

40 Copthall Road East

Flood Risk Assessment

May 2022



Quality Management

Project	40 Copthall Road East Flood Risk Assessment
Location	40 Copthall Road East, Ickenham, Uxbridge, UB10 8SE
Reference	LE2021055FRA

Revision History

Rev	Date	Issue / Purpose/ Comment	Prepared
R01	May 2022	Final	ZY

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Contact Us:

Liska Environmental Ltd
Tel: 07449 043037
Email: info@liskaltd.co.uk
www.liskaltd.co.uk

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Executive Summary

Site Name	40 Copthall Road East Flood Risk Assessment
Location	40 Copthall Road East, Ickenham, Uxbridge, UB10 8SE
Grid Reference	507339, 186634
Area (ha)	Approximately 0.04ha
EA Flood Zone Classification	Flood Zone 3
Current Site Use	Residential
Description of proposed development	Erection of a side extension
Vulnerability Classification	Residential – 'More Vulnerable'
Summary of Pre-development Risks	• Fluvial Flood Risk: High Risk • Tidal Flood Risk: Negligible Risk • Flood Risk from Land, Surface Water and Sewers: Medium Risk • Groundwater Flood Risk: Low Risk • Flood Risk from Artificial Sources: Low Risk • Residual Flood Risk: Low Risk

1. Introduction

1.1 Requirement

- 1.1.1 Liska Environmental has been commissioned by Mehwish Fatima to undertake a desk based Flood Risk Assessment (FRA) for a development at 40 Copthall Road East, Ickenham, Uxbridge, UB10 8SE (Figure 3-1). It is understood by Liska Environmental that this report is to support a planning application for the erection of a side extension.

1.2 Report Objectives

- 1.2.1 The contents of this FRA describe the assessment of the proposal and the implications of the proposed development on flood risk. The FRA has been prepared following guidance provided in the revised National Planning Policy Framework (July 2018) and the Planning Policy Guidance (November 2016).
- 1.2.2 The aim of this assessment is to provide the level of detail necessary to demonstrate that the potential effects of flood risk (to the proposal) have been addressed by:
- Identifying the source and probability of flooding to the application site, including the possible effects of climate change;
 - Determining the consequences of flooding to and from the proposed development proposal and advising on the how this will be managed, if necessary; and
 - Demonstrating the flood risk issues described in this assessment are compliant with the relevant guidance.

1.3 Limitations

- 1.3.1 This report relies on publicly available information which Liska Environmental assumes to be correct: Liska Environmental cannot and does not verify accuracy of this data, and it is outside the scope of this commission to do so.

1.4 Sources of Information

- 1.4.1 Sources of information used during the compilation of this report include:
- Environment Agency (EA) website – ‘*Flood Map for Planning*’ [Accessed 01/05/2022];
 - British Geological Survey (BGS) website – ‘*GeoIndex*’ and ‘*Lexicon of Named Rock Units*’ [Accessed 01/05/2022];
 - Department of Environment, Food, and Rural Affairs (DEFRA) website – ‘*MAGIC Map Application*’ [Accessed 01/05/2022];
 - Environment Agency (EA) website – ‘*Catchment Data Explorer*’ [Accessed 01/05/2022].

2. Policy and Guidance

2.1 Thames Catchment Flood Management Plan (CFMP), 2009

- 2.1.1 A Catchment Flood Management Plan (CFMP) is a high-level strategic plan prepared by the EA, which identifies long-term (50 to 100 year) policies for sustainable flood risk within a catchment.
- 2.1.2 The relevant key messages contained within the Thames Region CFMP (2009) are that:
- Climate change will be the major cause of increased flood risk in the future; in urban areas and areas of narrow floodplain, flooding from heavy rainfall will be more regular and more severe. Surface water, sewer and fluvial flooding can occur within minutes of a severe rainfall event. Flooding can therefore occur at any time of the year, and there is very little time to provide flood warnings.
 - Development and urban regeneration provide a crucial opportunity to manage flood risk; the location, layout and design of development can all reduce flood risk. For example, the use of SuDS can help to control surface water runoff.
 - NPPF should be applied to ensure that flood risk is managed appropriately.

2.2 Flood and Water Management Act, 2010

- 2.2.1 Combined with the Flood Risk Regulations 2009 ('the Regulations'), (which enact the EU Floods Directive in the England and Wales) the Flood and Water Management Act 2010 ('the Act') places significantly greater responsibility on Local Authorities to manage and lead on local flooding issues. The Act and the Regulations together raise the requirements and targets Local Authorities need to meet, including:
- Playing an active role leading Flood Risk Management;
 - Development of Local Flood Risk Management Strategies (LFRMS);
 - Implementing requirements of Flood and Water Management legislation;
 - Development and implementation of drainage and flooding management strategies; and
 - Responsibility for first approval, then adopting, management and maintenance of Sustainable Drainage Systems (SuDS) where they service more than one property.
- 2.2.2 The Act also clarifies three key areas that influence development:
1. **Sustainable Drainage Systems (SuDS)** - the Act makes provision for a national standard to be prepared on SuDS, and developers will be required to obtain local authority approval for in accordance with the standards, likely with conditions. Supporting this, the Act requires local authorities to adopt and maintain SuDS, removing any ongoing responsibility for developers to maintain SuDS if they are designed and constructed robustly.
 2. **Flood risk management structures** - the Act enables the EA and local authorities to designate structures such as flood defences or embankments owned by third parties for protection if they affect flooding or coastal erosion. A developer or landowner will not be able to alter, remove or replace a designated structure or feature without first obtaining consent from the relevant authority.
 3. **Permitted flooding of third party land** - The EA and local authorities have the power to carry out work, which may cause flooding to third party land where the works are deemed to be in the interest of nature conservation, the preservation of cultural heritage or people's

enjoyment of the environment or of cultural heritage.

2.3 National Planning Policy Framework (NPPF), July 2018

- 2.3.1 In determining an approach for the assessment of flood risk for the proposal there is a need to review the policy context. The National Planning Policy Framework requires that consideration be given to flood risk in the planning process. The National Planning Policy Framework was revised and issued in July 2018 and outlines the national policy position on development and flood risk assessment.
- 2.3.2 The Framework states that the appropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk. Where development is necessary in flood risk areas, it can be permitted provided it is made safe without increasing flood risk elsewhere.
- 2.3.3 The essence of NPPF is that:
- Local Plans should be supported by Strategic Flood Risk Assessment and develop policies to manage flood risk from all sources, taking advice from the Environment Agency and other relevant flood risk management bodies, such as lead local flood authorities and internal drainage boards;
 - Policies in development plans should outline the consideration, which will be given to flooding issues, recognising the uncertainties that are inherent in the prediction of flooding and that flood risk is expected to increase as a result of climate change;
 - Planning authorities should apply the precautionary principle to the issue of flood risk, using a risk-based search sequence to avoid such risk where possible and managing it elsewhere;
 - The vulnerability of a proposed land use should be considered when assessing flood risk;
 - Opportunities offered by new developments should be used to reduce the causes and impacts of flooding;
 - Planning authorities should recognise the importance of functional floodplains, where water flows or is held at times of flood, and avoid inappropriate development on undeveloped and undefended floodplains; and
 - Development is based on the concept of Flood Risk Reduction, particularly in circumstances where development has been sanctioned on the basis of the “Exception Test”.

3. Development Site Planning Considerations

3.1 Location

- 3.1.1 The site, of approximately 0.04ha, is located at 40 Copthall Road East, Ickenham, Uxbridge, UB10 8SE at Ordinance Survey (OS) coordinates 507339, 186634.



Figure 3-1 Site Boundary. Source: Google Map

3.2 Proposed Development

- 3.2.1 The proposal consists of the erection of a side extension. Further details about the proposals have been provided in Appendix A.

3.3 Local Geology

- 3.3.1 A review of the published geological information was carried out, including information from the BGS GeoIndex and Lexicon of Named Rock Units websites¹. The geological sequence underlying the Site is summarised in Table 3-1.

¹ <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

Table 3-1 Underlying Geological Sequence

Stratum	Name	Location	Parent Unit	Description
Bedrock Geology	Lambeth Group - Clay, Silt and Sand	Onsite	Not Applicable (-)	Sedimentary Bedrock formed approximately 48 to 59 million years ago in the Palaeogene Period. Local environment previously dominated by swamps, estuaries and deltas.
Superficial Deposits	None recorded	None recorded	None recorded	None recorded

- 3.3.2 The BGS geological mapping shows that the Site bedrock comprises Lambeth Group - Clay, Silt And Sand. These sedimentary rocks are fluvial, palustrine and shallow-marine in origin. They are detrital, forming deposits reflecting the channels, floodplains and deltas of a river in a coastal setting (with periodic inundation from the sea).

3.4 Hydrogeology

- 3.4.1 The bedrock geology is designated as Secondary Aquifers. These are permeable strata capable of supporting water supplies at a local rather than strategic scale and in some cases forming an important source of base flow to rivers.
- 3.4.2 The nearest surface water feature is River Pinn which is located at approximately 51 m to the west of the site.

3.5 Flood Zone

- 3.5.1 Flood Zones describe the extent of flooding that would occur on the assumption that no flood defences are in place. The definition of Flood Zones is provided in Table 1 of the PPG and in table 3.1 below:

Table 3-1: Flood zone terminology

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
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. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea

Flood Zone	Definition
	flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

- 3.5.2 The site lies within the Environment Agency's Flood Zone 3 which is described within PPG Table 1 as having a 'High Probability' of flooding. The Environment Agency's flood zone map is shown in Appendix B.

3.6 Vulnerability Classification

- 3.6.1 The proposed development is considered to fall under the classification of 'More Vulnerable' land uses based on Table 2 of PPG Technical Guidance. Table 3: Flood Risk Vulnerability and Flood Zone Compatibility in PPG, states that these land uses are compatible in Flood Zone 3 (with the requirement to apply the Exception Test) (as in Table 3.2 below).

Table 3.2: Flood Zone Risk and Vulnerability

Flood Zones	Flood Risk Vulnerability				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a	Exception Test required	X	Exception Test required	✓	✓
Zone 3b	Exception Test required	X	X	X	✓

Key: ✓Development is appropriate XDevelopment should not be permitted

3.7 Sequential Test and Exception Test

- 3.7.1 Paragraph 101 of the NPPF sets out guidance on the application of the Sequential Test, the aim of which is to steer new development to areas with the lowest probability of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding. Where areas of lower risk are not available, the Exception Test, as set out in paragraph 102 of the NPPF can be applied, to ensure that flood risk to people and property will be managed satisfactorily.

- 3.7.2 As the proposed development is classified as a 'Minor Development', and there would be no additional vulnerability to flood risk nor any worsening of flood risk elsewhere over that as a result of the proposal on this site. Therefore, a Sequential and Exception Test are considered as passed.

3.8 Existing Flood Risk Management Infrastructure

- 3.8.1 According to the Environment Agency's flood zone map the Site is in Flood Zone 3. The site does not benefit from any formal flood defences.

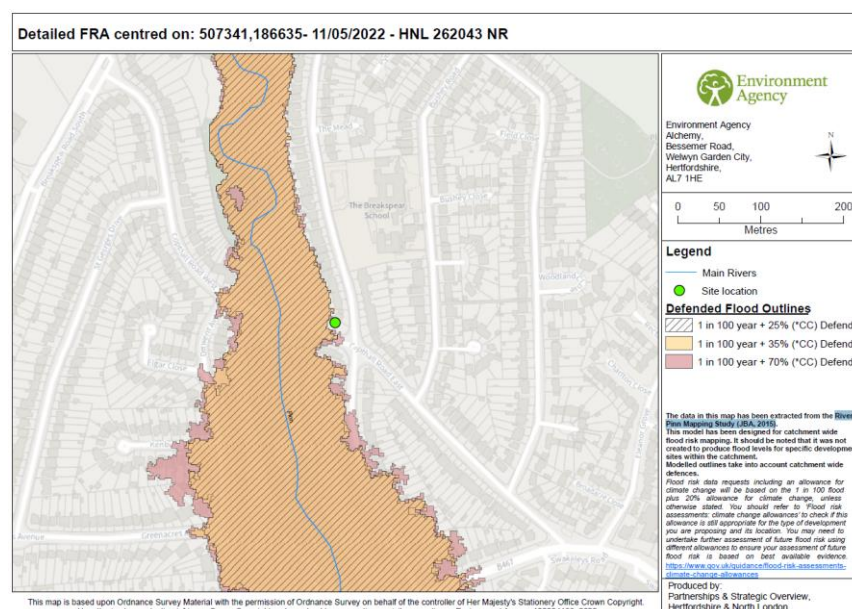
4. Sources of Flooding – Actual Flood Risk

4.1.1 The NPPF describes potential sources of flooding. It is necessary to consider the risk of flooding from all sources within a FRA. This section provides a review of flooding from land, sewers, groundwater and artificial sources, in addition to that from rivers and the sea.

