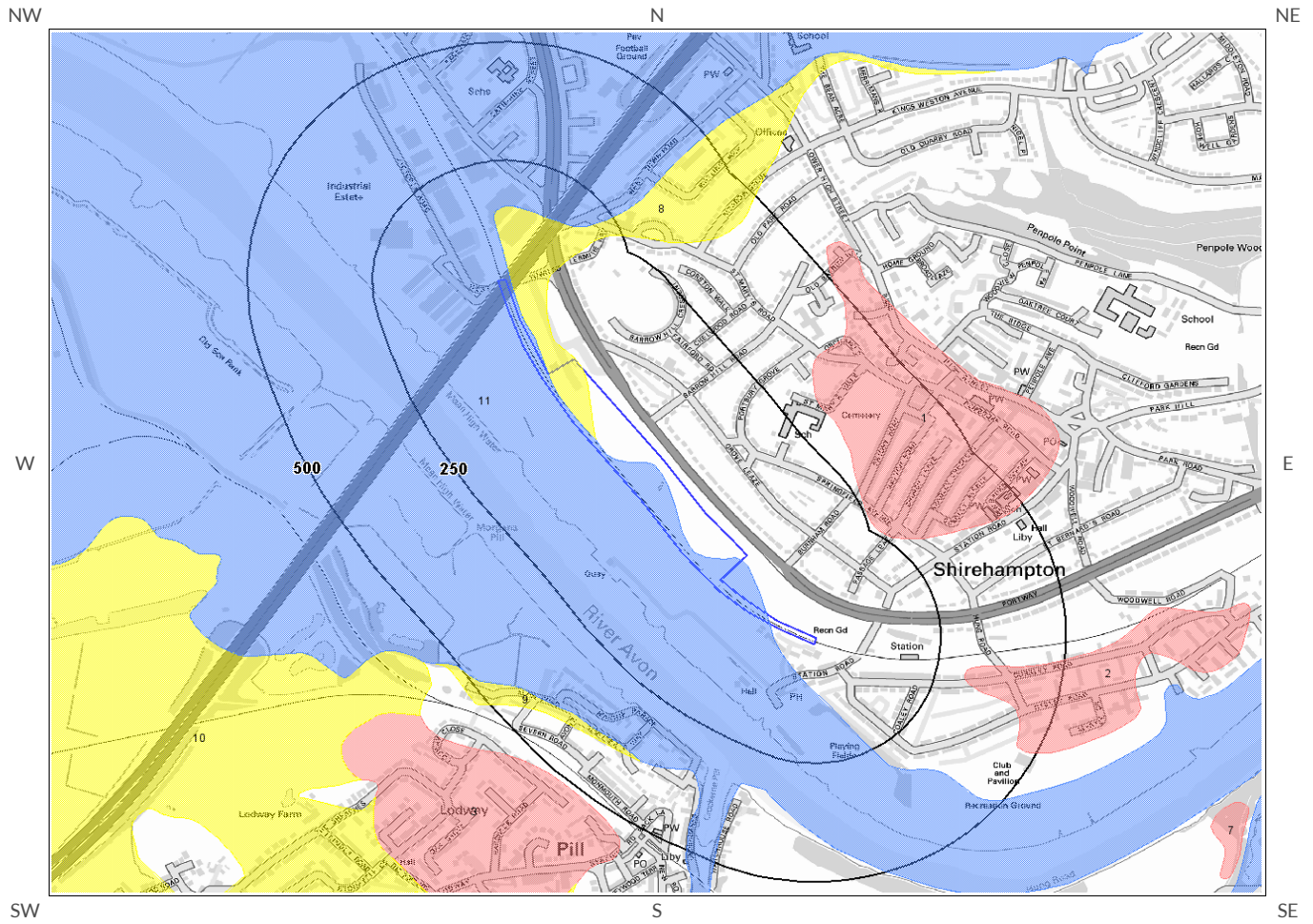
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
MMG-MDHA	MERCIA MUDSTONE GROUP	MUDSTONE AND HALITE-STONE

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

5. Hydrogeology and Hydrology

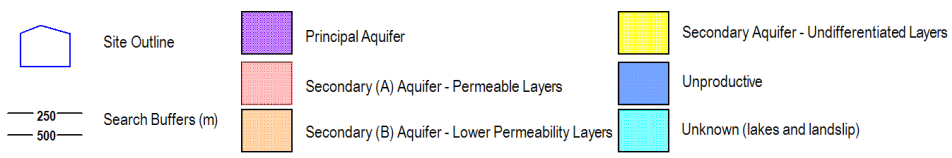
5a. Aquifer Within Superficial Geology



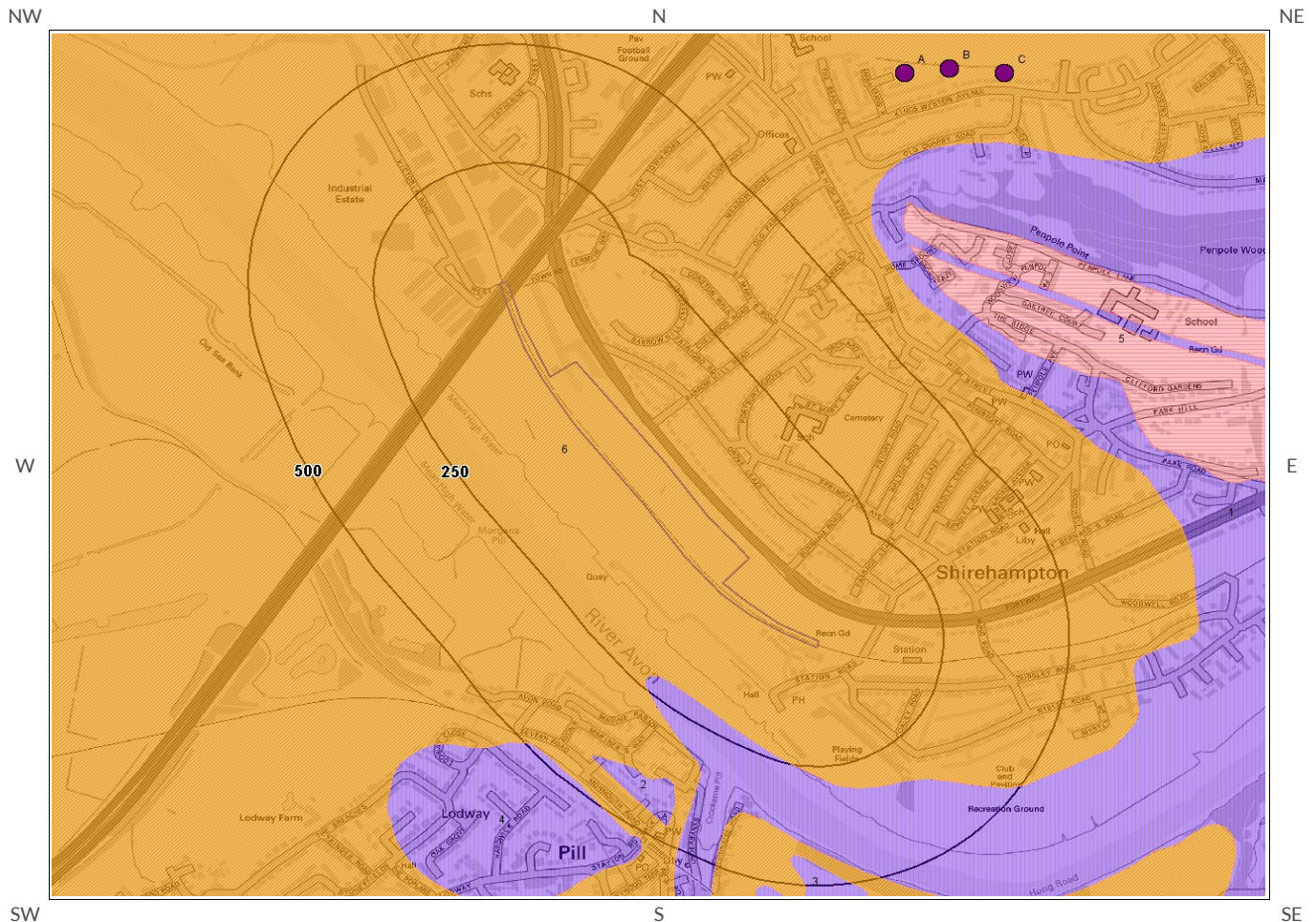
Aquifer Within Superficial Geology



© Crown copyright and database rights 2014. Ordnance Survey license 100035207.



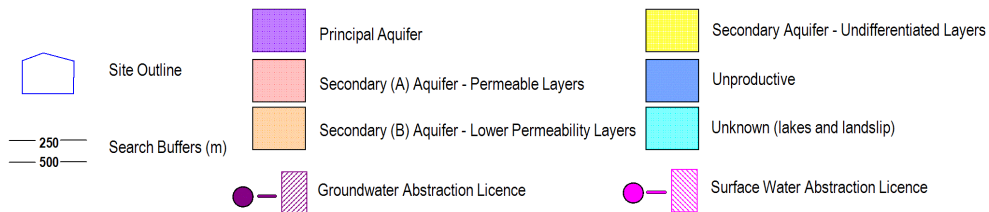
5b. Aquifer Within Bedrock Geology and Abstraction Licenses



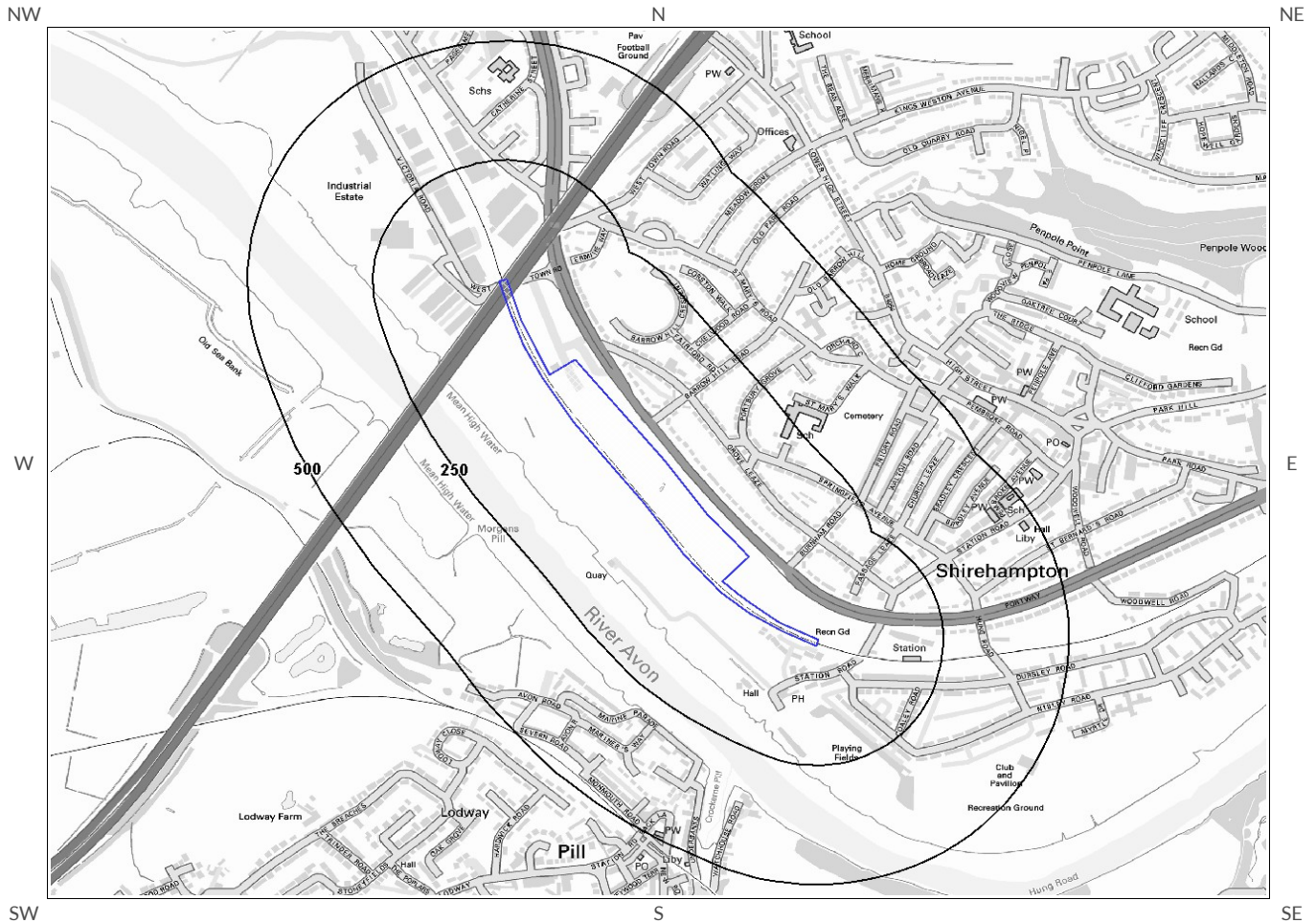
Aquifer Within Bedrock Geology and Abstraction Licenses



© Crown copyright and database rights 2014. Ordnance Survey license 100035207.



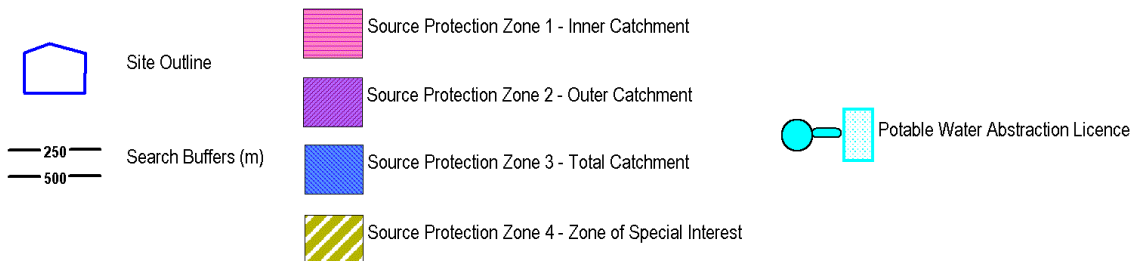
5c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



Map Legend Source Protection Zones and Potable Water Abstraction Licenses



© Crown copyright and database rights 2014. Ordnance Survey license 100035207.









5d. Hydrology Source Protection Zones within confined aquifer



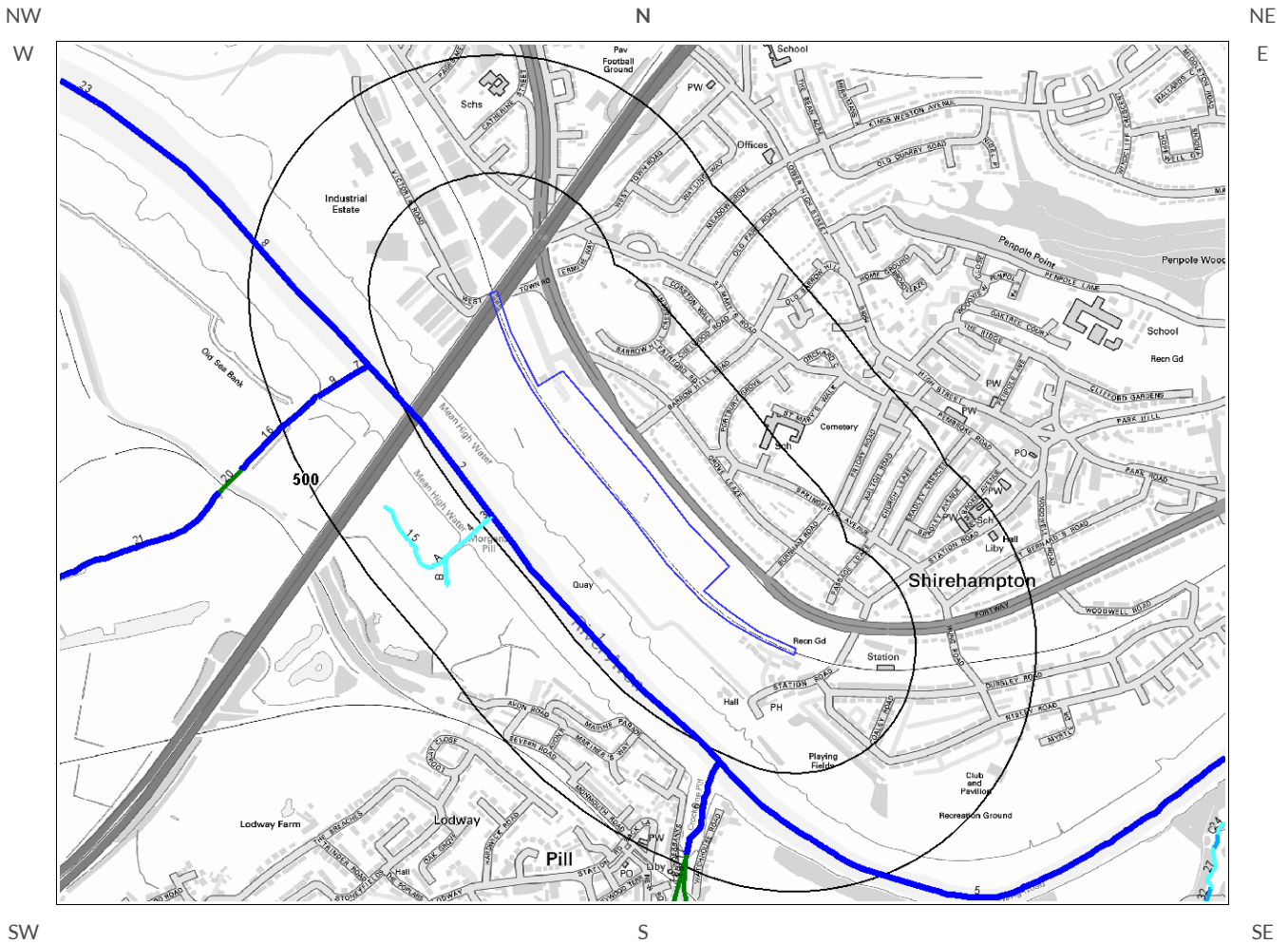
Hydrology Source Protection Zones



© Crown copyright and database rights 2014.
Ordnance Survey license 100035207.

-  Site Outline
-  Search Buffers (m)
-  Source Protection Zone 1C - Inner Catchment within Confined Aquifer
-  Source Protection Zone 2C - Outer Catchment within Confined Aquifer
-  Source Protection Zone 3C - Total Catchment within Confined Aquifer
-  Potable Water Abstraction Licence

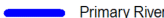
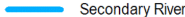

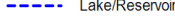
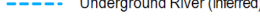



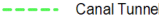

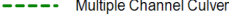
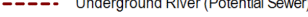
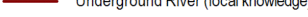
5 e. Hydrology – Detailed River Network and River Quality

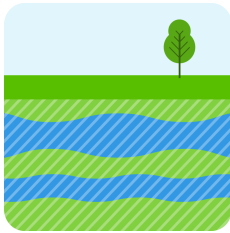


Hydrology – Detailed River Network and River Quality

Mapping sourced from 

© Crown copyright and database rights 2014. Ordnance Survey license 100035207.

-  Primary River
-  Secondary River
-  Tertiary River
-  Lake/Reservoir
-  Underground River (inferred)
-  General Quality Assessment: Biology
-  General Quality Assessment: Chemistry
-  Canal
-  Canal Tunnel
-  Culvert
-  Multiple Channel Culvert
-  Underground River (Potential Sewer)
-  Underground River (local knowledge)



5. Hydrogeology and Hydrology

5.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property? **Yes**

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the GroundSure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (5a):

ID	Distance (m)	Direction	Designation	Description
8	0.0	On Site	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
11	0.0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
1	256.0	E	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
2	308.0	E	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
9	376.0	SW	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

5.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? **Yes**

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the GroundSure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (5b):

ID	Distance (m)	Direction	Designation	Description
6	0.0	On Site	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers

ID	Distance (m)	Direction	Designation	Description
1	207.0	SW	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers
2	378.0	SW	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers
3	437.0	S	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers
4	484.0	SW	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

5.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site? Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (5b):

ID	Distance (m)	Direction	NGR	Details
7A	891.0	NE	352950 177600	Licence No: 18/54/020/G/129 Details: Non-Evaporative Cooling Direct Source: Ground Water - Fresh Point: Pen Pole - Borehole 3 Data Type: Point Annual Volume (m ³): 1513302 Max Daily Volume (m ³): 4146.04 Original Application No: - Original Start Date: 8/7/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:
8A	891.0	NE	352950 177600	Licence No: 18/54/020/G/129 Details: Process Water Direct Source: Ground Water - Fresh Point: Pen Pole - Borehole 3 Data Type: Point Annual Volume (m ³): 1513302 Max Daily Volume (m ³): 4146.04 Original Application No: - Original Start Date: 8/7/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:
9B	965.0	NE	353040 177610	Licence No: 18/54/020/G/129 Details: Process Water Direct Source: Ground Water - Fresh Point: Pen Pole - Borehole 1 Data Type: Point Annual Volume (m ³): 1513302 Max Daily Volume (m ³): 4146.04 Original Application No: - Original Start Date: 8/7/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:
10B	965.0	NE	353040 177610	Licence No: 18/54/020/G/129 Details: Non-Evaporative Cooling Direct Source: Ground Water - Fresh Point: Pen Pole - Borehole 1 Data Type: Point Annual Volume (m ³): 1513302 Max Daily Volume (m ³): 4146.04 Original Application No: - Original Start Date: 8/7/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
11C	1043.0	NE	353150 177600	Licence No: 18/54/020/G/129 Details: Non-Evaporative Cooling Direct Source: Ground Water - Fresh Point: Pen Pole - Borehole 2 Data Type: Point	Annual Volume (m ³): 1094998 Max Daily Volume (m ³): 3000 Original Application No: - Original Start Date: 8/7/1966 Expiry Date: - Issue No: 102 Version Start Date: 19/3/2008 Version End Date:
12C	1043.0	NE	353150 177600	Licence No: 18/54/020/G/129 Details: Process Water Direct Source: Ground Water - Fresh Point: Pen Pole - Borehole 2 Data Type: Point	Annual Volume (m ³): 1094998 Max Daily Volume (m ³): 3000 Original Application No: - Original Start Date: 8/7/1966 Expiry Date: - Issue No: 102 Version Start Date: 19/3/2008 Version End Date:
Not shown	1556.0	W	350630 176800	Licence No: 16/52/016/G/029 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - Fresh Point: Borehole Two At Lafarge Plaster Board Data Type: Point	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: N75 Original Start Date: 7/6/1992 Expiry Date: - Issue No: 100 Version Start Date: 7/2/1995 Version End Date:
Not shown	1556.0	W	350630 176800	Licence No: 16/52/016/G/029 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - Fresh Point: "lafarge Borehole ""b"" Data Type: Point	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: N75 Original Start Date: 7/6/1992 Expiry Date: - Issue No: 100 Version Start Date: 1/1/1999 Version End Date:
Not shown	1556.0	W	350630 176800	Licence No: 16/52/016/G/029 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - Fresh Point: Lafarge Borehole ""b"" Data Type: Point	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: N75 Original Start Date: 7/6/1992 Expiry Date: - Issue No: 100 Version Start Date: 1/1/1999 Version End Date:
Not shown	1556.0	W	350630 176800	Licence No: 16/52/016/G/029 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Ground Water - Fresh Point: Lafarge Borehole "b" Data Type: Point	Annual Volume (m ³): 230000 Max Daily Volume (m ³): 660 Original Application No: NPS/WR/013442 Original Start Date: 7/6/1992 Expiry Date: - Issue No: 101 Version Start Date: 14/5/2013 Version End Date:
Not shown	1588.0	W	350590 176830	Licence No: 16/52/016/G/029 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - Fresh Point: Lafarge Borehole ""a"" Data Type: Point	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: N75 Original Start Date: 7/6/1992 Expiry Date: - Issue No: 100 Version Start Date: 1/1/1999 Version End Date:
Not shown	1588.0	W	350590 176830	Licence No: 16/52/016/G/029 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - Fresh Point: "lafarge Borehole ""a"" Data Type: Point	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: N75 Original Start Date: 7/6/1992 Expiry Date: - Issue No: 100 Version Start Date: 1/1/1999 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1588.0	W	350590 176830	Licence No: 16/52/016/G/029 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Ground Water - Fresh Point: Lafarge Borehole "a" Data Type: Point	Annual Volume (m ³): 230000 Max Daily Volume (m ³): 660 Original Application No: NPS/WR/013442 Original Start Date: 7/6/1992 Expiry Date: - Issue No: 101 Version Start Date: 14/5/2013 Version End Date:
Not shown	1626.0	NE	352940 178590	Licence No: 18/54/020/G/131 Details: Non-Evaporative Cooling Direct Source: Ground Water - Fresh Point: Ballast Lane (borehole No 7) Data Type: Point	Annual Volume (m ³): 1274360 Max Daily Volume (m ³): 3491.4 Original Application No: - Original Start Date: 8/7/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:
Not shown	1626.0	NE	352940 178590	Licence No: 18/54/020/G/131 Details: Process Water Direct Source: Ground Water - Fresh Point: Ballast Lane (borehole No 7) Data Type: Point	Annual Volume (m ³): 1274360 Max Daily Volume (m ³): 3491.4 Original Application No: - Original Start Date: 8/7/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:
Not shown	1664.0	W	350500 176900	Licence No: 16/52/016/G/029 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - Fresh Point: Woodspring Data Type: Point	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: N75 Original Start Date: 7/6/1992 Expiry Date: - Issue No: 100 Version Start Date: 7/2/1995 Version End Date:
Not shown	1932.0	SW	350830 175600	Licence No: 16/52/016/G/028 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Ground Water - Fresh Point: "borehole, Easton-in-gordano" Data Type: Point	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: 16/52/016/G/028 Original Start Date: 31/5/1991 Expiry Date: - Issue No: 100 Version Start Date: 3/9/1998 Version End Date:
Not shown	1932.0	SW	350830 175600	Licence No: 16/52/016/G/028 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Ground Water - Fresh Point: Borehole, Easton-in-gordano Data Type: Point	Annual Volume (m ³): 35040 Max Daily Volume (m ³): 96 Original Application No: 16/52/016/G/028 Original Start Date: 31/5/1991 Expiry Date: - Issue No: 100 Version Start Date: 3/9/1998 Version End Date:

5.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site?

No

Database searched and no data found.

5.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

5.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? No

Database searched and no data found.

5.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site? No

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

5.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency information on groundwater vulnerability and soil leaching potential within 500m of the study site? Yes

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
156	S	Major Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
254	NE	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
271	SW	Major Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
448	SW	Major Aquifer/Intermediate Leaching Potential	I1	Soils which can possibly transmit a wide range of pollutants.
466	SW	Minor Aquifer/Intermediate Leaching Potential	I1	Soils which can possibly transmit a wide range of pollutants.

5.9 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site? No

5.9.1 Biological Quality:

Database searched and no data found.

5.9.2 Chemical Quality:

Database searched and no data found.

5.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site?

Yes

The following Detailed River Network records are represented on the Hydrology Map (5e):

ID	Distance (m)	Direction	Details	
1	217.0	SW	River Name: River Avon Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
2	220.0	SW	River Name: River Avon Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
3	223.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
4	244.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
5	269.0	SW	River Name: River Avon Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
6	269.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
7	286.0	W	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
8	286.0	W	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
9	322.0	W	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
10 A	348.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
11 A	348.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
12 A	350.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
13 B	369.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
14 B	369.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
15	384.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
16	407.0	W	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
17	474.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
18	478.0	SW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined
19	478.0	SW	River Name: Markham Brook Welsh River Name: - Alternative Name: -	River Type: Culvert Main River Status: Currently Undefined

5.11 Surface Water Features

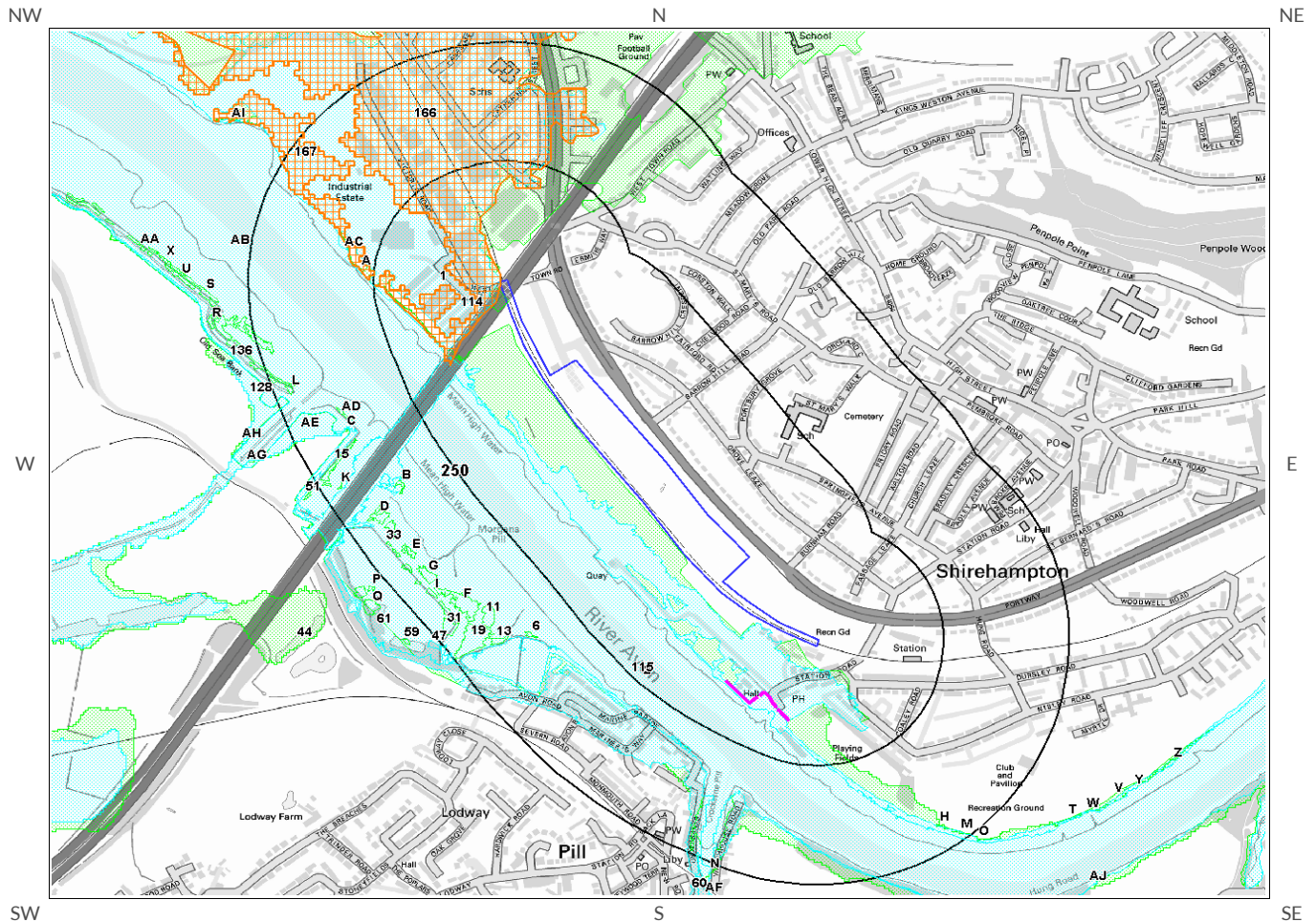
Are there any surface water features within 250m of the study site?

Yes

The following surface water records are not represented on mapping:

Distance (m)	Direction
129.0	SW
168.0	W








6. Environment Agency Flood Map for planning (from rivers and the sea)



Environment Agency Flood Map for planning (from rivers and the sea)



© Crown copyright and database rights 2014. Ordnance Survey license 100035207.

-  Site Outline
-  Search Buffers (m)
-  Zone 2 Floodplain
-  Zone 3 Floodplain
-  Flood Storage Area
-  Area Benefiting from Flood Defences
-  Flood Defences



6. Flooding

6.1 Zone 2 Flooding

Environment Agency Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 1 – Environment Agency Flood Map for Planning:

Is the site within 250m of an Environment Agency Zone 2 floodplain? Yes

The following floodplain records are represented as green shading on the Flood Map:

ID	Distance (m)	Direction	Update	Type
1	0.0	On Site	03-Nov-2014	Zone 2 - (Tidal Models)
2	114.0	SW	03-Nov-2014	Zone 2 - (Fluvial / Tidal Models)
3AB	153.0	W	03-Nov-2014	Zone 2 - (Fluvial / Tidal Models)

6.2 Zone 3 Flooding

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 1 – Environment Agency Flood Map for Planning.

Is the site within 250m of an Environment Agency Zone 3 floodplain? Yes

The following floodplain records are represented as blue shading on the Flood Map:

ID	Distance (m)	Direction	Update	Type
114	0.0	NW	03-Nov-2014	Zone 3 - (Tidal Models)
115	114.0	SW	03-Nov-2014	Zone 3 - (Fluvial / Tidal Models)
116A B	153.0	W	03-Nov-2014	Zone 3 - (Fluvial / Tidal Models)
117	170.0	W	03-Nov-2014	Zone 3 - (Fluvial Models)

6.3 Flood Defences

Are there any Flood Defences within 250m of the study site? Yes

The following flood defence records are represented as lines on the Flood Map:

ID	Distance (m)	Direction	Update
168	132.0	SW	31-Oct-2014
169	144.0	SW	31-Oct-2014
170	153.0	SW	31-Oct-2014
171	153.0	SW	31-Oct-2014

6.4 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? Yes

6.5 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

6.6 Groundwater Flooding Susceptibility Areas

6.6.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site?

Yes

Does this relate to Clearwater Flooding or Superficial Deposits Flooding? Superficial Deposits Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

6.6.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Potential at Surface

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

6.7 Groundwater Flooding Confidence Areas

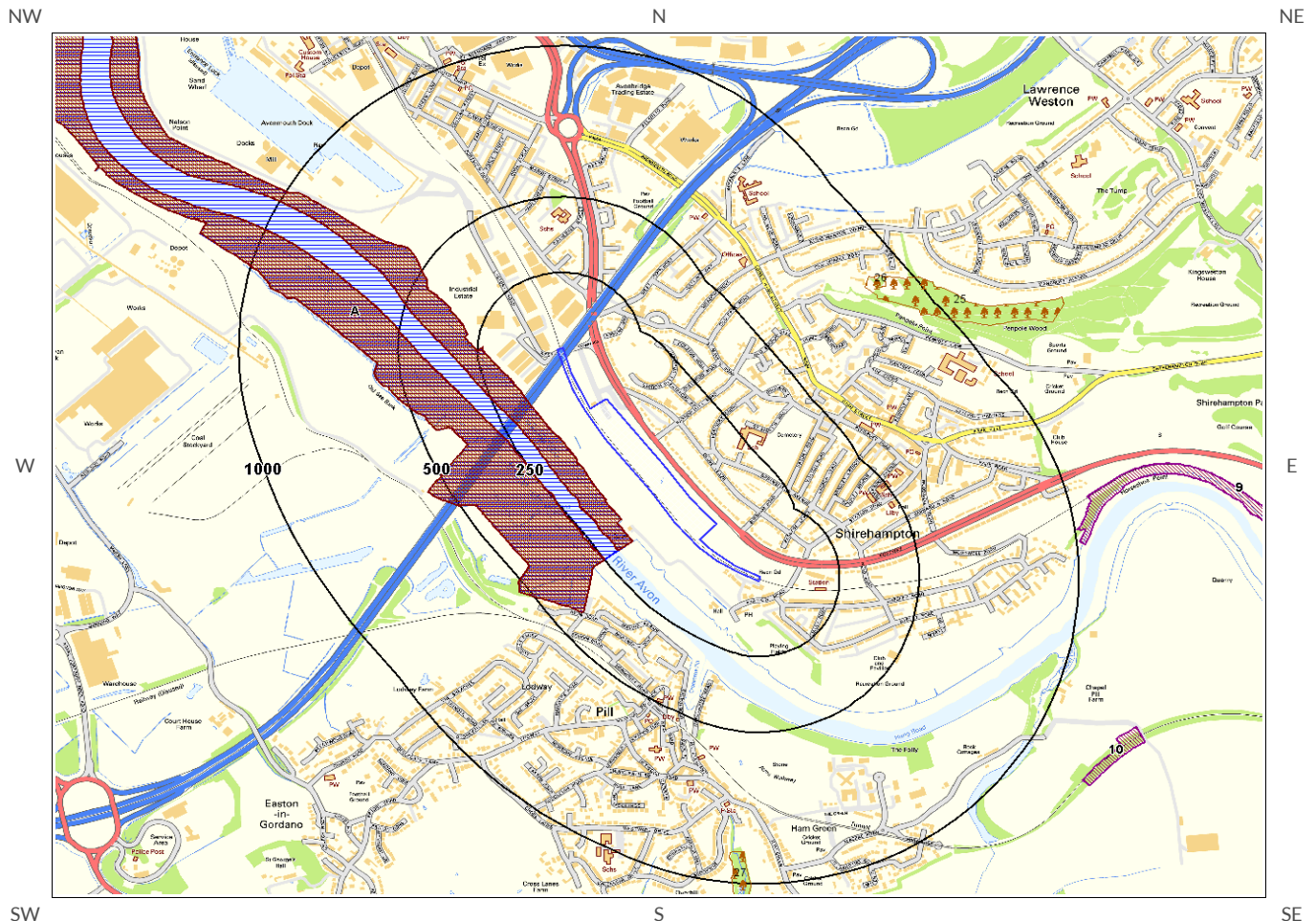
What is the British Geological Survey confidence rating in this result?

Moderate

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

7. Designated Environmentally Sensitive Sites Map



Designated Environmentally Sensitive Sites Map



© Crown copyright and database rights 2014. Ordnance Survey license 100035207.

-  Site Outline
-  SAC
-  SSSI
-  NNR
-  World Heritage Sites
-  SPA
-  Ramsar
-  LNR
-  Environmentally Sensitive Areas
-  Nitrate Vulnerable Zones
-  Nitrate Sensitive Areas
-  National Parks
-  Ancient Woodlands
-  Areas of Outstanding Natural Beauty



7. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? Yes

7.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site: 4

The following Site of Special Scientific Interest (SSSI) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SSSI Name	Data Source
7B	110.0	SW	Severn Estuary	Natural England
8	243.0	SW	Severn Estuary	Natural England
9	1007.0	E	Horseshoe Bend, Shirehampton	Natural England
10	1208.0	SE	Ham Green	Natural England

7.2 Records of National Nature Reserves (NNR) within 2000m of the study site: 0

Database searched and no data found.

7.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site: 2

The following Special Area of Conservation (SAC) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SAC Name	Data Source
1A	110.0	SW	Severn Estuary	Natural England
2A	110.0	SW	Severn Estuary (England)	Natural Resources Wales

7.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

4

The following Special Protection Area (SPA) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SPA Name	Data Source
3B	110.0	SW	Severn Estuary	Natural England
4B	110.0	SW	Severn Estuary (England)	Natural Resources Wales
5C	243.0	SW	Severn Estuary	Natural England
6C	243.0	SW	Severn Estuary (England)	Natural Resources Wales

7.5 Records of Ramsar sites within 2000m of the study site:

4

The following Ramsar records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ramsar Site Name	Data Source
11B	110.0	SW	Severn Estuary (England)	Natural Resources Wales
12B	110.0	SW	Severn Estuary	Natural England
13C	243.0	SW	Severn Estuary	Natural England
14C	243.0	SW	Severn Estuary (England)	Natural Resources Wales

7.6 Records of Ancient Woodland within 2000m of the study site:

6

The following records of Designated Ancient Woodland provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
25	858.0	NE	UNKNOWN	Ancient and Semi-Natural Woodland
26	889.0	NE	UNKNOWN	Ancient and Semi-Natural Woodland
27	894.0	S	LEIGH WOOD/MARKHAM BOTTOM	Ancient and Semi-Natural Woodland
Not shown	1755.0	SW	HAILS WOOD	Ancient and Semi-Natural Woodland
Not shown	1772.0	SW	HAILS WOOD	Ancient and Semi-Natural Woodland
Not shown	1997.0	NE	UNKNOWN	Ancient Replanted Woodland

7.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

10

The following Local Nature Reserve (LNR) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	LNR Name	Data Source
Not shown	1620.0	SW	St George's Flower Bank	Natural England
Not shown	1629.0	SW	St George's Flower Bank	Natural England
Not shown	1672.0	SW	St George's Flower Bank	Natural England
Not shown	1684.0	SW	St George's Flower Bank	Natural England
Not shown	1692.0	SW	St George's Flower Bank	Natural England
Not shown	1694.0	SW	St George's Flower Bank	Natural England
Not shown	1699.0	SW	St George's Flower Bank	Natural England
Not shown	1780.0	SW	St George's Flower Bank	Natural England
Not shown	1889.0	SW	St George's Flower Bank	Natural England
Not shown	1922.0	SW	St George's Flower Bank	Natural England

7.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

7.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

7.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

7.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

7.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

7.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

0

Database searched and no data found.



8. Natural Hazards Findings

8.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a **GroundSure GeoInsight**, available from [our website](#). The following information has been found:

8.1.1 Shrink Swell

What is the maximum Shrink-Swell* hazard rating identified on the study site? Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

8.1.2 Landslides

What is the maximum Landslide* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

* This indicates an automatically generated 50m buffer and site.

8.1.3 Soluble Rocks

What is the maximum Soluble Rocks* hazard rating identified on the study site?

Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

8.1.4 Compressible Ground

What is the maximum Compressible Ground* hazard rating identified on the study site?

Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

8.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site?

Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

8.1.6 Running Sand

What is the maximum Running Sand** hazard rating identified on the study site?

Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Significant potential for running sand problems with relatively small changes in ground conditions. Avoid large amounts of water entering the ground (for example through pipe leakage or soak-aways). Do not dig (deep) holes into saturated ground near the property without technical advice. For new build consider the consequences of soil and groundwater conditions during and after construction. For existing property possible increase in insurance risk from running sand, for example, due to water leakage, high rainfall events or flooding.

* This indicates an automatically generated 50m buffer and site.



9. Mining

9.1 Coal Mining

Are there any coal mining areas within 75m of the study site? No

Database searched and no data found.

9.2 Shallow Mining

What is the subsidence hazard relating to shallow mining on-site*? Negligible

*Please note this data is searched with a 150m buffer.

9.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? No

Guidance: No Guidance Required.

Contact Details

GroundSure Helpline
Telephone: 08444 159 000
info@groundsure.com



British Geological Survey Enquiries

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email: enquiries@bgs.ac.uk
Web: www.bgs.ac.uk

BGS Geological Hazards Reports and general geological enquiries



Environment Agency

National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 08708 506 506

Web: www.environment-agency.gov.uk
Email: enquiries@environment-agency.gov.uk



Public Health England

Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
<https://www.gov.uk/government/organisations/public-health-england>
Email: enquiries@phe.gov.uk
Main switchboard: 020 7654 8000



The Coal Authority

200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk



Ordnance Survey

Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505



Local Authority

Authority: Bristol City Council
Phone: 0117 922 2000
Web: www.bristol-city.gov.uk
Address: The Council House, College Green, Bristol, BS1 5TR

Gemapping PLC

Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444



Acknowledgements: Site of Special Scientific Interest, National Nature Reserve, Ramsar Site, Special Protection Area, Special Area of Conservation data is provided by, and used with the permission of, Natural England who retain the Copyright and Intellectual Property Rights for the data. PointX © Database Right/Copyright, Thomson Directories Limited © Copyright Link Interchange Network Limited © Database Right/Copyright and Ordnance Survey © Crown Copyright and/or Database Right. All Rights Reserved. Licence Number [03421028].
This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.

Standard Terms and Conditions

1 Definitions

In these terms and conditions unless the context otherwise requires:

"Beneficiary" means the person or entity for whose benefit the Client has obtained the Services.

"Client" means the party or parties entering into a Contract with GroundSure.

"Commercial" means any building or property which is not Residential.

"Confidential Information" means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by GroundSure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

"Support Services" means Support Services provided by GroundSure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

"Contract" means the contract between GroundSure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

"Third Party Data Provider" means any third party providing Third Party Content to GroundSure.

"Data Reports" means reports comprising factual data with no accompanying interpretation.

"Fees" has the meaning set out in clause 5.1.

"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028.

"GroundSure Materials" means all materials prepared by GroundSure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

"Intellectual Property" means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

"Mapping" means a map, map data or a combination of historical maps of various ages, time periods and scales.

"Order" means an electronic, written or other order form submitted by the Client requesting Services from GroundSure in respect of a specified Site.

"Ordnance Survey" means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

"Order Website" means the online platform through which Orders may be placed by the Client and accepted by GroundSure.

"Report" means a Risk Screening Report or Data Report for Commercial or Residential property.

"Residential" means any building or property used as or intended to be used as a single dwelling.

"Risk Screening Report" means a risk screening report comprising factual data with an accompanying interpretation by GroundSure.

"Services" means any Report, Mapping and/or Support Services which GroundSure has agreed to provide by accepting an Order pursuant to clause 2.6.

"Site" means the area of land in respect of which the Client has requested GroundSure to provide the Services.

"Third Party Content" means data, database information or other information which is provided to GroundSure by a Third Party Data Provider.

"User Guide" means the user guide, as amended from time to time, available upon request from GroundSure and on the website (www.GroundSure.com) and forming part of this Contract.

2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 GroundSure agrees to provide the Services in accordance with the Contract.

2.2 GroundSure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions

implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, GroundSure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and GroundSure will have no liability therefor. In addition you acknowledge and agree that GroundSure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 GroundSure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by GroundSure. GroundSure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by GroundSure. GroundSure's acceptance of an Order shall be binding only when made in writing and signed by GroundSure's authorised representative or when accepted through the Order Website.

3 The Client's obligations

3.1 The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to GroundSure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.

3.3 The Client shall supply to GroundSure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as GroundSure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client's approval or decision is required to enable GroundSure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the GroundSure Materials, or use the GroundSure Materials in a manner for which they were not intended. The Client may make the GroundSure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that GroundSure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1 The Client acknowledges that the Services provided by GroundSure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by GroundSure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

(i) the Beneficiary,

(ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),

(iv) the first purchaser or first tenant of the Site, and

(v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by GroundSure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1 GroundSure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by GroundSure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").

5.2 The Client shall pay all outstanding Fees to GroundSure in full without deduction, counterclaim or set off within 30 days of the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of GroundSure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to

(i) full payment of all relevant Fees and

(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the GroundSure Materials.

6.2 All Intellectual Property in the GroundSure Materials are and shall remain owned by GroundSure or GroundSure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the GroundSure Materials shall:

(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the GroundSure Materials in order to advise the Beneficiary in a professional capacity. However, GroundSure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7. Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of GroundSure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

(i) any breach of contract, including any deliberate breach of the Contract by GroundSure or its employees, agents or subcontractors;

(ii) any use made of the Reports, Services, Materials or any part of them; and

(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death

or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 GroundSure shall not be liable for

- (i) loss of profits;
- (ii) loss of business;
- (iii) depletion of goodwill and/or similar losses;
- (iv) loss of anticipated savings;
- (v) loss of goods;
- (vi) loss of contract;
- (vii) loss of use;
- (viii) loss or corruption of data or information;
- (ix) business interruption;
- (x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;

(xi) loss or damage that arise as a result of the use of all or part of the GroundSure Materials in breach of the Contract;

(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the GroundSure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;

(xiii) loss or damage to a computer, software, modem, telephone or other property; and

(xiv) loss or damage caused by a delay or loss of use of GroundSure's internet ordering service.

7.5 GroundSure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 GroundSure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of GroundSure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against GroundSure in relation to the Services or other matters arising pursuant to the Contract.

8 GroundSure's right to suspend or terminate

8.1 If GroundSure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, GroundSure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 GroundSure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to GroundSure within 30 days of the Payment Date; or

(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon GroundSure's acceptance of the Order; and

(ii) the Reports and/or Mapping provided under this Contract are

(a) supplied to the Client's specification(s) and in any event

(b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(i) GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in

GroundSure's possession or control; and

(ii) the Client shall pay to GroundSure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination or suspension of the Contract.

11 Anti-Bribery

11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of GroundSure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to GroundSure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through GroundSure.

12.3 GroundSure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of GroundSure.

12.4 No failure on the part of GroundSure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

- (i) the Client or Beneficiary's failure to provide facilities, access or information;
- (ii) fire, storm, flood, tempest or epidemic;
- (iii) Acts of God or the public enemy;
- (iv) riot, civil commotion or war;
- (v) strikes, labour disputes or industrial action;
- (vi) acts or regulations of any governmental or other agency;
- (vii) suspension or delay of services at public registries by Third Party Data Providers;
- (viii) changes in law; or
- (ix) any other reason beyond GroundSure's reasonable control.

In the event that GroundSure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then GroundSure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English

law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 GroundSure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at GroundSure who will respond in a timely manner.

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law. © GroundSure Limited June 2013

Ove Arup & Partners Ltd

OVE ARUP & PARTNERS, 63 ST. THOMAS
STREET,
BRISTOL, BS1 6JZ

GroundSure Reference: GS-1812520

Your Reference: Portway

Report Date 11 Dec 2014

Report Delivery Method: Email - pdf

GroundSure Geoinsight

Address: 352475 176752,

Dear Sir/ Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure GeoInsight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above GroundSure reference number.

Yours faithfully,



Managing Director
Groundsure Limited

Enc.
GroundSure GeoInsight



GroundSure GeoInsight

Address: 352475 176752,
Date: 11 Dec 2014
Reference: GS-1812520
Client: Ove Arup & Partners Ltd

NW N NE

W E



SW S SE

Aerial Photograph Capture date: 01-Jun-2009
Grid Reference: 352404,176778
Site Size: 5.54ha

Contents Page

Overview of Findings.....	5
1 Geology.....	8
1.1 Artificial Ground Map.....	8
1 Geology.....	9
1.1 Artificial Ground.....	9
1.1.1 Artificial/ Made Ground.....	9
1.1.2 Permeability of Artificial Ground.....	9
1.2 Superficial Deposits and Landslips Map.....	10
1.2 Superficial Deposits and Landslips.....	11
1.2.1 Superficial Deposits/ Drift Geology.....	11
1.2.2 Permeability of Superficial Ground.....	11
1.2.3 Landslip.....	11
1.2.4 Landslip Permeability.....	11
1.3 Bedrock and Faults Map.....	12
1.3 Bedrock, Solid Geology & Faults.....	13
1.3.1 Bedrock/ Solid Geology.....	13
1.3.2 Permeability of Bedrock Ground.....	13
1.3.3 Faults.....	13
1.4 Radon Data.....	14
1.4.1 Radon Affected Areas.....	14
1.4.2 Radon Protection.....	14
2 Ground Workings Map.....	15
2 Ground Workings.....	16
2.1 Historical Surface Ground Working Features derived from Historical Mapping.....	16
2.2 Historical Underground Working Features derived from Historical Mapping.....	18
2.3 Current Ground Workings.....	19
3 Mining, Extraction & Natural Cavities Map.....	21
3 Mining, Extraction & Natural Cavities.....	22
3.1 Historical Mining.....	22
3.2 Coal Mining.....	22
3.3 Johnson Poole and Bloomer.....	23
3.4 Non-Coal Mining.....	23
3.5 Non-Coal Mining Cavities.....	23
3.6 Natural Cavities.....	23
3.7 Brine Extraction.....	24
3.8 Gypsum Extraction.....	24
3.9 Tin Mining.....	24
3.10 Clay Mining.....	24
4 Natural Ground Subsidence.....	25
4.1 Shrink-Swell Clay Map.....	25
4.2 Landslides Map.....	26
4.3 Ground Dissolution Soluble Rocks Map.....	27
4.4 Compressible Deposits Map.....	28
4.5 Collapsible Deposits Map.....	29
4.6 Running Sand Map.....	30
4 Natural Ground Subsidence.....	31
4.1 Shrink-Swell Clays.....	31
4.2 Landslides.....	31
4.3 Ground Dissolution of Soluble Rocks.....	31
4.4 Compressible Deposits.....	32
4.5 Collapsible Deposits.....	32
4.6 Running Sands.....	32
5 Borehole Records Map.....	34
5 Borehole Records.....	35

6 Estimated Background Soil Chemistry.....	36
7 Railways and Tunnels Map.....	37
7 Railways and Tunnels.....	38
7.1 Tunnels	38
7.2 Historical Railway and Tunnel Features	38
7.3 Historical Railways.....	41
7.4 Active Railways.....	41
7.5 Railway Projects.....	42

Overview of Findings

The GroundSure GeoInsight provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Shallow Mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and GroundSure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1:Geology

1.1 Artificial Ground	1.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	Yes
	1.1.2 Are there any records relating to permeability of artificial ground within the study site* boundary?	Yes
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?	Yes
	1.2.2 Are there any records relating to permeability of superficial geology within the study site boundary?	Yes
	1.2.3 Are there any records of landslip within 500m of the study site boundary?	No
	1.2.4 Are there any records relating to permeability of landslips within the study site boundary?	No
1.3 Bedrock, Solid Geology & Faults	1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	1.3.2 Are there any records relating to permeability of bedrock within the study site boundary?	Yes
	1.3.3 Are there any records of faults within 500m of the study site boundary?	No
1.4 Radon data	1.4.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level
	1.4.2 Is the property in an area where Radon Protection Measures are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary

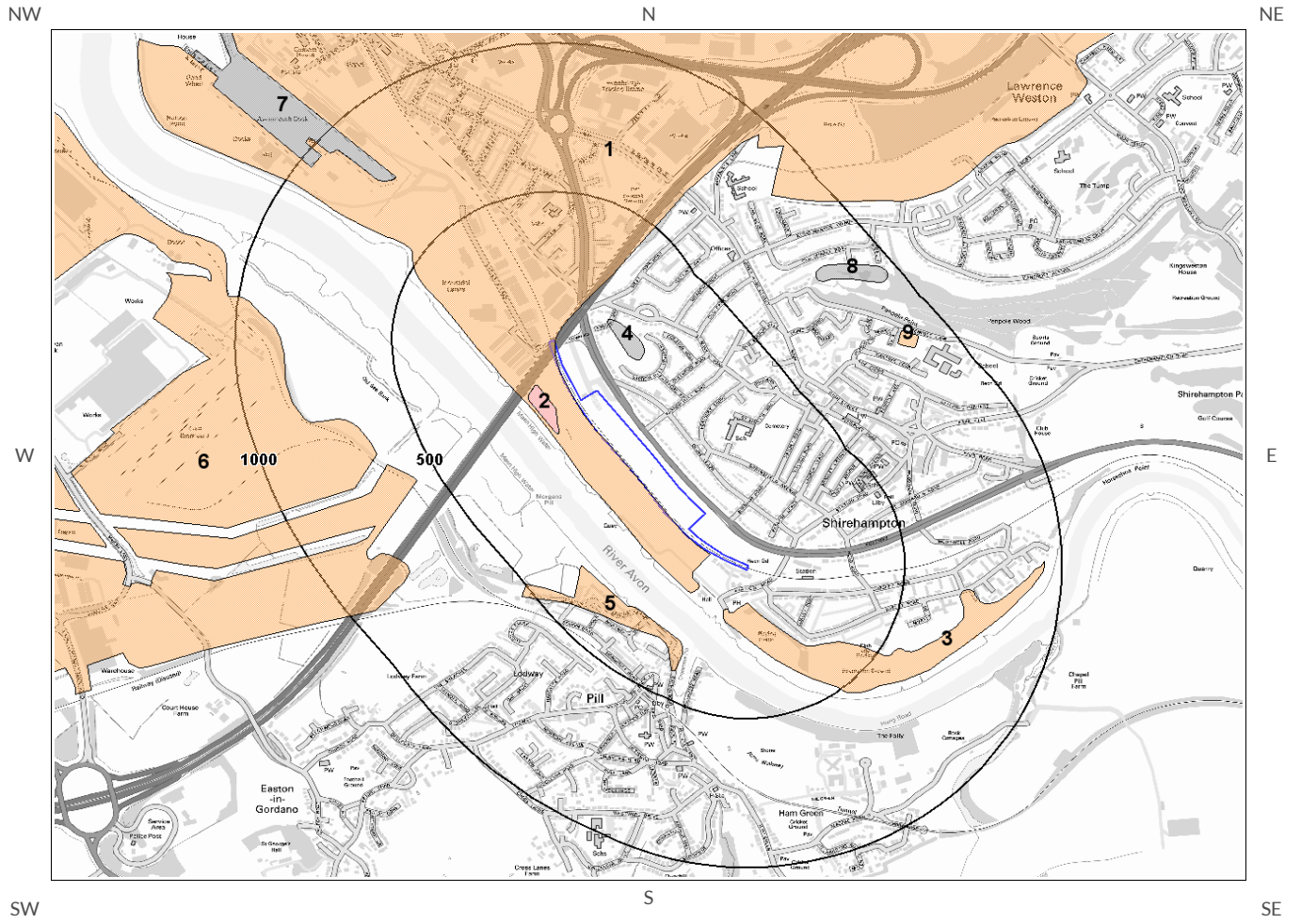
Section 2:Ground Workings	On-site	0-50m	51-250	251-500	501-1000
2.1 Historical Surface Ground Working Features from Small Scale Mapping	10	12	47	Not Searched	Not Searched
2.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	19
2.3 Current Ground Workings	0	0	4	0	2
Section 3:Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
3.1 Historical Mining	0	0	0	0	12

Section 3: Mining, Extraction & Natural Cavities					
	On-site	0-50m	51-250	251-500	501-1000
3.2 Coal Mining	0	0	0	0	0
3.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
3.4 Non-Coal Mining	0	0	0	0	2
3.5 Non-Coal Mining Cavities	0	0	0	0	0
3.6 Natural Cavities	0	0	0	0	0
3.7 Brine Extraction	0	0	0	0	0
3.8 Gypsum Extraction	0	0	0	0	0
3.9 Tin Mining	0	0	0	0	0
3.10 Clay Mining	0	0	0	0	0
Section 4: Natural Ground Subsidence					
	On-site				
4.1 Shrink Swell Clay	Low				
4.2 Landslides	Very Low				
4.3 Ground Dissolution of Soluble Rocks	Negligible				
4.4 Compressible Deposits	Moderate				
4.5 Collapsible Deposits	Very Low				
4.6 Running Sand	Moderate				
Section 5: Borehole Records					
	On-site	0-50m	51-250		
5 BGS Recorded Boreholes	0	1	1		
Section 6: Estimated Background Soil Chemistry					
	On-site	0-50m	51-250		
6 Records of Background Soil Chemistry	9	4	15		
Section 7: Railways and Tunnels					
	On-site	0-50m	51-250	251-500	
7.1 Tunnels	0	0	0	Not Searched	
7.2 Historical Railway and Tunnel Features	4	18	51	Not Searched	
7.3 Historical Railways	0	0	0	Not Searched	
7.4 Active Railways	2	3	2	Not Searched	

Section 7:Railways and Tunnels	On-site	0-50m	51-250	251-500
7.5 Railway Projects	0	0	0	0

1 Geology




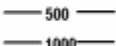




1.1 Artificial Ground Map



Artificial Ground Legend



© Crown copyright and database rights 2014.
Ordnance Survey license 100035207.

