Drainage Strategy Report (DSR) For:

Glynhir Road,

Pontarddulais,

SA4 8PT

Prepared for:

DANTWYN
(PONTARDDULAIS) LTD.

REF: 18649 – DSR – R03

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Document Control

Project	**Glynhir Road,** **Pontarddulais,** **SA4 8PT**
Client	**DANTWYN (PONTARDDULAIS) LTD.**
Vale Consultancy Ref:	**18649 – DSR**

Document Checking:

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Issue	Date	Status
01	25.06.2024	First issue
02	15.07.2024	Appendices updated
03	23.08.2024	Appendices updated

CONTENTS

Limitations

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All comments and proposals contained in this report, including any conclusions, are based on information available to Vale Consultancy during investigations. The conclusions drawn by could therefore differ if the information is found to be inaccurate or misleading. Vale Consultancy accepts no liability should this be the case.

Purpose of the Report

The purpose of the report is to describe the proposed strategies for the discharge of surface water emanating from the development proposals; in support of a full SuDS Approval Body (SAB) application for Swansea Council. Flow rates for surface water will be quantified, and a SuDS approval body (SAB) full application will be submitted in support of planning application. The SAB consent legislation came into effect on 7th January 2019, when the Welsh Government introduced Schedule 3 of the Flood and Water Management Act 2010.

The drainage strategy assesses the proposals for the management of the surface water discharge from the proposed development, within the context of the expectations of the planning proposals, and also within the constraints of the site layout, environmental conditions.

1 INTRODUCTION

1.1 Site Location

Vale Consultancy has been instructed by DANTWYN (PONTARDDULAIS) LTD, '*The Client*' to undertake a drainage strategy report (DSR) for the proposed housing development at Glynhir Road, Pontarddulais, SA4 8PT ***(259819E, 204424N)***.

Refer to Figure 1 below.

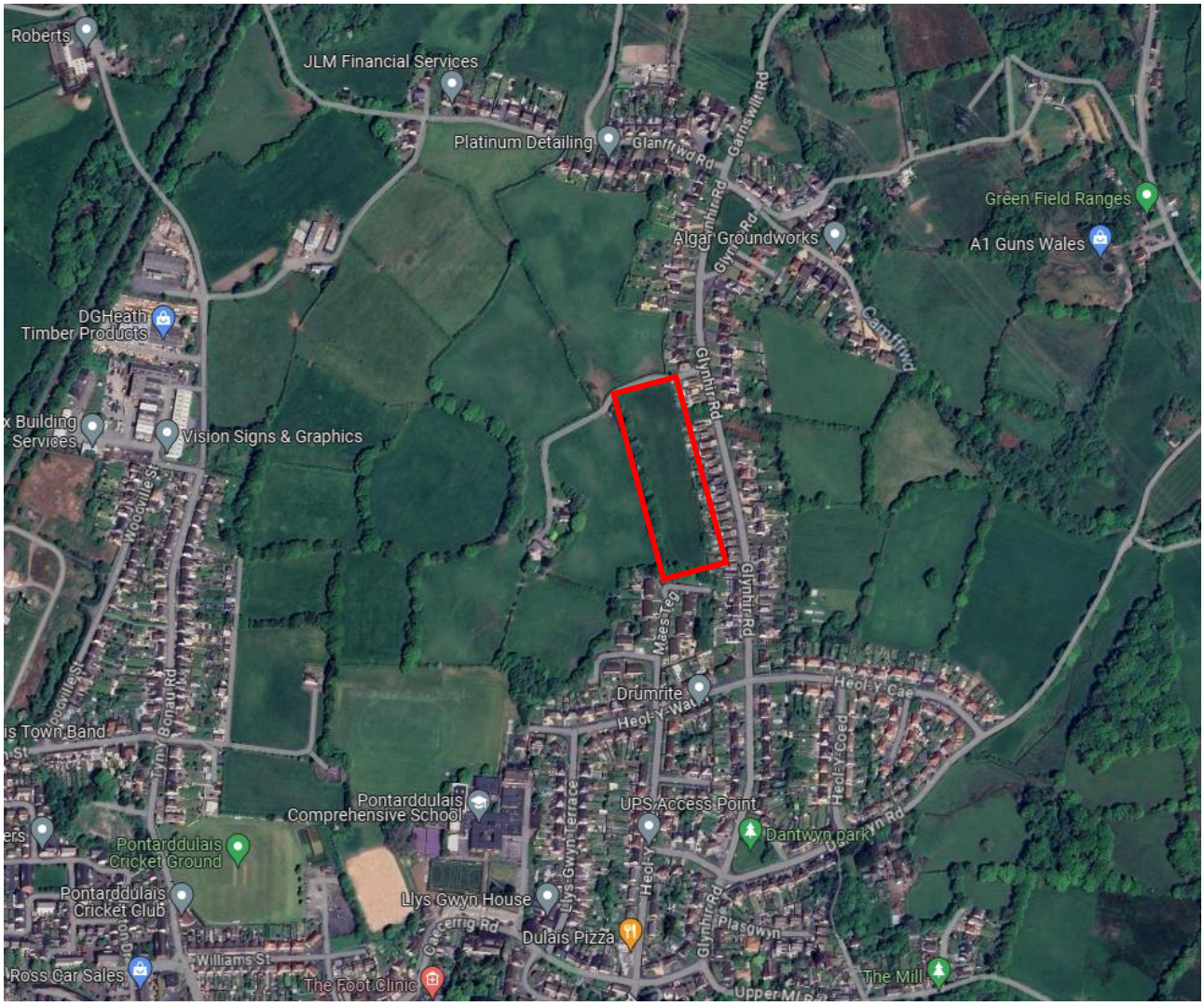

Figure 1 - Site Location Plan

The development site has a total site area of **14521m² (1.452Ha)** of currently undeveloped land. The site is located at the Northern side of Pontarddulais in the county of Swansea, and is approximately 2.3km North-East of junction 48 of the M4. There are existing utilities within the site boundary, most notably a DCWW raw water pipe which crosses the site at its Northern side and runs from North-West to East.

The site is ***Undeveloped Land*** and is therefore considered to be ***Greenfield***.

1.2 Proposed Development

The proposed housing development is for 30 plots consisting of 2 detached houses, 10 semi-detached houses, and one flat block with 6 dwellings.

The development will mostly be sited at exiting ground level, with some cut and fill as required to realise the scheme and some lifting of proposed structures in line with the recommendations from the JBA breach modelling report to reduce flood risk in the event that the raw water pipe bursts within or near the site boundary.

The overall site area is 1.452Ha, the developed area of buildings and hard landscaped areas totals 3843m^2 (0.384Ha).

In conjunction with our design and assessment as civil engineers, information from the other appointed consultants including Powell Dobson (Project Architect) and DANTWYN (PONTARDDULAIS) LTD (The Client), have been used to produce the DSR and SAB submission.

Refer to Proposed Site Plans: Appendix A

1.3 Existing Topography

A site topographic survey has been undertaken which includes site and boundary features and site levels. Ground levels across the site reduce gradually from the East to West from 27.20m to 24.83m. Trees line the Western boundary however the rest of the site consists of unused grassland.

1.4 Existing Geology

The British Geological Survey (BGS) online records show the site to have the following make ups:

Bedrock: Swansea Member - Sandstone. Sedimentary bedrock formed between 309.5 and 308 million years ago during the Carboniferous period.
Superficial soils: Glaciofluvial Deposits, Devensian - Sand and gravel. Sedimentary superficial deposit formed between 116 and 11.8 thousand years ago during the Quaternary period.

Gibbs Geotechnical undertook 4 trial pits and 4 soil infiltration tests to BRE365 standard in February 2024 to determine the local geology and permeation rates on site. Below is a summary of the report findings.
For full infiltration Testing Report refer to Appendix B.

Four pits were successfully excavated to 1.0m depth, soils encountered were logged at the following approximate depths:

Pit 1 Topsoil: 0-0.15m - Grassed loam
Superficial soils: 0.2-1.0m – Silt

Pit 2 Topsoil: 0-0.2m - Grassed loam
Superficial soils: 0.2-1.0m – Silt

Pit 3 Topsoil: 0-0.2m - Grassed loam
Superficial soils: 0.2-1.0m – Silt

Pit 4 Topsoil: 0-0.2m - Grassed loam
Superficial soils: 0.2-1.0m - Silt

The infiltration testing was carried out to BRE 365 standards, below is a summary of the tests which could be performed in the timeframe allowed found infiltration results of:

Test Pit 1 N/A – test pit did not drain within the 6hr timeframe allowed, after 21.4hrs had drained to 46%
Test Pit 2 1.77E-06m/s
Test Pit 3 N/A – test pit did not drain within the 6hr timeframe allowed, after 15hrs had drained to approx 60%
Test Pit 4 N/A – test pit did not drain within the 6hr timeframe allowed, after 7hrs had drained to approx 33%

Based on the poor infiltration rates, it has been deemed that infiltration would not be a suitable mean of surface water disposal for the site.

For full Infiltration Testing Report refer to Appendix B.

1.5 Flood Risk

The Natural Resources Wales Flood Map For Planning (FMFP) indicates that the site is located within flood zone 1 for flooding due to rivers and sea, meaning it is '*considered to be at little or no risk flooding due to 'tidal, rivers or reservoirs'*. A small portion of the North-West corner for the site is within flood zone 2 for surface water and small watercourse flooding meaning it has a 0.1% to 1% risk of flooding due to small watercourses and surface water. This also indicates that the justification test is not applicable and there is no need to consider flood risk further, with respect to naturally occurring flooding at the site.

Breach modelling and a subsequent report has been conducted by JBA Consulting for the development site to simulate the flood risk associated with a breach in the 1.68m dia. DCWW raw water pipe. The simulation tested the possibility of eight pipe burst locations (two within the site boundary) with a discharge rate of 2.8m^3/s per breach over a 24 hour period. The model found that water levels were generally shallow, with water levels within the site boundary not exceeding 0.02m in depth, however near the pipe burst locations the flood water depth is predicted to be a maximum of 0.25m deep. The report recommends that ground and finished floor levels are raised up between 150-300mm across the site. As a result of these findings, the FFLs and ground levels near the pipe easement will be raised by 300mm, with other plots being raised by a minimum of 150mm from the existing ground level.

Refer to Natural Resources Wales Flood Map for Planning: Appendix C

For full JBA Consulting breach modelling report - Refer to MGV-JBA-XX-XX-RP-Z-0001-S3-P01-Pontarddulais_Breach_Modelling

2.0 Drainage Systems Assessment

2.1 Existing Drainage Systems

There are existing utilities within the site boundary, most notably a DCWW strategic asset in the form of a 66”raw water pipe which crosses the site at its Northern side and runs from North-West to East. DCWW have advised an easement of 25m is required for this strategic asset.

The site is currently classified as greenfield and as such is not currently served by a drainage system or connection to the public sewer network. There are no recorded surface water or foul drainage assets, either private, local authority or Dwr Cymru Welsh Water (DCWW) recorded within the curtilage of the proposed development site.

DCWW asset mapping shows a public combined sewer running south to north within the public highway on Glynhir Road. There is also a DCWW combined 225mm diameter combined sewer to the south of the proposed development within Maes Teg. Also within Maes Teg, to the south of the site, there is a DCWW 9 inch surface water sewer within the public highway.

Refer to **Appendix E** for DCWW Asset Plans

3 PROPOSED SURFACE WATER DRAINAGE SYSTEMS

3.1 Sustainable Surface Water Drainage

The proposed surface water drainage layout illustrates how surface water runoff from developed hard landscaped areas will be is to be managed. The hard landscaped areas within the development include roof, parking areas and access road/ turning area.

For the purposes of the surface water drainage strategy the site is considered to be categorised as ***Greenfield*** or ***Undeveloped***.

3.2 S1: SuDS hierarchy of surface water discharge locations

The following receptors have been considered for surface water runoff on site, in order of SuDS preference. The aim of SuDS Standards is to ensure that the most effective drainage scheme is delivered with the most preferred levels of surface water destination, where the design can move to the next means of discharge only under exception criteria.

1. Surface Water collection for reuse.
2. Discharge by infiltration into ground.
3. Discharge into open surface water body.
4. Discharge into surface water sewer, highway drain, or other drainage system.
5. Discharge into combined sewer.

Priority Level 1 - Surface water collected for reuse

The site development of 30 residential plots is not expected to require any significant non-potable water demand. DCWW pre-planning advice indicates there is capacity in the water supply system for the development.

The use of a rainwater harvesting system has been discounted due to the nature of the development and the associated use and upkeep required for adequate and safe maintenance. The site instead uses rain gardens, which reuse water at source. On plot water butts are proposed, however as usage cannot be guaranteed, this has been discounted from the calculations but will act as an amenity to the future resident.

Partial solution, move to next Priority Level

Priority Level 2 – Discharge via infiltration

As in section 1.4 of this report, Gibbs Geotechnical carried out infiltration tests to BRE 365 standards. Testing found the site to have poor infiltration rates, it has been deemed that infiltration would not be a suitable means of surface water disposal for the site.

No solution, move to next Priority Level

Priority Level 3 – Discharge to Surface Water Body

There are no waterbodies or watercourses within the vicinity of the site. The nearest water body is Camffrwd located approximately 250m East of the site. To achieve a discharge route to this site, it is likely that pumping would be required due to the topography, with any potential route also crossing multiple third parties land as

well as the DCWW raw water pipe, which must be avoided as it is critical infrastructure. Thus, discharging surface water into a water body has been deemed unviable for the development.

No solution, move to next Priority Level

Priority Level 4 – Discharge To A Surface Water Sewer, Highway Drain, Or Another Drainage System

There is an existing 9" dia. (equates to approximately 225mm dia.) vitrified clay Dwr Cymru Welsh Water (DCWW) surface water sewer located within Maes Teg, approximately 125m South of the development site. This is the proposed destination for final surface water discharge. DCWW have been consulted for pre-development advice and have agreed in principal to the proposed connection location in Maes Teg, at an attenuated rate. Subject to the detailed design and S104 & S106 agreements.

Priority Level 4.

3.3 S2: Surface water runoff hydraulic control

Proposed SuDS drainage system

The proposed SuDS drainage system will consist of raingardens, combined with detention basins and permeable paving. The aim is to collect and convey surface water from the dwellings, parking bays and highways to discharge at an attenuated rate to a the DCWW surface water sewer to the south of the site boundary within the public highway in Maes Teg.

Refer to **Appendix E** for the proposed drainage plan.

Hydraulic Control

The site is classified as greenfield with a total site area of 1.45 ha.

Storm Event	Greenfield Run Off Rate (l/s)
Q1	20.07
Qbar	22.81
Q30	40.60
Q100	49.72

The table above gives the greenfield run off rates derived using the FEH methodology, which flows overland into the highway land and into the open cover manhole to the culverted watercourse in the current scenario. It is proposed that following the development total flows will not exceed 7.3 l/s for all events up to the Q100 + 40% Climate Change event. The proposed discharge rate of 7.3 l/s has been derived from the pro-rata'd rate of 5 l/s per hectare, discharge rate to be confirmed by DCWW. Flows will be attenuated within detention basins by use of HydroBrake flow control before discharging to the DCWW surface water sewer within Maes Teg.

Refer to **Appendix F** for hydraulic calculations.

Rainwater butts, ACO channel drains, rain gardens, permeable paving will be used to collect surface water from rainwater pipes and driveway areas outside of the raw water pipe easement. Surface water from the access road itself will be managed by traditional road gullies which will flow into the proposed surface water sewer network and outfall into the detention basin to the South. This ensures that all surface water will at least pass through the detention basin prior to discharging into the existing surface water sewer.

Two detention basins will be utilised for the surface water attenuation and to improve water quality. The basin located to the South of the site will be used to attenuate water up to the Q30 storm event, and will overflow into the second basin to the North after this event and up to and including the Q100 +40% climate change and accounting for an increase of 10% in impermeable area (urban creep). Both basins will have a 300mm depth freeboard to ensure that the basins capacities are not exceeded.

The attenuated water from both basins will be conveyed via a headwall inlet in the South basin and directed towards the Hydrobrake flow control chamber, which will discharge water into the existing DCWW surface water sewer at a controlled rate of 7.8l/s. This rate is below the greenfield runoff rate, and has been chosen due to the capacity of the existing receiving surface water sewer. All plots will direct flows through a catchpit prior to flowing into the proposed surface water sewer to reduce silt build-up and ensure the effective function of the surface water sewer between the two basins.

Hydraulic Design Calculations

The surface water design has been modelled using Causeway Flow hydraulic modelling software. The designs use 2022 FEH rainfall data for all standard storm durations for events up to and including the 1 in 100 year plus 40% climate change and accounting for +10% urban creep.

Refer to Hydraulic Model Results: Appendix E
Refer to Drainage Layouts: Appendix F

The calculations demonstrate that, based on discharging surface water at a rate of 7.8 l/s, the proposed surface water drainage system will have sufficient capacity to manage surface water runoff from post development hard landscaped areas.

Interception of runoff

By providing interception of runoff through SuDS systems developed sites can be designed so to have zero runoff for most small rainfall events and more closely replicate the surface water characteristics of its former greenfield state.

Exceedance Flows

Exceedance occurs during rainfall events which exceed the capacity of the drainage system, due to either rainfall events beyond standard design considerations or issues with the maintenance and performance of the surface water drainage systems.

Three hundred millimetres of freeboard has been provided for each basin to ensure that the first of the exceedance is managed within the basins and reduces exceedance volumes. The topography of the site reduces in level gradually towards the West of the site. Exceedance flows will generally be directed towards the access road, and will flow South towards Maes Teg. The majority of surface water runoff from the Western side of the access road will flow West towards the adjacent grassed fields.

3.4 S3:Water Quality

As the site is currently greenfield, there are no existing site surface water drainage systems. Post development surface water runoff will be generated by hard landscaped areas comprising: roofs, access road and parking areas. The Surface water runoff destination will be to existing DCWW surface water sewer within Maes Teg.

In accordance with the CIRIA C753 publication 'The SuDS Manual' (2015) definitions, residential roofs have a 'very low' pollution hazard level, with residential access roads and parking areas having a 'low' pollution hazard level. Table 1 shows the pollution hazard indices for each land use. To deliver adequate water quality treatment the total SuDS mitigation index must be more than the pollution hazard index for each contaminant type. The pollution hazard and mitigation indices have been taken from tables 26.2 and 26.3 of the CIRIA SuDS Manual 2015.

The proposed design will ensure that surface water runoff from roof and hard landscaped areas will pass through the detention basins, which will provide primary treatment. Most of the dwelling roofs will discharge their surface water into a lined permeable paving system initially, providing treatment and slowing flows before discharging into the proposed surface water sewer network. Some dwellings and the apartment block will discharge into raingardens as initial treatment, before being directed towards the Southern detention basin. Most of the surface water runoff will flow through a minimum two SuDs features which ensure that adequate water quality is achieved prior to final discharge.

The SuDS components will separate the smaller particles and chemicals from the surface water discharge as it filters through, providing sufficient water quality treatment prior to final discharge into the existing sewer.

		Pollution hazard index				Mitigation Index			
Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydro-carbons	SuDS Components for land use	Total Suspended Solids (TSS)	Metals	Hydro-carbons	Mitigation hazard index > Pollution hazard index (for each contaminant type)
Residential parking	Low	0.5	0.4	0.4	Permeable Paving	0.7	0.6	0.7	Yes
					Detention Basin	0.5	0.5	0.6	
Residential Roof	Very Low	0.2	0.2	0.05	Permeable Paving	0.7	0.6	0.7	Yes
					Bioretention Area (Rain Garden)	0.8	0.8	0.8	
					Detention Basin	0.5	0.5	0.6	
Low traffic road	Low	0.5	0.4	0.4	Detention Basin	0.5	0.5	0.6	Yes

Table 1 – Summary of pollution Hazard and relevant SuDS Mitigation Indices

The proposed SuDS components will be sufficient in removing contaminants and pollutants for the proposed site and will have a positive impact on the receiving water quality for the runoff source.

3.5 S4: Amenity

The proposed SuDS features will enhance and soften the impact of the built environment, and will provide an aesthetically pleasing aspect to the development. The raingardens will be planted with native wildflower species which will improve the appearance and add colour to the built environment post-development. The detention basins will be planted with an EG1-Meadow Seed Mix which add long meadow grasses to the basins to improve their appearance and blend in with the surrounding natural environment.

The SuDS features provided with the development will enhance the overall environmental setting of the proposed development. Within the site constraints the proposed solution looks to maximise amenity benefits within the development proposals.

Refer to Drainage Layouts: Appendix G

3.6 S5: Biodiversity

The development site is set in a semi-rural location on the Northern side of Pontarddulais.
The use of a raingardens will help to provide a new quality habitat for wildlife, having a positive contribution

to biodiversity in the area. The use of planting native species can support local biodiversity by providing habitat and food for invertebrates and birds. Ephemeral water bodies can be a specific requirement for the life cycle of some plants and animals. At detailed design, a detailed planting schedule will be provided.

These features will link with the surrounding countryside, further contributing towards the biodiversity of the area.

3.7 S6: Operation and Maintenance Requirements

To ensure SuDS components continue to operate reliably, regular inspection and maintenance should be carried out. In most cases, appropriate information should be provided by the relevant manufacturer on what has been installed, how it works, when to inspect it and whether maintenance will be required. CIRIA C753 The SuDS Manual also provides information on the operation and maintenance requirements for various SuDS components.

Maintenance of the outlined drainage assets will be the responsibility of the housing association.

Conventional surface water drainage features such as gullies, channels, catchpits and manholes should be inspected as an absolute minimum annually, and where practicable after intense storm events, with silt removal.

Maintenance of the guttering and RWP's is key to effectively managing surface water runoff, particularly due to the proximity of the large established trees in this semi-rural setting.

The raingardens and the detention basin should be inspected for litter, which should be disposed of offsite. Any weak or dying plants should be replaced, and the basin weeds sprayed and removed when dead during the following inspection.

The maintenance plan 60-year life cycle costings for the SuDS components has been detailed within the maintenance plan document 18649 - MP01.

The construction programme will be developed by the appointed contractor, and be coordinated with the construction of the non-SuDS feature development on site, i.e. building foundations and super structure, foul drainage and services.

4 FOUL WATER DRAINAGE

It is proposed to discharge foul waste generated by the development into the DCWW combined 225mm diameter combined sewer to the south of the proposed development within Maes Teg, approximately 130m South of the development site.

