



Greenfield Farm, Barns Green

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Drainage Strategy

Site Address: Greenfield Farm
Valewood Lane
Barns Green
West Sussex
RH14 9DR

UK Experts in Flood Modelling, Flood Risk
Assessments, and Surface Water Drainage Strategies

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Document Issue Record

Project: Drainage Strategy

Prepared for: Manorwood Construction Limited

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Site Location: Greenfield Farm, Valewood Lane, Barns Green, West Sussex, RH14 9DR

Issue	Date	Author	Check	Auth.	Comments
1	18/03/2026	Daniel Buciak	James Mahoney	James Mahoney	First issue

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1. Introduction

1.1. Aegaea were commissioned by the Client to prepare a Drainage Strategy to support the discharge of Condition 5 associated with the planning application (ref. DC/25/0055) at Greenfield Farm, Valewood Lane, Barns Green, West Sussex, RH14 9DR.

1.2. Planning condition 5 states:

No development shall commence until details of the proposed means of disposal of foul and surface water, and a timetable for implementation, has been submitted to and approved in writing by the local planning authority. Development shall be carried out in accordance with the approved details.

Site Overview

1.3. The site of the proposed development is shown in the location plan, Figure 1, below.



Figure 1: Site Location Plan

- 1.4. The site measures approximately 0.897 hectares and is currently an unused grassed field. The site is bound by West Chiltington Lane to the west, Kingfisher Farm to the north with existing access off West Chiltington Lane and existing static caravans to the south.
- 1.5. An existing roadside ditch/ordinary watercourse runs on the easterly side of West Chiltington Lane that flows north to south.
- 1.6. The topography across the site generally falls from a high point in the north-east to a low point in the west, towards the site's access off West Chiltington Lane.
- 1.7. Horsham District Council are the Local Planning Authority (LPA) for the site.
- 1.8. West Sussex County Council is the designated Lead Local Flood Authority (LLFA) and Local Highway Authority (LHA).
- 1.9. Southern Water is the Sewerage Undertaker for the area. A copy of Southern Water's sewer records is included in Appendix A.

Development Proposals

- 1.10. Planning consent has been granted (DC/25/0055) with conditions on appeal for the use of land for the stationing of 5 static caravans for residential purposes and 3 associated day rooms, and associated landscape works.
- 1.11. The development proposals are included in Appendix B.

Ground Conditions

- 1.12. Soilsmap Viewer (LandIS) indicates that the site is located within an area of "Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils with impeded drainage".
- 1.13. British Geological Survey (BGS) data indicates that the bedrock underlying the site is "Weald Clay Formation – Mudstone".
- 1.14. Based on the above, infiltration is not considered to be feasible and an alternative strategy in line with the SuDS hierarchy will need to be sought.

2. Surface Water Drainage Strategy

Existing Drainage Arrangements

- 2.1. Due to the undeveloped greenfield nature of the site, it is assumed that there is no existing drainage system at the site. It is assumed that surface water runoff currently discharges overland to the existing roadside drainage ditch.

Proposed Drainage Hierarchy

- 2.2. Current guidance indicates that the following surface water disposal options should be considered, listed in order of preference:
- i. **Disposal via on-site infiltration systems:** As discussed above, a discharge to ground has been discounted due to unsuitable ground conditions.
 - ii. **Discharge to a watercourse/surface water body:** An existing roadside ditch/ordinary watercourse runs on the easterly side of West Chilton Lane that flows north to south.
 - iii. **Disposal to surface water sewer:** Southern Water's sewer records indicate that there are no public surface water sewers located within the vicinity of the site.
 - iv. **Disposal to combined sewer:** Southern Water's sewer records indicate that there are no public combined sewers located within the vicinity of the site.

Proposed Drainage Strategy

- 2.3. In accordance with the SuDS hierarchy, it is proposed that surface water flows from the development are to discharge at a controlled rate to the existing roadside ditch located along the site's western boundary.
- 2.4. The surface water runoff from the proposed development will be managed using SuDS features comprising filter drains, permeable gravel driveways and geocellular crates prior to discharging to the existing ditch. The permeable gravel driveway would drain as in the pre-development scenario, i.e. no change/increase to impermeable areas within its extents.

- 2.5. The proposed drainage features have been sized to accommodate surface water runoff from all proposed impermeable areas on site, including all modelled 1 in 100-year storm events with an appropriate allowance (45%) made for climate change, plus a 10% urban creep allowance.
- 2.6. The proposed surface water drainage strategy, including layout and details, can be found in Appendix C. Supporting surface water drainage calculations are contained within Appendix D.

Runoff Rates

- 2.7. An assessment of greenfield runoff rates based on the proposed development impermeable areas (circa 491m²) was made using the pre-development calculator in Causeway Flow software based on the input parameters shown in Figure 2 below.

Pre-development discharge

Site Makeup

Greenfield Method

Positively Drained Area (ha)

SAAR (mm)

Soil Index

SPR

Region

Betterment (%)

QBar (l/s)

Return Period (years)	Growth Factor	Q (l/s)
1	0.85	0.2
30	2.40	0.6
100	3.19	0.9

Figure 2: Extract from Causeway Flow Greenfield Runoff Rate Calculator

2.8. The greenfield runoff rates for the proposed development site are set out in the Table 1 below.

Return Period	Greenfield Runoff Rate
Q_{BAR}	0.3 l/s
1 in 1 Year	0.2 l/s
1 in 30 Year	0.6 l/s
1 in 100 Year	0.9 l/s

Table 1: Greenfield Runoff Rates

2.9. The table above shows that due to the small nature of the proposed development and the associated soil class type, greenfield runoff rates are extremely low.

2.10. Where a site is below 1ha and the amount of impermeable area of the site is low, it is considered that 2 l/s forms a practical minimum flow rate that balances and mitigates both the increased flood risk and blockage risk to the proposed drainage system. It is therefore proposed to restrict flows to 2 l/s as an appropriate minimum flow for small sites.

3. Future Maintenance Strategy

General Maintenance

- 3.1. The surface water drainage network will be managed throughout the lifetime by the owners of the proposed development.
- 3.2. All drainage, whether piped or SuDS require regular maintenance. The tables below provide an overview of general maintenance tasks and frequency of which they need to be undertaken.
- 3.3. The required maintenance for each component making up the drainage system is scheduled in the tables below, based on CIRIA report C753 – The SuDS manual.

Surface Water Drainage Systems

Maintenance Schedule	Required Action	Typical frequency
Regular Maintenance	Inspect for sediment and debris in catchpit manholes and gullies. Clean out as required	Twice Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional Maintenance	Remove sediment and debris in catchpits, gullies, attenuation devices and inside concrete manhole rings.	As required, based on inspections.
Remedial actions	Reconstruct and/or replace components, if performance deteriorates or failure/blockage occurs.	As required
	Replacement of clogged components (flow restriction)	As required
Monitoring	Inspect silt traps/gullies/catchpits and note rate of sediment accumulation.	Monthly in the first year and then annually
	Check attenuation devices	Annually

General maintenance for Surface Water Drainage Systems as per CIRIA C753.

Filter Drains

Maintenance Schedule	Required Action	Typical frequency
Regular Maintenance	Remove Litter and debris from filter drain surface, access chambers and pre-treatment devices.	Monthly (or as required)
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage.	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate frequencies	Six monthly
	Remove sediment from pre-treatment devices	Six monthly or as required
Occasional Maintenance	Remove or control tree roots where they are encroaching the sides of the filter drain using recommended methods (eg NJUG, 2007 or BS 3998:2010)	As required
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlaying filter medium.	Five yearly, or as required
	Clear perforated pipework of blockages	As required

Permeable Hardstanding Surface

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Regular raking to ensure even spread and smooth surface, may require additional top up.	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment.
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying.	As required – once per year on less frequently used pavements
Remedial Maintenance	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving.	As required
	Remediate work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material.	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action.	Three-monthly, 48 hr after large storms in the first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Hydro-Brake (Vortex Flow Control)

Maintenance Schedule	Required Action	Typical frequency
Regular Maintenance	Remove sediment and debris from flow control chambers and upstream manholes. Check for signs of damage, wear and tear. Check any visible fixing bolts.	Monthly (for the first 12 months, then 6 monthly).
Remedial Actions	Replace or clean hydrobrake if performance deteriorates or failure occurs. In the event of the blockage, the blockage/foreign material should be manually removed	As necessary.
Monitoring	Check flow control to ensure emptying is occurring.	Quarterly and post high intensity storm event.

Headwall

Maintenance Schedule	Required Action	Typical frequency
Regular Maintenance	Inspect inlets, outlets for blockages and clear if required	Monthly (for the first 12 months, then 6 monthly).
	Check for signs of damage, erosion of banks or scour.	
	Inspect structural integrity of head wall structure	
	Check integrity of metal work and replace when needed.	
Occasional Maintenance	In the event of the blockage, the blockage/foreign material should be manually removed	Annual/bi-annual visual checks are basic recommendation
	Galvanised Grates and Handrails	
Remedial Actions	In the event of damage, erosion of banks or scour, rehabilitate as required.	As required
	Repair/rehabilitation of inlets/outlets/overflows	As required
	Re-level uneven surfaces and reinstate design levels	As required

Cellular Attenuation Tank

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings.	Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional Maintenance	Remove sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings.	As required, based on inspections.
Remedial actions	Reconstruct tank and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of tank)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation.	Monthly in the first year and then annually
	Check tank to ensure emptying is occurring	Annually

General maintenance for a Cellular Attenuation Tank as per CIRIA C753.

4. Pollution Prevention & Water Quality Management

SuDS Mitigation Indices

- 4.1. Chapter 26 of the CIRIA C753 The SuDS Manual, provides design advice to meet water quality standards by adopting the SuDS train treatment mechanism and thereby reduce the risk of pollution by evaluating potential pollution hazards at the outset.
- 4.2. The proposed site layout provides the opportunity to introduce SuDS into the scheme to reduce potential contaminant risk further. Runoff from individual property driveways, residential car parks and low traffic roads are generally viewed as low risk (as per Table 26.2 of C753), shown in the tables below.

