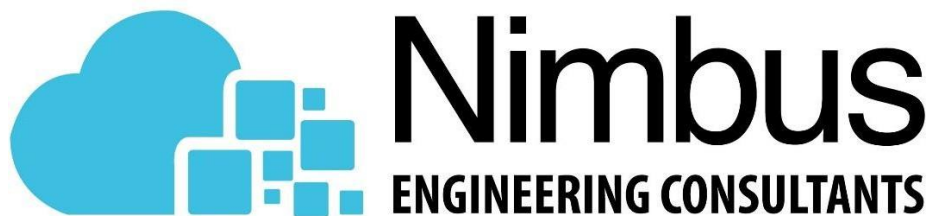


PLANNING CONDITION 4, DISCHARGE REPORT
FOR WARREN CREEK, THE WARREN,
CAVERSHAM, RG4 7TQ

DOCUMENT NUMBER.: C3710-R3-REV-B

PREPARED BY



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APPENDIX C – EXISTING & PROPOSED SITE PLANS

APPENDIX D – VOID BLOCKAGE SCENARIO REPORT

1. INTRODUCTION

1.1 Appointment

Nimbus Engineering Consultants Ltd have been appointed to alleviate the concerns of the local planning authority, who have imposed the following planning condition, relating to surface water:

4. No development shall commence on site, barring any demolition works down to existing ground levels only, until a scheme to mitigate flood risk impact has been submitted to and been approved in writing by the Local Planning Authority. The scheme shall include:
 - a) Detailed proposals of the compensatory flood storage being provided.
 - b) Details of the void design, including the height of the openings from ground level to above design flood level.
 - c) Details to ensure there will be no ground level raising on site.
 - d) Void blockage scenario analysis for multiple flood events up to and including the design flood, including a reasonable worst case scenario.

The scheme shall be fully implemented prior to the first occupation of the dwelling hereby approved and subsequently maintained throughout the lifetime of the development.

Reason: To reduce the risk of flooding to the proposed development and future occupants and to reduce the risk of increasing flood risk elsewhere, in accordance with section 14 of the National Planning Policy Framework (December 2024, as amended) and Policy EN18 of the Reading Borough Local Plan 2019.

1.2 Objectives

This report has been prepared to address Planning Condition 4, which requires a scheme to mitigate flood-risk impact in relation to the proposed development within the floodplain. The report addresses compensatory flood storage, undercroft void design, ground-level control and the void-blockage scenario analysis required by the condition.

1.3 Limitations

The general limitations of this report are:

- A number of data and information sources have been used to prepare this report. Whilst Nimbus Engineering believes them to be trustworthy, Nimbus Engineering is unable to guarantee the accuracy of data and information that has been provided by others;
- This report has been prepared using the best data and information that was available at the time of writing. There is the potential for further information or data to become available, leading to changes in the conclusions drawn by this report, for which Nimbus Engineering cannot be held responsible.

2. COMPENSATORY FLOOD STORAGE COMPENSATION

Flood storage compensation measures have previously been provided by removing existing buildings at the site, as shown on drawing number C3429-04, which can be located within Appendix A of this report.

After the removal of the existing dwelling and outbuildings and erection of the proposals, there is a net gain of 6.59m³ of flood compensation volume.

Excavation of the proposed floodplain compensation scheme will be completed prior to the construction of development to ensure floodplain capacity is maintained.

Previously, an objection from the Environment Agency was been received as they believe that the storage buildings that we are including in our loss of flood storage calculations, are floodable. However, the client has provided photographs and evidence that clearly confirming that these outbuilding are solid structures, used for storage and therefore do count as flood plain storage loss, should these be removed. The photographs of these buildings and an explanation of these can also be found in Appendix A.

3. DETAILS OF THE VOID DESIGN, INCLUDING THE HEIGHT OF THE OPENINGS FROM GROUND LEVEL TO ABOVE DESIGN FLOOD LEVEL

Flood point data was provided at the location of the dwelling with a modelled flood level for the 1 in 100 years plus 43% climate change event of 39.200mAOD.

Therefore, the client has proposed the finished floor level of the proposed replacement dwelling to be raised 300mm above this flood level, to 39.500mAOD, with slatted stairs and open-area undercroft voids to be provided underneath.

The undercroft voids and openings can be seen in the plans provided within Appendix B, shown spanning from the existing ground level (Approx. 37.340m AOD) to above the predicted flood level (39.200m AOD).

The undercroft voids and flood openings shall be retained open and unobstructed for the lifetime of the development. They shall not be infilled, enclose, clad, screened, blocked, or used for storage in a way that would reduce floodwater conveyance or floodplain storage.

4. DETAILS TO ENSURE THERE WILL BE NO GROUND LEVEL RAISING ON SITE

No imported fill shall be used to raise existing ground levels, Excavated material shall not be spread across the site in a way that raises ground levels or reduced floodplain capacity. Any localised construction disturbance shall be reinstated to existing/proposed approved levels. The finished site levels shall accord with the approved drawings and shall preserve floodplain conveyance and storage.

5. VOID BLOCKAGE ANALYSIS SCENARIO REPORT

A void blockage analysis was conducted, as can be seen in the report located within Appendix D.

The assessment included a post-development void impact analysis for all relevant design flood events, including a 43% climate change allowance, with results compared against the existing baseline scenario. Flood levels and afflux were reviewed to determine any change in fluvial flood risk associated with the proposed development.

A 50% blockage representation has been adopted as a conservative reasonable worst-case blockage scenario for the purposes of Condition 4. The modelling results show that the proposed development causes a negligible change in flood levels, with increases of less than 10 mm.

This demonstrates that, in the context of the wider floodplain storage and local fluvial processes, the void blockage scenario at this development does not have a measurable impact on fluvial flood risk at the site.

6. CONCLUSIONS

The purpose of this report and associated drawings, is to satisfy the planning condition number 4 imposed by the local planning authority relating to the mitigation of flood risk.

This report concludes that the development proposals will not increase flood risk at the site or elsewhere, and the impacts of our clients proposed dwelling on the flood risk, is negligible.

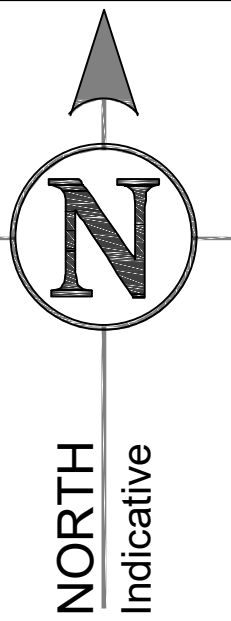
Warren Creek, The Warren, Caversham, RG4 7TQ

