Flood Risk Assessment

7-9 Salterns Way, Poole

Vereley Homes Limited

Prepared by:

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SLR Project No.: 416.065227.00001

12 February 2024

Revision: 01

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
01	12 March 2024	Hamza El-Adnany	Nick Bosanko	Nick Bosanko
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Basis of Report

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Appendices

1.0 Introduction

1.1 Background

SLR has been instructed by Vereley Homes Limited to prepare a Flood Risk Assessment (FRA), including drainage strategy to accompany the planning application for the redevelopment at 7-9 Salterns Way, Poole.

The scheme consists of the demolition of a detached house and replacement with two dwellings, including parking, associated access and landscaping. Proposed site layout plans are enclosed in Appendix A.

According to the Environment Agency (EA) Flood Map for Planning, the site is entirely located in Flood Zone 1. This flood zone is classified as low risk and is defined as land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding.

This FRA has been undertaken in accordance with the guidelines set out in the National Planning Policy Framework (NPPF) and wider national and local guidance documents.

1.2 Aims and Objectives

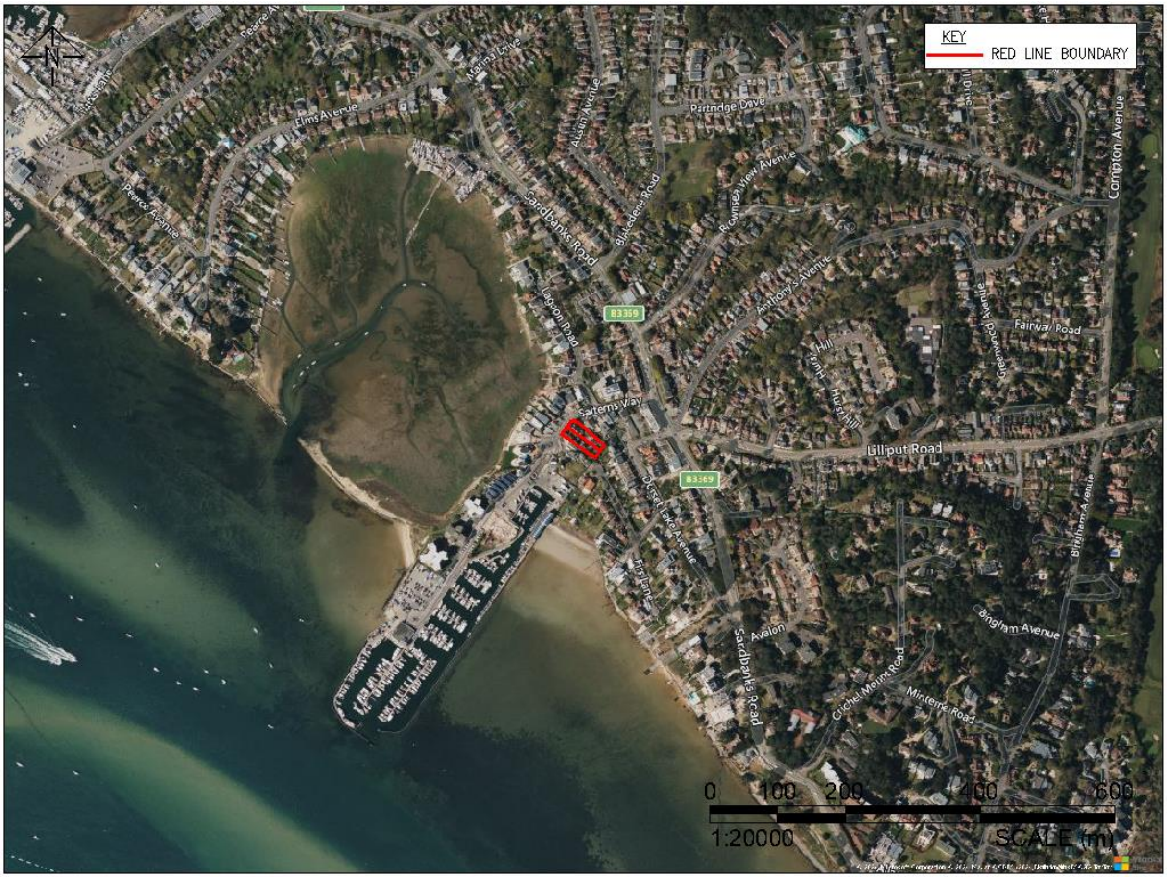
The aim of this FRA is to demonstrate that the site can be redeveloped safely for residential purposes, without exposing it to an unacceptable degree of flood risk and/or increasing the flood risk to third parties. The objectives of this FRA are to:

- Review the relevant planning policy documents to ensure that the redevelopment proposals are in accordance with these and other regional and local guidance.
- Undertake a desk-based review of the available flood risk information to assess past, current and future flood risk issues, taking into consideration the anticipated impacts of climate change.
- Identify flood mitigation requirements, if any, to ensure the redevelopment is safe from flooding, without impacting third parties.
- Assess whether the redevelopment will result in an increase of surface water runoff and how this can be mitigated through the incorporation of Sustainable Drainage Systems (SuDS) into the proposed development.
- Evaluate a conceptual foul water drainage solution.
- Summarise the above into an FRA report.

2.0 Site Description

The site is located to the south east of Salterns Way, Sandbanks, Poole. It has an approximate National Grid Reference of SZ038898. The site and surrounding area are shown in Figure 1.

Figure 1 – Site and Surround Area



The site currently consists of a detached dwelling served by an access with surrounding gardens. The wider area mostly consists of residential development, with Poole Harbour located to the south.

2.1 Topography

A topographic survey is enclosed within Appendix B. It shows that ground levels fall to the west from a maximum level of approximately 4.5 m above Ordnance Datum (AOD) to a minimum level of approximately 2.5 m AOD.

2.2 Geology and Hydrogeology

The 1:50,000 scale British Geological Survey (BGS) mapping indicates that the site is mostly underlain by a bedrock geology of Parkstone Clay Member – Clay. This is overlain by superficial deposits of Head – Clay, silt, sand and gravel.

According to MAGIC maps the site is not located within any groundwater Source Protection Zones.

The online Cranfield soil mapping tool (Soilscapes) shows that naturally wet very acid and loamy soils occupy the site.

A ground investigation has not been undertaken at this stage. It is unlikely that the ground conditions will permit the use of infiltration as a means of surface water disposal due to the presence of clay and close proximity to Poole Harbour.

2.3 Hydrology and Drainage

There are no ditches or streams on, or in the proximity of, the site.

A Wessex Water sewer map (Appendix C) shows a 225 mm diameter surface water sewer and a 200 mm diameter foul water sewer in Salterns Way west of the site. It is understood that the site currently drains to the public sewerage infrastructure.

3.0 Planning Policy and Guidance

3.1 National Planning Policy

The NPPF sets out the Government's national policies for flood risk management in a land use planning context within England and how these are expected to be applied. It states that developers and Local Planning Authorities (LPAs) should try to locate development in zones with the lowest probability of flooding. This should be achieved by application of the Sequential Test, which aims to ensure that a sequential approach is followed to steer new development to areas with the lowest probability of flooding.

A sequential risk-based approach to determining the suitability of land for development in flood risk areas is central to the policy statement and should be applied at all levels in the planning process.

The site is entirely in Flood Zone 1 and, according to the Planning Practice Guidance (PPG), is compatible with all development uses. The BCP Strategic Flood Risk Assessment (SFRA) includes a series of future flood maps (i.e. including an allowance for climate change). Both new dwellings have been positioned outside of the future flood zones (see Chapter 4). Therefore, application of the Sequential Test is not required for the proposed redevelopment.

3.2 Sustainable Drainage

The NPPF sets out the national planning policy in terms of development and flood risk with guidance on how this should be applied defined in the PPG. This strongly promotes the use of SuDS to manage surface water runoff from new development sites.

The "Non-Statutory Technical Standards (NTS) for Sustainable Drainage Systems" was published by Defra in March 2015 for the design, maintenance and operation of SuDS. The NTS states that for developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

4.0 Flood Risk

4.1 Flood Map for Planning

The Flood Map for Planning identifies the risk of flooding from both fluvial (i.e. river) and tidal sources, an extract of which is presented in Figure 2. The site is entirely located in Flood Zone 1. Land and property in Flood Zone 1 is assessed as having low risk of flooding from fluvial and tidal sources (i.e. less than 1 in 1,000 annual probability of flooding).

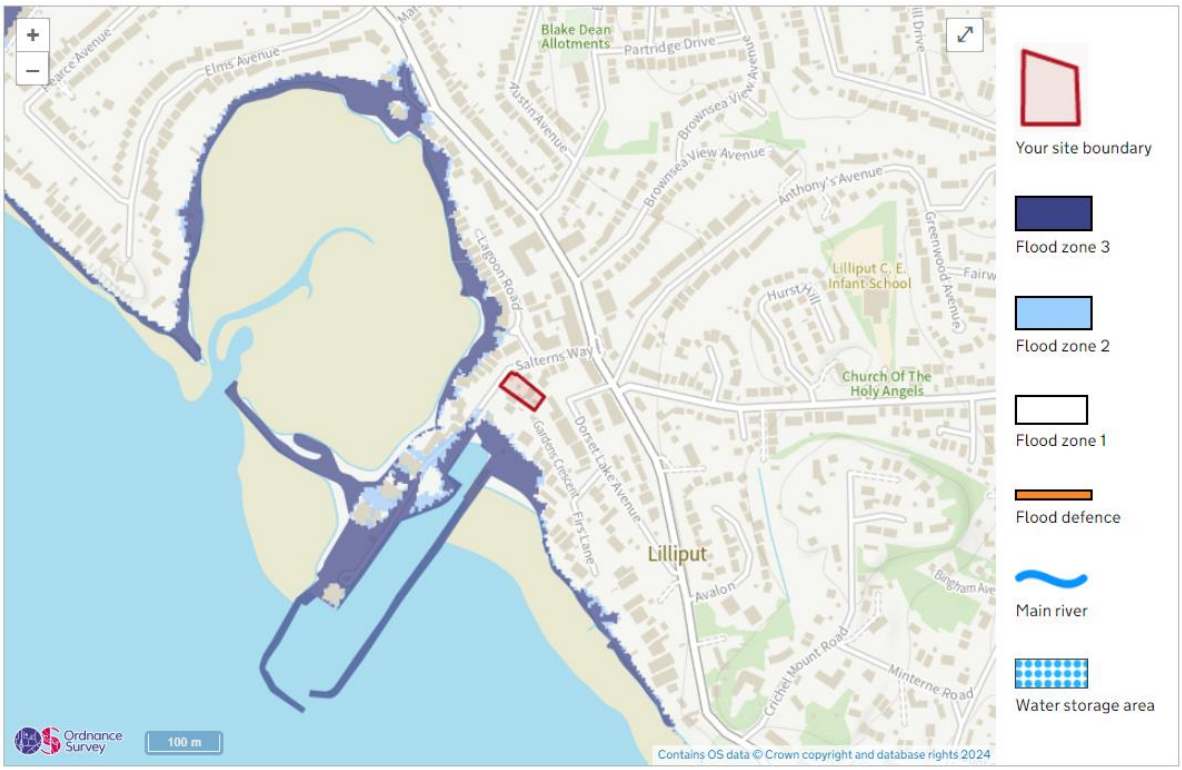


Figure 2 - Environment Agency Flood Map for Planning

4.2 Risk of Flooding from the Sea

Still water tidal levels were obtained from the EA Coastal Flood Boundary Conditions for the UK: update 2018. This shows that in Poole Harbour the 1 in 200 year tidal level is 1.92 m AOD. Over the anticipated lifetime of the development (i.e. 100 years), sea levels are expected to rise. Based on the PPG climate change (higher central) allowances sea levels could rise by 1.09 m. This would result in a 1 in 200 year plus climate change flood level of 2.97 m AOD.

The upper end sea level allowance would result in a 1 in 200 year plus climate change flood level of 3.34 m AOD.

Most of the site is elevated above this flood level. Furthermore, as noted in Chapter 3, the SFRA includes a series of future flood maps (i.e. including an allowance for climate change). Both new dwellings have been positioned outside of the future flood zones (see Figure 3).

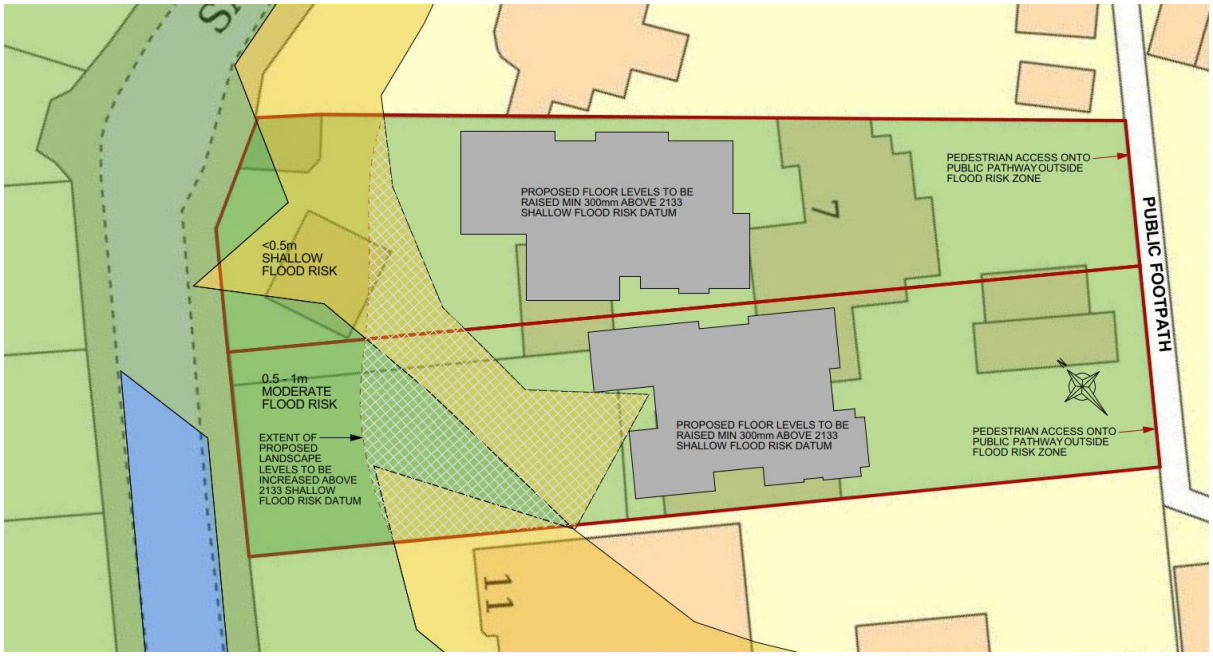


Figure 3 – SFRA Flood Mapping and Schem Overlay (prepared by Bear Architects)

Finished floor levels are discussed later in this chapter, which will ensure that flood risk from the sea, both now and in the future is assessed to be low.

4.3 Risk of Flooding from Rivers

As previously noted, the site is entirely located in Flood Zone 1, which is classified as a low fluvial flood risk. There are no watercourses within the proximity of the site and therefore fluvial flood risk, both now and in the future is assessed to be low.

4.4 Risk from Surface Water Flooding

According to the Risk of Flooding from Surface Water map, the site is entirely unaffected by surface water flooding (see Figure 4). The flood risk from surface water is classified as very low risk (i.e. annual chance of flooding is less than 1 in 1000).