4.2 Fluvial Flood Risk

4.2.1 The Environment Agency's Flood map for Planning, was used to identify risk of flooding at site (refer Appendix B). These confirm that the site is in Flood Zone 3. The site does not benefit from any formal flood defences. The development area is located in Flood Zone 2.

4.2.2 River Pinn Mapping Study completed in 2015 has been provided by the Environment Agency following a data request for Product 4.



4.2.3 The EA's modelled defended flood outlines indicate that the proposed development area would remain unaffected for all events up to and including the 1:100 year +CC (35%) flood event.

4.2.4 It can therefore be considered that the risk to the site from fluvial flooding is relatively low.

4.3 Flood Risk from Land, Surface Water and Sewers

4.3.1 Flooding from land can be caused by rainfall being unable to infiltrate into the natural ground or entering the drainage systems due to blockage, or flows being above design capacity. This can then result in (temporary) localised ponding and flooding. The natural topography and location of buildings/structures can influence the direction and depth of water flowing off impermeable and permeable surfaces.

4.3.2 Surface water flooding can be difficult to predict, much more so than river or sea flooding as it is hard to forecast exactly where or how much rain will fall in any storm. The Environment Agency classifies the site, as being within a medium risk area of flooding (i.e. each year this area has a chance of flooding of between 1% and 3.3%).

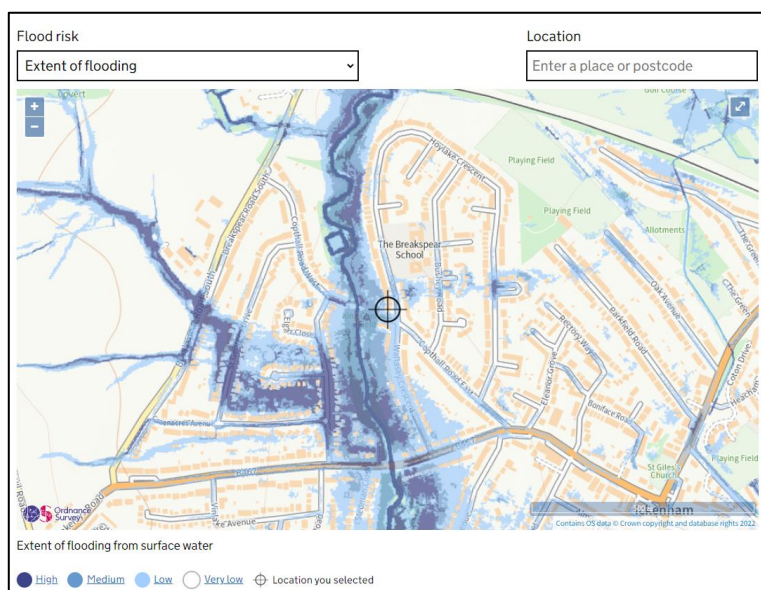


Figure 4-1: Surface Water Flood Map (Source Environment Agency²)

4.4 Tidal Flood Risk

4.4.1 Tidal flooding occurs when a high astronomical tide and storm (tidal surge) exceeds the level of coastal land or coastal flood defences. Tidal flooding can also be caused by 'tide locking' of rivers or estuaries. Tide locking prevents a river from discharging into the sea, causing 'backing up' and resulting in tidal/fluvial flooding.

4.4.2 The Site is not located within an area at risk from tidal flooding.

4.5 Groundwater Flood Risk

4.5.1 According to the West London Strategic Flood Risk Assessment, the site is located in the area with the potential for Elevated Groundwater in permeable superficial deposits, as the proposed development is on ground level or above, the risk of flooding from this source could be considered low.

4.6 Flood Risk from Artificial Sources

4.6.1 Artificial sources of flooding include reservoirs, canals, ponds and mining abstraction.

² <http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?&topic=ufmfs#x=357683&y=355134&scale=2>
[accessed 01/05/2022]

- 4.6.2 A review of the Environment Agency Reservoir Maps indicates that the site is within an area at risk from reservoir flooding. Reservoir flooding can be extremely dangerous due to the speed and volume of the water released which may be with little or no warning. Since this is a prediction of a worst case scenario, it's unlikely that any actual flood would be this large. Reservoir flooding is also extremely unlikely with no loss of life attributed since 1925. The Local Authority for each reservoir listed below could be contacted for further information on local emergency plans.

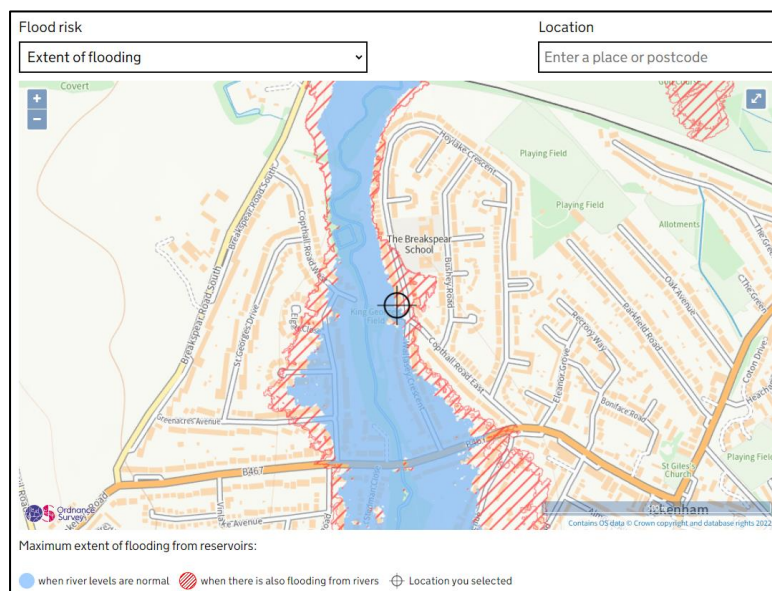


Figure 4-2: Extend of flooding from reservoirs (Source Environment Agency³)

Table 4-1: Reservoirs identified as posing risk to the site.

Reservoir	Owner	Grid Reference	Lead Local Flood Authority
King George VI	Thames Water Ltd	TQ0417074259	Surrey
Queen Mary	Thames Water Ltd	TQ0831069750	Surrey
Wraysbury	Thames Water Ltd	TQ0303075640	Surrey
Virginia Water	The Crown Estate	SU9785768524	Surrey
Queen Mother	Thames Water Ltd	TQ0129777727	Windsor and Maidenhead

4.7 Residual Flood Risk

- 4.7.1 Residual Risk is defined as 'the risk which remains after risk avoidance, reduction and mitigation measures have been implemented'. For the purpose of assessing flood risk, it is assumed that events greater than those assessed as Actual Risk are considered a 'Residual Risk'.
- 4.7.2 As proposed development is located in a high flood risk zone and does not benefit from the presence of significant defences. As such, the residual risk to the site could be considered to be relatively low.

³ <http://watermaps.environment-agency.gov.uk/wiyby/wiyby.aspx?&topic=ufmfs#x=357683&y=355134&scale=2>
[accessed 01/05/2022]

4.8 Summary of flood risk

4.8.1 Table 4.1 below summarises the types of flood risk at the Site:

Table 4-1: Summary of flood risk

Source of risk	Ongoing risk
Fluvial Flood Risk	High Risk
Tidal Flood Risk	Negligible Risk
Flood Risk from Land, Surface Water and Sewers	Medium Risk
Groundwater Flood Risk	Low Risk
Flood Risk from Artificial Sources	Low Risk
Residual Flood Risk	Low Risk

5. Flood Risk Management

5.1 Principles of Flood Risk Management

- 5.1.1 NPPF requires a precautionary approach to be undertaken when making land use planning decisions regarding flood risk. This is partly due to the considerable uncertainty surrounding flooding mechanisms and how flooding may respond to climate change. It is also due to the potentially devastating consequences of flooding to the people and property affected.
- 5.1.2 Flood risk is a combination of the probability of flooding and the consequences of flooding. Hence 'managing flood risk' involves managing either, the probability of flooding or the consequences of flooding, or both.
- 5.1.3 NPPF requires flooding from tidal, fluvial, land, surface water & sewerage and from groundwater to be considered. The flood risk management measures discussed in this section are based on the sources of flooding identified in Section 4 that are considered to pose a risk to the development proposals.

5.2 Flood Resilient Measures

- 5.2.1 The flood risk management measures discussed in this section are based on the sources of flooding identified in section 4. The following flood resilient measures should be adopted to minimise the damage and to enable quick recovery and clean up after the flooding event:
- Non-return valves will be used in the drainage system to prevent back-flow of diluted sewage in situations where there is an identified risk of the foul sewer surcharging.
 - Wiring for telephone, TV, Internet and other services will be protected by suitable insulation to minimise damage.
 - Wall sockets will be raised to as high as is feasible and practicable to avoid damage if flood waters inundate the property.

5.3 Finished Floor Level (FFL)

- 5.3.1 Finished floor levels within the proposed side extension will be set no lower than existing levels.

5.4 Sustainable Drainage Systems (SuDS)

- 5.4.1 A sustainable drainage system (SuDS) is recommended to help to reduce the surface water discharge rate based on the proposed development. The requirements for SuDS will ensure that any redevelopment or new development does not negatively contribute to the surface water flood risk off site and instead provides a positive benefit to the level of risk in the area. It will also ensure that appropriate measures are taken to increase the flood resilience of new properties and developments in surface water flood risk areas, such as those identified as being in an area with critical drainage problems.
- 5.4.2 The SuDS hierarchy and management train has been discussed in the SuDS Manual (C753) which aims to mimic the natural catchment processes as closely as possible. The general hierarchy of the SuDS measures is provided in Table 5-1 below.

Table 5-1 SuDS measures Hierarchy

Measures	Description
Prevention	The use of good site design and housekeeping measures to prevent runoff and pollution (e.g. rainwater harvesting/reuse, Water butt).
Source control	Control of runoff at or very near its source (e.g. soakaways, porous and pervious surfaces, green roofs).
Site control	Management of water in a local area on site (e.g. routing water to large soakaways, infiltration or detention basins)
Regional control	Management of runoff from a site or several sites (e.g. balancing ponds, wetlands).

5.4.3 Table 5-2 below presents the feasibility assessment of the SuDS measures for the site.

Table 5-2 Feasibility Assessment of SuDS measures for the site

SuDS Measures	Description	Feasibility for the site
Source control	Surface runoff can be improved by implementing rainwater harvesting using water butt	Yes

5.4.4 Based on the general assessment of the potential SuDS measures above, it is recommended that a water butt can be proposed to help to improve the surface runoff from the site.

5.5 Safe Access/Egress Arrangements

5.5.1 Demonstrating safe access and egress is available for the site for the development lifetime is a key factor in demonstrating compliance with the NPPF. This requires site occupants to be able to safely access and exit their dwellings in design flood conditions. Vehicular access to allow the emergency services to safely reach the development during design flood conditions is also normally required.