Pre-development advice sought from DCWW indicates that there is capacity within the network and a suitable connection point would be via the existing chamber SN59047201 within the public highway, subject to section 104/106 agreement with DCWW.

The peak design flow rates for the dwelling, based 4000 litres per dwelling per day equates to 1.4 l/s.

5 CONCLUSIONS

The development site has a total site area of 14521m² (1.452Ha) of currently undeveloped land. The site is located at the Northern side of Pontarddulais in the county of Swansea, and is approximately 2.3km North-East of junction 48 of the M4.

The proposed housing development is for 30 plots consisting of 2 detached houses, 10 semi-detached houses, and one flat block with 6 dwellings.

There are existing utilities within the site boundary, most notably a DCWW strategic asset in the form of a 66”raw water pipe which crosses the site at its Northern side and runs from North-West to East. DCWW have advised an easement of 25m is required for this strategic asset.

Breach modelling and a subsequent report has been conducted by JBA Consulting for the development site to simulate the flood risk associated with a breach in the 1.68m dia. DCWW raw water pipe. The simulation tested the possibility of eight pipe burst locations (two within the site boundary) with a discharge rate of 2.8m^3/s per breach over a 24 hour period. The model found that water levels were generally shallow, with water levels within the site boundary not exceeding 0.02m in depth, however near the pipe burst locations the flood water depth is predicted to be a maximum of 0.25m deep. The report recommends that ground and finished floor levels are raised up between 150-300mm across the site. As a result of these findings, the FFLs and ground levels near the pipe easement will be raised by 300mm, with other plots being raised by a minimum of 150mm from the existing ground level.

Rainwater butts, ACO channel drains, rain gardens, and permeable paving will be used to collect surface water from rainwater pipes and driveway areas outside of the raw water pipe easement. Surface water from the access road itself will be managed by traditional road gullies which will flow into the proposed surface water sewer network and outfall into the detention basin to the South. This ensures that all surface water will at least pass through the detention basin prior to discharging into the existing surface water sewer.

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The surface water design has been modelled using Causeway Flow hydraulic modelling software. The designs use 2022 FEH rainfall data for all standard storm durations for events up to and including the 1 in 100 year plus 40% climate change and accounting for +10% urban creep.

It is proposed to discharge foul waste generated by the development into the DCWW combined 225mm diameter combined sewer to the south of the proposed development within Maes Teg, approximately 130m South of the development site.

Pre-development advice sought from DCWW indicates that there is capacity within the network and a suitable connection point would be via the existing chamber SN59047201 within the public highway, subject to section 104/106 agreement with DCWW.

APPENDIX A: Proposed Site Plans

Key:

Site Boundary | Green Buffer | 5m to Green Buffer | Existing Trees | Root Protection Zone | High-Pressure Water Main | 25m Easement

Accommodation Schedule:

	No.
1B2P (Walk Up)	6
2B4P	13
3B5P	6
3B5P (Corner Turner)	5
TOTAL	**30**

0m — 50m

SCALE / 1:500

This drawing must not be scaled.
Figured dimensions and levels to be used.
Any inaccuracies must be notified to the architect.
Detail drawings and large scale drawings take precedence over smaller drawings.

Rev:		Rev:		Rev:	
A	Increase in unit numbers in line with client comments. TW. 11/04/24	G	Red line boundary and walk-up block adjusted. Status updated to 'Planning'. TW. 30/05/2024		
B	Amendment to layout in line with client comments. TW. 16/04/24	H	SuDs adjusted in line with engineer drawings and additional 2B4P unit added. TW. 13/05/2024		
C	Site access layout adjusted to allow for additional housing unit to South-East corner. TW. 17/04/24	I	Parking arrangement of Plots 7-9 adjusted. Key and schedule added. TW. 13/05/2024		
D	Access road layout and parking amended to accommodate extra 3 1B2P apartments to the north of the site. NS 03/05/2024	J	Parking arrangement of Plot 9-12 and visitor bays adjusted. Traffic calming amended in line with client comments. NS. 29/07/2024		
E	General layout amendments in line with client comments. NS. 09/05/2024				
F	Added detail around existing parking to South. DR. 17/05/2024				

PRELIMINARY	
PLANNING	✓
DESIGN	
TENDER	
CONSTRUCTION	

powelldobson ARCHITECTS
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Drawing No.	Rev.
23066 (05) 200	J

Contract: Life Property Group
Pontarddulais North

Title: Proposed Site Plan

Scale: 1:500 @ A2
Date: 29/07/2024
Drawn: NS
Checked: DR

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APPENDIX B: Infiltration Testing Report

Infiltration Testing For:

Land off Glynhir Road,
Pontardulais

Prepared for: Jon Taylor of Life Property Group

REF: Pontardulais #508

DATE: 17.02.2024

GibbsGeoTechnical

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Document Control

Project	**Pontardulais**
Client	**Life Property Group**
Ref:	**Pontardulais #508**

Document Checking:

Prepared By: **Oliver Gibbs** **Signed:** 

Issue	Date	Status
01	**17/02/2024**	**Written and submitted**
02		
03		

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1 Introduction

1.1 Brief

Gibbs Geotechnical has been instructed by Jon Taylor of Life Property Group (the Client) to undertake 4 soil infiltration tests to BRE365 standard at the land off Glyhir Road, Pontardulais.

National Grid Reference: SN599043– Easting 259969, Northing 204346

Latitude, Longitude: 51.720307 , -4.0285988

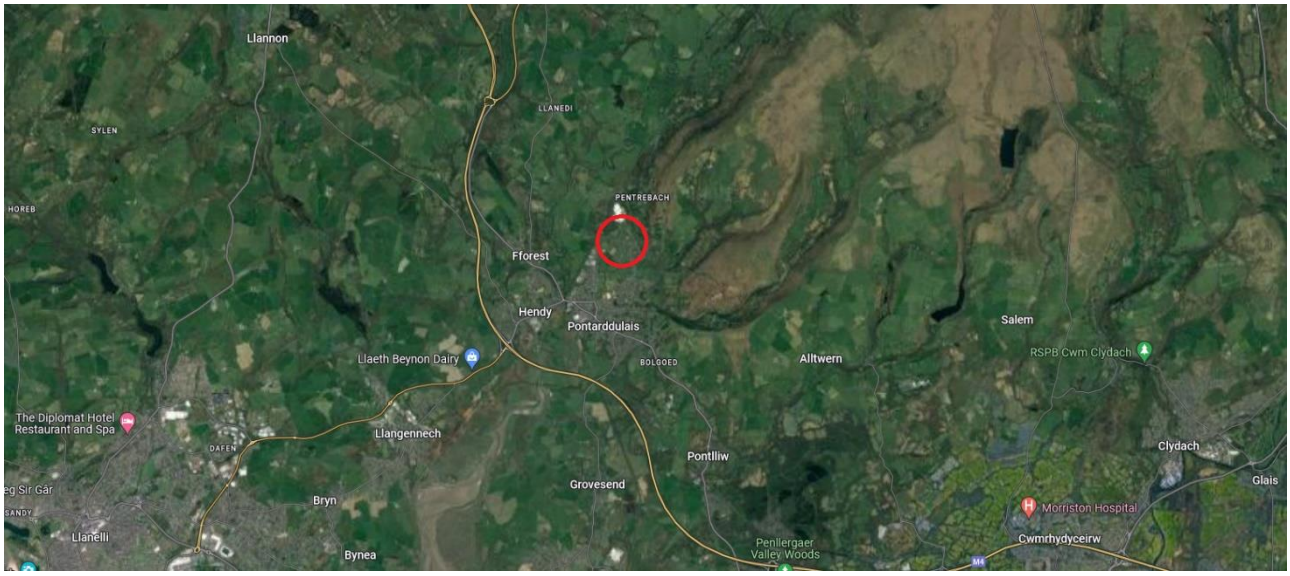

Figure 1 - Site location

Four BRE365 infiltration tests have been proposed to determine the local geology and permeation rates on site. These test pits will be 0.5x1x0.5m minimum and tested a maximum of 3 times or as many as possible in the timeframe allowed. Refer to **Appendix A** – Site Test Plans

1.2 Site Investigations

The tests were performed by Gabriel Usher (of Gibbs Geotechnical) on the 5-6th of February 2024. Refer to **Appendix B** – Site photos

2 Site findings

The following tests were performed to the best of the ability of those involved, subject to site constraints and weather conditions. The pits were successfully excavated to 1.0m depth, shown in the location on **Appendix A**.

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2.1 British Geological Records

Local searches from the British Geological Survey (BGS) online records show the site to have the following superficial soils and bedrock:

Bedrock: Swansea Member - Sandstone. Sedimentary bedrock formed between 309.5 and 308 million years ago during the Carboniferous period.

Superficial soils Glaciofluvial Deposits, Devensian - Sand and gravel. Sedimentary superficial deposit formed between 116 and 11.8 thousand years ago during the Quaternary period.

Refer to **Appendix C** for BGS records http://mapapps.bgs.ac.uk/geologyofbritain3d/

2.2 Trial pit soil conditions

Soils encountered were logged at the following approximate depths:

Pit 1

Topsoil:	*0-0.15m*	*- Grassed loam*
Superficial soils:	*0.2-1.0m*	*- Silt*

Pit 2

Topsoil:	*0-0.2m*	*- Grassed loam*
Superficial soils:	*0.2-1.0m*	*- Silt*

Pit 3

Topsoil:	*0-0.2m*	*- Grassed loam*
Superficial soils:	*0.2-1.0m*	*- Silt*

Pit 4

Topsoil:	*0-0.2m*	*- Grassed loam*
Superficial soils:	*0.2-1.0m*	*- Silt*

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Results

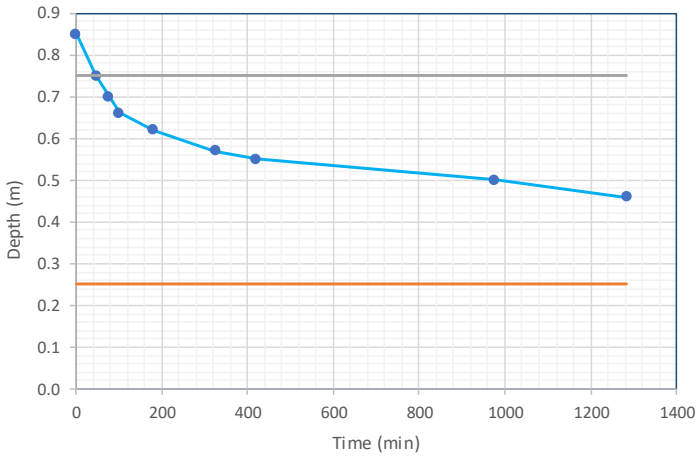
Soakaway Test Results - BRE 365 Digest standards

Site: Land off Glyndir Road, Pontardulais
Client: Jon Taylor of Life Property Group

Trial Pit	**1**	**Date:**	5+6/02/2024
		Performed by:	Gabriel Usher (of Gibbs Geotechnical)
Dimensions	(m)	**Weather:**	Sunny
Width	1	**Topsoil:**	Grassed loam
Length	0.5	**Superficial soil:**	Silt
Effective depth	0.9	**Comments:**	
Total depth of hole	0.9		

GibbsGeoTechnical

Test No.	Time (min)	Depth (m)			
1	0	0.85	**time 75% =**	47	
	47	0.75	**time 25% =**	N/A	
	76	0.70	**Area =**	0.5	
	101	0.66	**Vp 75% =**	0.75	
	180	0.62	**Vp 25% =**	0.25	
	325	0.57			
	420	0.55			
	977	0.50			
	1285	0.46			
			Vp75-25 =	0.25	m
			As50 =	1.85	m²
			tp75-25 =	N/A	s
			f =	**N/A**	**m/s**



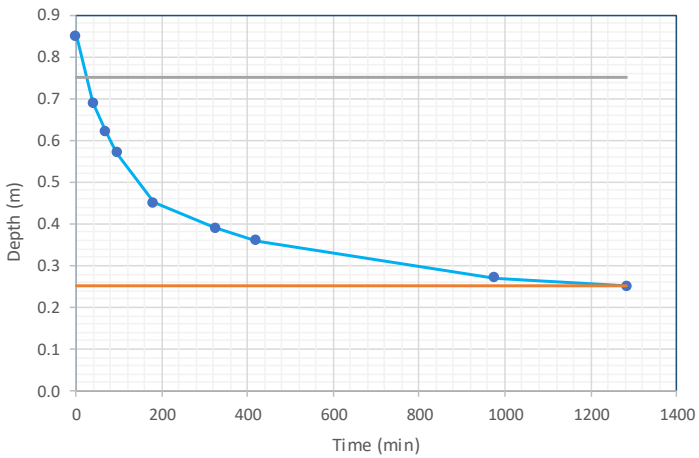
Soakaway Test Results - BRE 365 Digest standards

Site: Land off Glyndir Road, Pontardulais
Client: Jon Taylor of Life Property Group

Trial Pit	**2**	**Date:**	5+6/02/2024
		Performed by:	Gabriel Usher (of Gibbs Geotechnical)
Dimensions	(m)	**Weather:**	Sunny
Width	1	**Topsoil:**	Grassed loam
Length	0.5	**Superficial soil:**	Silt
Effective depth	0.9	**Comments:**	
Total depth of hole	0.9		

GibbsGeoTechnical

Test No.	Time (min)	Depth (m)			
1	0	0.85	**time 75% =**	10	
	40	0.69	**time 25% =**	1285	
	70	0.62	**Area =**	0.5	
	95	0.57	**Vp 75% =**	0.75	
	180	0.45	**Vp 25% =**	0.25	
	325	0.39			
	420	0.36			
	977	0.27			
	1285	0.25			
			Vp75-25 =	0.25	m
			As50 =	1.85	m²
			tp75-25 =	76500	s
			f =	**1.77E-06**	**m/s**



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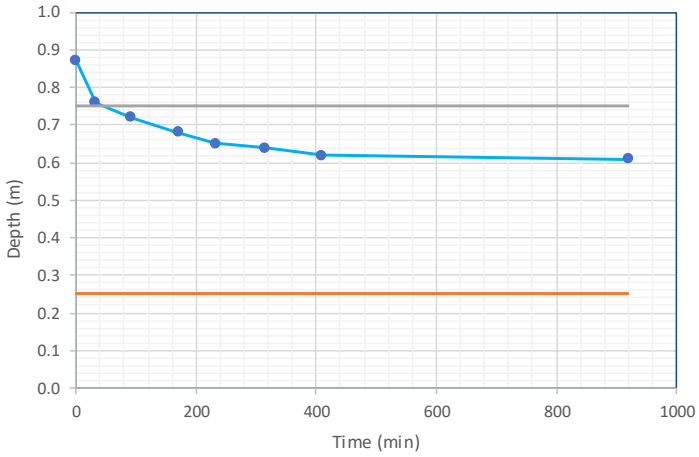
Soakaway Test Results - BRE 365 Digest standards

Site: Land off Glyndir Road, Pontardulais
Client: Jon Taylor of Life Property Group

Trial Pit	**3**	**Date:**	5+6/02/2024
		Performed by:	Gabriel Usher (of Gibbs Geotechnical)
Dimensions	(m)	**Weather:**	Sunny
Width	1	**Topsoil:**	Grassed loam
Length	0.5	**Superficial soil:**	Silt
Effective depth	0.9	**Comments:**	
Total depth of hole	0.9		

Test No.	Time (min)	Depth (m)			
	0	0.87	**time 75% =**	40	
	32	0.76	**time 25% =**	N/A	
	92	0.72	**Area =**	0.5	
	170	0.68	**Vp 75% =**	0.75	
	232	0.65	**Vp 25% =**	0.25	
	314	0.64			
	410	0.62			
1	920	0.61			
			Vp75-25 =	0.25	m
			As50 =	1.85	m²
			tp75-25 =	N/A	s
			f =	**N/A**	**m/s**

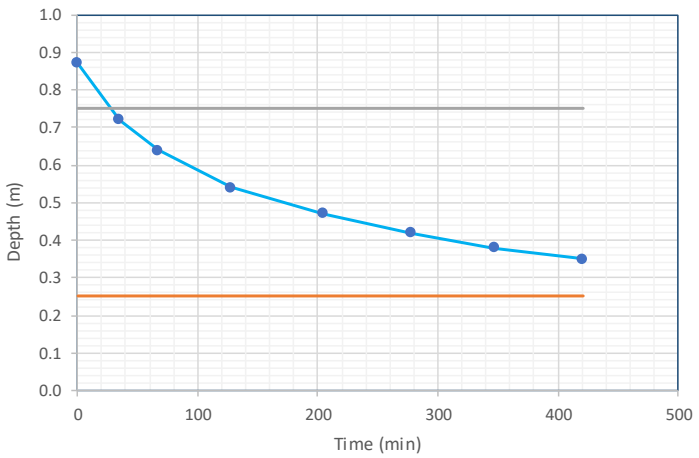


Soakaway Test Results - BRE 365 Digest standards

Site: Land off Glyndir Road, Pontardulais
Client: Jon Taylor of Life Property Group

Trial Pit	**4**	**Date:**	5+6/02/2024
		Performed by:	Gabriel Usher (of Gibbs Geotechnical)
Dimensions	(m)	**Weather:**	Sunny
Width	1	**Topsoil:**	Grassed loam
Length	0.5	**Superficial soil:**	Silt
Effective depth	0.9	**Comments:**	
Total depth of hole	0.9		

Test No.	Time (min)	Depth (m)			
	0	0.87	**time 75% =**	30	
	35	0.72	**time 25% =**	N/A	
	67	0.64	**Area =**	0.5	
	128	0.54	**Vp 75% =**	0.75	
	205	0.47	**Vp 25% =**	0.25	
	278	0.42			
	347	0.38			
1	421	0.35			
			Vp75-25 =	0.25	m
			As50 =	1.85	m²
			tp75-25 =	N/A	s
			f =	**N/A**	**m/s**



3 Conclusions

The tests which could be performed in the timeframe allowed found infiltration results of:

Test Pit 1: N/A – test pit did not drain within the 6hr timeframe allowed, after 21.4hrs had drained to 46%
Test Pit 2: 1.77E-06m/s
Test Pit 3: N/A – test pit did not drain within the 6hr timeframe allowed, after 15hrs had drained to approx 60%
Test Pit 4: N/A – test pit did not drain within the 6hr timeframe allowed, after 7hrs had drained to approx 33%

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APPENDIX A: Site Test Plans

Figure 1- Test pit locations – weather conditions on both days precluded sending the drone to an altitude sufficient to capture all pits in a single frame (high winds)

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APPENDIX B: Site Photos

Figure 2 - Test pit 1 during excavation

Figure 3 - Test pit 2 after filling

Figure 4 – TP1 strata

Figure 5 - Test pit remediation

Figure 6 - Test pit remediation

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APPENDIX C: BGS Records

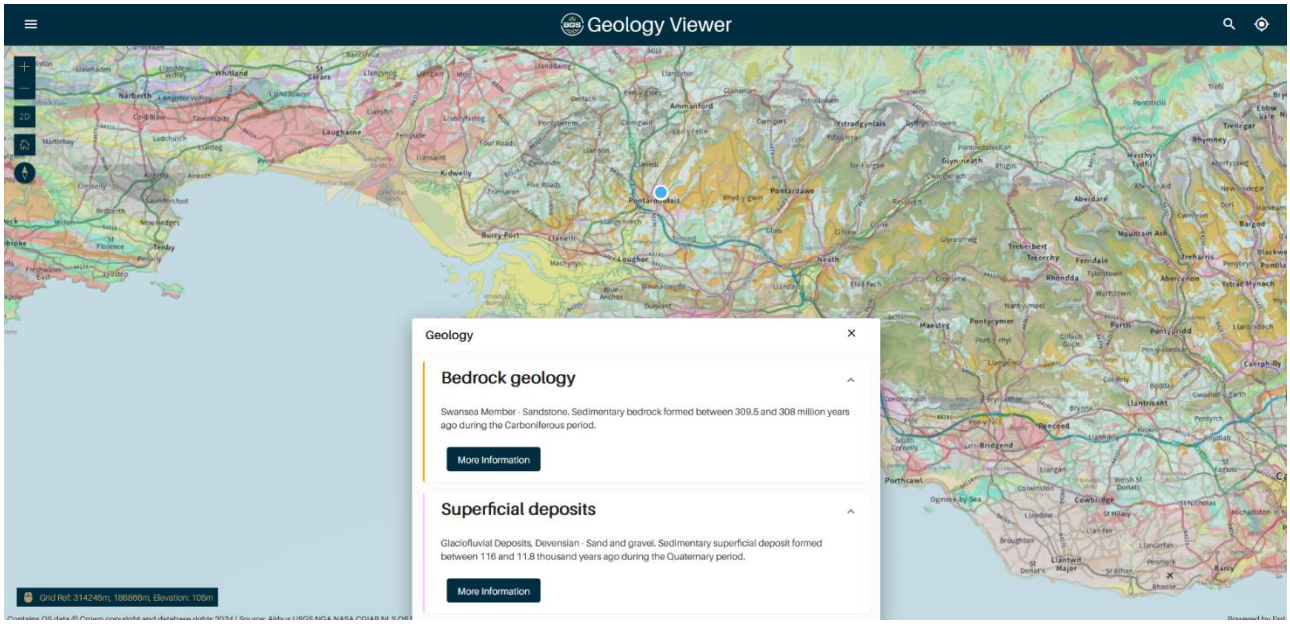


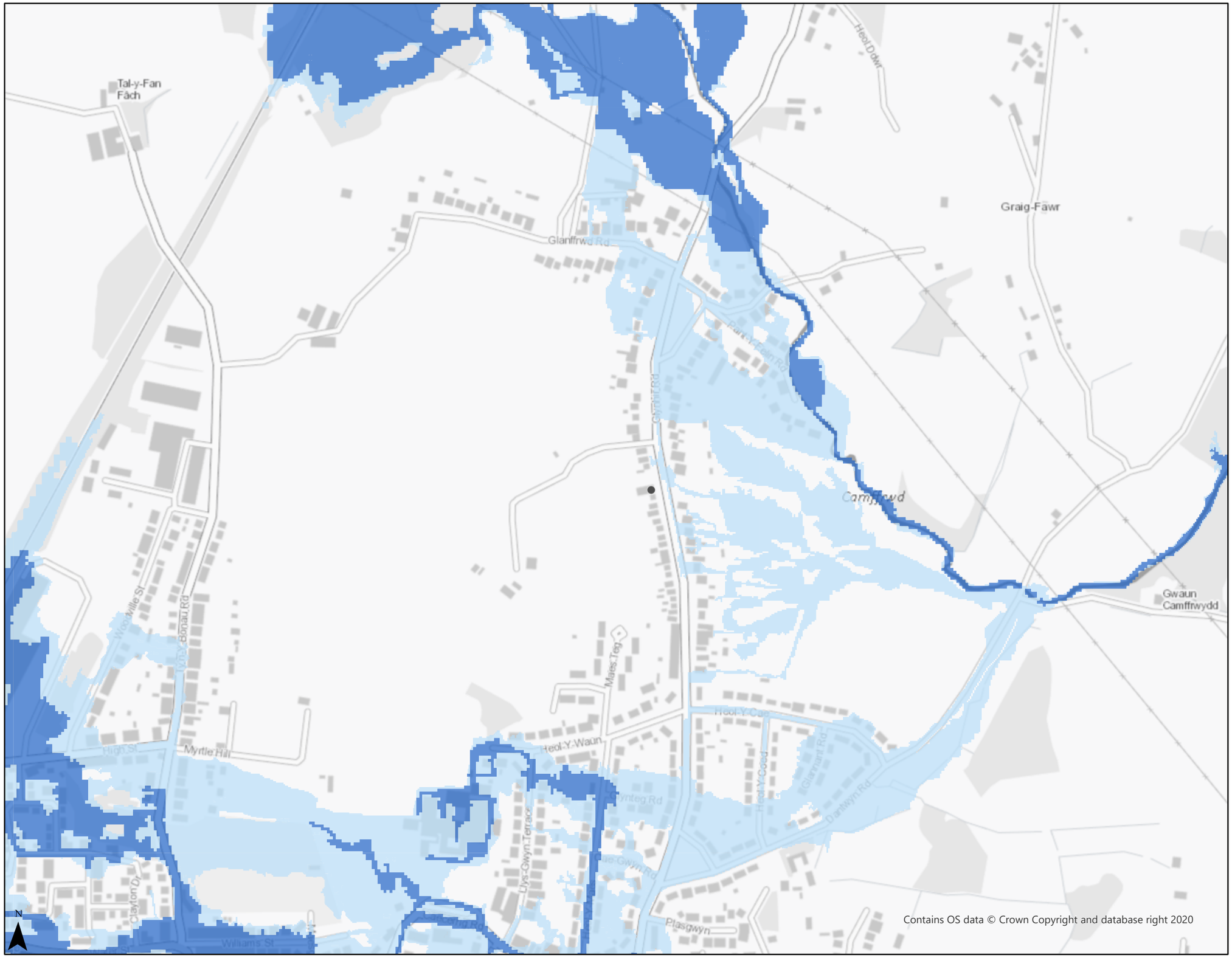
Figure 7 - Royal Geological survey records of the site