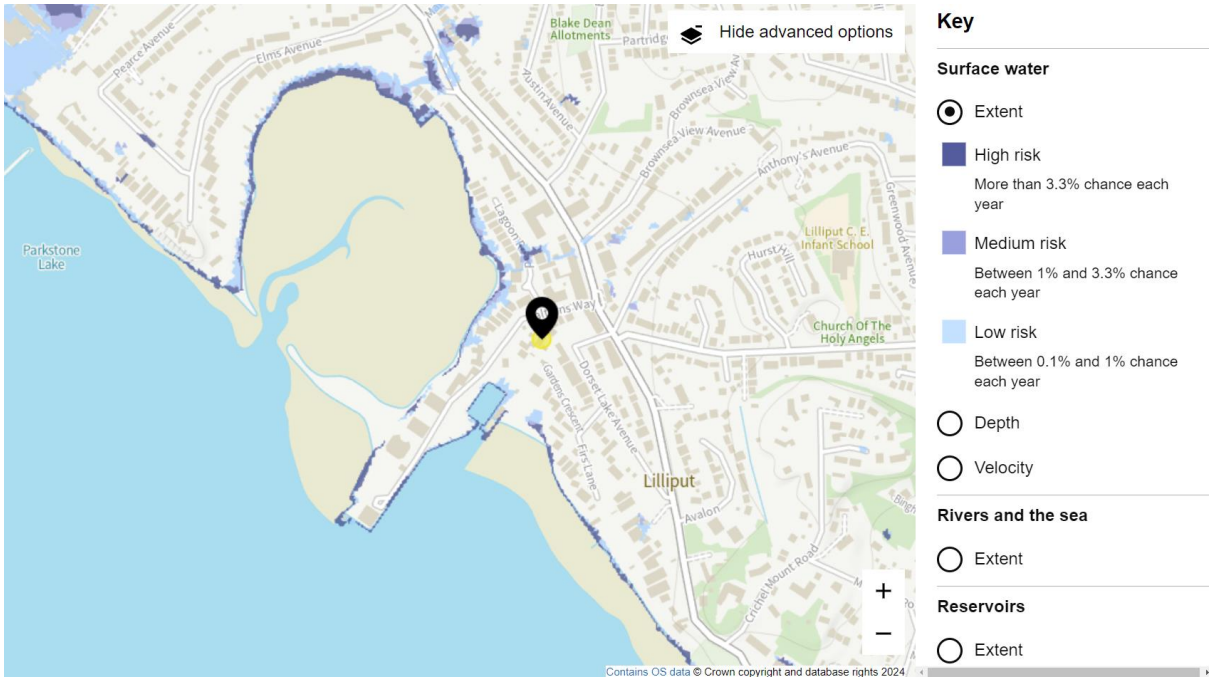


Figure 4 - Risk of Flooding from Surface Water Map

4.5 Sewer Flooding

This source of flooding occurs when sewerage systems are overwhelmed and result in flooding, which may occur alone or be combined with other flood sources (e.g. fluvial or surface water).

There is a network of public sewers to the west of the site in Salterns Way, which may introduce a source of flood risk to the area. This road is set at a lower elevation than the site and grounds levels slope towards the sea. Therefore, a pathway for sewer flooding into the site is limited and the risk form this source is low.

4.6 Other Sources of Flooding

A desktop study has not revealed any other significant potential sources of flood risk in the proximity of the site.

4.7 Flood Mitigation

Tidal flood risk may impact the lower lying parts of the site in the future, if the anticipated impacts of climate change materialise. However, it is recommended that finished floor levels for the ground floor are set no lower than 3.94 m AOD. This will provide a 0.6 m freeboard above the 1 in 200 plus climate change (upper end) tidal level, which will offer robust protection from tidal flooding.

Pedestrian access is available from the rear of the site to a public footpath, which leads to Dorset Lake Avenue and wider areas outside of the future tidal floodplain.

5.0 Surface Water Drainage Strategy

5.1 Overview

It is well understood that one of the effects of development is typically to reduce the permeability of the site and consequently to change its response to rainfall. Therefore, a suitable surface water drainage strategy is required to ensure that the surface water runoff regime is managed appropriately so that there will be no increase flood risk to third parties.

The NPPF states that flood risk to land and property must not be increased as a result of development. The associated PPG states that flood risk should not increase for events up to and including a 1 in 100 year return period, with appropriate allowance for climate change.

A fundamental principle of sustainable development in terms of flood defence is the reduction of surface water runoff from new developments. Surface water drainage arrangements for any development site must ensure that volumes and peak discharge rates leaving the site are no greater than those for the site prior to development. Any increase in surface water run-off above the pre-development volumes must also be controlled on site.

5.2 Proposed Receptor of Site Runoff

The drainage hierarchy presented in the PPG states that the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable:

- into the ground (infiltration),
- to a surface water body,
- to a surface water sewer, highway drain, or another drainage system,
- to a combined sewer.

As noted in Chapter 2, infiltration is unlikely to be feasible due to the presence of clay bedrock. There are no surface water bodies within the site. Therefore, surface water sewer will be discharged to the public surface water sewer albeit at a heavily restricted discharge rate.

5.3 Existing Runoff Rates

The Wallingford Procedure Modified Rational Method has been used to estimate the existing brownfield runoff rate from the existing impermeable area of the site. This is outlined below:

Q = C x I x A

Where:

C = 2.78;

I = rainfall intensity (average 59.8 mm/h) (taken from MicroDrainage rainfall profile tool, provided in Appendix D, using a 10 year return period, which is likely to be the approximate return period that the private sewer system has been designed to accommodate, and a 15 minute winter storm, which has been assessed to be the critical storm for this small site);

A = area in hectares (the existing impermeable area is 0.03 ha).

Therefore:

Q = 2.78 x 59.8 x 0.03

Q = 4.7 l/s

Table 1 presents the estimated existing runoff rates for the site associated with the various return period events. This ignores the greenfield runoff rates from the existing garden, which would be comparatively small.

Table 1: Existing Discharge Rates

Return Period	Average Rainfall Intensity (mm/hr)	Existing Runoff Rate (l/s)
1 in 2	34.7	2.7
1 in 10	59.8	4.7
1 in 30	78.9	6.1
1 in 100	100.1	7.8

Significant improvements on this existing rate of runoff are proposed as part of the surface water drainage strategy.

5.4 Proposed Runoff Rates

It is proposed to connect to the surface water sewer beneath Salterns Way, at a restricted rate. Consultation with Wessex Water (Appendix E) demonstrates that Wessex Water will allow a discharge rate of 2.0 l/s for all events up to and including the 1 in 100 year plus 45% climate change event to enter their surface water sewer. The existing and proposed rates are illustrated in Table 2. This represents an 57% betterment over the estimated 1 in 100 year existing brownfield runoff rate.

Table 2: Proposed Discharge Rates

Return Period	Existing Discharge Rate (l/s)	Proposed Discharge Rate (l/s)
1 in 2	2.7	2.0
1 in 10	4.7	2.0
1 in 30	6.1	2.0
1 in 100	7.8	2.0

5.5 Proposed Surface Water Drainage Strategy

Surface water runoff generated from the proposed roof surfaces will be collected and conveyed to an attenuation storage tank located in the access to the west of each of the proposed dwellings.

The tanks will be supplemented with rain garden planters, which will offer water quality treatment. Permeable surfacing will be used for each driveway; this will be unlined to allow runoff to percolate into the soil below. These features will help to meet the broader objectives of the SuDS strategy (i.e. water quality, amenity and biodiversity).

The location of each tank is shown on the Preliminary Surface Water Drainage Strategy, which is enclosed in Appendix F. Each outfall into the sewer will be restricted to 1.0 l/s which totals to the agreed rate of 2.0 l/s.

A Causeway Flow calculation has been undertaken to inform the proposed surface water drainage strategy for each dwelling. This was undertaken to estimate the tank size that would be required to provide a sufficient volume of storage. These calculations are enclosed in Appendix D and the parameters are outlined in Tables 3 & 4. A 10% factor has been applied to account for urban creep.

Table 3: Causeway Flow Parameters - North

Parameter	Values	Unit
Proposed impermeable area	0.021	ha
Urban creep	10	%
Future impermeable area	0.023	ha
Discharge rate	1.0	l/s
Porosity	95	%
Climate change allowance	45	%

The preliminary Causeway Flow calculations demonstrates that a tank with dimensions of 2.0 m width by 3.0 m length and 1.2 m deep will be sufficient for the storage of attenuated surface water runoff from the site up to and including the 1 in 100 year rainfall event, plus an additional 45% allowance for climate change.

Table 4: Causeway Flow Parameters - South

Parameter	Values	Unit
Proposed impermeable area	0.021	ha
Urban creep	10	%
Future impermeable area	0.023	ha
Discharge rate	2.0	l/s
Porosity	95	%
Climate change allowance	45	%

The preliminary Causeway Flow calculations demonstrates that a tank with dimensions of 2.0 m width by 3.0 m length and 1.2 m deep will be sufficient for the storage of attenuated surface water runoff from the site up to and including the 1 in 100 year rainfall event, plus an additional 45% allowance for climate change.

5.6 Exceedance

Surface water flow paths in extreme events, known as exceedance events (i.e. events in excess of the design criteria i.e. the 1 in 100 year plus climate change event), should be steered away from properties and to provide better protection to people and property. The proposed exceedance routes are shown in the Preliminary Surface Water Drainage Strategy enclosed in Appendix F.

5.7 Water Quality

In accordance with the SuDS Manual (CIRIA C753), SuDS components must have a total pollution index that equals or exceeds the pollution hazard index for different land use classifications. Rain gardens and the permeable paving provided as part of the surface water drainage strategy would offer sufficient mitigation for the land use classification as demonstrated in Tables 4 - 7 (as informed by Table 26.2 and 26.3 of the SuDS Manual respectively).

Table 4: Pollution Hazard Indices for the Proposed Development – Roof surfaces

Land Use	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential roofs	0.20	0.20	0.05

Table 5: SuDS Mitigation Indices for the Proposed Development – Roof surfaces

TYPE OF SUDS	MITIGATION INDICES		
	TSS	Metals	Hydrocarbons
Bioretention system (raised planter etc)	0.80	0.80	0.80

Table 6: Pollution Hazard Indices for the Proposed Development – External surfaces

Land Use	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Individual property driveways, residential car parking, low traffic roads and non-residential car parking with infrequent change.	0.50	0.40	0.40

Table 7: SuDS Mitigation Indices for the Proposed Development

TYPE OF SUDS	MITIGATION INDICES		
	TSS	Metals	Hydrocarbons
Permeable surfacing	0.70	0.60	0.70

5.8 Operation and Maintenance

The surface water drainage network will be privately operated and maintained. Maintenance will be undertaken in according with the recommendations outlined in The SuDS Manual (CIRIA C753, 2015), as replicated in Figures 5 - 7, for the key SuDS features.

Figure 5: Operation and Maintenance Requirements for Bioretention / Rain Gardens

TABLE 18.3 Operation and maintenance requirements for bioretention systems

Maintenance schedule	Required action	Typical frequency
Regular inspections	Inspect infiltration surfaces for silting and ponding, record de-watering time of the facility and assess standing water levels in underdrain (if appropriate) to determine if maintenance is necessary	Quarterly
	Check operation of underdrains by inspection of flows after rain	Annually
	Assess plants for disease infection, poor growth, invasive species etc and replace as necessary	Quarterly
	Inspect inlets and outlets for blockage	Quarterly
Regular maintenance	Remove litter and surface debris and weeds	Quarterly (or more frequently for tidiness or aesthetic reasons)
	Replace any plants, to maintain planting density	As required
	Remove sediment, litter and debris build-up from around inlets or from forebays	Quarterly to biannually
Occasional maintenance	Infill any holes or scour in the filter medium, improve erosion protection if required	As required
	Repair minor accumulations of silt by raking away surface mulch, scarifying surface of medium and replacing mulch	As required
Remedial actions	Remove and replace filter medium and vegetation above	As required but likely to be > 20 years

Figure 6: Operation and Maintenance Requirements for Permeable Surfaces

TABLE 20.15 Operation and maintenance requirements for pervious pavements

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Figure 7: Operation and Maintenance Requirements for Tanks

TABLE 21.3 Operation and maintenance requirements for attenuation storage tanks

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

5.8.1 Flow Control

A hydro-brake (or similar) will be used to control the flow leaving the site. Should a hydro-brake be fitted limited maintenance is required as there are no moving parts. If blockages occur, they do so at the intake.

Access should be allowed for clearing debris from the chamber housing the flow control. In the event that the inlet to the unit becomes blocked, the pivoting bypass door may be operated by pulling the wire rope attached upwards to drain down the chamber and provide access for maintenance. The pivoting bypass door must be returned to the closed position following drain down of the chamber and clearance of the blockage.

Regular inspections should be carried out to ensure that debris that may obstruct the inlet to the flow control is not present in the chamber. Following installation, it is essential that any extraneous material i.e. building materials are removed from the unit and the chamber. Once in operation, it should be inspected monthly for three months and thereafter at six monthly intervals with hose down if required. The units can be jetted from downstream, in accordance with standard sewer jetting procedures without affecting the hydraulic performance of the system.

Refer to Appendix G for further details. Should another manufacturer be used it is recommended that their maintenance guidance is reviewed and adopted.

5.8.2 Other Assets

Various other smaller assets of the surface water drainage strategy consist of gutters, down water pipes, manholes, pipes and drainage channels. These assets should be checked annually and after large storm events, in order to remove debris and inspect the condition.

Jet washing may be required on occasion to remove any blockages within the pipe network. If the condition is found to be poor, replacement or repairs may be required.

5.9 Summary

The surface water drainage strategy has been prepared to demonstrate that the proposed redevelopment of the site can meet national and local requirements for the management of surface water runoff. This will be achieved through some principles of SuDS but is subject to more detailed design considerations once planning permission has been approved.

6.0 Foul Drainage

In April 2018 Ofwat changed the rules with respect to new sewer connections. Developers may now connect to the nearest public sewer on a size for size basis at their cost and, in this case, Wessex Water will provide capacity in the network to accommodate domestic type flows from granted development which is funded by their infrastructure charging arrangements.

There is a 200 mm diameter foul sewer in Salterns Way, to the west of the site. Wessex Water have confirmed this is to be suitable for connection purposes as shown in Appendix E and would be subject to a Section 106 application to Wessex Water prior to connection.

7.0 Closure

SLR has been instructed by Vereley Homes Limited to prepare a Flood Risk Assessment (FRA), including drainage strategy to accompany the planning application for the redevelopment at 7-9 Salterns Way, Poole.

This FRA has been prepared in accordance with the guidelines set out in National Planning Policy Framework and local guidance.

A minimum finished floor level has bene recommended to protect the site from tidal flooding in the future.

An attenuation-led surface water drainage strategy has been proposed to manage surface water using Sustainable Drainage Systems (SuDS).

Foul water will be discharged from the site to the adjacent public foul sewer beneath Salterns Way.

