

16 Elmore Road, Enfield, London, EN3 5QA

Reference: 658 FRA-v1

May-24

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FLOOD RISK ASSESSMENTS &  
DRAINAGE STRATEGIES

# Flood Risk Assessment

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## Report Limitations

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The information presented and conclusions drawn are based on statistical data and are for guidance purposes only.

The study provides no guarantee against flooding of the study site or elsewhere, nor of the absolute accuracy of water levels, flow rates and associated probabilities.

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## Purpose of this report

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- 1.1 RIDA Reports Ltd has been appointed to undertake a Level 1 – Screening Study Flood Risk Assessment for a development located at EN3 5QA.

## Objectives

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- 1.2 The objectives of this FRA are to demonstrate the following:
- \* Whether the proposed development will likely be affected by current or future flooding.
  - \* Whether the proposed development will increase flood risk elsewhere.
  - \* Whether the flood risks associated with the proposed development can be satisfactorily managed.
  - \* Whether the measures proposed to deal with the flood risk are sustainable.

## Documents Consulted

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- 1.3 To achieve these objectives, the following documents have been consulted and referenced:

The National Planning Policy Framework (NPPF)  
CIRIA C753 document The SuDS Manual, 2015  
Local Flood Risk Management Strategy (LFRMS)  
Level 1 Strategic Flood Risk Assessment (SFRA)  
Aerial photographs and topographical survey of the site  
British Geological Society Records  
Local Council flood Maps  
Environment Agency flood maps  
The CIRIA publication 'C635 Designing for exceedance in urban drainage— Good practice'

### Development Site and Location

- 2.1 The site is located at Elmore Road, London. The nearest postcode is EN3 5QA. Refer to appendix A for site location plan.
- 2.2 The current use of the site is the garden of the property, and the southern part of the house. The current use vulnerability classification of the site is Water compatible. The site is located in the River Flood Zone 1. Refer to Appendix B for more details.

### Development Proposals

- 2.3 The proposed development includes the construction of a new dwelling . Refer to Appendix B for the layout of the proposed development.
- 2.4 The vulnerability classification of the proposed development is More vulnerable with an estimated lifetime between 50 and 100 years.

### Site Hydrology and Hydrogeology

- |                        |   |
|------------------------|---|
| Hydrology              | 2.5 The Turkey Brook is located approximately 630 m away from the development.  |
| Aquifer                | 2.6 The development is located within a secondary aquifer type A. Aquifers type A consist of permeable layers capable of supporting water supplies at a local rather than strategic scale. They are generally aquifers formerly classified as minor aquifers. |
| Source Protection Zone | 2.7 The site is located within the source protection zone 2. This zone is defined by a 400 day travel time from a point below the water table. This zone has a minimum radius of 250 or 500 metres around the source.   |
| Groundwater Levels     | 2.8 The ground water levels for this site are unknown.  |

### Site Geology

- |                      |   |
|----------------------|---|
| Bedrock              | 2.9 The British Geological Survey records of the site show that it is located within the London Clay Formation - Clay, Silt and Sand. |
| Superficial Deposits | 2.10 The British Geological Survey records show that the superficial deposits are Kempton Park Gravel Member - Sand and Gravel.       |

## **National Planning Policy Framework (NPPF)**

- 3.1 The NPPF and its technical guidance is a set of planning policies with the key objective of contributing to sustainable development. As part of it, they ensure that flood risk and sustainability are considered during the planning process. This ensures that developments are not located in flood risk areas and directs developments to lower risk areas. The NPPF applies a sequential risk-based approach to determining land suitability for development in flood risk areas. The NPPF also encourages developers to seek opportunities to reduce the overall level of flood risk through the development layout and the application of Sustainable Drainage Systems (SuDS).

## **The Flood and Water Management Act (2010)**

- 3.2 The Flood and Water Management Act aims to reduce the flood risk associated with extreme weather events. It provides robust flood risk management for people, homes and businesses and encourages using SuDS for developments. A robust SuDS strategy should consider the recommendations in this Flood Risk Assessment.

## **Strategic Flood Risk Assessment (SFRA)**

- 3.3 Planning policy with regard to development and flood risk in the area is detailed in the New Enfield Local Plan 2041 Strategy Flood Risk Assessment (NELP SFRA) which was published in 2021. The proposed development site is located within the administrative boundary of the London Borough of Enfield.
- 3.4 The SFRA commits to direct new development to locations at the lowest flood risk. The SFRA provides information on the levels and flood hazards that could result from flooding. The Environment Agency flood zone maps and the SFRA ignore the presence of existing flood defences when defining the potential extent of flooding.
- 3.5 This report follows the guidance given in the New Enfield Local Plan 2041 Strategy Flood Risk Assessment by evaluating the flood risk and providing relevant flood mitigation.

- 4.1 The NPPF guidance states that the sequential test "is designed to ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk. This means avoiding, so far as possible, development in current and future medium and high flood risk areas considering all sources of flooding including areas at risk of surface water flooding."

## Applicability of the Sequential Test

- 4.2 The flood risks were determined by identifying all the sources of flooding and assessing their possible impact and likelihood to development. It is confirmed that the development is:

- In Flood Zone 1, based on the Planning Flood Risk Map
- The development is located in the flood risk zone of the Planning Flood Risk Map
- At Low risk of surface flooding
- At high risk of groundwater flooding
- Within a critical drainage area
- Potentially within an area of sewer flooding

- 4.3 Due to the flood risk on the development, a sequential test is required. For this development, the sequential assessment was completed for the area within the red line of the planning application. The development has been located at the lowest flood risk. It is concluded that the current proposals pass the sequential test.

## Exception Test

- 4.2 Fluvial flood risk was assessed using the Environment Agency Flood Zone Maps and the sequential risk-based approach recommended in the NPPF guidance. The exception test requirement considers the flood risk vulnerability of land uses about the flood zone categorisation. These parameters are assessed to determine whether the development requires an exception test or is inappropriate.

### Step 1 Flood Zone categorisation

- 4.3 The proposed development is less than 1 ha and falls within the Environment Agency (EA) Flood Zone 1. Therefore, this Flood Risk Assessment Level 1- Screening report should be sufficient under the NPPF. Flood Zone 1 is considered to have a low probability of flooding, with an annual probability of flooding of <0.1%. The chance of flooding is 1 in 1000 years or lower.

**Step 2** 4.4 Within Table 2 (Flood Risk Vulnerability Classification) of the NPPF  
Flood risk vulnerability Planning Practice Guide, the proposed development is classified as  
'More vulnerable '.

**Step 3** 4.5 The Flood Risk vulnerability and Flood Zone incompatibility table of the  
Flood Zone incompatibility NPPF Planning Practice Guide states that More vulnerable  
developments do not require an exception test in this area.

### The Exception Test

4.6 The exception test is not required.

- 5.1 The development has been assessed for the following potential flood risks, river and tidal flood risk, surface water flooding, flooding from groundwater, reservoir flood risk and drainage systems.

## **Flood Defence and Historic Flooding**

- 5.2 The Environment Agency records show that the site does not benefit from flood defences. They also show that the area around the site has not been flooded in the past. See Appendix C for details.

## **Flooding from river and sea**

- 5.3 The proposed development is less than 1 ha and falls within the Environment Agency (EA) Flood Zone 1. Therefore, this Flood Risk Assessment Level 1- Screening report should be sufficient under the NPPF. Flood Zone 1 is considered to have a low probability of flooding, with an annual probability of flooding of <0.1%. The chance of flooding is 1 in 1000 years or lower.
- 5.4 The climate change allowance is not applicable for this site.
- 5.5 The site is located in an area outside of fluvial flooding flood risk.
- 5.6 It is concluded that the site is not affected by fluvial/sea flood risk.



### Surface water (overland flows) flood risk

- 5.7 The Environment Agency maps show that the flood risk from surface water is low. A residual risk of localised shallow ponding remains likely. The Environment Agency surface water flood risk maps are defined by applying a specific procedure based on digital terrain models and assumptions regarding infiltration and urban drainage losses. The surface water flood maps are determined by the Environment Agency as follows.
- 5.8 *"The nationally produced surface water flood mapping only indicates where surface water flooding could occur due to local rainfall. It does not fully represent flooding that occurs from:*
- Ordinary watercourses
  - Drainage systems or public sewers caused by catchment-wide rainfall events
  - Rivers
  - Groundwater
- Due to the modelling techniques, the mapping picks out depressions in the ground surface. It simulates some flow along natural drainage channels, rivers, low areas in floodplains, and flow paths between buildings. Although the maps appear to show flooding from ordinary watercourses, they should not be taken as definitive mapping of flood risk from these as the conveyance effect of ordinary watercourses or drainage channels is not explicitly modelled. Also, structures (such as bridges, culverts and weirs) and flood risk management infrastructure (such as defences) are not represented.*
- The nationally produced surface water flood mapping does not consider the effect of pumping stations in catchments with pumped drainage. No allowance is made for tide locking, high tidal or fluvial levels where sewers cannot discharge into rivers or the sea."*
- 5.9 The strategic flood risk for the London Borough of Enfield confirms that the flood risk for the site is Low. The surface water flood data has not been produced to determine the flood levels at individual properties. This data does not contain the climate change allowances for depth levels. Therefore, the Design flood level given above is an assumption. The new development may have greater or lower surface water flood depths.
- 5.10 Based on Environment Agency and the Strategic flood risk assessment's surface water mapping, together with the presence of surface water drainage systems at the site and surrounding area, it is concluded that the site is at Low risk of flooding from surface water sources. The depth of water is potentially below 300mm. For this assessment, a depth of water of 0.15m with a climate change allowance of 0.15m has been taken as the most appropriate depth to the site. The average ground level at the site is 19.7m AOD. The surface water flood level on this site could be in the region of 19.84m AOD.

## **Flooding from drainage systems in adjacent areas**

- 5.11 The area around the development is shown a having a high level of sewer incident within the flood maps of the Strategic Flood Risk Assessment. See appendix C for details.

## **Reservoirs Risks**

- 5.12 The Reservoir Flood Map (RFM) produced by the Environment Agency do not show the risk to individual properties of dam breach flooding. The maps do not indicate or relate to any particular probability of dam breach flooding. The maps were prepared for emergency planning purposes. They can be used to help reservoir owners produce on-site plans, and the Local Resilience Forum produce off-site plans and to prioritise areas for evacuation/early warning in the event of a potential dam failure. The RFM shows that the development could be outside of the possible dam breach flooding path. See Appendix C.

## **Groundwater flood risk**

- 5.13 The British Geological Survey's flood risk susceptibility maps show that the development has the potential for groundwater flooding above ground level. Groundwater levels vary seasonally and are influenced by ground and meteorological conditions and proximity to water features. The groundwater flooding risk for this site is considered to be high. The groundwater flood depth could potentially be 0.15m. The external level at the site is 19.7m AOD. The potential groundwater flood level is 19.57m AOD. This level has been given as a precautionary measure. It is recommended that monitoring of groundwater is undertaken should this measure be reviewed. Refer to Appendix C for record drawings.

## **Critical Drainage Areas**

- 5.14 The development falls within a Critical Drainage Area. The risks of critical problems and the increase of downstream flooding are high. Critical Drainage Area (CDA) is an area that has critical drainage problems and which has been notified to the local planning authority by the Environment Agency.

- 6.1 The Flood hazard assessment has demonstrated that the site is:
- In Flood Zone 1, based on the Planning Flood Risk Map
  - The development is located in the flood risk zone of the Planning Flood Risk Map
  - At Low risk of surface flooding
  - At high risk of groundwater flooding
  - Within a critical drainage area
  - Potentially within an area of sewer flooding
- 6.2 Under the NPPF it is necessary to demonstrate that, for any new development on the site, it is possible to provide an adequate level of flood protection for personnel working or living at the development.

## Design Flood Level

- 6.3 The design flood level is the maximum estimated water level during the design storm event including an allowance for climate change in line with current best practice and the national planning policy guidance.
- 6.4 The Design Flood Level for this development has been determined by evaluating the levels from the Pluvial/Sea, Surface Water and Groundwater flood levels.
- 6.5 For this site, the Design Flood Level is 19.84m AOD. This is the highest level and corresponds to the Surface Water Flood Level.

## Flood Protection

- 6.6 The National Planning Guidance standing advice and Environment Agency, states that where possible, flood avoidance is provided by establishing the development's finished floor level 0.15m above the Design Flood Level. The finished floor should be 19.99m AOD. It would involve a height differential of 0.29m. This is the distance between the average external level (19.7m AOD) and the potential Finished Floor Level.
- 6.7 It is possible to achieve this FFL. As the foundations and other parts of the building are in contact with water, it is proposed that the following flood mitigation is provided.

6.8 The flood mitigation strategies for the development has been based on the CLG 2007 Improving the Flood Performance of New Buildings. See the figure below for the strategy highlighted in red. The strategy is based on the water level within the proximity to the building.

Figure 1: Rationale for flood resilient and/or resistant design strategies.

	Design water depth*	Approach	Mitigation measures
Resistance/Resilience**	Design water depth above 0.6m	Allow water through property to avoid risk of structural damage. Attempt to keep water out for low depths of flooding <b>'Water Entry Strategy'***</b>	<ul style="list-style-type: none"> <li>Materials with low permeability up to 0.3m</li> <li>Accept water passage through building at higher water depths</li> <li>Design to drain water away after flooding</li> <li>Access to all spaces to permit drying and cleaning</li> </ul>
	Design water depth from 0.3m to 0.6m	Attempt to keep water out, in full or in part, depending on structural assessment. If structural concerns exist follow approach above***	<ul style="list-style-type: none"> <li>Materials with low permeability to at least 0.3m</li> <li>Flood resilient materials and designs</li> <li>Access to all spaces to permit drying and cleaning</li> </ul>
	Design water depth up to 0.3m	Attempt to keep water out <b>'Water Exclusion Strategy'</b>	<ul style="list-style-type: none"> <li>Materials and constructions with low permeability</li> </ul>
Avoidance		Remove building/development from flood hazard	<ul style="list-style-type: none"> <li>Land raising, landscaping, raised thresholds</li> </ul>

Notes:

\* Design water depth should be based on assessment of all flood types that can impact on the building

\*\* Resistance/resilience measures can be used in conjunction with Avoidance measures to minimise overall flood risk

\*\*\* In all cases the 'water exclusion strategy' can be followed for flood water depths up to 0.3m

6.9 The design water depth for this site is 0.14m. The development should utilise building materials that are suitable for a 'water exclusion strategy'. Materials classified as "Good" (highlighted in red) in the Figure below shall be used for new construction upto level of 20.44m AOD.

