



Flood Risk Assessment

Extra Care Facility, Kenmore Drive, Cleckheaton

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Flood Risk Assessment

Project: Kenmore Drive

Client: Housing 21

BGP Job No: 19T2200

Document Checking:

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Issue	Date	Status	Checked for Issue
001	03/04/2020	Planning	JC

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Contents

1	Introduction
2	Development Description and Location
3	Definition of the Flood Hazard
4	Probability of Flooding
5	Climate Change
6	Surface Water Strategy
7	Drainage Strategy
8	Flood Risk Management Measures
9	Off-Site Impacts
10	Residual Risks
11	Conclusions

APPENDICES

Appendix A	Site Location Plan
Appendix B	Proposed Site Layout
Appendix C	EA Flood Maps
Appendix D	Existing Drainage Records
Appendix E	Topographic Survey
Appendix F	Reference Documents List

1. Introduction

This Flood Risk Assessment has been prepared in accordance with the requirements of The National Planning Policy Framework (Department for Communities and Local Government March 2018) [The Framework] and the Planning Practice Guidance to the National Planning Policy Framework (July 2018) [The Technical Guidance].

This report has been prepared to supplement the planning application for the proposed Extra Care Facility, Kenmore Drive, Cleckheaton. See Appendix A for the site location.

2. Development Description and Location

2.1 Site Location:

- 2.1.1 Site Name: Kenmore Drive
- 2.1.1 Site Address: Land East of – Kenmore Drive, Cleckheaton, BD19 3EJ
- 2.1.1 Easting and Northings: 41837, 425741
- 2.1.1 National Grid Reference: SE183257

2.2 Site Description:

- 2.2.1 Gross Site Area: 1.6ha
- 2.2.2 Existing Land Use: Open scrub land.
- 2.2.3 Proposed Land Use: Construction of an Extra Care facility.
- 2.2.4 Local Planning Authority: Kirklees Council
- 2.2.5 Sewer Undertaker: Yorkshire Water (YWL)

2.3 Development Description:

It is proposed to construct an 80 apartment Extra Care facility with associated access road, car parking and paved areas on the open land to the east of Kenmore Drive, Cleckheaton.

The development is located approximately 1km to the northwest of Cleckheaton centre. The site is currently open scrub land, with a number of trees and bushes. The topographic survey shows a steep fall across the site from southwest to northeast of approximately 15m, 115.6m to 100.4m AOD. The proposed development has a split ground floor arrangement, Lower ground floor FFL 111.4m AOD, and Upper ground floor FFL 115m AOD. The site is bound on all sides by residential developments, and a Nursing Home to the south.

2.4 Flood Zone (Table 1 NPPF):

The site lies within Flood Zone 1. (see Appendix C for EA Maps).

2.5 NPPF Site Classification (Table 2 NPPF):

The vulnerability classification for the development is “More Vulnerable” suitable for construction in Flood Zone 1.

2.6. Flood Zone “Compatibility” (Table 3 NPPF):

	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Flood Zone 1	Yes	Yes	Yes	Yes	Yes
Flood Zone 2	Yes	Exception test required	Yes	Yes	Yes
Flood Zone 3a	Exception test required	No	Exception test required	Yes	Yes
Flood Zone 3b	Exception test required	No	No	No	Yes

The proposals are acceptable in terms of flood risk in accordance with Table 3 of the NPPF.

2.7. Sequential Test:

The development is consistent with the Local Development Documents and the Local Planning Authority are consultees during the design development stages.

The involvement of the Local Authority in the design development process demonstrates that the Sequential Test has been applied in the selection of this site for this development type.

3. Definition of the Flood Hazard

3.1. Tidal Flood Risk:

The site is located approximately 70km inland from the Irish Sea, and the lower ground floor FFL is proposed at 111.4m AOD. The site is not classified as an area at risk of tidal flooding on the Environment Agency map. It is therefore considered that the site will not be affected by flooding from the sea.

The risk of flooding from the sea is categorised as **LOW**.

3.2. Fluvial Flood Risk:

To the northeast of the site approximately 600m from the boundary is located the River Spen. The levels around the site generally fall from southwest to northeast, as such the River Spen is located lower than the proposed site.

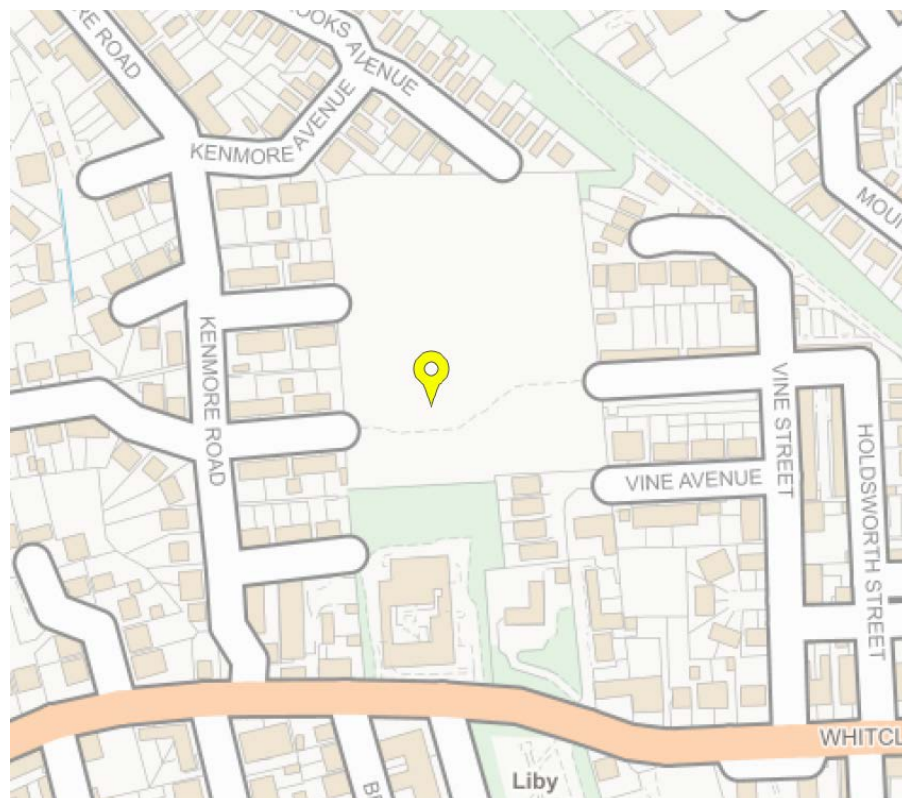


Figure 1 – Environment Agency Flood Map for Planning

The Environment Agency 'Flood Map for Planning' (Figure 1 and Appendix C) shows that the proposed site is unaffected by this or any other watercourse and is wholly within Flood Zone 1. Flood Zone 1 is land that is assessed as having less than a 1 in 1000 (0.1 percent) chance of flooding each year.

It is considered that the risk of flooding to the site from fluvial sources is categorised as **LOW**.

3.3. Overland Flood Risk:

Intensive rainfall, often of short duration, that is unable to soak into the ground or enter drainage systems can run quickly off land and result in localised flooding. The existing site topographical survey shows that the site falls from a level of 115.6m to 100.4m AOD southwest to northeast. See the Topographical survey within Appendix E.



