

TFL_PSF_9131 SITE INVESTIGATIONS: SMALL SITES INITIATIVE LAND AT PORTREE STREET, POPLAR, E14

Site Ref. 2748

Flood Risk Review

OCTOBER 2017

Land at Portree Street, Poplar, E14

Flood Risk Review

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1 INTRODUCTION

1.1 Background

Arcadis Consulting (UK) Limited ('Arcadis') has been commissioned by Transport for London (TfL) 'the Client' to undertake a number of technical surveys for a site known as Land at Portree Street in Poplar, in the London Borough of Tower Hamlets ('the Site').

TfL is aiming to divest a number of small sites to enable positive regeneration. The objective of the Small Sites Initiative is to provide robust and pragmatic advice that sensibly de-risks each of the sites such that unreasonable 'abnormal' development costs are not included by developers.

The aim of this flood risk review is to assess the flood risk status of the Site and confirm the suitability for various forms of development on the Site, based on the findings of this desk study.

1.2 Scope of Works

Specific objectives of the flood risk review are to:

- Collect and review Environment Agency (EA) and Lead Local Flood Authority (Tower Hamlets London Borough Council (THLBC)) flood maps and published datasets (including Strategic Flood Risk Assessments, Preliminary Flood Risk Assessment and Local Flood Risk Management Strategy);
- Assess flood risk from all relevant sources (coastal and tidal, rivers, groundwater, surface water, sewers and artificial sources) and assign a risk value for each form of flooding (high, medium or low);
- Confirm the EA Flood Zone and confirm the acceptability of accommodating residential or other forms of development in accordance with the National Planning Policy Framework (NPPF) requirements;
- Confirm the need for application of the NPPF Sequential and Exception Tests; and
- Provide recommendations for further study or necessary flood risk mitigation measures to facilitate development.

1.3 Limitations

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This report has been compiled from a number of sources, which Arcadis believes to be trustworthy. However, Arcadis is unable to guarantee the accuracy of information provided by others. The report is based on information available at the time. Consequently, there is a potential for further information to become available, which may change this report's conclusion and for which Arcadis cannot be responsible.

2 SITE OVERVIEW

The Site covers 0.023 hectares and is located between Portree Street and Lanrick Road, centred at National Grid reference 538914 181303.

The Site consists of an infill plot, located at the southern end of a row of terraced housing, within a generally urban setting, surrounded by residential, commercial and public buildings as well as some green open spaces. Land use on the Site consists of open, but overgrown land with some formal tree planting in the east and south. The Site is bounded by terraced housing to the north and by Lanrick Road (A13), Abbott Road (B125) and Portree Street to the east, south and west respectively, as shown in Figure 1.

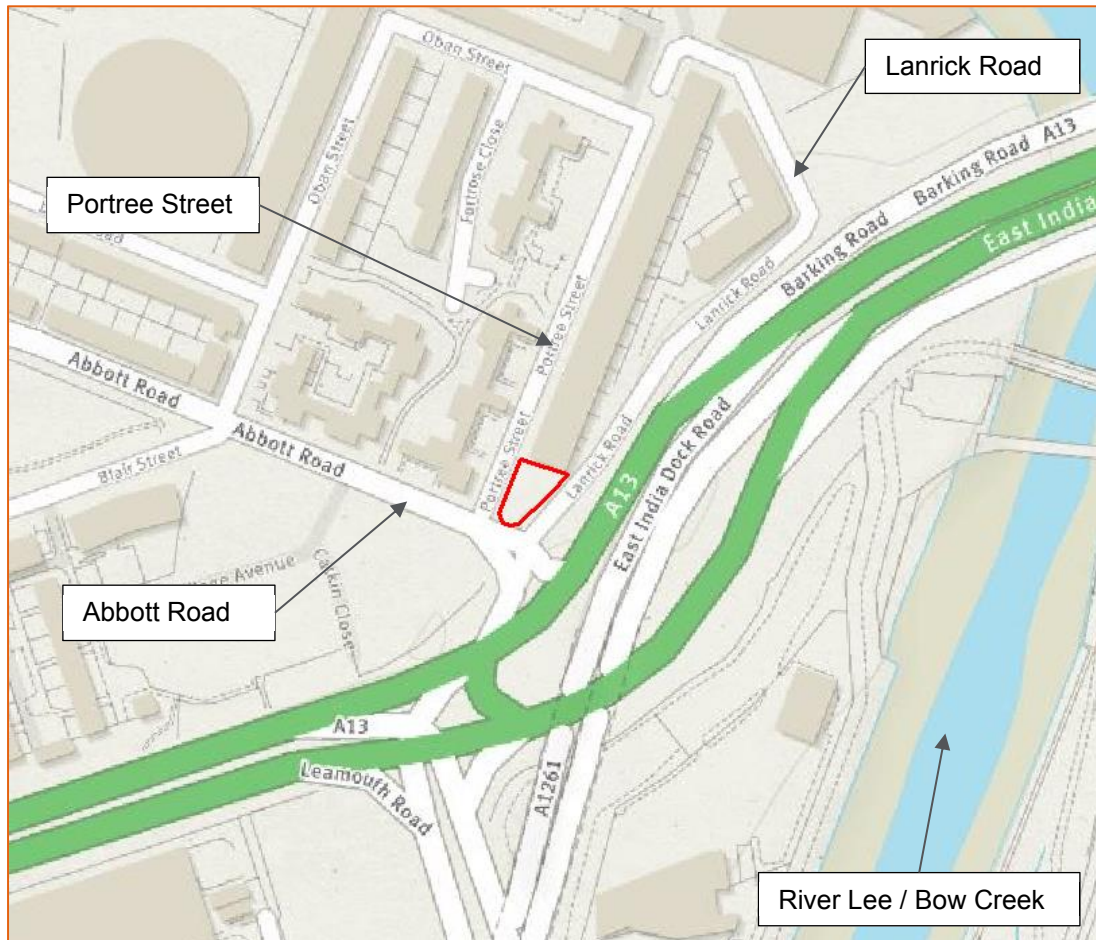


Figure 1: Site Location. Site Boundary Outlined in Red.
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Topographical information for the Site has been identified from EA Opensource Government License 2m LiDAR digital terrain mapping (DTM) datasets (Ref. 1). The Site slopes down towards the west, with ground levels between 2.89m above ordnance datum (mAOD) and 4.18mAOD. The landform in the wider area is generally flat, with ground levels between 2.0mAOD and 4.0mAOD (Figure 2).

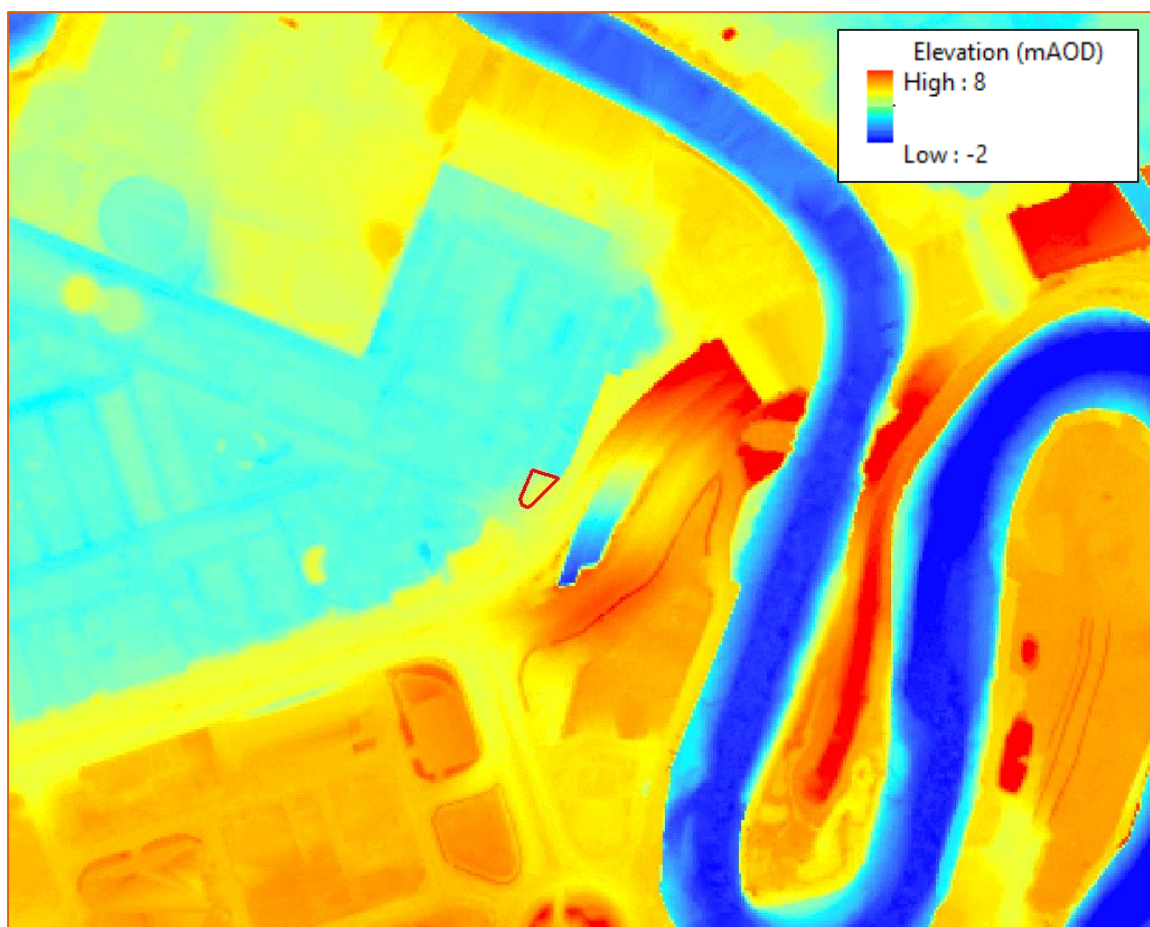


Figure 2: Site Topography. Site Boundary Outlined in Red.
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2.1 Catchment Description

The Site is located within the catchment of the River Lee, an EA designated Main River and tributary of the River Thames. The River Lee is known as the Bow Creek in its final section before confluenting with the River Thames. The River Lee flows in a southerly direction approximately 180m east of the Site and to this point drains a catchment of over 1,400km². The catchment local to the Site receives an average annual rainfall of approximately 670mm (Ref. 2).

The River Thames flows in an easterly direction approximately 800m south of the Site and to which point drains a catchment of over 10,000km². The River Thames is tidally influenced to Teddington, over 40km upstream of the Site.

2.2 Ground Conditions and Aquifers

Soils underlying the Site are described as naturally wet loamy and clayey soils of coastal flats with naturally high groundwater (Ref. 3). The superficial geology consists of Alluvium – clay, silt, sand and gravel (Ref. 4), which supports a Secondary (undifferentiated) aquifer (Ref. 5). Such aquifers are defined by rock layers or drift deposits with a wide range of permeability and storage, which have previously been designated as both minor and non-aquifer. The bedrock geology underlying the Site consists of the London Clay Formation – clay and silt, which has no aquifer designation.

3 DATA SOURCES

Information has been drawn from web-based and published sources, outlined below, as well as having been collected through consultation with the EA who provided Flood Product 4 and Flood Product 8 data packs (Ref. 6).

Web-based sources:

- Flood Estimation Handbook (FEH) Web-Service;
- EA What's In Your Backyard? Interactive Maps;
- EA Long Term Flood Risk, Interactive Maps (Ref. 7);
- EA Flood Map for Planning (Ref. 8);
- Cranfield Soil and AgriFood Institute, Soilscales Viewer;
- British Geological Survey, Geology of Britain Viewer.

Published documents:

- THLBC Level 2 Strategic Flood Risk Assessment (SFRA) (Ref. 9);
- THLBC Preliminary Flood Risk Assessment (PFRA) (Ref 10);
- THLBC Local Flood Risk Management Strategy (LFRMS) (Ref. 11);
- Surface Water Management Plan for THLBC (SWMP) (Ref. 12);
- Thames Estuary 2100 (TE2100) Plan (Ref. 13).

4 RELEVANT PLANNING POLICES & DESIGNATIONS

4.1 NPPF and Flood Risk

The NPPF (Ref. 14) and accompanying flood risk and coastal change planning practice guidance (PPG) (Ref. 15) set out the Government's planning policy for England and advises on '*how to take account of and address the risks associated with flooding and coastal change in the planning process*'. The principal aim of the NPPF is to achieve sustainable development by accounting for flooding at all stages of the planning process, avoiding inappropriate development in areas at risk of flooding and directing development away from areas where risks are highest. Where development is necessary in areas at risk of flooding, the NPPF aims to ensure it is safe, without increasing flood risk to third parties.

Early adoption of, and adherence to, the principles set out in the NPPF and its PPG, with respect to flood risk, ensures that detailed designs and plans for development take due account of flood risk and the need for appropriate mitigation, if required.

4.2 The Sequential and Exception Tests

The NPPF identifies four Flood Zone classifications, detailed in Table 1 below.

Table 1 Flood Zones (Source: PPG, Table 1)

Flood Zone	Definition
Zone 1 – Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding.
Zone 2 – Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.
Zone 3a – High Probability	Land having a greater than 1 in 100 annual probability of river flooding; or land having a greater than 1 in 200 annual probability of sea flooding.
Zone 3b – The Functional Floodplain	Land where water flows or is stored in times of flood.

The NPPF specifies that the suitability of all new development in relation to flood risk should be assessed by applying the Sequential Test to demonstrate that there are no reasonably available sites in areas with a lower probability of flooding that would be appropriate to the type of development proposed. The NPPF provides guidance on the compatibility of each land use classification in relation to each of the Flood Zones, as summarised in Table 2.

Table 2 Flood Risk Vulnerability and Flood Zone Compatibility (Source: PPG, Table 3)

Flood Zone	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	✓	Exception Test required	✓	✓

Flood Risk Review

Flood Zone	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 3a	Exception Test required	✓	X	Exception Test required	✓
Zone 3b	Exception Test required	✓	X	X	X
Key: ✓ Development is appropriate X Development should not be permitted					

When the Exception Test is triggered, this requires the development proposals to demonstrate wider sustainability benefits to the community that outweigh flood risk, and that the development will be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce overall flood risk.

The Site has been assessed against the NPPF planning tests in Section 6 of this report.

5 FLOOD RISK SOURCES AND FLOODING HISTORY

5.1 Overview

In line with best practice, flood risk from the range of possible sources listed in Table 3 has been considered.

Table 3 Potential Sources of Flooding

Source of Flooding	Description
1. Flooding from the sea (Coastal and Tidal)	Flooding originating from nearby sea or connected waterbody when seawater overflows onto land through extreme tidal conditions, storm surge or breach.
2. Flooding from rivers (Fluvial)	Floodwater originating from a nearby watercourse when the amount of water exceeds the channel capacity of that watercourse.
3. Flooding from land (Surface Water)	Flooding caused by intense rainfall exceeding the available infiltration and/or drainage capacity of the ground.
4. Flooding from groundwater	Flooding caused when groundwater levels rise above ground level following prolonged rainfall.
5. Flooding from reservoirs, canals and other artificial sources and sewers	Failure of infrastructure that retains or transmits water or controls its flow.

5.2 Historical Flooding

Historical flood records provided by the EA identify the Site as situated on land affected by the 1947 River Thames and River Lee flood event and on the boundary of the area impacted by the 1928 River Thames flood event. The THLBC Level 2 SFRA states that the March 1947 floods '*affected nearly all of the main river in the south of England and caused the greatest flood event on the River Lee since records began*'. The SFRA identifies that flood defence structures were installed following this flood to '*prevent a repeat of the consequences*'.

The THLBC PFRA *Summary Map of Past Floods – Main River / Fluvial / Tidal Incidents* map identifies the Site as having been affected by flooding. No specific event details are available, but this likely relates to the 1947 and 1928 flood events. In addition, the THLBC Level 2 SFRA identifies that parts of Tower Hamlets, particularly the area around the confluence of the River Lee and the River Thames, were impacted by flooding in 1953, caused by a storm surge. During this event, the Site is not located within the mapped flood outline, but areas less than 200m east of the Site were affected.

The THLBC Level 2 SFRA *Recorded Incidents of Sewer Flooding* map identifies flooding incidents within the Borough. No specific location information is available, instead flood incidents are defined based on postal code and there are three recorded incidents of sewer flooding in the E14 0 area.

The THLBC PFRA holds one record of groundwater flooding affecting the Borough, consisting of standing water emergence on Eric Street in December 2004, which is located approximately 2.5km northwest of the Site.

5.3 Flood Defences

The River Thames is tidally dominated through London, with the most severe flood risks associated with tidal surges. However, land within the Thames floodplain is defended by a combination of raised banks, river walls and tidal barriers, most notably the Thames Barrier.

The Thames Barrier and associated defence system protect to the 1 in 1,000 year standard (0.1% annual probability). The EA state that *'if levels and flows are forecast to be any higher [than the 1 in 1,000 year standard] the Thames Barrier would shut, ensuring that the tide is blocked and the river maintained to a low level. For this reason, the probability of any given water level upriver of the Barrier [beyond the 1 in 1,000 year standard] is controlled and therefore any associated return period becomes irrelevant.'*

In addition to the Thames Barrier, the River Thames and the River Lee are contained by river walls and raised banks. In proximity to the Site, the defences along the River Thames are raised to a height of 5.23mAOD and the defences along the River Lee are raised to a height of between 5.23mAOD and 5.28mAOD. The EA describes the condition of these defences as 'Good' to 'Moderate', denoting defences with some 'minor' to 'moderate' defects.

Through the combination of the Thames Barrier, river walls and other structures, it is considered that the Site is fully defended against flooding beyond the 0.1% annual probability extreme tide level.

The TE2100 Plan sets out the EA recommendations for flood risk management for London and the River Thames to 2100. The policy direction for the study area is to undertake future raising of the river walls on the River Thames to a minimum level of 6.20mAOD by 2100.

5.4 Flooding from the Sea

The EA *Flood Map for Planning*, identifies the Site as in an 'area benefitting from flood defences'. This designation identifies areas that benefit from formal flood defences that protect to a minimum of a 1 in 200 (0.5%) standard from the sea. The residual flood risk to the Site, ignoring the presence of flood defences, identifies the Site in Flood Zone 3, high flood risk (land having a greater than 1 in 200 (0.5%) annual probability of flooding from the sea). This denotes the high residual flood risk to the Site from the River Thames in the unlikely event of a failure/breach of the defences.