Nimbus Engineering Consultants Ltd

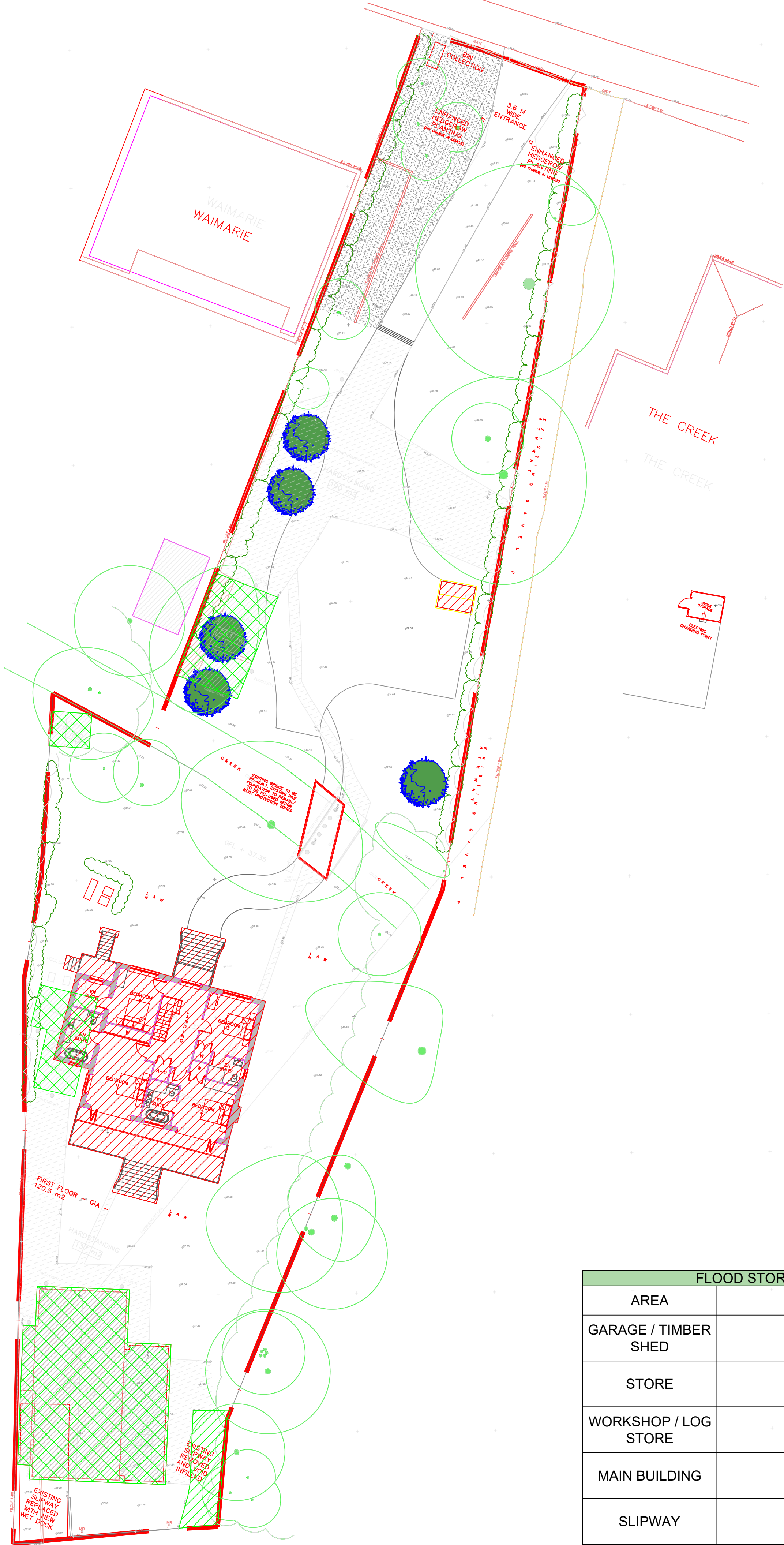
Planning Condition 4, Discharge Report

July 2026

APPENDIX A – FLOOD STORAGE COMPENSATION DRAWINGS



TOTAL FLOOD STORAGE GAINED/LOST		
TOTAL FLOOD STORAGE LOST BY DEVELOPMENT PROPOSALS		TOTAL FLOOD STORAGE GAINED BY REMOVING EXISTING BUILDINGS
333.21m ³		339.80m ³
OVERALL GAIN OF 6.59m ³		
FLOOD STORAGE LOST BY CYCLE STORE		
AREA	SURFACE AREA	FLOOD STORAGE VOLUME DISPLACED
CYCLE STORE	4.62m ²	(4.62 x 1.36) = 6.28m ³
FLOOD STORAGE LOST BY STAIRS		
SET OF STAIRS	SURFACE AREA	FLOOD STORAGE VOLUME DISPLACED
MAIN	(L x B) = (2.88 x 3.55) = 10.22m ²	(10.22 x 1.78 x 0.5) = 9.10m ³
LHS 1	(L x B) = (2.00 x 1.04) = 2.08m ²	(2.08 x 1.74 x 0.5) = 1.81m ³
LHS 2	(L x B) = (1.10 x 1.03) = 1.13m ²	(1.13 x 1.74 x 0.5) = 0.98m ³
REAR	(L x B) = (2.88 x 2.54) = 7.32m ²	(7.32 x 1.79 x 0.5) = 6.55m ³
FLOOD STORAGE LOST BY MAIN HOUSE & TERRACE		
AREA	SURFACE AREA	FLOOD STORAGE VOLUME DISPLACED
HOUSE	137.07m ²	(137.07 x 1.78) = 243.98m ³
TERRACE	(L x B) = [(11.21 x 2.85) + (1.45 x 2.64)] = 36.04m ²	(36.04 x 1.79) = 64.51m ³



FLOOD STORAGE GAINED BY REMOVING BUILDINGS		
AREA	SURFACE AREA	FLOOD STORAGE VOLUME DISPLACED
GARAGE / TIMBER SHED	37.92m²	(37.92 x 1.82) = 69.01m³
STORE	7.50m²	(7.50 x 1.81) = 13.58m³
WORKSHOP / LOG STORE	25.92m²	(25.92 x 1.79) = 46.40m³
MAIN BUILDING	96.65m²	(96.65 x 1.79) = 173.00m³
SLIPWAY	20.33m²	(20.33x1.86) = 37.81m³

DRAWING TO BE PRINTED IN COLOUR.

KEY:

- Flood Storage Area Lost
- Flood Storage Area Gained
- Proposed Site Boundary

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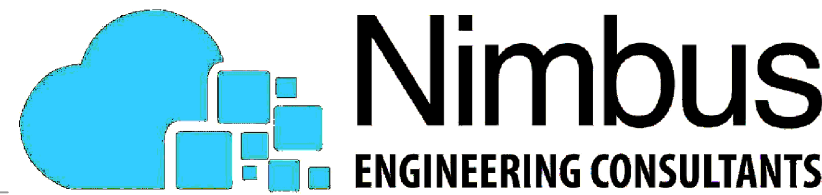
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REV	DATE	DRAWN	DESCRIPTION	CHECK	APPR.
E	02-06-25	M.HAM	Updated Proposed Plan.	S.L	S.L
D	06-03-24	M.HAM	Updated Layout & Calculations.	S.L	S.L
C	27-11-24	M.HAM	Updated Garage Roof.	S.L	S.L
B	15-11-24	M.HAM	Updated Mesh Bridge.	S.L	S.L
A	12-11-24	M.HAM	For Information.	S.L	S.L

Warren Creek, The Warren, Caversham, RG4 7TQ

Flood Storage Areas Lost & Gained on Proposed Plan

Mr Rob Arnold



S.L	02-06-25	S.L	02-06-25
M.HAM	1:200	C3429-04	E
12-11-24	A1		

Photographs of Outbuildings

Workshop shed

Area... 13.0 sq m

Located in the middle of the garden on the western boundary and sitting on a raised concrete block base. A fully working and equipped workshop. It is enclosed by wall on all 4 sides and secured with a locked door. It is fitted out with electrics.



