

SITE 5A, WREXHAM

Operation & Maintenance Manual

Clywedog Road South, Wrexham, LL13 9XS

Final Report

S5A-BML-XX-XX-RP-C-0502

Monday, 11th July 2022

Contents Amendment Record

This report has been issued and amended as follows:

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Appendices

APPENDIX A : SUDS DRAINAGE PROPOSALS

1. Introduction

1.1 Project Background

Barnsley Marshall Ltd was appointed by FI Real Estate Management to provide a Flood Consequences Assessment & SuDS Drainage Strategy for the proposed development of 1 industrial unit on 3.0Ha of land off Clywedog Road South, Wrexham, postcode LL13 9XS.

This report provides recommended maintenance regimes for SuDS assets proposed as part of the surface water drainage for the development based on government and local authority guidance with regard to maintenance.

The report is based on currently available and preliminary discussions.

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 deviation from the intent contained in this document, prior approval shall be obtained from the relevant authority in advance of commencing such works.

Where the proposed works to which this report refers are undertaken more than twelve months following the issue of this report, Barnsley Marshall shall reserve the right to re-validate the findings and conclusions by undertaking appropriate further investigations at no cost to Barnsley Marshall.

1.2 Scope of O&M Manual

This manual is intended to give an overview of the operation and maintenance for the range of SuDS features included with the drainage strategy. 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 maintenance regimes and frequencies are typical only and should be more frequent initially to ensure that there are no unforeseen issues with the operation of the proposed asset, and thereafter adjusted to suit the site requirements.

2. Flow Control Units

2.1 Location and Description

The locations and details of flow control units are shown on the SuDS Drainage Strategy Layout drawings and construction details, refer to **Appendix A**. The main flow control device is specified as Hydro-brake or similar approved and is a proprietary product; therefore, the manufacturer's recommendations should also be taken into consideration.

2.2 Operation

Two Hydro-brakes intended to be the main Surface Water Control Devices from the site, limiting the outflow from the development to a maximum of 12.5 l/s for all storm events up to and including the 100-year + 40 CC storm event. The Hydro-brake controlling flow out of pond 1 limits flow to a maximum of 7.5 l/s for all storm events up to and including the 100-year + 40 CC storm event. The Hydro-brake controlling flow out of pond 2 limits flow to a maximum of 5.0 l/s for all storm events up to and including the 100-year + 40 CC storm event.

2.3 Inspection and Maintenance Regime

Regular inspection and maintenance are important for the effective operation of the flow control unit.

Being part of private drainage, whole life cycle maintenance of the Flow Control Chambers and Hydro-brakes shall be the responsibility of the owners of the proposed development – FI Real Estate Management. The responsible officer is Emily Armstrong, with email: eamstrong@fi-rem.com, and telephone: 01257 263 010 (land) & 07740 546 216 (mobile).

Table 2.1 gives the recommended maintenance regime for the asset.

Table 2.1: Recommended Maintenance Regime for Flow Control Chamber and Hydro-brake

Maintenance Schedule	Required Action		Frequency
Monitoring (to be undertaken more regularly within the first year of operation and adjusted as required)	Inspect inlets for blockages, and clear if required. If faults persist jetting and CCTV survey may be required.		Monthly and after large storms.
Regular maintenance/inspection	Inspect and identify any areas that are not operating correctly. If required, take remedial action.		Six-monthly
	Remove sediment and debris from flow control chambers.		Annually (or as required after heavy rainfall events).
Remedial actions	Repair/rehabilitation of inlets.		As required.

3. Geo-cellular Attenuation Tank

3.1 Location and Description

The locations and details of the Geo-cellular Attenuation Tanks are shown on the SuDS Drainage Strategy Layout drawings and construction details, refer to **Appendix A**. Geo-cellular Attenuation Modules vary in strength and unit sizes, and are therefore a proprietary product therefore the manufacturer's recommendations should also be taken into consideration. The details shown are based on **Polystorm Xtra** modules, but the contractor may be able to find a cheaper supplier of a similar product. The engineer will evaluate the alternative product and approve before it can be used as an alternative.

3.2 Operation

The attenuation tanks are intended to be the surface water storage features to attenuate the discharge from the site up to and including the 100-year plus 40% climate change event. The tanks are intended to be empty between rainfall events. Access for maintenance has been provided from the manhole chambers upstream and downstream of the tanks.

3.3 Inspection and Maintenance Regime

Regular inspection and maintenance are important for the effective operation of the attenuation tank. The Inspection Chamber (Catchpit with 450mm sump) immediately upstream of the attenuation tank should be cleansed of silt annually to prevent silt from entering the tank.

Being part of private drainage, whole life cycle maintenance of the geo-cellular tanks shall be the responsibility of the owners of the proposed development – FI Real Estate Management. The responsible officer is Emily Armstrong, with email: earmstrong@fi-rem.com, and telephone: 01257 263 010 (land) & 07740 546 216 (mobile).

Table 3.1 gives the recommended maintenance regime for the asset.

Table 3.1: Recommended Maintenance Regime for Geo-cellular Attenuation Tank

Regular Maintenance	
Monthly	- Inspect and identify any areas that are not operating correctly. If required, take remedial action. (for 3 months following installation) - Debris removal from catchment surface (where may cause risks to performance) - Inspect systems as specified by the manufacturer - 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.
Sixth Monthly	Inspect and identify any areas that are not operating correctly. If required, take remedial action. (following initial 3-month period)
Annually	- Remove sediment from pre-treatment structures (e.g. upstream silt traps or Vortex flow control upstream) and geo-cellular system where required (High pressure water jetting) - Inspect and document the presence of wildlife
Remedial Actions: Significant storms may cause significant damage to SuDS. As such, many actions may be required following such events	
Following all significant storm events	Inspect and carry out essential recovery works to return the feature to full working order

4. Permeable Pavements

4.1 Location and Description

The permeable pavements are proposed as the construction make-up for proposed parking bays throughout the site as shown on drainage strategy drawing S5A-BML-XX-XX-DR-C-0700 included in **Appendix A**.

