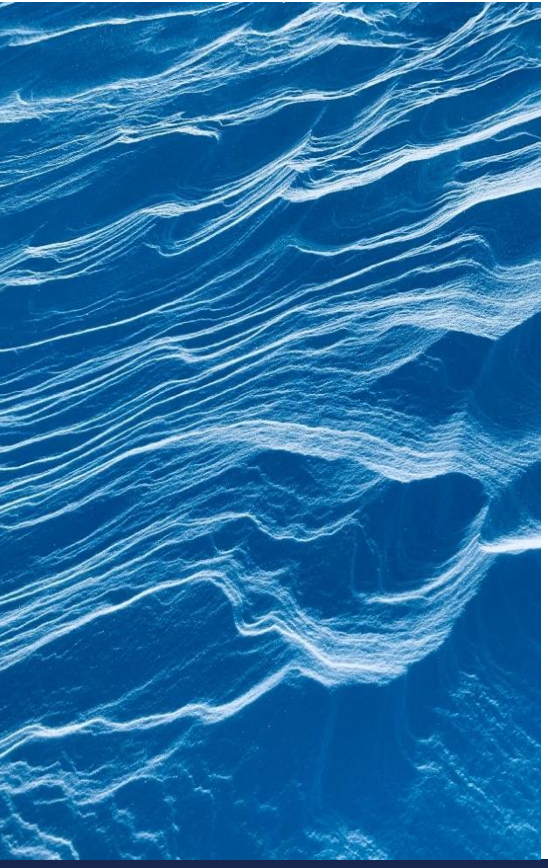
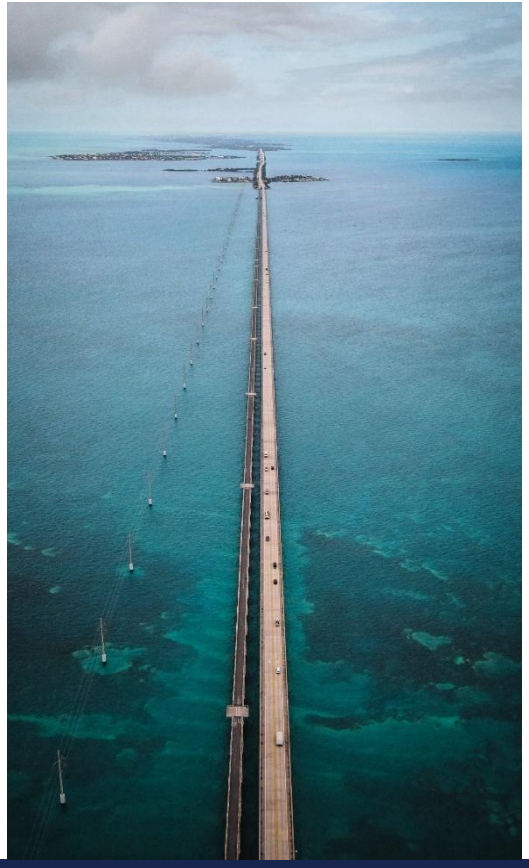




Drainage Strategy

7657_RH20_Pickhurst Lane_07

aegaea
water, civils and environment

Site Address: Land West of Parsons Field Stables
Pickhurst Lane
Pulborough
RH20 1DA

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

aegaea
water, civils and environment

Document Issue Record

Project: Drainage Strategy

Prepared for: Manorwood Construction Limited

Reference: 7657_RH20_Pickhurst Lane_07

Site Location: Land West of Parsons Field Stables, Pickhurst Lane, Pulborough, RH20 1DA

Issue	Date	Author	Check	Auth.	Comments
1	28/04/2025	Ceri Metcalfe	Daniel Buciak	James Mahoney	First issue
2	02/05/2025	Ceri Metcalfe	Daniel Buciak	James Mahoney	Amended site layout

Please Note:

Table of Contents

aegaea

water, civils and environment

1. Introduction

1.1. Aegaea were commissioned by the Client to prepare a Drainage Strategy to support a planning application associated with the proposed development at the below address.

Site Overview

1.2. The site of the proposed development is Land West of Parsons Field Stables, Pickhurst Lane, Pulborough, RH20 1DA.

Figure 1: Site Location

1.3. The proposed development site measures approximately 5,920m^2 (0.592ha), situated and accessed from Pickhurst Lane to the north of the site.

1.4. The topographical survey is included in Appendix A, which illustrates that existing site levels vary between 22.869m Above Ordnance Datum (AOD) north of the site and 18.700m AOD to the south.

1.5. Horsham District Council is the Local Planning Authority (LPA) for the site and West Sussex County Council is the designated Lead Local Flood Authority (LLFA).

1.6. Southern Water are the Sewerage Undertaker for the area.

Development Proposals

1.7. The proposed development comprises of stationing of 2 static caravans for residential purposes and associated day rooms with the formation of hardstanding and associated landscaping.

1.8. The proposed development layout can be seen in Figure 2 below and is contained within Appendix B.

Figure 2: Proposed Site Plan

Ground Conditions

1.9. A review of readily available information indicates that the site is in an area of slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils with impeded drainage (Soilscapes soil types viewer). British Geological Survey (BGS) data indicates that the bedrock underlying the site is Weald Clay Formation.

1.10. Based on the above, it is considered that the disposal of surface water via infiltration is not feasible and an alternative strategy in line with the SuDS hierarchy is to be sought.

2. Surface Water Drainage Strategy

Existing Drainage System

2.1. No information regarding the existing onsite drainage system has been provided, however, it is assumed that surface water drainage currently discharges via gravity to the ditch located along the southern site boundary.

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 rainwater harvesting:** It is proposed that surface water runoff from the roof areas is to be utilised via a rainwater harvesting system for potable and non-potable usage.

ii. **Disposal via on-site infiltration systems:** As mentioned above, infiltration has been discounted due to unfavourable ground condition.

iii. **Disposal to a watercourse/surface water body:** There is an existing drainage ditch that runs along the southern boundary of the site which it is proposed that surface water flows are to discharge to.

iv. **Disposal to surface water sewer:** There are no public surface water sewers within the proximity of the proposed development.

v. **Disposal to combined sewer:** There are no public surface water sewers within the proximity of the proposed development.

2.3. In accordance with the SuDS hierarchy, it is proposed that surface water flows from roof areas are to be re-used within a rainwater harvesting system. The remaining of the developments surface water flows and any overflows from the rainwater harvesting systems are to discharge at a controlled rate into the existing ditch along the southern site boundary.

Proposed Drainage Strategy

2.4. The use of a rainwater harvesting systems has been proposed for the reuse of surface water flows from all roof areas within the development. Refer to the Water Neutrality Statement produced by Motion for rainwater harvesting calculations and information.

2.5. The use of permeable paving has been proposed to filter water and improve water quality of surface water flows for the proposed development, with a geocellular attenuation tank proposed to attenuate flows prior to discharging at a controlled rate into an existing ditch running along the southern site boundary.

2.6. Where a site is below 1ha and greenfield runoff rates are low, it is considered that 1 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 1 l/s as an appropriate minimum flow for small sites.

2.7. All on site drainage has been designed to accommodate surface water runoff from all proposed impermeable areas on site, including all modelled 1 in 100-year storms plus 45% climate change.