Figure 2 – Environment Agency Surface Water Flooding Map for Planning

The surface water map (figure 2) identifies areas at High, Medium, or Low risk of surface water flooding from overland flows. High is classified as up to the 30 year storm event, medium 30 year to 100 year storm event, and low is the 100 year to 1000 year. Detailed

maps showing potential depths during the Low, medium, and high risk events are included in Appendix C.

The surface water map identifies a surface water flow route along the eastern boundary of the site, flowing north to the northeast corner. The flow route is identified on the Low risk map with maximum depths less than 300mm. This follows the boundary between the open space and the residential developments, and follows the levels on the topo survey. It is proposed that the ground in this area will be regraded as part of the development, and consideration should be taken to ensure any water flows are directed away from buildings.

The Northeast corner of the site has an area identified a at risk during the High, Medium, and Low risk events. The shows a maximum water level above 900mm. this area is outside the proposed development area, and is not considered a risk to the development.

Based on the above, the risk of flooding from overland sources is categorised as **LOW**.

3.3. Groundwater Flood Risk:

Groundwater flooding occurs when water levels in the ground rise above surface elevations. It is most likely to occur in low lying areas underlain by permeable rocks.

The intrusive Ground investigation carried out for the development identified that the site is underlain with clay and mudstone, and no groundwater was encountered.

It is unlikely that the proposed site would be affected by groundwater due to the type and nature of material.

The risk of flooding from ground water is therefore categorised as **LOW**.

3.4. [Flooding from Sewers:](#)

The existing YWL records show no adopted surface water or foul water sewers within the site boundary.

There are no records of sewer flooding occurring in the site.

A plan showing the existing YWL sewer network has been included within Appendix D

The risk of flooding from sewers is categorised as **LOW**.

3.5. [Flooding from Artificial Sources:](#)

No artificial bodies of water have been identified that would pose a risk to the development.

The risk of flooding from artificial sources is categorised as **LOW**.

4. Probability of Flooding

The Environment Agency maps have been reviewed (see Appendix C). The entirety of the site is identified as being in Flood Zone 1 as categorised by the National Planning Policy Framework (NPPF) and Technical Guidance.

Flood Zone 1 describes the land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any one year.

The previous section describes other flood hazards and the risk they pose to this project. A summary of the existing flood risk and the mitigation required is provided on the following page.

Based on the previous section the overall assessment of the probability of flooding to the site is **LOW**.

Flood Risk Source	Current Risk Level	Mitigation Requirement during detailed design	Risk Level following Mitigation
Tidal and Fluvial Flooding	LOW	Not required	LOW
Overland Flow	LOW	Ensure ground is profiled to remove low spots in topography and falls are directed away from buildings.	LOW
Groundwater	LOW	Not required	LOW
Sewer Flooding	LOW	All live connections from site to be confirmed and diverted to accommodate the new development if required.	LOW
Artificial Sources	LOW	Not required	LOW

5. Climate Change

NPPF Planning Practice Guidance website provides information on the impacts of climate change, which include sea level changes, river flash flooding and more frequent high intensity, short-duration rainfall.

As concluded previously the risk of flooding from the sea and rivers is low. The risk of flooding from land again is low; both are, therefore **unlikely** to be affected by climate change.

6. Surface Water Strategy

The existing site is classified as Greenfield throughout with overland flow following the existing topography. Due to the site being underlain by clay it is expected that only a small portion of surface water is expected to disperse via natural infiltration.

QBar rate has been calculated for the site and due to the urban setting this can be considered as 9.3l/s as shown in figure 3 below.

<u>ICP SUDS Mean Annual Flood</u>			
Input			
Return Period (years)	100	Soil	0.450
Area (ha)	1.600	Urban	0.000
SAAR (mm)	893	Region Number	Region 10
Results l/s			
QBAR Rural	9.3		
QBAR Urban	9.3		
Q100 years	19.4		
Q1 year	8.1		
Q30 years	15.8		
Q100 years	19.4		

Figure 3 – Micro drainage QBar rates

Possible Drainage solutions:

In accordance with Building Regulations and NPPF the disposal of surface water has been considered in the following order of priority, an adequate soakaway or some other infiltration system, where not reasonably practicable, a watercourse, or where not reasonably practicable a sewer.

Infiltration

Given the prevalence of cohesive low permeability clay soils identified during the ground investigation, it is considered the site is not suitable for a soakaway drainage solution.

Discharge to Watercourse

The nearest watercourse is the River Spen situated approximately 600m to the northeast of the site. It is not considered a practicable discharge point due to the distance and impact on existing infrastructure.

Discharge to Sewer

The Existing YWL records show the extents of the adopted surface water sewer surrounding the site (see figure 5 below). It is proposed to discharge the surface water from the site into the network adjacent to the northeast corner of the site, at a rate of 5l/s.



Figure 5 – NWL Sewer Network

7. Drainage Strategy

It is proposed that the surface water run-off from the site be collected via a number of gullies and linear drainage features, and conveyed to the proposed discharge point via a below ground drainage network. The flows from the site shall be attenuated to a maximum of 5l/s. The rate of 5l/s is considered the minimum practicable flow from site, with regards to maintenance and adoptable requirements.

The Surface water network will be sized to accommodate storms up to the 1:100 year plus an additional 40% for climate change. With the additional volume being provided within an off-line attenuation tank.

For further information please refer to the proposed below ground drainage layout 19T2200-130 and associated calculations, available separate to this report.

8. Flood Risk Management Measures

As stated in previous sections, the site is not at risk from flooding from any source. It is proposed that the external landscaping for the new development will be design to direct any over land run-off away from buildings toward the drainage network or areas of soft landscaping.

9. Off Site Impacts

It is proposed that the surface water flows generated from the new development are attenuated to a rate of 5l/s, to reduce the existing risk of flooding downstream of the development.

10. Residual Risks

Due to the location of the site, the site topography, it is considered that the residual risks are negligible.

11. Conclusions

From the above analysis it can be seen that the risk to the proposed Extra care Facility, Kenmore Drive, Cleckheaton is considered **LOW** from all forms of flooding as categorised in the Framework and the Technical Guidance documents. This confirms the Flood Zone designation for the site.

