

Operation and Maintenance Drainage Manual

Land at Sunrise Way, Amesbury

Surrey, SL4 7SQ
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1 Operations and Maintenance Scope

This manual is intended to give an overview of the operation and maintenance for the range of drainage and SuDs features included with the drainage strategy and in relation to typical details only. Where proprietary products are specified the manufacturer's instructions and recommendations should be followed in priority to this document unless specifically noted otherwise due to project constraints.

The recommended operations and frequencies are typical only and should be more frequent initially to ensure that there are no unforeseen issues with the operation and then adjusted to suit the site requirements.

This report is based on current best practice guidance.

Proposals contained or forming part of this report represent the design intent and may be subject to alteration or adjustment in completing the detailed design for this project. Where such adjustments are undertaken as part of the detailed design and are deemed a material derivation from the intent contained in this document, prior approval shall be obtained from the relevant authority in advance of commencing such works.

In accordance with the flood risk assessment and drainage strategy, the surface water network has been designed to accommodate the 1 in 100-year storm rainfall event plus a 25% allowance for climate change. As the flows are generally being attenuated on site and within SuDs features there will be a period of time after storm events where the network is still partially or fully surcharged and is draining down. Where this surcharging is still present after 48hrs appropriate action should be taken as noted below.

This manual should be read in conjunction with the drainage strategy drawing '10369894-HDR-XX-XX-DR-C-0300' for further details.

2 Attenuation Tank (Geocellular Units)

2.1 Location and Description

The attenuation tank locations are shown on drawing ‘10369894-HDR-XX-XX-DR-C-0300’.

The tank has been designed in accordance with CIRIA C697 and the product specific requirements.

Geocellular units are proprietary products and therefore manufacturer’s recommendations should also be taken into consideration. Additionally different manufacturers may have different connection types and arrangements which will need to be taken into consideration.

2.2 Operation

The attenuation tank is intended to be the surface water storage feature to attenuate the discharge from the site up to and including the 1 in 100 years plus 25% climate change event. The tank is intended to be empty between rainfall events.

Access for maintenance has been provided through the central filter drain with the units being effectively sealed laterally preventing the ingress of deleterious material. The main maintenance of this central filter drain should be undertaken in accordance with the filter drain section.

2.3 Inspection and Maintenance Regime

Regular inspection and maintenance are important for the effective operation of attenuation tanks as designed. As the feature is buried a regularly inspection regime is very important to ensure the correction functionality of the surface water drainage network. Maintenance responsibility for an attenuation tank and its surrounding area should be placed with the site owner.

Sediment / material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols, especially where run-off is taken from potentially contaminated areas such as car parks / service yards.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required)	Inspect inlets, outlets and overflows for blockages, and clear if required. If faults persist jetting and CCTV survey may be required.	Monthly and after large storms.
	Check penstocks and other mechanical devices (if present).	Half yearly.
	Inspect ventilation cowl (if present)	Monthly and after large storms.
Regular maintenance\inspection	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly
	Debris removal from catchment surface (where may cause risks to performance)	Monthly
	Where rainfall infiltrates into blocks from above, check surface of filter for blockage by silt, algae or other matter. Remove and replace surface infiltration medium as necessary.	Monthly (and after large storms)
	Remove sediment from pre-treatment structures	Annually (or as required after heavy rainfall events)
Remedial actions	Repair/rehabilitation of inlets, outlet, overflows and vents.	As required.

Table 1 - Attenuation Tank Maintenance Schedule

3 Permeable Pavements

3.1 Location and Description

The permeable pavements are located within the car parking bays, as shown on drainage strategy drawing ‘10369894-HDR-XX-XX-DR-C-0300’.

The permeable pavements have/will be designed in accordance with CIRIA C697 and BS7533-13.

Permeable pavements contain proprietary products and as such where used the manufacture’s recommendations should be followed.