APPENDIX C: Natural Resources Wales Flood Map For Planning

Cyfoeth Naturiol Cymru
Natural Resources Wales

Flood Map for Planning - Basic

Glynhir Rd, Pontarddulais



Legend

TAN15 Defended Zones

- Rivers
- Sea
- Rivers and Sea

Rivers and Sea

- Flood Zone 3
- Flood Zone 2

Scale at A3: 1:5,000

Date: 20/06/2024

0.2 0.1 0 0.2

km

British National Grid

Disclaimer

https://naturalresources.wales/flooding/disclaimer-for-our-flood-and-coastal-erosion-risk-maps/?lang=en

Cyfoeth Naturiol Cymru
Natural Resources Wales

Flood Map for Planning - Basic

Glynhir Rd, Pontarddulais Surface water

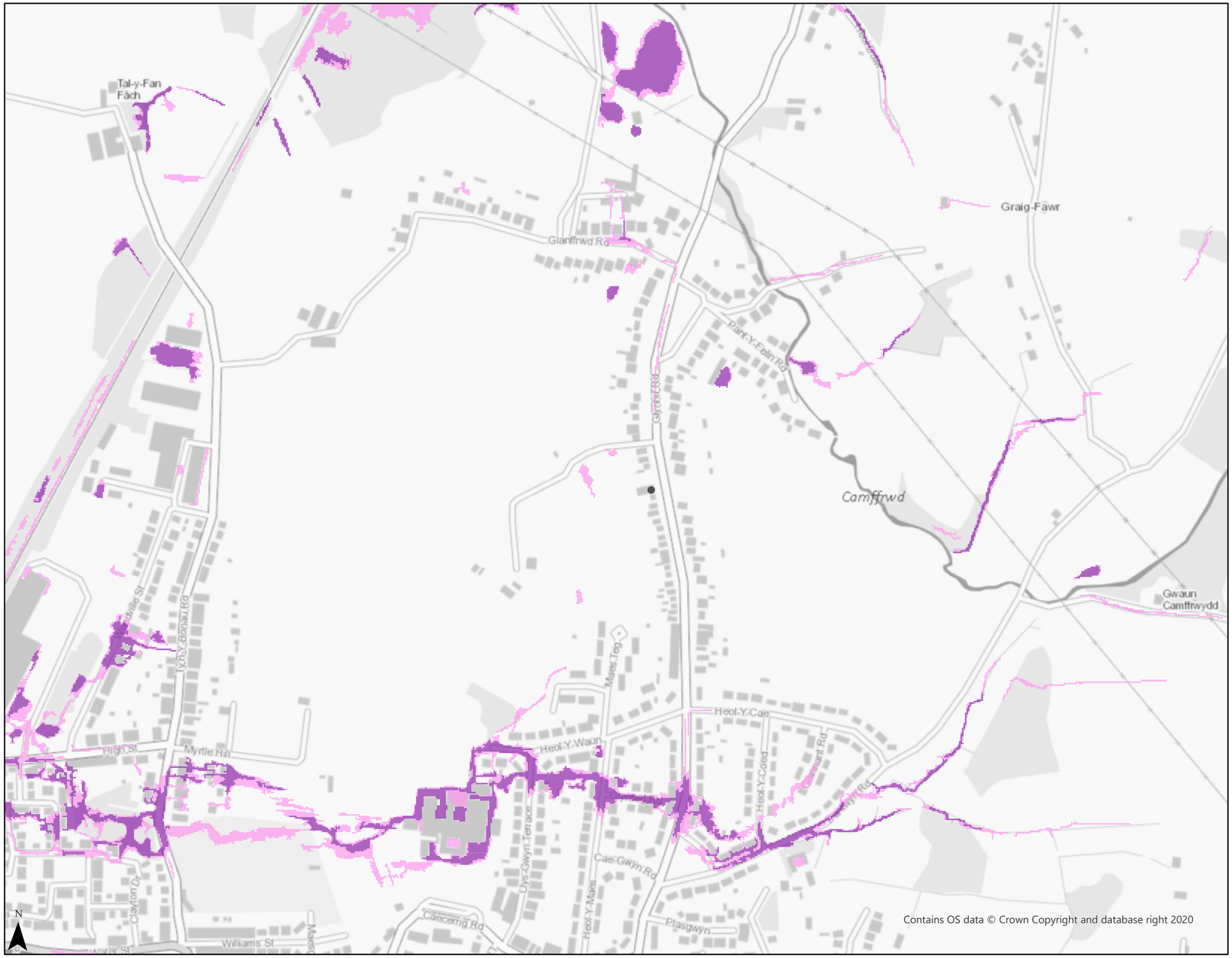
Legend

TAN15 Defended Zones

- Rivers
- Sea
- Rivers and Sea

Surface Water and Small Watercourses

- Flood Zone 3
- Flood Zone 2



Scale at A3: 1:5,000

Date: 20/06/2024

0.2 0.1 0 0.2

km

British National Grid

Disclaimer

https://naturalresources.wales/flooding/disclaimer-for-our-flood-and-coastal-erosion-risk-maps/?lang=en

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APPENDIX D: DCWW Asset Plans

Dŵr Cymru
Welsh Water

Glynhir Road, Pontarddulais Swansea SA4 8PT

N
W E
S

LEGEND(Representative of most common features)

Waste network:

- Foul chamber
- Surface water chamber
- Combined chamber
- Combined sewer overflow
- Special purpose chamber
- Treatment works
- Pumping station
- Outfall
- Lamphole
- Storm Overflow
- Rising main
- Gravity sewer
- Private sewer
- Private sewer subject to Sect. 104 adoption agreement
- Private Sewer Transfer
- Lateral Drain
- Inspection Chamber

NB: Sewer symbol colour indicates the type.

RED - Combined
GREEN - Surface Water
BROWN - Foul
Purple - Former 524 sewers (for indicative purposes only)

Notes:

Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases, pipe material (other than Asbestos Cement or Pitch Fibre) may be found to be asbestos cement (AC) or Pitch Fibre (PF) . It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

Map Ref:	259822,204496
Map scale:	1:1000
Printed by:	Zara Howells
Printed on:	12 Dec 2023

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APPENDIX E: Hydraulic Design Calculations

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Paul Graham
Site name:	Pontardulais
Site location:	

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	51.72100° N
Longitude:	4.03124° W
Reference:	3811739145
Date:	Feb 16 2024 12:04

Runoff estimation approach

FEH Statistical

Site characteristics

Total site area (ha):	1.45

Methodology

Q_{MED} estimation method:	Calculate from BFI and SAAR
BFI and SPR method:	Calculate from dominant HOST
HOST class:	6
BFI / BFIHOST:	0.402
Q_{MED} (l/s):	21.22
Q_{BAR} / Q_{MED} factor:	1.08

Hydrological characteristics

	Default	Edited
SAAR (mm):	1396	1396
Hydrological region:	9	9
Growth curve factor 1 year:	0.88	0.88
Growth curve factor 30 years:	1.78	1.78
Growth curve factor 100 years:	2.18	2.18
Growth curve factor 200 years:	2.46	2.46

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	22.81	22.81
1 in 1 year (l/s):	20.07	20.07
1 in 30 years (l/s):	40.6	40.6
1 in 100 year (l/s):	49.72	49.72
1 in 200 years (l/s):	56.11	56.11

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	40	Minimum Backdrop Height (m)	0.200
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
BASIN#2		5.00	25.700	1350	259781.868	204492.551	0.900
S01			26.000	1350	259803.625	204479.774	1.205
S02	0.028	5.00	26.200	1350	259817.250	204480.080	1.473
S03C			26.250	600	259804.222	204459.359	1.440
S03B	0.008	5.00	26.250	600	259813.656	204467.263	1.228
S03A	0.018	5.00	26.350	600	259823.197	204467.356	1.350
S03			26.350	1350	259819.788	204466.713	1.691
PP13/14	0.015	5.00	26.300	1200	259804.943	204452.434	0.610
S04A	0.029	5.00	26.300	1200	259808.890	204452.837	1.400
S04			26.400	1350	259822.491	204452.485	1.813
S14			25.800	1200	259839.743	204306.495	2.176
PP23	0.009	5.00	26.450	1200	259828.166	204446.431	0.610
S-P23			25.830	600	259825.127	204445.854	0.930
JCT01			25.830		259823.725	204445.588	1.278
PP12	0.008	5.00	26.450	1200	259818.625	204435.033	0.610
S-P12			26.100	600	259820.665	204434.512	1.000
PP11	0.009	5.00	26.500	1200	259818.977	204430.574	0.610
S-P11			26.100	600	259822.310	204426.871	1.000
S05	0.013	5.00	26.650	1350	259826.996	204427.304	2.191
PP25	0.009	5.00	26.700	1200	259836.198	204417.864	0.610
PP24	0.008	5.00	26.700	1200	259835.704	204420.467	0.610
S06A			26.700	600	259830.555	204418.146	1.200
PP08	0.008	5.00	26.700	1200	259823.343	204410.180	0.610
S06B			26.900	600	259824.813	204413.434	1.897
PP10	0.008	5.00	26.600		259819.647	204425.266	0.610
S06	0.017	5.00	26.800	1350	259829.535	204413.113	2.413
PP06	0.008	5.00	26.500	1200	259822.710	204397.554	0.610
PP07	0.008	5.00	26.800	1200	259822.222	204400.666	0.610
S07A	0.000	15.00	26.800	600	259828.188	204400.193	1.430
S07			26.750	1350	259831.174	204400.645	2.426
PP26	0.009	5.00	26.600	1200	259837.995	204390.774	0.610
PP04	0.008	5.00	26.350	1200	259824.659	204381.266	0.610
PP05	0.008	5.00	26.500	1200	259824.167	204384.378	0.610
S08A			26.700	600	259830.182	204383.964	1.400
S08	0.018	5.00	26.600	1350	259834.129	204384.571	2.358
PP28	0.008	5.00	26.500	1200	259847.334	204364.016	0.610
PP27	0.008	5.00	26.500	1200	259846.850	204366.622	0.610
S09A			26.600	600	259841.137	204365.973	1.200

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
PP02	0.008	5.00	26.350	1200	259827.111	204364.967	0.610
PP03	0.008	5.00	26.350	1200	259826.535	204368.064	0.610
S09B			26.350	600	259832.833	204367.656	1.011
S09	0.028	5.00	26.400	1350	259837.100	204365.243	2.256
PP01	0.009	5.00	26.500	1200	259830.088	204349.119	0.610
S-P1			26.350	600	259835.568	204351.590	0.950
S10	0.019	5.00	26.250	1350	259839.638	204350.758	2.180
S16	0.029	5.00	25.950	1200	259843.988	204326.275	1.600
PP30	0.009	5.00	26.200	1200	259852.474	204336.010	0.610
PP29	0.009	5.00	26.200	1200	259851.994	204338.616	0.610
S11A			26.200	600	259846.305	204337.186	1.168
S11	0.008	5.00	26.120	1350	259841.566	204339.982	2.105
PP09	0.009	5.00	26.650		259823.112	204413.120	0.610
BASIN#1			26.000	1350	259825.588	204338.042	2.100
RG1	0.008	5.00	26.250		259798.586	204462.908	0.500
S12			26.000	2400	259842.719	204327.715	2.233
S13			25.825	1200	259841.044	204311.727	2.165
S15			25.600	1200	259828.127	204298.270	2.071
EX. SMH			25.070	1200	259808.003	204278.818	1.803
S16A		5.00	25.800	1200	259842.046	204309.929	1.300
PPV	0.002	5.00	26.450		259847.430	204362.224	0.610

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	BASIN#2	S01	1.000	0.600	24.800	24.795	0.005	200.0	375	5.01	50.0
1.001	S01	S02	13.628	0.600	24.795	24.727	0.068	200.0	375	5.19	50.0
1.002	S02	S03	13.606	0.600	24.727	24.659	0.068	200.0	375	5.37	50.0
2.001	S03C	S03B	12.307	0.600	25.110	25.022	0.088	139.9	100	5.36	50.0
2.002	S03B	S03	6.157	0.600	25.022	24.964	0.058	106.1	100	5.50	50.0
3.000	S03A	S03	3.469	0.600	25.300	24.964	0.336	10.3	100	5.02	50.0
1.003	S03	S04	14.482	0.600	24.659	24.587	0.072	200.0	375	5.69	50.0
4.000	PP13/14	S04A	1.000	0.600	25.690	25.200	0.490	2.0	100	5.00	50.0
4.001	S04A	S04	13.606	0.600	25.200	24.812	0.388	35.1	150	5.14	50.0
1.004	S04	JCT01	7.007	0.600	24.587	24.552	0.035	200.0	375	5.78	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	1.277	141.1	0.0	0.525	0.830	0.000	0.0	0	0.000
1.001	1.277	141.1	0.0	0.830	1.098	0.000	0.0	0	0.000
1.002	1.277	141.1	7.1	1.098	1.316	0.028	0.0	57	0.677
2.001	0.648	5.1	2.0	1.040	1.128	0.008	0.0	44	0.613
2.002	0.746	5.9	4.0	1.128	1.286	0.016	0.0	61	0.805
3.000	2.419	19.0	4.6	0.950	1.286	0.018	0.0	33	1.985
1.003	1.277	141.1	15.7	1.316	1.438	0.062	0.0	84	0.852
4.000	5.457	42.9	3.8	0.510	1.000	0.015	0.0	20	3.347
4.001	1.705	30.1	11.1	0.950	1.438	0.044	0.0	63	1.578
1.004	1.277	141.1	26.8	1.438	0.903	0.106	0.0	110	0.991

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	PP23	S-P23	3.093	0.600	25.840	25.200	0.640	4.8	100	5.01	50.0
5.001	S-P23	JCT01	1.427	0.600	25.200	24.827	0.373	3.8	100	5.02	50.0
1.005	JCT01	S05	18.574	0.600	24.552	24.459	0.093	200.0	375	6.02	50.0
6.000	PP12	S-P12	2.105	0.600	25.840	25.450	0.390	5.4	100	5.01	50.0
6.001	S-P12	S05	9.594	0.600	25.450	24.734	0.716	13.4	100	5.09	50.0
7.000	PP11	S-P12	1.000	0.600	25.890	25.400	0.490	2.0	100	5.00	50.0
8.001	S-P11	S05	4.706	0.600	25.400	24.734	0.666	7.1	100	5.04	50.0
1.006	S05	S06	14.416	0.600	24.459	24.387	0.072	200.0	375	6.21	50.0
11.000	PP25	S06A	1.000	0.600	26.090	25.800	0.290	3.4	100	5.00	50.0
12.000	PP24	S06A	1.000	0.600	26.090	25.800	0.290	3.4	100	5.00	50.0
11.001	S06A	S06	5.135	0.600	25.800	24.662	1.138	4.5	100	5.03	50.0
9.000	PP08	S06B	3.571	0.600	26.090	25.303	0.787	4.5	100	5.02	50.0
9.001	S06B	S06	4.733	0.600	25.303	24.662	0.641	7.4	100	5.04	50.0
8.000	PP10	S-P11	3.109	0.600	25.990	25.400	0.590	5.3	100	5.02	50.0
1.007	S06	S07	12.575	0.600	24.387	24.324	0.063	200.0	375	6.38	50.0
13.000	PP06	S07A	1.000	0.600	25.890	25.670	0.220	4.5	100	5.00	50.0
14.000	PP07	S07A	1.000	0.600	26.190	25.670	0.520	1.9	100	5.00	50.0
13.001	S07A	S07	3.020	0.600	25.670	24.534	1.136	2.7	100	5.02	50.0
1.008	S07	S08	16.343	0.600	24.324	24.242	0.082	200.0	375	6.59	50.0
15.000	PP26	S08	7.309	0.600	25.990	24.498	1.492	4.9	100	5.03	50.0
16.000	PP04	S08A	1.000	0.600	25.740	25.600	0.140	7.1	100	5.01	50.0
17.000	PP05	S08A	1.000	0.600	25.890	25.600	0.290	3.4	100	5.00	50.0
16.001	S08A	S08	3.993	0.600	25.600	24.498	1.102	3.6	100	5.02	50.0
1.009	S08	S09	19.555	0.600	24.242	24.144	0.098	200.0	375	6.84	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	3.541	27.8	2.3	0.510	0.530	0.009	0.0	19	2.118
5.001	3.982	31.3	2.3	0.530	0.903	0.009	0.0	18	2.322
1.005	1.277	141.1	29.1	0.903	1.816	0.115	0.0	115	1.012
6.000	3.350	26.3	2.0	0.510	0.550	0.008	0.0	19	2.003
6.001	2.122	16.7	4.3	0.550	1.816	0.017	0.0	35	1.784
7.000	5.457	42.9	2.3	0.510	0.600	0.009	0.0	16	2.925
8.001	2.927	23.0	2.0	0.600	1.816	0.008	0.0	20	1.793
1.006	1.277	141.1	38.7	1.816	2.038	0.153	0.0	134	1.095
11.000	4.195	32.9	2.3	0.510	0.800	0.009	0.0	18	2.382
12.000	4.195	32.9	2.0	0.510	0.800	0.008	0.0	17	2.316
11.001	3.665	28.8	4.3	0.800	2.038	0.017	0.0	26	2.639
9.000	3.656	28.7	2.0	0.510	1.497	0.008	0.0	18	2.131
9.001	2.863	22.5	4.3	1.497	2.038	0.017	0.0	29	2.195
8.000	3.391	26.6	2.0	0.510	0.600	0.008	0.0	18	1.977
1.007	1.277	141.1	51.6	2.038	2.051	0.204	0.0	156	1.180
13.000	3.652	28.7	2.0	0.510	1.030	0.008	0.0	18	2.129
14.000	5.622	44.2	2.0	0.510	1.030	0.008	0.0	14	2.825
13.001	4.780	37.5	4.0	1.030	2.116	0.016	0.0	22	3.133
1.008	1.277	141.1	55.7	2.051	1.983	0.220	0.0	164	1.205
15.000	3.517	27.6	2.3	0.510	2.002	0.009	0.0	19	2.104
16.000	2.911	22.9	2.0	0.510	1.000	0.008	0.0	20	1.783
17.000	4.195	32.9	2.0	0.510	1.000	0.008	0.0	17	2.316
16.001	4.092	32.1	4.0	1.000	2.002	0.016	0.0	24	2.791
1.009	1.277	141.1	66.5	1.983	1.881	0.263	0.0	181	1.260