Modelled water levels applicable to the Site have been supplied by the EA, extracted from the TE2100 Plan. The TE2100 Plan provides values for the maximum likely floodwater level (1 in 1,000 year (0.1%) annual exceedance probability) for a present day scenario (2008) and two future scenarios (2065 and 2100), which also incorporate an allowance for climate change. Flood levels are provided for a model node located on the River Thames, approximately 800m south of the Site. The TE2100 Plan estimates extreme water levels of 4.67mAOD (present day, 2008) and design water levels of 5.16mAOD (future, 2065) and 5.65mAOD (future, 2100). These flood levels would result in overtopping of the current installed defences in the future (post 2065) scenarios. However, the TE2100 Plan provides recommendations for continuous improvement of defences along the River Thames, including their raising and repair, in line with predicted climate change impacts. It is therefore anticipated that the Thames flood defences will be maintained to provide a 0.1% standard of protection over the lifetime of any proposed development at the Site.

It is therefore considered highly unlikely that the installed defences will be overtopped, instead the greatest tidal flood risk from the River Thames or the River Lee corresponds to a failure (breach) of the defences.

The EA *Breach Modelling Map* (included in Appendix A), provides outlines for the predicted inundation areas following a breach of the River Thames flood defences coinciding with a 1 in 1,000 year (0.1%) annual exceedance probability flood event. Outlines are provided for a 2014 present day scenario and a 2100 future scenario, which incorporates an allowance for climate change.

The Site is located on the boundary of the flood outline for the 2014 scenario, with predicted flood levels of up to 2.393mAOD, and within the outline of the 2100 scenario, with predicted flood levels of up to 4.479mAOD. Compared with the Site's elevation, these flood levels demonstrate that the Site would experience flooding with depths of up to 0.279m in the 2100 future scenario, but would be flood free in the present day (2014) scenario. The likelihood of a defence breach is low, especially

considering the TE2100 recommendation for continuous improvement and repair, and it is therefore considered that there is a low risk of flooding from this source.

Overall, it is considered that the Site is at low risk of tidal flooding, due to the protection afforded by flood defences, but has a high residual risk of shallow flooding from this source in the unlikely event of defence failure (breach) in the future.

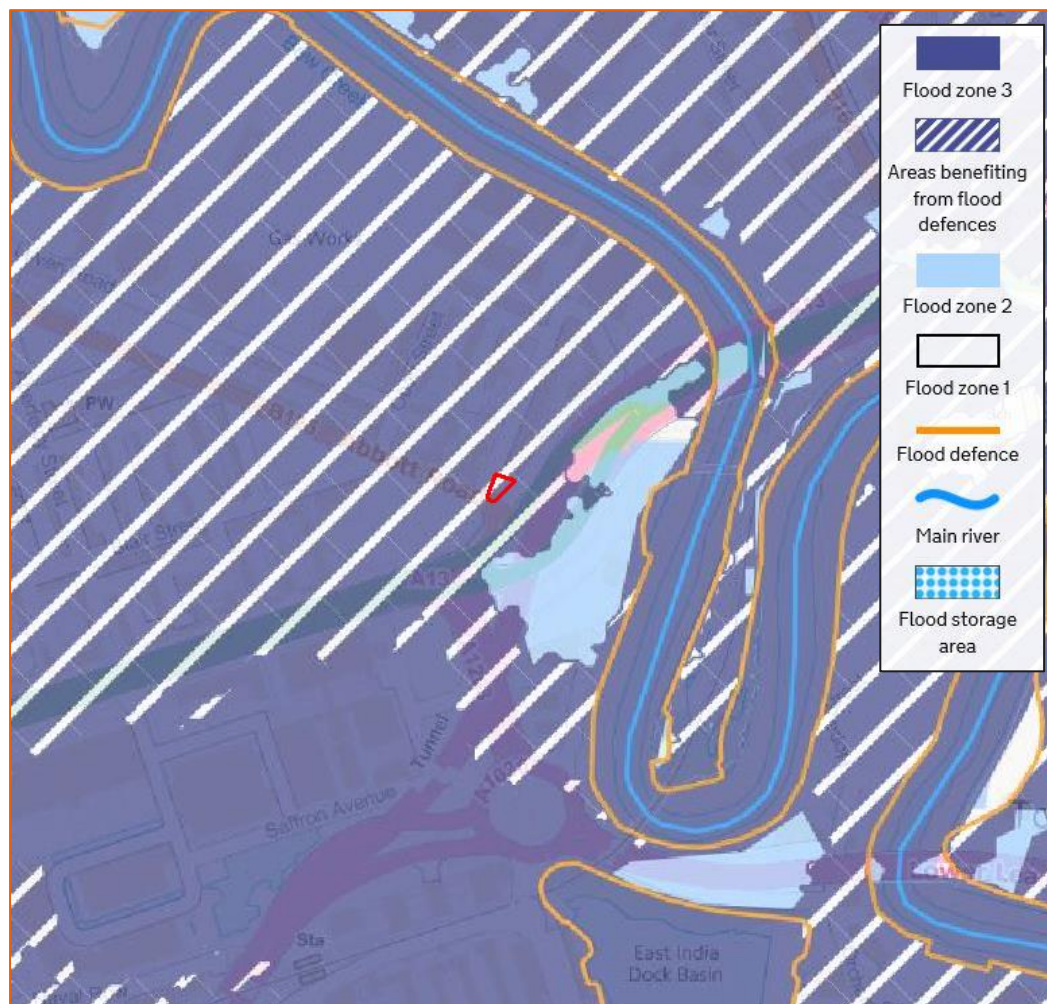


Figure 3 EA Flood Map for Planning. Site Boundary Outlined in Red.
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5.5 Flooding from Rivers

The EA *flood map for planning* identifies the Site within an area designated as 'benefitting from flood defences'. Modelled flood outlines supplied with the EA Product 4 data pack (Appendix A) show that the Site is fully defended for fluvial flood scenarios up to and including the 1 in 1,000 (0.1%) scenario, against maximum flood levels of up to 4.86mAOD, and therefore has a very low susceptibility to flooding from this source.

The EA *Flood Map for Planning* and EA Flood Zone classifications do not illustrate flood risk from non-Main River sources (ordinary watercourses). However, no ordinary watercourses have been identified in proximity to the Site.

Overall, it is considered that the Site is at low risk of fluvial flooding, due to the protection afforded by the flood defences, but has a high residual risk of flooding from this source in the unlikely event of defence failure (breach) in the future.

5.6 Flooding from Surface Water

The THLBC Draft LFRMS states that surface water flooding poses ‘*the most significant risk of flooding within the borough*’. This risk is due to rapid urbanisation within the borough and the subsequent increase in paved and impermeable surfacing. Most rainfall in the borough drains and is piped away via the combined sewer system, however, the sewer system has limited capacity, when combined with topographical low points and underground infrastructure, poses an increased risk of surface water flooding.

The SWMP for THLBC identifies 14 Critical Drainage Areas (CDAs) in the borough, however the Site is not included within one of these.

The EA Risk of Flooding from Surface Water map (Figure 4) identifies the entire Site as having a very low risk (having a less than 1 in 1,000 (0.1%) annual probability) of surface water flooding. Lanrick Road to the east, and the gardens of the terraced houses to the north, are designated with low risk (having between 1 in 100 (1%) and 1 in 1,000 (0.1%) annual probability) of surface water flooding. Surrounding the Site there are several areas of medium (having between 1 in 30 (3.3%) and 1 in 100 (1%) annual probability) and high risk (having a greater than 1 in 30 (3.3%) annual probability) of surface water flooding. These correspond to areas of lower topography where surface water pooling is likely or represent surface water overland flow paths.

Overall, it is considered that the Site is at low risk of surface water flooding.

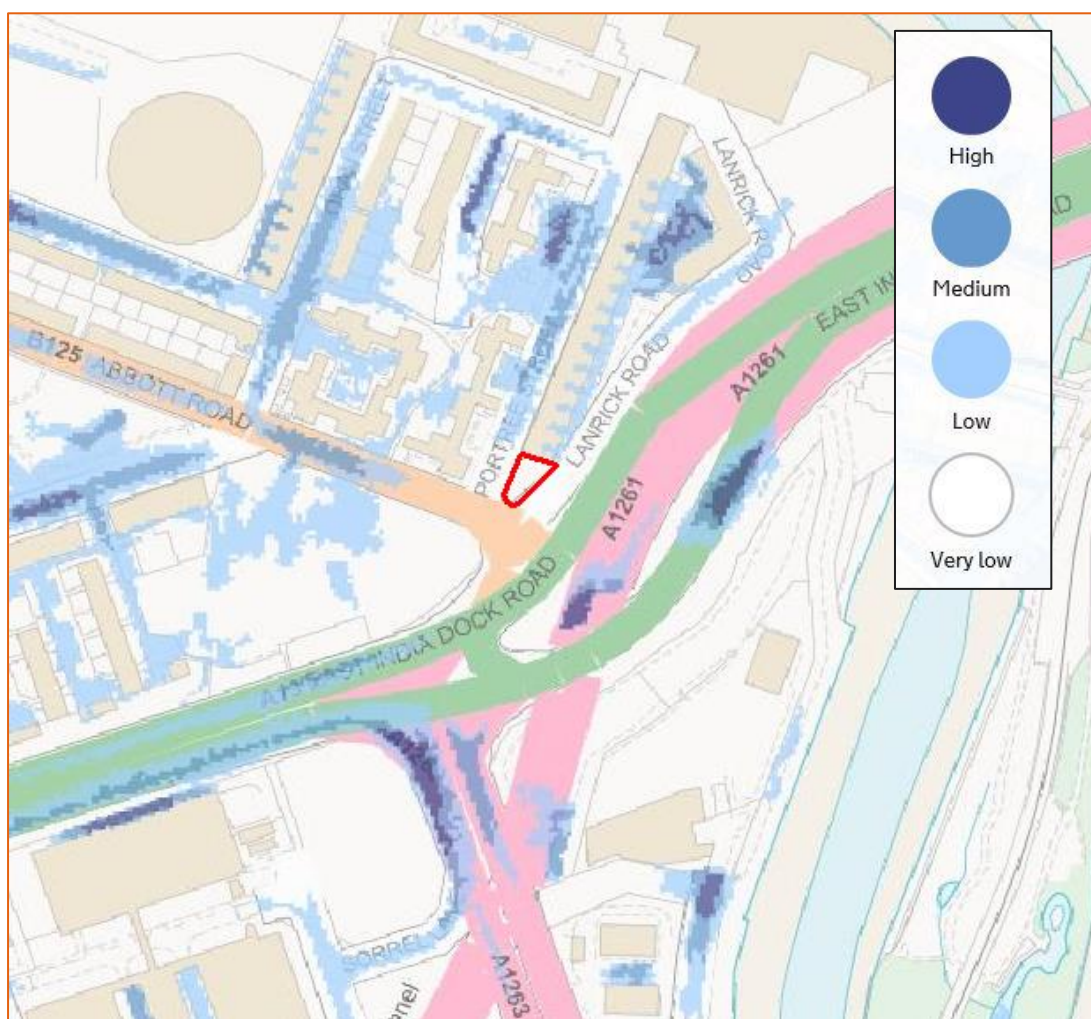


Figure 4: EA Risk of Flooding from Surface Water, Site Boundary Outlined in Red.
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5.7 Flooding from Sewers

The THLBC Level 2 SFRA states that *'the risk of flooding from sewers is increasing due to the increasing urbanisation of areas and rising rainfall intensities'* and the sewer network in London cannot cope. There are three records of sewer flooding within the E14 0 postal district.

The sewer network mainly consists of combined sewers and sewer flood risk is therefore intrinsically linked to surface water flood risk, which is considered to be a low risk.

Overall, it is considered that the Site is at low risk of sewer flooding, however it is recommended that consultation with Thames Water should be undertaken to understand the capacity of the local network serving the Site.

5.8 Flooding from Groundwater

The THLBC Draft LFRMS states that there are localised areas in the borough with *'more permeable substrate/ground'* and that therefore have a *'higher potential for groundwater flooding'*. However, this risk would only occur following the alignment of numerous factors, including the end/reduction of groundwater abstraction, significant periods of prolonged rainfall and/or the introduction of barriers to groundwater flow.

The Site is underlain by superficial deposits designated as Secondary (undifferentiated) aquifer, therefore has some, limited potential for groundwater emergence. The PFRA notes one incident of groundwater flooding in the borough, more than 2km from the Site.

Overall, it is considered that the Site is at low risk of groundwater flooding.

5.9 Flooding from Artificial Sources

The EA *Risk of Flooding from Reservoirs* map indicates that the Site is not located within the maximum extent of reservoir flooding, should large reservoirs fail and release the water that they hold. Areas surrounding the Site are identified as being at risk and this risk is associated with the Lee Valley reservoirs upstream of the Site, notably the William Girling and King George reservoirs. The consequence of reservoir breach can be very high, however continuing management of reservoirs under the Reservoirs Act 1975 serves to greatly reduce the likelihood of reservoir flooding.

The Site is located approximately 1.5km southeast of the Lee Navigation and the Limehouse Cut, which are identified as reaches of the national canal network. The distance of separation of the Site from these reaches and the flood defences installed in proximity to the Site means that no risk is predicted from these receptors.

Overall, it is considered that the Site is at low risk of flooding from artificial sources.

6 RISK RATING & RECOMMENDATIONS FOR FURTHER INVESTIGATION

Following an assessment of flood risk to the Site from all likely sources, it is considered that there is a **Low** risk of flooding from all sources. The degree of tidal and fluvial flood risk is dependent on the installed defences on the River Thames and the River Lee, which protect the Site up to the 0.1% flood event in the present day and in accordance with TE2100 policy should be maintained to provide the same level of protection into the future, accounting for the predicted effects of climate change.

Table 4 Flood Risk Sources

Source of Flooding	Flood Risk
1. Flooding from the Sea (Coastal and Tidal)	Low (High Residual)
2. Flooding from rivers (Fluvial)	Low (High Residual)
3. Flooding from land (Surface Water)	Low
4. Flooding from groundwater	Low
5. Flooding from reservoirs, canals and other artificial sources	Low
6. Flooding from sewers	Low

Following the NPPF guidance, the Site would be suitable for '*Water Compatible*' and '*Less Vulnerable*' development types, but would trigger application of the Exception Test for '*More Vulnerable*' (which includes residential land use) and '*Essential Infrastructure*' uses. The Site would not be appropriate for '*Highly Vulnerable*' development types (which notably includes basement dwellings).

As a defended Site, there is a residual risk of flooding, and any future planning application for development of the Site would need to be informed by a Flood Risk Assessment. The FRA would be a more detailed assessment than is presented in this Flood Risk Review and would need to be specific to the type and layout/configuration of development that is proposed. The FRA should demonstrate that any proposed development would not be subject to an unreasonable risk of flooding and would not increase flood risk to third parties. If proven, this would satisfy the NPPF Exception Test.

It is considered that there is a low risk of surface water flooding and sewer flooding, however there is an increasing risk of surface water and sewer flooding in the borough. Surface water drainage and runoff from the Site, including available connections with the sewer network, should be further investigated and it should be ensured that drainage is managed to a high standard. Further investigation should include the calculation of current rainfall-runoff rates and volumes, greenfield runoff rates for the Site and confirmation of the available capacity of the local and wider sewer networks.

A Drainage Strategy should be developed, detailing methods to manage runoff from the Site, which would ideally be controlled to match greenfield rates by adopting suitable Sustainable Drainage (SuDS) techniques.

Overall, it is considered that, with the exception of basement dwellings, the Site is appropriate for residential and most other forms of development.

7 REFERENCES

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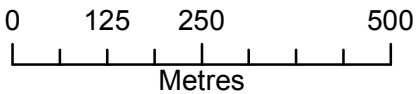
APPENDIX A

ENVIRONMENT AGENCY FLOOD PRODUCT 4 AND FLOOD PRODUCT 8 DATA PACKS

Flood Map for Planning centred on Lanrick Road, Tower Hamlets, E14 0JP - 20/07/2017 - HNL52203



Environment Agency
2 Bishops Square Business Park
St Albans Road West
Hatfield
Hertfordshire
AL10 9EX



Legend

Main Rivers

Flood Map for Planning

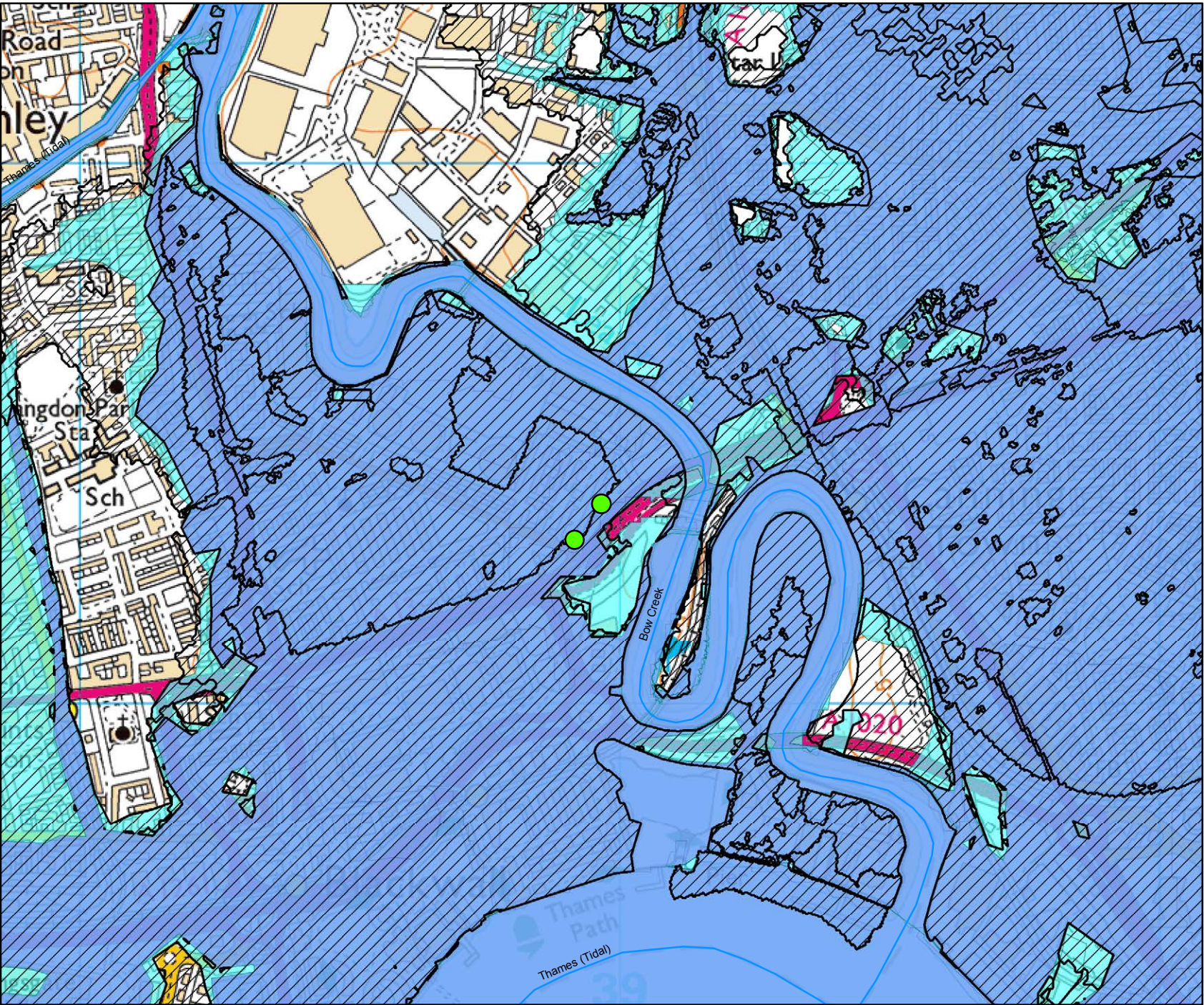
- Flood Storage Area
- Areas Benefiting from Flood Defences
- Flood Zone 3
- Flood Zone 2