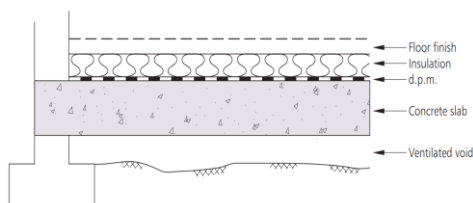
Figure 2: Flood resilience characteristics of building materials (based on laboratory testing)

Material	Resilience characteristics*		
	Water penetration	Drying ability	Retention of pre-flood dimensions, integrity
<b>Bricks</b>			
Engineering bricks (Classes A and B)	Good	Good	Good
Facing bricks (pressed)	Medium	Medium	Good
Facing bricks (handmade)	Poor	Poor	Poor
<b>Blocks</b>			
Concrete (3.5N, 7N)	Poor	Medium	Good
Aircrete	Medium	Poor	Good
<b>Timber board</b>			
OSB2, 11mm thick	Medium	Poor	Poor
OSB3, 18mm thick	Medium	Poor	Poor
<b>Gypsum plasterboard</b>			
Gypsum Plasterboard, 9mm thick	Poor	Not Assessed	Poor
<b>Mortars</b>			
Below d.p.c. 1:3(cement:sand)	Good	Good	Good
Above d.p.c. 1:6(cement:sand)	Good	Good	Good

\* Resilience characteristics are related to the testing carried out and exclude aspects such as ability to withstand freeze/thaw cycles, cleanability and mould growth

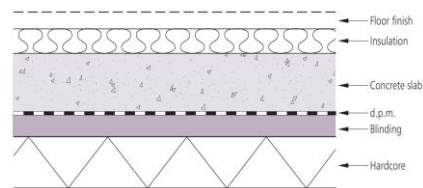
- 6.10 New services and fittings (communications wiring, heating systems, electrical services, water, electricity and gas meters) should be placed at above the level of 20.44m AOD. All service entries should be sealed (e.g. with expanding foam or similar closed cell material).
- 6.11 Closed-cell insulation should be used for pipes. Sealed PVC external framed doors or good fit and sealed wooden frames should be used.
- 6.12 Hollow core timber internal doors should not be used unless sufficient flood warning is given, butt hinges, can be used to allow internal doors to be easily removed and stored.
- 6.13 Suspended concrete floor slab at least 150mm thick is the preferred option. Beam and Block slabs with geomembrane and 75mm min screed can also be used. There should be a minimum space of 150mm ventilated void between the ground level and the bottom of the floor slab. Damp proof membranes should be included in the design. Floor insulation should be of the closed-cell type. Under floor services using ferrous materials should be avoided. Ceramic/concrete-based floor tiles, sitting on a bed of sand, cement render and water resistant grout can be used. Ground-bearing slabs are also an option. See figures below.

Suspended Concrete Slab detail



- Reinforced concrete slab at least 150mm thick and complying with structural requirements for uplift forces
- Damp proof membrane of polythene at least 1200 gauge
- Insulation as rigid closed-cell material
- Ceramic tiles or stone floor finishes and including skirting boards.

Ground bearing Concrete Slab detail

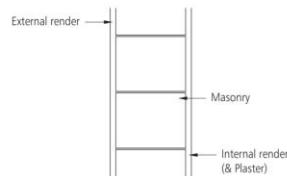


- Hardcore bed at least 100mm thick of well compacted inert material, blinding with fine inert material to provide a smooth base
- Damp proof membrane of polythene at least 1200 gauge
- Concrete slab at least 150mm thick
- Insulation as rigid closed-cell material
- Ceramic tiles or stone floor finishes and skirting boards.

6.14 Concrete blocks used in foundations should be sealed with an impermeable material or encased in concrete to prevent water movement from the ground to the wall construction. In new walls use extended periscope subfloor ventilators or fit removable airbrick covers; fix plasterboard sheets horizontally rather than vertically, or split sheets mid-height with a dado rail, to reduce the extent of replacement; specify lime- or cement-based renovating plasters or renders rather than gypsum-based, with water-resistant paint finishes. The use of water-proof, water-resistant or micro-porous surface coatings on masonry should be avoided as they can inhibit the drying-out of the building fabric.

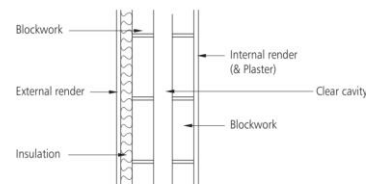
6.15 Good quality facing bricks or external renders with water-repellent properties can be used for the external face. See the examples below of external walls that can be used.

### Solid External Wall



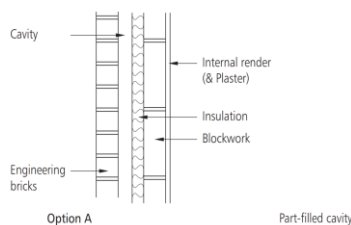
- External cement based render, preferably with lime content. Composition depends on masonry. The following mixes have good resilient properties:
  - 1 cement : 6 sand on bricks;
  - 1 cement : 4 sand: 1/2 lime on concrete blockwork or bricks;
  - 1 cement : 6 sand: 1 lime on Aircrete blocks.
- Masonry with minimum thickness of 300mm (thin mortar joint construction using Aircrete blocks is effective as demonstrated in laboratory tests) or alternatively reinforced concrete wall
- Internal cement-based render, preferably with lime content. Composition depends on masonry; the following mix is effective for flood resilience:
  - 1 cement : 6 sand: 1 lime on Aircrete.
- Apply external and internal renders, following good practice guidance, ensuring minimum total thickness of 20mm and at least two coats.
- Use external insulation in preference to internal insulation.

### Cavity External Walls – Clear cavity



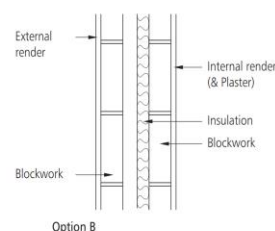
- Clear cavity**
- External cement based render, preferably with lime content. Composition depends on masonry, the following mixes are effective for flood resilience:
    - 1 cement : 4 sand: 1/2 lime on concrete blockwork (or bricks);
    - 1 cement : 6 sand: 1 lime on Aircrete.
  - Apply render following good practice guidance, ensuring minimum total thickness of 20mm and two coats.
  - Internal cement based render, preferably with lime content. Composition depends on masonry. The following mix works well:
    - 1 cement : 6 sand: 1 lime on Aircrete.
  - Stainless steel wall ties should be used to minimise corrosion and consequent staining.

### Cavity External Walls- Part fill Option A



- Part-filled cavity – Option A**
- External face consisting of engineering bricks up to required level for flood protection (up to 0.6m maximum above floor level plus one course). Other external facing materials can be used above this level, but ensure interface is watertight.
  - Rigid insulation.
  - Internal face consisting of blocks.
  - Internal cement based render, preferably with lime content. Composition depends on masonry, the following mix is effective:
    - 1 cement : 6 sand: 1 lime on Aircrete.
  - Ensure stainless steel wall ties are used to minimise corrosion and consequent staining.
  - Sacrificial plasterboard can be used, but it needs to be removed between ground floor and flood level. The board should be fitted horizontally to make removal easier. In some cases a dado rail can be used to cover the joints.

### Cavity External Walls- Part fill Option B



- Part-filled cavity – Option B**
- External cement based render, preferably with lime content. Composition depends on masonry, the following mixes are effective:
    - 1 cement : 4 sand: 1/2 lime on concrete blockwork
    - 1 cement : 6 sand: 1 lime on Aircrete.
  - External face consisting of blocks.
  - Rigid insulation.
  - Internal face consisting of blocks.
  - Internal cement based render, preferably with lime content. Composition depends on masonry, the following mix is effective for flood resilience:
    - 1 cement : 6 sand: 1 lime on Aircrete.
  - Ensure stainless steel wall ties are used to minimise corrosion and consequent staining.

6.16 The general precautionary measures to mitigate the risk of groundwater flooding in this development are:

- Ground floor threshold levels are higher than 0.25 m above ground level to allow for uncertainty.

- It is proposed to add a tanking membrane up to 0.3 m above the ground level.

- Flow paths are provided around the proposed development, which groundwater will take in the event of groundwater emergence.

As these measures would mitigate the risks from groundwater flooding, it is considered that the risk from groundwater has been managed.

6.17 The site is within an area of sewer flooding. The following recommendation should be followed:

- All new connections to the sewer network should have non-return valves.

6.18 The development is within a Critical Drainage Area, the local authority expects that the new development to reduce flood risks downstream, rather than having just neutral impact. It also expects that Sustainable Drainage Systems (SuDS) are used for managing surface water. Refer to section 7 of this report.

7.1 The NPPF specifically stipulates that consideration should be given to potential off-site flood impacts of any proposed development. These off-site impacts are in relation to the following:

- Surface water management
- Flood flow conveyance, storage and climate change

### **Surface Water Management**

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7.2 The surface water run-off will be disposed of using SuDS techniques. The aim is to provide a sustainable design that accommodates the proposed attenuation volume and replicates the existing drainage regime using the SuDS hierarchy. See drainage strategy for more details.

### **Flood Flow conveyance and storage**

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7.3 The proposed development will not affect flood flow conveyance through the site or surrounding area as the house will be located outside of surface water paths.



- 8.1 This flood risk assessment has identified the potential flooding mechanisms that could affect the site. As part of this, the following residual risks have been evaluated.

### **Public safety and Site Access**

- 8.2 This assessment has demonstrated that the proposed development will have no adverse impact on flood risk in the area surrounding the site. Available evidence indicates that the development would not change surface water generation. Therefore, there is no basis to indicate that, with respect to flood risk, the proposed development would adversely impact public safety.
- 8.3 It is recommended that the users of the building stay put in case of surface water flood risk.

- 9.1 It is concluded that subject to the proposed mitigation measures, the site can be developed in accordance with the provisions of the NPPF and the requirements of the Environment Agency and the local planning authority.
  
- 9.2 This report demonstrates that the proposal will be safe, in terms of flood risk, for its design life and will not increase the flood risk elsewhere.

# Appendix A



# Appendix B



Co-ordinate Table			
Station	Easting	Northing	Level
1	1000.000	500.000	19.580
2	997.548	513.523	19.683

All levels related to front step of property.  
Arbitrary value = 20.000m

KEY	
Survey control station	5
Gate (single)	
Gate (double)	
Tree Spread and Girth shown to scale	
Banking	
Foliage Line	
Drainage run, direction of flow and pipe size	100
Approximate Position	
Step Up	
Ramp Up	

ABBREVIATIONS			
Air Handling Unit	AHU	Water Meter	WM
Belisha Beacon	BB	Eaves Level	EL
Bollard	BD	Ridge Level	RFL
Borehole	BH	Roof Level	RFL
BT Inspection Cover	BT	Soffit Level	SFL
Cable Television Cover	CTV	Threshold Level	THL
Drainage Channel	DC	Parapet Wall Level	PWL
Electricity Cover	EC	Finished Floor Level	FFL
Electricity Pole	EP	Head Level	HL
Earth Rod	ER	Sill Level	SL
Fire Hydrant	FH	Cover Level	CL
Gas Valve	GV	Invert Level	IL
Gate Post	GP	No Visible Pipes	NVP
Gully	GY	Unable to Lift	UTL
Inspection Cover	IC	Foul Water	FW
Junction Box	JB	Sump Level	SUL
Kerb Outlet	KO	Surface Water	SW
Lamp Post	LP	Brick Paviors	BP
Manhole	MH	Concrete	CON
Marker Post	MK	Concrete Paving Slabs	CPS
Post	P	Flower Bed	FIB
Pipe	PE	Shrub Bed	SIB
Road Sign	RS	Tactile Paving	TAC
Rodding Eye	RE	Unsurfaced	US
Marker Post	MK	Brick Wall	BW
Sign Post	SP	Retaining Wall	RW
Stop Valve	SV	Chainlink Fence	CLF
Stop Tap	ST	Chestnut Paling Fence	CPF
Telegraph Pole	TP	Iron Railing Fence	IRF
Traffic Light	TL	Metal Security Fence	MSF
Vent Pipe	VP	Post and Chain Fence	PCF
Post and Rail Fence	PRF	Post and Wire Fence	PWF
Wooden Panel Fence	WPF	Rain Water Pipe	RWP
		Soil Vent Pipe	SVP

Client  
**AREA DESIGN**

Project  
**16 ELMORE ROAD  
ENFIELD, LONDON  
EN3 5QA**

Title  
**TOPOGRAPHICAL SURVEY**

Drawing Number  
**TS24-115-1**

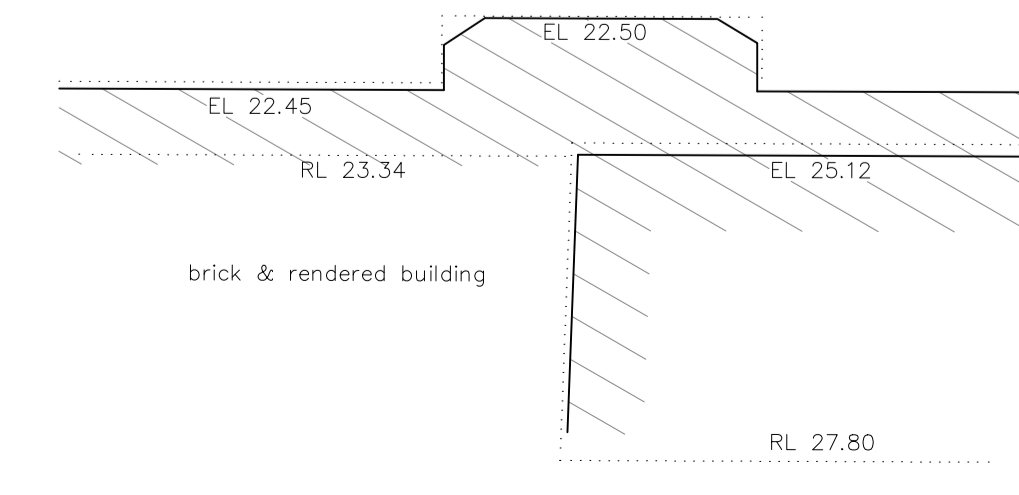
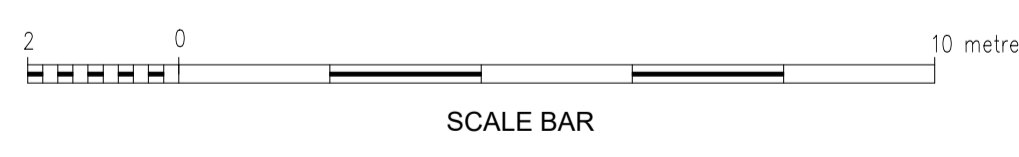
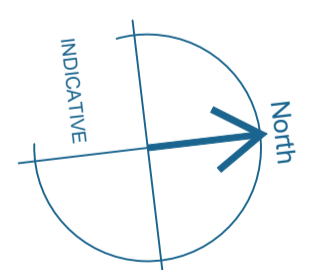
Revision	Description	Rev. By	Date

Scale 1:100@A1 Sheet 1 of 1

Drawn by BB Checked by LC Date of Survey FEB 2024

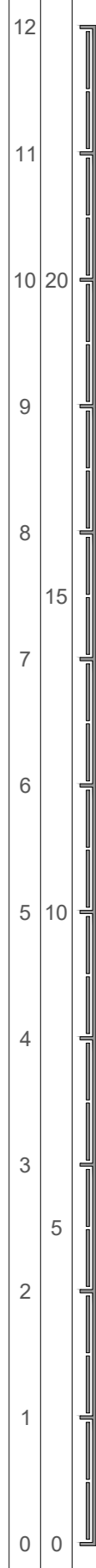


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Dimensions should represent dimensions where none have been provided. Do not estimate dimensions from drawings. All dimensions to be checked on site.