2.8. The proposed drainage layout can be found within Appendix C with supporting drainage calculations can be found in Appendix D.

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 in accordance with details set out below.

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.

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.

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.

Permeable Paving

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 glyphospate 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

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

Maintenance will usually be carried out manually, although a suction tanker can be used for sediment/debris removal for large systems. If maintenance is not undertaken for long periods, deposits can become hard packed and require considerable effort to remove.

Orifice Plate (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	Clean or replace orifice plate if defects are located or, 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.

Headwalls (inlets and outlets)

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

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.

4.3. 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
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

4.4. The mitigation indices offered by the proposed SuDS features exceed the hazard indices from roof areas 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

5.1. There are no public foul sewers within the vicinity of the site. Southern Water Asset Mapping is included within Appendix E.

5.2. Discharge to ground, i.e. drainage field, has been discounted due to the above information deeming infiltration techniques unfeasible for the site.

5.3. Based on the above information it is therefore proposed that foul flows from the proposed development are directed to a package treatment plant, prior to the treated flows discharging into the existing ditch located along the southern boundary of the site. Subject to relevant approvals.

5.4. It is proposed that the stable washdown areas are to discharge to onsite cesspools, capacity of the cesspool tanks will be dependent on frequency of use and is subject to detailed design.

Appendix A - Topographical Survey

NOTES
Survey accurate at time of site attendance. Do not scale from printed drawings except for planning purposes.
Although this is a digital survey the accuracy and amount of detail shown is only commensurate with the graphical scale of mapping as specified. Care should be exercised when working to larger scales.

ORDNANCE MAP

National Grid 1:2500 (Accuracy data) Surveying tolerances:
Distances up to 200 metres ±1 in100m
Distances 200 to1,000 metres ±2m
Distances over 1,000 metres ±1 in 500m

0 5 10 15 20
SCALE 1:500

medlams
surveys limited
www.medlams-surveys.co.uk
info@medlams-surveys.co.uk
07717 205 388

project: Land adjacent to Parsonsfield Stables
client: Manorwood
job ref: S3048
title: As built site survey
scale: 1:500@A3
date: April 2025
dwg no: EX101 rev: -

Appendix B - Proposed Site Layout

The following ecological enhancements will be implemented:

Instillation of a bat box to the mobile home or within a tree positioned approx. 3-5m above ground.

Installation of a bird box to the mobile home or within a tree within the site.

Infilling of any gaps within the existing hedgerows with a native species hedge.

Gaps to be included at the bottom of fences to allow for movement of small mammals across the site.

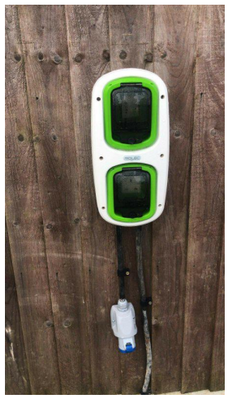
1no Electric Vehicle (EV) charging point will be provided

1no. Covered and secure cycle parking space will be provided

1no. Refuse and recycling storage facility will be provided

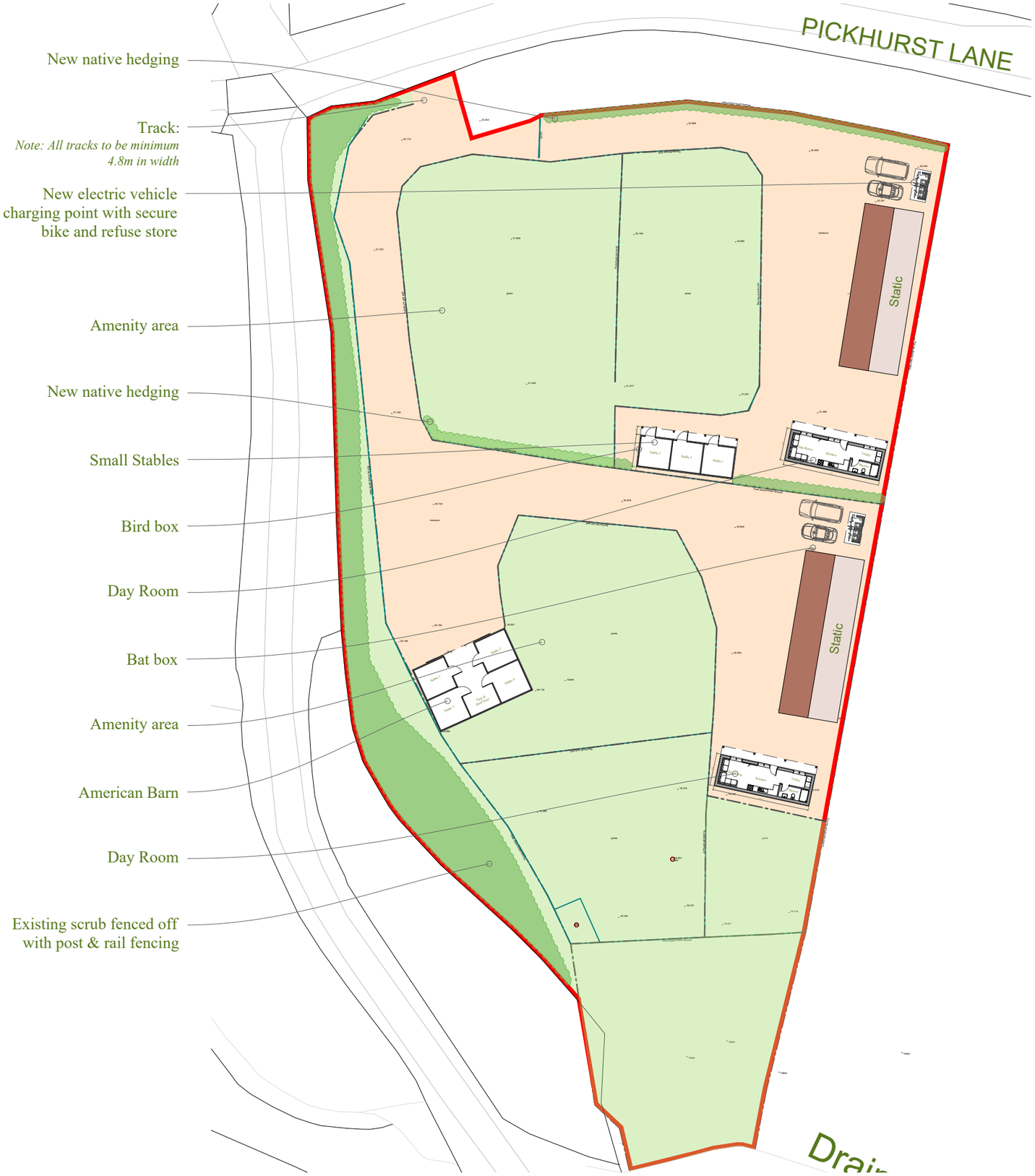
- - - - 1.8m timber close-boarded fence

—·— 1.2m timber post & rail fencing



Electric vehicle charging point

Bird box



Block Plan

1:500 | PROPOSED

PROMETHEAN PLANNING

Suite 114
26 The Hornet
Chichester
West Sussex
PO19 7BB

tel: 01243 201 102
email: enquiries@prometheanplanning.co.uk
web: www.prometheanplanning.co.uk