- | | | | | | |
|---|--------------------|---|---------------------------|---|-------------------------------|
|  | Site Outline |  | Made Ground (undivided) |  | Disturbed Ground (undivided) |
|  | Search Buffers (m) |  | Worked Ground (undivided) |  | Landscaped Ground (undivided) |
| | |  | Infilled Ground |  | Reclaimed Ground |



1 Geology

1.1 Artificial Ground

1.1.1 Artificial/ Made Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:264

Are there any records of Artificial/Made Ground within 500m of the study site boundary? Yes

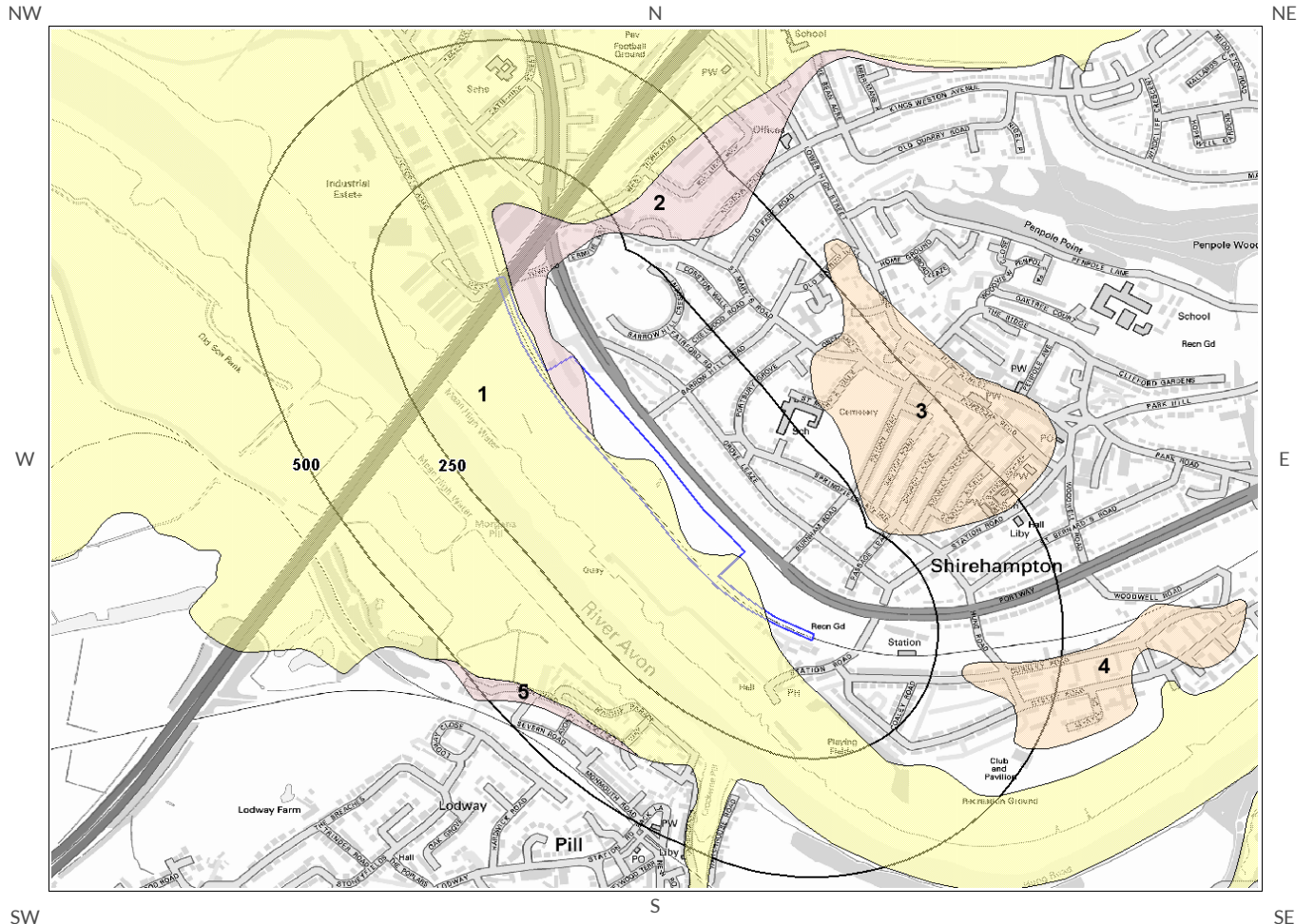
ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
2	67.0	SW	WMGR-MGRD	INFILLED GROUND	ARTIFICIAL DEPOSIT
3	111.0	S	MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
4	157.0	NE	WGR-OPEN	WORKED GROUND (UNDIVIDED)	VOID
5	288.0	SW	MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

1.1.2 Permeability of Artificial Ground

Are there any records relating to permeability of artificial ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Intergranular	Very High	Very Low

1.2 Superficial Deposits and Landslips Map



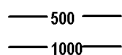
Superficial Deposits and Landslips Legend



© Crown copyright and database rights 2014. Ordnance Survey license 100035207.



Site Outline



Search Buffers (m)

1.2 Superficial Deposits and Landslips

1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary? Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	TFD-CLSI	TIDAL FLAT DEPOSITS	CLAY AND SILT
2	0.0	On Site	HEAD-CSSG	HEAD	CLAY, SILT, SAND AND GRAVEL
3	256.0	E	RTD2-SAGR	RIVER TERRACE DEPOSITS, 2	SAND AND GRAVEL
4	308.0	E	RTD1-SAGR	RIVER TERRACE DEPOSITS, 1	SAND AND GRAVEL
5	376.0	SW	HEAD-CSSG	HEAD	CLAY, SILT, SAND AND GRAVEL

1.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Intergranular	Low	Very Low
0.0	On Site	Mixed	High	Very Low

1.2.3 Landslip

Are there any records of Landslip within 500m of the study site boundary? No

Database searched and no data found.

This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

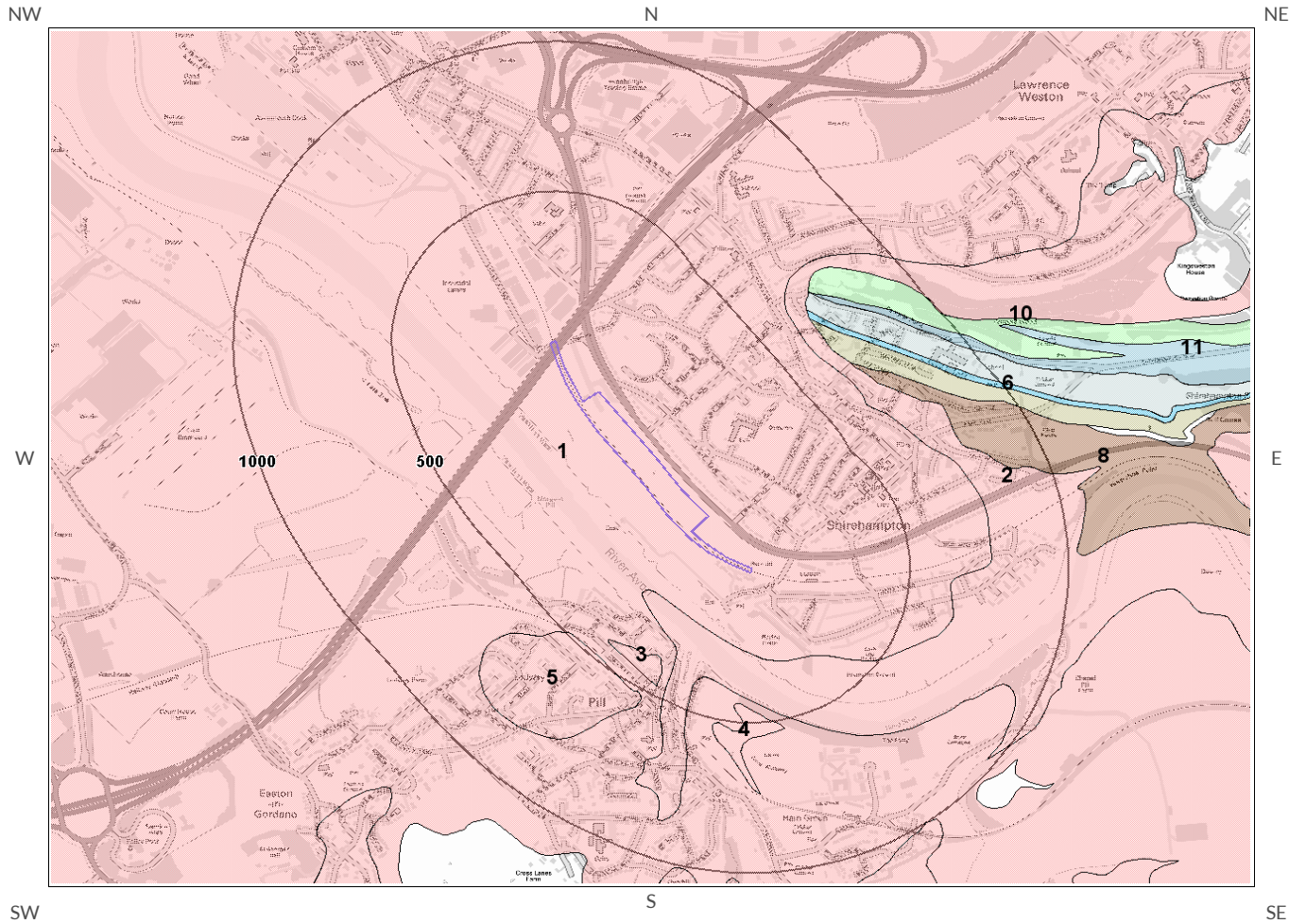
1.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site** boundary? No

Database searched and no data found.

* This includes an automatically generated 50m buffer zone around the site

1.3 Bedrock and Faults Map



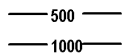
Bedrock and Faults Legend



© Crown copyright and database rights 2014.
Ordnance Survey license 100035207.



Site Outline



Search Buffers (m)

1.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:264

1.3.1 Bedrock/ Solid Geology

Records of Bedrock/ Solid Geology within 500m of the study site boundary:

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	MMG-MDHA	Mercia Mudstone Group - Mudstone And Halite-stone	Rhaetian / Scythian
2	207.0	SW	MMMF-CONG	Mercia Mudstone Group (marginal Facies) - Conglomerate	Triassic
3	378.0	SW	MMMF-CONG	Mercia Mudstone Group (marginal Facies) - Conglomerate	Triassic
4	437.0	S	MMMF-CONG	Mercia Mudstone Group (marginal Facies) - Conglomerate	Triassic
5	484.0	SW	MMMF-CONG	Mercia Mudstone Group (marginal Facies) - Conglomerate	Triassic

1.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site* boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	Low	Low

1.3.3 Faults

Are there any records of Faults within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

* This includes an automatically generated 50m buffer zone around the site

1.4 Radon Data

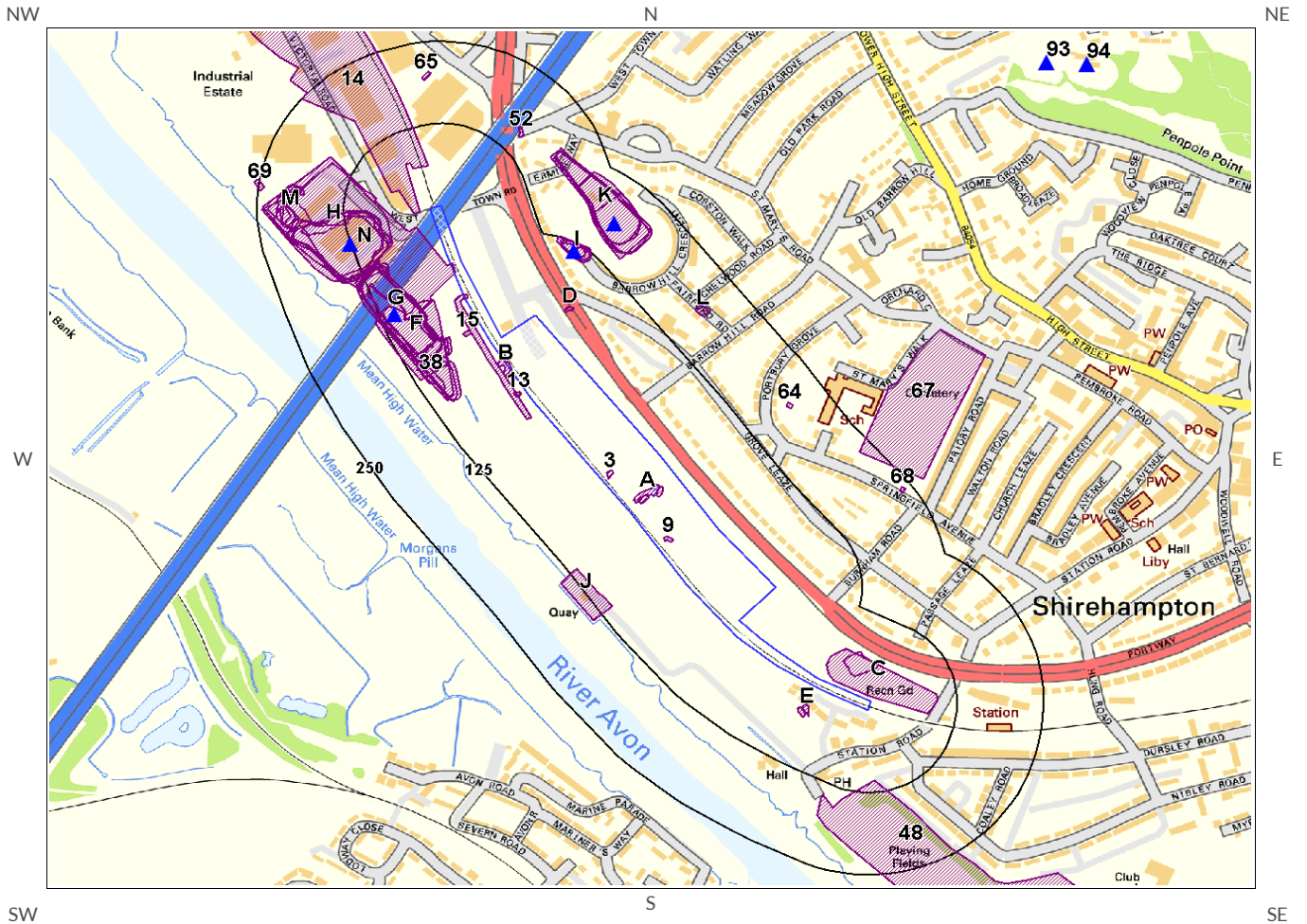
1.4.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level

1.4.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary


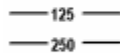



2 Ground Workings Map



Ground Workings Legend



© Crown copyright and database rights 2014.
Ordnance Survey license 100035207.

-  Site Outline
-  Search Buffers (m)
-  Historic Surface Ground Workings
-  Historic Underground Workings
-  Current Ground Workings



2 Ground Workings

2.1 Historical Surface Ground Working Features derived from Historical Mapping

This dataset is based on GroundSure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping.

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? Yes

The following Historical Surface Ground Working Features are provided by GroundSure:

ID	Distance (m)	Direction	NGR	Use	Date
1A	0.0	On Site	352456 176723	Ponds	1883
2B	0.0	On Site	352252 176917	Pond	1902
3	0.0	On Site	352403 176753	Pond	1920
4A	0.0	On Site	352452 176715	Pond	1902
5A	0.0	On Site	352475 176727	Pond	1902
6N	0.0	On Site	352118 177076	Brick Works	1883
7A	0.0	On Site	352475 176727	Pond	1920
8A	0.0	On Site	352452 176715	Pond	1920
9	0.0	On Site	352488 176654	Pond	1920
10B	0.0	On Site	352229 176933	Unspecified Ground Workings	1912
11C	6.0	NE	352796 176438	Unspecified Heap	1979
12C	6.0	NE	352796 176438	Unspecified Heap	1991
13	7.0	SW	352270 176875	Pond	1902
14	15.0	W	351188 178575	Docks	1949
15	17.0	SW	352198 176968	Pond	1912
16C	26.0	NE	352765 176464	Unspecified Ground Workings	1949
17E	29.0	SW	352685 176393	Pond	1902
18D	36.0	NE	352344 177003	Pond	1902
19D	36.0	NE	352344 177003	Pond	1912
20E	37.0	SW	352679 176391	Pond	1920
21F	43.0	W	352117 176958	Refuse Heap	1949

ID	Distance (m)	Direction	NGR	Use	Date
22F	48.0	SW	352116 176971	Old Clay Pit	1912
23F	53.0	SW	352113 176968	Old Clay Pit	1912
24F	56.0	SW	352107 176971	Old Clay Pit	1921
25F	62.0	SW	352100 176997	Old Clay Pit	1901
26F	63.0	SW	352103 176995	Old Clay Pit	1902
27H	64.0	W	351994 177138	Unspecified Heap	1949
28G	65.0	SW	352097 177002	Old Clay Pits	1883
29G	70.0	SW	352101 176989	Pond	1901
30H	70.0	W	352016 177100	Unspecified Pit	1938
31F	71.0	SW	352101 176986	Pond	1902
32H	74.0	W	352015 177101	Pond	1912
33H	74.0	W	352015 177101	Pond	1901
34H	76.0	W	352014 177094	Pond	1912
35H	76.0	W	352014 177094	Pond	1902
36H	77.0	W	352007 177104	Pond	1921
37H	81.0	W	352017 177101	Old Clay Pit	1883
38	91.0	SW	352145 176902	Unspecified Heap	1902
39I	104.0	NE	352353 177090	Old Clay Pit	1912
40I	104.0	NE	352353 177090	Old Clay Pit	1902
41I	105.0	NE	352354 177095	Old Clay Pit	1883
42I	105.0	NE	352354 177095	Unspecified Pit	1938
43I	105.0	NE	352354 177095	Old Clay Pit	1901
44I	105.0	NE	352354 177095	Old Clay Pit	1912
45I	106.0	NE	352349 177099	Old Clay Pit	1921
46J	106.0	SW	352370 176573	Quay	1991
47J	106.0	SW	352370 176573	Quay	1979
48	106.0	S	352888 176171	Refuse Heap	1949
49I	111.0	NE	352361 177091	Unspecified Pit	1949
50K	149.0	NE	352390 177164	Clay Pit	1921
51K	152.0	NE	352394 177163	Clay Pit	1912

ID	Distance (m)	Direction	NGR	Use	Date
52	154.0	NE	352275 177274	Pond	1912
53K	155.0	NE	352394 177171	Unspecified Pit	1938
54K	155.0	NE	352394 177171	Clay Pit	1912
55K	156.0	NE	352412 177143	Unspecified Pit	1991
56K	157.0	NE	352402 177161	Cuttings	1979
57M	173.0	W	351940 177156	Clay Pit	1883
58L	182.0	NE	352537 177001	Pond	1912
59L	182.0	NE	352537 177001	Pond	1902
60M	183.0	W	351935 177157	Pond	1902
61M	187.0	W	351936 177160	Pond	1901
62M	187.0	W	351936 177160	Pond	1912
63M	189.0	W	351936 177162	Pond	1912
64	191.0	NE	352662 176858	Pond	1912
65	193.0	N	352138 177361	Pond	1912
66M	196.0	W	351929 177164	Pond	1921
67	229.0	NE	352854 176860	Cemetery	1991
68	232.0	NE	352825 176729	Pond	1920
69	241.0	W	351897 177194	Pond	1912

2.2 Historical Underground Working Features derived from Historical Mapping

This data is derived from the GroundSure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? Yes

The following Historical Underground Working Features are provided by GroundSure:

ID	Distance (m)	Direction	NGR	Use	Date
Not shown	655.0	N	352224 177818	Air Shaft	1902
Not shown	655.0	N	352224 177818	Air Shaft	1912
Not shown	655.0	N	352227 177817	Air Shaft	1883

ID	Distance (m)	Direction	NGR	Use	Date
Not shown	655.0	N	352225 177818	Unspecified Shaft	1938
Not shown	655.0	N	352225 177818	Air Shaft	1901
Not shown	655.0	N	352225 177818	Air Shaft	1912
Not shown	659.0	N	352222 177821	Air Shaft	1921
Not shown	680.0	NW	351812 177755	Air Shaft	1883
Not shown	738.0	S	353042 175587	Tunnel	1921
Not shown	738.0	S	353042 175587	Tunnel	1938
Not shown	743.0	S	353051 175583	Tunnel	1991
Not shown	743.0	S	353051 175583	Tunnel	1979
Not shown	743.0	S	353051 175583	Tunnel	1949
Not shown	745.0	S	353061 175580	Tunnel	1902
Not shown	745.0	S	353061 175580	Tunnel	1920
Not shown	940.0	SE	353198 175550	Air Shaft	1921
Not shown	941.0	SE	353202 175550	Air Shaft	1902
Not shown	941.0	SE	353202 175550	Air Shaft	1920
Not shown	942.0	SE	353201 175550	Air Shaft	1883

2.3 Current Ground Workings

This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

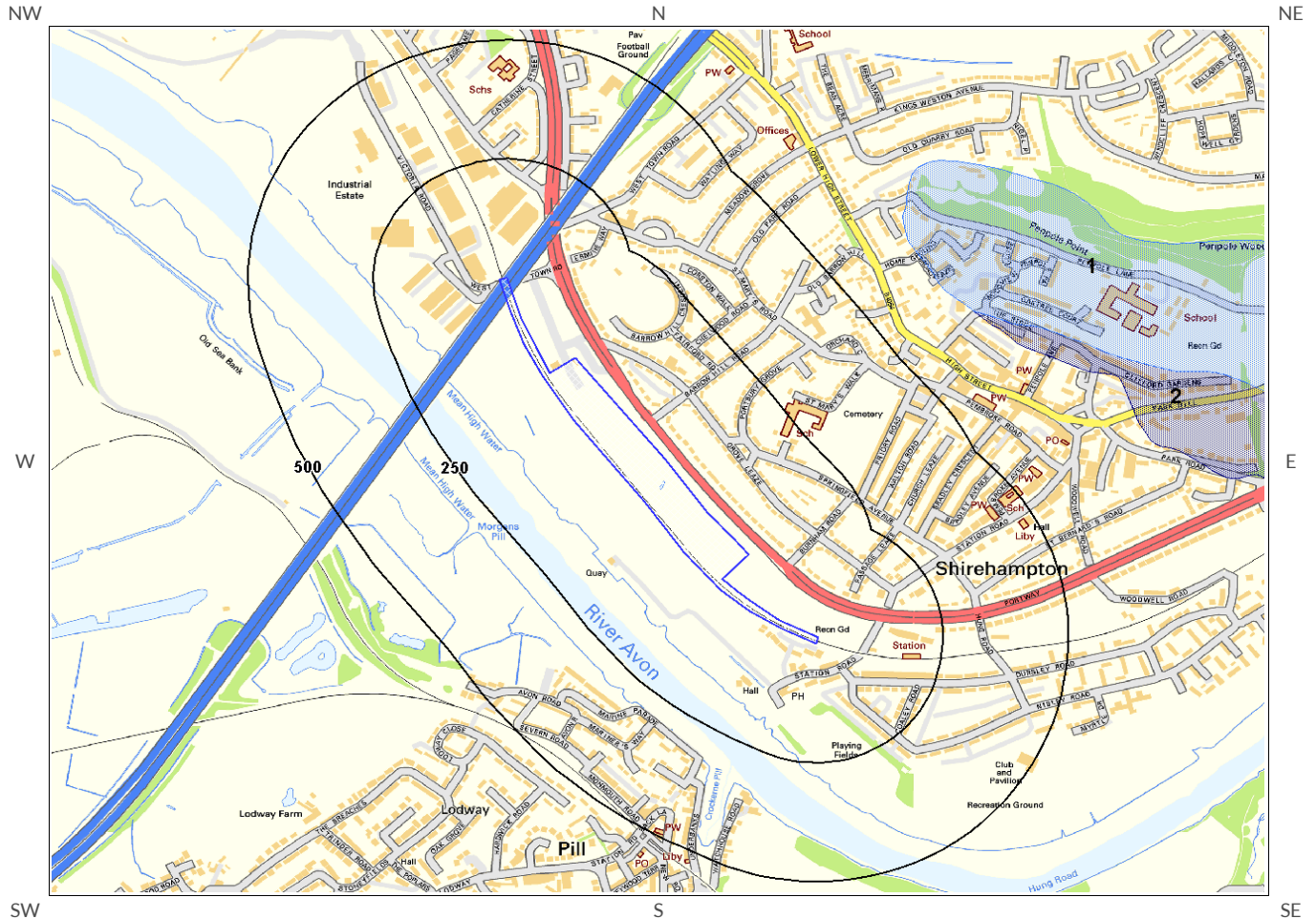
Are there any BGS Current Ground Workings within 1000m of the study site boundary? Yes

The following Current Ground Workings information is provided by British Geological Survey:

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
89G	105.0	W	352091 176996	Clay & Shale	Crown Brick Works	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
90I	111.0	NE	352350 177092	Clay & Shale	Crown Brick Works	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
91N	128.0	W	352028 177103	Clay & Shale	Crown Brick Works	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
92K	179.0	NE	352409 177134	Clay & Shale	Shirehampton	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
93	812.0	NE	353033 177380	Dolomite	Penpole Point	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
94	854.0	NE	353090 177378	Dolomite	Penpole Point	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

3 Mining, Extraction & Natural Cavities Map



Mining, Extraction and Natural Cavities Legend

Mapping sourced from 

© Crown copyright and database rights 2014. Ordnance Survey license 100035207.





3 Mining, Extraction & Natural Cavities

3.1 Historical Mining

This dataset is derived from GroundSure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary? Yes

The following Historical Mining information is provided by GroundSure:

ID	Distance (m)	Direction	NGR	Details	Date
Not shown	655.0	N	352224 177818	Air Shaft	1912
Not shown	655.0	N	352224 177818	Air Shaft	1902
Not shown	655.0	N	352227 177817	Air Shaft	1883
Not shown	655.0	N	352225 177818	Unspecified Shaft	1938
Not shown	655.0	N	352225 177818	Air Shaft	1912
Not shown	655.0	N	352225 177818	Air Shaft	1901
Not shown	659.0	N	352222 177821	Air Shaft	1921
Not shown	680.0	NW	351812 177755	Air Shaft	1883
Not shown	940.0	SE	353198 175550	Air Shaft	1921
Not shown	941.0	SE	353202 175550	Air Shaft	1902
Not shown	941.0	SE	353202 175550	Air Shaft	1920
Not shown	942.0	SE	353201 175550	Air Shaft	1883

3.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

3.3 Johnson Poole and Bloomer

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

Are there any JPB Mining areas within 1000m of the study site boundary? No

The following information provided by JPB is not represented on mapping: Database searched and no data found.

3.4 Non-Coal Mining

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

Are there any Non-Coal Mining areas within 1000m of the study site boundary? Yes

The following non-coal mining information is provided by the BGS:

ID	Distance (m)	Direction	Name	Commodity	Assessment of likelihood
1	658.0	NE	Not available	Vein Mineral	Rare and localised small scale mining may have occurred.
2	676.0	NE	Not available	Vein Mineral	Occasional minor mining may have occurred but of restricted extent.

3.5 Non-Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled "Review of mining instability in Great Britain, 1990" PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary? No

Database searched and no data found.

3.6 Natural Cavities

This dataset provides information based on Peter Brett Associates natural cavities database.

Are there any Natural Cavities within 1000m of the study site boundary? No

Database searched and no data found.

3.7 Brine Extraction

This data provides information from the Coal Authority issued on behalf of the Cheshire Brine Subsidence Compensation Board.

Are there any Brine Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

3.8 Gypsum Extraction

This dataset provides information on Gypsum extraction from British Gypsum records.

Are there any Gypsum Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

3.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level.

Are there any Tin Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

3.10 Clay Mining

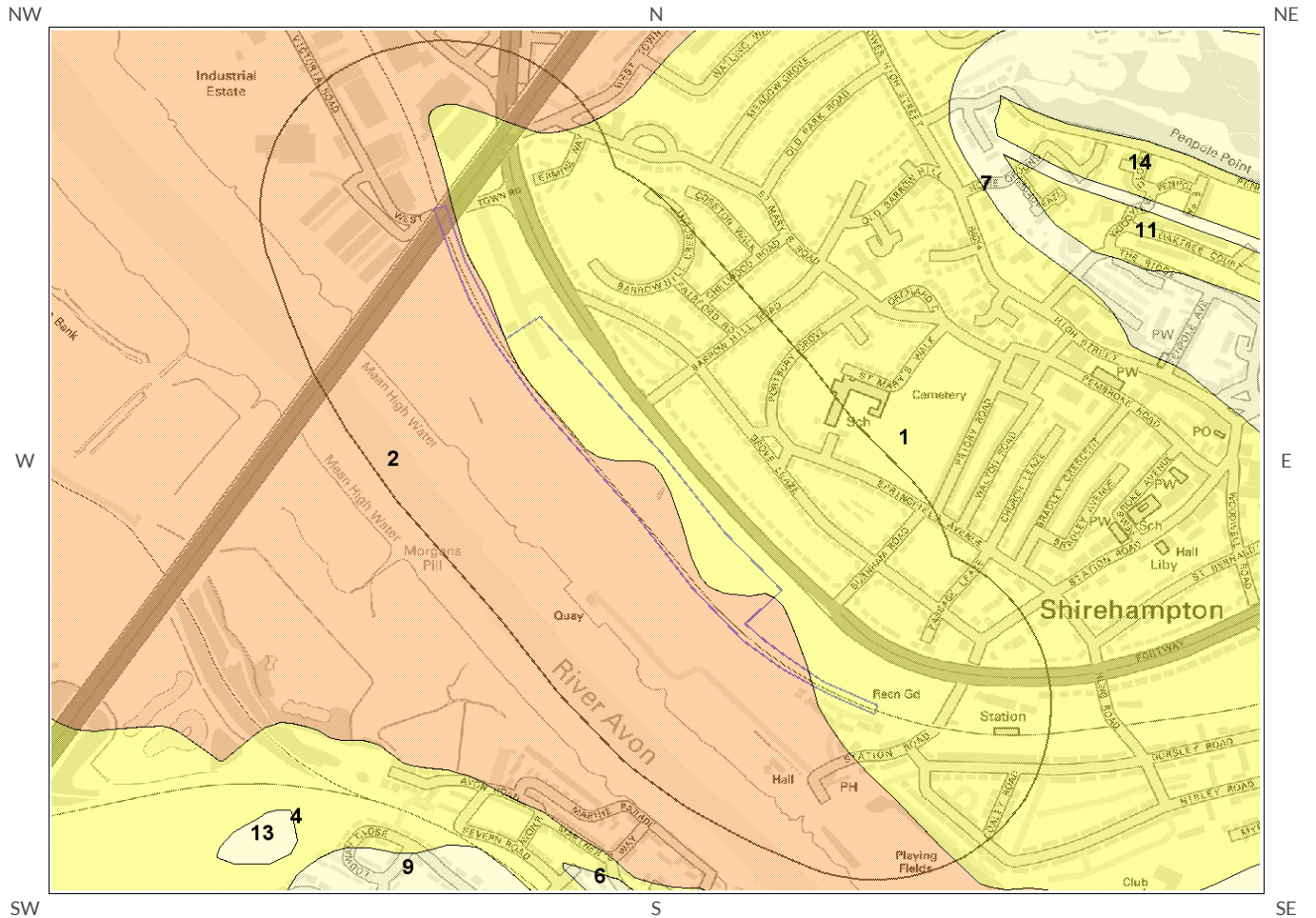
This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

Are there any Clay Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

4 Natural Ground Subsidence

4.1 Shrink-Swell Clay Map



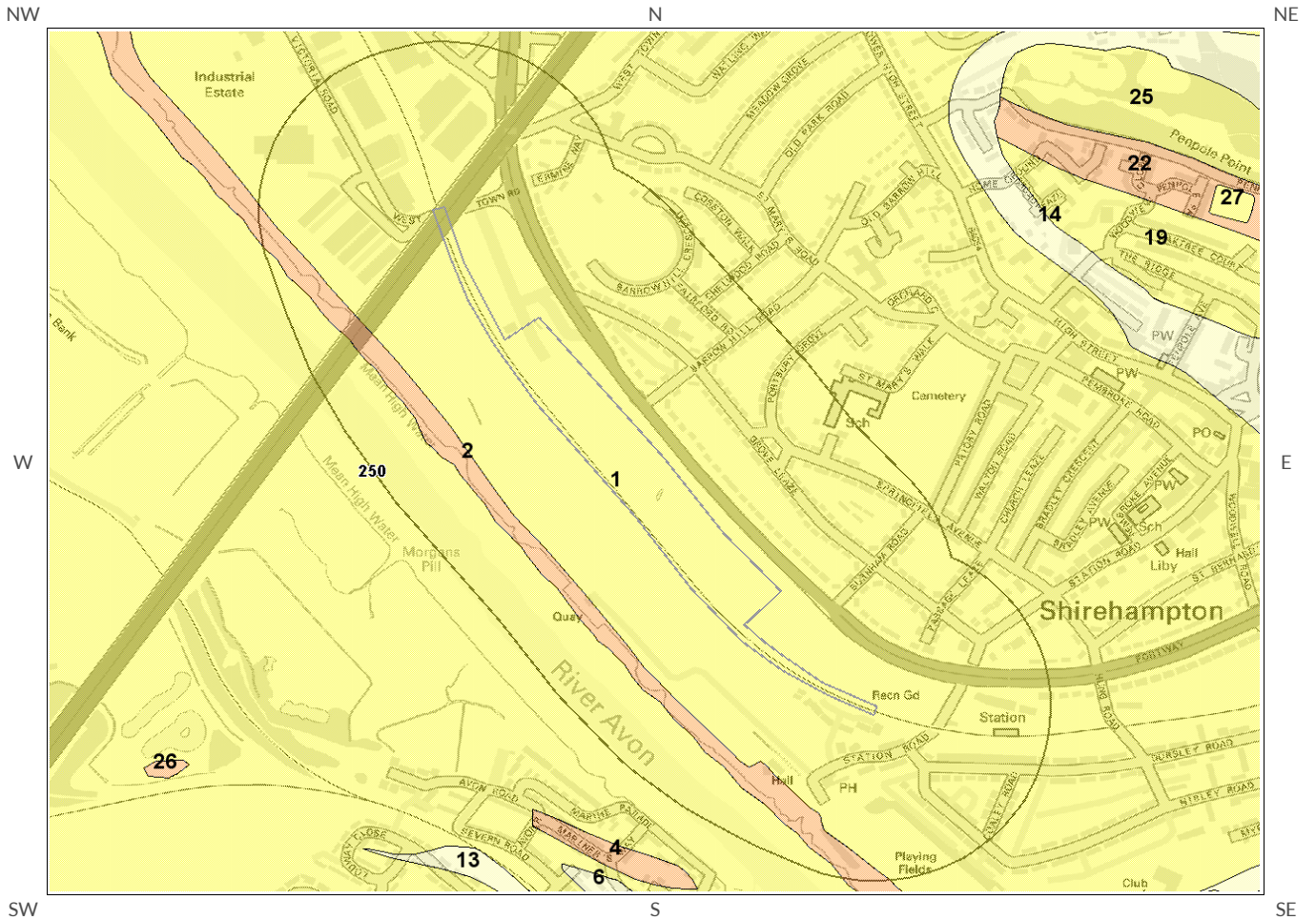
Shrink Swell Clay Legend



© Crown copyright and database rights 2014. Ordnance Survey license 100035207.



4.2 Landslides Map



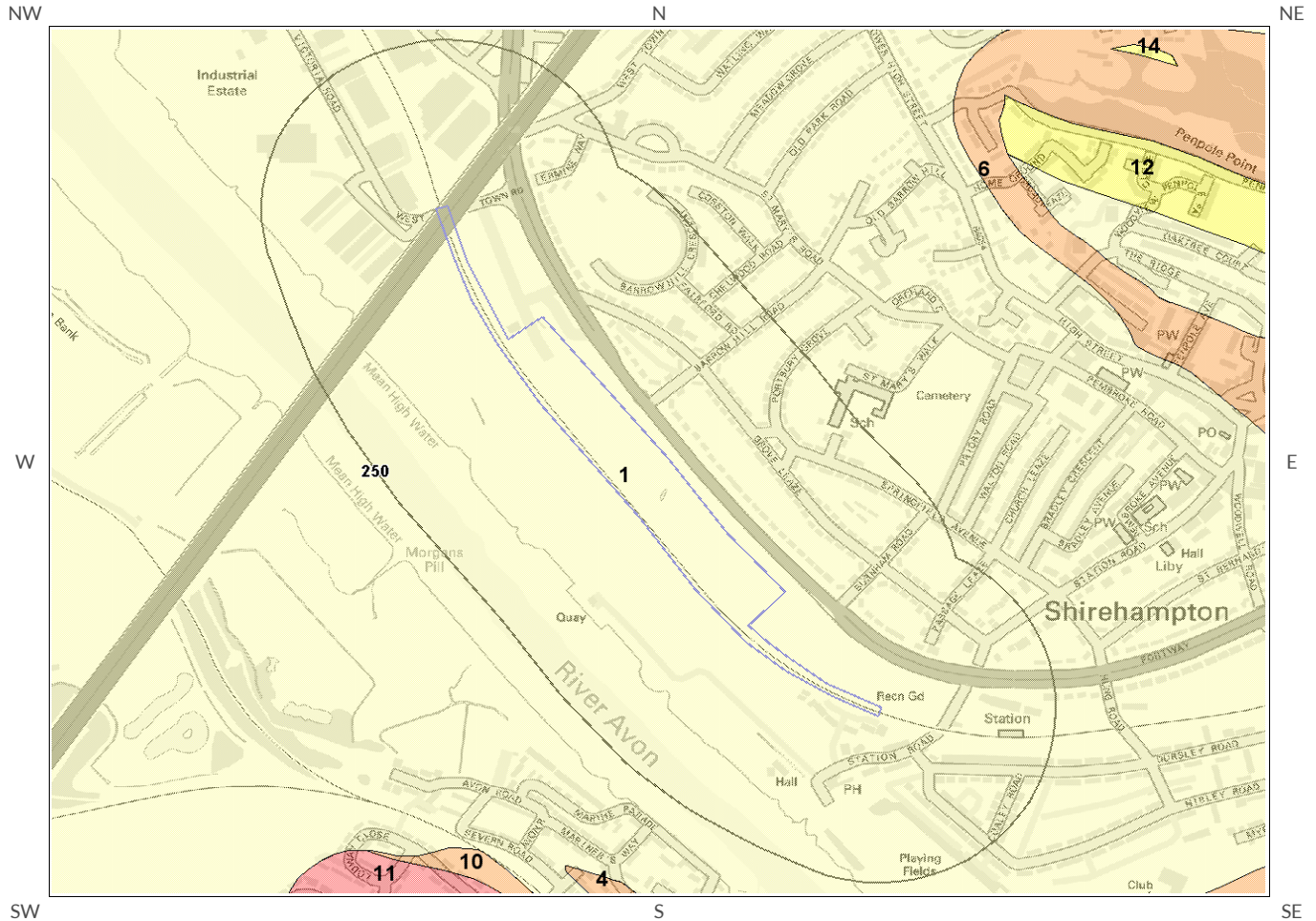
Landslides Legend



© Crown copyright and database rights 2014. Ordnance Survey license 100035207.



4.3 Ground Dissolution Soluble Rocks Map



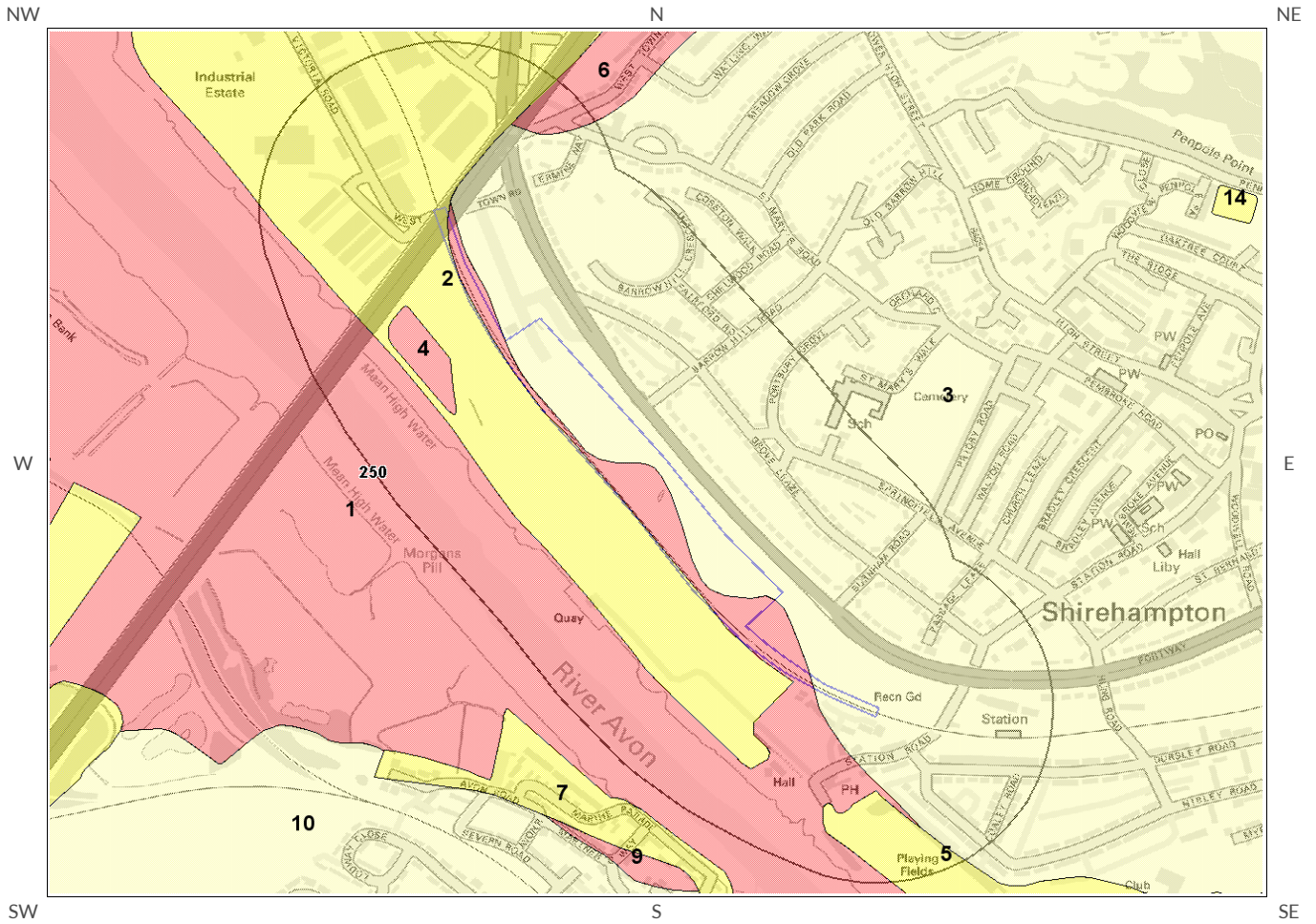
Ground Dissolution Soluble Rocks Legend



© Crown copyright and database rights 2014. Ordnance Survey license 100035207.



4.4 Compressible Deposits Map



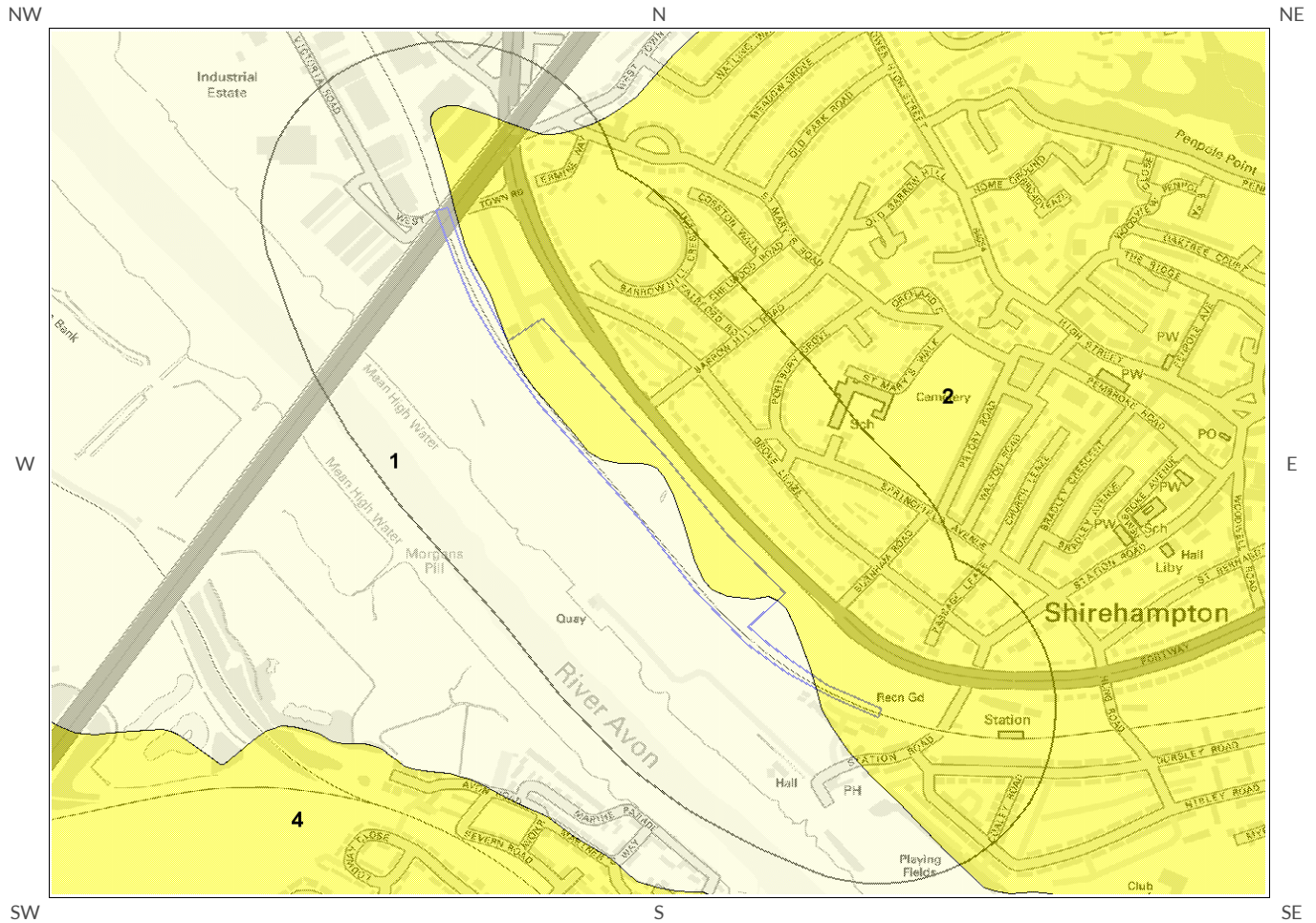
Compressible Deposits Legend



© Crown copyright and database rights 2014. Ordnance Survey license 100035207.



4.5 Collapsible Deposits Map



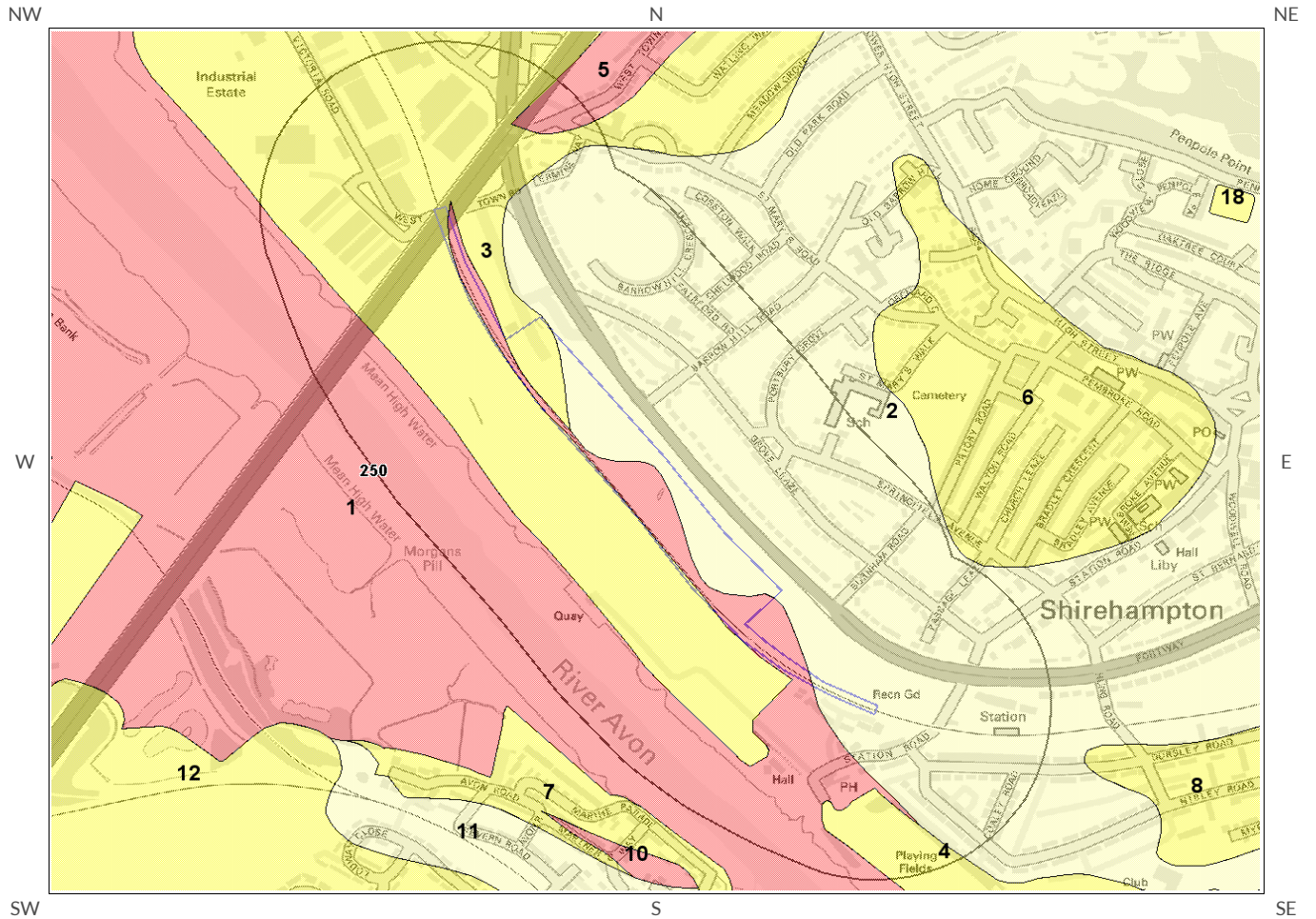
Collapsible Deposits Legend



© Crown copyright and database rights 2014. Ordnance Survey license 100035207.



4.6 Running Sand Map



Running Sand Legend



© Crown copyright and database rights 2014. Ordnance Survey license 100035207.





4 Natural Ground Subsidence

The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS).

The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

What is the maximum hazard rating of natural subsidence within the study site* boundary? Moderate

4.1 Shrink-Swell Clays

The following Shrink Swell information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.
2	0.0	On Site	Low	Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

4.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

4.3 Ground Dissolution of Soluble Rocks

The following Ground Dissolution information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

* This includes an automatically generated 50m buffer zone around the site

4.4 Compressible Deposits

The following Compressible Deposits information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Moderate	Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build - consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property - possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.
2	0.0	On Site	Very Low	Very low potential for compressible deposits to be present. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.
3	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

4.5 Collapsible Deposits

The following Collapsible Rocks information provided by the British Geological Survey:

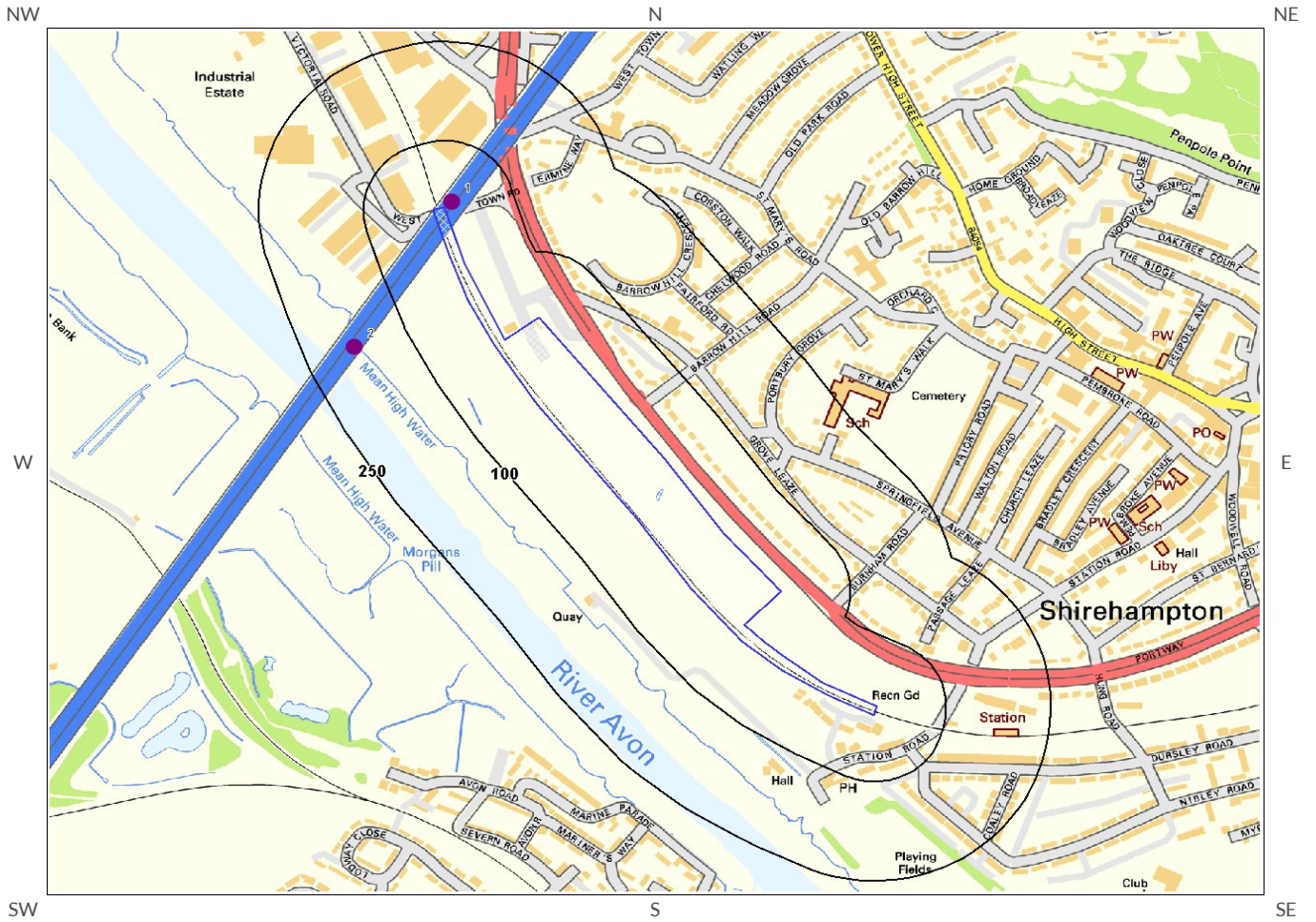
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for collapsible deposits identified. No actions required to avoid problems due to collapsible deposits. No special ground investigation required, or increased construction costs or increased financial risk due to potential problems with collapsible deposits.
2	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

4.6 Running Sands

The following Running Sands information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Moderate	Significant potential for running sand problems with relatively small changes in ground conditions. Avoid large amounts of water entering the ground (for example through pipe leakage or soak-aways). Do not dig (deep) holes into saturated ground near the property without technical advice. For new build - consider the consequences of soil and groundwater conditions during and after construction. For existing property - possible increase in insurance risk from running sand, for example, due to water leakage, high rainfall events or flooding.
2	0.0	On Site	Negligible	No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
3	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.



