

Householder Application for Planning Permission for works or extension to a dwelling. Town and Country Planning Act 1990

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Upon receipt of this form and any supporting information, it is the responsibility of the Local Planning Authority to inform you of their obligations in regards to the processing of your application. Please refer to their website for further information on any legal, regulatory and commercial requirements relating to information security and data protection of the information you have provided.

Local Planning Authority details:



Development Control
 Gloucester City Council
 PO Box 3252, Gloucester, GL1 9FW
 01452 396396
development.control@gloucester.gov.uk
www.gloucester.gov.uk/planning

Publication on Local Planning Authority websites

Information provided on this form and in supporting documents may be published on the authority's planning register and website.

Please ensure that the information you submit is accurate and correct and does not include personal or sensitive information. If you require any further clarification, please contact the authority directly.

If printed, please complete using block capitals and black ink.

It is important that you read the accompanying guidance notes and help text as incorrect completion will delay the processing of your application.

1. Applicant Name and Address

Title: First name:

Last name:

Company (optional):

Unit: House number: House suffix:

House name:

Address 1:

Address 2:

Address 3:

Town:

County:

Country:

Postcode:

2. Agent Name and Address

Title: First name:

Last name:

Company (optional):

Unit: House number: House suffix:

House name:

Address 1:

Address 2:

Address 3:

Town:

County:

Country:

Postcode:

3. Description of Proposed Works

Please describe the proposed works:

Demolish existing rear conservatory/front porch and construct rear extension and front porch

Has the work already started? Yes No

If Yes, please state when the work was started (DD/MM/YYYY): (date must be pre-application submission)

Has the work already been completed? Yes No

If Yes, please state when the work was completed (DD/MM/YYYY): (date must be pre-application submission)

4. Site Address Details

Please provide the full postal address of the application site.

Unit: House number: House suffix:

House name:

Address 1:

Address 2:

Address 3:

Town:

County:

Postcode (optional):

5. Pedestrian and Vehicle Access, Roads and Rights of Way

Is a new or altered vehicle access proposed to or from the public highway? Yes No

Is a new or altered pedestrian access proposed to or from the public highway? Yes No

Do the proposals require any diversions, extinguishments and/or creation of public rights of way? Yes No

If Yes to any questions, please show details on your plans or drawings and state the reference number(s) of the plan(s)/drawing(s):

6. Pre-application Advice

Has assistance or prior advice been sought from the local authority about this application? Yes No

If Yes, please complete the following information about the advice you were given. (This will help the authority to deal with this application more efficiently).

Please tick if the full contact details are not known, and then complete as much possible:

Officer name:

Reference:

Date (DD MM YYYY): (must be pre-application submission)

Details of the pre-application advice received:

7. Trees and Hedges

Are there any trees or hedges on your own property or on adjoining properties which are within falling distance of your proposed development? Yes No

If Yes, please mark their position on a scaled plan and state the reference number of any plans or drawings:

Will any trees or hedges need to be removed or pruned in order to carry out your proposal? Yes No

If Yes, please show on your plans which trees by giving them numbers e.g. T1, T2 etc, state the reference number of the plan(s)/drawing(s) and indicate the scale.

8. Parking

Will the proposed works affect existing car parking arrangements? Yes No

If Yes, please describe:

9. Authority Employee / Member

It is an important principle of decision-making that the process is open and transparent. For the purposes of this question, "related to" means related, by birth or otherwise, closely enough that a fair minded and informed observer, having considered the facts, would conclude that there was bias on the part of the decision-maker in the local planning authority.

Do any of the following statements apply to you and/or agent? Yes No With respect to the authority, I am:
(a) a member of staff
(b) an elected member
(c) related to a member of staff
(d) related to an elected member

If Yes, please provide details of their name, role and how you are related to them.

10. Materials

If applicable, please state what materials are to be used externally. Include type, colour and name for each material:

	Existing (where applicable)	Proposed	Not applicable	Don't Know
Walls	External red imperial bricks	External red imperial bricks	<input type="checkbox"/>	<input type="checkbox"/>
Roof	Slate roof	Slate Roof	<input type="checkbox"/>	<input type="checkbox"/>
Windows	White Upvc	White Upvc	<input type="checkbox"/>	<input type="checkbox"/>
Doors	White Upvc	White Upvc	<input type="checkbox"/>	<input type="checkbox"/>
Boundary treatments (e.g. fences, walls)			<input type="checkbox"/>	<input type="checkbox"/>

10. Materials

If applicable, please state what materials are to be used externally. Include type, colour and name for each material:

Vehicle access and hard-standing			<input type="checkbox"/>	<input type="checkbox"/>
Lighting			<input type="checkbox"/>	<input type="checkbox"/>
Others (please specify)			<input type="checkbox"/>	<input type="checkbox"/>

Are you supplying additional information on submitted plan(s)/drawing(s)/design and access statement?

Yes

No

If Yes, please state references for the plan(s)/drawing(s)/design and access statement:

--

11. Ownership Certificates and Agricultural Land Declaration

One Certificate A, B, C, or D, must be completed with this application form

CERTIFICATE OF OWNERSHIP - CERTIFICATE A

Town and Country Planning (Development Management Procedure) (England) Order 2015 Certificate under Article 14

I certify/The applicant certifies that on the day 21 days before the date of this application nobody except myself/ the applicant was the owner* of any part of the land or building to which the application relates, and that none of the land to which the application relates is, or is part of, an agricultural holding**

NOTE: You should sign Certificate B, C or D, as appropriate, if you are the sole owner of the land or building to which the application relates but the land is, or is part of, an agricultural holding.

* "owner" is a person with a freehold interest or leasehold interest with at least 7 years left to run.

** "agricultural holding" has the meaning given by reference to the definition of "agricultural tenant" in section 65(8) of the Act.

Signed - Applicant:

Or signed - Agent:

Date (DD/MM/YYYY):

CERTIFICATE OF OWNERSHIP - CERTIFICATE B

Town and Country Planning (Development Management Procedure) (England) Order 2015 Certificate under Article 14

I certify/ The applicant certifies that I have/the applicant has given the requisite notice to everyone else (as listed below) who, on the day 21 days before the date of this application, was the owner* and/or agricultural tenant** of any part of the land or building to which this application relates.

* "owner" is a person with a freehold interest or leasehold interest with at least 7 years left to run.

** "agricultural tenant" has the meaning given in section 65(8) of the Town and Country Planning Act 1990

Name of Owner / Agricultural Tenant	Address	Date Notice Served

Signed - Applicant:

Or signed - Agent:

Date (DD/MM/YYYY):

11. Ownership Certificates and Agricultural Land Declaration (continued)

CERTIFICATE OF OWNERSHIP - CERTIFICATE C

Town and Country Planning (Development Management Procedure) (England) Order 2015 Certificate under Article 14

I certify/ The applicant certifies that:

- Neither Certificate A or B can be issued for this application
- All reasonable steps have been taken to find out the names and addresses of the other owners* and/or agricultural tenants** of the land or building, or of a part of it, but I have/ the applicant has been unable to do so.

* "owner" is a person with a freehold interest or leasehold interest with at least 7 years left to run.

** "agricultural tenant" has the meaning given in section 65(8) of the Town and Country Planning Act 1990

The steps taken were:

Name of Owner / Agricultural Tenant	Address	Date Notice Served

Notice of the application has been published in the following newspaper (circulating in the area where the land is situated):

On the following date (which must not be earlier than 21 days before the date of the application):

Signed - Applicant:

Or signed - Agent:

Date (DD/MM/YYYY):

CERTIFICATE OF OWNERSHIP - CERTIFICATE D

Town and Country Planning (Development Management Procedure) (England) Order 2015 Certificate under Article 14

I certify/ The applicant certifies that:

- Certificate A cannot be issued for this application
- All reasonable steps have been taken to find out the names and addresses of everyone else who, on the day 21 days before the date of this application, was the owner* and/or agricultural tenant** of any part of the land to which this application relates, but I have/ the applicant has been unable to do so.

* "owner" is a person with a freehold interest or leasehold interest with at least 7 years left to run.

** "agricultural tenant" has the meaning given in section 65(8) of the Town and Country Planning Act 1990

The steps taken were:

Notice of the application has been published in the following newspaper (circulating in the area where the land is situated):

On the following date (which must not be earlier than 21 days before the date of the application):

Signed - Applicant:

Or signed - Agent:

Date (DD/MM/YYYY):

12. Planning Application Requirements - Checklist

Please read the following checklist to make sure you have sent all the information in support of your proposal. Failure to submit all information required will result in your application being deemed invalid. It will not be considered valid until all information required by the Local Planning Authority (LPA) has been submitted.

The original and 3 copies* of a completed and dated application form:

The original and 3 copies* of a plan which identifies the land to which the application relates drawn to an identified scale and showing the direction of North:

The original and 3 copies* of other plans and drawings or information necessary to describe the subject of the application:

The original and 3 copies* of a design and access statement if proposed works fall within a conservation area or World Heritage Site, or relate to a Listed Building:

The correct fee:

The original and 3 copies* of the completed, dated Ownership Certificate (A, B, C or D – as applicable) and Article 14 Certificate (Agricultural Holdings):

*National legislation specifies that the applicant must provide the original plus three copies of the form and supporting documents (a total of four copies), unless the application is submitted electronically or, the LPA indicate that a smaller number of copies is required. LPAs may also accept supporting documents in electronic format by post (for example, on a CD, DVD or USB memory stick). You can check your LPA's website for information or contact their planning department to discuss these options.

13. Declaration

I/we hereby apply for planning permission/consent as described in this form and the accompanying plans/drawings and additional information. I/we confirm that, to the best of my/our knowledge, any facts stated are true and accurate and any opinions given are the genuine opinions of the person(s) giving them.

Signed - Applicant:

Or signed - Agent:

Date (DD/MM/YYYY):

(date cannot be pre-application)

14. Applicant Contact Details

Telephone numbers

Country code: National number: Extension number:

Country code: Mobile number (optional):

Country code: Fax number (optional):

Email address (optional):

15. Agent Contact Details

Telephone numbers

16. Site Visit

Can the site be seen from a public road, public footpath, bridleway or other public land? Yes No

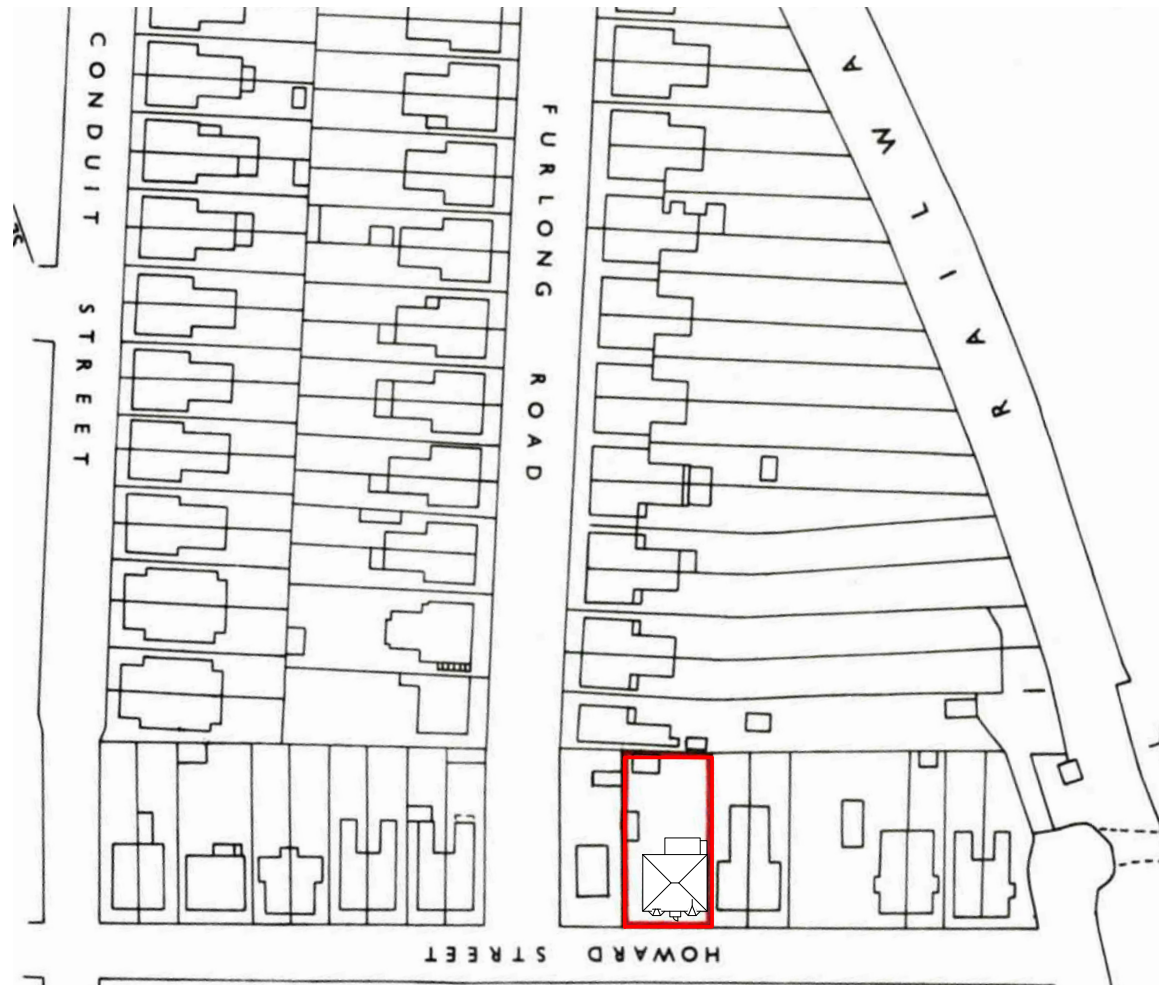
If the planning authority needs to make an appointment to carry out a site visit, whom should they contact? (Please select only one) Agent Applicant Other (if different from the agent/applicant's details)

If Other has been selected, please provide:

Contact name:

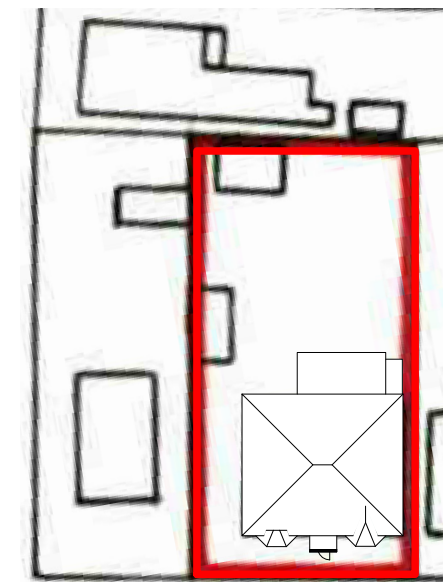
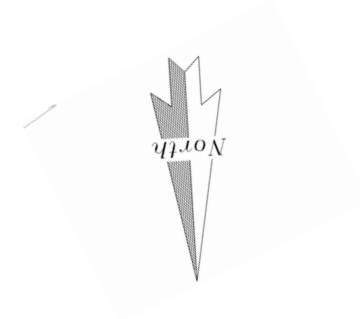
Telephone number:

Email address:



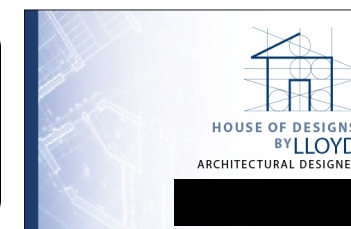
SITE PLAN

1:1250

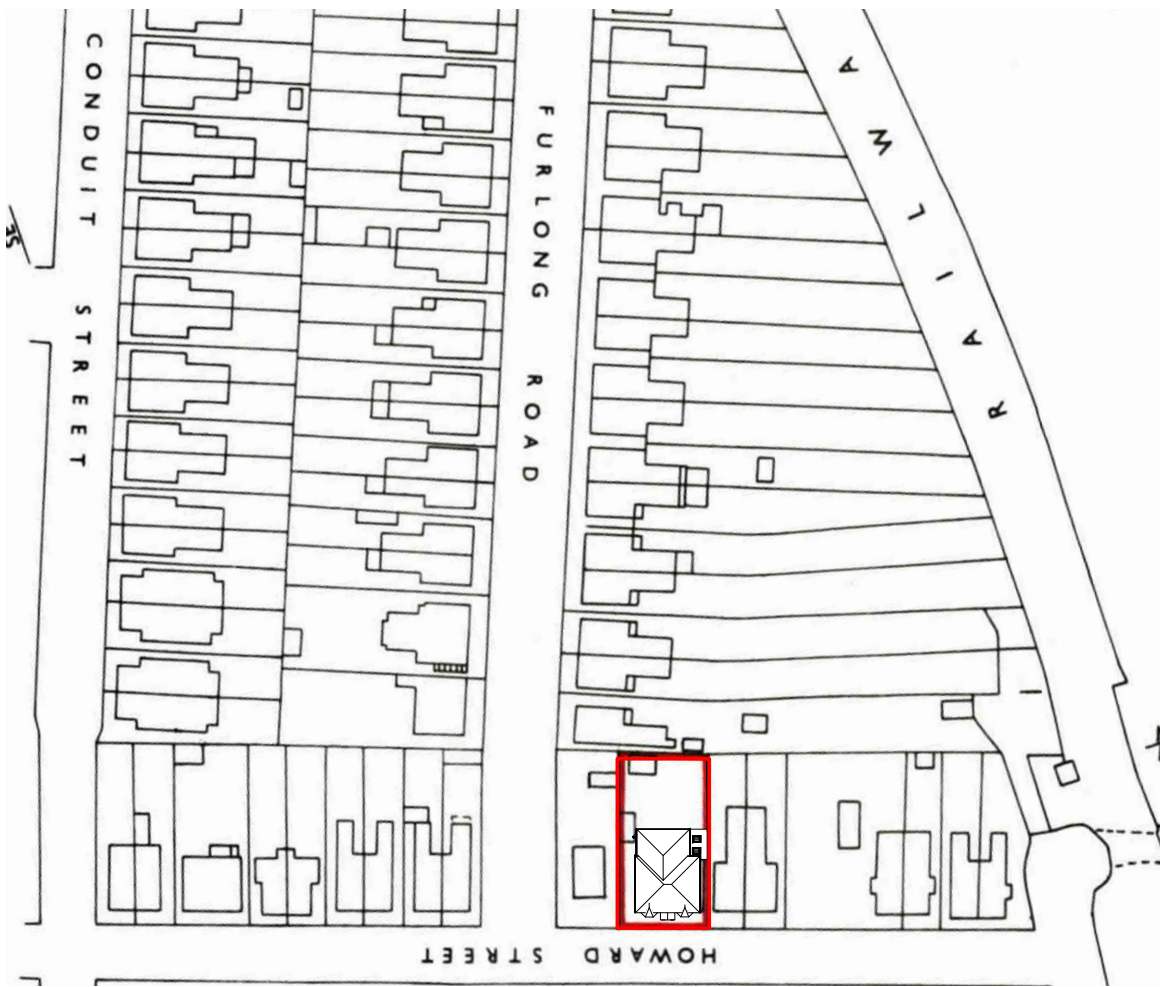


BLOCK PLAN 1:500

EXISTING SITE/BLOCK PLAN

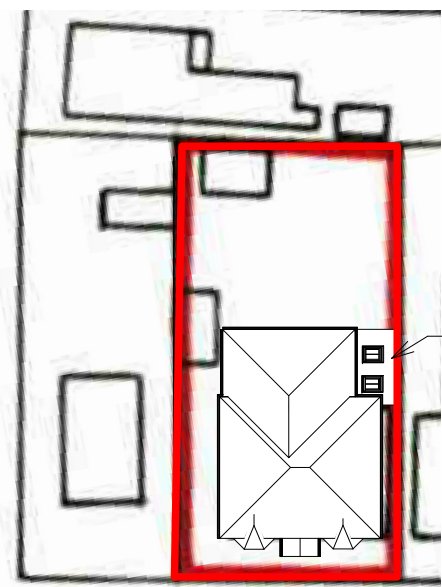


Project: 18 Howard Street
 Client: Mrs Fatima Jaffer
 Drawing: Existing Site/Block Plan
 Drawn By Lloyd Gordon
 Date: 05/03/2022
 Scale: 1:1250, 1:500@A3
 Revision: 0



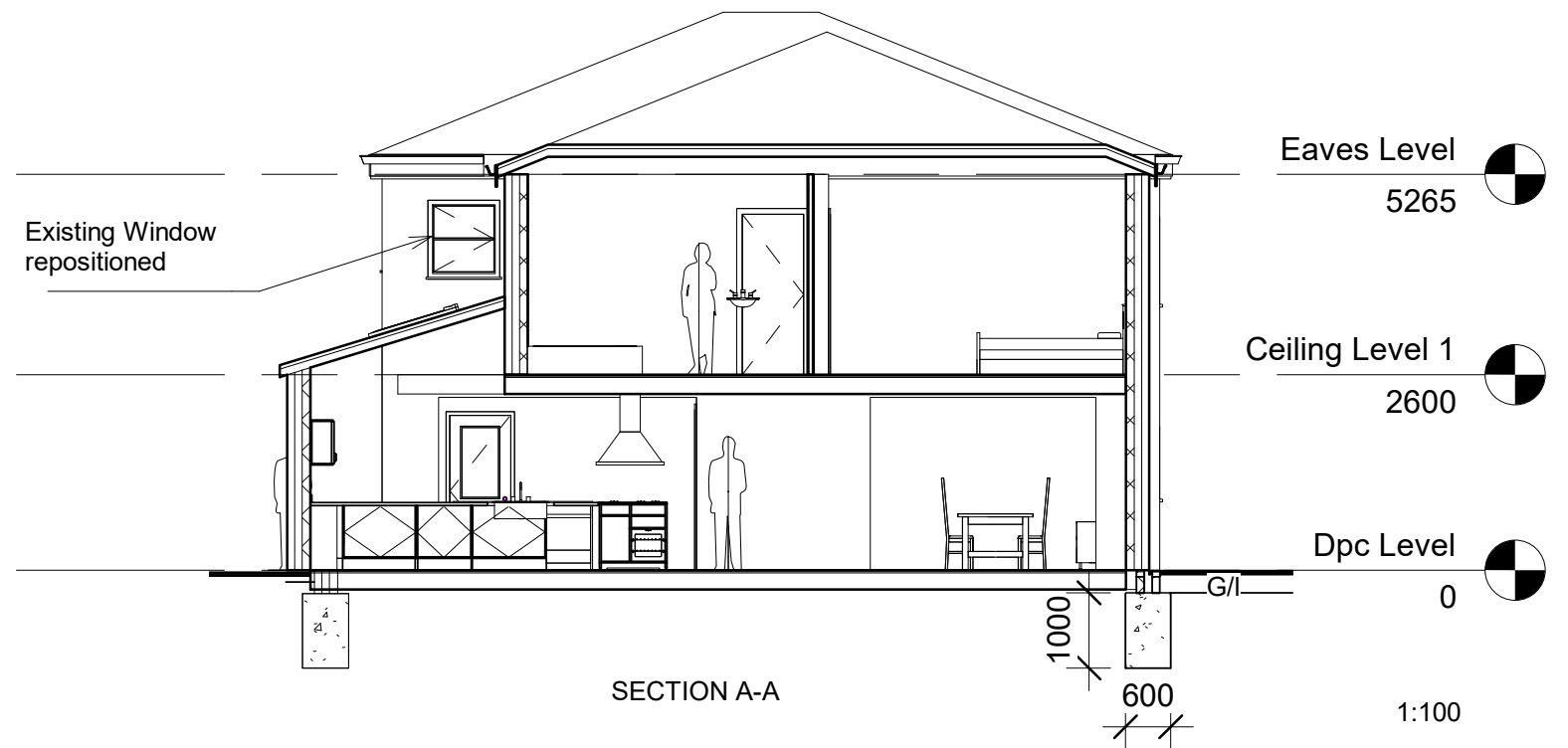
SITE PLAN

1:1250



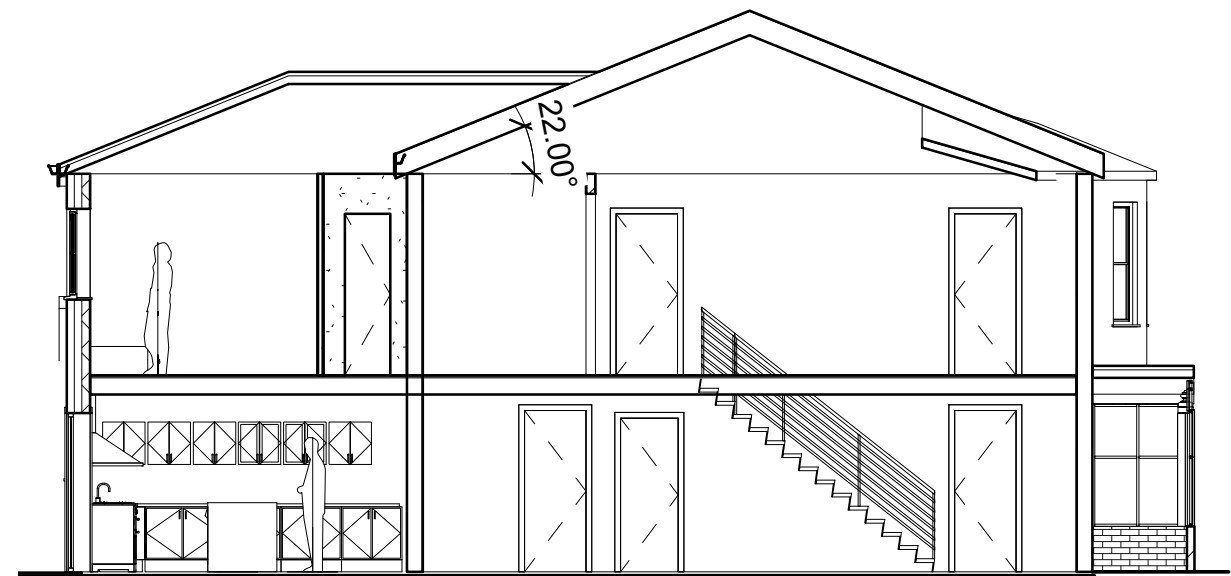
BLOCK PLAN

1:500



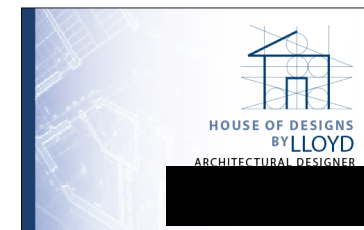
SECTION A-A

1:100



SECTION B-B

PROPOSED SITE/BLOCK PLAN



Project: 18 Howard Street
 Client: Mrs Fatima Jaffer
 Drawing: Proposed Site/Block Plan
 Drawn By Lloyd Gordon
 Date: 05/03/2022
 Scale: 1:1250, 1:500@A3
 Revision: 1