Address

Land West Of Parsons Field Stables, Pickhurst Lane, Pulborough, West Sussex, RH20 1DA

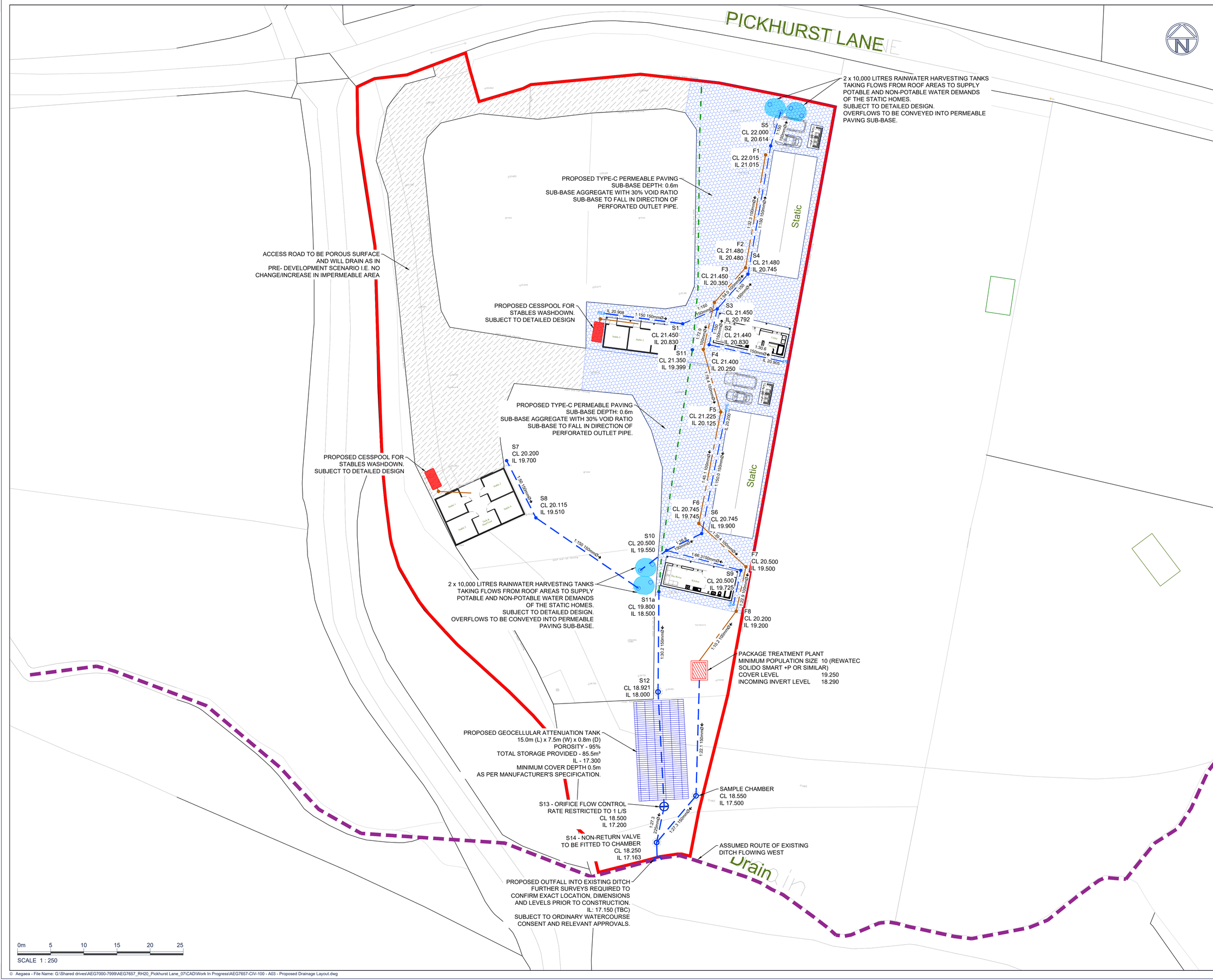
Drawing No.	2502MB_R3_001
Scale @ A3	1:500
Job No.	2502MB_R3
Drawn By	MD
Checked By	BK
Drawn On	08.04.2025
Issued On	23.04.2025
Status	Proposed
Drawing	Block Plan
Submission	Planning
Revision	000

N

Indicative: 0.0°

1m @ 1:
50
100
200
500
1250

Appendix C - Proposed Drainage Layout



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.

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.

GENERAL NOTES

1. THIS DRAWING IS INDICATIVE ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN AND APPROVALS FROM RELEVANT STATUTORY BODIES.
2. POSITIONS OF EXISTING SERVICES/STATUTORY UNDERTAKERS APPARATUS ADJACENT TO OR CROSSING PROPOSED EXCAVATIONS ARE TO BE CONFIRMED PRIOR TO START ON SITE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH AND CHECKED AGAINST ALL ENGINEERING DETAILS, SPECIFICATIONS, GEOTECHNICAL AND OTHER RELEVANT DOCUMENTATION PROVIDED.
4. THIS DRAWING IS SCHEMATIC FOR CLARITY ONLY. POSITIONS OF PIPE RUNS AND MANHOLES MAY VARY ON SITE DUE TO SITE CONDITIONS.
5. WHERE EXISTING OR PROPOSED TREES ARE ADJACENT TO ACCESS ROADS OR DRAINAGE, ROOT BARRIERS (TYPE TO BE APPROVED) ARE REQUIRED TO PREVENT STRUCTURAL DAMAGE.
6. ANY ANOMALY OR CONTRADICTIONS BETWEEN ANY OF THE ABOVE IS TO BE REPORTED IMMEDIATELY.
7. THE DESIGN IS TO COMPLY IN ALL ASPECTS WITH THE CURRENT BRITISH STANDARDS, BUILDING REGULATIONS AND BUILDING LEGISLATION ETC.
8. ALL PIPE SIZES, CHAMBER DEPTHS, SIZE & QUANTITY SUBJECT TO REVIEW AND DETAILED DESIGN. ALL ADOPTED PIPE WORK ROUTING AND ANY EASEMENTS SUBJECT TO FULL DESIGN REVIEW AND APPROVAL BY THE RELEVANT BODIES.
9. DRAINAGE DESIGN SUBJECT TO DETAILED LEVELS AND EXTERNAL WORKS DESIGN.
10. SUBJECT TO DETAILED DESIGN AND APPROVAL.