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)
19.000	PP28	S09A	1.000	0.600	25.890	25.700	0.190	5.3	100	5.00	50.0
20.000	PP27	S09A	1.000	0.600	25.890	25.700	0.190	5.3	100	5.00	50.0
18.001	S09A	S09	4.102	0.600	25.700	24.444	1.256	3.3	100	5.13	50.0
21.000	PP02	S09B	1.000	0.600	25.740	25.639	0.101	9.9	100	5.01	50.0
22.000	PP03	S09B	1.000	0.600	25.740	25.639	0.101	9.9	100	5.01	50.0
21.001	S09B	S09	4.902	0.600	25.639	24.444	1.195	4.1	100	5.03	50.0
1.010	S09	S10	14.706	0.600	24.144	24.070	0.074	200.0	375	7.04	50.0
23.000	PP01	S-P1	6.011	0.600	25.890	25.700	0.190	31.6	100	5.07	50.0
23.001	S-P1	S10	4.154	0.600	25.700	24.411	1.289	3.2	100	5.09	50.0
1.011	S10	S11	10.947	0.600	24.070	24.015	0.055	200.0	375	7.18	50.0
24.001	S16	S11	13.919	0.600	24.350	24.165	0.185	75.2	225	5.37	50.0
25.000	PP30	S11A	1.000	0.600	25.590	25.332	0.258	3.9	100	5.00	50.0
26.000	PP29	S11A	1.000	0.600	25.590	25.332	0.258	3.9	100	5.00	50.0
25.001	S11A	S11	5.502	0.600	25.332	24.290	1.042	5.3	100	5.03	50.0
1.012	S11	BASIN#1	16.095	0.600	24.015	23.900	0.115	140.0	375	7.35	50.0
10.000	PP09	S06B	1.730	0.600	26.040	25.303	0.737	2.3	100	5.01	50.0
2.000	RG1	S03C	6.660	0.600	25.750	25.110	0.640	10.4	100	5.05	50.0
1.013	BASIN#1	S12	20.003	0.600	23.900	23.767	0.133	150.0	375	7.58	50.0
1.014	S12	S13	16.076	0.600	23.767	23.660	0.107	150.0	225	7.83	50.0
1.016	S14	S15	14.233	0.600	23.624	23.529	0.095	150.0	225	8.14	50.0
1.017	S15	EX. SMH	27.988	0.600	23.529	23.267	0.262	106.8	225	8.51	50.0
24.000	S16A	S16	16.461	0.600	24.500	24.350	0.150	109.7	225	5.22	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)
19.000	3.393	26.6	2.0	0.510	0.800	0.008	0.0	18	1.978
20.000	3.393	26.6	2.0	0.510	0.800	0.008	0.0	18	1.978
18.001	4.311	33.9	4.6	0.800	1.856	0.018	0.0	25	2.996
21.000	2.470	19.4	2.0	0.510	0.611	0.008	0.0	21	1.583
22.000	2.470	19.4	2.0	0.510	0.611	0.008	0.0	21	1.583
21.001	3.845	30.2	4.0	0.611	1.856	0.016	0.0	25	2.672
1.010	1.277	141.1	82.2	1.881	1.805	0.325	0.0	206	1.325
23.000	1.376	10.8	2.3	0.510	0.550	0.009	0.0	31	1.085
23.001	4.340	34.1	2.3	0.550	1.739	0.009	0.0	18	2.464
1.011	1.277	141.1	89.3	1.805	1.730	0.353	0.0	217	1.349
24.001	1.509	60.0	7.3	1.375	1.730	0.029	0.0	53	1.033
25.000	3.956	31.1	2.3	0.510	0.768	0.009	0.0	18	2.307
26.000	3.956	31.1	2.3	0.510	0.768	0.009	0.0	18	2.307
25.001	3.387	26.6	4.6	0.768	1.730	0.018	0.0	28	2.520
1.012	1.529	168.9	103.2	1.730	1.725	0.408	0.0	212	1.602
10.000	5.088	40.0	2.3	0.510	1.497	0.009	0.0	16	2.727
2.000	2.409	18.9	2.0	0.400	1.040	0.008	0.0	22	1.577
1.013	1.477	163.1	103.2	1.725	1.858	0.408	0.0	217	1.560
1.014	1.065	42.3	103.2	2.008	1.940	0.408	0.0	225	1.085
1.016	1.065	42.3	103.2	1.951	1.846	0.408	0.0	225	1.085
1.017	1.264	50.3	103.2	1.846	1.578	0.408	0.0	225	1.288
24.000	1.247	49.6	0.0	1.075	1.375	0.000	0.0	0	0.000

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)
1.015	S13	S14	5.391	0.600	23.660	23.624	0.036	150.0	225	7.92	50.0
18.000	PPV	S09A	7.325	0.600	25.840	25.700	0.140	52.3	100	5.11	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)
1.015	1.065	42.3	103.2	1.940	1.951	0.408	0.0	225	1.085
18.000	1.067	8.4	0.5	0.510	0.800	0.002	0.0	17	0.585

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	1.000	200.0	375	Circular	25.700	24.800	0.525	26.000	24.795	0.830
1.001	13.628	200.0	375	Circular	26.000	24.795	0.830	26.200	24.727	1.098
1.002	13.606	200.0	375	Circular	26.200	24.727	1.098	26.350	24.659	1.316
2.001	12.307	139.9	100	Circular	26.250	25.110	1.040	26.250	25.022	1.128
2.002	6.157	106.1	100	Circular	26.250	25.022	1.128	26.350	24.964	1.286
3.000	3.469	10.3	100	Circular	26.350	25.300	0.950	26.350	24.964	1.286
1.003	14.482	200.0	375	Circular	26.350	24.659	1.316	26.400	24.587	1.438
4.000	1.000	2.0	100	Circular	26.300	25.690	0.510	26.300	25.200	1.000
4.001	13.606	35.1	150	Circular	26.300	25.200	0.950	26.400	24.812	1.438
1.004	7.007	200.0	375	Circular	26.400	24.587	1.438	25.830	24.552	0.903
5.000	3.093	4.8	100	Circular	26.450	25.840	0.510	25.830	25.200	0.530
5.001	1.427	3.8	100	Circular	25.830	25.200	0.530	25.830	24.827	0.903
1.005	18.574	200.0	375	Circular	25.830	24.552	0.903	26.650	24.459	1.816
6.000	2.105	5.4	100	Circular	26.450	25.840	0.510	26.100	25.450	0.550
6.001	9.594	13.4	100	Circular	26.100	25.450	0.550	26.650	24.734	1.816
7.000	1.000	2.0	100	Circular	26.500	25.890	0.510	26.100	25.400	0.600

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	BASIN#2	1350	Manhole	Adoptable	S01	1350	Manhole	Adoptable
1.001	S01	1350	Manhole	Adoptable	S02	1350	Manhole	Adoptable
1.002	S02	1350	Manhole	Adoptable	S03	1350	Manhole	Adoptable
2.001	S03C	600	Manhole	Adoptable	S03B	600	Manhole	Adoptable
2.002	S03B	600	Manhole	Adoptable	S03	1350	Manhole	Adoptable
3.000	S03A	600	Manhole	Adoptable	S03	1350	Manhole	Adoptable
1.003	S03	1350	Manhole	Adoptable	S04	1350	Manhole	Adoptable
4.000	PP13/14	1200	Manhole	Adoptable	S04A	1200	Manhole	Adoptable
4.001	S04A	1200	Manhole	Adoptable	S04	1350	Manhole	Adoptable
1.004	S04	1350	Manhole	Adoptable	JCT01		Junction	
5.000	PP23	1200	Manhole	Adoptable	S-P23	600	Manhole	Adoptable
5.001	S-P23	600	Manhole	Adoptable	JCT01		Junction	
1.005	JCT01		Junction		S05	1350	Manhole	Adoptable
6.000	PP12	1200	Manhole	Adoptable	S-P12	600	Manhole	Adoptable
6.001	S-P12	600	Manhole	Adoptable	S05	1350	Manhole	Adoptable
7.000	PP11	1200	Manhole	Adoptable	S-P12	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)
8.001	4.706	7.1	100	Circular	26.100	25.400	0.600	26.650	24.734	1.816
1.006	14.416	200.0	375	Circular	26.650	24.459	1.816	26.800	24.387	2.038
11.000	1.000	3.4	100	Circular	26.700	26.090	0.510	26.700	25.800	0.800
12.000	1.000	3.4	100	Circular	26.700	26.090	0.510	26.700	25.800	0.800
11.001	5.135	4.5	100	Circular	26.700	25.800	0.800	26.800	24.662	2.038
9.000	3.571	4.5	100	Circular	26.700	26.090	0.510	26.900	25.303	1.497
9.001	4.733	7.4	100	Circular	26.900	25.303	1.497	26.800	24.662	2.038
8.000	3.109	5.3	100	Circular	26.600	25.990	0.510	26.100	25.400	0.600
1.007	12.575	200.0	375	Circular	26.800	24.387	2.038	26.750	24.324	2.051
13.000	1.000	4.5	100	Circular	26.500	25.890	0.510	26.800	25.670	1.030
14.000	1.000	1.9	100	Circular	26.800	26.190	0.510	26.800	25.670	1.030
13.001	3.020	2.7	100	Circular	26.800	25.670	1.030	26.750	24.534	2.116
1.008	16.343	200.0	375	Circular	26.750	24.324	2.051	26.600	24.242	1.983
15.000	7.309	4.9	100	Circular	26.600	25.990	0.510	26.600	24.498	2.002
16.000	1.000	7.1	100	Circular	26.350	25.740	0.510	26.700	25.600	1.000
17.000	1.000	3.4	100	Circular	26.500	25.890	0.510	26.700	25.600	1.000
16.001	3.993	3.6	100	Circular	26.700	25.600	1.000	26.600	24.498	2.002
1.009	19.555	200.0	375	Circular	26.600	24.242	1.983	26.400	24.144	1.881
19.000	1.000	5.3	100	Circular	26.500	25.890	0.510	26.600	25.700	0.800
20.000	1.000	5.3	100	Circular	26.500	25.890	0.510	26.600	25.700	0.800
18.001	4.102	3.3	100	Circular	26.600	25.700	0.800	26.400	24.444	1.856
21.000	1.000	9.9	100	Circular	26.350	25.740	0.510	26.350	25.639	0.611
22.000	1.000	9.9	100	Circular	26.350	25.740	0.510	26.350	25.639	0.611

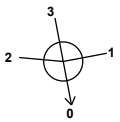
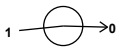
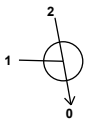
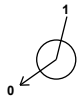
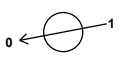
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
8.001	S-P11	600	Manhole	Adoptable	S05	1350	Manhole	Adoptable
1.006	S05	1350	Manhole	Adoptable	S06	1350	Manhole	Adoptable
11.000	PP25	1200	Manhole	Adoptable	S06A	600	Manhole	Adoptable
12.000	PP24	1200	Manhole	Adoptable	S06A	600	Manhole	Adoptable
11.001	S06A	600	Manhole	Adoptable	S06	1350	Manhole	Adoptable
9.000	PP08	1200	Manhole	Adoptable	S06B	600	Manhole	Adoptable
9.001	S06B	600	Manhole	Adoptable	S06	1350	Manhole	Adoptable
8.000	PP10		Junction		S-P11	600	Manhole	Adoptable
1.007	S06	1350	Manhole	Adoptable	S07	1350	Manhole	Adoptable
13.000	PP06	1200	Manhole	Adoptable	S07A	600	Manhole	Adoptable
14.000	PP07	1200	Manhole	Adoptable	S07A	600	Manhole	Adoptable
13.001	S07A	600	Manhole	Adoptable	S07	1350	Manhole	Adoptable
1.008	S07	1350	Manhole	Adoptable	S08	1350	Manhole	Adoptable
15.000	PP26	1200	Manhole	Adoptable	S08	1350	Manhole	Adoptable
16.000	PP04	1200	Manhole	Adoptable	S08A	600	Manhole	Adoptable
17.000	PP05	1200	Manhole	Adoptable	S08A	600	Manhole	Adoptable
16.001	S08A	600	Manhole	Adoptable	S08	1350	Manhole	Adoptable
1.009	S08	1350	Manhole	Adoptable	S09	1350	Manhole	Adoptable
19.000	PP28	1200	Manhole	Adoptable	S09A	600	Manhole	Adoptable
20.000	PP27	1200	Manhole	Adoptable	S09A	600	Manhole	Adoptable
18.001	S09A	600	Manhole	Adoptable	S09	1350	Manhole	Adoptable
21.000	PP02	1200	Manhole	Adoptable	S09B	600	Manhole	Adoptable
22.000	PP03	1200	Manhole	Adoptable	S09B	600	Manhole	Adoptable

Pipeline Schedule

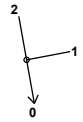
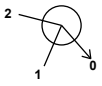
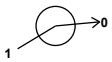
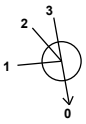
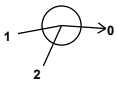
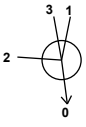
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
21.001	4.902	4.1	100	Circular	26.350	25.639	0.611	26.400	24.444	1.856
1.010	14.706	200.0	375	Circular	26.400	24.144	1.881	26.250	24.070	1.805
23.000	6.011	31.6	100	Circular	26.500	25.890	0.510	26.350	25.700	0.550
23.001	4.154	3.2	100	Circular	26.350	25.700	0.550	26.250	24.411	1.739
1.011	10.947	200.0	375	Circular	26.250	24.070	1.805	26.120	24.015	1.730
24.001	13.919	75.2	225	Circular	25.950	24.350	1.375	26.120	24.165	1.730
25.000	1.000	3.9	100	Circular	26.200	25.590	0.510	26.200	25.332	0.768
26.000	1.000	3.9	100	Circular	26.200	25.590	0.510	26.200	25.332	0.768
25.001	5.502	5.3	100	Circular	26.200	25.332	0.768	26.120	24.290	1.730
1.012	16.095	140.0	375	Circular	26.120	24.015	1.730	26.000	23.900	1.725
10.000	1.730	2.3	100	Circular	26.650	26.040	0.510	26.900	25.303	1.497
2.000	6.660	10.4	100	Circular	26.250	25.750	0.400	26.250	25.110	1.040
1.013	20.003	150.0	375	Circular	26.000	23.900	1.725	26.000	23.767	1.858
1.014	16.076	150.0	225	Circular	26.000	23.767	2.008	25.825	23.660	1.940
1.016	14.233	150.0	225	Circular	25.800	23.624	1.951	25.600	23.529	1.846
1.017	27.988	106.8	225	Circular	25.600	23.529	1.846	25.070	23.267	1.578
24.000	16.461	109.7	225	Circular	25.800	24.500	1.075	25.950	24.350	1.375
1.015	5.391	150.0	225	Circular	25.825	23.660	1.940	25.800	23.624	1.951
18.000	7.325	52.3	100	Circular	26.450	25.840	0.510	26.600	25.700	0.800

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
21.001	S09B	600	Manhole	Adoptable	S09	1350	Manhole	Adoptable
1.010	S09	1350	Manhole	Adoptable	S10	1350	Manhole	Adoptable
23.000	PP01	1200	Manhole	Adoptable	S-P1	600	Manhole	Adoptable
23.001	S-P1	600	Manhole	Adoptable	S10	1350	Manhole	Adoptable
1.011	S10	1350	Manhole	Adoptable	S11	1350	Manhole	Adoptable
24.001	S16	1200	Manhole	Adoptable	S11	1350	Manhole	Adoptable
25.000	PP30	1200	Manhole	Adoptable	S11A	600	Manhole	Adoptable
26.000	PP29	1200	Manhole	Adoptable	S11A	600	Manhole	Adoptable
25.001	S11A	600	Manhole	Adoptable	S11	1350	Manhole	Adoptable
1.012	S11	1350	Manhole	Adoptable	BASIN#1	1350	Manhole	Adoptable
10.000	PP09		Junction		S06B	600	Manhole	Adoptable
2.000	RG1		Junction		S03C	600	Manhole	Adoptable
1.013	BASIN#1	1350	Manhole	Adoptable	S12	2400	Manhole	Adoptable
1.014	S12	2400	Manhole	Adoptable	S13	1200	Manhole	Adoptable
1.016	S14	1200	Manhole	Adoptable	S15	1200	Manhole	Adoptable
1.017	S15	1200	Manhole	Adoptable	EX. SMH	1200	Manhole	Adoptable
24.000	S16A	1200	Manhole	Adoptable	S16	1200	Manhole	Adoptable
1.015	S13	1200	Manhole	Adoptable	S14	1200	Manhole	Adoptable
18.000	PPV		Junction		S09A	600	Manhole	Adoptable

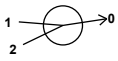
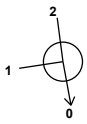
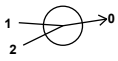
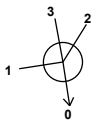
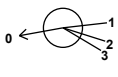
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
BASIN#2	259781.868	204492.551	25.700	0.900	1350		0 1.000	24.800	375
S01	259803.625	204479.774	26.000	1.205	1350		1 1.000 0 1.001	24.795 24.795	375 375
S02	259817.250	204480.080	26.200	1.473	1350		1 1.001 0 1.002	24.727 24.727	375 375
S03C	259804.222	204459.359	26.250	1.440	600		1 2.000 0 2.001	25.110 25.110	100 100
S03B	259813.656	204467.263	26.250	1.228	600		1 2.001 0 2.002	25.022 25.022	100 100
S03A	259823.197	204467.356	26.350	1.350	600		0 3.000	25.300	100
S03	259819.788	204466.713	26.350	1.691	1350		1 3.000 2 2.002 3 1.002 0 1.003	24.964 24.964 24.659 24.659	100 100 375 375
PP13/14	259804.943	204452.434	26.300	0.610	1200		0 4.000	25.690	100
S04A	259808.890	204452.837	26.300	1.400	1200		1 4.000 0 4.001	25.200 25.200	100 150
S04	259822.491	204452.485	26.400	1.813	1350		1 4.001 2 1.003 0 1.004	24.812 24.587 24.587	150 375 375
S14	259839.743	204306.495	25.800	2.176	1200		1 1.015 0 1.016	23.624 23.624	225 225
PP23	259828.166	204446.431	26.450	0.610	1200		0 5.000	25.840	100
S-P23	259825.127	204445.854	25.830	0.930	600		1 5.000 0 5.001	25.200 25.200	100 100

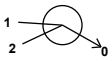
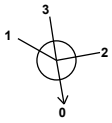
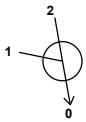
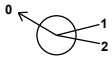
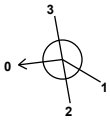
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
JCT01	259823.725	204445.588	25.830	1.278		 1	5.001	24.827	100
						2	1.004	24.552	375
						0	1.005	24.552	375
PP12	259818.625	204435.033	26.450	0.610	1200				
						0	6.000	25.840	100
S-P12	259820.665	204434.512	26.100	1.000	600	1	7.000	25.400	100
						 2	6.000	25.450	100
						0	6.001	25.450	100
PP11	259818.977	204430.574	26.500	0.610	1200				
						0	7.000	25.890	100
S-P11	259822.310	204426.871	26.100	1.000	600	1	8.000	25.400	100
									
						0	8.001	25.400	100
S05	259826.996	204427.304	26.650	2.191	1350	 1	8.001	24.734	100
						2	6.001	24.734	100
						3	1.005	24.459	375
						0	1.006	24.459	375
PP25	259836.198	204417.864	26.700	0.610	1200				
						0	11.000	26.090	100
PP24	259835.704	204420.467	26.700	0.610	1200				
						0	12.000	26.090	100
S06A	259830.555	204418.146	26.700	1.200	600	1	12.000	25.800	100
						 2	11.000	25.800	100
						0	11.001	25.800	100
PP08	259823.343	204410.180	26.700	0.610	1200				
						0	9.000	26.090	100
S06B	259824.813	204413.434	26.900	1.897	600	1	10.000	25.303	100
						 2	9.000	25.303	100
						0	9.001	25.303	100
PP10	259819.647	204425.266	26.600	0.610					
						0	8.000	25.990	100
S06	259829.535	204413.113	26.800	2.413	1350	 1	11.001	24.662	100
						2	9.001	24.662	100
						3	1.006	24.387	375
						0	1.007	24.387	375

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
PP06	259822.710	204397.554	26.500	0.610	1200		0	13.000	25.890	100
PP07	259822.222	204400.666	26.800	0.610	1200		0	14.000	26.190	100
S07A	259828.188	204400.193	26.800	1.430	600		1	14.000	25.670	100
							2	13.000	25.670	100
							0	13.001	25.670	100
S07	259831.174	204400.645	26.750	2.426	1350		1	13.001	24.534	100
							2	1.007	24.324	375
							0	1.008	24.324	375
PP26	259837.995	204390.774	26.600	0.610	1200		0	15.000	25.990	100
PP04	259824.659	204381.266	26.350	0.610	1200		0	16.000	25.740	100
PP05	259824.167	204384.378	26.500	0.610	1200		0	17.000	25.890	100
S08A	259830.182	204383.964	26.700	1.400	600		1	17.000	25.600	100
							2	16.000	25.600	100
							0	16.001	25.600	100
S08	259834.129	204384.571	26.600	2.358	1350		1	16.001	24.498	100
							2	15.000	24.498	100
							3	1.008	24.242	375
							0	1.009	24.242	375
PP28	259847.334	204364.016	26.500	0.610	1200		0	19.000	25.890	100
PP27	259846.850	204366.622	26.500	0.610	1200		0	20.000	25.890	100
S09A	259841.137	204365.973	26.600	1.200	600		1	20.000	25.700	100
							2	19.000	25.700	100
							3	18.000	25.700	100
							0	18.001	25.700	100
PP02	259827.111	204364.967	26.350	0.610	1200		0	21.000	25.740	100

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
PP03	259826.535	204368.064	26.350	0.610	1200				
						0	22.000	25.740	100
S09B	259832.833	204367.656	26.350	1.011	600		1	22.000	25.639	100
							2	21.000	25.639	100
							0	21.001	25.639	100
S09	259837.100	204365.243	26.400	2.256	1350		1	21.001	24.444	100
							2	18.001	24.444	100
							3	1.009	24.144	375
							0	1.010	24.144	375
PP01	259830.088	204349.119	26.500	0.610	1200					
						0	23.000	25.890	100
S-P1	259835.568	204351.590	26.350	0.950	600		1	23.000	25.700	100
										
							0	23.001	25.700	100
S10	259839.638	204350.758	26.250	2.180	1350		1	23.001	24.411	100
							2	1.010	24.070	375
							0	1.011	24.070	375
S16	259843.988	204326.275	25.950	1.600	1200		1	24.000	24.350	225
							0	24.001	24.350	225
PP30	259852.474	204336.010	26.200	0.610	1200					
						0	25.000	25.590	100
PP29	259851.994	204338.616	26.200	0.610	1200					
						0	26.000	25.590	100
S11A	259846.305	204337.186	26.200	1.168	600		1	26.000	25.332	100
							2	25.000	25.332	100
							0	25.001	25.332	100
S11	259841.566	204339.982	26.120	2.105	1350		1	25.001	24.290	100
							2	24.001	24.165	225
							3	1.011	24.015	375
							0	1.012	24.015	375
PP09	259823.112	204413.120	26.650	0.610						
						0	10.000	26.040	100
BASIN#1	259825.588	204338.042	26.000	2.100	1350		1	1.012	23.900	375
										
