New Build Kitchen Extension at The VAGA, Ganarew, Wyastone Leys Estate, Monmouth

Foul and Stormwater Drainage Strategy.

30th November 2020.

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Job number 2019_046

Document Verification

Job title	**New Build Kitchen Extension at The VAGA, Ganarew, Wyastone Leys Estate, Monmouth**	Job number	2019_046
Document title	Foul and Stormwater Drainage Strategy.		
Document ref			

Revision	Date	Filename	2019_046/30_11_2020		
01	16/06/2021	Description	Final Issue		
			Prepared by	Checked by	Approved by
		Name	Eugene Travers Jones	Eugene Travers Jones	Eugene Travers Jones

Issue Document Verification with Document ✓

Contents

1. Introduction.

Andrew O'Sullivan is proposing to extend his current property by building a mono-pitched single storey kitchen dining space immediately adjacent to the existing northern elevation of the existing dwelling.

The new extension is some 36 m^2 in plan area and will be constructed on an existing yard area that is currently finished mainly with chippings.

The other remaining rooms (lounge, dining rooms, bathrooms, and bedroom will remain as currently is, there will be no increase in occupancy as a result of the proposals.

WL Squared have been engaged to consider implications of the proposals on the existing drainage systems and make recommendations as to any revisions that may be required to the existing drainage system serving the property or in relation to any new drainage systems that will be needed to serve the property as a result of the proposed extension being developed.

This document describes the considerations given and the conclusions of those considerations including providing outline details of any new drainage systems required.

2. The Predevelopment Situation.

The existing property at the VAGA is a detached four-bedroom house, with numerous outbuildings including a barn, a forecourt area and a large landscaped area to the east alongside the Rover Wye.

The site location is shown below.

The property currently occupying the site is served by a private foul drainage system that utilises a standalone package treatment plant.

The stormwater run-off from the hard surfacing with the site is collected locally and discharged (as is typical with some many older rural properties) directly into the ground. This run-off will ultimately make its way into the adjacent River Wye.

3. Existing and Future Foul Discharge.

There is no change in foul flows discharged from the property as a result of the development proposals. Hence, there is no requirement for any changes to the foul drainage system serving the site.

The new kitchen will be connected into the existing foul drainage system serving the existing property.

4. Existing and Future Stormwater Discharge.

The discharge of stormwater falling on the existing property will remain unchanged as a result of the proposals, whilst the new extension (some 36m^2 of hard area) will be provided with a new separate drainage system.

The new extension is provided with a mono-pitch roof which falls to a linear gutter. Rainwater falling on the roof will be collected by the roof/gutter system and discharged from the roof via a rainwater pipe into a suitably planted feature water garden constructed alongside the new extension, similar to that shown below.

Rainwater will be filtered by the water garden prior to its discharge via a small network of underground pipework into a soakaway. Drawings of the proposed system are provided within Appendix A.

The pipework network and soakaway is designed to cater for all the run-off from the new roof area in a 1 in 100 year storm event taking account of a 30% increase in flow resulting from climate change. The network will be provided with a catchpit to catch silt deposits and an inspection hatch with the soakaway itself to aid maintenance. See Appendix B.

British Geological Survey (BGS) 1:50,000 maps have been used to determine that the underlying subsoils within the area comprise of clayey sands and gravels and a typical likely permeability value for such soils has been used when calculating the size of the soakaway for schematic design purposes. Filtration testing

will be undertaken on site at the position of the proposed soakaway and this information used to re-size the soakaway once the technical design stage progresses and before construction starts.

Rainwater harvesting and re-use was been considered but rejected as this is impractical as it would require the complete re-plumbing of the existing house.

5. Implementation.

The drainage systems described will be constructed as part of the proposed development, they will become operable as they are completed.

6. Management and Maintenance.

Accessible catchpit inspection chambers have been incorporated as part of the attenuation system, upstream of the soakaway. The catchpit inspection chambers will minimise the volume of silts and debris entering the soakaway and therefore will require six monthly checks for blockages and cleaned out as necessary.

