



Stage 2 Flood Risk Assessment

41 Overmead, Shoreham-By-Sea BN43 5NS
Proposed End-of-Terrace Two Storey House
Planning reference: AWDM/0080/24

Client

Foxan Ltd

41 Overmead
Shoreham-By-Sea
BN43 5NS
Ref: 13086
Date: May 2024

Consulting Engineers

GTA Civils & Transport Ltd

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Issue	Issue date	Compiled	Checked
Preliminary Issue	29 April 2024	JP	MR
First Issue	01 May 2024	JP	MR
Second Issue	24 October 2024	JP	MR

1 Introduction

- 1.1 GTA Civils Ltd. was appointed by Foxan Ltd to provide a Stage 2 Flood Risk Assessment (FRA) report in relation to the proposed 2-storey house at 41 Overmead, Shoreham-By-Sea BN43 5NS. No responsibility is accepted to any third party for all or part of this study in connection with this or any other development.
- 1.2 GTA Civils & Transport Limited was appointed by the client to provide a Flood Risk Assessment (FRA) as required by the Environment Agency and Adur District Council in order to achieve Planning Approval at said property.
- 1.3 This report will take the form of a formal Flood Risk Assessment in accordance with the 2023 National Planning Policy Framework (NPPF) and the current Planning Practice Guidance (PPG).
- 1.4 This report supports planning application reference: AWDM/0080/24.
- 1.5 The second version of this report has been prepared following a meeting with the LLFA engineer, Katherine Waters (WSP in collaboration with Adur Council). This report has been amended to reflect the changes in the EA's Standing Advice, which was updated earlier in 2024.

2 Existing Site and Current Flood Conditions

- 2.1 The application site lies within the area administered by Adur District Council (CDC). It comprises a 2-storey end of terrace dwelling house, parking and garden. A site location map and aerial view are shown in Appendix A.
- 2.2 Hydrology: the River Adur flows broadly southwards approximately 570m to the west.
- 2.3 Topography: a topographic survey was commissioned – see Appendix C. The direction of fall is broadly north to south, with levels ranging between 6.25m AOD at the most northern corner and 5.6m AOD (approximately) in the southern corner. The ground floor level (FFL) of #41 is 5.56m AOD. The approximate average gradient is 1 in 40.
- 2.4 Geology: The BGS's online geology map shows the solid geology is Newhaven Chalk - with Head Deposits (clay, silt, sand and gravel) overlying. Much depends on the depth and nature of the drift stratum: infiltration features may be viable if these are non-cohesive or very shallow.
- 2.5 Public sewers: Southern Water's sewer records are shown in Appendix C. A 150mmØ foul sewer flows north-south under Mill Lane; a 225mmØ public surface water sewer originates SW of the site, flowing west along Overmead. Neither of the 2 closest manholes have their invert levels recorded, however. The presence of storm sewers in this area would indicate that the Head deposits extend unduly, ie soakaways are unlikely to be prevalent.
- 2.6 Fluvial/Tidal flooding: the Environment Agency's (EA) Rivers and Seas flood map in Appendix B indicates the whole site lies in tidal/coastal FZ1 (Low Risk).
- 2.7 Surface water flooding: this can occur when excess rainwater does not infiltrate into the ground, or is not intercepted by urban drainage systems, and instead flows across the surface. The EA's Online 'Surface Water Depth - Low Risk Scenario' (1 in 1000 years) Flood Map in Appendix B shows some external areas of the site are liable to flood. The dwelling house is – broadly - clear of this extreme threat.
- 2.8 The ScalgoLive Maps in Appendix B show the EA's surface water flood depth map (in the 1000yrs event – Low Risk). The first map shows all the flooding while the second has the minimum depth setting of 10mm: this portrays all areas with flood depth <10mm as not flooding. The third map in this series in Appendix B shows the 10mm map superimposed on to the topographic survey. The zero flood level nearest to the middle of the site is estimated at 5.95m AOD – which makes the flood level in this event **5.96m AOD** (adding 0.01m to 5.95m AOD.)
- 2.9 Climate Change: Flood Risk engineers usually accept that the EA's 'Low Risk - 1 in 1000yrs' surface water flood map is broadly equivalent to the '1 in 100 years + predicted effects of Climate Change' scenario where there is no published / bespoke modelling available for this scenario.

- 2.10 Artificial sources: flooding from reservoirs, canals and docks. The EA's Reservoirs Flood Map in Appendix B shows the site is not liable to flood from this source. There are no docks or canals nearby with Shoreham Harbour some distance to the south – at a lower elevation.
- 2.11 Historical Flooding: DEFRA's historical flood map in Appendix B shows the site has not been affected by flooding in the past.
- 2.12 Groundwater Flooding: ADC's Strategic Flood Risk Assessment (SFRA) shows no indication that this vicinity is liable to flood from this source. The Head geology is likely to provide a cap on rising water table levels.
- 2.13 In conclusion, the flood risk profile of the site is High – due primarily to the site affected by surface water flooding in the 1000yrs event, which is equivalent to the 100yrs + Climate Change event.

3 Proposed Development, The Sequential Test & Mitigation

- 3.1 The proposed scheme is to build a 2-storey end-of-terrace dwelling house.
- 3.2 The site lies in the surface water floodplain, equivalent to FZ3A - once climate change is factored in.
- 3.3 Sequential / Exception Tests: The Sequential and Exception Tests are policy mechanisms created to steer 'vulnerable use' developments away from high risk zones to lower risk zones – unless wider planning benefits exist that offset the flood risk issues.
- 3.4 The ruling of a test case in the Court of Appeal (Civil Division) in January 2024 (The King v The Secretary of State for Energy, East Anglia One North Ltd. and East Anglia Two Ltd.) confirmed that sites that are in surface water FZ2/FZ3 are exempt from having to consider the Sequential Test.
- 3.5 For full compliance of the NPPF, new dwellings' ground floor levels should be set at a minimum of + 0.3m above the '1% + CC' level – provided that there is no sleeping accommodation on the ground floor. The floor level of the accommodation areas shall be set at **6.29m AOD**. (The entrance area will be set at 6.14m AOD, which is above the critical flood level.)
- 3.6 Setting the floor level at 0.6m above the predicted flood level was considered – but was dismissed due to planning and building regulations constraints.
- 3.7 Flood Mitigation: The ground floor shall be of raised suspended concrete beam and block construction.
- 3.8 Flood resilience measures are proposed. 0.60m high demountable flood barriers are proposed to each external doorway. These shall protect the dwelling in lesser storm intensities, as there will be many more occurrences of these than the 1 in 100 years event over the development's lifetime. Floodproof airbricks shall be fitted, if needed. A non-return valve shall be fitted to the foul drain.
- 3.9 The flood depth of up to 1m is too great for resistance (barrier systems) to be safe. Standard construction can withstand hydraulic pressure up to 0.6m only. Above this level the water pressure is likely to cause a local hazardous failure – or partial collapse. For this reasoning, the ground floor and the walls up to 1.3m will be constructed using flood resilient materials and techniques.
- 3.10 The document "Improving the Flood Performance of New Buildings – Flood Resilient Construction" published by DEFRA/Environment Agency is a good source of information on resilient techniques. It is conceded that the principles set out in this will have to be modified to suit a non-residential building.
- 3.11 Flood resilient construction may include – and not necessarily limited to the following:
- Waterproof screed and/or durable flooring with integral skirting;

- Electrical distribution to be routed down from the ceiling; sockets placed above the critical level;
- Waterproofing installed up to the critical level; waterproofing will be tied in to the ground floor as appropriate; details will be provided at detailed design, to comply with building regulations;
- Plasterboard, if used, will be installed horizontally to minimise the number of sheets damaged;
- Any wood fixings below the critical level will be robust and/or protected by suitable coatings to minimise damage;
- Boilers and meter cupboards will be placed above the critical level.

- 3.12 Floodplain volume: A floodable void is proposed under the unit's ground floor – to balance floodplain volume displacement caused by the new unit's walls. This will be subject to detailed design at the next stage. The base will be a concrete lean-mix oversite laid to falls to ensure flood waters exit the void without impedance. The soffit of the void will be the highest predicted flood level.
- 3.13 There will be a minimum of 25% openings, ie 1m every 4m of perimeter wall. All openings in the external walls shall be louvred or fitted with mesh to prevent the ingress of vermin and birds. The internal walls shall be supported either by hit and miss masonry (25-30% gaps) or on clear spanning reinforced concrete beams.
- 3.14 It is understood that the NPPF provides **guidance** on the use of floodable voids: they are not considered reliable. In this case, it is contended that there is no alternative as there is no scope to balance the displaced volume on a level for level basis (and the applicant has no other land nearby to provide compensatory storage.)
- 3.15 Because the walls below the flood level will displace volume, the external ambient levels around the new unit shall be lowered by 50mm on average.
- 3.16 Safe Access To Dry Land: In order to comply with the NPPF, all occupants must be able to make their way to dry land, unassisted by the Emergency Services. This is known as 'safe access to dry land' and it does not have to be dry, just not *hazardous* (safe).
- 3.17 The access/egress of the site would be in depths of over 0.5m – but this would be limited to the brief period at the peak of flooding. This would be hazardous to all users, whether able bodied or not. Because this risk is solely pluvial, it is most likely to be of short duration. Such events can last for less than 2 hours, with the peak lasting up between 10 and 30 minutes or so. It is contended that all occupants will be able to reside at high level during such an event.
- 3.18 A Flood Warning and Evacuation Plan has been drafted, to alert the occupants of the flood risk – so that they can prepare for this eventuality – if necessary. Refer to Appendix F.

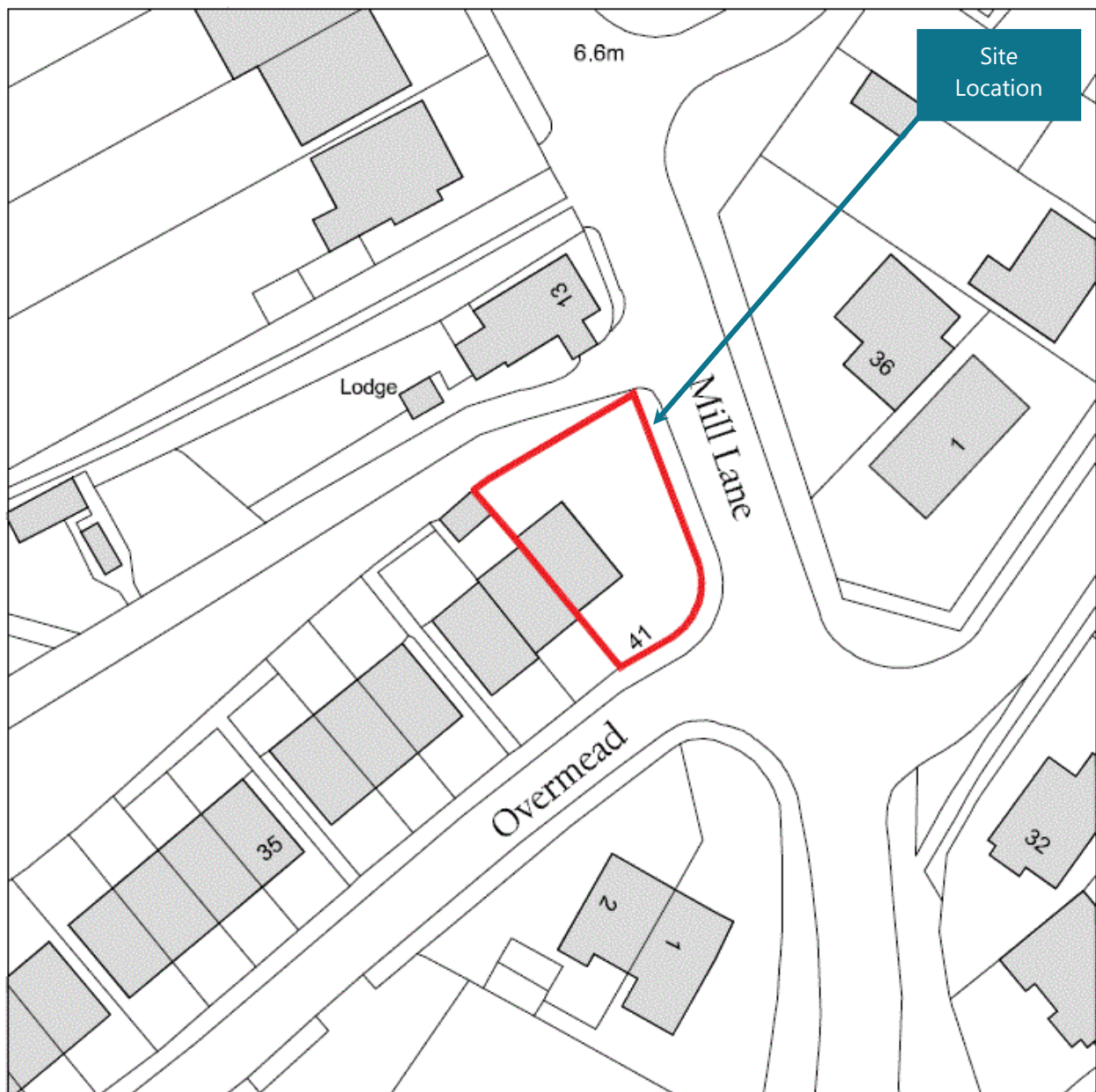
4 Sustainable Surface Water Drainage Design