							0	1.013	23.900	375

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
RG1	259798.586	204462.908	26.250	0.500		0	2.000	25.750	100
S12	259842.719	204327.715	26.000	2.233	2400	1	1.013	23.767	375
						0	1.014	23.767	225
S13	259841.044	204311.727	25.825	2.165	1200	1	1.014	23.660	225
						0	1.015	23.660	225
S15	259828.127	204298.270	25.600	2.071	1200	1	1.016	23.529	225
						0	1.017	23.529	225
EX. SMH	259808.003	204278.818	25.070	1.803	1200	1	1.017	23.267	225
S16A	259842.046	204309.929	25.800	1.300	1200	0	24.000	24.500	225
PPV	259847.430	204362.224	26.450	0.610		0	18.000	25.840	100

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	20.0
Summer CV	1.000	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	1.000	Drain Down Time (mins)	240	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 %)
2	0	0	0
30	0	0	0
100	40	10	0

Node S12 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	23.767	Product Number	CTL-SHE-0112-7300-1995-7300
Design Depth (m)	1.995	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	7.3	Min Node Diameter (mm)	1200

Node BASIN#1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	1.0	Invert Level (m)	23.900
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	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)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	2.1	0.0	0.601	71.9	0.0	1.201	240.7	0.0	1.601	0.1	0.0
0.600	28.4	0.0	1.200	151.0	0.0	1.600	375.3	0.0			

Node BASIN#2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	1.0	Invert Level (m)	24.800
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	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	245.0	0.0	0.600	398.0	0.0	0.601	0.1	0.0

Node PPV Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	25.840	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	2.0	Width (m)	3.200	Inf Depth (m)	
Porosity	1.00	Length (m)	5.200		

Node PP13/14 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	25.690	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	1.0	Width (m)	5.200	Inf Depth (m)	
Porosity	0.30	Length (m)	10.000		

Node PP12 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	25.840	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	1.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.30	Length (m)	5.200		

Node PP11 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	25.890	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	1.0	Width (m)	5.200	Inf Depth (m)	
Porosity	0.30	Length (m)	2.400		

Node PP10 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	25.990	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	1.0	Width (m)	5.200	Inf Depth (m)	
Porosity	0.30	Length (m)	5.000		

Node PP08 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	26.090	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	1.0	Width (m)	5.000	Inf Depth (m)	
Porosity	0.30	Length (m)	5.200		

Node PP23 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	25.840	Slope (1:X)	30.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	1.0	Width (m)	6.400	Inf Depth (m)	
Porosity	0.30	Length (m)	5.000		

Node PP24 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	26.090	Slope (1:X)	30.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	1.0	Width (m)	2.600	Inf Depth (m)	
Porosity	0.30	Length (m)	10.100		

Node PP25 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	26.090	Slope (1:X)	30.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	1.0	Width (m)	2.600	Inf Depth (m)	
Porosity	0.30	Length (m)	10.100		

Node PP07 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	26.190	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	1.0	Width (m)	10.300	Inf Depth (m)	
Porosity	0.30	Length (m)	3.200		

Node PP06 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	25.890	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	
Safety Factor	1.0	Width (m)	10.300	Inf Depth (m)	
Porosity	0.30	Length (m)	3.200		

Node PP05 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	25.890	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	1.0	Width (m)	3.200	Inf Depth (m)	
Porosity	0.30	Length (m)	10.100		

Node PP04 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	25.740	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	1.0	Width (m)	3.200	Inf Depth (m)	
Porosity	0.30	Length (m)	10.100		

Node PP26 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	25.990	Slope (1:X)	30.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	1.0	Width (m)	6.400	Inf Depth (m)	
Porosity	0.30	Length (m)	5.000		

Node PP03 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	25.740	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	1.0	Width (m)	3.200	Inf Depth (m)	
Porosity	0.30	Length (m)	10.300		

Node PP02 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	25.740	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	1.0	Width (m)	3.200	Inf Depth (m)	
Porosity	0.30	Length (m)	10.300		

Node PP27 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	25.890	Slope (1:X)	30.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	1.0	Width (m)	2.600	Inf Depth (m)	
Porosity	0.30	Length (m)	10.100		

Node PP28 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	25.890	Slope (1:X)	30.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	
Safety Factor	1.0	Width (m)	2.600	Inf Depth (m)	
Porosity	0.30	Length (m)	10.100		

Node PP01 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	25.890	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	1.0	Width (m)	2.600	Inf Depth (m)	
Porosity	0.30	Length (m)	10.100		

Node PP29 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	25.590	Slope (1:X)	30.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	1.0	Width (m)	2.600	Inf Depth (m)	
Porosity	0.30	Length (m)	10.200		

Node PP30 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	25.590	Slope (1:X)	30.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	1.0	Width (m)	2.600	Inf Depth (m)	
Porosity	0.30	Length (m)	10.200		

Node PP09 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	26.040	Slope (1:X)	1000.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.400
Safety Factor	1.0	Width (m)	11.000	Inf Depth (m)	
Porosity	0.30	Length (m)	3.200		

Node RG1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	1.0	Invert Level (m)	26.150
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	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	31.5	0.0	0.100	31.5	0.0	0.101	0.0	0.0

Node RG1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	1.0	Invert Level (m)	25.750
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.27	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	31.5	0.0	0.400	31.5	0.0	0.401	0.0	0.0

Node RG1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	1.0	Invert Level (m)	25.450
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	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	31.5	0.0	0.300	31.5	0.0	0.301	0.0	0.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute summer	BASIN#2	435	24.815	0.015	1.4	3.7883	0.0000	OK
600 minute summer	S01	390	24.843	0.048	1.4	0.0684	0.0000	OK
600 minute summer	S02	390	24.844	0.117	1.5	0.2120	0.0000	OK
30 minute summer	S03C	19	25.141	0.031	1.1	0.0089	0.0000	OK
30 minute summer	S03B	19	25.066	0.044	2.2	0.0182	0.0000	OK
30 minute summer	S03A	18	25.327	0.027	2.6	0.0167	0.0000	OK
600 minute summer	S03	390	24.844	0.185	3.2	0.2649	0.0000	OK
30 minute summer	PP13/14	18	25.705	0.015	2.2	0.0433	0.0000	OK
15 minute summer	S04A	10	25.249	0.049	6.5	0.0808	0.0000	OK
600 minute summer	S04	390	24.844	0.257	5.5	0.3679	0.0000	OK
60 minute summer	S14	115	23.686	0.062	6.6	0.0707	0.0000	OK
15 minute summer	PP23	11	25.855	0.015	1.3	0.0304	0.0000	OK
15 minute summer	S-P23	11	25.215	0.015	1.3	0.0041	0.0000	OK
600 minute summer	JCT01	390	24.844	0.292	5.9	0.0000	0.0000	OK
30 minute summer	PP12	18	25.855	0.015	1.2	0.0374	0.0000	OK
30 minute summer	S-P12	18	25.477	0.077	2.5	0.0218	0.0000	OK
15 minute summer	PP11	11	25.902	0.012	1.3	0.0503	0.0000	OK
30 minute summer	S-P11	18	25.416	0.016	1.1	0.0044	0.0000	OK
600 minute summer	S05	390	24.844	0.385	7.9	0.5970	0.0000	SURCHARGED
15 minute summer	PP25	11	26.104	0.014	1.3	0.0232	0.0000	OK
30 minute summer	PP24	18	26.103	0.013	1.2	0.0215	0.0000	OK
30 minute summer	S06A	18	25.821	0.021	2.5	0.0059	0.0000	OK
30 minute summer	PP08	18	26.104	0.014	1.2	0.1025	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)
600 minute summer	BASIN#2	1.000	S01	-1.4	-0.501	-0.010	0.0042	
600 minute summer	S01	1.001	S02	-1.4	0.174	-0.010	0.2552	
600 minute summer	S02	1.002	S03	1.5	0.321	0.011	0.5678	
30 minute summer	S03C	2.001	S03B	1.1	0.405	0.214	0.0334	
30 minute summer	S03B	2.002	S03	2.1	0.669	0.367	0.0198	
30 minute summer	S03A	3.000	S03	2.6	1.618	0.137	0.0056	
600 minute summer	S03	1.003	S04	3.2	0.424	0.023	0.9754	
30 minute summer	PP13/14	4.000	S04A	2.2	1.026	0.051	0.0023	
15 minute summer	S04A	4.001	S04	6.4	1.324	0.212	0.0658	
600 minute summer	S04	1.004	JCT01	5.4	0.596	0.039	0.6049	
60 minute summer	S14	1.016	S15	6.6	0.797	0.157	0.1188	
15 minute summer	PP23	5.000	S-P23	1.3	1.774	0.047	0.0023	
15 minute summer	S-P23	5.001	JCT01	1.3	1.915	0.042	0.0010	
600 minute summer	JCT01	1.005	S05	5.9	0.544	0.042	1.8798	
30 minute summer	PP12	6.000	S-P12	1.2	1.021	0.045	0.0025	
30 minute summer	S-P12	6.001	S05	2.5	1.496	0.149	0.0160	
15 minute summer	PP11	7.000	S-P12	1.3	0.390	0.030	0.0035	
30 minute summer	S-P11	8.001	S05	1.1	1.489	0.049	0.0036	
600 minute summer	S05	1.006	S06	7.3	0.561	0.052	1.5900	
15 minute summer	PP25	11.000	S06A	1.3	1.463	0.040	0.0009	
30 minute summer	PP24	12.000	S06A	1.2	1.375	0.036	0.0009	
30 minute summer	S06A	11.001	S06	2.5	2.197	0.087	0.0058	
30 minute summer	PP08	9.000	S06B	1.1	1.159	0.040	0.0036	

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S06B	11	25.326	0.023	2.4	0.0065	0.0000	OK
30 minute summer	PP10	18	26.004	0.014	1.2	0.0953	0.0000	OK
600 minute summer	S06	390	24.844	0.457	10.0	0.7187	0.0000	SURCHARGED
30 minute summer	PP06	19	25.904	0.014	1.2	0.1347	0.0000	OK
30 minute summer	PP07	18	26.201	0.011	1.2	0.1027	0.0000	OK
30 minute summer	S07A	19	25.687	0.017	2.2	0.0049	0.0000	OK
600 minute summer	S07	390	24.844	0.520	10.4	0.7443	0.0000	SURCHARGED
15 minute summer	PP26	11	26.005	0.015	1.3	0.0296	0.0000	OK
30 minute summer	PP04	19	25.756	0.016	1.2	0.1253	0.0000	OK
30 minute summer	PP05	18	25.903	0.013	1.2	0.0928	0.0000	OK
30 minute summer	S08A	19	25.618	0.018	2.2	0.0052	0.0000	OK
600 minute summer	S08	390	24.844	0.602	11.6	0.9538	0.0000	SURCHARGED
30 minute summer	PP28	18	25.905	0.015	1.2	0.0253	0.0000	OK
30 minute summer	PP27	18	25.905	0.015	1.2	0.0253	0.0000	OK
30 minute summer	S09A	18	25.720	0.020	2.7	0.0056	0.0000	OK
30 minute summer	PP02	19	25.757	0.017	1.2	0.1422	0.0000	OK
30 minute summer	PP03	19	25.757	0.017	1.2	0.1422	0.0000	OK
30 minute summer	S09B	19	25.657	0.018	2.1	0.0052	0.0000	OK
600 minute summer	S09	390	24.844	0.700	13.8	1.1763	0.0000	SURCHARGED
30 minute summer	PP01	19	25.915	0.025	1.3	0.1912	0.0000	OK
30 minute summer	S-P1	19	25.713	0.013	1.2	0.0037	0.0000	OK
600 minute summer	S10	390	24.844	0.774	15.0	1.2433	0.0000	SURCHARGED
600 minute summer	S16	390	24.844	0.494	1.5	0.7378	0.0000	SURCHARGED

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	S06B	9.001	S06	2.4	1.806	0.106	0.0062	
30 minute summer	PP10	8.000	S-P11	1.1	1.577	0.043	0.0023	
600 minute summer	S06	1.007	S07	9.6	0.674	0.068	1.3870	
30 minute summer	PP06	13.000	S07A	1.1	1.388	0.038	0.0008	
30 minute summer	PP07	14.000	S07A	1.1	1.692	0.026	0.0007	
30 minute summer	S07A	13.001	S07	2.2	2.544	0.059	0.0026	
600 minute summer	S07	1.008	S08	9.4	0.617	0.067	1.8026	
15 minute summer	PP26	15.000	S08	1.3	1.779	0.047	0.0053	
30 minute summer	PP04	16.000	S08A	1.1	1.198	0.046	0.0009	
30 minute summer	PP05	17.000	S08A	1.1	1.440	0.033	0.0008	
30 minute summer	S08A	16.001	S08	2.2	2.273	0.067	0.0038	
600 minute summer	S08	1.009	S09	10.7	0.648	0.076	2.1569	
30 minute summer	PP28	19.000	S09A	1.2	1.304	0.045	0.0009	
30 minute summer	PP27	20.000	S09A	1.2	1.304	0.045	0.0009	
30 minute summer	S09A	18.001	S09	2.7	2.507	0.079	0.0081	
30 minute summer	PP02	21.000	S09B	1.0	1.100	0.054	0.0009	
30 minute summer	PP03	22.000	S09B	1.0	1.100	0.054	0.0009	
30 minute summer	S09B	21.001	S09	2.1	2.156	0.069	0.0099	
600 minute summer	S09	1.010	S10	13.5	0.641	0.096	1.6220	
30 minute summer	PP01	23.000	S-P1	1.2	1.122	0.107	0.0064	
30 minute summer	S-P1	23.001	S10	1.1	1.981	0.034	0.0144	
600 minute summer	S10	1.011	S11	14.8	0.663	0.105	1.2074	
600 minute summer	S16	24.001	S11	1.2	0.526	0.020	0.5536	

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	PP30	10	25.604	0.014	1.3	0.0239	0.0000	OK
15 minute summer	PP29	10	25.604	0.014	1.3	0.0239	0.0000	OK
15 minute summer	S11A	10	25.354	0.022	2.6	0.0062	0.0000	OK
600 minute summer	S11	390	24.844	0.829	17.1	1.2495	0.0000	SURCHARGED
15 minute summer	PP09	11	26.052	0.012	1.3	0.1085	0.0000	OK
600 minute summer	BASIN#1	390	24.844	0.944	16.9	42.9773	0.0000	SURCHARGED
30 minute summer	RG1	18	25.766	0.016	1.2	0.1489	0.0000	OK
600 minute summer	S12	390	24.844	1.077	8.6	4.8713	0.0000	SURCHARGED
180 minute winter	S13	80	23.725	0.065	6.6	0.0740	0.0000	OK
960 minute summer	S15	900	23.585	0.056	6.6	0.0635	0.0000	OK
30 minute summer	EX. SMH	74	23.322	0.055	6.6	0.0000	0.0000	OK
600 minute summer	S16A	390	24.844	0.344	0.3	0.3891	0.0000	SURCHARGED
30 minute summer	PPV	19	25.853	0.013	0.3	0.0277	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	PP30	25.000	S11A	1.3	1.356	0.042	0.0010	
15 minute summer	PP29	26.000	S11A	1.3	1.356	0.042	0.0010	
15 minute summer	S11A	25.001	S11	2.6	2.101	0.098	0.0224	
600 minute summer	S11	1.012	BASIN#1	16.9	0.690	0.100	1.7752	
15 minute summer	PP09	10.000	S06B	1.3	1.385	0.032	0.0016	
600 minute summer	BASIN#1	1.013	S12	8.6	0.300	0.053	2.2063	
30 minute summer	RG1	2.000	S03C	1.1	0.788	0.058	0.0098	
600 minute summer	S12	Hydro-Brake®	S13	6.6				
180 minute winter	S13	1.015	S14	6.6	0.718	0.157	0.0500	
960 minute summer	S15	1.017	EX. SMH	6.6	0.874	0.132	0.2128	243.0
600 minute summer	S16A	24.000	S16	-0.3	-0.010	-0.007	0.6547	
30 minute summer	PPV	18.000	S09A	0.3	0.377	0.034	0.0061	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute summer	BASIN#2	645	25.049	0.249	18.7	69.1957	0.0000	OK
960 minute summer	S01	645	25.049	0.254	19.0	0.3631	0.0000	OK
960 minute summer	S02	645	25.049	0.322	19.1	0.5830	0.0000	OK
30 minute summer	S03C	19	25.163	0.053	2.8	0.0149	0.0000	OK
30 minute summer	S03B	19	25.108	0.086	5.7	0.0356	0.0000	OK
30 minute summer	S03A	18	25.345	0.045	6.5	0.0283	0.0000	OK
960 minute summer	S03	645	25.049	0.390	17.5	0.5577	0.0000	SURCHARGED
15 minute summer	PP13/14	10	25.713	0.023	5.5	0.0828	0.0000	OK
30 minute summer	S04A	18	25.283	0.083	15.9	0.1370	0.0000	OK
960 minute summer	S04	645	25.049	0.462	15.4	0.6607	0.0000	SURCHARGED
30 minute summer	S14	230	23.686	0.062	6.6	0.0707	0.0000	OK
30 minute summer	PP23	18	25.865	0.025	3.3	0.0558	0.0000	OK
30 minute summer	S-P23	18	25.224	0.024	3.3	0.0067	0.0000	OK
960 minute summer	JCT01	645	25.049	0.497	12.8	0.0000	0.0000	SURCHARGED
30 minute summer	PP12	18	25.862	0.022	2.9	0.0708	0.0000	OK
30 minute summer	S-P12	18	25.494	0.094	6.2	0.0267	0.0000	OK
30 minute summer	PP11	18	25.908	0.018	3.3	0.0806	0.0000	OK
30 minute summer	S-P11	18	25.425	0.025	2.9	0.0071	0.0000	OK
960 minute summer	S05	645	25.049	0.590	12.3	0.9140	0.0000	SURCHARGED
30 minute summer	PP25	18	26.113	0.023	3.3	0.0421	0.0000	OK
30 minute summer	PP24	18	26.111	0.021	2.9	0.0373	0.0000	OK
15 minute summer	S06A	10	25.833	0.033	6.2	0.0095	0.0000	OK
30 minute summer	PP08	18	26.111	0.021	2.9	0.1715	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)
960 minute summer	BASIN#2	1.000	S01	-18.7	-1.081	-0.133	0.0785	
960 minute summer	S01	1.001	S02	-19.0	-0.407	-0.135	1.2268	
960 minute summer	S02	1.002	S03	-17.4	0.320	-0.123	1.4352	
30 minute summer	S03C	2.001	S03B	2.8	0.482	0.548	0.0699	
30 minute summer	S03B	2.002	S03	5.5	0.810	0.942	0.0418	
30 minute summer	S03A	3.000	S03	6.5	2.029	0.342	0.0111	
960 minute summer	S03	1.003	S04	-15.4	0.415	-0.109	1.5973	
15 minute summer	PP13/14	4.000	S04A	5.4	1.294	0.127	0.0041	
30 minute summer	S04A	4.001	S04	15.9	1.664	0.528	0.1300	
960 minute summer	S04	1.004	JCT01	-12.8	0.578	-0.091	0.7729	
30 minute summer	S14	1.016	S15	6.6	0.807	0.157	0.1188	
30 minute summer	PP23	5.000	S-P23	3.3	2.258	0.119	0.0045	
30 minute summer	S-P23	5.001	JCT01	3.3	2.477	0.106	0.0027	
960 minute summer	JCT01	1.005	S05	-12.3	0.524	-0.087	2.0487	
30 minute summer	PP12	6.000	S-P12	2.9	1.289	0.110	0.0049	
30 minute summer	S-P12	6.001	S05	6.2	1.905	0.372	0.0507	
30 minute summer	PP11	7.000	S-P12	3.3	0.727	0.077	0.0043	
30 minute summer	S-P11	8.001	S05	2.9	1.930	0.125	0.0214	
960 minute summer	S05	1.006	S06	-10.0	0.570	-0.071	1.5900	
30 minute summer	PP25	11.000	S06A	3.3	1.891	0.100	0.0018	
30 minute summer	PP24	12.000	S06A	2.9	1.751	0.088	0.0017	
15 minute summer	S06A	11.001	S06	6.1	2.797	0.213	0.0226	
30 minute summer	PP08	9.000	S06B	2.9	1.555	0.100	0.0068	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S06B	11	25.341	0.038	6.0	0.0108	0.0000	OK
30 minute summer	PP10	18	26.012	0.022	2.9	0.1614	0.0000	OK
960 minute summer	S06	645	25.049	0.662	10.1	1.0401	0.0000	SURCHARGED
30 minute summer	PP06	18	25.914	0.024	2.9	0.2405	0.0000	OK
30 minute summer	PP07	18	26.208	0.018	2.9	0.1791	0.0000	OK
15 minute summer	S07A	10	25.698	0.028	5.5	0.0079	0.0000	OK
960 minute summer	S07	645	25.049	0.725	9.8	1.0369	0.0000	SURCHARGED
15 minute summer	PP26	10	26.014	0.024	3.3	0.0531	0.0000	OK
30 minute summer	PP04	19	25.767	0.027	2.9	0.2509	0.0000	OK
30 minute summer	PP05	18	25.912	0.022	2.9	0.1890	0.0000	OK
15 minute summer	S08A	10	25.629	0.029	5.4	0.0082	0.0000	OK
960 minute summer	S08	645	25.049	0.807	12.4	1.2775	0.0000	SURCHARGED
30 minute summer	PP28	18	25.915	0.025	2.9	0.0451	0.0000	OK
30 minute summer	PP27	18	25.915	0.025	2.9	0.0451	0.0000	OK
15 minute summer	S09A	10	25.732	0.032	6.4	0.0089	0.0000	OK
30 minute summer	PP02	19	25.770	0.030	2.9	0.2832	0.0000	OK
30 minute summer	PP03	19	25.770	0.030	2.9	0.2832	0.0000	OK
30 minute summer	S09B	19	25.668	0.029	5.4	0.0081	0.0000	OK
960 minute summer	S09	645	25.048	0.904	16.1	1.5194	0.0000	SURCHARGED
30 minute summer	PP01	19	25.933	0.043	3.3	0.3541	0.0000	OK
30 minute summer	S-P1	19	25.720	0.020	3.1	0.0057	0.0000	OK
960 minute summer	S10	645	25.048	0.978	17.8	1.5711	0.0000	SURCHARGED
960 minute summer	S16	645	25.048	0.698	2.0	1.0424	0.0000	SURCHARGED