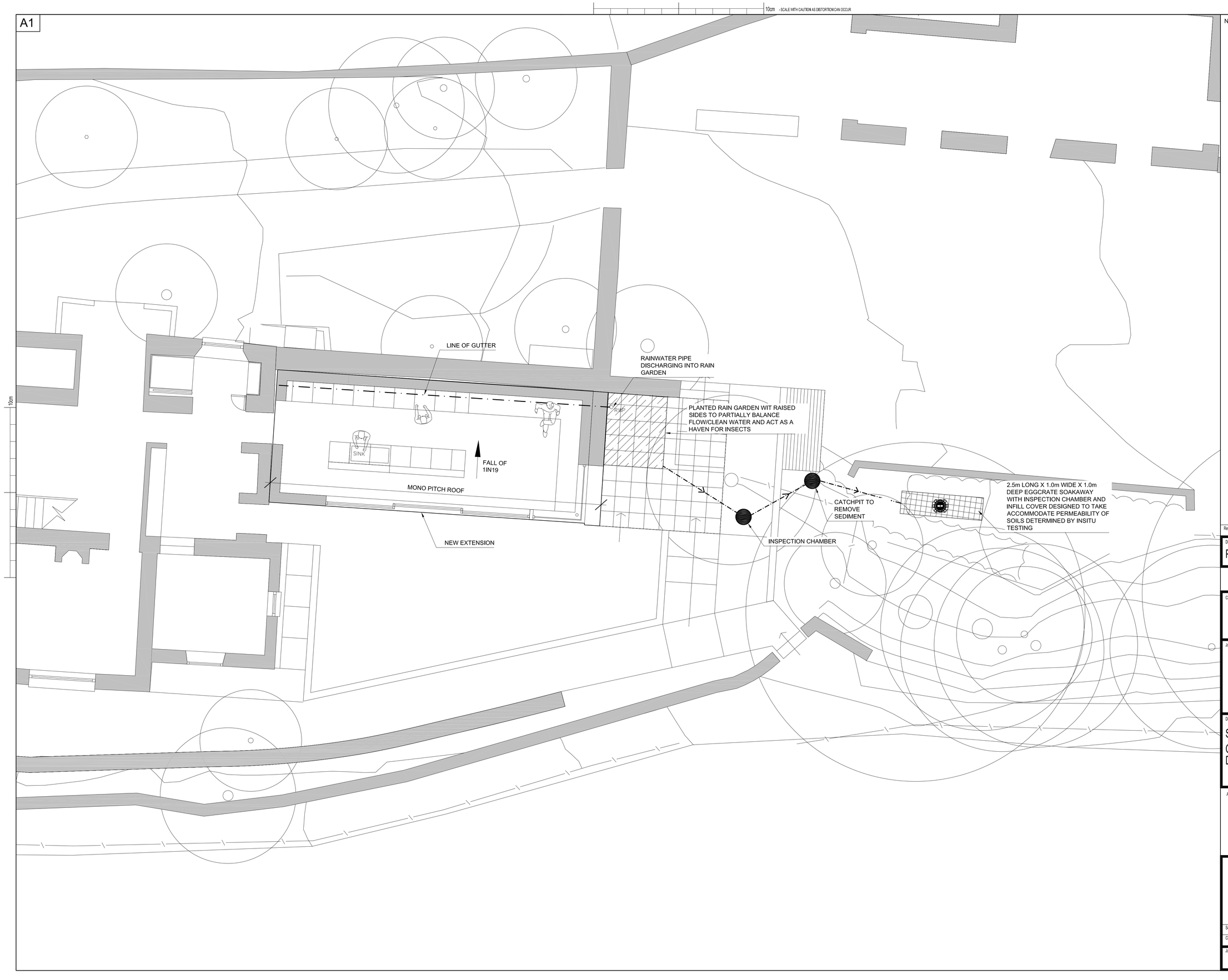
The planting within the rainwater garden will be maintained properly on an ongoing basis the nature of the maintenance will be undertaken to suit the species of planting used. The raingarden will be re-constructed/replanted every 10 years.

No other specific maintenance requirements are necessary.

Appendix A

A1

10cm - SCALE WITH CAUTION AS DISTORTION CAN OCCUR



NOTES:

1. DRAWING NOT TO BE SCALED.
2. ALL BUILDING DRAINAGE TO BE INSTALLED AND TESTED IN COMPLIANCE WITH THE BUILDING REGULATIONS 2000 DRAINAGE AND WASTE DISPOSAL APPROVED DOCUMENT H 2002 EDITION.
3. ALL COMPONENTS AND MATERIALS ARE TO BE MANUFACTURED AND SUPPLIED IN ACCORDANCE WITH THE RELEVANT BRITISH STANDARDS, AND LAID AND BACKFILLED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS AND THE RELEVANT BRITISH STANDARDS.
4. THE CONTRACTOR SHALL, BEFORE COMMENCING THE WORKS, VERIFY ALL SITE AND SETTING DIMENSIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE TRUE AND PROPER SETTING OUT OF THE WORKS AND FOR THE CORRECTNESS OF THE POSITIONS, LEVELS, DIMENSIONS, AND ALIGNMENT OF ALL PARTS OF THE WORKS.
5. SMALL LIGHTWEIGHT ACCESS COVERS SHOULD BE SECURED) WITH SCREWS TO DETER UNAUTHORISED ACCESS.
6. ALL INSITU CONCRETE USED TOR DRAINAGE WORKS SHALL BE GEN1 C20 MIX AND COMPLY WITH BS EN 206-1 AND BS8500.
7. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELATED WL², ARCHITECTS & SUB-CONTRACTORS DRAWINGS. IN THE CASE OF DISCREPANCIES BETWEEN DRAWING REFER TO WL² FOR CLARIFICATION.
8. THIS DRAWING TO BE READ IN CONJUNCTION WITH WL ² DRAWINGS D001 AND D002.

Rev.	Date	By	Description

Drawing Status
PLANNING

Client

Job Title

Drawing Title
SCHEMATIC DRAWING
OF STORMWATER SYSTEM
DRAINING ROOF EXTENSION

Architect

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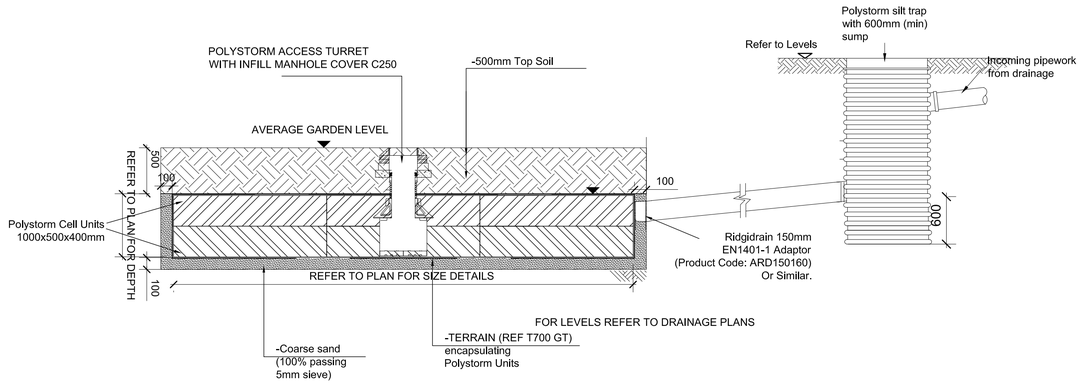
Scales	AS SHOWN	Originator	IA
Checked		Approved	Date 01/02/2020

Job No.	Drawing No.	Rev.
2019 046	D001	

A1

10cm - SCALE WITH CAUTION AS DISTORTION CAN OCCUR



CROSS SECTIONAL DETAIL OF POLYSTORM SOAKAWAY

(NTS)

Construction Sequence

Installation procedures should be carried out in accordance with the Health and Safety at Work Etc. Act (1974) and any other relevant legislation. Special attention should be paid to temporary work requirements in excavations.

Excavate to the required plan dimensions and level, ensuring that the excavation orientation will allow easy installation of connecting pipework. Consideration should be given to maintaining construction plant access for reinstating around the installed Polystorm units.

The base of the excavation should be smooth and level, free of large stones and soft spots. Any soft spots should be excavated and replaced with suitable compacted granular material.

The type of geosynthetic material used to encapsulate the Polystorm units will determine the installation requirements. Please note the following information is generic and advice from the geosynthetic manufacture should be sought to ensure that the appropriate protective measures are taken to comply with any proprietary requirements.

a) Soakaway

Place and compact a 100mm thick bedding layer of coarse sand (with 100% passing the 5mm sieve), in accordance with the Manual of Contract Documents for Highway Works (MCHW), Volume 1, Series 600. Install the Terrain T700GT geotextile, forming joints in accordance with the manufacturer's recommendations, making an allowance for the connecting pipework or adapters.