5.5.2 In order for the development to be classified as safe users should be able evacuate the site building before an extreme flood. Key points to note are:

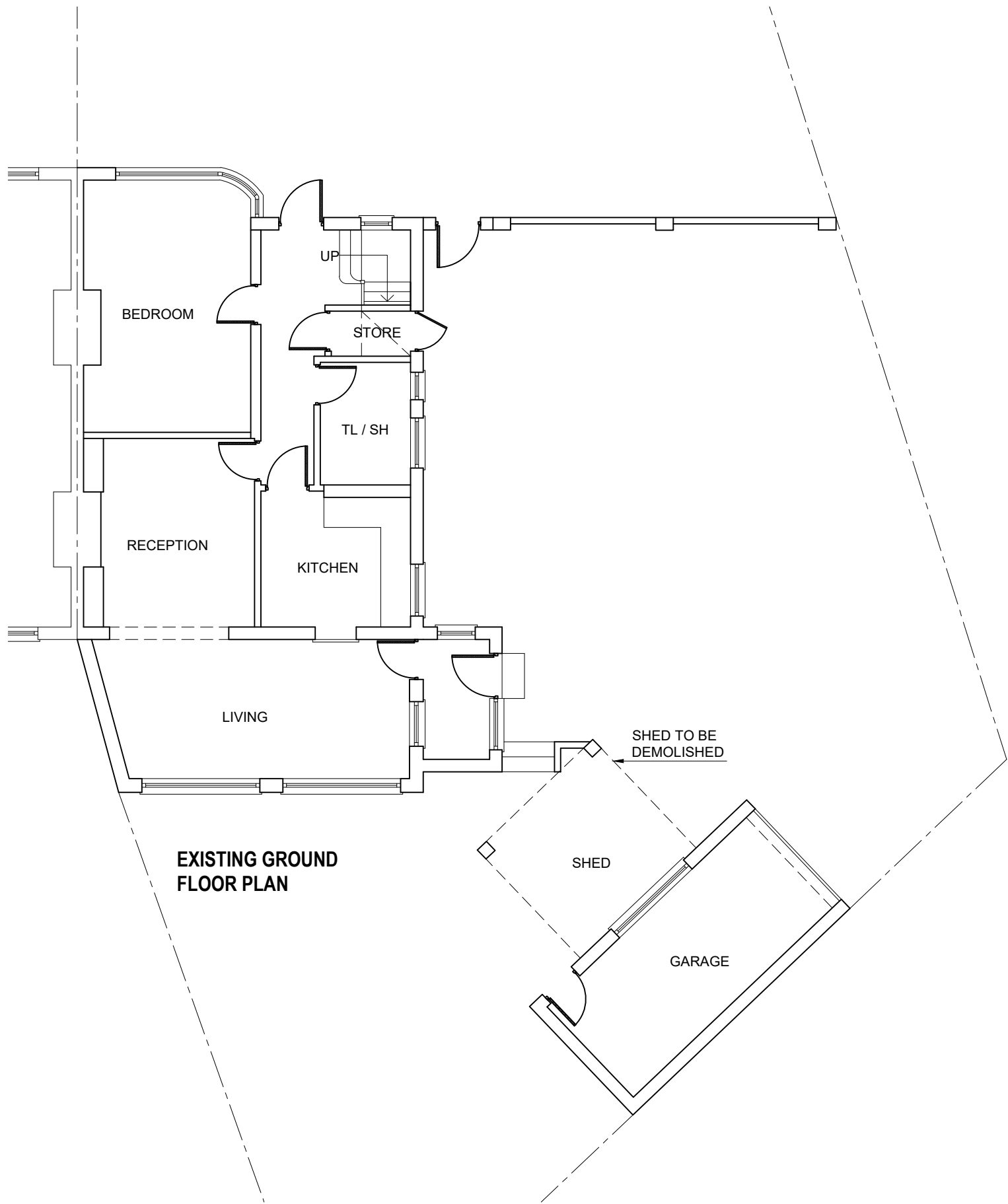
- Occupiers would have more than 24 hours' notice of severe weather warning service.
- The Environment Agency and Emergency Services would evacuate the area should a breach be detected or expected. This is likely to occur if a breach were spotted well in advance of inundation.
- Following the receipt of flood warning it is recommended that the site is evacuated and closed and is only re-opened when it is safe to do so taking advice from the Environment Agency and the Local Authority. In the event that users cannot reach an evacuation area, it is suggested that safe refuge is sought in locations such as the upper storeys of the main building.

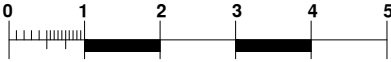
5.5.3 As a further precaution, the Environment Agency provides a warning system, which is free to all users, including their flood warning feeds, flood warning widget, live flood warning map and three day flood risk forecast.

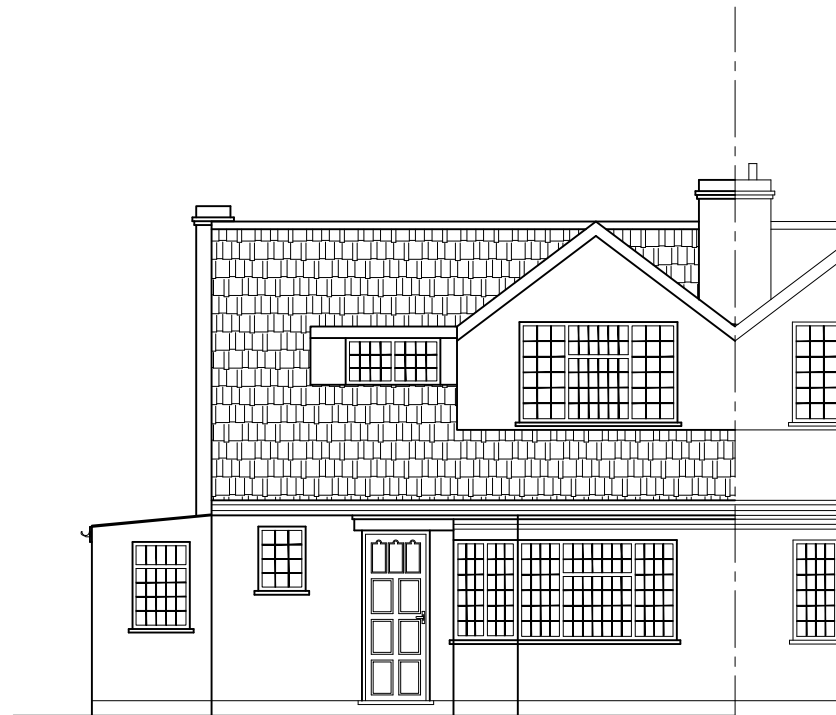
6. Conclusions & Recommendations

- 6.1.1 An assessment of areas potentially at risk from flooding has been undertaken and the development proposals have been examined in relation to their potential to increase flood risk both on and off site. This desk based FRA accompanies the full planning application for the erection of a side extension at 40 Copthall Road East, to demonstrate that flood risk has been given material consideration throughout the development planning process and development should not be restricted at this Site due to flood risk.
- 6.1.2 The site is located within Flood Zone 3 according to the Environment Agency Flood Zones Maps. The current and proposed development Site use is classified as a 'More Vulnerable' land use and 'Minor Development' according to NPPF. Therefore, the site is compatible with the Environment Agency's vulnerability tests.
- 6.1.3 In line with the NPPF, all sources of flooding have been considered and assessed, using readily available sources of information. It should be noted that at this stage no detailed modelling has been undertaken. The site is located in the area with high/medium risk from rivers and surface water and low risk from all other sources including tidal risk, groundwater, sewer and reservoir.
- 6.1.4 The development proposal has considered flood risk at all stages throughout the development of the final layout and reflects the flood risk constraints and the need to manage, and where possible reduce, flood risk in compliance with the guidance in NPPF. The proposal will not increase the risk of flooding to others and as a result, proposed development at this site should not be restricted as a result of flood risk.

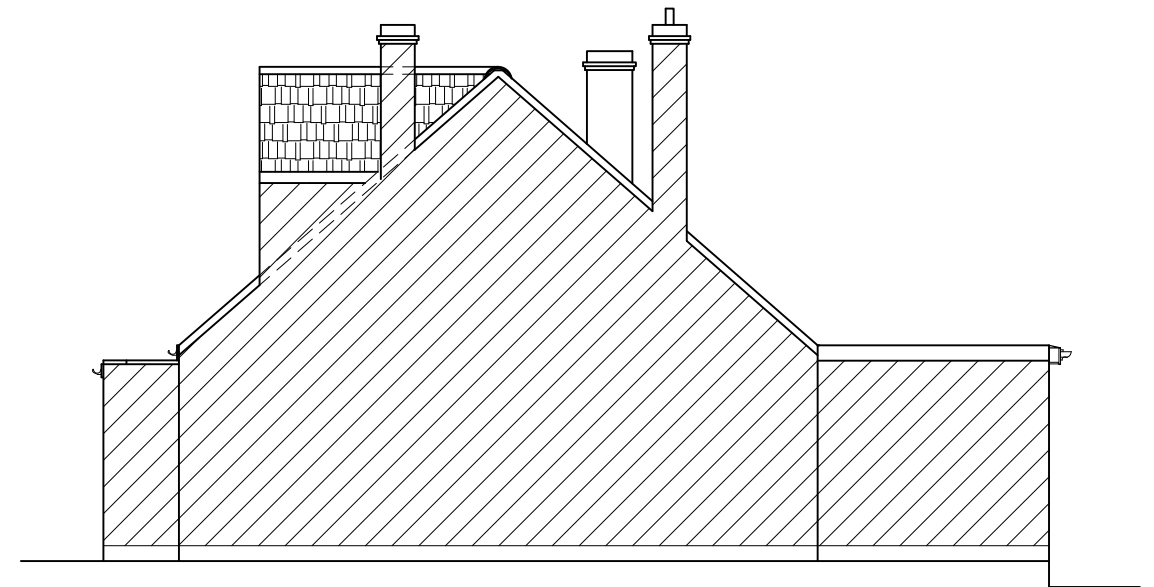
Appendix A Existing Site and Proposed Plans