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	S06B	9.001	S06	6.0	2.305	0.267	0.0220	
30 minute summer	PP10	8.000	S-P11	2.9	2.044	0.108	0.0044	
960 minute summer	S06	1.007	S07	8.8	0.624	0.062	1.3870	
30 minute summer	PP06	13.000	S07A	2.8	1.830	0.096	0.0015	
30 minute summer	PP07	14.000	S07A	2.8	2.246	0.064	0.0013	
15 minute summer	S07A	13.001	S07	5.4	3.232	0.145	0.0142	
960 minute summer	S07	1.008	S08	9.6	0.592	0.068	1.8026	
15 minute summer	PP26	15.000	S08	3.3	2.311	0.118	0.0335	
30 minute summer	PP04	16.000	S08A	2.7	1.557	0.119	0.0017	
30 minute summer	PP05	17.000	S08A	2.8	1.869	0.085	0.0015	
15 minute summer	S08A	16.001	S08	5.4	2.875	0.169	0.0191	
960 minute summer	S08	1.009	S09	12.1	0.627	0.086	2.1569	
30 minute summer	PP28	19.000	S09A	2.9	1.676	0.109	0.0017	
30 minute summer	PP27	20.000	S09A	2.9	1.676	0.109	0.0017	
15 minute summer	S09A	18.001	S09	6.3	3.160	0.187	0.0199	
30 minute summer	PP02	21.000	S09B	2.7	1.413	0.139	0.0019	
30 minute summer	PP03	22.000	S09B	2.7	1.413	0.139	0.0019	
30 minute summer	S09B	21.001	S09	5.4	2.528	0.179	0.0237	
960 minute summer	S09	1.010	S10	15.9	0.658	0.113	1.6220	
30 minute summer	PP01	23.000	S-P1	3.1	1.471	0.286	0.0129	
30 minute summer	S-P1	23.001	S10	3.1	2.137	0.091	0.0186	
960 minute summer	S10	1.011	S11	17.6	0.677	0.125	1.2074	
960 minute summer	S16	24.001	S11	1.9	0.506	0.032	0.5536	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	PP30	18	25.614	0.024	3.3	0.0435	0.0000	OK
30 minute summer	PP29	18	25.614	0.024	3.3	0.0435	0.0000	OK
15 minute summer	S11A	9	25.366	0.034	6.5	0.0097	0.0000	OK
960 minute summer	S11	645	25.048	1.033	20.9	1.5570	0.0000	SURCHARGED
30 minute summer	PP09	18	26.059	0.019	3.3	0.1796	0.0000	OK
960 minute summer	BASIN#1	645	25.048	1.148	20.8	69.9210	0.0000	SURCHARGED
30 minute summer	RG1	18	25.776	0.026	2.9	0.2360	0.0000	OK
960 minute summer	S12	645	25.048	1.281	8.2	5.7939	0.0000	SURCHARGED
30 minute summer	S13	230	23.725	0.065	6.6	0.0740	0.0000	OK
15 minute summer	S15	147	23.585	0.056	6.6	0.0635	0.0000	OK
15 minute winter	EX. SMH	147	23.322	0.055	6.6	0.0000	0.0000	OK
960 minute summer	S16A	645	25.048	0.548	0.4	0.6200	0.0000	SURCHARGED
30 minute summer	PPV	19	25.859	0.019	0.7	0.0615	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	PP30	25.000	S11A	3.3	1.751	0.106	0.0019	
30 minute summer	PP29	26.000	S11A	3.3	1.751	0.106	0.0019	
15 minute summer	S11A	25.001	S11	6.5	2.622	0.244	0.0279	
960 minute summer	S11	1.012	BASIN#1	20.8	0.730	0.123	1.7752	
30 minute summer	PP09	10.000	S06B	3.3	1.884	0.082	0.0032	
960 minute summer	BASIN#1	1.013	S12	8.2	0.288	0.050	2.2063	
30 minute summer	RG1	2.000	S03C	2.8	0.995	0.149	0.0192	
960 minute summer	S12	Hydro-Brake®	S13	6.6				
30 minute summer	S13	1.015	S14	6.6	0.718	0.157	0.0500	
15 minute summer	S15	1.017	EX. SMH	6.6	0.874	0.132	0.2128	64.2
960 minute summer	S16A	24.000	S16	-0.4	-0.016	-0.007	0.6547	
30 minute summer	PPV	18.000	S09A	0.7	0.488	0.080	0.0107	

Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute summer	BASIN#2	1020	25.616	0.816	21.4	194.2879	0.0000	FLOOD RISK
1440 minute summer	S01	1020	25.612	0.817	21.6	1.1693	0.0000	SURCHARGED
1440 minute summer	S02	1020	25.613	0.886	21.8	1.6394	0.0000	SURCHARGED
30 minute summer	S03C	20	25.646	0.536	5.5	0.1518	0.0000	SURCHARGED
1440 minute summer	S03B	1020	25.613	0.591	1.6	0.2518	0.0000	SURCHARGED
30 minute summer	S03A	19	25.615	0.315	12.6	0.2079	0.0000	SURCHARGED
1440 minute summer	S03	1020	25.613	0.954	19.2	1.3651	0.0000	SURCHARGED
30 minute summer	PP13/14	20	25.770	0.080	10.5	0.6373	0.0000	OK
30 minute summer	S04A	19	25.748	0.548	29.7	0.9371	0.0000	SURCHARGED
1440 minute summer	S04	1020	25.613	1.026	16.2	1.4682	0.0000	SURCHARGED
1440 minute summer	S14	1020	23.688	0.064	7.0	0.0728	0.0000	OK
15 minute summer	PP23	10	25.876	0.036	6.2	0.0911	0.0000	OK
1440 minute summer	S-P23	1020	25.613	0.413	0.9	0.1169	0.0000	FLOOD RISK
1440 minute summer	JCT01	1020	25.613	1.061	12.4	0.0000	0.0000	FLOOD RISK
30 minute summer	PP12	19	25.874	0.034	5.6	0.1379	0.0000	OK
30 minute summer	S-P12	20	25.747	0.347	11.6	0.0981	0.0000	SURCHARGED
30 minute summer	PP11	19	25.921	0.031	6.3	0.1378	0.0000	OK
1440 minute summer	S-P11	1020	25.613	0.213	0.8	0.0603	0.0000	SURCHARGED
1440 minute summer	S05	1020	25.613	1.154	11.8	1.8025	0.0000	SURCHARGED
30 minute summer	PP25	17	26.125	0.034	6.3	0.0674	0.0000	OK
30 minute summer	PP24	17	26.122	0.032	5.6	0.0597	0.0000	OK
30 minute summer	S06A	19	25.857	0.057	12.0	0.0162	0.0000	OK
30 minute summer	PP08	18	26.120	0.030	5.6	0.2482	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)
1440 minute summer	BASIN#2	1.000	S01	-21.4	-1.058	-0.151	0.1103	
1440 minute summer	S01	1.001	S02	-21.6	-0.443	-0.153	1.5031	
1440 minute summer	S02	1.002	S03	-19.1	0.287	-0.135	1.5007	
30 minute summer	S03C	2.001	S03B	5.7	0.734	1.128	0.0963	
1440 minute summer	S03B	2.002	S03	1.5	0.572	0.251	0.0482	
30 minute summer	S03A	3.000	S03	11.7	2.267	0.618	0.0271	
1440 minute summer	S03	1.003	S04	-16.0	0.384	-0.114	1.5973	
30 minute summer	PP13/14	4.000	S04A	11.2	1.555	0.262	0.0073	
30 minute summer	S04A	4.001	S04	26.4	1.807	0.877	0.2395	
1440 minute summer	S04	1.004	JCT01	-12.3	0.533	-0.087	0.7729	
1440 minute summer	S14	1.016	S15	7.0	0.810	0.166	0.1240	
15 minute summer	PP23	5.000	S-P23	6.3	2.720	0.226	0.0150	
1440 minute summer	S-P23	5.001	JCT01	0.9	1.355	0.029	0.0112	
1440 minute summer	JCT01	1.005	S05	-11.8	0.480	-0.083	2.0487	
30 minute summer	PP12	6.000	S-P12	5.5	1.502	0.210	0.0107	
30 minute summer	S-P12	6.001	S05	11.3	2.008	0.676	0.0751	
30 minute summer	PP11	7.000	S-P12	6.2	1.093	0.144	0.0049	
1440 minute summer	S-P11	8.001	S05	0.9	1.093	0.038	0.0368	
1440 minute summer	S05	1.006	S06	-9.3	0.508	-0.066	1.5900	
30 minute summer	PP25	11.000	S06A	6.3	2.119	0.192	0.0034	
30 minute summer	PP24	12.000	S06A	5.6	1.985	0.171	0.0033	
30 minute summer	S06A	11.001	S06	11.8	2.779	0.409	0.0320	
30 minute summer	PP08	9.000	S06B	5.6	1.681	0.194	0.0175	

Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	S06B	19	25.629	0.326	11.9	0.0923	0.0000	SURCHARGED
30 minute summer	PP10	17	26.022	0.032	5.6	0.2359	0.0000	OK
1440 minute summer	S06	1020	25.613	1.226	11.5	1.9443	0.0000	SURCHARGED
15 minute summer	PP06	11	25.925	0.035	5.5	0.3623	0.0000	OK
15 minute summer	PP07	10	26.216	0.026	5.5	0.2641	0.0000	OK
30 minute summer	S07A	19	25.726	0.056	11.4	0.0158	0.0000	OK
1440 minute summer	S07	1020	25.613	1.289	12.5	1.8443	0.0000	SURCHARGED
30 minute summer	PP26	18	26.022	0.032	6.3	0.0806	0.0000	OK
30 minute summer	PP04	18	25.781	0.041	5.6	0.4025	0.0000	OK
15 minute summer	PP05	11	25.921	0.031	5.5	0.2975	0.0000	OK
30 minute summer	S08A	19	25.663	0.063	11.2	0.0180	0.0000	OK
1440 minute summer	S08	1020	25.613	1.371	14.6	2.1918	0.0000	SURCHARGED
15 minute summer	PP28	10	25.927	0.037	5.5	0.0729	0.0000	OK
15 minute summer	PP27	10	25.927	0.037	5.5	0.0729	0.0000	OK
30 minute summer	S09A	19	25.755	0.055	12.5	0.0156	0.0000	OK
30 minute summer	PP02	18	25.786	0.046	5.6	0.4572	0.0000	OK
30 minute summer	PP03	18	25.786	0.046	5.6	0.4572	0.0000	OK
30 minute summer	S09B	19	25.696	0.057	10.7	0.0161	0.0000	OK
1440 minute summer	S09	1020	25.613	1.469	17.6	2.5025	0.0000	SURCHARGED
30 minute summer	PP01	18	25.954	0.064	6.3	0.5497	0.0000	OK
30 minute summer	S-P1	19	25.730	0.030	6.0	0.0085	0.0000	OK
1440 minute summer	S10	1020	25.612	1.542	18.8	2.5034	0.0000	SURCHARGED
1440 minute summer	S16	1020	25.612	1.262	2.8	1.9313	0.0000	SURCHARGED

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	S06B	9.001	S06	11.2	2.223	0.500	0.0370	
30 minute summer	PP10	8.000	S-P11	5.6	2.464	0.212	0.0137	
1440 minute summer	S06	1.007	S07	11.7	0.610	0.083	1.3870	
15 minute summer	PP06	13.000	S07A	5.4	2.069	0.188	0.0028	
15 minute summer	PP07	14.000	S07A	5.4	2.581	0.123	0.0023	
30 minute summer	S07A	13.001	S07	11.2	2.870	0.298	0.0186	
1440 minute summer	S07	1.008	S08	12.6	0.574	0.089	1.8026	
30 minute summer	PP26	15.000	S08	6.3	2.102	0.228	0.0366	
30 minute summer	PP04	16.000	S08A	5.5	1.688	0.240	0.0041	
15 minute summer	PP05	17.000	S08A	5.4	2.135	0.165	0.0028	
30 minute summer	S08A	16.001	S08	11.0	2.546	0.342	0.0261	
1440 minute summer	S08	1.009	S09	14.7	0.573	0.104	2.1569	
15 minute summer	PP28	19.000	S09A	5.5	1.909	0.205	0.0029	
15 minute summer	PP27	20.000	S09A	5.5	1.909	0.205	0.0029	
30 minute summer	S09A	18.001	S09	12.4	2.874	0.365	0.0251	
30 minute summer	PP02	21.000	S09B	5.4	1.558	0.276	0.0040	
30 minute summer	PP03	22.000	S09B	5.4	1.558	0.276	0.0040	
30 minute summer	S09B	21.001	S09	10.6	2.404	0.352	0.0305	
1440 minute summer	S09	1.010	S10	17.6	0.622	0.125	1.6220	
30 minute summer	PP01	23.000	S-P1	6.0	1.696	0.556	0.0216	
30 minute summer	S-P1	23.001	S10	6.0	2.072	0.176	0.0203	
1440 minute summer	S10	1.011	S11	18.8	0.627	0.133	1.2074	
1440 minute summer	S16	24.001	S11	2.7	0.483	0.044	0.5536	

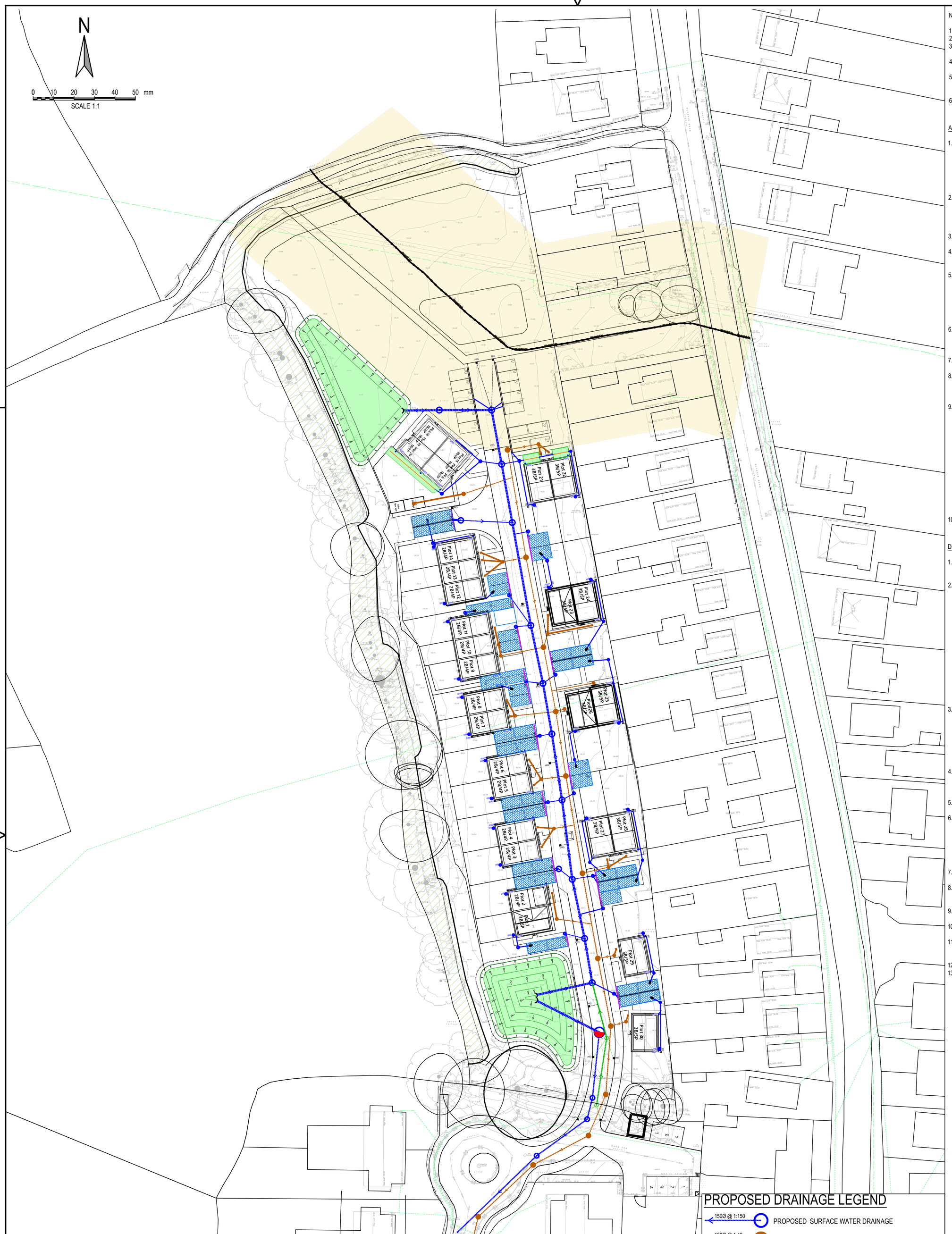
Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.40%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	PP30	10	25.625	0.035	6.2	0.0688	0.0000	OK
15 minute summer	PP29	10	25.625	0.035	6.2	0.0688	0.0000	OK
1440 minute summer	S11A	1020	25.613	0.281	1.8	0.0794	0.0000	SURCHARGED
1440 minute summer	S11	1020	25.612	1.597	21.1	2.4199	0.0000	SURCHARGED
30 minute summer	PP09	18	26.066	0.026	6.3	0.2550	0.0000	OK
1440 minute summer	BASIN#1	1020	25.612	1.712	21.0	201.6952	0.0000	SURCHARGED
30 minute summer	RG1	19	25.788	0.038	5.6	0.3370	0.0000	OK
1440 minute summer	S12	1020	25.612	1.845	7.2	8.3449	0.0000	SURCHARGED
1440 minute summer	S13	1020	23.728	0.068	7.0	0.0764	0.0000	OK
1440 minute summer	S15	1020	23.587	0.058	7.0	0.0654	0.0000	OK
1440 minute summer	EX. SMH	1020	23.324	0.057	7.0	0.0000	0.0000	OK
1440 minute summer	S16A	1020	25.612	1.112	0.2	1.2579	0.0000	FLOOD RISK
30 minute summer	PPV	19	25.867	0.027	1.4	0.1174	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	PP30	25.000	S11A	6.2	1.976	0.199	0.0034	
15 minute summer	PP29	26.000	S11A	6.2	1.976	0.199	0.0034	
1440 minute summer	S11A	25.001	S11	1.8	1.220	0.068	0.0430	
1440 minute summer	S11	1.012	BASIN#1	21.0	0.693	0.125	1.7752	
30 minute summer	PP09	10.000	S06B	6.3	2.016	0.157	0.0082	
1440 minute summer	BASIN#1	1.013	S12	7.2	0.273	0.044	2.2063	
30 minute summer	RG1	2.000	S03C	5.5	1.085	0.293	0.0350	
1440 minute summer	S12	Hydro-Brake®	S13	7.0				
1440 minute summer	S13	1.015	S14	7.0	0.728	0.166	0.0522	
1440 minute summer	S15	1.017	EX. SMH	7.0	0.889	0.140	0.2220	598.2
1440 minute summer	S16A	24.000	S16	-0.2	-0.011	-0.005	0.6547	
30 minute summer	PPV	18.000	S09A	1.3	0.562	0.155	0.0223	

APPENDIX F: Drainage Layouts

Sheet ACAD - A1 rev. C



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE SHOWN IN METRES UNLESS NOTED OTHERWISE.
3. DO NOT SCALE FROM THE DRAWING. USE FIGURED DIMENSIONS ONLY.
4. ANY DISCREPANCIES TO BE REPORTED IMMEDIATELY TO THE ENGINEER.
5. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS, SUBCONTRACTORS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS.
6. EXISTING SERVICES HAVE NOT BEEN SHOWN BUT ARE PRESENT - THE CONTRACTOR IS TO LIAISE WITH ALL STATUTORY AUTHORITIES PRIOR TO THE COMMENCEMENT OF ANY WORKS.

ADOPTABLE DRAINAGE NOTES:

1. THE DEVELOPER MUST SELF VET AND CERTIFY THAT THE DESIGN CRITERIA, MATERIAL STANDARDS AND WORKMANSHIP SPECIFICATIONS FOR THE PROPOSED ADOPTABLE SEWERS ARE IN ACCORDANCE WITH THOSE SET OUT IN "SEWERS FOR ADOPTION" 7TH EDITION, THE WELSH MINISTERS STANDARDS AND THE REQUIREMENTS OF DCWW AS THE STATUTORY SEWERAGE UNDERTAKER.
2. SUBJECT TO A SECTION 104 ADOPTION AGREEMENT BEING COMPLETE, A SECTION 106 APPLICATION TO CONNECT MUST BE MADE TO DCWW, THE DEVELOPER SHALL GIVE 21 DAYS NOTICE PRIOR TO CONNECTION. THE WORKS MAY ONLY BE UNDERTAKEN BY A SIPS REGISTERED CONTRACTOR.
3. **HAZARDOUS WASTE:**- CONTRACTOR TO PROVIDE EVIDENCE OF THE PROPOSED REMOVAL OF THE EXISTING PITCH FIBRE DRAINAGE RUN.
4. CONTRACTOR TO CONFIRM PRIOR TO THE ABANDONMENT OF SEWER THAT NO EXISTING CONNECTION UPSTREAM EXIST. (TO ENSURE NO EXISTING USERS ARE CUT OFF.)
5. COMPLIANCE WITH HEALTH & SAFETY MATTERS ON ANY TRENCH/MANHOLE IS OBLIGATORY AND A PERMIT TO ENTER A CONFIRMED SPACE IS REQUIRED WHEN CONNECTING SITE DRAINAGE TO THE EXISTING PUBLIC SEWERAGE SYSTEM. A PERMIT TO ENTER A CONFINED SPACE WILL BE OBTAINED FROM DWR CYMRU/WELSH WATER PRIOR TO THE WORKS COMMENCING ON ANY PUBLIC SEWERAGE SYSTEM.
6. MH COVER & FRAMES SHALL BE DUCTILE IRON WITH A MINIMUM SQUARE OPENING OF 675x675m. COVERS SHALL BE DOUBLE TRIANGLE FOR 675mmSQUARE OPENINGS AND BE PROVIDED WITH LOOSE BOLTED CONNECTIONS. FRAME DEPTH SHALL BE 150mm.
7. ALL IRONWORK TO BE KITE MARKED BY BSI OR CERTIFIED BY EQUAL INSPECTION AUTHORITY.
8. PLANTING CLOSE TO ADOPTABLE DRAINAGE RUNS INDICATED IS TO ACCORD WITH THE SPECIFICATIONS IN SFA 7th EDITION SECTION C3.1.13 TO COMPLY WITH THE REQUIREMENTS OF SFA 7th & THE WELSH MINISTERS STANDARDS.
9. NOTE WHERE PLASTIC PIPE IS TO BE USED, IT MUST CONFORM WITH CLAUSES **E2.21** AND/OR **E2.22** IN SEWERS FOR ADOPTION 7th EDITION AND BE KITE MARKED. THE PLASTIC PIPES ACCEPTED BY DCWW FOR GRAVITY SEWERS FOR DIAMETERS OF 150mm - 300mm INCLUDE :
   a. MARLEY TWINWALL SYSTEM
   b. UPONER ULTRARIB SYSTEM
   c. OSMA ULTRARIB SYSTEM
   d. POLYSEWER TWINWALL SYSTEM

   POLYPIPE RIGISEWER IS ACCEPTABLE AND AVAILABLE FOR 400mm-600mm AND 750mm-900mm DIAMETER RANGES. PLEASE BE MINDFUL OF THE PROPOSED PIPE MATERIAL/MAKE FOR 375mm DIAMETER SEWERS AS CONCRETE PIPE MAY BE THE ONLY ACCEPTABLE OPTION AT THIS SIZE.
10. CONTRACTOR TO ENSURE PIPES WITH STIFFNESS OF SN8 OR GREATER ARE USED FOR PIPES LESS THAN 500mmØ AND A MINIMUM OF SN2 FOR PIPES GREATER THAN 500mmØ.