Regards,

SLR Consulting Limited

Hamza El-Adnany

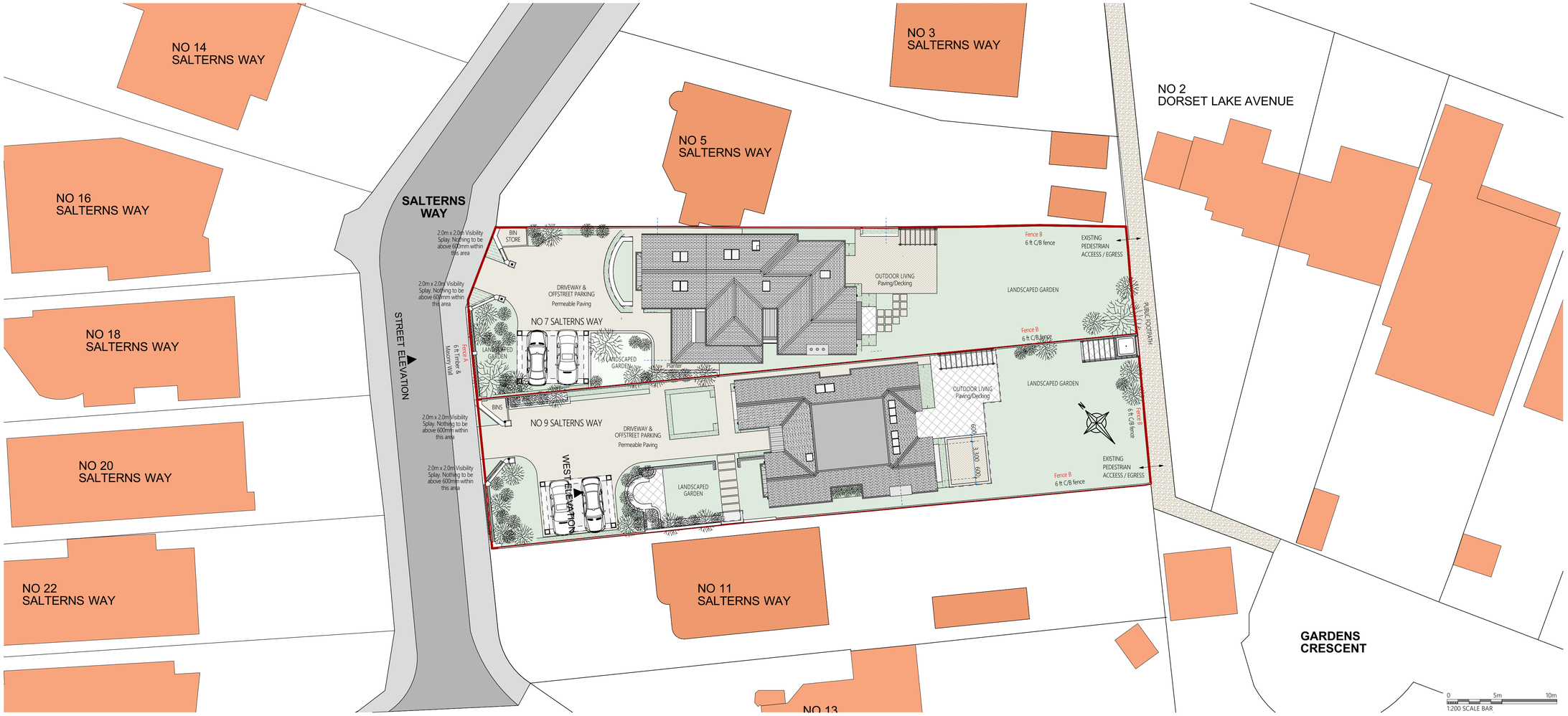
Hamza El-Adnany MEng
Senior Engineer

Nick Bosanko

Nick Bosanko BSc MSc MCIWEM C.WEM
Technical Director

Appendix A Site Plans

PROPOSED BLOCK PLAN 1:200



SITE PLAN - PROPOSED 1:200

NOTES
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- FIGURED DIMENSIONS TAKE PREFERENCE TO SCALING. OVERALL DIMENSIONS TAKE PRECEDENCE.

- ALL DIMENSIONS, LEVELS AND HEIGHTS TO BE CHECKED ON SITE, AND ANY DISCREPANCIES TO BE REPORTED TO BEAR ARCHITECTS LIMITED BEFORE ANY WORK IS PUT INTO HAND.

STRUCTURAL ENGINEER and CIVIL ENGINEER:

FIRE CONSULTANT:

MECHANICAL ENGINEER:

ELECTRICAL ENGINEER:

ARCHITECT SIGNATURE:
R DUFFY

Architects Registration Board
REG NO: 068530E

REV	DATE	DESCRIPTION
A	18/01/2024	ISSUED FOR COORDINATION
B	07/03/2024	ISSUED FOR COORDINATION

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PROJECT ARCHITECT
ROGAN DUFFY

DRAWN BY
#Project Team Member

PROJECT
No's 7 & 9 SALTERNS WAY, POOLE, BH14 8JR

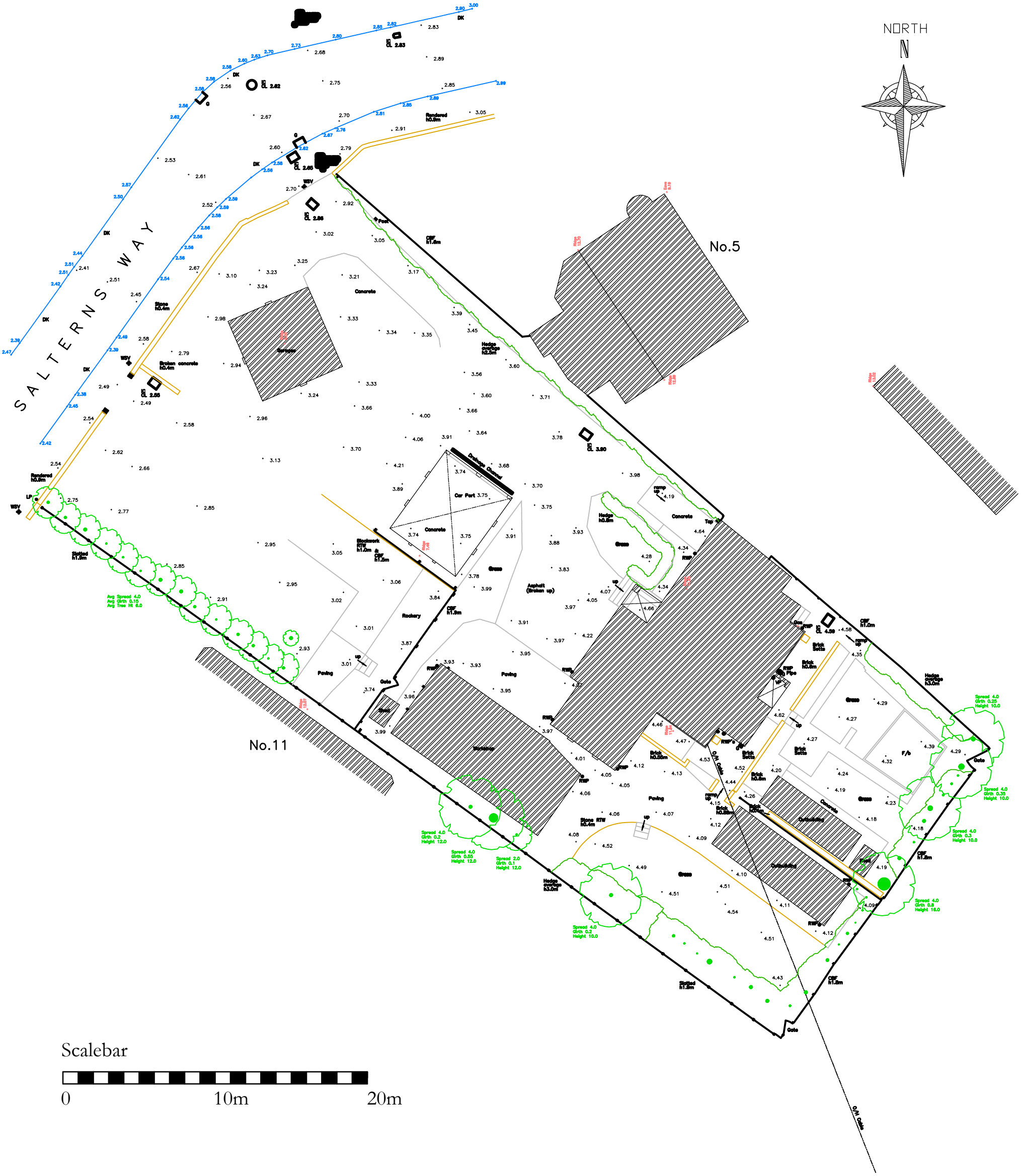
PROPOSED 2 NEW RESIDENCES

DRAWING TITLE
PROPOSED BLOCK PLAN AND SITE PLAN

SCALE	DATE	SHEET SIZE
	07/03/2024	A1

PROJECT No. BA2353 | DRAWING No. 110.03 | B

Appendix B Topographic Survey



BARRETT
DIMENSIONAL SURVEYS

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CLIENT :	Vereley Homes
PROJECT ADDRESS :	7-9 Salterns Way Poole BH14 8JR
TITLE :	Topographic Survey
DRAWING NO :	BAR/7-9SALT/1

REV	DATE	DESCRIPTION
0	22/01/24	Original Issue
A	19/02/24	Levels adjusted to OSBM
B	22/02/24	Survey adjusted to OS Grid

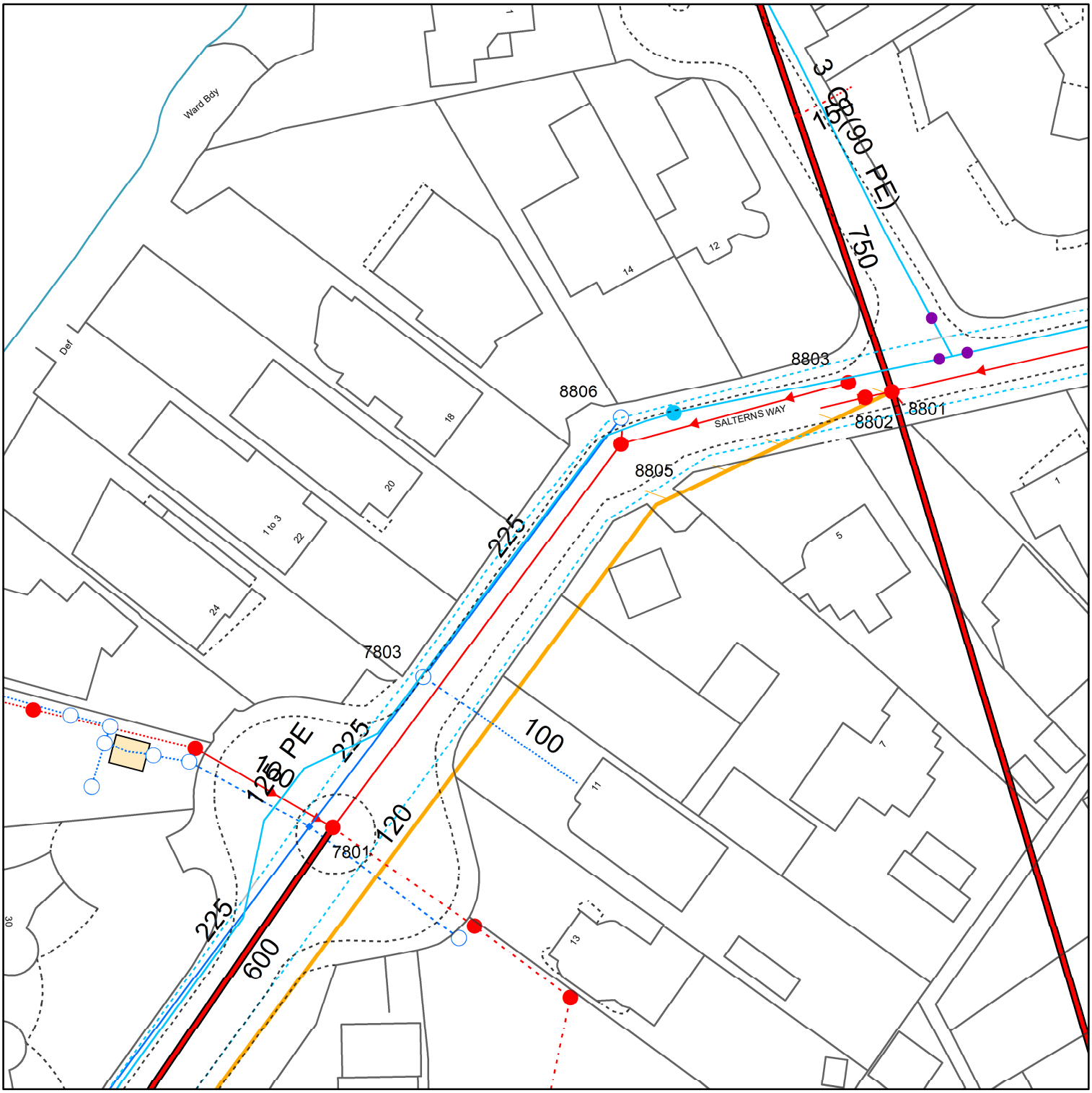
NOTES :
Date of survey 19/01/24
All levels based on OSBM (22 Lilliput Rd) - value 18.779m
Boundaries shown are not necessarily legal boundaries
Drawing Scale 1:250 @ A3

Legend

SV	Stop Valve		
TIC	Telecoms Inspection Cover		
IC	Inspection Cover		
CATV	Cable TV Cover		
G	Gully		
VP	Vent Pipe		
RWP	Rainwater Pipe	Fences	
DK	Drop Kerb	LLF	Larchlap
P	Post	CBF	Close Boarded
F/B	Flower Bed	I/R	Iron Railing

Appendix C Sewer Plans

Wessex Water Network Map



WATER MAINS
- Distribution
- Washout
- Raw Water
- Abandoned
- Private

FITTINGS
- Hydrant
- Other

SEWERS — STRATEGIC / PUBLIC / PRIVATE / SECTION 104
- Foul
- Surface
- Combined
- Abandoned

Colours generally indicate the use of the sewer/drain (i.e Red - Foul, Dark Blue - Surface, Magenta - Combined/Dual Use, Light Green - Highway Drain, Mid Green - Overflow). Some styles of line and symbol are shown on the key in sample/typical colours.

STRUCTURES
- Manhole - Foul
- Manhole - Surface
- Manhole - Combined
- Inlet
- Outfall
- Lamphole
- Bifurcation - Foul
- Bifurcation - Surface
- Bifurcation - Combined
- Combined Sewage Overflow
- Pumping Station - Surface
- Pumping Stn - Foul/Combined
- Gully
- Vent Column
- Rodding Eye
- Catchpit
- Flushing Chamber
- Soakaway
- Non Return Valve
- Air Valve
- Hatch Box
- X Washout

OTHER WESSEX PIPES
- Rising Mains
- Standby Rising Mains
- EDM Effluent Disposal
- Overflow
- S Syphon

NON-WESSEX / UNKNOWN
- Private Rising Mains
- CW Culverted Watercourse
- H Highway Drain
- ? Use Unknown
- SU Status Unknown

OTHER STRUCTURES
- Attenuation Tank
- Storage Tank
- Chamber
- Tunnel
- Interceptor

Wessex Water
YTL GROUP

Date: 16/01/2024
Centre: 403798, 89837
Scale: 1:625
(when printed at A4 size)