Log Store 1

Area... 8.0 sq m

The primary log store. Attached to the workshop shed. This is open as it obviously needs air to allow the wood to dry. This isn't a wood store just in name. We have emptied it in readiness for building work. Prior to emptying it there was 12 cubic metres of wood that has been part used and part relocated - see pictures. With this mass of wood it didn't float during the January 2025 floods, therefore contributing to floodplain reduction



Garden equipment shed

Area... 5.0 sq m

Located on the western boundary south of the creek and sitting on a raised concrete block platform. Floor, 4 walls and a locked door



Log Store 2

Area... 4.3 sq m

The secondary log store. Located on the western boundary south of the creek. We have been burning this in readiness for building. It is still circa half full to a height of about 1.7m which doesn't float in a flood situation



Garage with store

Area... 28.7 sq m

Located on the western boundary north of the creek. Sitting in a cast concrete platform, the garage has 4 walls, a locking 'up and over' garage door and a locking side door.. It is fitted out with heavy duty shelving and electrics



Garden furniture store

Area... 9.3 sq m

Located on the western boundary north of the creek. Sitting on tantalized timber, the shed has 4 walls and a locking door. It stores all the garden furniture in the winter and is fitted out with electrics



APPENDIX B – PROPOSED ELEVATIONS

MATERIALS:
NATURAL SLATE ROOF
FACING BRICKWORK
PAINTED TIMBER JOINERY



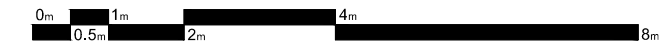
FRONT (NORTH) ELEVATION - FACING ROAD



SIDE (EAST) ELEVATION

Note: The proposed screen will be fixed against the dwelling and extend along the full depth of the terrace and first floor balcony, providing continuous screening along the side boundary.

1:100 scale Bar
This Drawing has been produced for printing onto A3 size paper,



REV	COMMENTS	DATE



CLIENT Mr R. Arnold
PROJECT Warren Creek, The Warren
Caversham, Reading, RG4 7TQ
DRAWING Proposed Elevations

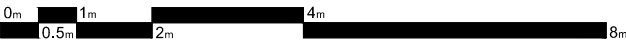
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SCALE 1:100
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NO 3863/244
REV E
DATE Sep 2024

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MATERIALS:
NATURAL SLATE ROOF
FACING BRICKWORK
PAINTED TIMBER JOINERY

RIDGE + 47.85
RIDGE + 48.16

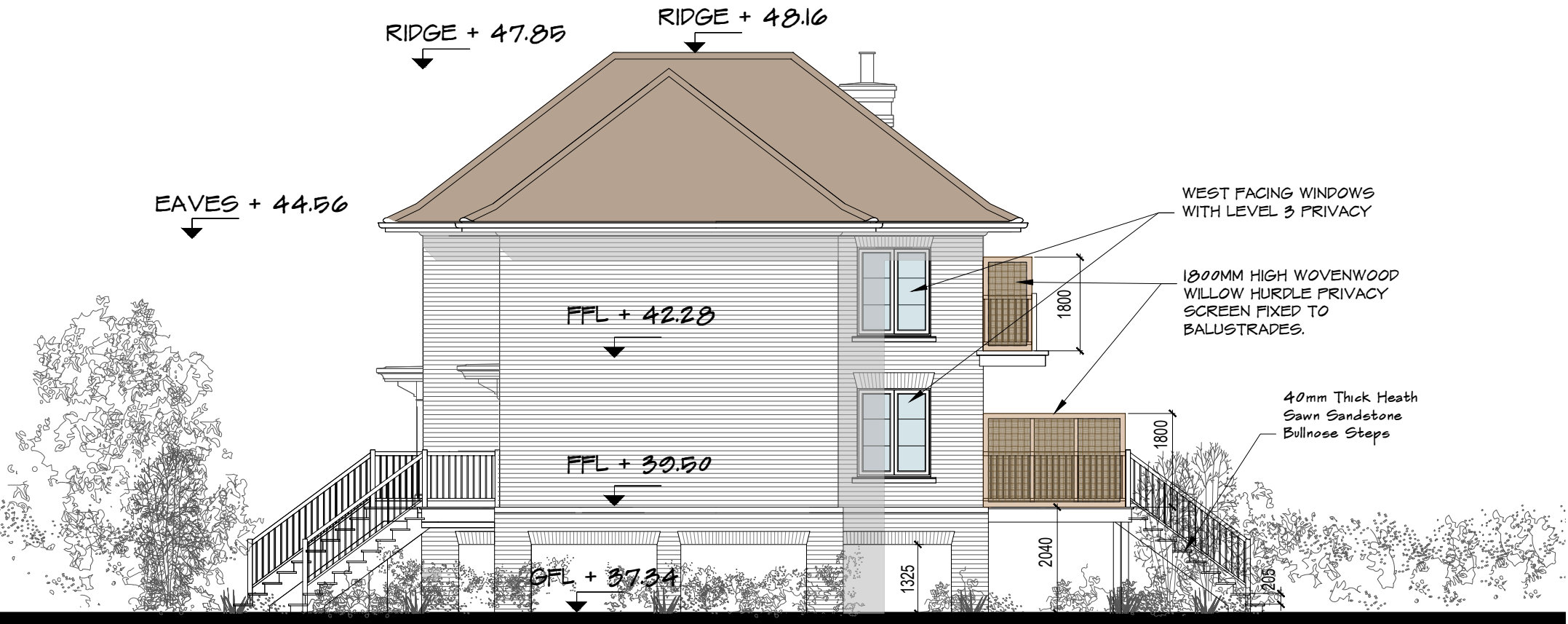
1:100 scale Bar
This Drawing has been produced for printing onto A3 size paper,



REV	COMMENTS	DATE



REAR (SOUTH) ELEVATION - FACING RIVER



SIDE (WEST) ELEVATION

Note: The proposed screen will be fixed against the dwelling and extend along the full depth of the terrace and first floor balcony, providing continuous screening along the side boundary.