DRAINAGE NOTES:

1. MH COVERS AND FRAMES TO CONFORM TO BS EN 124: -HIGHWAYS AND FOOTWAYS TO FRONT OF BUILDINGS (D400)
   -FOOTWAYS TO REAR OF BUILDINGS (C250).
2. TYPE S BEDDING AND SURROUND TO ALL PIPES EXCEPT IN THE FOLLOWING CIRCUMSTANCES, IN WHICH TYPE Z BEDDING AND SURROUND ARE TO BE USED:
   -DOMESTIC GARDENS AND PATHWAYS WITHOUT ANY POSSIBILITY OF VEHICULAR ACCESS, 0.35m;
   -DOMESTIC DRIVEWAYS, PARKING AREAS AND YARDS WITH HEIGHT RESTRICTIONS TO PREVENT ENTRY BY VEHICLES WITH A GROSS VEHICLE WEIGHT IN EXCESS OF 7.5 TONNES, 0.5m;
   -DOMESTIC DRIVEWAYS, PARKING AREAS AND NARROW STREETS WITHOUT FOOTWAYS (E.G. MEWS DEVELOPMENT) WITH LIMITED ACCESS FOR VEHICLES WITH A GROSS VEHICLE WEIGHT IN EXCESS OF 7.5 TONNES, 0.9m;
   -AGRICULTURAL LAND AND PUBLIC OPEN SPACE, 0.9m;
   -HIGHWAYS AND PARKING AREAS WITH UNRESTRICTED ACCESS TO VEHICLES WITH A GROSS VEHICLE WEIGHT IN EXCESS OF 7.5 TONNES, 1.2m.
3. ALL EXISTING MANHOLE INVERTS TO BE CHECKED AND REPORTED TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF DRAINAGE WORKS. EXISTING PIPE CONNECTIONS ARE TO BE CCTV SURVEYED AND INSPECTED BY THE ENGINEER AND LOCAL AUTHORITY. IF THE PIPE CONNECTION IS FOUND TO BE DAMAGED OR IN DISTRESS, THE CONTRACTOR IS TO CARRY OUT REMEDIAL WORKS OR PROVIDE A NEW CONNECTION TO THE EXISTING SEWER (PIPE SIZE AND GRADIENT TO BE DETERMINED BY THE ENGINEER.
4. THE GRADIENTS INDICATED AGAINST THE DRAIN RUNS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL INSTALL DRAINS TO THE INVERT LEVELS SHOWN FOR EACH MANHOLE OR OTHER INDICATED POSITION.
5. ALL PLOT FOUL DRAINAGE TO BE MINIMUM 100mm DIAMETER UNLESS OTHERWISE NOTED.
6. ALL ADOPTABLE THERMOPLASTIC STRUCTURED WALL SEWER PIPE SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN 13476-1 AND WIS 4-35-01 AND BS EN 13476-2 OR BS EN 13476-3. PIPES SHALL BE BSI KITEMARKED OR HAVE EQUIVALENT THIRD PARTY CERTIFICATION. PIPES LESS THAN OR EQUAL TO 500mm DIA. SHALL HAVE A SHORT-TERM RING STIFFNESS OF NOT LESS THAN 8kN/m^2 (SN8).
7. ALL JOINTING IN ACCORDANCE WITH MANUFACTURERS TECHNICAL ADVICE & SPECIFICATION.
8. ALL NON ADOPTABLE DRAINAGE TO BE THE STANDARD UPVC 110mm, 160mm DRAINAGE AND MANUFACTURED TO BS-EN 1401 AND BS 4660 UNLESS NOTED OTHERWISE.
9. ALL STORM WATER DRAINAGE TO BE A MINIMUM OF 150mm DIAMETER UNLESS OTHERWISE NOTED.
10. SOIL & VENT PIPE LOCATION AND NUMBER TO BE CONFIRMED WITH ARCHITECT.
11. PRIOR TO ORDERING ANY MATERIALS THE CONTRACTOR IS TO CONFIRM MANUFACTURER/PIPE MATERIAL AND GRADE PROPOSED WITH WATER AUTHORITY.
12. TEMPORARY WORKS DESIGN BY OTHERS.
13. DESIGN RISK ASSESSMENTS AND METHOD STATEMENTS ARE TO BE PROVIDED TO THE PRINCIPLE CONTRACTOR PRIOR TO THE COMMENCEMENT OF ANY WORKS.

ANY WORKS ON SITE PRIOR TO PLANNING, HIGHWAY/ DRAINAGE APPROVALS BEING GRANTED TO BE UNDERTAKEN AT DEVELOPER / CONTRACTORS OWN RISK.

PRELIMINARY

PROPOSED DRAINAGE LEGEND

- 150Ø @ 1:150 — PROPOSED SURFACE WATER DRAINAGE
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- PROPOSED ALTHON HEADWALL
- RE — RODDING EYE
- PROPOSED PRIVATE FOUL DRAINAGE
- PRG — PROPOSED ROAD GULLY
- TFG — PROPOSED FOUL TRAPPED GULLY
- RWP — PROPOSED RAINWATER PIPE
- WB — PROPOSED WATER BUTT

(ALL RAINWATER PIPE, WATERBUTT & INTERNAL DRAINAGE CONNECTION LOCATIONS TBC. BY ARCHITECT)

- PROPOSED DRAINAGE CHANNEL (ACO MD100 OSA.)
- PERMEABLE PAVING PARKING BAY - MIN. 400mm TYPE 3 SUB-BASE WITH PERFORATED SUMP PIPE
- SDO — SUMP DRAIN WITH OUTLET PIPE
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- DEMARCATION KERBING - TO DEMARCATE ADJACENT PERMEABLE PAVING SYSTEMS
- RAIN GARDEN / BIO RETENTION AREA WITH PERFORATED PIPE
- 1.2m HIGH TIMBER POST & 4 RAIL FENCE
- LIFE RING & SAFETY NOTICE

EXISTING DRAINAGE LEGEND

- EXISTING DCWW COMBINED DRAINAGE
- EXISTING DCWW SURFACE WATER DRAINAGE
- EXISTING DCWW RAW WATER PIPE WITH EASEMENT

EXISTING DRAINAGE TAKEN FROM DCWW ASSET MAPPING AND DRAINTECH CCTV SURVEY UNDERTAKEN 17.03.2021

EXISTING SERVICES LEGEND

- EXISTING UNDERGROUND ELECTRICITY CABLES
- EXISTING UNDERGROUND STREET LIGHTING CABLES

rev.	drawn	chkd.	apprvd.	date	description
03	HT	PG	-	22.08.24	UPDATED TO SUIT NEW SITE LAYOUT
02	HT	PG	-	12.07.24	MINOR AMENDMENTS
01	HT	PG	-	21.06.24	FIRST ISSUE

Client
DANTWYN (PONTARDDULAIS) LTD

Project
GLYNHIR ROAD
PONTARDDULAIS
SA4 8PT

Title
DRAINAGE LAYOUT OVERVIEW

Vale Consultancy
CONSULTING CIVIL & STRUCTURAL ENGINEERS
29 Bocam Park, Old Field Road, Pencoed, Bridgend CF35 5LJ.
Phone: 01656 863794 Email: enquiries@vale-consultancy.co.uk

date	drawn	checked	approved
11.06.24	RM	PG	

scale @ A1	project no.
1:500	18649

status	drg. no.	rev.
P	18649/500	03

DRAWING STATUS
A - Approval, AB - As-Built, C - Construction, D - Draft, P - Preliminary, T - Tender

ORIGINAL DRAWING SIZE 841 x 594

A1

Sheet ACAD - A1 rev. C

N

0 2 4 6 8 10 m
SCALE 1:200

NORTHERN BASIN - ATTENUATES SURFACE WATER RUNOFF FOR ALL STORM EVENTS FROM Q30 UP TO AND INCLUDING THE Q100+40%CC AND +10% URBAN CREEP.
CL 25.700
IL 24.800
STORAGE DEPTH: 0.600m
FREEBOARD: 0.300m

FOUL GULLY TO SERVE BIN STORE AREA FOR FOUL WASHDOWN.

SURFACE WATER FROM RWPs TO DISCHARGE INTO DRAINAGE BLANKET VIA DIFFUSER UNIT

Plot 18 18/2P
Plot 19 18/2P
Plot 20 18/2P
Plot 15 18/2P
Plot 16 18/2P
Plot 17 18/2P
Plot 14 2B/4P
Plot 13 2B/4P
Plot 12 2B/4P
Plot 11 2B/4P
Plot 10 2B/4P
Plot 9 2B/4P
Plot 8 2B/4P
Plot 7 2B/4P
Plot 6 2B/4P
Plot 5 2B/4P
Plot 21 3B/5P
Plot 22 3B/5P
Plot 23 3B/5P
Plot 24 3B/5P
Plot 25 3B/5P
Plot 26 3B/5P

Bike Storage
Bin Storage

375mm 1:200 CONC
100mm
100mm PLASTIC
150mm

S01 S02 S03 S03A CP S03B [CP] S03C [CP] S04 S04A [CP] S05 S06 S06A [CP] S06B [CP] S07 [CP] S07A [CP] S08 S08A [CP]
S-P11 [CP] S-P12 [CP] S-P22 S-P23 [CP] S-P24 S-P25 S-P26 [CP]
F8 F8.1 F9 F9.1 F10 F10.1 F10.2 F11 F11.1 F11.2 F12 F12.1

RG#1 RG#2A RG#2B

WM~depth: 2.0m
WM~depth: 2.1m
WM~depth: 2.2m

11KV ELEC

25.000

SHEET 1
SHEET 2
SHEET 2 - INSET

KEY PLAN
SCALE 1:1250

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CAUTION: BEWARE OF UNDERGROUND SERVICES IN THE VICINITY. ALL EXCAVATIONS TO BE IN ACCORDANCE WITH HSG47

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EXISTING DRAINAGE TAKEN FROM DCWW ASSET MAPPING AND DRAINTECH CCTV SURVEY UNDERTAKEN 17.03.2021

EXISTING SERVICES LEGEND

- EXISTING UNDERGROUND ELECTRICITY CABLES
- EXISTING UNDERGROUND STREET LIGHTING CABLES

10 0 10 20 50 100mm NATURAL SCALE

ORIGINAL DRAWING SIZE 841 x 594

rev.	drawn	chkd.	apprvd.	date	description
03	HT	PG	--	22.08.24	UPDATED TO SUIT NEW SITE LAYOUT
02	HT	PG	--	12.07.24	MINOR AMENDMENTS
01	HT	PG	--	25.06.24	FIRST ISSUE

Client
DANTWYN (PONTARDDULAIS) LTD

Project
GLYNHIR ROAD
PONTARDDULAIS
SA4 8PT

Title
DRAINAGE LAYOUT
SHEET 1

Vale Consultancy
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scale @ A1	project no.
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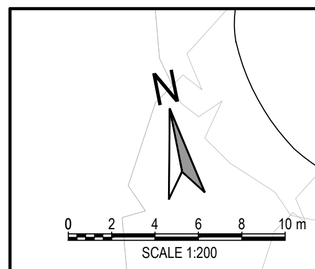
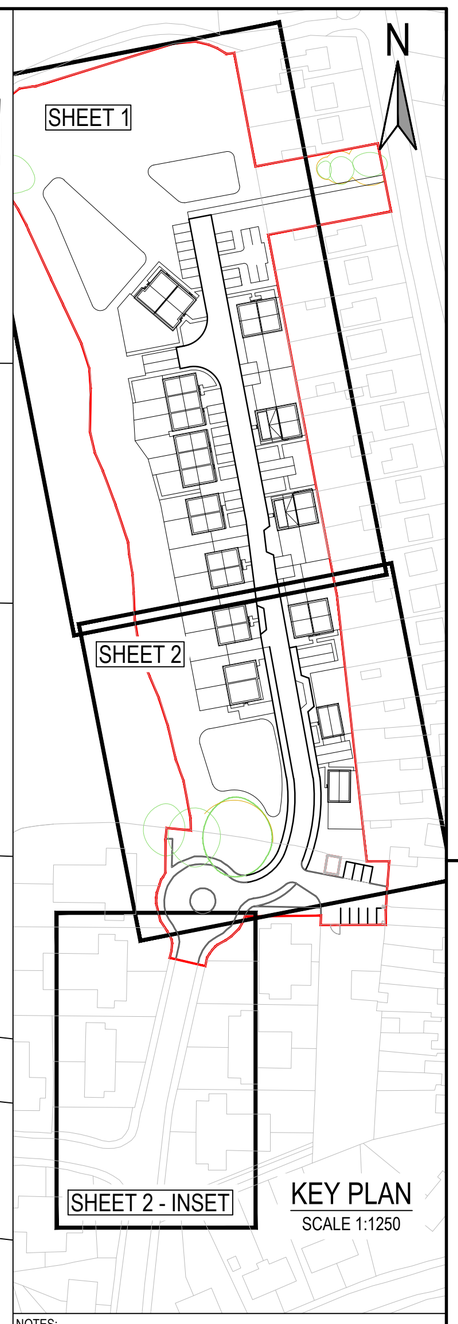


SOUTHERN BASIN - ATTENUATES SURFACE WATER RUNOFF FOR RAINFALL EVENTS UP TO Q30. FOR STORM EVENTS AFTER Q30, SURFACE WATER WILL BACK UP THROUGH PROPOSE SURFACE WATER SEWER TO NORTHERN BASIN.
CL 26.000
IL 23.900
STORAGE DEPTH: 1.800m
FREEBOARD: 0.300m

S40 - FLOW CONTROL CHAMBER HYDROBRAKE (OSA.)
SET @ 7.3l/s FOR ALL STORM EVENTS UP TO AND INCLUDING Q100+40%CC AND +10% URBAN CREEP (RATE TO BE AGREED WITH DCWW)



KEY PLAN
SCALE 1:1250

DRAINAGE LAYOUT
SCALE 1:200

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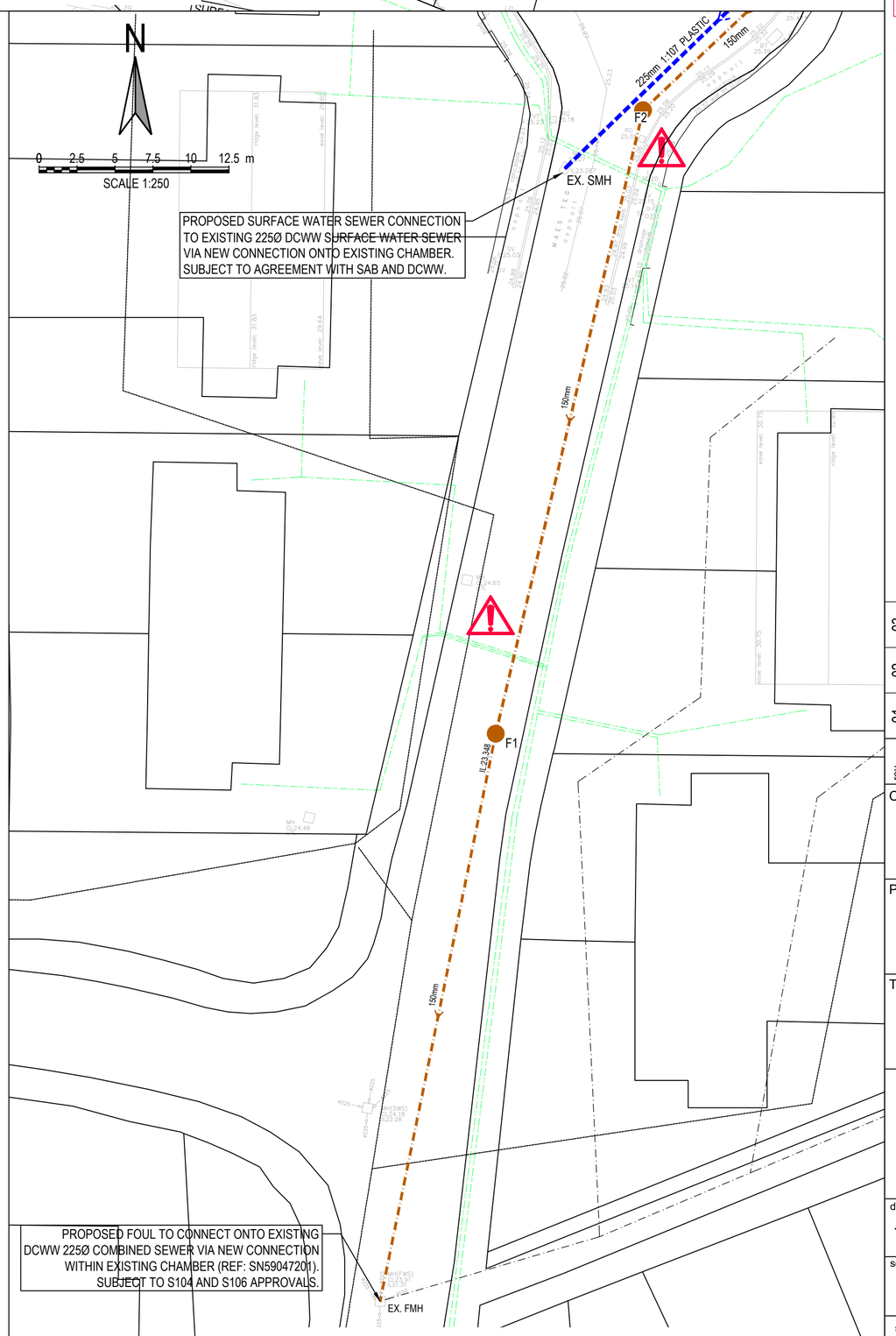

INSET FOUL OFFSITE OUTFALL ROUTE
SCALE 1:250

PRELIMINARY

rev.	drawn	chkd.	apprvd.	date	description
03	HT	PG	-	22.08.24	UPDATED TO SUIT NEW SITE LAYOUT
02	HT	PG	-	12.07.24	MINOR AMENDMENTS
01	HT	PG	-	25.06.24	FIRST ISSUE

Client
DANTWYN (PONTARDDULAIS) LTD

Project
GLYNHIR ROAD
PONTARDDULAIS
SA4 8PT

Title
DRAINAGE LAYOUT
SHEET 2

Vale Consultancy
CONSULTING CIVIL & STRUCTURAL ENGINEERS
29 Bocam Park, Old Field Road, Pencoed, Bridgend CF35 5LJ.
Phone: 01656 863794 Email: enquiries@vale-consultancy.co.uk

date	drawn	checked	approved
11.06.24	RM	PG	

scale @ A1	project no.
1:200 1:250	18649

status	drg. no.	rev.
P	18649/502	03

10 0 10 20 50 100mm NATURAL SCALE

ORIGINAL DRAWING SIZE 841 x 594

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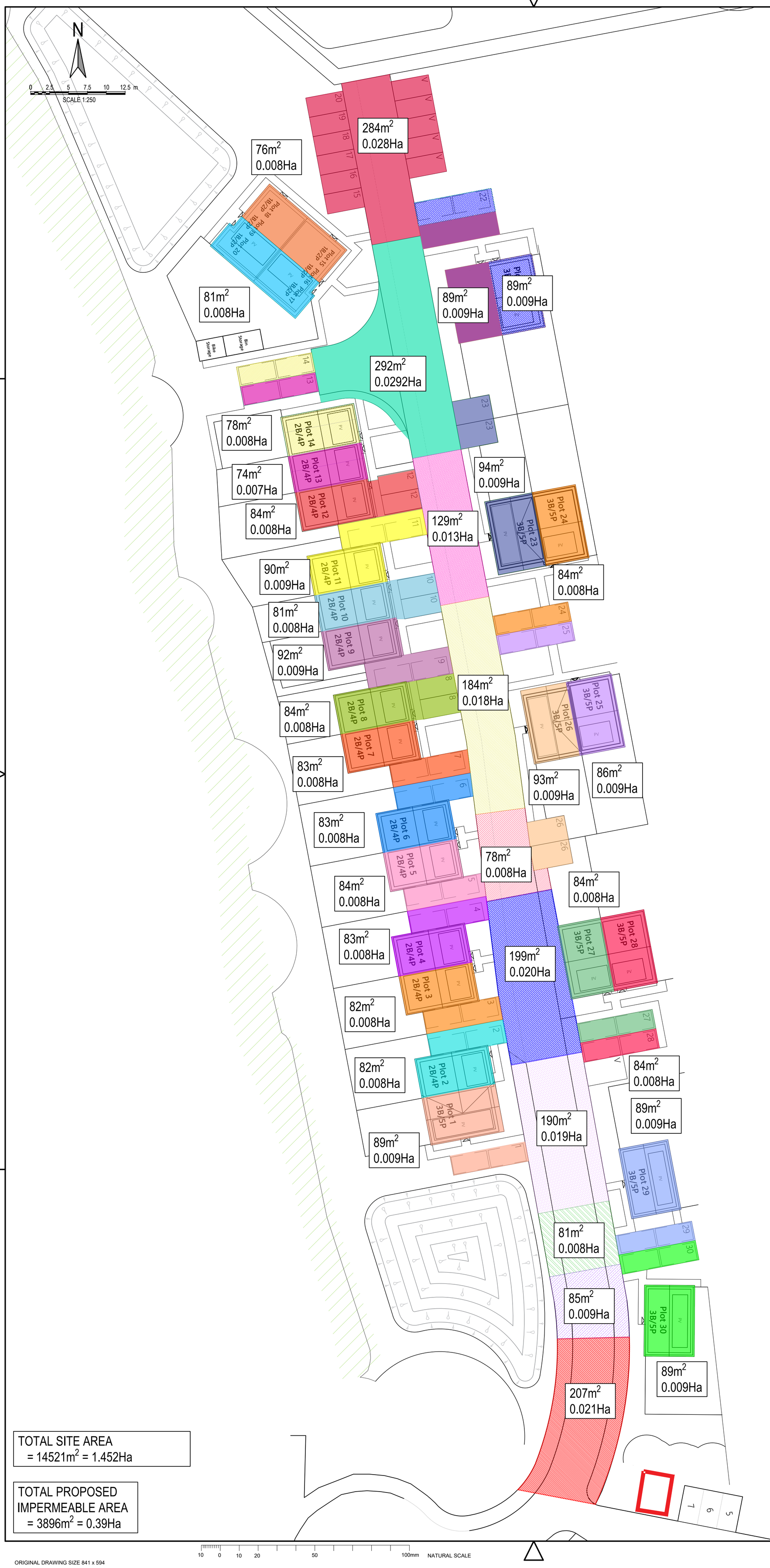