FloodSmart Plus



Flood Risk Assessment

Site Address

18 Howard Street
Gloucester
Gloucestershire
GL1 4UR

Date

2022-08-17

Report Status

FINAL

Site Area

0.04 ha

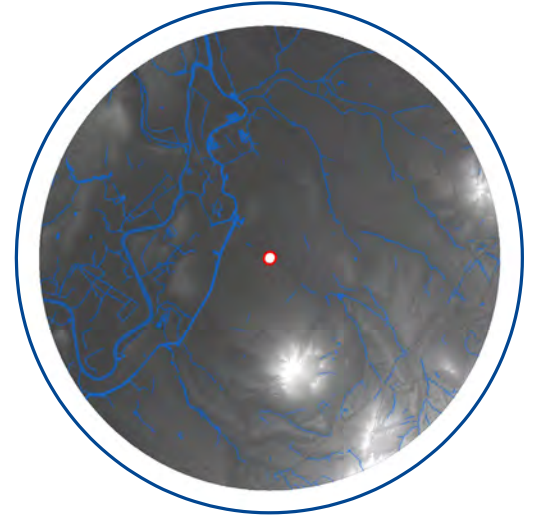
Report Reference

77417R1

Grid Reference

383435, 217497

Report Prepared for



RISK - Very Low to Medium

The Site is located within a fluvial and tidal Flood Zone 3 (high probability), but benefits from the presence of flood defences. Taking into consideration the presence of defences, the risk of flooding from rivers and sea is classed as Very Low to Medium. The Site is at a Low to Medium risk of pluvial flooding and a Low risk of groundwater flooding.

Report Author

Consultant

Report Checker

Associate

Report Reviewer

Associate

GeoSmart Information Ltd
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Bellstone, Shrewsbury, SY1 1HU

www.geosmartinfo.co.uk



1. Executive summary



A review has been undertaken of national environmental data sets to assess the flood risk to the Site from all sources of flooding in accordance with the National Planning Policy Framework (NPPF) (2021) and National Planning Practice Guidance (NPPG) (2014). A site-specific flood risk assessment, to assess the flood risk to and from the development Site, is provided within this concise interpretative report written by an experienced GeoSmart consultant. Baseline flood risk and residual risks that remain after the flood risk management and mitigation measures are implemented are summarised in the table below.

Site analysis

Source of Flood Risk	Baseline	After Mitigation
River (fluvial) flooding	Very Low to Medium	Low
Sea (coastal/tidal) flooding	Low*	Very Low
Surface water (pluvial) flooding	Low to Medium	Low
Groundwater flooding	Low**	Low
Other flood risk factors present	Yes	N/A
Is any other further work recommended?	Yes	Yes (see below)

N/A = mitigation not required

*Whilst there is a Low risk of tidal flooding from the sea (associated with the River Severn), there remains a residual flood risk in the event of flood defence breach or overtopping.

**Whilst GeoSmart's groundwater flood risk mapping indicates that the Site is at Negligible risk from regional sources of flooding, following assessment of the local geology, the presence of a water course immediately adjacent to the Site and an existing basement at the property, the Site-specific flood risk is considered to be Low.

Summary of existing and proposed development

The Site is located at 18 Howard St, Gloucester, Gloucestershire, GL1 4UR in a setting of residential land use. It consists of a two storey detached dwelling including associated access, car parking, landscaping and a basement which is not currently used.

Development plans include the demolition of the existing conservatory and the extension of the ground floor and first floor to the rear of the property. The access will remain the same, however, there will be an alteration to the landscaping. There are no proposed development plans included for the existing basement.

Summary of flood risks

The flood risks from all sources have been assessed as part of this report and are as follows:

- According to the Environment Agency's (EA) Flood Map for Planning Purposes, the Site is located partially within fluvial and tidal Flood Zones 1, 2 and 3 (Low to High probability). Areas in the north and east of the Site are located in Flood Zone 3, with the centre of the Site in Flood Zone 2, and the south of the Site in Flood Zone 1. The proposed extension will be located within Flood Zones 2 and 3.
- It is noted that according to the interactive SFRA (Halcrow Group Limited, 2008) mapping, the north of the Site is in Flood Zone 3b, however, the area of the proposed extension is located within Flood Zone 3a.
- The Site benefits from the presence of flood defences on the Sud Brook and the River Severn.

Defences on the Sud Brook are approximately 100 m to the north west.

Defences on the River Severn are approximately 1.1 km to the north west.

- The Site is situated immediately adjacent to a culverted watercourse (the Sud Brook). Therefore, it could potentially be at risk from flooding due to blockage or failure of the culvert.
- According to the EA's Risk of Flooding from Rivers and Sea (RoFRS) map, which considers the type, condition and crest height of flood defences, the Site has a Low to Medium risk of flooding from Rivers and the Sea, with the proposed extension within the Medium risk area.
- Modelled flood data obtained from the EA have been analysed in line with the most up to date guidance on climate change (EA, 2016), to confirm a maximum "design" flood level at the Site.

During a 1 in 100 year plus 37% climate change allowance event the flood level at the Site would be 14.79 mAOD.

- Ground levels at the Site where node point 2D 01 is situated are between 14.52 mAOD and 14.95 mAOD.

- During this event, flood depths in the area proposed for development could be up to 0.27 m.
- Existing Finished Floor Levels (FFL) are set to 0.3 m above ground level, therefore, whilst the fluvial flood risk across the Site will vary, the proposed extension will likely not be impacted in this flooding scenario.

During a 1 in 1000 year flood event the flood level at the Site would be 14.85 mAOD.

- Flood depths across the Site would be up to 0.33 m.
- Given the existing and proposed FFLs, the flood depths at the existing dwelling and proposed extension would be very shallow (up to 0.03 m). There is therefore a low likelihood of flooding occurring, however, where FFLs cannot be raised in the extension area, alternative mitigation measures are recommended.

Emergency evacuation routes are available to the south and south east. In the event of a flood, safe refuge can be taken on the 1st floor levels and above.

- According to the EA's Risk of Flooding from Surface Water (pluvial) flood mapping, the Site is at a variable risk of pluvial flooding ranging from Low to Medium.
- Within the Medium risk scenario, an area of surface water flooding is predicted along the northern boundary, with anticipated depths up to 0.15 m. Within the Low risk scenario, pluvial flooding will occur on-Site, anticipated depths are between 0.6 m and 0.9 m. Built infrastructure may potentially be affected.

Groundwater Flood Risk screening data indicate that there is a Negligible risk of groundwater flooding at the surface in the vicinity of the Site during a 1 in 100 year event. However, following assessment of the local geology and the presence of a basement at the Site, the site-specific risk is considered to be Low.

- The risk of flooding from artificial (man-made) sources such as reservoirs, sewers and canals has been assessed:
 - The EA's Risk of Flooding from Reservoir map confirms that the Site is at risk of reservoir flooding.
 - Ordnance Survey (OS) data indicate that there are no canals near to the Site.
 - The Site is situated on or adjacent to a culverted watercourse (the Sud Brook).
 - A sewer flooding history search was undertaken using the Strategic Flood Risk Assessment (Halcrow Group Limited, 2008). This confirms no recorded incidences of sewer flooding at or within the vicinity of the Site.

A flood risk has been identified from reservoirs and the local culvert, although the level of risk could not be determined.

- The risk to the development has been assessed over its expected 100 year lifetime, including appropriate allowances for the impacts of climate change. More extreme weather events could increase the risk to the Site from increased potential for surface

water and river flooding. Site specific assessment indicates risk to the Site will increase and appropriate mitigation measures are proposed.

Recommendations / Next steps

Recommendations for mitigation are provided below, based upon the proposed development and the flood risk identified at the Site.

- As there is a risk of flooding from both fluvial and tidal sources, where 1 in 100 year flood depths could be up to 14.79 mAOD in the area proposed for development, Finished Floor Levels (FFL) of the proposed development should be set to a minimum of 15.09 mAOD¹. Standard flood resilient design measures should also be incorporated.

However, as FFLs of the existing property are 14.82 mAOD, it would be unrealistic to set FFLs of the proposed extension to 15.09 mAOD. Therefore, alternative mitigation has been considered in this report.

- Compensation for any reduction in floodplain storage and displacement of flood water (up to the 1 in 100 year event with allowance made for climate change) should be provided. Compensatory flood storage must be provided through a level for level, volume for volume approach and may require an area at the edge of the floodplain to provide storage.
- As there is a risk of flooding from surface water (pluvial) sources, where flood depths could be up to 0.9 m in a 'Low' risk scenario and up to 0.15 m in a 'Medium' risk scenario, mitigation measures identified for managing the river and sea flood risk will likely be suitable for the relatively shallow depths which could be experienced in a 1 in 100 year (Medium risk) flood event.
- Finished Floor Levels (FFL) of the proposed development should be set at least 0.3 m above surrounding ground levels and ground levels should aim to slope away from buildings.
- As there is a low risk of flooding from groundwater sources at the surface, the identified mitigation measures for river and sea flood risk are likely to be sufficient to manage the groundwater flood risk at the development.

Finished Floor Levels (FFL) of the proposed development should be set no lower than existing FFLs and ground levels should slope away from buildings. Risk to buried infrastructure should be considered along with water proofing of basement areas, standard flood resilient design and non-return valves on the sewer inlet. French drains and/or pumping systems may also be considered.

- Occupants of the Site should be signed up to receive EA Flood Alerts and Flood Warnings.

¹ 0.3 m above the 1 in 100 year plus climate change flood level of 14.75 mAOD.

- A Flood Warning and Evacuation Plan (FWEP) is recommended to ensure persons using the Site can evacuate safely on receipt of a Flood Warning.
- A Sustainable Drainage Strategy (SuDS) should be developed for the Site, for effective management of surface water runoff over the lifetime of the proposed development.

GeoSmart recommend the mitigation measures discussed within this report are considered as part of the proposed development where possible and evidence of this is provided to the Local Planning Authority as part of the planning application.

2. Introduction



Background and purpose

A site-specific flood risk assessment has been undertaken, to assess the flood risk to and from the development Site. This assessment has been undertaken by firstly compiling information concerning the Site and the surrounding area. The information gathered was then used to construct a 'conceptual site model', including an understanding of the appropriateness of the development as defined in the NPPF (2021) and the source(s) of any flood risk present. Finally, a preliminary assessment of the steps that can be taken to manage any flood risk to the development was undertaken.

This report has been prepared with reference to the NPPF (2021) and NPPG (2014).

"The National Planning Policy Framework set out the Government's planning policies for England and how these are expected to be applied" (NPPF, 2021).

The NPPF (2021) and NPPG (2014) promote a sequential, risk based approach to the location of development. This also applies to locating a development within a Site which has a variable risk of flooding.

"This general approach 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. The aim should be to keep development out of medium and high risk flood areas (Flood Zones 2 and 3) and other areas affected by other sources of flooding where possible" (NPPG, 2014).

The purpose of this report is to provide clear and pragmatic advice regarding the nature and potential significance of flood hazards which may be present at the Site.

Report scope

In accordance with the requirements set out within NPPG 2014 (Paragraph: 030 Reference ID: 7-030-20140306), a thorough review of a commercially available flood risk report and EA supplied data indicating potential sources of flood risk to the Site from rivers and coastal sources, surface run-off (pluvial), groundwater and reservoirs, including historical flood information and modelled flood extent. Appropriate measures are recommended to manage and mitigate the flood risk to the property.

Information obtained from the EA and a review of the Gloucestershire County Council Strategic Flood Risk Assessment (SFRA) (Halcrow Group Limited, 2008) is used to ascertain local flooding issues and, where appropriate, identify information to support a Sequential and/or Exception test required as part of the NPPF (2021).

The existing and future flood risks to and from the Site from all flood sources is assessed in line with current best practice using the best available data. The risk to the development has been assessed over its expected lifetime, including appropriate allowances for the impacts of climate change. Residual risks that remain after the flood risk management and mitigation

measures are implemented, are considered with an explanation of how these risks can be managed to keep the users of the development safe over its lifetime.

An indication of whether the Site will potentially increase flood risk elsewhere is provided, including where the proposed development increases the building footprint at the Site. A drainage strategy to control runoff can be commissioned separately if identified as a requirement within this report.

Report limitations

It is noted that the findings presented in this report are based on a desk study of information supplied by third parties. Whilst we assume that all information is representative of past and present conditions, we can offer no guarantee as to its validity and a proportionate programme of site investigations would be required to fully verify these findings.

The basemap used is the OS Street View 1:10,000 scale, however the Site boundary has been drawn using BlueSky aerial imagery to ensure the correct extent and proportion of the Site is analysed.

This report excludes consideration of potential hazards arising from any activities at the Site other than normal use and occupancy for the intended land uses. Hazards associated with any other activities have not been assessed and must be subject to a specific risk assessment by the parties responsible for those activities.

Datasets

The following table shows the sources of information that have been consulted as part of this report:

Table 1. Datasets consulted to obtain confirmation of sources of flooding and risk

Source of flooding	Datasets consulted			
	Commercial Flood Maps	Local Policy & Guidance Documents*	Environment Agency (Appendix B)	OS Data
Historical	X	X	X	
River (fluvial) / Sea (tidal/coastal)	X	X	X	

Source of flooding	Datasets consulted			
	Commercial Flood Maps	Local Policy & Guidance Documents*	Environment Agency (Appendix B)	OS Data
Surface water (pluvial)	X	X	X	
Groundwater	X	X		
Sewer		X		
Culvert/bridges		X		X
Reservoir		X	X	

*Local guidance and policy, referenced in Section 6, has been consulted to determine local flood conditions and requirements for flood mitigation measures.

3. Site analysis



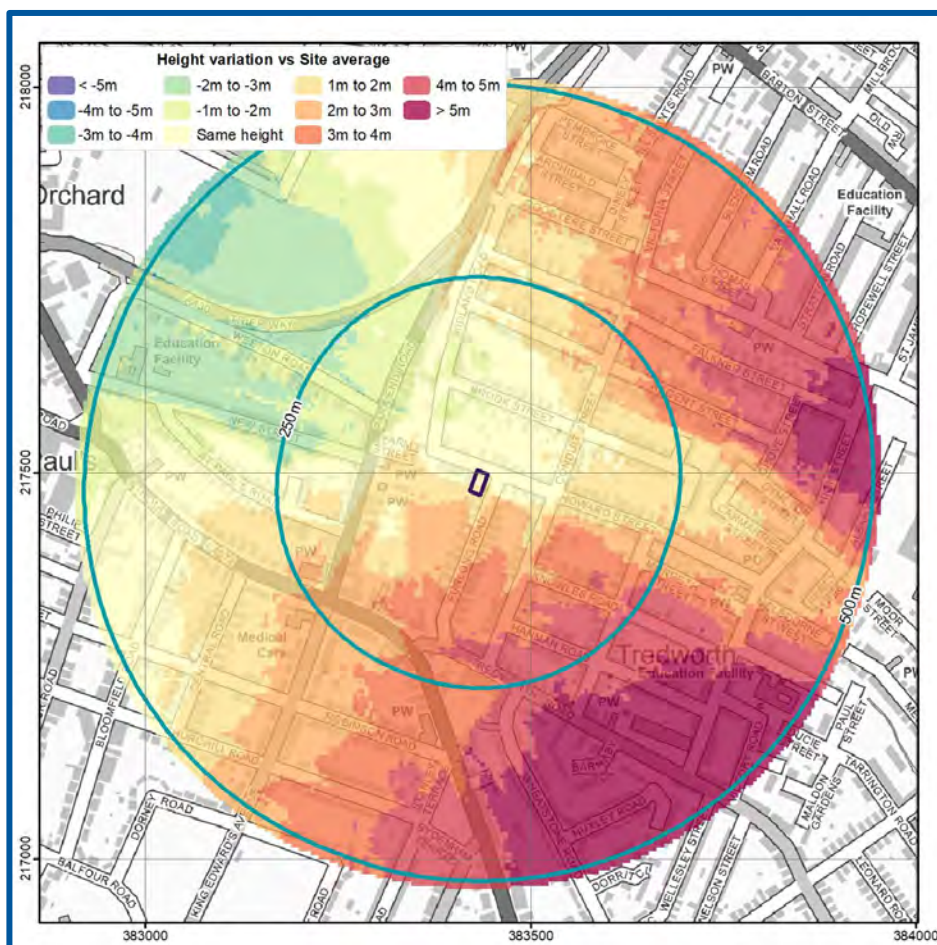
Site information

The Site is located at 18 Howard St, Gloucester, Gloucestershire, GL1 4UR in a setting of residential land use at National Grid Reference SO 83435 17497. Site plans and drawings are provided in Appendix A.

According to OS data, using a 500 m buffer around the Site, the area is on a gentle slope (Figure 1). It is noted that to the north land rises to c. 15.37 m above Ordnance Datum (AOD). To the west land falls to c. 13.84 mAOD, to the east land rises to c. 15.7 mAOD and to the south rises to c. 18.1 mAOD.

The general ground levels on the Site are between 14.52 mAOD and 14.95 mAOD with the Site remaining relatively level with some topographic low points towards the eastern boundary. This is based on EA elevation data obtained for the Site to a 1 m resolution with a vertical accuracy of ± 0.15 m (Appendix C).

Figure 1. Site Location and Relative Elevations (GeoSmart, 2022).



Contains Ordnance Survey data © Crown copyright and database right 2022

Development

The Site is currently used within a residential capacity as a two storey detached dwelling including associated access, car parking, landscaping and a basement which is currently not used.

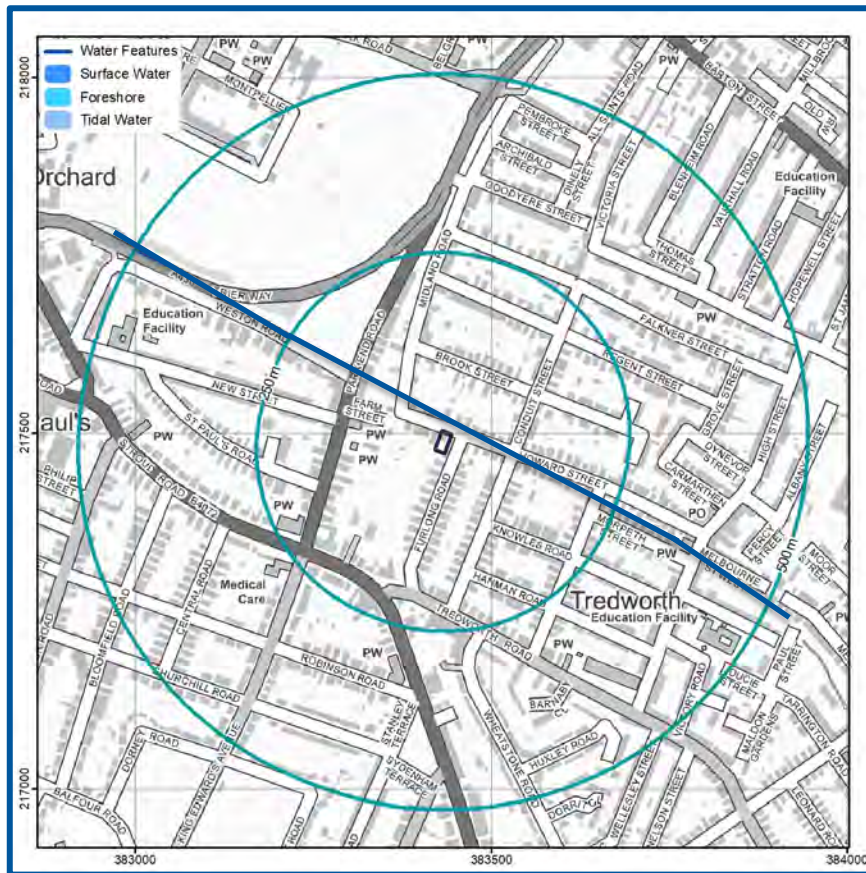
Development proposals comprise the demolition of the existing conservatory and the extension of the ground floor and first floor to the rear of the property. The Site access will remain the same, however, there will be an alteration to the landscaping. There are no proposed development plans included for the existing basement. Site plans are included within Appendix A.

The effect of the overall development will not result in an increase in number of occupants and/or users of the building and will not result in the change of use, nature or times of occupation. According to Table 2 of the NPPG (2014), the vulnerability classification of the existing development is More Vulnerable and proposed development is More Vulnerable. The estimated lifespan of the development is 100 years.

Hydrological features

According to Ordnance Survey (OS) mapping included in the following figure, a single surface water feature is located within 500 m of the Site.

Figure 2. Surface water features (EA, 2022)



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The Sud Brook may pass beneath or immediately adjacent to the Site flowing from east to west. It is noted that the EA's Flood Risk from Rivers and the Sea (RoFRS) mapping (Figure 8) shows that there is a High flood risk to the north of the Site, along Howard Street. Furthermore, according to the SFRA the Sud Brook is heavily culverted through most of the area (Halcrow Group Limited, 2008). Therefore, the exact location of the Sud Brook in relation to the Site is unclear and the positioning of the Sud Brook within Figure 2 is based on estimations from information in Figure 8 and google maps.

The Gloucester Docks are located approximately 955 m to the north west at a lower elevation than the Site.

The River Severn is approximately 1.1 km to the north west at a lower elevation than the Site.

Proximity to relevant infrastructure

There are flood defences located within 500 m of the Site. The nearest flood defences are located approximately 102 m to the north west of the Site on the Sud Brook.

There are flood defences located approximately 1.1 km to the north west of the Site on the Gloucester Docks.