3.2 Operation

The permeable pavements are intended to be water quality and attenuation storage features. These features are intended to be dry except during rainfall events.

The surface has been designed to be porous or to contain gaps where rain can flow through the upper construction layers into the voided stone which makes up the subbase.

Access for maintenance is provided as this is a surface feature only.

3.3 Inspection and Maintenance Regime

Regular inspection and maintenance are important for the effective operation of the pervious pavement. Maintenance responsibility for the pavement and its surrounding area should be placed with the site owner.

Sediment / material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols, as run-off is taken from potentially contaminated areas such as car parks / service yards.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required)	Initial inspection.	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth. If required, take remedial action.	3-monthly, 48 hours after large storms.
	Inspect silt accumulation rates and establish appropriate brushing frequencies. Silt can also be caused by adjacent landscaping areas which should be reprofiled to provide a flat area or berm adjacent to the paving.	Annually.
	Monitor inspection chambers.	Annually.
Regular maintenance\inspection	Brushing and vacuuming.	Three times/year at end of winter, mid-summer, after autumn leaf fall, or as required based on site-specific observations of clogging or manufacturers' recommendations.
Occasional maintenance	Stabilise and mow contributing and adjacent areas.	As required and as per landscape architect's specification.
	Removal of weed.	As required.
Remedial actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving.	As required.
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users.	As required.

	Rehabilitation of surface and upper sub-structure. This could include replacement of the jointing and bedding material. The upper geotextiles layer may also need replacing if clogged and Terram 1000 has a life span of 25 years.	As required (if infiltration performance is reduced as a result of significant clogging).

Table 2 - Permeable Pavement Maintenance Schedule

4 Pipes (Including Oversized) & Manholes

4.1 Location and Description

Pipes and manholes are the main conveyance across the site with the network as shown on drainage strategy drawing ‘10369894-HDR-XX-XX-DR-C-0300’.

Pipes and manholes are proprietary products, and the materials can vary across the site and as such where used the manufacture’s recommendations should be followed. Regardless of the product used the pipes will be fully compliant with the drainage specification.

4.2 Operation

Pipes are intended to be the main conveyance across the development and are intended to be dry except for during rainfall events. These have been designed to be self-cleansing where possible for smaller diameter pipes, and for larger diameters the risk is reduced due to the overall pipe size.

Access for maintenance is provided through access chambers, manholes and rodding eyes.

4.3 Inspection and Maintenance Regime

Regular inspection and maintenance are important to identify areas which may have been obstructed / clogged and may not be drainage correctly thus exposing the development to a greater level of flood risk. Maintenance responsibility for the pipes and manholes should be placed with the site owner.

Sediment / material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols, as run-off is taken from potentially contaminated areas such as car parks / service yards.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required)	Initial inspection should be provided as post construction CCTV survey.	N/A
	Inspect for evidence of poor operation via water level in chambers. If required, take remedial action.	3-monthly, 48 hours after large storms.
Occasional maintenance	Check and remove large vegetation growth near pipe runs.	6 monthly
Remedial actions	Rod through poorly performing runs as initial remediation.	As required.
	If continued poor performance jet and CCTV survey poorly performing runs.	As required.
	Seek advice as to remediation techniques suitable for the type of performance issue and location.	As required If above does not improve performance.

Table 3 - Pipe and Manhole Maintenance Schedule

5 Drainage Channels

5.1 Location and Description

Drainage channels are located in the service yard areas and convey water to the wider network as shown on drainage strategy drawing ‘10369894-HDR-XX-XX-DR-C-0300’.

Channels are proprietary products, and the materials can vary across the site and as such where used the manufacture’s recommendations should be followed. Regardless of the product used the pipes will be fully compliant with the drainage specification.

5.2 Operation

Drainage channels are intended to protect the industrial buildings and convey overland flow falling on the service yard and parking areas.

Access for maintenance is provided through sump access units.

