

MERIDIAN

CIVIL ENGINEERING CONSULTANCY

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SURFACE WATER DRAINAGE DISCHARGE OF CONDITIONS

SEPTEMBER 2025

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Client : Martin Naldrett

Rev	Date	Prepared by / Amended by	Checked by	Approved by
-	03/02/2025	IW	SL	SL
P1	19/06/2025	SL	-	-
P2	16/09/2025	IW	SL	SL

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Revision P2

Following the P1 revision of this DOC report, further minor amendments were requested regarding comments 21 and 30 from Arun District Council (which are included in Section 2.4 of this report). As such, the CIV01 and CIV02 drawings (Appendix I) have been updated.

1.0 INTRODUCTION

- 1.1 Meridian Civil Engineering Consultancy LTD (MCEC) has been instructed by Martin Naldrett to prepare a document pack to collate information required for addressing a planning condition, Planning ref: M/39/24/DOC with Arun District Council. The proposals are for the construction of 2x semi-detached dwellings.
- 1.2 This drainage strategy has been produced in order to address points 1 to 31 of Planning Condition 7 – surface water drainage scheme.
- 1.3 Infiltration testing was undertaken at the site by the Client, returning an infiltration rate of 8.2x10⁻⁶m/s which MCEC deems suitable for onsite infiltration. This has been accepted by Arun District Council.
- 1.4 MCEC have created a network model to assess the required storage capacities for the proposed development. The rainfall model used for detailed storage calculations is the FEH-22 rainfall model. Storms have been modelled up to, and including, the 1in100yr rainfall event with 45% climate change allowance in accordance with best practice as requested by Arun District Council.
- 1.5 The calculations show potential runoff from the 1in100yr+45% runoff rainfall event can be accommodated within the proposed attenuation devices.
- 1.6 See attached Meridian Civils drainage layout drawing CIV01/02 and associated calculations MC0539 Calcs.

2.0 CONDITION

- 2.1 Condition 7 relating to drainage has been objected.

Critical items for Surface Water Drainage Design Conditions:

"The failure to adequately address the following items will result in an objection to an application to discharge a surface water drainage design condition. If any of these items are inadequately addressed by the submission, then their connection may result in a redesign of the surface water drainage scheme. a redesign is likely to have site wide implications such as the potential for storage structures to increase in volume or plan area.

Items are further elaborated upon in the attached comment tracker where necessary.

Further comments which are unlikely to impact the design methodology will be provided in the comment tracker, these relate to the detailed design. Unless clearly stated, it is considered that these additional comments are unlikely to result in a redesign of the system. These can be addressed following a second consultation to prevent unnecessary refusals."

- 2.2 Arun District Council have noted compliance in 8 out of the 10 critical items. The reasoning for insufficiency in the remaining two is extracted below:

"Calculations: Insufficient – CV values unclear. Other elements compliant"

"Water Quality Benefits: Insufficient but not required as silt traps will capture debris from residential roofs."

- 2.3 Arun District Council have responded with 31 points for consultation. Points 1, 2, 3, 4, 7, 9, 11, 12, 13, and 16 have been 'closed' following prior fulfilment. The remaining comments have been reviewed and addressed.

2.4 With regards to each comment made in relation to fulfilling Condition 7, the following comments are provided.

Comment Number	Drainage Condition	MCEC comment
5	<i>Please see comments 14, 17, 19, 20-23 below.</i>	See MCEC comments for 14, 17, 19 20-23 below.
6	<i>Provided – see comments 14, 15, (19), 22, (23), 26-28 below.</i>	See MCEC comments for 14, 15, 19, 22, 23, 26-28 below.
8	<i>Summer CV is 0.75, please correct to 1.</i>	Summer CV has been set to 1, and resulting changes have been made to the drainage design to account for the increase in runoff from the original CV setting. See attached CIV01 drawing for adapted drainage design, as well as Appendix II for accompanying calculations.
10	<i>Gradients provided. Pipe upstream of SWM1 does not include gradient and is likely steeper than 1 in 100 as described by the notes.</i>	Drainage design has changed, therefore rectifying the issue raised concerning pipe gradients. See attached CIV01 drawing for adapted drainage design, as well as Appendix II for accompanying calculations.
14	<i>'Notes state 'or similar'. The exact crate must be specified, or the specifications of an alternative. Is capable of withstanding vehicular loading at 1.2m depth.</i>	Crate specifications have been provided for the front and rear soakaways which reflect their structural requirements.
15	<i>Please also label the membrane below the tarmacadam on the permeable paving detail.</i>	Amended – see CIV02 for construction detail.
17	<i>Why is there no rodding eye or inspection chamber north of the proposed 117a at the junction of the RWP? Upstream of SWM1.</i>	Drainage design has changed, therefore rectifying the issue raised concerning the absence of rodding eye or inspection chamber at this location. See attached CIV01 drawing for adapted drainage design.
18	<i>The design has changed to two (rather than 4) soakaways. These are in the centre of the divided front and rear gardens. How will management and maintenance be organised between the future homeowners?</i>	Proposal has been altered to address this concern. There are now two rear soakaways – each proposed in garden of the properties, and safely positioned (at least 5m away from any building, and at least 2.5m away from any boundary). See attached CIV01 drawing for adapted drainage design.
19	<i>Please provide a plan and details showing how that the new design for the rear soakaways will not be structurally impacted by the boundary treatments – particularly in the rear gardens.</i>	Updated drawing includes an assumed boundary line and two rear soakaways rather than one combined across the two proposed properties. This indicates how the rear soakaways will not be structurally impacted by the boundary treatments. See attached CIV01 drawing for adapted drainage design.

20	<i>Suggested: include dimensions of the soakaways rather than just plan areas.</i>	Additional length and width dimensions have been included in the Soakaway notes in addition to total plan areas and depths – see attached CIV01 drawing.
21	<i>Soakaways must be set at 1.2m below ground level to accord with the infiltration testing (see point 1). Therefore, the soakaways must be set deeper.</i>	All proposed soakaways have been set at the requested depth, with drainage redesigned to account for this change. See attached CIV01 drawing for adapted drainage design, as well as Appendix II for accompanying calculations.
22	<i>Soakaway base levels appear to not be consistent between the construction details and the layout. It is assumed that the IL labelled directly next to the soakaways related to the incoming pipe invert levels. Please Clarify. It is suggested that the incoming pipe invert level, or the base of the soakaway are labelled with different notation on the layout to avoid confusion.</i>	Drawing annotations have been altered to provide clarity – see attached CIV 01 drawing.
23	<i>Suggested: A link could be provided between the permeable paving subbase with a diffuser unit connected to SWM6 so the the two systems are linked to maximise infiltration and storage. This is suggested on the basis of a lack of design infiltration rate at the proposed depth of the now formal permeable paving construction.</i> <i>If provided, please provide a construction detail drawing, to include base level of diffuser and invert level at the point of connection of the catchpit.</i>	MCEC have opposed this suggestion. The roof runoff area has been designed to run directly into the soakaways to allow for a greater than 5m proximity to the building for infiltration. Use of diffuser units would not be possible or safe to implement as infiltration would be promoted less than 5m from the building, possibly compromising its long-term structural integrity.
24	<i>Climate Change allowance for the 1% AEP event must be 45%.</i>	Climate change allowance for the 1% AEP event has been increased from 40% to 45% for drainage calculations. See Appendix II for accompanying calculations.
25	<i>Please provide 10%+CCA and 3.33%+CCA calculations.</i>	The 10%+CCA and 3.33%+CCA events have now been included as part of the provided calculations. See Appendix II for accompanying calculations.
26	<i>Please specify catchpit diameter.</i>	Annotations have been included in the CIV01 drawing which detail the designed catchpit diameters.
27	<i>Typical crate soakaway refers to a slotted pipe, it is not clear why. Please adjust.</i>	Typical Crate Soakaway detail in CIV02 has been amended.
28	<i>Rodding eye detail, the pipe diameter needs to be corrected to</i>	Rodding Eye Detail in CIV02 has been amended.