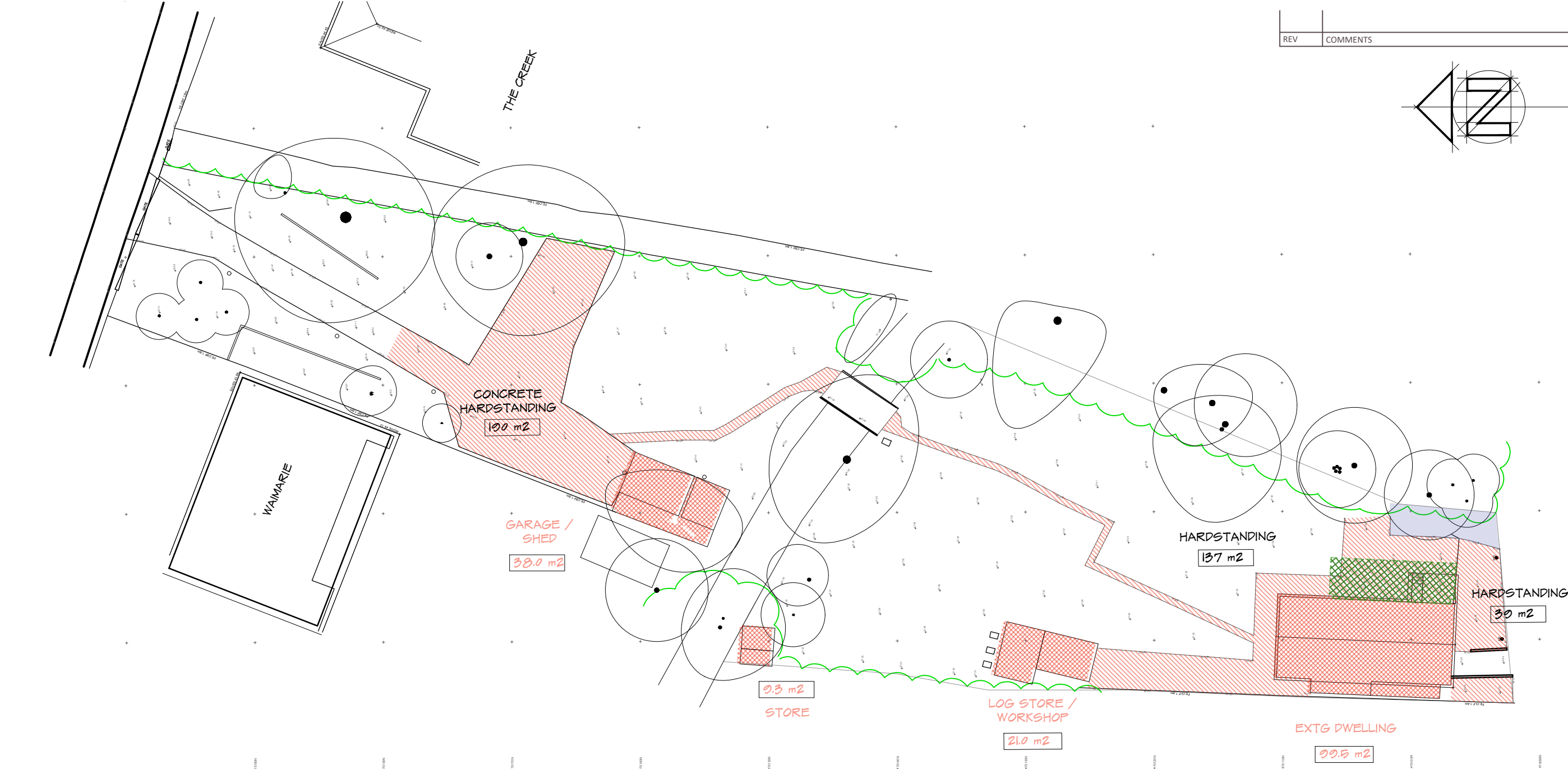
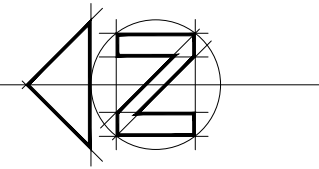
SHAUN TANNER
ARCHITECTURE & PLANNING

www.stlarchitecture.co.uk studio@stlarchitecture.co.uk 0118 989 0808

CLIENT	Mr R. Arnold	STATUS	Planning	DATE	Sep 2024
PROJECT	Warren Creek, The Warren	SCALE	1:100	DRAWN	ST
DRAWING	Proposed Elevations	CHECKED	NO	3863/245	REV E
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APPENDIX C – EXISTING & PROPOSED SITE PLANS

REV	COMMENTS	DATE



WITHOUT PERMITTED DEVELOPMENT:

- EXTG HEDGE AREA - 43 M2
- HARDSTANDING AREA (WITHOUT PERMITTED DEVELOPMENT) - 366 M2
- BUILDING FOOTPRINTS (WITHOUT PERMITTED DEVELOPMENT) - 168 M2
- HARDSTANDING AREA (WITH PERMITTED DEVELOPMENT) - 336 M2
- ADDITIONAL AREA FOR PERMITTED DEVELOPMENT- 30 M2
- GRASS AREA - 1431 M2
- CREEK AREA - 121 M2
- SLIPWAY - 10 M2
- EXTG CONCRETE RAMP - 67 M2
- RIVER INLET - 20 M2

TOTAL SITE AREA = 2226 M2



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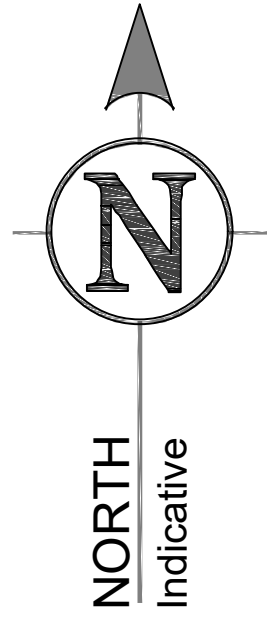
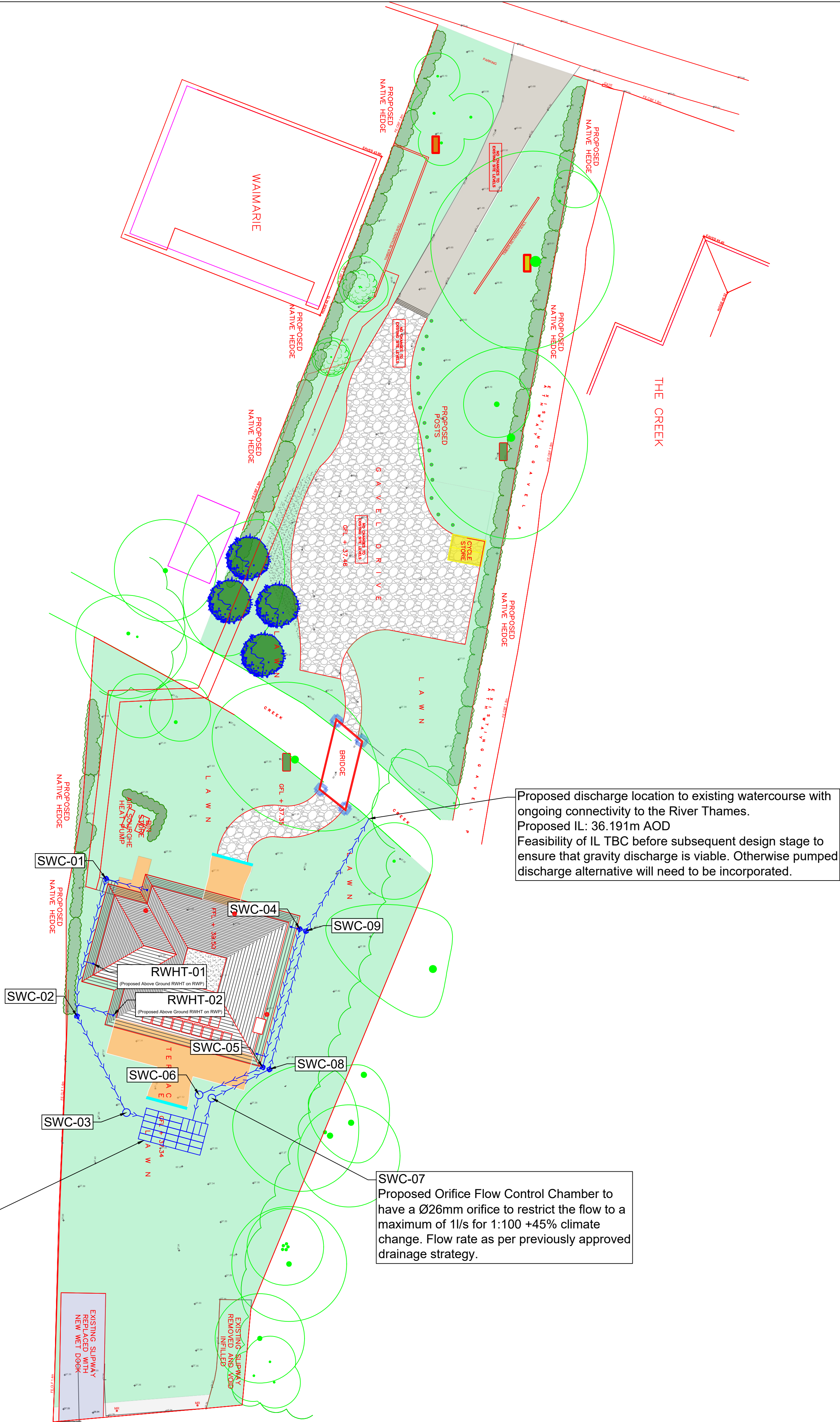
CLIENT	Mr R. Arnold
PROJECT	Warren Creek, The Warren Caversham, Reading, RG4 7TQ
DRAWING	EXISTING AREAS