5.3 Inspection and Maintenance Regime

Regular inspection and maintenance are important to identify areas which may have been obstructed / clogged and may not be drainage correctly thus exposing the development to a greater level of flood risk. Maintenance responsibility for the drainage channels should be placed with the site owner.

Sediment / material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols, as run-off is taken from potentially contaminated areas such as car parks / service yards.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required)	Inspections will include gratings; covers including their locking bolts; sumps and sump buckets; exposed concrete surround and adjacent surfacing.	6-monthly, after large storms.
	Check for accumulation of debris and silt and cleaned as necessary	6-monthly, after large storms.
	Gratings, frames and all associated locking parts to be checked for damage.	6 monthly
	Exposed concrete and adjacent surfacing to be checked for cracking and general damage.	6 monthly
	Check condition of inlet and outlet pipes, flow controls, baffles, and isolation structures	6-monthly, after large storms.
Occasional maintenance	Channel/Slot cleaning will be by flushing with water or high-pressure jetting (no boiling water or cleaning agent will be used). All silt buckets and sumps will be cleaned out replaced back into the units ensuring they are correctly fitted.	6-monthly, after large storms.
	All channel surfaces and joints will be checked and repaired as necessary.	6-monthly, after large storms.
Remedial actions	Repair/rehabilitation of inlets, outlet, as required.	As required.

Table 4 - Drainage Channel Maintenance Schedule

6 Catchpit Manholes

6.1 Location and Description

Catchpit manholes are located immediately after surface drainage features such as permeable paving and attenuation tanks to prevent silt and debris from building up and causing blockages. Locations of catchpits are shown on drainage strategy drawing '10369894-HDR-XX-XX-DR-C-0300'.

6.2 Operation

Manholes provide access to the surface water network.

6.3 Inspection and Maintenance Regime

Inspection and maintenance are important to identify manholes with excessive debris or sediments which may have been obstructed / clogged and may not be drainage correctly thus exposing the development to a greater level of flood risk. Maintenance responsibility for the manholes should be placed with the site owner.

Sediment / material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols, as run-off is taken from potentially contaminated areas such as car parks / service yards.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required)	Inspect/identify any damage or areas that are not operating correctly.	Annually
Remedial actions	Remove silt, litter, leaves and other detritus.	As required.
	Repair/rehabilitation of inlets, outlet and vents	As required

Table 5 - Catchpit Manhole Maintenance Schedule

7 Oil Interceptor

7.1 Location and Description

Interceptors are installed for each unit and drain the car park and service yard areas where oil spillage is a risk as shown on drainage strategy drawing ‘10369894-HDR-XX-XX-DR-C-0300’.

7.2 Operation

Guidelines laid out by the Environment Agency and EN858-2 state that a separator should be serviced at least twice per year and in line with manufacturer recommendations. This should also include a 5-year integrity check.

7.3 Inspection and Maintenance Regime

Manufacturers normally offer maintenance plans and complete the following inspections:

- Complete an internal inspection of the structure for internal damage.
- Check closure device to ensure it is unrestricted by new filter.
- Remove oil probe to be cleaned and tested to ensure its operational.

8 Hydro-brake

8.1 Location and Description

Hydro-brakes are installed in manholes to restrict discharge rates into the wider network. The location of the hydro-brake is shown on drainage strategy drawing '10369894-HDR-XX-XX-DR-C-0300'.

8.2 Operation

The Hydro-brake flow controls are self-activating, relying on upstream hydraulic head to generate an air-filled vortex within the centre of the casing and restricts discharge into the wider network. These are important as they limit water exiting the system and if not maintained can increase surface water flood risk.

8.3 Inspection and Maintenance Regime

Regular inspection and maintenance are important to identify if the Hydro-brake is acting as intended, the manufacturer is to be consulted on issues with the Hydro-brake.