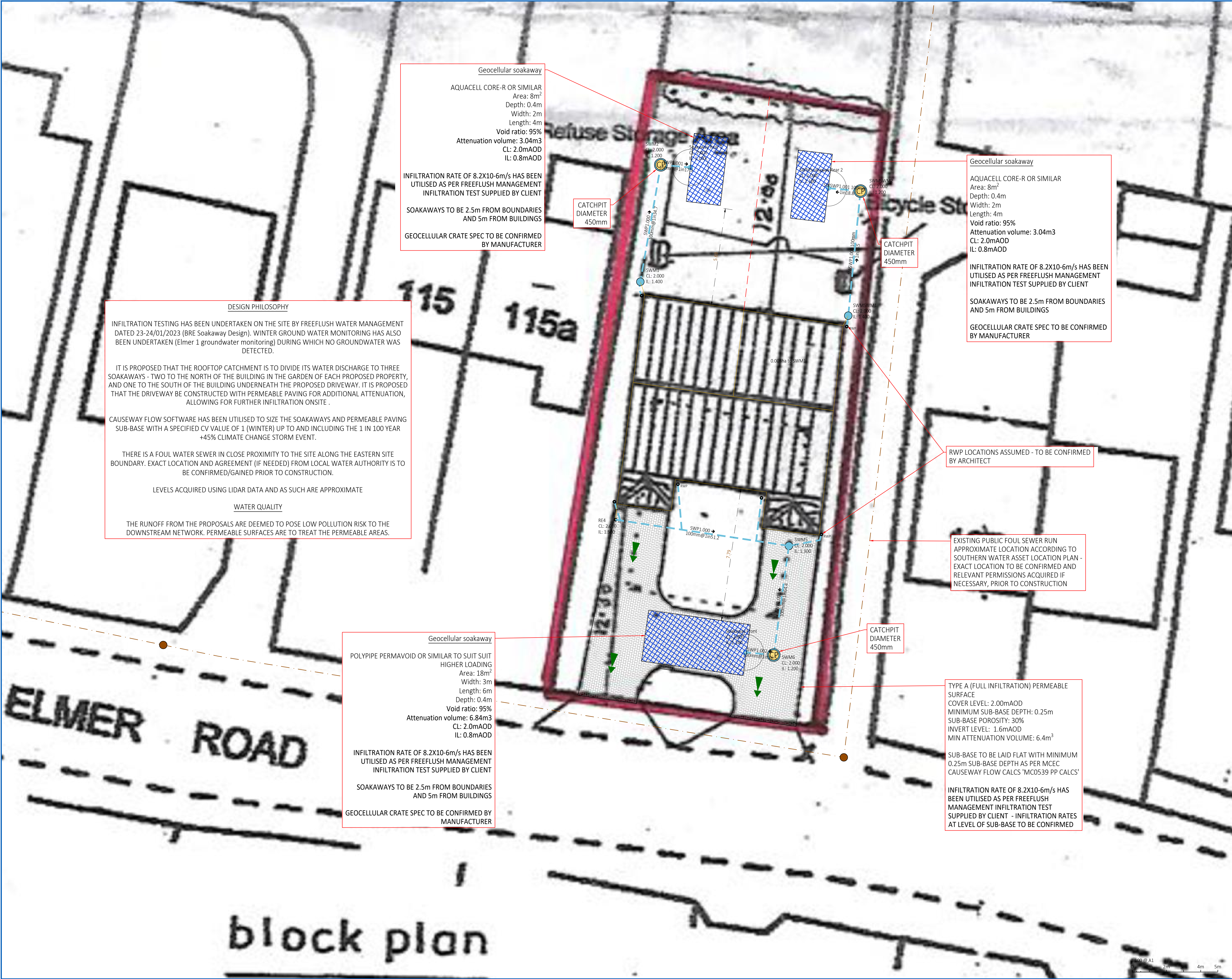
	<i>100mm in accordance with the design.</i>	
29	<i>The design infiltration rate has been applied to the base and sides of the soakaways and permeable paving in the calculations. Please apply to the base OR the sides, not both.</i> <i>The design infiltration rate must be 0.02952m/hr or 8.2x10⁻⁶m/s.</i>	The design infiltration rate of 0.02952m/hr has been applied to only the base of each proposed soakaway, with no side infiltration used in the calculations. See Appendix II for accompanying calculations.
30	<i>Please provide construction detail for oblique pipe to pipe connections/junctions.</i>	Oblique Pipe Junction detail has been added to CIV02.
31	<i>Please illustrate exceedance flow routes.</i>	Exceedance flow routes have been illustrated on the front driveway – see attached CIV01 drawing.

- 2.5 Based on the information above, it can be seen that all parts of the condition have been addressed.

3.0 CONCLUSION

- 3.1 Meridian Civil Engineering Consultancy LTD (MCEC) has been instructed by Martin Naldrett to prepare a document pack to collate information required for addressing a planning condition, Planning ref: M/39/24/DOC with Arun District Council. The proposals are for the construction of 2x semi-detached dwellings.
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- 3.6 See attached Meridian Civils drainage layout drawing CIV01/02 and associated calculations MC0539 Calcs.

APPENDIX I Drainage Design Drawings



1. GENERAL

a. THIS DRAWING IS NOT TO BE SCALED, WORK TO FIGURED DIMENSIONS ONLY, CONFIRMED ON SITE.

b. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL DRAWINGS, DETAILED SPECIFICATIONS WHERE APPLICABLE AND ALL ASSOCIATED DRAWINGS IN THIS SERIES.

c. ANY DISCREPANCY ON THIS DRAWING IS TO BE REPORTED IMMEDIATELY TO THE PARTNERSHIP FOR CLARIFICATION.

d. THE CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY WORKS AND FOR THE STABILITY OF THE WORKS IN PROGRESS.

e. CDM REGULATIONS 2015. ALL CURRENT DRAWINGS AND SPECIFICATIONS MUST BE READ IN CONJUNCTION WITH THE DESIGNER'S HAZARD RISK AND ENVIRONMENT ASSESSMENT RECORD. DESIGN HAS BEEN PRODUCED BASED ON INFORMATION PROVIDED BY THE CLIENT/PRINCIPLE DESIGNER AVAILABLE AT TIME OF ISSUE. CONTRACTOR TO REVIEW DRAWING AND SPECIFICATION IN CONTEXT WITH THE WIDER SITE AND SPECIFIC SITE INVESTIGATION, CONTAMINATION ASSESSMENT, ASBESTOS SURVEY, ENVIRONMENTAL SURVEY, UXO SURVEY AND ANY OTHER RELEVANT INFORMATION AND MANAGE RISKS RELATING TO THE WORKS OUTLINED IN THE DRAWINGS AND SPECIFICATION. PRINCIPLE CONTRACTOR TO MAKE DESIGNER AND CLIENT AWARE OF SITE SPECIFIC RISKS THAT MAY AFFECT THE DRAWING AND SPECIFICATION.

f. CDM REGULATIONS 2015. FOR GENERIC MAINTENANCE AND MANAGEMENT RISKS REFER TO CHAPTER 36 OF CIRIA 752 SUDS MANUAL. FOR PROPRIETARY SYSTEMS SEE MANUFACTURER'S MANAGEMENT AND MAINTENANCE DETAILS AND RISK ASSESSMENT WITH REGARDS TO MAINTENANCE OF PROPRIETARY SYSTEMS.