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential Roofs	Very Low	0.2	0.2	0.05
Individual property driveways, residential car parks and low traffic roads	Low	0.5	0.4	0.4

Pollutant Hazard Indices

	Mitigation Indices				Indices for Calculation		
	TSS	Metals	Hydrocarbons		TSS	Metals	Hydrocarbons
Permeable Paving	0.7	0.6	0.7	100%	0.7	0.6	0.7
Total Mitigation Indices score					0.7	0.6	0.7
Sufficiency of Pollution Mitigation Indices					Sufficient (No additional mitigation required)		

SuDS Mitigation Indices

- 4.3. The mitigation indices offered by the proposed SuDS features exceed the hazard indices from roof areas and residential car park and therefore provides adequate mitigation. It is therefore considered that the proposed SuDS features on site are appropriate and acceptable in terms of water quality.

5. Foul Drainage Strategy

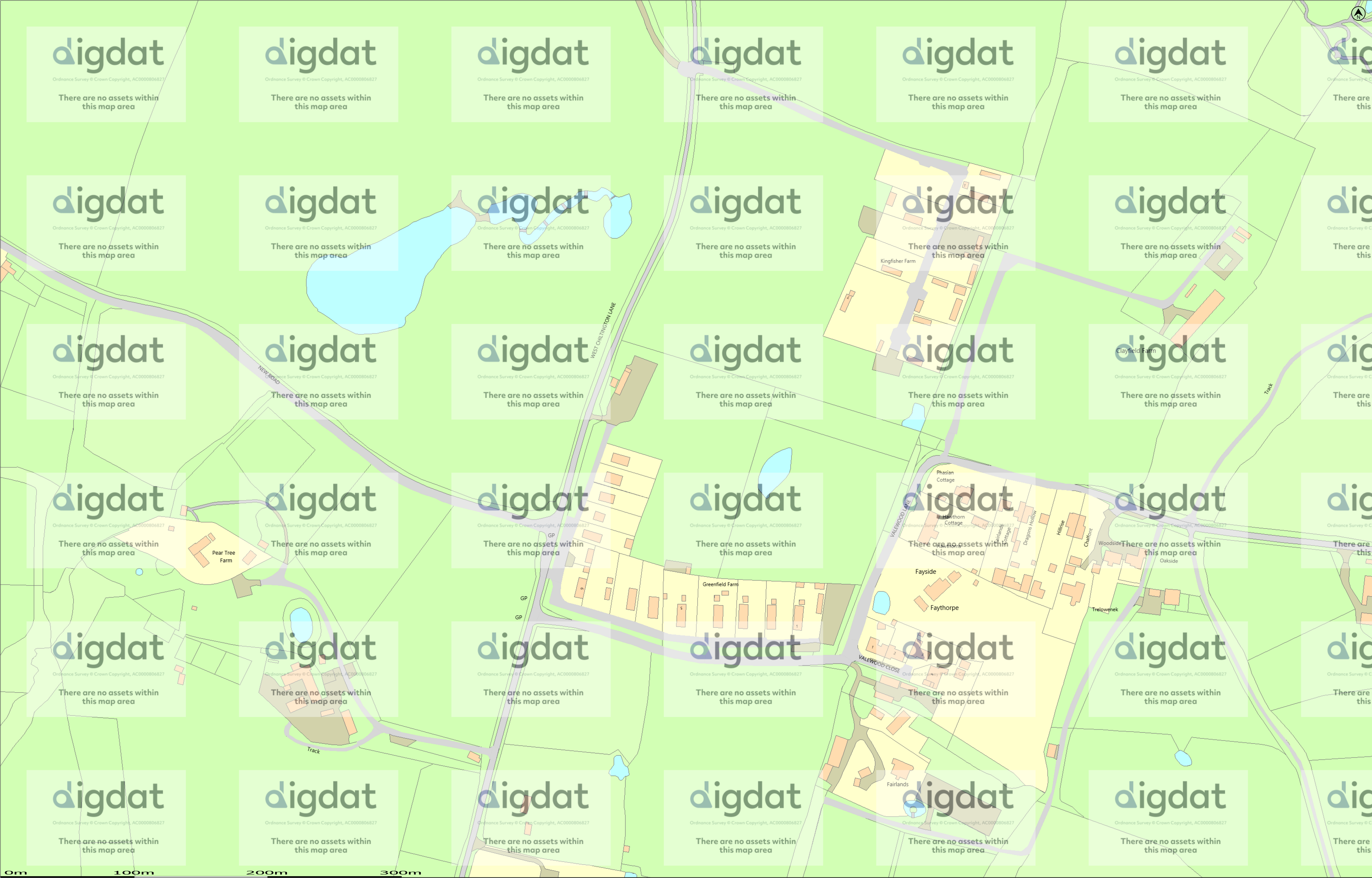
Existing Drainage Arrangements

- 5.1. Due to the undeveloped greenfield nature of the site, it is assumed that there is no existing drainage system at the site.
- 5.2. Southern Water's public sewer records contained in Appendix A show there are no public foul or combined sewers within the vicinity of the site.

Proposed Drainage Strategy

- 5.3. The foul drainage strategy will follow and comply with the 'hierarchy' below, with a connection to a foul/combined sewer being the priority.
- 5.4. As mentioned above, there are no Southern Water's public foul sewers within the vicinity of the site, therefore a connection to a public sewer has been discounted.
- 5.5. As discussed in Section 1 above, based on soil conditions, a discharge to ground, i.e. drainage field, is not considered to be feasible and an alternative strategy in line with the foul hierarchy will need to be sought.
- 5.6. It is therefore proposed that foul flows arising from the proposed development are directed to a sewage treatment plant, prior to an outfall via gravity into the existing roadside ditch located along the site's western boundary.
- 5.7. Prior to any development, an Environmental Agency Permit and Ordinary Watercourse Consent would need to be obtained.

Appendix A - Southern Water Sewer Records



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Date: 11/03/26

Scale: 1:1250

Map Centre: 511476.126450

Data updated: 22/02/26

Our Ref: 2056045 - 1

Wastewater Plan A1
Powered by digdat

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 2026 Ordnance Survey AC0000806827. 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.

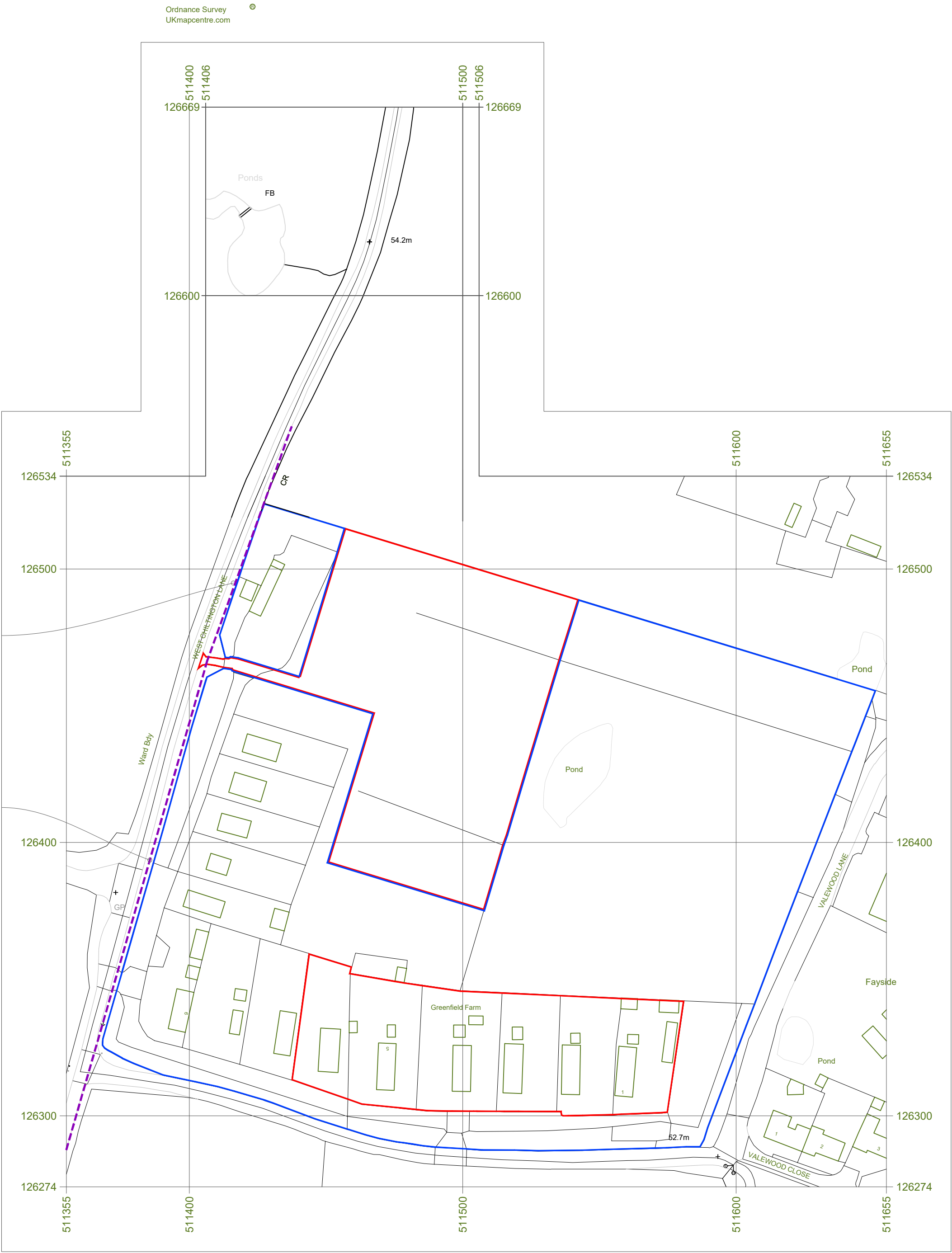
WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

nick@aegaea.com

9718

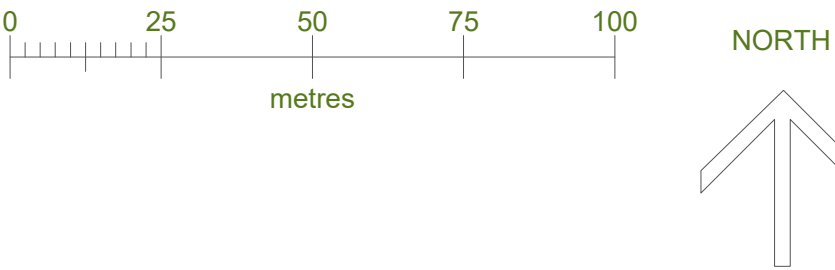


Appendix B - Development Proposals



Serial number: 296614 & 305629

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Regulations or construction design
Status and prior to construction works
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Principle Designer as stated within the
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Drawing No. 2410GR_R3_001