Revision	Changes	Date

Date of issue: March 2024  
 Scale: 1:100  
 Paper size: A2

16 Elmore Road  
 Site layout plan  
 Existing

Job number: 390  
 Drawing number: 390 : 01

area

1:50  
 1:100  
 Scale bar

Andrew Ross, Ryan D. Kistall, Matt T. ...  
 ...



Front



Side



Rear

CONSTRUCTION SHOULD REQUEST DIMENSIONS WHERE NECESSARY FROM DRAWINGS. ALL DIMENSIONS TO BE CHECKED ON SITE.

revision	changes	date

date of issue	scale	paper size
March 2024	1:100	A2

job number	drawing number	revision
390	390 : 05	

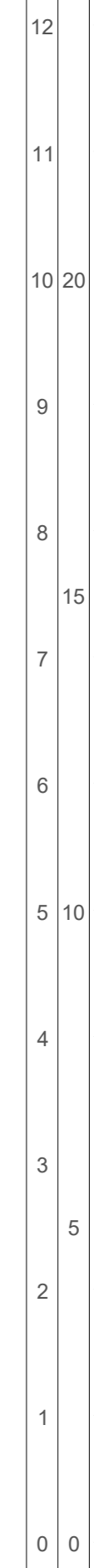
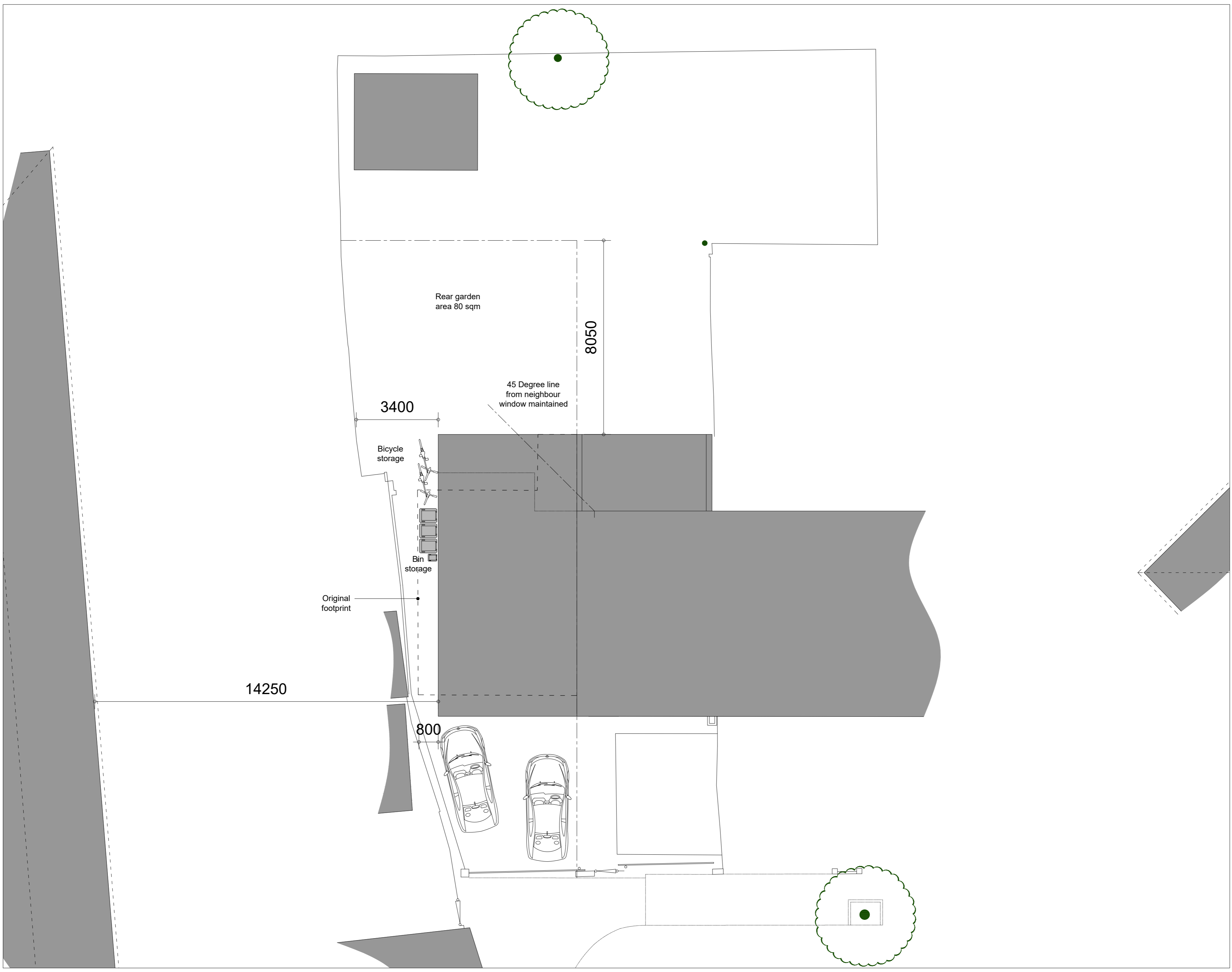
16 Elm Road  
Elevations  
Existing

**area**

ANDREW PAUL RIBA © RIBA/PAUL RIBA ARCHITECTS 2024  
www.ribapaul.com



Dimensions should represent dimensions where necessary have been provided - do not estimate dimensions from drawings - all dimensions to be checked on site



Revision	Changes	Date

Date of Issue	Scale	Paper Size
March 2024	1:100	A2

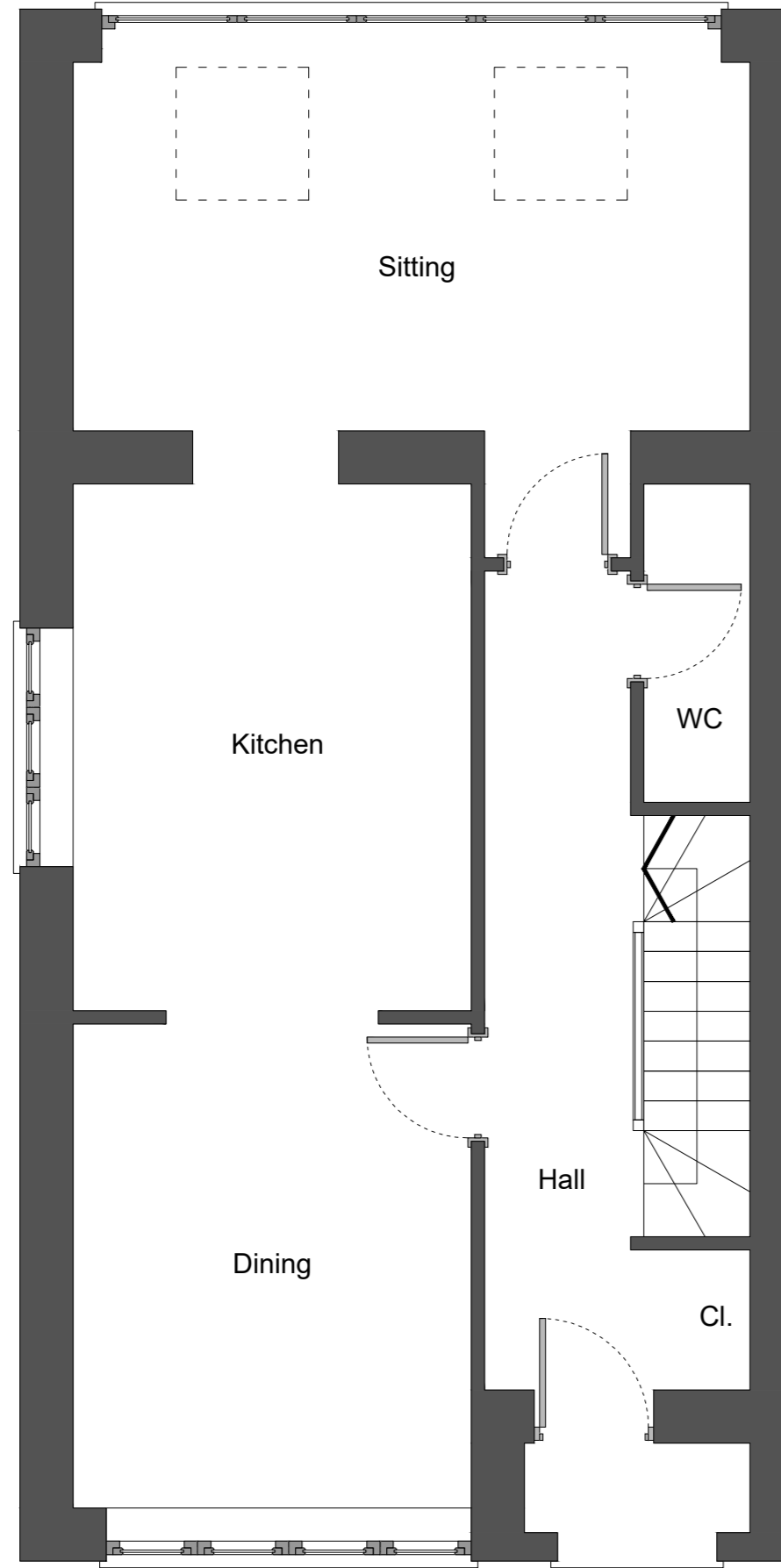
  

Job Number	Drawing Number	Revision
390	390 : 11	

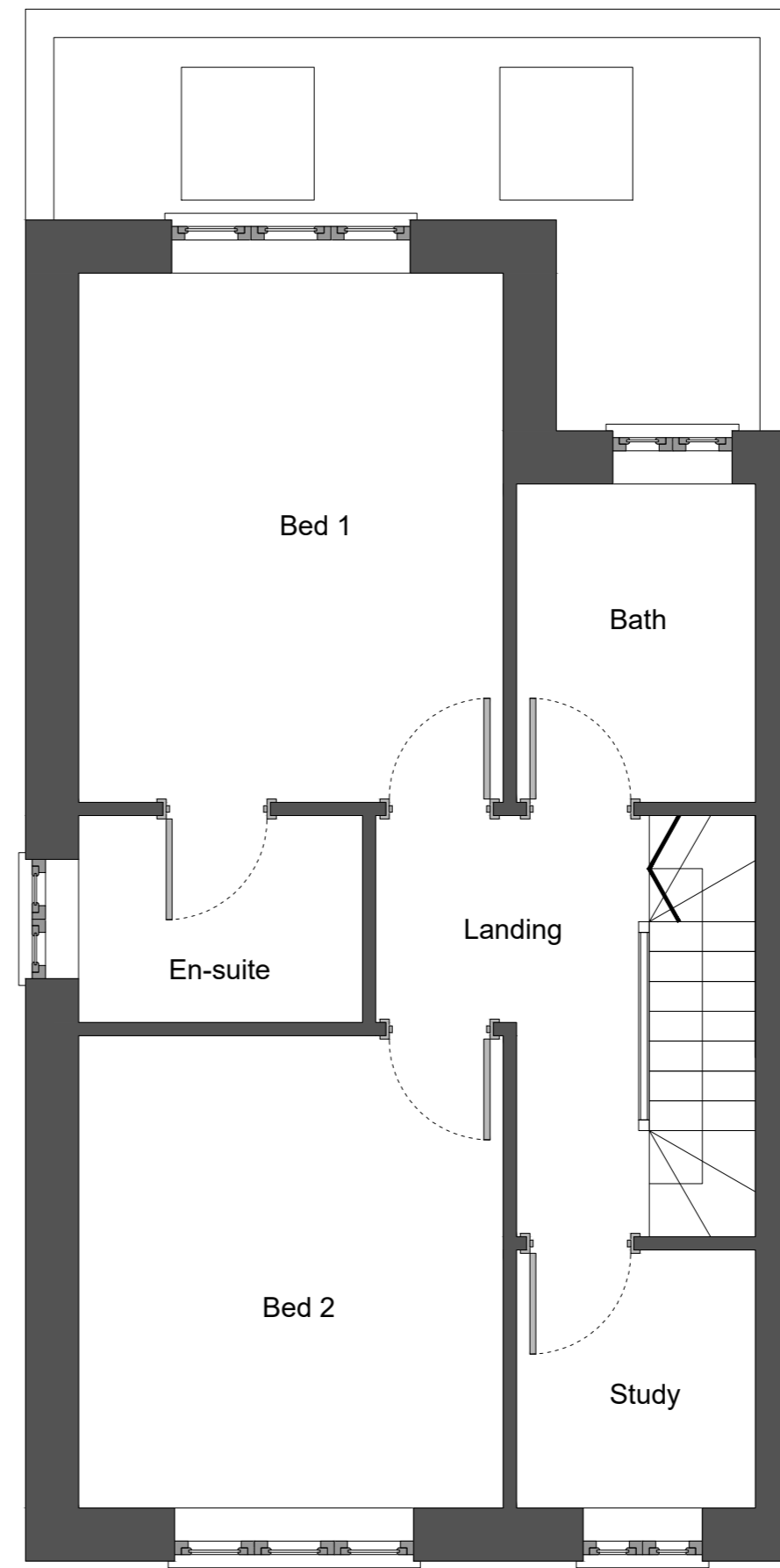
  

Scale bar	Project Name	Company
1:50 1:100	16 Elmore Road Site layout plan Proposed	area

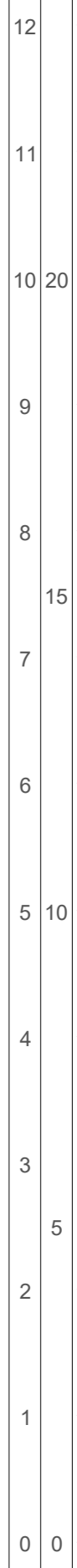
ANDREW RANK RIBA R 21162411 MAY 2016  
www.andrewrank.co.uk