- 4.1 One of the main tenets of the PPG is for new developments *not* to increase the flood risk of neighbouring/downstream properties. CIRIA's SuDS hierarchy has been applied here to determine how the development's surface water should be dealt with, this being:-
- Infiltration to ground, namely features such as soakaways, infiltration trenches and the like;
 - Discharging to a watercourse;
 - Discharging to a public sewer.
- 4.2 As concluded in section 2.5 above, the presence of public storm sewerage in this area would suggest that there is limited scope to route surface water to ground. BRE365 soil soakage testing will be undertaken during the next stage to confirm this. In the meantime, as there is a viable alternative – ie routing the surface water to the nearby sewer under Overmead, it is proposed to route the new unit's surface water to said public sewer.
- 4.3 The offsite runoff rate shall be restricted to as close to the Qbar (greenfield) runoff rate as is practically possible. As the greenfield runoff rate for a contributing area of 50m² is much less than 1l/s (the practical minimum limit of screened orifice plates) the offsite flow rate will be restricted to 1l/s.
- 4.4 A capacity check application to Southern Water will be submitted in due course to confirm this is viable.
- 4.5 Volume will be stored upstream of the control manhole. Storage volume shall be provided in a cellular attenuation tank, whose dimensions are 3m² x 0.4m deep. The MicroDrainage calculation in Appendix E shows that there is no flooding.
- 4.6 All drainage covers will be flood-proof. A non-return valve will be fitted to each network.
- 4.7 Foul water drainage: similar to the surface water network, the foul effluent would be routed to the public foul sewer in Mill Lane.
- 4.8 It is contended that this development will not increase the flood risk to this site or neighbouring sites.

- End of Report -

Appendix A

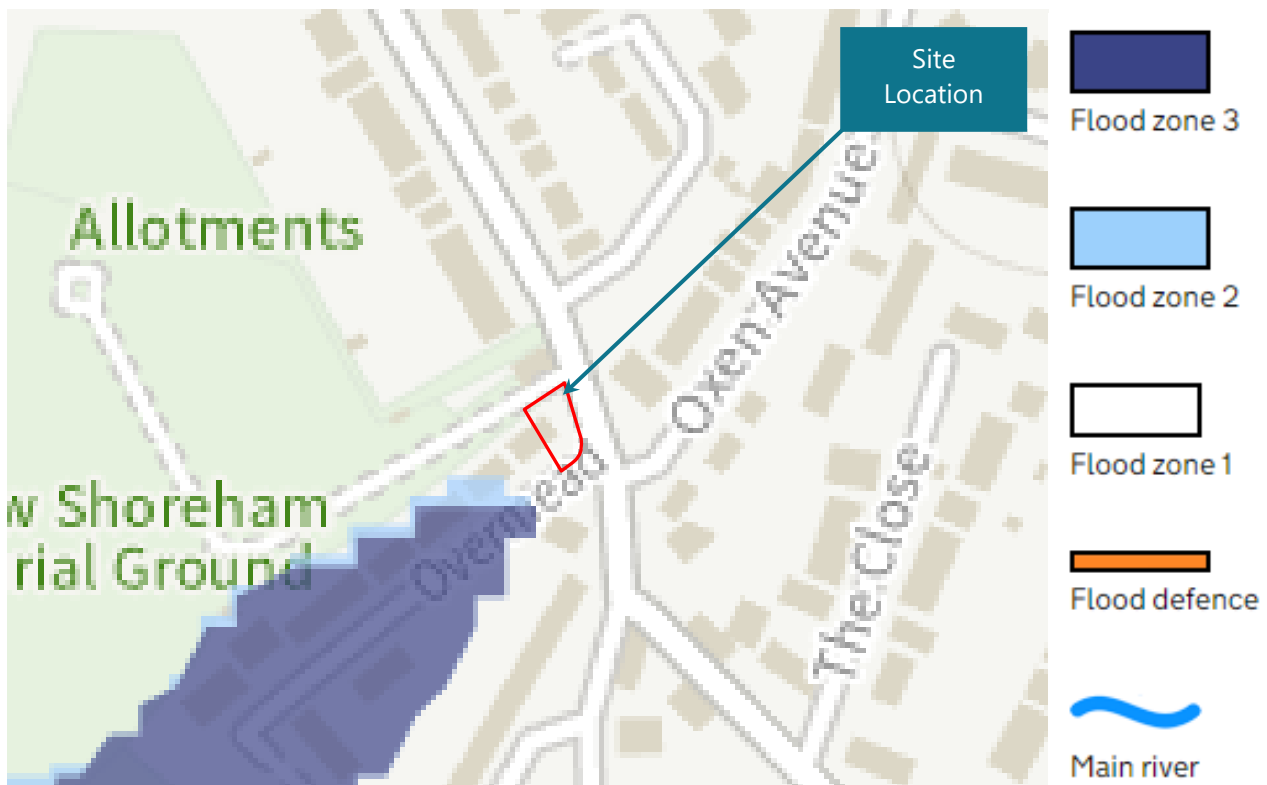
Site Location Map & Aerial Photo





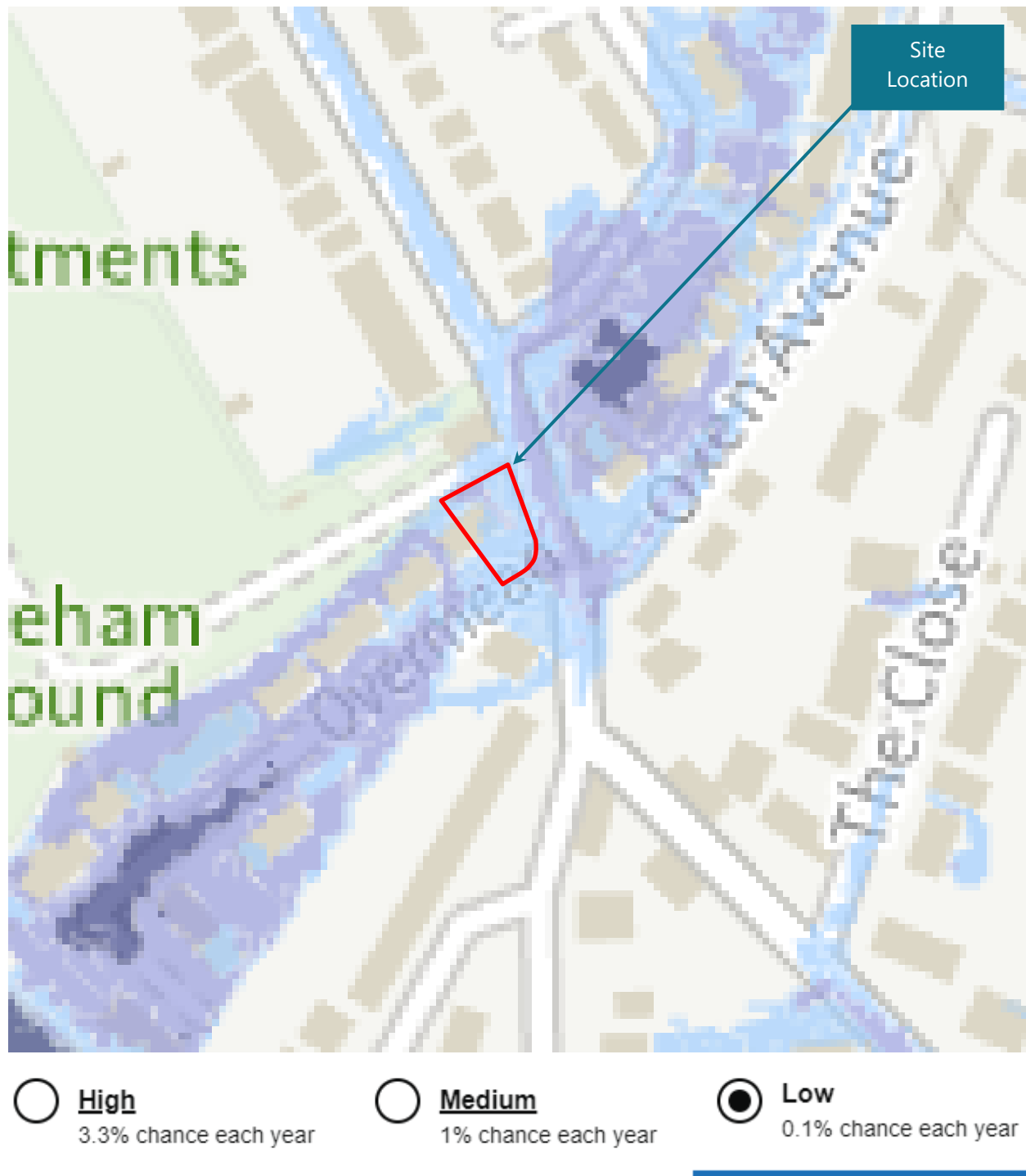
Appendix B

Environment Agency Flood Maps



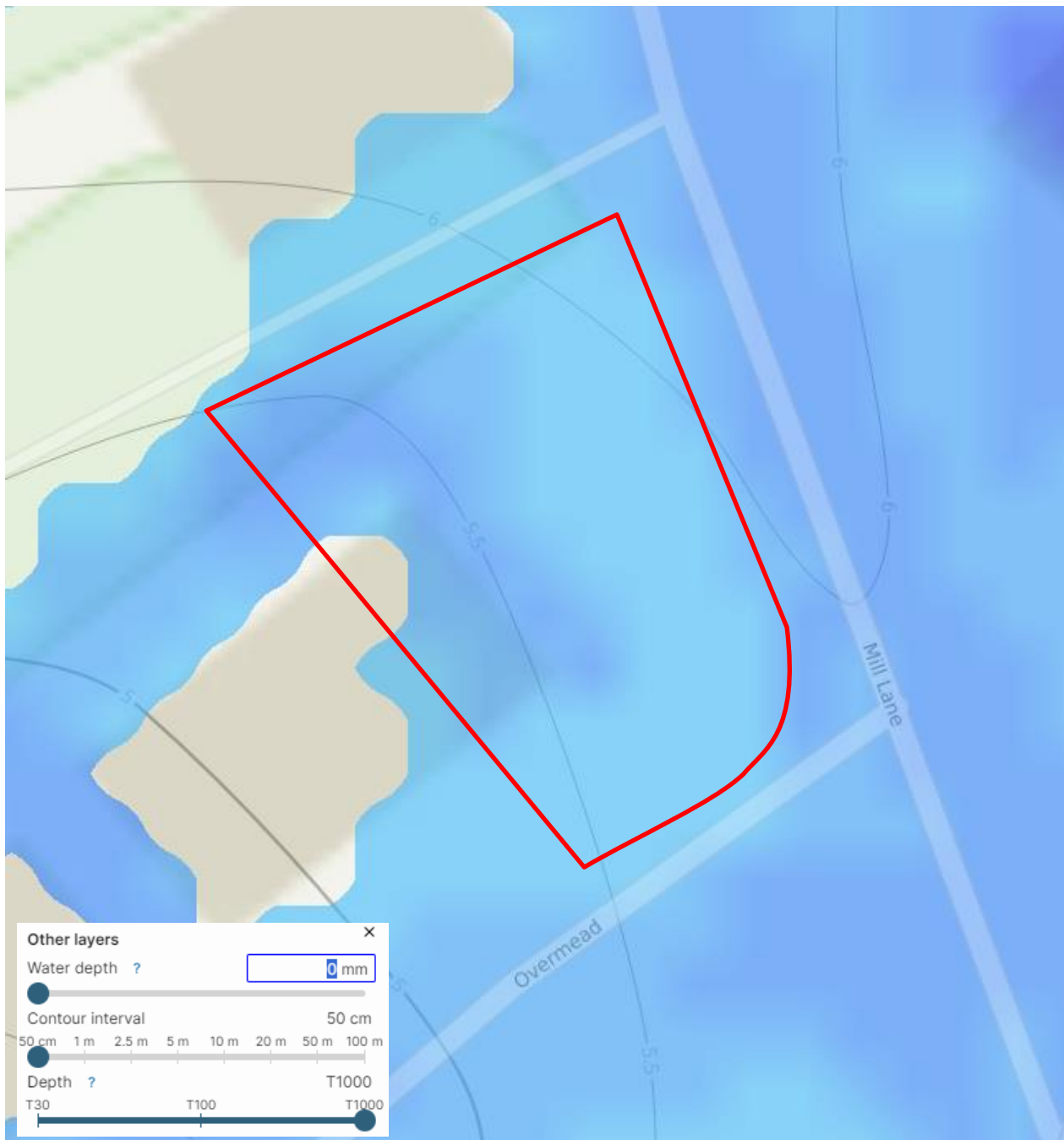
EA's Online Flood Map for Planning (Rivers and Seas)