2. CONSTRUCTION NOTE

a. THE MAIN CONTRACTOR IS RESPONSIBLE FOR THE DESIGN OF ALL TEMPORARY WORKS, AND IS ALSO RESPONSIBLE FOR THE SAFE MAINTENANCE AND STABILITY OF EXISTING BUILDINGS AT ALL TIMES.

b. THE MAIN CONTRACTOR IS RESPONSIBLE FOR ALL OCCURRENCES OF GROUND WATER DURING THE CONSTRUCTION PERIOD.

c. ANY INFORMATION GIVEN REGARDING EXISTING UNDERGROUND SERVICES IS GIVEN IN GOOD FAITH AFTER CONSULTATION WITH THE RELEVANT AUTHORITY, HOWEVER ACCURACY IS NOT CERTAIN. THE MAIN CONTRACTOR IS RESPONSIBLE FOR CHECKING ALL INFORMATION ON SITE PRIOR TO WORK COMMENCING AND TAKING DUE CARE AND ATTENTION WHILST UNDERTAKING THE WORKS.

d. THE CONTRACTOR MUST COMPLY WITH ALL CURRENT LEGISLATION RELATING TO HEALTH & SAFETY.

e. ALL PRODUCTS SPECIFIED SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND INSTRUCTIONS. IF THERE ARE DISCREPANCIES BETWEEN THAT INFORMATION AND THE DETAILS ON ANY MERIDIAN DRAWINGS, THE MANUFACTURERS INSTRUCTIONS MUST BE USED.

3. BELOW GROUND DRAINAGE

a. UPVC-U PIPES TO BS 46607: 2000 AND PLASTIC INSPECTION CHAMBERS AND FITTINGS TO BS EN 13598-1:2020. CLAY PIPES TO BS EN 295-1:2013. CONCRETE MANHOLE AND INSPECTION CHAMBERS TO BS EN 1917:2002.

b. ALL ADAPTABLE DRAINAGE TO BE CONSTRUCTED IN ACCORDANCE WITH SEWERAGE SECTOR GUIDANCE App C - DESIGN AND CONSTRUCTION GUIDANCE AND THE RELEVANT COUNCIL DESIGN GUIDE.

c. ALL PRIVATE FOUL WATER SEWERS TO BE LAID AT 1 IN 40 AT THE HEAD OF PIPE RUNS AND 1 IN 80 ELSEWHERE UNLESS OTHERWISE STATED.

d. ALL PRIVATE FOUL SEWER PIPES TO BE 100mm DIAMETER FROM SOIL STACKS UNLESS OTHERWISE STATED ON THE DRAWING AND 150mm WHERE SERVING MORE THAN 9 PROPERTIES.

e. ALL PRIVATE SURFACE WATER SEWERS TO BE LAID AT 1 IN 100 UNLESS OTHERWISE STATED ON THE DRAWING.

f. ALL PRIVATE SURFACE WATER SEWER PIPES TO BE 100mm DIAMETER FROM DOWNPIPES AND 150mm DIAMETER ELSEWHERE UNLESS OTHERWISE STATED ON THE DRAWING.

g. ALLOW FOR RODDING ACCESS ABOVE GROUND WHERE RAINWATER DOWNPIPES OR SOIL STACKS DO NOT HAVE A DIRECT CONNECTION TO AN INSPECTION CHAMBER.

h. EXISTING SEWER PIPE TO BE RE-USED TO BE SURVEYED AND LEVELED PRIOR TO COMMENCEMENT OF THE DRAINAGE WORKS AND REFURBISHED IF NECESSARY.

i. CONNECTIONS TO AN ADOPTED SEWER ONLY TO BE MADE FOLLOWING APPROVAL FROM THE RELEVANT ADOPTING AUTHORITY.

j. ALL DRAINS, SEWER PIPES AND MANHOLES TO BE CLEANED AND TESTED FOR WATER TIGHTNESS ON COMPLETION OF CONSTRUCTION.

4. MANHOLE COVERS AND FRAMES

a. MANHOLE COVERS TO BE CLASS D400 IN HIGHWAYS, CLASS B125 IN FOOTWAYS AND VERGES, CLASS A15 IN NON-TRAFFICKED AREAS.

b. MANHOLE COVER AND FRAME TO BE BEDDED AND SURROUNDED IN 1:3 MORTAR.