Scale @ A2 1:1250

Job No. 2410GR_R3

Drawn By MD

Checked By BK

Drawn On 12.03.2025

Issued On 12.03.2025

Status Existing

Drawing Visibility Splays

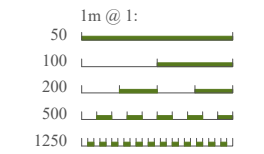
Submission Planning

Revision 002

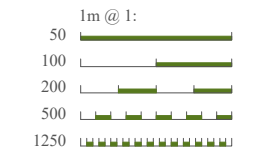
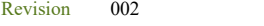
Application Area: 9070 m²
(North) + 6154 m² (South)



Indicative: 0.0°



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Appendix C - Proposed Drainage Strategy

EXISTING OUTFALL LEVELS AND DEPTHS TO BE
CONFIRMED PRIOR TO CONSTRUCTION.



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LEGEND

- INDICATIVE SITE BOUNDARY
- INDICATIVE PLOT DRAINAGE
SURFACE WATER SEWER
- PROPOSED SURFACE WATER SEWER
- INDICATIVE PLOT DRAINAGE SURFACE
WATER INSPECTION CHAMBER
- INDICATIVE PLOT DRAINAGE
RODDING EYE
- PROPOSED FILTER DRAIN
- PROPOSED GEOCELLULAR CRATES
- PROPOSED PACKAGE TREATMENT
PLANT - REWATEC SOLIDO SMART
2-8 PERSON SEWAGE TREATMENT
- EXISTING DITCH
- PROPOSED FOUL WATER SEWER
- PROPOSED FOUL INSPECTION
CHAMBER (450mmØ)

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A01	19.03.26	FIRST ISSUE	DB
Rev	Date	Description	By

Client
MANORWOOD

Project
GREENFIELD FARM, VALEWOOD LANE,
BARNES GREEN, WEST SUSSEX

Title
PROPOSED DRAINAGE STRATEGY

Project No.	Drawing No.	Revision
AEG9718	CIV-001	A01

Drawn	Checked	Approved	Date	Scale @ A1
DB	JM	JM	MARCH 2026	1:250

Drawing Status
FOR PLANNING

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CR

WEST CHILTINGTON LANE

Pond

Ward Bdy

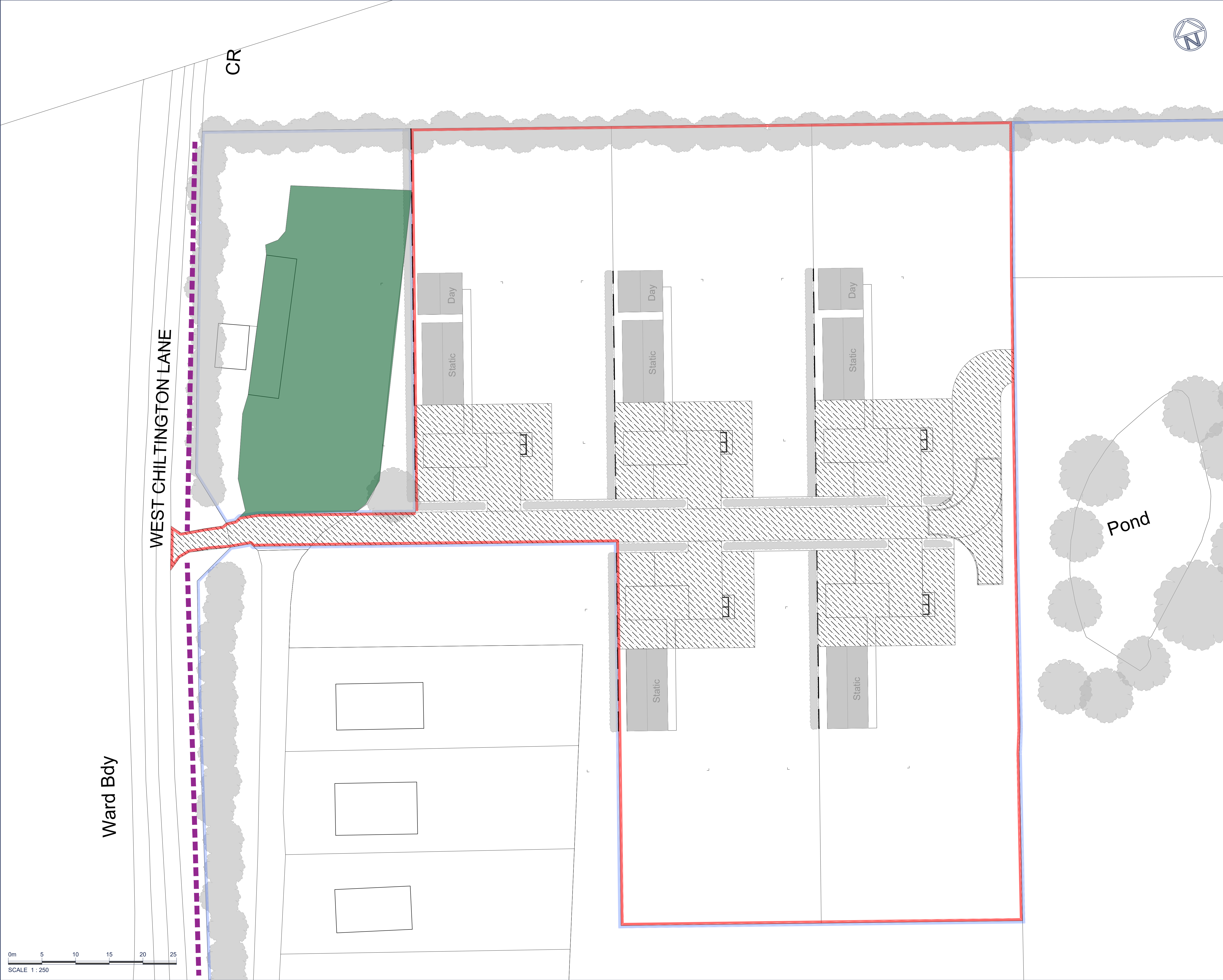
GEOCELLULAR CRATES
BASE LEVEL: 14.175
DIMENSIONS: 5.0m x 8.0m x 0.8m (DEEP)
POROSITY: 95%
VOLUME: 30.40m³
MINIMUM COVER DEPTH IN
ACCORDANCE WITH MANUFACTURER
SPECIFICATION AND REQUIREMENTS

EXISTING DITCH FLOWING
NORTH TO SOUTH

OUTFALL INTO EXISTING
DITCH INVERT: 51.60(TBO)
SUBJECT TO RELEVANT
APPROVALS

EXISTING DITCH FLOWING NORTH TO
SOUTH. FURTHER SURVEYS
REQUIRED TO CONFIRM EXACT
LOCATION, DIMENSIONS AND LEVELS
PRIOR TO CONSTRUCTION

0m 5 10 15 20 25
SCALE 1 : 250



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LEGEND

INDICATIVE SITE BOUNDARY

PROPOSED IMPERMEABLE AREA (491m²)

EXISTING YARD AREA RETAINED (978m²)
- NO CHANGE FROM PRE-DEVELOPMENT

PROPOSED POROUS SURFACE (2280m²) -
GRAVEL SHINGLE TO DRAIN AS IN
PRE-DEVELOPMENT SCENARIO

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A01	18.03.26	FIRST ISSUE	DB
Rev	Date	Description	By