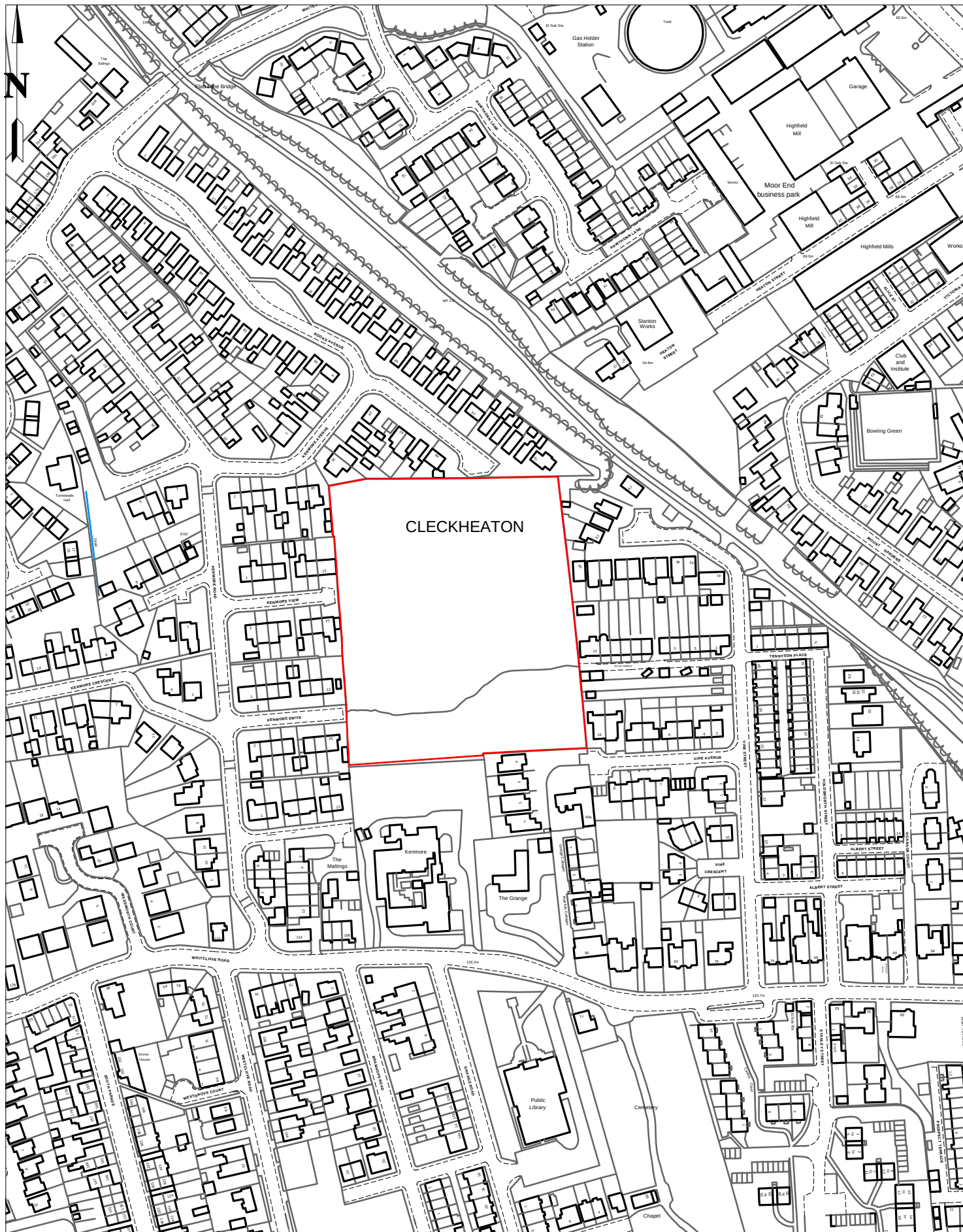
The development is located within Flood zone 1. The proposed uses of land are appropriate in this Flood Zone (Tables 1, 2 & 3 of the Technical Guidance).

This report has been prepared with reference to the information available at the time of writing. The summary and recommendations may be revised upon receipt of additional or further information.



Appendix A

Site Location Plan



CLECKHEATON



Appendix B

Proposed Site Layout



- KEY:
- Red Line Boundary
 - Crib retaining wall, extent to be confirmed with engineer
 - Low level brick retaining wall
 - Tarmac Areas
 - Block Paving to Parking Bays
 - 600 x 600 x 38mm Flag Paving
 - Grass Areas
 - Proposed Planting Areas (hedges, shrubs etc TBC by Landscape Architect)
 - Proposed Tree Locations
 - Existing Trees to be Retained (if possible)
 - Electric car charging point

REV. 4 | DATE: 20/03/20 | DRAWN: RB | CHECKED: RB
RETAINING WALLS UPDATED IN LINE WITH NEW TOPO LEVELS AND SITE SECTIONS, PATHS ADJUSTED, VEHICLE TRACKING SHOWN AND ISLAND PARKING UPDATED TO SUIT. LOWER GROUND & GROUND FLOOR PLAN SHOWN ON SAME SITE PLAN SHEET.

REV. 3 | DATE: 20/03/20 | DRAWN: EC | CHECKED: EC
BUILDING PUSHED NORTH & MORE PARKING ADDED.

REV. 2 | DATE: 21/01/20 | DRAWN: EC | CHECKED: EC
RETAINING WALL UPDATED, COMMENTS INCORPORATED.

REV. 1 | DATE: 17/01/20 | DRAWN: EC | CHECKED: EC
SITE PLAN & FORMAT UPDATED.

REVISIONS

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Housing 21

PROPOSED EXTRA CARE DEVELOPMENT

KENMORE DRIVE, CLECKHEATON

PROPOSED SITE PLAN SHOWING LOWER GROUND & GROUND FLOOR PLANS

Drawn: EC Date: DEC 19 Scale: 1:500@A2 Checked: RB

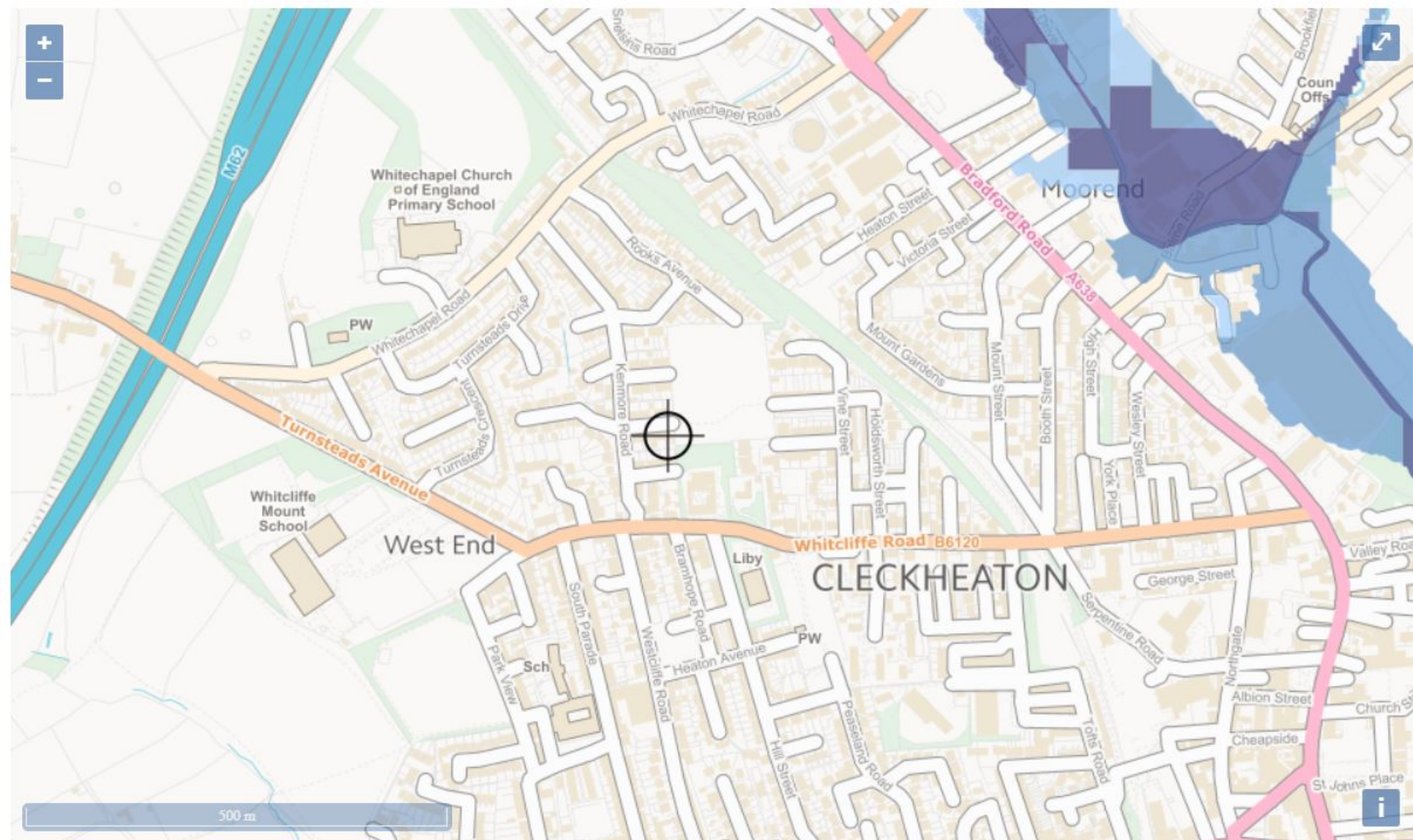
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Dwg No: 463/15(01)009 4