Flood Map for Planning (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

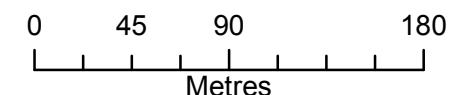
Produced by:
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Detailed FRA centred on Lanrick Road, Tower Hamlets, E14 0JP - 20/07/2017 - HNL52203



Environment Agency
2 Bishops Square Business Park
St Albans Road West
Hatfield
Hertfordshire
AL10 9EX



Legend

— Main Rivers

Defended Flood Outlines

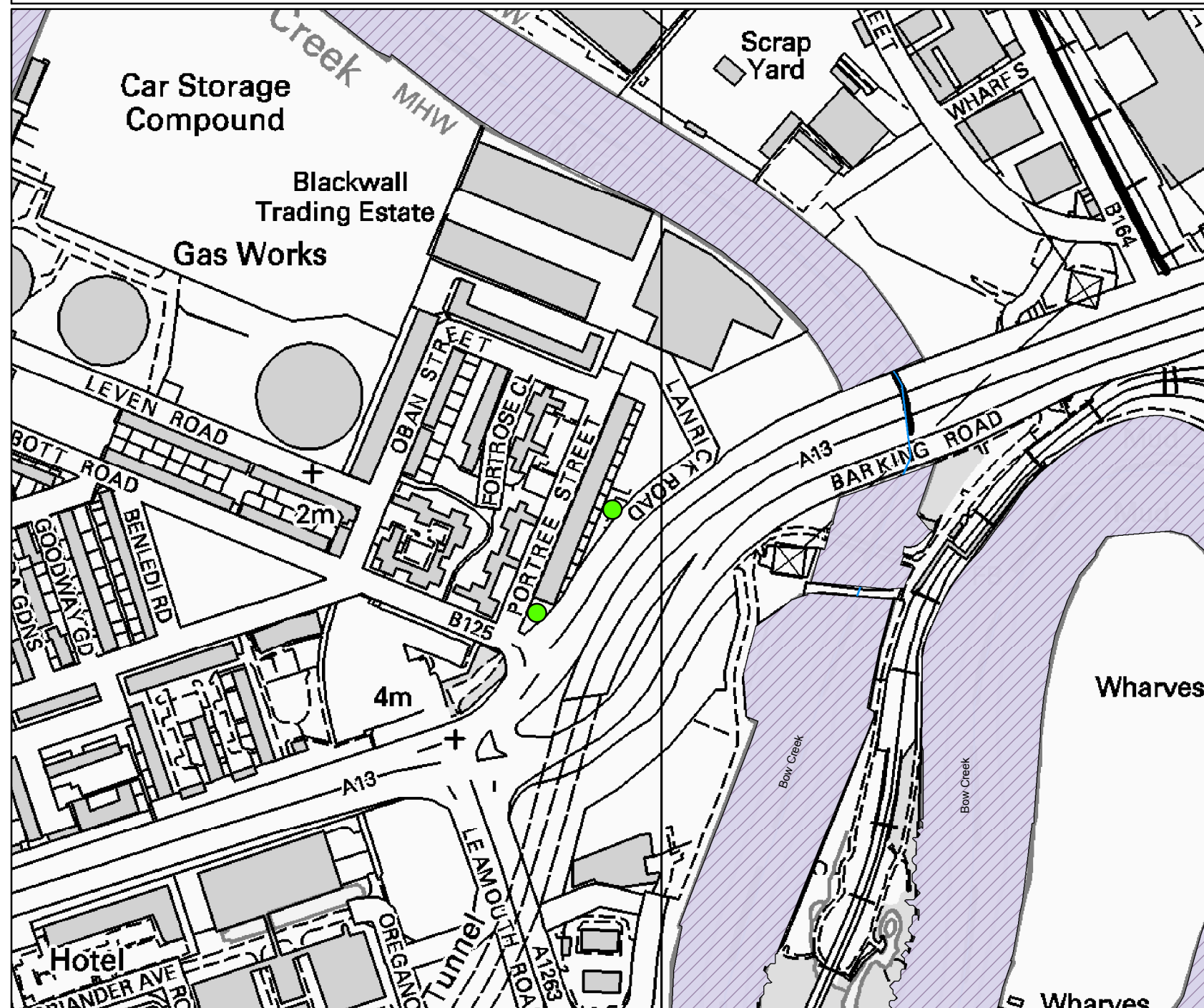
- 1 in 2 (50%) Defended
- 1 in 5 (20%) Defended
- 1 in 10 (10%) Defended
- 1 in 20 (5%) Defended
- 1 in 50 (2%) Defended

The data in this map has been extracted from the River Lee 2D Flood Mapping Study (CH2M Hill, 2014). This was a catchment-scale mapping study, so may need local updates for site-specific decisions. It should be noted that it was not created to produce flood levels for specific development sites within the catchment.

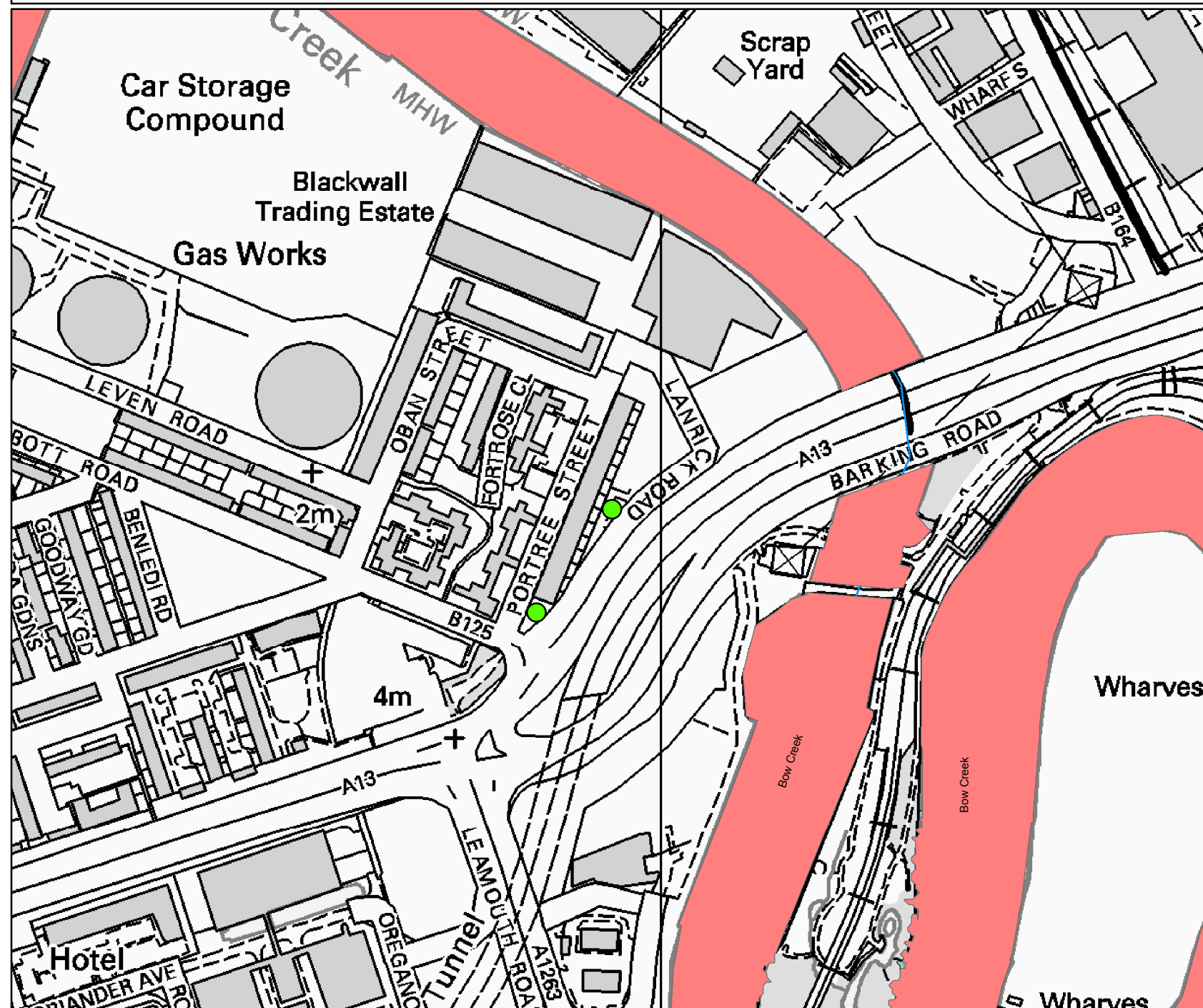
Modelled outlines take into account catchment-wide defences. Updates to model M03 were undertaken by the Lower Hall Sluices Operational Scenario Modelling (CH2M Hill, 2014), and updates to model M04 by the Lower Lee Tributaries Economic Appraisal project (CH2M Hill, 2015).

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<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

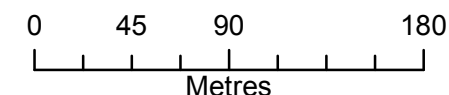
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Detailed FRA centred on Lanrick Road, Tower Hamlets, E14 0JP - 20/07/2017 - HNL52203








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Hatfield
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Legend

— Main Rivers

Defended Flood Outlines

- | | |
|---|-----------------------------|
|  | 1 in 75 (1.3%) Defended |
|  | 1 in 100 (1%) Defended |
|  | 1 in 100+20% (*CC) Defended |
|  | 1 in 200 (0.5%) Defended |
|  | 1 in 1000 (0.1%) Defended |

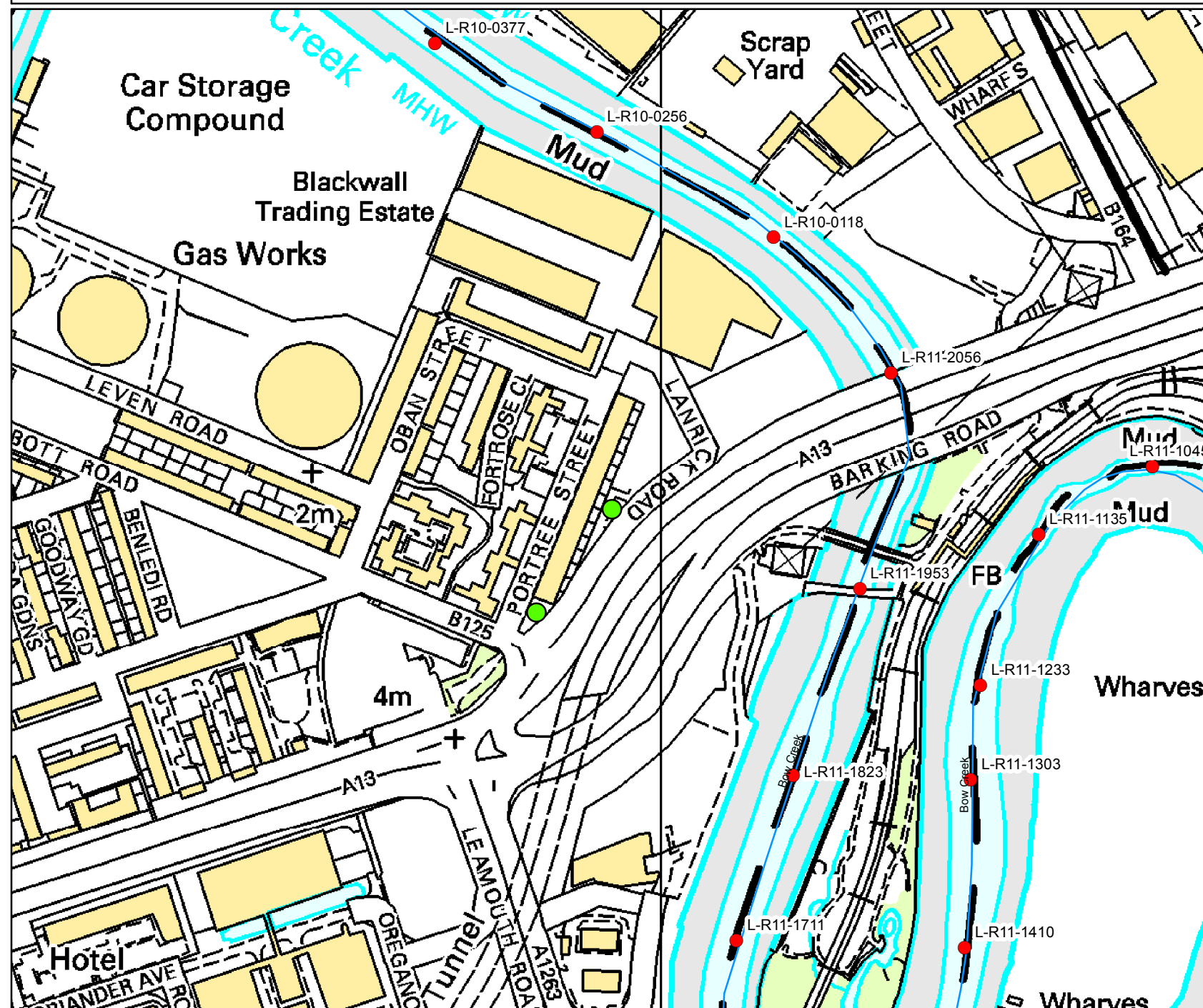
The data in this map has been extracted from the River Lee 2D Flood Mapping Study (CH2M Hill, 2014). This was a catchment-scale mapping study, so may need local updates for site-specific decisions. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment-wide defences. Updates to model M03 were undertaken by the Lower Hall Sluices Operational Scenario Modelling (CH2M Hill, 2014), and updates to model M04 by the Lower Lee Tributaries Economic Appraisal project (CH2M Hill, 2015).

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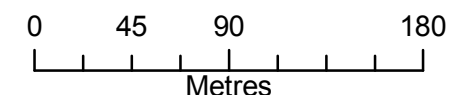
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Legend

— Main Rivers

1D Node Results

- Node Results

The data in this map has been extracted from the River Lee 2D Flood Mapping Study (CH2M Hill, 2014). This was a catchment-scale mapping study, so may need local updates for site-specific decisions. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment-wide defences. Updates to model M03 were undertaken by the Lower Hall Sluices Operational Scenario Modelling (CH2M Hill, 2014), and updates to model M04 by the Lower Lee Tributaries Economic Appraisal project (CH2M Hill, 2015).

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Environment Agency ref: HNL52203

The data in this map has been extracted from the River Lee 2D Modelling study (CH2M Hill, 2014).

Flood risk data requests including an allowance for climate change will be based on the 1 in 100 flood plus 20% allowance for climate change, unless otherwise stated. You should refer to 'Flood risk assessments: climate change allowances' to check if this allowance is still appropriate for the type of development you are proposing and its location. You may need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.

<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Caution:

This model has been designed for catchmentwide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment wide defences.