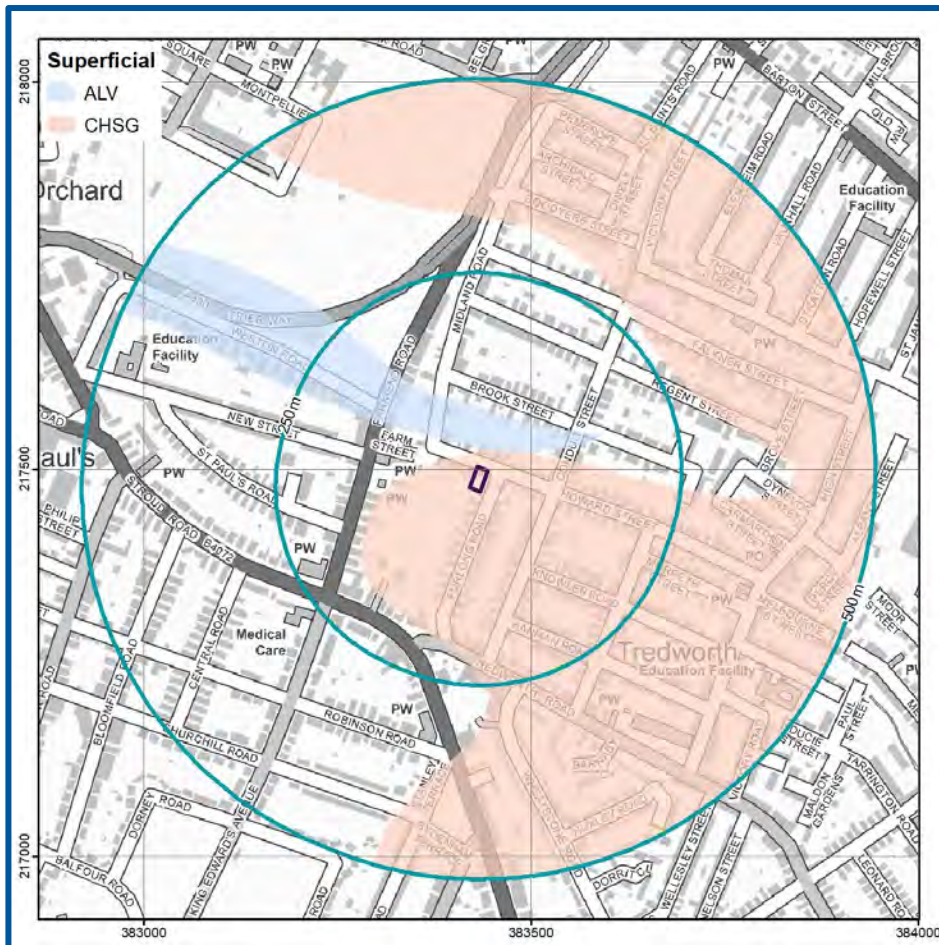
St Ann Way Bridge is located approximately 1 km to the west of the Site.

The bridge on Llanthony Road is located approximately 1 km to the north west of the Site.

Hydrogeological features

British Geological Survey (BGS) mapping indicates the underlying superficial geology (Figure 3) consists of Cheltenham Sand and Gravel (CHSG) (BGS, 2022) which is classified as a Secondary (A) Aquifer (EA, 2022). Alluvium (ALV) is also mapped to the north in close proximity of the Site.

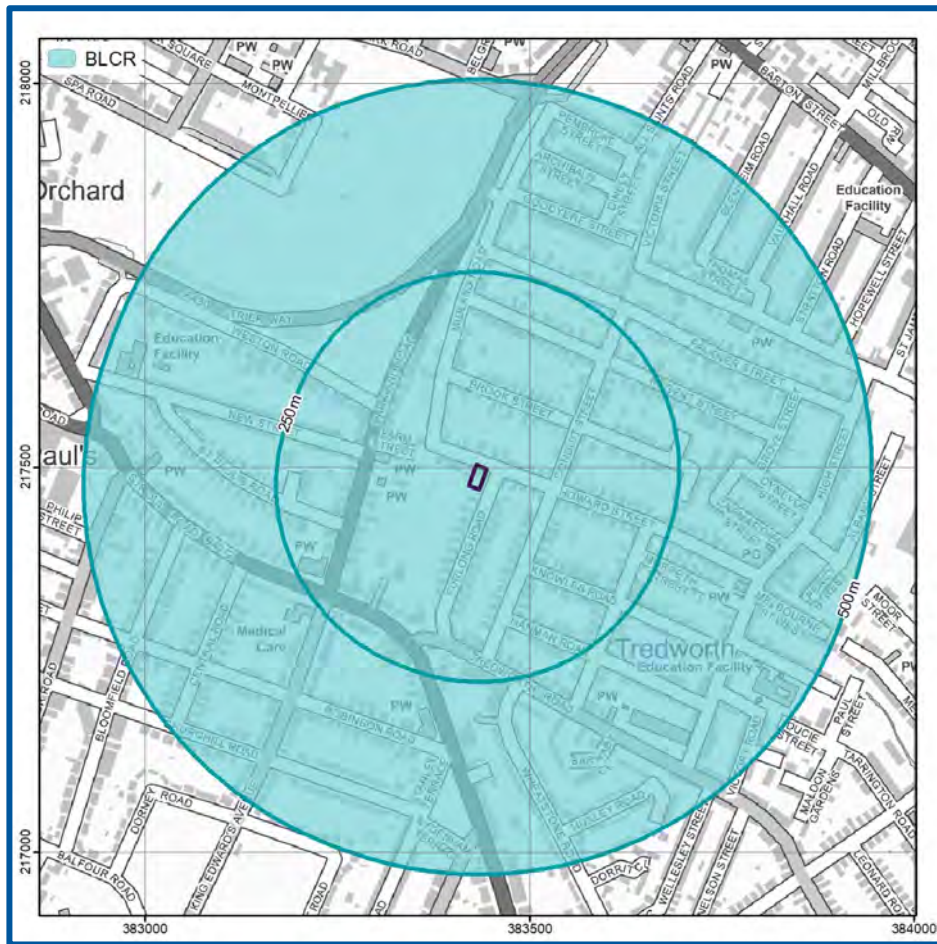
Figure 3. Superficial Geology (BGS, 2022)



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BGS mapping indicates the underlying bedrock geology (Figure 4) consists of the Blue Lias Formation and Charmouth Mudstone Formation (undifferentiated) (BLCR) (BGS, 2022) which is classified as a Secondary Undifferentiated Aquifer (EA, 2022).

Figure 4. Bedrock Geology (BGS, 2022)



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The Site does not lie within a groundwater Source Protection Zone (SPZ) (EA, 2022).

A review of the BGS borehole database (BGS, 2022) indicates the nearest and most relevant boreholes are as follows:

- There is a borehole (ref: SO81NW31) approximately 777 m to the east of the Site boundary at an elevation of approximately 20.8 mAOD; this record indicates a 3.4 m thickness of coarse sand and gravel overlying 4.8 m of clay and sand. Groundwater levels were not recorded.
- There is a borehole (ref: SO81NW30) approximately 695 m to the north east of the Site at an elevation of approximately 20 mAOD; this indicates a 0.7 m thickness of topsoil, 0.3 m of sandy clay, 2.7 m of coarse-grained sand and gravel, overlying 5.3 m of clay and sand. Groundwater levels were not recorded.
- There is a borehole (ref: SO81NW116) approximately 701 m to the north of the Site at an elevation of approximately 16 mAOD. The borehole records little water ingress and standing water levels at 2.9 m below ground level.

It should be noted that while these boreholes were taken from the same superficial geology as the Site, they are a significant distance from the Site and therefore information regarding groundwater levels may not be as accurate. However, it is still useful to consider these within the report.

The hydrogeological characteristics suggest there is potential for a groundwater table beneath the Site. Groundwater levels may rise in the bedrock and superficial aquifers in response to high river and tidal events and/or in prolonged rainfall recharge which may cause an unusually high peak in groundwater levels during some years, subject to hydraulic continuity between the driving water level, the groundwater system and the Site.

Spring lines could give rise to groundwater seepage and overland flow through the Site. A spring line has not been identified in the vicinity of the Site. However, the contact between Cheltenham Sand and Gravel and Alluvium deposits is located immediately adjacent to the north of the Site. The presence of a spring line would depend on local differences in elevation and hydraulic conductivity.

4. Flood risk to the development



Historical flood events

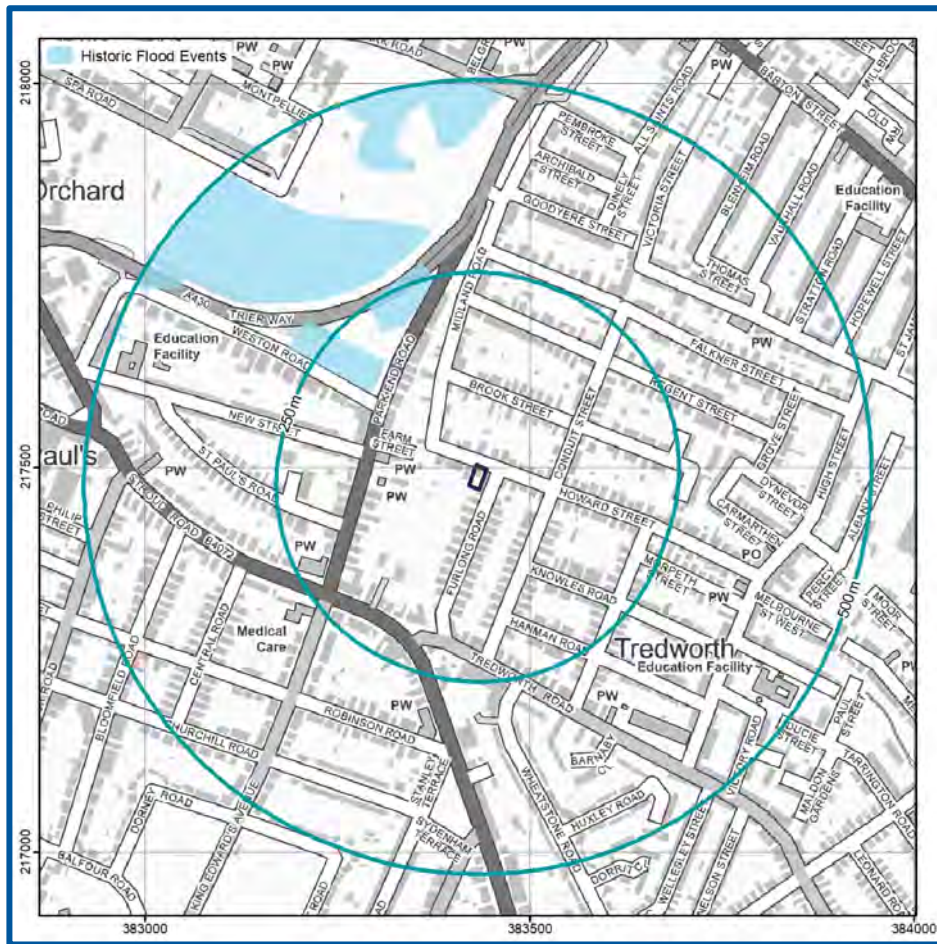
According to the EA's historical flood map (Figure 5) no historical flood events have been recorded at the Site. However, there are recorded historical flood events within 500 m of the Site, with the closest recorded historical flood events occurring approximately 170 m to the north west of the Site (EA, 2022). According to the SFRA, this flooding occurred in July 1968 and affected many areas, including the Spa Fields adjacent to the Sub Brook, which is in close proximity to the Site.

According to the SFRA, there have been no records of historical flooding at the Site. However, the SFRA highlights that extensive areas in Gloucester have flooded historically (Halcrow Group Limited, 2008).

Furthermore, according to the SFRA, there were widespread floods in 1981, 2000 and 2007 (Halcrow Group Limited, 2008). Specific information on which properties were affected by these flooding events has not been provided, therefore it is difficult to assess whether the Site was affected in any of these flood events. However, as Figure 5 shows that flooding has occurred within 200 m of the Site, it should be considered that properties on Howard street, including the Site, may have possibly been affected by historical flooding.

The purpose of historical flood data is to provide information on where and why flooding may have occurred in the past. The absence of any recorded events does not mean flooding has never occurred on-Site or that flooding will never occur at the Site.

Figure 5. EA historical flood map (EA, 2022)



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Rivers (fluvial) / Sea (coastal/tidal) flooding

The predominant risk at the Site is fluvial and tidal flooding from the River Sever and fluvial flooding from the Sud Brook.

Parts of urban areas of Gloucester are at risk of flooding from the River Sever, however, tidal events in Gloucester are rarer, and therefore the risk of flooding from the River Sever is residual. The predominant risk of flooding to the Site is from the culverted Sud Brook, which is located in very close proximity to the Site and affects larger areas of Gloucester (EA, 2015).

The flood risk from the River Sever is reduced by the presence of defences, therefore, the risk is Low but there is a residual risk in case of a breach.

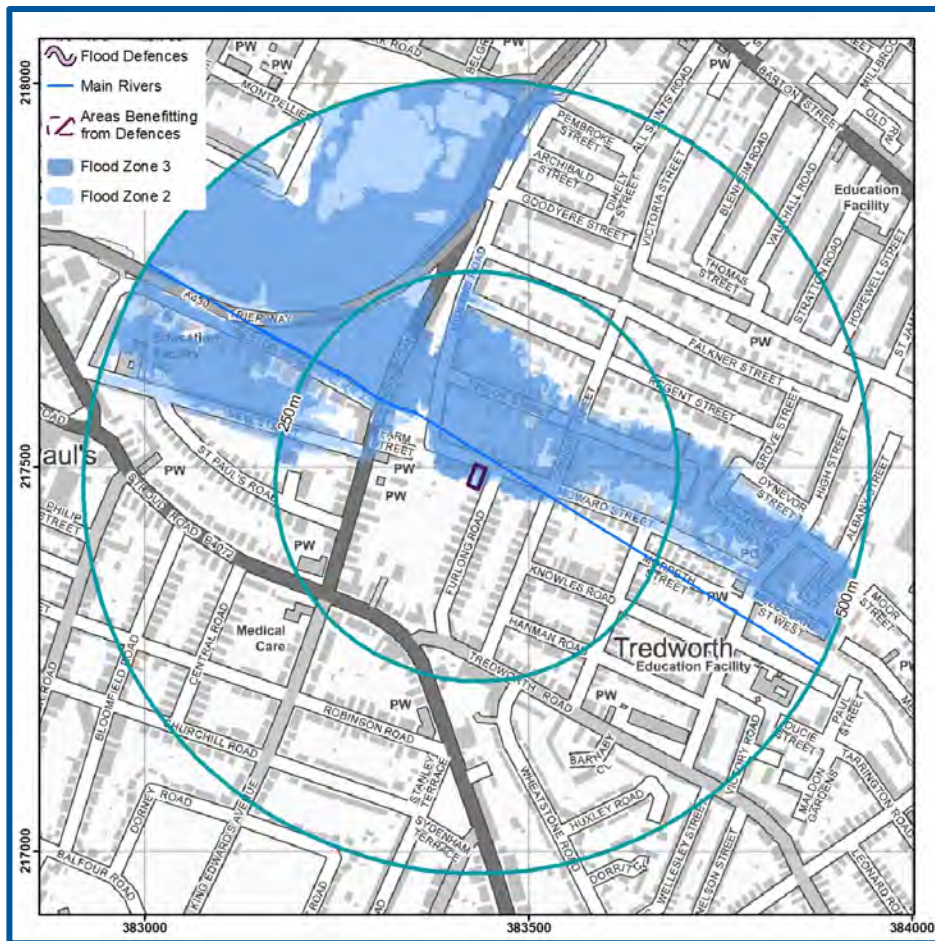
According to the EA's Flood Map for Planning Purposes (Figure 6), the Site is located within fluvial and tidal Flood Zone 1, Flood Zone 2 and Flood Zone 3 and is therefore classified as having a Low to High probability of fluvial and tidal (coastal) flooding from the River Sever and the Sea.

- Approximately 40% of the Site in the north and east is situated in Flood Zone 3.

- Approximately 95% of the Site is situated in Flood Zone 2.
- A very small area towards the southern boundary of the Site is situated in Flood Zone 1 (approximately up to 5%)

It is noted that according to the interactive SFRA mapping (Appendix D; Halcrow Group Limited, 2008), the north of the Site is in Flood Zone 3b, however, the area of the proposed extension is not located within Flood Zone 3b.

Figure 6. EA Flood Map for Planning Purposes (EA, 2022)



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As defined in the NPPF (2021):

Ignoring the presence of any defences, land located in a Flood Zone 1 is considered to have a Low probability of flooding, with less than a 1 in 1000 annual probability of fluvial or coastal flooding in any one year.

Ignoring the presence of any defences, land located in a Flood Zone 2 is considered to have a Medium probability of flooding, with between a 1 in 100 and 1 in 1000 annual probability of fluvial flooding or between a 1 in 200 and 1 in 1000 annual probability of coastal flooding in any one year.

Ignoring the presence of any defences, land located in a Flood Zone 3 is considered to have High probability of flooding with a 1 in 100 year or greater annual probability of fluvial flooding or a 1 in 200 or greater annual probability of coastal flooding in any one year.

Development of all uses of land is appropriate in this zone (see glossary for terminology).

Flood defences

Sites that are located close to flood defences are likely to be zones where rapid inundation will occur in the event of the flood defences being overtopped or breached. A Site located close to flood defences (within 250 m) may require a more detailed FRA subject to local topography.

- The Site is in an area which benefits from flood defences.

Flood defences located on the Sud Brook are located approximately 102 m to the north west of the Site and are comprised of natural high ground.

Flood defences on the River Severn are located approximately 1.1 km to the north west of the Site and are comprised of engineered high ground.

- There are no proposed flood defences within 500 m of the Site.

Model data

As the Site is located within the EA's fluvial floodplain, modelled flood elevation data were obtained from the EA. These data are more up to date than that which is included in the Gloucestershire County Council SFRA (Halcrow Group Limited, 2008) and have been used to assess flood risk and to provide recommendations for mitigation for the proposed development.

Defended modelled flood data from the Sud Brook Modelling Study (EA, 2022) have been taken from the 2D node point located on-Site and have been used to assess flood risk². The data are provided in the table below and also within Appendix B.

Modelled flood levels were taken from node point 2D 01 which is located on-Site. Ground levels on the Site vary between 14.52 mAOD and 14.95 mAOD.

Table 2. EA modelled flood level data

Ground levels at the Site (mAOD)	Modelled Flood Levels (mAOD) and depths (m)			
	1 in 20 year	1 in 100 year	1 in 100 year plus 20% CC	1 in 1000 year
14.52 to 14.95	–	14.72	14.75	14.85
Flood depths (m)	No Flooding	Up to 0.20	Up to 0.23	Up to 0.33
Finished Floor Levels (FFL) of 14.82	No Flooding	No Flooding	No Flooding	Up to 0.03

As the proposed development includes an extension to the existing dwelling, the area at potential flood risk will be increased. The topography of the Site where the proposed extension will be located varies, with ground levels ranging between 14.52 mAOD and 14.8 mAOD. At present, the Finished Floor Levels (FFL) are 0.3 m above ground level, which is approximately 14.82.

- Table 2 confirms that the Site would likely be affected by flooding in a 1 in 1000 (0.1%) flood event. Considering the FFLs of the property, which are estimated to be set at

² The accuracy of the modelled flood levels are not known. These are dependent on the accuracy of input datasets such as LiDAR data, used to model the impacts of flooding within the 2D domain. Confirmation of the accuracy of the modelled flood data can be obtained separately from the Environment Agency.

14.82 mAOD, flooding at the property would be at very shallow depths (up to 0.03 m). Other areas of the Site, particularly the rear garden, would be affected by flooding in this flood event. Note: the rear of the Site where the garden is situated is at an elevation of approximately 14.60 mAOD to 14.74 mAOD. As such, this area of the Site is potentially at risk from flooding during the various flooding scenarios shown in Table 2.

- Finished Floor Levels are set above the flood depths in the 1 in 100 year flood event, therefore the dwelling will likely not be affected. The garden at the rear of the property is at risk of being affected by this flooding.
- There would be no flooding at the Site in the 1 in 20 year (5%) flood event.
- There is an unused basement in the existing dwelling with no plans for removal which needs consideration as it may be at a higher risk of flooding and associated mitigation may be required.

Flooding from the River Severn

According to the EA (2015), parts of urban areas of Gloucester are at risk of flooding from the River Severn, however tidal events in Gloucester are rarer and therefore the risk from the River Severn is residual. According to the Joint Core Strategy (Gloucester City Council, 2017), the risk of flooding from the River Severn is lower than from smaller river catchments due to the presence of defences. Much of the risk from the River Severn comes from the possibility of elevated levels in the Severn affecting high flows in smaller streams. Flooding from the River Severn can occur via the Sud Brook as a result of high tides, tidal surges and overtopping of defences (Halcrow Group Limited, 2008).

Figure 6 highlights areas in Flood Zones 2 and 3 at risk of flooding and Figure 7 highlights the extent of flooding from the River Severn and the Sud Brook. It can be inferred from Figure 7 that flooding directly from the River Severn occurs to the far west of the Site and that flooding from the River Severn is more likely to affect the Site through the Sud Brook when levels in the River Severn are elevated.

According to the SFRA, the effects of climate change will increase the flood risk in areas of Gloucester and flooding will likely be more frequent, though it is likely that the city will continue to be defended into the future which will mitigate future risk (Halcrow Group Limited, 2008). The tidal influence along the River Severn through Gloucester is significant, particularly the high spring tide, when a sudden increase in tidal water level downstream is funneled quickly and sometimes dramatically up the watercourse. Within the Severn Estuary, tidal levels can increase by up to 2 m during tidal surges. At present, wall defences are designed to accommodate a degree of wave overtopping. However, it is difficult to determine the effectiveness of these defences in relation to sea level rise, therefore it is possible that the Site and the proposed development may be impacted more severely by the River Severn in the future (Halcrow Group Limited, 2008).

It is therefore possible that the effects of climate change on sea level rise may increase the flood risk from the River Severn. So while the Sud Brook poses a higher risk to the Site at present, the effects of sea level rise on the River Severn may result in increased tidal flood risks in future.

Figure 7. EA Flood Map for Planning Purposes (EA, 2022)



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Climate change factors

The EA's *Flood risk assessments: climate change allowances* guidance (Published 19 February 2016 and updated 22 July 2020) has been used to inform a suitable increase in peak river flows for the proposed development.

The updated guidance confirms 'More Vulnerable' developments are required to undertake a Basic assessment approach.

As the Site is located within the Severn River Basin and the proposed development is classed as More Vulnerable, where the proposed lifespan is approximately 100 years, the Central (37%) allowance has been used to determine a suitable climate change factor to apply to river data.

Table 3. Flood levels plus climate change allowances

Node Point	1 in 100 year plus 37% allowance for climate change flood level (mAOD)
2D 01	14.79

Ground levels at the Site where node point 2D 01 is situated are between 14.52 mAOD and 14.95 mAOD. Areas of the existing property and the proposed extension may be at risk of flooding from a 1 in 100 year plus 37% climate change flood event. However, as existing FFLs are set to 0.3 m above ground level the extent of flooding would likely be less than indicated by the flood level shown in Table 3.

Flood risk including the benefit of defences

The type and condition of existing flood defences influence the 'actual' risk of fluvial flooding to the Site, albeit the long-term residual risk of flooding (ignoring the defences) should be considered when proposing new development.

According to the EA's Risk of Flooding from Rivers and the Sea (RoFRS) mapping (Figure 8), which considers the crest height, standard of protection and condition of defences, the flood risk from Rivers and the Sea is Very Low to Medium. The highest risk comes from the Sud Brook, which according to Figure 2 and Figure 8 is situated immediately north of the Site, and has been identified as having a High flood risk.

The proposed extension is situated within the Medium risk area.

Figure 8. Risk of Flooding from Rivers and Sea map (EA, 2022)



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Surface water (pluvial) flooding

Surface water flooding occurs when intense rainfall exceeds the infiltration capacity of the ground and overwhelms the drainage systems. It can occur in most locations even at higher elevations and at significant distances from river and coastal floodplains.

- According to the EA's Risk of Flooding from Surface Water (pluvial) flood mapping, the Site has a variable risk of pluvial flooding, ranging from Low to Medium.