The site lies in fluvial / tidal FZ1 (Low Risk)



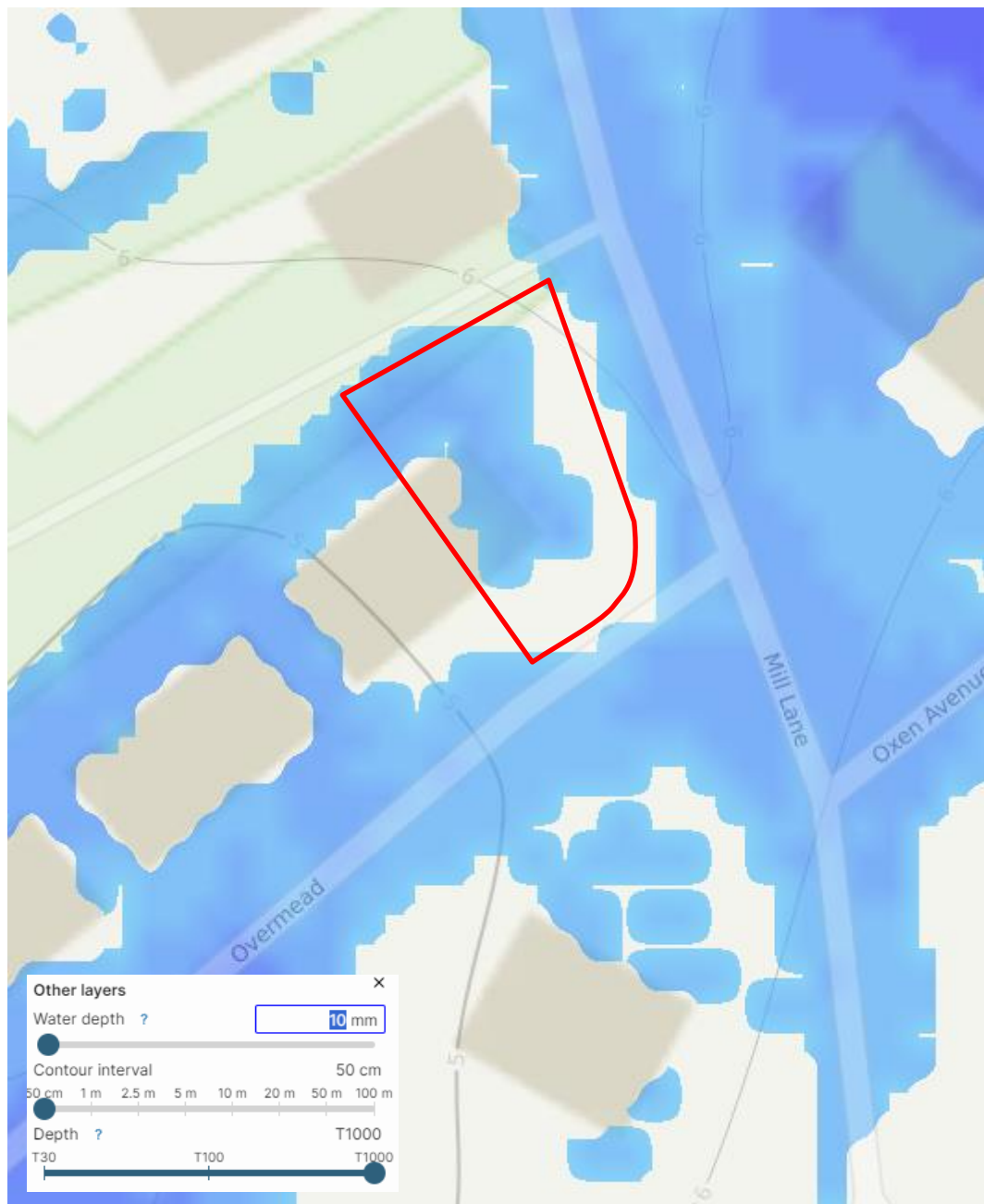
EA's Online Surface Water Flood Depth Map in a 'Low Risk Scenario'
(1 in 1000 years storm event)

The external areas are flooded in this extreme event



ScalgoLive Contour Map Showing the EA's Surface Water Flood Depth Map in a 'Low Risk Scenario' (1 in 1000 years storm event)

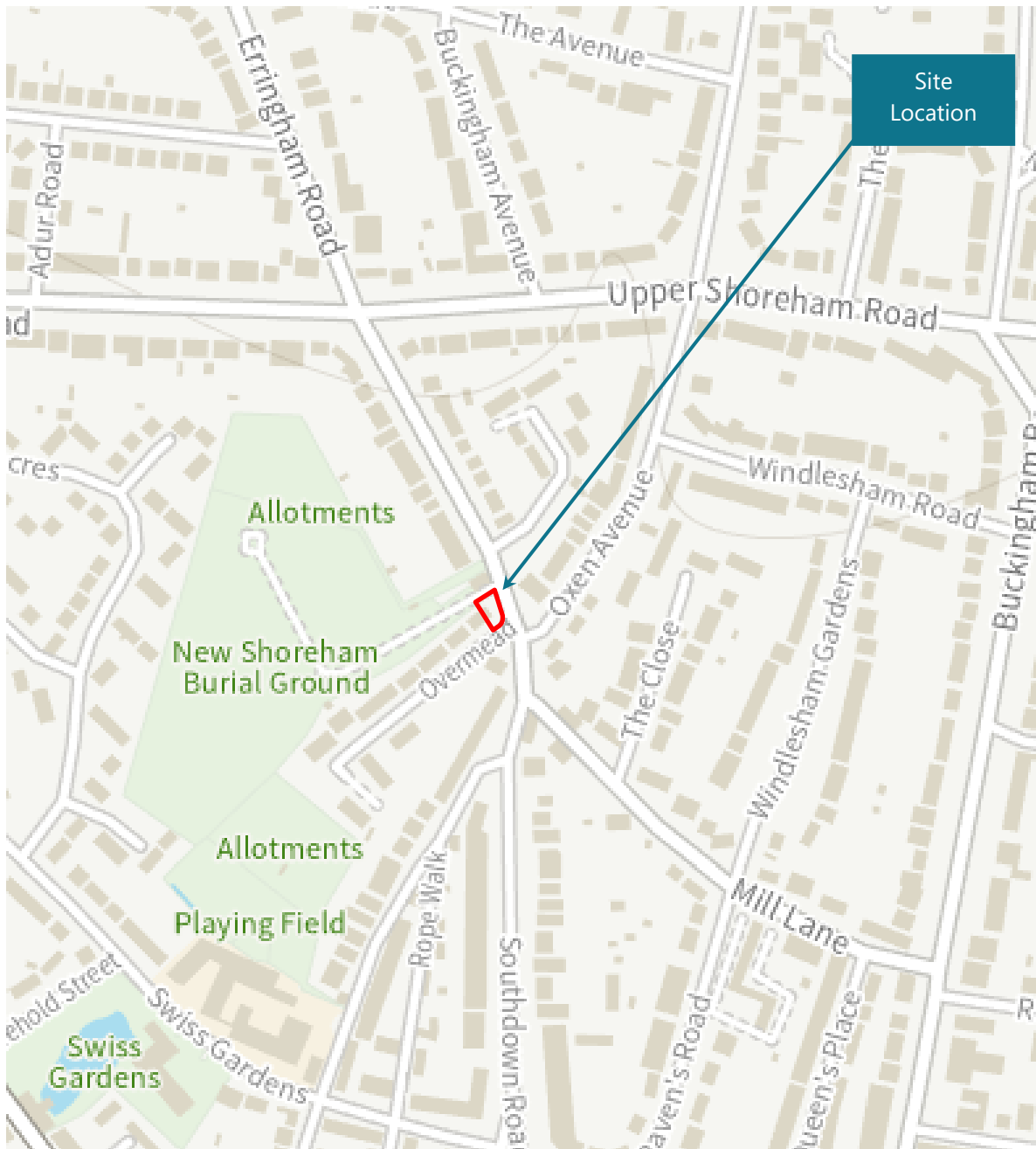
The levels fall to the SW (this map shows the same pattern as the EA's online map on the previous page – but to a better/finer resolution)



ScalgoLive Contour Map Showing the EA's Surface Water Flood Depth Map in a 'Low Risk Scenario' (1 in 1000 years storm event) Only Areas Deeper than 10mm showing

The maximum depth in the white areas is 10mm





Maximum extent of flooding from reservoirs:

● when river levels are normal
 ● when there is also flooding from rivers

EA's Online Risk of Flooding from Reservoirs' Map

The site is not liable to flood from this source

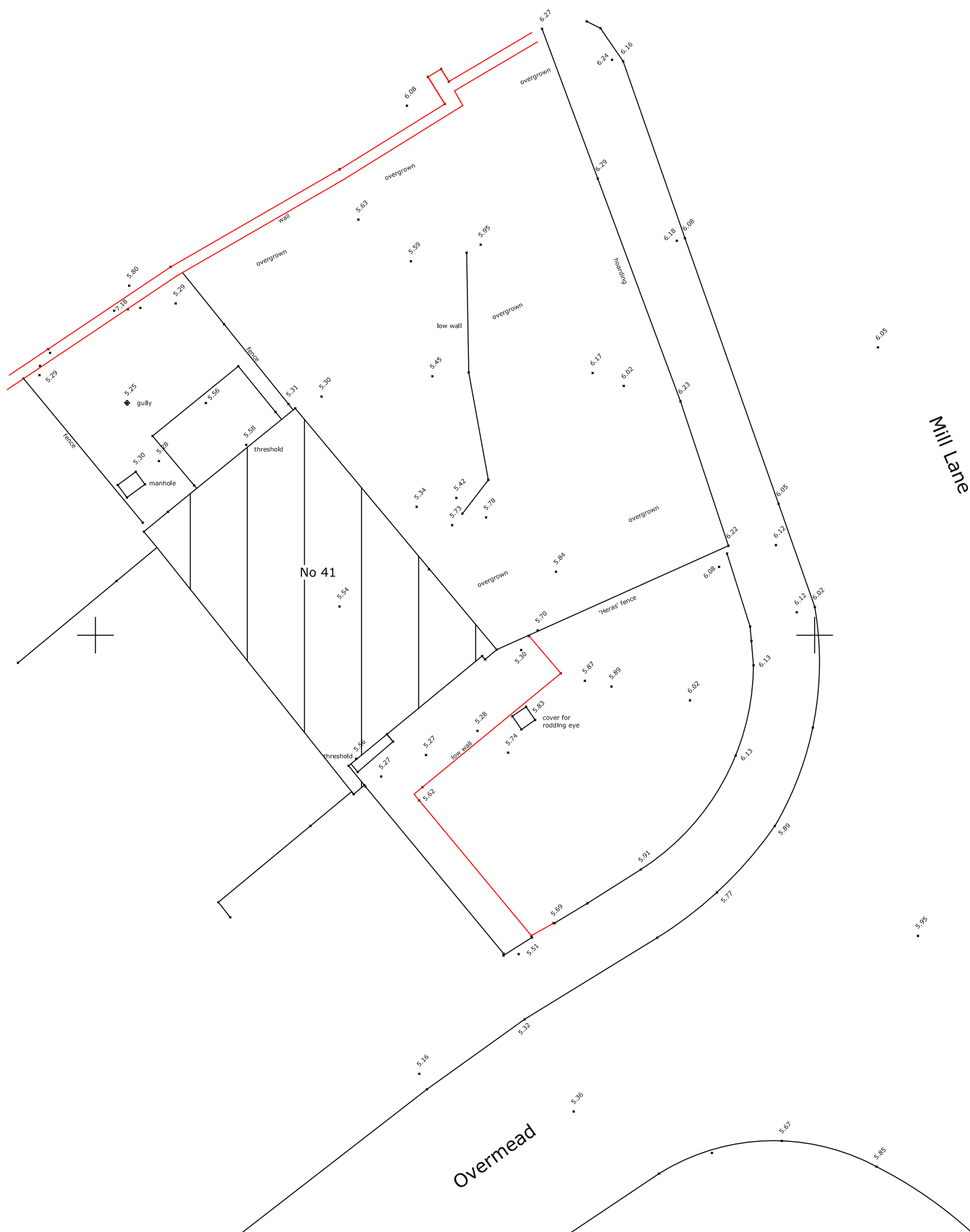


Environment Agency's Online Historical Flood Map

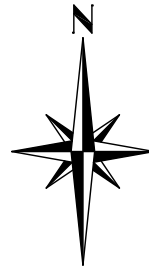
The site has not been affected by flooding in the past

Appendix C

Topographic Survey & Sewer Records



105760



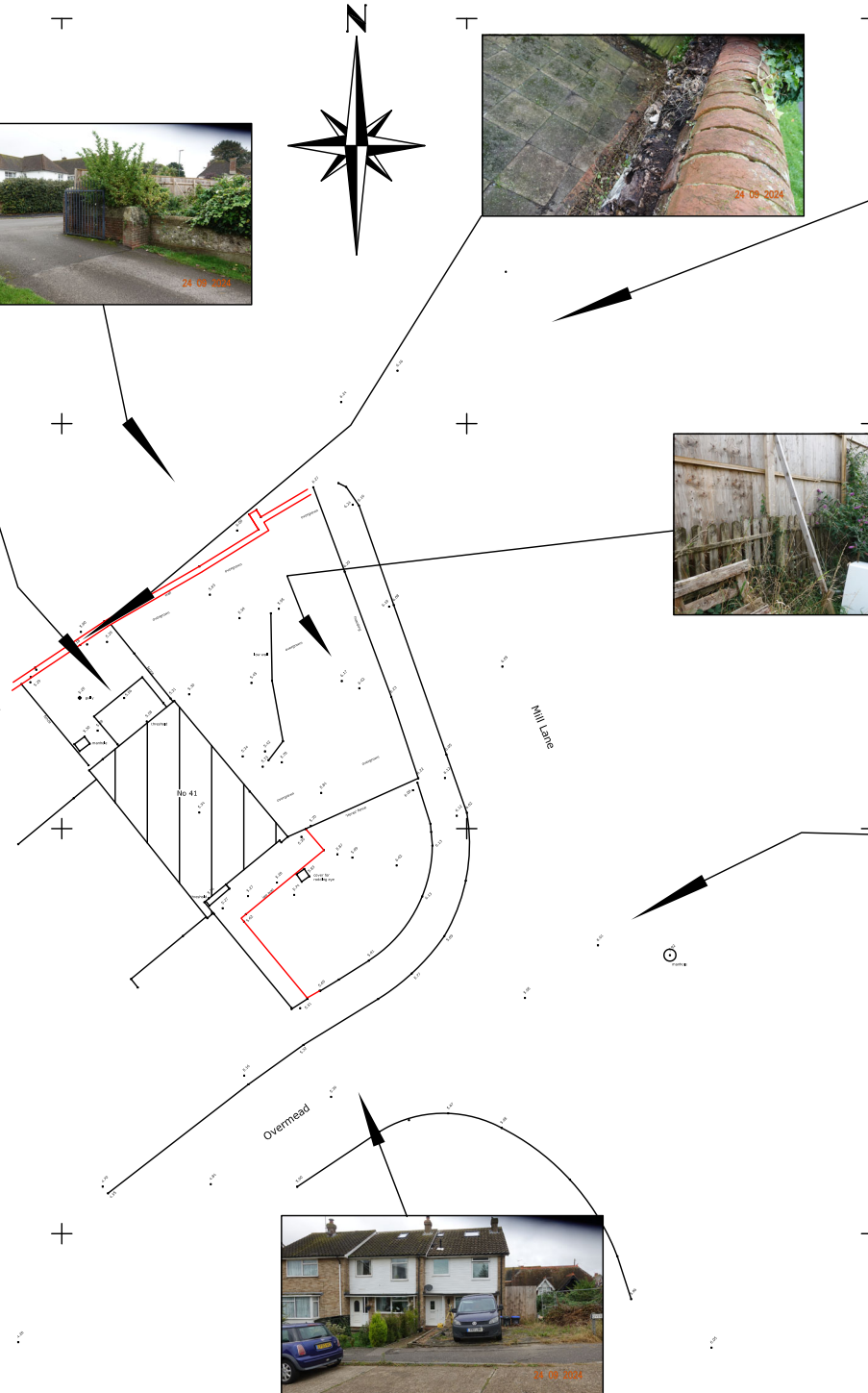
105740



105720



105700



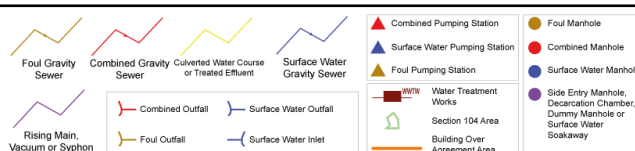


(c) Crown copyright and database rights 2024 Ordnance Survey 100031673 Date: 29/04/24 Scale: 1:1250 Map Centre: 521485,105721 Data updated: 12/04/24 Our Ref: 1456016 - 1 Wastewater Plan A4

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2024 Ordnance Survey 100031673. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.



kdaines@gtacivils.co.uk

13086/JP



[illegible][illegible]

Appendix D

Architect's Scheme Drawings

41 OVERMEAD, SHOREHAM - BY - SEA, BN43 5NS

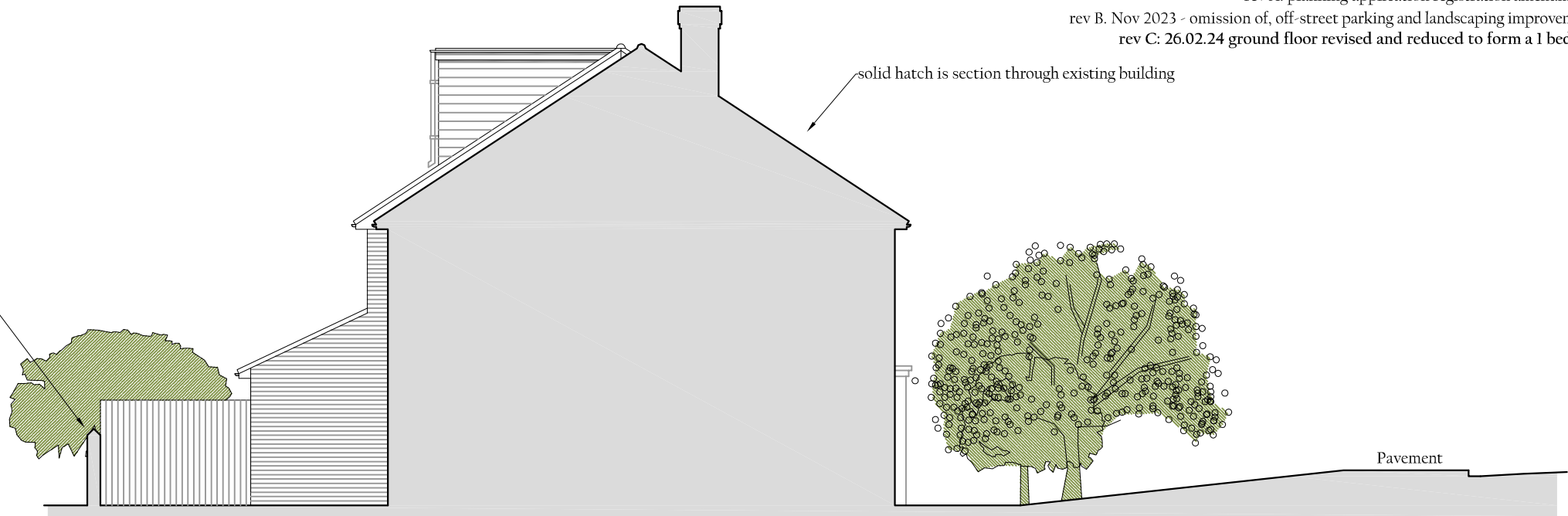
A Residential development for a proposed End-Of-Terrace to include 1 x 2 bedroom flats and 1 x 1 bedroom flat

Drawing Number 464/ A2/ 02C For Planning

rev A. planning application registration amendments.
rev B. Nov 2023 - omission of, off-street parking and landscaping improvements.
rev C: 26.02.24 ground floor revised and reduced to form a 1 bed flat.



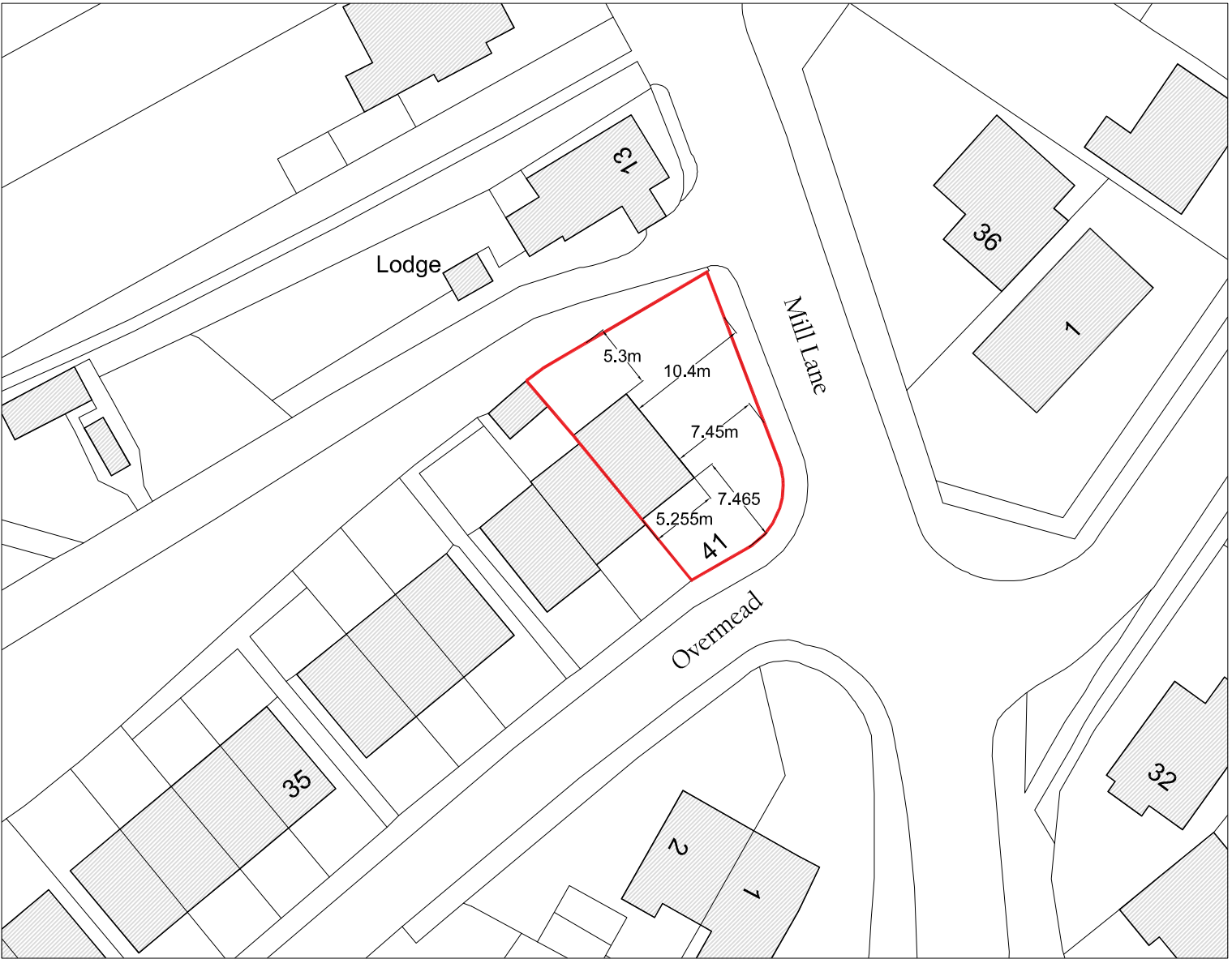
EXISTING SOUTH-WEST FACING (SIDE) ELEVATION 1:100