STATUS	Planning	DATE	May 2023
SCALE	NTS @ a3	DRAWN	ST
CHECKED	NO	3863/50	REV B

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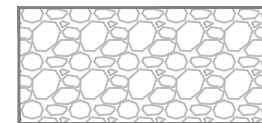
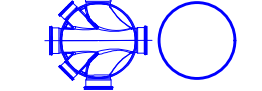
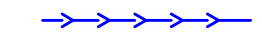
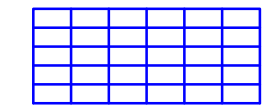
SCHEDULE OF SURFACE WATER CHAMBERS *COVER LEVELS TO BE CONFIRMED ON SITE PRIOR TO CONSTRUCTION					
NAME	TYPE	DIAMETER (m)	COVER LEVEL (m)	INVERT LEVEL (m)	DEPTH (m)
SWC-01	IC	0.450	37.420	36.920	0.500
SWC-02	IC	0.450	37.350	36.550	0.800
SWC-03	CP	0.600	37.330	36.400	0.930
SWC-04	IC	0.450	37.380	36.880	0.500
SWC-05	IC	0.450	37.360	36.560	0.800
SWC-06	CP	0.600	37.280	36.393	0.887
SWC-07	FCC	0.600	37.280	36.371	0.909
SWC-08	IC	0.450	37.360	36.326	1.034
SWC-09	IC	0.450	37.380	36.257	1.123

SCHEDULE OF SURFACE WATER PIPES				
PIPE NAME	START AND END STRUCTURE	DIAMETER (m)	LENGTH (m)	GRADIENT
SWP-01	SWC-01 to SWC-02	0.150	10.415	1:30
SWP-02	SWC-02 to SWC-03	0.150	8.960	1:60
SWP-03	SWC-03 to Att. Tank	0.150	1.966	1:100
SWP-04	SWC-04 to SWC-05	0.150	10.249	1:30
SWP-05	SWC-05 to SWC-06	0.150	6.870	1:40
SWP-06	SWC-06 to Att. Tank	0.150	1.275	1:100
SWP-07	Att. Tank to SWC-07	0.150	1.260	1:140
SWP-08	SWC-07 to SWC-08	0.150	6.730	1:150
SWP-09	SWC-08 to SWC-09	0.150	10.282	1:150
SWP-10	SWC-09 to Outlet	0.150	9.900	1:150



DRAWING TO BE PRINTED IN COLOUR.

KEY:

-  Proposed Permeable Paving
-  Proposed Site Boundary
-  SW Inspection / Catchpit Chambers
-  Surface Water UPVC Pipes
-  Indicative Channel Drain Position
-  Proposed Attenuation Tank

NOT FOR CONSTRUCTION

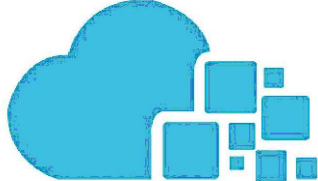
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REV	DATE	DRAWN	DESCRIPTION	CHECK	APPR.
A	24-02-26	M.HAM	For Information.	SL	SL

PROJECT:
Warren Creek, The Warren, Caversham, RG4 7TQ

TITLE:
SuDS & SW Layout & Location Plan

CLIENT:
Mr Rob Arnold

 **Nimbus**
ENGINEERING CONSULTANTS
www.nimbusengineering.co.uk
info@nimbusengineering.co.uk

CHECKED BY: S.L.	DATE: 24-02-26	APPROVED BY: S.L.	DATE: 24-02-26
DRN BY: M.HAM	SCALE: 1:200	DRAWING NUMBER: C3710-01	REV: A
DATE: 24-02-26	SIZE: A1		

Warren Creek, The Warren, Caversham, RG4 7TQ

Nimbus Engineering Consultants Ltd

Planning Condition 4, Discharge Report

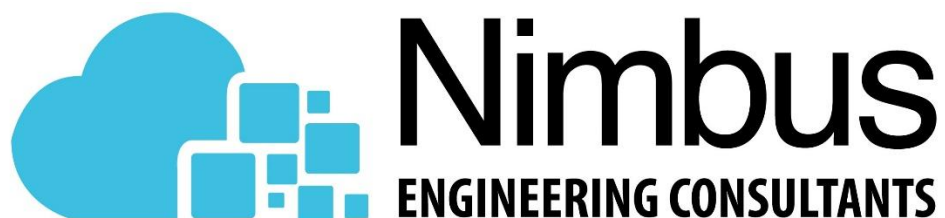
July 2026

APPENDIX D – VOID BLOCKAGE SCENARIO REPORT

VOID BLOCKAGE SCENARIO ANALYSIS REPORT
FOR WARREN CREEK, THE WARREN,
CAVERSHAM, RG4 7TQ

DOCUMENT NUMBER.: C3710-R2-REV-B

PREPARED BY



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1. BRIEF

The scope of the project is to provide information to discharge the following planning condition, and this report focusses on point d) as the Void blockage scenario results:

4. No development shall commence on site, barring any demolition works down to existing ground levels only, until a scheme to mitigate flood risk impact has been submitted to and been approved in writing by the Local Planning Authority. The scheme shall include:
 - a) Detailed proposals of the compensatory flood storage being provided.
 - b) Details of the void design, including the height of the openings from ground level to above design flood level.
 - c) Details to ensure there will be no ground level raising on site.
 - d) Void blockage scenario analysis for multiple flood events up to and including the design flood, including a reasonable worst case scenario.

The scheme shall be fully implemented prior to the first occupation of the dwelling hereby approved and subsequently maintained throughout the lifetime of the development.

Reason: To reduce the risk of flooding to the proposed development and future occupants and to reduce the risk of increasing flood risk elsewhere, in accordance with section 14 of the National Planning Policy Framework (December 2024, as amended) and Policy EN18 of the Reading Borough Local Plan 2019.

2. STUDY AREA

2.1. Catchment location

The Site is located in Caversham Heights Reading adjoining Thames River. This study develops on existing fluvial risk flood study ‘Caversham Flood Alleviation Scheme project (Jacobs,2021)’.

The initial model extent of the river section is shown in Figure 1.