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

LEGEND

- SITE BOUNDARY
- PROPOSED SURFACE WATER DRAINAGE
- PROPOSED FOUL DRAINAGE
- PROPOSED RODDING EYE
- PROPOSED SURFACE WATER ORIFICE PLATE
- PROPOSED PERMEABLE PAVING (GRAVEL SURFACING)
- PROPOSED ATTENUATION TANK
- PROPOSED POROUS SURFACE ALONG ACCESS ROAD
- PROPOSED PERMEABLE PAVING OUTLET PERFORATE PIPE
- PROPOSED RAINWATER HARVESTING TANK
- EXISTING DITCH

Rev	Date	Description	By
A03	02.05.25	UPDATED TO SUIT AMENDED SITE LAYOUT	CM
A02	24.04.25	UPDATED TO SUIT NEW SITE LAYOUT	CM
A01	09.04.25	FIRST ISSUE	CM

Client
MANORWOOD CONSTRUCTION LIMITED

Project
LAND WEST OF PARSONS FIELD
STABLES, PICKHURST LANE

Title
PROPOSED DRAINAGE LAYOUT

Project No.	Drawing No.	Revision
AEG7657	CIV-100	A03

Drawn	Checked	Approved	Date	Scale @ A1
CM	DB	JM	APR 2025	1:250

Drawing Status
PLANNING

aegaea
water, civils and environment

FIGURE B18
TYPICAL INSPECTION CHAMBER DETAIL - TYPE D (FLEXIBLE MATERIAL DETAIL)

MAXIMUM DEPTH FROM COVER LEVEL TO SOFFIT OF PIPE
IN AREAS SUBJECT TO VEHICLE LOADING 2M, NON-ENTRY

PLASTIC CHAMBERS AND RINGS SHALL COMPLY WITH BS EN 13598-1 AND BS EN 13598-2 OR HAVE EQUIVALENT INDEPENDENT APPROVAL

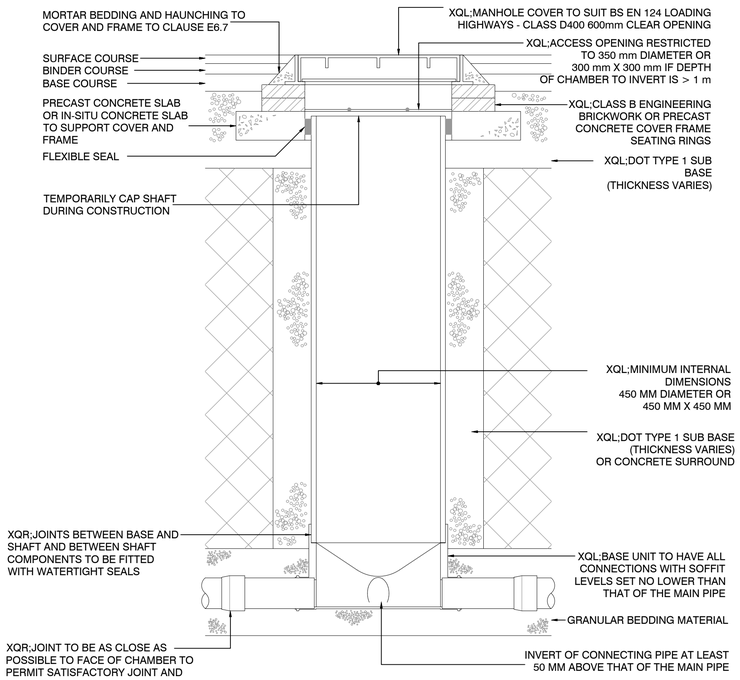
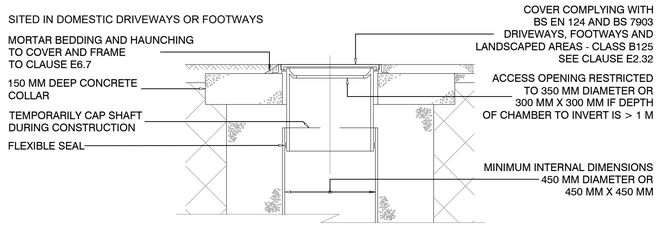


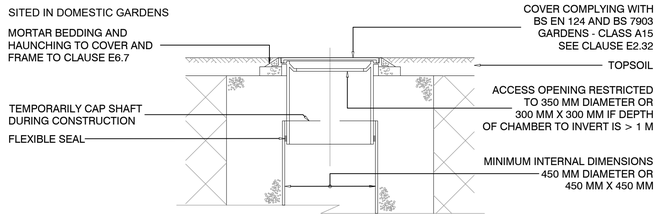
FIGURE B19
ALTERNATIVE TOP DETAILS FOR LIGHT VEHICLE LOADING AND LANDSCAPED AREAS - TYPE D