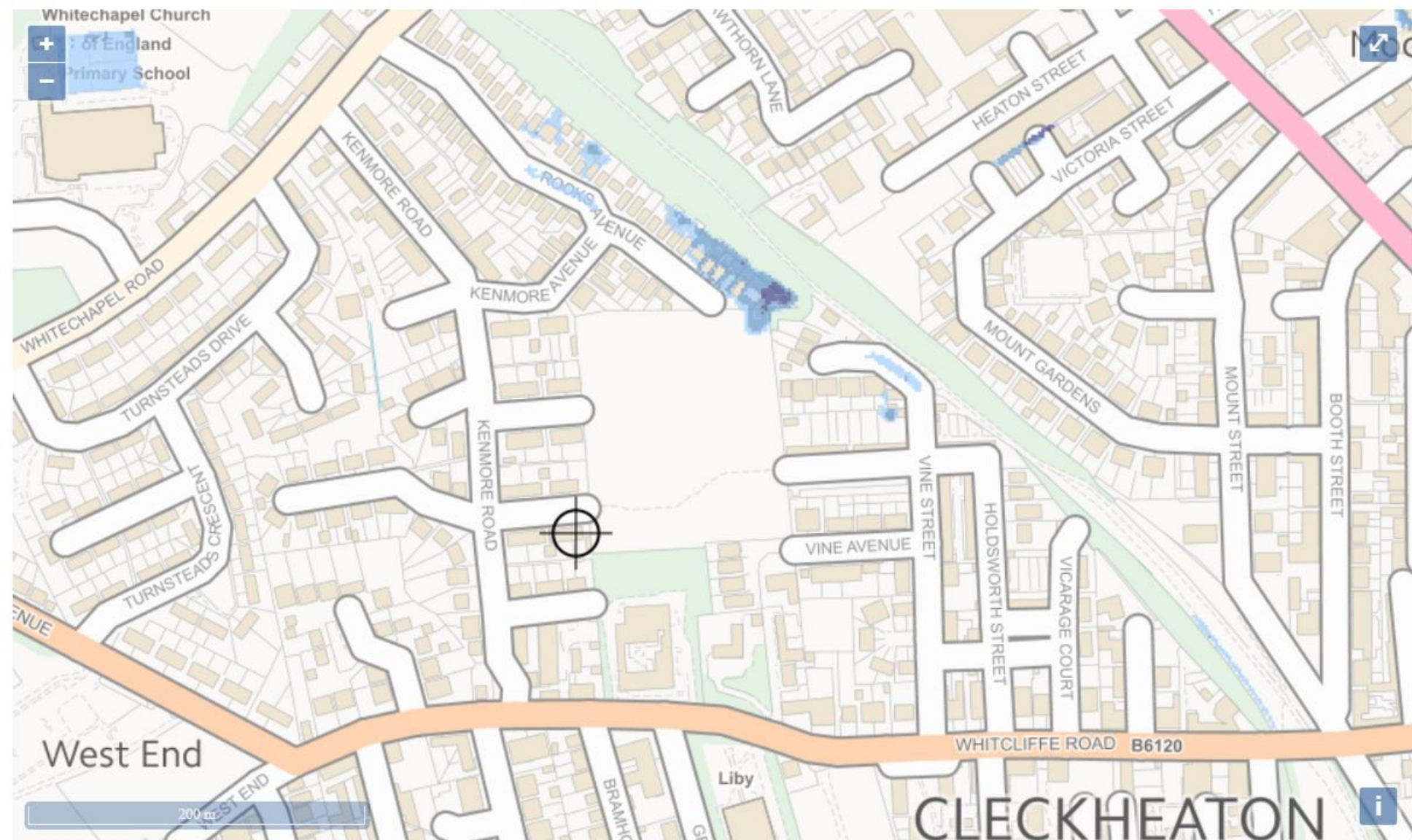
Appendix C

EA Flood Maps



Extent of flooding from rivers or the sea

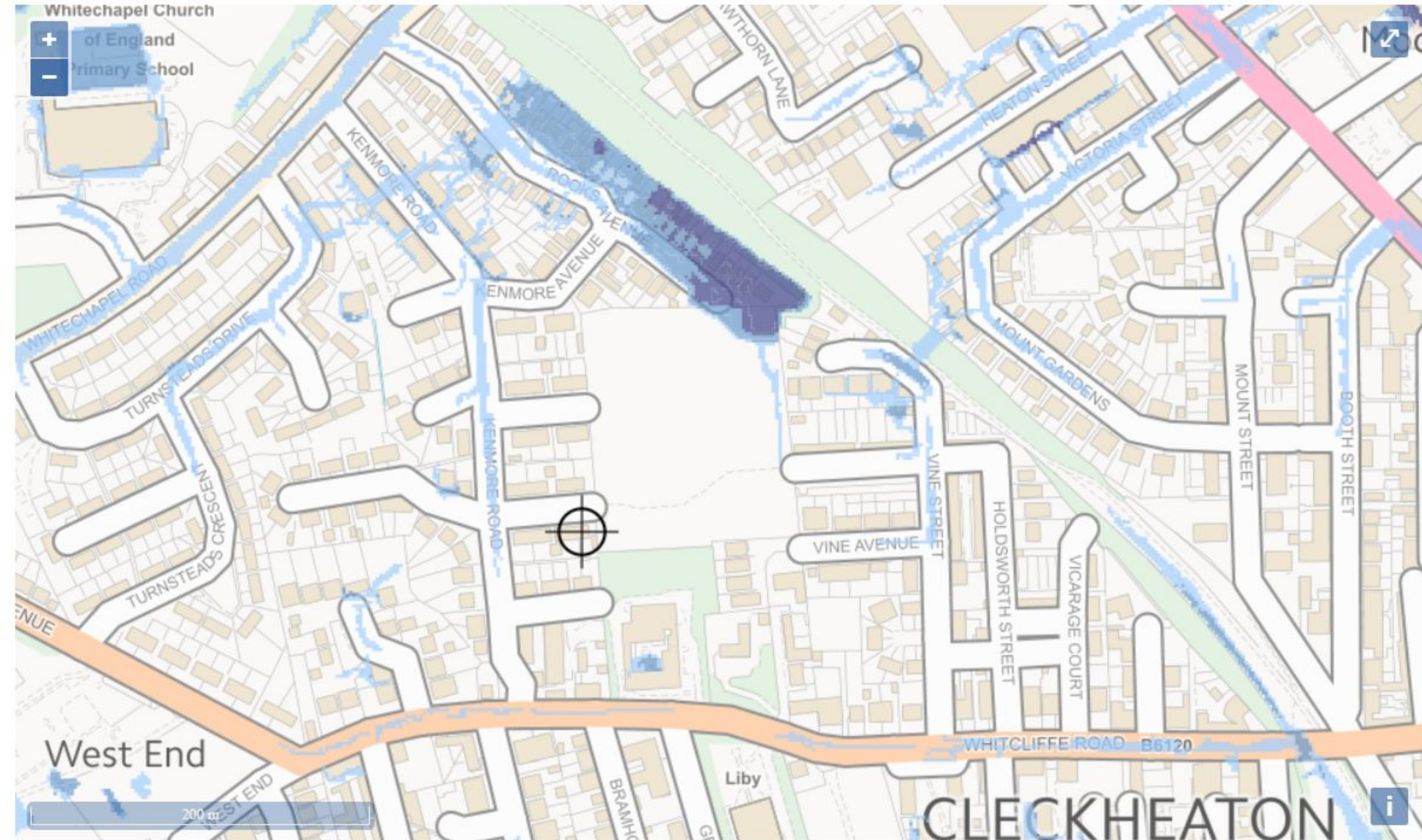
 [High](#)  [Medium](#)  [Low](#)  [Very low](#)  Location you selected