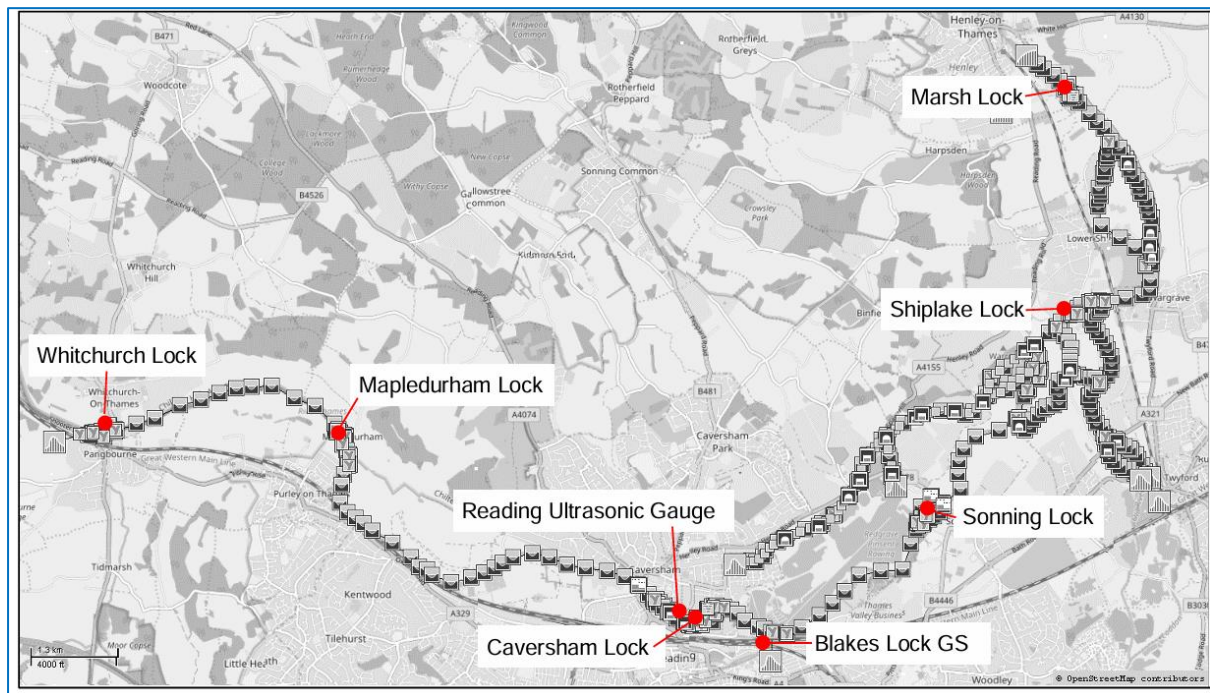


Figure 1

2.1.1. Watercourses

The principal modelled fluvial flood source is the River Thames. Warren Creek is present adjacent to/within the site setting and has been considered as part of the local site context, but the hydraulic modelling assessment is based on the River Thames flood model inputs described in this report.

2.2. Site survey

The existing topographic levels were obtained at the proposed development that would be used to assess the flood levels at the site

3. Methodology

3.1. Choice of approach

The Environment Agency's Caversham Flood Alleviation Scheme model (Jacobs, 2021) was adopted for this assessment. The model was truncated to the local study area and refined to a finer resolution suitable for site-specific analysis.

Inflow boundaries (river and floodplain flows) were taken directly from the original model as upstream conditions, while water levels from the same model were applied as downstream boundaries.

The modified model was then validated against the original by comparing flood depths and extents in the vicinity of the site, confirming its suitability for use in the site-specific flood risk assessment.

The purpose of this study was to assess the impact of void under the proposed building on the flood levels. The 50% blockage representation has been adopted as a conservative reasonable worst-case blockage scenario for the purposes of Condition 4 of the proposals. The flood levels around the site to this scenario are assessed.

4. HYDRAULIC MODELLING

4.1. Model Extent and Schematic

The truncated model extent is shown in Figure 2 as described above along the location of site.

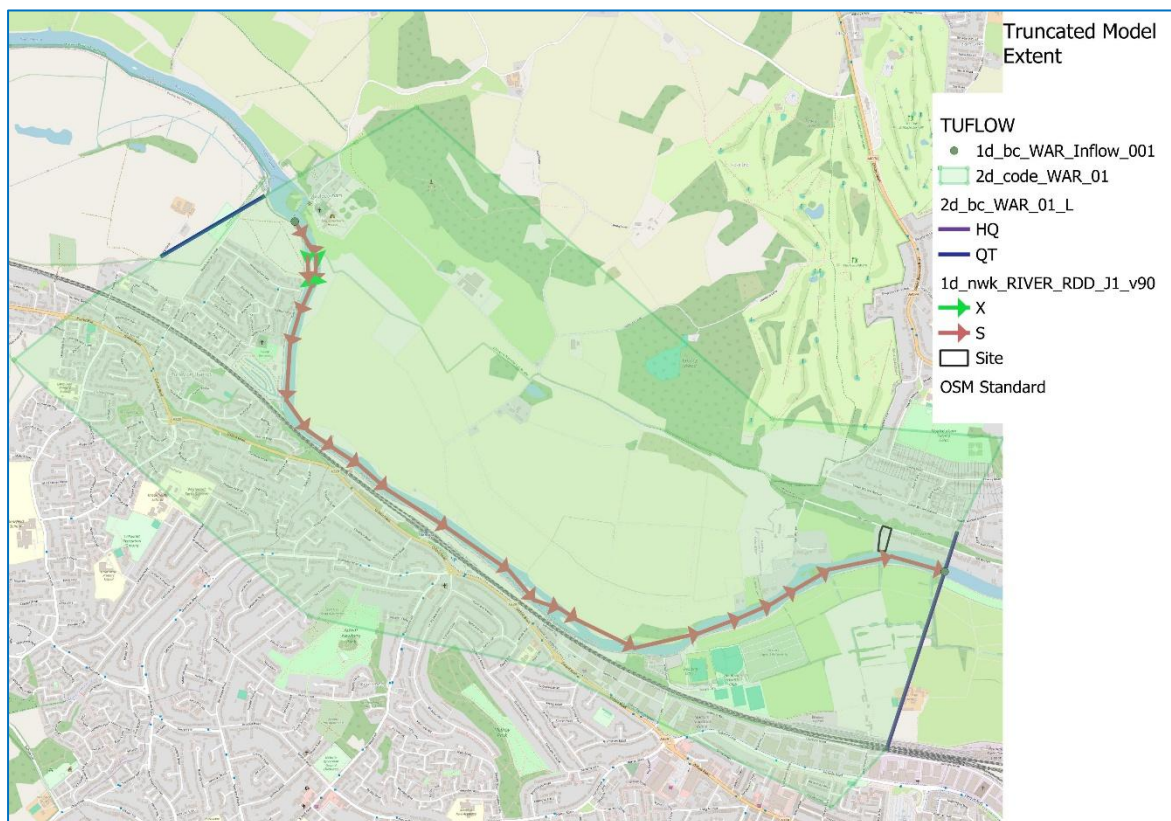


Figure 2: Truncated Model Extent Schematic

The model is truncated at Node 36.149 from the original model that is near Mapledurahm house. This is where river flow is obtained along with overland flows at the location. All other hydraulic inputs are based on the original model including terrain, topography modifications, and land use data.

The model was validated with the original model for Q100 years with extents and flood levels at the site as in Figure 3 & 4.