PLASTIC CHAMBERS AND RINGS SHALL COMPLY WITH BS EN 13598-1 AND BS EN 13598-2 OR HAVE EQUIVALENT INDEPENDENT APPROVAL

SITED IN DOMESTIC DRIVEWAYS OR FOOTWAYS

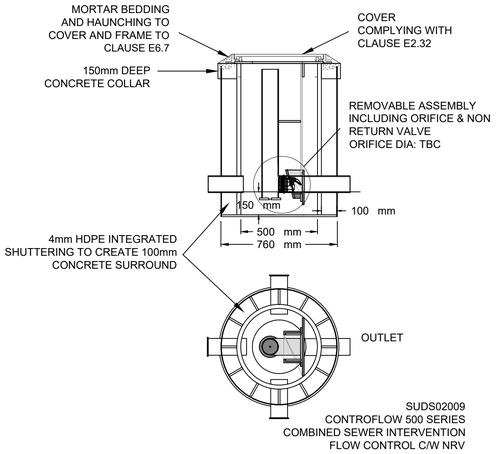


SITED IN DOMESTIC GARDENS

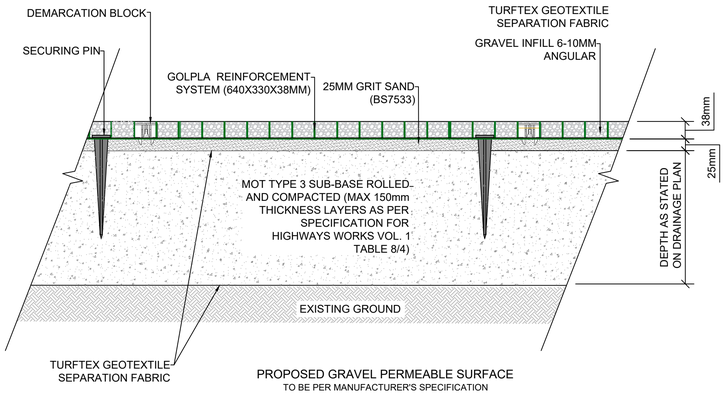


NOTE: WHERE THE ACCESS CHAMBER IS IN THE HIGHWAY THE HIGHWAY AUTHORITY CAN HAVE SPECIFIC REQUIREMENTS

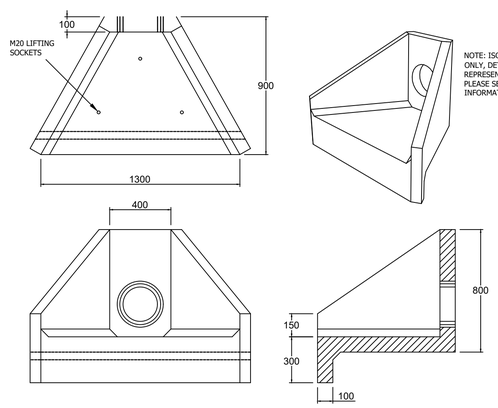
NOT TO SCALE



ORIFICE FLOW CONTROL CHAMBER
DETAIL TO BE CONFIRMED WITH MANUFACTURER FOR SITE SPECIFIC REQUIREMENTS

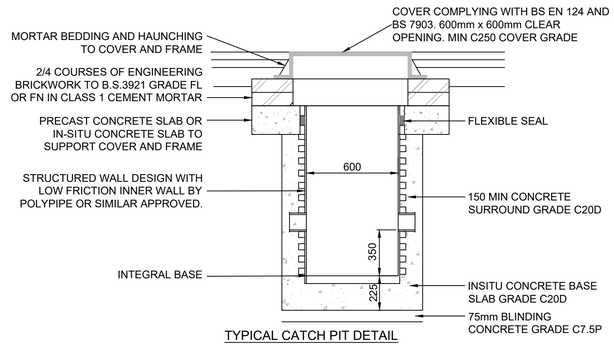


PROPOSED GRAVEL PERMEABLE SURFACE
TO BE PER MANUFACTURER'S SPECIFICATION

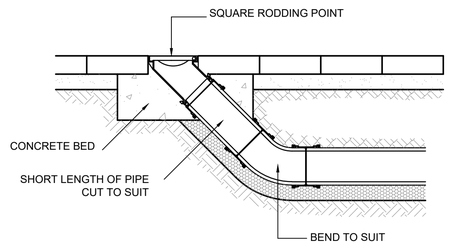


NOTE: ISOMETRIC DRAWING IS FOR REFERENCE ONLY, DETAILS MAY NOT ACCURATELY REPRESENT ACTUAL DESIGN - PLEASE SEE DETAILED VIEWS FOR TECHNICAL INFORMATION

OUTFALL HEADWALL DETAIL
ALTHON H3C HEADWALL

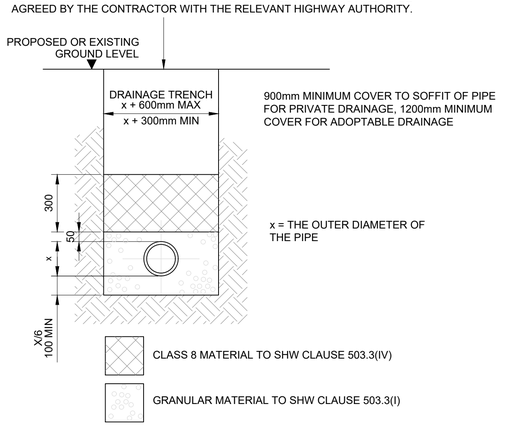


TYPICAL CATCH PIT DETAIL
SCALE 1:20



RODDING EYE DETAIL
NTS

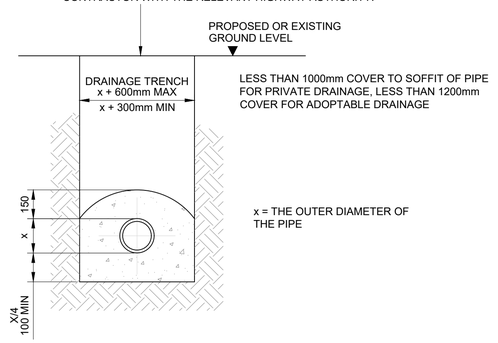
FOR SURFACE FINISH TO DRAINAGE EXCAVATION REFER TO THE EXTERNAL FINISHES PLAN AND THEN RELEVANT HIGHWAY DETAILS. NOTE THAT REINSTATEMENT FOR WORKS IN EXISTING ADOPTED HIGHWAYS ARE TO BE AGREED BY THE CONTRACTOR WITH THE RELEVANT HIGHWAY AUTHORITY.



NOTE: CLASS 'S' BEDDING FOR USE WITH ALL ADOPTABLE DRAINAGE WITH COVER TO SOFFIT OF PIPE GREATER THAN 1200MM. PRIVATE DRAINAGE WITHIN LANDSCAPED AND OTHER NON-TRAFFICKED AREAS WITH COVER GREATER THAN 1000MM TO THE PIPE SOFFIT MAY USE PIPE BEDDING CLASS 'T' REFER TO DRAWING F1 (SHW) HIGHWAY CONSTRUCTION DETAILS.

CLASS 'S' PIPE BEDDING

FOR SURFACE FINISH TO DRAINAGE EXCAVATION REFER TO THE EXTERNAL FINISHES PLAN AND THEN RELEVANT HIGHWAY DETAILS. NOTE THAT REINSTATEMENT FOR WORKS IN EXISTING ADOPTED HIGHWAYS ARE TO BE AGREED BY THE CONTRACTOR WITH THE RELEVANT HIGHWAY AUTHORITY.



NOTE: CLASS 'Z' BEDDING FOR USE WITH ALL ADOPTABLE DRAINAGE WITH COVER TO SOFFIT OF PIPE LESS THAN 1200mm.

CLASS 'Z' PIPE BEDDING

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.

GENERAL NOTES

1. THE CONTRACTOR IS TO CHECK AND VERIFY ALL SITE DIMENSIONS AND LEVELS, INCLUDING EXISTING SEWER INVERT LEVELS AND UTILITIES, PRIOR TO START ON SITE.
2. POSITIONS OF EXISTING SERVICES ADJACENT TO OR CROSSING PROPOSED EXCAVATIONS ARE TO BE CONFIRMED PRIOR TO START ON SITE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH AND CHECKED AGAINST ALL, ENGINEERING DETAILS, SPECIFICATIONS, GEOTECHNICAL AND OTHER RELEVANT DOCUMENTATION PROVIDED.
4. POSITIONS OF PIPE RUNS AND MANHOLES MAY VARY ON SITE DUE TO ONGOING STATUTORY UNDERTAKER COMMENTS/SITE CONDITIONS.
5. ANY ANOMALY OR CONTRADICTIONS BETWEEN ANY OF THE ABOVE IS TO BE REPORTED IMMEDIATELY.
6. THE CONTRACTOR IS TO COMPLY IN ALL ASPECTS WITH THE CURRENT BRITISH STANDARDS, BUILDING REGULATIONS AND BUILDING LEGISLATION ETC.
7. WE RECOMMEND INFILTRATION TESTING IS UNDERTAKEN TO THE BASE OF THE INFILTRATION BASIN ONCE CONSTRUCTED TO CONFIRM THE RATE.