Guidance

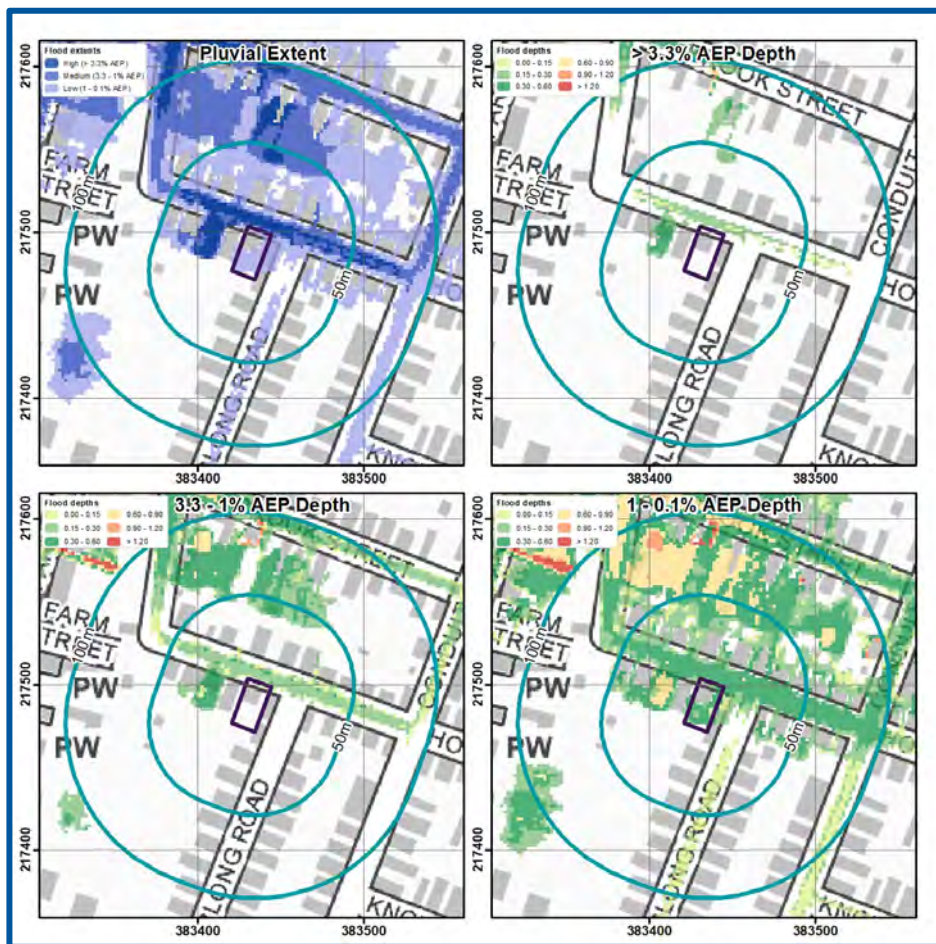
According to EA's surface water flood risk map the Site is at:

- Low risk - chance of flooding of between a 1 in 1000 & 1 in 100 (0.1% and 1%).
- Medium risk - chance of flooding of between a 1 in 100 and 1 in 30 (1% and 3.3%).

Figure 9 confirms the extent and depth of flooding during all risk scenarios. The pluvial flood risks are summarised as follows:

- Within the Low risk scenario, pluvial flooding will occur on-Site and anticipated depths are between 0.6 m and 0.9 m. Built infrastructure and associated landscaping will likely to be affected, including the proposed extension to the rear of the property. However, a small area to the north western boundary of the Site will likely not be affected.
- Within the Medium risk scenario, pluvial flooding will be contained within Howard Street, anticipated depths are up to 0.3 m. However, an area of surface water flooding is predicted along the northern boundary, with anticipated depths up to 0.15 m. Therefore, water levels may encroach onto the front end of the dwelling.
- Within the High risk scenario, pluvial flooding will be contained within Howard Street and anticipated depths are up to 0.3 m.

Figure 9. EA Medium surface water flood risk map (EA, 2022)



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According to EA's surface water flood risk map the following advisory guidance applies to the Site:

Flood Depth

- 0.15 to 0.3 m - Flooding would: typically exceed kerb height, likely exceed the level of a damp-proof course, cause property flooding in some areas
- 0.3 to 0.9 m - Flooding is likely to exceed average property threshold levels and cause internal flooding. Resilience measures are typically effective up to a water depth of 0.6 m above floor level.

Analysis of OS mapping, ground elevation data and the EA's pluvial flow route mapping in the 1 in 1000 year event confirms the Site is located on a potential overland flow route during a Low risk scenario.

- During this event the majority of flow velocities are less than 0.25 m/s. The flows could potentially affect the rear of the Site and parts of the property.
- Water may flow onto the Site from adjacent land to the south west and to the north east and should be managed, in addition to run-off generated on-Site.
- The Site may potentially transmit overland flows off-Site in a north west direction.

Analysis of OS mapping, ground elevation data and the EA's pluvial flow route mapping in the 1 in 100 year event confirms the Site is located on a potential overland flow route during a Medium risk scenario.

- During this event the majority of flow velocities are less than 0.25 m/s. The flows could potentially affect the front of the property at the north of the Site.
- Water may flow onto the Site from adjacent land to the north east and should be managed, in addition to run-off generated on-Site.

The Site is susceptible to overland flow and/or surface water flooding which may be increased as a result of climate change.

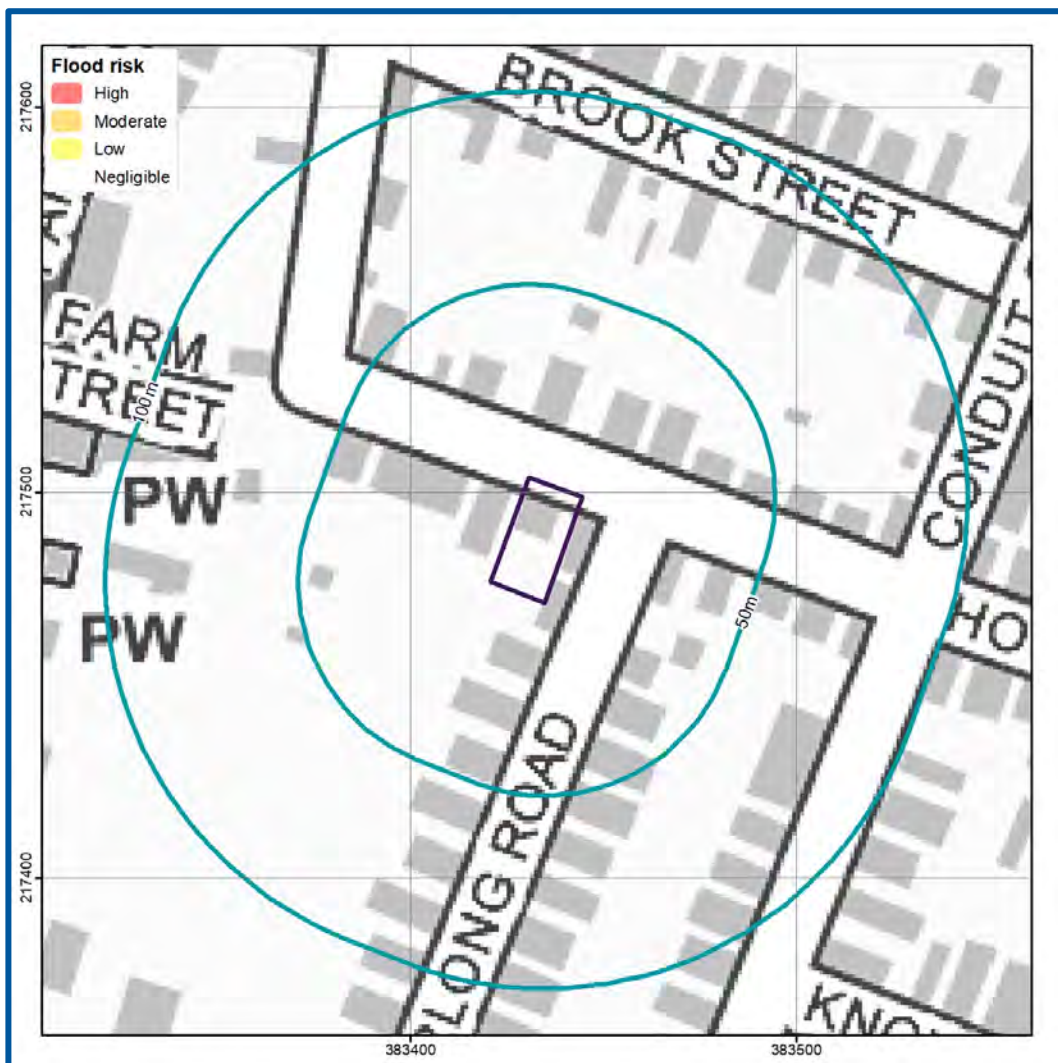
On-Site surface water drainage systems should be designed appropriately to manage the run-off.

Groundwater flooding

Groundwater flooding occurs when sub-surface water emerges from the ground at the surface or into Made Ground and structures. This may be as a result of persistent rainfall that recharges aquifers until they are full; or may be as a result of high river levels, or tides, driving water through near-surface deposits. Flooding may last a long time compared to surface water flooding, from weeks to months. Hence the amount of damage that is caused to property may be substantially higher.

Groundwater Flood Risk screening data (Figure 10) indicates there is a Negligible risk of groundwater flooding at surface in the vicinity from permeable bedrock and superficial deposits during a 1 in 100 year event.

Figure 10. GeoSmart GW5 Groundwater Flood Risk Map (GeoSmart, 2022)



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Mapped classes combine likelihood, possible severity and the uncertainty associated with predicting the subsurface system. The map is a national scale screening tool to prompt site-

specific assessment where the impact of groundwater flooding would have significant adverse consequences. Mapping limitations and a number of local factors may reduce groundwater flood risk to land and property even where it lies within mapped groundwater flood risk zones, which do not mean that groundwater floods will occur across the whole of the risk area

The SFRA does not indicate reported incidents of historical groundwater flooding in specific areas of Gloucester City Council (Halcrow Group Limited, 2008). This is due to limited data for the Gloucester City Council area. However, it states that low lying areas underlain by permeable rocks (aquifers) are at risk of groundwater flooding.

A site-specific assessment has been undertaken to refine the groundwater risk screening information on the basis of site-specific datasets (see Section 3) including BGS borehole data, and the EA's fluvial and tidal floodplain data (where available) to develop a conceptual groundwater model. The risk rating is refined further using the vulnerability of receptors including occupants and the existing and proposed Site layout, including the presence of basements and buried infrastructure. The presence of any nearby or on-Site surface water features such as drainage ditches, which could intercept groundwater have also been considered.

Based on a review of (limited) site specific data groundwater levels may rise in the bedrock and superficial aquifers in response to high river and prolonged rainfall recharge events.

- The underlying superficial geology consists of Cheltenham Sand and Gravel (CHSG) which is classified as a Secondary (A) Aquifer.
- The underlying bedrock geology consists of the Blue Lias Formation And Charmouth Mudstone Formation (undifferentiated) (BLCR) which is classified as a Secondary Undifferentiated Aquifer.

The Sud Brook runs potentially beneath or immediately adjacent to the Site (the available mapping does not give a clear indication), therefore it is possible that the groundwater level and the river level may be in continuity with one another. Therefore, in times of fluvial flooding, there is increased potential for groundwater flooding to occur as well.

- The Site is approximately 20 m away from the contact between Cheltenham Sand and Gravel and the Blue Lias Formation and Charmouth Mudstone Formation, which could represent a potential spring line.
- Areas of surface water flooding identified on the Site may be exacerbated by groundwater flooding.

Site specific assessment suggests that groundwater levels could potentially reach the surface and appropriate mitigation would be required. Therefore, the revised groundwater flood risk to the development is considered to be Low.

The risks are higher for basements, buried infrastructure and soak-away systems which may be affected by high groundwater levels.

Low Risk - There will be a remote possibility that incidence of groundwater flooding could lead to damage to property or harm to other sensitive receptors at, or near, this location.

Climate change predictions suggest an increase in the frequency and intensity of extremes in groundwater levels. Rainfall recharge patterns will vary regionally resulting in changes to average groundwater levels. A rise in peak river levels will lead to a response of increased groundwater levels in adjacent aquifers subject to the predicted climate change increases in peak river level for the local catchment. Sea level rises of between 0.4m and 1m are predicted by 2100, leading to a rise in average groundwater levels in the adjacent coastal aquifer systems, and potential increases in water levels in the associated drainage systems. The 'backing up' of groundwater levels from both coast and tidal estuary locations may extend a significant distance inland and affect infrastructure previously constructed above average groundwater levels.

The impact of climate change on groundwater levels beneath the Site is linked to the predicted risk in both peak river levels and sea levels and also the variation in rainfall recharge which is uncertain.

Based on the available evidence the resulting increase to groundwater flood risk will be mitigated by the proposed measures.

Flooding from artificial sources

Artificial sources of flood risk include waterbodies or watercourses that have been amended by means of human intervention rather than natural processes. Examples include reservoirs (and associated water supply infrastructure), docks, sewers and canals. The flooding mechanism associated with flood risk from artificial sources is primarily related to breach or failure of structures (reservoir, lake, sewer, canal, flood storage areas, etc.).

Sewer flooding

According to Table 4.5 of the SFRA, 36 properties have been flooded as a result of surcharging sewers within the GL1 4 postcode and it states that properties in this postcode are at a High risk of sewer flooding. However, it is recognised that this four digit postcode covers a large area and instances of flooding are not specific to the Site (Halcrow Group Limited, 2008).

The SFRA does not state that the area surrounding the Site is at risk from sewer flooding (Halcrow Group Limited, 2008). The local water company did not respond within the timeframe of this report.

Properties classified as “at risk” are those that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system either once or twice in the ten year reference period. Records held by the sewage utility company provide information relating to reported incidents, the absence of any records does not mean that the Site is not at risk of flooding.

Canal failure

According to Ordnance Survey (OS) mapping, there are no canals within 500 m of the Site.

Water supply infrastructure

Water supply infrastructure is comprised of a piped network to distribute water to private houses or industrial, commercial or institution establishments and other usage points. In urban areas, this represents a particular risk of flooding due to the large amount of water supply infrastructure, its condition and the density of buildings. The risks of flooding to properties from burst water mains cannot be readily assessed.

If more information regarding the condition and history of the water supply infrastructure within the vicinity of the Site is required, then it is advisable to contact the local water supplier, Severn Trent.

Culverts and bridges

The blockage of watercourses or structures by debris (that is, any material moved by a flowing stream including vegetation, sediment and man-made materials or refuse) reduces flow capacity and raises water levels, potentially increasing the risk of flooding. High water levels can cause saturation, seepage and percolation leading to failure of earth embankments or other structures. Debris accumulations can change flow patterns, leading to scour, sedimentation or structural failure.

Culverts and bridges have been identified within 500 m of the Site.

The Sud Brook, which is heavily culverted, has been identified immediately adjacent to the Site. The Site could potentially be affected by flooding as a result of blockage within the culverted water course. Further assessment of local elevation data indicates the Site is potentially at risk from the Sud Brook. An additional assessment is therefore recommended.

The SFRA has identified historical drainage issues within the Site area. It states that eighteen postcode areas within the Gloucester City administrative area are identified as having properties at risk of flooding from artificial drainage systems and surface water runoff. It is recognised, however, that this covers a large area of the city and therefore it cannot be confirmed that the Site is included in this. (Halcrow Group Limited, 2008).

Reservoir flooding

According to the EA's Risk of Flooding from Reservoir mapping the Site is at risk of flooding from reservoirs (Figure 11) (EA, 2022).

The Site is considered to be at risk of flooding from the Saintbridge Balancing Pond No.1 and No.2 Reservoirs, located c. 1.85 km southeast of the Site.

Figure 11. EA Risk of Reservoir Flooding (EA, 2022)



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Guidance

The risk of reservoir flooding is related to the failure of a large reservoir (holding over 25,000 m³ of water) and is based on the worst-case scenario. Reservoir flooding is extremely unlikely to occur (EA, 2022).

5. Flood risk from the development



Floodplain storage

The development is located within a fluvial Flood Zone, it would be impacted by the 1 in 100 year plus 37% climate change event and involves an increase in building footprint compensatory flood storage is therefore required for any loss in flood plain storage. Any losses in floodplain storage are likely to displace flooding and could potentially alter flood flow routes, increasing flood risk elsewhere.

Compensation for any reduction in floodplain storage and displacement of flood water (up to the 1 in 100 year event with allowance made for climate change) should be provided. Compensatory flood storage must be provided through a level for level, volume for volume approach and may require an area at the edge of the floodplain to provide storage.

Where this is not possible, the EA and Lead Local Flood Authority (LLFA) may accept voids, stilts or undercroft parking as options for flood plain storage compensation. These solutions should be discussed at an early stage and may require a management and maintenance plan, as they can become blocked over time leading to a gradual reduction in storage. More information is provided in the EA's *"Framework and Guidance for Assessing and Managing Flood Risk for New Development"* FD2320/TR2 publication (EA, 2005).

Scoping estimates of the storage requirements can be made by multiplying the increase in building footprint by the average flood depth at the development, during the 1 in 100 year flood event with a 37% allowance for climate change.

Drainage and run-off

The proposed development involves the demolition of the existing conservatory and in its place an extension at the rear of the existing dwelling and therefore, an increase of impermeable surfaces at the Site. An estimation of run-off is therefore required to permit effective Site water management and prevent any increase in flood risk to off-Site receptors from the Site.

The potential surface water run-off generated from the Site during a 1 in 100 year return period should be calculated, using FEH 2013 rainfall data from the online Flood Estimation Handbook (FEH), developed by NERC (2009) and CEH (2016).

The NPPF (2021) recommends the effects of climate change are incorporated into FRA's and the recently updated climate change guidance (published in 2016 and updated in 2021) confirms the requirements for inclusion within FRA's.

As the proposed development is residential, the lifespan of the development is 100 years and requirements for climate change should allow up to the 2070s scenario for the upper end allowance within the Severn Vale Management Catchment.

Table 4. Severn Vale Management Catchment peak rainfall allowances

Severn Vale Management Catchment	3.3% Annual exceedance rainfall event		1% Annual exceedance rainfall event	
	2050s	2070s	2050s	2070s
Central	20%	25%	25%	25%
Upper end	35%	35%	40%	40%

Sustainable Drainage System (SuDS)

It is recommended that attenuation of run-off is undertaken on-Site to compensate for proposed increases in impermeable surface areas. Attenuation may comprise the provision of storage within a Sustainable Drainage System (SuDS). SuDS can deliver benefits from improving the management of water quantity, water quality, biodiversity and amenity. Potential SuDS options are presented in the table below, subject to further investigation.

Table 5. SuDS features which may be feasible for the Site

Option	Description
Rainwater harvesting	Rainwater harvesting can collect run-off from the roofs for use in non-potable situations, using water butts for example.
Permeable paving	Permeable pavements can be used for driveways, footpaths and parking areas to increase the amount of permeable land cover. Suitable aggregate materials (angular gravels with suitable grading as per CIRIA, 2007) will improve water quality due to their filtration capacity. Plastic geocellular systems beneath these surfaces can increase the void space and therefore storage but do not allow filtration unless they are combined with aggregate material and/or permeable geotextiles.
Soakaways	An excavation filled with gravel within the Site. Surface water run-off is piped to the soakaway.

It is assumed that any changes to the existing drainage system will be undertaken in accordance with best practice and that care will be taken to ensure the new development does not overload/block any existing drainage or flow pathways to/from the Site.

6. Suitability of the proposed development



The information below outlines the suitability of proposed development in relation to national and local planning policy.

National policy and guidance

The aims of the national planning policies are achieved through application of the Sequential Test and in some cases the Exception Test.

Guidance

Sequential test: The aim of this test is to steer new development towards areas with the lowest risk of flooding (NPPF, 2021). Reasonably available sites located in Flood Zone 1 should be considered before those in Flood Zone 2 and only when there are no reasonably available sites in Flood Zones 1 and 2 should development in Flood Zone 3 be considered.

Exception test: In some cases, this may need to be applied once the Sequential Test has been considered. For the exception test to be passed it must be demonstrated that the development would provide wider sustainability benefits to the community that outweigh flood risk and a site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

Suitability of the proposed development, and whether the Sequential and Exception Tests are required, is based on the Flood Zone the Site is located within and the flood risk vulnerability classification of the existing and proposed development. Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

This report has been produced to assess all development types, prior to any development. The vulnerability classification and Flood Zones are compared within Table 6 overleaf (Table 3 of the NPPG (2014)).

As the Site is located within Flood Zone 3a and the proposed development is defined as More Vulnerable; the proposals are acceptable, but may be subject to the Sequential and Exceptions Test.

The proposed development is a small extension to the existing property which would extend the rear of the property to include a kitchen on the ground floor and an additional bedroom on the first floor, and is therefore defined as minor development.

Paragraph 168 of the NPPF states: *“Applications for some minor development should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments.”* (NPPF, 2021).

The NPPG (2014) defines a 'minor development' as "householder development and small non-residential extensions (with a footprint of less than 250 m²)."

As a result, as the proposals are defined as "minor development – householder development" they are not subject to the Sequential Test or an Exception Test.

Table 6. Flood risk vulnerability and flood zone 'compatibility (taken from NPPG, 2014)

Flood risk vulnerability classification		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood Zone	Zone 1 – low probability	✓	✓	✓	✓	✓
	Zone 2 – medium probability	✓	✓	Exception test required	✓	✓
	Zone 3a - high probability	Exception test required	✓	X	Exception test required*	✓
	Zone 3b – functional flood plain	Exception test required	✓	X	X	X

*As the development proposals are for a minor development the Sequential and Exception Tests are not required.

It should be noted that according to the SFRA's interactive mapping (Appendix D), part of the Site is situated in Flood Zone 3b. However, the area of the Site in this area consists of the front of the property and the rear of the property where the proposed development is situated falls into Flood Zone 3a.

EA Flood Risk Standing Advice for vulnerable developments located in Flood Zones 2 or 3

The proposed development is considered to be a minor extension, this is defined as a household or non-domestic extension with a floor space of no more than 250 m².

In line with the 'Minor extensions standing advice:

- A plan is required showing the finished floor levels and the estimated flood levels.
- Floor levels are either no lower than existing floor levels or 0.3 m above the estimated flood level. If your floor levels aren't going to be 0.3 m above existing flood levels, you need to check with your local planning authority if you also need to take flood resistance and resilience measures.

Surface water management

Plans for the management of surface water need to meet the requirements set out in either the local authority's:

- Surface water management plan where available; OR
- Strategic flood risk assessment.

They also need to meet the requirements of the approved building regulations Part H: drainage and water disposal. Read section H3 rainwater drainage.

Planning permission is required to use a material that can't absorb water (e.g. impermeable concrete) in a front garden larger than 5m².

Access and evacuation

Details of emergency escape plans should be provided for any parts of a building that are below the estimated flood level:

Plans should show:

- Single storey buildings or ground floors that don't have access to higher floors can access a space above the estimated flood level, e.g. higher ground nearby;
- Basement rooms have clear internal access to an upper level, e.g. a staircase;
- Occupants can leave the building if there's a flood and there's enough time for them to leave after flood warnings.

Floor levels

The following should be provided:

- Average ground level of the building; and
- Finished floor level of the lowest habitable room in the building.

Ground floor levels should be a minimum of whichever is higher of:

- 0.3 m above the general ground level of the Site; OR

- At least 0.6 m above the estimated river or sea flood level³.

If you cannot raise floor levels above the estimated flood level, you need to consider extra flood resistance and resilience measures.

Extra flood resistance and resilience measures

Follow the extra flood resistance and resilience requirements for developments in flood risk areas where ground floor levels are lower than the estimated flood level for the Site.

Water depth up to 0.3 m

The design of the building or development should keep water out as much as possible. You should use materials that have low permeability (materials that water cannot pass through, for example, impermeable concrete).

Water depth from 0.3 m to 0.6 m

The design of the building or development should keep water out (unless there are structural concerns) by:

- using materials with low permeability to at least 0.3 m;
- using flood resilient materials (for example lime plaster) and design (for example raised electrical sockets);
- making sure there's access to all spaces to enable drying and cleaning.

Water depth above 0.6 m

The design of the building or development should allow water to pass through the property to avoid structural damage by:

- using materials with low permeability to at least 0.3 m;
- making it easy for water to drain away after flooding;
- making sure there's access to all spaces to enable drying and cleaning.

Local policy and guidance

For this report, several documents have been consulted for local policy and guidance and relevant information is outlined below:

³ This is 0.6 m above the 1 in 100 year fluvial or 1 in 200 year tidal flood events. The 0.6 m is split into a 0.3 m freeboard allowance for climate change and 0.3 m allowance for the inaccuracies in the EA's flood modelling. Where the climate change flood level is known, a 0.3 m allowance should be added to the climate change flood level to allow for the inaccuracies in the EA's flood modelling.