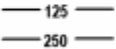
5 Borehole Records Map



Borehole Records Legend



© Crown copyright and database rights 2014.
Ordnance Survey license 100035207.

-  Site Outline
-  Borehole Locations
-  Search Buffers (m)



5 Borehole Records

The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary:

2

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	12.0	NE	352170 177170	ST57NW47	13.1	BIRMINGHAM EXETER MOTORWAY 64
2	179.0	SW	352030 176950	ST57NW46	11.88	BIRMINGHAM EXETER MOTORWAY 63

Additional online information is available for the following boreholes listed above:

#1: scans.bgs.ac.uk/sobi_scans/boreholes/388191

#2: scans.bgs.ac.uk/sobi_scans/boreholes/388190



6 Estimated Background Soil Chemistry

Records of background estimated soil chemistry within 250m of the study site boundary:

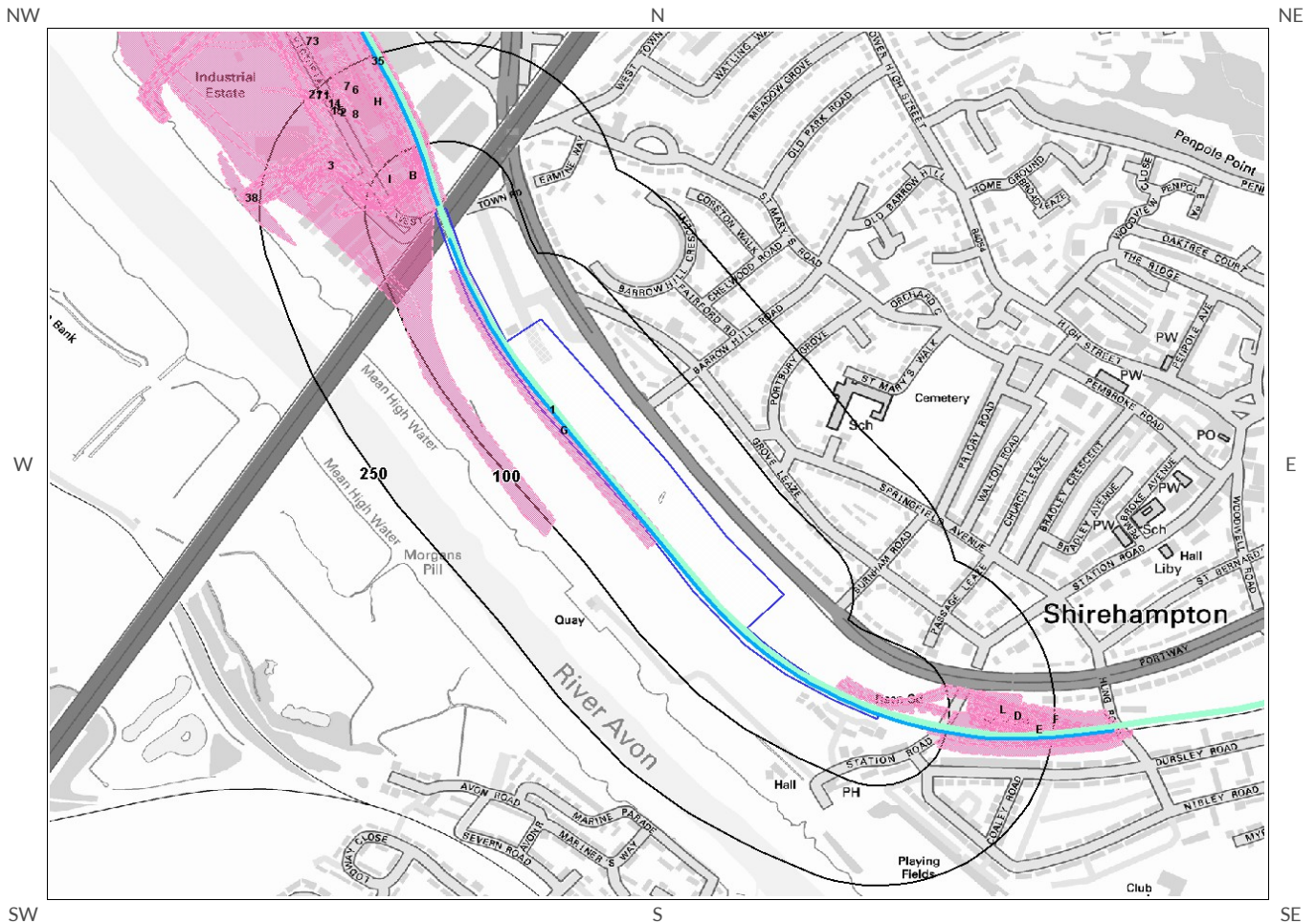
28

For further information on how this data is calculated and limitations upon its use, please see the GroundSure Geolnsight User Guide, available on request.

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	Sediment	15 - 25 mg/kg	>6.0 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
0.0	On Site	Sediment	15 - 25 mg/kg	>6.0 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
0.0	On Site	Sediment	15 - 25 mg/kg	3.0 - 6.0 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
0.0	On Site	Sediment	15 - 25 mg/kg	3.0 - 6.0 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
0.0	On Site	Sediment	15 - 25 mg/kg	3.0 - 6.0 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	200 - 300 mg/kg
0.0	On Site	Sediment	15 - 25 mg/kg	3.0 - 6.0 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
0.0	On Site	Sediment	25 - 35 mg/kg	3.0 - 6.0 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
0.0	On Site	Sediment	15 - 25 mg/kg	3.0 - 6.0 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	200 - 300 mg/kg
0.0	On Site	Sediment	15 - 25 mg/kg	3.0 - 6.0 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
4.0	NE	Sediment	25 - 35 mg/kg	3.0 - 6.0 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
4.0	NE	Sediment	25 - 35 mg/kg	3.0 - 6.0 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
5.0	N	Sediment	15 - 25 mg/kg	3.0 - 6.0 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
5.0	N	Sediment	15 - 25 mg/kg	3.0 - 6.0 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
68.0	SW	Sediment	15 - 25 mg/kg	2.2 - 3.0 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	200 - 300 mg/kg
144.0	W	Sediment	15 - 25 mg/kg	3.0 - 6.0 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
144.0	W	Sediment	15 - 25 mg/kg	3.0 - 6.0 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
159.0	NE	Sediment	15 - 25 mg/kg	>6.0 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	600 - 1200 mg/kg
159.0	NE	Sediment	15 - 25 mg/kg	>6.0 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	600 - 1200 mg/kg
188.0	W	Sediment	15 - 25 mg/kg	3.0 - 6.0 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
188.0	W	Sediment	15 - 25 mg/kg	3.0 - 6.0 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
188.0	W	Sediment	15 - 25 mg/kg	3.0 - 6.0 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
188.0	W	Sediment	15 - 25 mg/kg	3.0 - 6.0 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
207.0	SW	Sediment	15 - 25 mg/kg	3.0 - 6.0 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	200 - 300 mg/kg
207.0	SW	Sediment	15 - 25 mg/kg	2.2 - 3.0 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	200 - 300 mg/kg
221.0	E	Sediment	15 - 25 mg/kg	3.0 - 6.0 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	200 - 300 mg/kg
221.0	E	Sediment	15 - 25 mg/kg	3.0 - 6.0 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	200 - 300 mg/kg
240.0	NE	Sediment	15 - 25 mg/kg	>6.0 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg
240.0	NE	Sediment	15 - 25 mg/kg	>6.0 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	300 - 600 mg/kg

*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.












7 Railways and Tunnels Map



Railways and Tunnels Legend



© Crown copyright and database rights 2014.
Ordnance Survey license 100035207.
© OpenStreetMapContributors

-  Underground or Partially Underground Railway / Subway System
-  Railway Track (OpenStreetMap)
-  Site Outline
-  Railway Tunnel (OS Mapping)
-  High Speed 2
-  250 Search Buffers (m)
-  Abandoned or Dismantled Railway (OpenStreetMap)
-  Crossrail
-  500 Search Buffers (m)
-  Railway Track (OS Mapping)
-  Railway and/or Tunnel Feature from Historical Mapping



7 Railways and Tunnels

7.1 Tunnels

This data is derived from OpenStreetMap and provides information on the possible locations of underground railway systems in the UK - the London Underground, the Tyne & Wear Metro and the Glasgow Subway.

Have any underground railway lines been identified within the study site boundary? No

Have any underground railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

This data is derived from Ordnance Survey mapping and provides information on the possible locations of railway tunnels forming part of the UK overground railway network.

Have any other railway tunnels been identified within the site boundary? No

Have any other railway tunnels been identified within 250m of the site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

7.2 Historical Railway and Tunnel Features

This data is derived from GroundSure's unique Historical Land-use Database and contains features relating to tunnels, railway tracks or associated works that have been identified from historical Ordnance Survey mapping.

Have any historical railway or tunnel features been identified within the study site boundary? Yes

Have any historical railway or tunnel features been identified within 250m of the study site boundary? Yes

ID	Distance (m)	Direction	NGR	Details	Date
1	0	On Site	352304 176857	Railway Sidings	1970
2	0	On Site	350975 178088	Railway Sidings	1920
39G	0	On Site	352321 176830	Railway Sidings	1951
40G	0	On Site	352321 176830	Railway Sidings	1972
3	2	W	350872 178333	Railway Sidings	1979
4L	3	NE	352925 176405	Railway Sidings	1970
5K	7	NE	352859 176410	Railway Sidings	1955
41	10	NE	352770 176425	Railway Sidings	1951

ID	Distance (m)	Direction	NGR	Details	Date
6	15	W	351188 178575	Railway Sidings	1970
7	16	W	351185 178575	Railway Sidings	1955
42H	16	W	352070 177337	Railway Sidings	1952
43H	16	W	352067 177326	Railway Sidings	1952
8	36	NW	351096 178078	Railway Sidings	1938
44I	39	W	352081 177194	Railway Sidings	1975
9B	41	NW	351921 177209	Railway Sidings	1901
45B	43	NW	351915 177204	Railway Sidings	1904
10	46	NW	351964 177203	Railway Sidings	1902
11A	47	NW	352118 177209	Railway Sidings	1883
12A	47	NW	352029 177190	Railway Sidings	1887
13	48	NW	350907 178083	Railway Sidings	1912
46A	49	NW	352109 177199	Railway Sidings	1881
47I	50	NW	352014 177212	Railway Sidings	1904
14	52	NW	351456 177790	Railway Sidings	1912
48J	52	NW	352042 177359	Railway Sidings	1916
15	53	NW	350915 178051	Railway Sidings	1912
16B	53	NW	351906 177210	Railway Sidings	1900
17A	56	NW	352101 177198	Railway Sidings	1921
18A	56	NW	352101 177198	Railway Sidings	1975
19A	56	NW	352101 177198	Railway Sidings	1975
20A	56	NW	352101 177198	Railway Sidings	1904
21	56	NW	351513 177977	Railway Sidings	1916
49	68	W	352072 177059	Railway Sidings	1900
50J	70	NW	352058 177339	Railway Sidings	1902
51C	73	E	352980 176374	Railway Sidings	1920
52	81	W	351999 177259	Railway Sidings	1901
22C	88	E	352984 176382	Railway Sidings	1881
23C	89	SE	352992 176376	Railway Sidings	1921
24C	95	E	352994 176386	Railway Sidings	1951

ID	Distance (m)	Direction	NGR	Details	Date
25C	96	E	352989 176380	Railway Sidings	1920
53E	119	E	352983 176375	Railway Sidings	1883
26D	125	E	352988 176401	Railway Sidings	1912
54K	125	E	352906 176416	Railway Sidings	1938
27C	128	E	353011 176389	Railway Sidings	1966
28E	130	E	353001 176376	Railway Sidings	1951
29D	132	E	353001 176399	Railway Sidings	1915
30D	132	E	353001 176399	Railway Sidings	1916
55L	132	E	352955 176404	Railway Sidings	1901
56L	132	E	352956 176405	Railway Sidings	1901
57E	133	E	352996 176389	Railway Sidings	1912
58E	134	E	352988 176394	Railway Sidings	1887
31E	135	E	352958 176382	Railway Sidings	1972
32E	135	E	352958 176382	Railway Sidings	1903
33E	137	E	353008 176392	Railway Sidings	1979
34E	137	E	352970 176376	Railway Sidings	1979
59D	138	E	352958 176401	Railway Sidings	1964
60E	139	E	352980 176372	Railway Sidings	1981
61N	153	W	351590 177578	Railway Sidings	1966
62M	153	W	351834 177289	Railway Sidings	1951
63M	153	W	351834 177289	Railway Sidings	1912
64N	154	W	351513 177579	Railway Sidings	1991
65D	163	E	352971 176382	Railway Sidings	1979
66D	164	E	352971 176383	Railway Sidings	1972
35	167	N	351807 177741	Railway Sidings	1979
36F	168	E	353026 176394	Railway Sidings	1903
37F	168	E	353026 176394	Railway Sidings	1900
67D	175	E	352977 176380	Railway Sidings	1964
68O	197	NW	351980 177318	Railway Sidings	1952
69	198	W	351891 177198	Railway Sidings	1951

ID	Distance (m)	Direction	NGR	Details	Date
38	205	W	351874 177177	Railway Sidings	1952
70O	217	NW	351959 177332	Railway Sidings	
71	217	NW	351981 177327	Railway Sidings	
72F	221	E	353019 176386	Railway Sidings	
73	248	NW	351946 177430	Railway Sidings	

Any records that have been identified are represented on the Railways and Tunnels Map.

7.3 Historical Railways

This data is derived from OpenStreetMap and provides information on the possible alignments of abandoned or dismantled railway lines in proximity to the study site.

Have any historical railway lines been identified within the study site boundary? No

Have any historical railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Note: multiple sections of the same track may be listed in the detail above

Any records that have been identified are represented on the Railways and Tunnels Map.

7.4 Active Railways

These datasets are derived from Ordnance Survey mapping and OpenStreetMap and provide information on the possible locations of active railway lines in proximity to the study site.

Have any active railway lines been identified within the study site boundary? Yes

Have any active railway lines been identified within 250m of the study site boundary? Yes

Distance (m)	Direction	Name	Type
0	On Site	Severn Beach Line	Rail
0	On Site	Not given	Multi Track
6	N	Not given	Multi Track
13	N	Severn Beach Line	Rail
13	N	Severn Beach Line	Rail
83	E	Severn Beach Line	Rail
97	E	Severn Beach Line	Rail

Note: multiple sections of the same track may be listed in the detail above

Any records that have been identified are represented on the Railways and Tunnels Map.

7.5 Railway Projects

These datasets provide information on the location of large scale railway projects High Speed 2 and Crossrail.

Is the study site within 5km of the route of the High Speed 2 rail project? No

Is the study site within 500m of the route of the Crossrail rail project? No

Further information on proximity to these routes, the project construction status and associated works can be obtained through the purchase of a GroundSure HS2 and Crossrail Report.

Contact Details



GroundSure Helpline
Telephone: 08444 159 000
info@groundsure.com



British Geological Survey Enquiries

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email: enquiries@bgs.ac.uk
Web: www.bgs.ac.uk

BGS Geological Hazards Reports and general geological enquiries



British Gypsum

British Gypsum Ltd
East Leake
Loughborough
Leicestershire
LE12 6HX



The Coal Authority

200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk



Public Health England

Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
<https://www.gov.uk/government/organisations/public-health-england>
Email: enquiries@phe.gov.uk
Main switchboard: 020 7654 8000



Johnson Poole & Bloomer Limited

Harris and Pearson Building, Brettel Lane
Brierley Hill, West Midlands
DY5 3LH
Tel: +44 (0) 1384 262 000
Email: enquiries.gs@jpb.co.uk
Website: www.jpb.co.uk



Ordnance Survey

Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505
Website: <http://www.ordnancesurvey.co.uk/>



Getmapping PLC

Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444
Website: <http://www1.getmapping.com/>



Peter Brett Associates

Caversham Bridge House
Waterman Place
Reading
Berkshire RG1 8DN
Tel: +44 (0)118 950 0761 E-mail: reading@pba.co.uk
Website: <http://www.peterbrett.com/home>



Acknowledgements: Ordnance Survey © Crown Copyright and/or Database Right. All Rights Reserved. Licence Number [03421028]. This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.

Report Reference: GS-1812520

Client Reference: Portway

Standard Terms and Conditions

1 Definitions

In these terms and conditions unless the context otherwise requires:

"Beneficiary" means the person or entity for whose benefit the Client has obtained the Services.

"Client" means the party or parties entering into a Contract with GroundSure.

"Commercial" means any building or property which is not Residential.

"Confidential Information" means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by GroundSure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

"Support Services" means Support Services provided by GroundSure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

"Contract" means the contract between GroundSure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

"Third Party Data Provider" means any third party providing Third Party Content to GroundSure.

"Data Reports" means reports comprising factual data with no accompanying interpretation.

"Fees" has the meaning set out in clause 5.1.

"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028.

"GroundSure Materials" means all materials prepared by GroundSure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

"Intellectual Property" means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

"Mapping" means a map, map data or a combination of historical maps of various ages, time periods and scales.

"Order" means an electronic, written or other order form submitted by the Client requesting Services from GroundSure in respect of a specified Site.

"Ordnance Survey" means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

"Order Website" means the online platform through which Orders may be placed by the Client and accepted by GroundSure.

"Report" means a Risk Screening Report or Data Report for Commercial or Residential property.

"Residential" means any building or property used as or intended to be used as a single dwelling.

"Risk Screening Report" means a risk screening report comprising factual data with an accompanying interpretation by GroundSure.

"Services" means any Report, Mapping and/or Support Services which GroundSure has agreed to provide by accepting an Order pursuant to clause 2.6.

"Site" means the area of land in respect of which the Client has requested GroundSure to provide the Services.

"Third Party Content" means data, database information or other information which is provided to GroundSure by a Third Party Data Provider.

"User Guide" means the user guide, as amended from time to time, available upon request from GroundSure and on the website (www.GroundSure.com) and forming part of this Contract.

2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 GroundSure agrees to provide the Services in accordance with the Contract.

2.2 GroundSure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, GroundSure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and GroundSure will have no liability therefor. In addition you acknowledge and agree that GroundSure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 GroundSure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by GroundSure. GroundSure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by GroundSure. GroundSure's acceptance of an Order

shall be binding only when made in writing and signed by GroundSure's authorised representative or when accepted through the Order Website.

3 The Client's obligations

3.1 The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to GroundSure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.

3.3 The Client shall supply to GroundSure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as GroundSure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client's approval or decision is required to enable GroundSure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the GroundSure Materials, or use the GroundSure Materials in a manner for which they were not intended. The Client may make the GroundSure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that GroundSure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1 The Client acknowledges that the Services provided by GroundSure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by GroundSure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

(i) the Beneficiary,
(ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),
(iv) the first purchaser or first tenant of the Site, and
(v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by GroundSure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1 GroundSure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by GroundSure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").

5.2 The Client shall pay all outstanding Fees to GroundSure in full without deduction, counterclaim or set off within 30 days of the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of GroundSure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to

(i) full payment of all relevant Fees and
(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the GroundSure Materials.

6.2 All Intellectual Property in the GroundSure Materials are and shall remain owned by GroundSure or GroundSure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the GroundSure Materials shall:

(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the GroundSure Materials in order to advise the Beneficiary in a professional capacity. However, GroundSure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7. Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of GroundSure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

(i) any breach of contract, including any deliberate breach of the Contract by GroundSure or its employees, agents or subcontractors;

(ii) any use made of the Reports, Services, Materials or any part of them; and

(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 GroundSure shall not be liable for

(i) loss of profits;

(ii) loss of business;

(iii) depletion of goodwill and/or similar losses;

(iv) loss of anticipated savings;

(v) loss of goods;

(vi) loss of contract;

(vii) loss of use;

(viii) loss or corruption of data or information;

(ix) business interruption;

(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;

(xi) loss or damage that arise as a result of the use of all or part of the GroundSure Materials in breach of the Contract;

(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the GroundSure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;

(xiii) loss or damage to a computer, software, modem, telephone or other property; and

(xiv) loss or damage caused by a delay or loss of use of GroundSure's internet ordering service.

7.5 GroundSure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 GroundSure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of GroundSure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against GroundSure in relation to the Services or other matters arising pursuant to the Contract.

8 GroundSure's right to suspend or terminate

8.1 If GroundSure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, GroundSure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 GroundSure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to GroundSure within 30

days of the Payment Date; or

(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon GroundSure's acceptance of the Order; and

(ii) the Reports and/or Mapping provided under this Contract are

(a) supplied to the Client's specification(s) and in any event

(b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(i) GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in GroundSure's possession or control; and

(ii) the Client shall pay to GroundSure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination or suspension of the Contract.

11 Anti-Bribery

11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of GroundSure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to GroundSure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through GroundSure.

12.3 GroundSure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of GroundSure.

12.4 No failure on the part of GroundSure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

(i) the Client or Beneficiary's failure to provide facilities, access or information;

(ii) fire, storm, flood, tempest or epidemic;

(iii) Acts of God or the public enemy;

(iv) riot, civil commotion or war;

(v) strikes, labour disputes or industrial action;

(vi) acts or regulations of any governmental or other agency;

(vii) suspension or delay of services at public registries by Third

Party Data Providers;

(viii) changes in law; or

(ix) any other reason beyond GroundSure's reasonable control.

In the event that GroundSure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then GroundSure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly

given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

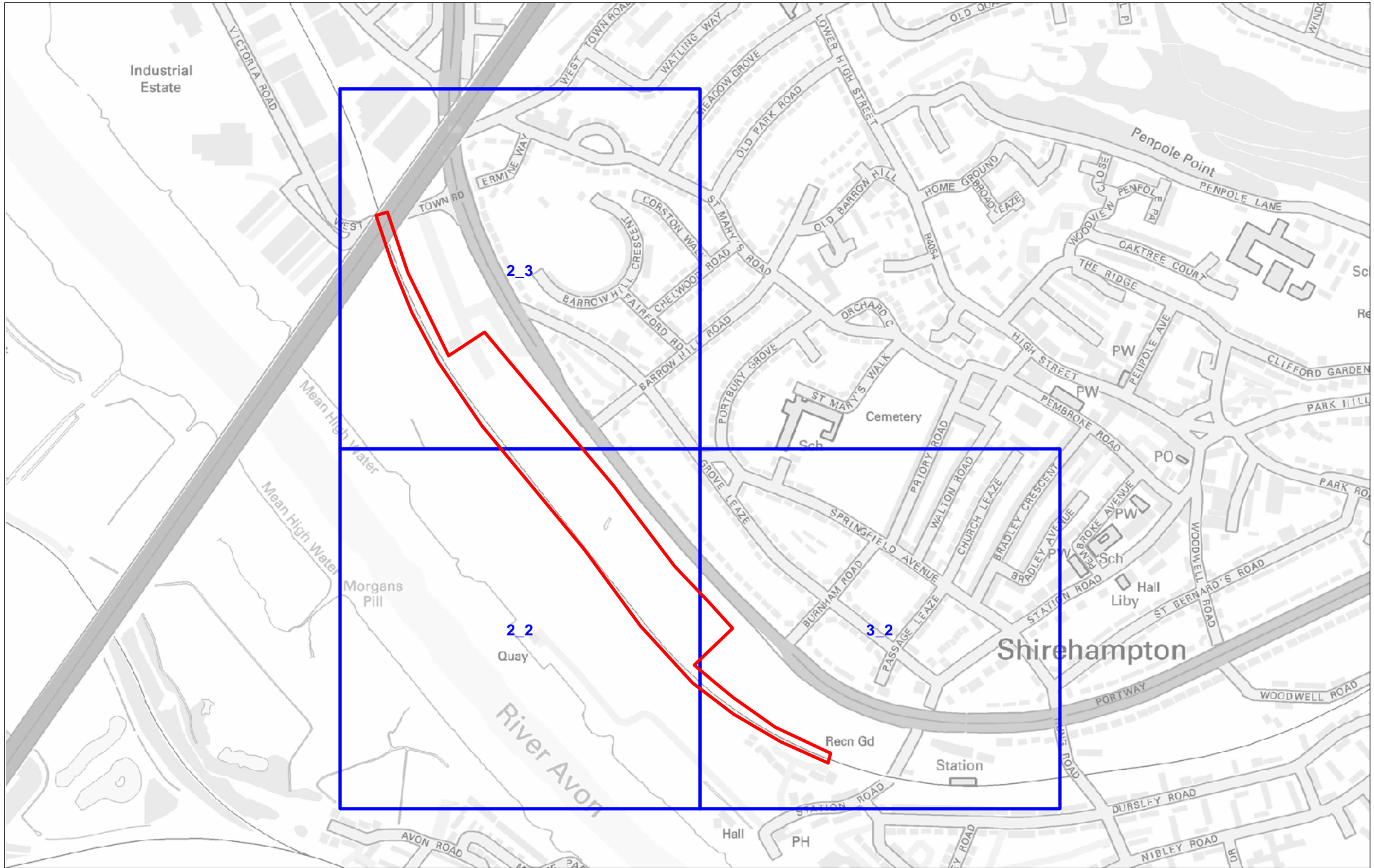
12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

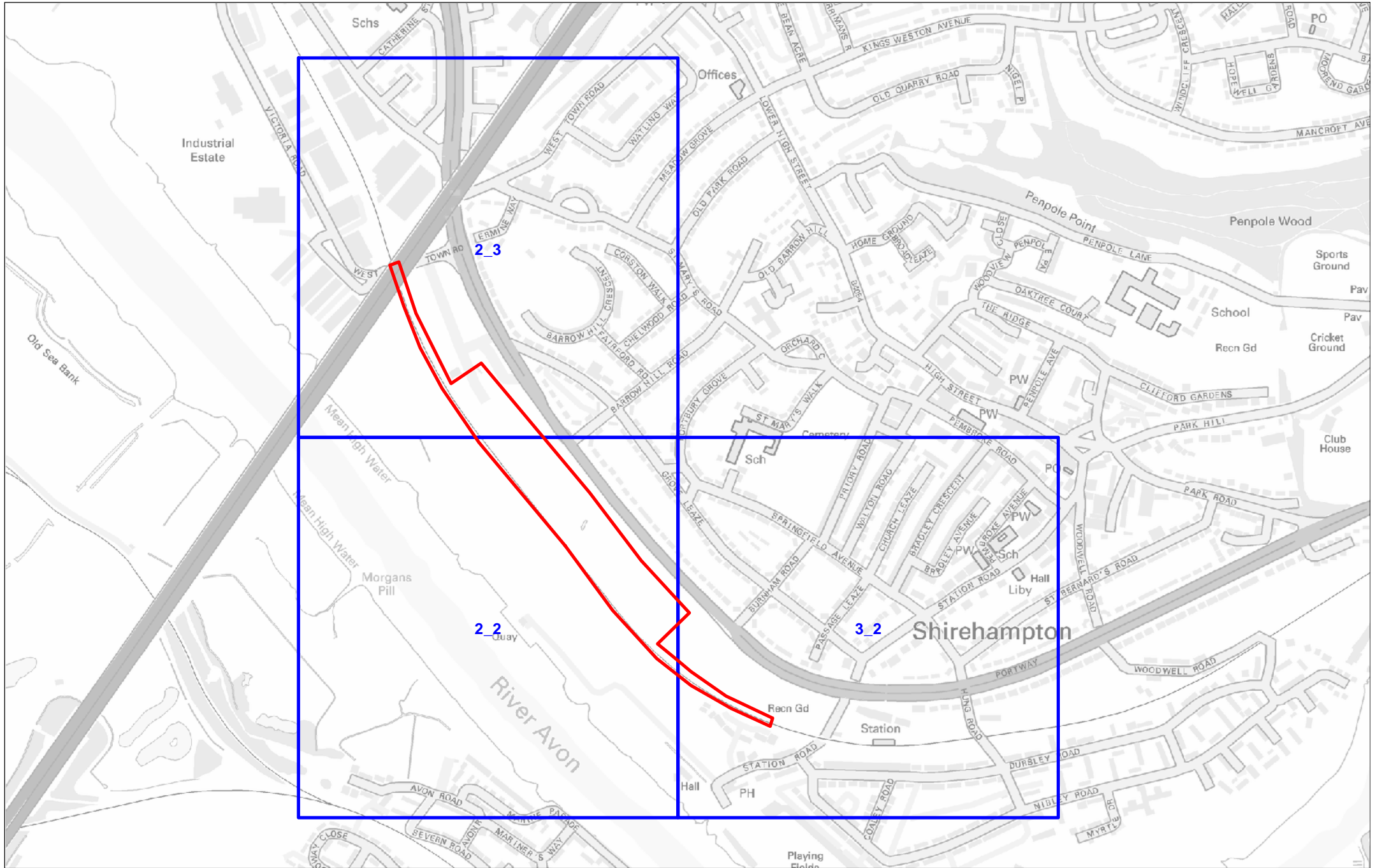
12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 GroundSure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at GroundSure who will respond in a timely manner.

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law





Site Details:

352475 176752

Client Ref: Portway
Report Ref: GS-1812521_1250scale_2_2
Grid Ref: 352345, 176580

Map Name: National Grid

Map date: 1951

Scale: 1:1,250

Printed at: 1:2,000



<p>Surveyed 1951 Revised 1951 Edition N/A Copyright N/A Levelled 1944</p>	<p>Surveyed 1951 Revised 1951 Edition N/A Copyright N/A Levelled 1945</p>
<p>Surveyed 1951 Revised 1951 Edition N/A Copyright N/A Levelled 1945</p>	<p>Surveyed 1951 Revised 1951 Edition N/A Copyright N/A Levelled 1945</p>

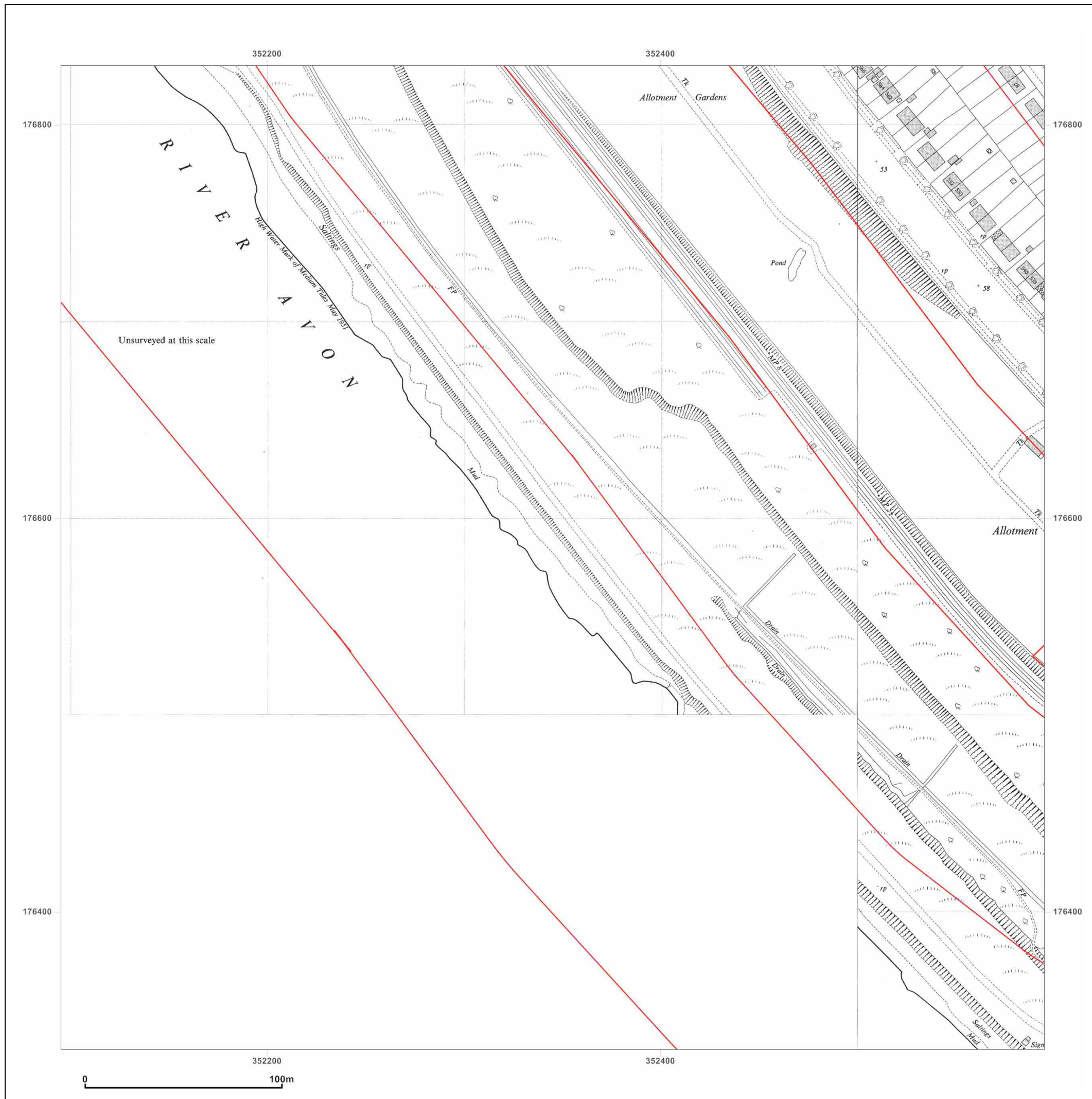


Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)



Site Details:

352475 176752

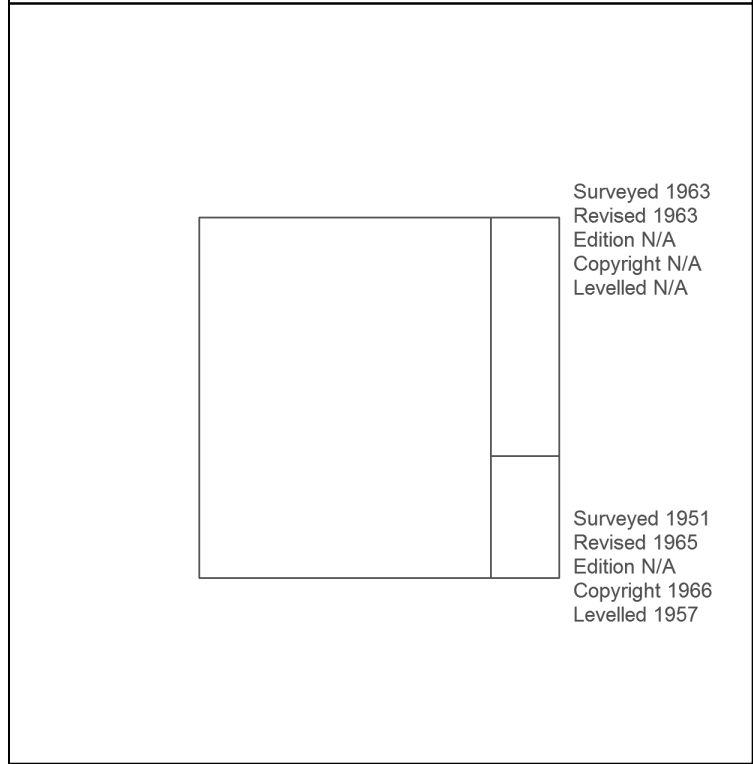
Client Ref: Portway
Report Ref: GS-1812521_1250scale_2_2
Grid Ref: 352345, 176580

Map Name: National Grid

Map date: 1963-1966

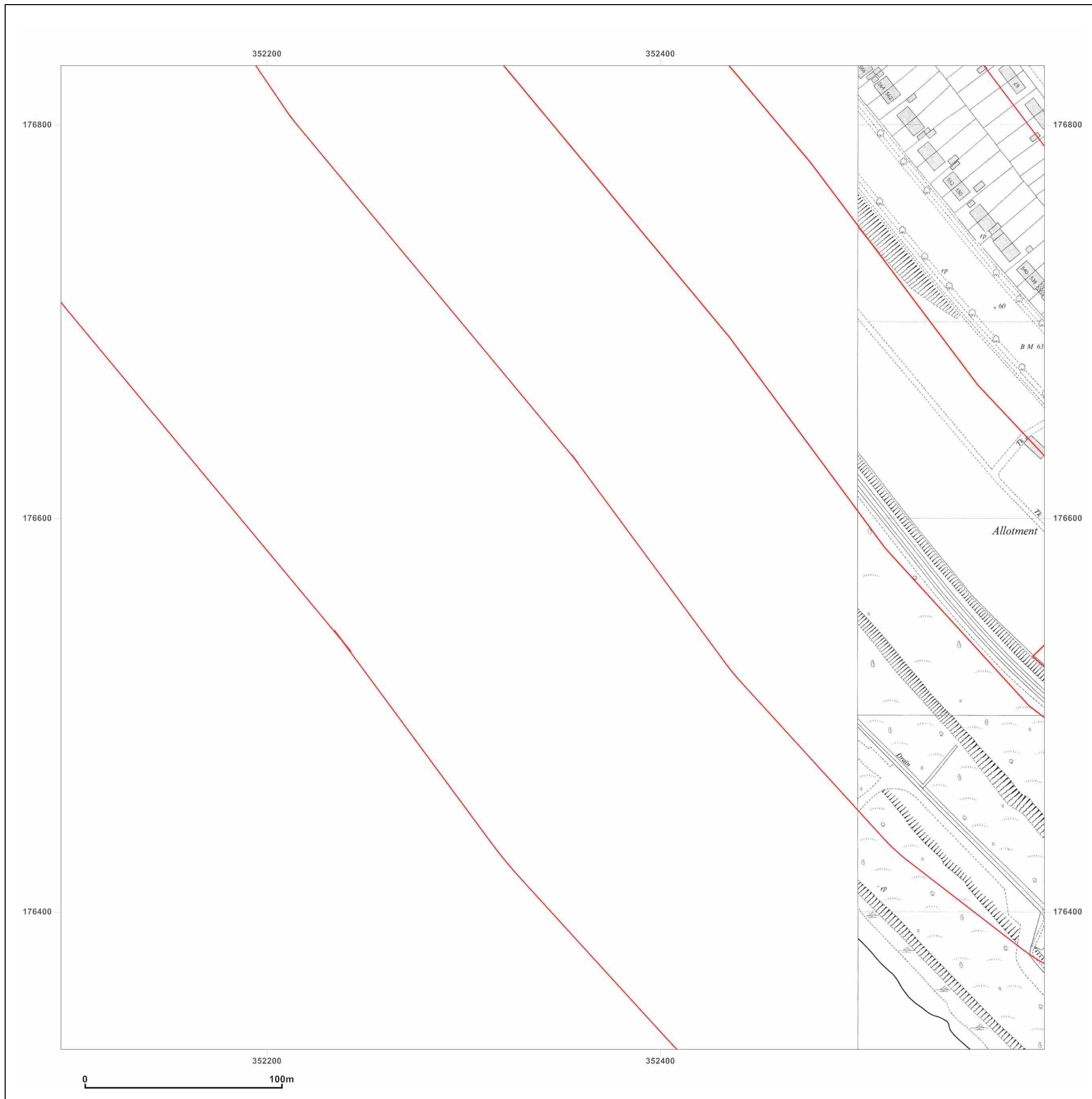
Scale: 1:1,250

Printed at: 1:2,000

Surveyed 1963
 Revised 1963
 Edition N/A
 Copyright N/A
 Levelled N/A

Surveyed 1951
 Revised 1965
 Edition N/A
 Copyright 1966
 Levelled 1957



Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)

Site Details:

352475 176752

Client Ref: Portway
Report Ref: GS-1812521_1250scale_2_2
Grid Ref: 352345, 176580

Map Name: National Grid

Map date: 1972

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1972
 Revised 1972
 Edition N/A
 Copyright 1972
 Levelled 1968

Surveyed 1972
 Revised 1972
 Edition N/A
 Copyright 1972
 Levelled 1956

Surveyed 1972
 Revised 1972
 Edition N/A
 Copyright 1972
 Levelled 1968

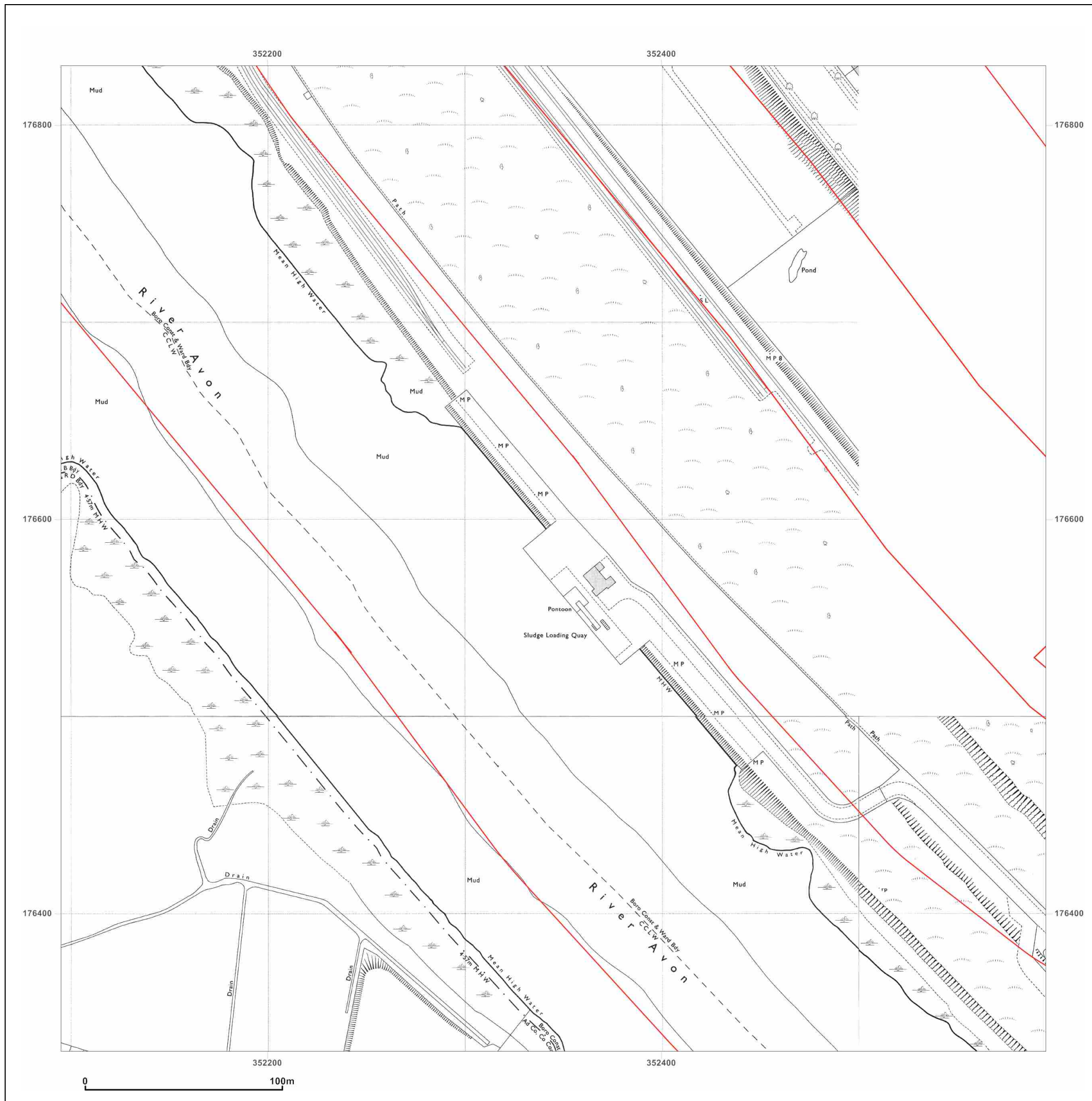


Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)



Site Details:

352475 176752

Client Ref: Portway
Report Ref: GS-1812521_1250scale_2_2
Grid Ref: 352345, 176580

Map Name: National Grid

Map date: 1985-1989

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1964
 Revised 1989
 Edition N/A
 Copyright 1989
 Levelled 1964

Surveyed N/A
 Revised N/A
 Edition N/A
 Copyright N/A
 Levelled N/A

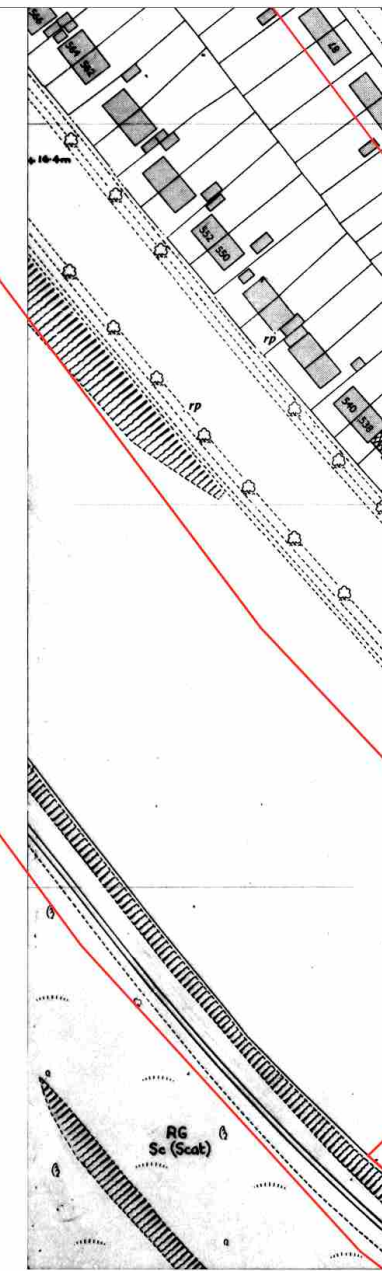
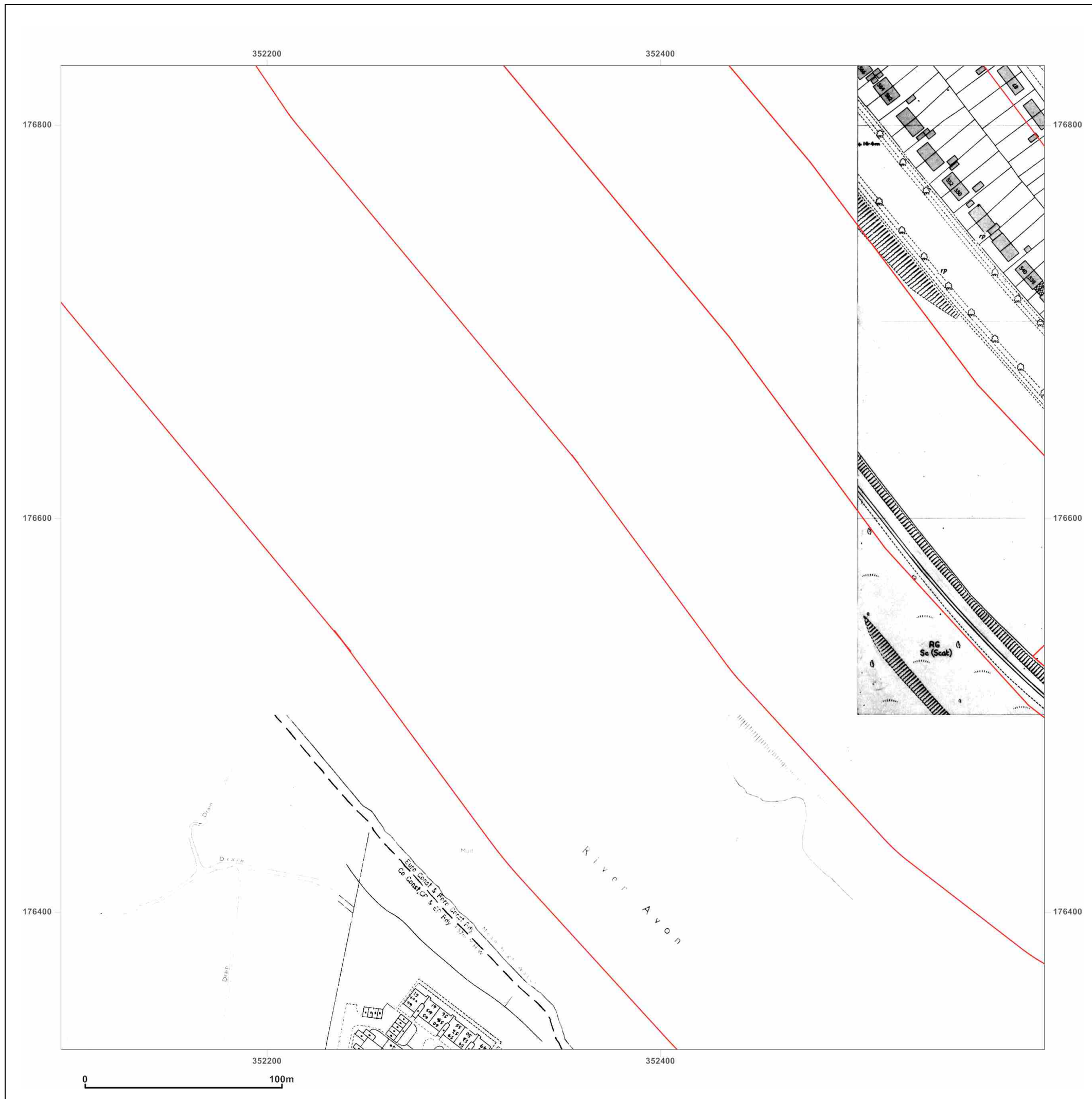


Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

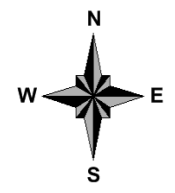
To view map legend click here [Legend](#)



Site Details:
352475 176752

Client Ref: Portway
Report Ref: GS-1812521_1250scale_2_3
Grid Ref: 352345, 177083

Map Name: National Grid
Map date: 1951-1952
Scale: 1:1,250
Printed at: 1:2,000



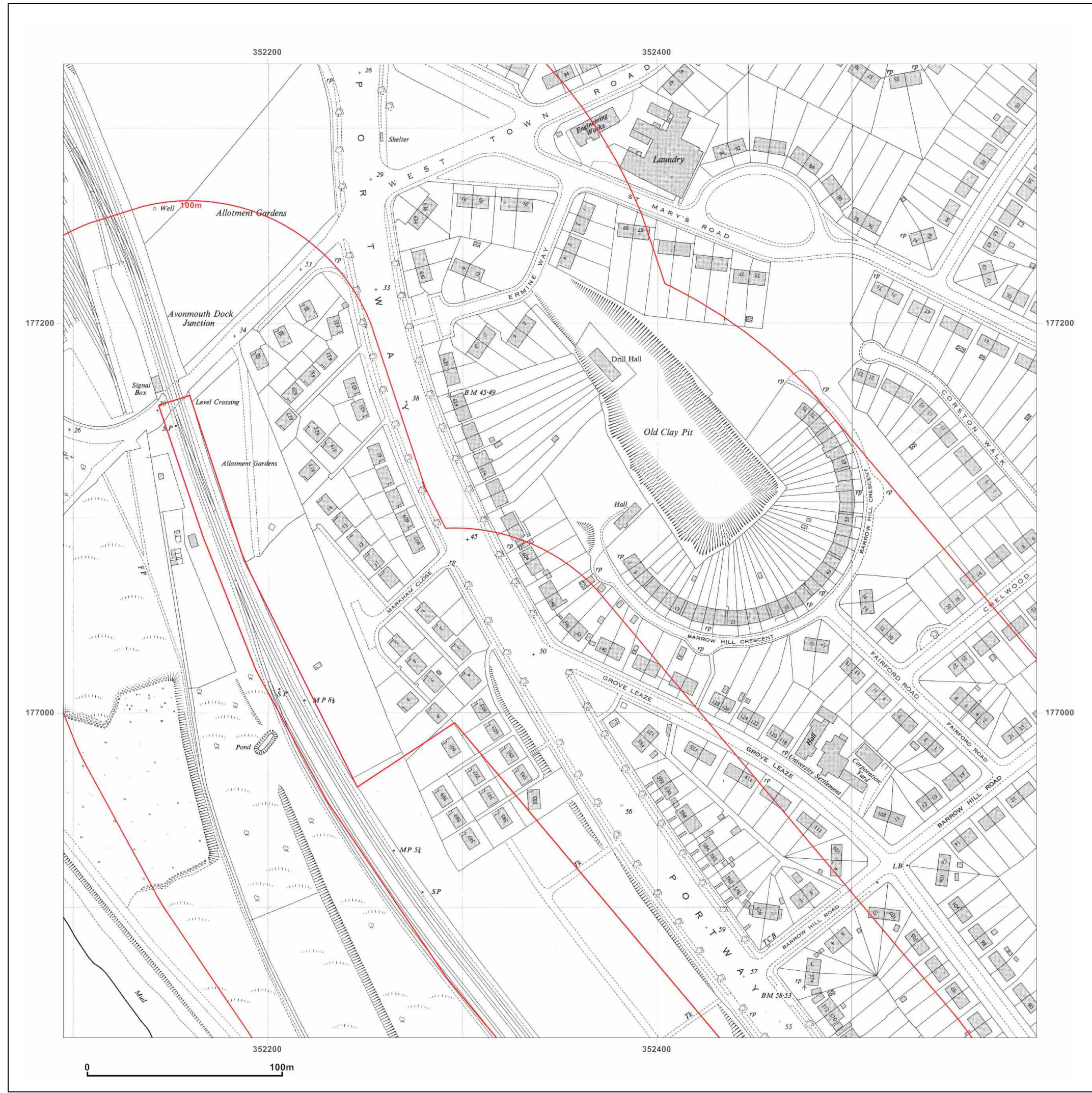
<p>Surveyed 1952 Revised 1952 Edition N/A Copyright N/A Levelled 1945</p>	<p>Surveyed 1952 Revised 1952 Edition N/A Copyright N/A Levelled 1945</p>
<p>Surveyed 1951 Revised 1951 Edition N/A Copyright N/A Levelled 1944</p>	<p>Surveyed 1951 Revised 1951 Edition N/A Copyright N/A Levelled 1945</p>

Produced by
GroundSure Environmental Insight
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)



Site Details:

352475 176752

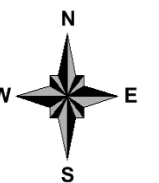
Client Ref: Portway
Report Ref: GS-1812521_1250scale_2_3
Grid Ref: 352345, 177083

Map Name: National Grid

Map date: 1972-1975

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1952
 Revised 1974
 Edition N/A
 Copyright 1975
 Levelled 1968