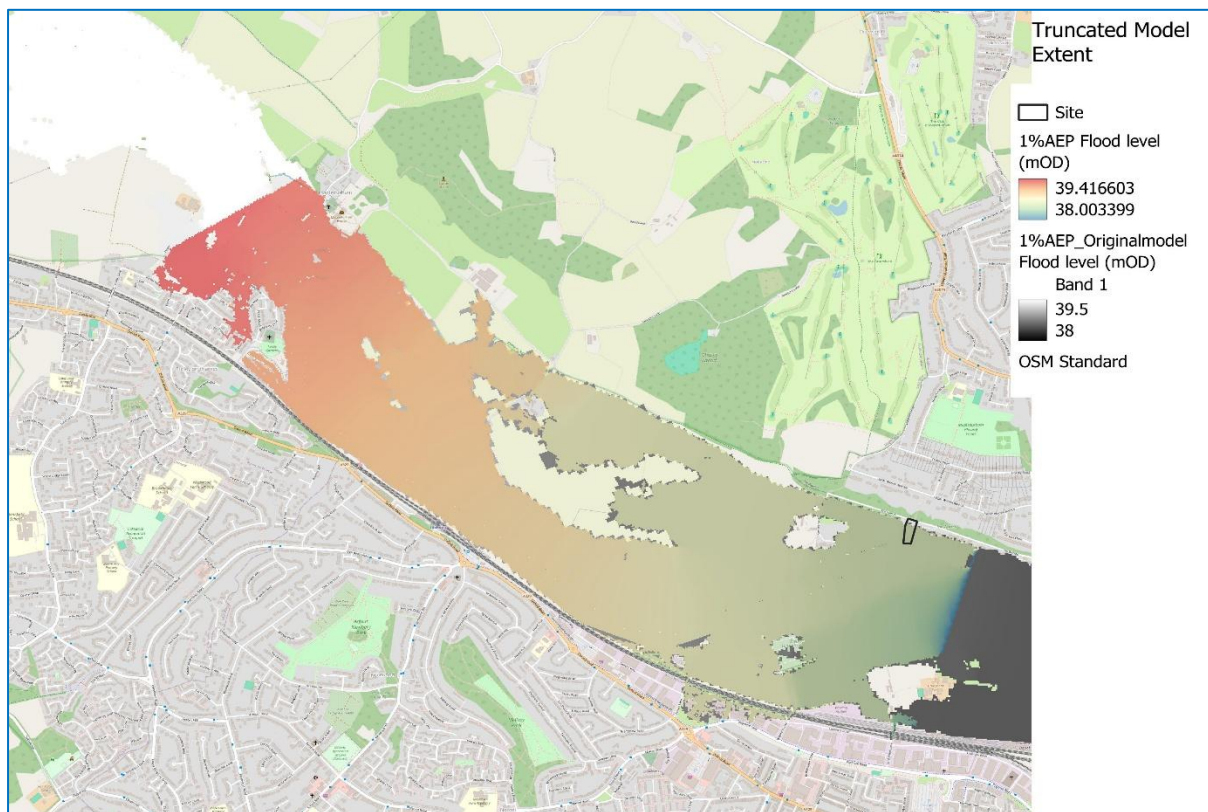


Figure 3 : Validation of Truncated model extents to original model extent



Figure 4 : Validation of Truncated model flood levels to original model at the site

4.2. 2d Domain

The basis of the 2D Domain was developed using the original model DTM. A 4m cell size was used in the study that was appropriate to represent fluvial flooding around the Thames River and the flooding at the site.

4.3. Development and void representation

The post-development scenario, the building footprint was represented in TUFLOW using a depth-varying flow constriction (2d_lfcsh). The ground level up to the entrance finished-floor level was modelled assuming 50% blockage, with full blockage applied above this level. This approach provides a conservative representation of flow behaviour under the proposed development conditions.

4.4. Surface roughness

All the roughness factors from the original model truncated to the model extent are used in this study.

4.5. Boundary conditions

River Inflow at node 36.149 from the original model is applied along with floodplain flows as QT boundary along the right bank of the river. The downstream boundary is modelled as a time varying water level based on original model.

5. MODEL RESULTS

The model was run for 3.33% AEP, 1% AEP, 0.1% AEP and 1%AEP plus 43% Climate Change event for both the existing scenario and development scenario (Void scenario). The model has run successfully without any issues along with normal parameters. The results map for the above events is given in the following sections.