N W E S

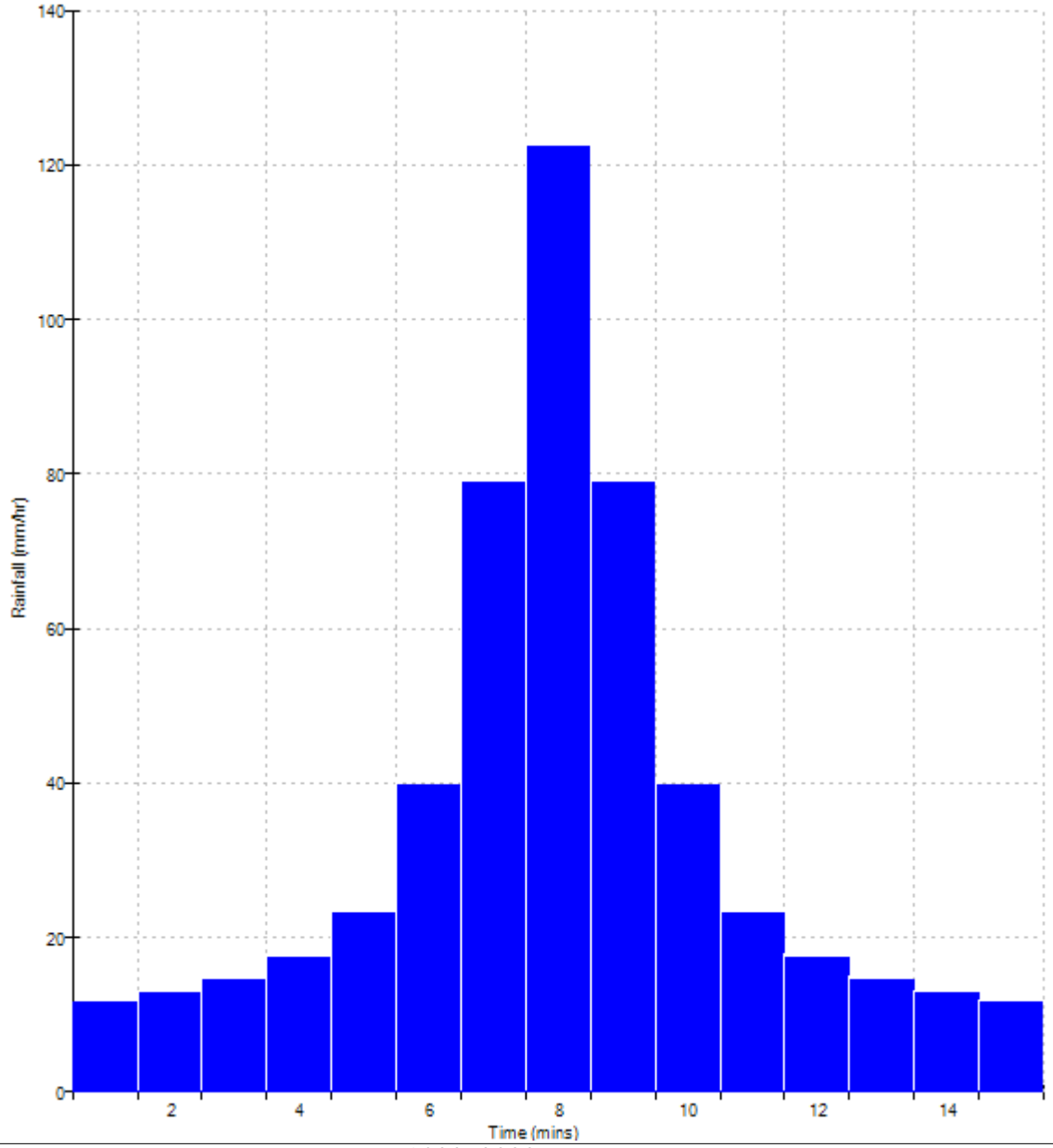
Appendix D Surface Water Calculations

Rainfall profile

Storm duration (mins) 15

FEH Data

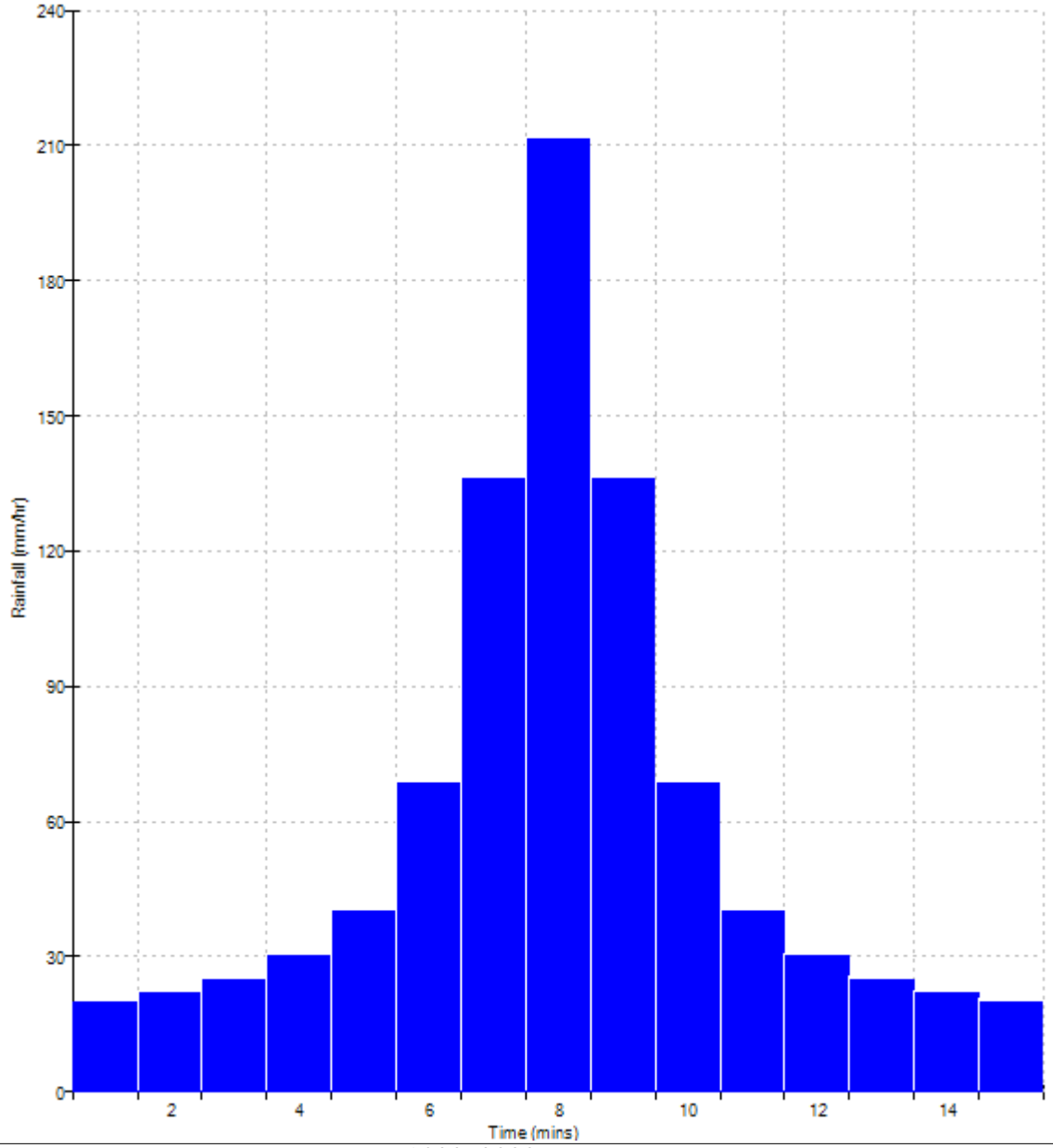
FEH Rainfall Version	2013
Site Location	GB 403835 89815 SZ 03835 89815
Data Type	Point
Peak Intensity (mm/hr)	122.559
Ave. Intensity (mm/hr)	34.680
Return Period (years)	2.0



Rainfall profile

Storm duration (mins) 15

FEH Data	
FEH Rainfall Version	2013
Site Location	GB 403835 89815 SZ 03835 89815
Data Type	Point
Peak Intensity (mm/hr)	211.408
Ave. Intensity (mm/hr)	59.821
Return Period (years)	10.0

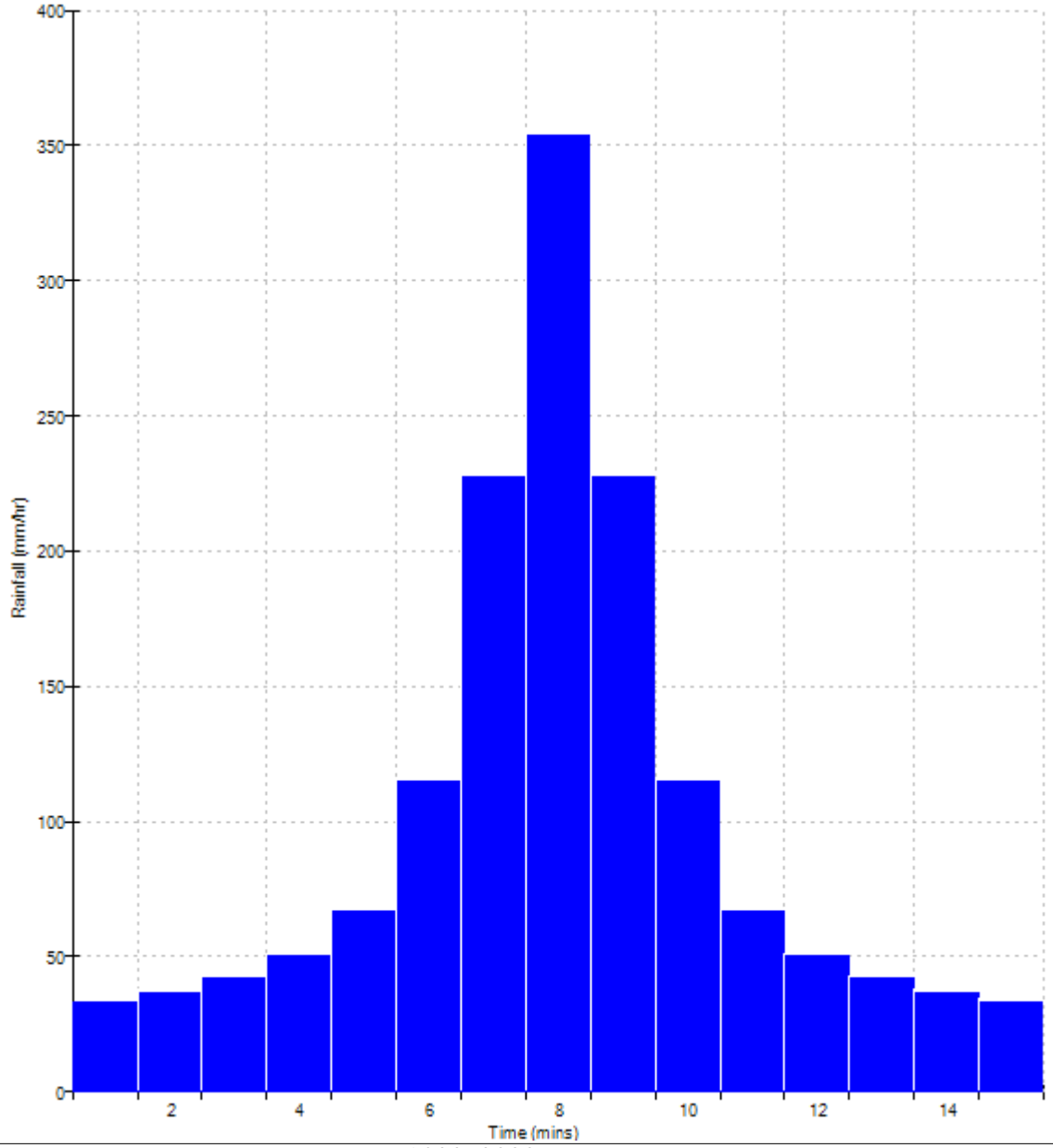


Rainfall profile

Storm duration (mins) 15

FEH Data

FEH Rainfall Version	2013
Site Location	GB 403835 89815 SZ 03835 89815
Data Type	Point
Peak Intensity (mm/hr)	353.815
Ave. Intensity (mm/hr)	100.117
Return Period (years)	100.0



Design Settings

Rainfall Methodology	FEH-22	Maximum Time of Concentration (mins)	30.00	Preferred Cover Depth (m)	1.200
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0	Include Intermediate Ground	✓
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00	Enforce best practice design rules	x
CV	0.750	Connection Type	Level Soffits		
Time of Entry (mins)	5.00	Minimum Backdrop Height (m)	0.200		

Nodes

	Name	Area (ha)	T of E (mins)	Cover Level (m)	Depth (m)
✓	SW01 (FC)			3.250	1.825
✓	SW02			2.570	1.465
✓	Attenuation Tank	0.023	5.00	3.250	1.800

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)
1.001	11.188	35.0	150	1 STANDARD	3.250	1.425	1.675	2.570	1.105	1.315
1.000	2.500	100.0	150	1 STANDARD	3.250	1.450	1.650	3.250	1.425	1.675

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.001	SW01 (FC)	1350	Manhole	1 STANDARD	SW02	1200	Manhole	1 STANDARD
1.000	Attenuation Tank		Junction		SW01 (FC)	1350	Manhole	1 STANDARD

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type
SW01 (FC)	403812.460	89839.556	3.250	1.825	1350	Manhole	1 STANDARD	1	1.000	1.425	150	1 STANDARD
								0	1.001	1.425	150	1 STANDARD
SW02	403803.508	89846.267	2.570	1.465	1200	Manhole	1 STANDARD	1	1.001	1.105	150	1 STANDARD
Attenuation Tank	403814.476	89838.054	3.250	1.800		Junction		0	1.000	1.450	150	1 STANDARD

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	0.840	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 %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0	100	45	0	0
30	0	0	0				

Node SW01 (FC) Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	1.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0044-1000-1225-1000
Invert Level (m)	1.425	Min Outlet Diameter (m)	0.075
Design Depth (m)	1.225	Min Node Diameter (mm)	1200
Design Flow (l/s)	1.0		

Node Attenuation Tank Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.450
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	122

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	6.0	6.0	1.200	6.0	18.0	1.201	0.0	18.0

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 15 minute summer	107.168	30.325	30 year 360 minute summer	35.864	9.229
2 year 15 minute winter	75.206	30.325	30 year 360 minute winter	23.313	9.229
2 year 30 minute summer	70.418	19.926	30 year 480 minute summer	27.747	7.333
2 year 30 minute winter	49.416	19.926	30 year 480 minute winter	18.435	7.333
2 year 60 minute summer	47.538	12.563	30 year 600 minute summer	22.376	6.120
2 year 60 minute winter	31.583	12.563	30 year 600 minute winter	15.289	6.120
2 year 120 minute summer	34.742	9.181	30 year 720 minute summer	19.681	5.275
2 year 120 minute winter	23.082	9.181	30 year 720 minute winter	13.227	5.275
2 year 180 minute summer	28.389	7.306	30 year 960 minute summer	15.835	4.170
2 year 180 minute winter	18.454	7.306	30 year 960 minute winter	10.489	4.170
2 year 240 minute summer	23.089	6.102	30 year 1440 minute summer	11.168	2.993
2 year 240 minute winter	15.340	6.102	30 year 1440 minute winter	7.506	2.993
2 year 360 minute summer	17.945	4.618	100 year +45% CC 15 minute summer	501.107	141.796
2 year 360 minute winter	11.665	4.618	100 year +45% CC 15 minute winter	351.654	141.796
2 year 480 minute summer	14.172	3.745	100 year +45% CC 30 minute summer	335.617	94.968
2 year 480 minute winter	9.416	3.745	100 year +45% CC 30 minute winter	235.521	94.968
2 year 600 minute summer	11.591	3.170	100 year +45% CC 60 minute summer	230.609	60.943
2 year 600 minute winter	7.920	3.170	100 year +45% CC 60 minute winter	153.211	60.943
2 year 720 minute summer	10.302	2.761	100 year +45% CC 120 minute summer	142.292	37.603
2 year 720 minute winter	6.924	2.761	100 year +45% CC 120 minute winter	94.535	37.603
2 year 960 minute summer	8.409	2.214	100 year +45% CC 180 minute summer	108.747	27.984
2 year 960 minute winter	5.570	2.214	100 year +45% CC 180 minute winter	70.689	27.984
2 year 1440 minute summer	6.078	1.629	100 year +45% CC 240 minute summer	85.361	22.558
2 year 1440 minute winter	4.085	1.629	100 year +45% CC 240 minute winter	56.712	22.558
30 year 15 minute summer	276.517	78.245	100 year +45% CC 360 minute summer	64.118	16.500
30 year 15 minute winter	194.047	78.245	100 year +45% CC 360 minute winter	41.678	16.500
30 year 30 minute summer	183.843	52.021	100 year +45% CC 480 minute summer	49.819	13.166
30 year 30 minute winter	129.013	52.021	100 year +45% CC 480 minute winter	33.099	13.166
30 year 60 minute summer	125.010	33.036	100 year +45% CC 600 minute summer	40.344	11.035
30 year 60 minute winter	83.054	33.036	100 year +45% CC 600 minute winter	27.566	11.035
30 year 120 minute summer	78.945	20.863	100 year +45% CC 720 minute summer	35.618	9.546
30 year 120 minute winter	52.449	20.863	100 year +45% CC 720 minute winter	23.937	9.546
30 year 180 minute summer	60.774	15.639	100 year +45% CC 960 minute summer	28.824	7.590
30 year 180 minute winter	39.504	15.639	100 year +45% CC 960 minute winter	19.093	7.590
30 year 240 minute summer	47.808	12.634	100 year +45% CC 1440 minute summer	20.448	5.480
30 year 240 minute winter	31.763	12.634	100 year +45% CC 1440 minute winter	13.742	5.480