Ground



First



revision	changes	date

date of issue	scale	paper size
March 2024	1:50	A2

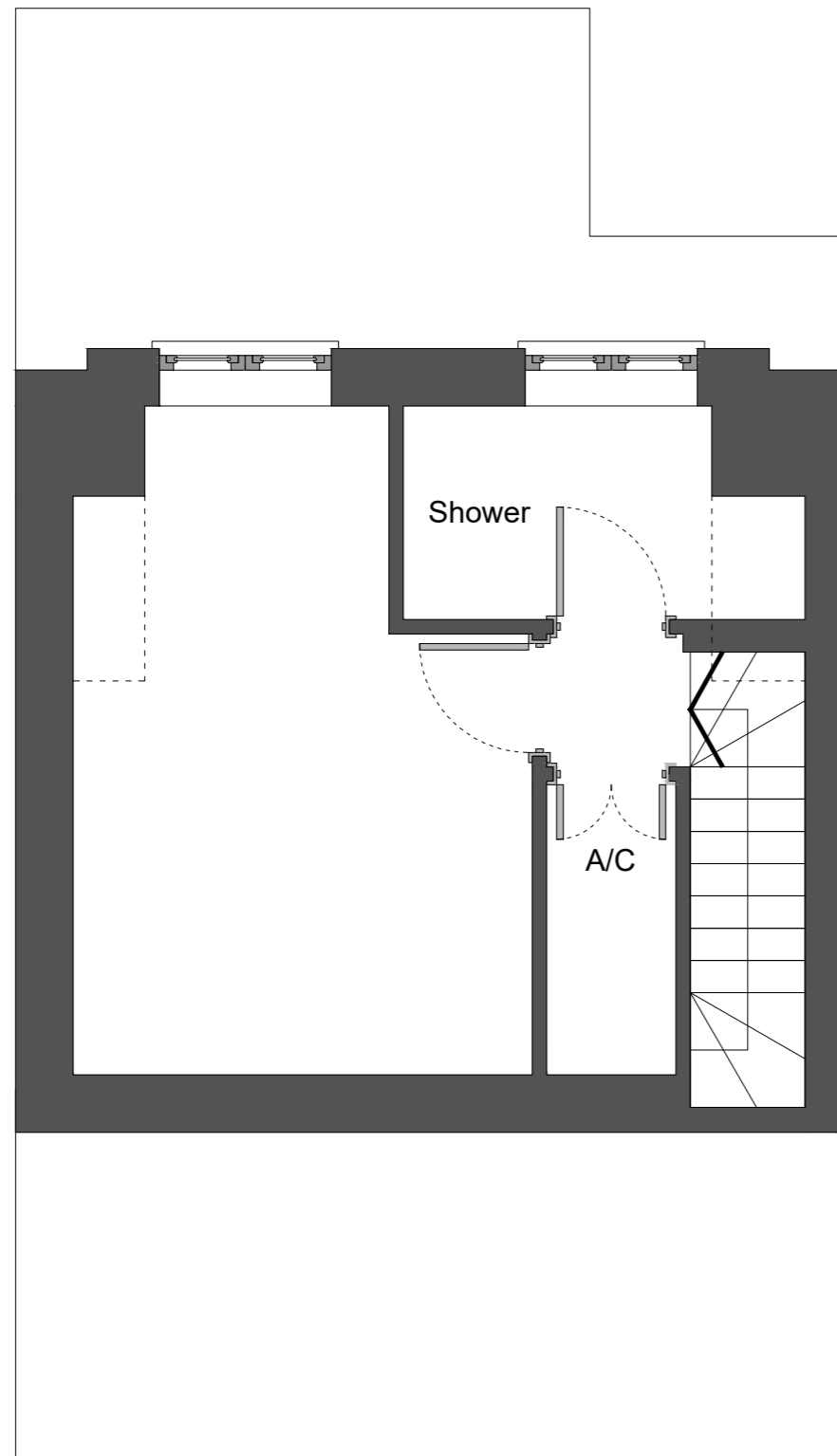
job number	drawing number	revision
390	390 : 12	

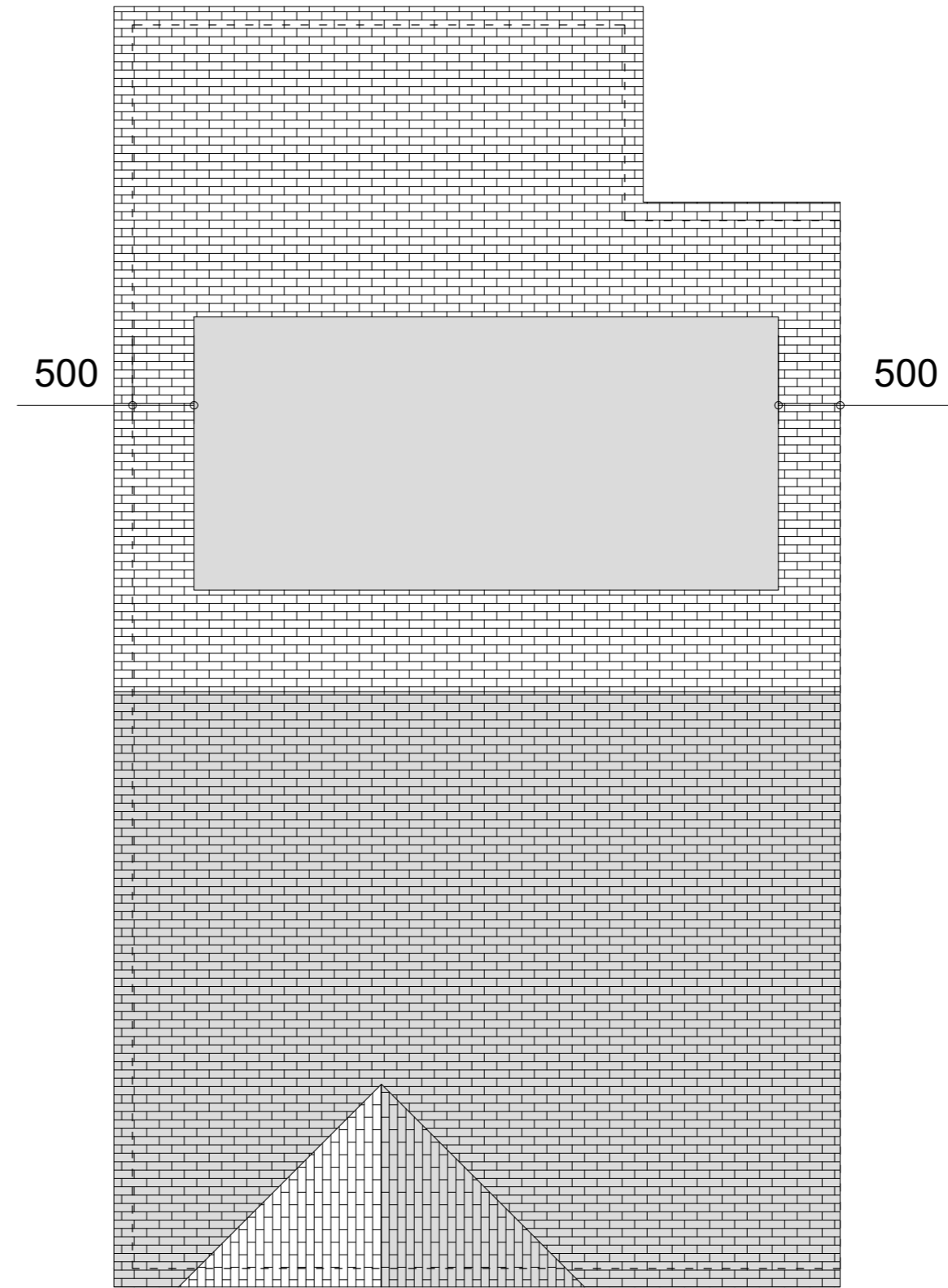
Scale bar	1:100	1:50

Dimensions should represent dimensions where necessary. Do not estimate dimensions from drawings. All dimensions to be checked on site.

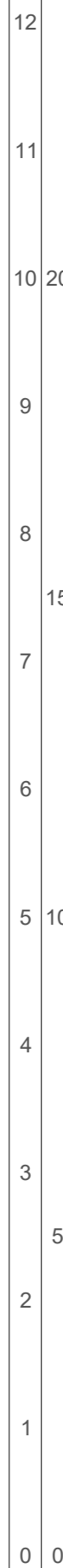
16 Elmore Road  
Ground & First Floor Plans  
Proposed  
area  
390 : 12



Loft



Roof



revision	changes	date

date of issue	scale	paper size
March 2024	1:50	A2

job number	drawing number	revision
390	390 : 13	

16 Elmore Road  
Loft & Roof Level Plans  
Proposed

area

1:50  
1:100  
Scale bar

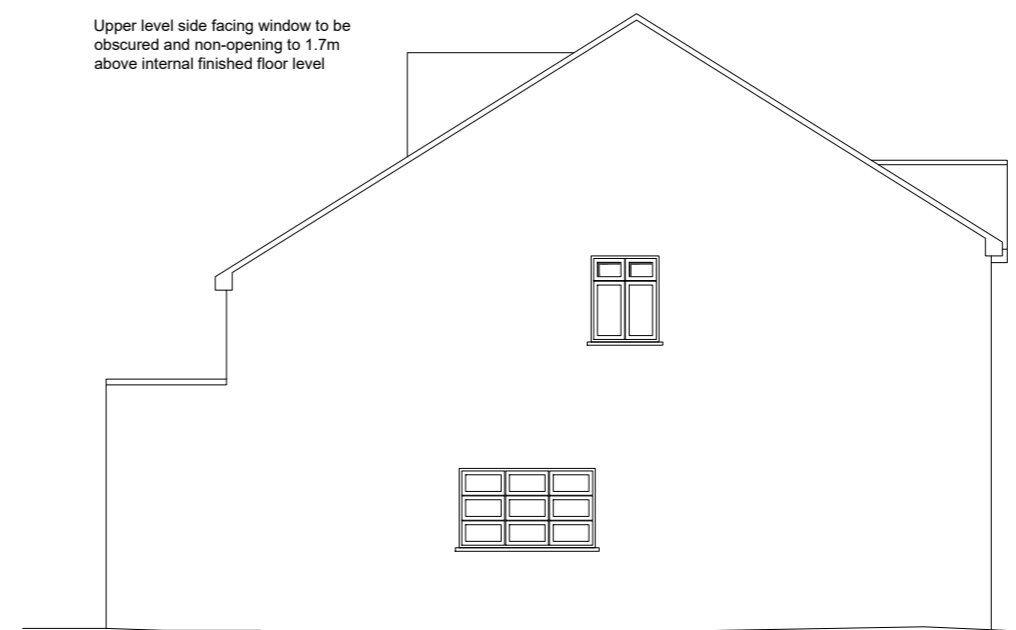
CONSTRUCTION SHOULD REQUEST DIMENSIONS WHERE NECESSARY HAVE BEEN PROVIDED. DO NOT ESTIMATE DIMENSIONS FROM DRAWINGS. ALL DIMENSIONS TO BE SHOWN ON SITE.

ANDREW PAUL RIBBON & HIS/HER/HIS/HER PARTNERS ARCHITECTS

consultants should request dimensions where necessary have been provided. Do not estimate dimensions from drawings. All dimensions to be checked on site.