PROPOSED SOUTH-WEST FACING (SIDE) ELEVATION 1:100



PROPOSED NORTH-EAST FACING (SIDE) ELEVATION 1:100
WITH THE TIMBER FENCE AND MIXED HEDGE FACING MILL LANE IN FOREGROUND



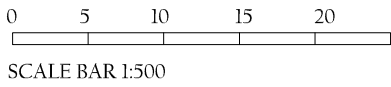
EXISTING BLOCK PLAN 1:500

NB: Block plan is based on Ordnance Survey Information. Red line indicated Application Site Boundary

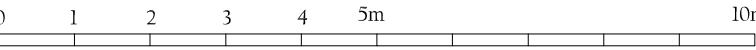


PROPOSED BLOCK PLAN 1:500

Blue hatch indicates footprint at 1st floor



SCALE BAR 1:500



SCALE BAR 1:100

JAMES BRECKELL : ARCHITECT : ARB : RIBA

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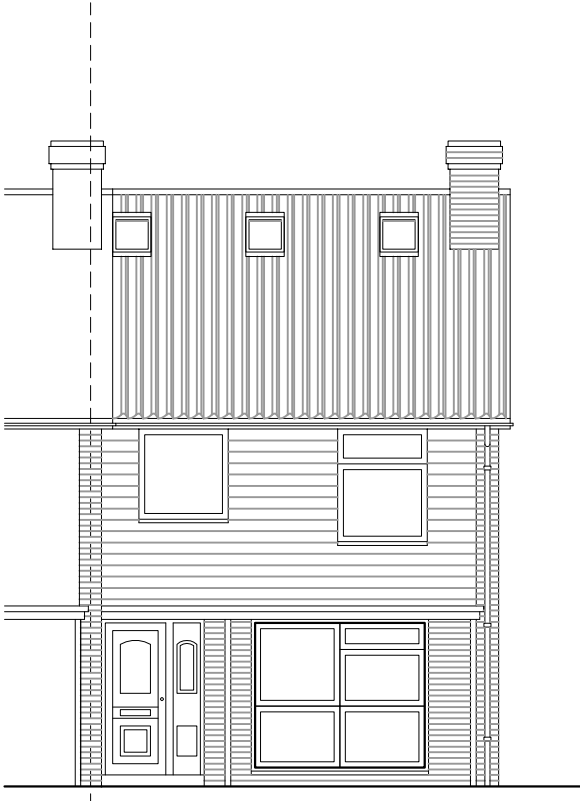
41 OVERMEAD, SHOREHAM - BY - SEA, BN43 5NS

A residential development for a proposed end-of-terrace house

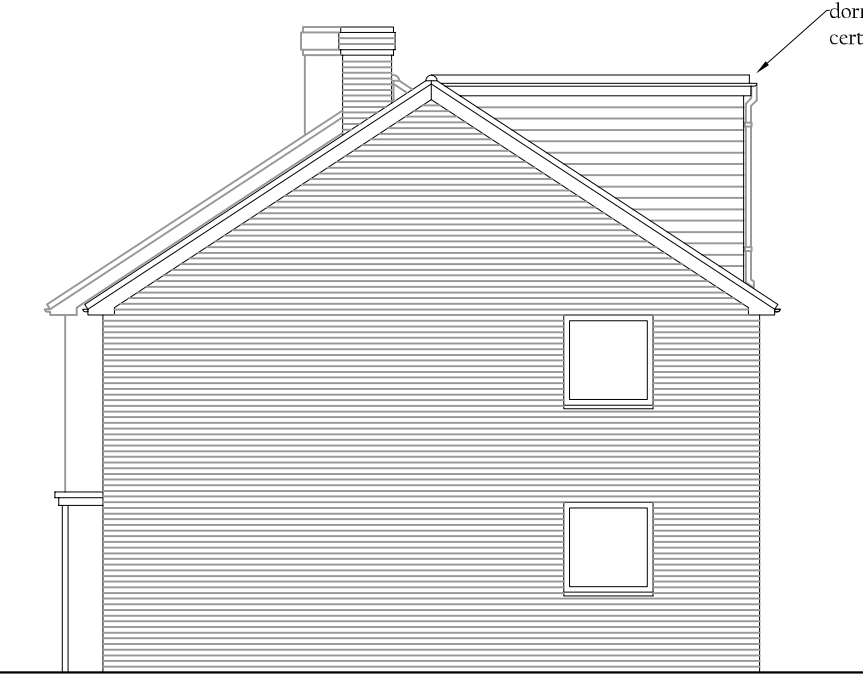
January 2024

Drawing Number 464/ A2/ 03F For Planning

rev A. planning application registration amendments
rev B. Nov 2023 - 2nd floor dormer window and roof conversion under certificate of lawfulness AWDM/0913/23
rev D. Jan 2024 - planning application drawing
rev E. Feb 2024 - (not issued with this application)
rev F. Feb 2024 - Internal alteration (as renovated)

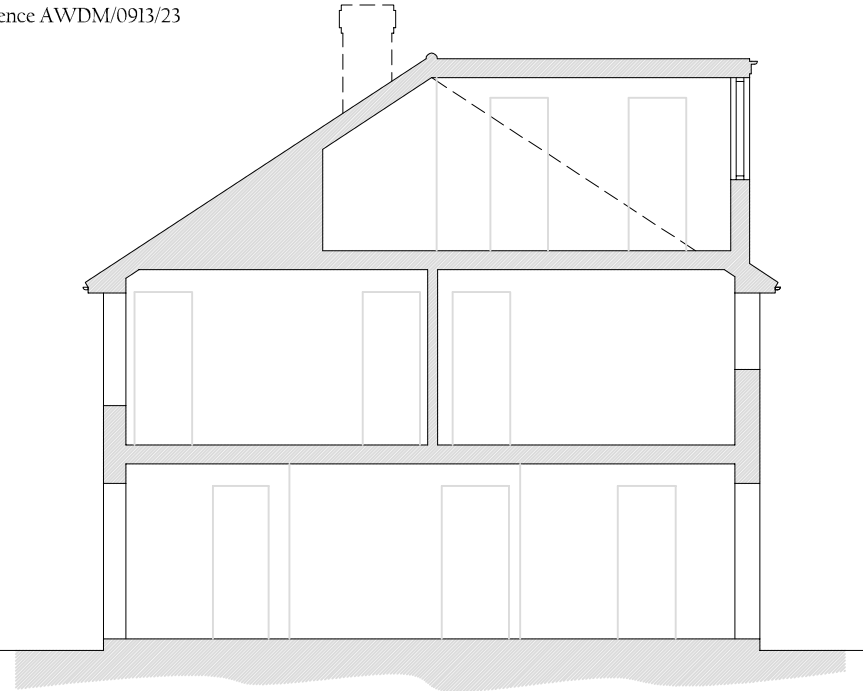


EXISTING SOUTH-EAST FACING (FRONT) ELEVATION 1:100



dormer window implemented under a certificate of lawfulness - reference AWDM/0913/23