LEGEND

PROPOSED SW PIPE RUN

PROPOSED TYPE 4 SW INSPECTION CHAMBER

CP

CATCHPIT CHAMBER/MANHOLE

RE

PROPOSED SW RODDING EYE

RWP

PROPOSED SW RAINWATER PIPE

JUNCTION/DUMMY SW MANHOLE - NEEDED TO RUN MODEL

PERMEABLE PAVING - NOT TANKED

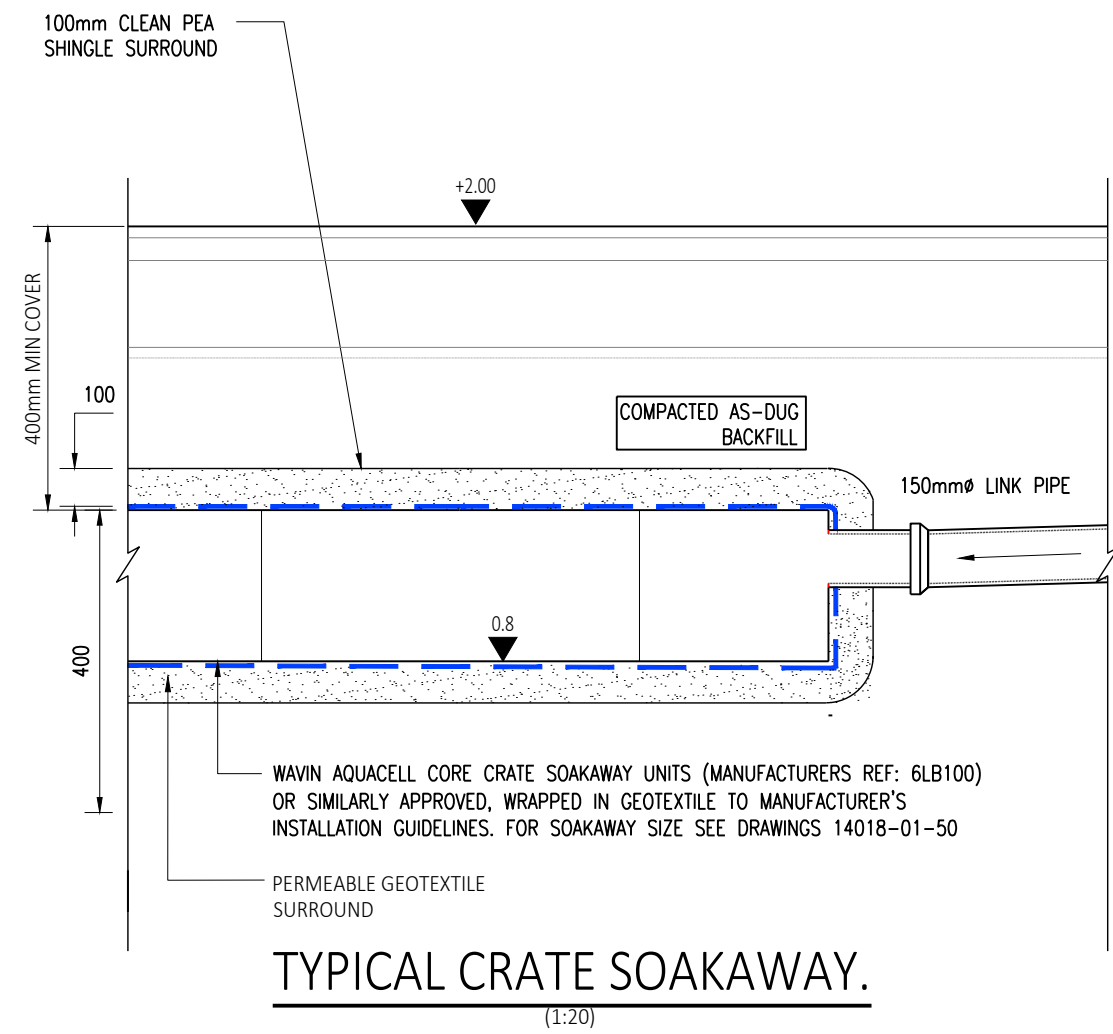
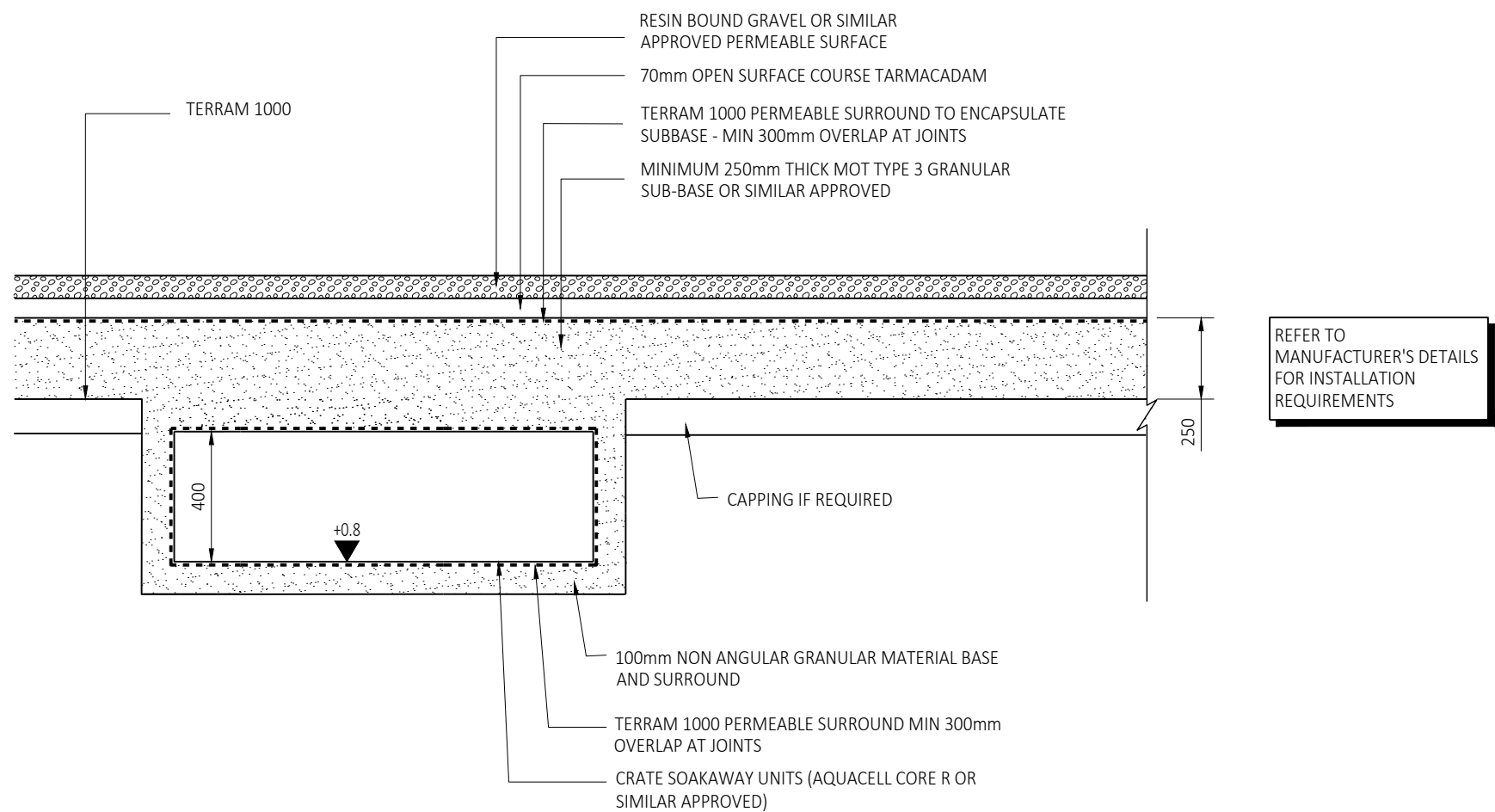
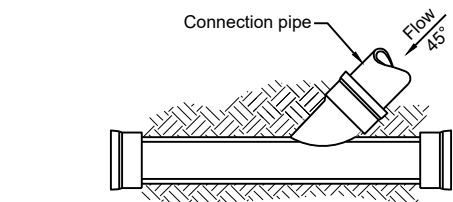
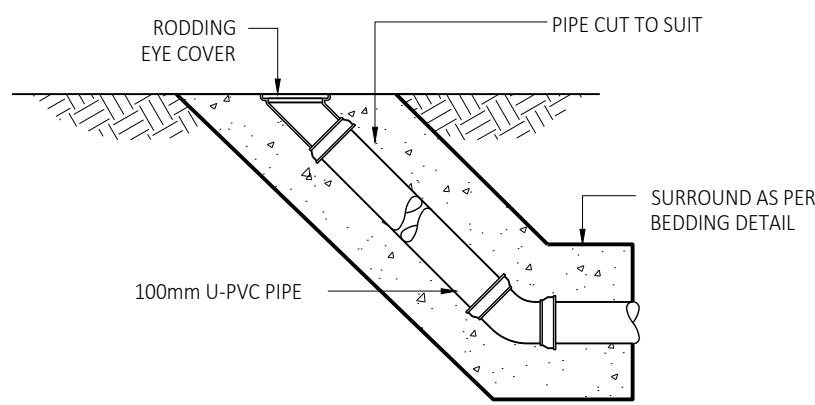
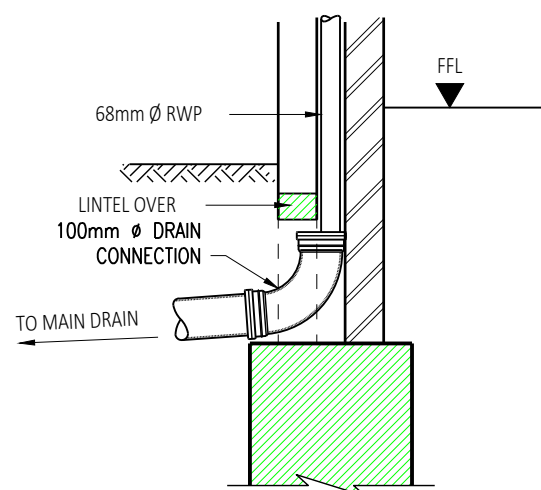
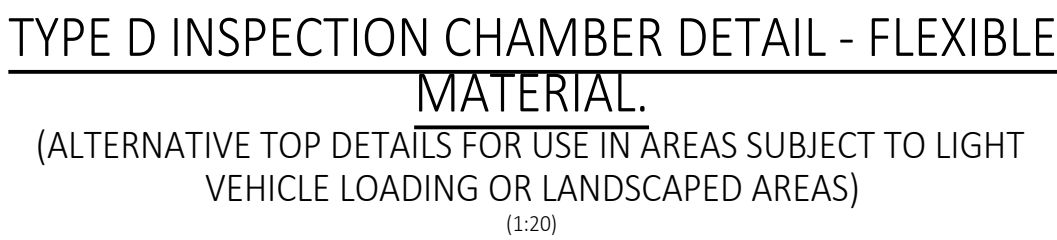
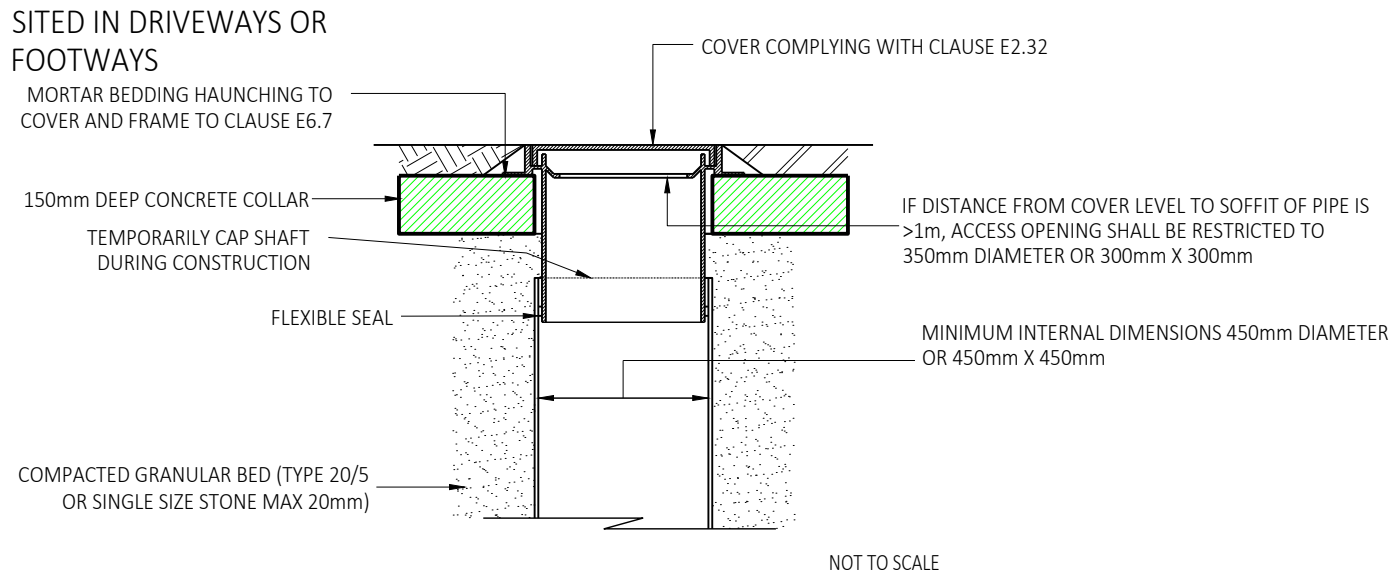
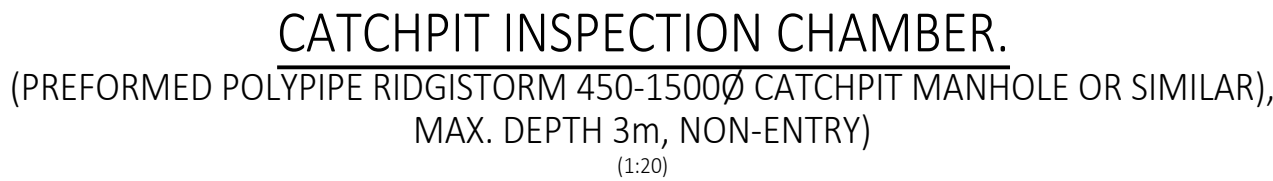
GEOCELLULAR ATTENUATION - NOT TANKED