Place the Polystorm units in accordance with the construction drawings and Polypipe connection details. Wherever possible the units should be placed in a stretcher bond fashion, avoiding continuous vertical joints. Ensure units are arranged so that they are in the correct alignment with the adjoining pipework. Polypipe clips connect horizontally adjacent units while vertical connections are formed with the Polypipe shear connector. 160mm EN 1401-1 pipes connect directly into the convenient knock-out incorporated in the end of each cell. Connection to 110mm EN 1401-1 pipes or other products is accommodated through the use of standard Polypipe adapters. Polystorm units are also available with either a 225mm or 300mm fabricated Ridgidrain pipe connection.

Complete the geosynthetic encapsulation of the entire Polystorm structure, forming joints where appropriate. Re-examine the geotextile for damage and joint integrity.

Backfill around the sides of the encapsulated units, forming a 100mm thick layer of coarse sand or Class 6H selected granular material immediately adjacent to the units. Where required, remaining excavated areas around the units should be backfilled with Class 6N or 6P selected granular material, in accordance with MCHW, Volume 1, or similarly approved specification.

Above the wrapped Polystorm units, place and lightly compact a minimum 100mm thick layer of either coarse sand (with 100% passing the 5mm sieve), in accordance with MCHW, Volume 1, Series 600. Then lay the specified topsoil to Architects spec.

Backfill Method: Lawn Areas

The backfill material that lies within 300mm above the Polystorm units should be free from particles exceeding 40mm in diameter, in accordance with Class 8 material to Series 600, Volume 1, MCHW. Final backfilling up to finished ground level may be achieved using selected as-dug material. Backfill material should be placed and compacted in layers no greater than 300mm, or in compliance with the approved specification.

Backfill Method: Hardstanding Areas

Backfill with Class 1 or 2 material in accordance with MCHW, Volume 1, Series 600. Backfill material should be placed and compacted in layers not greater than 150mm. Where the Polystorm units are installed beneath a paved area, the pavement sub-base may form part of the backfill material provided that minimum cover depths are maintained.

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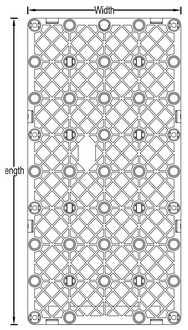
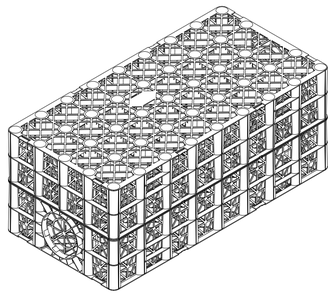
POLYSTORM CELLS