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

Rev	Date	Description	By
A01	09.04.25	FIRST ISSUE	CM

Client
MANORWOOD CONSTRUCTION LIMITED

Project
LAND WEST OF PARSONS FIELD STABLES, PICKHURST LANE

Title
PROPOSED DRAINAGE DETAILS

Project No.	Drawing No.	Revision
AEG7657	CIV-110	A01

Drawn	Checked	Approved	Date	Scale @ A1
CM	DB	JM	MAR 2025	1:100

Drawing Status
PLANNING

aegaea
water, civils and environment

Appendix D - Drainage Calculations

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	5	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	1.000	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.005	5.00	21.530	600	505376.278	120892.057	0.700
S2	0.002	5.00	21.550	600	505380.275	120888.904	0.720
S3	0.003	5.00	21.550	600	505381.500	120894.297	0.758
S4			21.540	600	505386.126	120899.548	0.795
S5	0.012	5.00	22.000	600	505389.557	120918.891	1.386
PAVE 1	0.030	5.00	22.000	1200	505379.270	120919.042	1.455
S11			21.250	600	505377.748	120888.132	1.911
S6	0.012	5.00	20.700	600	505379.149	120860.417	0.800
S8	0.009	5.00	20.110	600	505354.145	120862.794	0.600
S9	0.005	5.00	20.050	600	505385.052	120854.866	0.600
S10			20.500	600	505373.849	120857.876	1.350
PAVE 2	0.030	5.00	20.500		505372.993	120855.570	1.375
S12			18.925	600	505372.486	120836.376	0.925
S13			18.900	1200	505373.538	120833.329	1.300
S14			18.800	600	505374.589	120830.282	1.221
OUTFALL			18.000	1200	505371.729	120811.392	0.500

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1	S3	5.682	0.600	20.830	20.792	0.038	150.0	150	5.12	50.0
2.000	S2	S3	5.530	0.600	20.830	20.793	0.037	150.0	150	5.11	50.0
1.001	S3	S4	6.998	0.600	20.792	20.745	0.047	148.9	150	5.26	50.0
1.002	S4	S5	19.645	0.600	20.745	20.614	0.131	150.0	150	5.66	50.0
1.003	S5	PAVE 1	10.288	0.600	20.614	20.545	0.069	150.0	150	5.87	50.0
1.004	PAVE 1	S11	30.947	0.600	20.545	19.339	1.206	25.7	150	6.13	50.0
1.005	S11	S12	52.023	0.600	19.339	18.000	1.339	38.9	150	6.66	50.0

Name	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)
1.000	0.818	14.5	0.9	0.550	0.608	0.005	0.0	25	0.455
2.000	0.818	14.5	0.4	0.570	0.607	0.002	0.0	17	0.347
1.001	0.821	14.5	1.8	0.608	0.645	0.010	0.0	35	0.558
1.002	0.818	14.5	1.8	0.645	1.236	0.010	0.0	36	0.561
1.003	0.818	14.5	4.0	1.236	1.305	0.022	0.0	54	0.698
1.004	1.995	35.3	9.4	1.305	1.761	0.052	0.0	53	1.696
1.005	1.619	28.6	9.4	1.761	0.775	0.052	0.0	59	1.451

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
5.000	S6	S10	5.878	0.600	19.900	19.861	0.039	150.0	150	5.12	50.0
4.000	S9	S10	11.600	0.600	19.450	19.373	0.077	150.0	150	5.24	50.0
3.000	S8	PAVE 2	20.185	0.600	19.510	19.375	0.135	150.0	150	5.41	50.0
4.001	S10	PAVE 2	2.460	0.600	19.150	19.125	0.025	98.4	150	5.28	50.0
3.001	PAVE 2	S12	19.201	0.600	19.125	18.000	1.125	17.1	150	5.54	50.0
1.006	S12	S13	3.223	0.600	18.000	17.600	0.400	8.1	150	6.68	50.0
1.007	S13	S14	3.223	0.600	17.600	17.579	0.021	150.0	225	6.73	50.0
1.008	S14	OUTFALL	19.105	0.600	17.579	17.500	0.079	241.8	225	7.11	50.0

Name	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)
5.000	0.818	14.5	2.2	0.650	0.489	0.012	0.0	39	0.587
4.000	0.818	14.5	0.9	0.450	0.977	0.005	0.0	25	0.455
3.000	0.818	14.5	1.6	0.450	0.975	0.009	0.0	34	0.539
4.001	1.013	17.9	3.1	1.200	1.225	0.017	0.0	42	0.758
3.001	2.450	43.3	10.1	1.225	0.775	0.056	0.0	50	2.010
1.006	3.571	63.1	19.5	0.775	1.150	0.108	0.0	57	3.153
1.007	1.065	42.3	19.5	1.075	0.996	0.108	0.0	108	1.046
1.008	0.836	33.2	19.5	0.996	0.275	0.108	0.0	124	0.870

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	5.682	150.0	150	Circular	21.530	20.830	0.550	21.550	20.792	0.608
2.000	5.530	150.0	150	Circular	21.550	20.830	0.570	21.550	20.793	0.607
1.001	6.998	148.9	150	Circular	21.550	20.792	0.608	21.540	20.745	0.645
1.002	19.645	150.0	150	Circular	21.540	20.745	0.645	22.000	20.614	1.236
1.003	10.288	150.0	150	Circular	22.000	20.614	1.236	22.000	20.545	1.305
1.004	30.947	25.7	150	Circular	22.000	20.545	1.305	21.250	19.339	1.761
1.005	52.023	38.9	150	Circular	21.250	19.339	1.761	18.925	18.000	0.775
5.000	5.878	150.0	150	Circular	20.700	19.900	0.650	20.500	19.861	0.489
4.000	11.600	150.0	150	Circular	20.050	19.450	0.450	20.500	19.373	0.977
3.000	20.185	150.0	150	Circular	20.110	19.510	0.450	20.500	19.375	0.975
4.001	2.460	98.4	150	Circular	20.500	19.150	1.200	20.500	19.125	1.225
3.001	19.201	17.1	150	Circular	20.500	19.125	1.225	18.925	18.000	0.775

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1	600	Manhole	Adoptable	S3	600	Manhole	Adoptable
2.000	S2	600	Manhole	Adoptable	S3	600	Manhole	Adoptable
1.001	S3	600	Manhole	Adoptable	S4	600	Manhole	Adoptable
1.002	S4	600	Manhole	Adoptable	S5	600	Manhole	Adoptable
1.003	S5	600	Manhole	Adoptable	PAVE 1	1200	Manhole	Adoptable
1.004	PAVE 1	1200	Manhole	Adoptable	S11	600	Manhole	Adoptable
1.005	S11	600	Manhole	Adoptable	S12	600	Manhole	Adoptable
5.000	S6	600	Manhole	Adoptable	S10	600	Manhole	Adoptable
4.000	S9	600	Manhole	Adoptable	S10	600	Manhole	Adoptable
3.000	S8	600	Manhole	Adoptable	PAVE 2		Junction	
4.001	S10	600	Manhole	Adoptable	PAVE 2		Junction	
3.001	PAVE 2		Junction		S12	600	Manhole	Adoptable

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)
1.006	3.223	8.1	150	Circular	18.925	18.000	0.775	18.900	17.600	1.150
1.007	3.223	150.0	225	Circular	18.900	17.600	1.075	18.800	17.579	0.996
1.008	19.105	241.8	225	Circular	18.800	17.579	0.996	18.000	17.500	0.275

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.006	S12	600	Manhole	Adoptable	S13	1200	Manhole	Adoptable
1.007	S13	1200	Manhole	Adoptable	S14	600	Manhole	Adoptable
1.008	S14	600	Manhole	Adoptable	OUTFALL	1200	Manhole	Adoptable

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	0.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	1.000	Check Discharge Rate(s)	x
Winter CV	1.000	Check Discharge Volume	x

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 %)
1	0	0	0
30	0	0	0
100	45	0	0

Node S13 Online Orifice Control

Flap Valve	x	Design Depth (m)	1.200	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.0		
Invert Level (m)	17.600	Diameter (m)	0.021		

Node S11 Online Orifice Control

Flap Valve	x	Design Depth (m)	1.600	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.1		
Invert Level (m)	19.339	Diameter (m)	0.020		