All flood levels are given in metres Above Ordnance Datum (mAOD)

All flows are given in cubic metres per second (cumecs)

MODELLED FLOOD LEVEL

			Return Period									
Node Label	Easting	Northing	2 yr	5 yr	10 yr	20 yr	50 yr	75 yr	100 yr	100 yr + 20%	200 yr	1000 yr
L-R10-0118	539073	181546	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.86	4.85	4.86
L-R10-0256	538958	181614	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.87	4.86	4.87
L-R10-0377	538853	181671	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.88	4.86	4.88
L-R11-1045	539318	181397	4.81	4.81	4.81	4.81	4.81	4.81	4.80	4.82	4.81	4.82
L-R11-1135	539245	181353	4.81	4.81	4.81	4.81	4.81	4.81	4.80	4.82	4.81	4.82
L-R11-1233	539207	181255	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.83	4.82	4.83
L-R11-1303	539201	181194	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.83	4.82	4.83
L-R11-1410	539197	181085	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.83	4.82	4.83
L-R11-1711	539049	181090	4.82	4.81	4.82	4.82	4.82	4.81	4.81	4.84	4.83	4.84
L-R11-1823	539086	181197	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.85	4.84	4.85
L-R11-1953	539129	181318	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.85	4.84	4.85
L-R11-2056	539149	181457	4.82	4.82	4.82	4.82	4.82	4.82	4.82	4.86	4.85	4.86

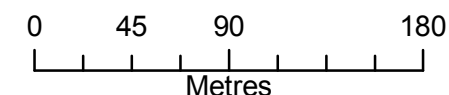
MODELLED FLOWS

			Return Period									
Node Label	Easting	Northing	2 yr	5 yr	10 yr	20 yr	50 yr		100 yr	100 yr + 20%	200 yr	1000 yr
L-R10-0118	539073	181546	194.01	210.64	216.39	220.44	241.34	260.49	270.37	280.49	277.48	298.26
L-R10-0256	538958	181614	190.67	207.30	213.08	217.15	238.65	257.37	267.30	277.36	274.21	295.06
L-R10-0377	538853	181671	187.61	204.24	209.99	214.09	236.21	254.49	264.45	274.49	271.17	292.06
L-R11-1045	539318	181397	228.85	245.26	251.05	255.01	271.71	294.27	304.84	314.60	313.04	331.97
L-R11-1135	539245	181353	225.97	242.41	248.20	252.18	269.13	291.47	302.06	311.78	310.21	329.17
L-R11-1233	539207	181255	222.56	239.03	244.82	248.88	266.11	288.19	298.80	308.45	306.86	325.86
L-R11-1303	539201	181194	219.95	236.40	242.19	246.34	263.77	285.66	296.29	305.87	304.23	323.30
L-R11-1410	539197	181085	216.38	232.85	238.55	242.81	260.51	282.16	292.83	302.26	300.49	319.76
L-R11-1711	539049	181090	207.41	223.95	229.68	233.89	252.50	273.39	284.12	293.31	291.04	311.05
L-R11-1823	539086	181197	204.16	220.73	226.40	230.53	249.75	270.22	280.85	290.11	287.71	307.89
L-R11-1953	539129	181318	200.70	217.29	222.99	226.99	246.86	266.87	277.24	286.82	284.14	304.57
L-R11-2056	539149	181457	196.98	213.59	219.33	223.36	243.77	263.30	273.30	283.30	280.41	301.08

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Hertfordshire
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Legend

— Main Rivers

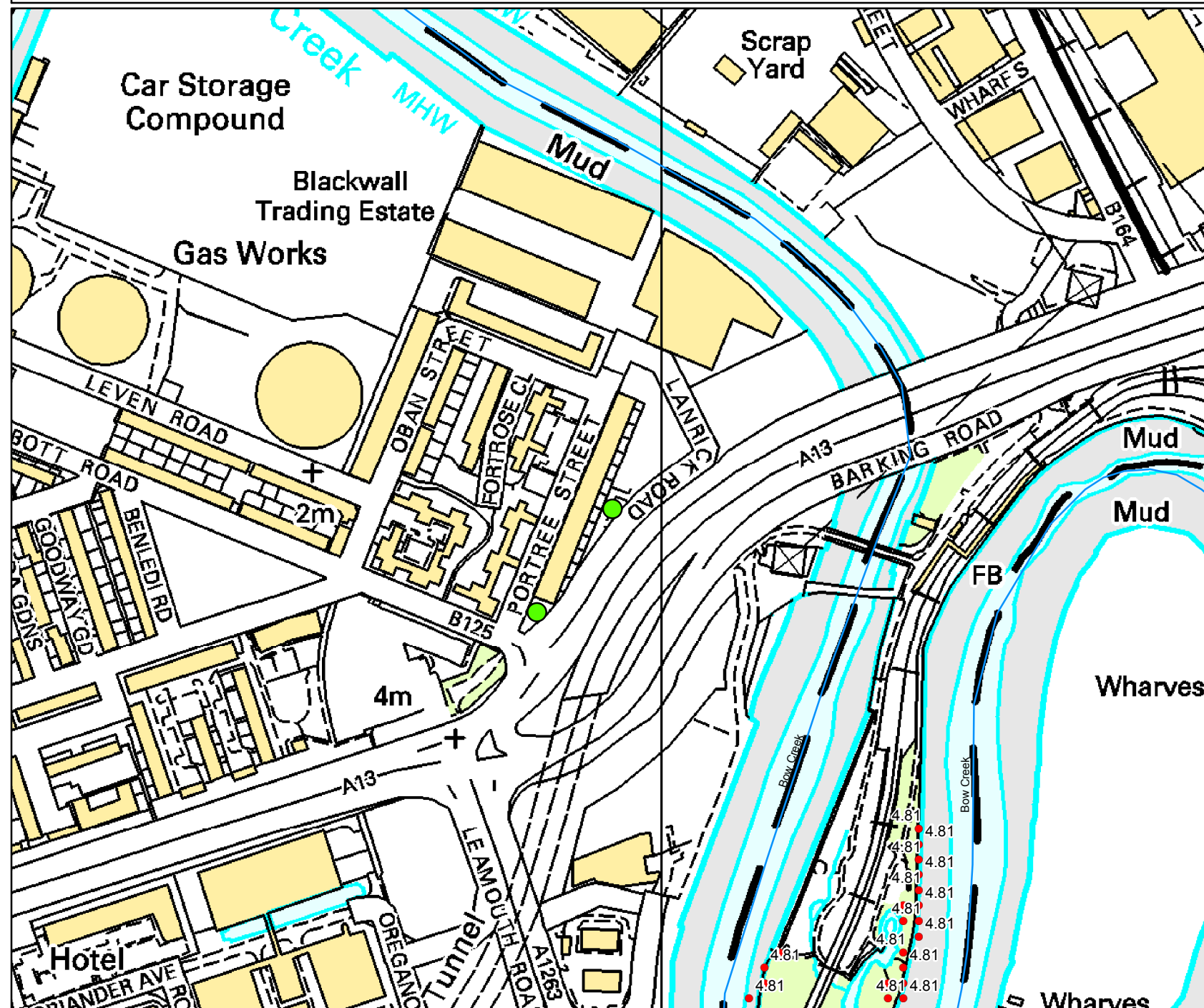
2D Node Results: Heights

● 1 in 2 (50%) Defended M04

The data in this map has been extracted from the River Lee 2D Flood Mapping Study (CH2M Hill, 2014). This was a catchment-scale mapping study, so may need local updates for site-specific decisions. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment-wide defences. Updates to model M03 were undertaken by the Lower Hall Sluices Operational Scenario Modelling (CH2M Hill, 2014), and updates to model M04 by the Lower Lee Tributaries Economic Appraisal project (CH2M Hill, 2015).

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<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

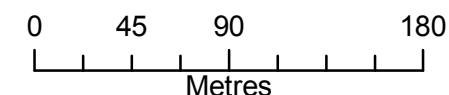
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Legend

— Main Rivers

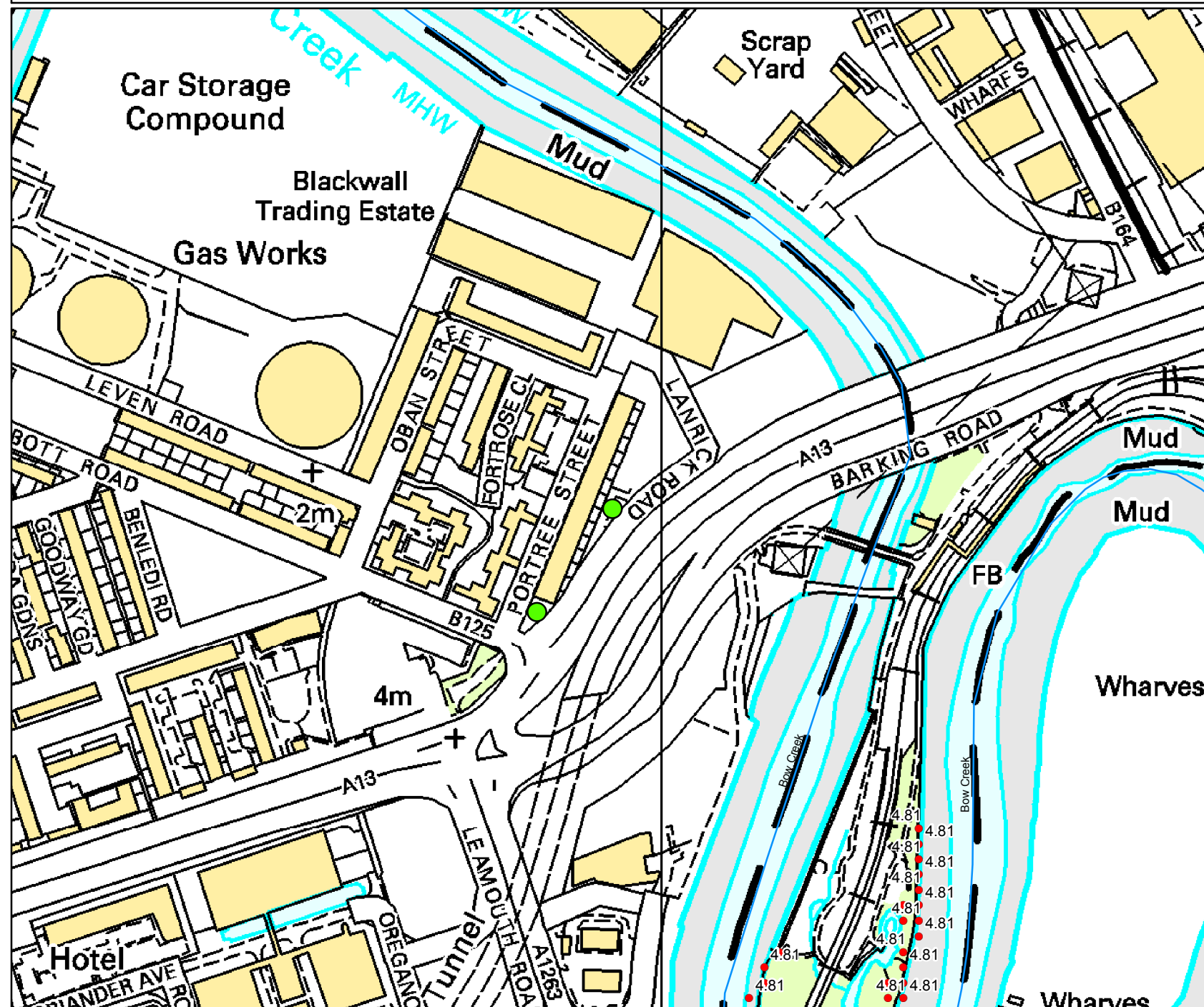
2D Node Results: Heights

● 1 in 5 (20%) Defended M04

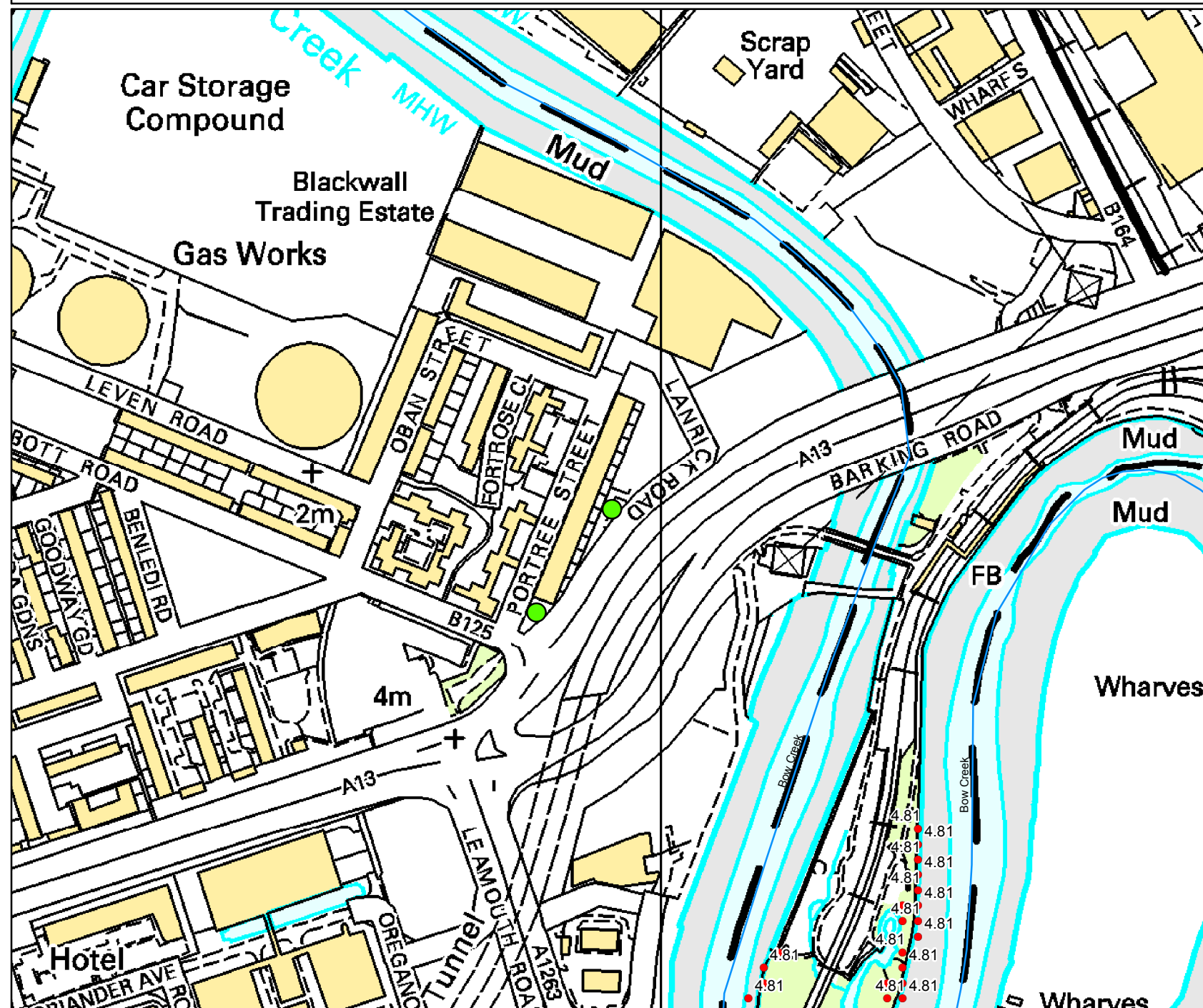
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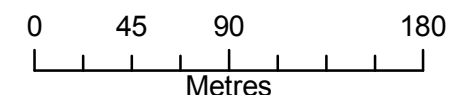
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Legend

— Main Rivers

2D Node Results: Heights

- 1 in 10 (10%) Defended M04

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<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

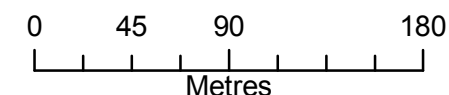
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Legend

— Main Rivers

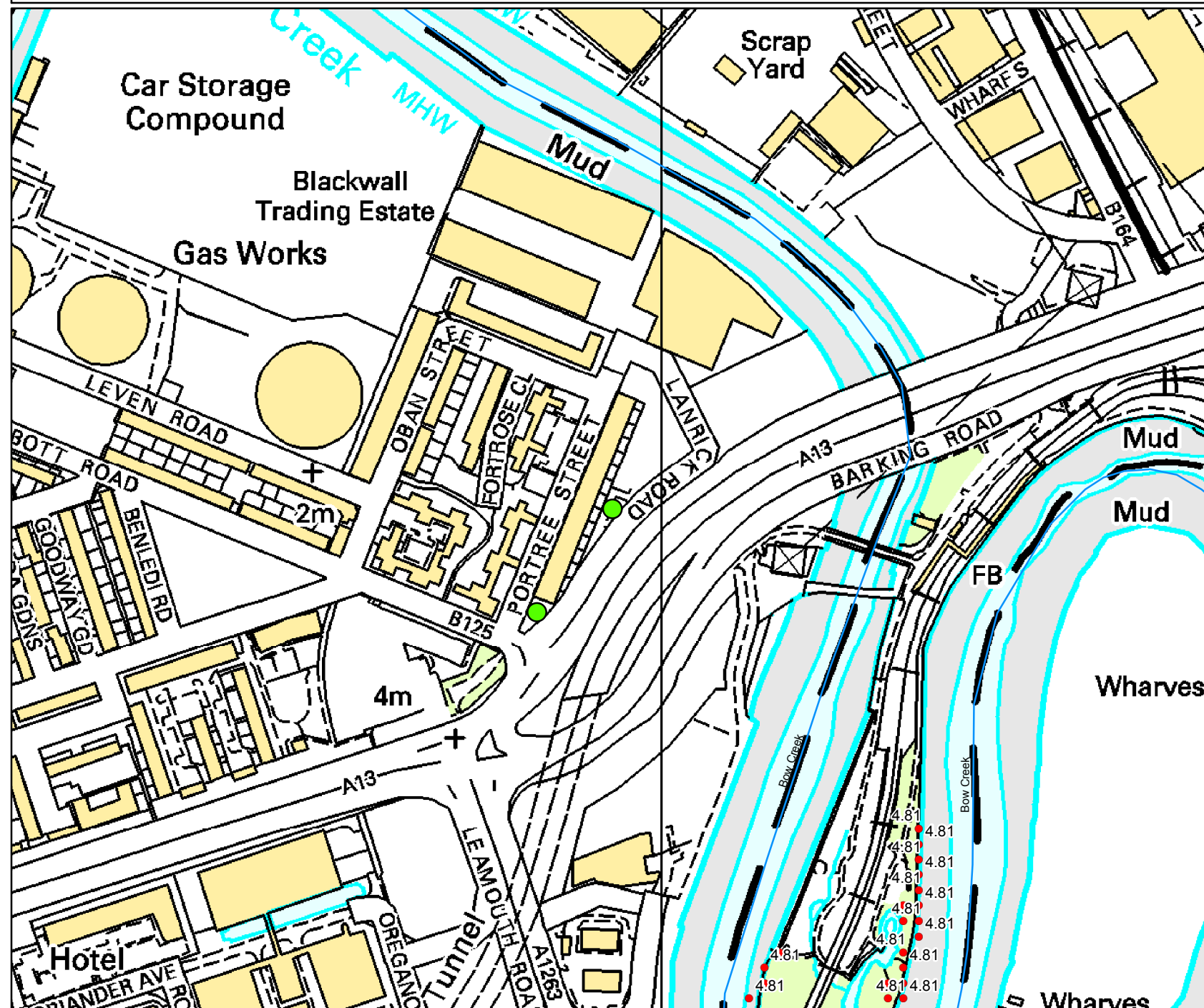
2D Node Results: Heights

● 1 in 20 (5%) Defended M04

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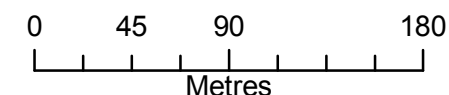
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Legend