EXISTING NORTH-EAST FACING (SIDE) ELEVATION 1:100



EXISTING SECTION 1:100

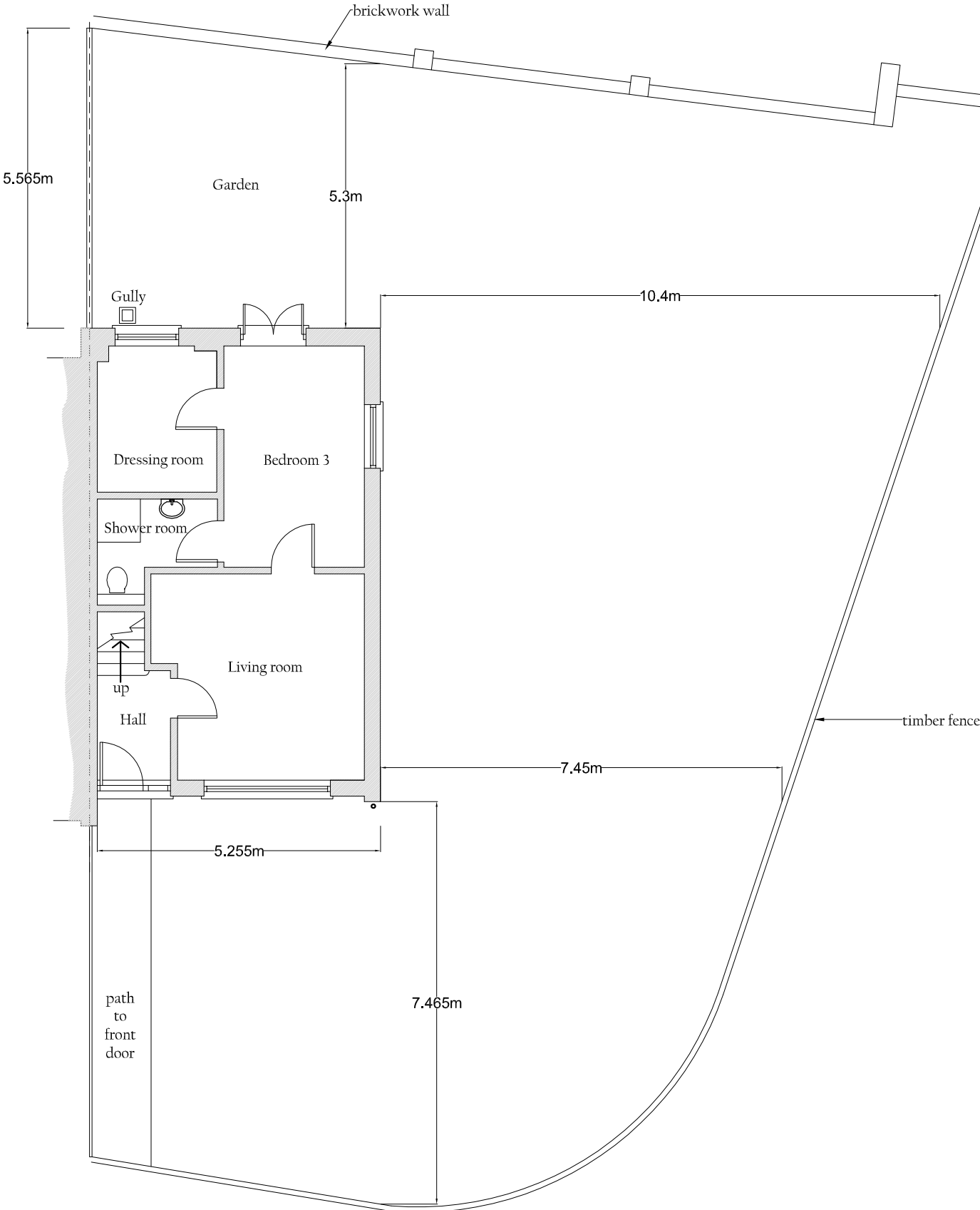
2nd Floor Level

First Floor Level

Ground Floor Level

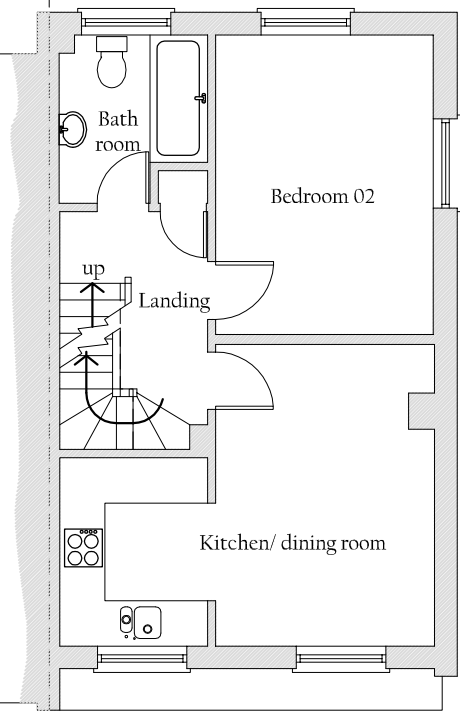


EXISTING NORTH-WEST FACING (REAR) ELEVATION 1:100



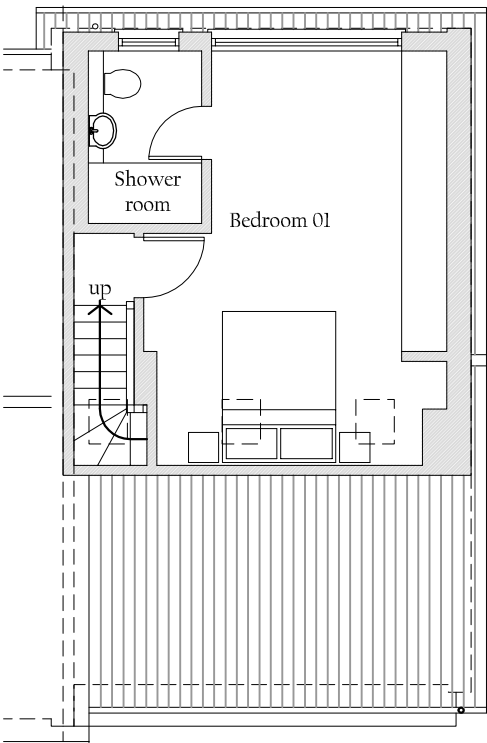
EXISTING GROUND FLOOR (AND SITE) PLAN 1:100

Floor Area : 40m.sq



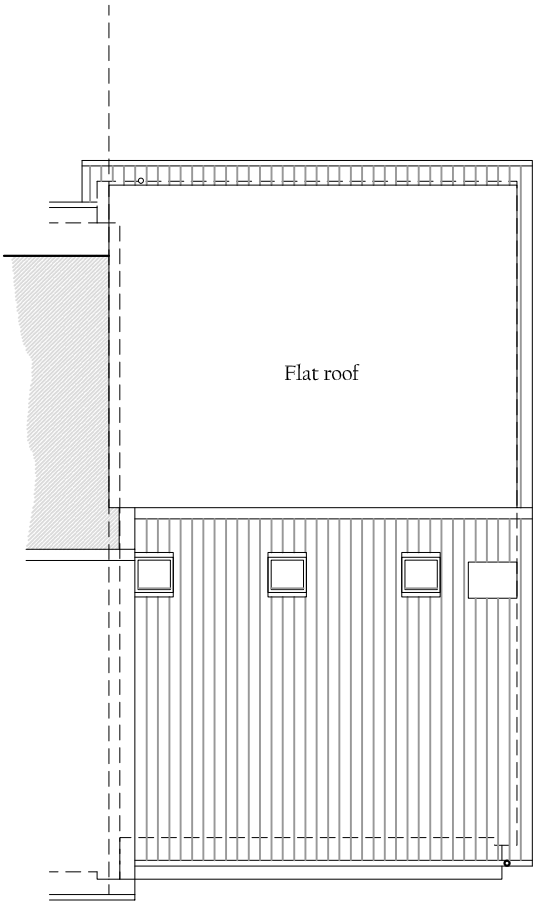
EXISTING FIRST FLOOR PLAN 1:100

Floor Area : 40m.sq



EXISTING 2ND FLOOR PLAN 1:100

Floor Area : 26.35m.sq



EXISTING ROOF PLAN 1:100



0 1 2 3 4 5m
SCALE BAR 1:100

JAMES BRECKELL : ARCHITECT : ARB : RIBA

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41 OVERMEAD, SHOREHAM - BY - SEA, BN43 5NS

October 2024

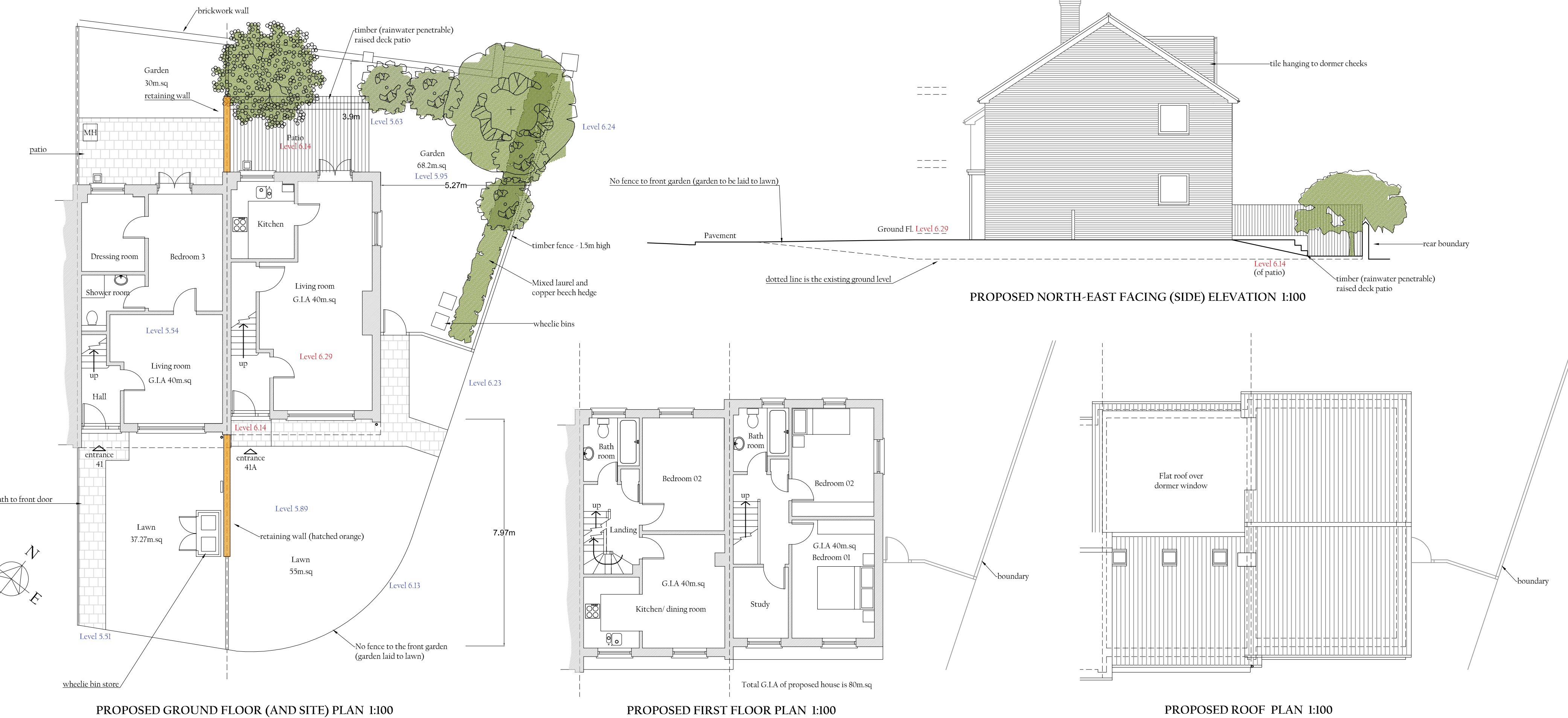
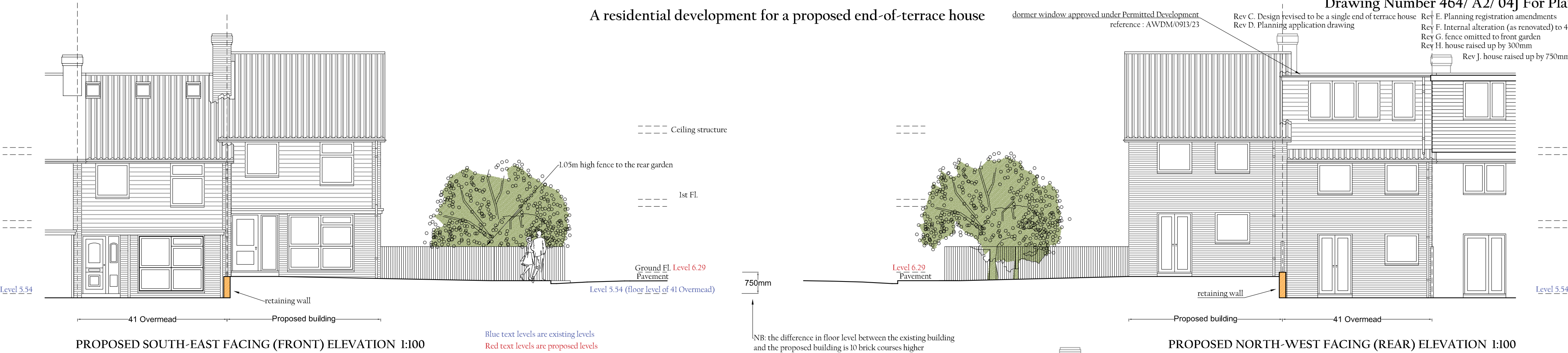
A residential development for a proposed end-of-terrace house

Drawing Number 464/ A2/ 04J For Planning

dormer window approved under Permitted Development
reference : AWDm/0913/23

Rev C. Design revised to be a single end of terrace house
Rev D. Planning application drawing

Rev E. Planning registration amendments
Rev F. Internal alteration (as renovated) to 41 Overmead
Rev G. fence omitted to front garden
Rev H. house raised up by 300mm
Rev J. house raised up by 750mm