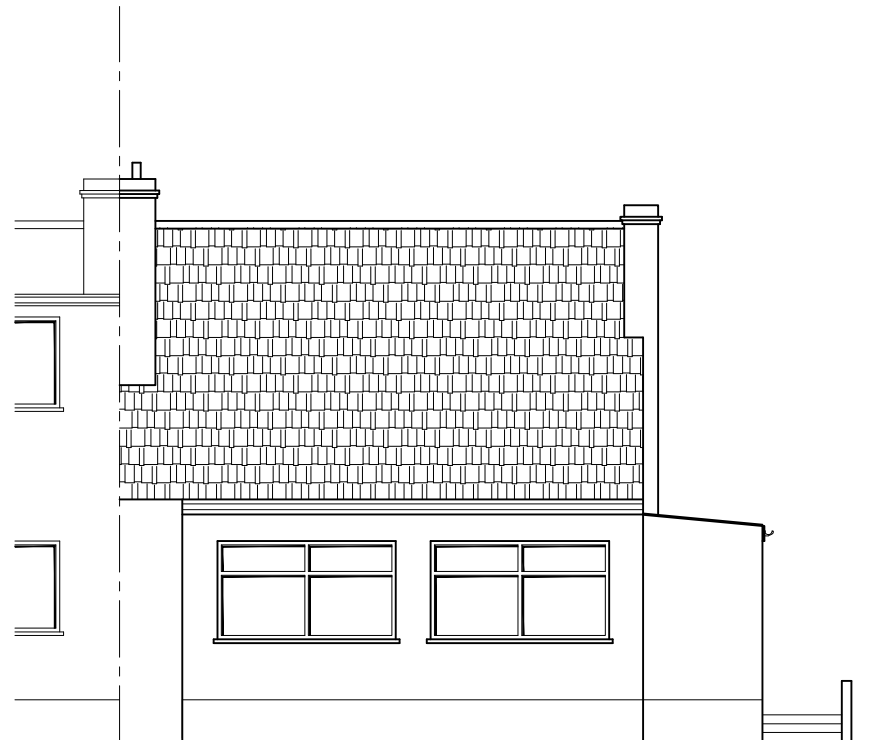
CLIENT	PROJECT 40 COPTHALL ROAD EAST ICKENHAM UXBRIDGE UB10 8SE	PROJECT TITLE	CONSULTANT AA DESIGN HOUSE LIMITED ARCHITECTURAL DESIGNERS AND STRUCTURAL ENGINEERS 109 WOOD STREET, WALTHAMSTOW, LONDON, E17 3LL Phone: 0203 417 5919, Email: info@aadesignhouse.co.uk	SHEET NO. 01
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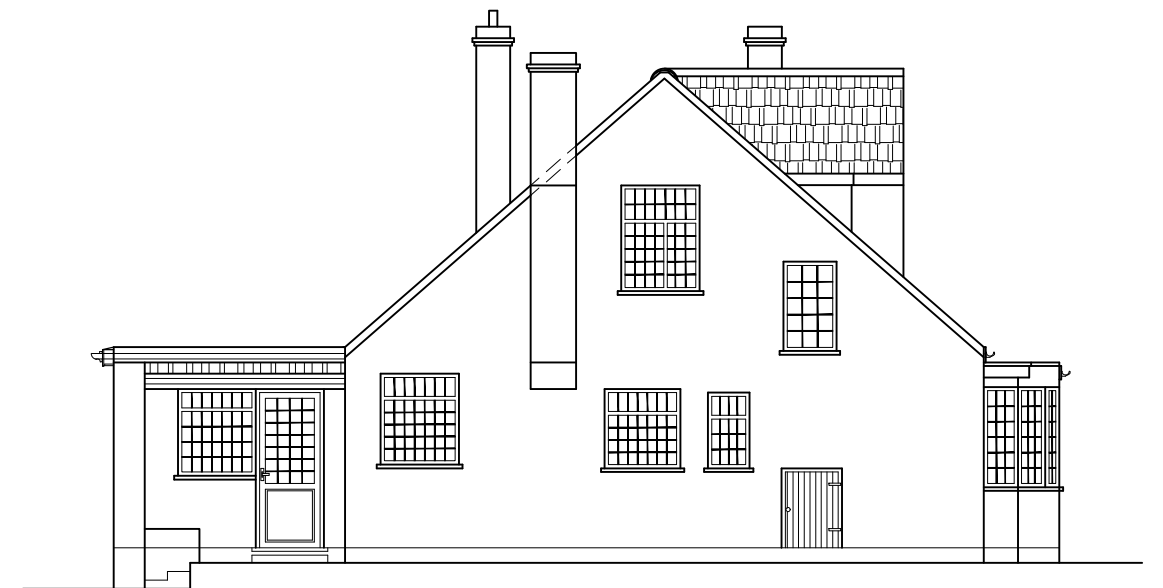
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PROJECT

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ICKENHAM UXBRIDGE UB10 8SE

DRAWING TITLE

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PROJECT TITLE



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CONSULTANT

AA DESIGN HOUSE LIMITED

ARCHITECTURAL DESIGNERS AND STRUCTURAL ENGINEERS

109 WOOD STREET, WALTHAMSTOW, LONDON, E17 3LL

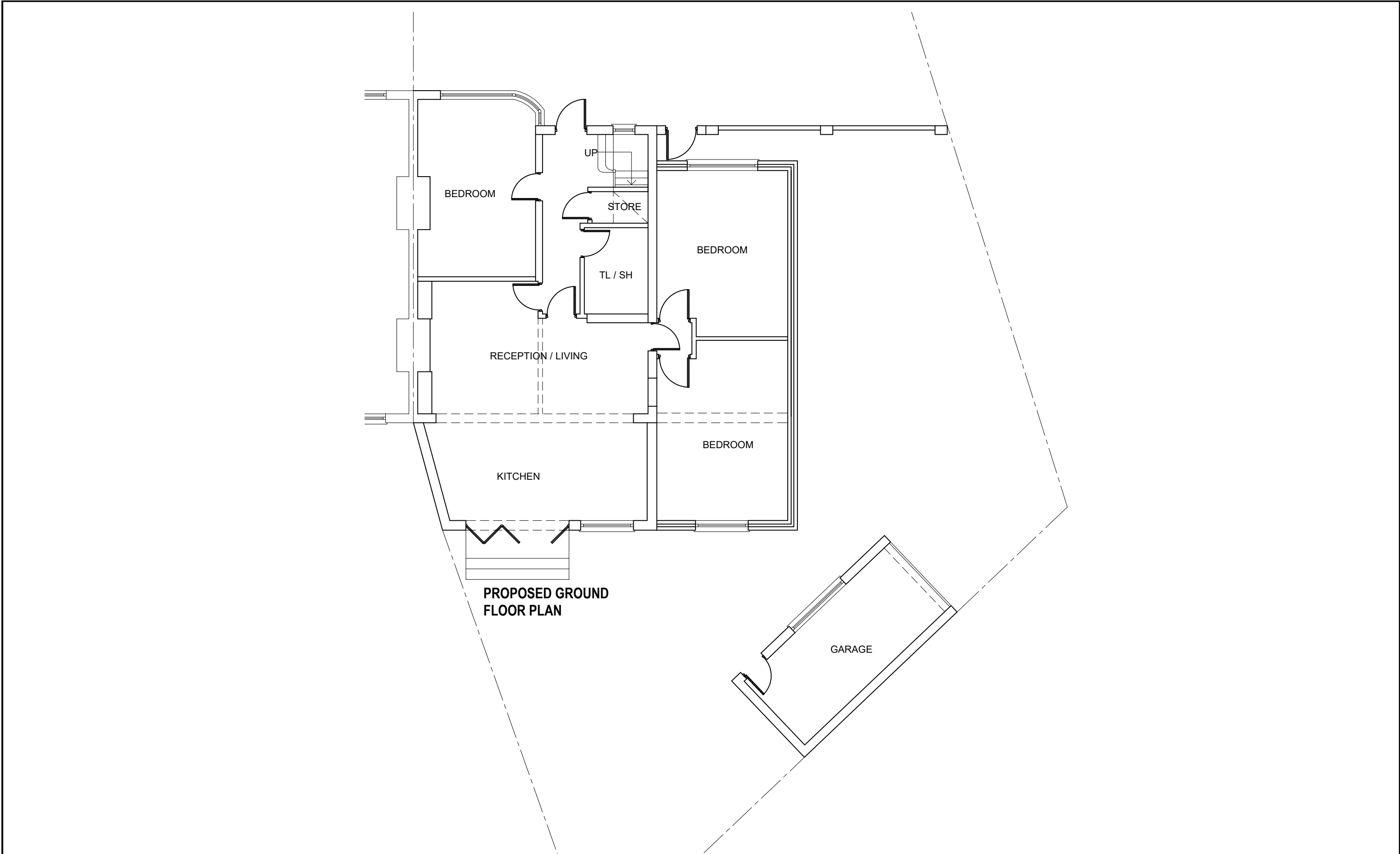
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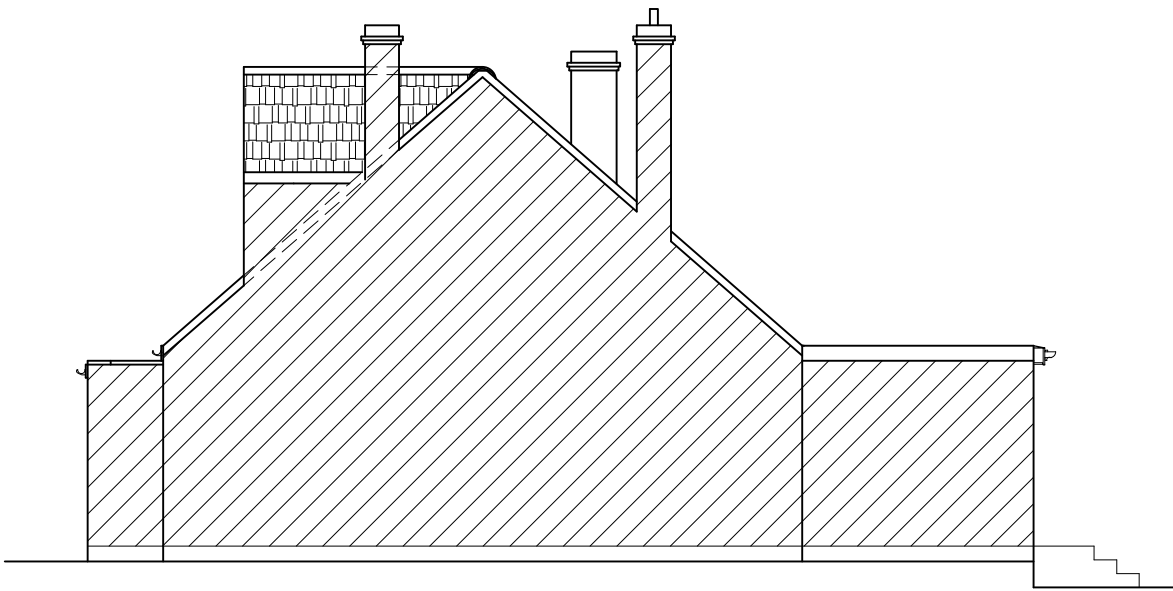
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2021



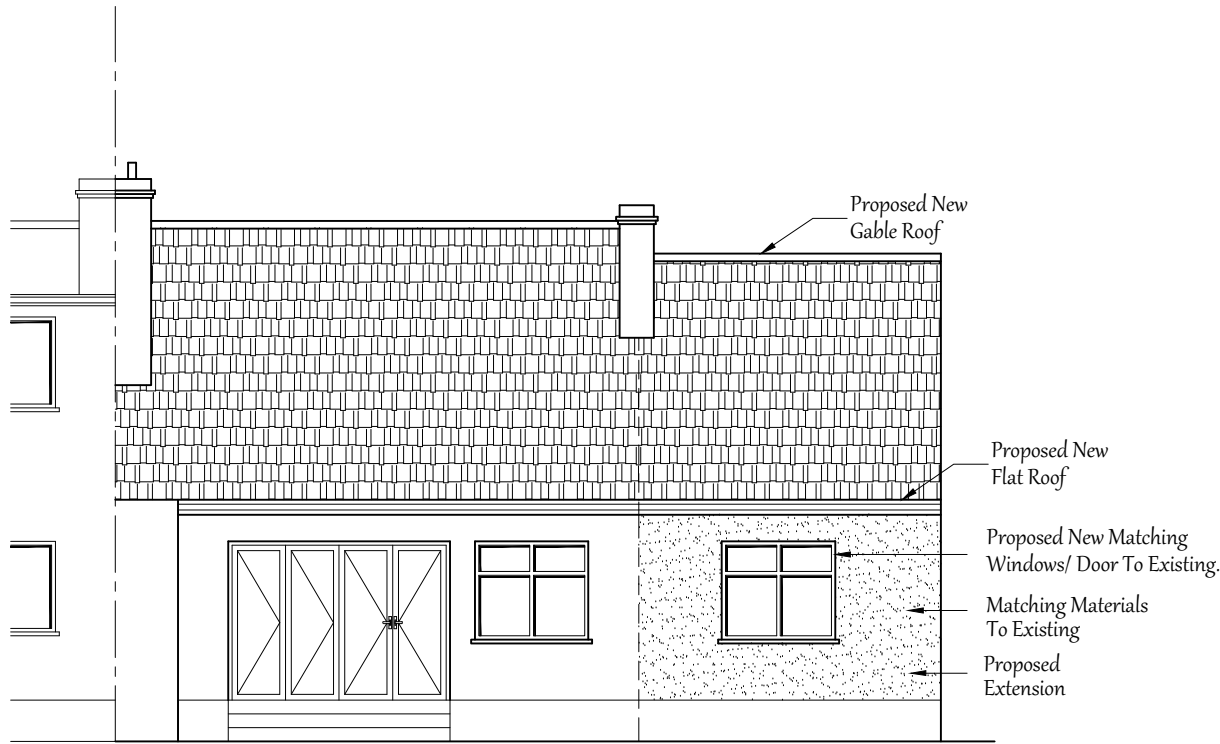
CLIENT	PROJECT 40 COPTHALL ROAD EAST ICKENHAM UXBRIDGE UB10 8SE	PROJECT TITLE	CONSULTANT AA DESIGN HOUSE LIMITED ARCHITECTURAL DESIGNERS AND STRUCTURAL ENGINEERS 109 WOOD STREET, WALTHAMSTOW, LONDON, E17 3LL Phone: 0203 417 5919, Email: info@aaesignhouse.co.uk	SHEET NO. 04
NOTES PLEASE NOTE THAT BEFORE BUILDING WORKS COMMENCES IT IS THE RESPONSIBILITY OF THE BUILDER OR OWNER TO SERVE PARTY WALL NOTICES TO ALL NEIGHBOURS. NO CONSTRUCTION WORK TO BE STARTED PRIOR TO COUNCIL'S APPROVAL. DRAWINGS TO BE READ IN CONJUNCTION WITH RELEVANT DRAWING AND SPECS. FIGURED DIMENSIONS ONLY. ANY DISCREPANCIES ARE TO BE POINTED TO THE COMPANY. THE COMPANY IS NOT LIABLE FOR ANY FAULTS NOT RAISED.	DRAWING TITLE PROPOSED PLAN	0 1 2 3 4 5 1:100 @ A3 (METERS)		DATE NOV 2021