Client
MANORWOOD

Project
GREENFIELD FARM, VALEWOOD LANE, BARN S GREEN, WEST SUSSEX

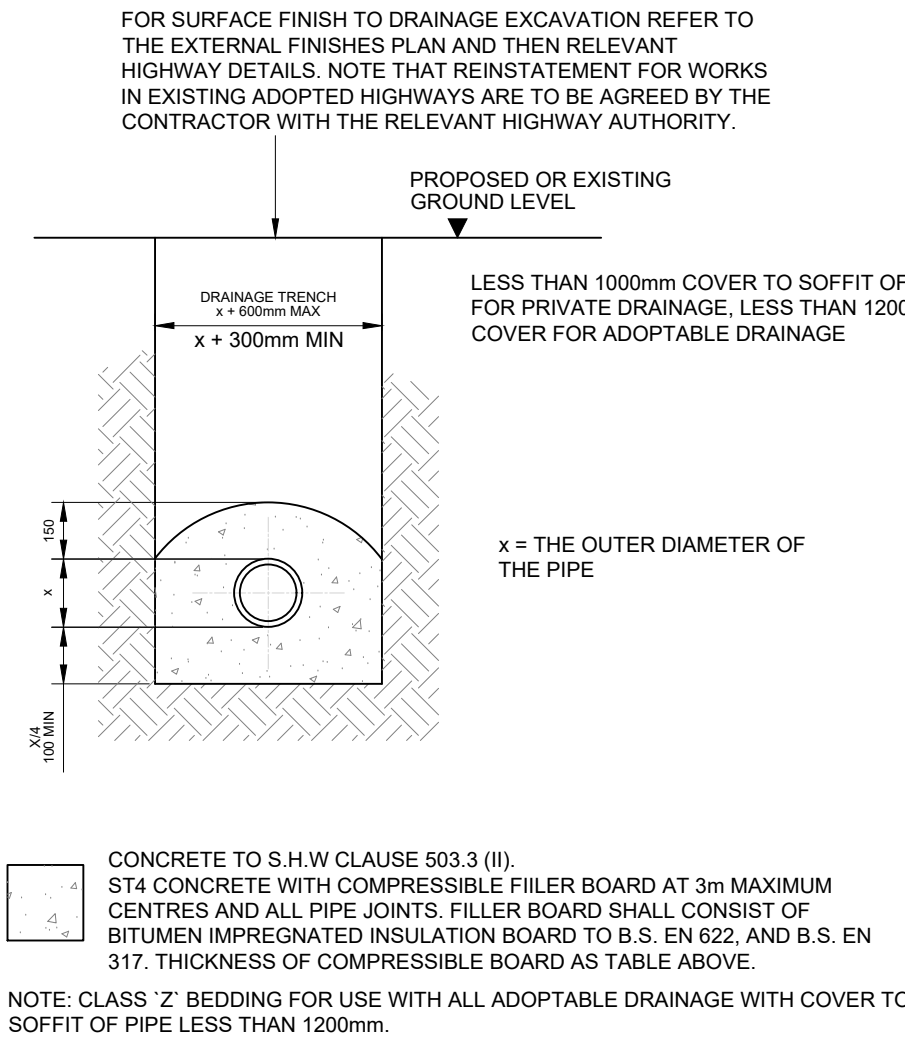
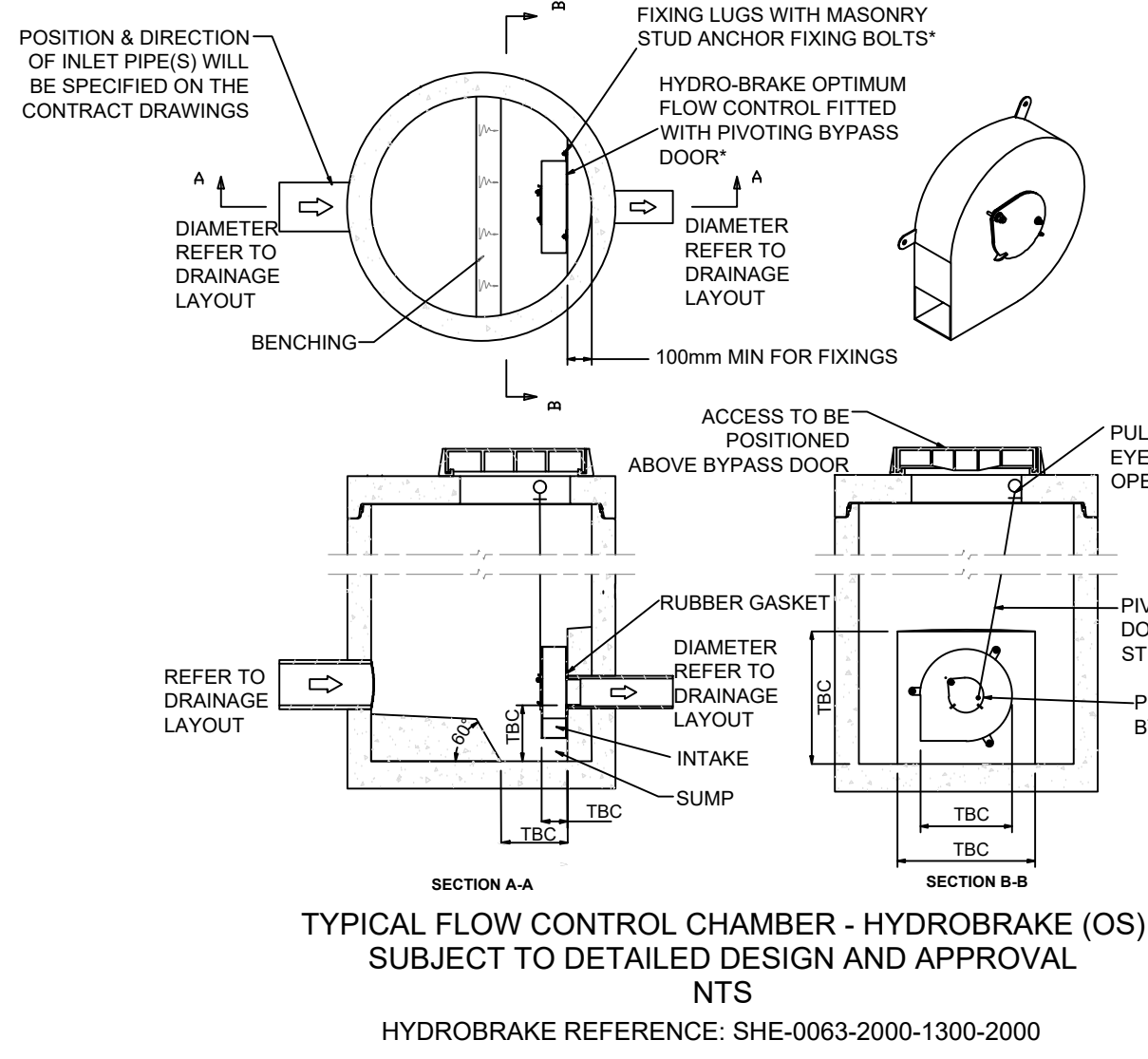
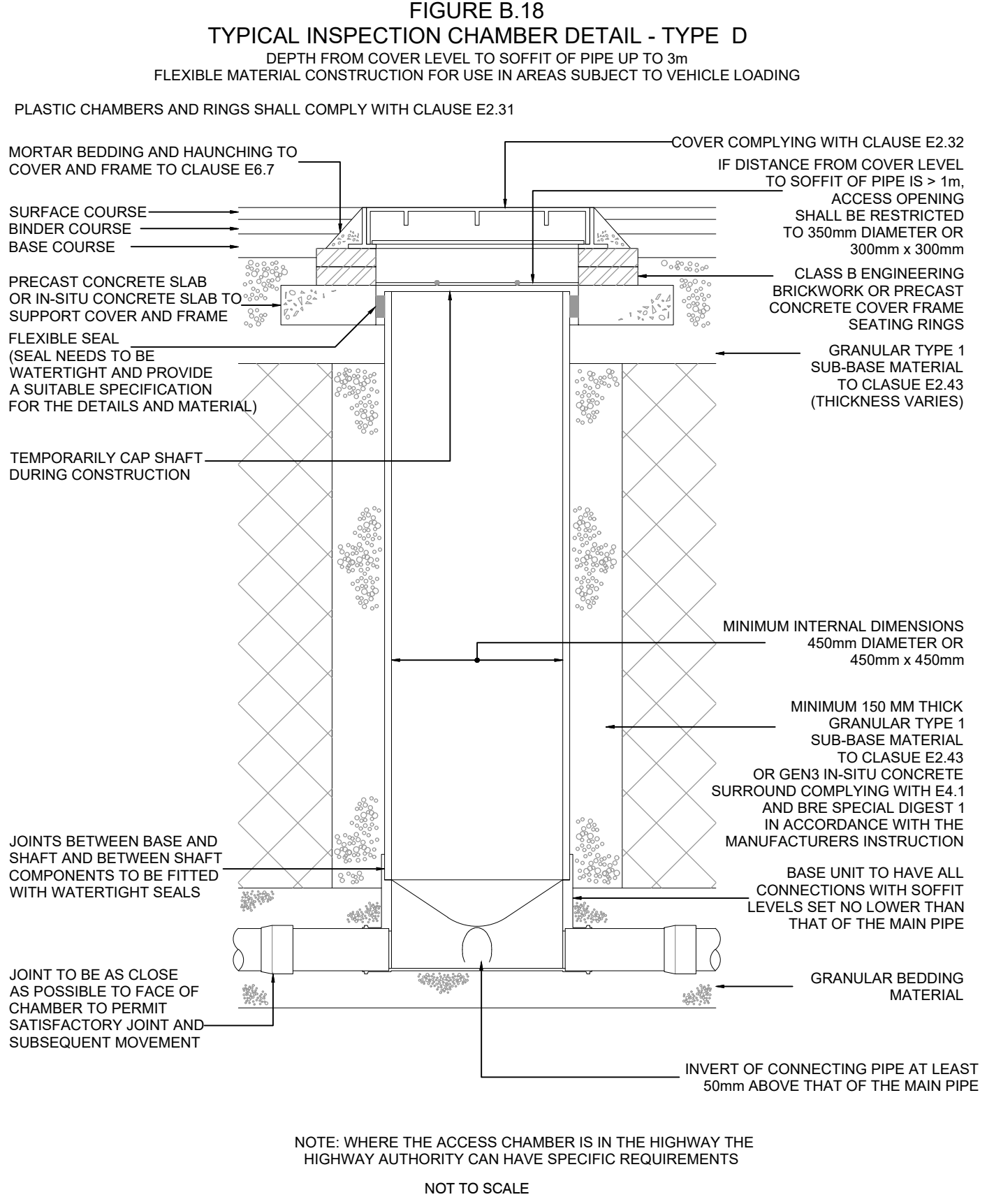
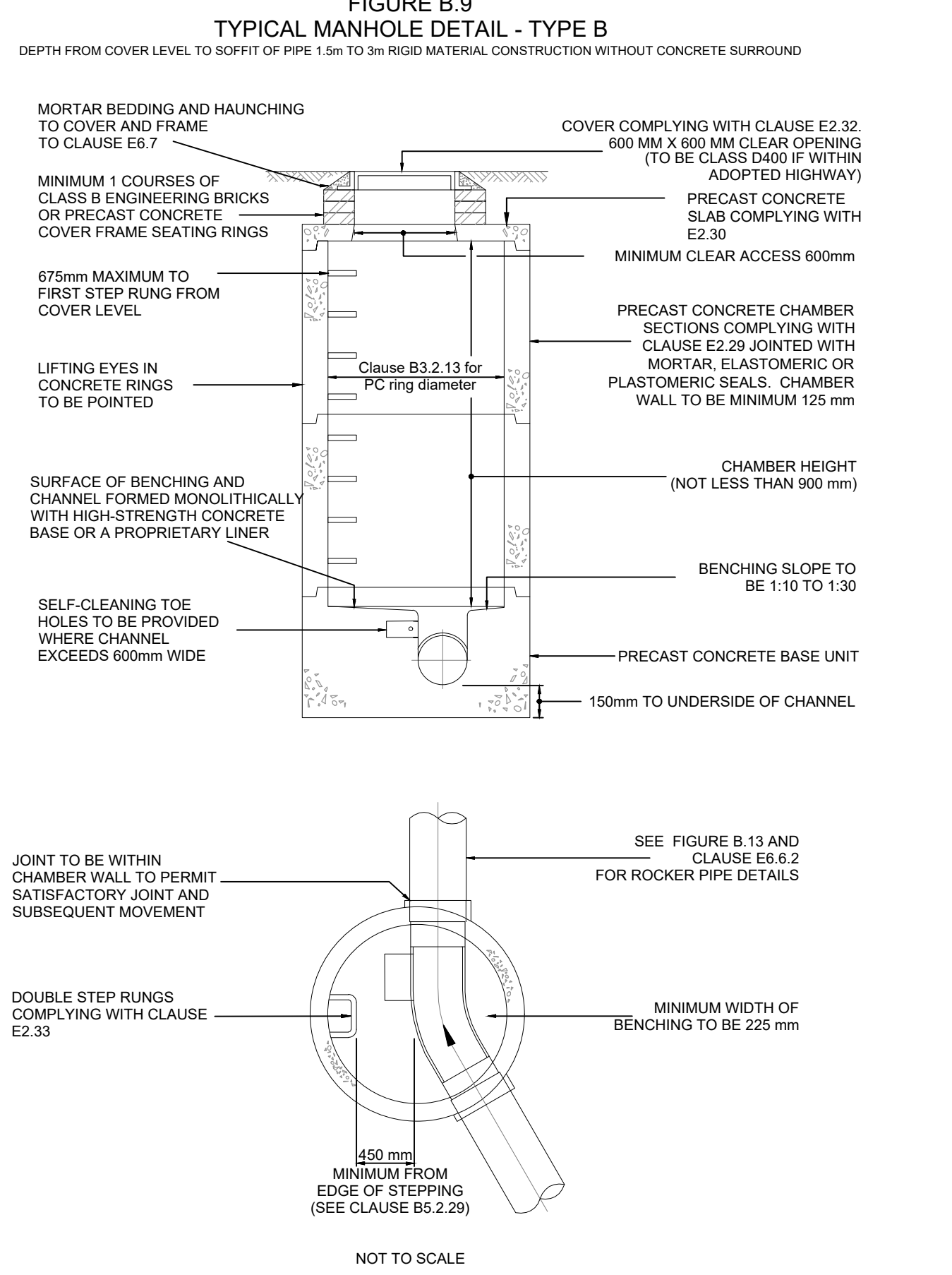
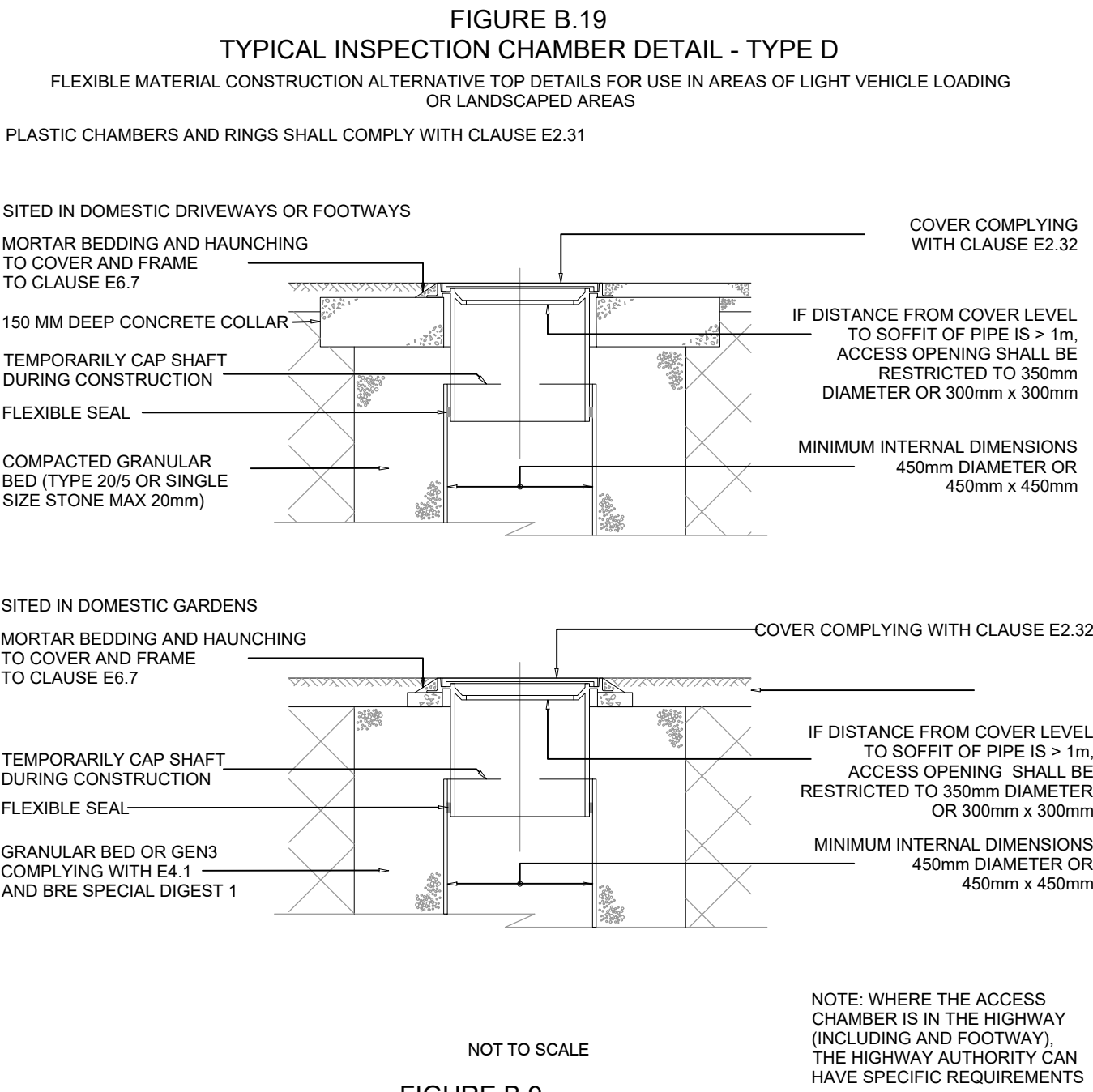
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Project No.	Drawing No.	Revision
AEG9718	CIV-002	A01