Surface water flood risk: water depth in a high risk scenario

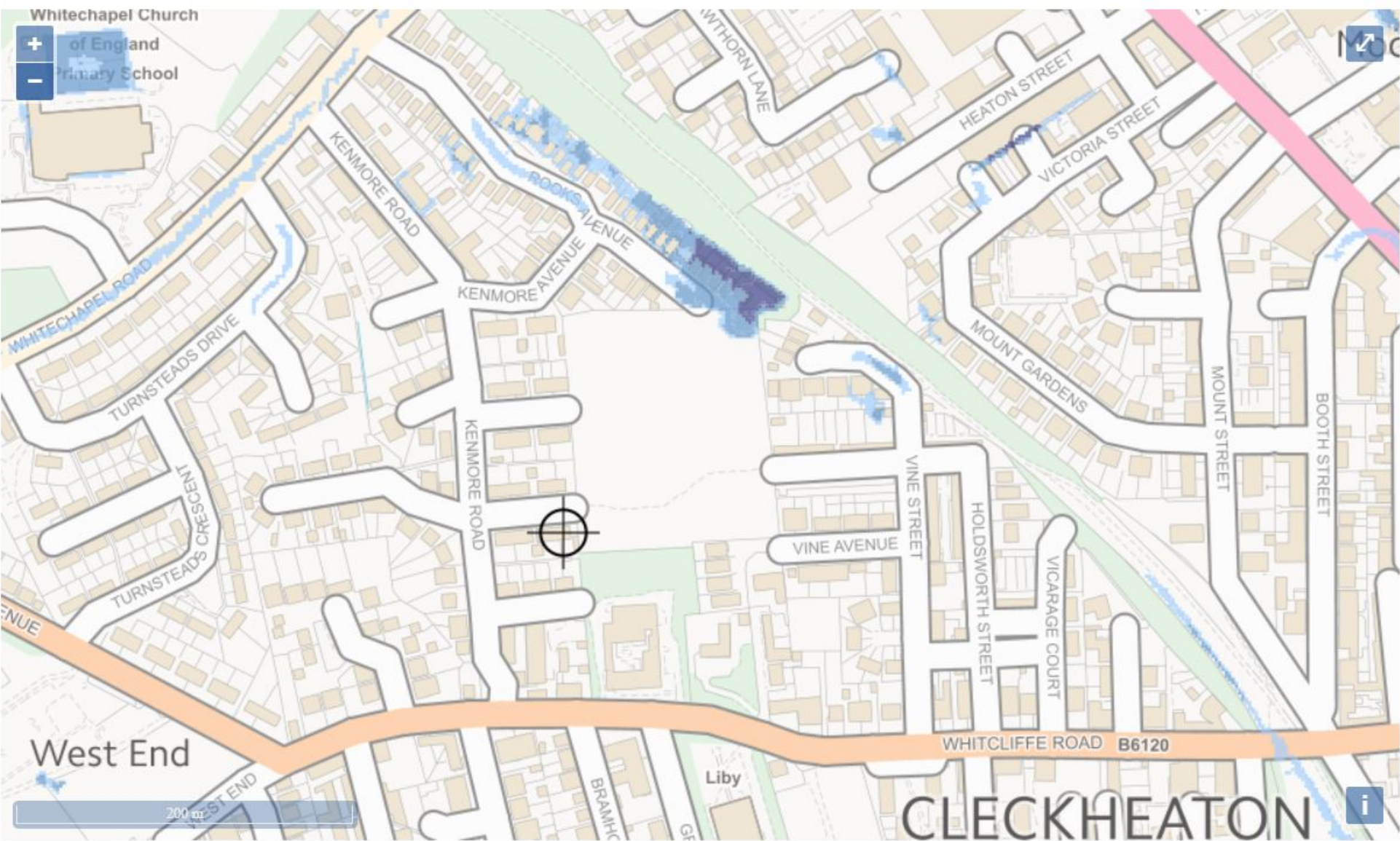
Flood depth (millimetres)

Over 900mm 300 to 900mm Below 300mm Location you selected



Surface water flood risk: water depth in a low risk scenario
Flood depth (millimetres)