Surveyed 1952
 Revised 1974
 Edition N/A
 Copyright 1975
 Levelled 1968

Surveyed 1972
 Revised 1972
 Edition N/A
 Copyright 1972
 Levelled 1968

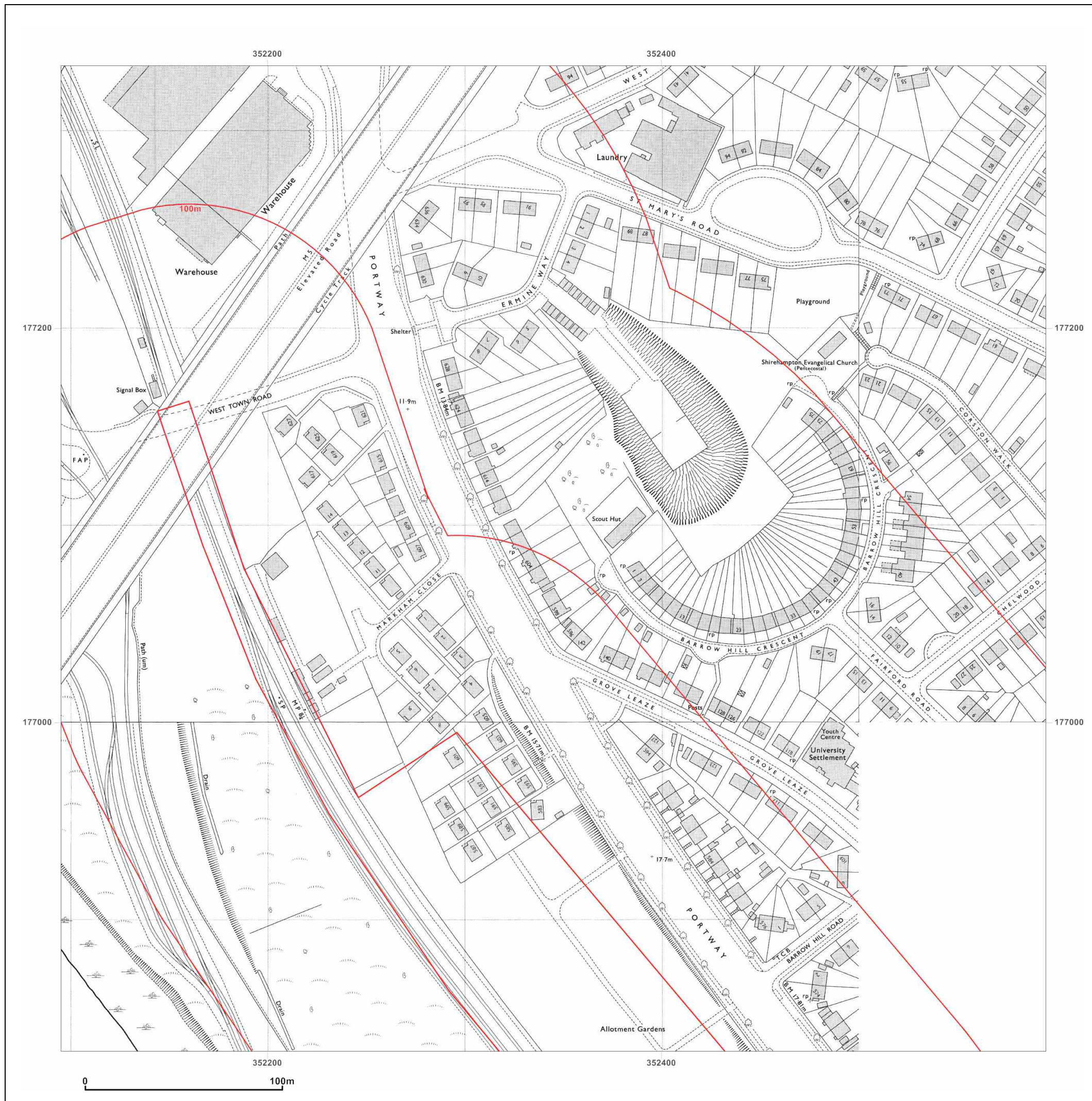


Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)



Site Details:

352475 176752

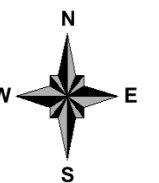
Client Ref: Portway
Report Ref: GS-1812521_1250scale_2_3
Grid Ref: 352345, 177083

Map Name: National Grid

Map date: 1978

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1968
 Revised 1978
 Edition N/A
 Copyright 1978
 Levelled 1968

Surveyed N/A
 Revised N/A
 Edition N/A
 Copyright N/A
 Levelled N/A

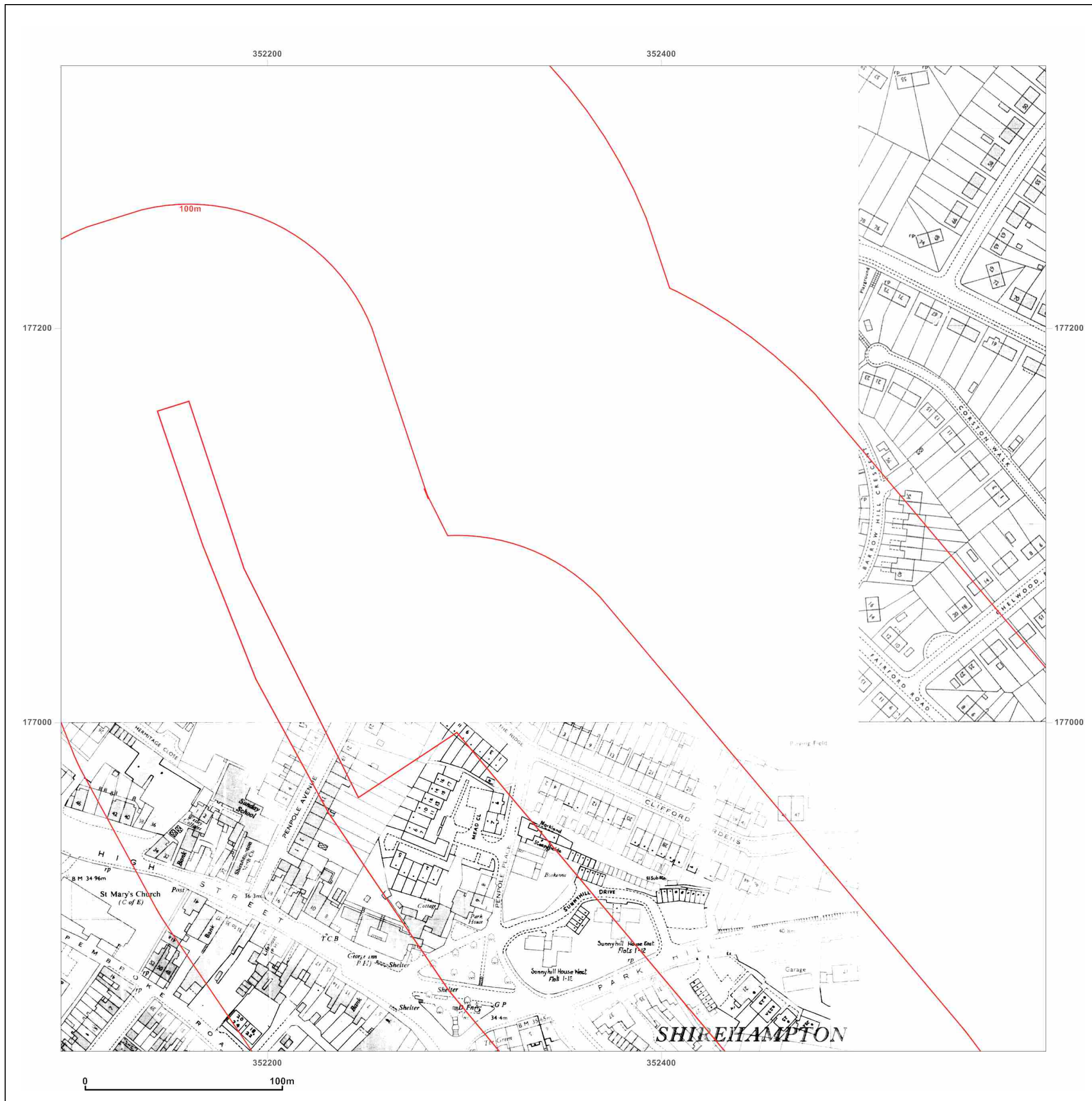


Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)



Site Details:

352475 176752

Client Ref: Portway
Report Ref: GS-1812521_1250scale_2_3
Grid Ref: 352345, 177083

Map Name: National Grid

Map date: 1986

Scale: 1:1,250

Printed at: 1:2,000



Surveyed 1984
 Revised 1986
 Edition N/A
 Copyright 1986
 Levelled 1984

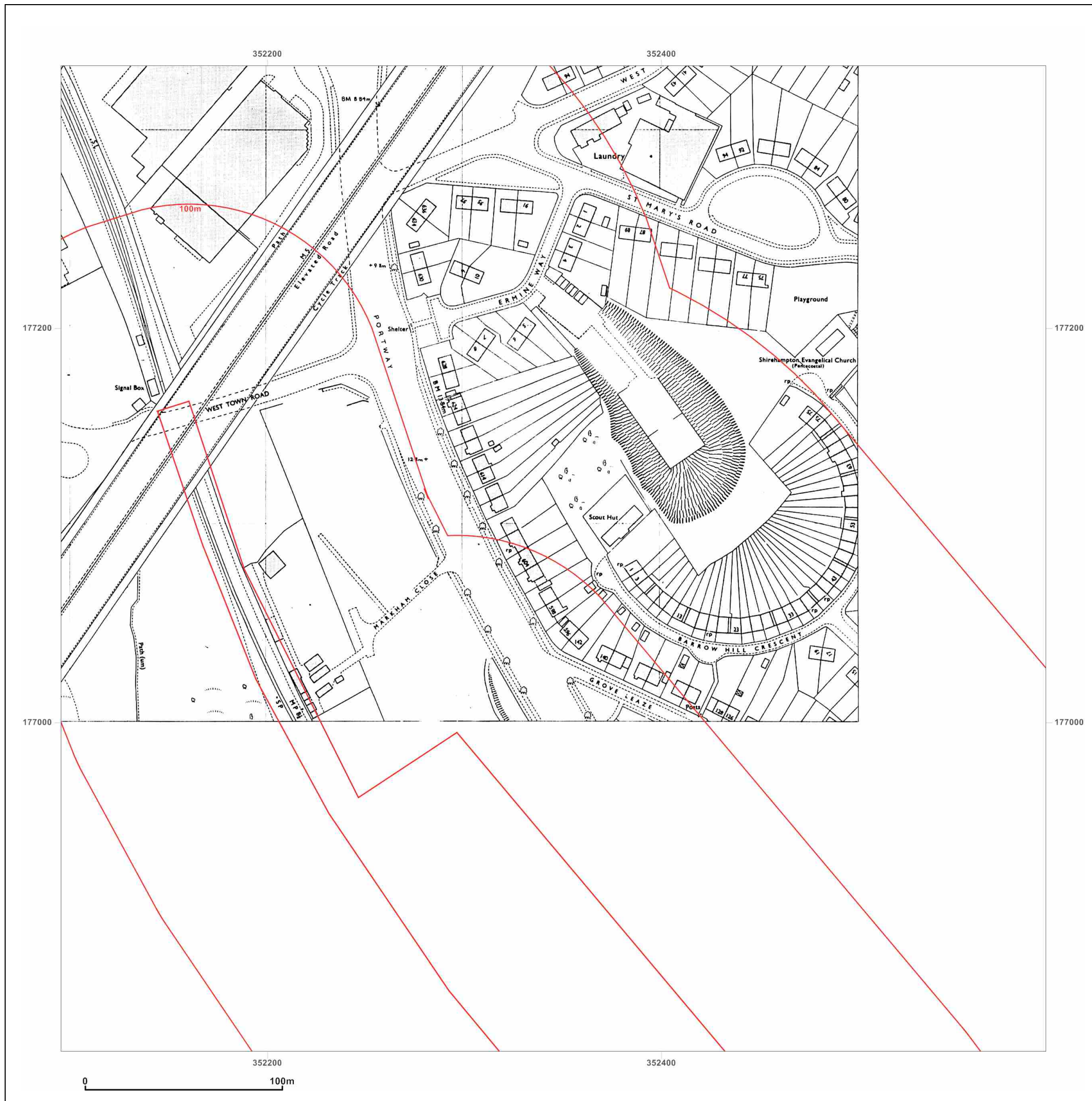


Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)



Site Details:

352475 176752

Client Ref: Portway
Report Ref: GS-1812521_1250scale_2_3
Grid Ref: 352345, 177083

Map Name: National Grid

Map date: 1992

Scale: 1:1,250

Printed at: 1:2,000



Surveyed N/A
 Revised N/A
 Edition N/A
 Copyright 1992
 Levelled N/A

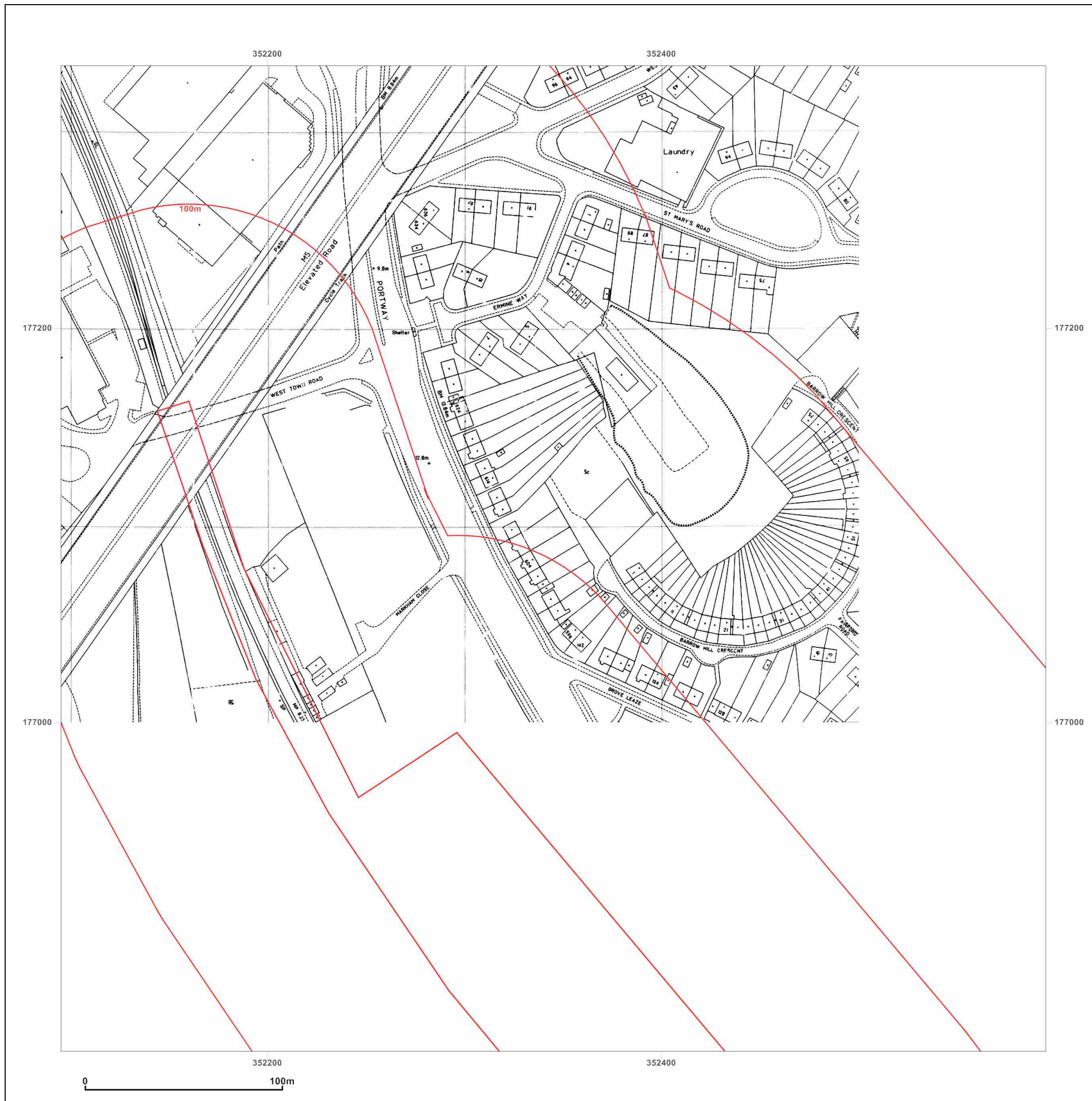


Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

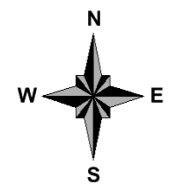
To view map legend click here [Legend](#)



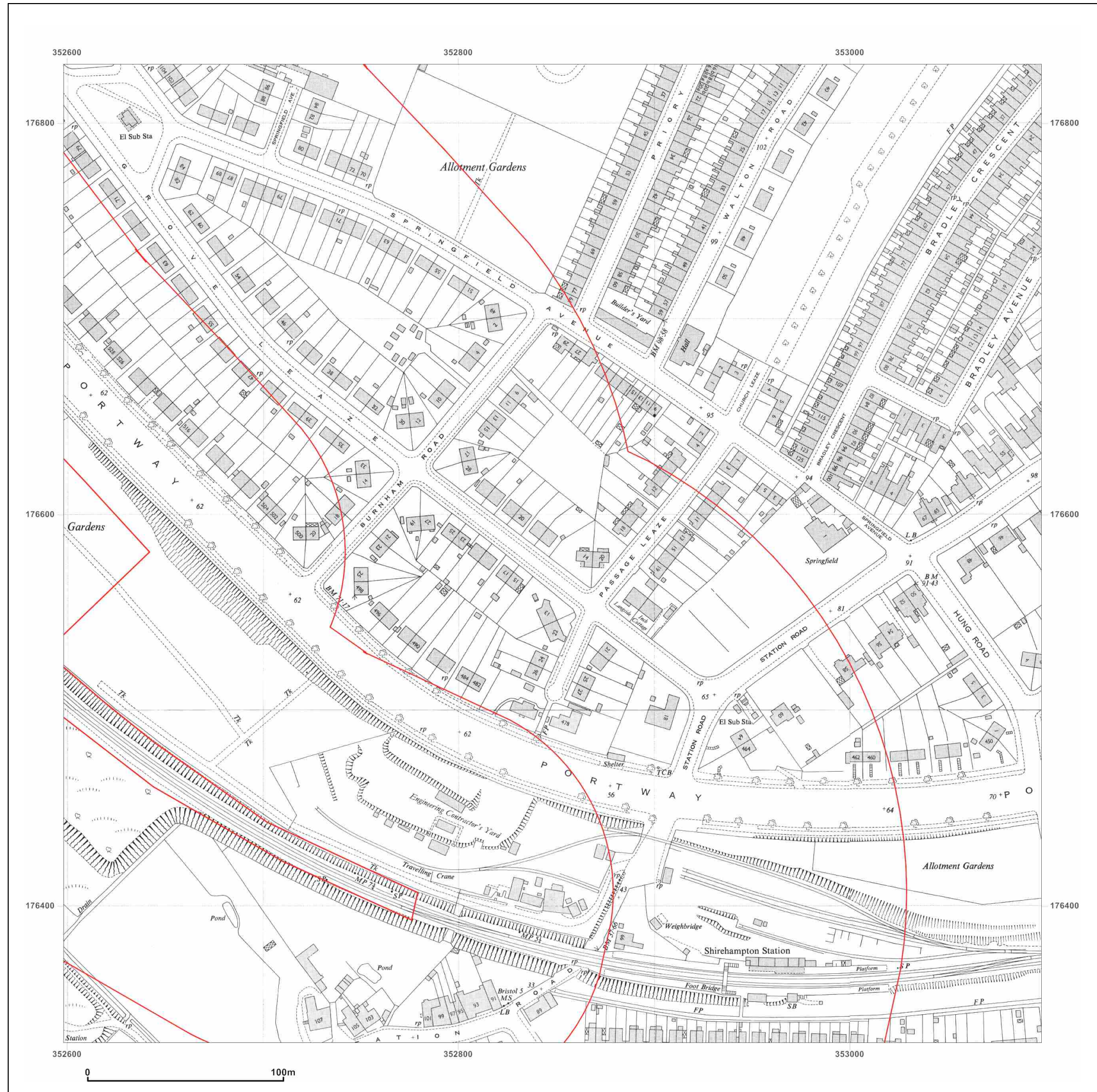
Site Details:
352475 176752

Client Ref: Portway
Report Ref: GS-1812521_1250scale_3_2
Grid Ref: 352848, 176580

Map Name: National Grid
Map date: 1951-1952
Scale: 1:1,250
Printed at: 1:2,000



Surveved 1951 Revised 1951 Edition N/A Copyright N/A Levelled 1945	Surveved 1952 Revised 1952 Edition N/A Copyright N/A Levelled 1945
Surveved 1951 Revised 1951 Edition N/A Copyright N/A Levelled 1945	Surveved 1951 Revised 1951 Edition N/A Copyright N/A Levelled 1945



Produced by
GroundSure Environmental Insight
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)

Site Details:

352475 176752

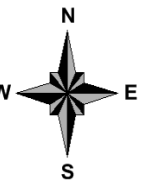
Client Ref: Portway
Report Ref: GS-1812521_1250scale_3_2
Grid Ref: 352848, 176580

Map Name: National Grid

Map date: 1959-1963

Scale: 1:1,250

Printed at: 1:2,000



Surveved 1963 Revised 1963 Edition N/A Copyright N/A Levelled N/A	Surveved 1952 Revised 1958 Edition N/A Copyright 1959 Levelled 1945
---	---

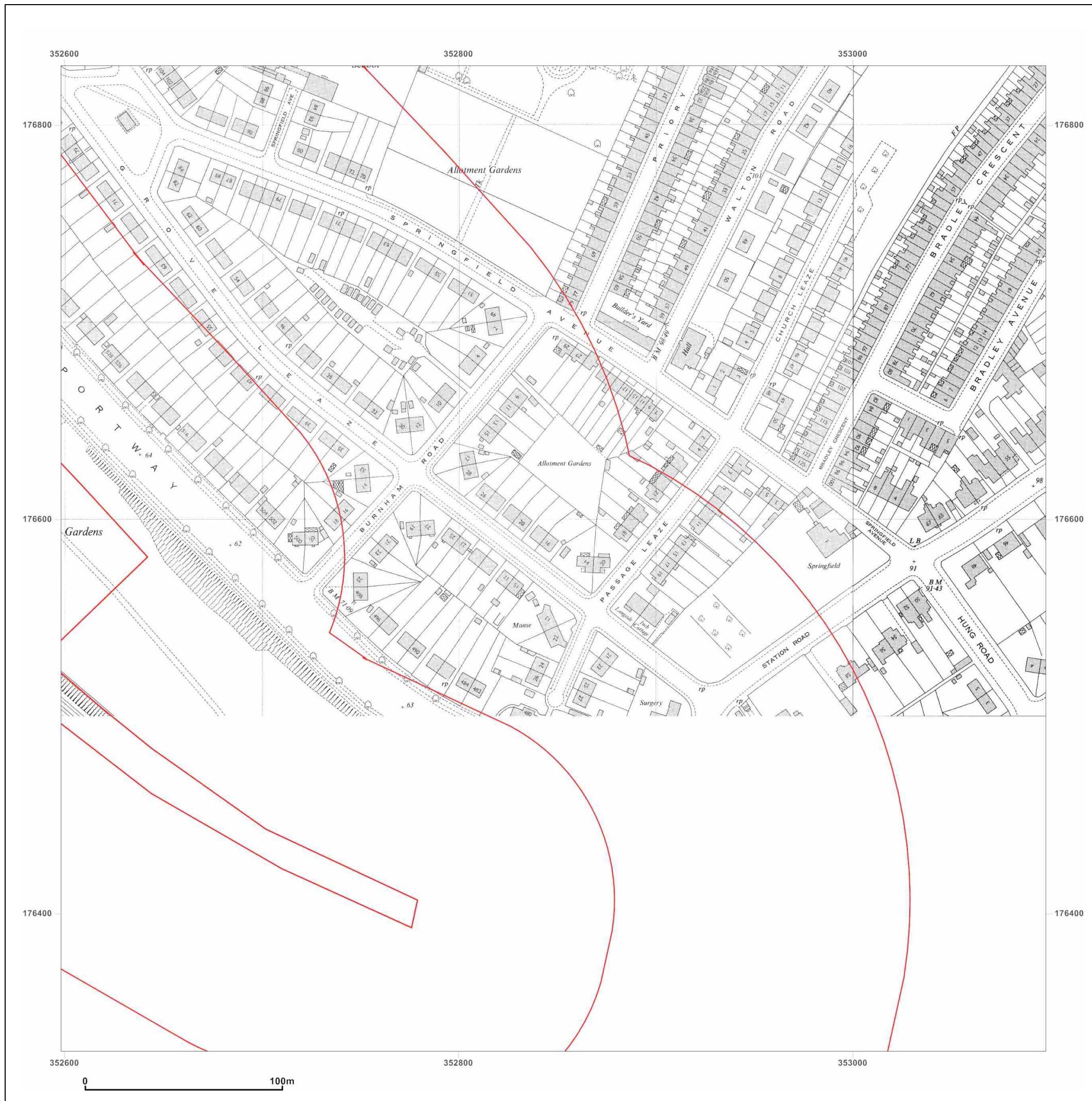


Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)



Site Details:
352475 176752

Client Ref: Portway
Report Ref: GS-1812521_1250scale_3_2
Grid Ref: 352848, 176580

Map Name: National Grid
Map date: 1963-1966
Scale: 1:1,250
Printed at: 1:2,000



<p>Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A</p>	<p>Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A</p>
<p>Surveyed 1951 Revised 1965 Edition N/A Copyright 1966 Levelled 1957</p>	

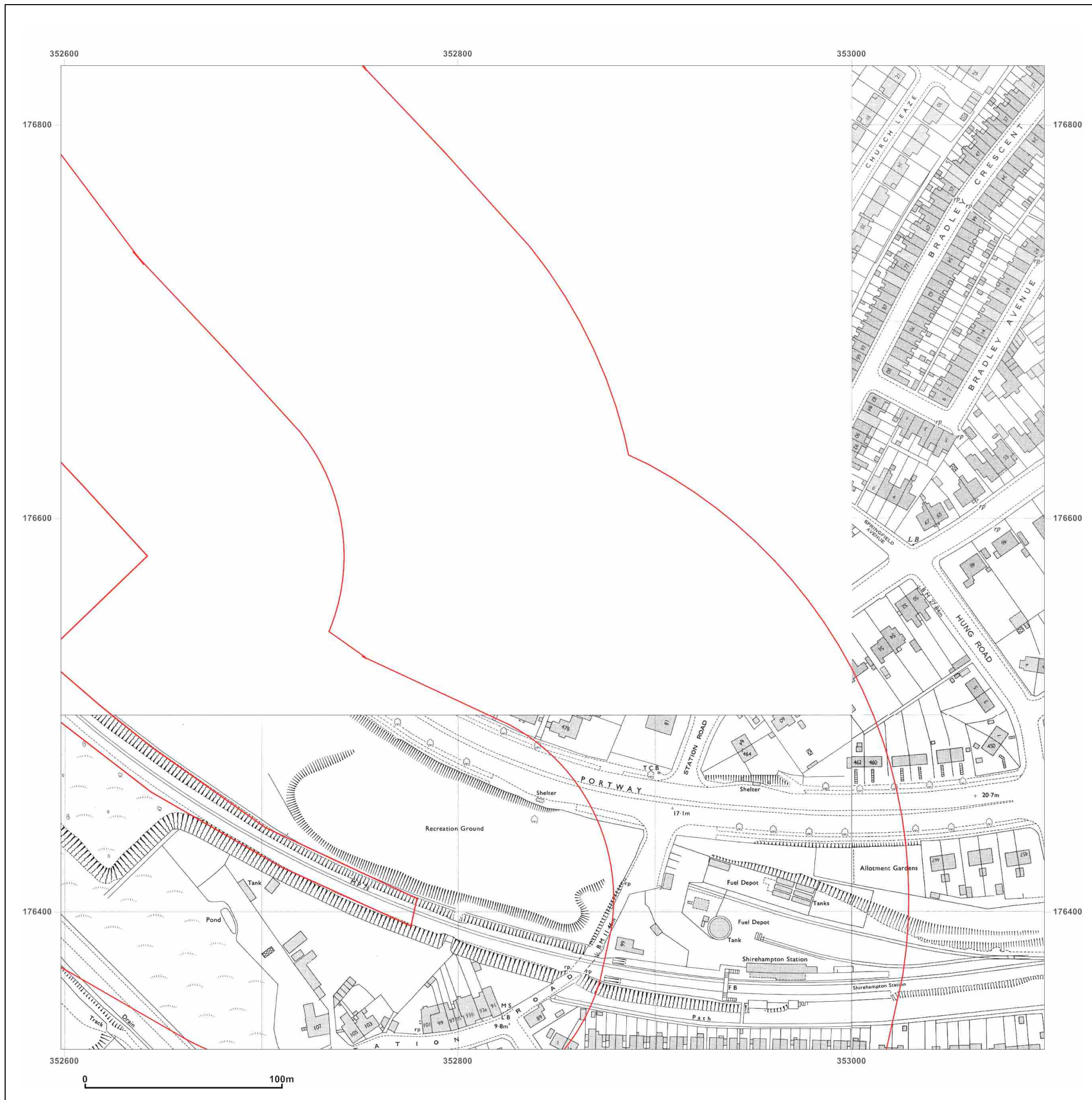
 Produced by GroundSure Environmental Insight
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)





Site Details:

352475 176752

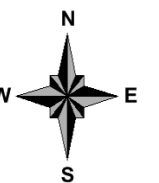
Client Ref: Portway
Report Ref: GS-1812521_1250scale_3_2
Grid Ref: 352848, 176580

Map Name: National Grid

Map date: 1970-1973

Scale: 1:1,250

Printed at: 1:2,000



<p>Surveyed 1972 Revised 1972 Edition N/A Copyright 1972 Levelled 1968</p>	<p>Surveyed 1951 Revised 1973 Edition N/A Copyright 1973 Levelled 1957</p>

Surveyed 1952
 Revised 1969
 Edition N/A
 Copyright 1970
 Levelled 1957



Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)

Site Details:

352475 176752

Client Ref: Portway
Report Ref: GS-1812521_1250scale_3_2
Grid Ref: 352848, 176580

Map Name: National Grid

Map date: 1989

Scale: 1:1,250

Printed at: 1:2,000



Surveved 1964 Revised 1989 Edition N/A Copyright 1989 Levelled 1964	Surveved 1957 Revised 1989 Edition N/A Copyright 1989 Levelled 1957
---	---

Surveved 1965 Revised 1989 Edition N/A Copyright 1989 Levelled 1965

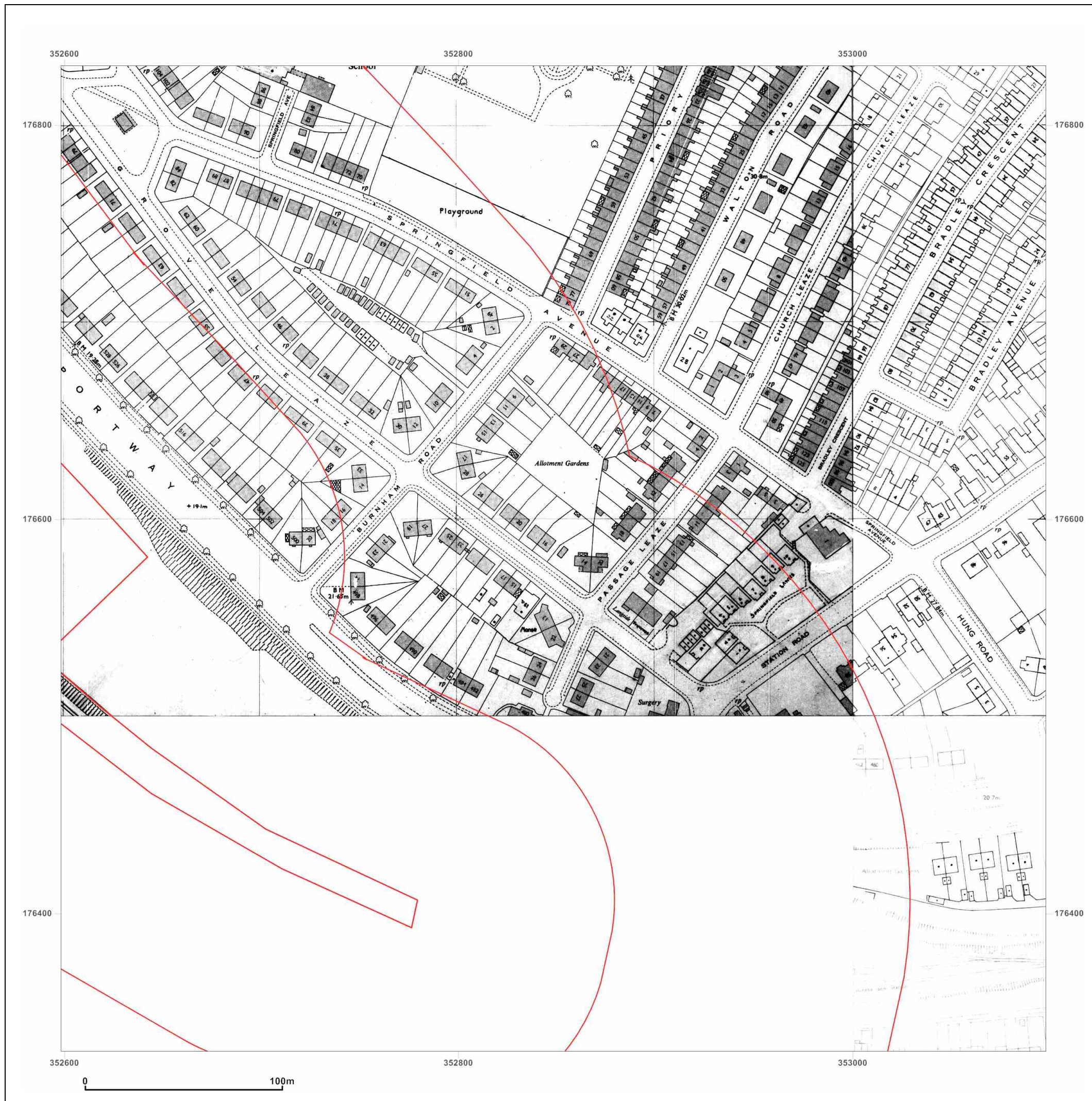


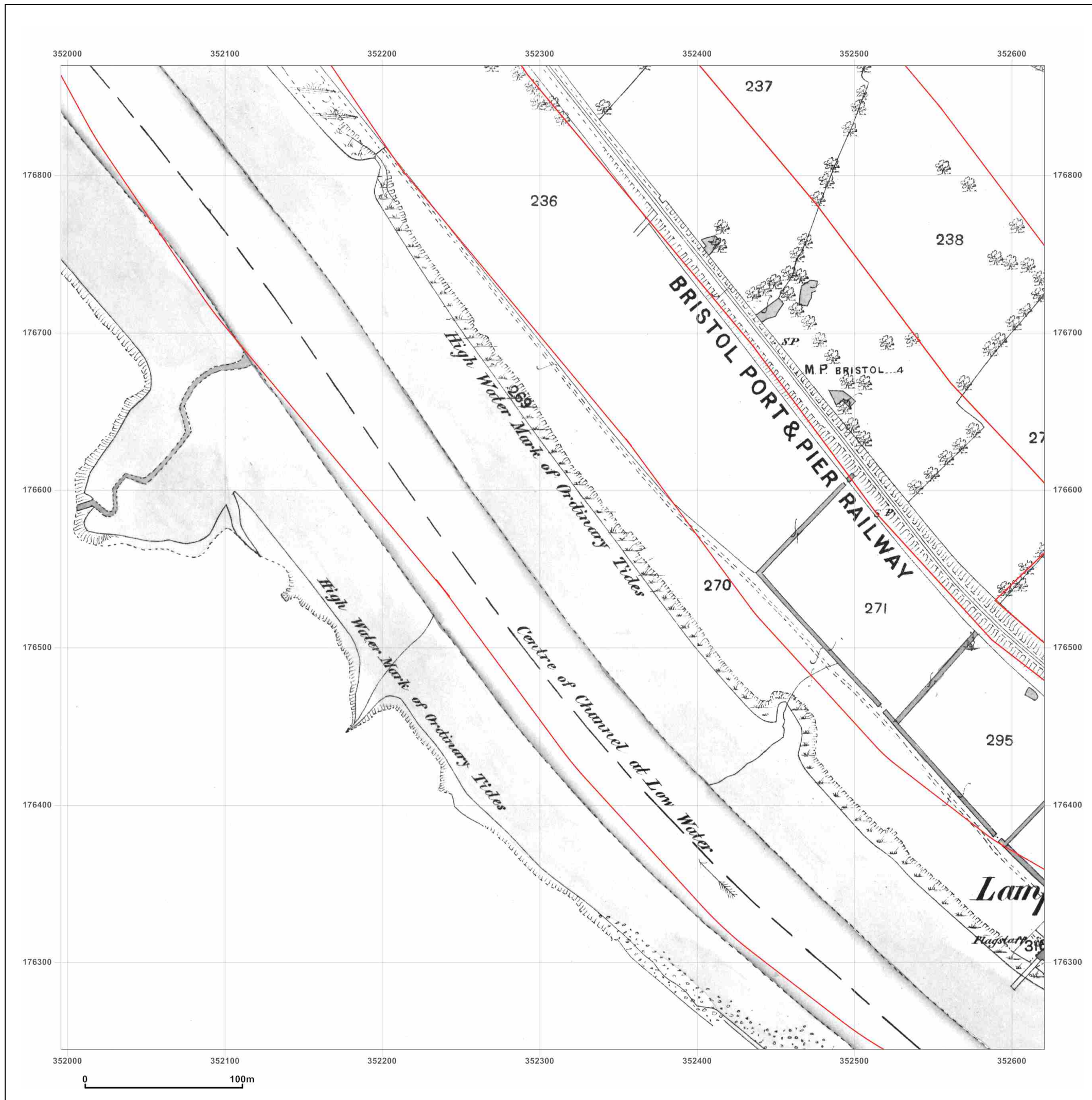
Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)





Site Details:

352475 176752

Client Ref: Portway
 Report Ref: GS-1812521_LS_2_2
 Grid Ref: 352308, 176557

Map Name: County Series

Map date: 1881

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1881
 Revised 1881
 Edition N/A
 Copyright N/A
 Levelled N/A

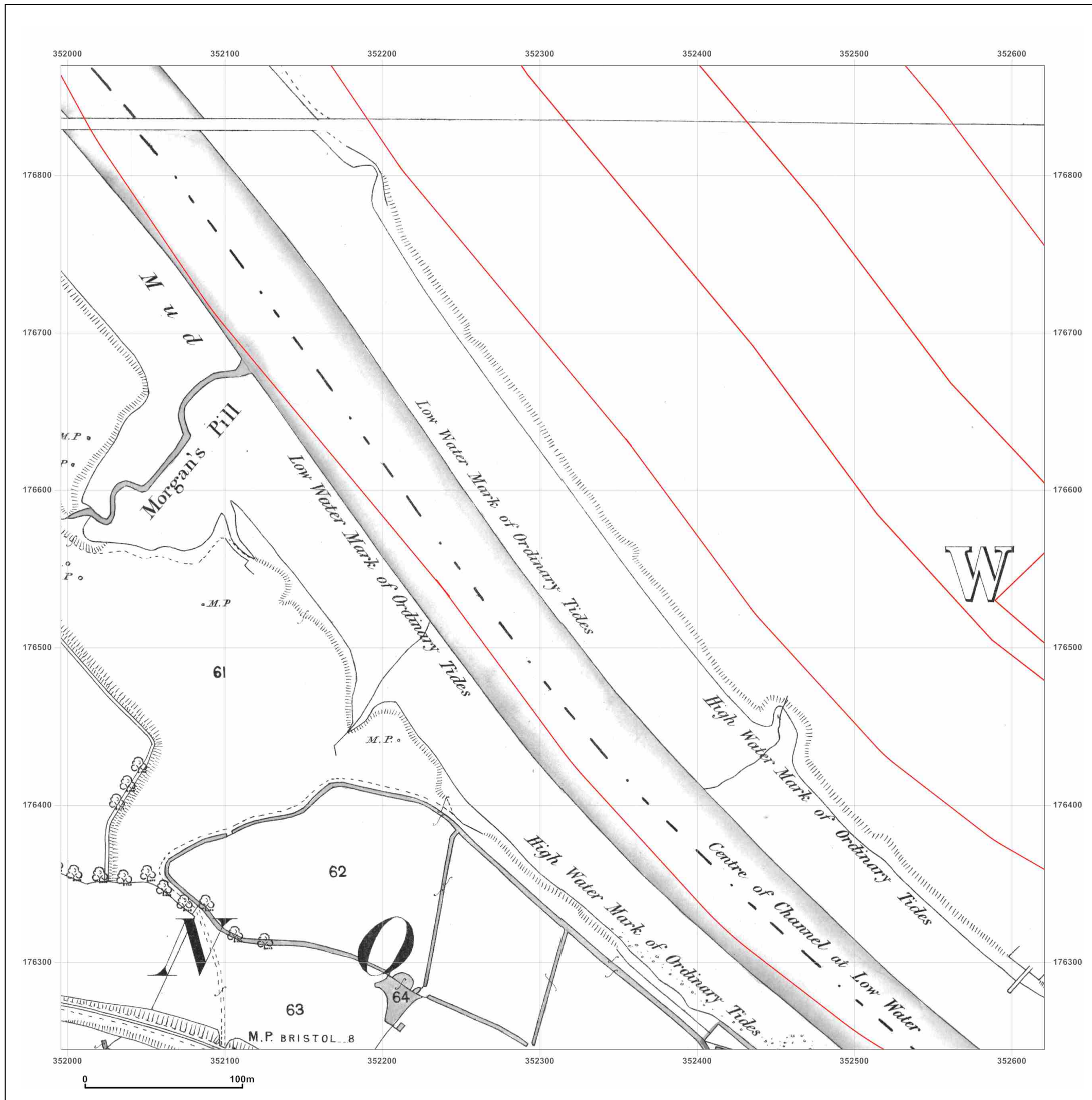


Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)



Site Details:

352475 176752

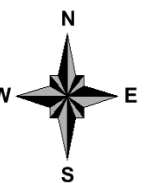
Client Ref: Portway
Report Ref: GS-1812521_LS_2_2
Grid Ref: 352308, 176557

Map Name: County Series

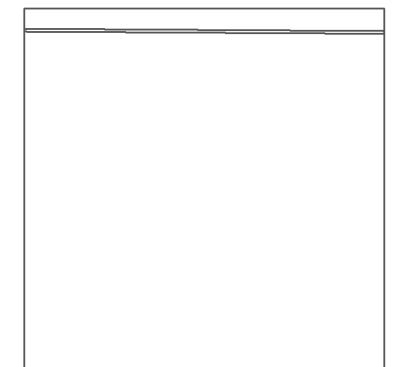
Map date: 1884

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1884
 Revised 1884
 Edition N/A
 Copyright N/A
 Levelled N/A



Surveyed 1884
 Revised 1884
 Edition N/A
 Copyright N/A
 Levelled N/A

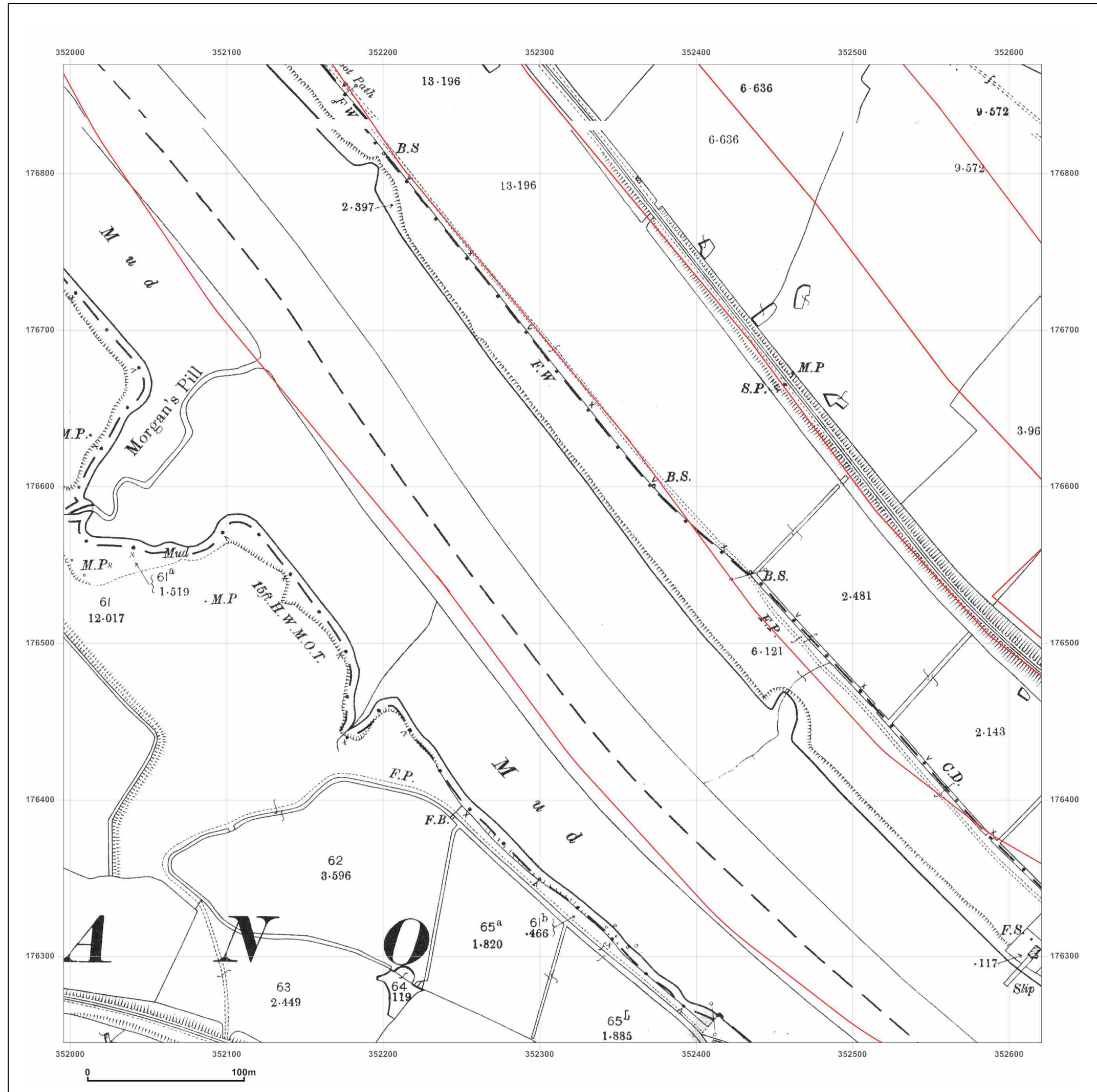


Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

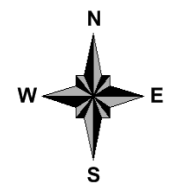
To view map legend click here [Legend](#)



Site Details:
352475 176752

Client Ref: Portway
Report Ref: GS-1812521_LS_2_2
Grid Ref: 352308, 176557

Map Name: County Series
Map date: 1903-1904
Scale: 1:2,500
Printed at: 1:2,500



Surveyed 1904
Revised 1904
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1903
Revised 1903
Edition N/A
Copyright N/A
Levelled N/A

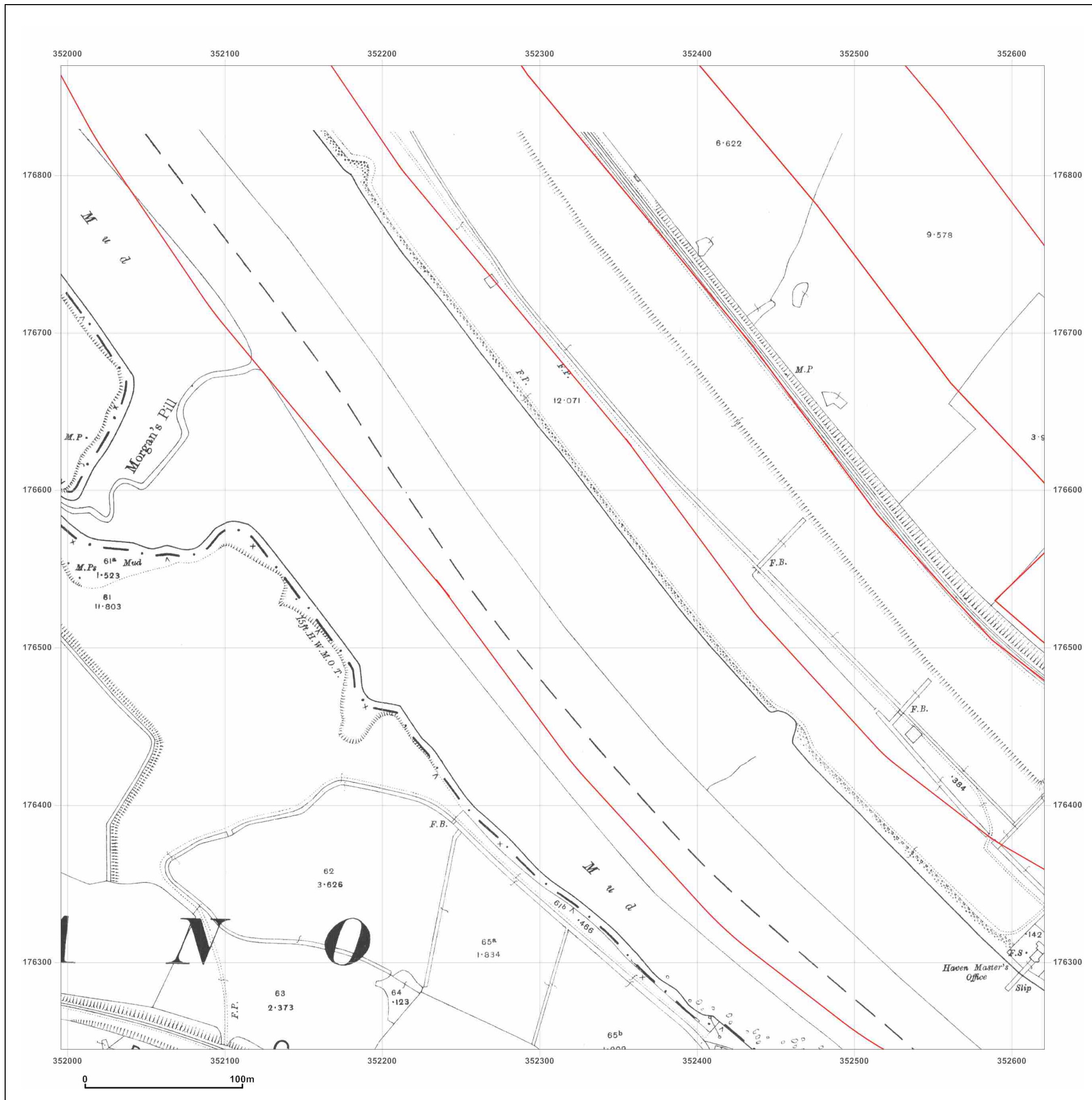


Produced by
GroundSure Environmental Insight
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)



Site Details:

352475 176752

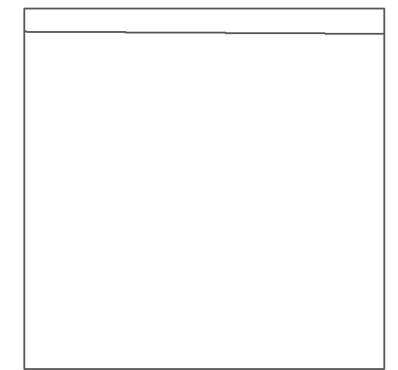
Client Ref: Portway
Report Ref: GS-1812521_LS_2_2
Grid Ref: 352308, 176557

Map Name: County Series

Map date: 1915

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1915
 Revised 1915
 Edition N/A
 Copyright N/A
 Levelled N/A

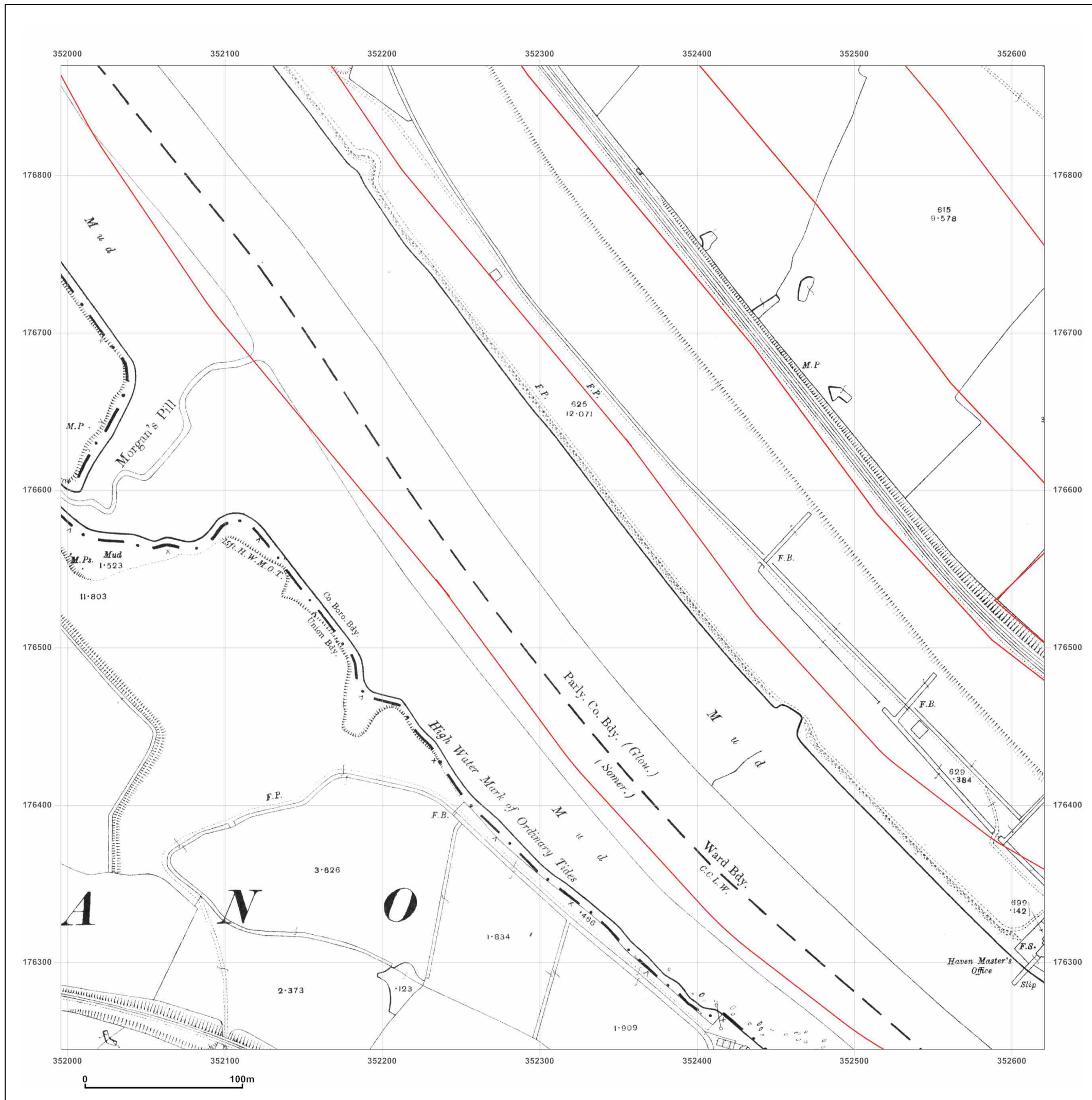


Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)



Site Details:

352475 176752

Client Ref: Portway
 Report Ref: GS-1812521_LS_2_2
 Grid Ref: 352308, 176557

Map Name: County Series

Map date: 1916

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1916
 Revised 1916
 Edition N/A
 Copyright N/A
 Levelled N/A