5.1. Existing scenario – 1% AEP Flood Depth

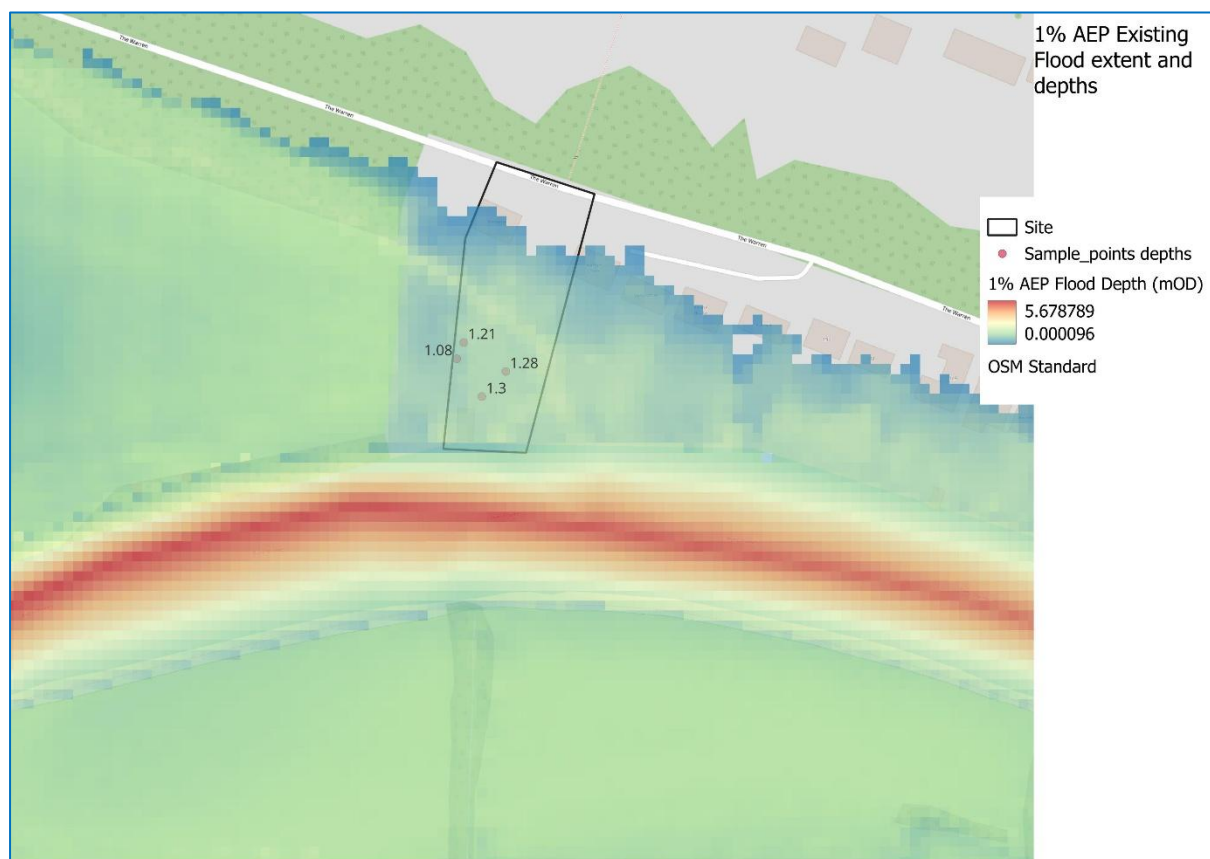


Figure 5 : 1% AEP Flood depth – Existing scenario

5.2. Development scenario – 1% AEP Flood Depth

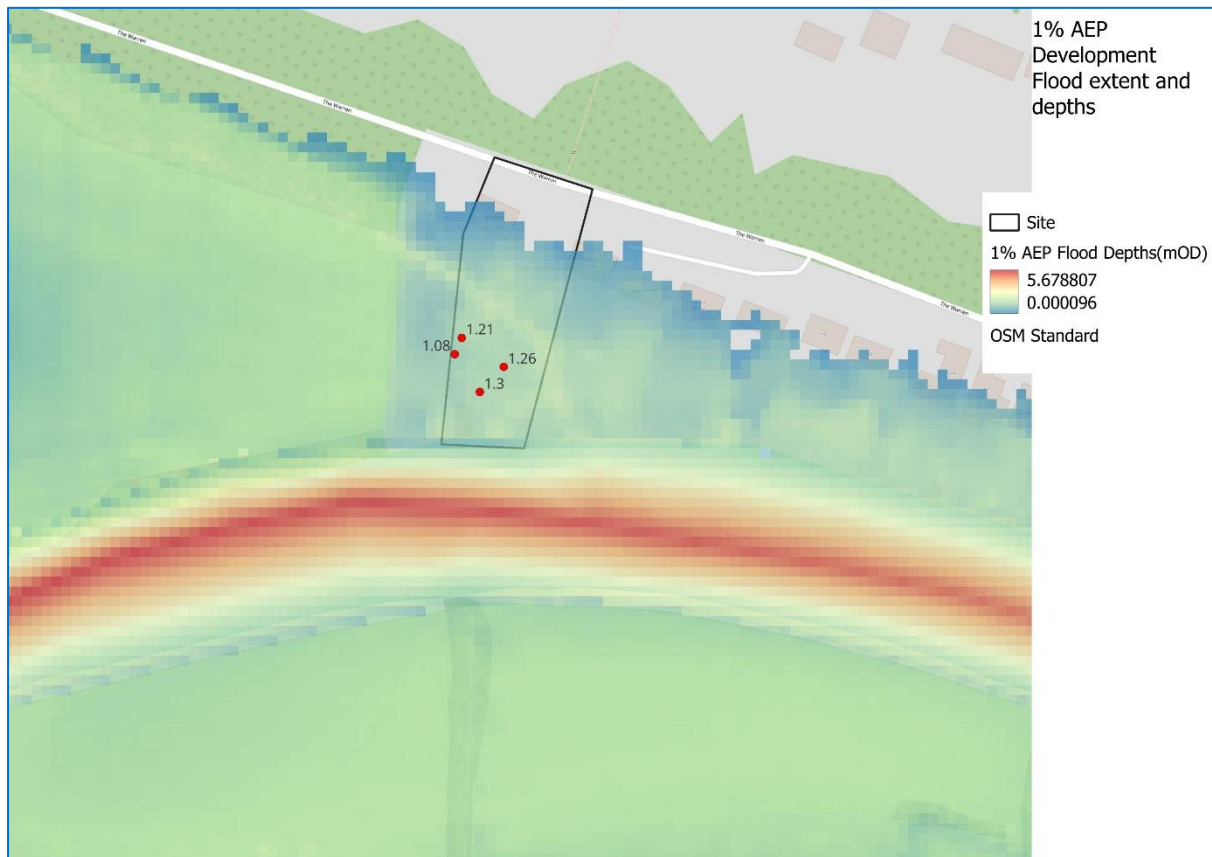


Figure 6 : 1% AEP Flood depth – Post Development scenario

5.3. Afflux Map – 1% AEP



Figure 7 : 1% AEP Afflux Map

5.4. Tabulated flood depths for all events around the site

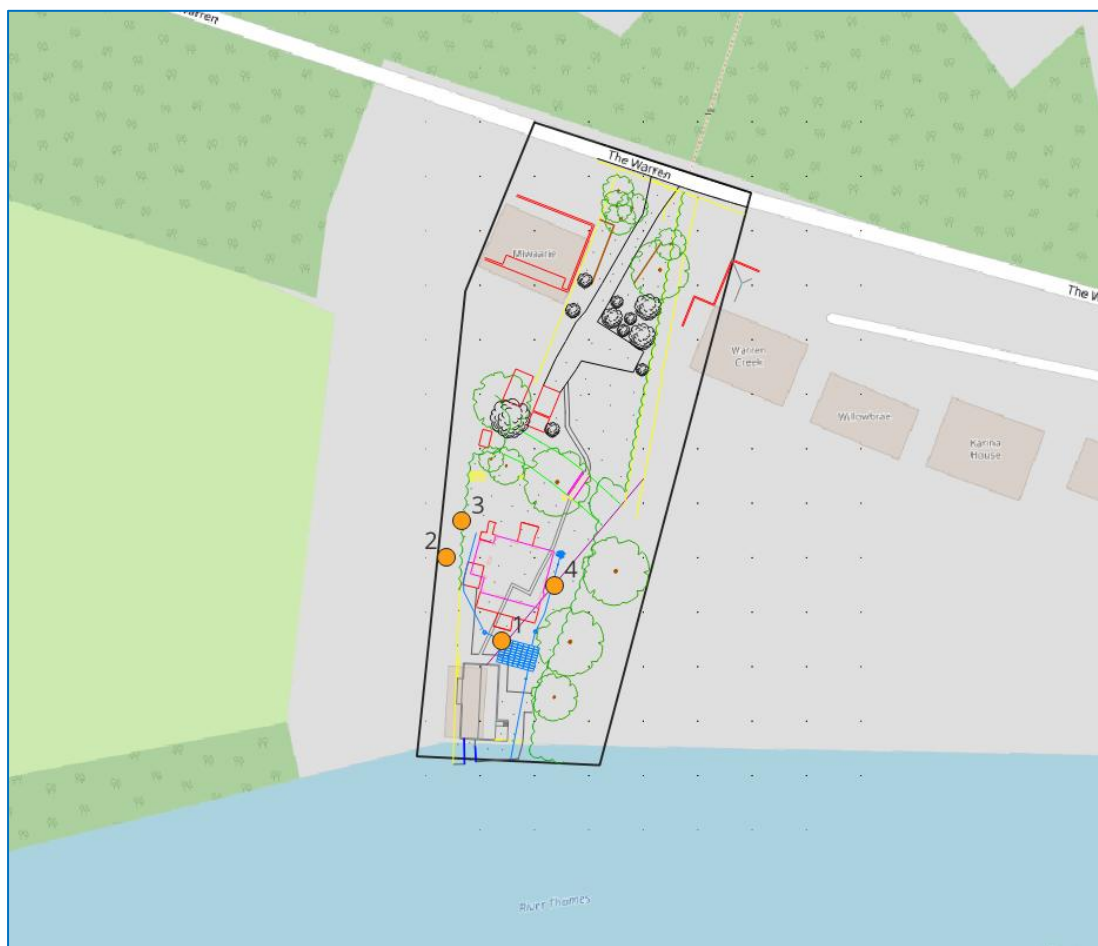


Figure 8: Flood depths sample points location

Sample point	3.33pct_EXG	3.33pct_DEV	1pct_EXG	1pct_DEV	0.1pct_EXG	0.1pct_DEV	1pctCC_EXG	1pctCC_DEV	0.1pctCC	0.1pctCC_DEV
1	0.942	0.938	1.303	1.299	1.936	1.932	1.702	1.698	2.304	2.300
2	0.717	0.718	1.078	1.079	1.710	1.710	1.476	1.476	2.077	2.077
3	0.852	0.853	1.214	1.215	1.846	1.847	1.612	1.613	2.214	2.214
4	0.915	0.894	1.276	1.255	1.910	1.889	1.676	1.655	2.278	2.258

6. SUMMARY OF RESULTS AND CONCLUSION

The hydraulic model was derived from an existing, large-scale flood alleviation scheme model, which was truncated and refined to suit the requirements of a site-specific assessment. Validation was undertaken by comparing water levels, depths, and extents from the truncated model against the original full-system model to confirm its suitability for further analysis.

The assessment included a post-development void impact analysis for all relevant design flood events, including a 43% climate change allowance, with results compared against the existing baseline scenario. Flood levels and afflux were reviewed to determine any change in fluvial flood risk associated with the proposed development.

The modelling results show that the proposed development causes a negligible change in flood levels, with increases of less than 10 mm.

This demonstrates that, in the context of the wider floodplain storage and local fluvial processes, the void blockage scenario at this development does not have a measurable impact on fluvial flood risk at the site.