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	SW01 (FC)	24	1.591	0.166	2.0	0.2371	0.0000	SURCHARGED
15 minute summer	SW02	1	1.105	0.000	0.7	0.0000	0.0000	OK
30 minute winter	Attenuation Tank	25	1.589	0.139	3.4	0.8282	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 winter	SW01 (FC)	Hydro-Brake®	SW02	0.7				1.9
30 minute winter	Attenuation Tank	1.000	SW01 (FC)	2.0	0.428	0.111	0.0433	

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	SW01 (FC)	57	2.020	0.595	2.4	0.8515	0.0000	SURCHARGED
15 minute summer	SW02	1	1.105	0.000	0.7	0.0000	0.0000	OK
60 minute winter	Attenuation Tank	57	2.020	0.570	4.4	3.3955	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)
60 minute winter	SW01 (FC)	Hydro-Brake®	SW02	0.7				6.4
60 minute winter	Attenuation Tank	1.000	SW01 (FC)	2.4	0.453	0.136	0.0440	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	SW01 (FC)	98	2.785	1.360	2.2	1.9455	0.0000	SURCHARGED
15 minute summer	SW02	1	1.105	0.000	0.8	0.0000	0.0000	OK
120 minute winter	Attenuation Tank	98	2.785	1.335	5.0	7.1845	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)
120 minute winter	SW01 (FC)	Hydro-Brake®	SW02	1.0				14.6
120 minute winter	Attenuation Tank	1.000	SW01 (FC)	2.2	0.391	0.122	0.0440	

Design Settings

Rainfall Methodology	FEH-22	Maximum Time of Concentration (mins)	30.00	Preferred Cover Depth (m)	1.200
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0	Include Intermediate Ground	✓
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00	Enforce best practice design rules	x
CV	0.750	Connection Type	Level Soffits		
Time of Entry (mins)	5.00	Minimum Backdrop Height (m)	0.200		

Nodes

	Name	Area (ha)	T of E (mins)	Cover Level (m)	Depth (m)
✓	SW03 (FC)			3.000	1.825
✓	EX7803			2.330	1.360
✓	Attenuation Tank	0.023	5.00	3.000	1.800

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)
1.001	17.366	84.7	150	1 STANDARD	3.000	1.175	1.675	2.330	0.970	1.210
1.000	2.500	100.0	150	1 STANDARD	3.000	1.200	1.650	3.000	1.175	1.675

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.001	SW03 (FC)	1350	Manhole	1 STANDARD	EX7803	1200	Manhole	1 STANDARD
1.000	Attenuation Tank		Junction		SW03 (FC)	1350	Manhole	1 STANDARD

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	MH Type	Connections	Link	IL (m)	Dia (mm)	Link Type
SW03 (FC)	403802.783	89822.954	3.000	1.825	1350	Manhole	1 STANDARD	1	1.000	1.175	150	1 STANDARD
								0	1.001	1.175	150	1 STANDARD
EX7803	403785.435	89822.160	2.330	1.360	1200	Manhole	1 STANDARD	1	1.001	0.970	150	1 STANDARD
Attenuation Tank	403805.281	89823.027	3.000	1.800		Junction		0	1.000	1.200	150	1 STANDARD

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	0.840	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 %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0	100	45	0	0
30	0	0	0				

Node SW03 (FC) Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Downstream Link	1.001	Sump Available	✓
Replaces Downstream Link	✓	Product Number	CTL-SHE-0044-1000-1225-1000
Invert Level (m)	1.175	Min Outlet Diameter (m)	0.075
Design Depth (m)	1.225	Min Node Diameter (mm)	1200
Design Flow (l/s)	1.0		

Node Attenuation Tank Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	1.200
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	122

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	6.0	6.0	1.200	6.0	18.0	1.201	0.0	18.0

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 15 minute summer	107.168	30.325	30 year 360 minute summer	35.864	9.229
2 year 15 minute winter	75.206	30.325	30 year 360 minute winter	23.313	9.229
2 year 30 minute summer	70.418	19.926	30 year 480 minute summer	27.747	7.333
2 year 30 minute winter	49.416	19.926	30 year 480 minute winter	18.435	7.333
2 year 60 minute summer	47.538	12.563	30 year 600 minute summer	22.376	6.120
2 year 60 minute winter	31.583	12.563	30 year 600 minute winter	15.289	6.120
2 year 120 minute summer	34.742	9.181	30 year 720 minute summer	19.681	5.275
2 year 120 minute winter	23.082	9.181	30 year 720 minute winter	13.227	5.275
2 year 180 minute summer	28.389	7.306	30 year 960 minute summer	15.835	4.170
2 year 180 minute winter	18.454	7.306	30 year 960 minute winter	10.489	4.170
2 year 240 minute summer	23.089	6.102	30 year 1440 minute summer	11.168	2.993
2 year 240 minute winter	15.340	6.102	30 year 1440 minute winter	7.506	2.993
2 year 360 minute summer	17.945	4.618	100 year +45% CC 15 minute summer	501.107	141.796
2 year 360 minute winter	11.665	4.618	100 year +45% CC 15 minute winter	351.654	141.796
2 year 480 minute summer	14.172	3.745	100 year +45% CC 30 minute summer	335.617	94.968
2 year 480 minute winter	9.416	3.745	100 year +45% CC 30 minute winter	235.521	94.968
2 year 600 minute summer	11.591	3.170	100 year +45% CC 60 minute summer	230.609	60.943
2 year 600 minute winter	7.920	3.170	100 year +45% CC 60 minute winter	153.211	60.943
2 year 720 minute summer	10.302	2.761	100 year +45% CC 120 minute summer	142.292	37.603
2 year 720 minute winter	6.924	2.761	100 year +45% CC 120 minute winter	94.535	37.603
2 year 960 minute summer	8.409	2.214	100 year +45% CC 180 minute summer	108.747	27.984
2 year 960 minute winter	5.570	2.214	100 year +45% CC 180 minute winter	70.689	27.984
2 year 1440 minute summer	6.078	1.629	100 year +45% CC 240 minute summer	85.361	22.558
2 year 1440 minute winter	4.085	1.629	100 year +45% CC 240 minute winter	56.712	22.558
30 year 15 minute summer	276.517	78.245	100 year +45% CC 360 minute summer	64.118	16.500
30 year 15 minute winter	194.047	78.245	100 year +45% CC 360 minute winter	41.678	16.500
30 year 30 minute summer	183.843	52.021	100 year +45% CC 480 minute summer	49.819	13.166
30 year 30 minute winter	129.013	52.021	100 year +45% CC 480 minute winter	33.099	13.166
30 year 60 minute summer	125.010	33.036	100 year +45% CC 600 minute summer	40.344	11.035
30 year 60 minute winter	83.054	33.036	100 year +45% CC 600 minute winter	27.566	11.035
30 year 120 minute summer	78.945	20.863	100 year +45% CC 720 minute summer	35.618	9.546
30 year 120 minute winter	52.449	20.863	100 year +45% CC 720 minute winter	23.937	9.546
30 year 180 minute summer	60.774	15.639	100 year +45% CC 960 minute summer	28.824	7.590
30 year 180 minute winter	39.504	15.639	100 year +45% CC 960 minute winter	19.093	7.590
30 year 240 minute summer	47.808	12.634	100 year +45% CC 1440 minute summer	20.448	5.480
30 year 240 minute winter	31.763	12.634	100 year +45% CC 1440 minute winter	13.742	5.480

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	SW03 (FC)	24	1.341	0.166	2.0	0.2371	0.0000	SURCHARGED
15 minute summer	EX7803	1	0.970	0.000	0.7	0.0000	0.0000	OK
30 minute winter	Attenuation Tank	25	1.339	0.139	3.4	0.8282	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 winter	SW03 (FC)	Hydro-Brake®	EX7803	0.7				1.9
30 minute winter	Attenuation Tank	1.000	SW03 (FC)	2.0	0.428	0.111	0.0433	

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	SW03 (FC)	57	1.770	0.595	2.4	0.8515	0.0000	SURCHARGED
15 minute summer	EX7803	1	0.970	0.000	0.7	0.0000	0.0000	OK
60 minute winter	Attenuation Tank	57	1.770	0.570	4.4	3.3955	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)
60 minute winter	SW03 (FC)	Hydro-Brake®	EX7803	0.7				6.4
60 minute winter	Attenuation Tank	1.000	SW03 (FC)	2.4	0.453	0.136	0.0440	

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	SW03 (FC)	98	2.535	1.360	2.2	1.9455	0.0000	SURCHARGED
15 minute summer	EX7803	1	0.970	0.000	0.8	0.0000	0.0000	OK
120 minute winter	Attenuation Tank	98	2.535	1.335	5.0	7.1845	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)
120 minute winter	SW03 (FC)	Hydro-Brake®	EX7803	1.0				14.6
120 minute winter	Attenuation Tank	1.000	SW03 (FC)	2.2	0.391	0.122	0.0440	

Appendix E Wessex Water Consultation

Hamza El-Adnany

From: Planning Liaison <planning.liaison@wessexwater.co.uk>
Sent: 05 February 2024 08:20
To: Hamza El-Adnany
Subject: FW: WW Dev Resp PL51645 7-9 Salterns Way, Poole, BH14 8JR
Attachments: SewerMap01.pdf; SewerMap02.pdf

Good Morning Hamza,

Thank you for your email.

Existing Assets

According to our records there is an existing 750mm diameter sewer which will be affected by the proposals. If planning is permitted you will need to apply for a sewer build near agreement. If your proposals are to build within 3 metres of the public sewer and meet our standard criteria, you have our consent to proceed without the need to contact us. If formal agreement is not made with Wessex Water as sewage undertaker difficulties may arise should you wish to sell your house. Wessex water will not accept liability for any damage to your property or costs associated for any repairs or maintenances to the public sewer. To apply for a build near agreement please visit our website https://developerservices.wessexwater.co.uk/your-project/developing-a-new-site

If your structure requires Building Regulations, the appointed Building Control Officer or Private Inspector for the site will need to view and approve the new foundations & you should discuss the proximity of the public sewer with them.

For further assistance please contact our Sewer Buildover Team; sewer.buildover@wessexwater.co.uk

Surface Water

Regarding the discharge rate into the surface water sewer, Wessex Water would accept a restricted rate of 2l/s including the 1 in 100 year event into the 225mm public surface water sewer in Salterns Way. This must not be exceeded.

The surface water manhole details are as follows:
MH7803: Cover Level: 2.330 Invert Level: 0.970
MH8806: Cover Level: 2.670 Invert Level: 1.140

Foul Water

Subject to application, Wessex Water would accept the foul flows only from the proposed development into the 200mm public foul sewer running along Salterns Way. For more information and how to apply, see here: Sewer connection (wessexwater.co.uk)

The foul water manhole details are as follows:
MH8805: Cover Level: 2.628 Invert Level: 0.448
MH7801: Cover Level: 2.620 Invert Level: -0.430

Kind regards,

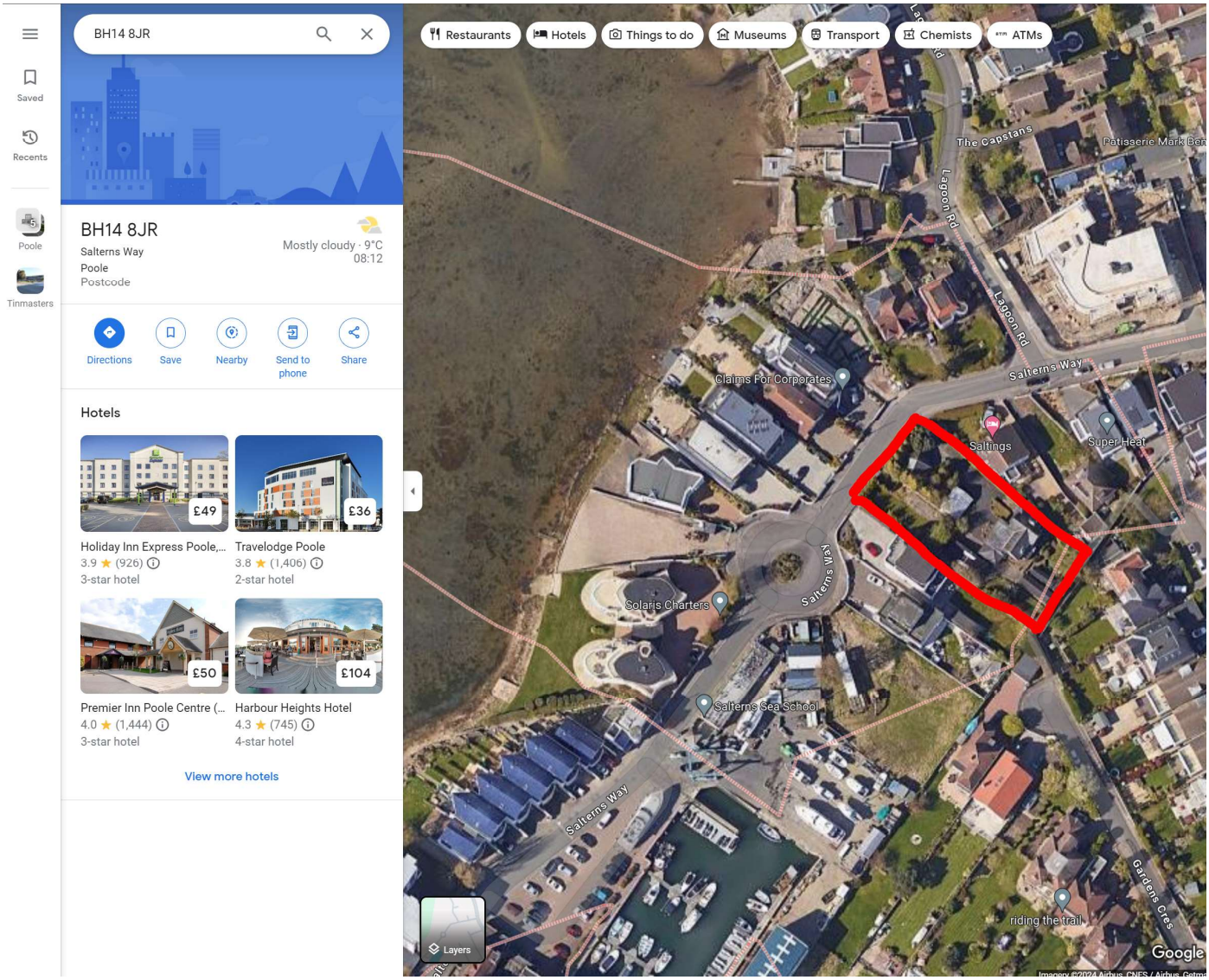
Lydia Daniel
Senior Planning Liaison Technician
Wessex Water
Claverton Down Bath BA2 7WW
wessexwater.co.uk

These comments are based upon known circumstances prevailing at the time of writing. A review of the contents of this email is required where 18 months or more have elapsed since issue or in the light of significant changes likely to impact upon the response (e.g. changes in development numbers or phasing). Please email review requests to planning.liaison@wessexwater.co.uk

From: Hamza El-Adnany <Hamza.ElAdnany@slrconsulting.com>
Sent: Friday, February 2, 2024 9:18 AM
To: Planning Liaison <planning.liaison@wessexwater.co.uk>
Subject: 7-9 Salterns Way, Poole, BH14 8JR

Dear Wessex Water,

We are flood risk consultants preparing a drainage strategy for a proposed residential redevelopment at 7-9 Salterns Way, Poole, BH14 8JR. The site currently consists of a dwelling as shown in the image below and the new proposal seeks to redevelop this dwelling into 2 new dwellings.