— Main Rivers

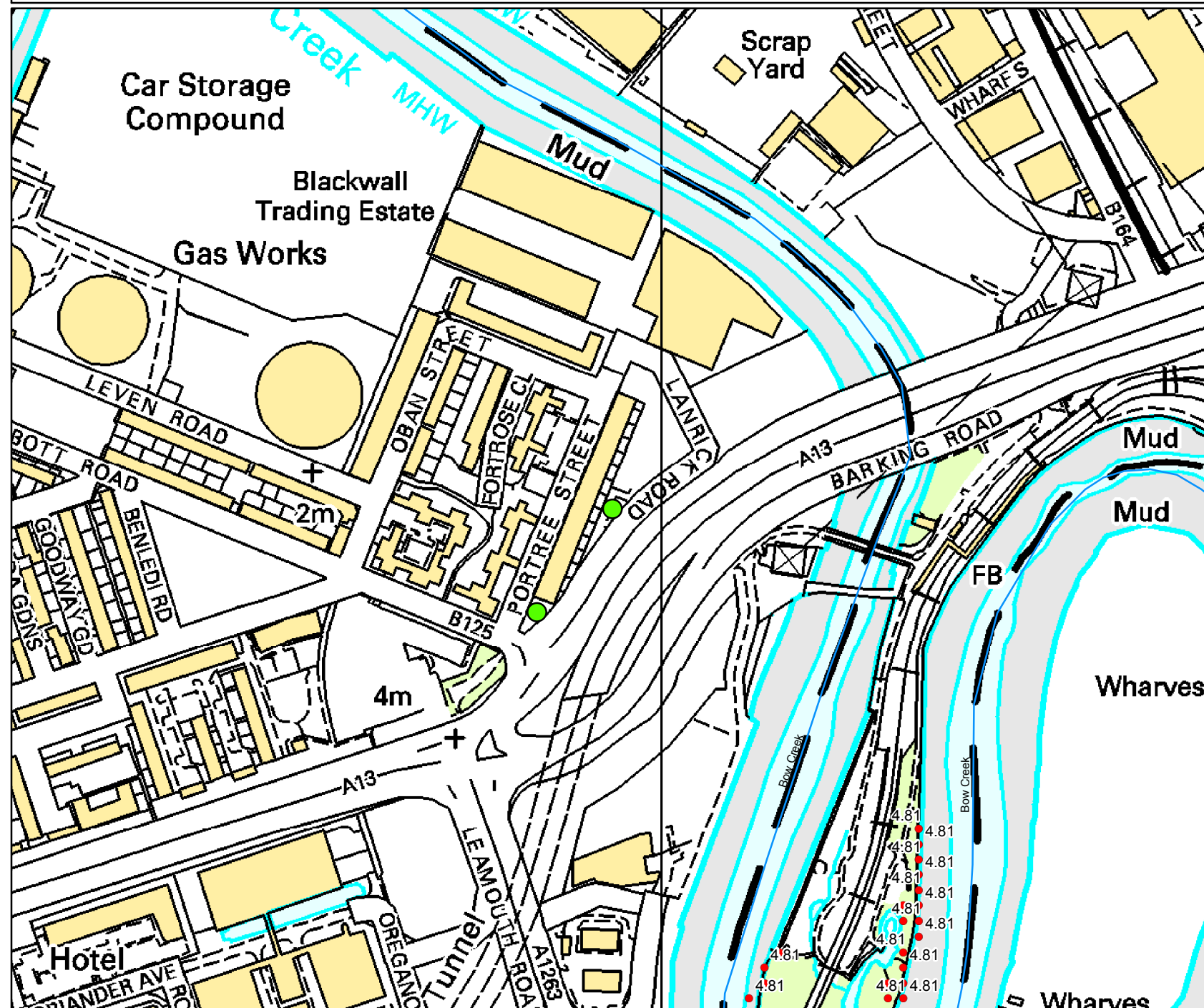
2D Node Results: Heights

● 1 in 50 (2%) Defended M04

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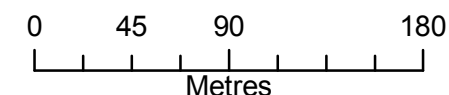
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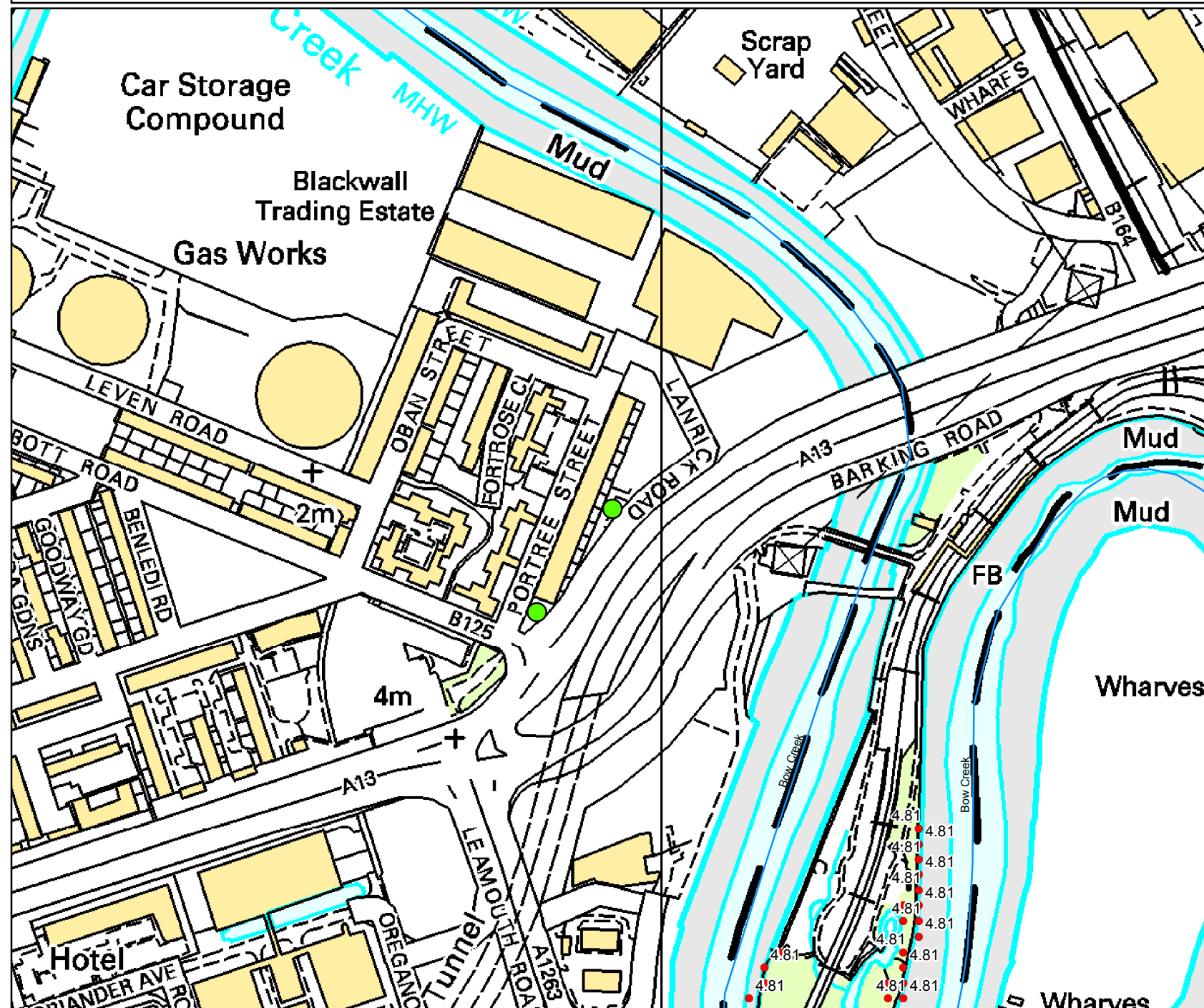
2D Node Results: Heights

● 1 in 75 (1.33%) Defended M04

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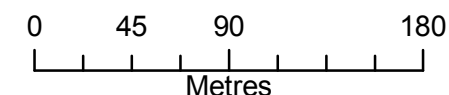
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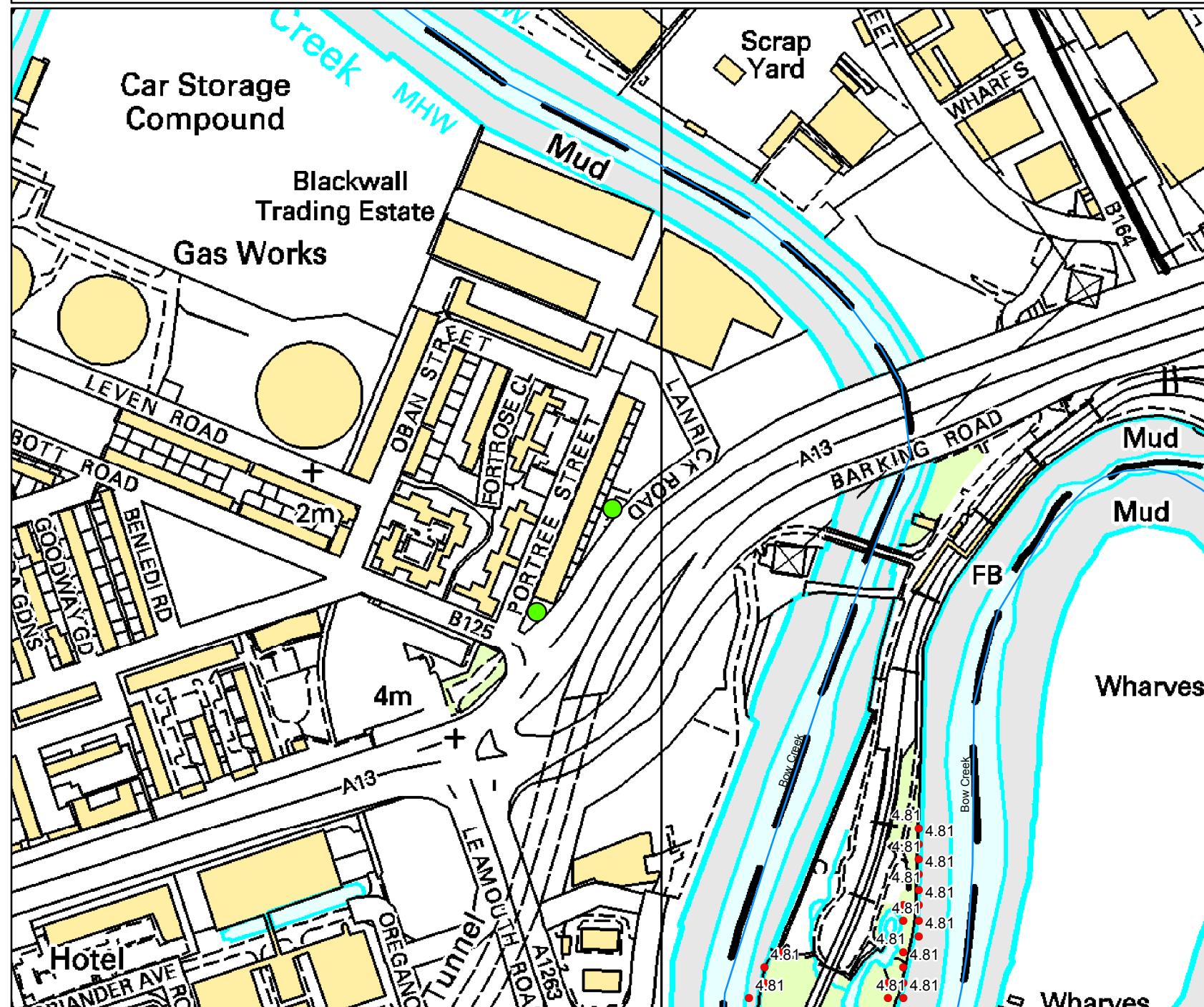
2D Node Results: Heights

● 1 in 100 (1%) Defended M04

The data in this map has been extracted from the River Lee 2D Flood Mapping Study (CH2M Hill, 2014). This was a catchment-scale mapping study, so may need local updates for site-specific decisions. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment-wide defences. Updates to model M03 were undertaken by the Lower Hall Sluices Operational Scenario Modelling (CH2M Hill, 2014), and updates to model M04 by the Lower Lee Tributaries Economic Appraisal project (CH2M Hill, 2015).

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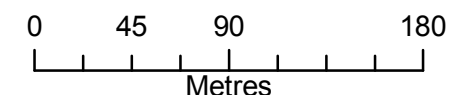
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Legend

— Main Rivers

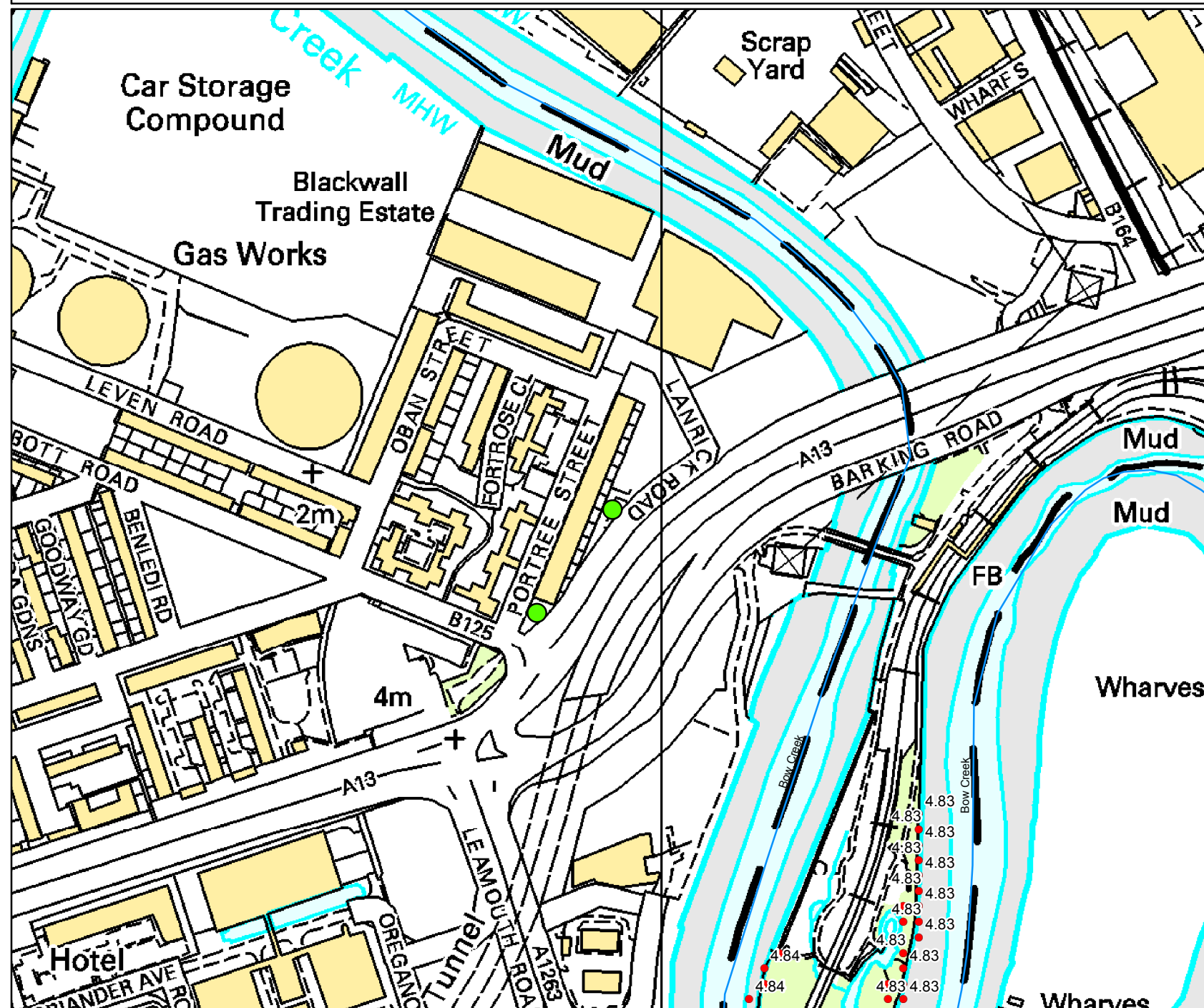
2D Node Results: Heights

● 1 in 100+20% (*CC) Defended M04

The data in this map has been extracted from the River Lee 2D Flood Mapping Study (CH2M Hill, 2014). This was a catchment-scale mapping study, so may need local updates for site-specific decisions. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment-wide defences. Updates to model M03 were undertaken by the Lower Hall Sluices Operational Scenario Modelling (CH2M Hill, 2014), and updates to model M04 by the Lower Lee Tributaries Economic Appraisal project (CH2M Hill, 2015).

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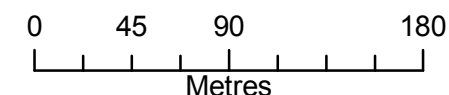
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Legend

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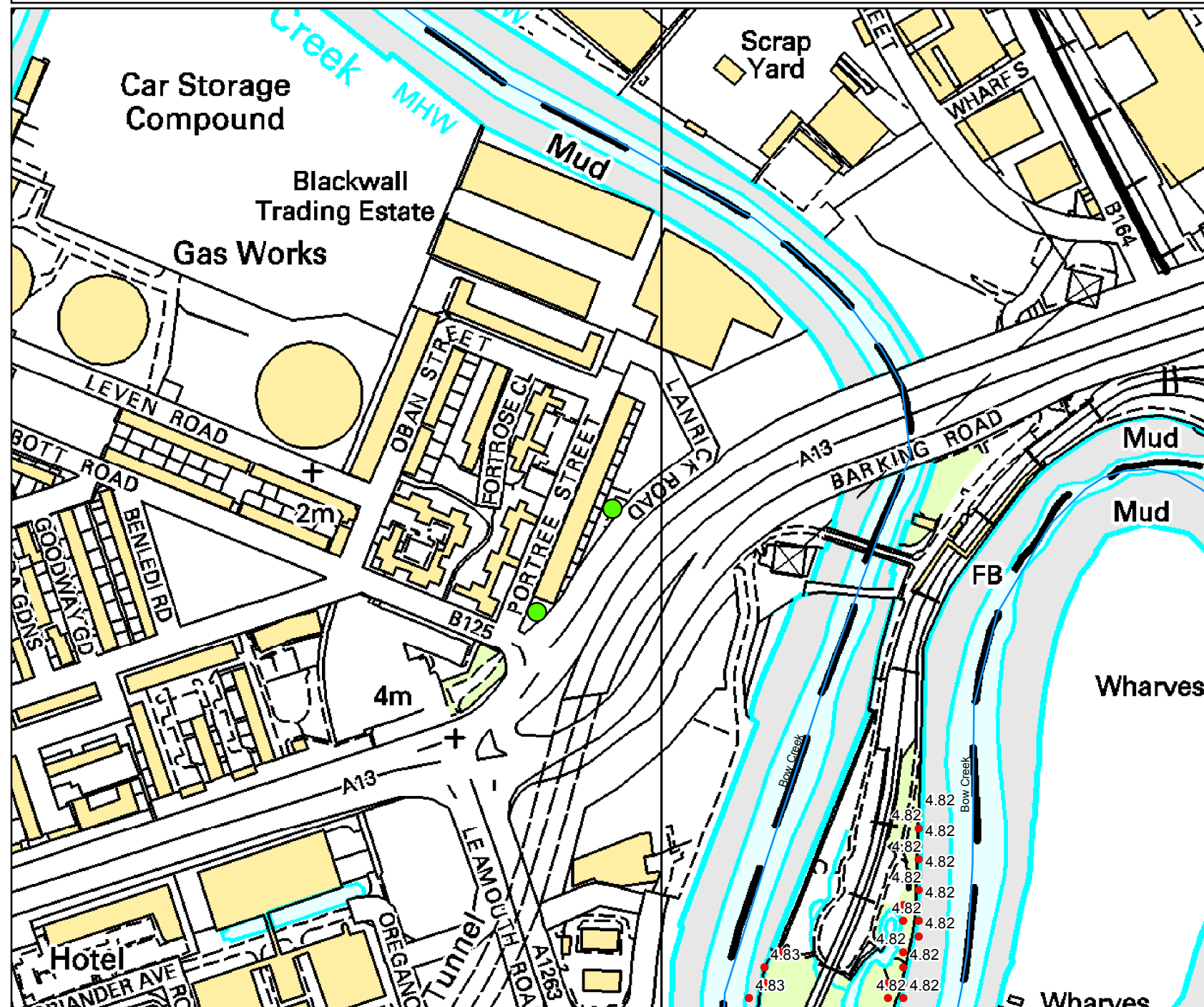
2D Node Results: Heights

• 1 in 200 (0.5%) Defended M04

The data in this map has been extracted from the River Lee 2D Flood Mapping Study (CH2M Hill, 2014). This was a catchment-scale mapping study, so may need local updates for site-specific decisions. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment-wide defences. Updates to model M03 were undertaken by the Lower Hall Sluices Operational Scenario Modelling (CH2M Hill, 2014), and updates to model M04 by the Lower Lee Tributaries Economic Appraisal project (CH2M Hill, 2015).