Joint Core Strategy (Gloucester City Council, 2017):

- The majority of flood risk in Gloucester City arises from the smaller river catchments. The Joint Core Strategy sets out information regarding Policy INF2 on Flood Risk Management, which is as follows:
 1. Development proposals must avoid areas at risk of flooding, in accordance with a risk-based sequential approach. Proposals must not increase the level of risk to the safety of occupiers of a site, the local community or the wider environment either on the site or elsewhere. For sites of strategic scale, the cumulative impact of the proposed development on flood risk in relation to existing settlements, communities or allocated sites must be assessed and effectively mitigated
 2. Minimising the risk of flooding and providing resilience to flooding, taking into account climate change, will be achieved by: This policy contributes towards achieving Objective 6.
 - i. Requiring new development to, where possible, contribute to a reduction in existing flood risk;
 - ii. Applying a sequential test for assessment of applications for development giving priority to land in Flood Zone 1, and, if no suitable land can be found in Flood Zone 1, applying the exception test;
 - iii. Requiring new development that could cause or exacerbate flooding to be subject to a flood risk assessment which conforms to national policy and incorporates the latest available updates to modelling and climate change data and historic data and information and guidance contained in the authorities' Strategic Flood Risk Assessments and Supplementary Planning Documents, in order to demonstrate it will be safe, without increasing flood risk elsewhere;
 - iv. Requiring new development to incorporate suitable Sustainable Drainage Systems (SuDS) where appropriate in the view of the local authority to manage surface water drainage: to avoid any increase in discharge into the public sewer system; to ensure that flood risk is not increased on-site or elsewhere; and to protect the quality of the receiving watercourse and groundwater. Where possible, the authorities will promote the retrofitting of SuDS and encourage development proposals to reduce the overall flood risk through the design and layout of schemes which enhance natural forms of drainage. Developers will be required to fully fund such mitigation measures for the expected lifetime of the development including adequate provision for ongoing maintenance;
 - v. Working with key partners, including the Environment Agency and Gloucestershire County Council, to ensure that any risk of flooding from development proposals is appropriately mitigated and the natural environment is protected in all new development.

Gloucestershire County Council Strategic Flood Risk Assessment (Halcrow Group Limited, 2008):

- The majority of flood risk in the area arises from smaller catchments. While the Severn is capable of coming out of bank and flooding a large area, flood risk is reduced by the

presence of defences. The main areas at risk appear to be on the Sud Brook around the Tredworth and Linden areas and on the Whaddon Brook around the Podsmead area.

- The SFRA states that Gloucester will continue to be defended against flood risk, both now and in the future. The Environment Agency's policy for Gloucester City Council is to take further action to reduce flood risk, due to the current and future consequences of flooding in urban areas to the north, east and south of Gloucester city centre itself. Apart from the use of defences, there are opportunities for the Council to assist in the reduction of risk by vigorously applying PPS25, promoting the use of SUDS, increasing flow attenuation within channels and seeking opportunities for flood storage by seeking to ensure that Flood Zones 2 and 3 remain undeveloped where possible and reinstating areas of functional floodplain which have been developed (e.g. reduce building footprints or relocate to lower flood risk zones). In addition, the level of flood preparedness (flood warning, flood proofing and flood resilience) should be increased and promoted in this area. An increase in targeted channel maintenance has also been identified as an opportunity in some areas to decrease debris build up in channel and help reduce incidents of blockage and resultant flooding.
- Details of existing site levels, proposed site levels and proposed ground floor levels should be provided on maps. A topographic survey and flood extents must be shown on maps to show the full extent of the 1% AEP (1 in 100 year) flood with and without an appropriate allowance for climate change and, where relevant, the extent of the functional floodplain. In addition, where safe access and egress is required, it must be demonstrated on the maps that it can be provided from the property to an area wholly outside of the floodplain.
- Surface water flooding mitigation:
 - When redeveloping existing buildings, the installation of some permanent or temporary floodproofing and resilience measures could protect against both surface water and sewer flooding. Non-return valves prevent water entering the property from drains and sewers. Non-return valves can be installed within gravity sewers or drains within a property's private sewer upstream of the public sewerage system. These need to be carefully installed and must be regularly maintained.
 - Consideration must also be given to attenuation and flow ensuring that flows during the 100-year plus climate change storm event are retained within the site if any flap valves shut. This should be demonstrated with suitable modelling techniques.
- The SFRA states that all new developments will demonstrate that the layout and design of the development will not have a detrimental impact upon floodwater flow conveyance.
- A flood warning system is in operation for the main rivers within the Gloucester administrative area and is outlined below in four stages.

- Flood Watch – flooding of low lying land and roads is expected. The following actions are recommended:
 1. Watch water levels
 2. Stay tuned to local radio or TV
 3. Ring Floodline on 0845 988 1188
 4. Make sure you have what you need to put your flood plan into action
 5. Alert your neighbours, particularly the elderly
 6. Check pets and livestock
 7. Reconsider travel plans
- Flood Warning – flooding of homes and businesses is expected. The following actions, in addition to those associated with Flood Watch, are recommended:
 1. Move pets, vehicles, food, valuables and other items to safety
 2. Put sandbags or floodboards in place
 3. Prepare to turn off gas and electricity
 4. Be prepared to evacuate your home
- Severe Flood Warning – severe flooding is expected and there is extreme danger to life and property. The following actions, in addition to those associated with Flood Warning, are recommended:
 1. Be prepared to lose power supplies - gas, electricity, water, telephone
 2. Try to keep calm, and to reassure others, especially children
 3. Co-operate with emergency services and local authorities
 4. You may be evacuated
- All clear – flood watches or warnings are no longer in force

Guidance

Strategic Flood Risk Assessments are carried out by local authorities, in consultation with the Environment Agency, to assess the flood risk to the area from all sources both now and in the future due to climate change. They are used to inform planning decisions to ensure inappropriate development is avoided (NPPF, 2021).

7. Resilience and mitigation



Based on the flood risk identified at the Site, the national and local policies and guidance and proposed development, the mitigation measures outlined within this section of the report are likely to help protect the development from flooding.

Sea (coastal/tidal) flood mitigation measures

As the Site is not identified as being at risk of flooding from the sea, no associated mitigation measures are required. However, the Site does have a residual risk of tidal flooding from the River Severn in an event of overtopping or breach of flood defences.

The mitigation measures detailed below for fluvial flood risk are likely to be suitable for the residual tidal flood risk from the River Severn.

If these mitigation measures are implemented this could reduce the flood risk to the development from Low to Very Low.

Rivers (fluvial) flood mitigation measures

The Site is located within an area which is affected by flooding from rivers. The following table confirms the flood levels and depths associated with the area proposed for development.

Table 7. Flood levels compared to ground levels in the area proposed for development

Ground levels in area proposed for development (mAOD)	Modelled Flood Levels (mAOD)	
	1 in 100 year plus 37% CC (mAOD)	1 in 1000 year (mAOD)
14.52 to 14.95	14.79	14.85
Flood depths (m)	Up to 0.27	Up to 0.33

Raising minimum floor levels

The vulnerability classification of the Site and the Flood Zone means proposals for the Site fall under the EA's Flood Risk Standing Advice (FRSA) for more vulnerable developments.

In this instance, in line with the EA's FRSA the recommended minimum Finished Floor Level (FFL) should be set at least 0.3m above 1 in 100 year plus 37% allowance for climate change flood level of 14.79 mAOD.

Table 8. Recommended Minimum Finished Floor Level Required

Ground Level (mAOD)	Flood Level (mAOD)	Freeboard above Flood Level (m)	Recommended FFL (mAOD)
14.52 to 14.95	14.79	0.3 m	15.09

In accordance with Minor Extensions Standing Advice, where finished floor levels cannot be raised to the recommended level these should be set no lower than the existing floor levels.

Existing floor levels have been estimated to be 14.82 mAOD, therefore it would be unrealistic to raise the FFLs of the extension to 15.09 mAOD. Hence, FFLs for the proposed extension should be set at the same level as existing FFLs and alternative mitigation should be considered.

Alternative Mitigation (WHERE FINISHED FLOOR LEVELS CANNOT BE RAISED)

Where it is not possible to raise the minimum finished floor levels to the recommended elevation, it may be appropriate to adopt a water exclusion strategy for flood depths up to 0.3 m in line with the EA's Standing Advice. A water exclusion strategy, using avoidance and resistance measures, is appropriate where floods are expected to last for short durations. Potential water exclusion strategies include:

- Passive flood door systems;
- Temporary flood barriers;
- Air brick covers (manual or automatic closing);
- Non-return flap valves on sewer outfalls.
- Construction of local bunds;
- Landscaping to divert water away from the property;
- Sustainable Drainage Systems (SuDS) to store/intercept flood water;
- Boundary walls/fencing;

Avoidance and resistance measures are unlikely to completely prevent floodwater entering a property, particularly during longer duration flood events. Therefore, it is recommended that the following flood resilience measures are also considered.

- Flood resilient materials and designs:
 - Use of low permeability building materials up to 0.3 m such as engineering bricks (Classes A and B) or facing bricks;
 - Hard flooring and flood resilient metal staircases;

- The use of internal lime plaster/render or where plasterboards are used these should be fitted horizontally instead of vertically and/or using moisture resistant plasterboard at lower levels;
- Water, electricity and gas meters and electrical sockets should be located above the predicted flood level;
- Communications wiring: wiring for telephone, TV, Internet and other services should be protected by suitable insulation in the distribution ducts to prevent damage.

Where flood depths are expected to exceed 0.6 m at the Site, a water entry strategy should be adopted to preserve building integrity and to promote flood resilience rather than resistance (which is more difficult to achieve for significant flood depths). A structural engineer should be consulted to confirm this would be a suitable strategy for the proposed development, to ensure flood flows would not impact the structural integrity of the building. Potential strategies include:

- Ground floors designed to permit water passage at high flood depths;
- Hard flooring and flood resilient metal staircases;
- Heating systems, electrical sockets and utility meters should be raised above the predicted flood level where possible; and
- Sump and pump.

Where flood depths are expected to be between 0.3-0.6 m both water exclusion and water entry strategies should be adopted depending on a structural assessment of the building.

If these mitigation measures are implemented this could reduce the flood risk to the development from Low to Medium to Low.

Surface water (pluvial) flood mitigation measures

The mitigation measures detailed above for river and sea flood risk are likely to be suitable for the relatively shallow flood depths which could be experienced in a 1 in 100 year pluvial flood event.

In addition, the regular maintenance of any drains and culverts surrounding/on the Site should be undertaken to reduce the flood risk.

A Sustainable Drainage Strategy (SuDS) should be developed for the Site, for effective management of surface water runoff from the proposed development.

If these mitigation measures are implemented this could reduce the flood risk to the development from Medium to Low.

Groundwater flood mitigation measures

It is likely the flood mitigation measures recommended for river/sea or surface water (pluvial) risk will be sufficient to reduce the groundwater flood risk at the development. However specific groundwater measures that may also be considered for the Low risk identified include:

- Waterproof tanking of the ground floor in the extension;
- Interceptor drains;
- Automatic sump to extract flood water; and
- Non-return flap valves on the proposed foul and surface water sewer lines.

If these mitigation measures are implemented this would maintain the flood risk to a Low level.

Reservoir flood mitigation measures

According to EA information, the nearest reservoirs are situated approximately 1.85 km to the southeast of the Site.

There would be a relatively high rate and onset of flooding associated with a reservoir breach, it is therefore unlikely that safe access could be achieved unless a long warning period was provided. Therefore, occupants should get to the highest level of the building as possible and contact the emergency services.

As residential areas of the development will be available on the first floor, safe refuge could be provided for residents in the event of a reservoir breach.

Other flood risk mitigation measures

There is a risk of flooding as a result of blockage from the culvert running below or adjacent to the Site, therefore a maintenance plan should be implemented to ensure effective operation of the culvert. Discussions should be held with the local authority to confirm that this is in place.

Residual flood risk mitigation measures

The risk to the Site has been assessed from all sources of flooding and appropriate mitigation and management measures proposed to keep the users of the development safe over its lifetime. There is however a residual risk of flooding associated with the potential for failure of mitigation measures if regular maintenance and upkeep isn't undertaken. If mitigation measures are not implemented or maintained, the risk to the development will remain as the baseline risk.

Further flood mitigation information

More information on flood resistance, resilience and water entry can be found here: http://www.planningportal.gov.uk/uploads/br/flood_performance.pdf

www.knowyourfloodrisk.co.uk

Emergency evacuation - safe access / egress and safe refuge

Emergency evacuation to land outside of the floodplain should be provided if feasible. Where this is not possible, 'more vulnerable' developments and, where possible, development in general (including basements), should have internal stair access to an area of safe refuge within the building to a level higher than the maximum likely water level. An area of safe refuge should be sufficient in size for all potential users and be reasonably accessible to the emergency services.

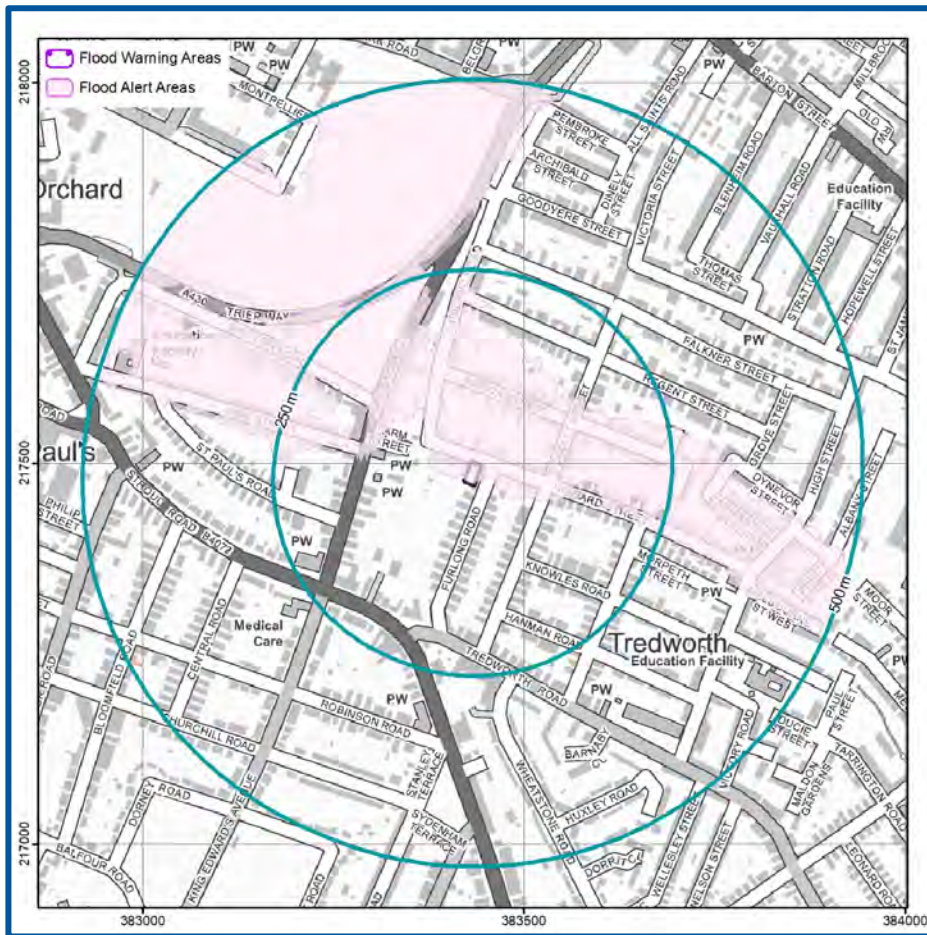
Emergency evacuation from the development and the Site should only be undertaken in strict accordance with any evacuation plans produced for the Site, with an understanding of the flood risks at the Site including available mitigation, the vulnerability of occupants and preferred evacuation routes.

Flood warnings

The EA operates a flood warning service in all areas at risk of flooding; this is available on their website: <https://www.gov.uk/check-flood-risk>. The Site is located within an EA Flood Alerts coverage area (ref: 031WAF212) so is able to receive alerts (Figure 11). All warnings are also available through the EA's 24 hour Floodline Service 0345 988 1188.

The EA aims to issue Flood Warnings 2 hours in advance of a flood event. Flood Warnings can provide adequate time to enable protection of property and evacuation from a Site, reducing risk to life and property.

Figure 12. EA Flood Warning Coverage for the local area (EA, 2022).



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Emergency evacuation

Where possible, a safe access and egress route with a 'very low' hazard rating from areas within the floodplain to an area wholly outside the 1 in 100 year flood event including an allowance for climate change should be demonstrated.

Based on the EA's Flood Zone Map the closest dry evacuation area within Flood Zone 1 is along Furlong Road (c.14 m east – direct measurement). It is advised that evacuation from the premises would be the preferred option in a flood event if safe to do so. It is recommended that residents prepare to evacuate as soon as an EA Flood Warning is issued in order to completely avoid flood waters.

On-Site refuge

Evacuation should be the primary action in preference, however safe refuge could be sought at first floor level in a worst-case scenario as the residential areas of the development are situated on the first floor.

The southern boundary of the Site is in Flood Zone 1, therefore it could be used as an alternative refuge area. However, it is still recommended that the first floor of the property is the preferred area of refuge.

Other relevant information

A Flood Warning and Evacuation Plan (FWEP) is recommended, and occupants should be signed up to receive EAs Flood Alerts.

Registration to the Environment Agency's flood warning scheme can be done by following this link: <https://www.gov.uk/sign-up-for-flood-warnings>.

It is recommended that main communication lines required for contacting the emergency services, electricity sockets/meters, water supply and first aid stations and supplies are not compromised by flood waters. Where possible these should all be raised above the extreme flood level.

8. Conclusions and recommendations



Table 9. Risk ratings following implementation and subsequent maintenance of mitigation measures

Source of Flood Risk	Baseline	After Mitigation
River (fluvial) flooding	Low to Medium	Low
Sea (coastal/tidal) flooding	Low*	Very Low
Surface water (pluvial) flooding	Low to Medium	Low
Groundwater flooding	Low**	Low
Other flood risk factors present	Yes	N/A

*While there is a Low risk of tidal flooding from the sea (associated with the tidal River Severn), there is a residual flood risk in the event of flood defence breach or overtopping.

**While GeoSmart's groundwater flood risk mapping indicates the site is at Negligible risk from regional sources, following assessment of the local geology, the presence of a water course immediately adjacent to the site and an existing basement on the property, the site-specific risk is considered to be Low.

The table below provides a summary of where the responses to key questions are discussed in this report. Providing the recommended mitigation measures are put in place it is likely that flood risk to this Site will be reduced to an acceptable level.



Table 10. Summary of responses to key questions in the report

Key sources of flood risks identified	Fluvial, surface water (pluvial), reservoir and flooding resulting from culvert blockages
Are standard mitigation measures likely to provide protection from flooding to/from the Site?	Yes, although the risk of flooding from reservoirs would remain
Is any further work recommended?	Yes (see Section 7 and executive summary for full details)

9. Further information



The following table includes a list of additional products by GeoSmart:

Additional GeoSmart Products		
✓	<p>Additional assessment:</p> <p>SuDSmart Report</p>	 <p>The SuDSmart Report range assesses which drainage options are available for a Site. They build on technical detail starting from simple infiltration screening and work up to more complex SuDS Assessments detailing alternative options and designs.</p> <p>Please contact [REDACTED] for further information.</p>
✓	<p>Additional assessment:</p> <p>EnviroSmart Report</p>	 <p>Provides a robust desk-based assessment of potential contaminated land issues, taking into account the regulatory perspective.</p> <p>Our EnviroSmart reports are designed to be the most cost effective solution for planning conditions. Each report is individually prepared by a highly experienced consultant conversant with Local Authority requirements.</p> <p>Ideal for pre-planning or for addressing planning conditions for small developments. Can also be used for land transactions.</p> <p>Please contact [REDACTED] for further information.</p>



References

British Geological Survey (BGS) (2022). Geology of Britain Viewer. Accessed from: <http://mapapps.bgs.ac.uk/geologyofbritain/home.html> on 15/08/22.

Defra/Environment Agency (2005). Flood Risk Assessment Guidance for New Development. *Phase 2 Framework and Guidance for Assessing and Managing Flood Risk for New Development – Fill Documentation and Tools*. R & D Technical Report FD232-TR2.

Environment Agency [EA] (2021). Flood risk assessments: climate change allowances. Accessed from: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> on 15/08/22.

Environment Agency [EA] (2022). MagicMap. Accessed from: <http://magic.defra.gov.uk/MagicMap.aspx> on 15/08/22.

Environment Agency [EA] (2022). Flood map for planning. Accessed from <https://flood-map-for-planning.service.gov.uk/> on 15/08/22.

Environment Agency [EA] (2022). Long term flood risk assessment for locations in England. Accessed from <https://flood-warning-information.service.gov.uk/long-term-flood-risk> on 15/08/22.

GeoSmart (2022). GeoSmart groundwater flood risk (GW5) map (version 2.4).

Ministry of Housing, Communities & Local Government (2021). National Planning Policy Framework (NPPF). Accessed from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf on 15/08/22.

Ministry of Housing, Communities & Local Government (2014). Planning Practice Guidance (NPPG). Flood Risk and Coastal Change. Accessed from <http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/> on 15/08/22.

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Halcrow Group Limited (2008). Gloucestershire County Council Strategic Flood Risk Assessment. Accessed from: https://www.gloucestershire.gov.uk/media/6815/gloucester_city_council_level_1_sfra_final-28382.pdf on 15/08/22.

Gloucester City Council (2017). Joint Core Strategy Accessed from: <https://www.gloucester.gov.uk/media/5441/jcs.pdf> on 19/07/2022 on 10/08/22 on 01/08/22.

Environment Agency (2015). Severn River Basin District Flood Risk Management Plan 2015-2021. Accessed from: https://cdn.cyfoethnaturiol.cymru/media/682461/lit-10214_severn_frmp_part-b.pdf?mode=pad&rnd=131529706900000000 on 12/08/22.

Survey Open Data (2022). Accessed from: <http://www.geostore.com/environment-agency/survey.html#/survey/tandc> on 15/08/22.

UK Flood Maps (Ambiental FTP) (2022). UKFloodMap4 Data

Glossary

General terms

BGS	British Geological Survey
EA	Environment Agency
GeoSmart groundwater flood risk model	GeoSmart's national groundwater flood risk model takes advantage of all the available data and provides a preliminary indication of groundwater flood risk on a 50m grid covering England and Wales. The model indicates the risk of the water table coming within 1 m of the ground surface for an indicative 1 in 100 year return period scenario.
Dry-Island	An area considered at low risk of flooding (e.g. In a Flood Zone 1) that is entirely surrounded by areas at higher risk of flooding (e.g. Flood Zone 2 and 3)
Flood resilience	Flood resilience or wet-proofing accepts that water will enter the building, but through careful design will minimise damage and allow the re-occupancy of the building quickly. Mitigation measures that reduce the damage to a property caused by flooding can include water entry strategies, raising electrical sockets off the floor, hard flooring.
Flood resistance	Flood resistance, or dry-proofing, stops water entering a building. Mitigation measures that prevent or reduce the likelihood of water entering a property can include raising flood levels or installation of sandbags.
Flood Zone 1	This zone has less than a 0.1% annual probability of river flooding
Flood Zone 2	This zone has between 0.1 and 1% annual probability of river flooding and between 0.1% and 0.5 % annual probability sea flooding
Flood Zone 3	This zone has more than a 1% annual probability of river flooding and 0.5% annual probability of sea flooding
Functional Flood Plain	An area of land where water has to flow or be stored in times of flood.

Hydrologic model	A computer model that simulates surface run-off or fluvial flow. The typical accuracy of hydrologic models such as this is $\pm 0.25\text{m}$ for estimating flood levels at particular locations.
OS	Ordnance Survey
Residual Flood Risk	The flood risk remaining after taking mitigating actions.
SFRA	Strategic Flood Risk Assessment. This is a brief flood risk assessment provided by the local council
SuDS	A Sustainable drainage system (SuDS) is designed to replicate, as closely as possible, the natural drainage from the Site (before development) to ensure that the flood risk downstream of the Site does not increase as a result of the land being developed. SuDS also significantly improve the quality of water leaving the Site and can also improve the amenity and biodiversity that a Site has to offer. There are a range of SuDS options available to provide effective surface water management that intercept and store excess run-off. Sites over 1 Ha will usually require a sustainable drainage assessment if planning permission is required. The current proposal is that from April 2014 for more than a single dwelling the drainage system will require approval from the SuDS Approval Board (SABs).

Aquifer Types

Principal aquifer	These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.
Secondary A aquifer	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.
Secondary B aquifer	Predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.
Secondary undifferentiated	Has been assigned in cases where it has not been possible to attribute either category A or B to a rock type due to the variable characteristics of the rock type.
Unproductive Strata	These are rock layers or drift deposits with low permeability that has negligible significance for water supply or river base flow.