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TOTAL SITE AREA
= 14521m² = 1.452Ha

TOTAL PROPOSED IMPERMEABLE AREA
= 3896m² = 0.39Ha

10 0 10 20 50 100mm NATURAL SCALE

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03	HT	PG	-	22.08.24	UPDATED TO SUIT AMENDED SITE LAYOUT
02	HT	PG	-	21.06.24	AMENDMENTS TO SITE BOUNDARY
01	HT	PG	-	21.06.24	FIRST ISSUE

Client
DANTWYN (PONTARDDULAIS) LTD

Project
LAND OFF GLYNHIR ROAD
PONTARDDULAIS NORTH

Title
PROPOSED DRAINAGE CATCHMENTS PLAN

Vale Consultancy
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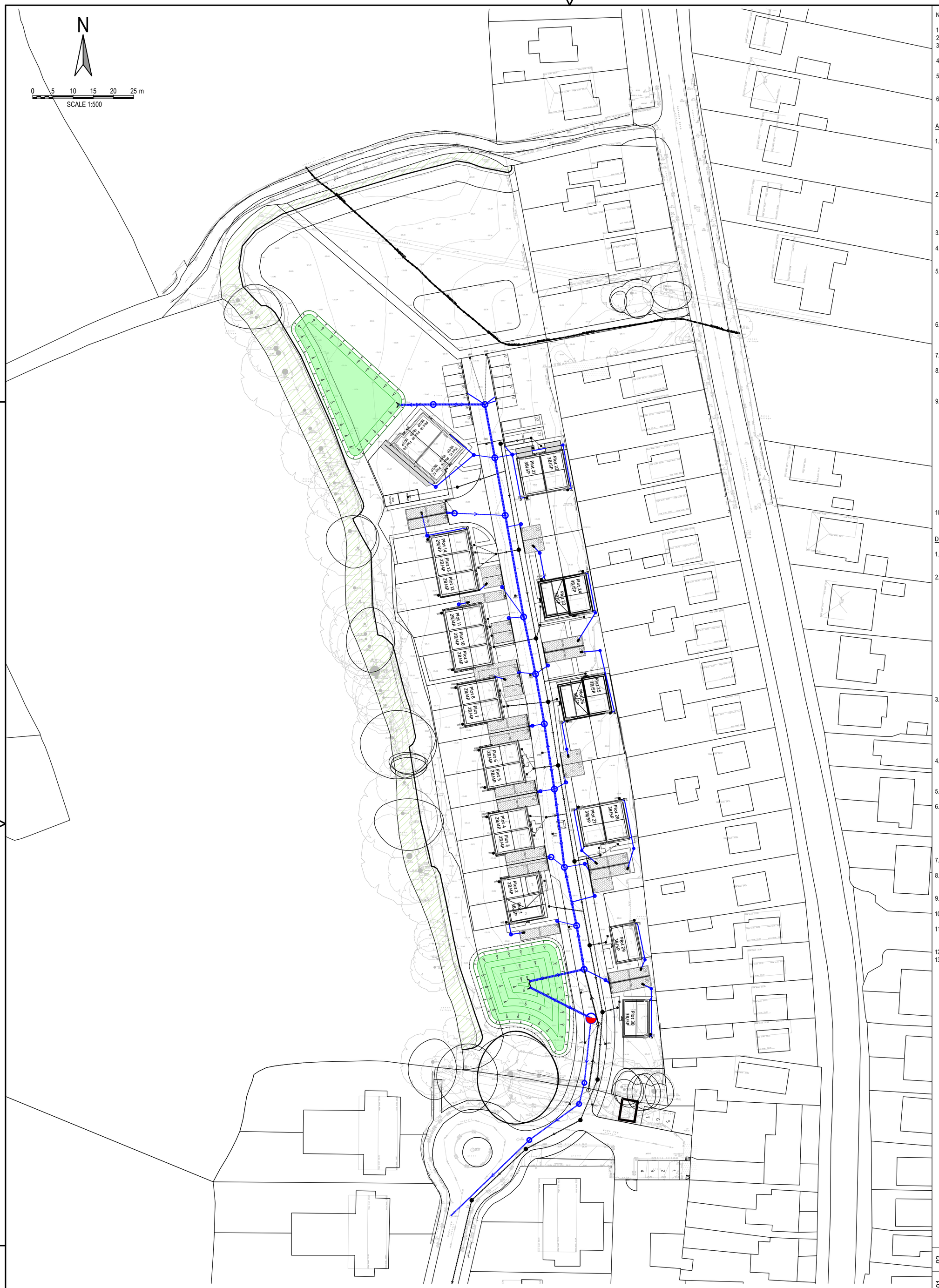

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6. MH COVER & FRAMES SHALL BE DUCTILE IRON WITH A MINIMUM SQUARE OPENING OF 675x675m. COVERS SHALL BE DOUBLE TRIANGLE FOR 675mmSQUARE OPENINGS AND BE PROVIDED WITH LOOSE BOLTED CONNECTIONS. FRAME DEPTH SHALL BE 150mm.
7. ALL IRONWORK TO BE KITE MARKED BY BSI OR CERTIFIED BY EQUAL INSPECTION AUTHORITY.
8. PLANTING CLOSE TO ADOPTABLE DRAINAGE RUNS INDICATED IS TO ACCORD WITH THE SPECIFICATIONS IN SFA 7th EDITION SECTION C3.1.13 TO COMPLY WITH THE REQUIREMENTS OF SFA 7th & THE WELSH MINISTERS STANDARDS.
9. NOTE WHERE PLASTIC PIPE IS TO BE USED, IT MUST CONFORM WITH CLAUSES **E2.21** AND/OR **E2.22** IN SEWERS FOR ADOPTION 7th EDITION AND BE KITE MARKED. THE PLASTIC PIPES ACCEPTED BY DCWW FOR GRAVITY SEWERS FOR DIAMETERS OF 150mm - 300mm INCLUDE :
   a. MARLEY TWINWALL SYSTEM
   b. UPONER ULTRARIB SYSTEM
   c. OSMA ULTRARIB SYSTEM
   d. POLYSEWER TWINWALL SYSTEM

   POLYPIPE RIGISEWER IS ACCEPTABLE AND AVAILABLE FOR 400mm-600mm AND 750mm-900mm DIAMETER RANGES. PLEASE BE MINDFUL OF THE PROPOSED PIPE MATERIAL/MAKE FOR 375mm DIAMETER SEWERS AS CONCRETE PIPE MAY BE THE ONLY ACCEPTABLE OPTION AT THIS SIZE.
10. CONTRACTOR TO ENSURE PIPES WITH STIFFNESS OF SN8 OR GREATER ARE USED FOR PIPES LESS THAN 500mmØ AND A MINIMUM OF SN2 FOR PIPES GREATER THAN 500mmØ.

DRAINAGE NOTES:

1. MH COVERS AND FRAMES TO CONFORM TO BS EN 124: -HIGHWAYS AND FOOTWAYS TO FRONT OF BUILDINGS (D400)
   -FOOTWAYS TO REAR OF BUILDINGS (C250).
2. TYPE S BEDDING AND SURROUND TO ALL PIPES EXCEPT IN THE FOLLOWING CIRCUMSTANCES, IN WHICH TYPE Z BEDDING AND SURROUND ARE TO BE USED:
   -DOMESTIC GARDENS AND PATHWAYS WITHOUT ANY POSSIBILITY OF VEHICULAR ACCESS, 0.35m;
   -DOMESTIC DRIVEWAYS, PARKING AREAS AND YARDS WITH HEIGHT RESTRICTIONS TO PREVENT ENTRY BY VEHICLES WITH A GROSS VEHICLE WEIGHT IN EXCESS OF 7.5 TONNES, 0.5m;
   -DOMESTIC DRIVEWAYS, PARKING AREAS AND NARROW STREETS WITHOUT FOOTWAYS (E.G. MEWS DEVELOPMENT) WITH LIMITED ACCESS FOR VEHICLES WITH A GROSS VEHICLE WEIGHT IN EXCESS OF 7.5 TONNES, 0.9m;
   -AGRICULTURAL LAND AND PUBLIC OPEN SPACE, 0.9m;
   -HIGHWAYS AND PARKING AREAS WITH UNRESTRICTED ACCESS TO VEHICLES WITH A GROSS VEHICLE WEIGHT IN EXCESS OF 7.5 TONNES, 1.2m.
3. ALL EXISTING MANHOLE INVERTS TO BE CHECKED AND REPORTED TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF DRAINAGE WORKS. EXISTING PIPE CONNECTIONS ARE TO BE CCTV SURVEYED AND INSPECTED BY THE ENGINEER AND LOCAL AUTHORITY. IF THE PIPE CONNECTION IS FOUND TO BE DAMAGED OR IN DISTRESS, THE CONTRACTOR IS TO CARRY OUT REMEDIAL WORKS OR PROVIDE A NEW CONNECTION TO THE EXISTING SEWER (PIPE SIZE AND GRADIENT TO BE DETERMINED BY THE ENGINEER.
4. THE GRADIENTS INDICATED AGAINST THE DRAIN RUNS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL INSTALL DRAINS TO THE INVERT LEVELS SHOWN FOR EACH MANHOLE OR OTHER INDICATED POSITION.
5. ALL PLOT FOUL DRAINAGE TO BE MINIMUM 100mm DIAMETER UNLESS OTHERWISE NOTED.
6. ALL ADOPTABLE THERMOPLASTIC STRUCTURED WALL SEWER PIPE SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN 13476-1 AND WIS 4-35-01 AND BS EN 13476-2 OR BS EN 13476-3. PIPES SHALL BE BSI KITEMARKED OR HAVE EQUIVALENT THIRD PARTY CERTIFICATION. PIPES LESS THAN OR EQUAL TO 500mm DIA. SHALL HAVE A SHORT-TERM RING STIFFNESS OF NOT LESS THAN 8kN/m^2 (SN8).
7. ALL JOINTING IN ACCORDANCE WITH MANUFACTURERS TECHNICAL ADVICE & SPECIFICATION.
8. ALL NON ADOPTABLE DRAINAGE TO BE THE STANDARD UPVC 110mm, 160mm DRAINAGE AND MANUFACTURED TO BS-EN 1401 AND BS 4660 UNLESS NOTED OTHERWISE.
9. ALL STORM WATER DRAINAGE TO BE A MINIMUM OF 150mm DIAMETER UNLESS OTHERWISE NOTED.
10. SOIL & VENT PIPE LOCATION AND NUMBER TO BE CONFIRMED WITH ARCHITECT.
11. PRIOR TO ORDERING ANY MATERIALS THE CONTRACTOR IS TO CONFIRM MANUFACTURER/PIPE MATERIAL AND GRADE PROPOSED WITH WATER AUTHORITY.
12. TEMPORARY WORKS DESIGN BY OTHERS.
13. DESIGN RISK ASSESSMENTS AND METHOD STATEMENTS ARE TO BE PROVIDED TO THE PRINCIPLE CONTRACTOR PRIOR TO THE COMMENCEMENT OF ANY WORKS.

ANY WORKS ON SITE PRIOR TO PLANNING, HIGHWAY/ DRAINAGE APPROVALS BEING GRANTED TO BE UNDERTAKEN AT DEVELOPER / CONTRACTORS OWN RISK.

PRELIMINARY

PROPOSED DRAINAGE LEGEND

- 150Ø @ 1:150 — PROPOSED SURFACE WATER DRAINAGE
- 100Ø @ 1:40 — PROPOSED FOUL WATER DRAINAGE
- 150Ø @ 1:150 — PROPOSED HIGHWAYS DRAINAGE
- FLOW CONTROL CHAMBER - HYDROBRAKE (OSA.)
- PROPOSED ALTHON HEADWALL
- RE — RODDING EYE
- PROPOSED PRIVATE FOUL DRAINAGE
- PRG — PROPOSED ROAD GULLY
- TFG — PROPOSED FOUL TRAPPED GULLY
- RWP — PROPOSED RAINWATER PIPE
- WB — PROPOSED WATER BUTT

(ALL RAINWATER PIPE, WATERBUTT & INTERNAL DRAINAGE CONNECTION LOCATIONS TBC. BY ARCHITECT)

- PROPOSED DRAINAGE CHANNEL (ACO MD100 OSA.)
- PERMEABLE PAVING PARKING BAY - MIN. 400mm TYPE 3 SUB-BASE WITH PERFORATED SUMP PIPE
- SDO — SUMP DRAIN WITH OUTLET PIPE
- PROPOSED DIFFUSER BOX WITHIN DRAINAGE BLANKET
- DEMARCATION KERBING - TO DEMARCATE ADJACENT PERMEABLE PAVING SYSTEMS
- RAIN GARDEN / BIO RETENTION AREA WITH PERFORATED PIPE
- 1.2m HIGH TIMBER POST & 4 RAIL FENCE
- LIFE RING & SAFETY NOTICE

rev.	drawn	chkd.	apprvd.	date	description
02	HT	PG	--	23.08.24	UPDATED TO SUIT NEW SITE LAYOUT
01	HT	PG	--	10.07.24	FIRST ISSUE

Client
DANTWYN (PONTARDDULAIS) LTD

Project
GLYNHIR ROAD
PONTARDDULAIS
SA4 8PT

Title
SuDS ASSET MAINTENANCE & ADOPTION PLAN

Vale Consultancy
CONSULTING CIVIL & STRUCTURAL ENGINEERS
29 Bocam Park, Old Field Road, Pencoed, Bridgend CF35 5LJ.
Phone: 01656 863794 Email: enquiries@vale-consultancy.co.uk

date	drawn	checked	approved
11.06.24	RM	PG	

scale @ A1	project no.
1:500	18649

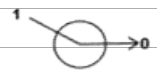
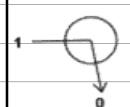
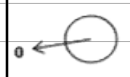
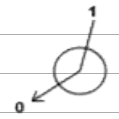
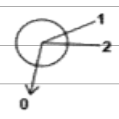
status	drg. no.	rev.
P	18649/550	02

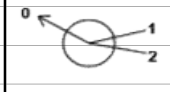
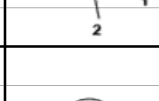
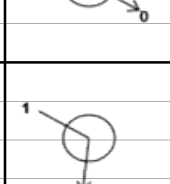
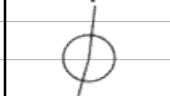
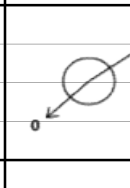
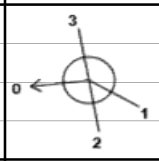
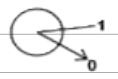
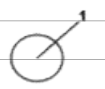
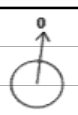
DRAWING STATUS
A - Approval, AB - As-Built, C - Construction, D - Draft, P - Preliminary, T - Tender

10 0 10 20 50 100mm NATURAL SCALE

ORIGINAL DRAWING SIZE 841 x 594

A1

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)
BASIN#2	259781.868	204492.551	25.700	0.900	1350						
											
								0	1.000	24.800	375
S01	259803.625	204479.774	26.000	1.205	1350	Manhole	Type 2	1	1.000	24.795	375
							D400				
								0	1.001	24.795	375
S02	259817.250	204480.080	26.200	1.473	1350	Manhole	Type 2	1	1.001	24.727	375
							D400				
								0	1.002	24.727	375
S03C	259804.222	204459.359	26.250	1.440	600	Manhole	Type 3	1	2.000	25.110	100
							D400				
								0	2.001	25.110	100
S03B	259813.656	204467.263	26.250	1.228	600	Manhole	Type 3	1	2.001	25.022	100
							D400				
								0	2.002	25.022	100
S03A	259823.197	204467.356	26.350	1.350	600	Manhole	Type 3				
							D400				
								0	3.000	25.300	100
S03	259819.788	204466.713	26.350	1.691	1350	Manhole	Type 2	1	3.000	24.964	100
							D400	2	2.002	24.964	100
								3	1.002	24.659	375
								0	1.003	24.659	375
S04A	259808.890	204452.837	26.300	1.400	1200	Manhole	Type 2	1	4.000	25.200	100
							D400				
								0	4.001	25.200	150
S04	259822.491	204452.485	26.400	1.813	1350	Manhole	Type 2	1	4.001	24.812	150
							D400	2	1.003	24.587	375
								0	1.004	24.587	375
S14	259839.743	204306.495	25.800	2.176	1200	Manhole	Type 2	1	1.015	23.624	225
							D400				
								0	1.016	23.624	225
S05	259826.996	204427.304	26.650	2.191	1350	Manhole	Type 2	1	8.001	24.734	100
							D400	2	6.001	24.734	100
								3	1.005	24.459	375
								0	1.006	24.459	375
S06A	259830.555	204418.146	26.700	1.200	600	Manhole	Type 3	1	12.000	25.800	100
							D400	 2	11.000	25.800	100
								0	11.001	25.800	100
S06B	259824.813	204413.434	26.900	1.897	600	Manhole	Type 3	1	10.000	25.303	100
							D400	2	9.000	25.303	100
								0	9.001	25.303	100
S06	259829.535	204413.113	26.800	2.413	1350	Manhole	Type 2	1	11.001	24.662	100
							D400	2	9.001	24.662	100
								3	1.006	24.387	375
								0	1.007	24.387	375
S07A	259828.188	204400.193	26.800	1.430	600	Manhole	Type 3	1	14.000	25.670	100
							D400	2	13.000	25.670	100
								0	13.001	25.670	100
S07	259831.174	204400.645	26.750	2.426	1350	Manhole	Type 2	1	13.001	24.534	100
							D400	2	1.007	24.324	375
								0	1.008	24.324	375
S08A	259830.182	204383.964	26.700	1.400	600	Manhole	Type 3	1	17.000	25.600	100
							D400	2	16.000	25.600	100
								0	16.001	25.600	100
S08	259834.129	204384.571	26.600	2.358	1350	Manhole	Type 2	1	16.001	24.498	100
							D400	2	15.000	24.498	100
								3	1.008	24.242	375

									0	1.009	24.242	375
S09A	259841.137	204365.973	26.600	1.200	600	Manhole	Type 3		1	20.000	25.700	100
							D400		2	19.000	25.700	100
									3	18.000	25.700	100
									0	18.001	25.700	100
S09B	259832.833	204367.656	26.350	1.011	600	Manhole	Type 3		1	22.000	25.639	100
							D400		2	21.000	25.639	100
									0	21.001	25.639	100
S09	259837.100	204365.243	26.400	2.256	1350	Manhole	Type 2		1	21.001	24.444	100
							D400		2	18.001	24.444	100
									3	1.009	24.144	375
									0	1.010	24.144	375
S-P1	259835.568	204351.590	26.350	0.950	600	Manhole	Type 3		1	23.000	25.700	100
							D400					
									0	23.001	25.700	100
S10	259839.638	204350.758	26.250	2.180	1350	Manhole	Type 2		1	23.001	24.411	100
							D400		2	1.010	24.070	375
									0	1.011	24.070	375
S16	259843.988	204326.275	25.950	1.600	1200	Manhole	Type 2		1	24.000	24.350	225
							D400					
									0	24.001	24.350	225
S11A	259846.305	204337.186	26.200	1.168	600	Manhole	Type 3		1	26.000	25.332	100
							D400		2	25.000	25.332	100
									0	25.001	25.332	100
S11	259841.566	204339.982	26.120	2.105	1350	Manhole	Type 2		1	25.001	24.290	100
							D400		2	24.001	24.165	225
									3	1.011	24.015	375
									0	1.012	24.015	375
BASIN#1	259825.588	204338.042	26.000	2.100	1350				1	1.012	23.900	375
												
									0	1.013	23.900	375
S12	259842.719	204327.715	26.000	2.233	2400	Manhole	Type 2		1	1.013	23.767	375
							D400					
									0	1.014	23.767	225
S13	259841.044	204311.727	25.825	2.165	1200	Manhole	Type 2		1	1.014	23.660	225
							D400					
									0	1.015	23.660	225
S15	259828.127	204298.270	25.600	2.071	1200	Manhole	Type 2		1	1.016	23.529	225
							D400					
									0	1.017	23.529	225
EX. SMH	259808.003	204278.818	25.070	1.803	1200	Manhole	Type 2		1	1.017	23.267	225
							D400					
S16A	259842.046	204309.929	25.800	1.300	1200	Manhole	Type 2					
							D400					
									0	24.000	24.500	225