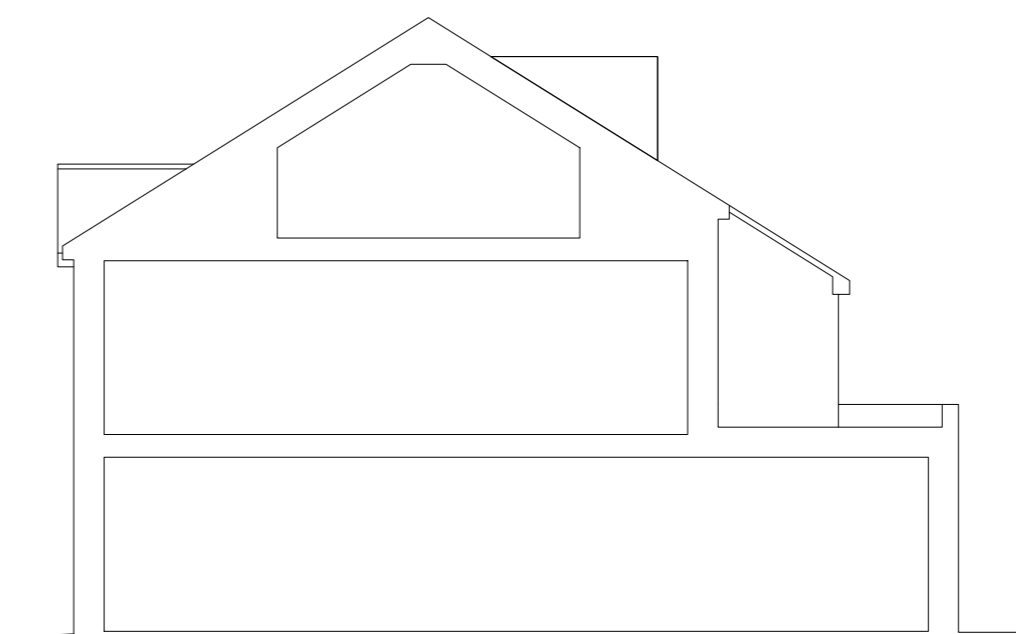
Front



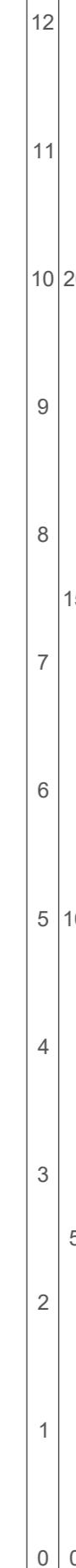
Side



Rear



Section



revision	changes	date

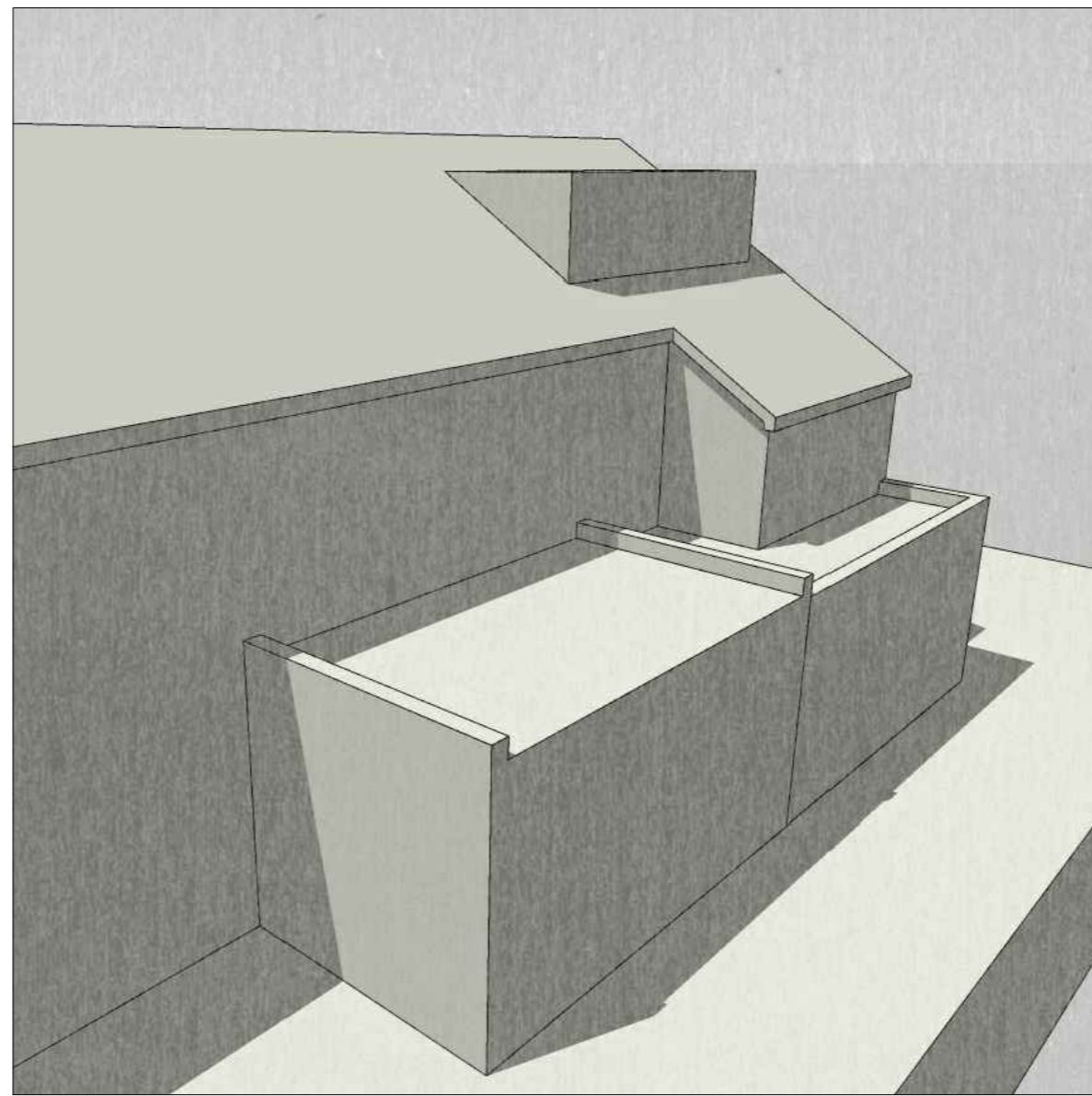
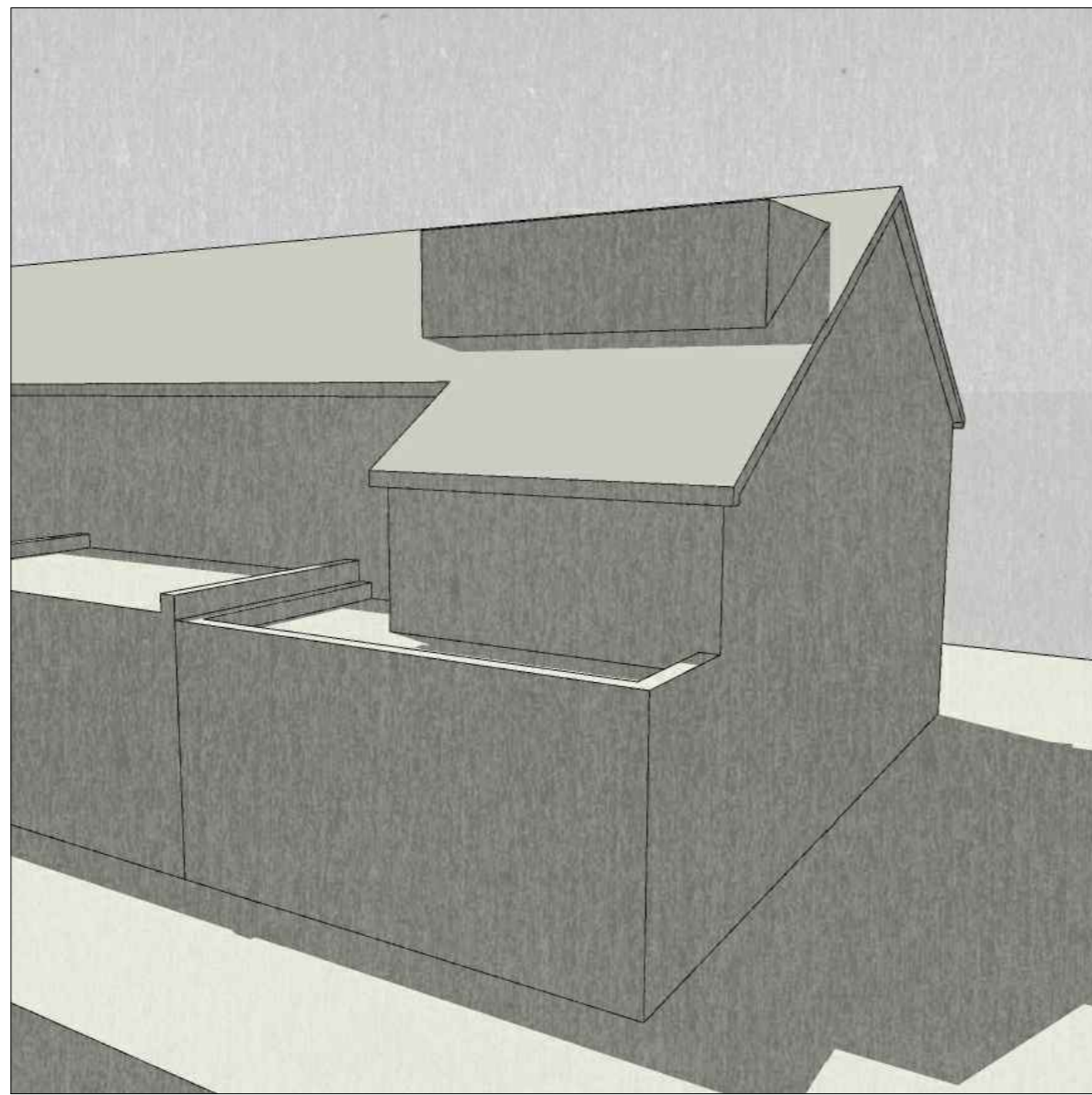
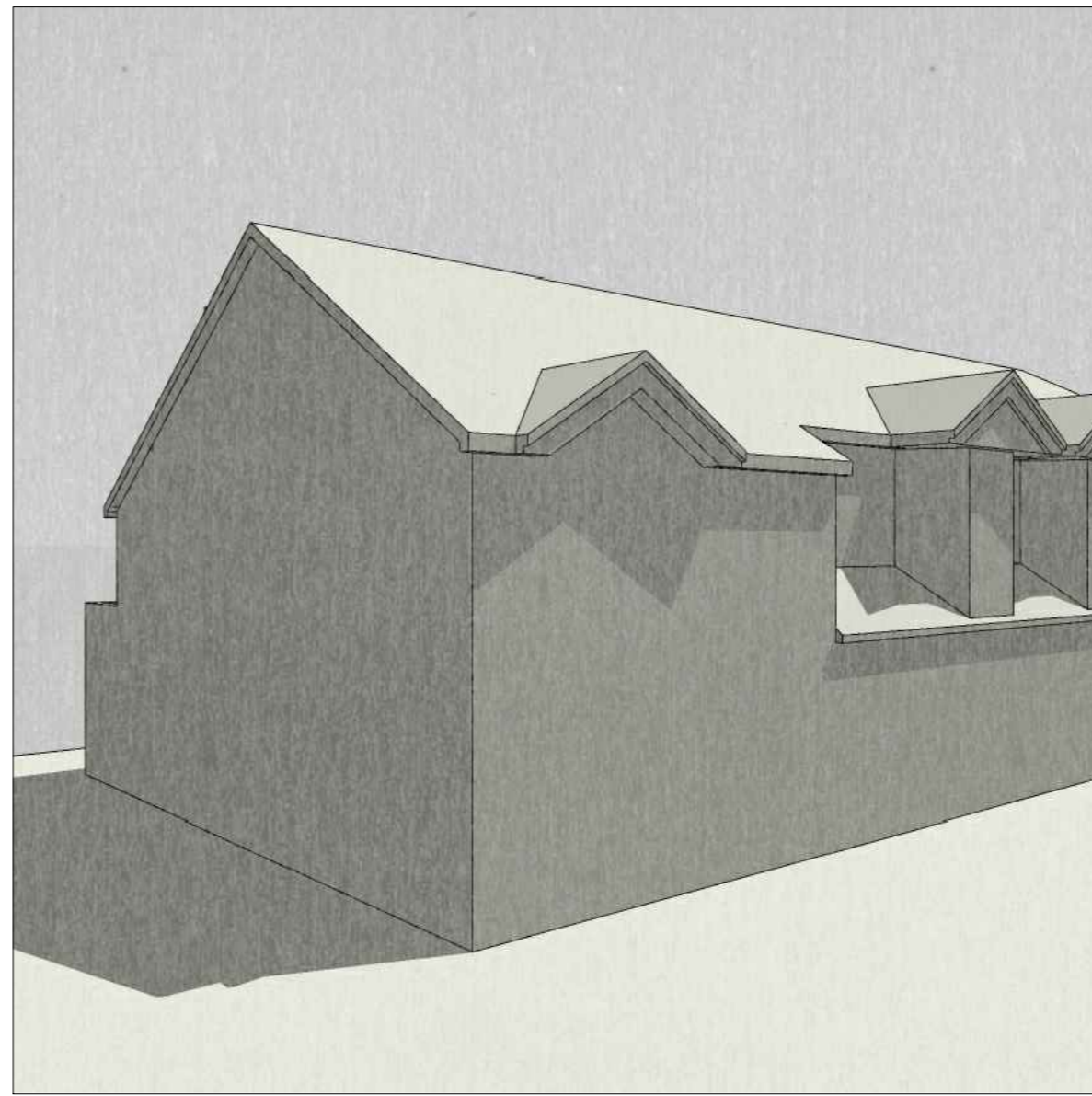
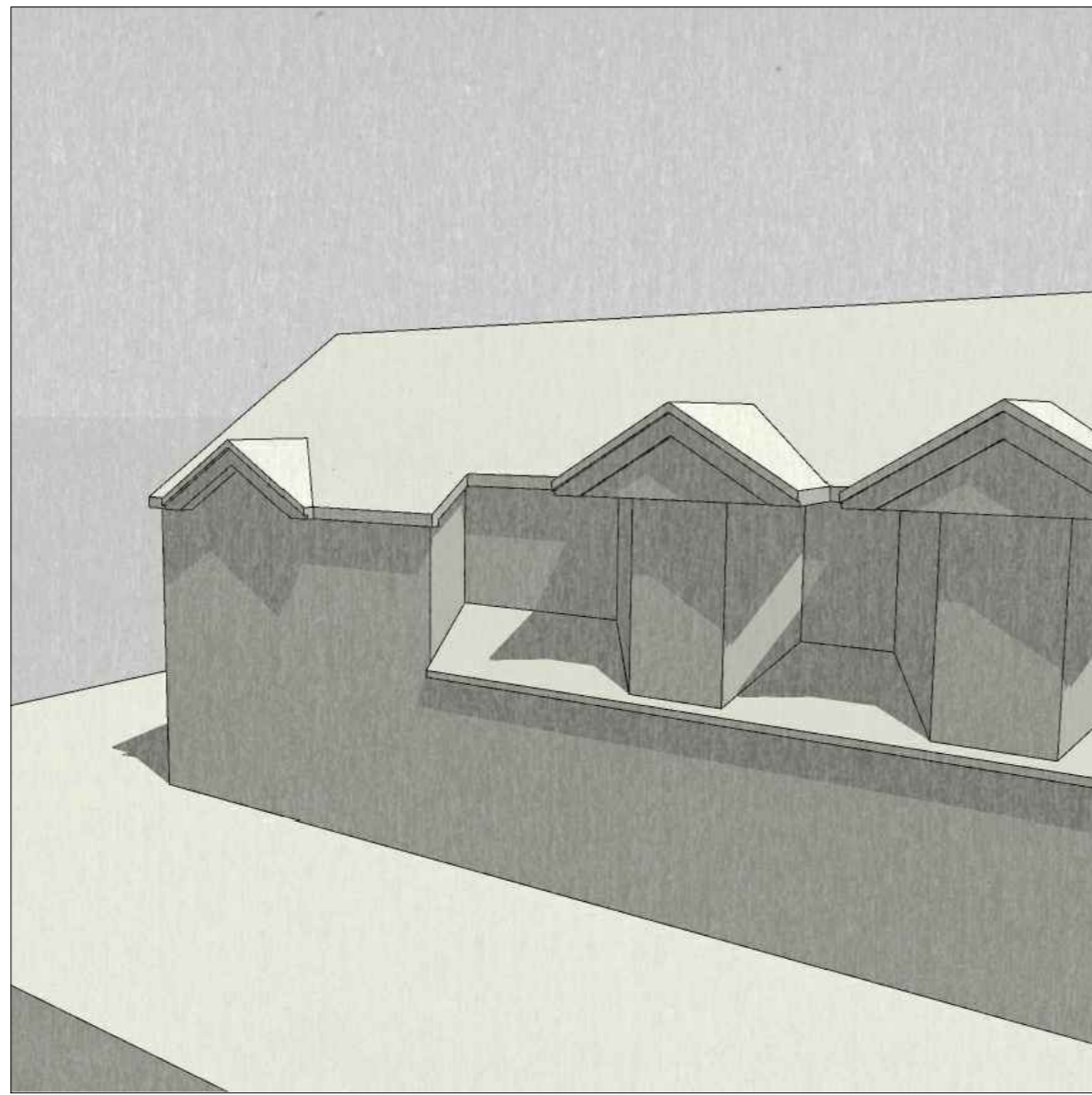
date of issue	scale	paper size
March 2024	1:50	A2

job number	drawing number	revision
390	390 : 15	

area

1:50  
Scale bar  
1:100

ANDREW PEARCE ARCHITECTS 2 HILWELL WAY RADFORD LEICESTER LE10 2JQ  
0116 2540000



CONTENTS SHOULD REQUEST DIMENSIONS WHERE NECESSARY HAVE BEEN PROVIDED - DO NOT ESTIMATE DIMENSIONS FROM DRAWINGS - ALL DIMENSIONS TO BE CHECKED ON SITE

revision	changes	date

date of issue	scale	paper size
March 2024	NTS	A2

Scale bar

1:50

1:100

16 Elmore Road

Massing models

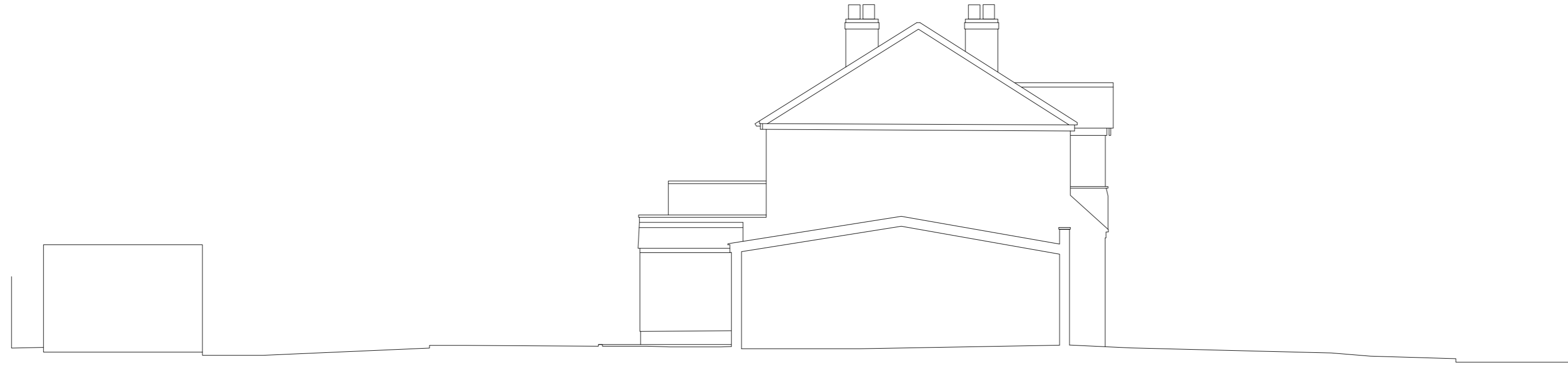
(Indicative only)