NPPF (2021) terms

Exception test	Applied once the sequential test has been passed. For the exception test to be passed it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk and a site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.
Sequential test	Aims to steer new development to areas with the lowest probability of flooding.
Essential infrastructure	Essential infrastructure includes essential transport infrastructure, essential utility infrastructure and wind turbines.
Water compatible	Water compatible land uses include flood control infrastructure, water-based recreation and lifeguard/coastal stations.
Less vulnerable	Less vulnerable land uses include police/ambulance/fire stations which are not required to be operational during flooding and buildings used for shops/financial/professional/other services.
More vulnerable	More vulnerable land uses include hospitals, residential institutions, buildings used for dwelling houses/student halls/drinking establishments/hotels and sites used for holiday or short-let caravans and camping.
Highly vulnerable	Highly vulnerable land uses include police/ambulance/fire stations which are required to be operational during flooding, basement dwellings and caravans/mobile homes/park homes intended for permanent residential use.

Data Sources

Aerial Photography	Contains Ordnance Survey data © Crown copyright and database right 2022 BlueSky copyright and database rights 2022
Bedrock & Superficial Geology	Contains British Geological Survey materials © NERC 2022 Ordnance Survey data © Crown copyright and database right 2022

<p>Flood Risk (Flood Zone/RoFRS/Historic Flooding/Pluvial/Surface Water Features/Reservoir/ Flood Alert & Warning)</p>	<p>Environment Agency copyright and database rights 2022 Ordnance Survey data © Crown copyright and database right 2022</p>
<p>Flood Risk (Groundwater)</p>	<p>GeoSmart, BGS & OS GW5 (v2.4) Map (GeoSmart, 2022) Contains British Geological Survey materials © NERC 2022 Ordnance Survey data © Crown copyright and database right 2022</p>
<p>Location Plan</p>	<p>Contains Ordnance Survey data © Crown copyright and database right 2022</p>
<p>Topographic Data</p>	<p>OS LiDAR/EA Contains Ordnance Survey data © Crown copyright and database right 2022 Environment Agency copyright and database rights 2022</p>
<p>UK Flood Maps (Ambiental FTP) (Surface Water Flooding)</p>	<p>Contains Ordnance Survey data © Crown copyright and database right 2022 Contains Ambiental UKFloodMap4™ data 2022</p>

11. Appendices



Appendix A

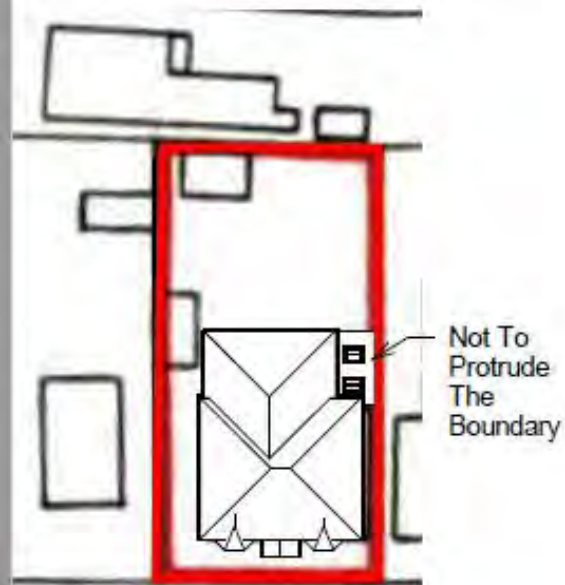


Site plans



SITE PLAN

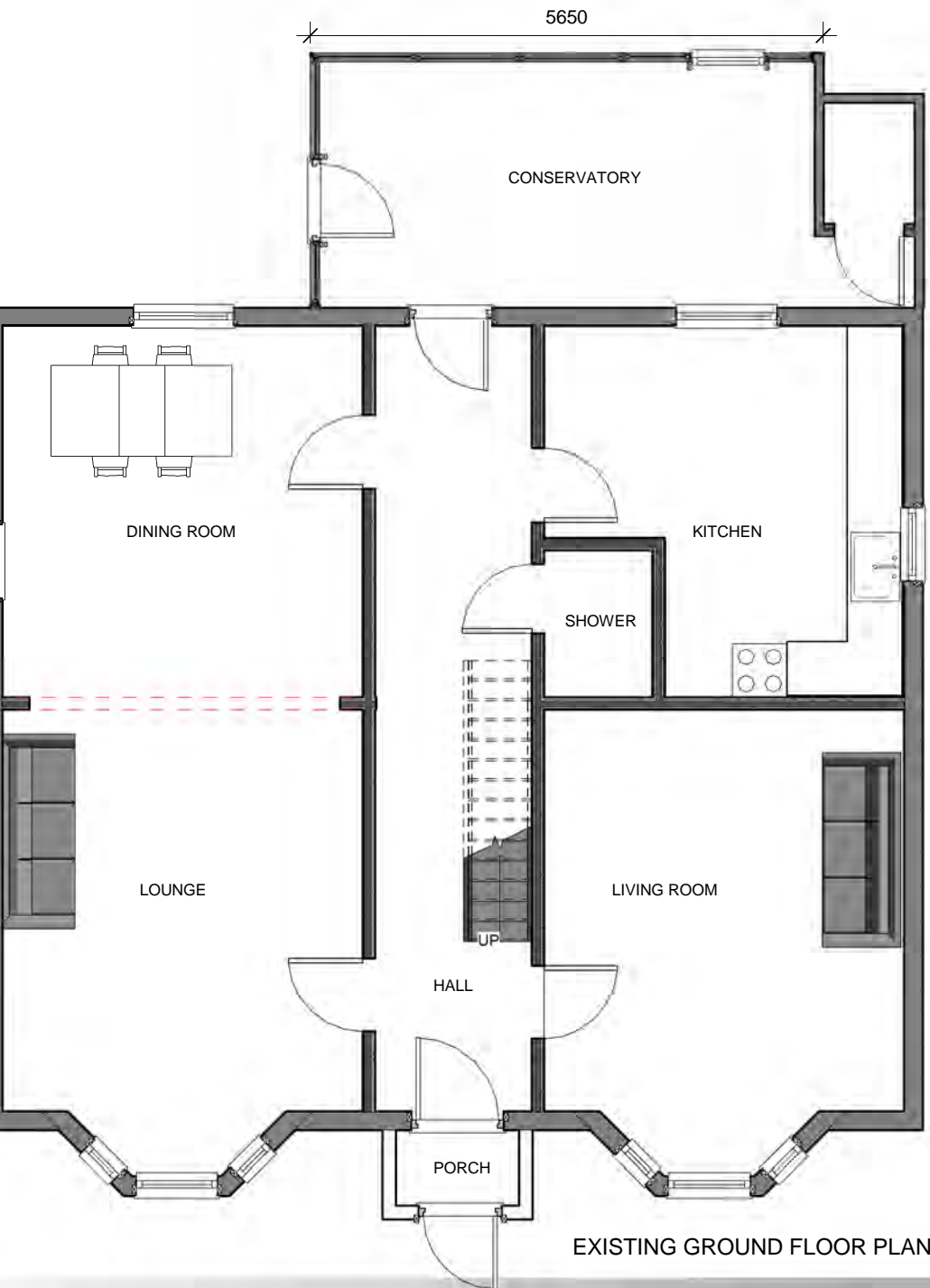
1:1250



BLOCK PLAN

1:500

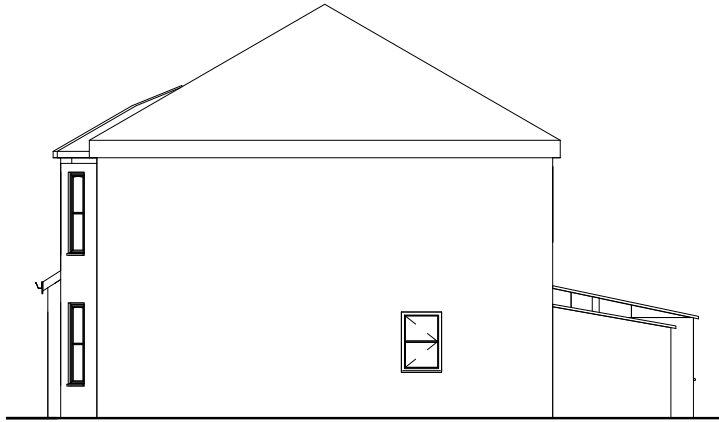
PRC



Project: 18 Howard Street
 Client: Mrs Fatima Jaffer
 Drawing: Existing Ground Floor Plan
 Drawn By Lloyd Gordon
 Date: 05/03/2022
 Scale: 1:50@A3
 Revision: 0



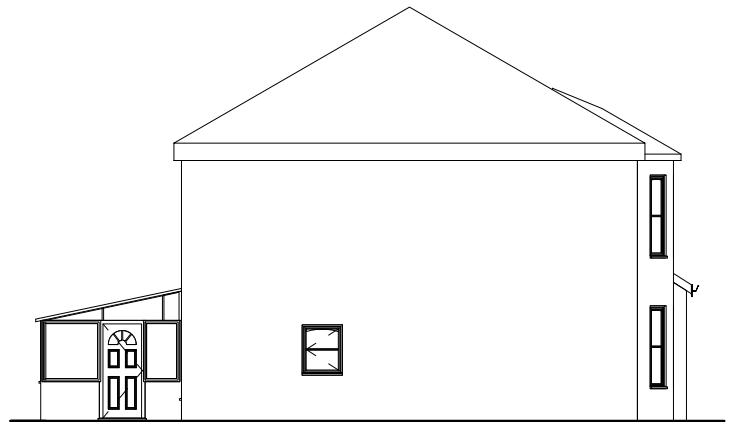
FRONT ELEVATION



SIDE ELEVATION



REAR ELEVATION



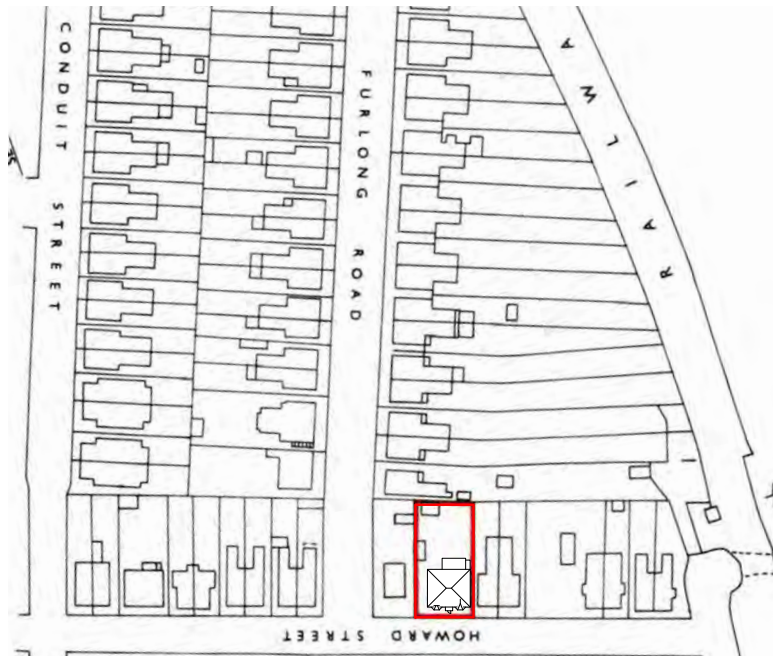
SIDE ELEVATION

1:100

EXISTING ELEVATIONS

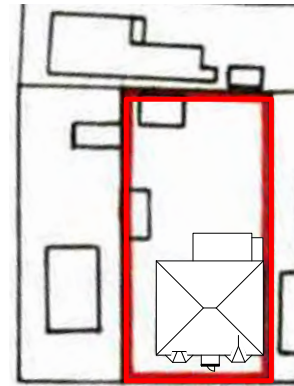


Project: 18 Howard Street
 Client: Mrs Fatima Jaffer
 Drawing: Existing Elevation
 Drawn By Lloyd Gordon
 Date: 05/03/2022
 Scale: 1:100@A3
 Revision: 0



SITE PLAN

1:1250



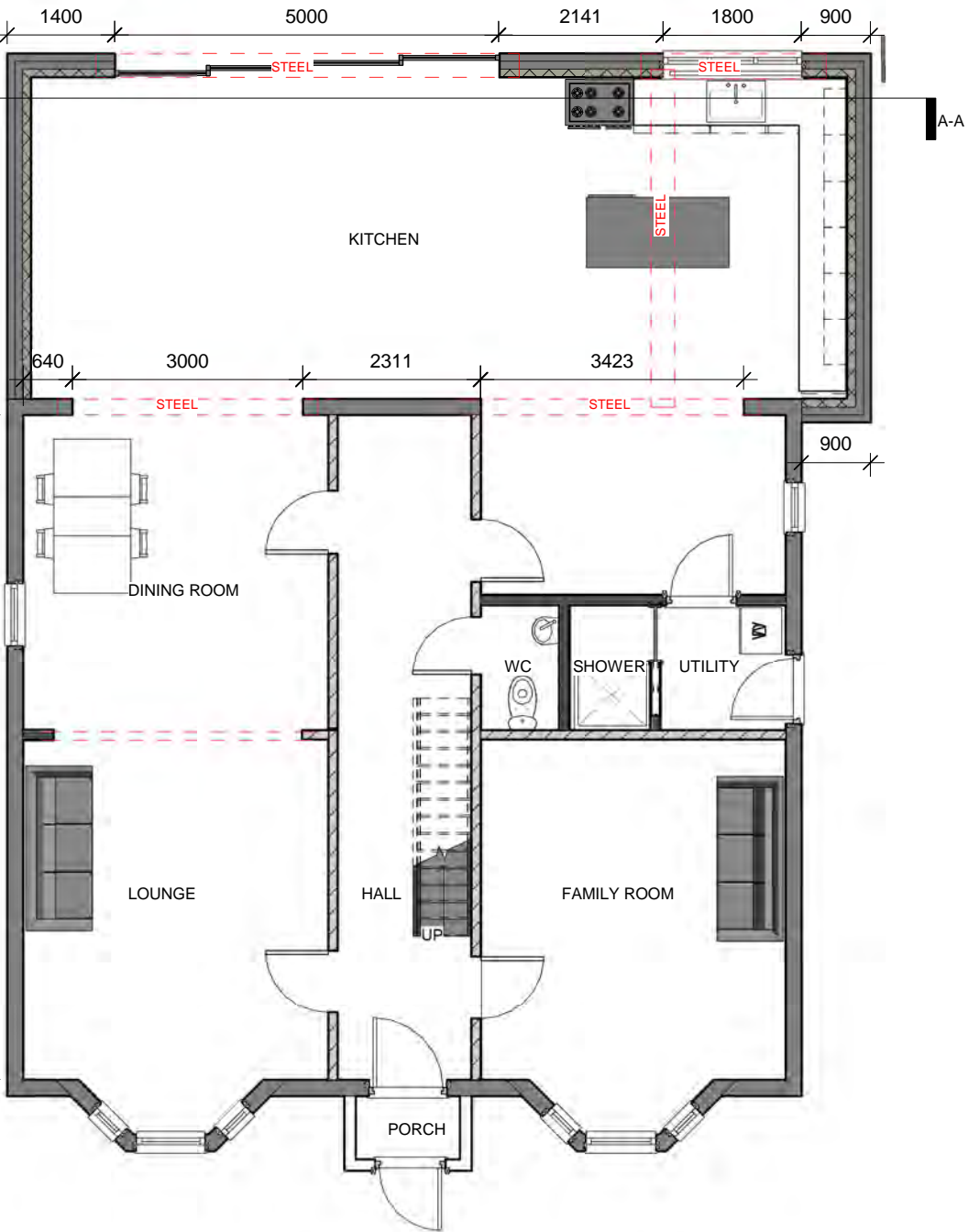
BLOCK PLAN

1:500

EXISTING SITE/BLOCK PLAN



Project: 18 Howard Street
Client: Mrs Fatima Jaffer
Drawing: Existing Site/Block Plan
Drawn By Lloyd Gordon
Date: 05/03/2022
Scale: 1:1250, 1:500@A3
Revision: 0



PROPOSED GROUND FLOOR PLAN

Notes:
Proposed Not to protrude the boundary

All Dimensions are to be checked on site

All proposed materials to match existing materials

Structural Engineers Calculations and Design Required For Steel Beams

Specification:

300mm wide cavity wall with 100mm cavity wall rock wool insulation Batts to BS 6676

Wall starter Ties fixed to existing external wall to BS EN10088-2

cavity wall ties positioned max 450mm vertical, 900mm horizontal to BS EN 845-1

Damp proof course laid level with existing floor level to BS EN 14909

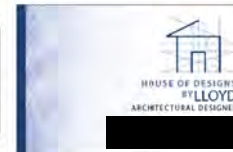
Damp proof tray laid to BS 8215

Cavity wall closures positioned at windows and doors to BS EN ISO 9001

Ground floor spec-

- (1) 100mm Hardcore
- (2) 100mm compacted tight one stone
- (3) 20mm sand binding
- (4) Damp proof membrane BS EN 13967: 2012.
- (5) 100mm rigid insulation BS 5241-1:1994
- (6) separation layer
- (7) 100mm concrete floor
- (8) floor finish to be confirmed by client

Fascia/Soffit: 19mm Upvc with 25mm continuous ventilation



Project: 18 Howard Street
Client: Mrs Fatima Jaffer
Drawing: Proposed Ground Floor Plan
Drawn By Lloyd Gordon
Date: 05/03/2022
Scale: 1:50@A3
Revision: 1



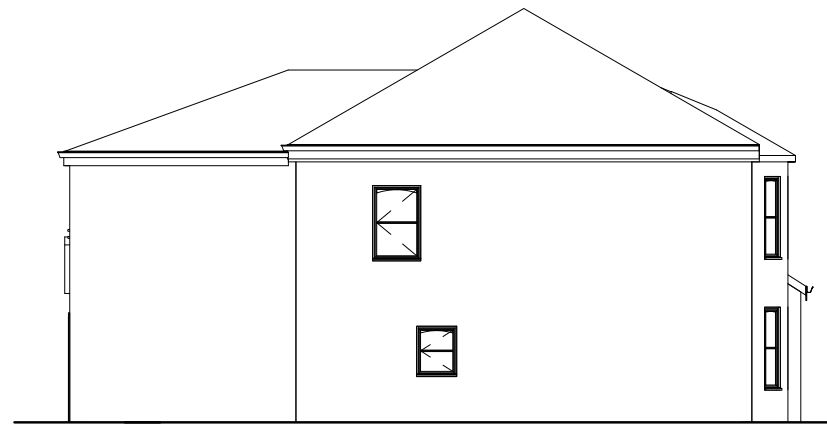
FRONT ELEVATION



SIDE ELEVATION



REAR ELEVATION



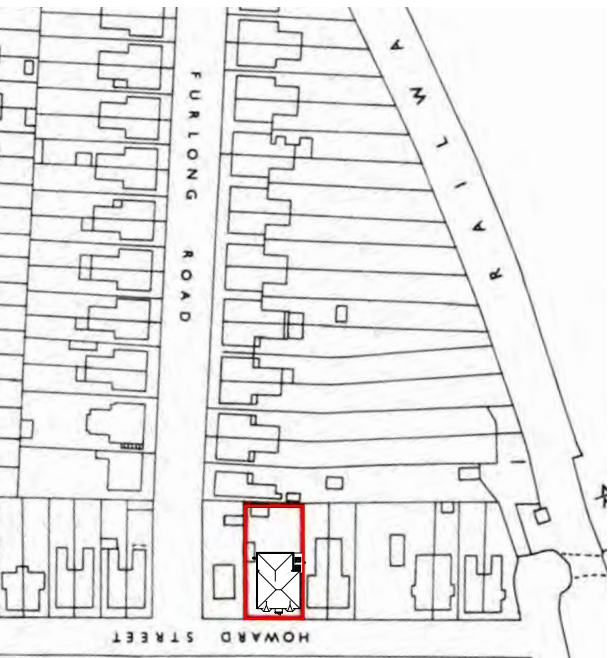
SIDE ELEVATION

1:100

PROPOSED ELEVATIONS

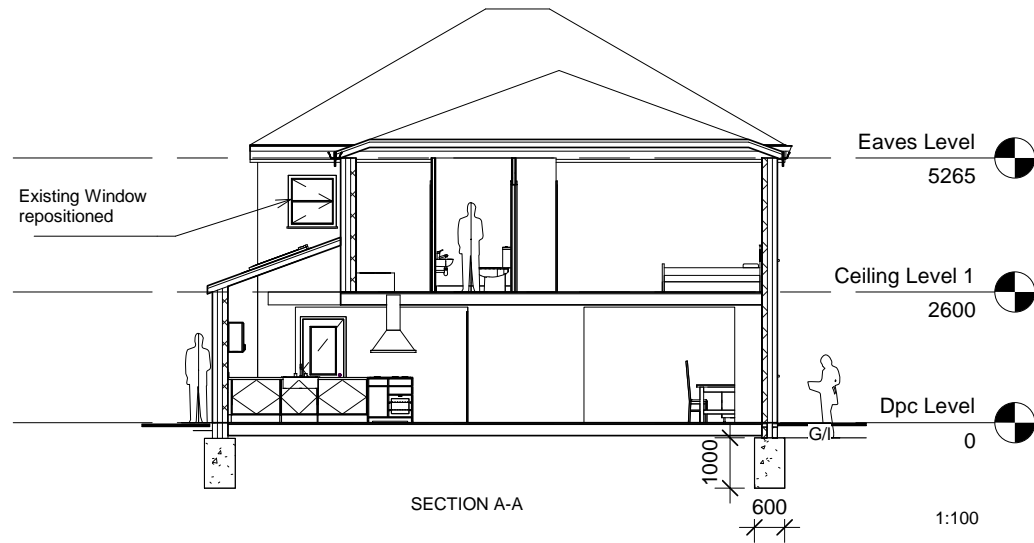


Project: 18 Howard Street
 Client: Mrs Fatima Jaffer
 Drawing: Proposed Elevation
 Drawn By Lloyd Gordon
 Date: 05/03/2022
 Scale: 1:100@A3
 Revision: 1



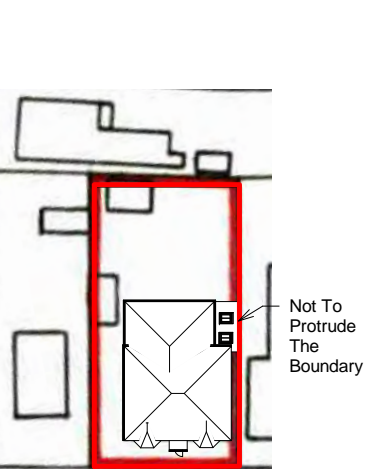
SITE PLAN

1:1250



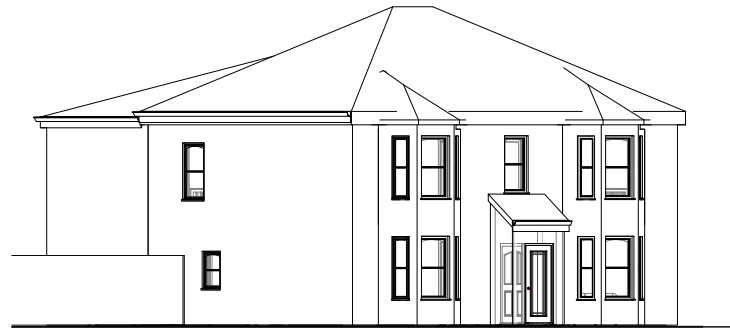
SECTION A-A

1:100



BLOCK PLAN

1:500



3D VIEW OF FRONT

PROPOSED SITE/BLOCK PLAN



Project: 18 Howard Street
 Client: Mrs Fatima Jaffer
 Drawing: Proposed Site/Block Plan
 Drawn By Lloyd Gordon
 Date: 05/03/2022
 Scale: 1:1250, 1:500@A3
 Revision: 1



RENDER OF REAR



RENDERED SKETCH OF REAR



RENDER OF KITCHEN (A)



RENDER OF KITCHEN (B)

PROPOSED RENDERS



Project: 18 Howard Street
Client: Mrs Fatima Jaffer
Drawing: Proposed Renders
Drawn By Lloyd Gordon
Date: 05/03/2022
Scale: @A3
Revision: 1

FURTHER INFORMATION TO ENHANCE YOUR FLOOD RISK ASSESSMENT.

We would like to obtain some further information from you, in order to enhance the Flood Risk Assessment.

Please email this form, along with any relevant plans and surveys for your Site to info@geosmartinfo.co.uk

PLEASE NOTE: Delays in receiving the answers to the questions below and relevant plans, may delay the delivery of your final report.