Product Code: PSM1



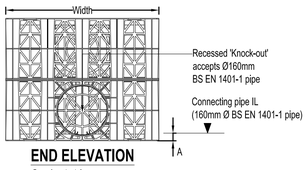
PLAN VIEW

Scale 1:10



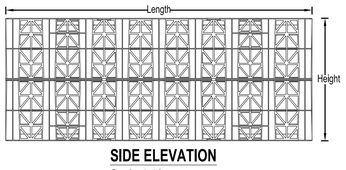
ISOMETRIC VIEW

Scale 1:10



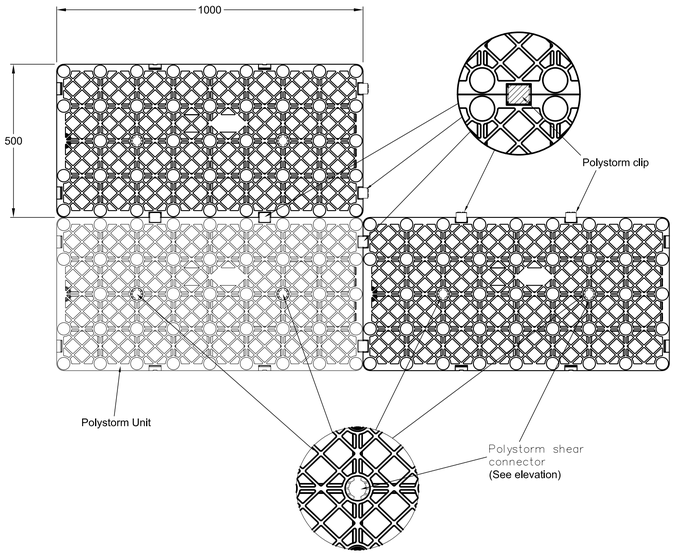
END ELEVATION

Scale 1:10

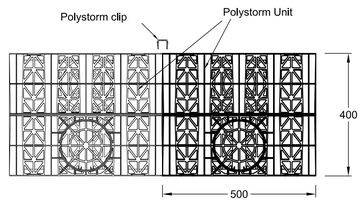


SIDE ELEVATION

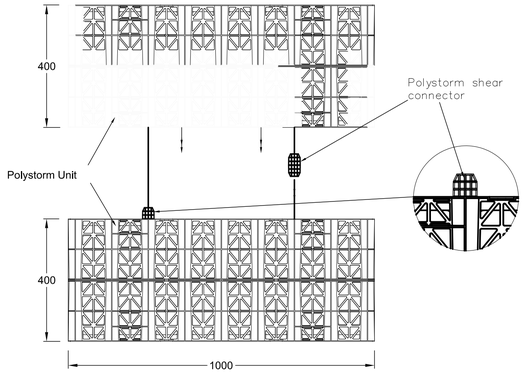
Scale 1:10



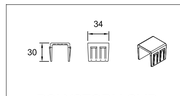
TYPICAL DETAIL POLYSTORM CONNECTORS
PLAN VIEW
(Scale 1:10)



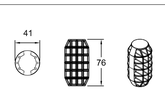
TYPICAL POLYSTORM CONNECTORS
END VIEW
(Scale 1:10)



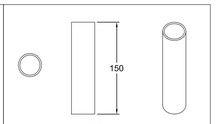
TYPICAL DETAIL POLYSTORM CONNECTORS
ELEVATION
(Scale 1:10)



POLYSTORM CLIP
(Scale 1:5)



POLYSTORM
SHEAR CONNECTOR
(Scale 1:5)



ALTERNATIVE
SHEAR CONNECTOR
(Scale 1:5)

Rev.	Date	By	Description

Drawing Status
PLANNING

Client

Job Title

Drawing Title
STORMWATER SYSTEM
DETAILS

Architect

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Scales	AS SHOWN	Originator	IA
Checked		Approved	Date 01/02/2020
Job No. 2019 046		Drawing No. D002	Rev.

Appendix B

SOAKAWAY DESIGN

In accordance with BRE Digest 365 - Soakaway design

Tedds calculation version 2.0.04

Design rainfall intensity

Location of catchment area	Other
Impermeable area drained to the system	A = **36.0** m^2
Return period	Period = **100** yr
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.350**
5-year return period rainfall of 60 minutes duration	M5_60min = **19.0** mm
Increase of rainfall intensity due to global warming	$p_{climate}$ = **30** %

Soakaway / infiltration trench details

Soakaway type	Rectangular
Minimum depth of pit (below incoming invert)	d = **1000** mm
Width of pit	w = **1000** mm
Length of pit	l = **2423** mm
Percentage free volume	V_{free} = **95** %
Soil infiltration rate	f = **7.00×10^{-6}** m/s
Wetted area of pit 50% full	a_{s50} = l × d + w × d = **3422847** mm^2

Table equations

Inflow (cl.3.3.1)	I = M100 × A
Outflow (cl.3.3.2)	O = a_{s50} × f × D
Storage (cl.3.3.3)	S = I - O

Duration, D (min)	Growth factor Z1	M5 rainfalls (mm)	Growth factor Z2	100 year rainfall, M100 (mm)	Inflow (m^3)	Outflow (m^3)	Storage required (m^3)
5	0.36;	8.8;	1.88;	16.6;	0.60;	0.01;	0.59
10	0.51;	12.5;	1.95;	24.4;	0.88;	0.01;	0.86
15	0.62;	15.2;	1.99;	30.3;	1.09;	0.02;	1.07
30	0.79;	19.4;	2.03;	39.4;	1.42;	0.04;	1.37
60	1.00;	24.7;	2.01;	49.7;	1.79;	0.09;	1.70
120	1.22;	30.2;	1.97;	59.5;	2.14;	0.17;	1.97
240	1.50;	37.0;	1.91;	70.8;	2.55;	0.35;	2.20
360	1.69;	41.7;	1.88;	78.3;	2.82;	0.52;	2.30
600	1.95;	48.1;	1.83;	87.8;	3.16;	0.86;	2.30
1440	2.48;	61.3;	1.73;	106.2;	3.82;	2.07;	1.75

Required storage volume	S_{req} = **2.30** m^3
Soakaway storage volume	S_{act} = l × d × w × V_{free} = **2.30** m^3

PASS - Soakaway storage volume

Time for emptying soakaway to half volume	t_{s50} = S_{req} × 0.5 / (a_{s50} × f) = 13hr 19min 57s

PASS - Soakaway discharge time less than or equal to 24 hours