JAMES BRECKELL : ARCHITECT : ARB : RIBA

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Appendix E

MicroDrainage Calculation

GTA Civils Ltd						Page 1																																																																																																																																																																																																																																																																					
Gloucester House 66a Church Walk Burgess Hill RH15 9AS			41 Overmead Shoreham 100yrs 45%CC Tank																																																																																																																																																																																																																																																																								
Date 29-Apr-24 14:43 File TANK 100yrs 45CC.SRCX			Designed by JP Checked by																																																																																																																																																																																																																																																																								
Micro Drainage						Source Control 2020.1																																																																																																																																																																																																																																																																					
<u>Summary of Results for 100 year Return Period (+45%)</u> Half Drain Time : 11 minutes. <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Control (l/s)</th><th>Max Σ Outflow (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>8.819</td><td>0.319</td><td>0.0</td><td>0.9</td><td>0.9</td><td>0.9</td><td>O K</td></tr><tr><td>30 min Summer</td><td>8.852</td><td>0.352</td><td>0.0</td><td>1.0</td><td>1.0</td><td>1.0</td><td>O K</td></tr><tr><td>60 min Summer</td><td>8.834</td><td>0.334</td><td>0.0</td><td>1.0</td><td>1.0</td><td>1.0</td><td>O K</td></tr><tr><td>120 min Summer</td><td>8.768</td><td>0.268</td><td>0.0</td><td>0.9</td><td>0.9</td><td>0.8</td><td>O K</td></tr><tr><td>180 min Summer</td><td>8.707</td><td>0.207</td><td>0.0</td><td>0.8</td><td>0.8</td><td>0.6</td><td>O K</td></tr><tr><td>240 min Summer</td><td>8.659</td><td>0.159</td><td>0.0</td><td>0.7</td><td>0.7</td><td>0.5</td><td>O K</td></tr><tr><td>360 min Summer</td><td>8.595</td><td>0.095</td><td>0.0</td><td>0.6</td><td>0.6</td><td>0.3</td><td>O K</td></tr><tr><td>480 min Summer</td><td>8.556</td><td>0.056</td><td>0.0</td><td>0.5</td><td>0.5</td><td>0.2</td><td>O K</td></tr><tr><td>600 min Summer</td><td>8.530</td><td>0.030</td><td>0.0</td><td>0.5</td><td>0.5</td><td>0.1</td><td>O K</td></tr><tr><td>720 min Summer</td><td>8.513</td><td>0.013</td><td>0.0</td><td>0.4</td><td>0.4</td><td>0.0</td><td>O K</td></tr><tr><td>960 min Summer</td><td>8.500</td><td>0.000</td><td>0.0</td><td>0.4</td><td>0.4</td><td>0.0</td><td>O K</td></tr><tr><td>1440 min Summer</td><td>8.500</td><td>0.000</td><td>0.0</td><td>0.3</td><td>0.3</td><td>0.0</td><td>O K</td></tr><tr><td>2160 min Summer</td><td>8.500</td><td>0.000</td><td>0.0</td><td>0.2</td><td>0.2</td><td>0.0</td><td>O K</td></tr><tr><td>2880 min Summer</td><td>8.500</td><td>0.000</td><td>0.0</td><td>0.2</td><td>0.2</td><td>0.0</td><td>O K</td></tr><tr><td>4320 min Summer</td><td>8.500</td><td>0.000</td><td>0.0</td><td>0.1</td><td>0.1</td><td>0.0</td><td>O K</td></tr><tr><td>5760 min Summer</td><td>8.500</td><td>0.000</td><td>0.0</td><td>0.1</td><td>0.1</td><td>0.0</td><td>O K</td></tr><tr><td>7200 min Summer</td><td>8.500</td><td>0.000</td><td>0.0</td><td>0.1</td><td>0.1</td><td>0.0</td><td>O K</td></tr><tr><td>8640 min Summer</td><td>8.500</td><td>0.000</td><td>0.0</td><td>0.1</td><td>0.1</td><td>0.0</td><td>O K</td></tr><tr><td>10080 min Summer</td><td>8.500</td><td>0.000</td><td>0.0</td><td>0.1</td><td>0.1</td><td>0.0</td><td>O K</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Discharge Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>134.314</td><td>0.0</td><td>1.5</td><td>14</td></tr><tr><td>30 min Summer</td><td>90.245</td><td>0.0</td><td>2.0</td><td>22</td></tr><tr><td>60 min Summer</td><td>57.831</td><td>0.0</td><td>2.6</td><td>40</td></tr><tr><td>120 min Summer</td><td>35.742</td><td>0.0</td><td>3.2</td><td>72</td></tr><tr><td>180 min Summer</td><td>26.552</td><td>0.0</td><td>3.6</td><td>102</td></tr><tr><td>240 min Summer</td><td>21.340</td><td>0.0</td><td>3.8</td><td>134</td></tr><tr><td>360 min Summer</td><td>15.710</td><td>0.0</td><td>4.2</td><td>194</td></tr><tr><td>480 min Summer</td><td>12.620</td><td>0.0</td><td>4.5</td><td>252</td></tr><tr><td>600 min Summer</td><td>10.639</td><td>0.0</td><td>4.8</td><td>312</td></tr><tr><td>720 min Summer</td><td>9.248</td><td>0.0</td><td>5.0</td><td>370</td></tr><tr><td>960 min Summer</td><td>7.407</td><td>0.0</td><td>5.3</td><td>0</td></tr><tr><td>1440 min Summer</td><td>5.407</td><td>0.0</td><td>5.8</td><td>0</td></tr><tr><td>2160 min Summer</td><td>3.938</td><td>0.0</td><td>6.4</td><td>0</td></tr><tr><td>2880 min Summer</td><td>3.141</td><td>0.0</td><td>6.8</td><td>0</td></tr><tr><td>4320 min Summer</td><td>2.280</td><td>0.0</td><td>7.4</td><td>0</td></tr><tr><td>5760 min 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Summer	8.500	0.000	0.0	0.3	0.3	0.0	O K	2160 min Summer	8.500	0.000	0.0	0.2	0.2	0.0	O K	2880 min Summer	8.500	0.000	0.0	0.2	0.2	0.0	O K	4320 min Summer	8.500	0.000	0.0	0.1	0.1	0.0	O K	5760 min Summer	8.500	0.000	0.0	0.1	0.1	0.0	O K	7200 min Summer	8.500	0.000	0.0	0.1	0.1	0.0	O K	8640 min Summer	8.500	0.000	0.0	0.1	0.1	0.0	O K	10080 min Summer	8.500	0.000	0.0	0.1	0.1	0.0	O K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	15 min Summer	134.314	0.0	1.5	14	30 min Summer	90.245	0.0	2.0	22	60 min Summer	57.831	0.0	2.6	40	120 min Summer	35.742	0.0	3.2	72	180 min Summer	26.552	0.0	3.6	102	240 min Summer	21.340	0.0	3.8	134	360 min Summer	15.710	0.0	4.2	194	480 min Summer	12.620	0.0	4.5	252	600 min Summer	10.639	0.0	4.8	312	720 min Summer	9.248	0.0	5.0	370	960 min Summer	7.407	0.0	5.3	0	1440 min Summer	5.407	0.0	5.8	0	2160 min Summer	3.938	0.0	6.4	0	2880 min Summer	3.141	0.0	6.8	0	4320 min Summer	2.280	0.0	7.4	0	5760 min Summer	1.813	0.0	7.8	0	7200 min Summer	1.519	0.0	8.2	0	8640 min Summer	1.315	0.0	8.5	0	10080 min Summer	1.164	0.0	8.8	0
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GTA Civils Ltd						Page 2	
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Date 29-Apr-24 14:43 File TANK 100yrs 45CC.SRCX			Designed by JP Checked by				
Micro Drainage						Source Control 2020.1	
Summary of Results for 100 year Return Period (+45%)							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
15 min Winter	8.869	0.369	0.0	1.0	1.0	1.1	O K
30 min Winter	8.900	0.400	0.0	1.0	1.0	1.1	O K
60 min Winter	8.860	0.360	0.0	1.0	1.0	1.0	O K
120 min Winter	8.755	0.255	0.0	0.9	0.9	0.7	O K
180 min Winter	8.674	0.174	0.0	0.7	0.7	0.5	O K
240 min Winter	8.617	0.117	0.0	0.7	0.7	0.3	O K
360 min Winter	8.550	0.050	0.0	0.5	0.5	0.1	O K
480 min Winter	8.514	0.014	0.0	0.4	0.4	0.0	O K
600 min Winter	8.500	0.000	0.0	0.4	0.4	0.0	O K
720 min Winter	8.500	0.000	0.0	0.3	0.3	0.0	O K
960 min Winter	8.500	0.000	0.0	0.3	0.3	0.0	O K
1440 min Winter	8.500	0.000	0.0	0.2	0.2	0.0	O K
2160 min Winter	8.500	0.000	0.0	0.1	0.1	0.0	O K
2880 min Winter	8.500	0.000	0.0	0.1	0.1	0.0	O K
4320 min Winter	8.500	0.000	0.0	0.1	0.1	0.0	O K
5760 min Winter	8.500	0.000	0.0	0.1	0.1	0.0	O K
7200 min Winter	8.500	0.000	0.0	0.1	0.1	0.0	O K
8640 min Winter	8.500	0.000	0.0	0.0	0.0	0.0	O K
10080 min Winter	8.500	0.000	0.0	0.0	0.0	0.0	O K
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360 min Winter	15.710	0.0	4.7	196			
480 min Winter	12.620	0.0	5.1	254			
600 min Winter	10.639	0.0	5.4	0			
720 min Winter	9.248	0.0	5.6	0			
960 min Winter	7.407	0.0	6.0	0			
1440 min Winter	5.407	0.0	6.5	0			
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2880 min Winter	3.141	0.0	7.6	0			
4320 min Winter	2.280	0.0	8.3	0			
5760 min Winter	1.813	0.0	8.8	0			
7200 min Winter	1.519	0.0	9.2	0			
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<u>Model Details</u> Storage is Online Cover Level (m) 10.000 <u>Cellular Storage Structure</u> Invert Level (m) 8.500 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table border="1"> <thead> <tr> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> </tr> </thead> <tbody> <tr><td>0.000</td><td>3.0</td><td>3.0</td><td>1.300</td><td>3.0</td><td>12.0</td></tr> <tr><td>0.100</td><td>3.0</td><td>3.7</td><td>1.400</td><td>3.0</td><td>12.7</td></tr> <tr><td>0.200</td><td>3.0</td><td>4.4</td><td>1.500</td><td>3.0</td><td>13.4</td></tr> <tr><td>0.300</td><td>3.0</td><td>5.1</td><td>1.600</td><td>3.0</td><td>14.1</td></tr> <tr><td>0.400</td><td>3.0</td><td>5.8</td><td>1.700</td><td>3.0</td><td>14.8</td></tr> <tr><td>0.500</td><td>3.0</td><td>6.5</td><td>1.800</td><td>3.0</td><td>15.5</td></tr> <tr><td>0.600</td><td>3.0</td><td>7.2</td><td>1.900</td><td>3.0</td><td>16.2</td></tr> <tr><td>0.700</td><td>3.0</td><td>7.8</td><td>2.000</td><td>3.0</td><td>16.9</td></tr> <tr><td>0.800</td><td>3.0</td><td>8.5</td><td>2.100</td><td>3.0</td><td>17.5</td></tr> <tr><td>0.900</td><td>3.0</td><td>9.2</td><td>2.200</td><td>3.0</td><td>18.2</td></tr> <tr><td>1.000</td><td>3.0</td><td>9.9</td><td>2.300</td><td>3.0</td><td>18.9</td></tr> <tr><td>1.100</td><td>3.0</td><td>10.6</td><td>2.400</td><td>3.0</td><td>19.6</td></tr> <tr><td>1.200</td><td>3.0</td><td>11.3</td><td>2.500</td><td>3.0</td><td>20.3</td></tr> </tbody> </table> <u>Orifice Outflow Control</u> Diameter (m) 0.027 Discharge Coefficient 0.600 Invert Level (m) 8.420			Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	0.000	3.0	3.0	1.300	3.0	12.0	0.100	3.0	3.7	1.400	3.0	12.7	0.200	3.0	4.4	1.500	3.0	13.4	0.300	3.0	5.1	1.600	3.0	14.1	0.400	3.0	5.8	1.700	3.0	14.8	0.500	3.0	6.5	1.800	3.0	15.5	0.600	3.0	7.2	1.900	3.0	16.2	0.700	3.0	7.8	2.000	3.0	16.9	0.800	3.0	8.5	2.100	3.0	17.5	0.900	3.0	9.2	2.200	3.0	18.2	1.000	3.0	9.9	2.300	3.0	18.9	1.100	3.0	10.6	2.400	3.0	19.6	1.200	3.0	11.3	2.500	3.0	20.3
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Appendix F

Flood Warning and Evacuation Plan

Introduction

The main objectives of this Flood Warning and Evacuation Plan are to 1) raise the awareness of the flood risk to this site and 2) to highlight the need for occupants (residents/visitors) to plan in advance how they would evacuate this area before the peak flooding (when the water levels will make evacuation hazardous).

A copy of this Plan must be bound into the legal documentation (leases or freehold deeds), so as to alert the owners or tenants.

This plan has been prepared so that all occupants can plan ahead – and prepare to evacuate in good time.

Background

This unit is in the area administered by Adur District Council.

The main threat of flooding is from surface water. The flood depth at the junction of Mill Lane and Overmead is liable to exceed 25cm (0.25m). Although this is not unduly deep, the speed of flow is likely to be hazardous to most users during the peak period of flooding.