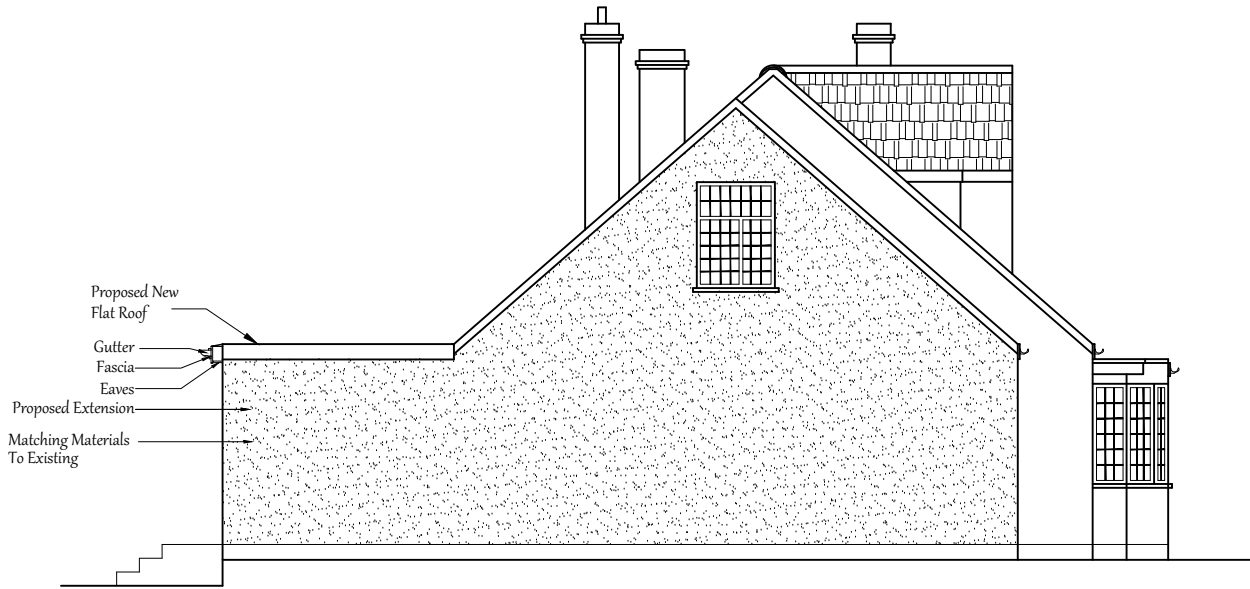
PROPOSED FRONT ELEVATION



PROPOSED SIDE ELEVATION



PROPOSED REAR ELEVATION



PROPOSED SIDE ELEVATION

CLIENT	PROJECT 40 COPTHALL ROAD EAST ICKENHAM UXBRIDGE UB10 8SE	PROJECT TITLE	CONSULTANT AA DESIGN HOUSE LIMITED ARCHITECTURAL DESIGNERS AND STRUCTURAL ENGINEERS 109 WOOD STREET, WALTHAMSTOW, LONDON, E17 3LL Phone: 0203 417 5919, Email: info@aadesignhouse.co.uk	SHEET NO. 06
NOTES PLEASE NOTE THAT BEFORE BUILDING WORKS COMMENCES IT IS THE RESPONSIBILITY OF THE BUILDER OR OWNER TO SERVE PARTY WALL NOTICES TO ALL NEIGHBOURS. NO CONSTRUCTION WORK TO BE STARTED PRIOR TO COUNCIL'S APPROVAL. DRAWINGS TO BE READ IN CONJUNCTION WITH RELEVANT DRAWING AND SPECS. FIGURED DIMENSIONS ONLY. ANY DISCREPANCIES ARE TO BE POINTED TO THE COMPANY. THE COMPANY IS NOT LIABLE FOR ANY FAULTS NOT RAISED.	DRAWING TITLE PROPOSED ELEVATIONS	1:100 @ A3 (METERS)		DATE NOV 2021

Appendix B Environment Agency Flood Map for Planning



Flood map for planning

Your reference
186634

Location (easting/northing)
507339/186634

Created
1 May 2022 12:27

Your selected location is in flood zone 2, an area with a medium probability of flooding.

This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see www.gov.uk/guidance/flood-risk-assessment-standing-advice)

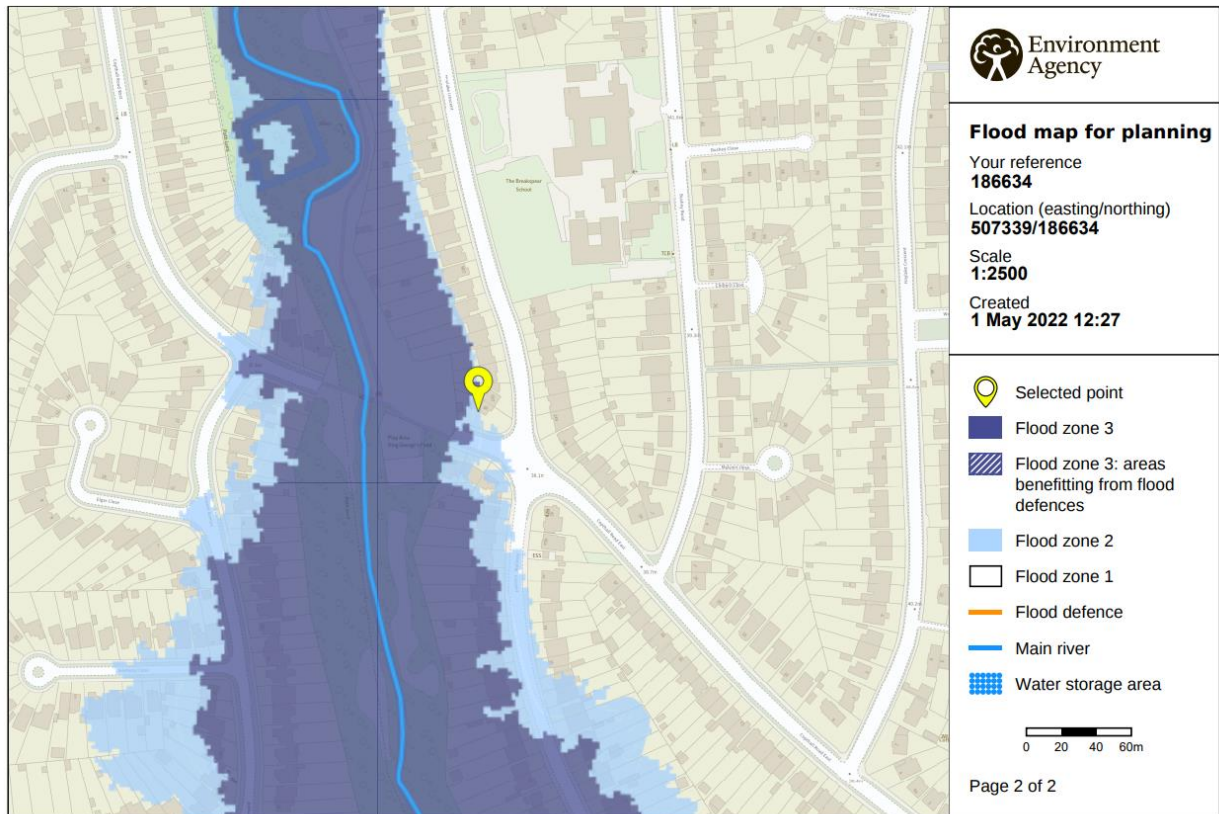
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

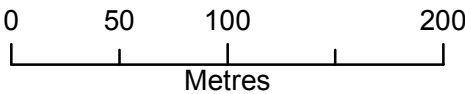
Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2021 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>



Appendix C Environment Agency Product 4



Environment Agency
Alchemy,
Bessemer Road,
Welwyn Garden City,
Hertfordshire,
AL7 1HE



Legend

- Main Rivers
- Site location

Defended Flood Outlines

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

The data in this map has been extracted from the River Pinn Mapping Study (JBA, 2015). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment.

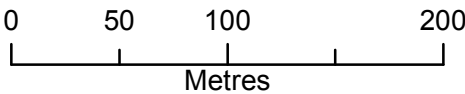
Modelled outlines take into account catchment wide defences.

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>

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Alchemy,
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Welwyn Garden City,
Hertfordshire,
AL7 1HE



Legend

- Main Rivers
- Site location

Defended Flood Outlines

- 1 in 20 year (5%) Defended
- 1 in 30 year (3.33%) Defended
- 1 in 50 year (2%) Defended

The data in this map has been extracted from the River Pinn Mapping Study (JBA, 2015). This model has been designed for catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites within the catchment.

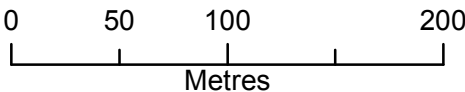
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Legend

- Main Rivers
- Site location

Defended Flood Outlines

- 1 in 75 year (1.33%) Defended
- 1 in 100 year (1%) Defended
- 1 in 100 year + 20% (*CC) Defended

The data in this map has been extracted from the River Pinn Mapping Study (JBA, 2015). This model has been designed for catchment wide 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.

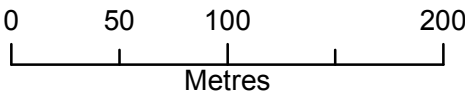
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Legend

- Main Rivers
- Site location

Defended Flood Outlines

- 1 in 100 year + 25% (*CC) Defended
- 1 in 100 year + 35% (*CC) Defended
- 1 in 100 year + 70% (*CC) Defended

The data in this map has been extracted from the River Pinn Mapping Study (JBA, 2015). This model has been designed for catchment wide 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.

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.

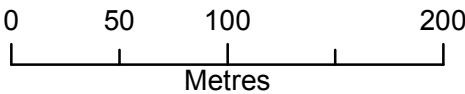
<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

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Legend

- Main Rivers
- Site location

Defended Flood Outlines

- 1 in 250 year (0.4%) Defended
- 1 in 1000 year (0.1%) Defended

The data in this map has been extracted from the River Pinn Mapping Study (JBA, 2015). This model has been designed for catchment wide 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.

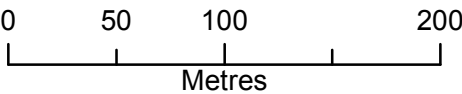
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Legend

- Main Rivers
- Site location

1D Node Results

- Nodes

The data in this map has been extracted from the River Pinn Mapping Study (JBA, 2015). This model has been designed for catchment wide 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.

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>

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Environment Agency ref: HNL 262043 NR

The following information has been extracted from the River Pinn Mapping Study (JBA, 2015)

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 catchment wide flood risk mapping. It should be noted that it was not created to produce flood levels for specific development sites across the entire catchment.