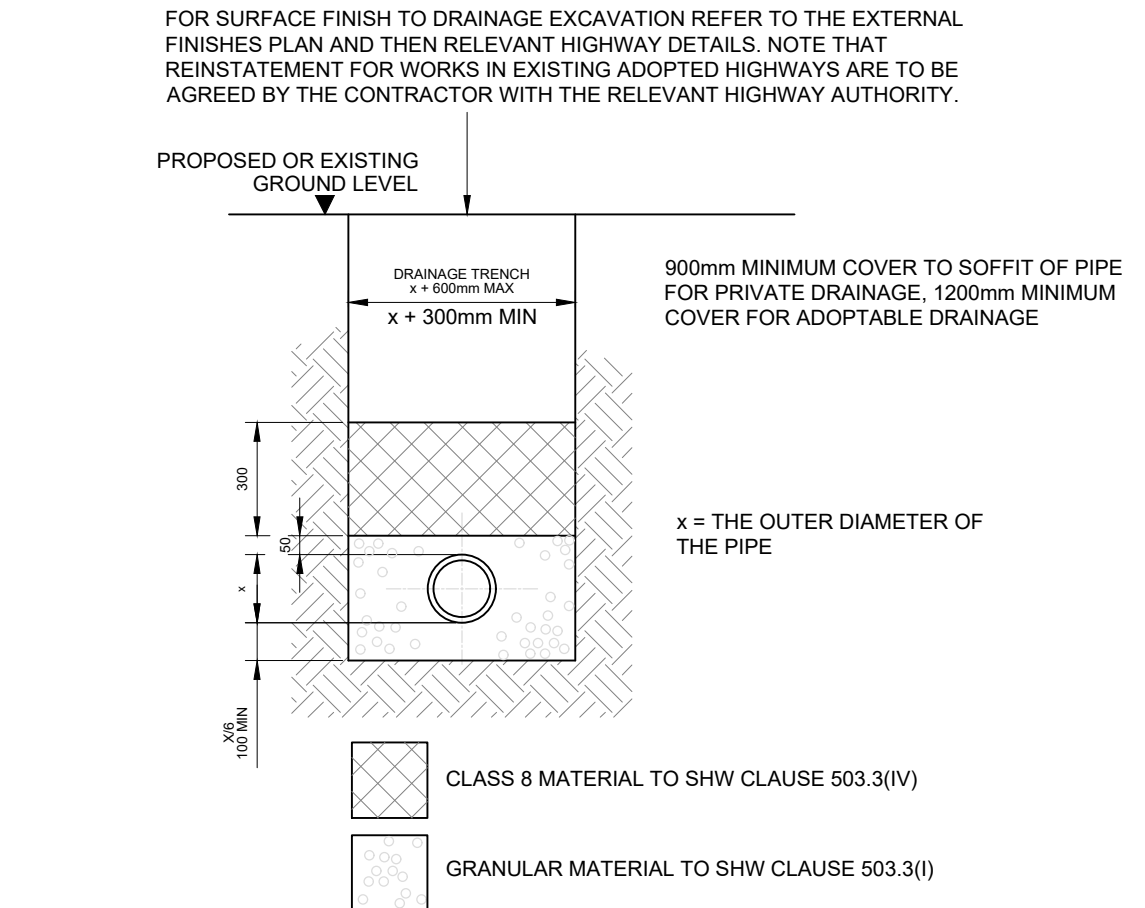
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DB	JM	JM	MARCH 2026	1:250