GeoSmart Question	Developer response
Has any flooding ever occurred at the Site?	NO
If flooding has occurred, to what depth, where and why?	→
What is the condition of the drainage systems on-Site?	FOUL SEWER
Do you have any CCTV drainage surveys of the on-site drainage systems? (Please send to us)	NO
Do you have any topographic survey, including Finished Floor Levels (FFLs) / Thresholds of existing buildings?	NO
How high are the FFL's of any existing buildings raised above external ground levels?	300 mm
Do your drainage systems discharge to the public sewer or via a soakaway?	DIRECT to PUBLIC SEWER
How old is the existing building (approximately) and is it listed?	NOT LISTED 100 YEARS OLD

GeoSmart Information Ltd
Suite 9-11, 1st Floor,
Old Bank Buildings, Bellstone,
Shrewsbury, SY1 1HU



Do you have an existing and/or proposed basement? How deep will it be?	EXISTING NOT BEEN USED
Are there any surface water features on-Site? <i>(How big are these, what is their condition?)</i>	NO
Are there any topographical depressions noted on-Site?	NO
Have you undertaken any pre-application discussions with the Local Planning Authority and/or the Risk Management Authority (RMA) ¹	NO.

Please add any further notes in the box below about your existing and proposed development which you feel may be useful to include in the flood risk assessment.

¹ Risk Management Authorities are: Local Authority (LA) and Environment Agency in England, LA and Natural Resources Wales (NRW) in Wales and LA and the Scottish Environmental Protection Agency (SEPA) in Scotland.



Environment Agency data

Product 4 (Detailed Flood Risk Data) for 18 Howard Street, Gloucester, GL1 4UR

Reference number: 272750

Date of issue: 17 August 2022

Model Information

The following information and attached maps contain a summary of the modelled information relevant to the area of interest. The information provided is based on the best available data as of the date of issue.

Model Name	Release Date
Sud Brook	2009

Flood Map for Planning (Rivers and Sea)

The Flood Map for Planning (Rivers and Sea) indicates the area at risk of flooding, **assuming no flood defences exist**, for a flood event with a 0.5% chance of occurring in any year for flooding from the sea, or a 1% chance of occurring in any year for fluvial (river) flooding (Flood Zone 3). It also shows the extent of the Extreme Flood Outlines (Flood Zone 2) which represents the extent of a flood event with a 0.1% chance of occurring in any year, or the highest recorded historic extent if greater. The Flood Zones refer to the land at risk of flooding and **do not** refer to individual properties. It is possible for properties to be built at a level above the floodplain but still fall within the risk area.

This Flood Map only indicates the extent and likelihood of flooding from rivers or the sea. It should also be remembered that flooding may occur from other sources such as surface water, sewers, road drainage, etc.

To find out which flood zone a location is in please use: <https://flood-map-for-planning.service.gov.uk/>

Definition of flood zones

- **Zone 1** - The area is within the lowest probability of flooding from rivers and the sea, where the chance of flooding in any one year is less than 0.1% (i.e. a 1000 to 1 chance).

- **Zone 2** - The area which falls between the extent of a flood with an annual probability of 0.1% (i.e. a 1000 to 1 chance) fluvial and tidal, or greatest recorded historic flood, whichever is greater, and the extent of a flood with an annual probability of 1% (i.e. a 100 to 1 chance) fluvial / 0.5% (i.e. a 200 to 1 chance) tidal. (Land shown in light blue on the Flood Map).
- **Zone 3** - The chance of flooding in any one year is greater than or equal to 1% (i.e. a 100 to 1 chance) for river flooding and greater than or equal to 0.5% (i.e. a 200 to 1 chance) for coastal and tidal flooding.

Note: The Flood Zones shown on the Environment Agency's Flood Map for Planning (Rivers and Sea) do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding. Reference should therefore also be made to the [Strategic Flood Risk Assessment](#) when considering location and potential future flood risks to developments and land uses.

Areas Benefitting From Defences

Where possible we show the areas that benefit from the flood defences, in the event of flooding:

- from rivers with a 1% (1 in 100) chance in any given year, or;
- from the sea with a 0.5% (1 in 200) chance in any given year.

If the defences were not there these areas would flood. Please note that we do not show all areas that benefit from flood defences.

The associated Dataset is available here: <https://data.gov.uk/dataset/flood-map-for-planning-rivers-and-sea-areas-benefiting-from-defences>

Node Data/ Modelled Levels

The attached map will show a selection of 1D & 2D model node points near to your site. The fluvial levels for these node points are shown below.

Fluvial Flood Levels (m AOD)

The modelled levels are given in m AOD (N), m AOD indicates metres Above Ordnance Datum (Newlyn).

The information is taken from the model referenced above and does not include the updated climate change figures.

Node Label	Easting	Northing	Annual Exceedance Probability - Maximum Water Levels (m AOD) (defended)							
			20% (1 in 5)	10% (1 in 10)	5% (1 in 20)	2% (1 in 50)	1.33% (1 in 75)	1% (1 in 100)	1% (1 in 100) inc. 20% increase in inflows	0.1% (1 in 1000)
SB01759DS	383999	217111	17.84	18.03	18.48	18.66	18.71	18.77	18.85	18.97
SB01656	383970	217169	17.23	17.47	18.14	18.26	18.30	18.32	18.37	18.52
SB01606	383939	217207	16.80	17.10	18.02	18.15	18.18	18.21	18.26	18.39
SB00921	383357	217569	13.75	13.96	14.09	14.18	14.22	14.25	14.31	14.54
SB00877	383315	217582	13.57	13.76	13.85	13.89	13.92	13.94	14.02	14.21
SB00877DS	383301	217589	13.39	13.47	13.48	13.51	13.53	13.55	13.63	13.85
2D 01	383437	217497	-	-	-	14.69	14.70	14.72	14.75	14.85

Modelled Flood Extents

Available modelled flood outlines produced as part of the detailed modelling have been provided to you in GIS format, these show modelled flood extents. Climate change will increase flood risk due to overtopping of defences.

<https://ea.sharefile.com/d-saeedf1f909e64bb0a1c50bb57bed77a2>

Climate Change

The '[Flood Risk Assessments: Climate Change Allowances](#)' are published on gov.uk. This is in replacement of previous climate change allowances for planning applications. The data provided in this product does not include the new allowances. You will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding. The climate change factors are now more complex and a single uplift percentage across England cannot be justified.

The Environment Agency will incorporate the new allowances into future modelling studies. For now it remains the applicant's responsibility to demonstrate through their proposal and flood risk assessments that new developments will be safe in flood risk terms for its lifetime.

Recorded Flood Outlines

Following an examination of our records of historical flooding we do hold records of flooding for this area, please find tabulated information below for these recorded flood events.

Flood Event Date	Source of Flooding	Cause of Flooding
July 1968	Main River	Channel capacity exceeded (no raised defences)
July 2007	Main River	Channel capacity exceeded (no raised defences)

The corresponding recorded flood outline/s can be accessed here:

<https://data.gov.uk/dataset/recorded-flood-outlines1>

Please note; the records of flooding from between October 2019 and March 2020 and beyond are still being reviewed, the outcomes of which have not yet been published or reflected within this request for information.

The Recorded Flood Outlines take into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding. It includes flood extents that may have been affected by overtopping, breaches or blockages. Any flood extents shown do not necessarily indicate that properties were flooded internally. It is also possible that the pattern of flooding in this area has changed and that this area would now flood or not flood under different circumstances.

Please note that our records are not comprehensive and that the map is an indicative outline of areas which have previously flooded, not all properties within this area will have flooded. It is possible that other flooding may have occurred that we do not have records for.

You may also wish to contact your Local Authority or Internal Drainage Board (where relevant), to see if they have other relevant local flood information.

Flood Defences

Flood defences do not completely remove the chance of flooding. They can be overtopped by water levels which exceed the capacity of the defences.

If flood defences are located in your area you can access this data here:

<https://data.gov.uk/dataset/spatial-flood-defences-including-standardised-attributes>

Planning developments

If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency Information for Flood Risk Assessments. You can also request pre application advice:

<https://www.gov.uk/planning-applications-assessing-flood-risk>

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

Supporting Information

River modelling: technical standards and assessment guidance

The link below contains standards for the flood risk management industry on how to build and review hydraulic models and provide evidence for flood risk management decisions.

<https://www.gov.uk/government/publications/river-modelling-technical-standards-and-assessment>

Surface Water

Managing the risk of flooding from surface water is the responsibility of Lead Local Flood Authorities. The 'risk of flooding from surface water' map has been produced by the Environment Agency on behalf of government, using information and input from Lead Local Flood Authorities.

You may wish to contact your Local Authority who may be able to provide further detailed information on surface water.

It is not possible to say for certain what the flood risk is but we use the best information available to provide an indication so that people can make informed choices about living with or managing the risks. The information we supply does not provide an indicator of flood risk at an individual site level. Further information can be found on the Agency's website:

<https://flood-warning-information.service.gov.uk/long-term-flood-risk>

Flood Risk from Reservoirs

The Flood Risk from Reservoirs map can be found on the Long Term Flood Risk Information website:

<https://flood-warning-information.service.gov.uk/long-term-flood-risk/map?map=Reservoirs>

Flood Alert & Flood Warning Area

We issue flood alert/warnings to specific areas when flooding is expected. If you receive a flood warning you should take immediate action.

You can check whether you are in a Flood Alert/Warning Area and register online using the links below:

<https://www.gov.uk/check-flood-risk>

<https://www.gov.uk/sign-up-for-flood-warnings>

If you would prefer to register by telephone, or if you need help during the registration process, please call Floodline on 0345 988 1188.

The associated dataset for flood warning areas is available here:

<https://data.gov.uk/dataset/flood-warning-areas3>

The associated dataset for flood alert areas is available here:

<https://data.gov.uk/dataset/flood-alert-areas2>

Flood Risk Activity Permits

We now consider applications for works, which may be Flood Risk Activities, under Environmental Permitting Regulations. This replaces the process of applying for a Flood Defence Consent. You may need an environmental Permit for flood risk activities if you want to do work:

- in, under, over or near a main river (including where the river is in a culvert)
- on or near a flood defence on a main river
- in the flood plain of a main river
- on or near a sea defence

Please go to this website to find out more about how to apply:

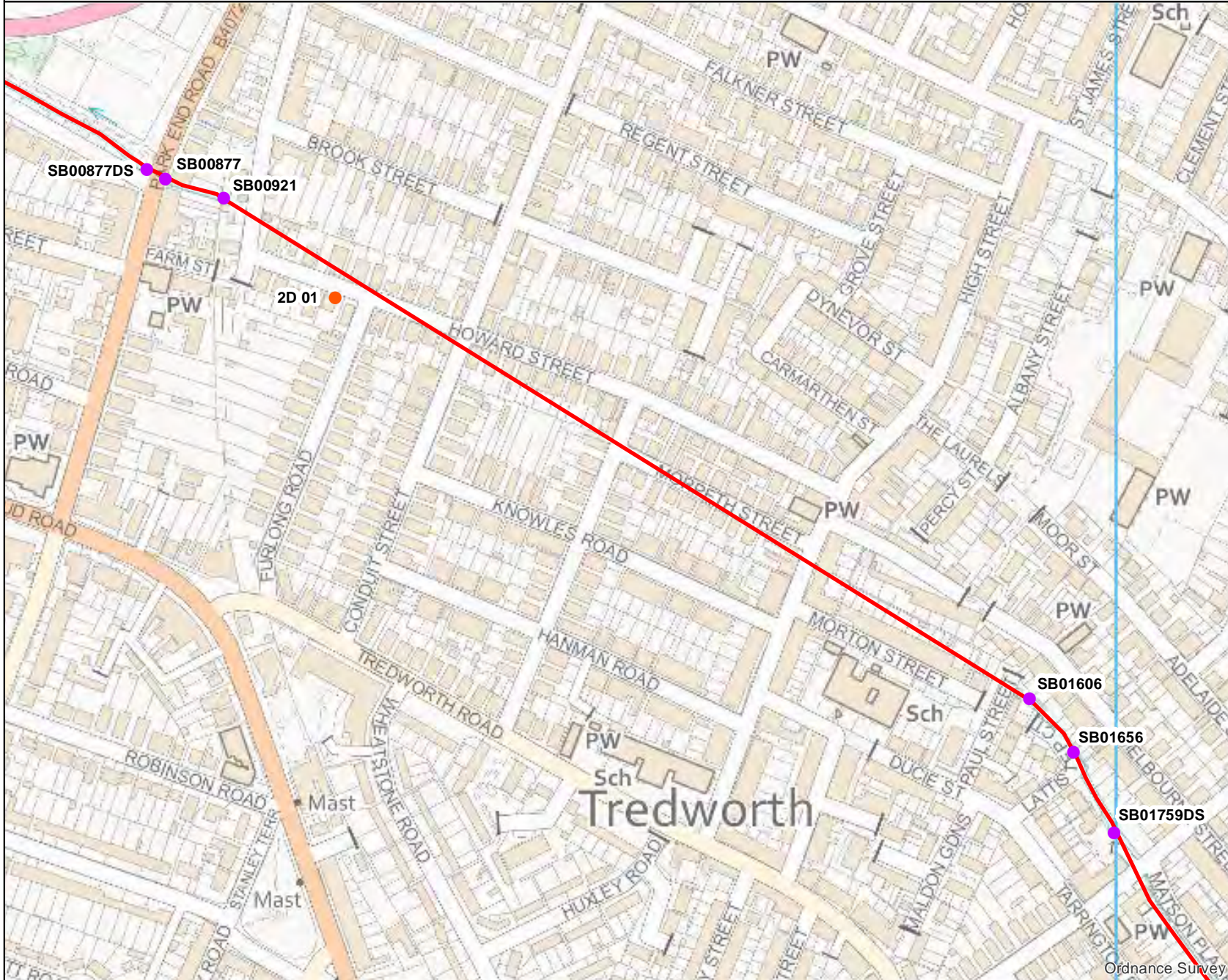
<https://www.gov.uk/guidance/flood-risk-activities-environmental-permits>.

Please be aware that Bespoke and Standard Rules permits can take up to 2 months to determine and will incur a charge.

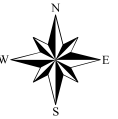
Further details about the Environment Agency information supplied can be found on the GOV.UK website:

<https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather>




Sud Brook Model Node Location Map including GL1 4UR - created 29/07/2022 [272750]



Scale 1: 4000



Legend

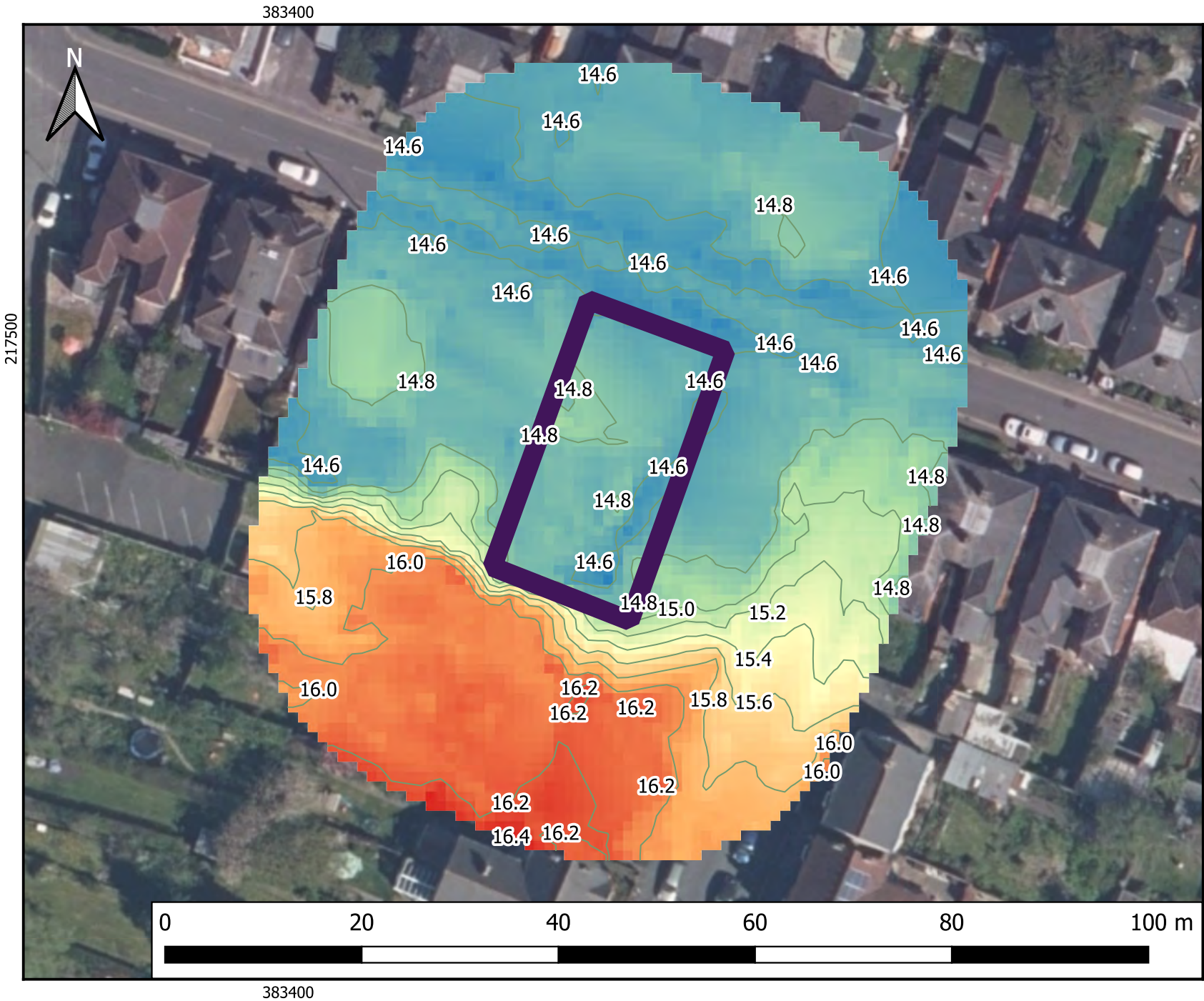
-  Main River
-  Sud Brook Model Node Point
-  2D SB Model Node Point



Created by Partnerships and Strategic Overview Team, West Midlands



Environment Agency LiDAR ground elevation data



**Elevation on Site
(LiDAR Data)**

Legend

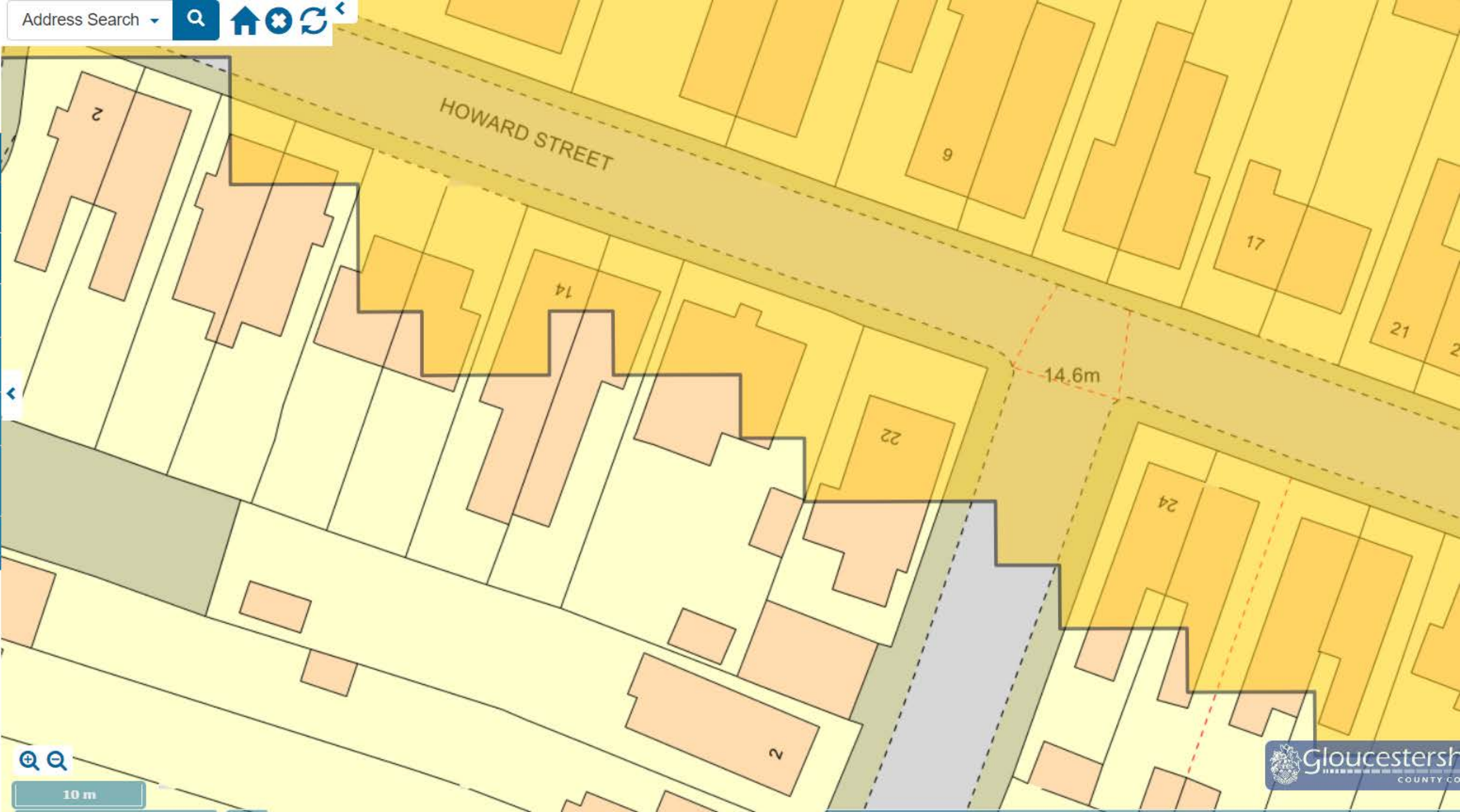
- ◆ Site Boundary
 - 0.2 m Contours
- Elevation (mAOD)
- 14.4
 - 14.9
 - 15.4
 - 15.9
 - 16.4



Local Council document mapping



- SHOW LAYERS
- Background Mapping +
 - Flooding -
 - Contours
 - SFRA Level 1 Flood Zone 3b
 - SFRA Level 1 Flood Zone 3a
 - SFRA Level 1 Flood Zone 3aCC
 - SFRA Level 1 Flood Zone 2



Disclaimer

This report has been prepared by GeoSmart in its professional capacity as soil, groundwater, flood risk and drainage specialists, with reasonable skill, care and diligence within the agreed scope and terms of contract and taking account of the manpower and resources devoted to it by agreement with its client and is provided by GeoSmart solely for the internal use of its client.

The advice and opinions in this report should be read and relied on only in the context of the report as a whole, taking account of the terms of reference agreed with the client. The findings are based on the information made available to GeoSmart at the date of the report (and will have been assumed to be correct) and on current UK standards, codes, technology and practices as at that time. They do not purport to include any manner of legal advice or opinion. New information or changes in conditions and regulatory requirements may occur in future, which will change the conclusions presented here.

This report is confidential to the client. The client may submit the report to regulatory bodies, where appropriate. Should the client wish to release this report to any other third party for that party's reliance, GeoSmart may, by prior written agreement, agree to such release, provided that it is acknowledged that GeoSmart accepts no responsibility of any nature to any third party to whom this report or any part thereof is made known. GeoSmart accepts no responsibility for any loss or damage incurred as a result, and the third party does not acquire any rights whatsoever, contractual or otherwise, against GeoSmart except as expressly agreed with GeoSmart in writing.

For full T&Cs see <http://geosmartinfo.co.uk/terms-conditions>

Important consumer protection information

This search has been produced by GeoSmart Information Limited, Suite 9-11, 1st Floor, Old Bank Buildings, Bellstone, Shrewsbury, SY1 1HU.

Tel: 01743 298 100

Email: [REDACTED]

GeoSmart Information Limited is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

The Search Code:

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom.
- sets out minimum standards which firms compiling and selling search reports have to meet.
- promotes the best practice and quality standards within the industry for the benefit of consumers and property professionals.
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.
- By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

The Code's core principles

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports.
- act with integrity and carry out work with due skill, care and diligence.
- at all times maintain adequate and appropriate insurance to protect consumers.
- conduct business in an honest, fair and professional manner.
- handle complaints speedily and fairly.
- ensure that products and services comply with industry registration rules and standards and relevant laws.
- monitor their compliance with the Code.

Complaints

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award up to £5,000 to you if the Ombudsman finds that you have suffered actual financial loss and/or aggravation, distress or inconvenience as a result of your search provider failing to keep to the Code.

Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

TPOs contact details:

The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire SP1 2BP
Tel: 01722 333306
Fax: 01722 332296
Email: admin@tpos.co.uk

You can get more information about the PCCB from www.propertycodes.org.uk.

Please ask your search provider if you would like a copy of the search code

Complaints procedure

GeoSmart Information Limited is registered with the Property Codes Compliance Board as a subscriber to the Search Code. A key commitment under the Code is that firms will handle any complaints both speedily and fairly. If you want to make a complaint, we will:

- Acknowledge it within 5 working days of receipt.
- Normally deal with it fully and provide a final response, in writing, within 20 working days of receipt.
- Keep you informed by letter, telephone or e-mail, as you prefer, if we need more time.
- Provide a final response, in writing, at the latest within 40 working days of receipt.
- Liaise, at your request, with anyone acting formally on your behalf.

If you are not satisfied with our final response, or if we exceed the response timescales, you may refer the complaint to The Property Ombudsman scheme (TPOs): Tel: 01722 333306, E-mail:

[REDACTED]

We will co-operate fully with the Ombudsman during an investigation and comply with his final decision. Complaints should be sent to:

[REDACTED]

Commercial Director

GeoSmart Information Limited

Suite 9-11, 1st Floor,

Old Bank Buildings,

Bellstone, Shrewsbury, SY1 1HU

[REDACTED]

[REDACTED]

12. Terms and conditions, CDM regulations and data limitations



Terms and conditions can be found on our website:

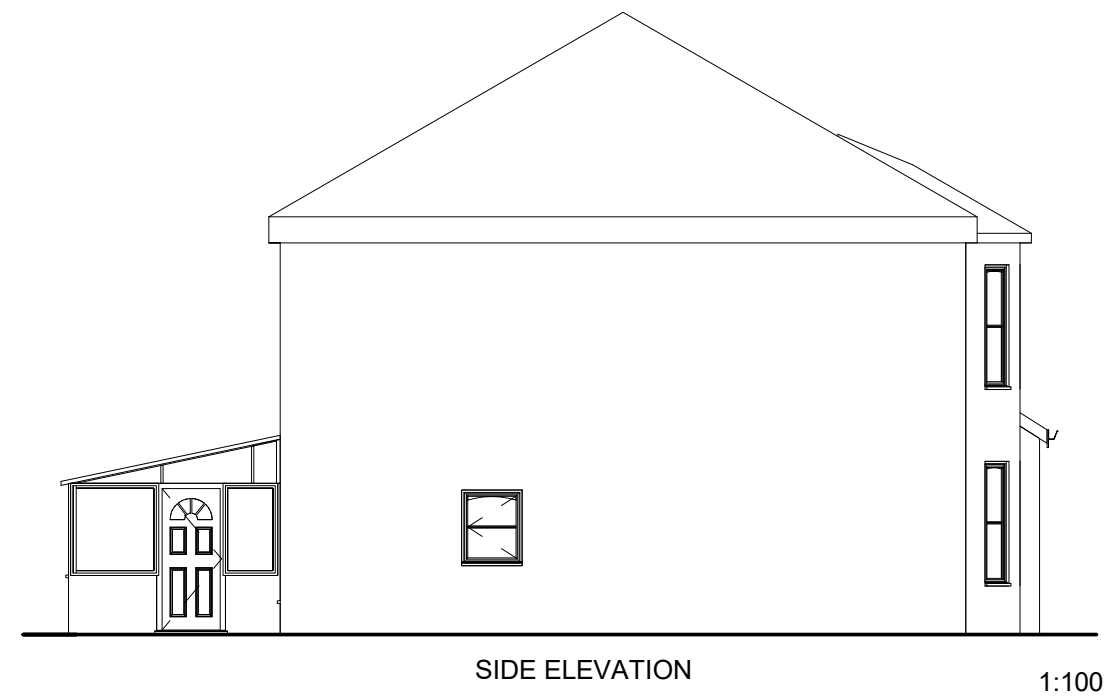
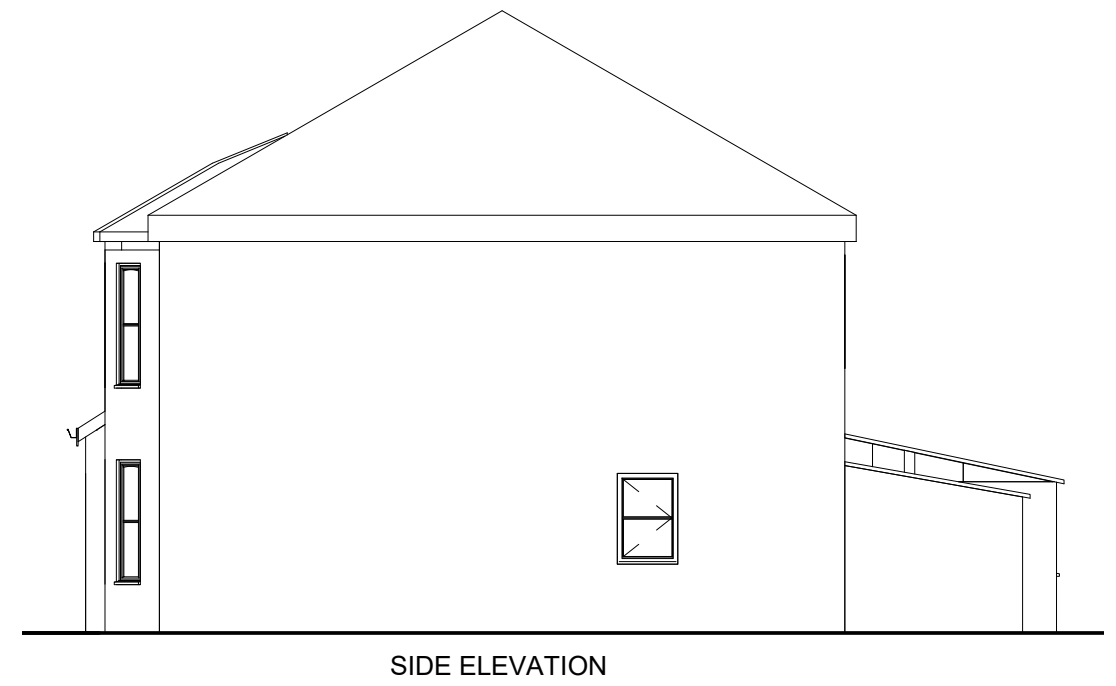
<http://geosmartinfo.co.uk/terms-conditions/>

CDM regulations can be found on our website:

<http://geosmartinfo.co.uk/knowledge-hub/cdm-2015/>

Data use and limitations can be found on our website:

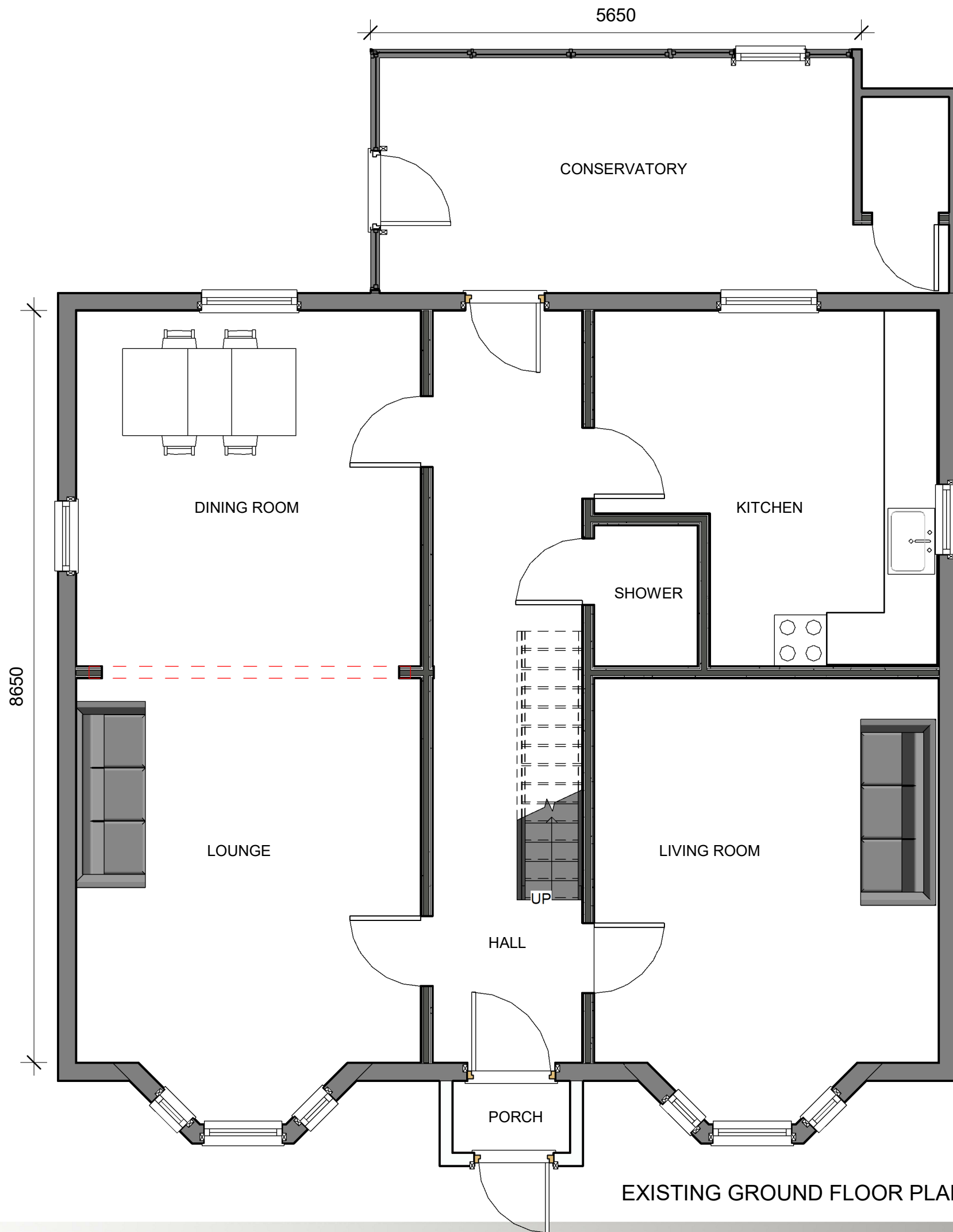
<http://geosmartinfo.co.uk/data-limitations/>



EXISTING ELEVATIONS



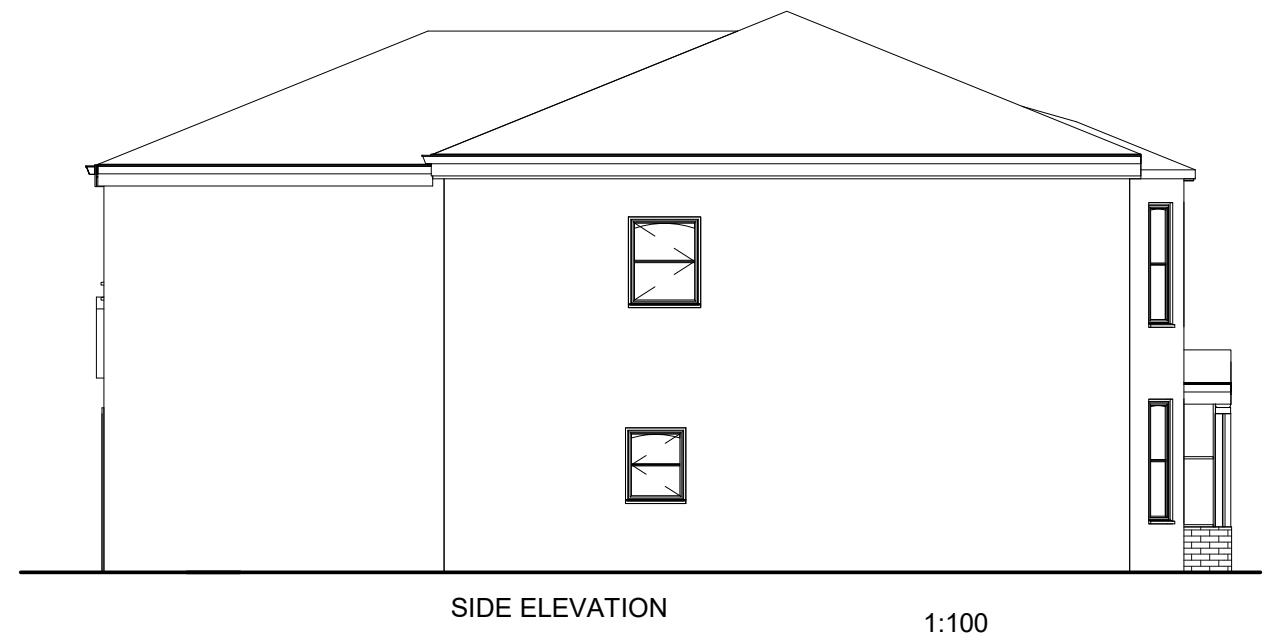
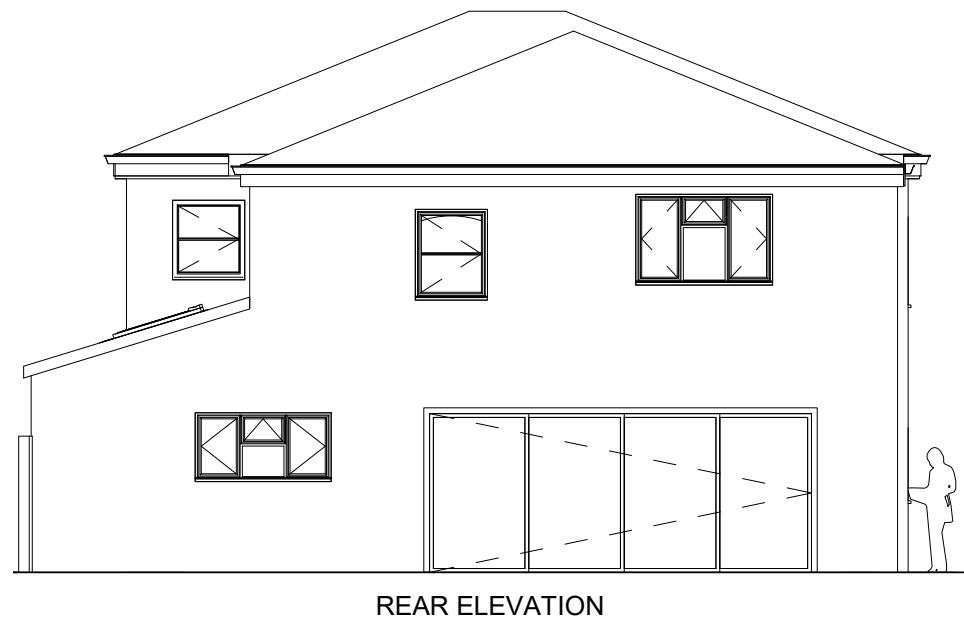
Project: 18 Howard Street
Client: Mrs Fatima Jaffer
Drawing: Existing Elevation
Drawn By Lloyd Gordon
Date: 05/03/2022
Scale: 1:100@A3
Revision: 0



EXISTING GROUND FLOOR PLAN



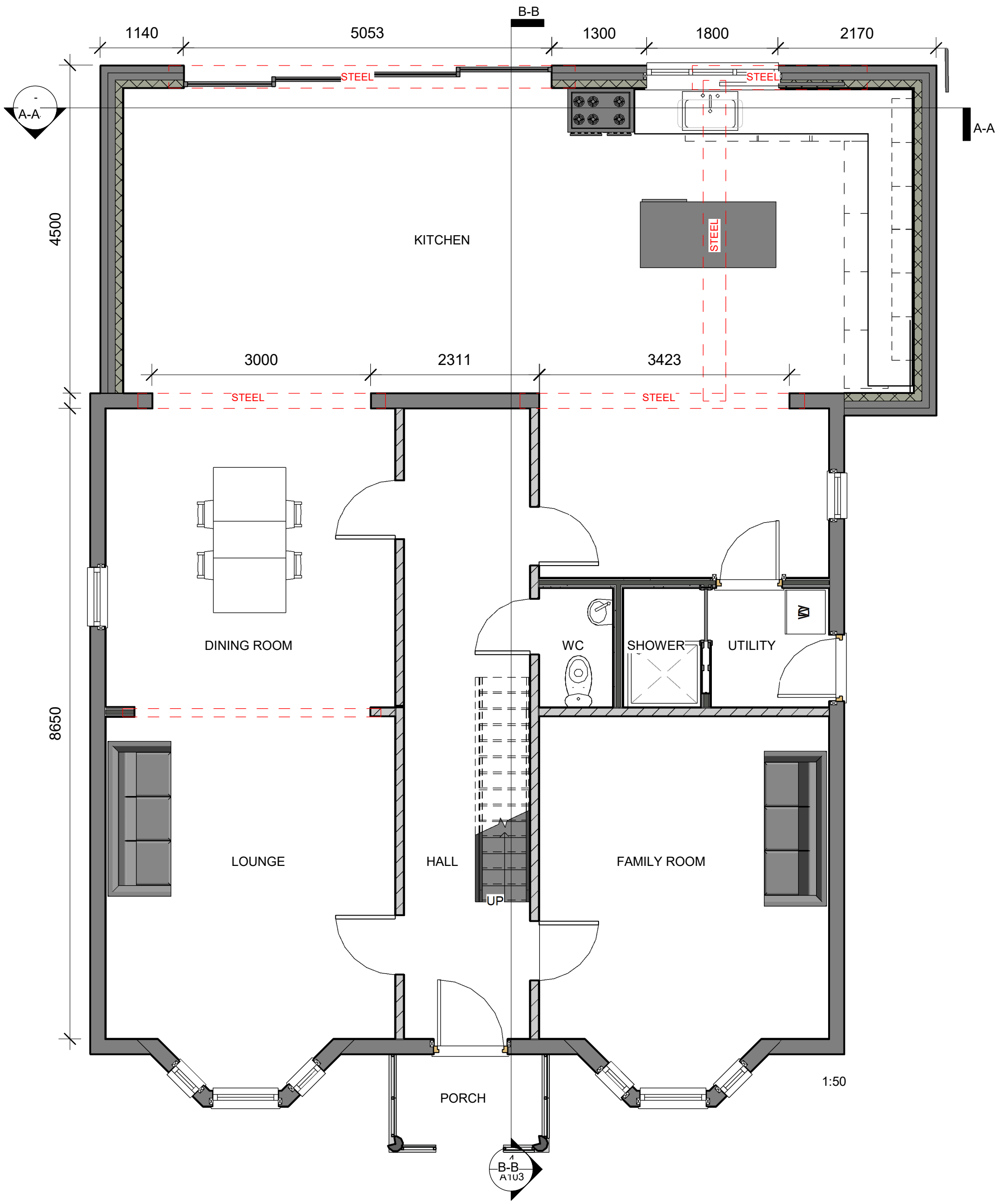
Project: 18 Howard Street
 Client: Mrs Fatima Jaffer
 Drawing: Existing Ground Floor Plan
 Drawn By Lloyd Gordon
 Date: 05/03/2022
 Scale: 1:50@A3
 Revision: 0



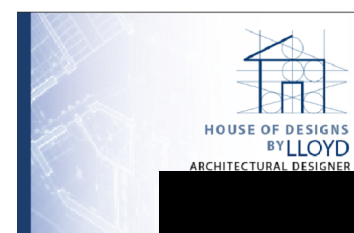
PROPOSED ELEVATIONS



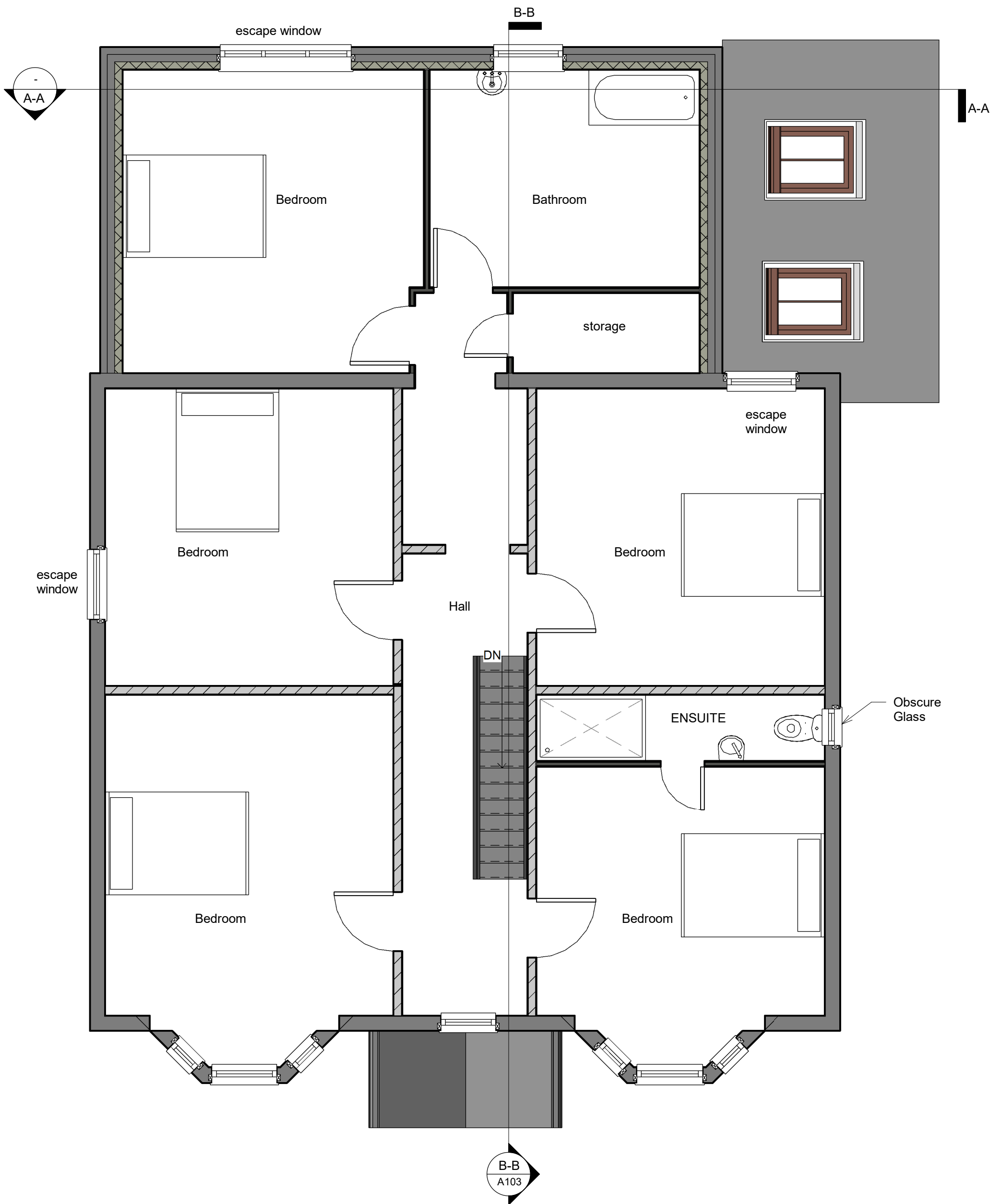
Project: 18 Howard Street
 Client: Mrs Fatima Jaffer
 Drawing: Proposed Elevation
 Drawn By Lloyd Gordon
 Date: 12/06/2022
 Scale: 1:100@A3
 Revision: 0



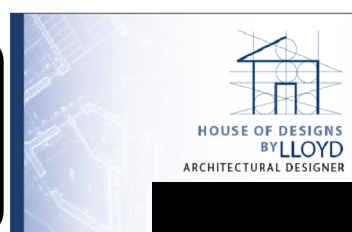
PROPOSED GROUND FLOOR PLAN



Project: 18 Howard Street
 Client: Mrs Fatima Jaffer
 Drawing: Proposed Ground Floor Plan
 Drawn By Lloyd Gordon
 Date: 12/06/2022
 Scale: 1:50@A3
 Revision: 0



PROPOSED FIRST FLOOR PLAN



Project: 18 Howard Street
 Client: Mrs Fatima Jaffer
 Drawing: Proposed First Floor Plan
 Drawn By Lloyd Gordon
 Date: 12/06/2022
 Scale: 1:50@A3
 Revision: 0



3D VIEW OF FRONT



3D VIEW OF REAR



RENDER OF KITCHEN (A)



RENDER OF KITCHEN (B)

PROPOSED RENDERS



Project: 18 Howard Street
Client: Mrs Fatima Jaffer
Drawing: Proposed Renders
Drawn By Lloyd Gordon
Date: 12/06/2022
Scale: @A3
Revision: 0