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	30 yr	50 yr	75 yr	100 yr	100yr + 20%	100yr + 25%	100yr + 35%	100yr + 70%	250 yr	1000yr
205	507256	186913	37.81	37.95	38.01	38.05	38.07	38.11	38.13	38.15	38.21	38.23	38.25	38.34	38.24	38.42
204	507201	186850	37.62	37.80	37.89	37.94	37.97	38.01	38.04	38.07	38.14	38.15	38.18	38.28	38.17	38.35
203	507270	186792	37.47	37.70	37.81	37.87	37.90	37.93	37.96	37.99	38.04	38.06	38.08	38.17	38.07	38.24
202	507253	186708	37.34	37.57	37.67	37.73	37.76	37.81	37.84	37.87	37.93	37.95	37.97	38.06	37.96	38.13
201	507270	186676	37.27	37.50	37.58	37.63	37.65	37.69	37.72	37.74	37.81	37.82	37.85	37.94	37.84	38.00
187	507277	186612	37.11	37.34	37.45	37.52	37.55	37.59	37.62	37.65	37.71	37.73	37.75	37.84	37.74	37.90
P91	507285	186509	36.97	37.20	37.32	37.39	37.43	37.47	37.51	37.54	37.61	37.62	37.65	37.74	37.64	37.80
P90	507299	186409	36.86	37.11	37.26	37.35	37.38	37.44	37.47	37.50	37.58	37.59	37.62	37.71	37.61	37.77
06664_1011	507320	186384	36.83	37.08	37.23	37.32	37.36	37.42	37.46	37.49	37.56	37.58	37.61	37.70	37.59	37.75
06664_1010	507336	186357	36.81	37.06	37.22	37.31	37.35	37.41	37.45	37.48	37.55	37.57	37.60	37.68	37.58	37.74
06664_1009	507347	186331	36.79	37.04	37.19	37.28	37.32	37.39	37.43	37.46	37.54	37.56	37.59	37.68	37.57	37.74
11976_001	507350	186292	36.74	37.00	37.15	37.23	37.27	37.32	37.36	37.39	37.46	37.48	37.51	37.61	37.50	37.68

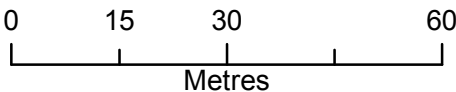
MODELLED FLOWS

				Return Period												
Node Label	Easting	Northing	2 yr	5 yr	10 yr	20 yr	30 yr	50 yr	75 yr	100 yr	100yr + 20%	100yr + 25%	100yr + 35%	100yr + 70%	250 yr	1000yr
205	507256	186913	6.23	6.98	7.71	8.26	8.50	8.91	9.24	9.53	10.23	10.39	10.74	11.86	10.58	12.82
204	507201	186850	6.20	6.73	6.74	6.73	6.74	6.78	6.85	6.95	7.12	7.21	7.43	8.13	7.34	8.82
203	507270	186792	5.62	6.41	6.58	6.81	6.98	7.45	7.81	8.09	9.40	9.56	9.97	11.59	9.76	13.00
202	507253	186708	6.36	8.26	9.48	10.21	10.41	10.64	10.83	11.10	11.43	11.52	11.81	12.69	11.68	13.63
201	507270	186676	6.49	8.42	9.87	10.95	11.42	12.04	12.44	12.83	13.48	13.64	13.92	15.00	13.78	16.07
187	507277	186612	6.48	8.35	9.15	9.64	9.82	10.14	10.44	10.71	11.36	11.49	11.79	12.88	11.65	13.95
P91	507285	186509	6.48	8.40	9.60	10.37	10.59	10.88	11.13	11.36	11.86	11.98	12.29	13.40	12.13	14.56
P90	507299	186409	6.62	8.26	8.57	8.72	8.79	8.89	8.94	9.00	9.13	9.16	9.42	10.40	9.29	11.38
06664_1011	507320	186384	6.62	8.44	9.04	9.24	9.33	9.44	9.53	9.59	9.70	9.73	9.76	10.37	9.77	11.28
06664_1010	507336	186357	6.62	8.48	9.44	9.79	9.90	10.01	10.12	10.19	10.34	10.36	10.38	11.46	10.40	12.46
06664_1009	507347	186331	6.62	8.48	9.93	10.53	10.68	10.85	10.97	11.05	11.20	11.21	11.23	11.36	11.24	11.50
11976_001	507350	186292	6.61	8.47	10.13	11.47	12.12	13.09	13.74	14.27	15.46	15.70	16.07	16.74	15.90	17.16

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Environment Agency
Alchemy,
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Legend

- Main Rivers
- Site location

2D Node Results: Heights

- 1 in 2 year (50%) Defended

The data in this map has been extracted from the River Pinn Mapping Study (JBA, 2015). This model has been designed for catchment wide 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.

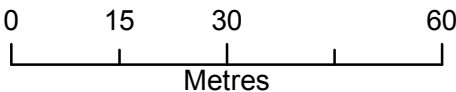
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Legend

- Main Rivers
- Site location

2D Node Results: Heights

- 1 in 5 year (20%) Defended

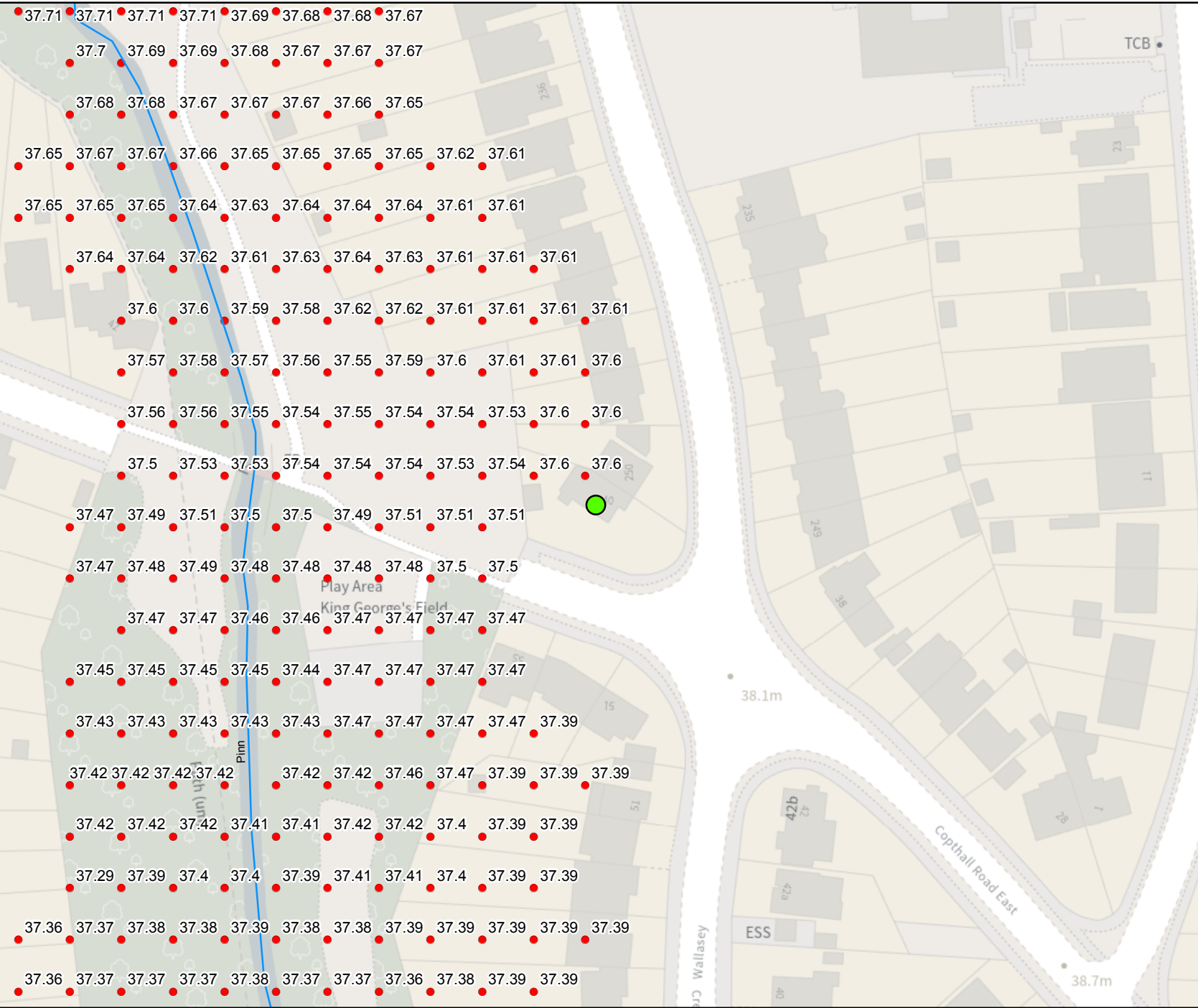
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Modelled outlines take into account catchment wide defences.

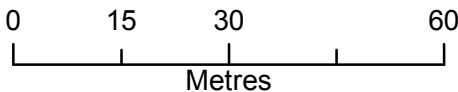
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Legend

- Main Rivers
- Site location
- 2D Node Results: Heights**
 - 1 in 10 year (10%) Defended

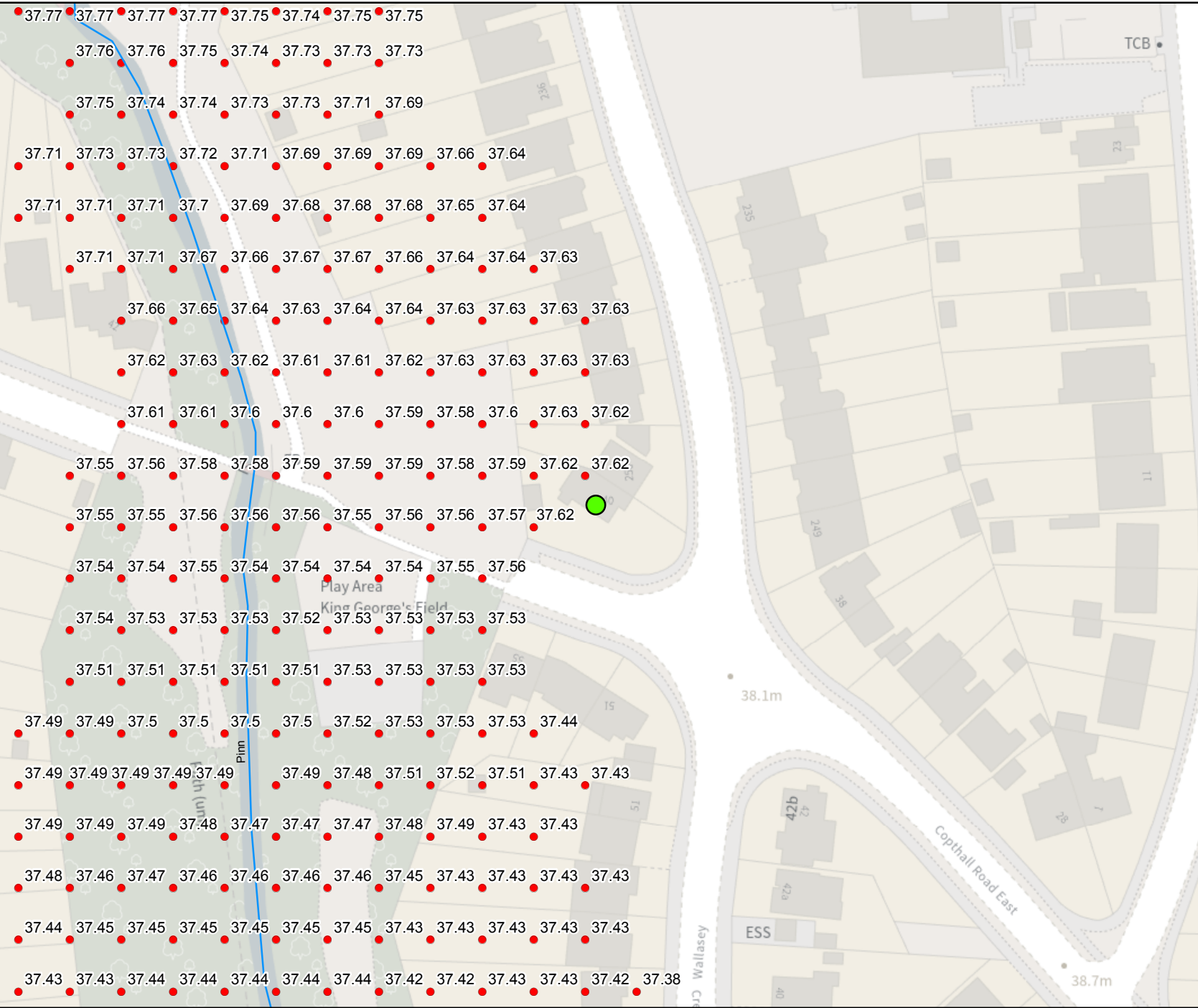
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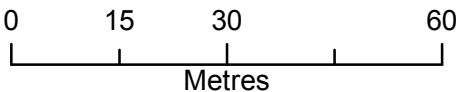
<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