EXISTING PUBLIC FW RUN - RETAINED

ASSUMED BOUNDARY LINE

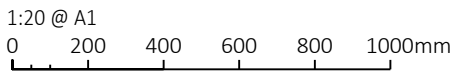
EXCEEDANCE FLOW ROUTES

P1	Minor Amendments	SL	19/06/25
REV:	DESCRIPTION:	BY:	DATE:
STATUS: PRELIMINARY			
MERIDIAN CIVIL ENGINEERING CONSULTANCY			
CLIENT: Martin Naldrett			
SITE: 117 Elmer Road PO22 6LH			
TITLE: Surface Water Drainage Strategy Proposed Layout			
SCALE AT A1: 1:100	DATE: 16/09/25	DRAWN: IW	CHECKED: SL
PROJECT NO: MC0539	DRAWING NO: CIV01	REVISION: P2	



- GENERAL
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STATUS: PRELIMINARY			
MERIDIAN CIVIL ENGINEERING CONSULTANCY			
CLIENT: Martin Naldrett			
SITE: 117 Elmer Road PO22 6LH			
TITLE: Surface Water Drainage Strategy Standard Details			
SCALE AT A1: 1:20	DATE: 16/09/25	DRAWN: IW	CHECKED: SL
PROJECT NO: MC0539	DRAWING NO: CIV02	REVISION: P2	



APPENDIX II Hydraulic Calculations

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
5			2.000	450	171.219	-53.718	0.700
6			2.000	450	170.328	-60.092	0.800
Soakaway Front			2.000		168.688	-59.932	0.900
4	0.008	4.00	2.000	100	161.095	-52.189	0.500

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	10.239	51.2	100	SW_Standard	2.000	1.500	0.400	2.000	1.300	0.600
1.001	6.436	64.4	100	SW_Standard	2.000	1.300	0.600	2.000	1.200	0.700
1.002	1.648	16.5	100	SW_Standard	2.000	1.200	0.700	2.000	1.100	0.800

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	4	100	Manhole	SW_RE	5	450	Manhole	SW_Standard
1.001	5	450	Manhole	SW_Standard	6	450	Manhole	SW_Standard
1.002	6	450	Manhole	SW_Standard	Soakaway Front		Junction	

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440	2160
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
10	45	0	0
30	45	0	0
100	45	0	0