Permeable pavement underlaid by a drainage blanket (5-20mm sub-base) wrapped in impermeable geo-membrane will allow runoff to undergo cleansing by the sand layer and sub-base before being collected by the proposed Permavoid Diffuser Unit. The permeable pavement shall be System C to BS 7533-13:2009 Figure 4, with an impermeable liner and collection pipe at the base of the sub-base.

4.2 Operation

The pavement has been designed to mimic the hydrological behaviour of soft landscaping by allowing the water to permeate into a sub-base at the same rate as it would naturally occur thus slowing the flow prior to entering the main surface water drain. The permeable paving is designed to treat and store runoff prior to discharge to surface water system downstream.

4.3 Inspection and Maintenance Regime

Regular inspection and maintenance are important for the effective operation of the Permeable Pavements.

Being part of private drainage and pavement, whole life cycle maintenance of Permeable Pavements shall be the responsibility of the owners of the proposed development – FI Real Estate Management. The responsible officer is Emily Armstrong, with email: eamstrong@fi-rem.com, and telephone: 01257 263 010 (land) & 07740 546 216 (mobile).

Table 4.1 gives the recommended maintenance regime for the asset.

Table 4.1: Recommended Maintenance Regime for Permeable Pavements

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).

5. Filter Drains

5.1 Location and Description

The locations of Filter Drains are shown on the SuDS Drainage Strategy Layout drawings and construction details, refer to **Appendix A**.

5.2 Operation

The proposed filter drains will have SHW Type B filter material (20-40mm stone) and be topped with 150mm top soil and lawn seeding to ensure that the filter drain will remain hidden from the surface.

5.3 Inspection and Maintenance Regime

Regular inspection and maintenance are important for the effective operation of the Filter Drains.

Being part of private drainage, whole life cycle maintenance of the Filter Drains shall be the responsibility of the owners of the proposed development – FI Real Estate Management. The responsible officer is Emily Armstrong, with email: eamstrong@fi-rem.com, and telephone: 01257 263 010 (land) & 07740 546 216 (mobile).

Table 5.1 gives the recommended maintenance regime for the asset.

Table 5.1: Recommended Maintenance Regime for Filter Drains

Regular Maintenance	
Monthly	• Litter and debris removal • Mow grasses (where required to promote lateral runoff inflow) and remove resultant clippings (during growing season only) • Remove nuisance and invasive vegetation (for 12 months following installation) • Inspect/check all inlets, outlets, surface and overflows (where required) to ensure that they are in good condition, free from blockages and operating as designed. Take action where required
Six Monthly	• Not applicable
Annually	• Not applicable
Annually	• Remove nuisance and invasive vegetation • Inspect and document the presence of wildlife
As Required	• Repair erosion or other damage by re-turfing, reseeding or replacing filter material • Re-level uneven surfaces and reinstate design levels (typically every 60-month period) • Remove and replace top 300 – 500mm of gravel, clean and replace where required (typically every 60-month period) • Remove and dispose of oils or petrol residues using safe standard practices
Remedial Actions: Significant storms may cause significant damage to SuDS. As such, a number of actions may be required following such events	
Following all significant storm events	• Inspect and carry out essential recovery works to return the feature to full working order

6. Storage Pond and Swale

6.1 Location and Description

The proposed storage pond is shown on the Drainage Strategy Layout drawings and construction details, refer to **Appendix A**. The grass seeding, flowers, shrubs, and plants within the pond area will be recommended by a Landscape Architect.

6.2 Operation

The planted flora will require periodic replacement to get rid of the accumulated adsorbed pollutants. The overflow pipe should be periodically cleansed of accumulated grass or debris to keep it fully effective.

6.3 Inspection and Maintenance Regime

Regular inspection and maintenance are important for the effective operation of the storage pond and swales.

Being part of private drainage, whole life cycle maintenance of Storage Ponds and Swales shall be the responsibility of the owners of the proposed development – FI Real Estate Management. The responsible officer is Emily Armstrong, with email: eamstrong@fi-rem.com, and telephone: 01257 263 010 (land) & 07740 546 216 (mobile).

Table 6.1 gives the recommended maintenance regime for the asset.

Table 6.1: Recommended Maintenance Regime for Storage Pond and Swale

Regular Maintenance	
Monthly	• Litter and debris removal • Mulching (where required) • Inspect/check all inlets, outlets, surface and overflow (where required) to ensure that they are in good condition, free from blockages and operating as designed. • Take action where required.
Six Monthly	• Remove nuisance and invasive vegetation
Annually	• Pruning and trimming of trees • Inspect and document the presence of wildlife • Check for poor vegetation growth due to lack of sunlight or dropping of leaf litter, and cut back adjacent vegetation where required
As Required	• Repair erosion or other damage by re-mulching or re-seeding • Re-seed areas of poor vegetation growth. Alter plant types to better suit conditions, if required • Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface (typically every 60-month period) • Remove build-up of sediment, reinstate design levels (typically every 60-month period) • Remove and dispose of oils or petrol residues using safe standard practices
Remedial Actions: Significant storms may cause significant damage to SuDS. As such, a number of actions may be required following such events.	
Following all significant storm events	• Inspect and carry out essential recovery works to return the feature to full working order.

APPENDICES



Appendix A

SuDS Drainage Proposals