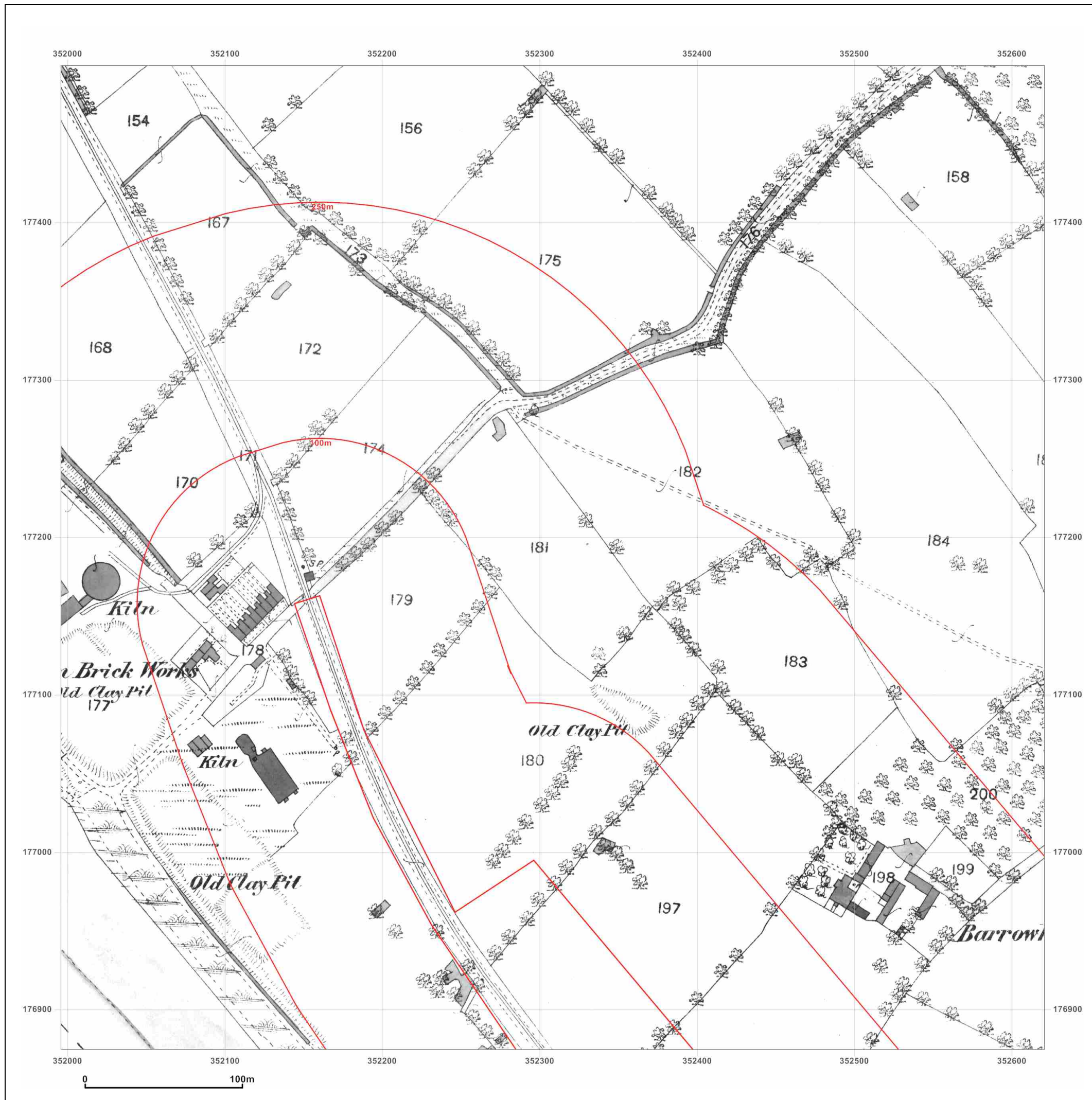


Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)



Site Details:

352475 176752

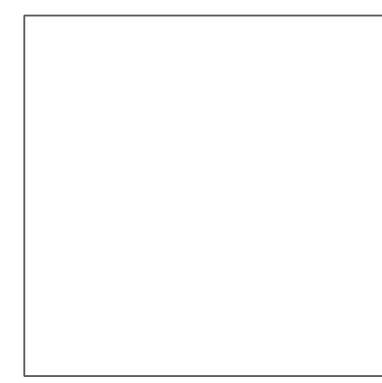
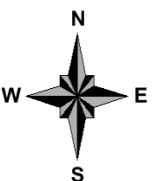
Client Ref: Portway
 Report Ref: GS-1812521_LS_2_3
 Grid Ref: 352308, 177187

Map Name: County Series

Map date: 1881

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1881
 Revised 1881
 Edition N/A
 Copyright N/A
 Levelled N/A

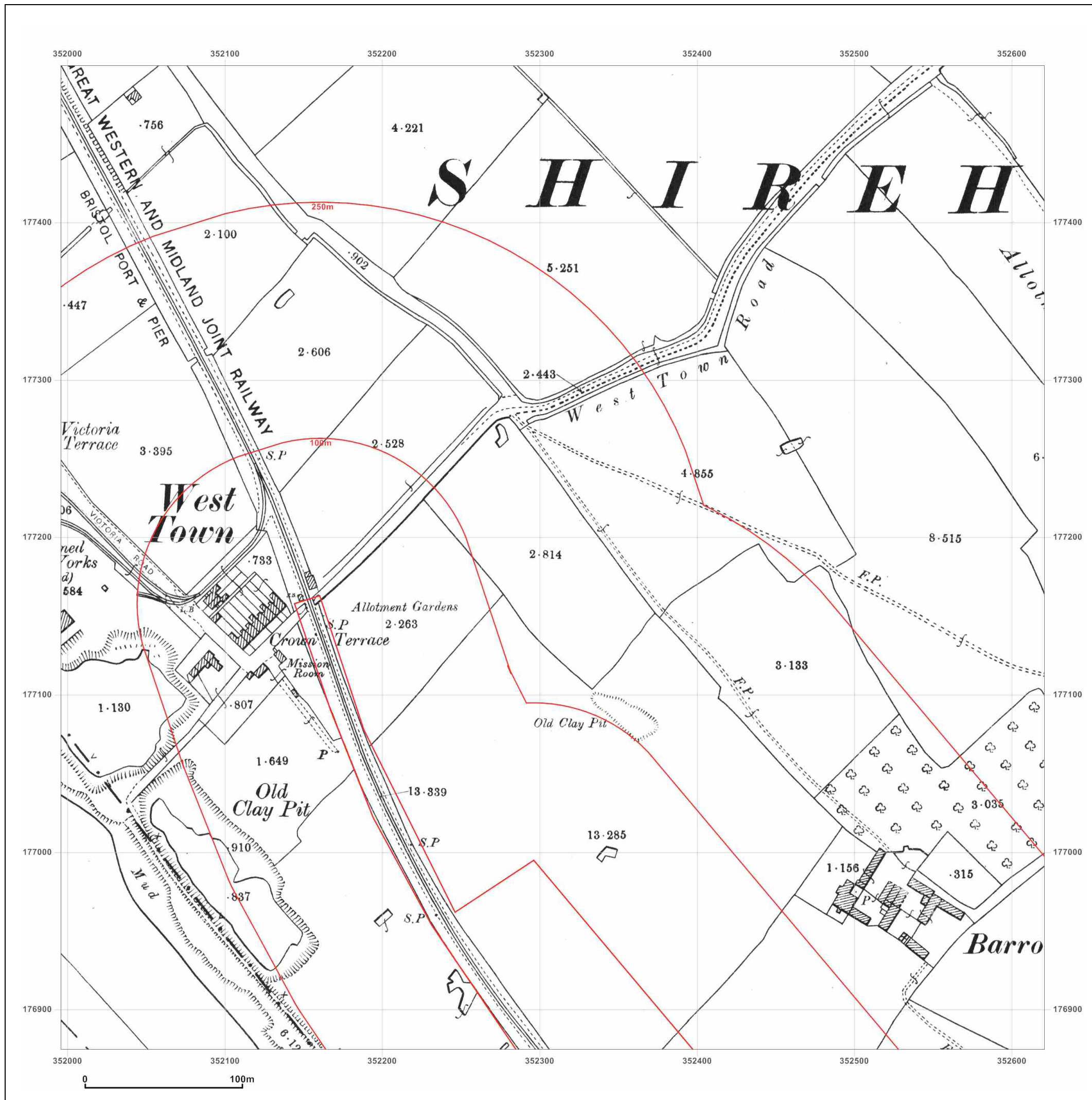


Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)



Site Details:
352475 176752

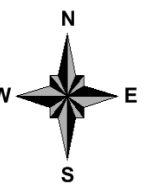
Client Ref: Portway
Report Ref: GS-1812521_LS_2_3
Grid Ref: 352308, 177187

Map Name: County Series

Map date: 1904

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1904
Revised 1904
Edition N/A
Copyright N/A
Levelled N/A

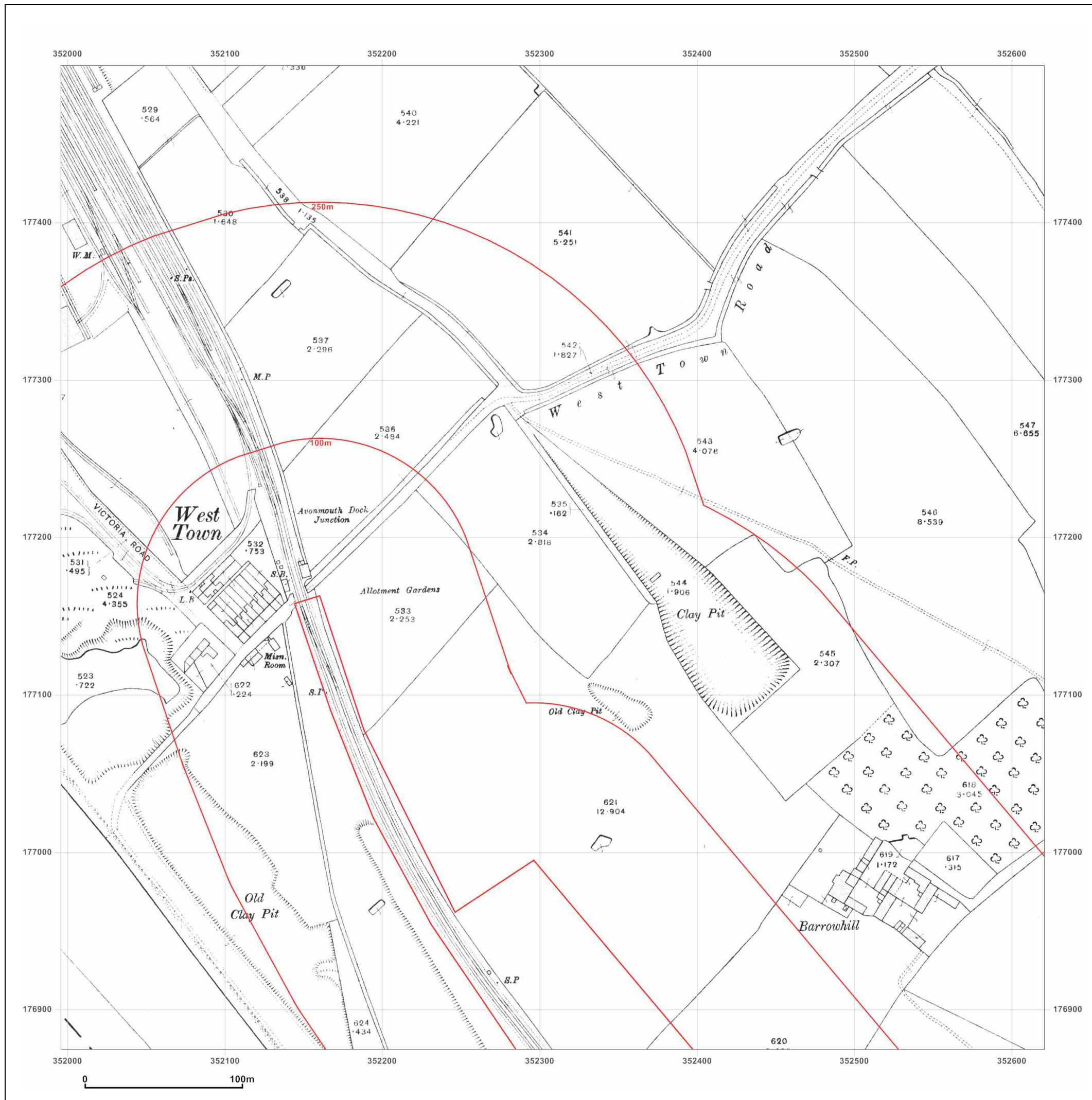


Produced by
GroundSure Environmental Insight
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)



Site Details:

352475 176752

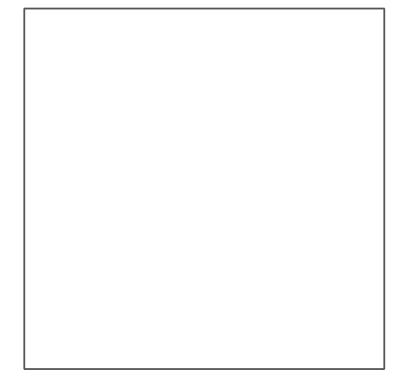
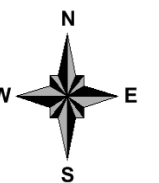
Client Ref: Portway
 Report Ref: GS-1812521_LS_2_3
 Grid Ref: 352308, 177187

Map Name: County Series

Map date: 1916

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1916
 Revised 1916
 Edition N/A
 Copyright N/A
 Levelled N/A

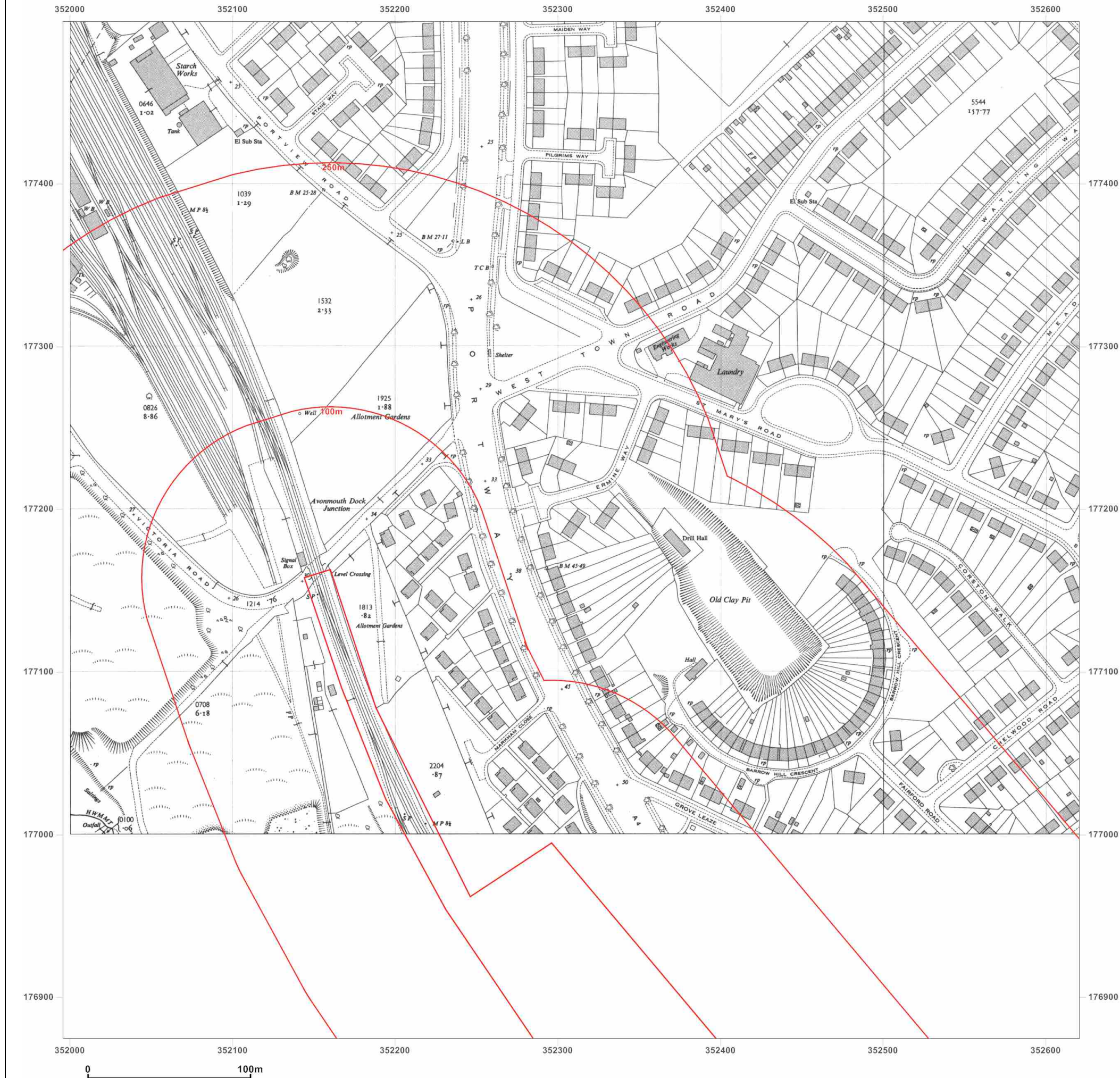


Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)



Site Details:

352475 176752

Client Ref: Portway
Report Ref: GS-1812521_LS_2_3
Grid Ref: 352308, 177187

Map Name: National Grid

Map date: 1952

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1952
 Revised 1952
 Edition N/A
 Copyright N/A
 Levelled 1945



Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)

Site Details:
352475 176752

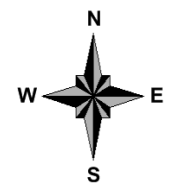
Client Ref: Portway
Report Ref: GS-1812521_LS_3_2
Grid Ref: 352938, 176557

Map Name: County Series

Map date: 1881

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1881
Revised 1881
Edition N/A
Copyright N/A
Levelled N/A

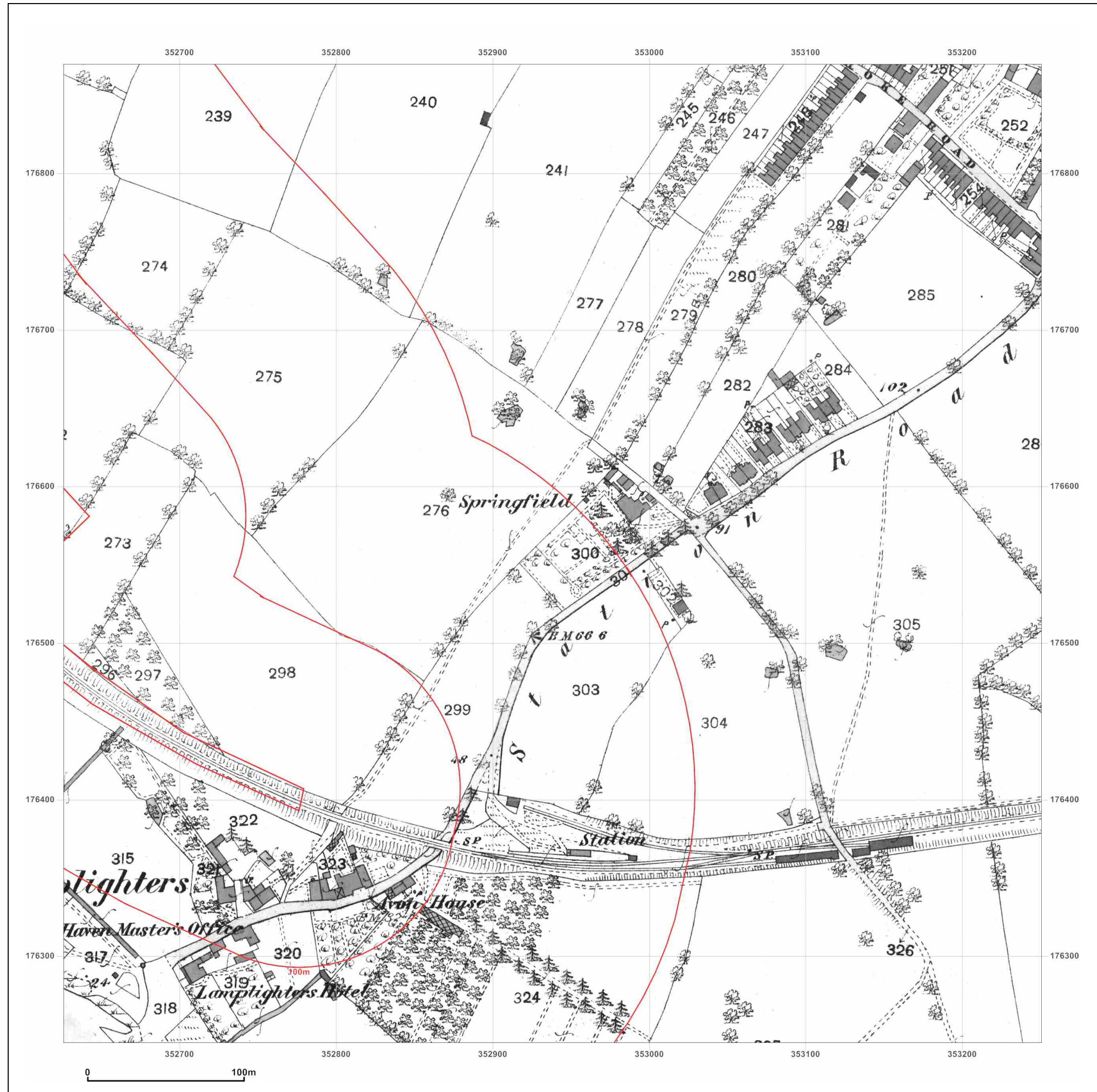
 **Ordnance Survey**
Licensed Partner

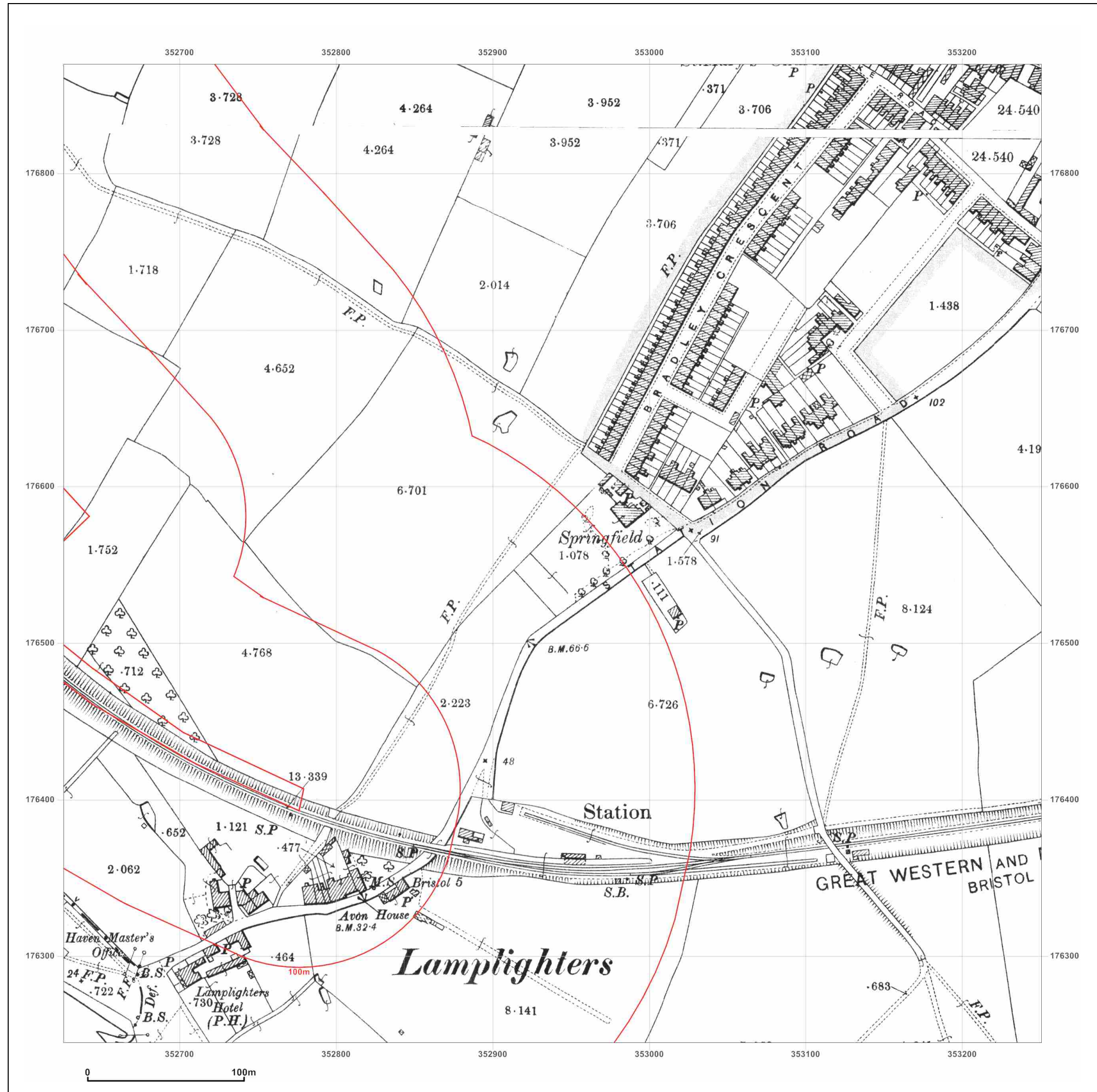
Produced by
GroundSure Environmental Insight
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)

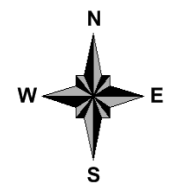




Site Details:
352475 176752

Client Ref: Portway
Report Ref: GS-1812521_LS_3_2
Grid Ref: 352938, 176557

Map Name: County Series
Map date: 1903-1904
Scale: 1:2,500
Printed at: 1:2,500



Surveyed 1904
Revised 1904
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1903
Revised 1903
Edition N/A
Copyright N/A
Levelled N/A

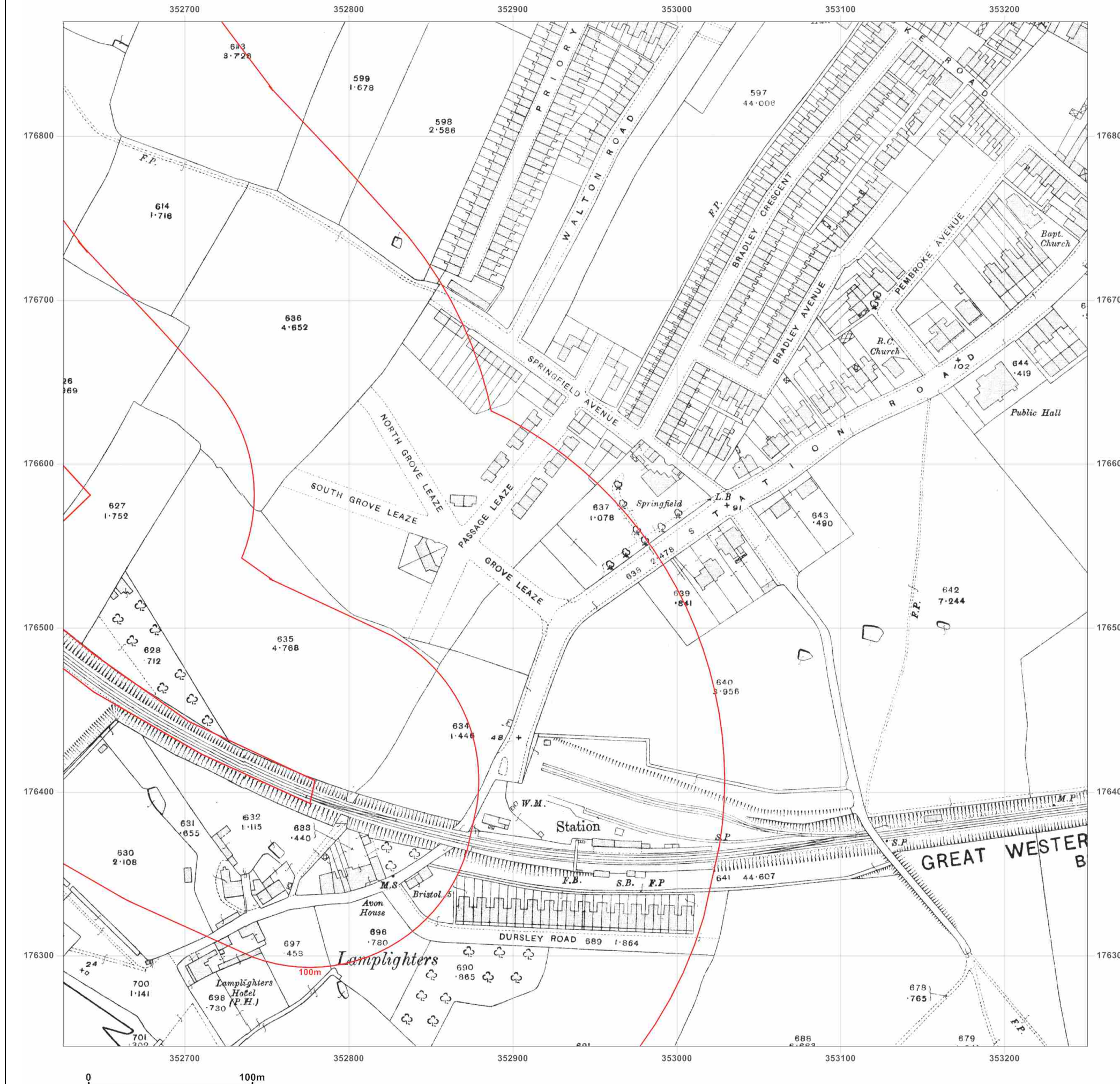


Produced by
GroundSure Environmental Insight
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)



Site Details:

352475 176752

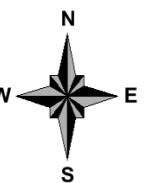
Client Ref: Portway
Report Ref: GS-1812521_LS_3_2
Grid Ref: 352938, 176557

Map Name: County Series

Map date: 1916

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1916
 Revised 1916
 Edition N/A
 Copyright N/A
 Levelled N/A



Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 12 December 2014

To view map legend click here [Legend](#)



Site Details:

352475 176752

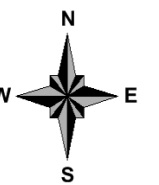
Client Ref: Portway
Report Ref: GS-1812521
Grid Ref: 352404, 176778

Map Name: County Series

Map date: 1883

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1883
 Revised 1883
 Edition N/A
 Copyright N/A
 Levelled N/A



Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

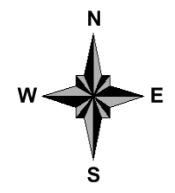
Production date: 11 December 2014

To view map legend click here [Legend](#)

Site Details:
 352475 176752

Client Ref: Portway
Report Ref: GS-1812521
Grid Ref: 352404, 176778

Map Name: County Series
Map date: 1887
Scale: 1:10,560
Printed at: 1:10,560



Surveyed 1883
 Revised N/A
 Edition N/A
 Copyright N/A
 Levelled N/A

 Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 11 December 2014

To view map legend click here [Legend](#)



Site Details:

352475 176752

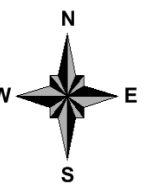
Client Ref: Portway
Report Ref: GS-1812521
Grid Ref: 352404, 176778

Map Name: County Series

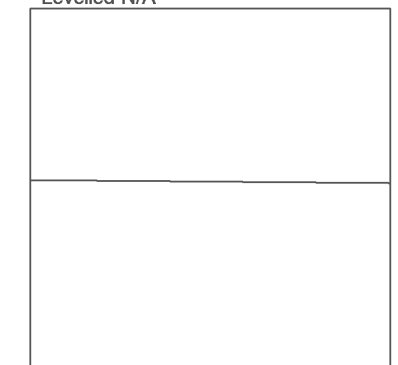
Map date: 1888

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1882
 Revised N/A
 Edition 1888
 Copyright N/A
 Levelled N/A

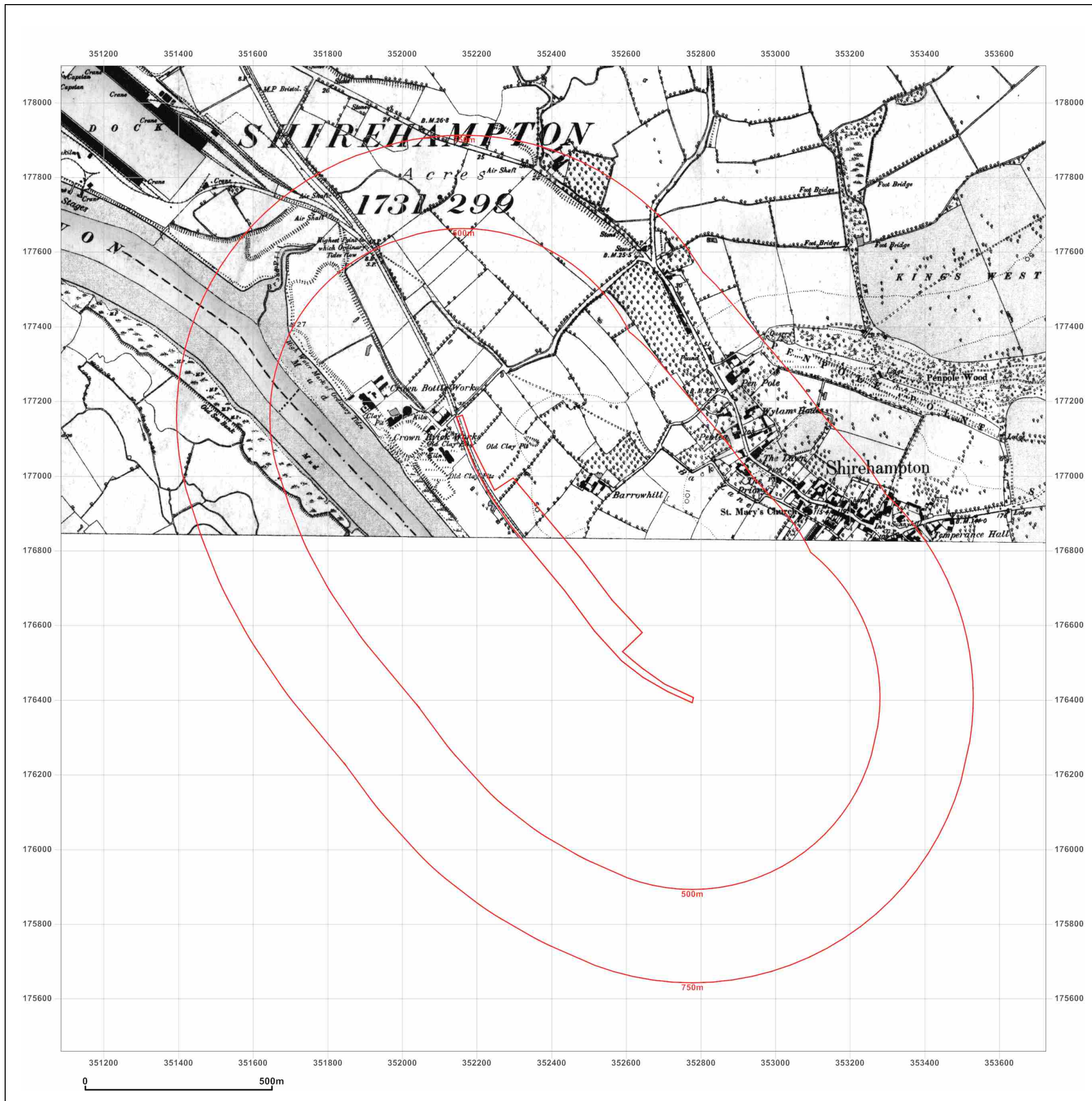


Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 11 December 2014

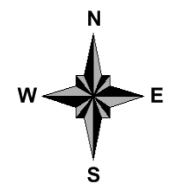
To view map legend click here [Legend](#)



Site Details:
352475 176752

Client Ref: Portway
Report Ref: GS-1812521
Grid Ref: 352404, 176778

Map Name: County Series
Map date: 1901-1902
Scale: 1:10,560
Printed at: 1:10,560



<p>Surveyed 1880 Revised 1901 Edition N/A Copyright N/A Levelled N/A</p>
<p>Surveyed 1882 Revised 1902 Edition N/A Copyright N/A Levelled N/A</p>

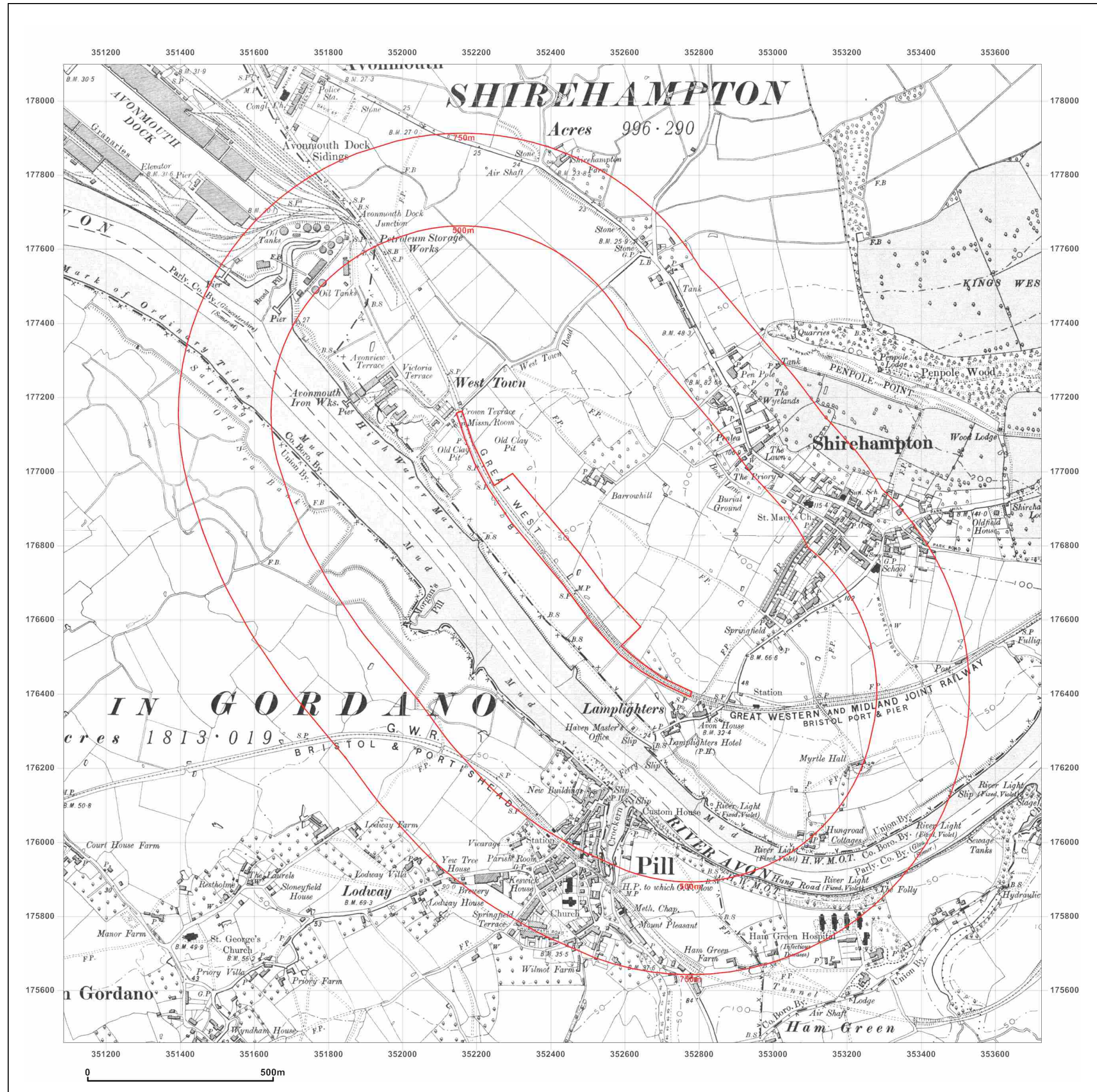
 **Ordnance Survey**
Licensed Partner

Produced by
GroundSure Environmental Insight
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 11 December 2014

To view map legend click here [Legend](#)



Site Details:
 352475 176752

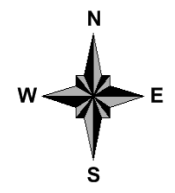
Client Ref: Portway
Report Ref: GS-1812521
Grid Ref: 352404, 176778

Map Name: County Series

Map date: 1912

Scale: 1:10,560

Printed at: 1:10,560



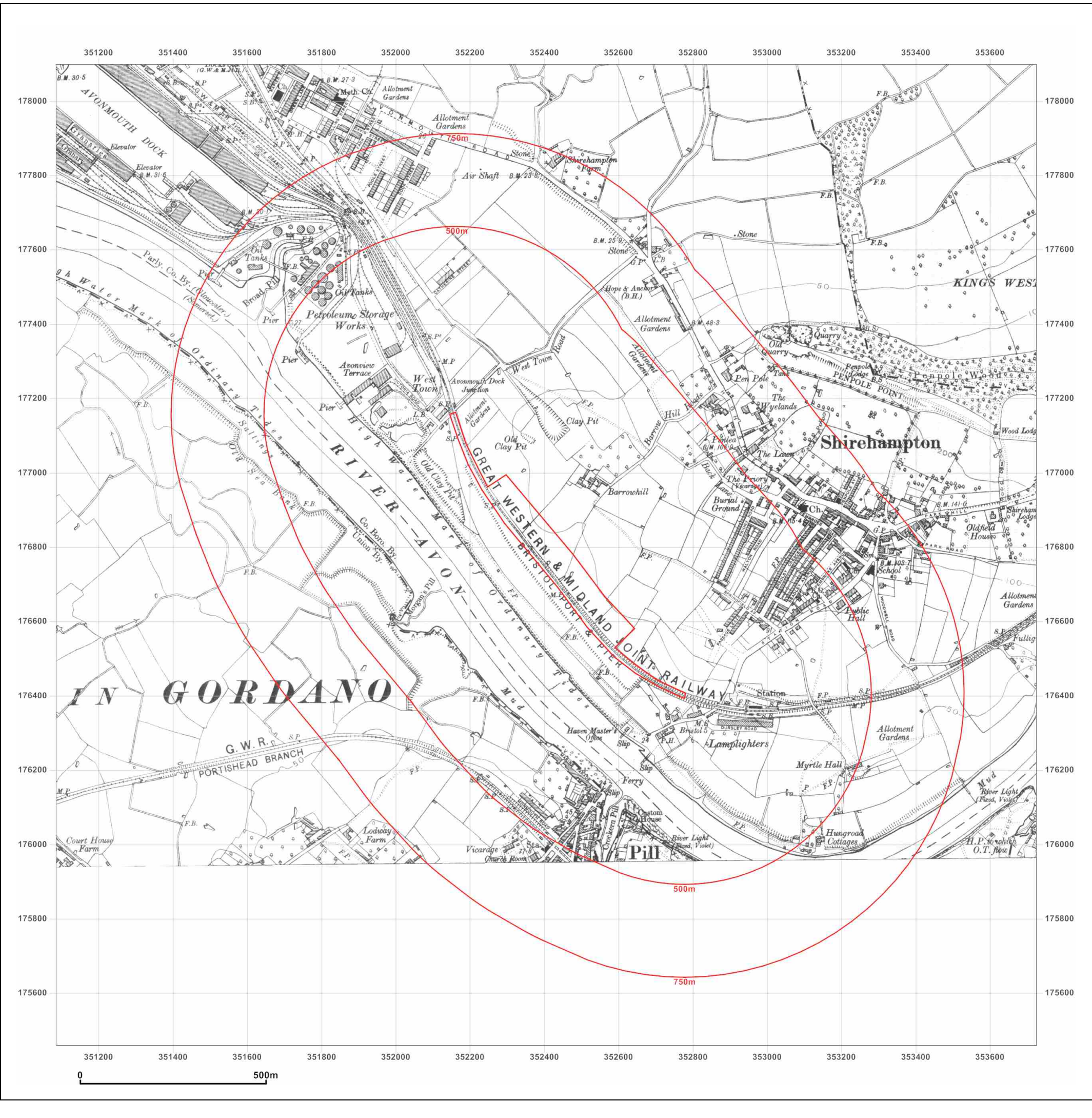
Surveyed 1880
 Revised 1912
 Edition N/A
 Copyright N/A
 Levelled N/A

 Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 11 December 2014

To view map legend click here [Legend](#)



Site Details:
 352475 176752

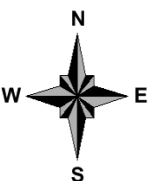
Client Ref: Portway
Report Ref: GS-1812521
Grid Ref: 352404, 176778

Map Name: County Series

Map date: 1920

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1882
 Revised 1920
 Edition 1920
 Copyright N/A
 Levelled N/A

Surveyed 1882
 Revised 1920
 Edition 1920
 Copyright N/A
 Levelled N/A

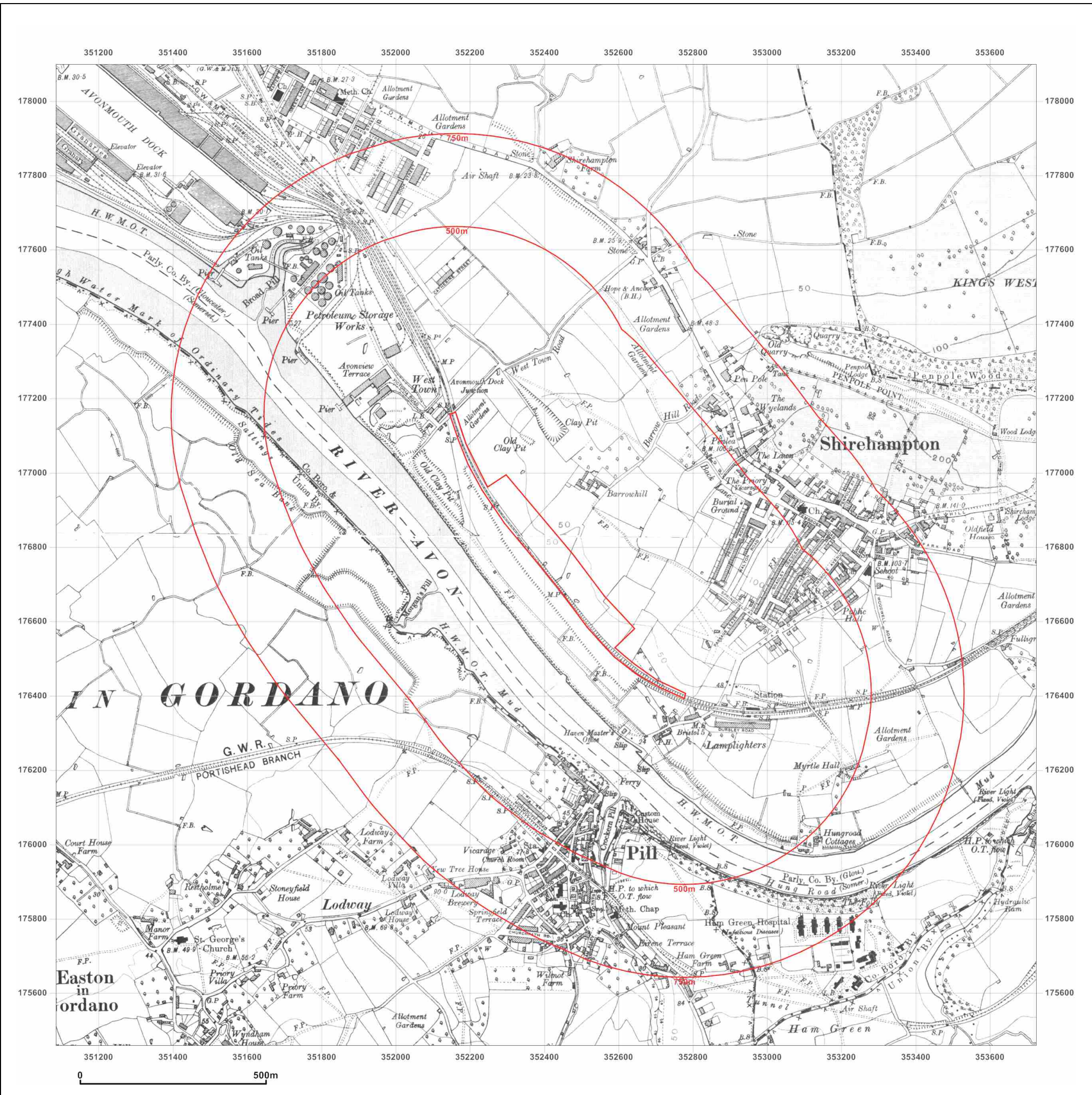
 **Ordnance Survey**
 Licensed Partner

Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 11 December 2014

To view map legend click here [Legend](#)



Site Details:
352475 176752

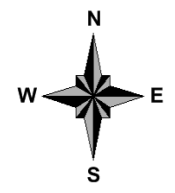
Client Ref: Portway
Report Ref: GS-1812521
Grid Ref: 352404, 176778

Map Name: County Series

Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1880
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1879
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

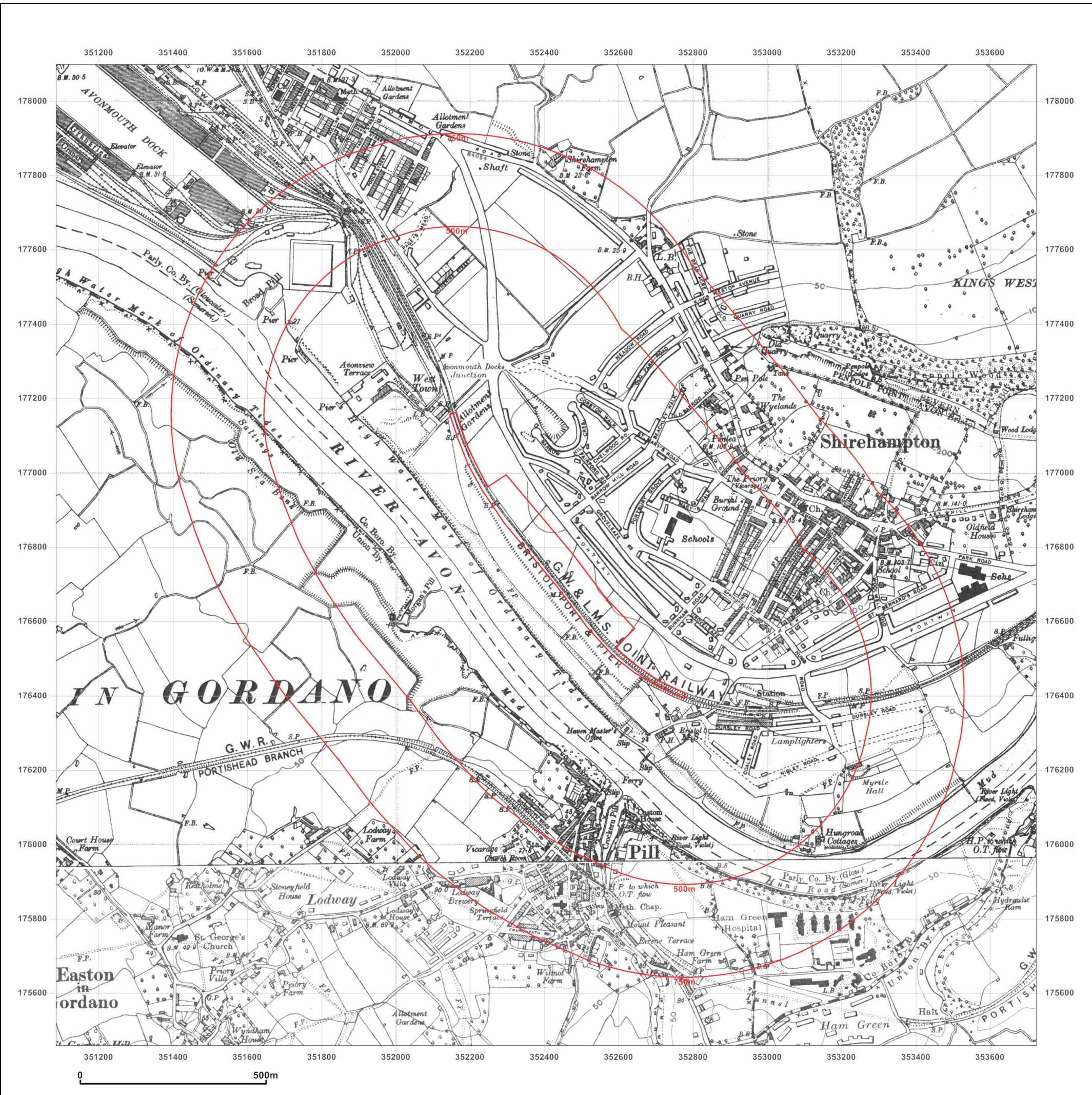
 **Ordnance Survey**
Licensed Partner

Produced by
GroundSure Environmental Insight
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 11 December 2014

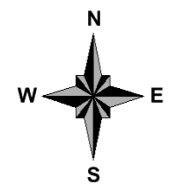
To view map legend click here [Legend](#)




Site Details:
352475 176752

Client Ref: Portway
Report Ref: GS-1812521
Grid Ref: 352404, 176778

Map Name: Provisional
Map date: 1955
Scale: 1:10,560
Printed at: 1:10,560



Surveyed 1949
Revised 1949
Edition N/A
Copyright N/A
Levelled N/A

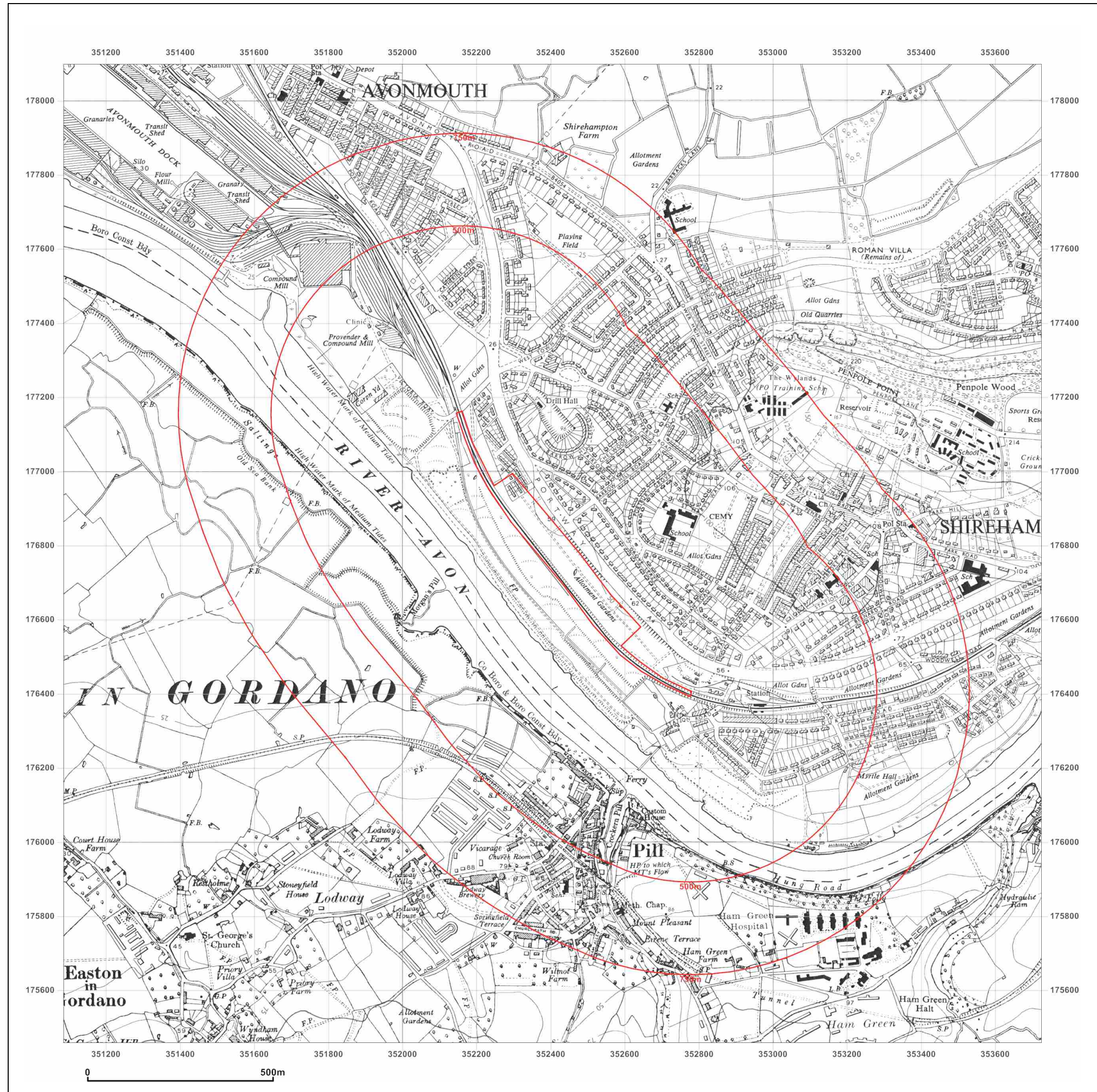
 **Ordnance Survey**
Licensed Partner

Produced by
GroundSure Environmental Insight
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 11 December 2014