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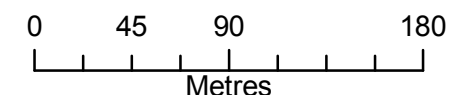
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Legend

— Main Rivers

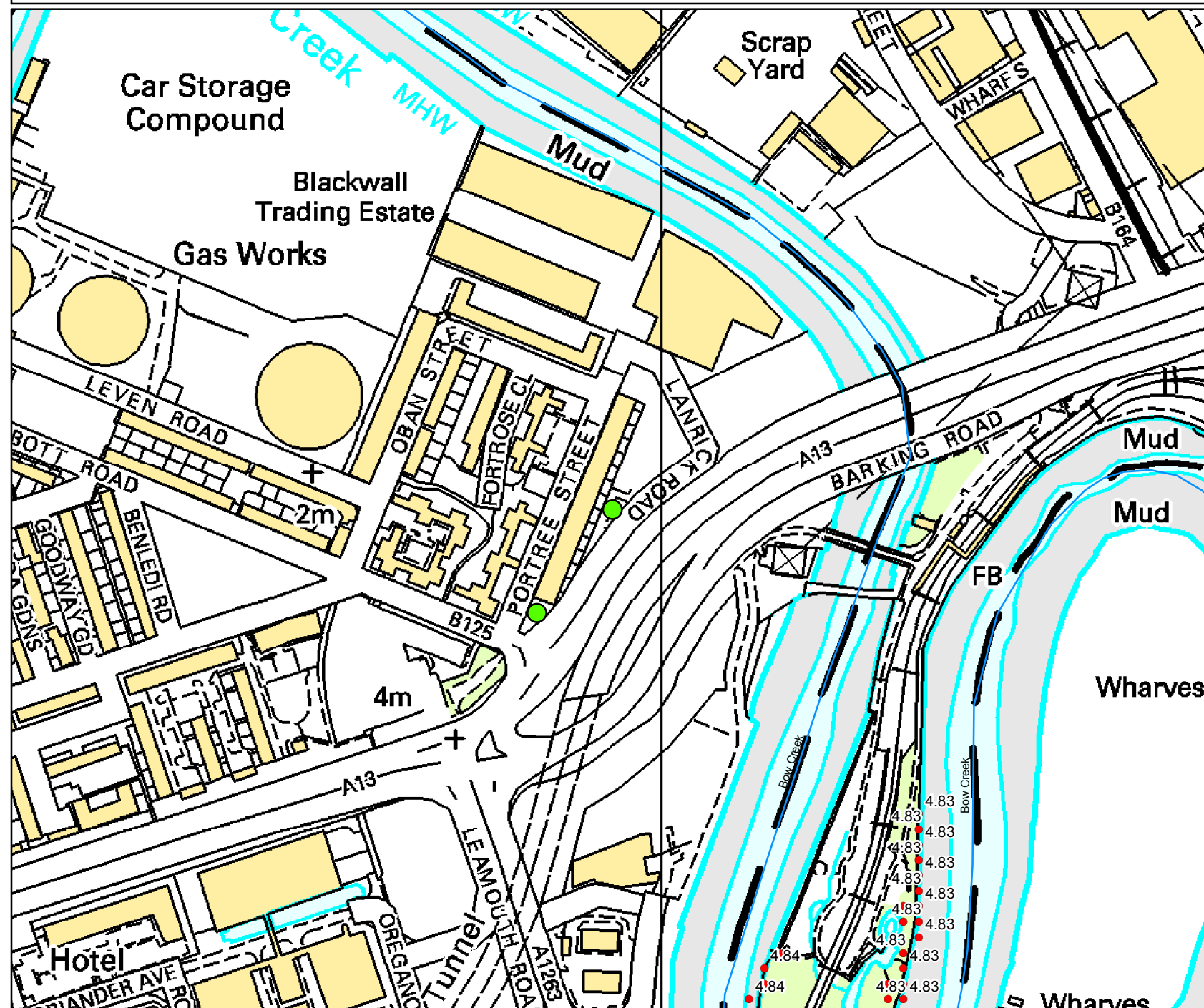
2D Node Results: Heights

● 1 in 1000 (0.1%) Defended M04

The data in this map has been extracted from the River Lee 2D Flood Mapping Study (CH2M Hill, 2014). This was a catchment-scale mapping study, so may need local updates for site-specific decisions. It should be noted that it was not created to produce flood levels for specific development sites within the catchment. Modelled outlines take into account catchment-wide defences. Updates to model M03 were undertaken by the Lower Hall Sluices Operational Scenario Modelling (CH2M Hill, 2014), and updates to model M04 by the Lower Lee Tributaries Economic Appraisal project (CH2M Hill, 2015).

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<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

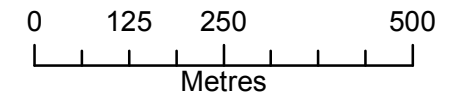
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Historic Flood Map centred on Lanrick Road, Tower Hamlets, E14 0JP - 20/07/2017 - HNL52203



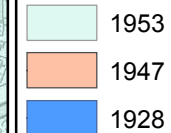
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Hatfield
Hertfordshire
AL10 9EX



Legend

— Main Rivers

Flood Event Outlines

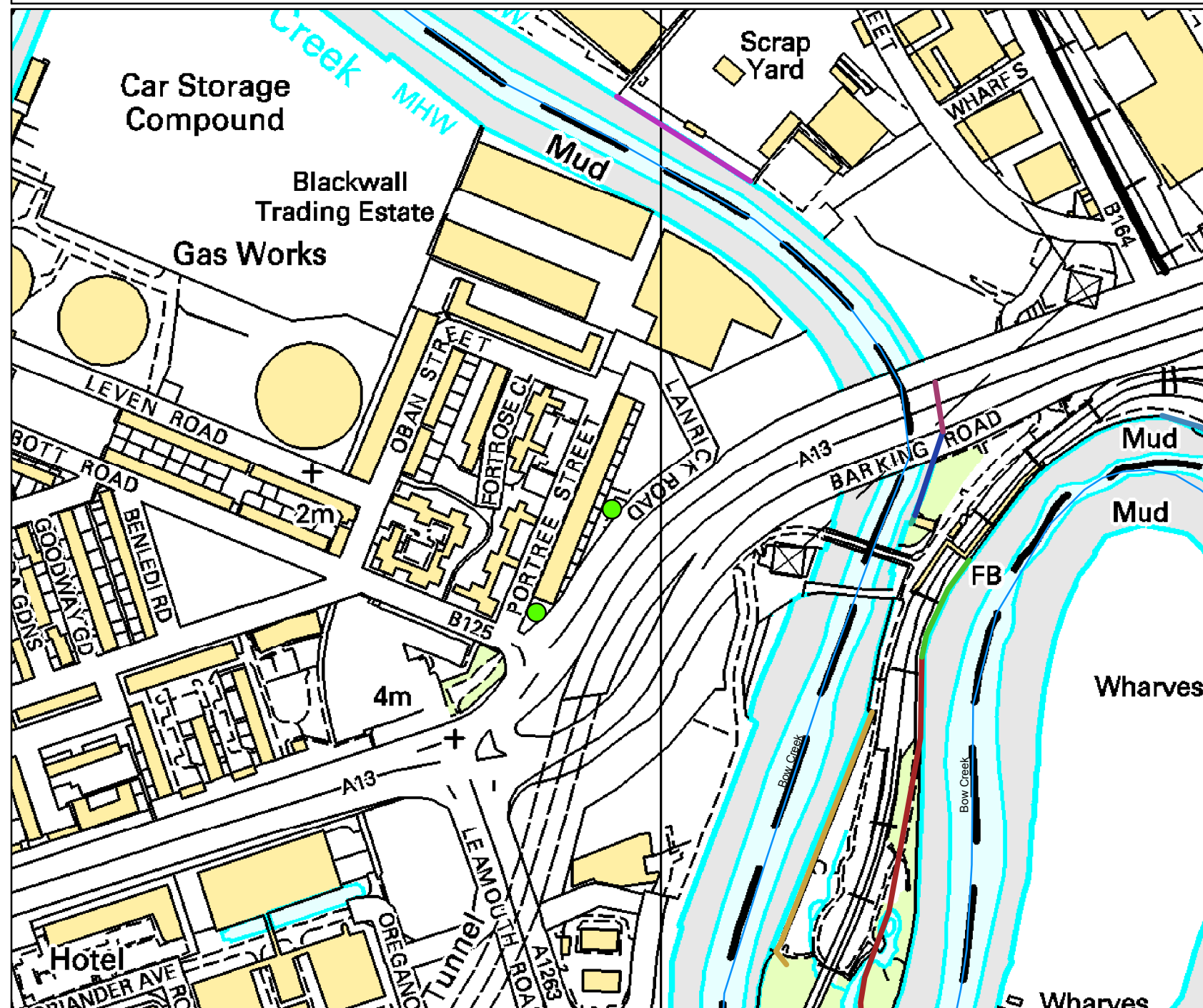


The historic flood event outlines are based on a combination of anecdotal evidence, Environment Agency staff observations and survey.

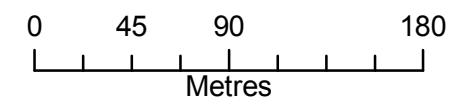
Our historic flood event outlines do not provide a definitive record of flooding. It is possible that there will be an absence of data in places where we have not been able to record the extent of flooding. It is also possible for errors occur in the digitisation of historic records of flooding.

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Structures and Defences centred on Lanrick Road, Tower Hamlets, E14 0JP - 20/07/2017 - HNL52203



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Legend

— Main Rivers

NAFRA DEFENCE

ASSET ID

8141

8142

8143

8258

8306

14355

14356

14357

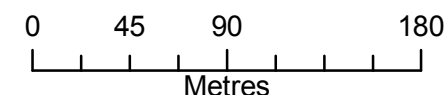
The following information on defences has been extracted from the Asset Information Management System (AIMS)

Produced by:
Partnerships & Strategic Overview,
Hertfordshire & North London

Structures and Defences centred on Lanrick Road, Tower Hamlets, E14 0JP - 20/07/2017 - HNL52203



Environment Agency
2 Bishops Square Business Park
St Albans Road West
Hatfield
Hertfordshire
AL10 9EX



Legend

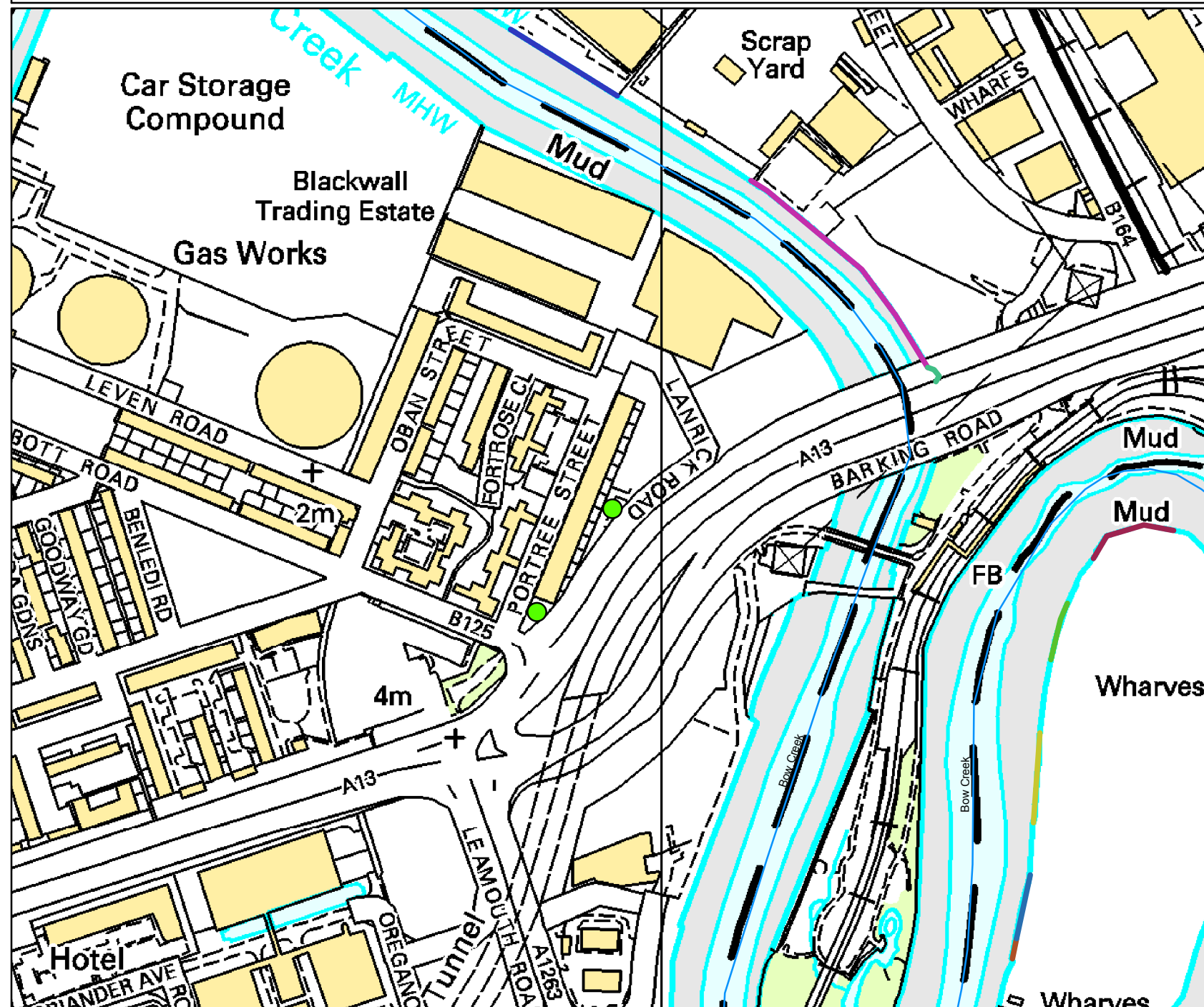
— Main Rivers

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- 14407
- 14408
- 14409
- 14428
- 14448
- 14449

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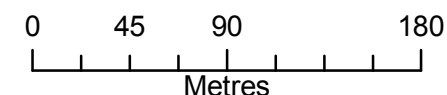
Produced by:
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Structures and Defences centred on Lanrick Road, Tower Hamlets, E14 0JP - 20/07/2017 - HNL52203



Environment Agency
2 Bishops Square Business Park
St Albans Road West
Hatfield
Hertfordshire
AL10 9EX