A surface water runoff strategy will likely require a connection into the Wessex water sewer given the site's proximity to the sea. The site is likely to have an existing connection into the sewer located along the site's western boundary.

We are also looking at other connection points into the sewer. Based on the existing impermeable area of the site, we have estimated the existing runoff rate using the Modified Rational Method. This is outlined below:

Q = C x I x A

Where C = 2.78

I = rainfall intensity (taken from microdrainage rainfall profile tool using a 10 year return period, which is likely to be the return period that the private sewer has been designed to accommodate and a 15 minute storm, which has been assessed to be the critical storm for this small site)

A = area in hectares

Q = 2.78 x 59.821 x 0.028

Q = 4.7 l/s

A betterment of 40% on these existing rates is proposed. This is equivalent to a discharge rate of 2.8 l/s into the public surface water sewer. We would like to agree this discharge rate for all events up to and including the 1 in 100 year plus 45% climate change event.

Could we please get chamber information (cover & invert levels) for chambers 7803 and 8806?

With regards to foul water, we would also look to propose a foul connection into the foul sewer on Salterns Way, most likely point of connection at chamber 8805 or upstream of chamber 7801. As of yet we do not have an estimate for the volume of discharge per day. Could you please inform us of any constraints such as flow capacity that you feel are likely to come up and which chamber is the preferred point of connection? Could we please also get chamber information (cover & invert levels) for chambers 8805 & 7801?

Attached are Wessex Water sewer maps for reference.

Please can you provide any comments?

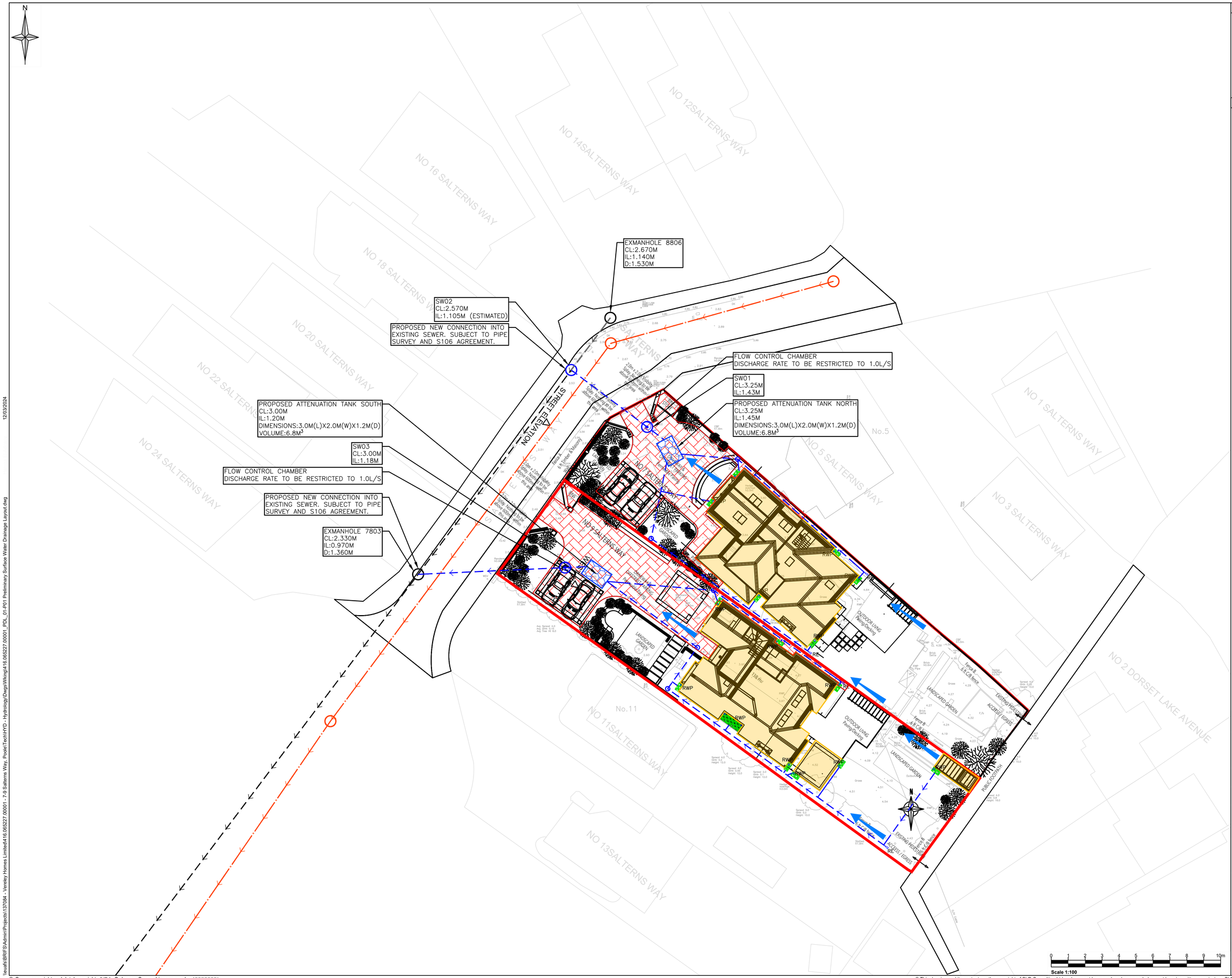
Kind regards,

Hamza El-Adnany
Senior Engineer - Hydrology & Hydrogeology

O +44 3300 886631
M 07513725534
E Hamza.ElAdnany@slrconsulting.com

SLR Consulting Limited
3rd Floor, Brew House, Jacob Street, Bristol United Kingdom BS2 0EQ

Appendix F Preliminary Surface Water Drainage Strategy



Notes:

1. DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT DOCUMENTS AND SLR DRAINAGE STRATEGY.
2. DRAINAGE STRATEGY IS SUBJECT TO DETAILED DESIGN INCLUDING LEVELS.
3. ALL LEVELS ARE SHOWN IN METRES ABOVE ORDNANCE DATUM.
4. PROPOSED OUTFALL CONNECTION TO EXISTING MANHOLE SUBJECT TO CCTV SURVEY.
5. DRAINAGE STRATEGY DESIGN ATTENUATES SURFACE WATERRUNOFF FOR THE 1 IN 100 YEAR EVENT PLUS 45% CLIMATE CHANGE.
6. DISPLAYED ACRONYMS:
- CL - COVER LEVEL
- IL - INVERT LEVEL
- D - DEPTH

Legend:

- SITE BOUNDARY
- EXISTING PUBLIC SURFACE WATER SEWER
- EXISTING PUBLIC FOUL WATER SEWER
- PROPOSED SURFACE WATER DRAIN
- INDICATIVE RAIN WATER PIPE LOCATION
- PROPOSED RODDING EYE
- PROPOSED ATTENUATION TANK
- PROPOSED UNLINED PERMEABLE PAVING
- PROPOSED RAIN GARDEN
- PROPOSED FLOOD EXCEEDANCE ROUTE
- PROPOSED IMPERMEABLE ROOF SURFACE AREA (0.046HA)

Rev	Amendments	Date	By	Chk	Auth

SLR

www.slrconsulting.com

Drawing Status & Suitability Code: **FOR INFORMATION**

Client: VERELEY HOMES LIMITED

Project: 7-9 SALTERNS WAY
POOLE

Drawing Title: PRELIMINARY SURFACE WATER DRAINAGE LAYOUT

Scale		SLR Project No.
1:200	@ A1	416.065227.00001

Designed	Drawn	Checked	Authorised
HE	HE	NB	NB
Date	Date	Date	Date
MAR 2024	MAR 2024	MAR 2024	MAR 2024

Drawing Number: **416.065227.00001_PDL_01** Rev: **P01**

12/03/2024

\\eusafs\BRIFS\Admin\Projects\137084 - Vereley Homes Limited\416.065227.00001 - 7-9 Salterns Way, Poole\Tech\HYD - Hydrology\Dwgs\Wking\416.065227.00001_PDL_01-P01 Preliminary Surface Water Drainage Layout.dwg

Appendix G Hydro-brake Maintenance Details

Hydro International Ltd
Shearwater House
Clevedon Hall Estate
Victoria Road
Clevedon
Somerset BS21 7RD

Tel: 01275 878371 (general enquiries)
Tel: 01275 337937 (Hydro-Brake sales/support)

Fax: 01275 874979

e-mail: enquiries@hydro-int.com
website: www.hydro-int.com

Agrément Certificate

08/4596

Product Sheet 1

HYDRO INTERNATIONAL HYDRO-BRAKE FLOW CONTROLS

S-RANGE HYDRO-BRAKE OPTIMUM FLOW CONTROLS

This Agrément Certificate Product Sheet(1) relates to S-Range Hydro-Brake Optimum Flow Controls(2), a range of units to control the discharge outlet flow in surface/storm water management systems.

(1) Hereinafter referred to as 'Certificate'.
(2) Hydro-Brake, Hydro-Brake Optimum, Flush-Flo and Kick-Flo are trademarks of Hydro International Ltd.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

Flow characteristics — the performance characteristics of the flow controls have been assessed (see section 6).

Strength — the ability of the flow controls to withstand characteristic loads has been assessed (see section 8).

Durability — under normal service conditions, the flow controls will have a life expectancy in excess of the structure in which they are installed (see section 10).

The BBA has awarded this Certificate to the company named above for the products described herein. These products have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of Fourth issue: 14 November 2017

Originally certificated on 18 October 2008

Paul Valentine
Technical Excellence Director

Claire Curtis-Thomas
Chief Executive

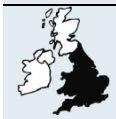
The BBA is a UKAS accredited certification body - Number 113.

The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

Regulations

In the opinion of the BBA, S-Range Hydro-Brake Optimum Flow Controls, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales) (as amended)

Requirement: **H3(3)** **Rainwater drainage**
Comment: The products can be used in a construction to satisfy this Requirement. See section 6 of this Certificate.

Requirement: **7** **Materials and workmanship**
Comment: The products are acceptable. See section 10 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

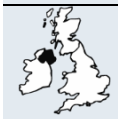
Regulation: **8(1)(2)** **Durability, workmanship and fitness of materials**
Comment: The products are acceptable. See sections 9 and 10 and the *Installation* part of this Certificate.

Regulation: **9** **Building standards applicable to construction**
Standard: 3.6(a)(b) Surface water drainage
Comment: The products can be used in a construction to satisfy this Standard, with reference to clauses 3.6.1(1)(2) to 3.6.5(1)(2). See section 6 of this Certificate.

Standard: 7.1(a)(b) Statement of sustainability
Comment: The products can contribute to satisfying the relevant requirements of Regulation 9, Standards 1 to 6, and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.

Regulation: **12** **Building standards applicable to conversions**
Comment: All comments given for the products under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1(1)(2) and Schedule 6(1)(2).

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation: **23(a)(i)(iii)(b)** **Fitness of materials and workmanship**
Comment: The products are acceptable. See section 10 and the *Installation* part of this Certificate.

Regulation: **82** **Rain-water drainage**
Comment: The products can be used in a construction to satisfy this Regulation. See section 6 of this Certificate.

Construction (Design and Management) Regulations 2015
Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See sections: 3 *Delivery and site handling* (3.3) and 12 *General* (12.1) of this Certificate.

1 Description

1.1 S-Range Hydro-Brake Optimum Flow Controls are vortex flow controls manufactured from 3, 5 or 8 mm thick grade 304 stainless steel to ASTM A240. Alternative material thicknesses and grades are available depending on the application, but are outside the scope of this Certificate. The Certificate holder should be contacted for further details.

1.2 Each unit is designed and manufactured to meet specific hydraulic requirements (see section 7). The configuration of the inlet, volute and outlet is varied to achieve the required discharge control characteristics. The units may be fitted with a fixed inlet or an adjustable inlet gate to allow for post-installation adjustment of the discharge flow rate by up to 20% (see Figure 1).

Figure 1 Fixed and adjustable inlet arrangements

1.3 The units are available in a range of sizes to give design flow rates from 0.7 to 250 l·s^{-1}, suitable for use in surface/stormwater management applications. A summary of technical information is given in Table 1.

Table 1 Summary of technical information

Characteristic (unit)	Typical range of values
Design flow rate (l·s^{-1})	0.7 to 250
Design head (m)	0.4 to 4
Maximum lateral dimension (mm)	
Lug mounted units	180 to 2000
Backplate mounted units	Dependent on discharge pipe size
Push-fit units	180 to 2000
Mass (kg) excluding packaging	
Lug mounted units	6 to 680
Backplate mounted units	Dependent on discharge pipe size
Push-fit units	6 to 680

1.4 Each unit is supplied fully assembled including:

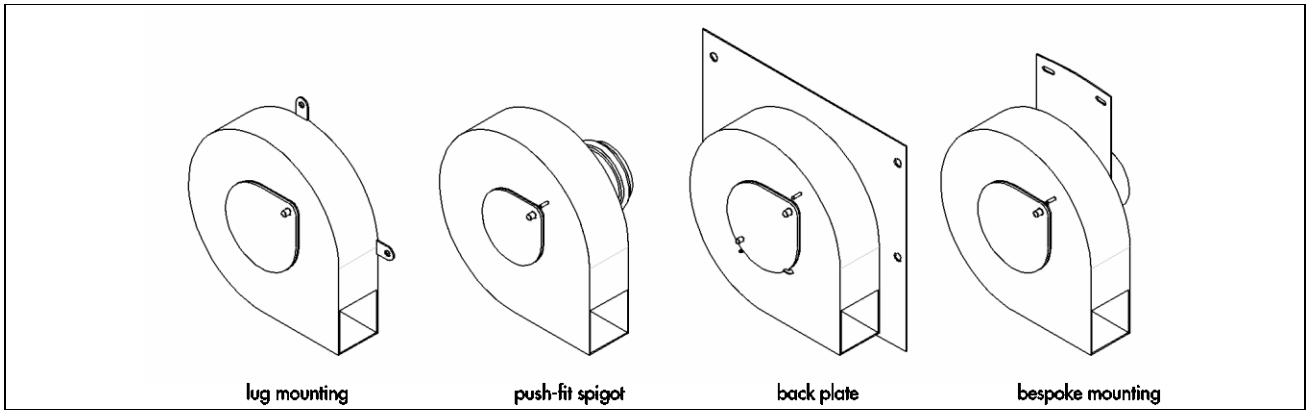
- an S-Range Hydro-Brake Optimum Flow Control with integral bypass door on the front face of the unit, outlet pipe location spigot and mounting face gasket or push-fit sealing rings

- wire rope to allow remote operation of the pivoting bypass door (3 mm diameter rope consisting of 7 x 7 strand elements of 0.018 mm diameter) and stainless steel wire rope attachment brackets
- mounting anchor bolts (A4 316 stainless steel). The performance and suitability of the mounting bolts is outside the scope of this Certificate; the Certificate holder should be contacted for advice on the most appropriate fixings for individual projects.

1.5 The flow controls are available with various types of mounting arrangement (see Figure 2):

- lug mounting — lugs are provided at points around the perimeter of the flow control mounting face. This is appropriate for the majority of applications where the outlet diameter of the installation structure is approximately 0.5 times the flow control body diameter or less
- push-fit spigot — a push-fit spigot with rubber sealing rings is provided. A single lug may also be provided on the outside perimeter of the mounting face to prevent rotation of the flow control in service. Precise specification of the outlet pipe is essential for push-fit mounting, in order to ensure a watertight seal
- backplate mounting — a rectangular mounting plate is provided to allow fixing to the outlet of the installation structure where lug mounting is not appropriate. If a flat surface is not available, the mounting plate may also be provided curved to the same radius as the chamber in which it is to be fitted.