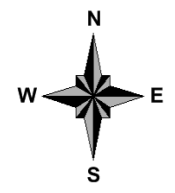
To view map legend click here [Legend](#)



Site Details:
 352475 176752

Client Ref: Portway
Report Ref: GS-1812521
Grid Ref: 352404, 176778

Map Name: Provisional
Map date: 1970
Scale: 1:10,560
Printed at: 1:10,560



Surveyed 1949
 Revised 1949
 Edition N/A
 Copyright N/A
 Levelled N/A

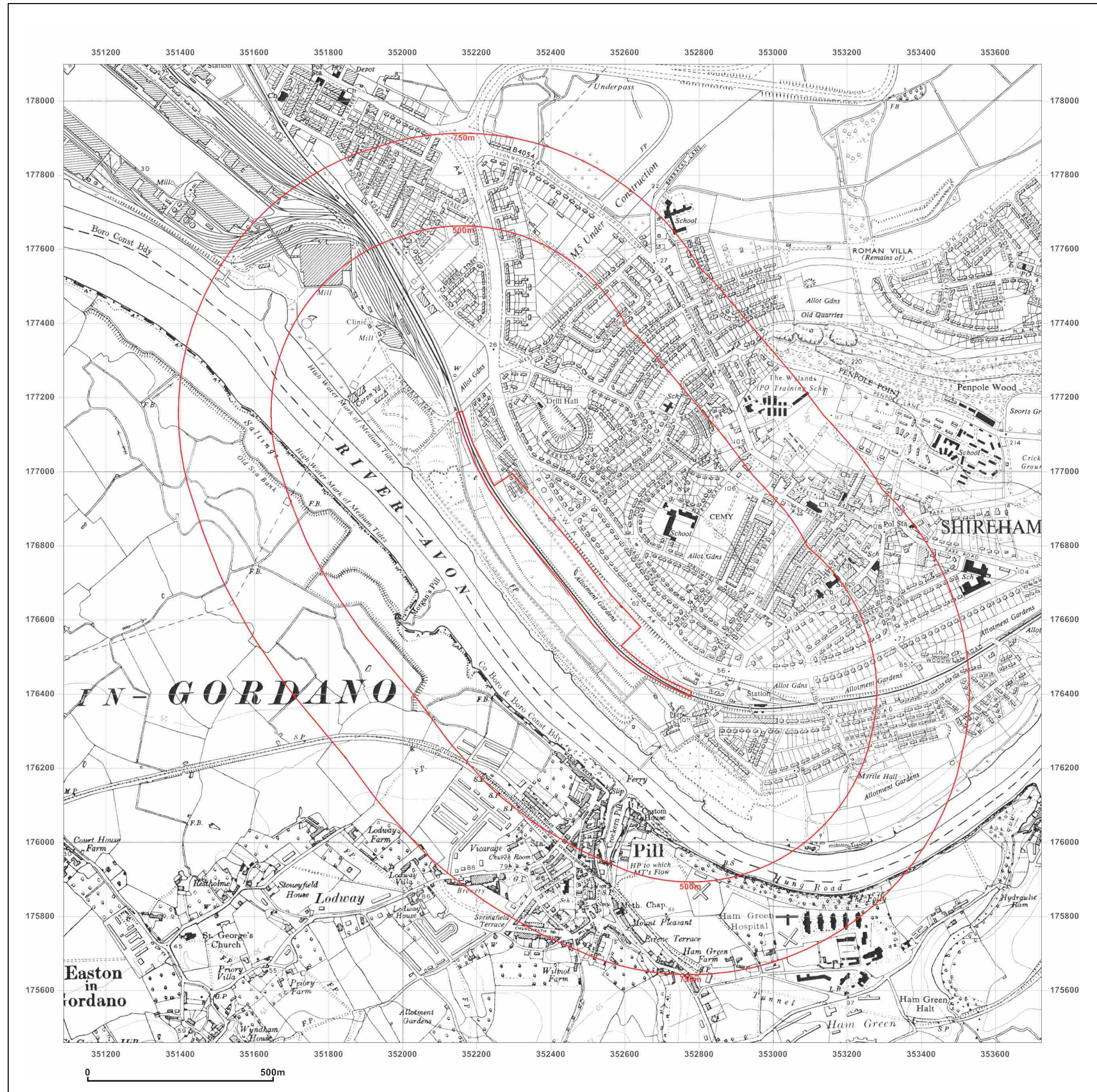
 **Ordnance Survey**
 Licensed Partner

Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 11 December 2014

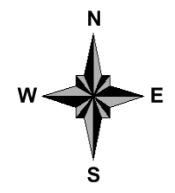
To view map legend click here [Legend](#)



Site Details:
352475 176752

Client Ref: Portway
Report Ref: GS-1812521
Grid Ref: 352404, 176778

Map Name: National Grid
Map date: 1979
Scale: 1:10,000
Printed at: 1:10,000



Surveyed 1977
Revised 1979
Edition N/A
Copyright N/A
Levelled N/A

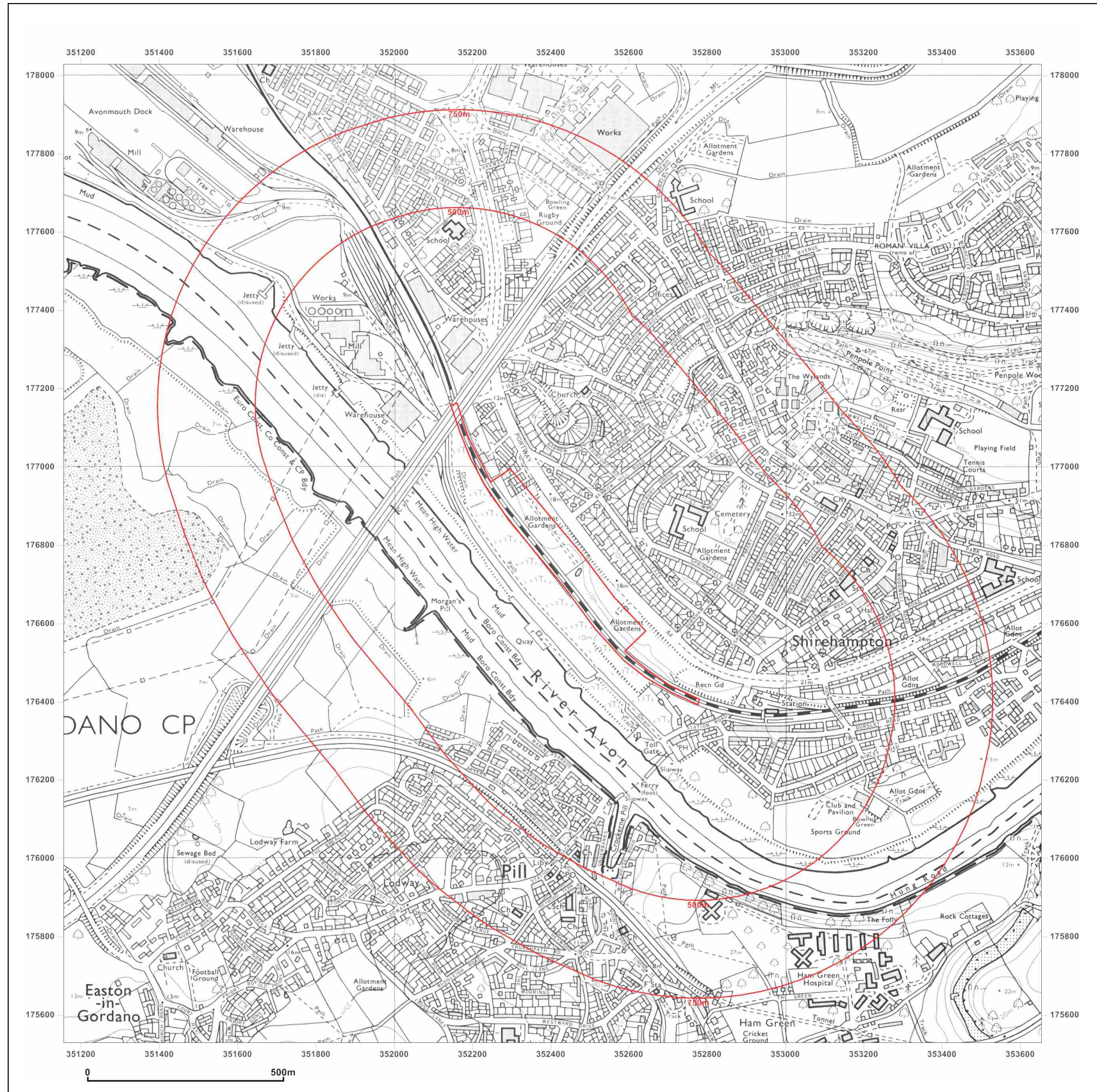


Produced by
GroundSure Environmental Insight
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 11 December 2014

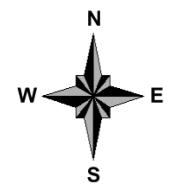
To view map legend click here [Legend](#)



Site Details:
352475 176752

Client Ref: Portway
Report Ref: GS-1812521
Grid Ref: 352404, 176778

Map Name: National Grid
Map date: 1991
Scale: 1:10,000
Printed at: 1:10,000



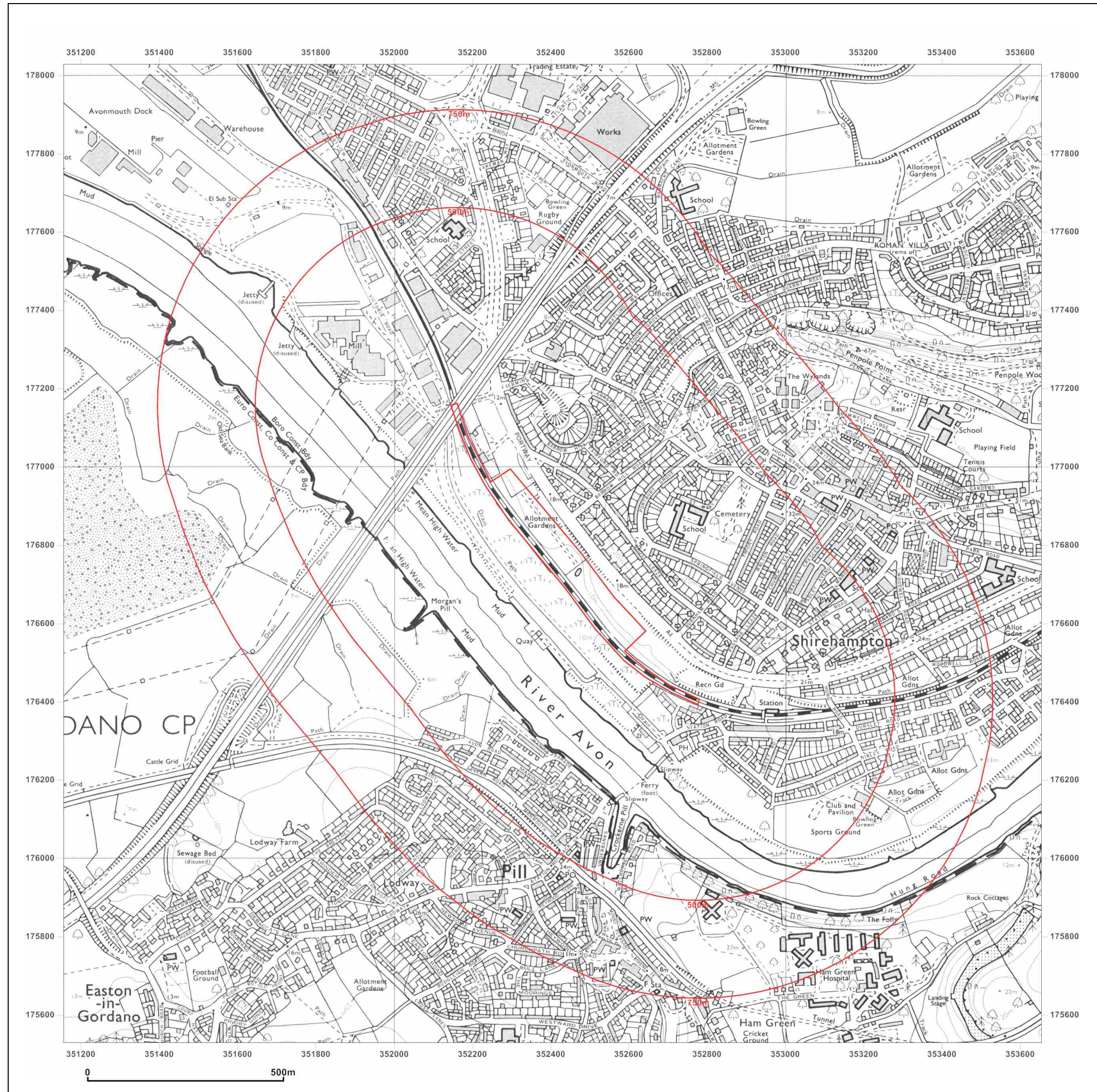
Surveyed 1984
Revised 1991
Edition N/A
Copyright N/A
Levelled N/A

 Produced by
GroundSure Environmental Insight
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 11 December 2014

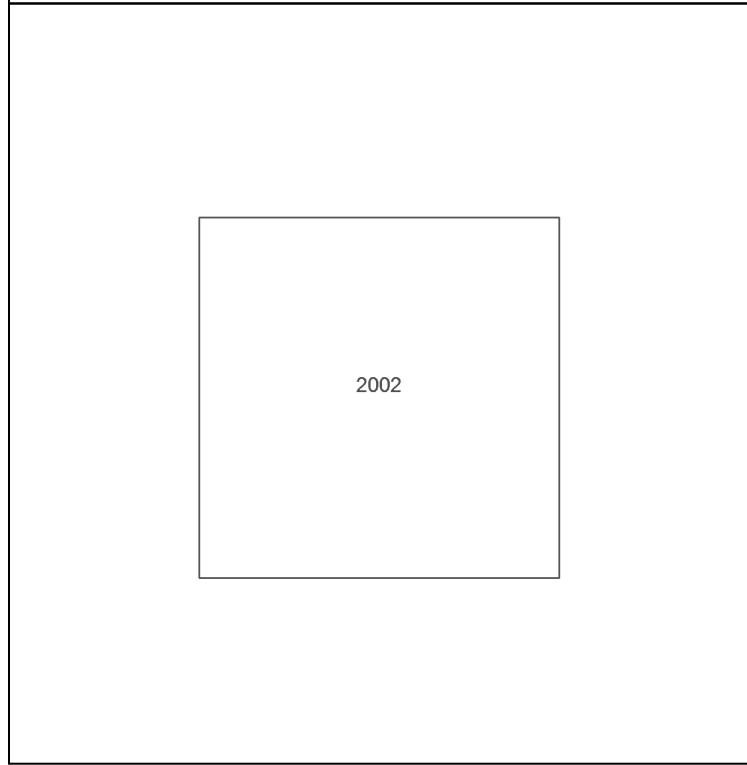
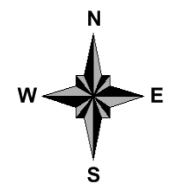
To view map legend click here [Legend](#)



Site Details:
352475 176752

Client Ref: Portway
Report Ref: GS-1812521
Grid Ref: 352404, 176778

Map Name: 1:10,000 Raster
Map date: 2002
Scale: 1:10,000
Printed at: 1:10,000



 **Ordnance Survey**
Licensed Partner

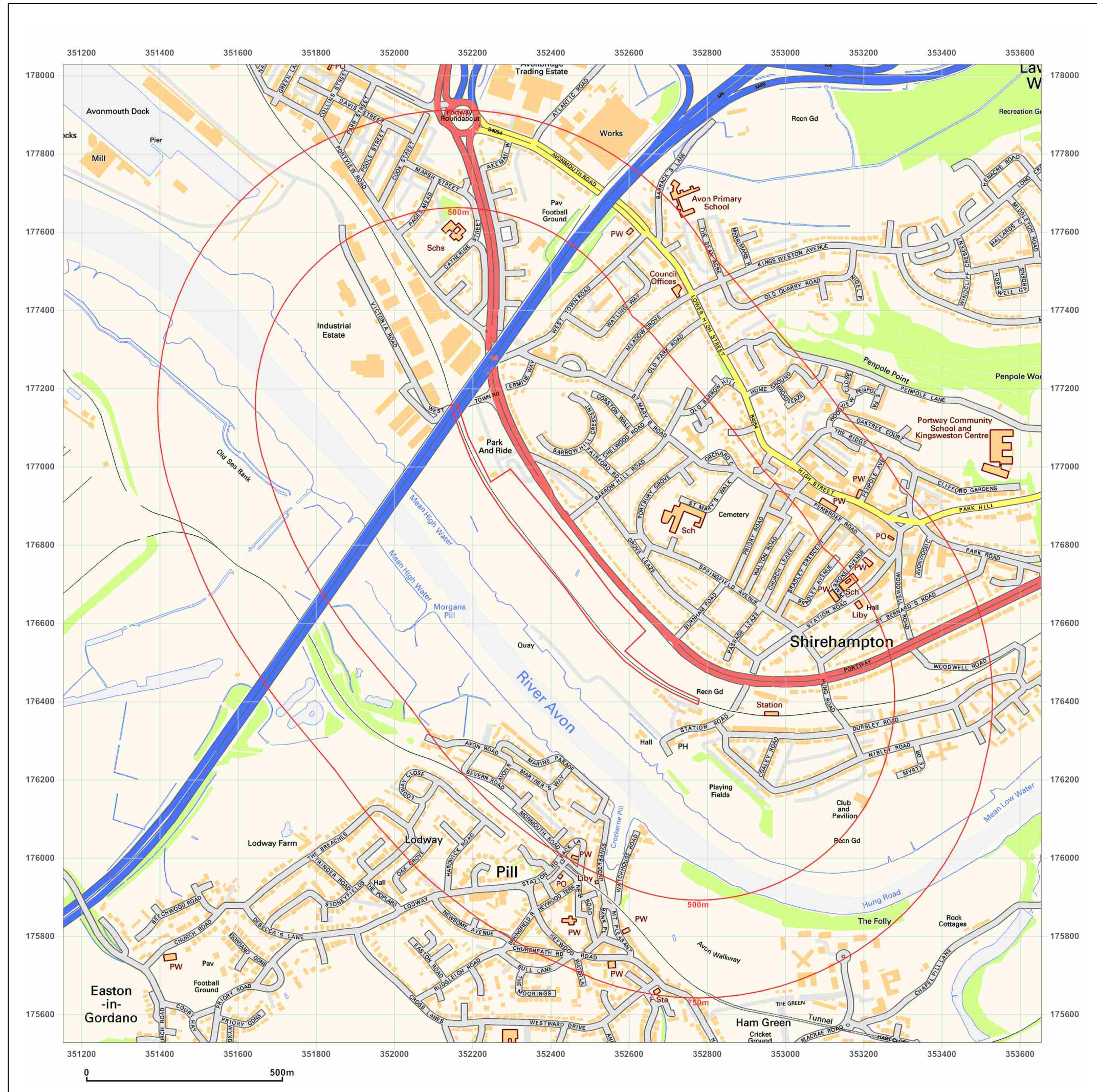
Produced by
GroundSure Environmental Insight
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 11 December 2014

To view map legend click here [Legend](#)

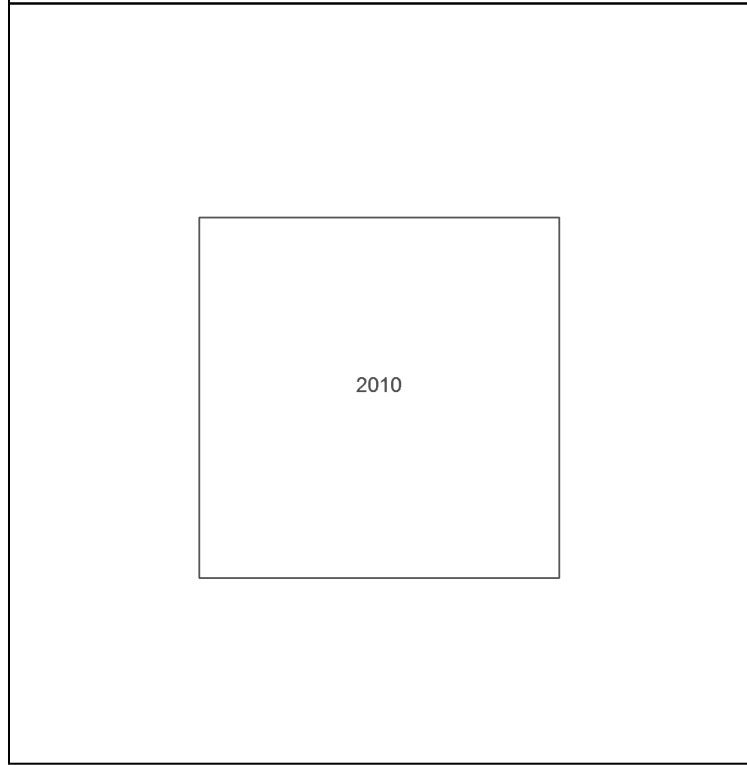
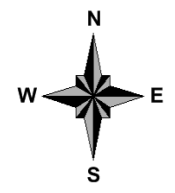




Site Details:
 352475 176752

Client Ref: Portway
Report Ref: GS-1812521
Grid Ref: 352404, 176778

Map Name: National Grid
Map date: 2010
Scale: 1:10,000
Printed at: 1:10,000



Produced by
 GroundSure Environmental Insight
 T: 08444 159000
 E: info@groundsure.com
 W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

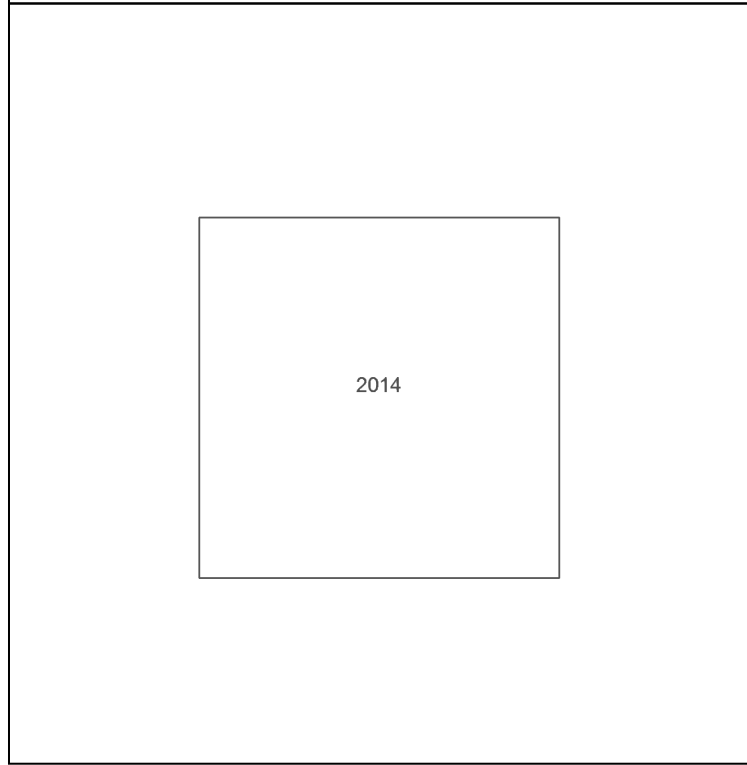
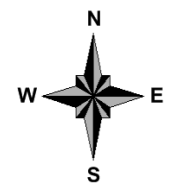
Production date: 11 December 2014

To view map legend click here [Legend](#)

Site Details:
352475 176752

Client Ref: Portway
Report Ref: GS-1812521
Grid Ref: 352404, 176778

Map Name: National Grid
Map date: 2014
Scale: 1:10,000
Printed at: 1:10,000



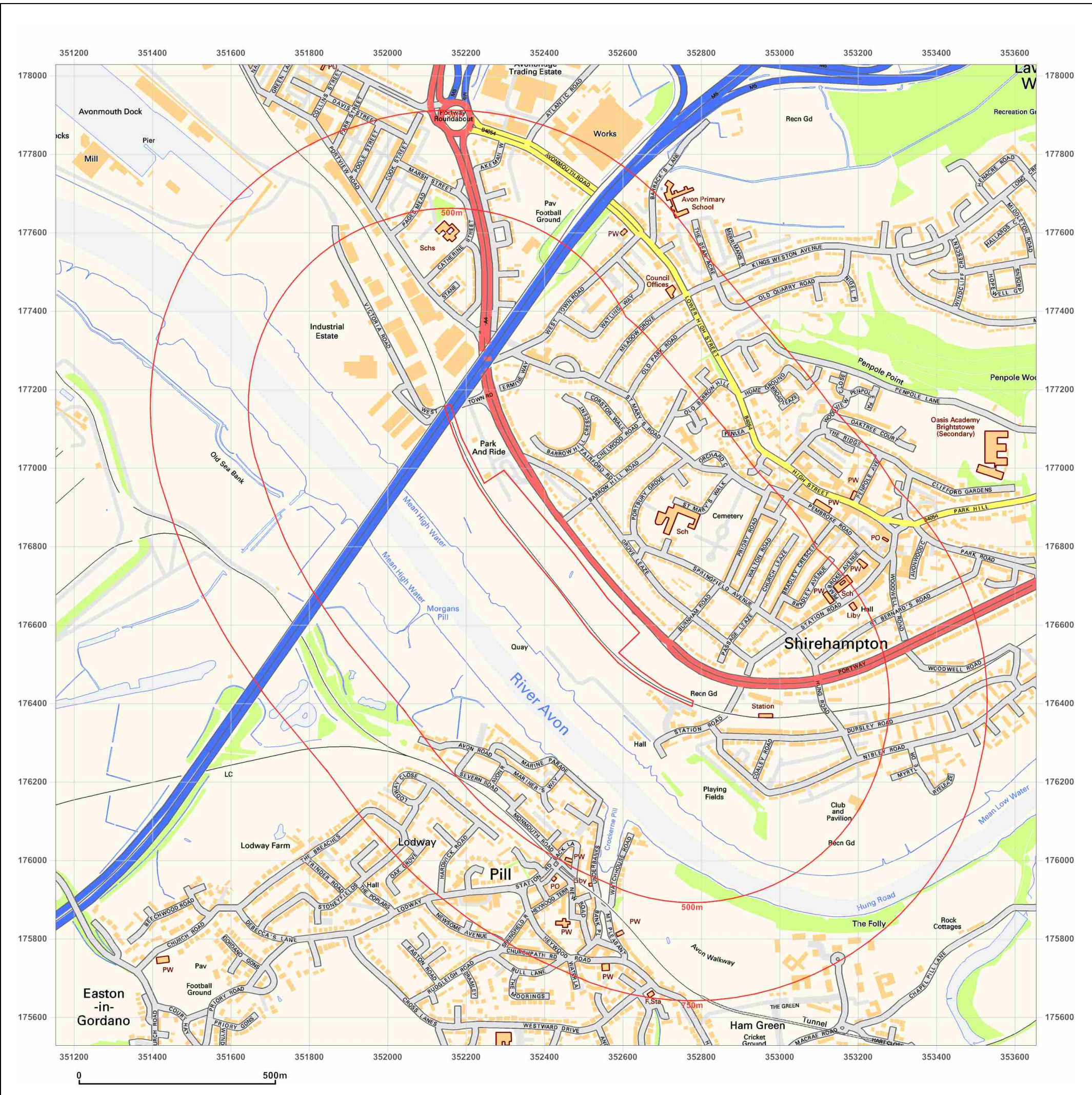
 **Ordnance Survey**
Licensed Partner

Produced by
GroundSure Environmental Insight
T: 08444 159000
E: info@groundsure.com
W: www.groundsure.com

© Crown copyright and database rights 2014 Ordnance Survey 100035207

Production date: 11 December 2014

To view map legend click here [Legend](#)



Appendices

Appendix B – Photos of Crib Wall construction extracted from Halcrow report (Halcrow Group Ltd, 2013).

Photographs of the Existing Crib Wall During Construction (Halcrow Group Ltd, 2013)



Appendix C

Signalling Sketches

Draft

SCALE
1:2500
9M+700YDS

SPEED
15MPH

9
1/4

SCALE
1:2500 | 1:5000
9M+0YDS

9

8
3/4

SCALE
1:5000 | 1:1000
8M+880YDS

8
1/2

SCALE
1:1000 | 1:5000
8M+440YDS

8
1/4

8

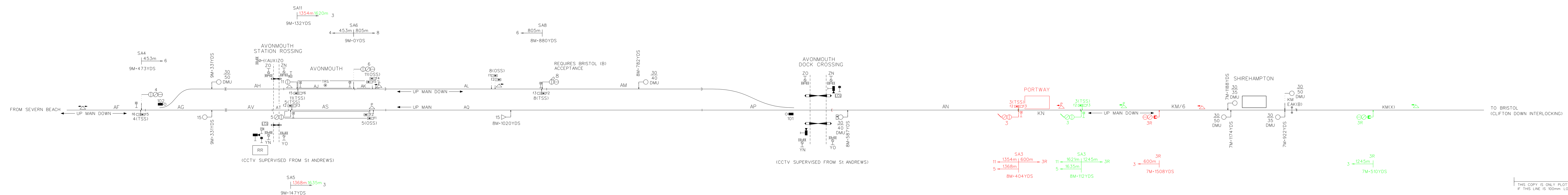
7
3/4

7
1/2

7
1/4

SCALE
1:5000
7M+0YDS

7



THIS COPY IS ONLY PLOTTED AT THE CORRECT SCALE
IF THIS LINE IS 100mm LONG ON SCALE OF 1:1000.

SCALE 1:1000, 1:2500 & 1:5000		Network Records Group		Network Rail	
Produced	AS	15.01.2015	ST ANDREWS S.B.		Drawing No
Checked	MC	23.02.2015	PORTWAY STATION		239240-00SIGSKT001A
Issued			OPTION A		Last Full Correlation
			SIGNALLING SCHEME SKETCH		Date
			Current Version	1.0	Version

SCALE
1:2500
9M+700YDS

SPEED
15MPH

9
1/4

SCALE
1:2500 | 1:5000
9M+0YDS

9

8
3/4

SCALE
1:5000 | 1:1000
8M+880YDS

8
1/2

SCALE
1:1000 | 1:5000
8M+440YDS

8
1/4

8

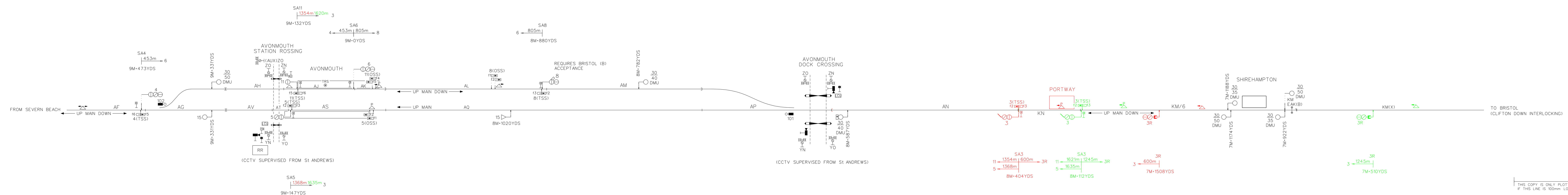
7
3/4

7
1/2

7
1/4

SCALE
1:5000
7M+0YDS

7



THIS COPY IS ONLY PLOTTED AT THE CORRECT SCALE
IF THIS LINE IS 100mm LONG ON SCALE OF 1:1000.

SCALE 1:1000, 1:2500 & 1:5000		Network Records Group		Network Rail	
Produced AS 15.01.2015		ST ANDREWS S.B. PORTWAY STATION OPTION B		Drawing No 239240-00SIGSKT001B	
Checked MC 23.02.2015		SIGNALLING SCHEME SKETCH		Last Full Correlation Date	
Issued				Current Version 1.0	

SCALE
1:2500
9M+700YDS

SPEED
15MPH

9
1/4

SCALE
1:2500 | 1:5000
9M+0YDS

9

8
3/4

SCALE
1:5000 | 1:1000
8M+880YDS

8
1/2

SCALE
1:1000 | 1:5000
8M+440YDS

8
1/4

8

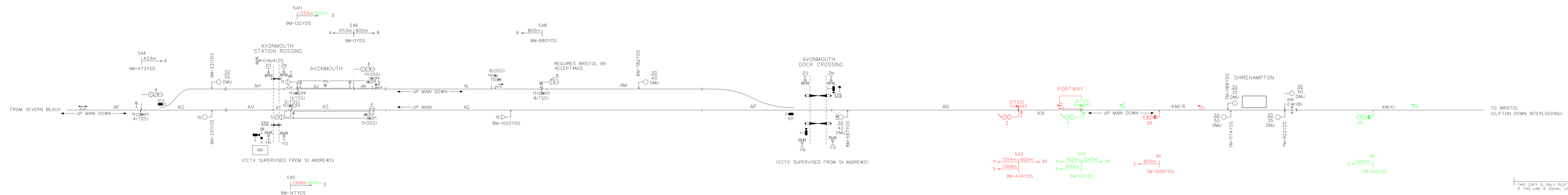
7
3/4

7
1/2

7
1/4

SCALE
1:5000
7M+0YDS

7



THIS COPY IS ONLY PLOTTED AT THE CORRECT SCALE
IF THIS LINE IS 100mm LONG ON SCALE OF 1:1000.

SCALE 1:1000, 1:2500 & 1:5000		Network Records Group		Network Rail	
Produced AS 15.01.2015		ST ANDREWS S.B.		Drawing No 239240-00SIGSKT001C	
Checked MC 23.02.2015		PORTWAY STATION		Last Full Correlation	
Issued		OPTION C		Date	
		SIGNALLING SCHEME SKETCH		Version	
				Current Version 1.0	

SCALE

1:2500

9M+700YDS

SPEED

15MPH

9
1/4

SCALE

1:2500 | 1:5000

9M+0YDS

9

8
3/4

SCALE

1:5000 | 1:1000

8M+880YDS

8
1/2

SCALE

1:1000 | 1:5000

8M+440YDS

8
1/4

8

7
3/4

7
1/2

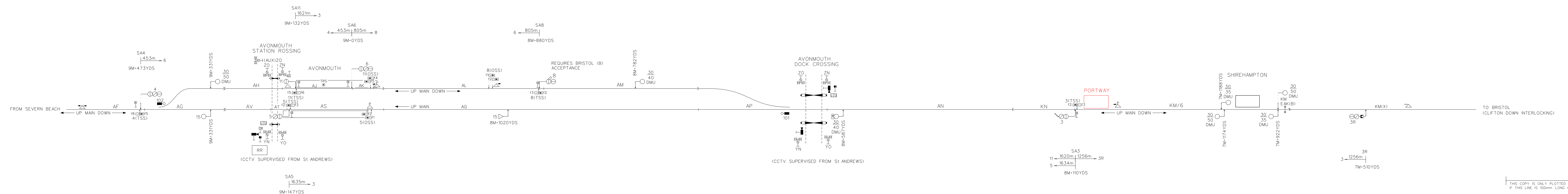
7
1/4

SCALE

1:5000

7M+0YDS

7



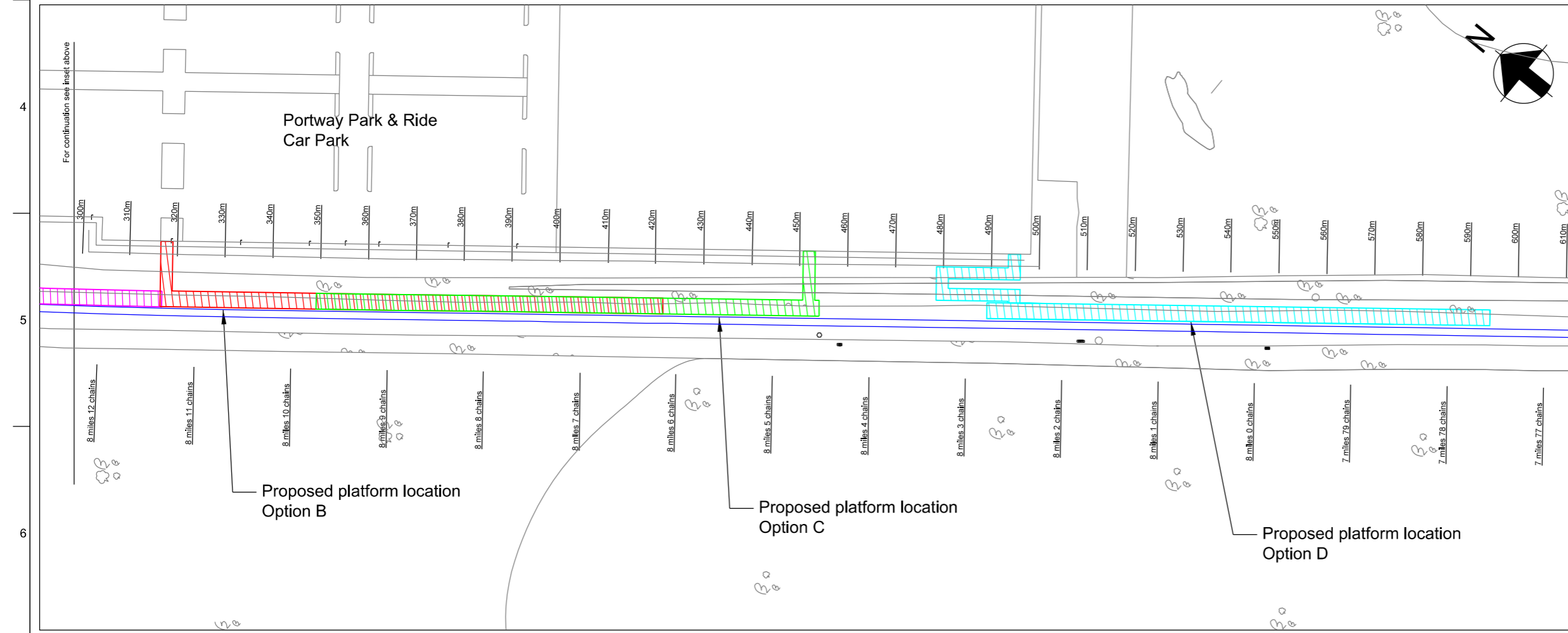
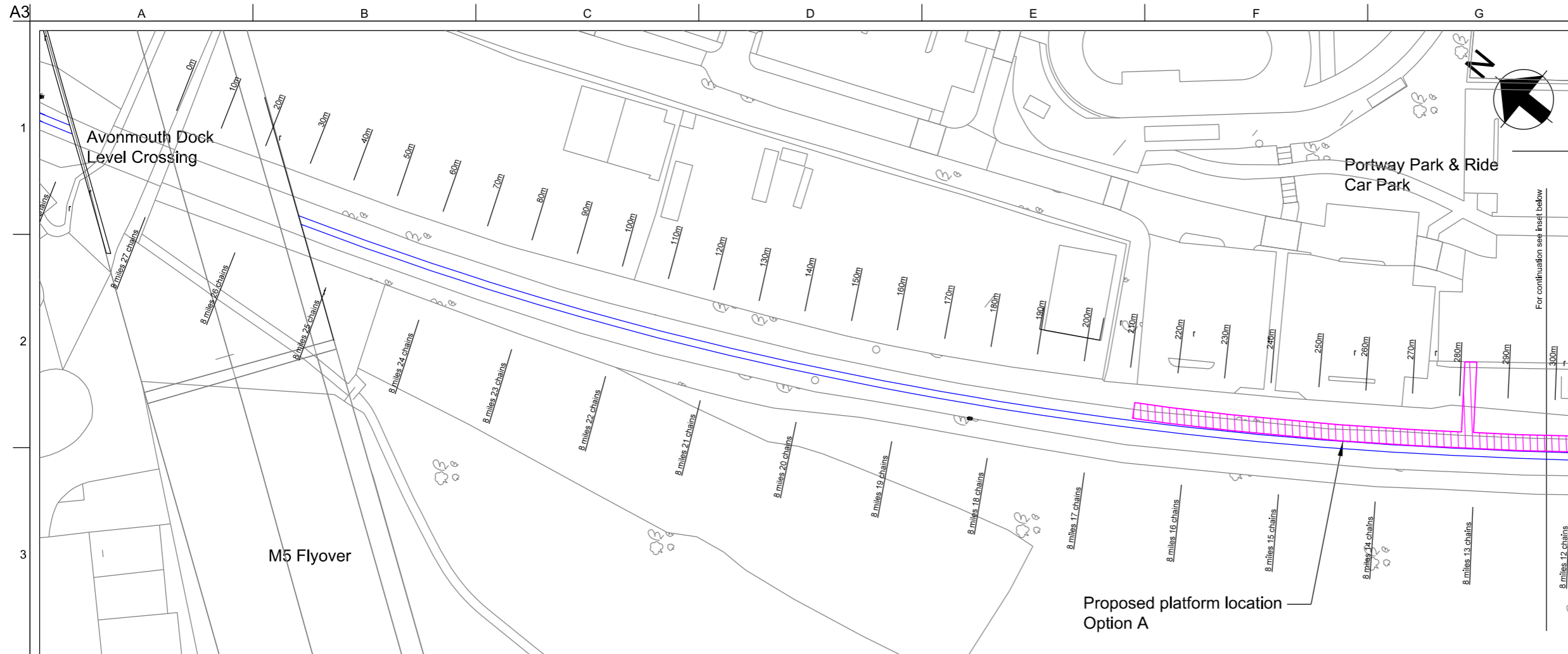
THIS COPY IS ONLY PLOTTED AT THE CORRECT SCALE
IF THIS LINE IS 100mm LONG ON SCALE OF 1:1000.

SCALE 1:1000, 1:2500 & 1:5000		Network Records Group		Network Rail	
Produced AS 15.01.2015		ST ANDREWS S.B.		Drawing No 239240-00SIGSKT001D	
Checked MC 23.02.2015		PORTWAY STATION		Last Full Correlation	
Issued		OPTION D		Date	
		SIGNALLING SCHEME SKETCH		Version	
				Current Version 1.0	

Appendix D

Drawings

Draft



01	13/03/15	RD		
Draft				
Issue	Date	By	Chkd	Appd

ARUP
 63 St Thomas Street
 Bristol BS1 6JZ
 Tel +44(0)117 976 5432 Fax +44(0)117 976 5433
 www.arup.com

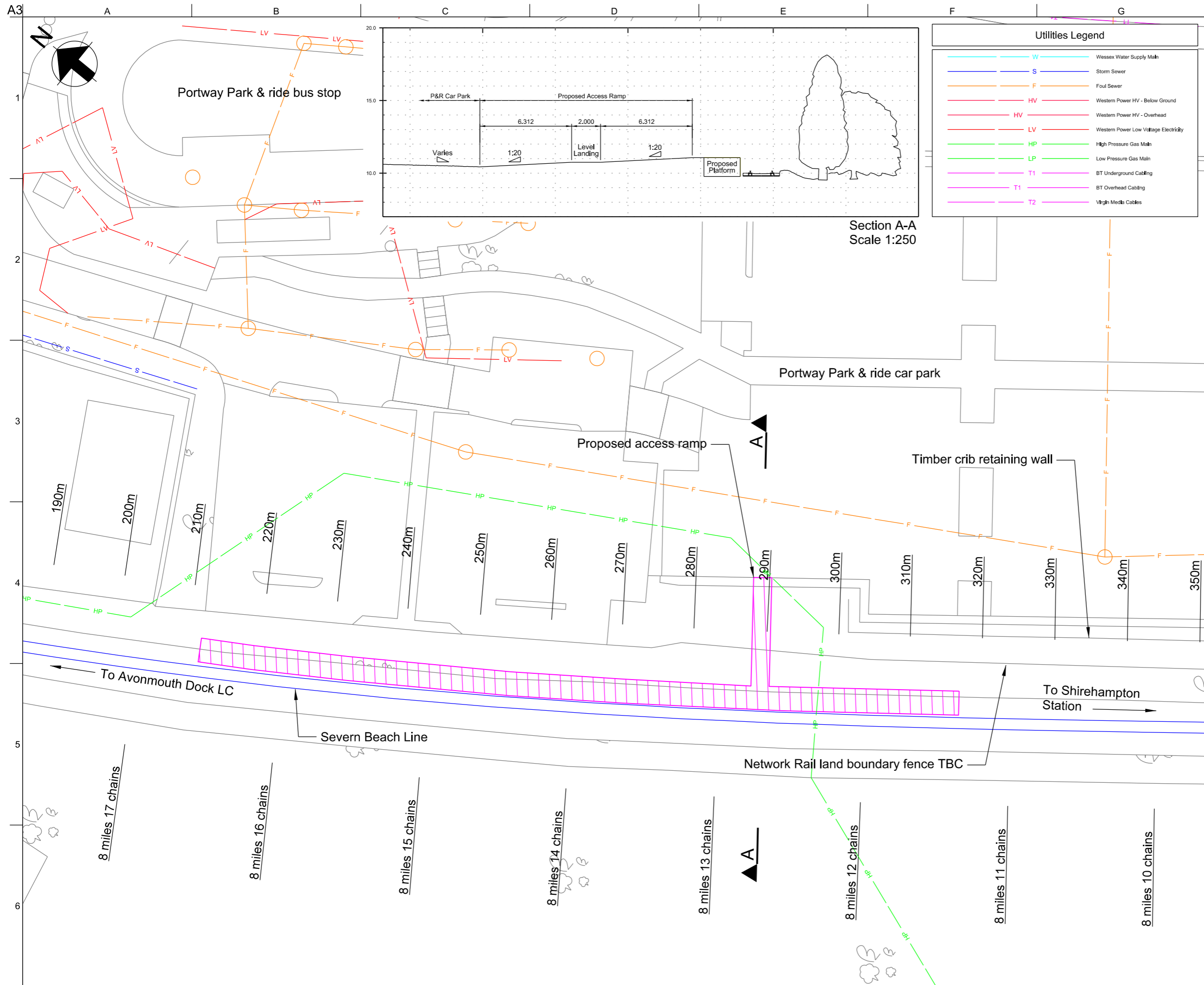
Client
Network Rail

Job Title
Portway Park & Ride Station GRIP2

Proposed Platform Option Locations

Scale at A3 1:1000	
Discipline Civil Engineering	
Job No 239240-00	Drawing Status
Drawing No CX-001	Issue 01

I:\Global\Europe\Bristol\Jobs\239xxx\239240-00\4_30_Drings\0_Drawing\CX-001.dgn



Utilities Legend	
W	Wessex Water Supply Main
S	Storm Sewer
F	Foul Sewer
HV	Western Power HV - Below Ground
HV	Western Power HV - Overhead
LV	Western Power Low Voltage Electricity
HP	High Pressure Gas Main
LP	Low Pressure Gas Main
T1	BT Underground Cabling
T1	BT Overhead Cabling
T2	Virgin Media Cables

Section A-A
Scale 1:250

01	13/03/15	RD		
Draft				

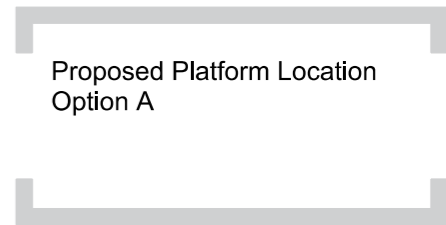
Issue	Date	By	Chkd	Appd

ARUP

63 St Thomas Street
Bristol BS1 6JZ
Tel +44(0)117 976 5432 Fax +44(0)117 976 5433
www.arup.com

Client
Network Rail

Job Title
**Portway
Park & Ride Station
GRIP2**

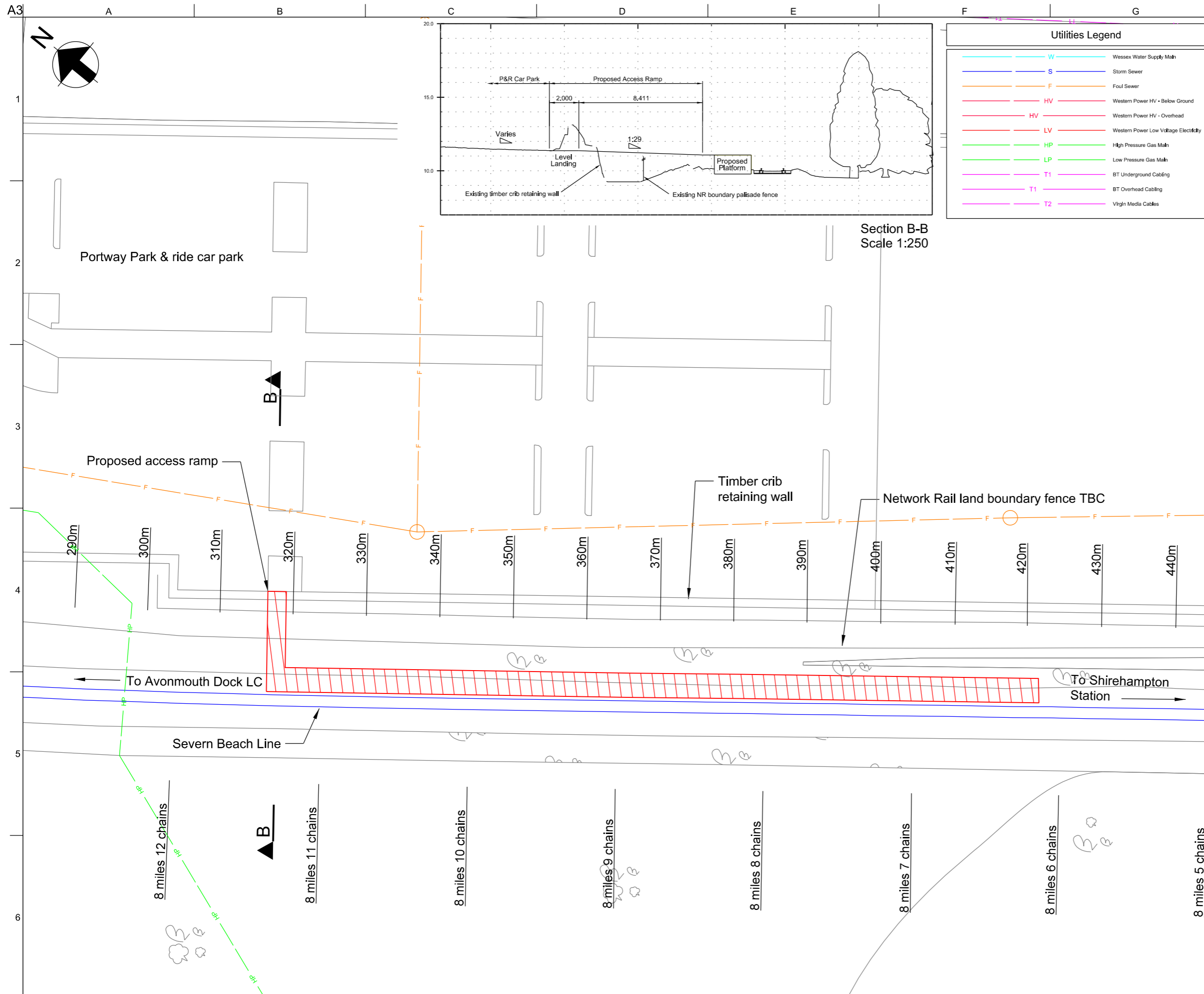


Scale at A3 1:500

Discipline **Civil Engineering**

Job No **239240-00** Drawing Status **Draft**

Drawing No **CX-002** Issue **01**



Utilities Legend	
W	Wessex Water Supply Main
S	Storm Sewer
F	Foul Sewer
HV	Western Power HV - Below Ground
HV	Western Power HV - Overhead
LV	Western Power Low Voltage Electricity
HP	High Pressure Gas Main
LP	Low Pressure Gas Main
T1	BT Underground Cabling
T1	BT Overhead Cabling
T2	Virgin Media Cables

Section B-B
Scale 1:250

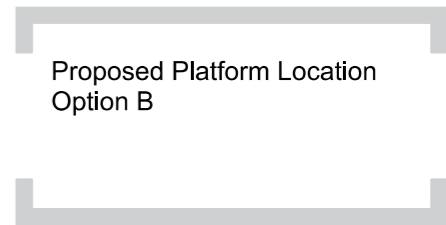
01	13/03/15	RD		
Draft				

Issue	Date	By	Chkd	Appd

ARUP
 63 St Thomas Street
 Bristol BS1 6JZ
 Tel +44(0)117 976 5432 Fax +44(0)117 976 5433
 www.arup.com

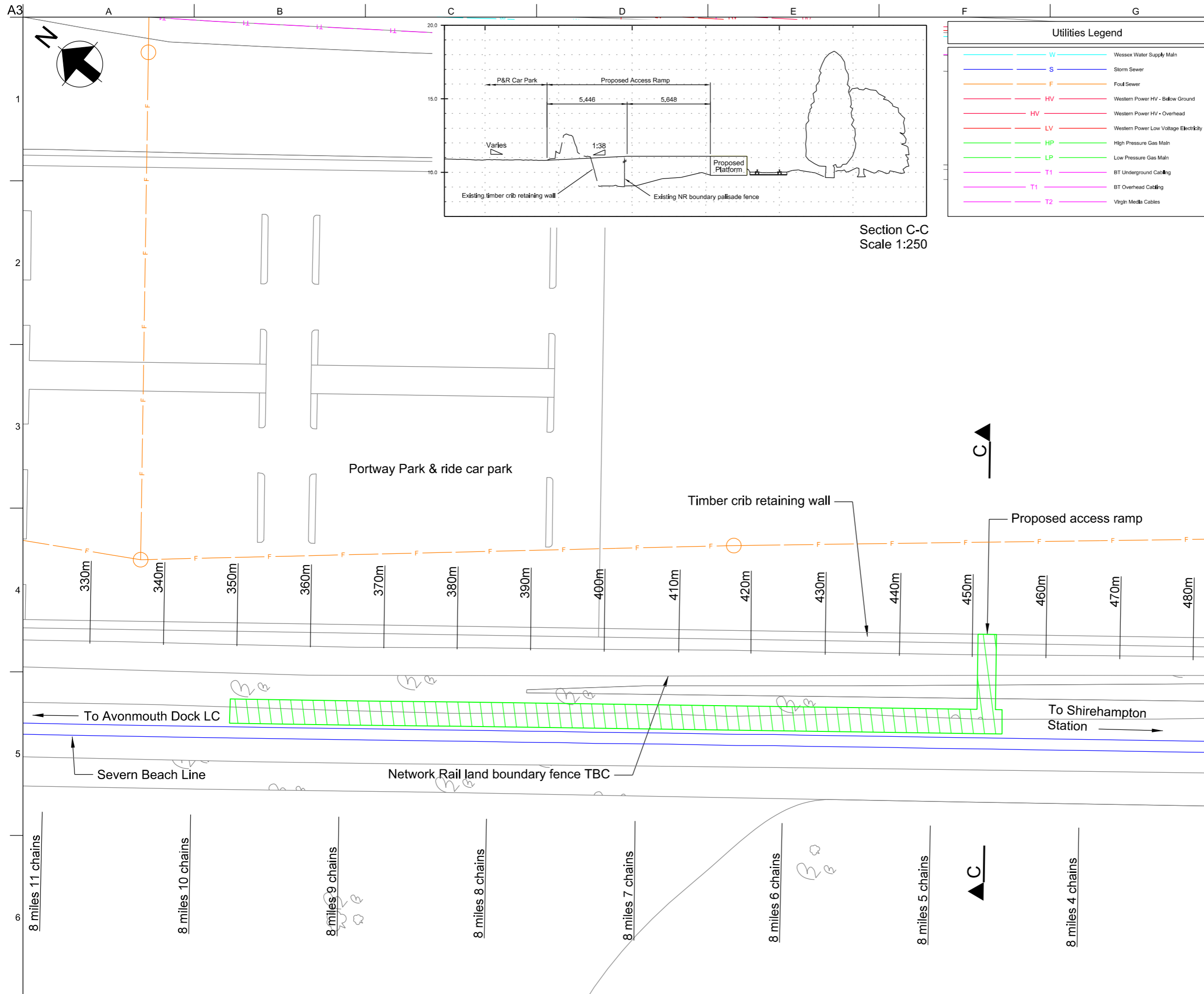
Client
Network Rail

Job Title
**Portway
 Park & Ride Station
 GRIP2**



Scale at A3 1:500	
Discipline Civil Engineering	
Job No 239240-00	Drawing Status Draft
Drawing No CX-003	Issue 01