Maintenance Schedule	Required Action	Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required)	Contact manufacturer for instruction on approved and safe inspection and maintenance practices.	Every three months for the first year, then annually after
Remedial actions	Inspect the hydro-brake for and check functionality. Remove any detritus as required. Inspect once clean.	As required.

Table 6 – Hydro-brake Maintenance Schedule

Appendix A. Drainage Strategy

NORTH

SUNRISE WAY

1. DRAINAGE STRATEGY BASED ON AN INFILTRATION RATE OF 0.028m/hr.
2. FOUL WATER FLOW RATES BASED ON AN AVERAGE OF 1.544 l/s. TO BE CONFIRMED BY THE MEP DESIGNER.
3. FFL's ARE SHOWN INDICATIVELY. TO BE CONFIRMED BY THE ARCHITECT.
4. PROPOSED TREES TO BE CO-ORDINATED WITH THE PROPOSED DRAINAGE AT THE NEXT DESIGN STAGE. ROOT PROTECTION REQUIRED FOR DRAINAGE IN CLOSE PROXIMITY TO TREES.

NOTES:

1. DO NOT SCALE FROM THIS DRAWING, WORK TO DIMENSIONS OR CO-ORDINATES PROVIDED.
2. THE CONTRACTOR IS ADVISED TO CHECK THE ACCURACY OF DRAWING INFORMATION TO ACTUAL ON-SITE CONDITIONS. I.E. THE LOCATION, LEVELS, SIZES, CONDITION OF EXISTING SEWERS TO BE RE-USED AND/OR CONNECTED INTO.
3. CONTRACTOR SHOULD INSTALL FINAL DRAINAGE CONNECTION PRIOR TO INSTALLING ANY UPSTREAM DRAINAGE TO AVOID POTENTIAL LEVEL ISSUES.
4. REPORT CONFLICTS TO ENGINEER IMMEDIATELY.
5. EVERY EFFORT HAS BEEN MADE TO ASCERTAIN TYPE, LOCATION AND DEPTH OF BURIED SERVICES AND/OR OBSTRUCTIONS. HOWEVER, THE CONTRACTOR IS ADVISED TO CARRY OUT OWN INVESTIGATIONS TO ENSURE THERE ARE NO CLASHES WITH THE PROPOSED WORKS.
6. CONTRACTOR IS RESPONSIBLE FOR PROTECTING RETAINED SERVICES AND MAKING CONTACT WITH OWNERS OF APPARATUS TO OBTAIN NECESSARY CONSENT FOR EXCAVATION, PROTECTION AND/OR DIVERTING.
7. BURIED OBSTRUCTIONS ENCOUNTERED DURING EXCAVATION THAT CONFLICT WITH PROPOSED WORKS SHOULD BE BROKEN OUT AND REMOVED. RESIDUAL VOIDS TO BE BACKFILLED AND COMPACTED AS PER SPECIFICATION.
8. THIS DRAWING IS BASED ON:
   - SITE PLAN: 'IAN C KING ASSOCIATES-ARCHITECTS' DWG NO: RO-105-TP2-02.
   - TOPOGRAPHICAL SURVEY: MK SURVEYS, DWG 24537 REV 2.
9. SURFACE WATER NETWORK ANALYSIS IS BASED ON FSR METHOD, SIZING OF THE DRAINAGE COMPONENTS FOR 1 IN 30 YRS WITHOUT FLOODING AND ANALYSIS FOR 1 IN 100 YRS +40% CC.
10. SURFACE WATER FLOW FROM ROADS IS COLLECTED VIA PERMEABLE PAVING AND CHANNEL DRAINS.
11. SURFACE WATER ON FOOTPATHS IS ASSUMED TO DISCHARGE TO GRASSED AREAS AND HAS NOT BEEN INCLUDED IN CATCHMENT CALCULATIONS.
12. PERMEABLE PAVING HAS BEEN PROPOSED FOR COLLECTION OF SURFACE WATER IN PARKING BAYS ASSOCIATED WITH THE SERVICE YARDS.
13. PETROL INTERCEPTORS HAVE BEEN INCORPORATED IN THE DESIGN FOR THE RETENTION OF THE HYDROCARBON, SILT AND OTHER POLLUTANTS.
14. ALL PIPES WITH DIAMETERS NOT SHOWN ARE NOMINAL150mm DIA.
15. DRAINAGE CHANNELS WITHIN SERVICE YARD TO HAVE E600 COVER LOAD CLASS, B125 LOAD CLASS FOR PEDESTRIAN AREAS AND D400 LOAD CLASS FOR VEHICLE TRAFFICKED AREAS .