Drawing Status
FOR PLANNING

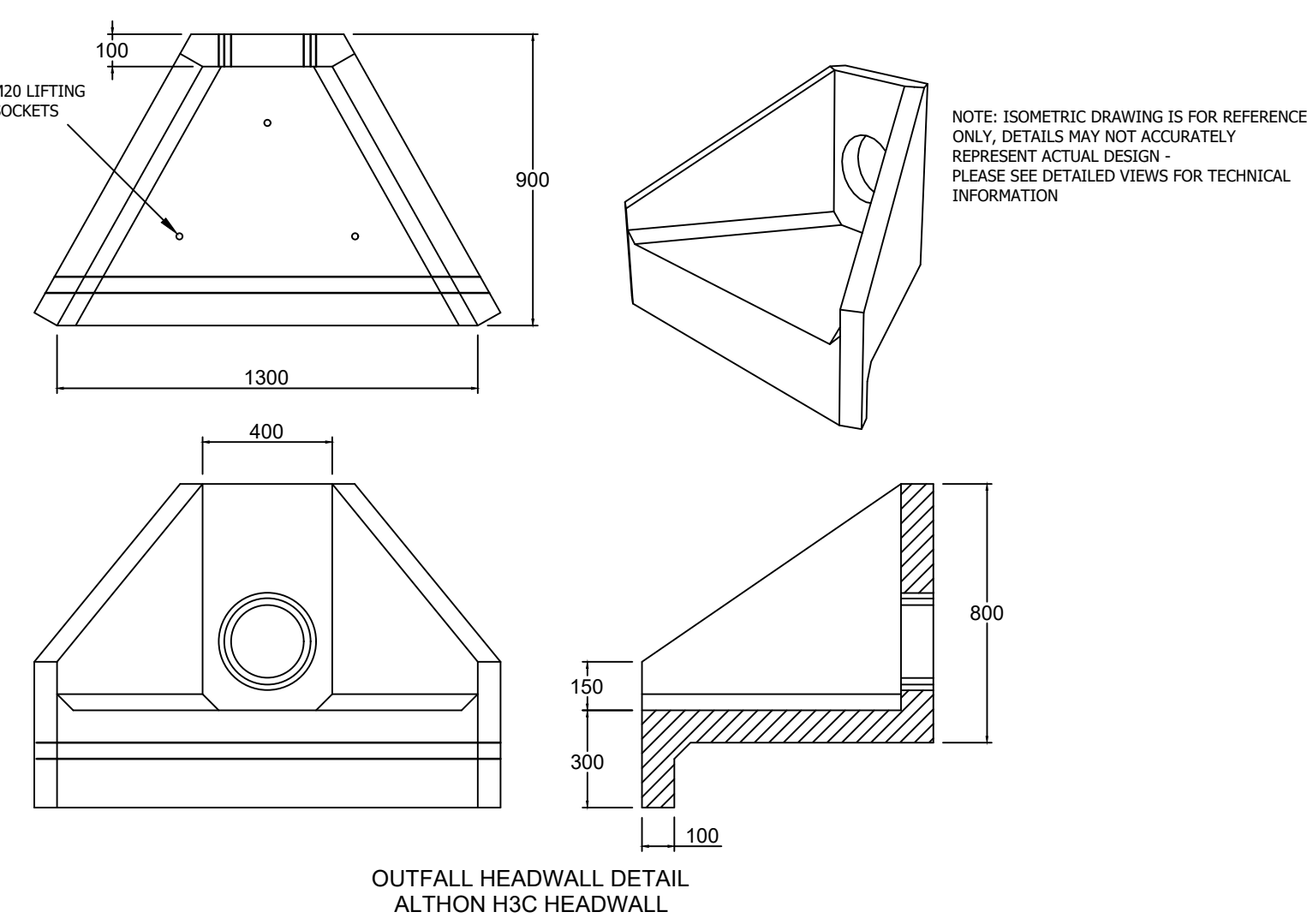
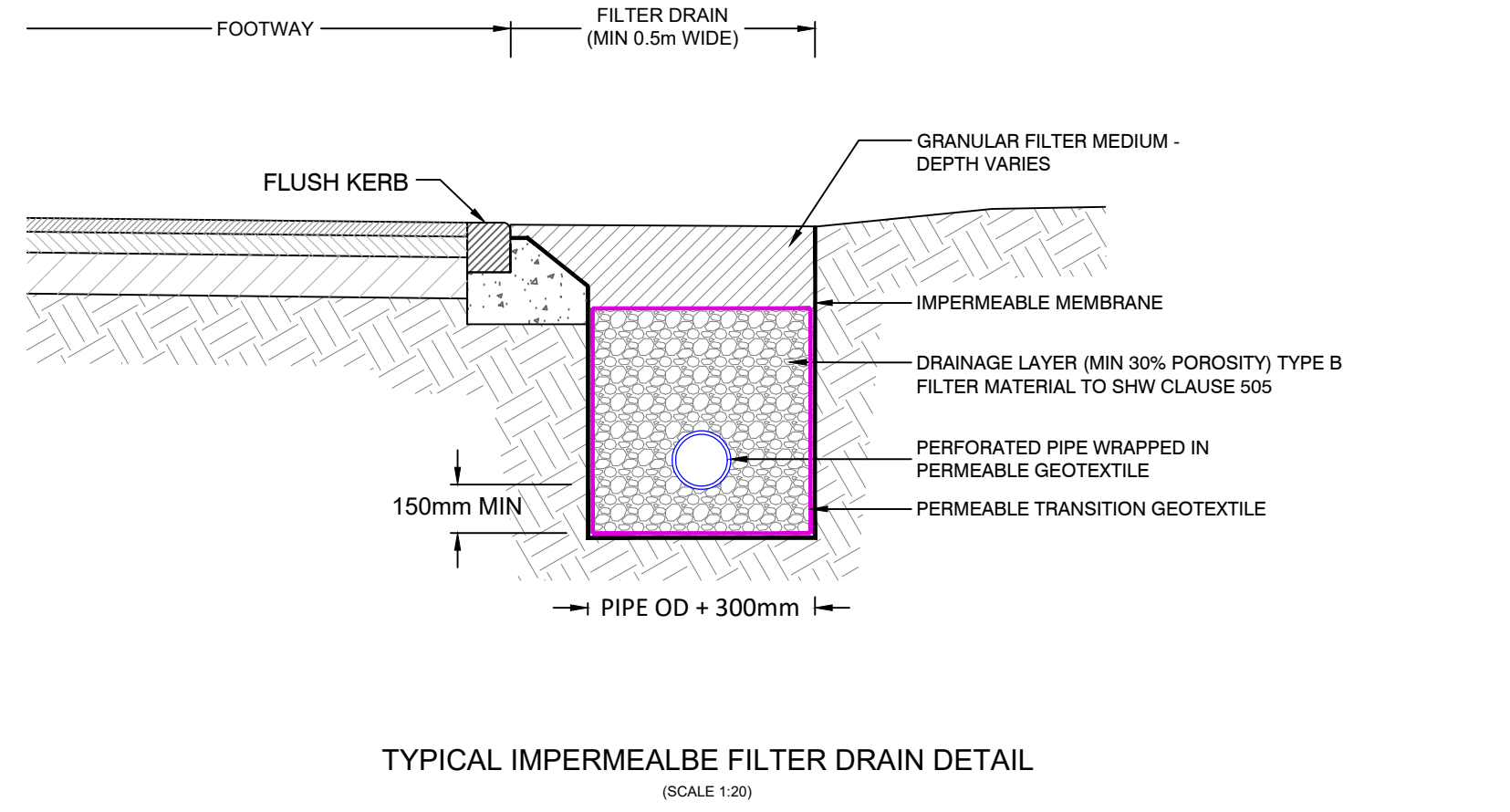
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CLASS 'Z' PIPE BEDDING



CLASS 'S' PIPE BEDDING



DO NOT SCALE THIS DRAWING. USE FIGURED DIMENSIONS ONLY. THE CONTRACTOR MUST CHECK & VERIFY ALL DIMENSIONS ON SITE. ANY DISCREPANCIES MUST BE REPORTED IMMEDIATELY TO THE ENGINEER FOR CLARIFICATION BEFORE PROCEEDING. THIS DRAWING IS COPYRIGHT AND OWNED BY AEGAEA.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION REFER TO THE RELEVANT CONSTRUCTION (DESIGN AND MANAGEMENT) DOCUMENTATION WHERE APPLICABLE. IT IS ASSUMED THAT ALL WORKS ON THIS DRAWING WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR, WORKING WHERE APPROPRIATE TO AN APPROVED METHOD STATEMENT.