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Legend

- Main Rivers
- Site location
- 2D Node Results: Heights**
 - 1 in 20 year (5%) Defended

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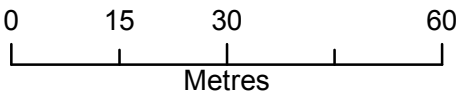
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Legend

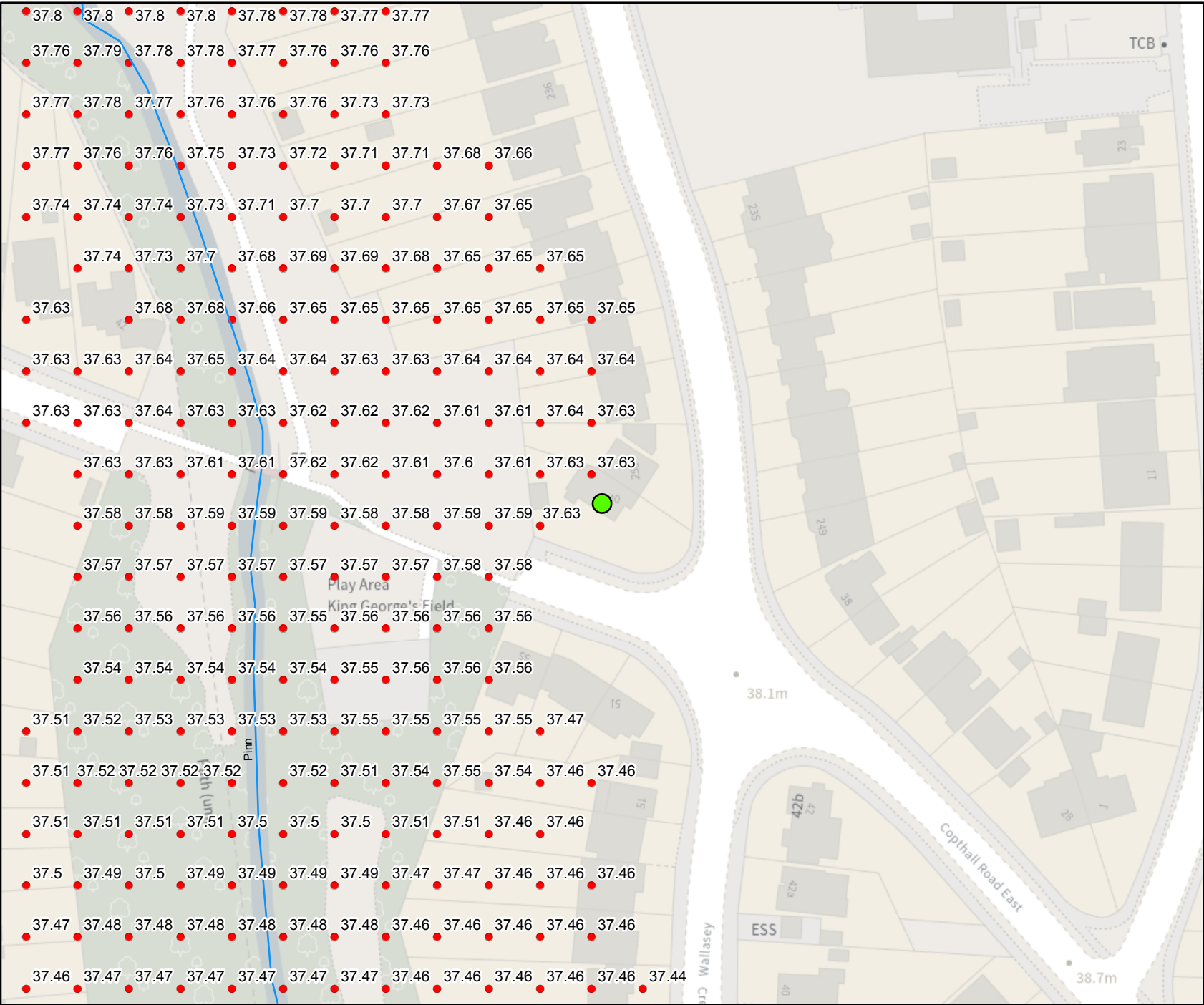
- Main Rivers
- Site location
- 2D Node Results: Heights**
 - 1 in 30 year (3.33%) Defended

The data in this map has been extracted from the River Pinn Mapping Study (JBA, 2015). This model has been designed for catchment wide 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.

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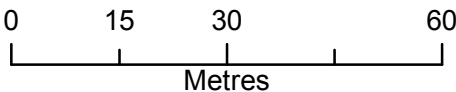


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Legend

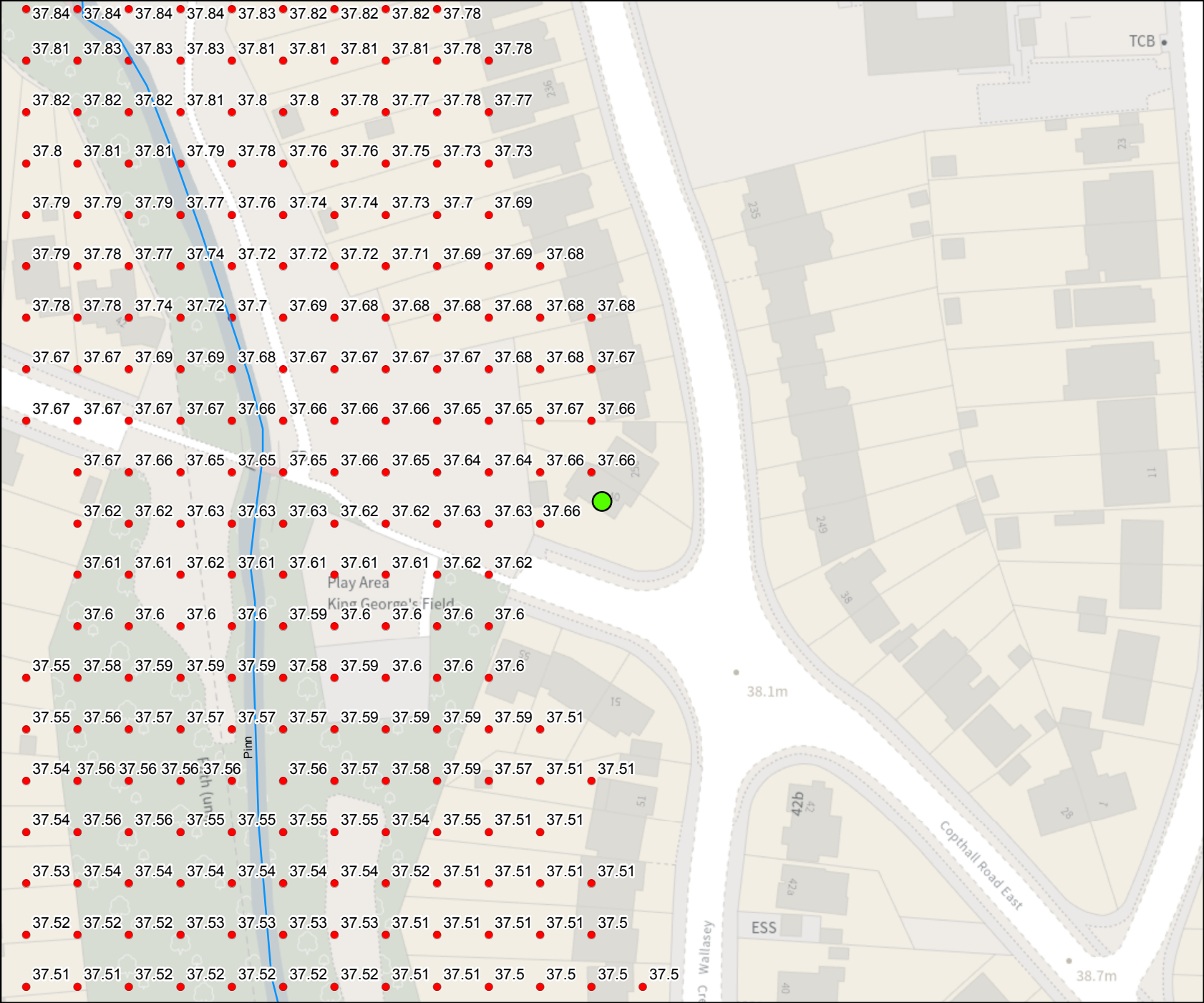
- Main Rivers
- Site location
- 2D Node Results: Heights**
 - 1 in 50 year (2%) Defended

The data in this map has been extracted from the River Pinn Mapping Study (JBA, 2015). This model has been designed for catchment wide 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.

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

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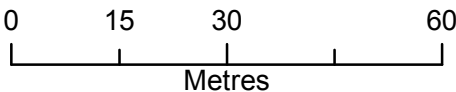


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Legend

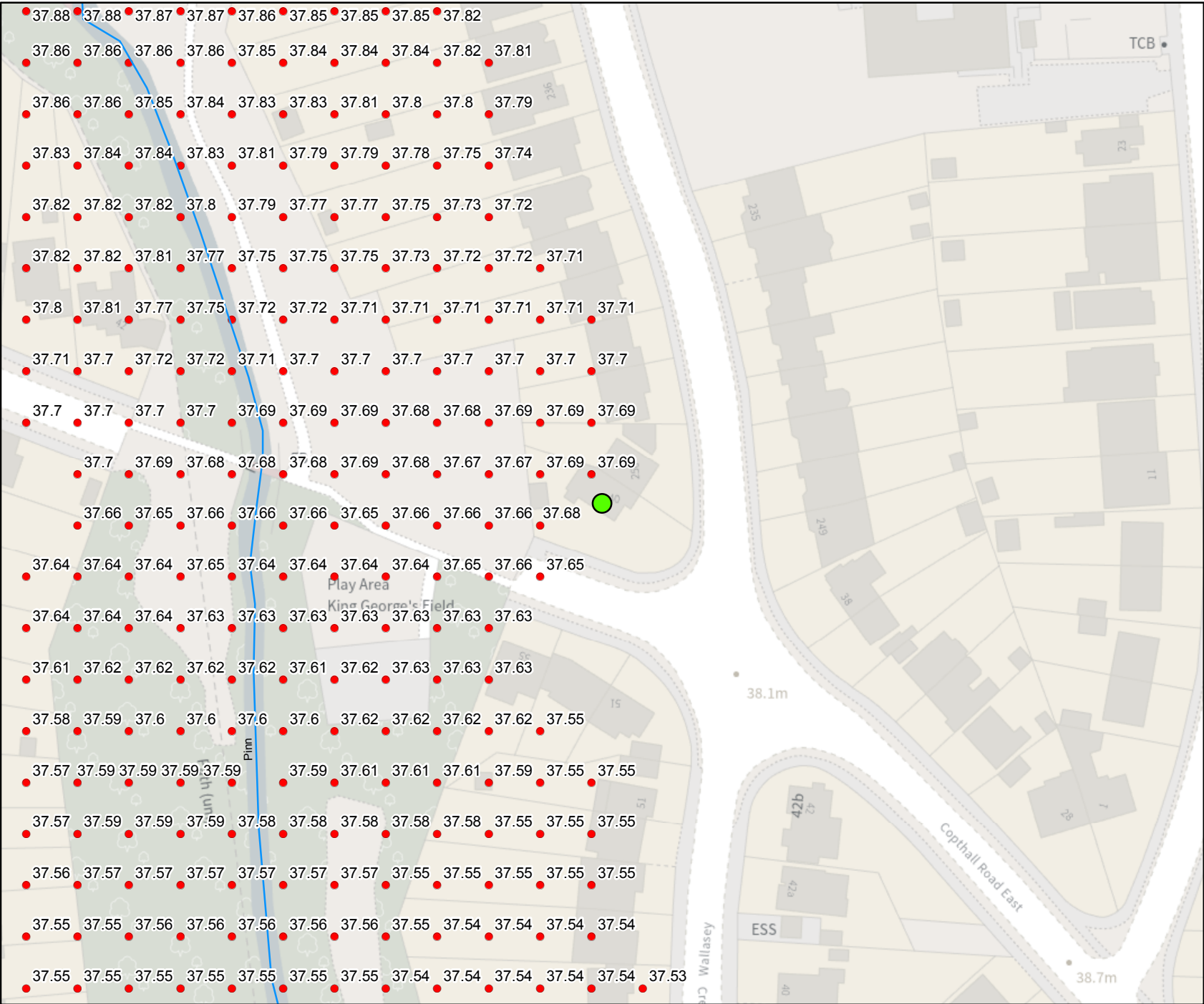
- Main Rivers
- Site location
- 2D Node Results: Heights**
 - 1 in 75 year (1.33%) Defended