Node Soakaway Front Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.02952	Invert Level (m)	0.800	Depth (m)	0.400
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	772	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	3.000	Number Required	1
Porosity	0.95	Pit Length (m)	6.000		

Results for 10 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	5	10	1.360	0.060	4.4	0.0096	0.0000	OK
15 minute summer	6	10	1.241	0.041	4.4	0.0065	0.0000	OK
480 minute summer	Soakaway Front	488	1.024	-0.076	0.7	3.8288	0.0000	OK
15 minute summer	4	10	1.553	0.053	4.4	0.0004	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	5	1.001	6	4.4	1.111	0.583	0.0255
15 minute summer	6	1.002	Soakaway Front	4.4	1.558	0.293	0.0046
480 minute summer	Soakaway Front	Infiltration		0.1			
15 minute summer	4	1.000	5	4.4	0.969	0.519	0.0466

Results for 30 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	5	10	1.373	0.073	5.8	0.0116	0.0000	OK
15 minute summer	6	10	1.248	0.048	5.8	0.0076	0.0000	OK
720 minute summer	Soakaway Front	720	1.080	-0.020	0.6	4.7822	0.0000	OK
15 minute summer	4	10	1.564	0.064	5.8	0.0005	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	5	1.001	6	5.8	1.174	0.768	0.0316
15 minute summer	6	1.002	Soakaway Front	5.8	1.665	0.385	0.0057
720 minute summer	Soakaway Front	Infiltration		0.1			
15 minute summer	4	1.000	5	5.8	1.027	0.684	0.0581

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
15 minute summer	5	10	1.387	0.087	7.2	0.0139	0.0000	OK
15 minute summer	6	10	1.255	0.055	7.2	0.0087	0.0000	OK
360 minute winter	Soakaway Front	360	1.164	0.064	0.9	6.2186	0.0000	OK
15 minute summer	4	10	1.576	0.076	7.2	0.0006	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m ³)
15 minute summer	5	1.001	6	7.2	1.203	0.950	0.0375
15 minute summer	6	1.002	Soakaway Front	7.2	1.746	0.476	0.0067
360 minute winter	Soakaway Front	Infiltration		0.1			
15 minute summer	4	1.000	5	7.2	1.065	0.849	0.0698

Design Settings

Rainfall Methodology	FEH-22	Maximum Time of Concentration (mins)	30.00	Preferred Cover Depth (m)	0.600
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0	Include Intermediate Ground	✓
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00	Enforce best practice design rules	✓
CV	1.000	Connection Type	Level Soffits		
Time of Entry (mins)	4.00	Minimum Backdrop Height (m)	0.200		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Easting (m)	Northing (m)	Depth (m)
Permeable Paving	0.010	4.00	2.000	Junction	56.307	88.761	0.400

Simulation Settings

Rainfall Methodology	FEH-22	Winter CV	1.000	Drain Down Time (mins)	1440	Check Discharge Rate(s)	x
Rainfall Events	Singular	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0	Check Discharge Volume	x
Summer CV	1.000	Skip Steady State	x	Starting Level (m)			

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 | 2160

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
10	45	0	0	100	45	0	0
30	45	0	0				

Node Permeable Paving Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.02952	Porosity	0.30	Width (m)	10.000	Depth (m)	0.250
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	1.600	Length (m)	10.000	Inf Depth (m)	
Safety Factor	2.0	Time to half empty (mins)	61	Slope (1:X)	9999.0		

Results for 10 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute summer	Permeable Paving	120	1.702	0.102	1.9	3.0323	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
180 minute summer	Permeable Paving	Infiltration	0.4

Results for 30 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	Permeable Paving	94	1.738	0.138	3.2	4.1384	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
120 minute summer	Permeable Paving	Infiltration	0.4

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	Permeable Paving	114	1.786	0.186	2.7	5.5544	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
120 minute winter	Permeable Paving	Infiltration	0.4

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.003	4.00	2.000	450	162.543	-38.299	0.600
2			2.000	450	163.740	-31.471	0.800
Soakaway Rear 1			2.000		165.461	-31.624	0.900

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	6.932	34.7	100	SW_Standard	2.000	1.400	0.500	2.000	1.200	0.700
1.001	1.728	17.3	100	SW_Standard	2.000	1.200	0.700	2.000	1.100	0.800

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	450	Manhole	SW_Standard	2	450	Manhole	SW_Standard
1.001	2	450	Manhole	SW_Standard	Soakaway Rear 1		Junction	

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440	2160
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
10	45	0	0
30	45	0	0
100	45	0	0

Node Soakaway Rear 1 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.02952	Invert Level (m)	0.800	Depth (m)	0.400
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	772	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	2.000	Number Required	1
Porosity	0.95	Pit Length (m)	4.000		

Results for 10 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	1.430	0.030	1.8	0.0048	0.0000	OK
15 minute summer	2	10	1.225	0.025	1.8	0.0040	0.0000	OK
240 minute winter	Soakaway Rear 1	224	1.002	-0.098	0.3	1.5374	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	1	1.000	2	1.8	1.028	0.174	0.0122
15 minute summer	2	1.001	Soakaway Rear 1	1.8	1.218	0.123	0.0026
240 minute winter	Soakaway Rear 1	Infiltration		0.0			

Results for 30 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	1.434	0.034	2.3	0.0054	0.0000	OK
15 minute summer	2	10	1.229	0.029	2.3	0.0045	0.0000	OK
240 minute summer	Soakaway Rear 1	240	1.070	-0.030	0.6	2.0522	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	1	1.000	2	2.3	1.095	0.223	0.0146
15 minute summer	2	1.001	Soakaway Rear 1	2.3	1.301	0.157	0.0031
240 minute summer	Soakaway Rear 1	Infiltration		0.0			

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	1.439	0.039	2.9	0.0062	0.0000	OK
15 minute summer	2	10	1.232	0.032	2.9	0.0052	0.0000	OK
360 minute summer	Soakaway Rear 1	336	1.141	0.041	0.5	2.5930	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	1	1.000	2	2.9	1.159	0.281	0.0174
15 minute summer	2	1.001	Soakaway Rear 1	2.9	1.382	0.198	0.0036
360 minute summer	Soakaway Rear 1	Infiltration		0.0			

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.003	4.00	2.000	450	174.682	-40.279	0.600
2			2.000	450	175.396	-33.007	0.800
Soakaway Rear 2			2.000		173.523	-32.833	0.900

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	7.307	36.5	100	SW_Standard	2.000	1.400	0.500	2.000	1.200	0.700
1.001	1.881	18.8	100	SW_Standard	2.000	1.200	0.700	2.000	1.100	0.800

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	450	Manhole	SW_Standard	2	450	Manhole	SW_Standard
1.001	2	450	Manhole	SW_Standard	Soakaway Rear 2		Junction	

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	1440	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440	2160
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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
10	45	0	0
30	45	0	0
100	45	0	0

Node Soakaway Rear 2 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.02952	Invert Level (m)	0.800	Depth (m)	0.400
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	772	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	2.000	Number Required	1
Porosity	0.95	Pit Length (m)	4.000		

Results for 10 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	1.429	0.029	1.7	0.0047	0.0000	OK
15 minute summer	2	10	1.225	0.025	1.7	0.0039	0.0000	OK
240 minute winter	Soakaway Rear 2	224	0.996	-0.104	0.3	1.4901	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	1	1.000	2	1.7	0.993	0.169	0.0125
15 minute summer	2	1.001	Soakaway Rear 2	1.7	1.167	0.121	0.0027
240 minute winter	Soakaway Rear 2	Infiltration		0.0			