Node S11 Online Weir Control

Flap Valve	x	Invert Level (m)	21.000	Discharge Coefficient	0.590
Replaces Downstream Link	x	Width (m)	0.150		

Node PAVE 1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	21.300	Slope (1:X)	150.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.600
Safety Factor	2.0	Width (m)	15.800	Inf Depth (m)	
Porosity	0.30	Length (m)	41.000		

Node PAVE 2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	19.800	Slope (1:X)	150.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	0.600
Safety Factor	2.0	Width (m)	13.500	Inf Depth (m)	
Porosity	0.30	Length (m)	49.000		

Node S13 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	17.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	110.5	110.5	0.800	110.5	140.3	0.801	0.0	140.3

Results for 1 year Critical Storm Duration. Lowest mass balance: 98.75%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	11	20.855	0.025	0.9	0.0072	0.0000	OK
15 minute summer	S2	10	20.846	0.016	0.4	0.0046	0.0000	OK
15 minute summer	S3	11	20.829	0.037	1.8	0.0103	0.0000	OK
120 minute summer	S4	82	20.827	0.082	0.8	0.0233	0.0000	OK
120 minute summer	S5	82	20.827	0.213	1.8	0.0603	0.0000	SURCHARGED
120 minute summer	PAVE 1	82	20.827	0.282	4.2	0.3187	0.0000	SURCHARGED
120 minute summer	S11	82	20.826	1.487	4.0	0.4208	0.0000	SURCHARGED
15 minute summer	S6	10	19.940	0.040	2.1	0.0114	0.0000	OK
15 minute summer	S8	11	19.543	0.033	1.6	0.0094	0.0000	OK
15 minute summer	S9	11	19.476	0.026	0.9	0.0073	0.0000	OK
15 minute summer	S10	10	19.195	0.045	3.0	0.0128	0.0000	OK
15 minute summer	PAVE 2	10	19.174	0.049	9.8	0.0000	0.0000	OK
15 minute summer	S12	9	18.066	0.066	10.3	0.0185	0.0000	OK
720 minute summer	S13	540	17.772	0.172	2.1	18.2776	0.0000	OK
720 minute summer	S14	540	17.596	0.017	0.4	0.0049	0.0000	OK
720 minute summer	OUTFALL	540	17.515	0.015	0.4	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	S1	1.000	S3	0.9	0.349	0.062	0.0150	
15 minute summer	S2	2.000	S3	0.4	0.178	0.025	0.0115	
15 minute summer	S3	1.001	S4	1.8	0.551	0.121	0.0225	
120 minute summer	S4	1.002	S5	0.8	0.323	0.054	0.2702	
120 minute summer	S5	1.003	PAVE 1	1.8	0.553	0.123	0.1811	
120 minute summer	PAVE 1	1.004	S11	4.0	0.559	0.114	0.5448	
120 minute summer	S11	1.005	S12	1.0	0.893	0.035	0.0958	
15 minute summer	S6	5.000	S10	2.1	0.564	0.143	0.0216	
15 minute summer	S8	3.000	PAVE 2	1.5	0.537	0.107	0.0579	
15 minute summer	S9	4.000	S10	0.9	0.452	0.062	0.0230	
15 minute summer	S10	4.001	PAVE 2	2.9	0.632	0.165	0.0116	
15 minute summer	PAVE 2	3.001	S12	9.8	1.778	0.226	0.1148	
15 minute summer	S12	1.006	S13	10.9	3.045	0.173	0.0127	
720 minute summer	S13	1.007	S14	0.4	0.290	0.009	0.0041	
720 minute summer	S14	1.008	OUTFALL	0.4	0.300	0.011	0.0233	13.6

Results for 30 year Critical Storm Duration. Lowest mass balance: 98.75%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	S1	21	21.273	0.443	2.6	0.1255	0.0000	FLOOD RISK
30 minute summer	S2	21	21.271	0.441	3.3	0.1249	0.0000	FLOOD RISK
30 minute summer	S3	21	21.272	0.480	8.9	0.1360	0.0000	FLOOD RISK
30 minute summer	S4	21	21.270	0.525	7.8	0.1486	0.0000	FLOOD RISK
30 minute summer	S5	21	21.264	0.650	13.7	0.1839	0.0000	SURCHARGED
30 minute summer	PAVE 1	21	21.253	0.708	13.6	0.8005	0.0000	SURCHARGED
30 minute summer	S11	21	21.110	1.771	11.2	0.5013	0.0000	FLOOD RISK
15 minute summer	S6	10	19.967	0.067	5.3	0.0190	0.0000	OK
15 minute summer	S8	10	19.563	0.053	3.9	0.0151	0.0000	OK
15 minute summer	S9	10	19.490	0.040	2.2	0.0114	0.0000	OK
15 minute summer	S10	10	19.228	0.078	7.4	0.0220	0.0000	OK
15 minute summer	PAVE 2	10	19.205	0.080	24.4	0.0000	0.0000	OK
15 minute summer	S12	9	18.095	0.095	26.1	0.0270	0.0000	OK
720 minute winter	S13	690	18.031	0.431	3.3	45.7061	0.0000	SURCHARGED
720 minute winter	S14	690	17.600	0.021	0.6	0.0060	0.0000	OK
720 minute winter	OUTFALL	690	17.519	0.019	0.6	0.0000	0.0000	OK