I:\Global\Europe\Bristol\Jobs\239xxx\239240-00\4_30_Drings\0_Drawing\CX-003.dgn



01	13/03/15	RD		
Draft				

Issue	Date	By	Chkd	Appd

ARUP

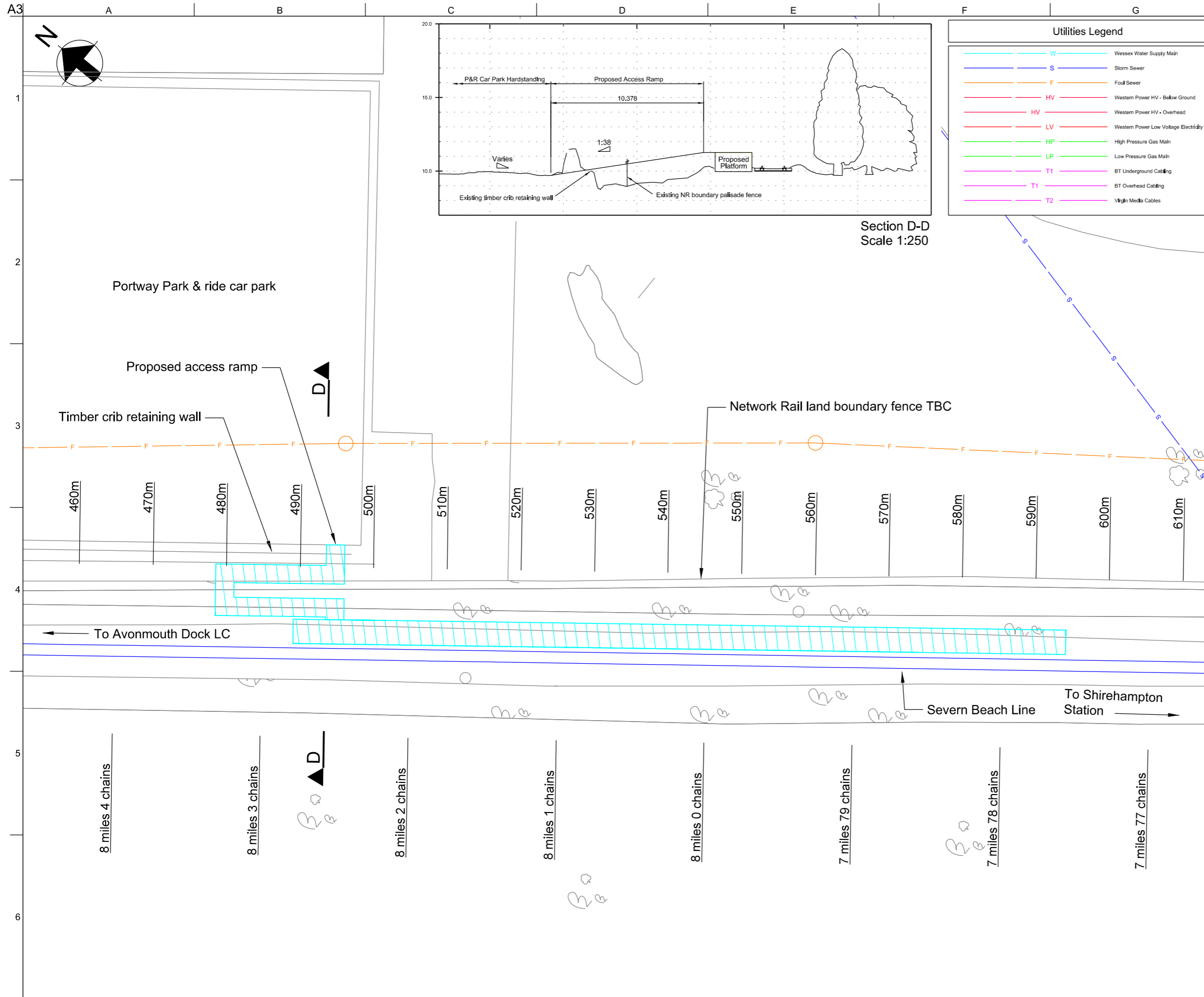
63 St Thomas Street
 Bristol BS1 6JZ
 Tel +44(0)117 976 5432 Fax +44(0)117 976 5433
 www.arup.com

Client
Network Rail

Job Title
Portway Park & Ride Station GRIP2

Proposed Platform Location Option C

Scale at A3 1:500	
Discipline Civil Engineering	
Job No 239240-00	Drawing Status Draft
Drawing No CX-004	Issue 01



Utilities Legend	
W	Wessex Water Supply Main
S	Storm Sewer
F	Foul Sewer
HV	Western Power HV - Below Ground
HV	Western Power HV - Overhead
LV	Western Power Low Voltage Electricity
HP	High Pressure Gas Main
LP	Low Pressure Gas Main
T1	BT Underground Cabling
T1	BT Overhead Cabling
T2	Virgin Media Cables

Section D-D
Scale 1:250

01	13/03/15	RD		
Draft				

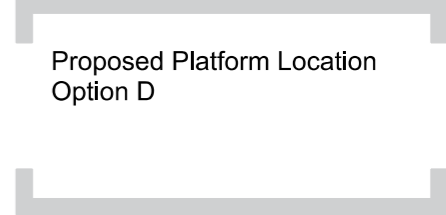
Issue	Date	By	Chkd	Appd

ARUP

63 St Thomas Street
Bristol BS1 6JZ
Tel +44(0)117 976 5432 Fax +44(0)117 976 5433
www.arup.com

Client
Network Rail

Job Title
**Portway
Park & Ride Station
GRIP2**



Scale at A3 1:500	
Discipline Civil Engineering	
Job No 239240-00	Drawing Status Draft
Drawing No CX-005	Issue 01

Appendix E

Level Crossing Assessment

Draft

Section	Field	Value
Crossing Basics	Crossing Name	Avonmouth Dock Jn.
	Crossing Type	CCTV
	Alternative Name	
	Engineers Line Reference	CNX
	Crossing ID	
	Name of Nearest Stations / Junction Up	Avonmouth
	Name of Nearest Stations / Junction Down	Shirehampton
	Is the crossing at or near a station	NOT WITHIN SIGHT
	Crossing Status	Public Highway
	Value Map	RED
Crossing Location	Area	WEST_COUNTRY
	Crossing OS Grid Reference	ST521771
	Engineers Line Reference	CNX
	Strategic Route	Great Western Main Line
	Hihgway Authority	South Gloucester
	Controlling SignalBox	St. Andrews Road
	Location on the Rail	8 Miles and 0 Yards 29.0 chains
Location on the Road		
Crossing Layout	Number Of Tracks Crossing Traverses	1
	Orientation of Road/Path across the crossing from the North	100
	Orientation of Railway from the North	20
	Describe the horizon looking across the crossing	NO
Taker Info	Assessment Title	MetroWest Phase 1; 4tph each way
	Collector's Name	Tim Mayo
	Collector's Phone Number	117372
	Collector's Email	tim.mayo@networkrail.co.uk
Photograph Record	Photos Taken of Downside Crossing Approach	NO
	Photos Taken of Downside Looking Across Crossing	NO
	Photos Taken of Downside Crossing Approach	NO
	Photos Taken of Downside Looking Across Crossing	NO
	Signs/lights/crossing equipment	NO
	Photograph Notes	n/a this option

Environment General Details	Is power to the line supplied by conductor rail	NO
	Is power to the line supplied by OHLE	NO
Environment in Up Direction	Distance to set of points	10
	Distance to cutting	0
	Distance to another crossing	0
	Distance on the right to a building within 20 metres of the track	26
	Distance on the right to a platform within 20 metres of the track	0
	Distance on the right to a tunnel within 20 metres of the track	0
	Distance on the right to a steepdrop within 20 metres of the track	0
	Distance on the right to an underbridge within 20 metres of the track	0
	Distance on the right to water within 20 metres of the track	0
	Distance on the right to a platform within 2 metres of the track	0
	Distance on the right to a tunnel within 2 metres of the track	0
	Distance on the right to an underbridge within 20 metres of the track	0
	Distance on the left to a building within 20 metres of the track	0
	Distance on the left to a platform within 20 metres of the track	0
	Distance on the left to a tunnel within 20 metres of the track	0
	Distance on the left to a steepdrop within 20 metres of the track	0
	Distance on the left to an underbridge within 20 metres of the track	0
	Distance on the left to water within 20 metres of the track	0
	Distance on the left to a platform within 2 metres of the track	0
	Distance on the left to a tunnel within 2 metres of the track	0
	Distance on the left to an underbridge within 20 metres of the track	0
	Are there any other hazards	NO
	Notes about the crossing environment	

Environment in Down Direction	Distance to set of points	0
	Distance to cutting	0
	Distance to another crossing	0
	Distance on the right to a building within 20 metres of the track	8
	Distance on the right to a platform within 20 metres of the track	0
	Distance on the right to a tunnel within 20 metres of the track	37
	Distance on the right to a steepdrop within 20 metres of the track	0
	Distance on the right to an underbridge within 20 metres of the track	0
	Distance on the right to water within 20 metres of the track	0
	Distance on the right to a platform within 2 metres of the track	0
	Distance on the right to a tunnel within 2 metres of the track	0
	Distance on the right to an underbridge within 20 metres of the track	0
	Distance on the left to a building within 20 metres of the track	5
	Distance on the left to a platform within 20 metres of the track	0
	Distance on the left to a tunnel within 20 metres of the track	0
	Distance on the left to a steepdrop within 20 metres of the track	0
	Distance on the left to an underbridge within 20 metres of the track	0
	Distance on the left to water within 20 metres of the track	0
	Distance on the left to a platform within 2 metres of the track	0
	Distance on the left to a tunnel within 2 metres of the track	0
Distance on the left to an underbridge within 20 metres of the track	0	
Are there any other hazards	NO	
Notes about the crossing environment		
Census 1 General Info	Date	30-Aug-12
	Taker	Simon Aston
	Type	quick

	Start	10:45
	Duration	30
	Notes	
	Duration of time that trains run	24
	Proportion of the year that census 1 applies to	100
	Census Proportion Notes	
Census 1 Environment	Is there a high number of irregular users	No
	Irregular User Notes	
	Is there a higher than usual number of vulnerable people	NO
	Vulnerable People Notes	
	Does the crossing have a high number of users during night/dusk? (e.g. near public house, fishing location, dog walkers and joggers)	No value
	If Yes Please Describe	
	Estimate the percentage of users who use the crossing between 2300 and 0700.	0
Census 1 Usage	Pedestrians	1
	Car Count	15
	Vans / Small Lorries	27
	Buses	0
	HGVs	16
	Pedal / Motor Cycles	0
	Horses / Riders	0
	Animals on the hoof	0
	Tractors / Farm Vehicles	0
General Train Info	Group 1 Train	Passenger
	Group 1 trains per day	62
	Group 1 Max Speed	50
	Group 1 Length (m)	92
	Group 2 Train	No value
	Group 2 trains per day	
	Group 2 Max Speed	
	Group 2 Length (m)	
	Group 3 Train	No value
	Group 3 trains per day	
	Group 3 Max Speed	
	Group 3 Length (m)	
Train Sighting	Group 1 Normal Strike-time (s)	145
	Group 2 Normal Strike-time (s)	
	Group 3 Normal Strike-time (s)	

	For what proportion of crossing activations does more than one train pass the crossing	OCCASIONALLY
Approach	At what speed do the vehicles approach the crossing	LESS THAN OR EQUAL TO 30MPH
	At this approach speed the visibility of the signs and crossing equipment	is adequate - the visibility should be sufficient for a vehicle to be able to react in time if the crossing is activated
	Are there other known visibility problems at the crossing at certain times of the year (e.g. fog or foliage)	NO
	Notes on visibility problems at certain times of the year	
	Describe the road	Good road surface with no significant gradient
	Is ice, mud, loose material or flood water a known problem at certain times	NO
	Notes on temporary adhesion issues	
	Is the approach road long and straight	NO
	Is there a risk of vehicle grounding on the crossing?	NO
	Notes	
	If grounding is a risk, are there risks of grounding signs?	No value
	Are there features on the crossing or on the distant side of the crossing (e.g. roundabout, road junction) that could distract a driver approaching the crossing	YES
	Notes	Road junction traffic lights on down side Lorry yard on down side Industrial unit on up side Cycle path on up side
Approach Notes	Has there been or is there planned or apparent any development near the crossing which may lead to a change or increase in use such as a housing estate or change in farming practice	NO
	Notes on new developments	
	Are there any adjacent sources of light/noise (e.g. Road, Industrial Site, Airport) that could affect the crossing users ability to see or hear an approaching train?	No value
	Are the signs for the crossing located?	No value

	Are the signs at the crossing positioned so as to be clearly visible for crossing users on a direct route over the crossing?	No value
	Are the signs for the crossing clearly visible during night/dusk?	No value
	Crossing approach notes	
	Notes on traffic utilisation	
Deliberate Misuse	The chance of a vehicle user deliberately abusing the crossing is estimated to be	Significantly lower than average
	Default has been overwritten	FALSE
	Reasons for changing default	
	Changed to	Significantly lower than average
Mitigation	Reasons for Mitigation	
	Car Reduction	
	Van / Small Lorry Reduction	
	Bus Reduction	
	HGV Reduction	
	Cycle Reduction	
	Pedestrian Reduction	
	Tractor Reduction	
	Train Passenger Reduction	
	Train Staff Reduction	
	All Users Reduction	
Cost Benefit	Option for Risk Reduction	Modify
	Description Of Project	n/a - train service increase only
	CBA Required	NO

Combined Risk Results

Crossing Details

Crossing Name: Avonmouth Dock Jn.
 Crossing Type: CCTV
 Location Rail: CNX

Usage

Vehicles 1566 per day
 Pedestrians/Cyclists 27 per day
 Trains 62 per day
 Census 1 Type quick
 Census 1 Date 30-Aug-2012 at 10:45

Safety Risk

Individual Risk J

User Type	Ind Risk (Fraction)	Ind Risk (Numeric)	Collectiv e Risk	Derailment
Car	1 in 6329113	1.58E-07	1.68E-05	
Van / Small Lorries	1 in 9090909	1.10E-07	3.02E-05	
HGV	1 in 16393442	6.10E-08	5.90E-06	
Bus	0	0	0	
Tractor / Farm	0	0	0	
Cyclist / Motorcyclist	0	0	0	
Pedestrian	1 in 345901	2.89E-06	5.70E-05	
Passengers			4.52E-06	80.89650723
Staff			1.36E-05	3.0065777
Total			1.28E-04	3.17801116

Collision Frequencies

	Train / User	User Equipment	Other
Vehicle:	1.53E-04	0.089017623	2.68E-04
Pedestrian:	5.46E-05	6.73E-05	5.26E-04

Collision Risk

	Train / User	User Equipment	Other
Vehicle:	5.29E-05	0	0
Pedestrian:	4.43E-05	1.08E-06	1.16E-05

Key Risk Drivers

Large Numbers of HGVs

Operational Risk

£ per year 188

Safety Spend

25 year £1,537.25
 50 year £1,855.72

Appendix F



Sustainability Appraisal

Draft

Ref:	239240
Version:	1
Date:	13/02/2015

Environmental Appraisal

Project Name:	Portway Park and Ride Proposed Rail Platform
Sponsor:	
Project Manager:	Rory Deuchar

Prepared By Name: Sophie England	Signature: 
	Job Title: Graduate Consultant
Approved By Name: Paul Clack	Signature: 
	Job Title: Associate

Ref:	239240
Version:	1
Date:	13/02/2015

Revision History

Version	Status	Details	Date
1	Draft Issue	Draft for comment by Network Rail	13/02/2015

Ref:	239240
Version:	1
Date:	13/02/2015

Contents

1 GRIP Stage	4
2 Purpose	4
3 Scope and Description of Project	4
3.1 Scope	4
3.2 Project Description	4
4 Environmental issues from earlier Grip stages	5
5 Environmental Appraisal	6
6 Sustainability Appraisal	30
7 Glossary and Supporting Information	34
7.1 Abbreviations	34
7.2 Statutory Agencies	35
7.3 Possible Consent Needed for Project Work	36
7.4 Action Plan	38
Appendix A: NR Hazard Directory	40
Appendix B: Ecology Report	41
Appendix C: TPO details	42
Appendix D: Constraints Map	43

Ref:	239240
Version:	1
Date:	13/02/2015

1 GRIP Stage

This Environmental Appraisal is being undertaken at the following stage of the project;

- a: Pre-feasibility (Stage 2) __Yes__
b: Option Selection (Stage 3) _____
c: Single Option Development (Stage 4) _____

2 Purpose

The purpose of this product is to identify potential environmental issues and risks that may arise during the design and construction of Portway new railway station and to ensure that actions are undertaken to manage these aspects.

3 Scope and Description of Project

3.1 Scope

This Environmental Appraisal provides a high level assessment of the potential environmental constraints that may affect this project. This includes impacts on the following: historical features, landscape designations, nature conservation designations, contaminated land, air quality etc.

Also included is an overview of the sustainability of the project, based on a preliminary review against CEEQUAL criteria v5.1.

3.2 Project Description

The project involves creation of a new railway station at Portway Park and Ride. This site is situated at the Portway Park and Ride which only has bus links currently. A range of options are currently being considered for placement of the railway platform.

Ref:	236253
Version:	
Date:	07/07/2014

4 Environmental issues from earlier Grip stages

4.1	<p>List the key environmental and stakeholder issues/actions that were identified during the earlier GRIP Stages 1/2/3) that need to be carried forward for further management. (See or attach Sponsor's Instructions/Previous Environmental Appraisals)</p> <p>Previous GRIP report not supplied.</p>
-----	---

Ref:	236253
Version:	
Date:	07/07/2014

5 Environmental Appraisal

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
1.0	General Risks						
1.1	Project Description, Town Planning/ Infrastructure Liabilities/ Operational Surveyor Teams, GI PORTAL	Does land or land rights (easements/way leaves/permanent – temporary site compounds, etc.) need to be purchased? Note: even if works are within permitted development (PD) rights there may be restrictions as to what activities are allowed (e.g. vegetation clearance during nesting season).		✓		<ul style="list-style-type: none"> Seek advice from Town Planning/Property/ Environment/Community Relations Teams and consult with external stakeholders/ local authorities (LA) where necessary Site investigation/ surveys 	Land purchase may be required, the platform should sit within NR land however land for access may need to be purchased.
1.2	Project Description, Town Planning/ Infrastructure Liabilities/ Operational Surveyor Teams, GI Portal, Hazard Directory, Utility Diagrams	Is the land leased out or are there 3 rd party interests or onsite utilities, telecommunication, etc.)?	✓			<ul style="list-style-type: none"> Design aspects: include in/modify design/relocate to avoid the need to address these issues/ incorporate mitigation measures Develop a Consent/ Environment/Communication Strategy Plan(s) as required Obtain consent (TWA Order/ planning permission/ area land rights) if required Specify protective measures in design or contract/construction requirements 	<p>There are various onsite utilities. These are:</p> <p>Three buried gas pipes are present on site at 8.0286ch, 8.0374-8.0594ch, and 8.0572ch.</p> <p>A buried fuel pipe is present on site at 8.0286-8.0594ch</p> <p>Four buried foul water services on site at 8.0506-8.0616ch, 8.0528-8.0550ch, 8.0638ch, and 8.0682-8.0726ch.</p> <p>There is a buried oil pipe on site at 8.0550-8.0616ch.</p> <p>There is a buried S&T Cable</p>

GRIP

May 2014

Governance of Railway Investment Projects

Page 6 of 43

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
							at 8.0638ch. A buried water main at 8.0572-8.0594ch. Two buried electrical cables at 8.0836ch and 8.1056ch. These are detailed in the Network Rail Hazard Directory (Appendix A).
1.3	Town Planning Team	Does the acquisition or lease of the land change the status of the land?		✓			Implication of previous land use needs to be checked at a later GRIP stage.
1.4	Project Description, GI Portal, Town Planning Team	Is land that may need to be purchased/leased contaminated or a licensed waste facility?		✓			Land purchase may be required, the platform should sit within NR land however land for access may need to purchased. This will be confirmed at a later stage.
1.5	Town Planning Team	Does the project require Transport and Works Act (TWA) order/planning permission or similar?		✓		<ul style="list-style-type: none"> Seek advice from Town Planning/Property/Environment/Community Relations Teams 	Subject to confirmation of operational land boundary, works are likely to be permitted development.
1.6	Town Planning/Environment/Community Relations Teams	Has the Local Planning Authority or any other Statutory Body expressed concern over the project or similar projects?		✓		<ul style="list-style-type: none"> Seek advice from Town Planning/Property/Environment/Community Relations Teams Consult with external stakeholders/LA 	Not aware of any such complaints at this stage.
1.7	Town Planning/	Have residents or any other interest group		✓		<ul style="list-style-type: none"> Seek advice from Town 	Not aware of any such

GRIP

May 2014

Governance of Railway Investment Projects

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
	Community Relations/ Environment Teams	indicated concern over the project or similar projects? Note: even if the works are within PD rights and are common activities, e.g. vegetation/tree clearance, this may still be sensitivity for stakeholders.				Planning/Property/ Environment/Community Relations Teams • Consult with external stakeholders/LA	complaints at this stage.
1.8	Town Planning Team/local authority	Are there any local plans/development proposals of land adjacent to/near the project that may have future ramifications on the project?		✓		• Seek advice from Town Planning/Property/ Environment/Community Relations Teams	There are nine planning applications identified within a 100m radius on the Bristol City Council planning website. These are a proposed garage with bedroom at 606 Portway (87/03056/H), garage replacement at 598 Portway (88/02744/H), creation of access at 622 Portway (92/02153/H), new vehicular access to 620 Portway (94/00992/H), single story extension at 636 Portway (04/02044/H), first floor rear extension at 606 Portway (06/01443/H and 06/02748/H)), replacement front porch at 626 Portway (06/04393/H), two story side extension at 604 Portway (11/01693/H). These properties are North East of the site on the opposite side of the A4. Thus unlikely to

GRIP

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
							create issues, however the ramifications should be considered at a later GRIP stage.
1.9	Project Description	Are there new or unusual features associated with the project that may become an issue with internal/external stakeholders e.g. tall masts, incompatible features with existing Network Rail structures?			✓	<ul style="list-style-type: none"> Consult internal Network Rail stakeholders Design aspects: include in/modify design/incorporate mitigation measures 	None.
1.10	Guidance from Asset steward/ other Network Rail departments,	Any relevant Network Rail policies (such as TWA/planning process)/conditions that may require derogation (e.g. issues: inc placing substations next to telecommunication masts) or adjacent to other Network Rail projects?			✓	<ul style="list-style-type: none"> Consult internal Network Rail stakeholders Design aspects: include modify design/incorporate mitigation measures 	Not aware of any at this stage.
2.0	Environmental Constraints						
2.1	Project Description, GI Portal, Hazard Directory, site investigation	Does the local environment constrain the project e.g:			✓	<ul style="list-style-type: none"> Consult internal Network Rail stakeholders Design aspects: include in/modify design/incorporate mitigation measures Consult with/obtain consent if required (e.g. building on a flood plain/change to coastal defences) 	Site is located near the river Avon but is not within a flood zone. Flood zone 2 lies to the South West of the site on the opposite side of the railway lines.
		Flood plain?			✓		
		Flooding?			✓		
		Landslide?			✓		
		Difficult access (e.g. steep embankment)?			✓		Access from level crossing easy.

GRIP

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
		Other (specify e.g. pests such as rabbits)?			✓		Japanese Knotweed has been identified as a constraint in the site walkover, refer to the ecology note in Appendix B.
3.0 Agriculture/Forestry/Vegetation Management							
3.1	GI Portal, BAP, Site survey	Does the project require taking good quality agricultural land, or affect any agriculture holding (e.g. severance)?		✓		<ul style="list-style-type: none"> • Site investigation • Consult with external stakeholders (particularly if noticeable amounts of vegetation/trees/ habitat are affected) • Design aspects: include in/modify design/incorporate mitigation measures • Obtain consent (LA permission, etc.) if required Specify protective measures	Subject to confirmation of site compound locations, no agricultural land take is required.
3.2		Does the project need to clear vegetation or trees on railway land or access routes?	✓				The Ecology Report (Appendix B) recommends that there is some low level vegetation clearance in appropriate places (identified by a qualified ecologist), avoiding isolating reptiles and outside the bird nesting season (April to July), areas of vegetation could be cleared down to ground level to prevent birds nesting and to deter reptiles from using the site.
3.3		Does the project need to remove hedgerows?			✓		Hedgerows removal is not currently planned.
3.4		GI PORTAL, BAP, HERITAGE, Town Planning/ Environment	Will the project need to remove, trim, cut trees under Tree Preservation Order (TPO) or in local planning conservation areas?		✓		

GRIP

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
	Teams						does not fall with a Conservation Area. Though some exist 100m south West of the site (refer to Appendix c).
4.0	Air Quality						
4.1	Project Description, GI Portal, Town Planning Team/ LA – (Environmental Health Officers)	Will there be significant project activity that could generate large quantities of dust/noxious fumes or change the local air quality?		✓		<ul style="list-style-type: none"> • Modify design/ incorporate mitigation measures • Consult with local authorities • Specify protective measures 	Dust emissions may arise during works. There is a possibility with all rail embankment projects that this may contain asbestos. Control measures should be identified within the Contractors CEMP.
4.2	Project Description, GI Portal, Town Planning Team/ LA – (Environmental Health Officers)	Are there adjacent/nearby receptors: residences, businesses, schools, medical facilities, etc.?	✓			<ul style="list-style-type: none"> • Modify design/ incorporate mitigation measures • Consult with local authorities • Specify protective measures 	<p>The site is located at the current park and ride site and agricultural land to the South East of the site.</p> <p>Approximately 50m South East of the site is a public park, the effect on this park will need to be considered at a later GRIP stage.</p> <p>The closest residences are within 100m North East, East and South East of the site. These are the residences on the other side of Portway Road/A4. The Institute of Air Quality Management suggests that air quality effects are likely</p>

GRIP

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
							<p>to be significant within 200m of site, therefore also houses on Barrow Road, Grove Leaze and Barrow Hill Crescent have the potential to be a significantly affected receptor.</p> <p>Due to distance from the site, noise effects have the potential to be significant, however, especially under certain conditions such as late night working could have noise effects on these local receptors. This should be considered in more depth at a later GRIP stage. Best Practicable Means should be adopted to control noise emissions and measures including community engagement should be included within the CEMP.</p>
4.3		Are there any local authority policy constraints (e.g. within/close to an Air Quality Management Area, breaching of government air quality objectives or limit values)?			✓		The Local Air Quality Management website states that there is one Air Quality Management Areas (AQMA) declared by Bristol City Council which is 5km South East of the site. South Gloucester Council have also declared the M5 AQMA which is 3.6km North East

GRIP

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
							of the site. This will not be affected by construction works due to distance from the site.
5.0	Buildings, structures and historic association						
5.1	GI Portal, Hazard Directory, HERITAGE, LA, Town Planning Team	Does the project affect a Building, structure and/or Scheduled Ancient Monument; e.g. from piling, excavation, demolition, change of use, visual obstruction, potential for subsidence, cable attachments, bridge platforms?			✓	<ul style="list-style-type: none"> • Seek advice from Town Planning • Consult with LA/Heritage Agencies • Design aspects: include in/ modify design/ incorporate mitigation measures • Obtain local authority/ heritage consent if required 	<p>There are no Scheduled Monuments in the area, and no listed buildings within the site. The closest listed buildings are over 500m South East from the proposed site. These listed buildings are Wellington House, 105 Station Road, 103 Station Road and the Lamplighters Public House.</p> <p>Other listed buildings are over 500m East of the proposed site and include the Priory, Bradley House, and the Tithe Barn.</p> <p>As determined using MAGIC data (www.magic.gov.uk) these will not be directly or indirectly affected by the works.</p>
5.2		Does the project affect a local planning Conservation Area, historic landscape features or similar designated area?			✓		No historic landscape features, conservation areas or other designations identified in within the site boundary using MAGIC data

GRIP

May 2014

Governance of Railway Investment Projects

Page 13 of 43

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
							or Bristol City Council Local Plan (www.magic.gov.uk). The station road Conservation Area (included in the Local Plan) is on the opposite side of the rail line to the site, approximately 400m South East of any likely works. The Conservation Site of Central Shirehampton is approximately 700m East of planned works on site.
5.3		Does the project affect any other historical or man made feature likely to be of value?			✓		The Historic Environment Record ('Know Your Place' ¹) states that there are no historical feature on site or in the surrounding area. A historical desk study is unlikely to be required to assess the potential requirement for further works.
6.0	Contaminated Land						

¹ <http://maps.bristol.gov.uk/knowyourplace/> [Accessed February 2015]

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
6.1	GI Portal, Hazard Directory, Contaminated land reports/ database, Railway Estates/ Environment team	Will the project disturb contaminated land?		✓		<ul style="list-style-type: none"> • Site investigation • Seek advice from Environment Team • Consult with LA if remediation required • Specify protective measures 	There is no contaminated land stated in the Network Rail National Hazards Directory (Appendix A). All rail embankment projects have the potential to be contaminated with asbestos, specific mitigation measures may be required.
6.2	GI Portal, Hazard Directory Contaminated land reports/ database, site survey, Railway Estates/ Environment team	Is the project site located adjacent to/near an externally owned (e.g. landfill/industrial site) or Network Rail potentially contaminated site or sidings?	✓			<ul style="list-style-type: none"> • Seek advice from Environment Team • Seek alternative site • Site investigation • Specify protective measures, including possible remediation 	The historic Portway Landfill site is located within the site boundary, in the field to the South East of the Site, adjacent to the current car park, between the A4 and the railway tracks. This is a 1970s commercial and household waste landfill site. Contaminated land effects should be anticipated relating to migration of landfill gas; excavation of contaminated land causing potential contaminated arisings and runoff; and creation of contamination pathways for existing contaminated

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
							material. Identified using Environment Agency 'What's in my backyard ² ' website.
6.3	Project Description, GI Portal, Hazard Directory	Will the project activities open up pathways (e.g. channels) from contaminated areas to environment/stakeholder receptors; e.g. SSSIs			✓	<ul style="list-style-type: none"> • Site investigation • Seek advice from Environment Team • Design aspects: include in/modify design/ incorporate mitigation measures • Specify protective measures 	<p>Based on a review of MAGIC data (www.magic.gov.uk) there are no designated sites within the site boundary. The Severn Estuary SAC, Ramsar site, SSSI, SPA and inshore Special Protection Area with Marine Components are 110m to the southwest of the site on the other side of the rail track.</p> <p>The bedrock is designated as a Secondary B aquifer. Groundwater vulnerability is classed as low to high, therefore pollution within the site has potential to impact on groundwater. Standard pollution control measures should be adopted.</p> <p>Due to the likelihood of contamination on site appropriate management</p>

² <http://apps.environment-agency.gov.uk/wiyby/default.aspx> [accessed February 2015]

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
							measures to prevent contamination of these receptors should be considered.
6.4	Project Description	Will produced wastes/spent ballast likely to be contaminated?		✓		<ul style="list-style-type: none"> • Seek advice from Environment Team • Site investigation/ sampling • Follow NR/L3/ENV/044 for used ballast and/or hazardous/special waste requirements 	No contaminated land is referred to in the Network Rail Hazards Directory (Appendix A). All rail embankment projects have the potential to be contaminated with asbestos, specific mitigation measures may be required.
7.0	Ecology						
7.1	GI Portal, BAP, Hazard Directory, HERITAGE, Town Planning/ Environment Teams, site survey, LA BAP local conservation organisations	Is the project site/access/staging areas/ compounds on/adjacent/nearby a statutory nature conservation site (e.g. SSSI, RAMSAR, SPA/SAC/cSAC/pSPA site) or other ecological designations?		✓		<ul style="list-style-type: none"> • Seek advice from Environment Team • Site survey • Consult with local Conservation Agencies/LA • Design aspects: include in/ modify design/ incorporate mitigation measures • Obtain protected species license if required • Specify protective measures/follow site management plan (SMS) if SSSI • Train staff • Continue monitoring if required 	Based on a review of MAGIC data (www.magic.gov.uk) there are no designated sites within the site boundary. The Severn Estuary SAC, Ramsar site, SSSI, SPA and inshore Special Protection Area with Marine Components are 110m to the southwest of the site on the other side of the rail track. Horseshoe bend SSSI is 1.1km east, Ham Green SSSI is 1.3km south east, Avon Gorge SSSI is 2.2km south east, Leigh Woods National Nature Reserve (NNR) is 3.8km

GRIP

May 2014

Governance of Railway Investment Projects

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
							<p>south east, St. George's Flower Bank Local Nature Reserve (LNR) – 1.8km south west, Lawrence Weston Moor LNR – 3.1km north east.</p> <p>There may also be effects on non-statutory conservation sites. Lamplighters Marsh (SNCI) falls within the study area. There are two wildlife trust areas within 2km of the site, Kingsweston Down (to the North East), and Pill Paddock 1.4km (to the South West).</p> <p>Suitable measures should be considered to prevent impact on these designated sites. Refer to the Ecology Report, Appendix B, for more details.</p>
7.2		Will the activity (e.g. working in a culvert, drainage works) and/or materials used have the potential to indirectly affect the designation and/or a protected area (e.g. downstream SSSI water quality)?			✓		There are no watercourses within the site, the River Avon is the closest watercourse, 200m South West of the site on the opposite side of the railway line. This is a SSSI, SAC, Ramsar and SPA site.
7.3		Are there any protected species and/or habitats e.g. bats, badgers, newts etc. at or		✓			Walkover survey identified potential badger setts and

GRIP

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
		near the project site?					the works will effect both breeding bird and reptile habitats. The habitat has been identified to have amphibian breeding potential (including Great Crested Newts). The effects on these species will differ depend on which platform option is taken forward. Refer the Ecology Report (Appendix B) for more details.
7.4	BAP, Hazard Directory, Site survey	Are there any invasive vegetation species (Japanese knotweed, Giant hogweed, etc.) at or near the project site?			✓	<ul style="list-style-type: none"> • Site investigation • Enabling works for removal • Specify protective measures 	Japanese knotweed was identified within the footprint of the site by the Ecology Report (Appendix B). The effect and required remediation will depend on which platform option is taken forward.
8.0	Landscape, townscape and visual						
8.1	Project Description, Town Planning/ Environment Teams, LA/ Heritage/ Conservation Agencies	Is the site at/near or can be seen from a National Park/World Heritage Site/Area of Outstanding Natural Beauty (AONB)/local landscape/coastal/townscape designation?			✓	<ul style="list-style-type: none"> • Site investigation • Consult with local Heritage/ Conservation Agencies • Design aspects: include in/ modify design/incorporate mitigation measures (e.g. restoration plan) • Specify protective measures 	Based on a review of MAGIC data (www.magic.gov.uk) and the Bristol Local Plan the site is not within or near any landscape designations.
8.2		Will the visual amenity of lineside residents be affected; e.g. removing vegetation, erecting new/taller structures than existing surroundings, demolition in Conservation			✓		There is vegetation present between the site and Portway Road/ A4 and there are no lineside properties. The nearest properties are

GRIP

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
		Areas?					those on the opposite side of Portway Road/ A4, approximately 50m East of the site.
8.3		Will new structures/project components obstruct visual amenity of dwellings/recreational areas/cultural heritage/conservation areas?			✓		
8.4		Will grading and vegetation removal with subsequent landscaping be required?		✓			
9.0	Nuisance, noise, vibration and light						
9.1	Project Description, GI PORTAL	Is noise/vibration likely to increase from existing levels at site during construction? Will it affect;	✓			<ul style="list-style-type: none"> • Site noise investigation • Consult with local authorities (EHO) • Design aspects: include in/modify design/incorporate mitigation measures • Neighbour letter drops/consultation • Obtain Section 61 consent if required • Specify protective measures • Train staff • Continue monitoring 	<p>If there is likely to an increase in noise/vibration levels, there are residential properties within 50m of the site which will be affected. This should be considered further at a later GRIP stage.</p> <p>Other properties are at distance e.g. 500m+ and are unlikely to be impacted, although night time construction works may be audible based on existing low ambient noise levels and should be avoided if</p>

GRIP

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
							possible.
9.2		Adjacent/nearby residences?	✓				There are multiple residences within 50m East of the site, along Portway road.
9.3							
9.4		Adjacent/nearby businesses, worship, schools, hospitals, hotels etc.?		✓			An industrial estate and other industrial buildings situated 50m North West of the site on the opposite side of the M5 in close proximity to the railway signalling equipment. These might be affected by the project depending on final designs.
9.5		Adjacent/nearby SPA/SAC, nesting birds, seasonal constraints?		✓			Based on a review of MAGIC data (www.magic.gov.uk) there are no designated sites within the site boundary. The Severn Estuary SAC, SPA and inshore Special Protection Area with Marine Components are 110m to the southeast of the site on the opposite side of the rail track. There are likely to be species that are affected by noise and vibration such as breeding birds, these are detailed in the Ecology Report (Appendix B).
9.6		Will the project occur at night/weekend or	✓				Night working is likely to be

GRIP

May 2014

Governance of Railway Investment Projects

Page 21 of 43

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
		public holiday (use of lights/noise)					required.
9.7	Project Description/ Noise Insulation Regulations	Is noise/vibration likely to increase from existing levels at site during operation?	✓				Yes, there will an increase from trains stopping at the station and waiting passengers.
10.0	Traffic generation and access						
10.1		Will significant traffic (vehicular/heavy loads), particularly through villages and along farm/country roads, be generated ?		✓		<ul style="list-style-type: none"> • Consult local authorities/highways dept. • Design aspects: include in/modify design • Obtain Highways consent if required • Specify protective measures 	Construction method is uncertain but export and import of materials by road may be required, further assessment at a more detailed design stage required.
10.2	Project Description	Will the scheme result in new vehicular traffic flows? (Before, during and/or after)		✓			A Construction Traffic Management Plan should be prepared, defining access routes to avoid local receptors and should be incorporated into the CEMP. During operational phase the site may increase traffic flows.
10.3		Will it cause new pedestrian movements? (Before, during and/or after)			✓		No public footpaths in the area, or created as part of a scheme. During operation the scheme will likely create new pedestrian movements (of rail passengers).

GRIP

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
10.4		Any footpath, road closures/diversions required during construction?		✓			
10.5	Project Description	Will parking outside railway land be required (e.g. on streets, on/near lineside neighbour's land)			✓	<ul style="list-style-type: none"> Specify protective measures Train staff 	
10.6		Are access points near adjacent properties?			✓		
11.0	Water Resources; pollutions and drainage						
11.1	Project Description, GI Portal, Hazard Directory, Surface water risk assessment model, Site investigation	Is the project on/near/adjacent to a watercourse and drainage channels?		✓		<ul style="list-style-type: none"> Site investigation Consult with local Environment Agency and the appropriate Internal Drainage board. Design aspects: include in/modify/design to remove the need for a consent Specify protective measures (e.g. Site Drainage Plan, Emergency Incident Plan) Continue monitoring 	No watercourses or drains are present on site. However the section of Japanese Knotweed (shown on Constraints Map, Appendix D) is a very water logged area which also includes reed beds which may be effected. The River Avon is also situated 200m South West of the site.
11.2		Will the works occur within 5-m of the bank and/or in a designated main river?			✓		No.
11.3		Will the project need to remove vegetation close to/on or in a riverbank?			✓		

GRIP

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
11.4		Is it likely to affect the flow of watercourses?			✓		
11.5		Will works occur around a water source protection area or require abstraction of water from a well?		✓		<ul style="list-style-type: none"> • Consult with the Marine Management Agency • Consult with local Environment Agency and the appropriate Internal Drainage board. • Consult with sewage provider 	<p>No Groundwater Source Protection Zones (SPZ) or Water Abstraction Management Areas are located near to the site.</p> <p>The bedrock of the site is designated as Secondary B aquifer, meaning there are predominantly lower permeability layers which store and yield limited amounts of groundwater due to localised features.</p> <p>The superficial deposits on site are designated as a secondary undifferentiated aquifer, meaning that it has been classified as both minor and non-aquifers in different locations due to variable rock characteristics.</p> <p>Groundwater vulnerability is classed as low to high within the site. As highlighted above, standard pollution control measures should be implemented.</p> <p>No abstraction requirement identified at this stage.</p>
11.6		Will works occur near marine waters, on coastal areas below mean high tide or affecting			✓		The River Avon is 200m away on the opposite side

GRIP

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
		navigation?					to the railway to the site thus navigation will be unlikely to be effected.
11.7		Will it generate a discharge either directly to a watercourse or to soakaway/ground; e.g. dewatering operation/discharge from a bund?		✓			Depends on solution option, this will need to be considered at more detailed design stage.
11.8		Will it generate a discharge to a foul sewer?		✓			Depends on solution option, this will need to be considered at more detailed design stage.
11.9	Project Description, GI Portal, Hazard Directory, Site investigation	Will waste/spoil be stockpiled, materials/chemicals/fuels/oils stored at site that could enter a watercourse, major aquifer underneath or on a flood plain?		✓		<ul style="list-style-type: none"> Establish protective measures Train staff 	<p>Site is located 200m North East of the River Avon but is not within a flood zone. Flood zone 2 lies to the South West of the site on the opposite side of the railway lines.</p> <p>Temporary stockpiling may occur. Areas of high groundwater vulnerability should be avoided for stockpiling.</p>
12.0	Waste Management						
12.1	Project Description, NDS/ Town Planning/ Environment Teams	In accordance with Grip all projects are to develop and implement a Site Waste Management Plan. Key questions to consider in this plan include, but are not limited to; Will onsite disposal or land purchase be required?		✓		<ul style="list-style-type: none"> Design aspects: include in/ modify design: reuse, recover, recycle Consult with and obtain consent from local authorities/Environmental Agencies for storage/ 	Depends on solution option, this will be considered at a later design stage. All clean excavated materials should preferably be reused on site.
12.2							
12.3							

GRIP

May 2014

Governance of Railway Investment Projects

Page 25 of 43

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
12.4		Will it generate large quantities of surplus material; i.e. spoil, sleepers?		✓		<ul style="list-style-type: none"> management concerns • Obtain environmental permit if necessary • Specify protective measures in the SWMP 	To be considered at a later GRIP stage.
12.5		Can surplus material be reused (spares, spoil, etc.)?		✓			Depends on solution option, this will be considered at a later design stage.
12.6		Will it generate hazardous wastes; e.g. oil, paint cans, contaminated land?		✓			Depends on solution option and results of contamination testing.
		Is it likely that waste contaminated with PCB will be produced?		✓			<ul style="list-style-type: none"> • If yes or ? then appendix A of the Environmental Action Plan product MUST be completed

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
13	SUSTAINABILITY: ENVIRONMENTAL OPPORTUNITIES						
13.1	Project Description/ Environment Team	Can recycled/reclaimed materials such as sleepers/ballast/spoil/cables be used instead of raw materials?		✓		<ul style="list-style-type: none"> • Modify design/contract/ construction strategy to capitalise on opportunities • Build into SWMP 	Spoil should be reused in embankment works where possible.
13.2		Can the project help meet the requirements of sustainable consumption; can sustainable materials be incorporated into the design?		✓		<ul style="list-style-type: none"> • Modify design/contract/ construction strategy to capitalise on opportunities 	Recycled aggregates should be considered if importing materials.
13.3		Can the project demonstrate a reduction in the reliance on fossil fuels; can renewable energy be incorporated into the design? Has whole life embedded carbon been considered?		✓			This should be considered at a later design stage.
13.4		Can energy/water efficiency be gained through building design/supply chain?		✓			The carbon footprint can be reduced through reuse of materials on site. This should be considered at a later GRIP stage.
13.5	Project Description/ Environment Team	Can work be performed in parallel with another project reducing wastage, duplication and redundancy of materials, timing and resources?		✓			<ul style="list-style-type: none"> • Modify design/contract/ construction strategy to capitalise on opportunities
13.6	Project Description/ Environment Team	Can effluents and discharges be minimised?		✓		<ul style="list-style-type: none"> • Modify design/contract/ construction strategy to capitalise on opportunities 	Scheme is unlikely to generate effluent or discharge. This will need to be considered at more detailed design stage, based on which solution is

GRIP

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
							taken forward.
13.7		Can potentially polluting materials be replaced with less harmful materials (e.g. biodegradable oils)?		✓			Contractor CEMP should incorporate biodegradable fuel usage requirements.
13.8		Are there other areas where environmental and sustainable benefits can be gained; such as	✓				The contractor should engage with local residents prior to start on site, particularly those adjacent to Portway Road/A4.
13.9		Positive communication/interactive consultation with lineside neighbours/other stakeholders?					
13.10		Innovative environmental designs/methods of work?		✓			There will be some reuse of aggregates on site.
13.11		Positive contribution to habitats/protected species?		✓			Planting scheme could be implemented with the potential to enhance biodiversity. To be considered at a later GRIP stage.
13.12		Other (specify on action log)?		✓			To be considered at a later GRIP stage.
13.13		Are there any other possible environmental effects specific to this project? If so list them: e.g. electro-magnetic effects, settlement, local issues/policies		✓			To be considered at a later GRIP stage.
14.0	OTHER						
14.1		Are there any other possible environmental effects specific to this project? If so list them: e.g. electro-magnetic effects, settlement, local		✓			None currently future consideration at a later

GRIP

Ref:	236253
Version:	
Date:	07/07/2014

Ref	Information Sources	Environmental Considerations and Risks	Yes	?	No	Possible action (but not limited to)	Comments
		issues/policies					GRIP stage.

Ref:	236253
Version:	
Date:	07/07/2014

6 Sustainability Appraisal

Preliminary Review against CEEQUAL Criteria (v5.1)										
Section	Title	Requirements within each section							Score based on current design stage.	
2	Project Management	The project could conform well to general management criteria, if this is managed well and environmental and social aspects are considered from the outset.	No specific performance targets set against environmental/ social performance at design stage or set at design stage for construction phase (however this would be anticipated to occur at next design stage).	No specific evidence of taking a whole life approach on the project at this stage. This can be considered in a report during design.	No specific evidence of sustainability target at this stage. These should be set at an individual project level and early on in the design stage.					Likely to score well providing and specific environmental, social and sustainability aspects are considered early in design including performance targets, training, and a whole life approach is taken.
3	People and Communities	The project should be part of the CCS which good communication, management and implementation of this.	Early public consultation once preferred option is identified- with a robust system for capturing and reviewing feedback.	Baseline studies and an Environmental Management Plan including the potential effects on neighbours and their mitigation during both construction and operational phases of the project will be required.	Consideration of the noise, vibration and visual impacts of the construction and operational phase of the project should be considered. Consultation with EHO regarding noise impacts required.	A robust community engagement programme and the establishment partnership links with other organisations though design and construction.	Appoint local contractors where possible, should be undertaken through design and construction.			Project may score well subject to the development of an appropriate community consultation strategy, consideration of mitigation of potential effects on neighbours and a community engagement programme.

GRIP

Ref:	236253
Version:	
Date:	07/07/2014

4	Landuse and Landscape	Consideration of land use efficiency should be considered in platform option decision.	Conservation of soils on site should be considered at design stage.	Contamination risk assessment and suitable management and remediation options are required due to the possibility of asbestos and the proximity of the site to a historic landfill site.	An assessment of flood risk, mitigation and enhancement measures should be included in project at design stage.	Local landscape and character and local landscape characters should be considered, there is a requirement that the station is link keeping with other local stations e.g. Clifton down	Retention of vegetation and valuable features on site.	Appropriate species selected for a planting plan and long term management plan should be considered at a later stage of design.	A later design stage will need to include flood risk, landscape character, contamination risk and soil conservation to score well here. A long term planting and management plan should also be created.
5	The Historic Environment	No impacts on listed buildings or archaeology identified at this stage.	Consultations should be undertaken with local government, national government agencies, statutory amenity societies, and voluntary groups.	A baseline historic environment study should be considered at design stage, and mitigation should be undertaken based on the findings of this report.	Consideration of the opportunity for public learning, based on the findings of the baseline study should be considered at construction stage.				Likely to score well if consultation undertaken. A baseline historic environment study should be considered.
6	Ecology and Biodiversity	Preliminary ecological surveys undertaken identified potential for badger setts, vegetation was identified as reptile and breeding bird habitats.	Japanese Knotweed is present on site. An appropriate methods statement should be drawn up and approved, and implementation should be monitored.	Any habitat creation measures should be considered in design, for conserving current habitat, mitigating any habitat lost and enhancing exhibiting habitat (this could include special structures					Likely to score well providing appropriate ecological surveys and mitigation (for both species and habitats) is undertaken, and Japanese Knotweed is controlled correctly. If habitat enhancement is also

GRIP

Ref:	236253
Version:	
Date:	07/07/2014

		Appropriate surveys and mitigation should be undertaken		for BAP species). This should be monitored and implemented in construction.					considered high marks are likely.
7	The Water Environment	The impacts on the water environment and their control needs to be considered during construction and operation of the project.	Demonstration of consultation with regulatory bodies required in design stage.	Measures to prevent pollution of groundwater should be implemented and monitored long term in construction stage.	Though SuDS drainage exists in the car park it should be considered if this is sufficient for the new platform at a more detailed design stage.	Opportunities to improve the local water environment should be considered and implemented into the design.			If impacts on the water environment are control, pollution is prevented, appropriate consultation and enhancement measures are undertaken, the project is likely to score well.
8	Physical Resources- Use and Management	All organisations engaged in the project should have policies for resource efficiency, and resource efficiency should be included in design (including durability, soil management and future disassembly)	Currently no carbon footprint, embodied water assessment, or lifecycle energy has been included. These should be considered at a later design stage.	Currently no renewable energy strategy. This should be considered at a later design stage.	Detailed contractor requirements can be specified around energy efficiency of plant and machinery and use of renewables	Efficient water use during construction could be considered at a later stage in the project.	Timber should be specified FSC or equivalent. Local sourcing, and the use of recycled materials should also be considered during the project.	Waste minimisation plan prepared as part of SWMP development. This should include hazardous waste and low-VOC coatings. All waste should be disposed of in a suitable way with licenced carriers.	Life cycle analysis, water assessments, renewable energy used in construction and operation, efficient water use, local and responsible sourcing have not yet been considered and will be required. A SWMP should also be created at a later stage.
9	Transport	The project will improve public transport, as it	The project should consider using non-road based transport	Contractor green travel plan and construction traffic					Project will score well due to rail based nature of work but

GRIP

Ref:	236253
Version:	
Date:	07/07/2014

		provided as new transport node.	for delivering materials and removing waste at a later design stage.	management plan required, including measures to keep roads clean.					will need to include specific traffic management requirements in contracts.
--	--	---------------------------------	--	---	--	--	--	--	---

Ref:	236253
Version:	
Date:	07/07/2014

7 Glossary and Supporting Information

7.1 Abbreviations

AONB	Area of Natural Beauty
BAP	Biodiversity Action Plan
CAR	Water Environment (Controlled Activities) (Scotland) Regulations
CR-E	NR/L2/ENV/015 Contract Requirements, Environment
cSAC	Candidate Special Areas of Conservation
EHO	Environmental Health Officer
EMP	Environment Management Plan
GRIP	Governance of Railway Investment Projects
HERITAGE	Network Rail-wide database of protected land and/or buildings
IDB	Internal Drainage Board
LA	Local Authority
GI Portal	Network Rail-wide property Geographical Information System
MMO	Marine Management Organisation
NDS	National Delivery Service
PD	Permitted Development
PSPA	Potential Special Protection Area
RAMSAR Site	Wetlands of International Importance Designation
SAC	Special Areas of Conservation
SMS	Site Management Statement
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
TPO	Tree Preservation Order
TWA	Transport and Works Act

Ref:	236253
Version:	
Date:	07/07/2014

7.2 Statutory Agencies

Environment Agencies	Environment Agency for England and Wales Scottish Environment Protection Agency (SEPA)
Conservation Agencies	Department of Environment, Food and Rural Affairs (DEFRA) Scottish Executive Environment and Rural Affairs Department (SEERAD) Natural England (NE) Countryside Council for Wales (CCW) Scottish Natural Heritage (SNH)
Heritage Agencies	English Heritage Welsh Heritage Agency (CADW) Historic Scotland

Ref:	236253
Version:	
Date:	07/07/2014

7.3 Possible Consent Needed for Project Work

Landtake	Responsible Agency	Comments
<ul style="list-style-type: none"> TWA Order if require compulsory purchase of land 	Planning authority	N
<ul style="list-style-type: none"> Planning permission from local authorities (Town and Country Planning Act 1990) 	Local Planning Authority	TBC – likely to be permitted development.
<ul style="list-style-type: none"> Listed Buildings/Conservation Area (Town and Country Planning Act) 	Planning authority	N
Trees and Ecology		
<ul style="list-style-type: none"> Work affecting Tree Preservation Orders, which offer legal protection to trees (Town and Country Planning (Trees) Regulations 1999) 	Local Planning Authority	N
<ul style="list-style-type: none"> Licence for felling timber (Forestry Act 1967) 	Local Planning Authority	N
<ul style="list-style-type: none"> Works affecting Important Hedgerows (Hedgerow Regulations 1997) 	Local Planning Authority	N
<ul style="list-style-type: none"> Licence for disturbance to badgers (Protection of Badgers Act 1992) 	DEFRA/SNH	TBC - dependant on platform option and badger surveys.
<ul style="list-style-type: none"> Other wildlife consents required for works affecting protected species e.g. great crested newts, bats 	NE/CCW; DEFRA/SNH	Various – see ecology recommendations.
Noise and Vibration		
<ul style="list-style-type: none"> Section 61 consent on nuisance (noise) during construction (under the Control of Pollution Act 1974) 	Local Authority – Environment Health Officer	Contractor to confirm at subsequent GRIP stage
Traffic Generation and Access		
<ul style="list-style-type: none"> Highways stopping/diversion consent (including tempoHazard Directoryy closures) Vehicle crossing consents (Highways Act 1980) 	Highways authority	Not known at present assumed not required
Water Resources (quality and hydrology)		
<ul style="list-style-type: none"> Consent for works over, under or adjacent to designated main rivers (Land Drainage Act /Water Resources Act 1991/CAR) 	Environment Agency/SEPA/IDB	N
<ul style="list-style-type: none"> Works affecting flow/structures in watercourse or navigation (Land Drainage Act 1991/CAR) 	Environment Agency/SEPA/IDB	N
<ul style="list-style-type: none"> Works around water source protection area (Water Resources Act 1991/CAR) 	Environment Agency/SEPA	N
<ul style="list-style-type: none"> Consent for works within 8m of a watercourse (Land Drainage bylaws) 	IDB/Local Planning Authority	N
<ul style="list-style-type: none"> Water abstraction license (Water Resources Act 1991/CAR) 	Environment Agency/SEPA	N
<ul style="list-style-type: none"> Consent for dewatering/discharge of water from excavations (Land Drainage Act 1991/CAR) 	Environment Agency/SEPA	Not known at present.