Figure 2 Standard mounting arrangements



1.6 The units may be supplied for installation in purpose-built or existing structural housings on site. These must have adequate strength to resist the loads imposed by the unit. The design of these structures is outside the scope of this Certificate but the performance and durability of the flow control will be unaffected, provided it is installed in accordance with the recommendations of this Certificate.

1.7 The units may also be supplied ready-fitted to purpose-built reinforced concrete or plastic manhole chambers ready for installation into the ground. The performance of these chambers is outside the scope of this Certificate.

2 Manufacture

2.1 The products are manufactured from austenitic stainless steel sheet which is cut, rolled and welded to the required dimensions.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management system of Hydro International Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by Lloyd's Register Quality Assurance Limited (Certificate LRQ 0961366).

3 Delivery and site handling

3.1 S-Range Hydro-Brake Optimum Flow Controls are supplied wrapped in polythene and plywood packaging for small units and on a pallet for large units. They should be handled and stored appropriately to avoid being dropped or receiving impacts, eg from construction plant.

3.2 Each unit is stamped with the Certificate holder's unique project reference number and carries a label bearing the Certificate holder's contact information and advice on orientation. The packaging also bears details of the package weight and client details.

3.3 Care should be taken handling the units and when lowering into position for installation. Where appropriate, larger units should be lifted via the fitted lugs using mechanical lifting/lowering equipment.

Assessment and Technical Investigations

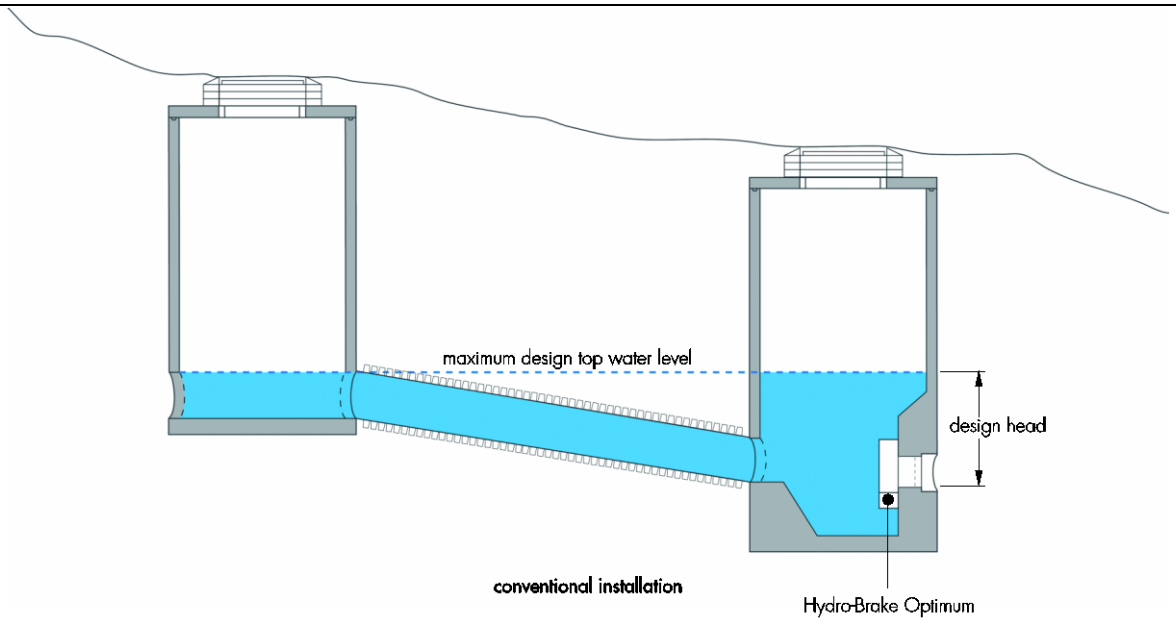
The following is a summary of the assessment and technical investigations carried out on S-Range Hydro-Brake Optimum Flow Controls.

Design Considerations

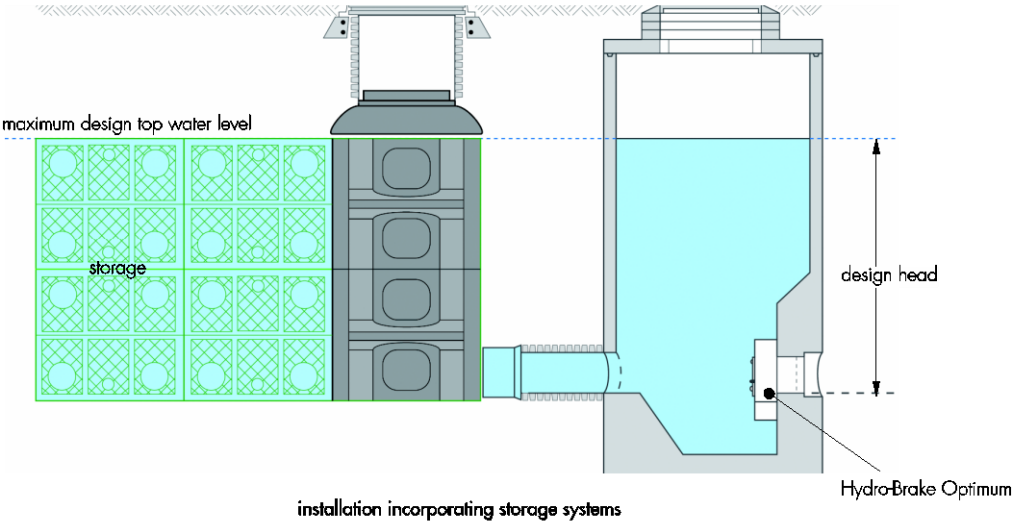
4 Use

4.1 S-Range Hydro-Brake Optimum Flow Controls are intended to restrict the outlet flow from a surface/storm water management system by increasing back pressure, achieved by inducing a vortex flow pattern in the water passing through the device. In these applications, the units are often used in conjunction with storage facilities, including geocellular storage systems, concrete tanks, oversized pipes and ponds. The performance of these items is outside the scope of this Certificate. Guidance on design of sustainable drainage systems is given in Planning Policy Statement 25 *Development and Flood Risk* and CIRIA C753 : 2015. Typical installation details are shown in Figure 3.

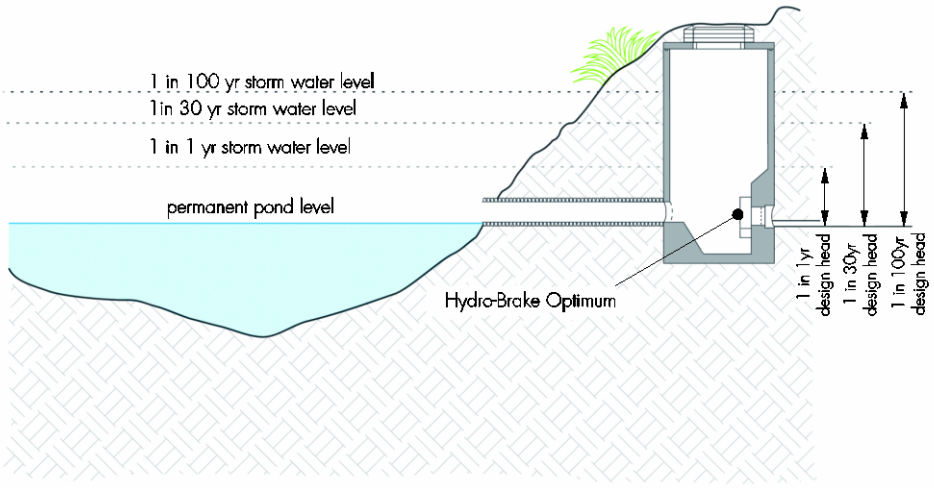
Figure 3 Typical applications and design head



conventional installation



installation incorporating storage systems



pond installation

4.2 The units are self-activating without any moving parts and do not, therefore, require external power.

4.3 As a matter of good design practice, measures should be taken to remove silt sediment and debris from the surface water at an early stage to prevent problems further downstream.

4.4 It is recommended to maintain a minimum clear opening of 75 mm in a surface water drainage system. In some cases, it may be necessary to use a flow control with a smaller minimum opening. In which case, the installation of screens or debris removal systems upstream of the device is recommended.

5 Practicability of installation

The products are designed to be installed by a competent contractor, experienced with these types of products.

6 Flow characteristics

6.1 Owing to the 'S'-shaped head-flow characteristic, the units are able to pass greater volume flow rates at lower heads, whilst still limiting the flow at the duty/design point to an acceptable level. A typical head versus flow characteristic for the units is given in Figures 4, 5 and 6.

6.2 The units have a hydraulic characteristic, comprising three distinct stages corresponding to different phases of operation (see Figures 4, 5 and 6):

- pre-initiation phase — at low heads, the flow control provides similar performance to an orifice plate with equivalent size to its outlet(1). Flow rate accuracy of ±5% of the ultimate duty/design flow is typically achievable in this region
- vortex initiation phase — as the head increases, vortex motion will start to develop inside the unit, starting to restrict the flow(1). Flow rate accuracy of –5% of flow to +5% of phase peak is typically achievable in this region
- post-initiation/design phase — following vortex initiation, the flow control characteristic stabilises, providing hydraulic performance equivalent to a substantially smaller orifice plate than the unit's outlet. The units can be specified to give a duty/design point in any part of this region, though in most practical cases specification will be at flow rates above the initiation phase peak (corresponding to the Flush-Flo point). Flow rate accuracy of ±5% of flow is typically achievable in this region.

As the water level subsides and water in the device drains, the energy within the flow reduces and the vortex collapses. Air is drawn into the volute and the unit returns to operating in a similar manner to an orifice of the same cross sectional area. This drains the system quickly so that the upstream network is ready for the next event.

(1) Although a flow control would not usually be selected with the duty/design point in this region, this part of the characteristic will have implications to overall drainage system operation.

Figure 4 Pre-initiation phase

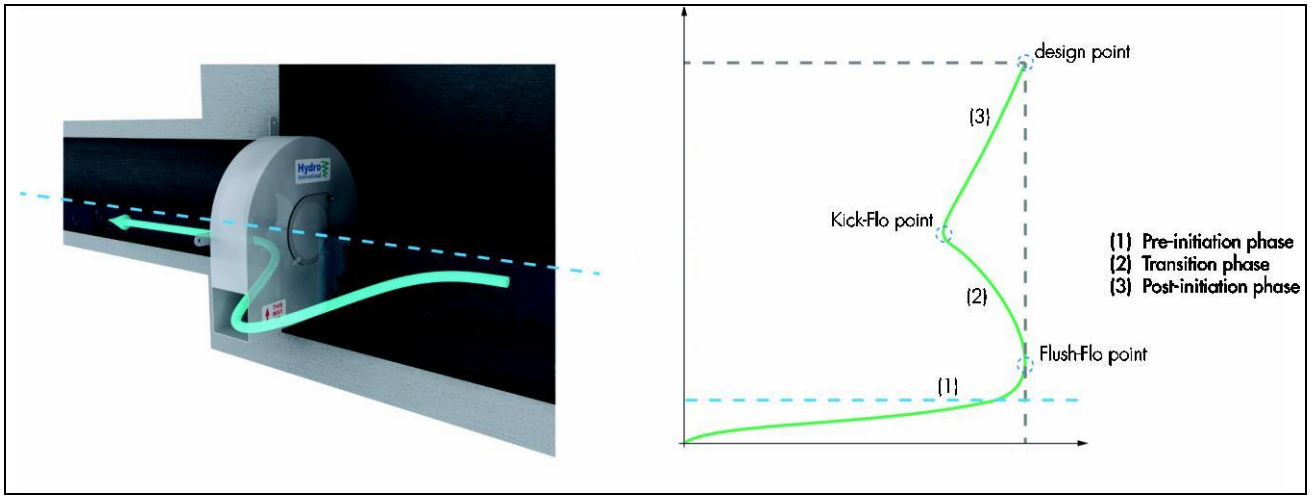


Figure 5 Vortex initiation phase

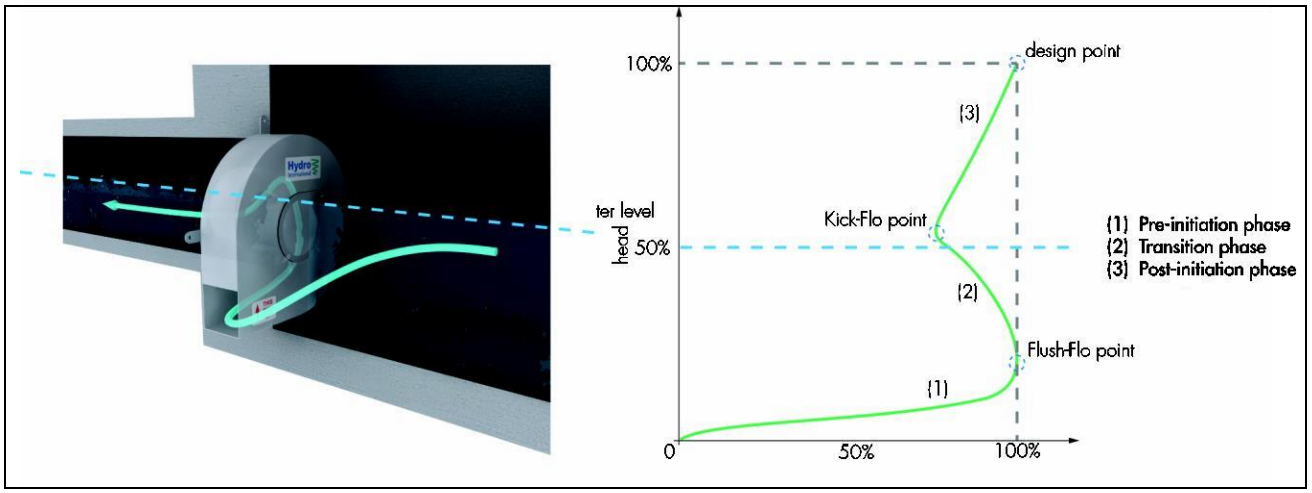
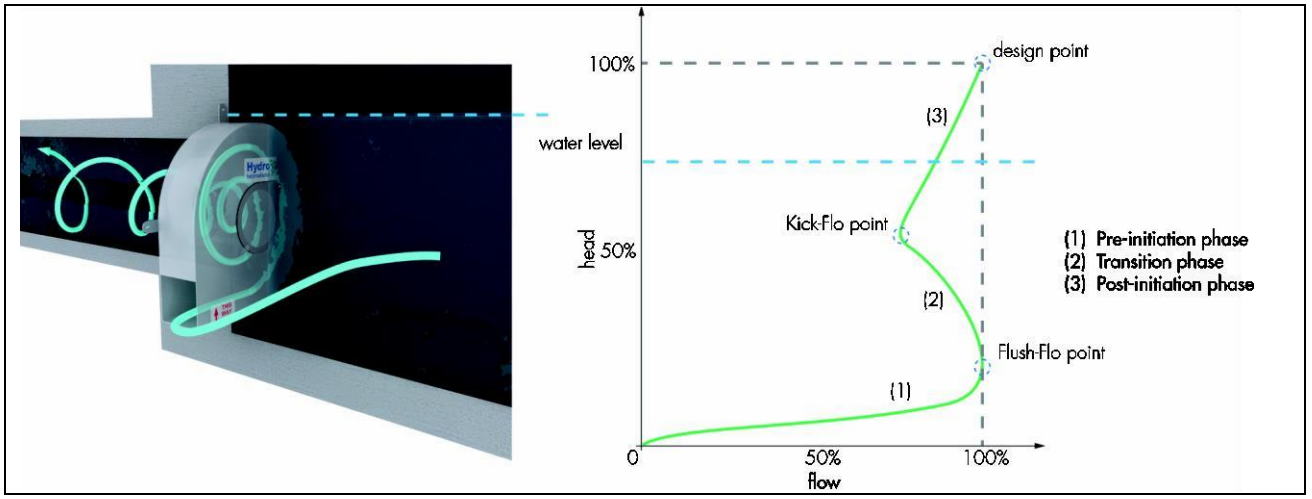