THIS DRAWING IS FOR TENDER PURPOSES ONLY
AND NOT FOR CONSTRUCTION
SUBJECT TO RELEVANT APPROVALS

NOTES

- ALL ADOPTABLE DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE DESIGN AND CONSTRUCTION GUIDANCE FOR FOUL AND SURFACE WATER SEWERS (DCO).
- LOCATION AND INVERT LEVELS OF DOWNSTREAM DRAINAGE CONNECTION POINTS ARE TO BE CONFIRMED.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS/SPECIFICATIONS.
- DO NOT SCALE FROM THIS DRAWING. USE FIGURED DIMENSIONS ONLY. ALL DIMENSIONS ARE IN METERS.
- ALL THE ABOVE REQUIREMENTS SHALL APPLY UNLESS OTHERWISE STATED IN THE GENERAL ARRANGEMENT DRAWINGS/SPECIFICATION. IN THE EVENT OF A CONTRADICTION THE CONTRACT SPECIFIC DOCUMENTS SHALL BE DEEMED TO PREVAIL.
- THE CONTRACTOR IS TO CHECK AND VERIFY ALL SITE DIMENSIONS AND LEVELS, INCLUDING EXISTING SEWER INVERT LEVELS AND UTILITIES, PRIOR TO START ON SITE.
- POSITIONS OF EXISTING SERVICES/STATUTORY UNDERTAKERS APPARATUS ADJACENT TO OR CROSSING PROPOSED EXCAVATIONS ARE TO BE CONFIRMED PRIOR TO START ON SITE.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH AND CHECKED AGAINST ALL ENGINEERING DETAILS, SPECIFICATIONS, GEOTECHNICAL AND OTHER RELEVANT DOCUMENTATION PROVIDED.
- THIS DRAWING IS SCHEMATIC FOR CLARITY ONLY. POSITIONS OF PIPE RUNS AND MANHOLES MAY VARY ON SITE DUE TO SITE CONDITIONS.
- WHERE TREES ADJACENT TO DRAINAGE ARE PROPOSED, ROOT BARRIERS ARE REQUIRED TO PREVENT STRUCTURAL DAMAGE.
- ANY ANOMALY OR CONTRADICTIONS BETWEEN ANY OF THE ABOVE IS TO BE REPORTED IMMEDIATELY.
- THE CONTRACTOR IS TO COMPLY IN ALL ASPECTS WITH THE CURRENT BRITISH STANDARDS, BUILDING REGULATIONS AND BUILDING LEGISLATION ETC.
- SUBJECT TO DETAILED DESIGN AND APPROVAL.

A01	19.03.26	FIRST ISSUE	DB
Rev	Date	Description	By
Client			
MANORWOOD			
Project			
GREENFIELD FARM, VALEWOOD LANE, BARNES GREEN, WEST SUSSEX			
Title			
DRAINAGE DETAILS			
Drawing No.		Revision	
AEG9718		A01	
Drawn	Checked	Approved	Date
DB	JM	JM	MARCH 2026
Scale @ A1			AS STATED
Drawing Status			
FOR PLANNING			
aegaea water, civils and environment			

Appendix D - Proposed Surface Water Drainage Calculations

Design Settings

Rainfall Methodology	FEH-22	Maximum Time of Concentration (mins)	30.00	Preferred Cover Depth (m)	0.650
Return Period (years)	30	Maximum Rainfall (mm/hr)	0.0	Include Intermediate Ground	✓
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00	Enforce best practice design rules	✓
CV	1.000	Connection Type	Level Soffits		
Time of Entry (mins)	5.00	Minimum Backdrop Height (m)	0.200		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
8			54.200	Manhole	1200	511458.622	126455.150	1.350	52.850
9_OUT			53.000	Manhole	1200	511417.030	126464.629	1.400	51.600
6			55.000	Manhole	1200	511486.788	126445.151	1.350	53.650
3			55.800	Manhole	1200	511512.272	126437.720	1.350	54.450
2	0.011	5.00	55.800	Manhole	1200	511518.083	126454.102	0.450	55.350
1	0.008	5.00	55.800	Manhole	1200	511507.078	126422.779	1.200	54.600
5	0.011	5.00	55.200	Manhole	1200	511493.572	126460.625	0.690	54.510
4	0.008	5.00	55.800	Manhole	1200	511480.070	126428.630	2.020	53.780
7	0.011	5.00	54.400	Manhole	1200	511465.917	126470.942	0.890	53.510
9			53.400	Manhole	1200	511429.498	126462.626	1.700	51.700
10			53.000	Manhole		511418.662	126466.000	1.376	51.624

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)
1.003	8	9	30.068	0.600	52.850	51.700	1.150	26.1	150	Circular	6.08	0.0
1.002	6	8	29.888	0.600	53.650	52.850	0.800	37.4	150	Circular	5.82	0.0
1.001	3	6	26.545	0.600	54.450	53.650	0.800	33.2	150	Circular	5.52	0.0
4.000	5	6	16.895	0.600	54.510	53.650	0.860	19.6	100	Circular	5.16	0.0
3.000	4	6	17.835	0.600	53.780	53.650	0.130	137.2	100	Circular	5.45	0.0
5.000	7	8	17.396	0.600	53.510	52.850	0.660	26.4	100	Circular	5.19	0.0
1.000	2	3	17.383	0.600	55.350	54.450	0.900	19.3	150	Circular	5.13	0.0
2.000	1	3	15.818	0.600	54.600	54.450	0.150	105.5	150	Circular	5.27	0.0
1.004	9	10	11.349	0.600	51.700	51.624	0.076	150.0	150	Circular	6.31	0.0
1.005	10	9_OUT	2.131	0.600	51.624	51.600	0.024	88.8	150	Circular	6.34	0.0

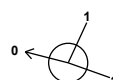
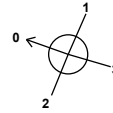
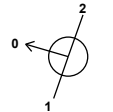
Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.003	8	9	1.977	34.9	0.0	1.200	1.550	0.049	0.0	0	0.000
1.002	6	8	1.652	29.2	0.0	1.200	1.200	0.038	0.0	0	0.000
1.001	3	6	1.753	31.0	0.0	1.200	1.200	0.019	0.0	0	0.000
4.000	5	6	1.750	13.7	0.0	0.590	1.250	0.011	0.0	0	0.000
3.000	4	6	0.655	5.1	0.0	1.920	1.250	0.008	0.0	0	0.000
5.000	7	8	1.509	11.9	0.0	0.790	1.250	0.011	0.0	0	0.000
1.000	2	3	2.302	40.7	0.0	0.300	1.200	0.011	0.0	0	0.000
2.000	1	3	0.978	17.3	0.0	1.050	1.200	0.008	0.0	0	0.000
1.004	9	10	0.818	14.5	0.0	1.550	1.226	0.049	0.0		
1.005	10	9_OUT	1.067	18.9	0.0	1.226	1.250	0.049	0.0		

Pipeline Schedule

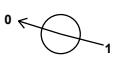
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.003	30.068	26.1	150	Circular	54.200	52.850	1.200	53.400	51.700	1.550
1.002	29.888	37.4	150	Circular	55.000	53.650	1.200	54.200	52.850	1.200
1.001	26.545	33.2	150	Circular	55.800	54.450	1.200	55.000	53.650	1.200
4.000	16.895	19.6	100	Circular	55.200	54.510	0.590	55.000	53.650	1.250
3.000	17.835	137.2	100	Circular	55.800	53.780	1.920	55.000	53.650	1.250
5.000	17.396	26.4	100	Circular	54.400	53.510	0.790	54.200	52.850	1.250
1.000	17.383	19.3	150	Circular	55.800	55.350	0.300	55.800	54.450	1.200
2.000	15.818	105.5	150	Circular	55.800	54.600	1.050	55.800	54.450	1.200
1.004	11.349	150.0	150	Circular	53.400	51.700	1.550	53.000	51.624	1.226
1.005	2.131	88.8	150	Circular	53.000	51.624	1.226	53.000	51.600	1.250

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.003	8	1200	Manhole	Adoptable	9	1200	Manhole	Adoptable
1.002	6	1200	Manhole	Adoptable	8	1200	Manhole	Adoptable
1.001	3	1200	Manhole	Adoptable	6	1200	Manhole	Adoptable
4.000	5	1200	Manhole	Adoptable	6	1200	Manhole	Adoptable
3.000	4	1200	Manhole	Adoptable	6	1200	Manhole	Adoptable
5.000	7	1200	Manhole	Adoptable	8	1200	Manhole	Adoptable
1.000	2	1200	Manhole	Adoptable	3	1200	Manhole	Adoptable
2.000	1	1200	Manhole	Adoptable	3	1200	Manhole	Adoptable
1.004	9	1200	Manhole	Adoptable	10		Manhole	Adoptable
1.005	10		Manhole	Adoptable	9_OUT	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
8	511458.622	126455.150	54.200	1.350	1200		1	5.000	52.850	100
							2	1.002	52.850	150
							0	1.003	52.850	150
9_OUT	511417.030	126464.629	53.000	1.400	1200		1	1.005	51.600	150
6	511486.788	126445.151	55.000	1.350	1200		1	4.000	53.650	100
							2	3.000	53.650	100
							3	1.001	53.650	150
							0	1.002	53.650	150
3	511512.272	126437.720	55.800	1.350	1200		1	2.000	54.450	150
							2	1.000	54.450	150
							0	1.001	54.450	150
2	511518.083	126454.102	55.800	0.450	1200					
							0	1.000	55.350	150
1	511507.078	126422.779	55.800	1.200	1200					
							0	2.000	54.600	150
5	511493.572	126460.625	55.200	0.690	1200					
							0	4.000	54.510	100
4	511480.070	126428.630	55.800	2.020	1200					
							0	3.000	53.780	100