job number	drawing number	revision
390	390 : 16	

ANDREW RANK RIBA & KITSWELL WAY RADFORD HEATH WOLF TOWN  
WWW.ANDREW-RANK.CO.UK

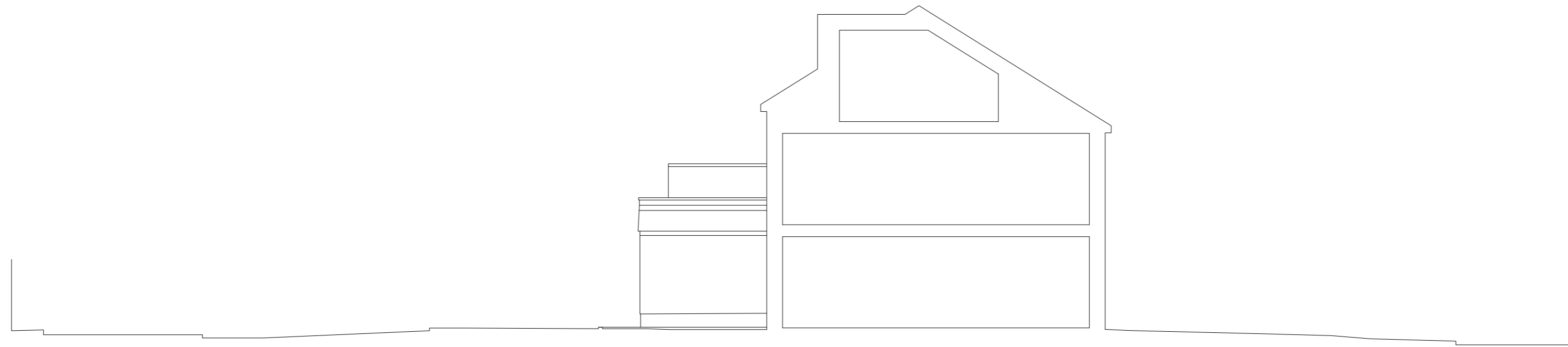
# Site Section

Existing

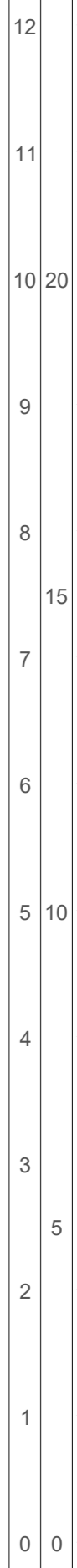


# Site Section

Proposed



CONSTRUCTION SHOULD REQUEST DIMENSIONS WHERE NECESSARY HAVE BEEN PROVIDED - DO NOT ESTIMATE DIMENSIONS FROM DRAWINGS - ALL DIMENSIONS TO BE CHECKED ON SITE



revision	changes	date

date of issue	scale	paper size
March 2024	1:100	A2

16 Elmore Road Site Section Existing & Proposed	area
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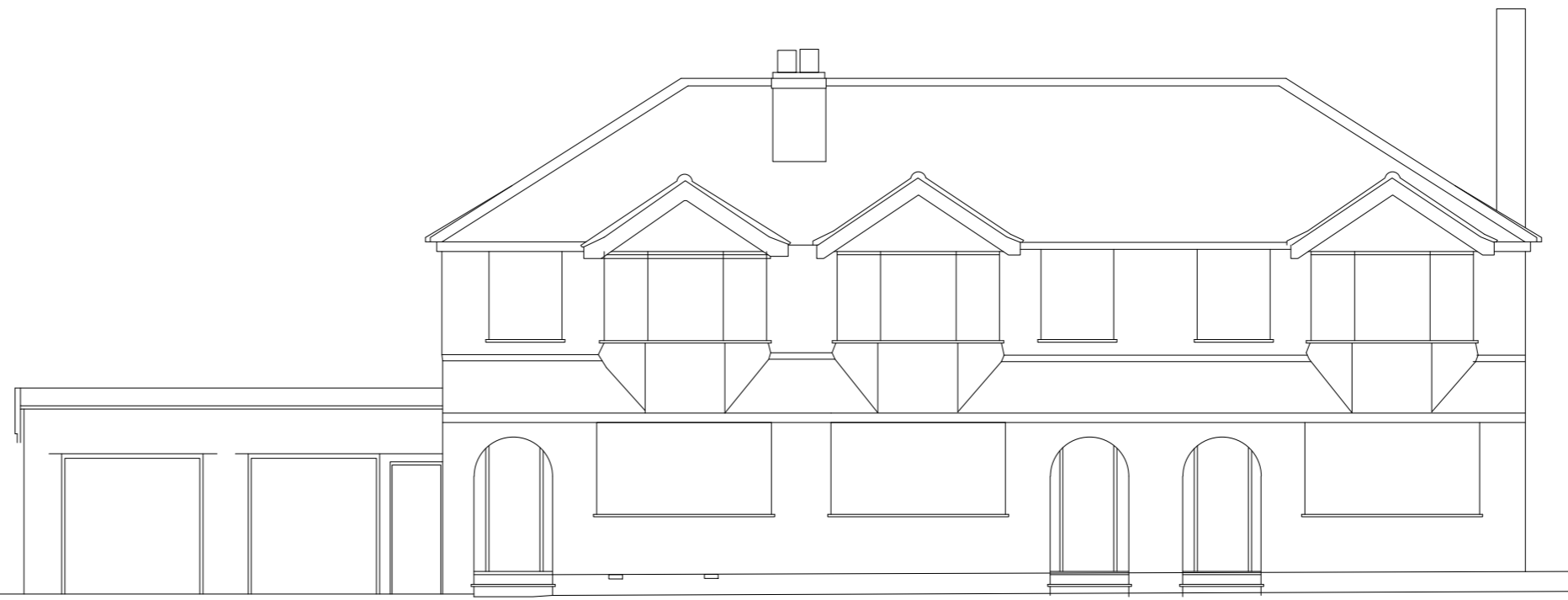
job number	drawing number	revision
390	390 : 17	

ANDREW RANK RIBA 2 HILLWELL WAY RADLEIGH HEATH SUT7 7JG  
www.andrewrank.co.uk

1:50  
1:100  
Scale bar

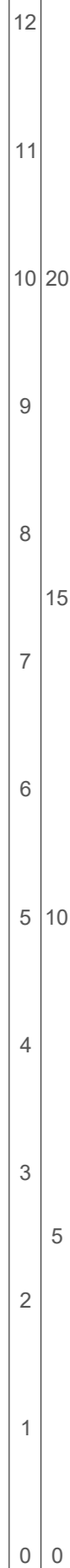
# Street Scene

Existing



# Street Scene

Proposed



dimensions should represent dimensions where none have been provided. do not estimate dimensions from drawings. all dimensions to be checked on site.