Legend

— Main Rivers

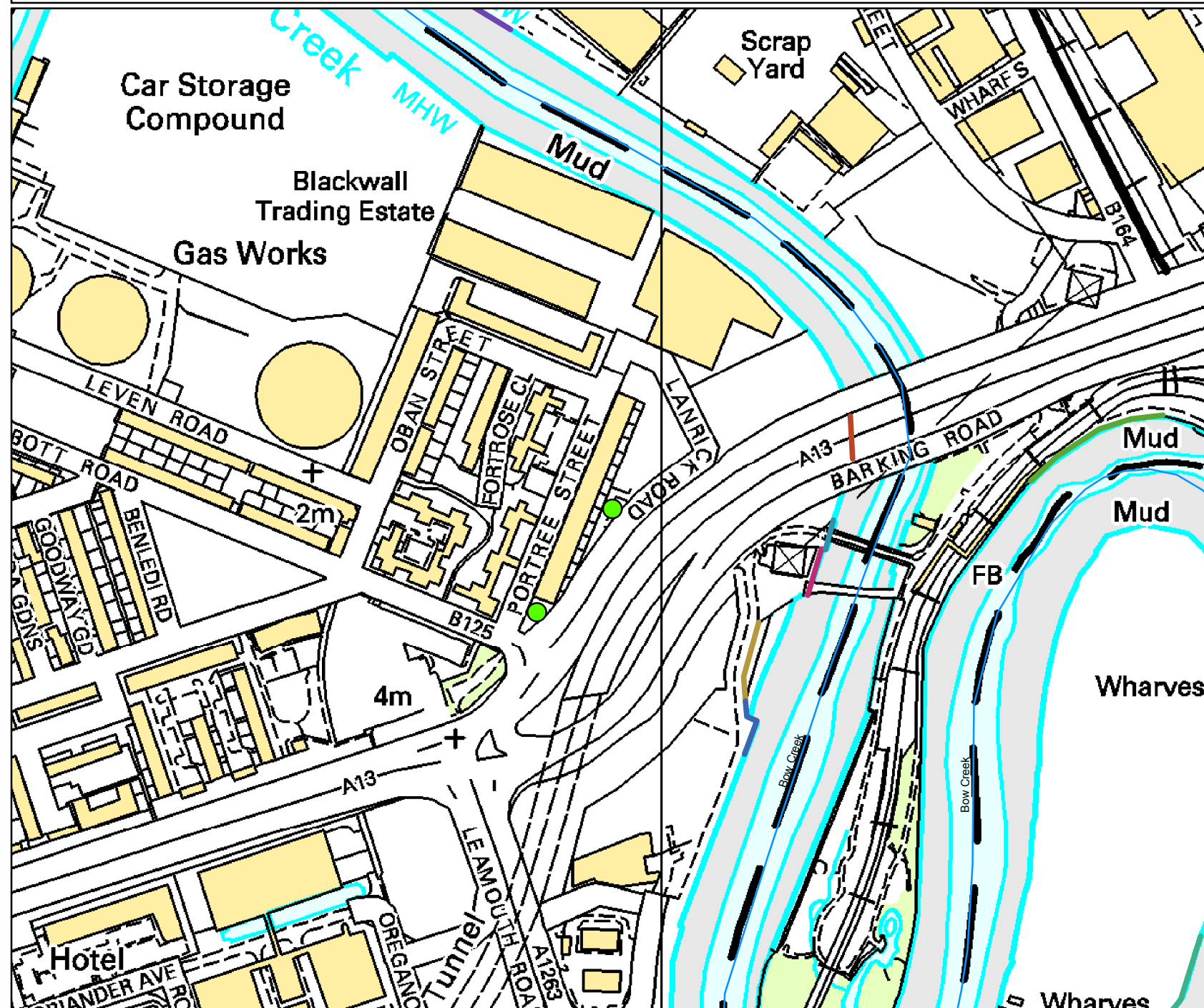
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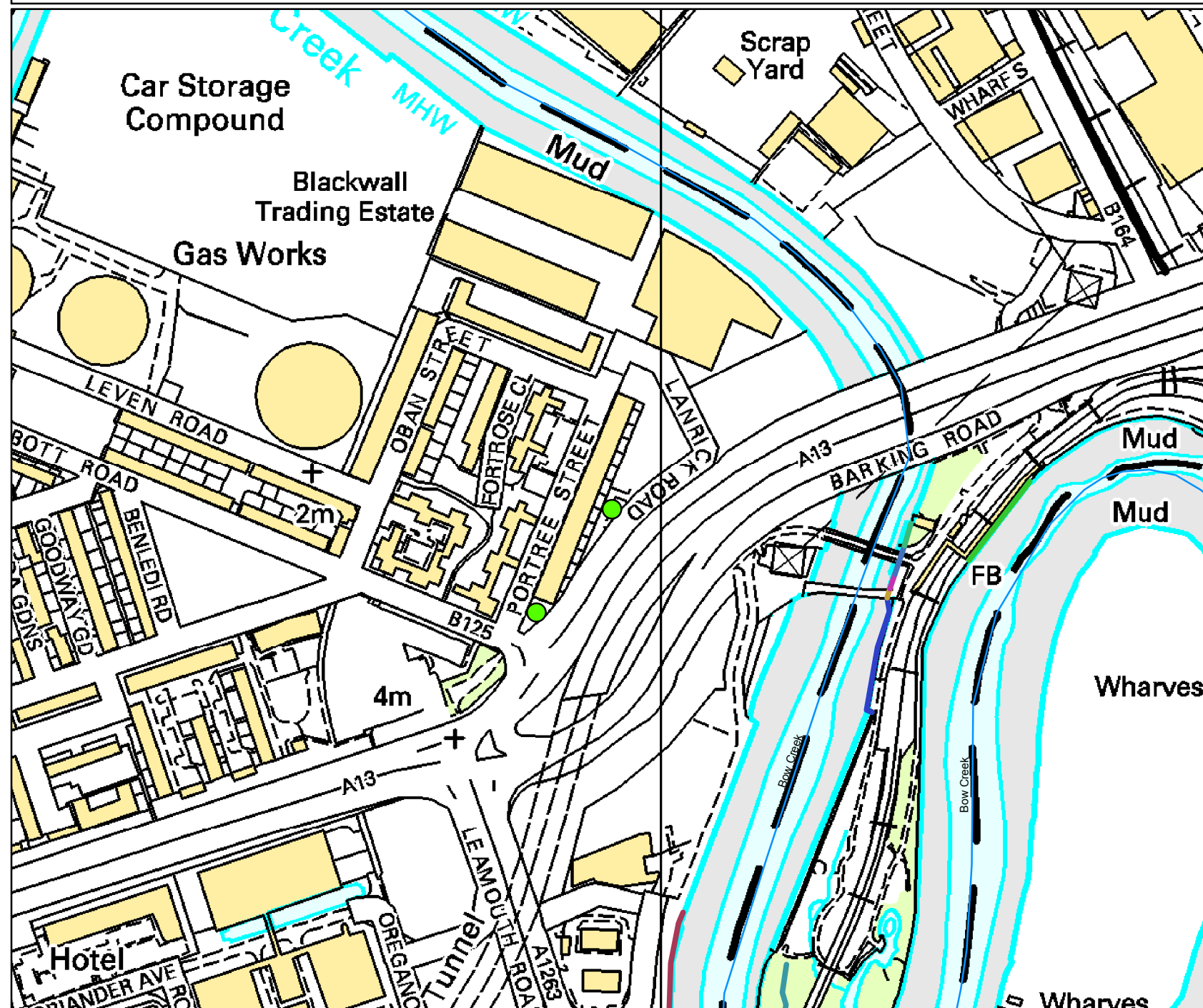
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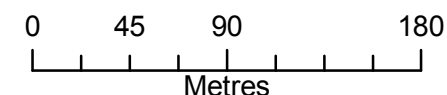
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Legend

— Main Rivers

NAFRA_DEFENCE ASSET_ID

- 14518
- 14588
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- 14737

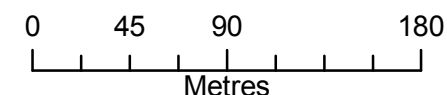
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Legend

— Main Rivers

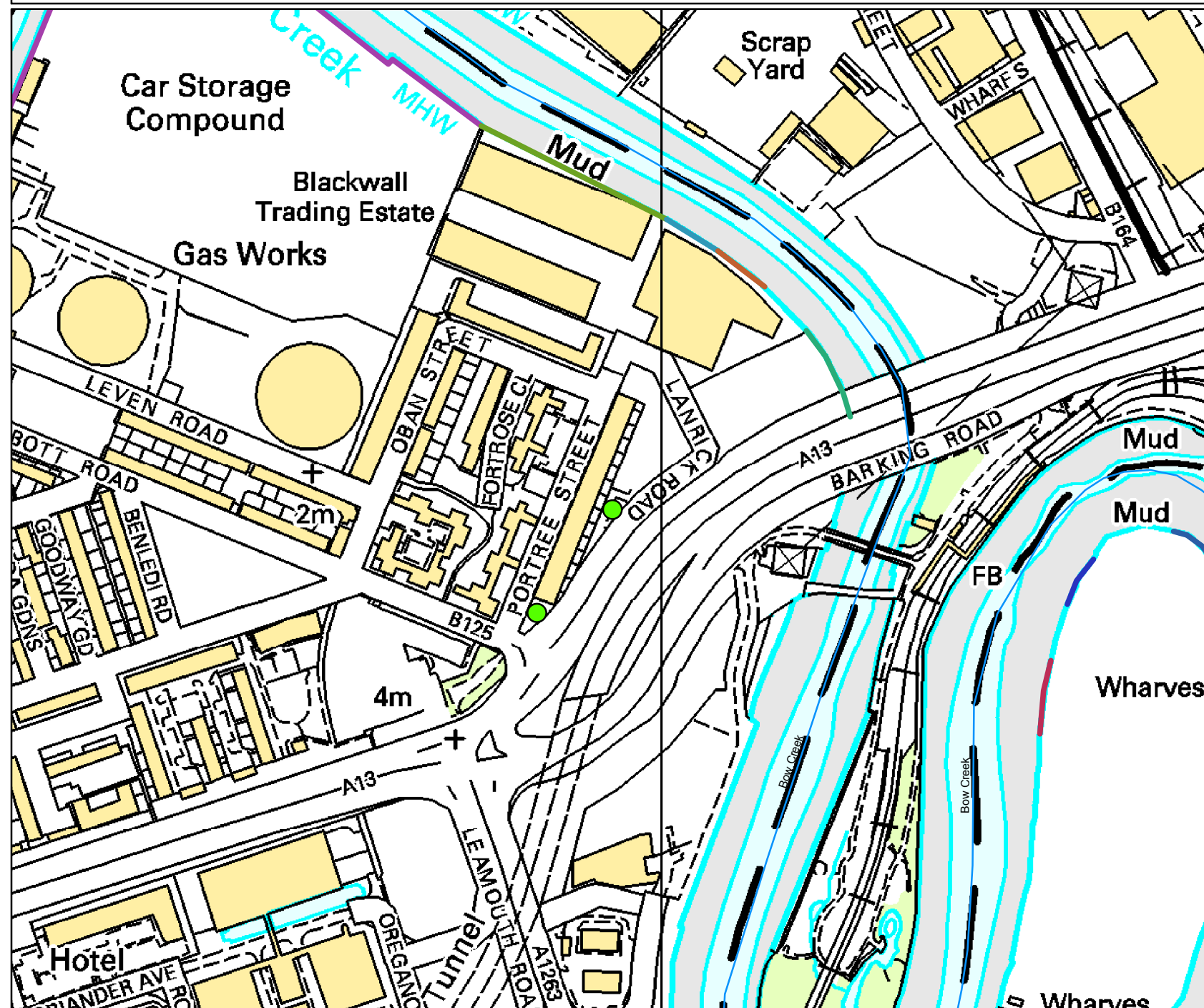
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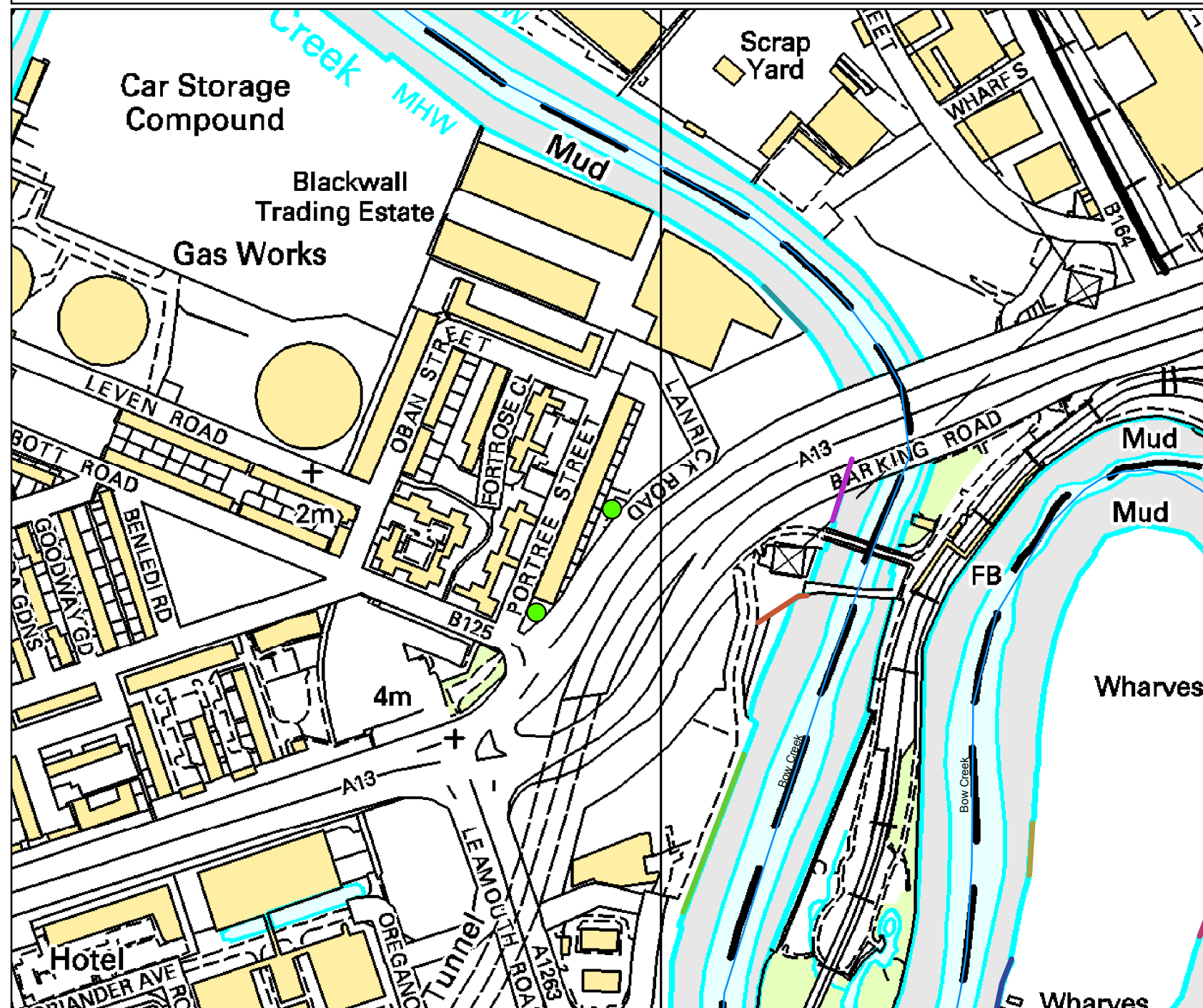
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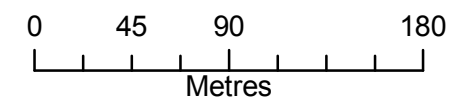
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Structures and Defences centred on Lanrick Road, Tower Hamlets, E14 0JP - 20/07/2017 - HNL52203



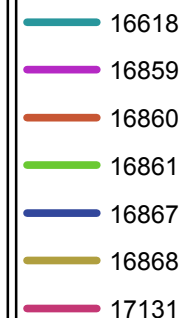
Environment Agency
2 Bishops Square Business Park
St Albans Road West
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Hertfordshire
AL10 9EX



Legend

— Main Rivers

NAFRA_DEFENCE
ASSET ID



The following information on defences has been extracted from the Asset Information Management System (AIMS)

Produced by:
Partnerships & Strategic Overview,
Hertfordshire & North London

Environment Agency ref: [HNL52203](#)

The following information on defences has been extracted from the Asset Information Management System (AIMS)

Defences

Asset ID	Asset Type	Asset Protection	Asset Comment	Asset Description	Design Standard of protection (years)	Downstream Crest Level	Upstream Crest Level	Condition of Defences (1=Good, 5 = Poor)
14877	wall	tidal	T6	Poplar Gas Works	1000	5.39	5.39	3
14467	wall	tidal	No data	Electra Park	1000	5.28	5.28	3
14878	wall	tidal	T6	Commercial Wharf	1000	5.3	5.3	3
14428	wall	tidal	T6	Electra Park	1000	5.28	5.28	2
8258	wall	tidal	No data	Canning Town.	1000	6.5	6.5	2
14879	wall	tidal	T6	Leapfield House	1000	5.28	5.28	3
14880	wall	tidal	T6	Creek Wharf	1000	5.28	5.28	3
14359	wall	tidal	No data	Canning Town	1000	6.5	6.5	3
16618	wall	tidal	T6	Creek Wharf	1000	5.28	5.28	2
14881	wall	tidal	T6	A13 Thames Gateway River Lee Crossing	1000	5.36	5.36	3
16859	wall	tidal	T6	A13 Thames Gateway River Lee Crossing	1000	5.28	5.28	3
14480	wall	tidal	No data	A13 Thames Gateway River Lee Crossing	1000	5.28	5.28	2
14355	wall	tidal	No data	Wharfside Rd, London E16 4	1000	6.5	6.5	3

14356	wall	tidal	No data	Wharfside Rd, London	1000	6.5	6.5	3
14358	wall	tidal	Storm outfall	A13 Lee Crossing	1000	6.5	6.5	4
14357	wall	tidal	No data	A13 Bridge	1000	6.5	6.5	2
14474	wall	tidal	No data	Limmo Site	1000	6.5	6.5	2
8141	wall	tidal	No data	Limmo Site / Lee Crossing	1000	6.5	6.5	2
16861	wall	tidal	T6	Blackwall Transfer Station	1000	5.28	5.28	2
14483	wall	tidal	T6	Blackwall Transfer Station	1000	5.28	5.28	2
14517	wall	tidal	T6	Blackwall Transfer Station	1000	5.28	5.28	2
16860	wall	tidal	No data	Blackwall Transfer Station	1000	5.28	5.28	2
8306	wall	tidal	No data	Bow Creek Ecology Park	1000	6.5	6.5	2
14482	wall	tidal	T6	Blackwall Transfer Station	1000	5.28	5.28	2
14481	wall	tidal	T6	Iron Bridge Wharf	1000	5.28	5.28	2
8143	wall	tidal	Flood defence line retreated into park.	Limmo Site	1000	6.5	6.5	2
14733	wall	tidal	No data	Bow Creek Ecology Park	1000	6.5	6.5	2
14734	wall	tidal	No data	Wharfside Rd, London E16 4	1000	6.5	6.5	2
14735	wall	tidal	No data	Wharfside Rd, London E16 4	1000	6.5	6.5	2
14736	wall	tidal	No data	Wharfside Rd, London E16 4	1000	6.5	6.5	2
14737	wall	tidal	No data	Wharfside Rd, London E16 4	1000	6.5	6.5	3
8142	wall	tidal	T6Defence requires subdividing.	Limmo Site	1000	6.5	6.5	2
14588	wall	tidal	No data	Limmo Site	1000	6.5	6.5	2

14409	wall	tidal	No data	Pura Foods	1000	5.63	5.63	2
16598	wall	tidal	No data	Pura Foods	1000	5.63	5.63	2
14448	wall	tidal	No data	Pura Foods	1000	5.63	5.63	2
16599	wall	tidal	No data	Pura Foods	1000	5.63	5.63	2
16600	wall	tidal	No data	Pura Foods	1000	6.33	6.33	2
14518	wall	tidal	T6	Orchard Wharf And Slipway	1000	5.27	5.27	2
16867	wall	tidal	No data	Pura Foods	1000	5.63	5.63	2
14511	wall	tidal	Requires subdivision.	Jubilee Wharf	1000	6.33	6.33	2
14407	wall	tidal	No data	Pura Foods	1000	5.63	5.63	2
14408	wall	tidal	No data	Pura Foods	1000	5.63	5.63	2
17131	wall	tidal	No data	Pura Foods	1000	6.33	6.33	3
16868	wall	tidal	No data	Pura Foods	1000	5.63	5.63	2
14732	wall	tidal	No data	Limmo Site	1000	6.5	6.5	2
14449	wall	tidal	No data	Pura Foods	1000	5.63	5.63	2

Product 4 (Detailed Flood Risk) for: Lanrick Road, Tower Hamlets, E14 0JP

Reference: HNL52203

Date: 20/07/2017

Contents

- Flood Map for Planning (Rivers and Sea)
- Flood Map Extract
- Thames Estuary 2100 (TE2100)
- Thames Tidal Upriver Breach Inundation Modelling 2017
- Thames Tidal Upriver Breach Inundation Modelling Map
- Site Node Locations Map
- Defence Details
- Recorded Flood Events Data
- Recorded Flood Events Outlines Map
- Additional Information
- Environment Agency Standard Notice

The information provided is based on the best data available as of the date of this letter.