Ref:	236253
Version:	
Date:	07/07/2014

<ul style="list-style-type: none"> Consent for discharge to controlled water and/or groundwater (Water Resources Act 1991/Groundwater Regulations/CAR) 	Environment Agency/SEPA	N
<ul style="list-style-type: none"> Water Authority Consent to discharge to foul sewer (Water Industries Act 1991/CAR) 	Sewerage undertaker/ Environment Agency/SEPA	Not known at present, confirm at a later GRIP stage.
<ul style="list-style-type: none"> Consent for works in tidal waters (Coastal Protection Act 1949/Harbours Act 1964) 	Marine Management Organisation/Marine Scotland	N
Waste Management		
<ul style="list-style-type: none"> Environmental Permitting (England and Wales) Regulations 2010 Waste Management Licensing Regulations 1994 	Environment Agency/SEPA	Contractor to confirm at subsequent GRIP stage

Ref:	236253
Version:	
Date:	07/07/2014

7.4 Action Plan

Environmental Considerations and Risks	Actions to be taken	Responsible Party(ies)	Start Date	Target Completion
6.2 Is the project site located adjacent to/near an externally owned (e.g. landfill/industrial site) or Network Rail potentially contaminated site or sidings?	<p>The historic Portway Landfill site is located within the site boundary, in the field to the South East of the Site, adjacent to the current car park, between the A4 and the railway tracks. Contaminated land effects should be anticipated relating to migration of landfill gas; excavation of contaminated land causing potential contaminated arisings and runoff; and creation of contamination pathways for existing contaminated material.</p> <p>Due to the likelihood of contamination on site appropriate management measures to prevent contamination of designated sites and the groundwater should be considered.</p>	Arup/Network Rail	Subsequent GRIP stages	Subsequent GRIP stages

Ref:	236253
Version:	
Date:	07/07/2014

Environmental Considerations and Risks	Actions to be taken	Responsible Party(ies)	Start Date	Target Completion
7.2 Are there any protected species and/or habitats e.g. bats, badgers, newts etc. at or near the project site?	<p>Reptile presence/absence survey: A baseline survey (consisting of 8 survey visits from April to September) should be carried out to identify is reptile are present and using habitat within the site area alongside the railway within embankments, scrub and grassland.</p> <p>Amphibians including Great Crested Newts (GCN): Each feature (ditch and pond separately) requires 4 surveys (monthly from April to June). Two surveys required Mid-April to Mid-May. If GCN found 2 additional surveys required. Mitigation will be required to avoid disturbance e.g. suitable vegetation clearance methods.</p> <p>Low level vegetation clearance: In appropriate places (identified by a qualified ecologist), avoiding isolating reptiles and outside the bird nesting season (March to August), areas of vegetation could be cleared down to ground level to prevent birds nesting and to deter reptiles from using the site. This should be done following a staged cutting method statement (supplied by a suitably qualified ecologist) to avoid harm to protected species and in order to search for badger setts in dense impenetrable vegetation. A licence will be required if badgers are found in these setts and works are likely to impact upon these setts.</p>	Arup/Network Rail	Subsequent GRIP stages	Timescales outlined
7.4 Are there any invasive vegetation species (Japanese knotweed, Giant hogweed, etc.) at or near the project site?	<p>Japanese knotweed clearance: Preferably prior to spring (when JK will start to re-grow and spread further) a suitable eradication procedure should be carried out to remove JK in advance of potential disturbance by works. A JK specialist should be contacted for this advice.</p>	Arup/Network Rail	Subsequent GRIP stages	Timescales outlined
9.0 Noise and Nuisance 10.0 Traffic, generation and access	Management through controls in CEMP and good neighbour practice. Specific measures may be required in relation to asbestos if encountered.	Contractor	Subsequent GRIP stages	Subsequent GRIP stages

Template Version 2.0
March 2012

GRIP
Governance of Railway Investment Projects

Ref:	236253
Version:	
Date:	07/07/2014

Appendix A: NR Hazard Directory

Template Version 2.0
March 2012

GRIP
Governance of Railway Investment Projects

National Hazard Directory

Extract for Site of Work

Search Criteria: Route = Western (West); ELR = CNX; Mileage From = 7.0000; Mileage To = 9.0000
Date: 24/11/2014

ELR/ELR Name	START	END	DESCRIPTION	LOCAL NAME	Track	Freetext
CNX: CLIFTON AND AVONMOUTH LINE	2.0064	9.0638	Buried Telecommunication Cables		All/Multiple Tracks	@Note: There could be buried telecoms cables throughout this ELR. If details of cable location are known this cable MUST be identified first before any ground penetration work is carried out.@
CNX: CLIFTON AND AVONMOUTH LINE	3.0616	7.1144	Buried Electrical Cables	Clifton Down	All/Multiple Tracks	ST578743-1-172 SWEB Agreement90336 refers to cables affecting RT property a>3.38-29ch Redland b>3.68-73chClifton c>6.3ch Seamills d>7.49-52chShirehampton Low Voltage Cable - HAZARD V.10
CNX: CLIFTON AND AVONMOUTH LINE	6.0880	7.0000	Conservation Area	Shirehampton		ST537767-1-172 Railtrack Track Formation On The Severn Beach Branch Between 6M 40C And 7M Kingsweston Conservation Area Between St53757675 And St54507645 Nearest stn: Shirehampton; Council: Bristol; Planning auth: Bristol City; ID: HR22648/8001 - HAZARD V.10
CNX: CLIFTON AND AVONMOUTH LINE	6.1100	7.0176	Water Protection Zone	Horseshoe Bend	Unknown	SSSI with no known agency- weedspray restriction-NO SCRUB
CNX: CLIFTON AND AVONMOUTH LINE	6.1100	7.0176	Site of Special Scientific Interest (SSSI)	Horseshoe Bend	All/Multiple Tracks	SSSI at Shirehampton Weedspray restrictions-No Scrub-indicates that Garlon, Timbrel or other treatments containing tricopyr should not be sprayed onto the scrub area.
CNX: CLIFTON AND AVONMOUTH LINE	7.0484	7.0484	Buried Water Main	Shirehampton	All/Multiple Tracks	ST536765-1-172 Bristol Corporation Agreement 84144 refers to water pipe crossing under track south west of Woodwell Rd Obr Water Pipeline - HAZARD V.10
CNX: CLIFTON AND AVONMOUTH LINE	7.0572	7.0572	Hazard Associated With Culvert		All/Multiple Tracks	ST537765-172 Railtrack 18" square stone Culverts <confined space> - RAR Code: BBUC or HSL- HAZARD V.10
CNX: CLIFTON AND AVONMOUTH LINE	7.0902	7.0902	Buried Water Main	Shirehampton	All/Multiple Tracks	ST535765-1-172 Bristol Water Agreement 110701 refers to 6" water pipe crossing over the track at Obr Hung Road High Pressure Water - RAR Code: HBW - HAZARD V.10
CNX: CLIFTON AND AVONMOUTH LINE	7.1100	7.1100	Authorised Access Point	Shirehampton	All/Multiple Tracks	ST529764-172 Railtrack Access Point
CNX: CLIFTON AND AVONMOUTH LINE	7.1166	7.1188	Buried Electrical Cables	Shirehampton	All/Multiple Tracks	ST532765-1-172 SWEB Agreement 98550 refers to 11kv cable crossing under track under road at Ubr Station Rd High Voltage Cable - RAR Code: HOE or HBE - HAZARD V.10
CNX: CLIFTON AND AVONMOUTH LINE	8.0286	8.0286	Buried Gas Pipe	Shirehampton	All/Multiple Tracks	ST523768-1-172 South Western Gas Board Agreement 99320 re gas main under line. High Pressure Gas - RAR Code: HBG - HAZARD V.10
CNX: CLIFTON AND AVONMOUTH LINE	8.0286	8.0594	Buried Fuel Pipe	Avonmouth Dock	All/Multiple Tracks	ST523769-1-172 Environment, Secretary of State for the Agreement 108472 refers to 2 x 16" Government petroleum pipelines

ELR/ELR Name	START	END	DESCRIPTION	LOCAL NAME	Track	Freetext
						crossing under track between mileages. Fuel Pipe - HAZARD V.10
CNX: CLIFTON AND AVONMOUTH LINE	8.0374	8.0594	Buried Gas Pipe	Shirehampton	All/Multiple Tracks	ST523769-1-172 Transco Agreement 109048 refers to 10" under and across the track. From plan it appears to proceed along upside cess High Pressure Gas - RAR Code: HBG - HAZARD V.10
CNX: CLIFTON AND AVONMOUTH LINE	8.0506	8.0616	Buried Foul Water Service	Shirehampton	All/Multiple Tracks	ST520770-1-172 Bristol Corporation Agreement 98235 refers to 8" sewage pipe crossing under track at 8.23ch and continuing along RT north east boundary Sewage - RAR Code: HBF - HAZARD V.10
CNX: CLIFTON AND AVONMOUTH LINE	8.0528	8.0550	Buried Foul Water Service	Shirehampton	All/Multiple Tracks	ST520770-1-172 Wessex Water Agreement 111888 refers to 450 mm sewer pipe and 2 x manholes crossing under track and RT property at mileage quoted Sewage - RAR Code: HBF - HAZARD V.10
CNX: CLIFTON AND AVONMOUTH LINE	8.0550	8.0616	Buried Oil Pipe	Avonmouth Dock	All/Multiple Tracks	ST520770-1-172 Environment, Secretary of State for the Agreement 101516 refers to diverted 16" oil pipeline crossing under track between mileages stated. Oil Pipeline - RAR Code: HBO or HOI - HAZARD V.10
CNX: CLIFTON AND AVONMOUTH LINE	8.0572	8.0572	Buried Gas Pipe	Shirehampton	All/Multiple Tracks	ST521770-1-172 Transco Agreement 111811 refers to 300mm gaspipe crossing under RT land and track under the viaduct<M5> High Pressure Gas - RAR Code: HBG - HAZARD V.10
CNX: CLIFTON AND AVONMOUTH LINE	8.0572	8.0594	Buried Water Main	Shirehampton	All/Multiple Tracks	ST521770-1-172 Bristol Water Agreement 111858 refers to 450 mm water pipe crossing under track and RT property at mileage quoted High Pressure Water - RAR Code: HBW - HAZARD V.10
CNX: CLIFTON AND AVONMOUTH LINE	8.0594	8.0594	Buried Gas Pipe	Shirehampton	All/Multiple Tracks	ST520771-1-172 Transco Agreement 109582 refers to 250mm gas pipe crossing under track at LC. See cross section plan High Pressure Gas - RAR Code: HBG - HAZARD V.10
CNX: CLIFTON AND AVONMOUTH LINE	8.0638	8.0638	Buried S&T Cable	Avonmouth Dock Junc	All/Multiple Tracks	ST521771--- Railtrack MCB/CCTV LC, with cables under line connecting to S&T cables. Source RT GWZ LC register. S&T Cable - RAR Code: HBS - HAZARD V.10
CNX: CLIFTON AND AVONMOUTH LINE	8.0638	8.0638	Buried Foul Water Service	Shirehampton	All/Multiple Tracks	ST520771-1-172 Bristol Corporation Agreement 77851 refers to 1 x surface water culvert with a foul sewer built therein crossing under track at the site of old LC Surface Water - HAZARD V.10
CNX: CLIFTON AND AVONMOUTH LINE	8.0638	8.0638	Authorised Access Point	Shirehampton	All/Multiple Tracks	ST521771-172 Railtrack Access Point
CNX: CLIFTON AND AVONMOUTH LINE	8.0682	8.0726	Buried Foul Water Service	Shirehampton	All/Multiple Tracks	ST521771-1-172 Wessex Water Agreement 112127 refers to 600mm sewer pipe crossing under track at mileage Sewage - RAR Code: HBF - HAZARD V.10
CNX: CLIFTON AND AVONMOUTH LINE	8.0836	8.0836	Buried Electrical Cables	Shirehampton	All/Multiple Tracks	ST521773-172 Not Known Electric Cable Keynsham 0117 986 6866 <0800 404090> - HAZARD V.10
CNX: CLIFTON AND	8.1056	8.1056	Buried Electrical Cables	Shirehampton	All/Multiple Tracks	ST520775-172 Not Known Electric Cable Keynsham 0117 986 6866 <0800 404090> - HAZARD V.10

ELR/ELR Name	START	END	DESCRIPTION	LOCAL NAME	Track	Freetext
AVONMOUTH LINE						
CNX: CLIFTON AND AVONMOUTH LINE	8.1699	9.0131	Red Zone Working Prohibited	AVONMOUTH STATION	All/Multiple Tracks	2100/1100 DVD344/1

Ref:	236253
Version:	
Date:	07/07/2014

Appendix B: Ecology Report

Template Version 2.0
March 2012

GRIP
Governance of Railway Investment Projects

63 St Thomas Street
Bristol BS1 6JZ
United Kingdom
www.arup.com

t +44 117 976 5432
d +441179886726

Project title	Portway	Job number
		239240
cc	Rory Deuchar Sophie England Paul Clack	File reference
		4-05
Prepared by	Marie Moore Tom Shelley	Date
		13 February 2015
Subject	Portway Ecological Constraints Note	

1 Background

Ove Arup & Partners Ltd (Arup) have been commissioned by Network Rail to assess options for Bristol City Council for the proposed development of a new platform and associated station facilities on the Severn Beach branch line near Shirehampton, Bristol.

The proposed platform and station facilities will be located approximately 500m to the north of the existing Shirehampton Station and will serve the existing local authority Park and Ride (P&R) site situated on the Portway (A4 road) near Junction 18 of the M5 and M49 motorways. The station and platform is intended to provide an alternative mode of transport to the existing bus service and to allow greater connectivity with areas of inner Bristol served by the Severn Beach branch line.

As part of Arup's services, Tom Shelley (Arup Senior Ecologist) carried out an ecological inspection survey on 15th January 2015 as part of the GRIP 2 Stage study. The aim of the inspection was to check the site for ecological constraints where the project is proposed. Furthermore, desk study data was requested and reviewed to check if known ecological receptors are near to the site and could potentially be impacted by construction works. At present the exact location of the station and platform has yet to be decided and four location options are being assessed.

As a result this note provides the high level results of this inspection survey and advice for ecological mitigation required for the ecological constraints identified on site which could be affected by proposed Portway project.

2 Ecological Constraints

2.1 Desk Study

2.1.1 Statutory Designated Sites

The search using Multi-Agency Geographic Information for the Countryside (MAGIC), in addition to data obtained from Bristol Regional Environmental Records Centre (BRERC) showed that there

File Note

239240

13 February 2015

are seven statutory designated nature conservation sites within 4km of the study area. However, the site boundary does not overlap any of these designated sites.

These designated sites include the Severn Estuary (which include the mouth of the River Avon) is 0.2km west of site and holds four designations, including Ramsar, Special Protection Area (SPA), Special Areas of Conservation (SAC) and Site of Special Scientific Interest (SSSI). This is collectively known as a European Marine Site (EMS).

Other designations include:

- Horseshoe Bend SSSI – 1.1km east;
- Ham Green SSSI – 1.3km south east;
- Avon Gorge SSSI – 2.2km south east;
- Leigh Woods National Nature Reserve (NNR) – 3.8km south east;
- St. George's Flower Bank Local Nature Reserve (LNR) – 1.8km south west;
- Lawrence Weston Moor LNR – 3.1km north east.

2.1.2 Non-statutory Designated Sites

A total of 27 Sites of Nature Conservation Interest (SNCIs)/Wildlife Sites were returned from the BRERC search, of which Lamplighter's Marsh falls within the study area. Lamplighter's Marsh lies along the River Avon in west Bristol, to the south-east of the M5 motorway flyover. North of the railway line is an area of demolished pre-fabricated housing and a sports ground. South of the line there are areas of saltmarsh-influenced grassland, as well as ruderal communities, grassland, scrub and secondary woodland. The following species have been recorded in the SINC. Sea aster *Aster tripolium*, sea beet *Beta vulgaris* ssp. *maritima*, narrow-leaved everlasting pea *Lathyrus sylvestris*, moth mullein *Verbascum blattaria*, and wormwood *Artemisia absinthum*. Invertebrates and breeding birds, particularly warblers have been noted.

There are two wildlife trust reserves within 2km of the study area. Kingsweston Down (also an SNCI) located north east, a limestone grassland habitat and Pill Paddock 1.4km on the south west, a wildflower meadow with a pond and planted woodland. The latter is separated by the River Avon to the south of the study area.

There are 28 Wildlife Network Sites (WNS) within 2km of the study area. Portway allotments is within the study area.

2.1.3 Priority Habitats

A total of eight Priority Habitats were returned from the BRERC search within 2km of the study area. These are summarised below with the distance of the nearest parcel approximated, using MAGIC.

- Coastal and floodplain grazing marsh (0.5km south west intersected by River Avon and 1.5km north east);
- Lowland meadows (2km east or 1.9km south intersected by River Avon);
- Coastal saltmarsh (150m west);
- Intertidal mudflats (180m west);

File Note

239240

13 February 2015

- Upland mixed ash woods (1.9km south intersected by River Avon);
- Wet woodland (0.9km south intersected by River Avon);
- Lowland mixed deciduous woodland (1.7km east or 1.1km south west intersected by River Avon);
- Lowland calcareous grassland (1.1km east).

No priority habitats lie within the site boundary. There are five ancient woodland parcels within 2km of the study area, the nearest being Penpole Wood 0.9km north east.

There are three regionally important geological sites (RIGS) within 2km of the study area, the nearest being Horseshoe Bend, Shirehampton 1.3km east and Blaise Castle/Kingsweston Down 2km north east.

2.1.4 Protected and/or Notable Species

2.1.4.1 Flora

A large volume of plant records post 2000 were provided by BRERC within 2km of the study area, totalling 95 plant species to include species listed in the Avon Local Biodiversity Action Plan (LBAP), Section 41 species under the NERC 2006 Act and species listed in Schedule 8 of the Wildlife and Countryside Act 1981 (as amended) (WCA).

There is potential for these plants to exist within the habitats on site. Furthermore, the following species are classed as invasive and listed under Schedule 9 of the WCA:

- 24 records for Japanese knotweed *Fallopia japonica* were returned from the search, the nearest 200m west within an open space in Portway 2005;
- A single New Zealand pigmyweed *Crassula helmsii* record towards Pill in 2003.

2.1.4.2 Fauna

BRERC also provided protected species records within 2km of the study area. The species below could exist and/or use habitats within the site boundary.

There are 91 records for invertebrates recorded within 2km of the study area, of which 20 species are listed under Avon LBAP.

Reptiles and amphibians were found within 2km of the study area, including 13 records for great crested newt *Triturus cristatus*, the nearest being 650m east towards Shirehampton in 2010. Great crested newts are a European Protected Species (EPS).

There are 12 bird species that are listed under Schedule 1 of the WCA and Avon LBAP species found within 2km search of the study area such as avocet *Recurvirostra avosetta* barn owl *Tyto alba* and skylark *Alauda arvensis*.

Bat records for unidentified bats *Chiroptera* sp., unidentified pipistrelle *Pipistrellus pipistrellus sensu lato* and roost records for lesser horseshoe *Rhinolophus hipposideros* and for unidentified pipistrelle roost were recorded within 2km of the study area.

A record for the EPS otter *Lutra lutra* in the River Avon near Horseshoe bend east in 2007 and two records 2km south towards Markham Bottom from 2002 were found.

File Note

239240

13 February 2015

There are 45 water vole *Arvicola amphibious* records, with the majority towards Portbury Dock (west), which is separated by the river, and Avonmouth (east). The records show evidence for latrines, burrows and feeding remains. The records were from 2003, 2004 and 2007.

A single record for the EPS dormouse *Muscardinus avellanarius* was recorded in 2km south towards Markham Bottom in 2002. This location is separated by the river.

There are 30 badger *Meles meles* records including evidence of road kill, feeding remains and tracks, with the nearest being 300m east towards Shirehampton in 2010 (road casualty). Badgers are protected under the Badger Act 1992.

Other mammals records were returned from the desk study to include stoat records *Mustela ermine*, weasel *Mustela nivalis*, polecat *Mustela putorius*, brown hare *Lepus europaeus*, hedgehog *Erinaceus europaeus*, common shrew *Sorex araneus* and water shrew *Neomys fodiens*.

2.2 Field Survey

Constraints tables are provided below to highlight the ecological features found in and within close proximity to the site and additional survey requirements and time constraints, as well as potential legal permissions that may be required if protected/notable species are found onsite.

Additionally, an Environmental Constraints Plan for this area (see Figure 1 below) has been created in order to display the nearby environmental constraints including desk study data such as designated sites, waterbodies and listed buildings and the results of the field survey. This can be used to inform the project programme.

The tables below in this section summarise ecological features found on site and the additional survey requirements, time constraints and potential legal permissions.

2.3 Habitats

Ecological Species/Feature (desk study records exist for these species)	Additional Work/Surveys Required (Seasonal Constraint)	Permission required if species found during surveys /Time Constraint
Habitats – SNCI and WNS habitats; Vegetated sidings including grassland and dense scrub, wet ditches and flood pond with surrounding reedbed.	Vegetated sidings = Clearance, re-profiling/strengthening required avoiding spread of Japanese Knotweed. Tree Cover = Felling/removal of trees. Wet ditch and pond = ditch and pond will need a culvert, re-routed or bridged over avoiding pollution incidents.	SNCI and WNS unlikely to be affected by the scheme but should be considered and discussed with Local Planning Authority (LPA). See specific species advice below.

File Note

239240

13 February 2015

2.4 Amphibians

Ecological Species/Feature (desk study records exist for these species)	Additional Work/Surveys Required (Seasonal Constraint)	Permission required if species found during surveys /Time Constraint
<p>Amphibians including Great Crested Newts (GCN) – habitats on site have amphibian breeding potential e.g. wet ditch and flood pond; site habitats also provide foraging habitat e.g. vegetated sidings including grassland and dense scrub.</p>	<p>Habitat Suitability Index (HSI) surveys - Each feature (ditch and pond separately) requires a HSI survey to determine if a feature is suitable to support breeding amphibians.</p> <p>Presence / absence surveys - If a feature is deemed suitable then 4 surveys are required (monthly from April to June). Two of these surveys are required Mid-April to Mid-May.</p> <p>Population Estimation - If GCN found 2 additional surveys required.</p> <p>Note - mitigation will be required to avoid disturbance e.g. suitable vegetation clearance methods.</p>	<p>European Protected Species (EPS) Licence. Minimum of 60 days (to write, submit and get approval). EPS licence will only be issued once planning permission granted.</p> <p>Note - the need for mitigation very much depends on scheme layout.</p>

2.5 Bats

Ecological Species/Feature (desk study records exist for these species)	Additional Work/Surveys Required (Seasonal Constraint)	Permission required if species found during surveys /Time Constraint
<p>Bats – no trees within the site boundary have bat roosting potential; site habitats do provide foraging habitat e.g. tree-lines and scrub-lines.</p>	<p>Note - mitigation may be required to avoid excessive disturbance e.g. artificial lighting and suitable vegetation clearance methods.</p>	<p>Note - the need for mitigation very much depends on scheme layout.</p>

2.6 Badgers

Ecological Species/Feature (desk study records exist for these species)	Additional Work/Surveys Required (Seasonal Constraint)	Permission required if species found during surveys /Time Constraint
<p>Badgers – no setts found on site but mammal tracks (characteristic of badgers) were found on site; site habitats do provide potential habitat where setts could exist e.g. dense scrub.</p>	<p>Note - potential setts could be on site in dense vegetation and should be considered/avoided; mitigation will be required to avoid disturbance e.g. suitable vegetation clearance methods.</p>	<p>Badger Development Licence / 60 working days (to write, submit and get approval).</p> <p>Note - the need for mitigation very much depends on scheme layout.</p>

File Note

239240

13 February 2015

2.7 Breeding Birds

Ecological Species/Feature (desk study records exist for these species)	Additional Work/Surveys Required (Seasonal Constraint)	Permission required if species found during surveys /Time Constraint
Breeding Birds - habitats on site have breeding bird potential e.g. trees and scrub.	Breeding Birds will likely use habitats to be effected. If works are required within bird nesting season (March to August) then a pre-works survey of nesting habitat should be carried out to check for nesting birds. If found suitable mitigation procedures should be put in place e.g. exclusion zones around nests until birds have fledged.	No works close to an active nest. Works can only continue once birds have fledged. Alternative is to avoid nesting period or clear vegetation in advance (subject to other ecological constraints being addressed where possible). Note - the need for mitigation very much depends on scheme layout.

2.8 Reptiles

Ecological Species/Feature (desk study records exist for these species)	Additional Work/Surveys Required (Seasonal Constraint)	Permission required if species found during surveys /Time Constraint
Reptiles – habitats on/immediately adjacent to site have reptile potential e.g. vegetated sidings and scrub. And there are also habitat corridors (ditch, dense vegetation) connecting woodlands etc to the wider landscape.	Presence / absence surveys required - 8 surveys (from April to September) may be required depending on scheme layout selected.	Natural England Method Statement Approval / 30 days and agreed with LPA in advance. Likely that a receptor site will not be required as reptiles found could be accommodated elsewhere on site. Carry out translocation procedure ca. 60 days. Note - the need for mitigation very much depends on scheme layout.

2.9 Japanese knotweed (JK)

Ecological Species/Feature (desk study records exist for these species)	Additional Work/Surveys Required (Seasonal Constraint)	Permission required if species found during surveys /Time Constraint
JK – Three stands found on/immediately adjacent to site.	No survey, just consideration in CEMP as contaminated waste and to avoid legal infringement it should not be spread.	Unknown at this stage, but method statement to be produced and agreed with LPA in advance. Likely that JK and the associated soil will need to be removed as controlled waste.

File Note

239240

13 February 2015

It is understood that the project will not be required for at least 12 months and therefore this allows time to carry out additional surveys to support the programme and gather appropriate permissions in advance of works to build the site access.

If site works are required sooner and surveys cannot be carried out in the correct survey season it is advised that there will need to be a discussion with the Local Planning Authority and client in order to understand if a works consent can be submitted with outstanding protected species surveys still to be carried out. This is dependent on if these works require planning permission or are covered under Permitted Development Rights.

Mitigation timescales depend on the number and species present, timescale of works and location, so at this early stage we cannot give precise guidance on the duration of such activities or impacts to programme.

3 Next Steps

A review of the final project design and associated works locations, such as building footprints and access tracks, will need to be carried out by an ecologist in order for specific ecological constraints to be identified and mitigated for in advance of works to prevent works which would result in legal infringement.

While the final project design is being confirmed, these additional ecological procedures should be carried out to gather ecological information in advance of works proceeding in order to prepare for potential licence applications:




1. **SNCI/WNS LPA Consultation:** A discussion should be had with Bristol City Council regarding the Lamplighter's Marsh SNCI and Portway allotments WNS which are within the site boundary and the likely implications to these sites. Mitigation and management will likely be required to avoid adverse impacts to these sites.
2. **Amphibian survey:** A HSI surveys should be carried out to determine suitability of the pond and wet ditch during the amphibian breeding season. If suitable a presence/absence survey (consisting of 4-6 survey visits from April to June) should be carried out to identify is amphibians, in particular GCN, are present and using habitats within the site (ditch and pond) to breed and likely exist in terrestrial habitat areas (outside of the breeding season) alongside the railway within sidings, scrub and grassland.
3. **Reptile presence/absence survey:** A baseline survey (consisting of 8 survey visits from April to September) should be carried out to identify is reptile are present and using habitat within the site area alongside the railway within embankments, scrub and grassland.
4. **Low level vegetation clearance:** If no amphibians and reptiles are found and outside the bird nesting season (April to July), areas of vegetation could be cleared down to ground level to prevent birds nesting and deter badgers from using the site. This should be done in appropriate places identified by a suitably qualified ecologist, following a staged cutting method statement to avoid harm to protected species. This is a precautionary approach in order to search for badger setts in dense impenetrable vegetation. A licence will be required if badgers are found in these setts and works are likely to impact upon these setts.
5. **Japanese knotweed clearance:** A suitable eradication procedure should be carried out to remove JK in advance of potential disturbance by works. This should consider and avoid impacts to protected species and should be discussed with an ecologist in advance. A JK specialist should be contacted for this advice.

File Note

239240

13 February 2015

DOCUMENT CHECKING (not mandatory for File Note)

	Prepared by	Checked by	Approved by
Name	Marie Moore	Tom Shelley	Paul Clack
Signature			

Ref:	236253
Version:	
Date:	07/07/2014

Appendix C: TPO details

Template Version 2.0
March 2012

GRIP
Governance of Railway Investment Projects

Planning Search Enquiries

From: Sophie England <Sophie.England@arup.com>
Sent: 06 January 2015 10:30
To: Planning Search Enquiries
Subject: TPOs and conservation areas

M/15357

Hello,

I am doing some work on the Portway Park and Ride Site (near the postcode BS11 9QE), the site is within the redline boundary in the figure below.

Are there any Tree Protection Orders or Conservation Sites within this boundary?



TPO N°338
T1 - POPLAR
T2 - OAK
T3 POPLAR
T4 POPLAR

Thank you very much for your help, if you have any questions please get in contact.

Kind regards,

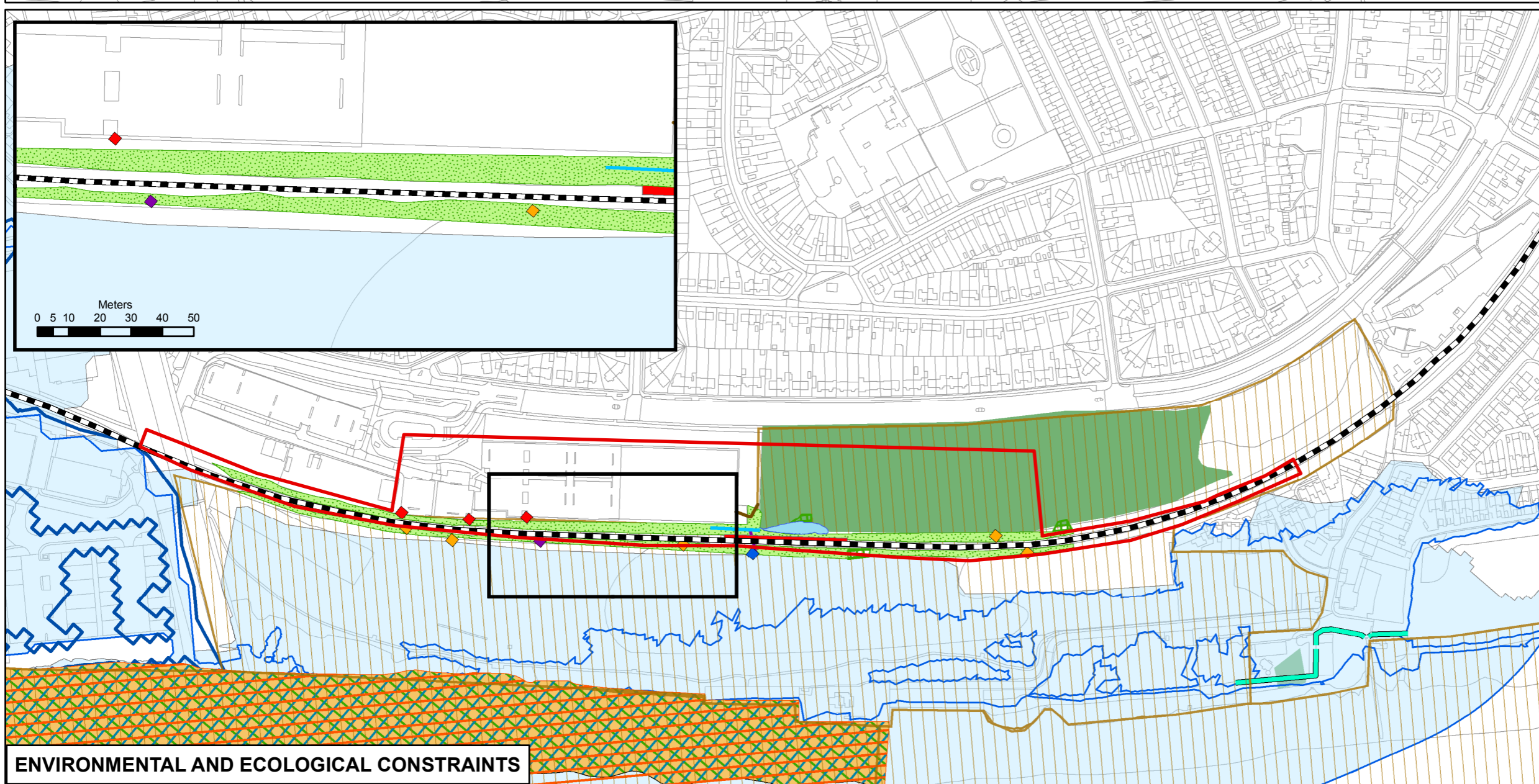
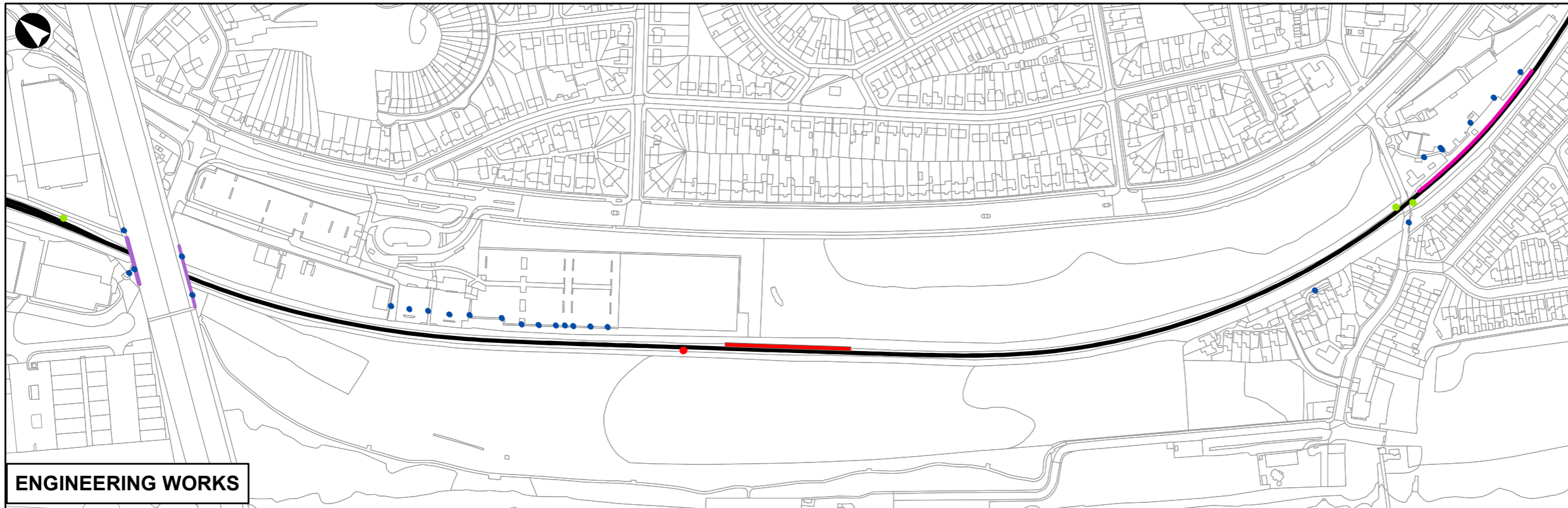
Sophie England
Consultant | Consulting West

Ref:	236253
Version:	
Date:	07/07/2014

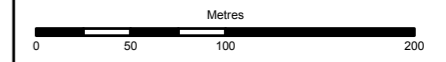
Appendix D: Constraints Map

Template Version 2.0
March 2012

GRIP
Governance of Railway Investment Projects



- Legend**
- Environmental and Ecological Constraints**
- Site Boundary
 - Rail Track
 - Proposed Platform
 - Cotoneaster
 - Mammal path
 - Mammal path and Snuffle holes
 - Reptile potential
 - Mammal crossing
 - Mammal path
 - Wet ditch
 - Japanese knotweed
 - Reptile potential
 - Standing water - flood pond
 - SNCIs
 - Local Authority Boundary
 - Special Area of Conservation
 - Special Protection Area
 - RAMSAR
 - SSSI
 - Flood Defence
 - Areas Benefiting from Flood Defences
 - Flood Zone 3
 - Flood Zone 2
 - Historic Landfill Sites
- Engineering Works**
- Light Signal
 - Signal
 - Lamp post
 - Level Overbridge
 - Existing Platform
 - Rail Track



P2	2015-02-23	SJ	SJ	SJ
Issue	Date	By	Chkd	Appd

ARUP

Client
Network Rail

Job Title
Portway Station GRIP 2

**Environmental Survey
Platform Option 1**

Scale at A3
1:4,000

Job No
239240-00

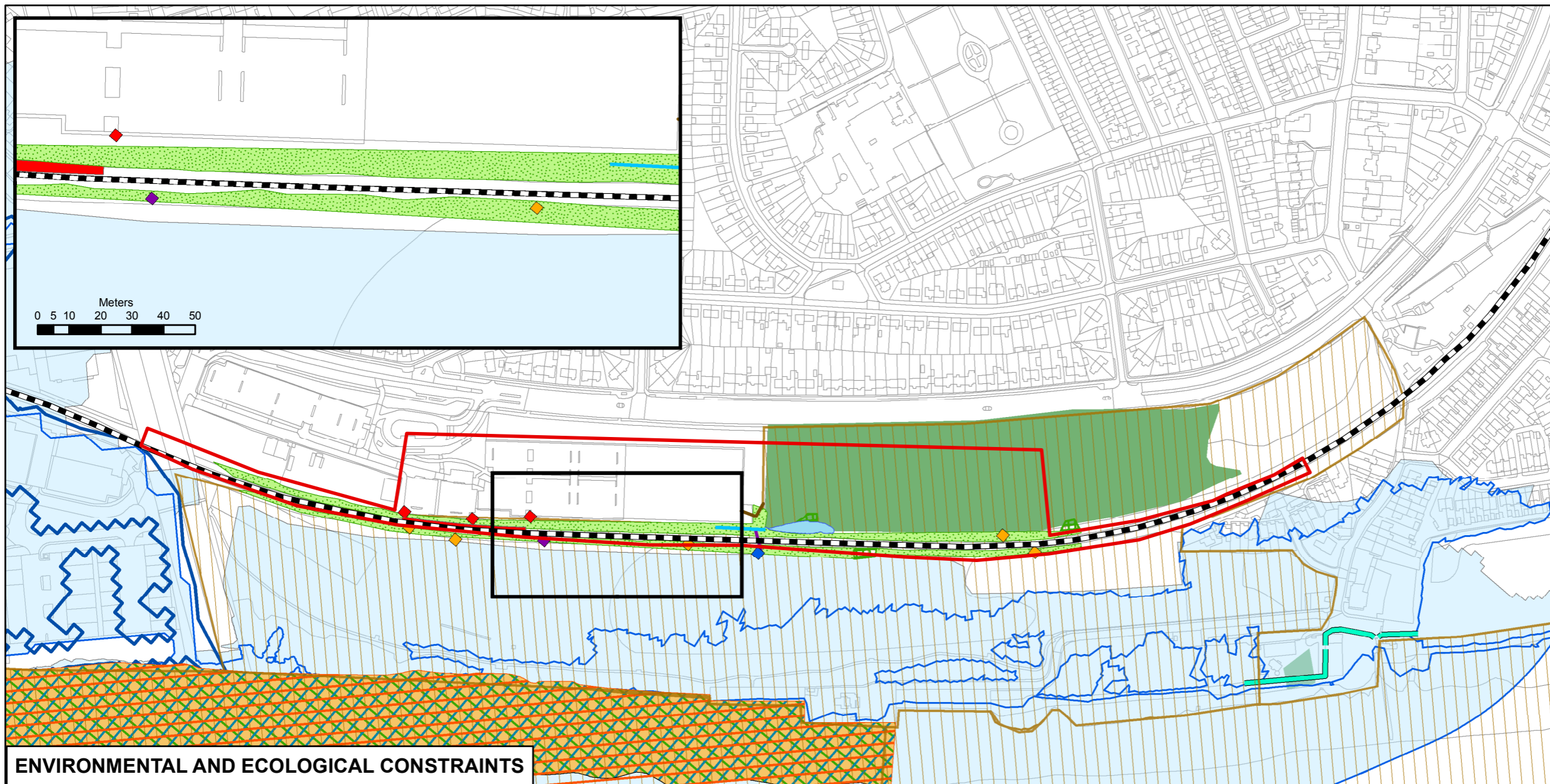
Drawing Status
Preliminary

Drawing No
001

Issue
P2

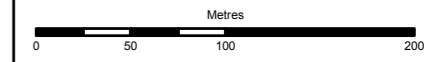


ENGINEERING WORKS



ENVIRONMENTAL AND ECOLOGICAL CONSTRAINTS

- Legend**
- Environmental and Ecological Constraints**
- Site Boundary
 - SNCIs
 - Local Authority Boundary
 - Proposed Platform
 - Special Area of Conservation
 - Cotoneaster
 - Mammal path
 - Mammal path and Snuffle holes
 - Reptile potential
 - Mammal crossing
 - Mammal path
 - Wet ditch
 - Japanese knotweed
 - Reptile potential
 - Standing water - flood pond
 - Special Protection Area
 - RAMSAR
 - SSSI
 - Flood Defence
 - Areas Benefiting from Flood Defences
 - Flood Zone 3
 - Flood Zone 2
 - Historic Landfill Sites
- Engineering Works**
- Light Signal
 - Signal
 - Lamp post
 - Level Overbridge
 - Existing Platform
 - Rail Track



P2	2015-02-23	SJ	SJ	SJ
Issue	Date	By	Chkd	Appd

ARUP

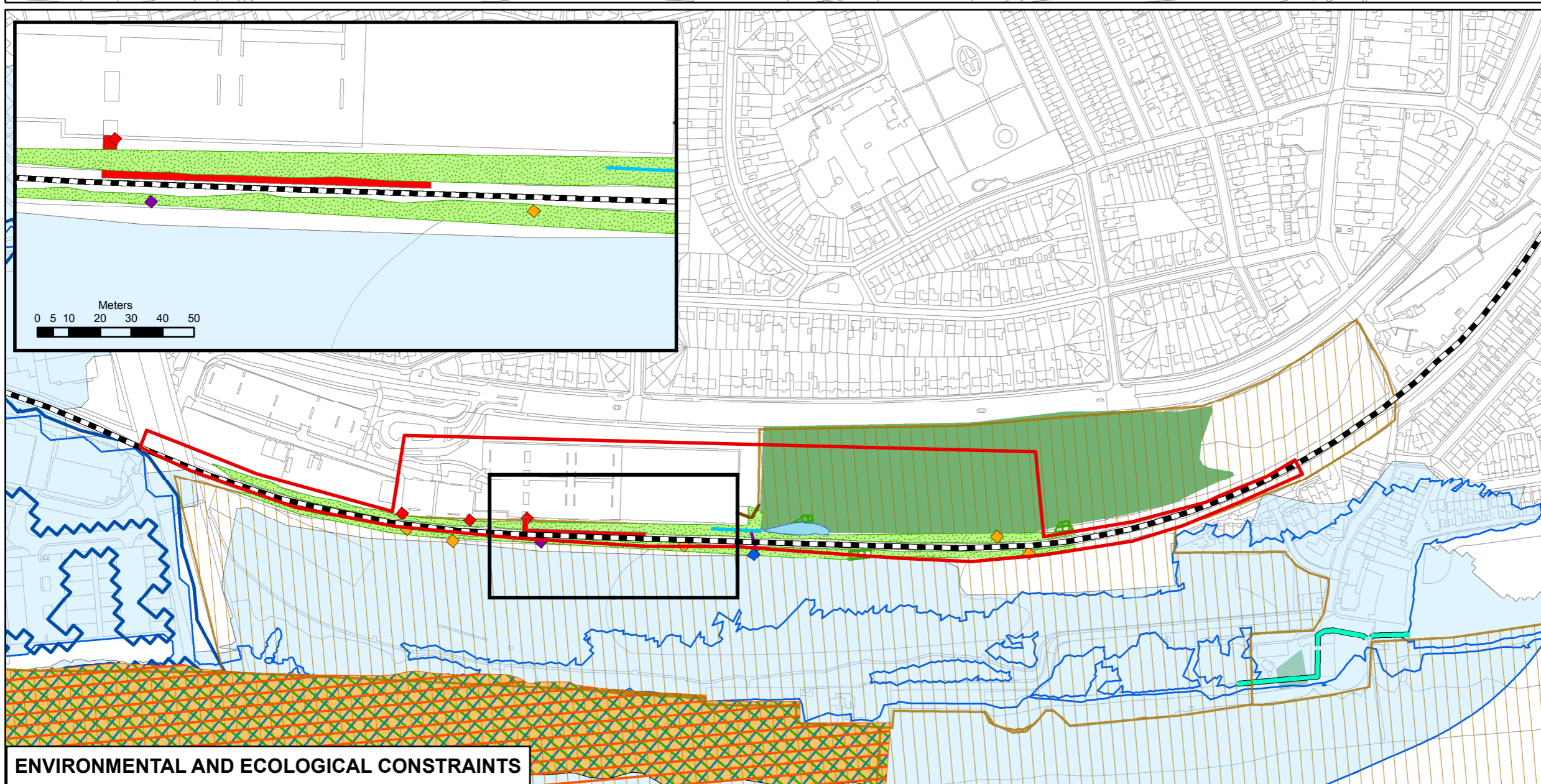
Client
Network Rail

Job Title
Portway Station GRIP 2

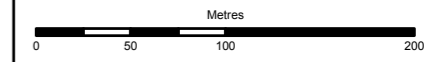
**Environmental Survey
Platform Option 2**

Scale at A3
1:4,000

Job No 239240-00	Drawing Status Preliminary
Drawing No 001	Issue P2



- Legend**
- Environmental and Ecological Constraints**
- Site Boundary
 - Rail Track
 - Proposed Platform
 - Cotoneaster
 - Mammal path
 - Mammal path and Snuffle holes
 - Reptile potential
 - Mammal crossing
 - Mammal path
 - Wet ditch
 - Japanese knotweed
 - Reptile potential
 - Standing water - flood pond
 - SNCIs
 - Local Authority Boundary
 - Special Area of Conservation
 - Special Protection Area
 - RAMSAR
 - SSSI
 - Flood Defence
 - Areas Benefiting from Flood Defences
 - Flood Zone 3
 - Flood Zone 2
 - Historic Landfill Sites
- Engineering Works**
- Light Signal
 - Signal
 - Lamp post
 - Level Overbridge
 - Existing Platform
 - Rail Track



P2	2015-02-23	SJ	SJ	SJ
Issue	Date	By	Chkd	Appd

ARUP

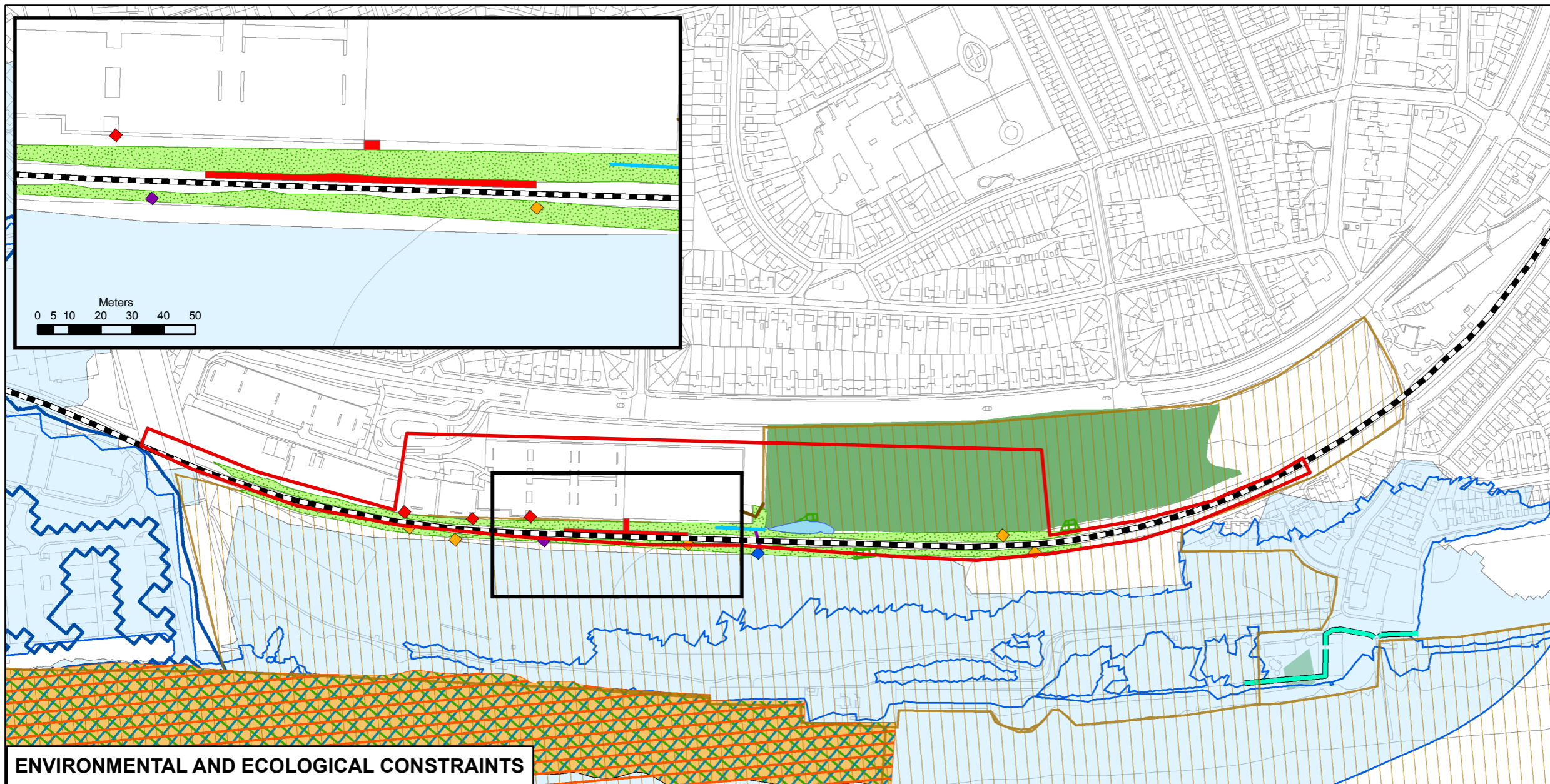
Client
Network Rail

Job Title
Portway Station GRIP 2

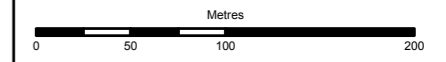
**Environmental Survey
Platform Option 3**

Scale at A3
1:4,000

Job No 239240-00	Drawing Status Preliminary
Drawing No 001	Issue P2



- Legend**
- Environmental and Ecological Constraints**
- Site Boundary
 - Rail Track
 - Proposed Platform
 - Cotoneaster
 - Mammal path
 - Mammal path and Snuffle holes
 - Reptile potential
 - Mammal crossing
 - Mammal path
 - Wet ditch
 - Japanese knotweed
 - Reptile potential
 - Standing water - flood pond
 - SNCIs
 - Local Authority Boundary
 - Special Area of Conservation
 - Special Protection Area
 - RAMSAR
 - SSSI
 - Flood Defence
 - Areas Benefiting from Flood Defences
 - Flood Zone 3
 - Flood Zone 2
 - Historic Landfill Sites
- Engineering Works**
- Light Signal
 - Signal
 - Lamp post
 - Level Overbridge
 - Existing Platform
 - Rail Track



P2	2015-02-23	SJ	SJ	SJ
Issue	Date	By	Chkd	Appd

ARUP

Client
Network Rail

Job Title
Portway Station GRIP 2

**Environmental Survey
Platform Option 4**

Scale at A3
1:4,000

Job No 239240-00	Drawing Status Preliminary
Drawing No 001	Issue P2

Appendix G

Matrix

Draft

Portway Park & Ride Station – GRIP2 – Feasibility Report – Options Matrix – Draft for Comment

13 March 2015

Impacts / items highlighted in yellow are considered to be significant. Key: Lowest Score = Lowest Impact

Option	Location A		Location B		Location C		Location D	
Option Title / Description	New station located 210m from Avonmouth Dock LC		New station located 310m from Avonmouth Dock LC		New station located 350m from Avonmouth Dock LC		New station located 490m from Avonmouth Dock LC	
Element / Discipline	Impact (Score 0 to 5)		Impact (Score 0 to 5)		Impact (Score 0 to 5)		Impact (Score 0 to 5)	
Track (Plain Line)	The track curve radius at this location is circa 800m which is not suitable for a platform. Could need level crossing to be realigned.	5	Track is generally straight. Some concern as there is a geometric transition which could affect the alignment.	3	No impact. Track is generally straight.	1	No impact. Track is generally straight.	1
Signalling	Existing signalling equipment moved and additional signalling required. Potential impact on LC.	4	Existing signalling equipment moved and additional signalling required.	3	Existing signalling equipment moved and additional signalling required.	3	Existing signalling equipment retained, therefore no impact. Minimal works to panel and local operations.	1
Telecoms	Little impact. New equipment may be required depending on GSM-R. Cable troughing on other side of track not affected.	1	Little impact. New equipment may be required depending on GSM-R. Cable troughing on other side of track not affected.	1	Little impact. New equipment may be required depending on GSM-R. Cable troughing on other side of track not affected.	1	Little impact. New equipment may be required depending on GSM-R. Cable troughing on other side of track not affected.	1
E&P	Signalling alterations would require 650V supply alterations. Main cable troughing on other side of track so not affected.	3	Signalling alterations would require 650V supply alterations. Main cable troughing on other side of track so not affected.	3	Signalling alterations would require 650V supply alterations. Main cable troughing on other side of track so not affected.	3	No foreseeable impact as signalling unaffected. Cable troughing on other side of track not affected.	1
Civils	Platform location almost at grade with car park, ramps/stairs required Disruption to car park. High pressure gas main crosses the track at this location.	3	Platform location is lower than car park, ramps/stairs required. Interface with crib wall. Disruption to car park.	4	Platform location is lower than car park, ramps/stairs required. Interface with crib wall. Disruption to car park. Access ramp position not ideal as at platform end.	4	Platform location is almost at grade with car park/hardstanding, ramps/stairs required. Possible need for additional land. Extend car park lighting, CCTV, drainage etc.	3
Level Crossing	Closest therefore potential impact on barrier down-time if operations dictate that barrier must be down while train is in new station.	5	Possible impact if operations dictate. Level crossing barrier down-time impacted.	2	Possible impact if operations dictate. Level crossing barrier down-time impacted.	2	No impact as no change to current signalling system. Level crossing barrier down-time impacted.	1
Operations	Additional station stop for timetabling. Level crossing barrier down-time impacted.	3	Additional station stop for timetabling.	3	Additional station stop for timetabling.	3	Additional station stop for timetabling.	3
Ecology	Further ecological surveys required. Potential for protected species (e.g. reptiles) but likely to be manageable risk.	2	Further ecological surveys required. Potential for protected species (e.g. reptiles) but likely to be manageable risk.	2	Further ecological surveys required. Potential for protected species (e.g. reptiles) but likely to be manageable risk.	2	Further ecological surveys required. Potential for protected species (e.g. reptiles) but likely to be manageable risk. Close proximity to landfill site and presence of Japanese Knotweed.	3
Sustainability	Similar for all options. May be opportunities for sustainable solutions for lighting, power and drainage – to be considered.	2	Similar for all options. May be opportunities for sustainable solutions for lighting, power and drainage – to be considered.	2	Similar for all options. May be opportunities for sustainable solutions for lighting, power and drainage – to be considered.	2	Similar for all options. May be opportunities for sustainable solutions for lighting, power and drainage – to be considered.	2
Maintenance	Current access is unaffected. Steps/ramp to be provided at both ends of platform.	1	Current access is unaffected. Steps/ramp to be provided at both ends of platform.	1	Current access is unaffected. Steps/ramp to be provided at both ends of platform.	1	Current access is unaffected. Steps/ramp to be provided at both ends of platform.	1
Sub-total	28		24		22		17	
General Project Impacts	Impact (Score 0 to 5)		Impact (Score 0 to 5)		Impact (Score 0 to 5)		Impact (Score 0 to 5)	
Cost	Station, Signalling, Track and Level Crossing	5	Station and Signalling	4	Station and Signalling	4	Station	2
Programme	Some possession requirements for construction. Changes to signalling.	4	Some possession requirements for construction. Changes to signalling.	4	Some possession requirements for construction. Changes to signalling.	4	Some possession requirements for construction.	2
Project Risk	Medium/high risk. Signalling interface with MetroWest and other adjacent schemes.	4	Medium/high risk. Signalling interface with MetroWest and other adjacent schemes.	4	Medium/high risk. Signalling interface with MetroWest and other adjacent schemes.	4	Low risk. In principle, works can be undertaken as a stand-alone scheme.	2
Health & Safety	Maintenance access included in design. Safe public access to platform is achievable.	2	Maintenance access included in design. Safe public access to platform is achievable.	2	Maintenance access included in design. Safe public access to platform is achievable.	2	Maintenance access included in design. Safe public access to platform is achievable.	2
Constructability	Access from P&R facility. Interface with P&R operations/car parking. Good highway access.	3	Access from P&R facility. Interface with P&R operations/car parking. Good highway access.	2	Access from P&R facility. Interface with P&R operations/car parking. Good highway access.	2	Access from P&R facility. Compound in car park extension. Good highway access.	1
Sub-total	18		16		16		9	
Overall Total	46		40		38		26	
Main Advantage	Furthest from Shirehampton Station / closest to Level Crossing / closest to existing P&R access.		Located on (generally) straight track / good access from P&R		Located on straight track / good access from P&R		Lowest capital cost / minimum signalling impact.	
Main Disadvantage	Signalling costs. Curved track leads to realignment and possible level crossing alterations. HP gas main.		Signalling costs. Transition in track alignment could lead to realignment requirements.		Signalling costs.		Furthest from level crossing / furthest from P&R access / closest to Shirehampton Station	
Conclusion	Not preferred on cost grounds		Not preferred on cost grounds		Should be considered further.		Should be considered further.	

Appendix H

CDM & CSM Hazard Log

Draft