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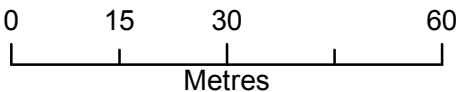


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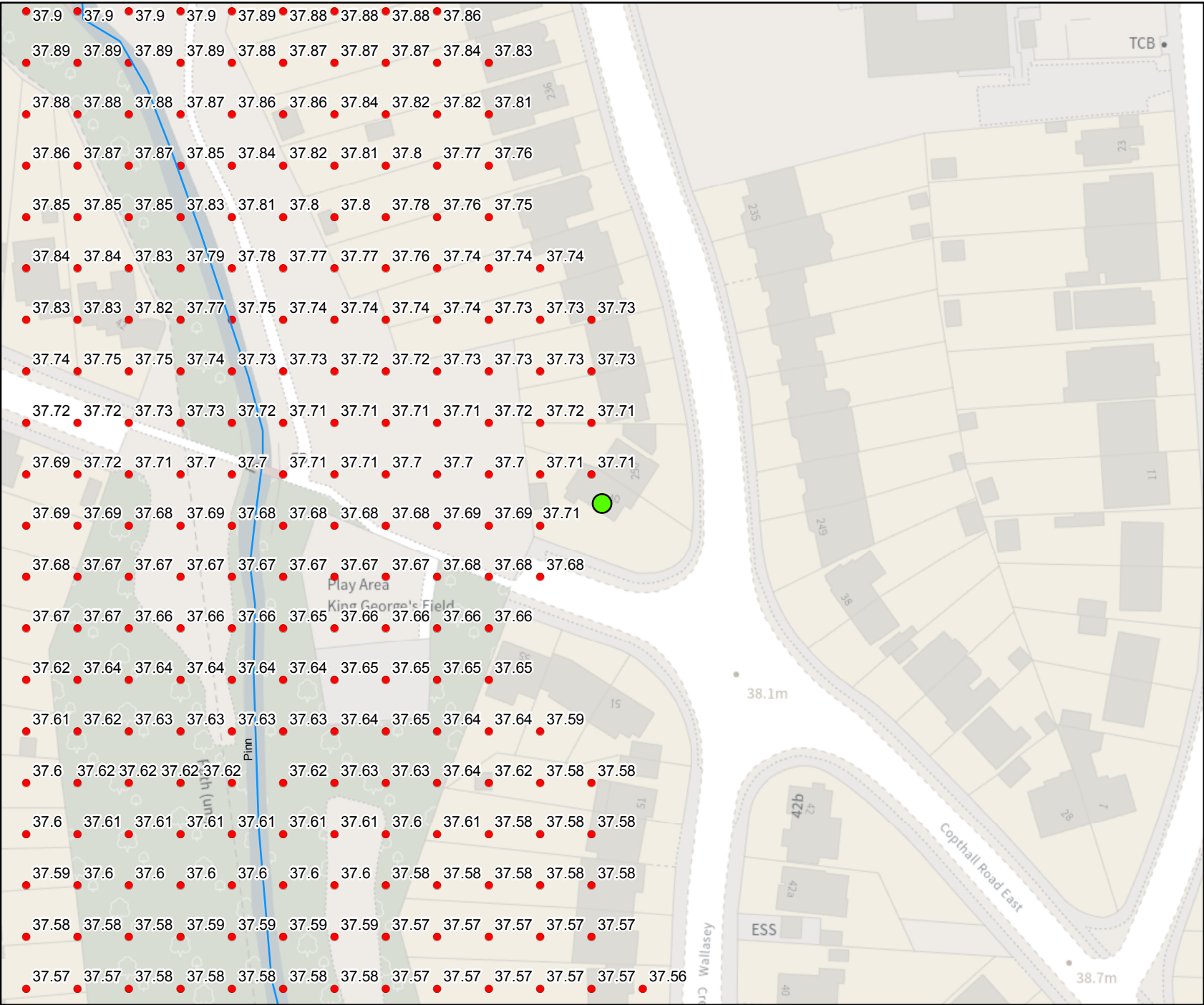
- Main Rivers
- Site location
- 2D Node Results: Heights**
 - 1 in 100 year (1%) Defended

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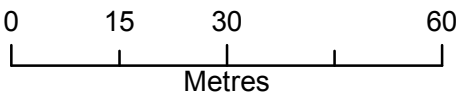


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Legend

- Main Rivers
- Site location

2D Node Results: Heights

- 1 in 100 year + 20% (*CC) Defended

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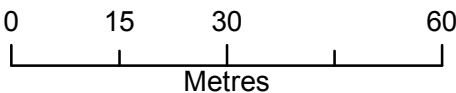
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Legend

- Main Rivers
- Site location

2D Node Results: Heights

- 1 in 100 year + 25% (*CC) Defended

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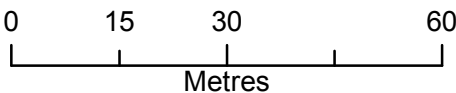
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- Main Rivers
- Site location

2D Node Results: Heights

- 1 in 100 year + 35% (*CC) Defended

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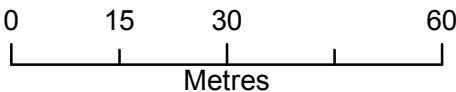
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- Main Rivers
- Site location

2D Node Results: Heights

- 1 in 100 year + 70% (*CC) Defended

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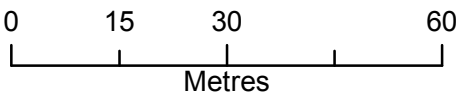
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- Main Rivers
- Site location

2D Node Results: Heights

- 1 in 250 year (0.4%) Defended

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Modelled outlines take into account catchment wide defences.

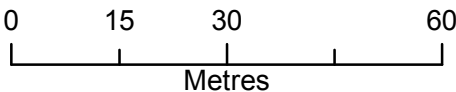
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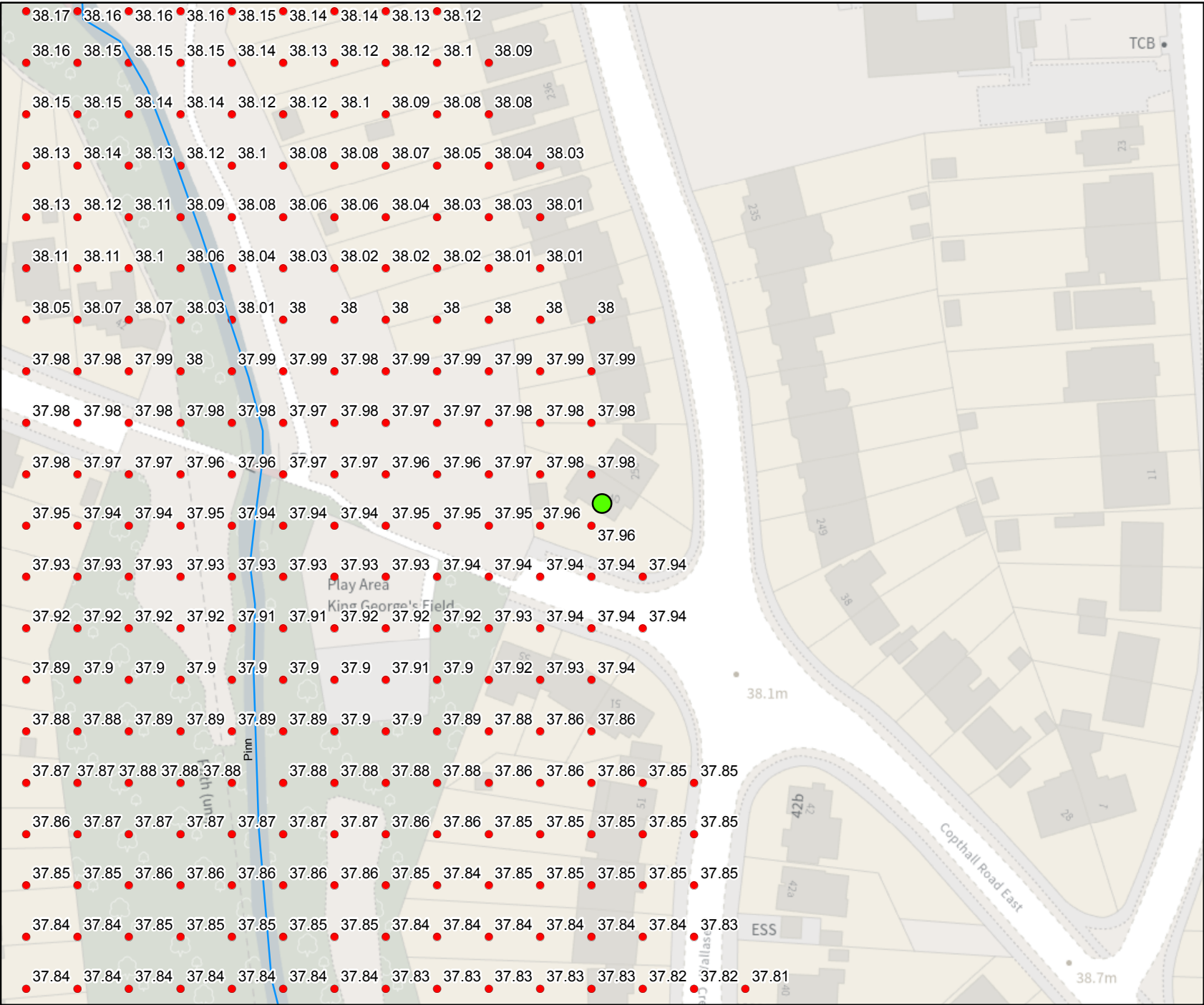
- Main Rivers
- Site location
- 2D Node Results: Heights**
 - 1 in 1000 year (0.1%) Defended

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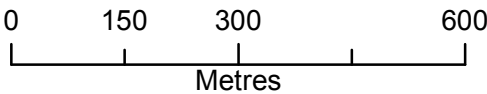


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Historic Flood Map centred on: 507341,186635- 11/05/2022 - HNL 262043 NR



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Legend

- Main Rivers
- Site location

Flood Event Outlines

- 1977
- 1988

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 to occur in the digitisation of historic records of flooding.

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