Results for 30 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	1.435	0.035	2.3	0.0055	0.0000	OK
15 minute summer	2	10	1.229	0.029	2.3	0.0046	0.0000	OK
240 minute summer	Soakaway Rear 2	236	1.066	-0.034	0.6	2.0198	0.0000	OK

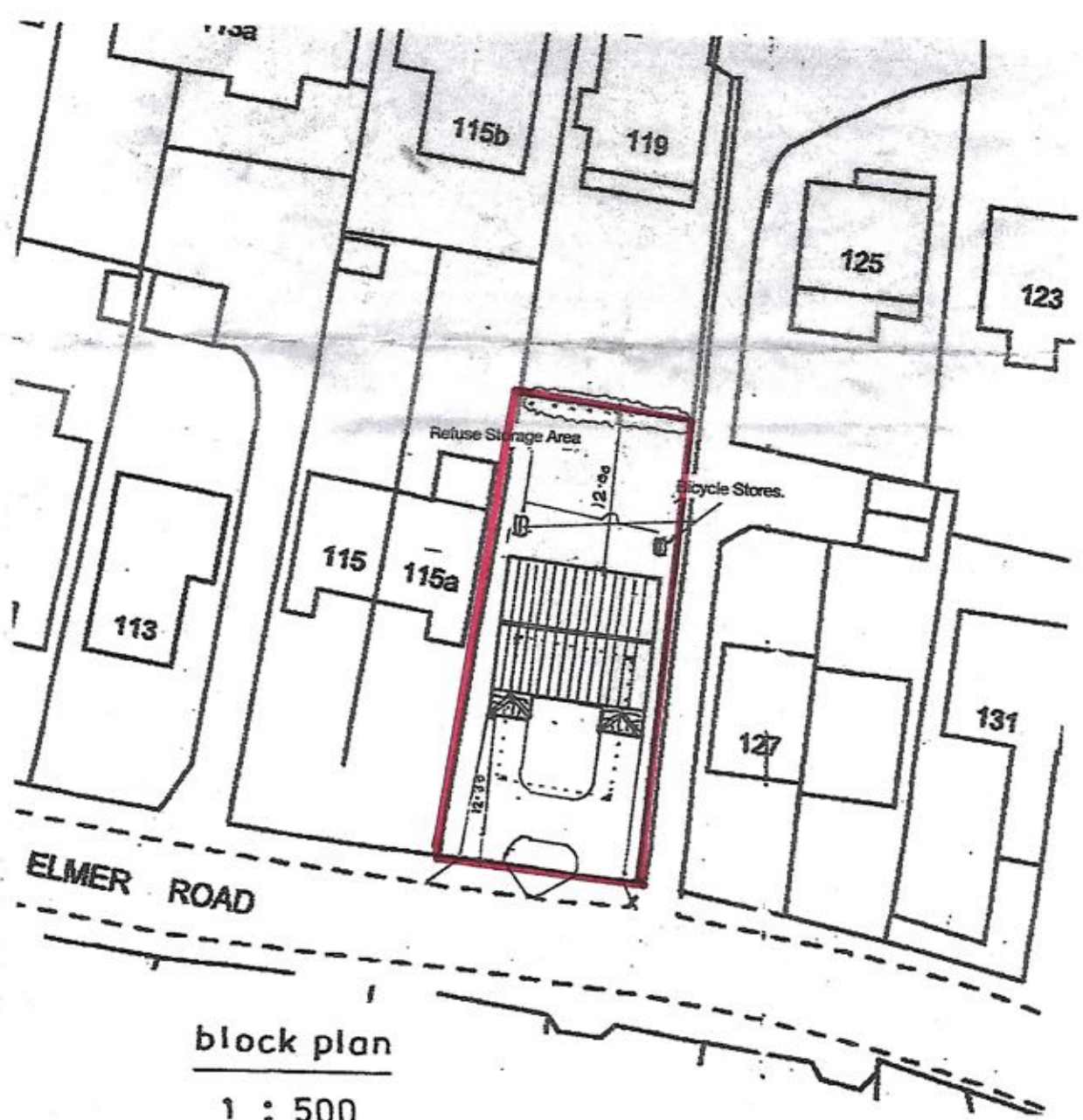
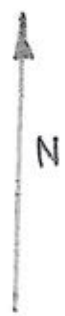
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	1	1.000	2	2.3	1.073	0.229	0.0157
15 minute summer	2	1.001	Soakaway Rear 2	2.3	1.265	0.164	0.0034
240 minute summer	Soakaway Rear 2	Infiltration		0.0			

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	1.439	0.039	2.9	0.0062	0.0000	OK
15 minute summer	2	10	1.233	0.033	2.9	0.0053	0.0000	OK
360 minute summer	Soakaway Rear 2	328	1.133	0.033	0.5	2.5291	0.0000	OK

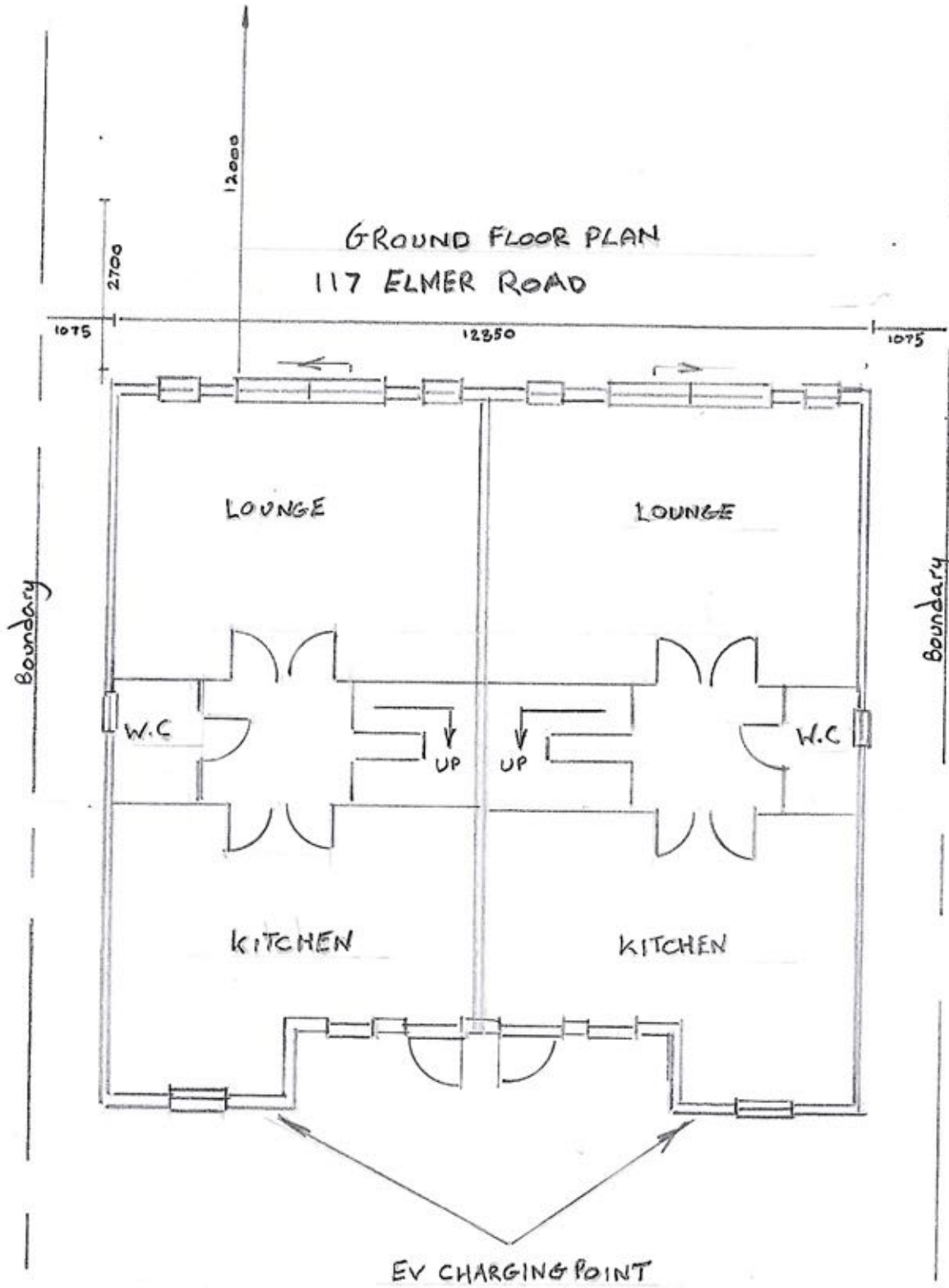
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	1	1.000	2	2.9	1.136	0.289	0.0187
15 minute summer	2	1.001	Soakaway Rear 2	2.9	1.344	0.206	0.0041
360 minute summer	Soakaway Rear 2	Infiltration		0.0			