You may feel it is appropriate to contact our office at regular intervals, to check whether any amendments/ improvements to the data for this location have been made. Should you re-contact us after a period of time, please quote the above reference in order to help us deal with your query.

This information is provided subject to the enclosed notice which you should read.

Flood Map for Planning (Rivers and Sea)

The Flood Map:

Our Flood Map shows the natural floodplain for areas at risk from river and tidal flooding. The floodplain is specifically mapped ignoring the presence and effect of defences. Although flood defences reduce the risk of flooding they cannot completely remove that risk as they may be over topped or breached during a flood event.

The Flood Map indicates areas with a 1% (0.5% in tidal areas), Annual Exceedance Probability (AEP) - the probability of a flood of a particular magnitude, or greater, occurring in any given year, and a 0.1% AEP of flooding from rivers and/or the sea in any given year. In addition, the map also shows the location of some flood defences and the areas that benefit from them.

The Flood Map is intended to act as a guide to indicate the potential risk of flooding. When producing it we use the best data available to us at the time and also take into account historic flooding and local knowledge. The Flood Map is updated on a quarterly basis to account for any amendments required. These amendments are then displayed on the internet at

<https://www.gov.uk/government/organisations/environment-agency>.

At this Site:

The Flood Map shows that this site lies within Flood Zone 3 - with a 0.5% chance of flooding from the sea (tidal flooding) in any given year.

Enclosed is an extract of our Flood Map which shows this information for your area.

Method of production

The Flood Map at this location has been derived using detailed modelling of the tidal River Thames through the Thames Tidal Defences Study completed in 2006 by Halcrow Ltd.

Thames Estuary 2100 (TE2100)

You have requested in-channel flood levels for the tidal river Thames. These have been taken from the Thames Estuary 2100 study completed by HR Wallingford in 2008. The modelled node closest to your site is **2.46**; the locations of nearby nodes are also shown on the enclosed map.

Details about the TE2100 plan

The TE2100 plan is now live and within it are a set of levels on which the flood risk management strategy is based. The plan is the overarching flood management strategy for the Thames Estuary and therefore any development planning should be based on the same underlying data.

Details about the TE2100 in-channel levels

The TE2100 in-channel levels take into account operation of the Thames Barrier when considering future levels. The Thames Barrier requires regular maintenance and with additional closures the opportunity for maintenance will be reduced. When this happens, river levels – for which the Barrier would normally shut for the 2008 epoch – will have to be allowed through to ensure that the barrier is not shut too often. For this reason, levels upriver of the barrier will increase and the tidal walls will need to be heightened to match.

Why is there no return period for levels upriver of the barrier?

The levels upriver of the barrier are the highest levels permitted by the operation of the Thames Barrier. If levels and flows are forecast to be any higher, the Thames Barrier would shut, ensuring that the tide is blocked and the river maintained to a low level. For this reason the probability of any given water level upriver of the Barrier is controlled and therefore any associated return period becomes irrelevant. The Thames Barrier and associated defence system has a 1 in 1000 year standard which means it ensures that flood risk is managed up to an event that has a 0.1% annual probability. The probability of water levels upriver is ultimately controlled by the staff at the Thames Barrier.

TE2100 2008 levels:

Levels downriver of the Thames Barrier are 0.1% AEP (1 in 1000) and levels upriver are the highest levels permitted by the Thames Barrier, described as the Maximum Likely Water Levels (MLWLs). The defence levels (left defence, right defence) are the minimum levels to which the defences should be built.

Location	Node	Easting	Northing	Extreme water level (m)	Left defence (m)	Right defence (m)	Allow for future defence raising to a level of...	
							Left Bank (m)	Right Bank (m)
Greenwich	2.46	538943	180471	4.67	5.23	5.23	6.20	6.20
	2.46au	539436	180390	4.66	5.18	5.18	6.20	6.20
	2.46ad	539528	180320	4.66	5.18	5.18	6.20	6.20
	2.47	539826	179982	4.65	5.18	5.18	6.20	6.20

TE2100 climate change levels:

Location	Node	Easting	Northing	2065 to 2100		2100	
				Design water level	Defence level (both banks)	Design water level	Defence level (both banks)
Greenwich	2.46	538943	180471	5.16	5.70	5.65	6.20
	2.46au	539436	180390	5.15	5.70	5.64	6.20
	2.46ad	539528	180320	5.15	5.70	5.63	6.20
	2.47	539826	179982	5.14	5.70	5.62	6.20

Thames Tidal Upriver Breach Inundation Modelling – 2017

The table below displays site-specific modelled flood levels at your site. These have been taken from the Thames Tidal Upriver Breach Inundation Modelling Study 2017 completed by Atkins Ltd. in May 2017.

We have developed a modelling approach where all upriver breach locations along the Thames are equitably modelled, to ensure a consistent approach across London. This modelling simulates 5679 continuous tidal breaches along the entire extent of the Thames from Teddington to the Thames Barrier. For hard and composite defences breaches are set at 20 m wide; for soft defences, breaches are 50 m wide. In both cases, the defence breach scour distance was assumed to extend into the floodplain by the same distance as the breach width.

For breaches upriver of the Thames Barrier, there is no return period for modelled levels as the levels are controlled by barrier closures. The levels used are referred to as Maximum Likely Water Levels (MLWLs). Therefore 2014 and 2100 epochs were modelled on that basis.

Node	National Grid Reference		Modelled levels in mAODN for Max Likely Water Level	
	Easting	Northing	2014	2100
0	538909	18129	No data	3.668
1	538916	181311	2.393	3.668
2	538928	181306	No data	3.475
3	538917	181299	No data	No data
4	538904	181305	2.767	3.668
5	538932	181299	No data	3.937
6	538982	181381	No data	4.383
7	538967	181379	2.393	4.466
8	538966	181363	No data	4.477
9	538978	181371	No data	4.479
10	538949	181337	2.393	4.201
11	538976	181358	No data	4.468

Defence Details

The design standard of protection of the flood defences in this area of the Thames is 0.1% AEP; they are designed to defend London up to a 1 in 1000 year **tidal** flood event. The defences are all raised, man-made and privately owned. It is the riparian owners' responsibility to ensure that they are maintained to a crest level of **5.23m** AODN (the Statutory Flood Defence Level in this reach of the Thames). We inspect them twice a year to ensure that they remain fit for purpose. The current condition grade for defences in the area is **2 (good)**, on a scale of 1 (very good) to 5 (very poor). For more information on your rights and responsibilities as a riparian owner, please see our document 'Living on the edge' found on our website at:

<https://www.gov.uk/government/publications/riverside-ownership-rights-and-responsibilities>

There are no planned improvements in this area. Please see the 'Thames Estuary 2100' document on our website for the short, medium and long term Flood Risk Management strategy for London:

<https://www.gov.uk/government/publications/flooding-thames-estuary-2100-te2100-plan>

Areas Benefiting from Flood Defences

This site is within an area benefiting from flood defences, as shown on the enclosed extract of our Flood Map. Areas benefiting from flood defences are defined as those areas which benefit from formal flood defences specifically in the event of flooding from rivers with a 1% (1 in 100) chance in any given year, or flooding from the sea with a 0.5% (1 in 200) chance in any given year.

If the defences were not there, these areas would be flooded. An area of land may benefit from the presence of a flood defence even if the defence has overtopped, if the presence of the defence means that the flood water does not extend as far as it would if the defence were not there.

Recorded Flood Events Data

We hold records of historic flood events from rivers and the sea. Information on the floods that may have affected the area local to your site are provided in the enclosed map.

Due to the fact that our records are not comprehensive, we would advise that you make further enquiries locally with specific reference to flooding at this location. You should consider contacting the relevant Local Planning Authority and/or water/sewerage undertaker for the area.

We map flooding to land, not individual properties. Our historic flood event record outlines are an indication of the geographical extent of an observed flood event. Our historic flood event outlines do not give any indication of flood levels for individual properties. They also do not imply that any property within the outline has flooded internally.

Please be aware that flooding can come from different sources. Examples of these are:

- from rivers or the sea;
- surface water (i.e. rainwater flowing over or accumulating on the ground before it is able to enter rivers or the drainage system);
- overflowing or backing up of sewer or drainage systems which have been overwhelmed,
- groundwater rising up from underground aquifers

Currently the Environment Agency can only supply flood risk data relating to the chance of flooding from rivers or the sea. However you should be aware that in recent years, there has been an increase in flood damage caused by surface water flooding and drainage systems that have been overwhelmed.

Other Sources of Flood Risk

The Lead Local Flood Authority for your area are responsible for local flood risk (i.e. surface runoff, ground water and ordinary watercourse) and may hold further information .

You may also wish to consider contacting the appropriate relevant Local Planning Authority and/or water/sewerage undertaker for the area. They may be able to provide some knowledge on the risk of flooding from other sources.

Additional Information

Use of Environment Agency Information for Flood Risk / Flood Consequence Assessments

Important

If you have requested this information to help inform a development proposal, then we recommend that you undertake a formal pre-application enquiry using the form available from our website:-

<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

Depending on the enquiry, we may also provide advice on other issues related to our responsibilities including flooding, waste, land contamination, water quality, biodiversity, navigation, pollution, water resources, foul drainage or Environmental Impact Assessment.

In **England**, you should refer to the Environment Agency's Flood Risk Standing Advice, the technical guidance to the National Planning Policy Framework and the existing PPS25 Practice Guide for information about what flood risk assessment is needed for new development in the different Flood Zones. These documents can be accessed via:

<https://www.gov.uk/flood-risk-standing-advice-frsa-for-local-planning-authorities>

<https://www.gov.uk/government/publications/national-planning-policy-framework-technical-guidance>

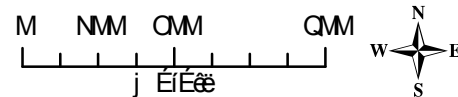
<https://www.gov.uk/government/publications/development-and-flood-risk-practice-guide-planning-policy-statement-25>

You should also consult the Strategic Flood Risk Assessment produced by your local planning authority.

You should note that:

1. Information supplied by the Environment Agency may be used to assist in producing a Flood Risk / Consequence Assessment (FRA / FCA) where one is required, but does not constitute such an assessment on its own.
2. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or overland runoff. The information produced by the local planning authority referred to above may assist here.
3. Where a planning application requires a FRA / FCA and this is not submitted or deficient, the Environment Agency may well raise an objection.
4. For more significant proposals in higher flood risk areas, we would be pleased to discuss details with you ahead of making any planning application, and you should also discuss the matter with your local planning authority.

Detailed FRA/FCA for: Lanrick Road, Tower Hamlets, E14 0JP - 20/07/2017 - HNL52203



Legend

- Site Location**
- qbNMkçQĒē
- 1707 Flood Outline**
- 1928 Flood Outline**
- 1953 Flood Outline**
- Flood Zone 3**
- Flood Zone 2**

Flood Map for Planning (assuming no defences)

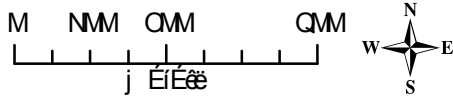
Flood Zone 3 = U₁ E₁ E₂ U₁ A₁ A₂ E₁
 ~NEA EQ A₁ N₁ C₁ A₁ O₁ W
 = N₁ A₁ U₁ E₁ U₁ A₁ ~MRB C₁ O₁ E₁ I₁ E₁
 = AU₁ aAE₁ C₁ N₁ AI₁ E₁ O₁ E₁ AU₁ E₁ e₁
 = C₁ N₁ A₁ ~E₁ E₁ U₁ ~N₁ B₁ C₁ O₁ E₁ I₁ E₁
 = AU₁ aAE₁ C₁ N₁ AI₁ E₁ O₁ E₁ AU₁ E₁ A₁

Flood Zone 2

« ba i a a a E ai a C e A a A c e o a d i a c i e q i ~ i A e e d i e o m n t e a a d i e e e e e e q » = e i a = c e o a d i a c c i ~ i A e e d i o m n t e a a d i e e e e e e q e c a a A e p i a E o a A e A e a i a A e n m m d q u k

Contact Us: k ~ íã ~ ð ~ ì ëĩã Éë= çáí~Á= ÉáíÉí= = çñ= RQQ= çíÜÉü~ã í= SMN v k Éáí= MPTM= RV= RV= E çãJçã= USF= ã ~ ð= É= ð= É= Éáí= çãã ÉáíJ~Çá= A= Ç= K á

Detailed FRA/FCA for: Lanrick Road, Tower Hamlets, E14 0JP - 20/07/2017 - HNL52203

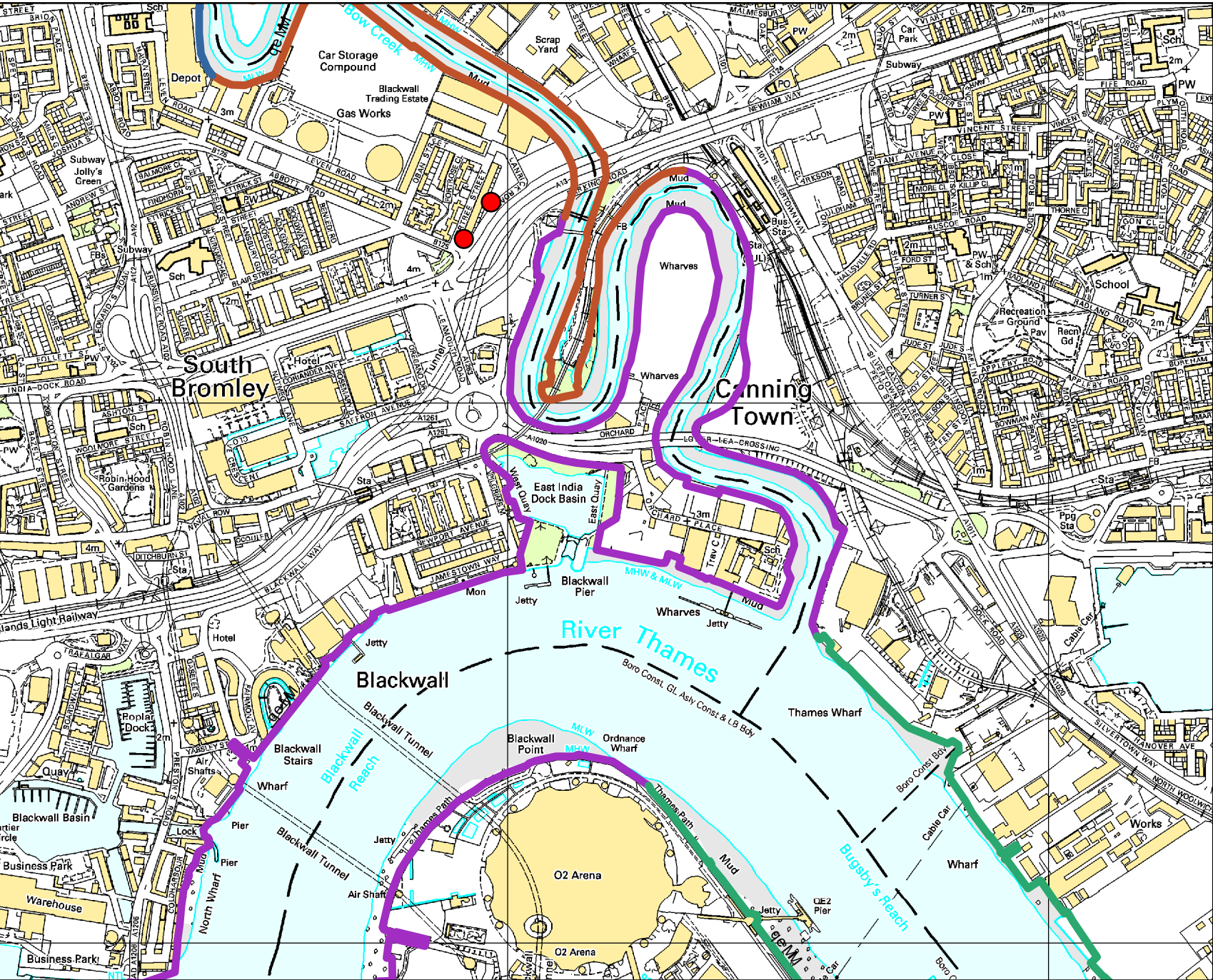


- Legend**
- Site Location
 - TTD Defences SDL (mAODN)
 - SDL
 - RKU
 - RCP
 - RCU
 - RRP

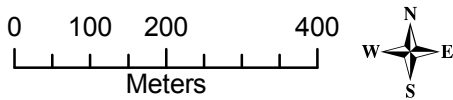
Flood Map for Planning (assuming no defences)

Flood Zone 3 - Areas at high risk of flooding from the River Thames and its tributaries, including the River Lea and the River Roding. This zone includes the area around the O2 Arena and the Blackwall Tunnel.

Flood Zone 2 - Areas at medium risk of flooding from the River Thames and its tributaries, including the River Lea and the River Roding. This zone includes the area around the Blackwall Tunnel and the Blackwall Basin.



Breach Modelling Map for: Lanrick Road, Tower Hamlets, E14 0JP - 20/07/2017 - HNL52203



- Legend**
- Site Location
 - Upriver Breach Inundation Outlines
 - Epoch
 - 2014 (Current year)
 - 2100

Thames Tidal Upriver Breach Inundation Modelling 2017

A modelled representation of all upriver tidal breach locations along the Thames from Teddington to the Thames Barrier, based on low floodplain topography. For hard and composite defences breaches are set at 20 m wide; for soft defences, breaches are 50 m wide. In both cases, the defence breach scour distance was assumed to extend into the floodplain by the same distance as the breach width. The modelling is based on the 2008 TE2100 in-channel levels, with an allowance for climate change for epoch 2100.

Modelled Flood Levels For: Lanrick Road, Tower Hamlets, E14 0JP - 20/07/2017 - HNL52203



0 5 10 20
Meters



Legend

- Site Location
- Points

Thames Tidal Upriver Breach Inundation Modelling 2017

A modelled representation of all upriver tidal breach locations along the Thames from Teddington to the Thames Barrier, based on low floodplain topography. For hard and composite defences breaches are set at 20 m wide; for soft defences, breaches are 50 m wide. In both cases, the defence breach scour distance was assumed to extend into the floodplain by the same distance as the breach width. The modelling is based on the 2008 TE2100 in-channel levels, with an allowance for climate change for epoch 2100.

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A decorative graphic consisting of three thin orange lines. One line is horizontal, extending from the left edge of the page towards the right. Two other lines are diagonal, starting from the bottom left and extending towards the top right, intersecting the horizontal line.