revision	changes	date

date of issue	scale	paper size
March 2024	1:100	A2

16 Elmore Road Street Scene Existing & Proposed		area
job number	drawing number	revision
390	390 : 18	

ANDREW RANK RIBA 2 HILLWELL WAY RADLETT Herts MK17 7JG  
www.andrewrank.co.uk

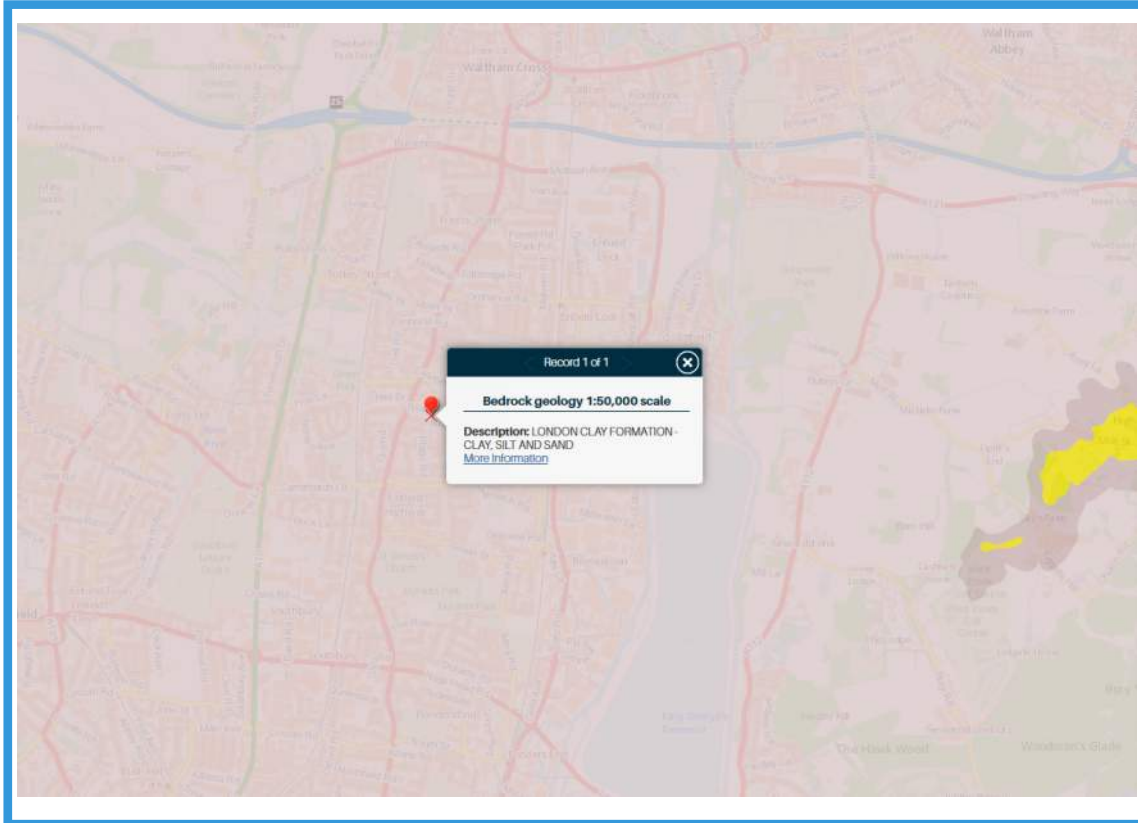
1:50  
1:100  
Scale bar

# Appendix C

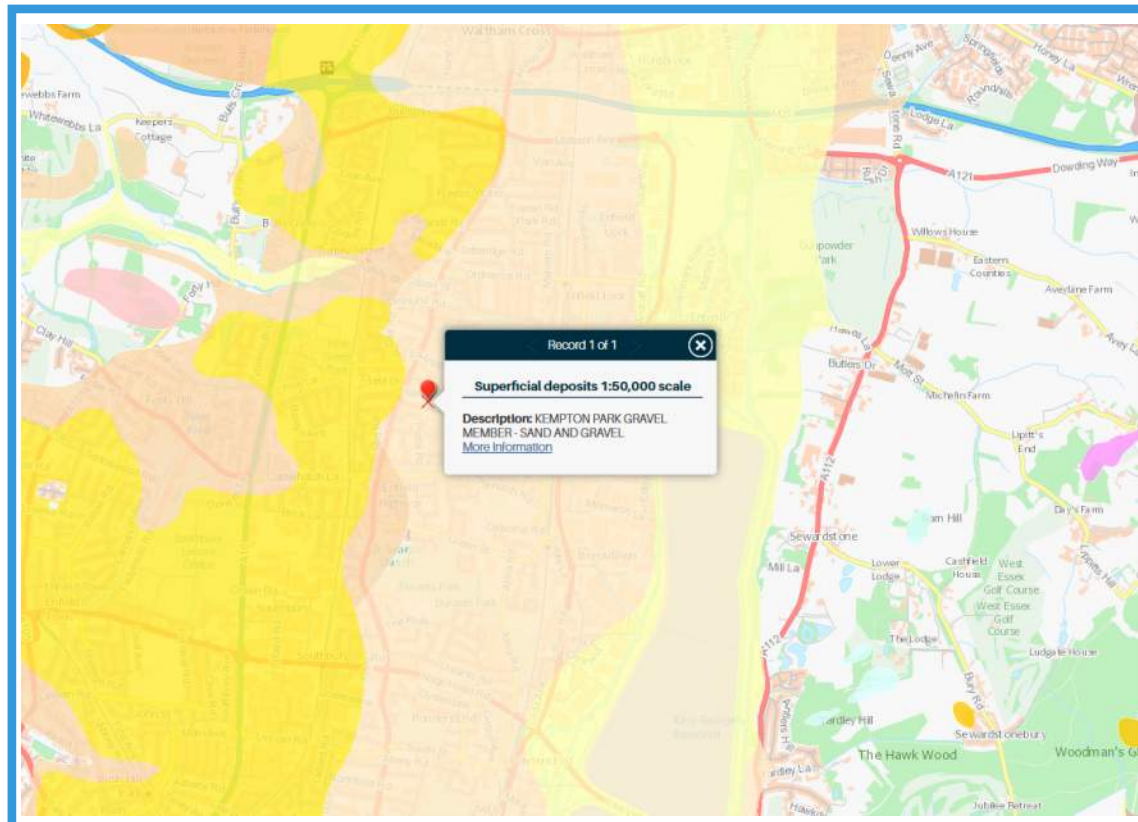


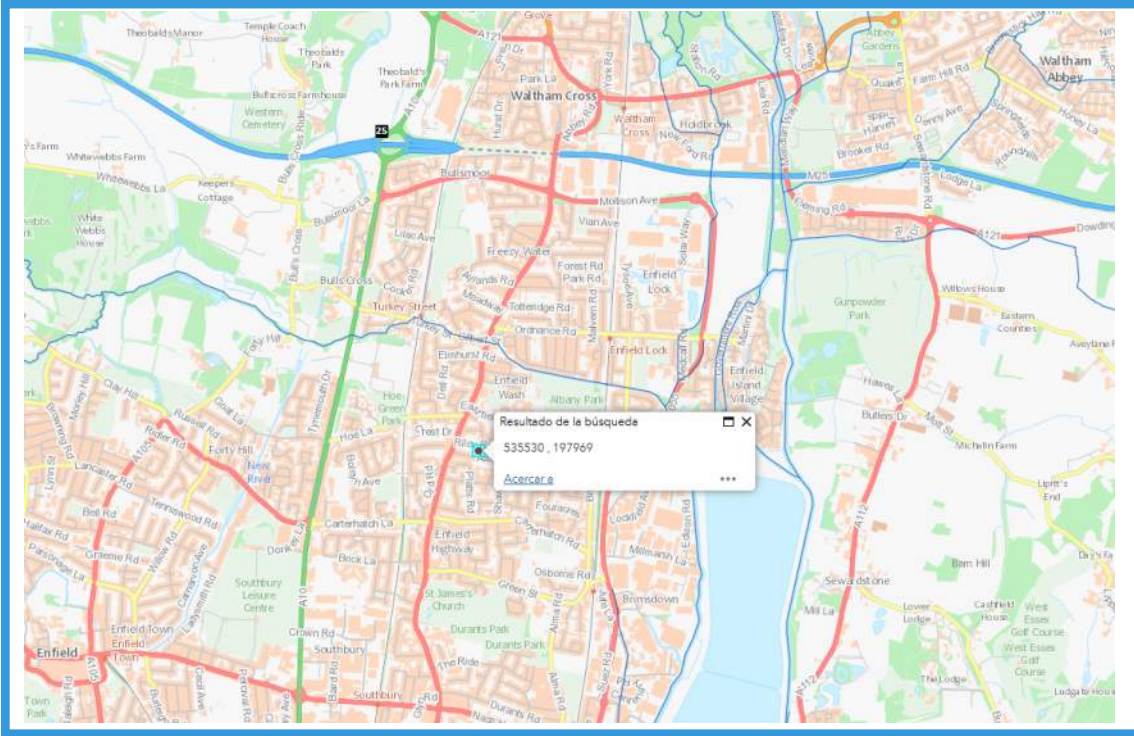


### GEOLOGY - BEDROCK - LONDON CLAY FORMATION - CLAY, SILT AND SAND



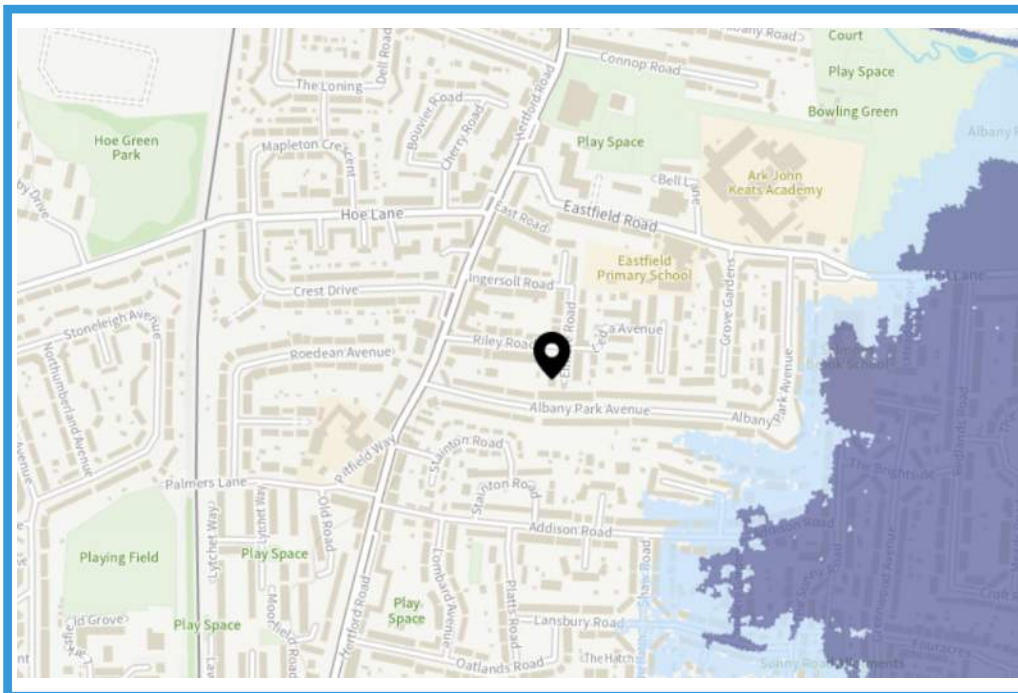
### GEOLOGY - SUPERFICIAL DEPOSITS - KEMPTON PARK GRAVEL MEMBER - SAND AND GRAVEL





Flood risk from reservoirs

Extent of flooding



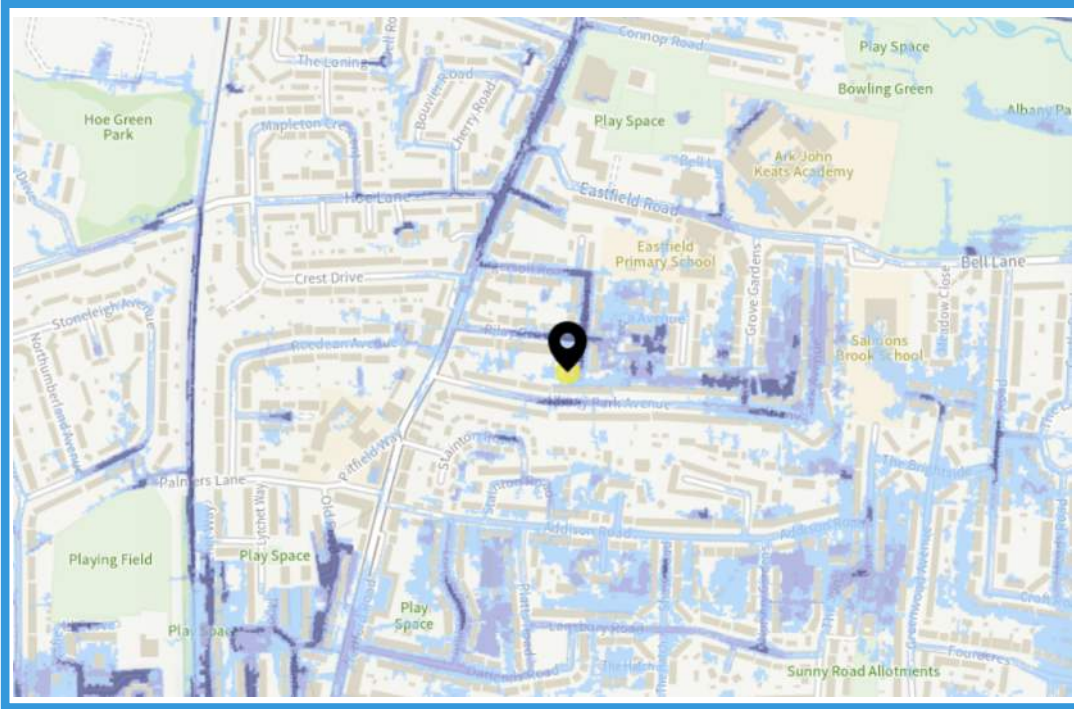
- When river levels are normal
- When there is also flooding from rivers

# SITE SURFACE WATER FLOOD RISK

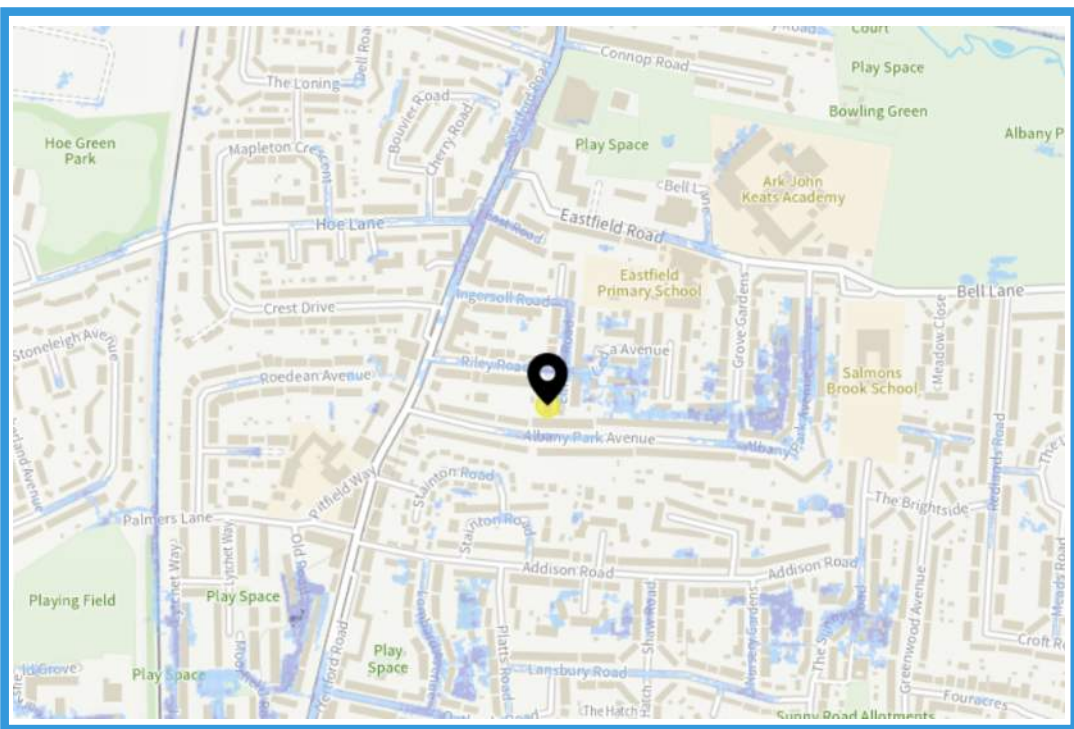
High risk means a chance of flooding greater than 3.3% (1:30)  
 Medium risk means a chance of flooding of btw 1% (1:100) and 3.3%  
 Low risk means a chance of flooding of btw 0.1% (1:1000) and 1%  
 Flooding from surface water is difficult to predict as rainfall location and volume are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding

**Flood risk from surface water**

**Extent of flooding**

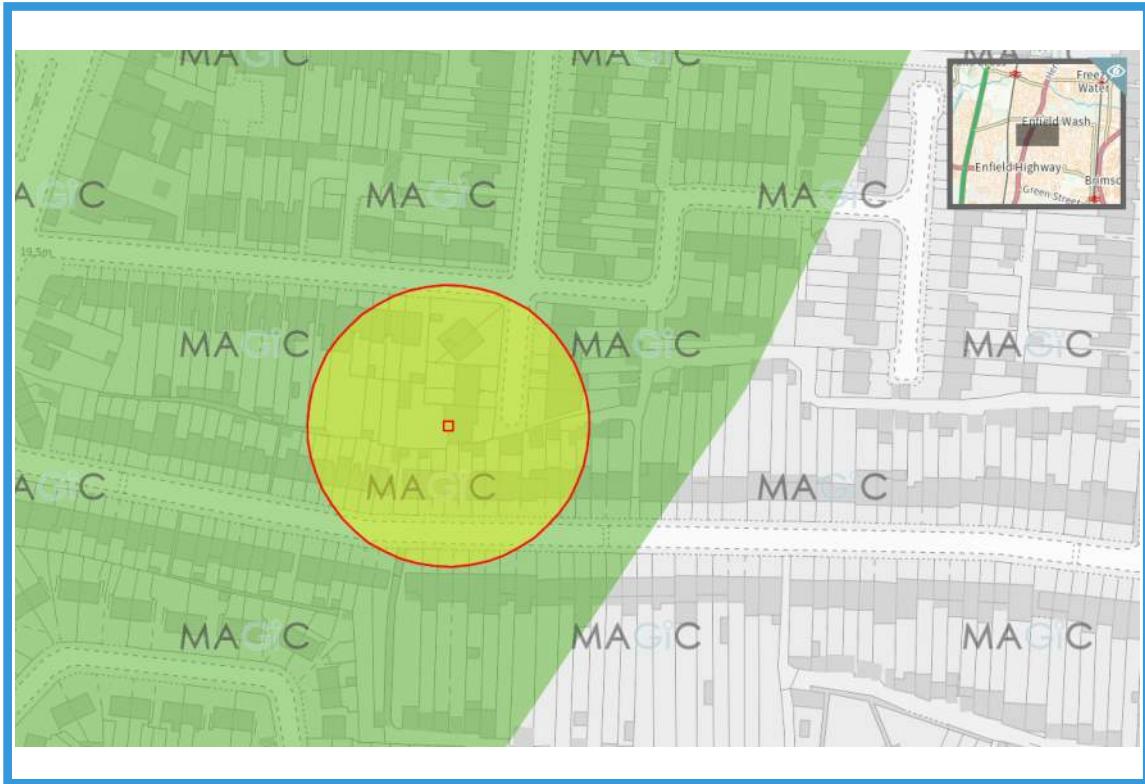


- High risk**  
 More than 3.3% chance each year
- Medium risk**  
 Between 1% and 3.3% chance each year
- Low risk**  
 Between 0.1% and 1% chance each year



- Above 90cm**
- 30cm to 90cm**
- Below 30cm**

# MAGIC RESULTS



**Site Check Results** ✕

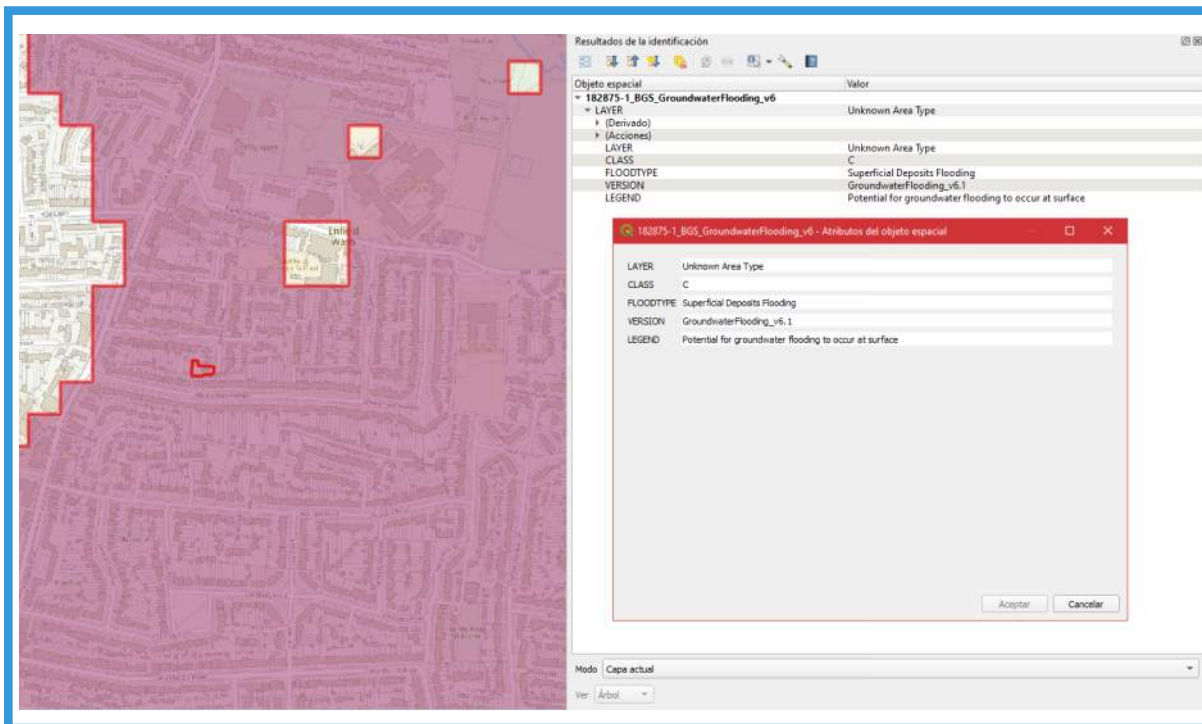
Site Check Report Report generated on Wed May 01 2024  
**You selected the location:** Centroid Grid Ref: TQ35529796  
 The following features have been found in your search area:

Source Protection Zones merged (England)	
Zone	2
Aquifer Designation Map (Bedrock) (England)	
Typology	Unproductive
Aquifer Designation Map (Superficial Drift) (England)	
Typology	Secondary A