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
7	511465.917	126470.942	54.400	0.890	1200		0	5.000	53.510	100
9	511429.498	126462.626	53.400	1.700	1200		1	1.003	51.700	150
							0	1.004	51.700	150
10	511418.662	126466.000	53.000	1.376			1	1.004	51.624	150
							0	1.005	51.624	150

Simulation Settings

Rainfall Methodology	FEH-22	Winter CV	1.000	Drain Down Time (mins)	240	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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	10	0	100	0	10	0
30	0	10	0	100	45	10	0
30	45	10	0				

Node 9 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	51.700	Product Number	CTL-SHE-0063-2000-1300-2000
Design Depth (m)	1.300	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node 9 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	51.700
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	178

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	40.0	40.0	0.800	40.0	57.9	0.801	0.0	57.9

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Results for 1 year +10% A 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	8	11	52.900	0.050	6.4	0.0562	0.0000	OK
180 minute summer	9_OUT	116	51.627	0.027	1.3	0.0000	0.0000	OK
15 minute summer	6	11	53.692	0.042	5.0	0.0474	0.0000	OK
15 minute summer	3	11	54.479	0.029	2.5	0.0327	0.0000	OK
15 minute summer	2	10	55.370	0.020	1.5	0.0222	0.0000	OK
15 minute summer	1	10	54.625	0.025	1.1	0.0284	0.0000	OK
15 minute summer	5	10	54.532	0.022	1.5	0.0251	0.0000	OK
15 minute summer	4	11	53.810	0.030	1.1	0.0345	0.0000	OK
15 minute summer	7	10	53.534	0.024	1.5	0.0270	0.0000	OK
180 minute summer	9	116	51.814	0.114	3.1	4.4765	0.0000	OK
180 minute summer	10	116	51.653	0.029	1.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	8	1.003	9	6.5	2.063	0.187	0.1187	
15 minute summer	6	1.002	8	5.0	1.110	0.171	0.1362	
15 minute summer	3	1.001	6	2.5	0.793	0.081	0.0849	
15 minute summer	2	1.000	3	1.5	0.822	0.036	0.0321	
15 minute summer	1	2.000	3	1.0	0.496	0.061	0.0339	
15 minute summer	5	4.000	6	1.5	0.764	0.107	0.0369	
15 minute summer	4	3.000	6	1.0	0.419	0.203	0.0457	
15 minute summer	7	5.000	8	1.5	0.736	0.124	0.0459	
180 minute summer	9	1.004	10	1.3	0.521	0.091	0.0288	
180 minute summer	10	1.005	9_OUT	1.3	0.582	0.070	0.0048	8.8

Results for 30 year +10% A 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	8	10	52.952	0.102	26.2	0.1151	0.0000	OK
60 minute summer	9_OUT	39	51.630	0.030	1.7	0.0000	0.0000	OK
15 minute summer	6	11	53.745	0.095	20.4	0.1072	0.0000	OK
15 minute summer	3	11	54.509	0.059	10.3	0.0669	0.0000	OK
15 minute summer	2	10	55.389	0.039	6.0	0.0440	0.0000	OK
15 minute summer	1	10	54.652	0.052	4.4	0.0591	0.0000	OK
15 minute summer	5	10	54.556	0.046	6.0	0.0523	0.0000	OK
15 minute summer	4	10	53.850	0.070	4.4	0.0788	0.0000	OK
15 minute summer	7	10	53.560	0.050	6.0	0.0569	0.0000	OK
120 minute summer	9	98	52.101	0.401	12.1	15.7096	0.0000	SURCHARGED
60 minute summer	10	39	51.657	0.033	1.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	8	1.003	9	26.6	2.324	0.762	0.4362	
15 minute summer	6	1.002	8	20.4	1.703	0.697	0.3610	
15 minute summer	3	1.001	6	10.2	1.137	0.329	0.2413	
15 minute summer	2	1.000	3	6.0	1.207	0.147	0.0875	
15 minute summer	1	2.000	3	4.3	0.731	0.252	0.0941	
15 minute summer	5	4.000	6	6.0	1.061	0.434	0.0942	
15 minute summer	4	3.000	6	4.3	0.632	0.837	0.1200	
15 minute summer	7	5.000	8	6.0	0.970	0.503	0.1024	
120 minute summer	9	1.004	10	1.7	0.557	0.117	0.0346	
60 minute summer	10	1.005	9_OUT	1.7	0.623	0.090	0.0058	18.5

Results for 30 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 98.63%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	8	12	53.119	0.269	36.9	0.3039	0.0000	SURCHARGED
60 minute winter	9_OUT	34	51.630	0.030	1.7	0.0000	0.0000	OK
15 minute summer	6	12	53.830	0.180	29.0	0.2037	0.0000	SURCHARGED
15 minute summer	3	10	54.523	0.073	15.1	0.0828	0.0000	OK
15 minute summer	2	10	55.397	0.047	8.8	0.0535	0.0000	OK
15 minute summer	1	10	54.665	0.065	6.4	0.0732	0.0000	OK
15 minute summer	5	10	54.568	0.058	8.8	0.0657	0.0000	OK
15 minute summer	4	12	53.981	0.201	6.4	0.2274	0.0000	SURCHARGED
15 minute summer	7	11	53.575	0.065	8.8	0.0734	0.0000	OK
180 minute winter	9	168	52.359	0.659	8.8	25.7800	0.0000	SURCHARGED
60 minute winter	10	34	51.657	0.033	1.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	8	1.003	9	35.5	2.345	1.016	0.5293	
15 minute summer	6	1.002	8	28.1	1.706	0.964	0.5262	
15 minute summer	3	1.001	6	14.9	1.216	0.480	0.3363	
15 minute summer	2	1.000	3	8.7	1.328	0.215	0.1155	
15 minute summer	1	2.000	3	6.3	0.801	0.366	0.1250	
15 minute summer	5	4.000	6	8.7	1.244	0.636	0.1060	
15 minute summer	4	3.000	6	5.8	0.737	1.122	0.1395	
15 minute summer	7	5.000	8	8.7	1.207	0.736	0.1148	
180 minute winter	9	1.004	10	1.7	0.557	0.117	0.0346	
60 minute winter	10	1.005	9_OUT	1.7	0.623	0.090	0.0058	25.7

Results for 100 year +10% A Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	8	10	52.971	0.121	32.8	0.1374	0.0000	OK
180 minute summer	9_OUT	96	51.630	0.030	1.7	0.0000	0.0000	OK
15 minute summer	6	11	53.762	0.112	25.4	0.1269	0.0000	OK
15 minute summer	3	10	54.518	0.068	13.2	0.0765	0.0000	OK
15 minute summer	2	10	55.394	0.044	7.7	0.0499	0.0000	OK
15 minute summer	1	10	54.660	0.060	5.6	0.0676	0.0000	OK
15 minute summer	5	10	54.563	0.053	7.7	0.0605	0.0000	OK
15 minute summer	4	11	53.911	0.131	5.6	0.1483	0.0000	SURCHARGED
15 minute summer	7	10	53.569	0.059	7.7	0.0662	0.0000	OK
120 minute summer	9	114	52.241	0.541	15.2	21.1655	0.0000	SURCHARGED
180 minute summer	10	96	51.657	0.033	1.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	8	1.003	9	33.3	2.340	0.954	0.4871	
15 minute summer	6	1.002	8	25.4	1.757	0.871	0.4344	
15 minute summer	3	1.001	6	13.0	1.196	0.418	0.2895	
15 minute summer	2	1.000	3	7.6	1.279	0.188	0.1045	
15 minute summer	1	2.000	3	5.5	0.775	0.320	0.1127	
15 minute summer	5	4.000	6	7.6	1.124	0.556	0.1021	
15 minute summer	4	3.000	6	5.1	0.657	0.991	0.1395	
15 minute summer	7	5.000	8	7.6	1.084	0.644	0.1095	
120 minute summer	9	1.004	10	1.7	0.557	0.117	0.0346	
180 minute summer	10	1.005	9_OUT	1.7	0.623	0.090	0.0058	31.4

Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 96.66%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	8	13	53.399	0.549	38.5	0.6206	0.0000	SURCHARGED
120 minute winter	9_OUT	118	51.633	0.033	2.0	0.0000	0.0000	OK
15 minute summer	6	13	54.251	0.601	33.9	0.6794	0.0000	SURCHARGED
15 minute summer	3	11	54.542	0.092	19.0	0.1035	0.0000	OK
15 minute summer	2	10	55.403	0.053	11.1	0.0604	0.0000	OK
15 minute summer	1	10	54.675	0.075	8.1	0.0844	0.0000	OK
15 minute summer	5	12	54.628	0.118	11.1	0.1330	0.0000	SURCHARGED
15 minute summer	4	13	54.392	0.612	8.1	0.6921	0.0000	SURCHARGED
15 minute summer	7	12	53.762	0.252	11.1	0.2847	0.0000	SURCHARGED
120 minute winter	9	118	53.025	1.325	15.2	31.9172	0.0000	SURCHARGED
120 minute winter	10	118	51.660	0.036	2.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	8	1.003	9	35.5	2.375	1.016	0.5293	
15 minute summer	6	1.002	8	28.5	1.637	0.978	0.5262	
15 minute summer	3	1.001	6	18.5	1.243	0.597	0.3831	
15 minute summer	2	1.000	3	11.0	1.408	0.271	0.1455	
15 minute summer	1	2.000	3	8.0	0.843	0.463	0.1562	
15 minute summer	5	4.000	6	10.6	1.419	0.774	0.1322	
15 minute summer	4	3.000	6	6.2	0.797	1.213	0.1395	
15 minute summer	7	5.000	8	10.0	1.327	0.841	0.1361	
120 minute winter	9	1.004	10	2.0	0.580	0.138	0.0390	
120 minute winter	10	1.005	9_OUT	2.0	0.650	0.106	0.0065	31.8