APPENDIX III Architectural Drawings



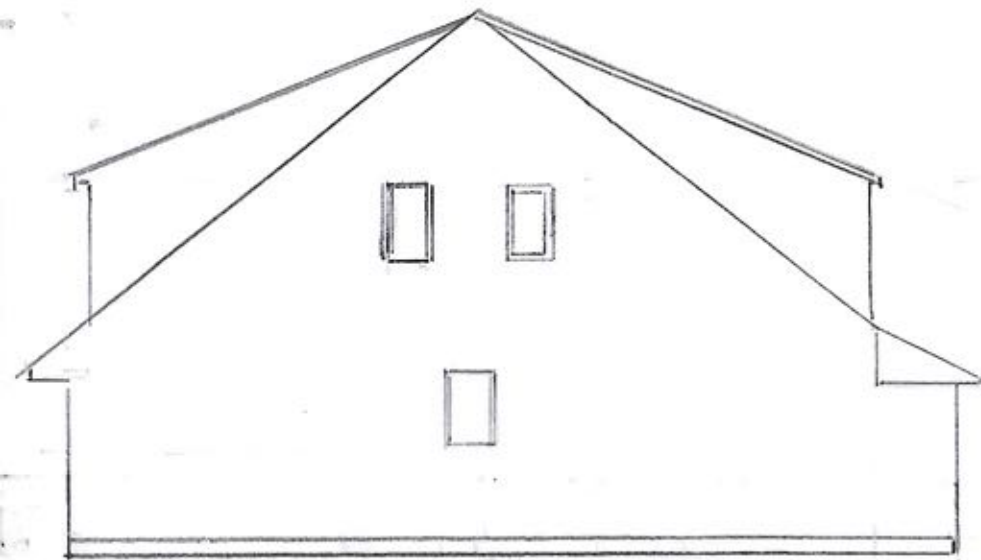
block plan
1 : 500

GROUND FLOOR PLAN
117 ELMER ROAD

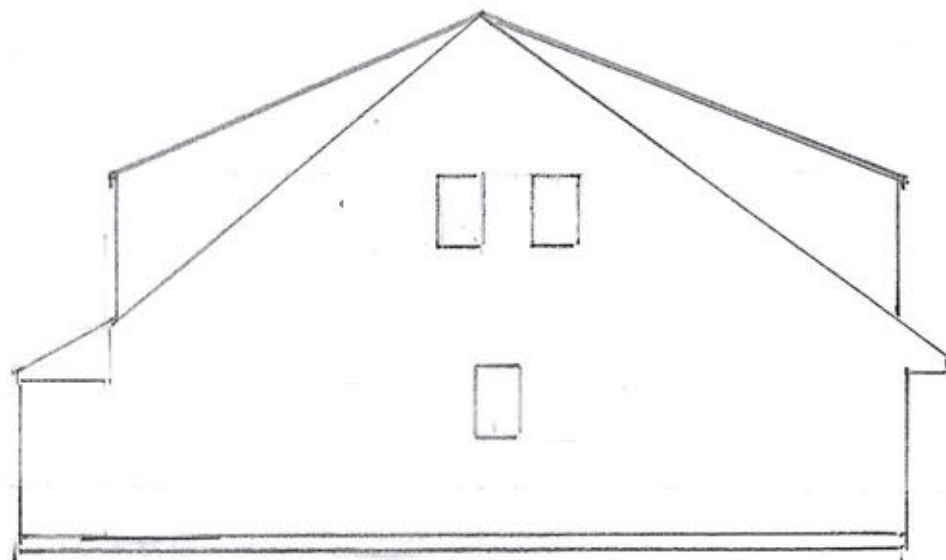


SCALE 1:100

WEST ELEVATION

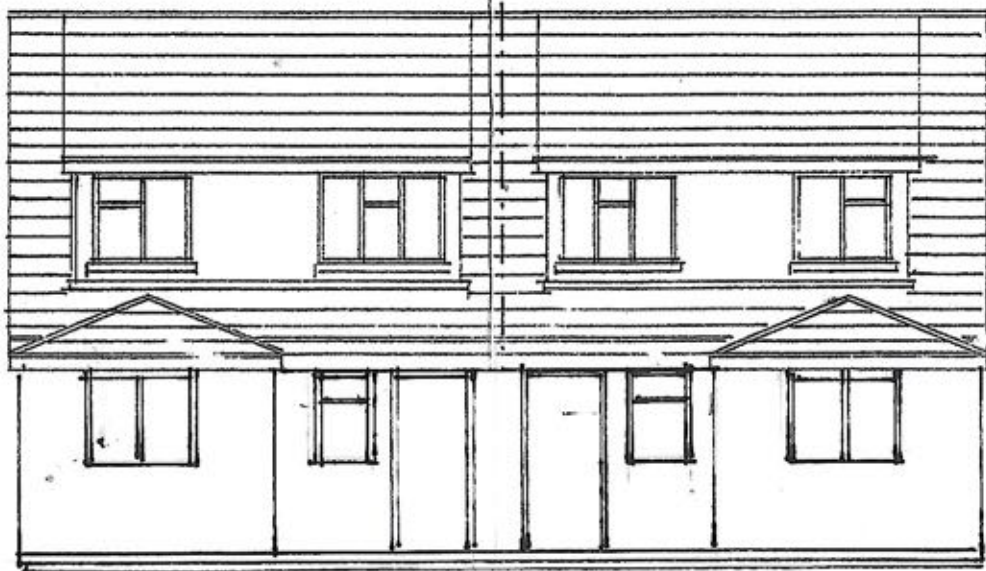


EAST ELEVATION



elmer road

1 : 100



STREET VIEW