OK Cancel Export to CSV Print

Post Code Sector	2 in 10 external	2 in 10 internal	1 in 10 external	1 in 10 internal	1 in 20 external	1 in 20 internal	Severe	Total Properties
E4 7	0	0	0	0	0	0	8	8
E4 8	4	3	2	15	2	1	0	25
EN1 1	0	0	0	0	1	1	2	4
EN1 3	0	0	0	0	1	1	1	3
EN1 4	0	0	4	0	3	5	0	12
EN2 0	0	0	1	0	3	6	0	10
EN2 6	2	0	2	0	4	3	0	11
EN2 7	0	0	1	4	10	7	2	24
EN2 8	0	0	1	0	3	5	0	9
EN2 9	0	0	3	1	2	0	0	6
EN3 4	0	0	0	0	0	10	0	10
EN3 5	0	0	2	0	3	2	0	7
EN3 6	0	0	4	0	0	3	0	7
EN3 7	0	0	2	0	2	0	0	4
EN4 0	0	1	1	1	1	4	0	8
EN4 9	0	0	1	0	0	1	0	2
EN40J	0	0	0	0	0	1	0	1
N11 1	0	0	1	0	1	0	0	2
N11 2	0	0	0	0	0	1	0	1
N13 4	8	0	8	0	3	1	0	20
N13 5	3	1	4	1	1	1	0	11
N14 4	0	0	0	0	25	12	0	37
N14 5	0	0	0	0	5	2	0	7
N14 6	0	0	0	0	2	3	0	5
N14 7	0	0	0	0	0	3	0	3
N147H	0	0	0	0	0	1	0	1
N18 1	0	0	2	0	3	3	0	8
N18 2	0	0	6	0	0	6	0	12
N21 1	0	0	1	0	0	4	0	5
N21 2	0	0	0	0	2	5	0	7
N21 3	1	1	3	0	1	2	0	8
N9	0	0	0	0	0	0	1	1
N9 0	0	0	3	0	0	0	0	3
N9 8	0	0	1	0	0	1	0	2
<b>Total</b>	<b>14</b>	<b>3</b>	<b>51</b>	<b>7</b>	<b>81</b>	<b>98</b>	<b>6</b>	<b>251</b>

## GROUND WATER FLOOD RISK



Resultados de la identificación

Objeto espacial: Valor

182875-1\_BGS\_GroundwaterFlooding\_v6

LAYER: Unknown Area Type

(Derivado)

(Acciones)

LAYER: Unknown Area Type

CLASS: C

FLOODTYPE: Superficial Deposits Flooding

VERSION: GroundwaterFlooding\_v6.1

LEGEND: Potential for groundwater flooding to occur at surface

182875-1\_BGS\_GroundwaterFlooding\_v6 - Atributos del objeto espacial

LAYER: Unknown Area Type

CLASS: C

FLOODTYPE: Superficial Deposits Flooding

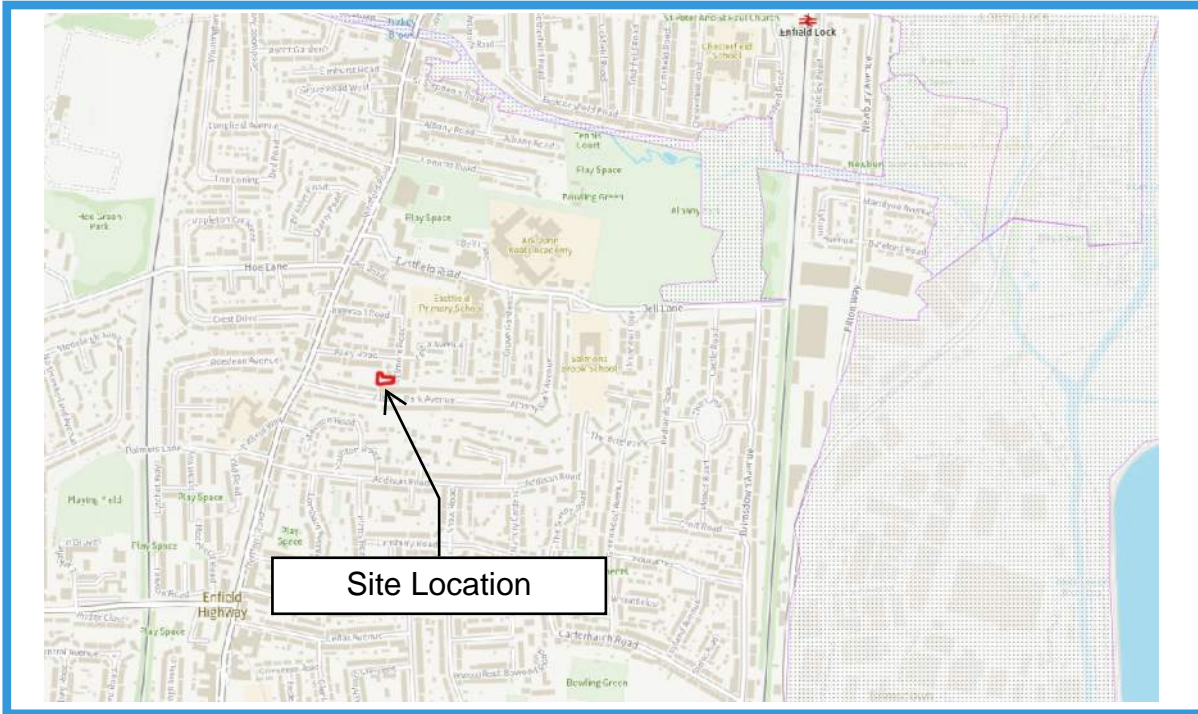
VERSION: GroundwaterFlooding\_v6.1

LEGEND: Potential for groundwater flooding to occur at surface

Modo: Capa actual

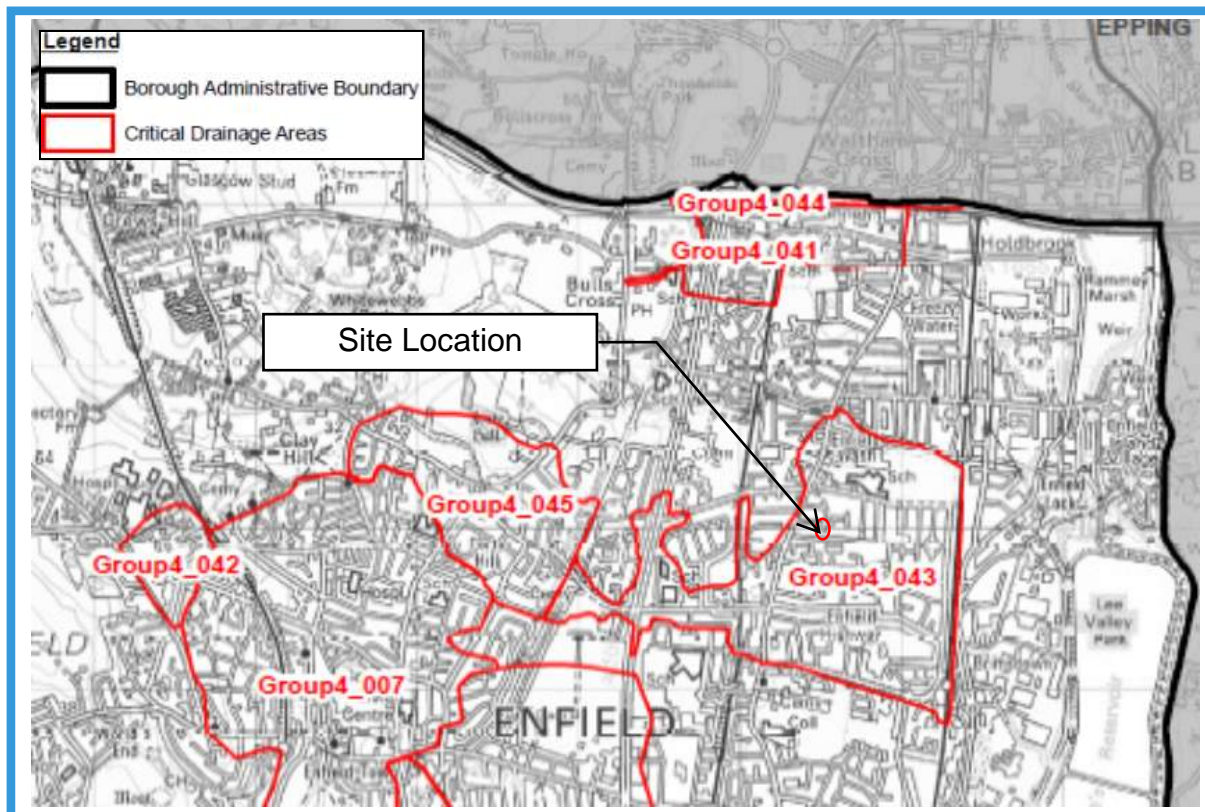
Ver: Árbol

# FLOOD WARNING AREA

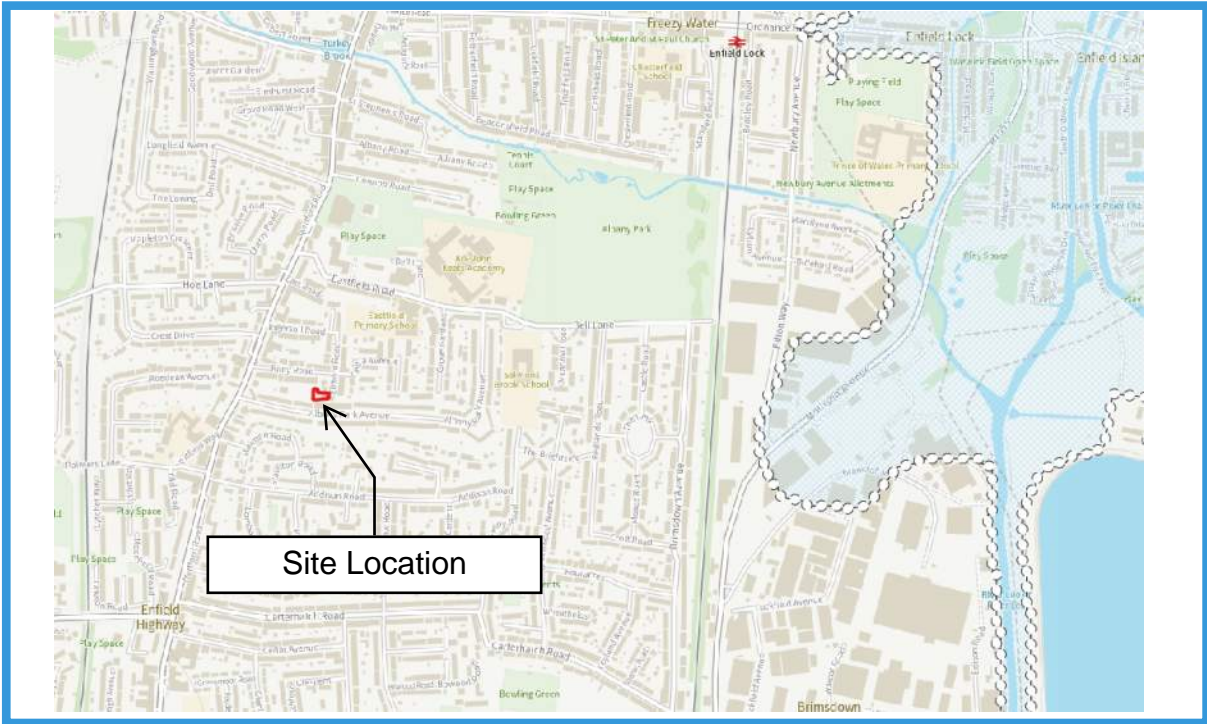


Flood Warning areas

# CRITICAL DRAINAGE AREA



## HISTORIC FLOOD MAP



 Historic Flood Outline

# Flood map for planning

Your reference  
<Unspecified>

Location (easting/northing)  
535522/197971

Created  
1 May 2024 5:47

**Your selected location is in flood zone 1, an area with a low probability of flooding.**

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

## Notes

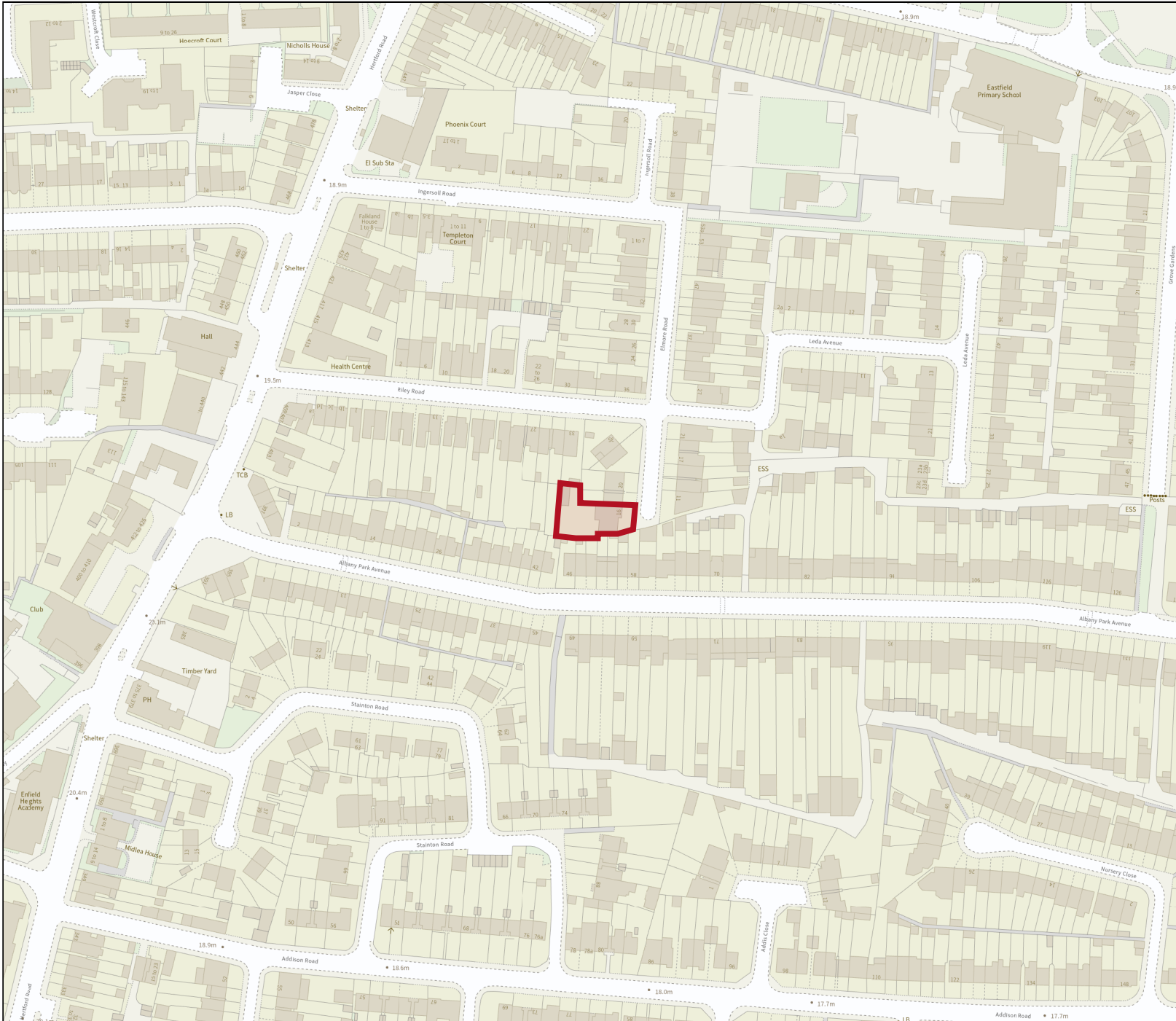
The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

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 2022 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>










## Flood map for planning

Your reference  
**<Unspecified>**

Location (easting/northing)  
**535522/197971**

Scale  
**1:2500**

Created  
**1 May 2024 5:47**

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area