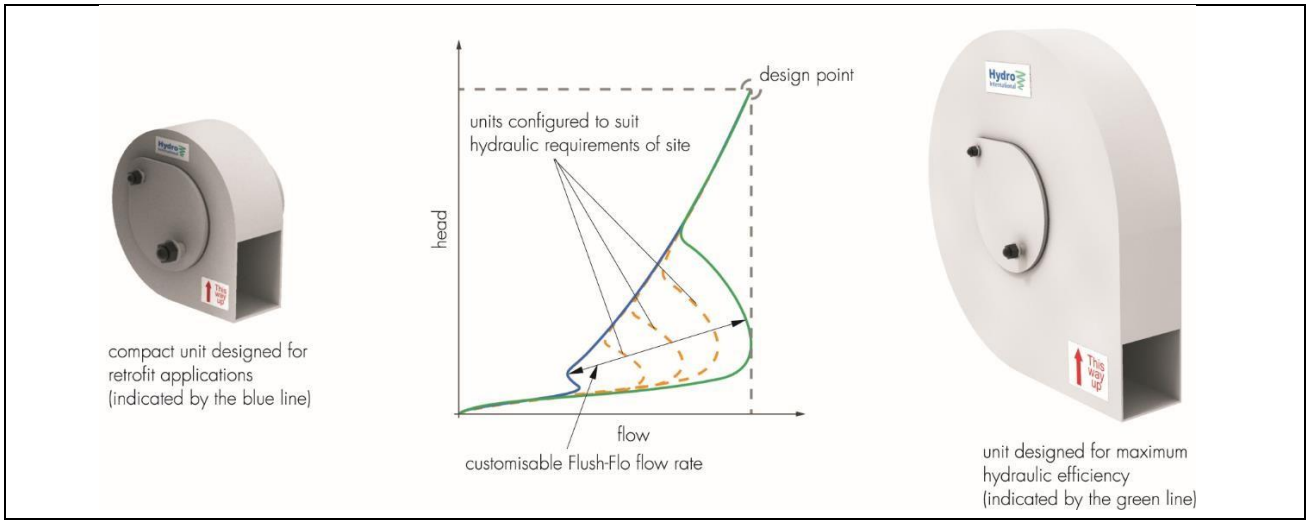
Figure 6 Post-initiation phase



6.3 S-Range Hydro-Brake Optimum Flow Controls allow the inlet, volute and outlet to be individually configured to suit the application, enabling the system to be designed to provide the appropriate hydraulic performance or to suit constant discharge, multi-stage discharge or risk-based network designs (see Figure 7). Individual configuration of the inlet, volute and outlet also allows the system designer to adjust the physical dimensions of the unit in order to:

- maximise the internal clearances
- comply with minimum outlet guidelines
- retrofit to existing infrastructure.

Figure 7 Application-based design



6.4 The units are specified and supplied to meet individual application requirements. Though the characteristics are incorporated into a number of commercially available hydraulic modelling packages, the Certificate holder should be contacted directly for advice on correct selection. The following information should be provided:

- operating head — depth from the unit's outlet invert to the design water level(s) (see Figure 3)
- flow — required discharge at the given head(s)
- manhole details or control chamber proposals, including outlet size
- information on any 'special' conditions, for example if the unit is expected to be subjected to downstream surcharging or possible siphoning effects.

6.5 In most cases the downstream drainage system will be designed to allow the unit a free discharge. However, this is not always possible and in certain cases it will be necessary to design the flow control to surcharge conditions. Surcharge of the flow control will affect the hydraulic performance, and advice should be sought from the Certificate holder. Installations where the outlet is surcharged are outside the scope of this Certificate.

6.6 Where a drainage system has been designed and hydraulically modelled based on the use of a S-Range Hydro-Brake Optimum Flow Control, it is essential to ensure that the same flow control, or a flow control that has been confirmed to provide an equivalent hydraulic performance across the whole design head range, is used in the final installation.

7 Hydraulic design

7.1 The units are typically used to control flows across a site or to limit the rate of discharge from a site. Where used to limit the rate of discharge from a site, the allowable discharge rate to an appropriate outfall will generally be set by the Environmental Regulator, local Planning Authorities or the Sewer Undertaker.

7.2 The allowable discharge rate will often be calculated in respect of the greenfield equivalent run-off rate for the undeveloped site. Advice on calculating the greenfield equivalent run-off rate can be found in the *Interim Code of Practice for Sustainable Drainage Systems*. Where a site is being redeveloped, the allowable discharge rate may be determined based on the discharge rate prior to the redevelopment. The design head acting on the upstream side of the S-Range Hydro-Brake Optimum Flow Control will generally be determined by the maximum design top water level within the storage volume. The design head is illustrated in Figure 3.

8 Strength

8.1 The units are manufactured from stainless steel of a sufficient strength and thickness to ensure that the products remain fit for purpose throughout their design life.

8.2 Under normal operation, the units will deflect by no more than the thickness of the material used for manufacture. This ensures that the volume of the unit available for water flow is not compromised during operation and therefore the hydraulic operation of the unit is not adversely affected by deformation of the unit.

9 Maintenance

9.1 Access should be allowed for clearing debris from the chamber housing the flow control. In the event that the inlet to the unit becomes blocked, the pivoting bypass door may be operated by pulling the wire rope attached upwards to drain down the chamber and provide access for maintenance. The pivoting bypass door must be returned to the closed position following drain down of the chamber and clearance of the blockage.

9.2 Regular inspections should be carried out to ensure that debris that may obstruct the inlet to the flow control is not present in the chamber. The frequency of inspection will depend on the location of the unit but must be at least once per year.

9.3 The units can be jetted from downstream, in accordance with standard sewer jetting procedures without affecting the hydraulic performance of the system.

10 Durability

The units are made from materials that will not be adversely affected by contaminants likely to be found in surface water. In the opinion of the BBA, the units will have a design life in excess of typical structures in which they might be installed.

11 Reuse and recyclability

The units consist of stainless steel which is readily recyclable.

Installation

12 General

12.1 S-Range Hydro-Brake Optimum Flow Controls must be installed in accordance with the Certificate holder's instructions. In many cases the installation will be in a confined space and all appropriate measures must be taken to ensure the safety of operatives working in such areas.

12.2 Dimensioned drawings for each installation are provided by the Certificate holder. It is important that the flow control chamber is constructed to the drawing. Other than where a curved backplate is supplied, this should incorporate a flat mounting surface on the inside face of the chamber wall at the outlet pipe. Ensure that the sump has sufficient width and depth below the invert of the outlet pipe to accommodate the unit.

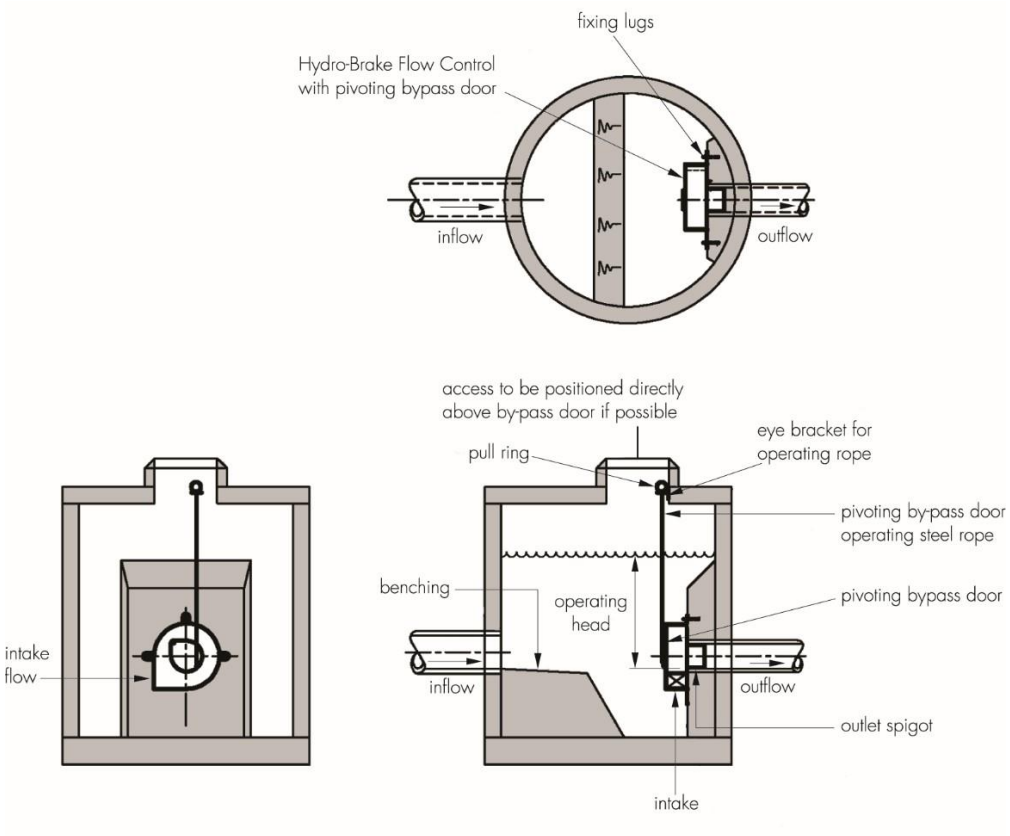
12.3 The benching must be formed as indicated on the installation drawing.

12.4 Where an adjustable inlet gate is provided, the factory set position must not be adjusted without prior consultation with the Certificate holder.

13 Procedure

13.1 The unit is offered up to the chamber outlet wall until the spigot projects into the outlet pipe with its invert seated to the outlet pipe invert and with the unit in the correct orientation (see Figure 8).

Table 8 Typical installation details



13.2 With the unit in position, the position of the required number of bolt holes is marked and drilled through the fixing lugs or plate mount (depending on specification).

13.3 Ensuring that the supplied rubber gasket is suitably positioned over the outlet spigot of the flow control, the fixings are inserted and tightened until moderate compression of the gasket is achieved.

13.4 The supplied eye brackets on the pivoting bypass door operating rope are fixed to the soffit of the roof slab using masonry bolts, to achieve a direct vertical line of pull from over the chamber access cover to the pivoting bypass door. It should be arranged that the rope is taut when held in the upper eye bracket. Where it is not possible to attain a direct vertical line of pull, additional eye brackets can be used to account for the change of direction.

13.5 The rope stop should be positioned to ensure that, when the pivoting bypass door is open, the rope stop can be clipped to the uppermost bracket. Once positioned, the stop attachment grub screws should be tightened.

Technical Investigations

14 Tests

Tests were carried out and the results assessed to determine:

- dimensional accuracy of the units
- the hydraulic performance of the units.

15 Investigations

15.1 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

15.2 A site visit was made to assess the practicability and ease of installation.

15.3 An assessment of computational fluid dynamic (CFD) modelling used to predict the hydraulic performance of the units was made.

15.4 An assessment of the Certificate holder's predicted characteristics was made against the results of hydraulic performance tests.

15.5 An assessment was made of the structural adequacy of the units under loads that they are expected to resist.

15.6 An evaluation of existing data was made to assess durability.

Bibliography

ASTM A240/A240 -16a *Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications*

BS EN ISO 9001 : 2008 *Quality management systems — Requirements*

CIRIA C753 : 2015 *The SUDS manual*

16 Conditions

16.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page – no other company, firm, organisation or person may hold claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document – it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

16.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

16.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

16.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

16.5 In issuing this Certificate the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

16.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.

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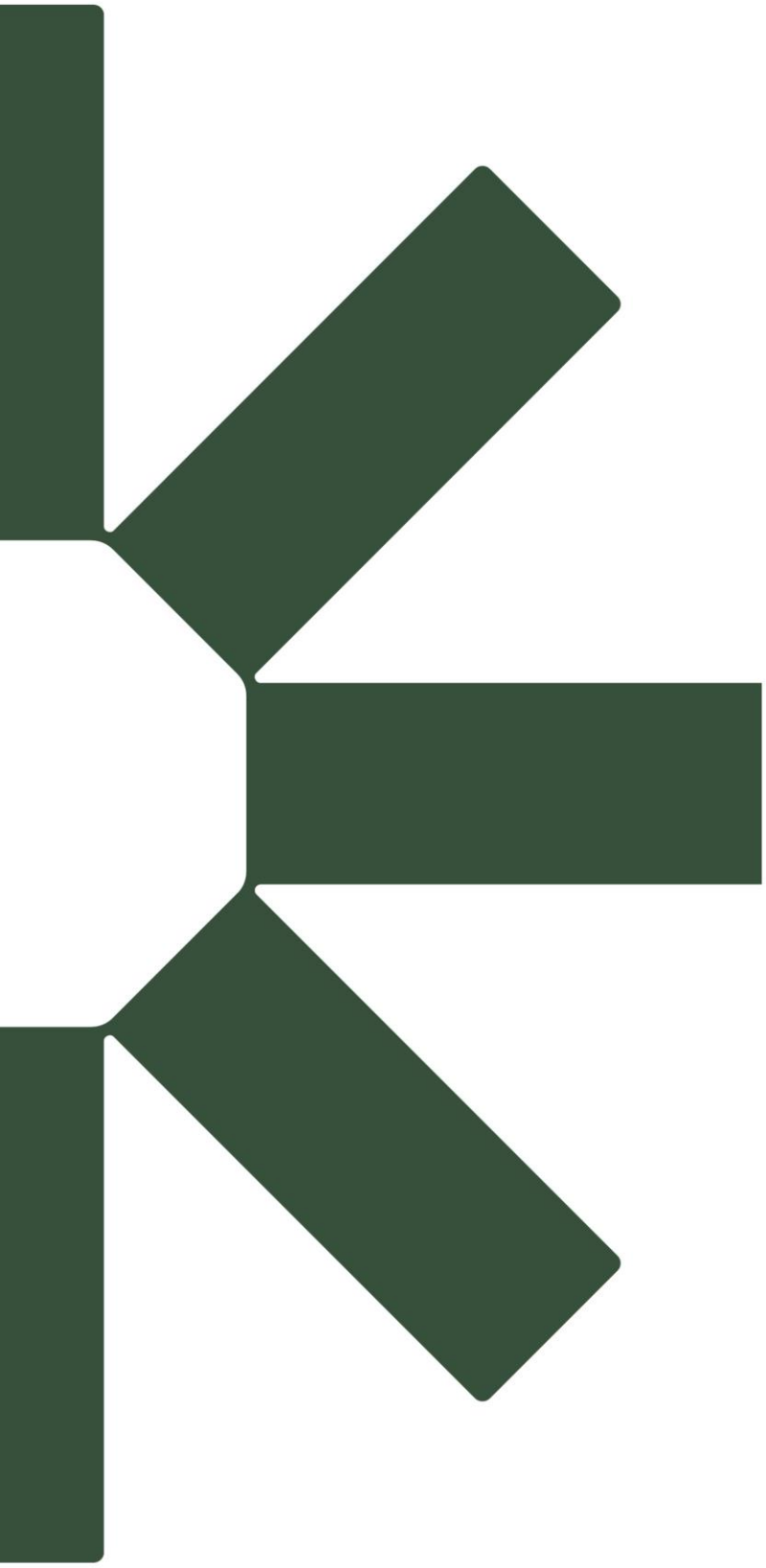

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