Resilience measures have been included in the unit's design – to minimise disruption caused by flood damage.

Warning Arrangements

This area is not covered by the EA's Flood Warnings service. Occupants should be mindful of the conditions and watch out for flood warnings provided in media and internet bulletins – local weather forecasts in the main. For a local media outlet offering flood information, consider tuning into BBC Radio Sussex:

Frequency: 104.5, 104.8 & 95.0–95.3 FM; **DAB:**
NOW Sussex Coast; Freeview: 720

Many other radio stations are available online and DAB – browse by name.

For tenanted dwellings: The landlord is responsible for ensuring that the details in this section are completed with the correct occupant details at the beginning of each change of tenancy. If the tenant changes their details they should communicate this to the landlord who will then update this Plan with the correct information. The registered contact for the site is [INSERT OCCUPIER'S NAME], and his/her contact number is [INSERT OCCUPIER'S TELEPHONE NUMBER]. His/her email address is [INSERT OCCUPIER'S EMAIL ADDRESS].

Likely depth: the flood depth outside your house may be as great as **0.25m** with a speed of over **2m/s**. The hazard rating of this combination of speed and depth is HIGH (hazardous to most users).

Time to inundation: the likely warning time period for surface water flooding is most likely to be extremely short – maybe as little as 20-30 minutes.

It must be stressed that the first floor is **not** at direct risk of being flooded. This plan has been prepared so that occupants can prepare to evacuate the area via the best safe route. If you do not manage to evacuate in time you should reside at high level until the flood waters recede from peak level. The total time of inundation is unlikely to be long as surface water flooding usually recedes quickly.

This plan has been prepared so that occupants can prepare to evacuate the area via the best safe route – see the Appendix - so as to minimise the impact on the emergency services.

Emergency Telephone numbers:

General first responders, namely police, ambulance and fire	999
Adur District Council – Environmental Health (business hours)	01903 221064
Gas Leaks/safety	0800 111 999
EA Floodline	0345 988 1188
RSPA	0300 1234 999

You should prepare by collecting all emergency numbers relevant to you, eg vehicle cover, insurer, landlord.

Flood Warning Codes

If flooding is forecast, alerts are issued by the EA using a set of four easily recognisable codes.

Each of the four codes indicates the level of danger associated with the warning/alert. The EA aims to issue flood alerts up to 12 hours in advance, although this is not always possible. The codes may not always be used in sequence; a Severe Flood Warning may be issued immediately, with no other warning code preceding it.

The Flood Warning Codes and their meanings are:



FLOOD ALERT
FLOODING IS POSSIBLE. BE PREPARED.

- What it means: Flooding is possible. Be prepared.
- When it's used: two hours to two days in advance of flooding.
- Impact: flooding of low lying land and roads - property flooding is not expected.



FLOOD WARNING
FLOODING IS EXPECTED. IMMEDIATE ACTION REQUIRED.

- What it means: Flooding is expected. Immediate action required.
- When it's used: Half an hour to one day in advance of flooding.
- Impact: Property flooding of homes and businesses is expected.



SEVERE FLOOD WARNING
SEVERE FLOODING. DANGER TO LIFE.

- What it means: Severe flooding. Danger to life.
- When it's used: When flooding poses a significant threat to life.
- Impact: Deep, fast flowing water. Debris in water. Communities cut off.

Source: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/311020/flood_warnings_LIT_5215.pdf

**WARNING
NO LONGER
IN FORCE**

- No further flooding is currently expected in your area.
- When it's used: When river (and sea) conditions return to normal.

Action to be Taken on Receipt of Flood Warnings



FLOOD ALERT
FLOODING IS POSSIBLE. BE PREPARED.

- What it means: Be prepared to act on your flood plan. Refer to the Action Checklist – below.
- Call Floodline on 0345 988 1188, select option 1 for up to date information.
- Monitor local water levels and flood forecast on the EA website.



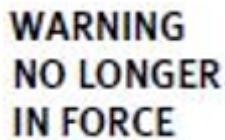
FLOOD WARNING
FLOODING IS EXPECTED. IMMEDIATE ACTION REQUIRED.

- What it means: Flooding is expected. Serious consideration needs to be given to the need to evacuate. It may be impossible for the emergency services to reach this building if events unfold differently to as anticipated.
- Move valuable items to as high a level as possible.
- Carry out the rest of the Action Checklist – as appropriate to the nature of the flooding

THE PROPERTY MUST BE EVACUATED IF SAFE TO DO SO.



- Co-operate with the emergency services. Call 999 if you are in immediate danger.
- If there has been a sudden breach or overtopping of a reservoir resulting in hazardous floodwaters surrounding the site, seek safe refuge at high level.



- Be careful. Floodwater may still be around for several days.
- If you've been flooded, ring your insurance company as soon as possible.

There is a map in the Appendix showing the probable safest route to dry land. All adults in this dwelling should be familiar with this.

Preparation for a Flood Event

Prepare a list of all your important contacts written in a notebook - and keep it to hand.

Prepare a **grab bag** of essential items and keep it to hand – with a copy of this Plan. It can include some or all of the following items:

- List of prescription medication for the family
- Pen
- Blankets and warm clothing
- Waterproofs
- Important documents such as passport and insurance certificates
- First aid kit
- Radio (battery or wind up)
- Torch (battery or wind up)
- Spare batteries
- Spare glasses
- Mobile phone and charger
- Contact numbers in a notebook (see 6.1)
- Insurance details
- Spare keys for house and car
- Tinned and non-perishable food, and a tin opener

Prepare a list of all your important contacts written in a notebook - and keep it close to hand, eg in the grab bag.

Ensure that all adults in your household know *exactly* how to turn off electricity, gas and water.

Make arrangements with family/friends living outside a flood area to receive you in case of evacuation. If this is not feasible, ensure that you have appropriate insurance cover that provides alternative accommodation (ie guest house/hotel).

Action Checklist

An evacuation route is shown at the back of this Plan. You should consider evacuating the property via this or a similar route on receipt of a flood alert. Bear in mind that there may be short notice between warnings and this area becoming inundated.

The evacuation route guides occupants from this building to higher, dry ground. Study this so that you are familiar with this in advance of deciding to evacuate.

Evacuate! Ensure all the measures listed above are in place – and lock up.

Pets

Pets should be included in your emergency planning arrangements.

Be prepared:

- Make sure your cats and dogs are wearing proper identification e.g. up to date contact details on their collar, microchip
- Make sure pet foods and medicines are well stocked
- Arrange for a family member or friend living outside the flood risk area to take in your pets when an evacuation order comes

If there's a flood warning:

- Move food, bedding and fresh water to somewhere safe and dry
- Keep your portable pet carriers at hand
- Keep familiar toys dry, because pets under stress will welcome something that smells of home
- Consider taking pets to a family member or friend who lives outside the flood risk area
- Put documents like vaccination records, vet's details, and microchip number(s) in a sealed bag with any other important documents. Include a current photograph in case your pet(s) get lost

If disaster strikes:

- Bring your small pets inside (upstairs)
- Move food, bedding and fresh water to somewhere safe and dry
- Keep your portable pet carriers at hand
- Keep familiar toys dry: pets under stress will welcome something that smells of home
- Consider taking pets to a family member or friend who lives outside the flood risk area
- Put documents like vaccination records, vet's details, and microchip number(s) in a sealed bag with any other important documents. Include a current photograph in case your pet(s) get lost

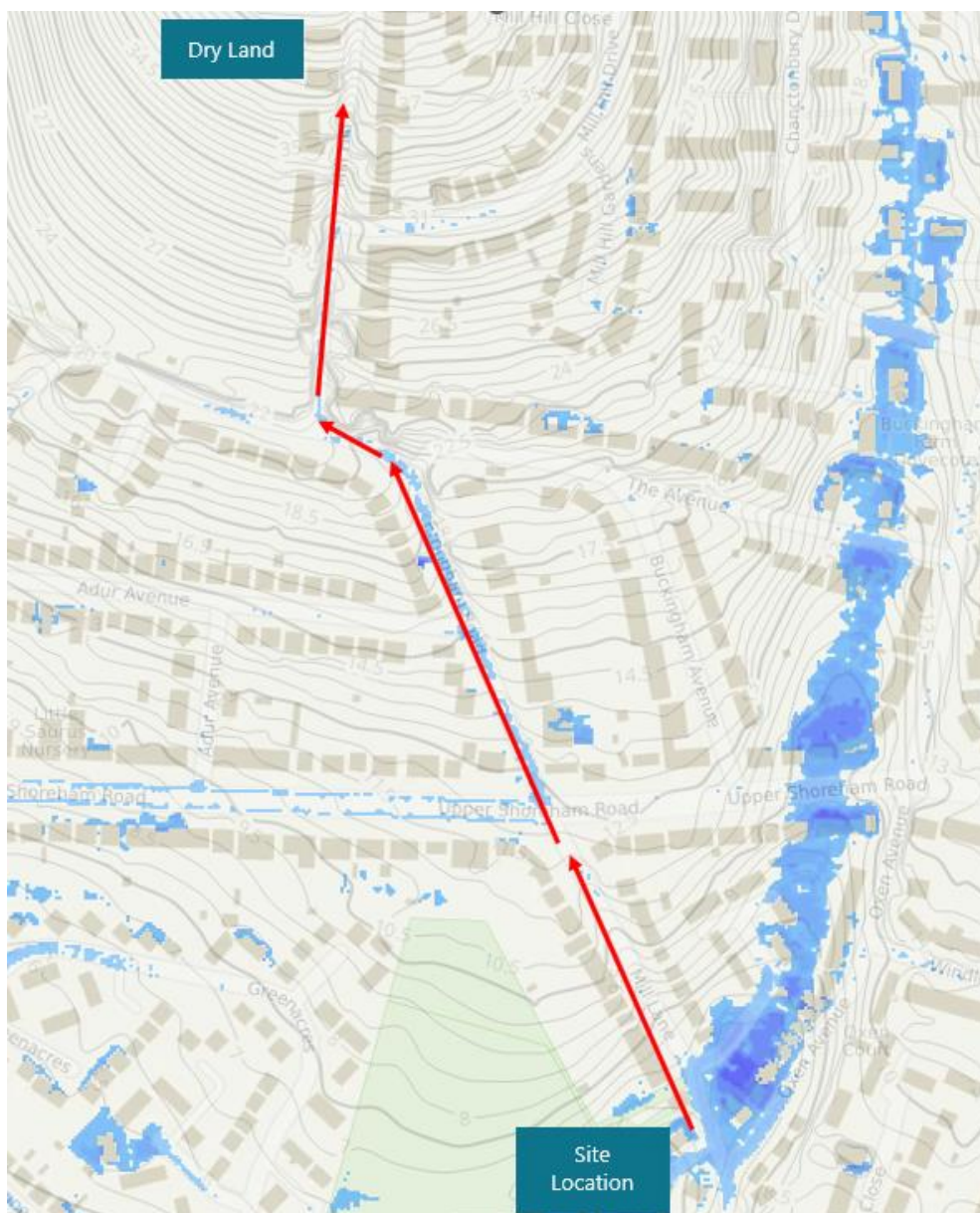
Upon Return & Recovery

When to go back? The responding organisations will be providing updates on the situation and notification when it is safe to return. Follow their advice.

- Do not start the clean-up until the threat of further flooding has passed
- Don't throw anything away until told to do so by your insurer
- Check with your insurance company if it is OK to start cleaning your property before starting
- Confirm what services your insurance company will pay for

- Use a permanent marker to mark on the wall the height of the flood water in each room
- Wear waterproof, gloves, boots and a face mask when clearing up
- Household products are sufficient to clean and disinfect your property
- Use mains pressure garden hose for washing down, not high pressure hose lines
- As soon as possible, ask your insurance company when a loss adjuster will visit
- Ask your insurance company if they will pay for repairs the will make your property more flood resilient for the future
- Keep records: date, time, name of person you spoke to and what was agreed
- Keep receipts
- Take photos and video of your damaged property
- Make a list/record of your damaged property

Map Showing Safest Route to Dry Land



The shortest and safest route to dry land is north – along Mill Lane and Southdown Road



Civil Engineering - Transport Planning - Flood Risk

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