KEY:

- PLOT BOUNDARY
- FFL — FINISHED FLOOR LEVEL
- PROPOSED SURFACE WATER PIPE (150D - PVCu, 300D+ CONCRETE)
- PROPOSED PERFORATED PIPE
- SWIC — PROPOSED SURFACE WATER INSPECTION CHAMBER (PVCu)
- SWMH — PROPOSED SURFACE WATER MANHOLE (PC RING)
- SWMH CP — PROPOSED SURFACE WATER CATCHPIT MANHOLE (PC RING)
- SWMH VM — PROPOSED SURFACE WATER VENTED MANHOLE (PC RING)
- RWP — PROPOSED RAIN WATER PIPE
- SDP — SIPHONIC DRAINAGE PIPE
- RG — PROPOSED ROAD GULLY
- ATTENUATION TANK (SOAKAWAY)
- POROUS PAVING
- PROPOSED PETROL INTERCEPTOR
- LINEAR DRAINAGE CHANNEL AND SUMP UNIT
- SVP — PROPOSED SOIL VENT PIPE
- FG — FOUL GULLY
- FWIC — PROPOSED FOUL WATER INSPECTION CHAMBER (PVCu)
- FWMH — PROPOSED FOUL WATER MANHOLE (PC RING)
- PROPOSED FOUL WATER PIPE (PVCu)

SOAKAWAY UNIT15
SIZE: 528m² x 1.50m DEEP
STORAGE VOLUME: 753m³(95% VOIDS)
CL: 98.066
IL: 96.407
INFILTRATION RATE: 0.028m/hr
NO GROUNDWATER ENCOUNTERED DURING TESTS.

CLASS 1 FULL RETENTION PETROL INTERCEPTOR. KLARGESTER OR SIMILAR APPROVED.

SOAKAWAY UNIT 12
SIZE: 120m² x 1.50m DEEP
STORAGE VOLUME: 171m³(95% VOIDS)
CL: 98.788
IL: 96.099
INFILTRATION RATE: 0.028m/hr
NO GROUNDWATER ENCOUNTERED DURING TESTS.

SOAKAWAY UNIT 13
SIZE: 130m² x 1.00m DEEP
STORAGE VOLUME: 124m³(95% VOIDS)
CL: 98.911
IL: 96.494
INFILTRATION RATE: 0.028m/hr
NO GROUNDWATER ENCOUNTERED DURING TESTS.

SOAKAWAY UNIT 14
SIZE: 110m² x 1.50m DEEP
STORAGE VOLUME: 157m³(95% VOIDS)
CL: 98.884
IL: 96.407
INFILTRATION RATE: 0.028m/hr
NO GROUNDWATER ENCOUNTERED DURING TESTS.

SOAKAWAY CAR PARK
SIZE: 160m² x 1.00m DEEP
STORAGE VOLUME: 152m³(95% VOIDS)
CL: 99.056
IL: 95.954
INFILTRATION RATE: 0.028m/hr
NO GROUNDWATER ENCOUNTERED DURING TESTS.

CONNECT INTO EXISTING FOUL WATER SPUR. INVERT LEVEL TO BE CONFIRMED.

SIPHONIC DRAINAGE OUTLETS. TO BE CONFIRMED BY THE ARCHITECT

FFL 99.55m

FFL 99.45m

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