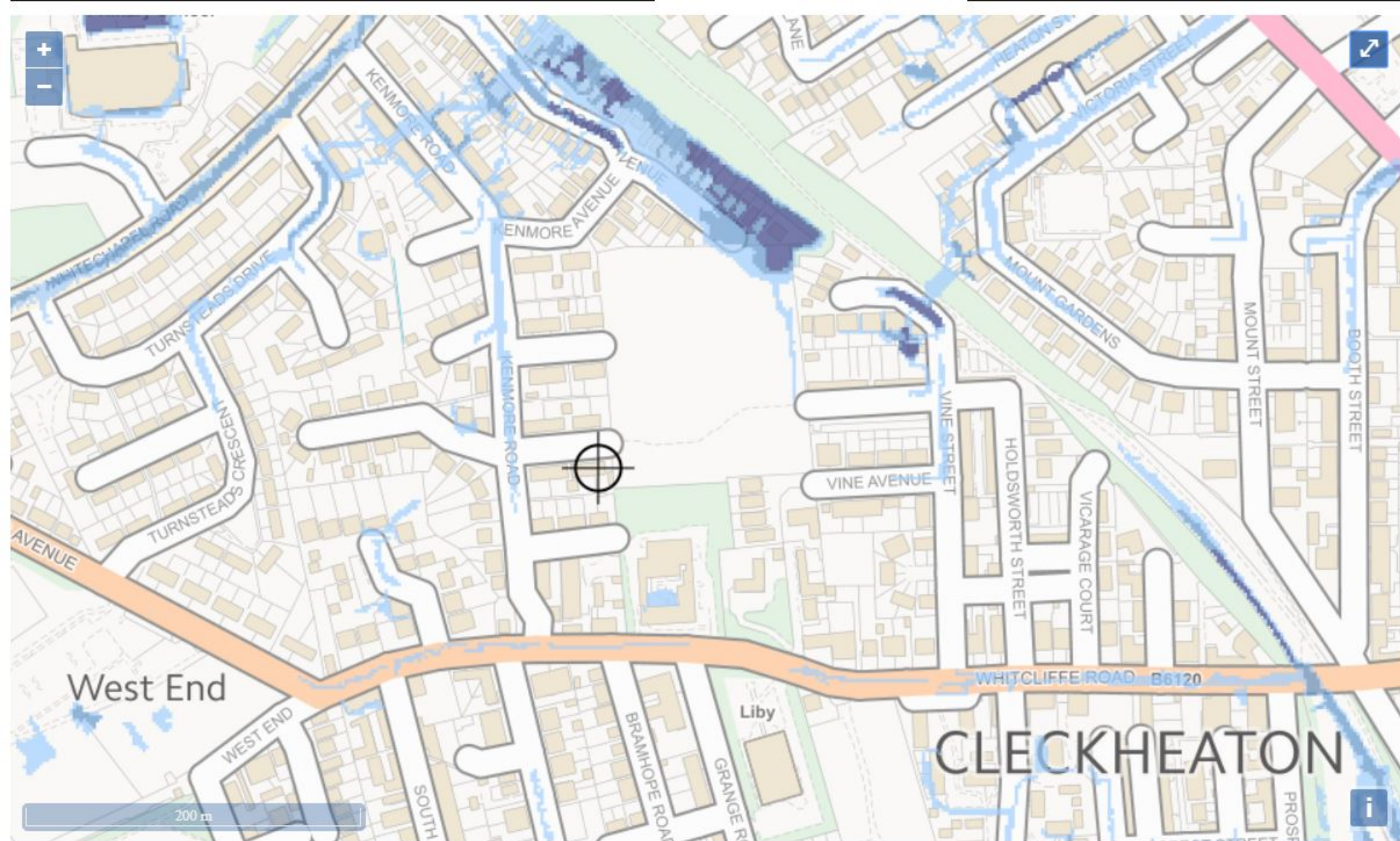
Over 900mm 300 to 900mm Below 300mm Location you selected



Surface water flood risk: water depth in a medium risk scenario

Flood depth (millimetres)

- Over 900mm
- 300 to 900mm
- Below 300mm
- Location you selected



Extent of flooding from surface water

High Medium Low Very Low Location you selected



Appendix D

Existing Drainage Records

YORKSHIRE WATER PROTECTION OF MAINS AND SERVICES

1. The position of Yorkshire Water Services Ltd (YWS) apparatus shown on the existing mains record drawing(s) indicates the **general** position and nature of our apparatus and the accuracy of this information cannot be guaranteed. Any damage to YWS apparatus as a result of your works may have serious consequences and you will be held responsible for all costs incurred. Prior to commencing major works, the exact location of apparatus must be determined on site, if necessary by excavating trial holes. The actual position of such apparatus and that of service pipes which have not been indicated must be established on site by contacting the Customer Helpline on 0845 124 24 24 for both water and sewerage.

2. The public sewer and water network is lawfully retained in its existing position and the sewerage and water undertaker is entitled to have it remain so without any disturbance. The provisions of section 159 of the Water Industry Act 1991 provides that the undertaker may "inspect, maintain, adjust, repair or alter" the network. Those rights are given to enable the undertaker to perform its statutory duties. Any development of the land or any other action that unacceptably hindered the exercise of those rights would be unlawful. The provisions contained in Section 185 of the Water Industry Act 1991 state that where it is reasonable to do so, a person may require the water supply undertaker to alter or remove a pipe where it is necessary to enable that person to carry out a proposed change of use of the land. The provisions contained in Section 185 also require the person making the request to pay the full cost of carrying out the necessary works.

3. Ground levels over existing YWS apparatus are to be maintained. Sewers in highways will **generally** be laid to give 1200mm of cover from finished ground level working to kerb races, other permanent identification of the limits of the road or to an agreed line and level. Substantial increases or decreases to this 1200mm depth of cover will result in the sewer being re-laid at your expense. Water mains and services will **generally** be laid with a minimum of 750mm depth of cover however some mains and services usually those installed over 50 years ago may have less ground cover.

4. If surface levels are to be decreased / increased significantly the effects on existing water supply apparatus will be carefully considered and if any alterations are necessary, the costs of the alterations will be recharged to you in full. Outlets on fire hydrants must be no more than 300mm below the new levels and all surface boxes must be adjusted as part of the scheme.

5. To enable future repair works to be carried out without hindrance; any pipe, cable, duct, etc. installed parallel to a water main or service pipe should not be installed directly over or within 300mm of a water main or service pipe or 1000mm of a waste water asset. Where a pipe, cable, duct, etc. crosses a main or service it should preferably cross perpendicular or at an angle of no less than 45° and with a minimum clearance of 150mm. These requirements apply to activities within an existing highway and are relevant to the installation of pipes, cables, ducts, etc. up to and including 250mm in diameter (*see illustration below*). Necessary protection measures for installations greater than 250mm in diameter and/or in private land will need to be agreed on an individual basis. Installations within a new development site must comply with the National Joint Utilities Group publication Volume 2: NJUG Guidelines On The Positioning Of Underground Utilities Apparatus For New Development Sites.

6. All excavation works near to YW apparatus should be by hand digging only.

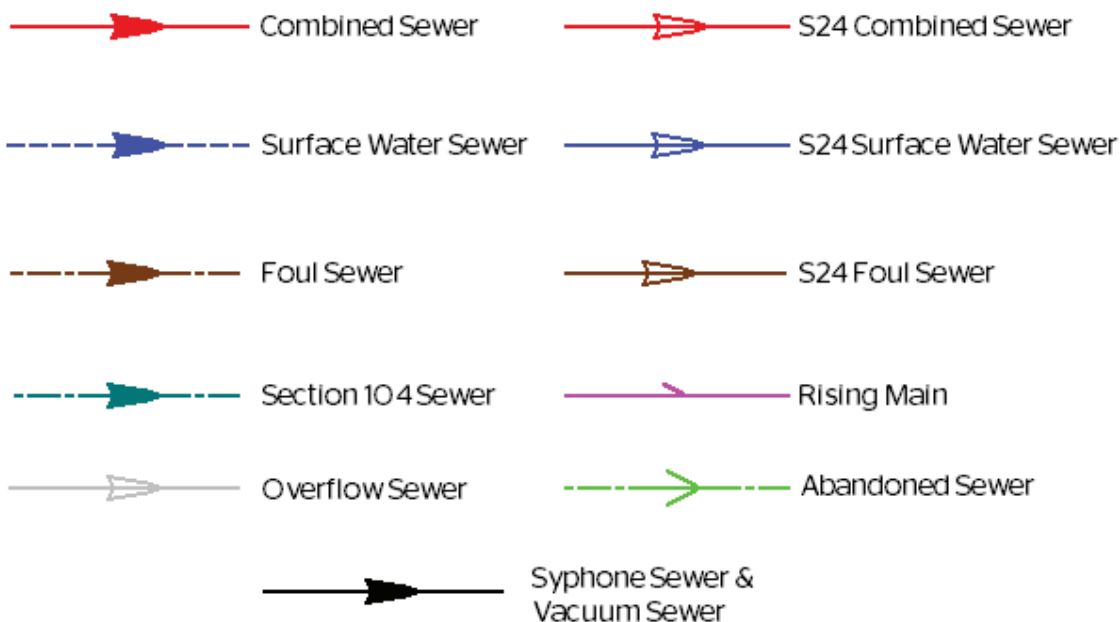
7. Backfilling with a suitable material to a minimum 300mm above YW apparatus is required.
8. Adequate support must be provided where any works pass under YW apparatus.
9. Jointing chambers, lighting columns and other structures must be installed in such a way that future repair or maintenance works to YW apparatus will not be hindered.
10. Apparatus such as; railings, sign posts, etc. must not be placed in such a way that they prevent access to or full operation of controlling valves, hydrants or similar apparatus. YWS surface boxes must not be covered or buried. Any adjustment, alteration or replacement of manhole covers must be agreed on site prior to the commencement of the works with a YWS Inspector who may be contacted via our Call Centre on 0845 124 24 24.
11. Explosives shall not be used within 100 metres of any Yorkshire Water Services apparatus or installations.
12. Vibrating plant should not be used directly over any apparatus. Movement or operation by vehicles or heavy plant is not to be permitted in the immediate vicinity of YWS plant or apparatus unless there has been prior consultation and, if necessary, adequate protection provided without cost to YWS.
13. ***Under no circumstances*** should thrust boring or similar trenchless techniques commence until the actual position of the Company's mains/services along the proposed route have been confirmed by trial holes.
14. Any alterations to the highway should be notified following the procedures outlined in the New Road and Street Works Act 1991 Code of Practice; Measures Necessary Where Apparatus Is Affected By Major Works (Diversionary Works).
15. You will be held responsible for any damage or loss to YWS apparatus during and after completion of work, caused by yourselves, your servant or agent. Any damage caused or observed to YWS plant or apparatus should be immediately reported to YWS. Should YW incur any costs as a result of non-compliance with the above, all costs will be rechargeable in full.
16. You should ensure that nothing is done on the site to prejudice the safety or operation of YWS employees, plant or apparatus.
17. In accordance with the New Roads and Street Works Act 1991, Chapter 22, Part 3, Section 80. The location of any identified YW asset "*which is not marked, or is wrongly marked, on the records made available*" should be communicated back to Yorkshire Water. The location of the apparatus should be identified on copies of the supplied plans which should be returned to Yorkshire Water (Asset Records Team) with photographic supporting evidence where possible.
18. The Government has decided that responsibility for private sewers serving two or more properties and lateral drains (the section of pipe beyond the boundary of a single property, connecting it to the public sewer) will be transferred to the water companies on Oct 1 2011. Private pumping stations will also transfer during the period 1 October 2011 – 1 Oct 2016. Records of these assets may not yet be shown on the existing mains record drawing(s). If you encounter any of these assets you must inform Yorkshire Water Services Ltd (YWS).
19. Please note that the information supplied on the enclosed plans is reproduced from Ordnance Survey material with the permission of the Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. Licence Number 1000019559.

20. This information is for guidance only and the position and depth of any YW apparatus is approximate only. Likewise, the nature and condition of any YW apparatus cannot be guaranteed. YW has no responsibility for recording the locations of privately owned apparatus. As of 1 October 2011, there may be some lateral drains and/or public sewers which are not documented on YW records but may still be present. For the avoidance of doubt, this information is not a substitute for appropriate professional and/or legal advice. YW accepts no responsibility for any inaccuracy or omissions in this information. The actual position of YW apparatus must be determined on site by excavating trial holes by hand. YW requires a minimum of two working days' written notice of the intention to excavate any trial holes before any excavation can be undertaken. If there are any queries in this respect please contact Yorkshire Water on 0345 124 24 24.

Property Identifier



Sewer Legend

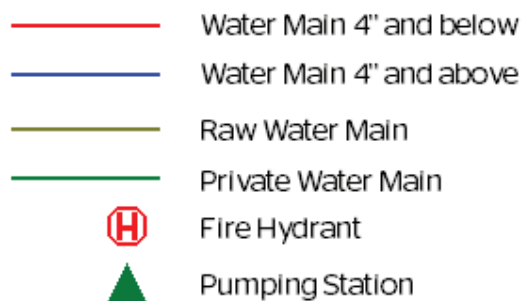


Pumping Station

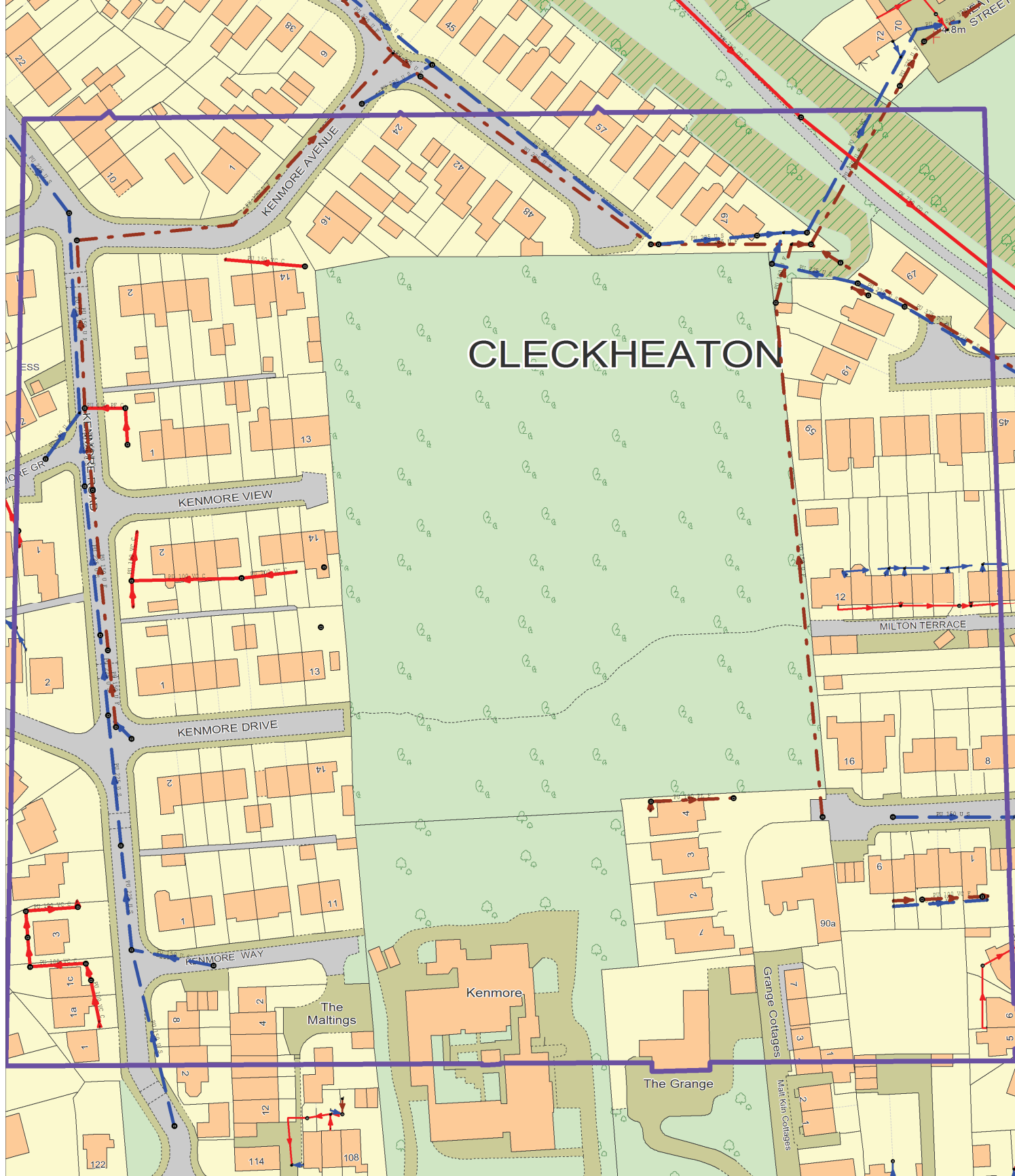


Public Sewer Treatment Works

Water Legend



CLECKHEATON

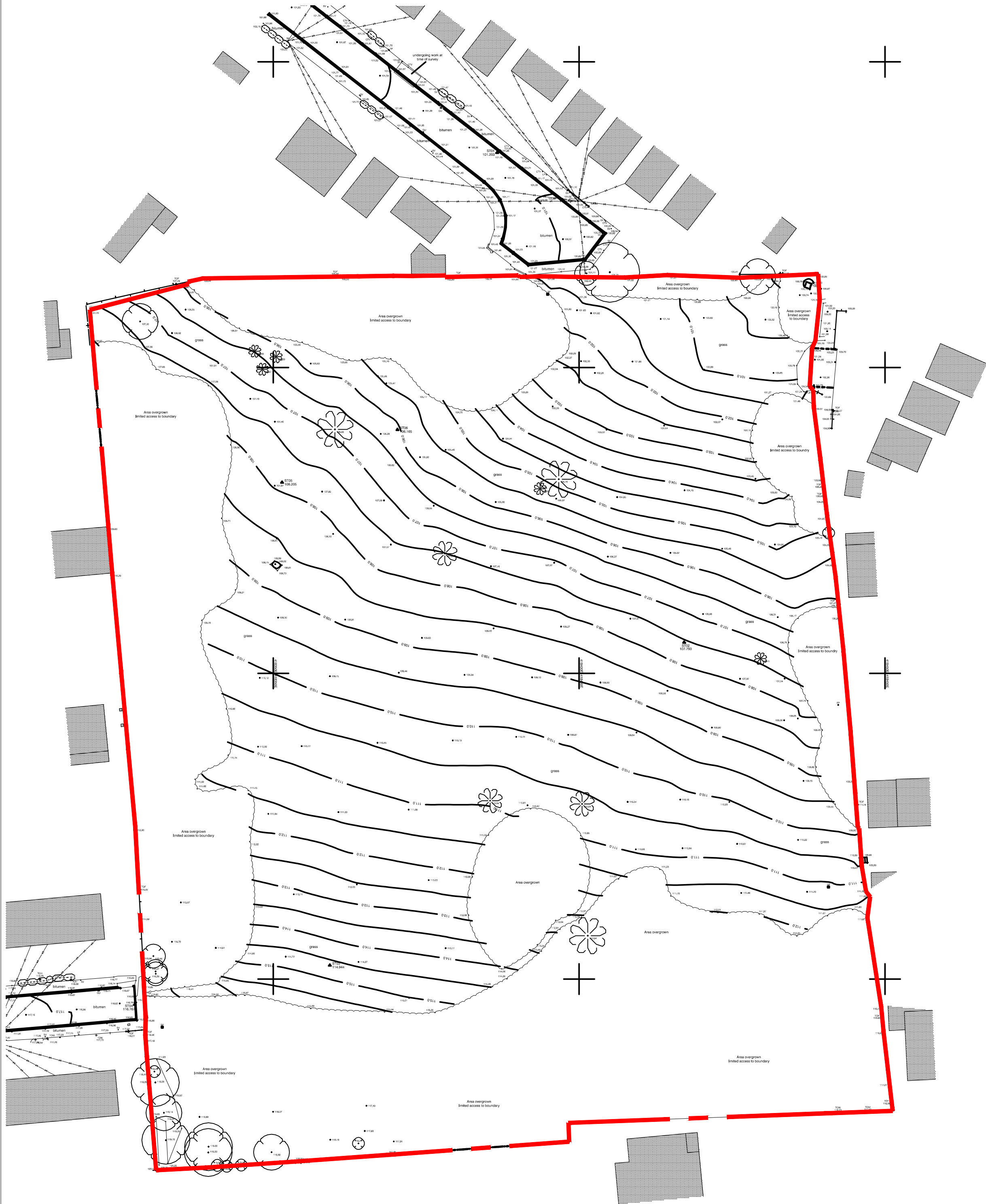


Public Waste Water Network 23/09/2019 11:15:14 OS Grid Coordinates: 418240 : 425628 Map Name : SE1825NW svcGISSafeMo



Appendix E

Topographic Survey



REVISIONS

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PROPOSED EXTRA
CARE DEVELOPMENT
KENMORE DRIVE, CLECKHEATON

EXISTING SITE
LAYOUT PLAN

Drawn: AH Scale: 1:500@A2
Date: FEB 19 Checked: MH

brewsterbye architects
5 NORTH HILL ROAD
HEADINGLEY
LEEDS
LS6 2EN
telephone 0113 2754000
facsimile 0113 2644250
e-mail info@brewsterbye.co.uk

Dwg No: 463/15(01)001 #

Appendix F

Reference Documents List

The National Planning Policy Framework (March 2018)	Communities and Local Government
The Technical Guidance to the NPPF (March 2018)	Communities and Local Government
Flood Risk Assessment Guidance Note 1	Environment Agency