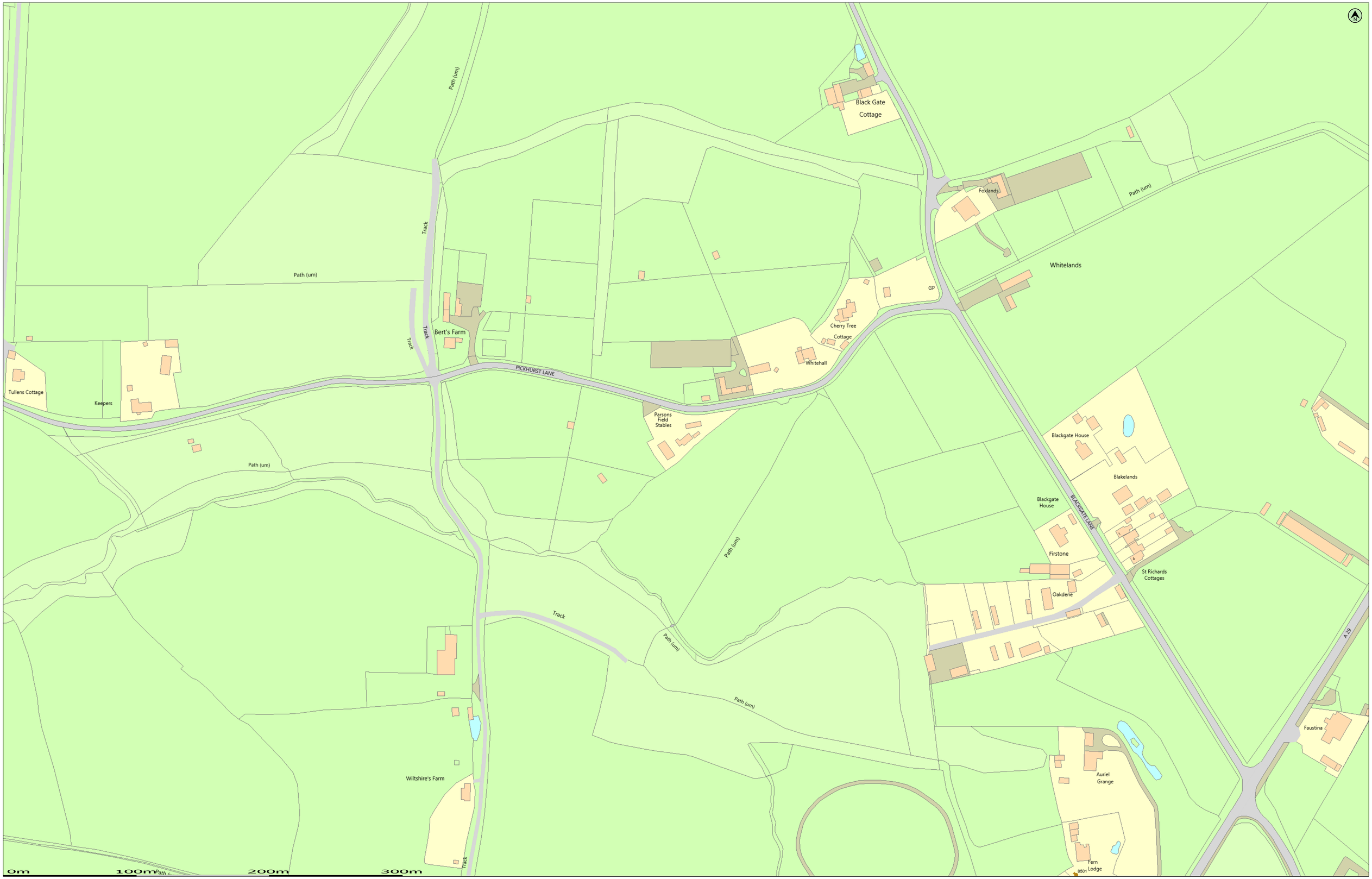
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	S1	1.000	S3	1.7	0.412	0.118	0.1000	
30 minute summer	S2	2.000	S3	-2.5	-0.261	-0.171	0.0974	
30 minute summer	S3	1.001	S4	-7.2	0.661	-0.500	0.1232	
30 minute summer	S4	1.002	S5	-7.8	-0.443	-0.539	0.3458	
30 minute summer	S5	1.003	PAVE 1	-6.5	0.638	-0.449	0.1811	
30 minute summer	PAVE 1	1.004	S11	11.2	0.885	0.318	0.5448	
30 minute summer	S11	1.005	S12	11.2	1.521	0.391	0.4342	
15 minute summer	S6	5.000	S10	5.2	0.720	0.362	0.0427	
15 minute summer	S8	3.000	PAVE 2	3.8	0.693	0.266	0.1118	
15 minute summer	S9	4.000	S10	2.2	0.579	0.149	0.0432	
15 minute summer	S10	4.001	PAVE 2	7.3	0.779	0.409	0.0232	
15 minute summer	PAVE 2	3.001	S12	24.2	2.363	0.560	0.2034	
15 minute summer	S12	1.006	S13	26.6	3.375	0.421	0.0306	
720 minute winter	S13	1.007	S14	0.6	0.335	0.014	0.0057	
720 minute winter	S14	1.008	OUTFALL	0.6	0.335	0.018	0.0337	23.2

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 98.75%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	S1	20	21.509	0.679	4.0	0.1922	0.0000	FLOOD RISK
30 minute summer	S2	20	21.507	0.677	3.9	0.1917	0.0000	FLOOD RISK
30 minute summer	S3	20	21.507	0.715	8.7	0.2023	0.0000	FLOOD RISK
30 minute summer	S4	20	21.496	0.751	10.3	0.2126	0.0000	FLOOD RISK
30 minute summer	S5	20	21.470	0.856	13.6	0.2423	0.0000	SURCHARGED
30 minute summer	PAVE 1	22	21.415	0.870	35.2	5.7313	0.0000	SURCHARGED
30 minute summer	S11	23	21.140	1.801	15.6	0.5096	0.0000	FLOOD RISK
15 minute summer	S6	10	20.000	0.100	9.9	0.0284	0.0000	OK
15 minute summer	S8	10	19.586	0.076	7.4	0.0216	0.0000	OK
15 minute summer	S9	10	19.506	0.056	4.1	0.0160	0.0000	OK
15 minute summer	S10	12	19.484	0.334	13.8	0.0946	0.0000	SURCHARGED
15 minute summer	PAVE 2	12	19.463	0.338	42.9	0.0000	0.0000	SURCHARGED
720 minute winter	S12	705	18.818	0.818	6.4	0.2315	0.0000	FLOOD RISK
720 minute winter	S13	705	18.818	1.218	6.4	85.4100	0.0000	FLOOD RISK
720 minute winter	S14	705	17.606	0.027	1.0	0.0077	0.0000	OK
720 minute winter	OUTFALL	705	17.525	0.025	1.0	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)
30 minute summer	S1	1.000	S3	3.1	0.423	0.214	0.1000	
30 minute summer	S2	2.000	S3	-2.5	0.214	-0.174	0.0974	
30 minute summer	S3	1.001	S4	-7.1	0.623	-0.487	0.1232	
30 minute summer	S4	1.002	S5	-10.3	-0.583	-0.710	0.3458	
30 minute summer	S5	1.003	PAVE 1	13.3	0.755	0.919	0.1811	
30 minute summer	PAVE 1	1.004	S11	15.6	1.039	0.442	0.5448	
30 minute summer	S11	1.005	S12	15.6	1.532	0.544	0.7002	
15 minute summer	S6	5.000	S10	9.8	0.832	0.679	0.0693	
15 minute summer	S8	3.000	PAVE 2	7.3	0.816	0.502	0.1948	
15 minute summer	S9	4.000	S10	4.0	0.685	0.279	0.1107	
15 minute summer	S10	4.001	PAVE 2	13.7	0.851	0.766	0.0433	
15 minute summer	PAVE 2	3.001	S12	41.7	2.477	0.963	0.3380	
720 minute winter	S12	1.006	S13	6.4	1.627	0.101	0.0567	
720 minute winter	S13	1.007	S14	1.0	0.387	0.024	0.0084	
720 minute winter	S14	1.008	OUTFALL	1.0	0.393	0.030	0.0489	33.9

Appendix E - Southern Water Asset Mapping



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Foul Gravity Sewer
Combined Gravity Sewer
Culverted Water Course or Treated Effluent
Surface Water Gravity Sewer
Rising Main, Vacuum or Syphon
Combined Outfall
Surface Water Outfall
Foul Outfall
Surface Water Inlet
Combined Pumping Station
Surface Water Pumping Station
Foul Pumping Station
Water Treatment Works
Section 104 Area
Building Over Agreement Area
Foul Manhole
Combined Manhole
Surface Water Manhole
Side Entry Manhole, Interception Chamber, Dummy Manhole or Surface Water Soakaway

ceri@aegaea.com
Pickhurst Lane

WATER for LIFE from Southern Water.

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
8501	F	28.44	27.22	

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert