

DRAINAGE CALCULATIONS

Client: **EcoHolmes Community Trust**

Site Address: **Land Adjacent to 67 Chapel Gate, Scholes, Holmfirth**

Project Number: **22055**

Reference (Revision): **CAL01 (A)**

Date: **08.04.22**

Author: S.Reid Date: April '22

Checker: P.Dixon Date: April '22

Job No.	22055	Sheet No.	i
Calcs By:	SDR	Date	April 2022

The site is a former quarry located between two roads to the north and east of the site. Along the west and southern boundaries are former quarry faces which are up to 5m high. The site generally has a level around 239.5m AOD, and has a steep embankment down to the highway on its eastern boundary and cut stone faces.

The existing site has had no previous development and has a gross site area of 3625m². The post development impermeable area is 1610m². The greenfield runoff rate for the site, QBAR is 1.19l/s.

The existing site consists of areas of made ground which consists of clays, gravels over the quarried stone. Within the gravels clinker and contaminants have been identified, which presents a medium risk to groundwater as detailed within the Phase 2 SI.

These contaminants will need to be explored further, as recommended in the SI, to ensure that these contaminants do not impact the underlying groundwater table. With the site being elevated above the adjacent highway, combined with this risk of contamination, soakaway has been discounted for the developed portion of the site. The land drainage within the site, including around the boundary, will utilise infiltration as it is expected that these drains will be in areas of low contamination risk.

Soakaway tests were undertaken within the site in March 22, and it was identified that the site would not be suitable for soakaways as the fractured rock within the site was fully saturated and had water escaping and bubbling into the trial pits. This will need to be considered during the structural design of retaining walls, foundations and the floatation of the attenuation tank.

The site is not served by a YW surface water sewer, but there is a possible route to the watercourse via an existing 300mm highway drain located to the east of the site. It is proposed to use this as the discharge point for this development for surface water.

The proposed site will utilise a traditional method of drainage management with the road being drained using gullies to enable future adoption, into a private attenuation tank and flow control located under a public open space within the site. This system will be designed to capture all overland flow from the site and direct water away from properties and direct it into the drainage system and underground into the tank which will be designed to accommodate the 1:30 and 1:100 + 30% climate change storm scenarios underground. Due to the site having gullies and open drainage methods, a vortex flow control with a 100mm orifice will be utilised and based on a 1.8m head, the flow rate will be then restricted to 3.0 l/s.

Water quality leaving the site will be managed using a Hydro International vortex silt separator, Downstream Defender 1.2 which should ensure that water leaving the site will be of suitable quality for discharge to the watercourse.

Foul drainage will be discharged to the YW sewer located opposite the development. Due to the development being at a lower level than this sewer, a foul water pump station will be required on the site. A s106 from Yorkshire Water and a highway permit will be required to accommodate the rising main crossing the highway and connecting into the sewer.

The site will be owned by a single owner with all 10 houses being jointly maintained by a single company, and this company will maintain the drainage infrastructure within the site and undertake periodic inspections and remedial works in accordance with the manufacturer requirements and the requirements within the CIRIA SUDS Manual.

Job No.	22055	Sheet No.	ii
Calcs By:	SDR	Date	April 2022

CODES OF PRACTICE

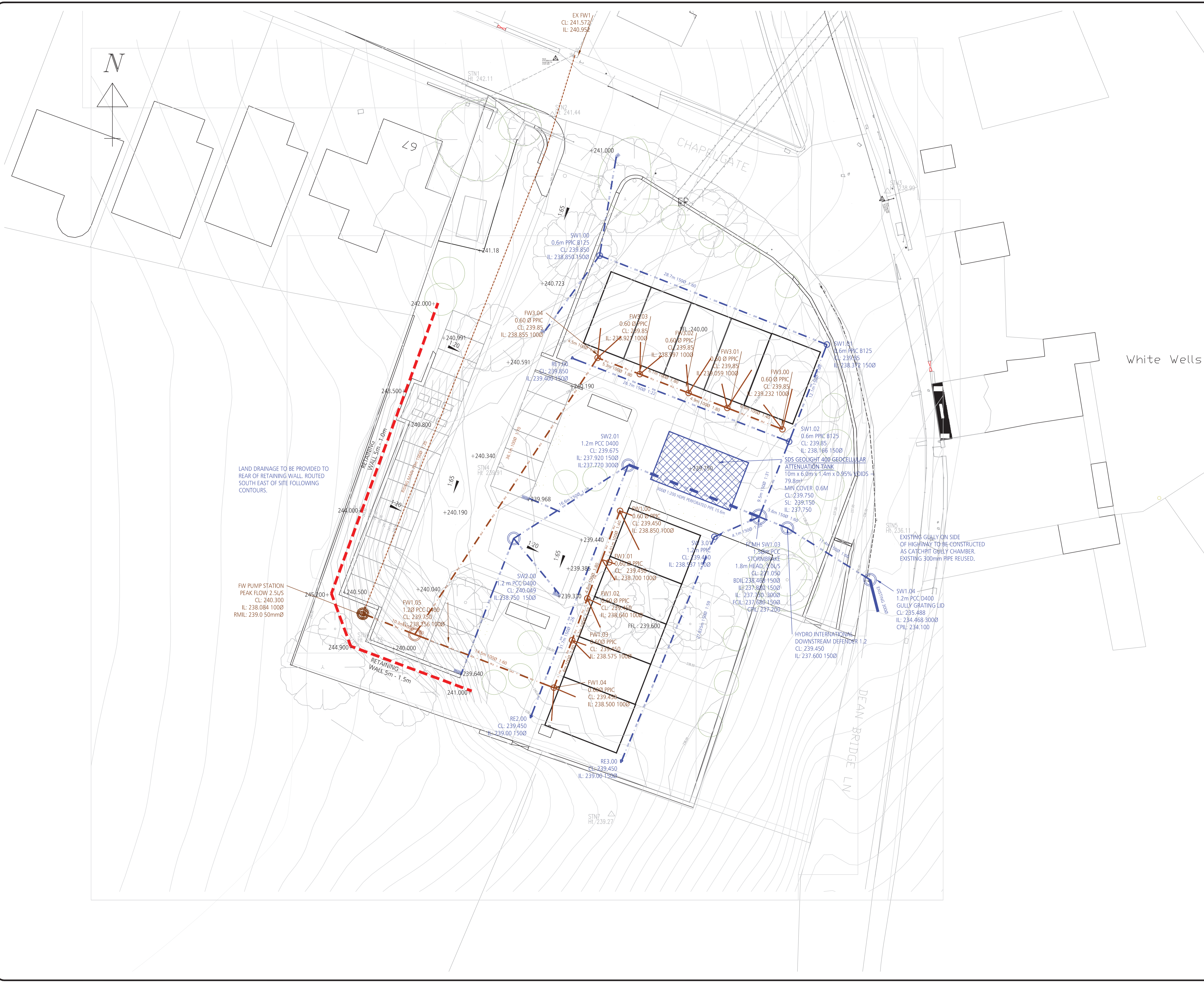
SW Drainage Outfall	Agreed Discharge Outfall Point	SW Highway Drain
	Soakaways Viable / Rate	Viable, but impacted by contamination. Rate TBC. Contamination TBC.
	Watercourse Discharge Available	Yes, via highway drain.
	Surface Water Sewer	No
	Combined Sewer	No
	Invert Level of Outfall	234.468m
Drainage Assessment Constants	Scenarios to be Tested	1:2, 1:30, 1:100 + 30% CC
	FFL	240 – 239.6m
	Existing Impermeable / Permeable Area	0 m ² / 3625 m ²
	Proposed Impermeable / Permeable Area	1610 m ² / 2015 m ²
	Proposed Attenuation Storage Volume	79.8m ³ (10m ² x 6.0 x 1.4m tall).
	Attenuation Storage Method	SDS Geolight Geocellular Crates with perforated pipe through tank
	Flow Control Unit	Stormbrake SB1-01800-00300-0100
Hydraulic Calculation	M5-60 / R	19 / 0.3
	MADD	0
	Global Time of Entry	4 mins
	Summer / Winter Coeffs	1.0 / 1.0
SUDS	Water Quality Methods Used	Gully and Sumps, Attenuation Tank, Downstream Defended
	Hydrocarbon Interception	Not Required
	Silt Capture	Yes, prior to Outfall
	Ponds / Swales	None used
	Permeable Pavement	None used.
Information Provided	22055-100 Drainage Strategy Attenuation Calculation Stormbrake Spec Phase 2 SI Summary and Contamination Recommendations Greenfield Runoff Rate LLFA Comments	



Structural & Civil Consultants

Job No.	22055	Sheet No.	iii
Calcs By:	SDR	Date	April 2022

	Downstream Defender Spec Pump Station Spec Soakaway Testing Attenuation Tank Info
--	--

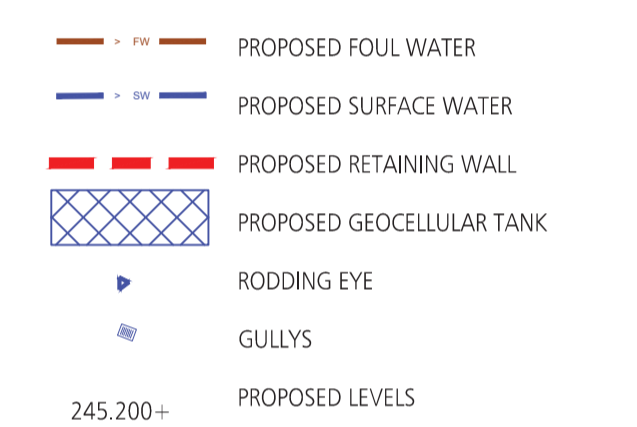


DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION
 IT IS ASSUMED THAT ALL WORKS WILL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT. IN ADDITION TO THE HAZARDS TYPICALLY ASSOCIATED WITH THE TYPES OF CONSTRUCTION DETAILED ON THIS DRAWING, ANY KNOWN ABNORMAL HAZARDS SPECIFIC TO THIS DRAWING HAVE BEEN IDENTIFIED.

ABNORMAL HAZARD REFERENCE

- GENERAL NOTES**
- DO NOT SCALE FROM THIS DRAWING.
 - IF ANY DISCREPANCIES ARE IDENTIFIED WITH THIS DRAWING OR THE INFORMATION WITHIN IT, PLEASE BRING IT TO THE ATTENTION OF DUDLEYS CONSULTING ENGINEERS LTD.
 - THIS DRAWING MUST BE REPRODUCED IN COLOUR. THIS DRAWING IS BASED ON TOPOGRAPHICAL SURVEY S'EH-CG6230 LAND OFF CHAPELGATE TOPOGRAPHIC & UTILITY SURVEY (11.03.22) - REV A' BY1ST HORIZON DATED 11.03.22' AND 'CONTOURS - 199900 - OS T5 - CHIPPING - 2020 12 03' DATED 11/02/2022 AS WELL AS 'CHAPELGATE SCHOLES TOPOGRAPHICAL' DATED 11/02/2022. THE ARCHITECT LAYOUT USED WAS '2112-GWP-01-01-D-A-(PA)-0003_SITE PLAN -P07' DATED 07/04/2022.
 - ALL WORKS TO BE IN ACCORDANCE WITH KIRKLEES COUNCIL COUNCIL STREET DESIGN GUIDE & TRANSPORTATION SPD.
 - ALL WORKS TO BE UNDERTAKEN ONLY WITH APPROVAL FROM KIRKLEES COUNCIL.
 - ALL WORKS IN THE PUBLIC HIGHWAY TO BE PERMITTED AND A PERMIT TO WORK ON THE HIGHWAY IS REQUIRED.
 - ALL WORKS IN THE PUBLIC HIGHWAY HAVE BEEN IDENTIFIED FOLLOWING PLANNING CONSULTATIONS



07.04.22	INITIAL ISSUE	SM	SR	P1
Date	Revision	By	Chkd	Ref

dudleys Tithe House
35 Town Street
Leeds
LS18 5LJ
T:0113 258 3611
E:info@dudleys.co.uk

Structural & Civil Consultants

Project
SCHOLES CHAPELGATE

Title
DRAINAGE STRATEGY

A1 v3.0

Scale	1:200	Paper	A1	Drawn	SM	Check	SR
Date	04.2022	Status	PRELIMINARY				
Job No.	22055	Drw. No.	100	Rev.	P1		

Calculated by:

Site name:

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:

Longitude:

Reference:

Date:

Runoff estimation approach

Site characteristics

Total site area (ha):

Methodology

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics

	Default	Edited
SOIL type:	<input type="text" value="2"/>	<input type="text" value="2"/>
HOST class:	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>
SPR/SPRHOST:	<input type="text" value="0.3"/>	<input type="text" value="0.3"/>

Hydrological characteristics

	Default	Edited
SAAR (mm):	<input type="text" value="1156"/>	<input type="text" value="1156"/>
Hydrological region:	<input type="text" value="3"/>	<input type="text" value="3"/>
Growth curve factor 1 year:	<input type="text" value="0.86"/>	<input type="text" value="0.86"/>
Growth curve factor 30 years:	<input type="text" value="1.75"/>	<input type="text" value="1.75"/>
Growth curve factor 100 years:	<input type="text" value="2.08"/>	<input type="text" value="2.08"/>
Growth curve factor 200 years:	<input type="text" value="2.37"/>	<input type="text" value="2.37"/>

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 $SPR/SPRHOST \leq 0.3$?

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):	<input type="text" value="1.19"/>	<input type="text" value="1.19"/>
1 in 1 year (l/s):	<input type="text" value="1.02"/>	<input type="text" value="1.02"/>
1 in 30 years (l/s):	<input type="text" value="2.08"/>	<input type="text" value="2.08"/>
1 in 100 year (l/s):	<input type="text" value="2.47"/>	<input type="text" value="2.47"/>
1 in 200 years (l/s):	<input type="text" value="2.82"/>	<input type="text" value="2.82"/>

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.



Structural & Civil Consultants

Tithe House 35 Town St, Horsforth Leeds LS18 5LJ
T 0113 258 3611

Project

CHAPELGATE, SCHOLES

Drainage Storage

Project No. 22055

SHEET No. C- D01

BY SM

DATE Apr 2022

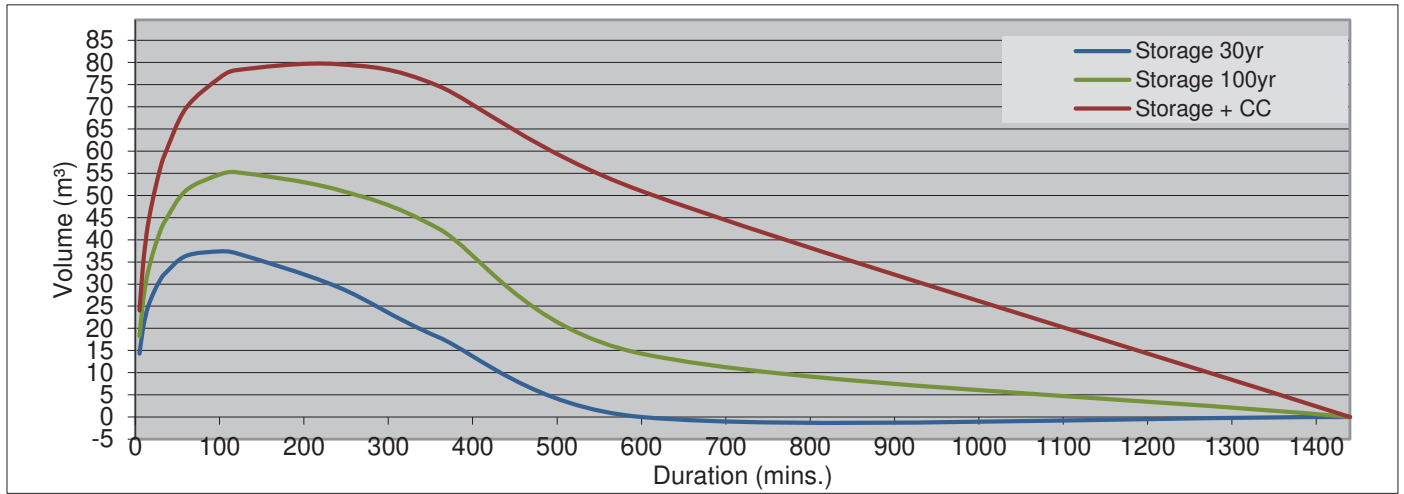
**Drainage Calculations for 1 in 30yr, 1 in 100yr return periods & 1 in 100yr + climate change;
Storage Requirements:**

Input Data

M5-60 =	19mm	Fig A.1	
r =	0.3	Fig A.2	
T =	30 yr	C =	2.78
T =	100 yr		
Max. Allowable Flow =	3.00l/s		
Contributing Area =	1610.0m²	1610.0m²	
Flow/Ha =	18.63	l/s/Ha	
Percentage Increase =	30%		

Output Data

Duration	Z1	M5-D (M5-60)*Z1	Z2 30 yr	Z2 100 yr	Increased			Qp 30 l/s	Qp 100 l/s	Increased l/s	Storage (30yr) m ³	Storage (100yr) m ³	Storage (+CC) m ³
					I (30yr) mm/h	I (100 yr) mm/h	(100yr)						
5	0.34	6.5	1.45	1.83	113	143	186	51	64	83	14.3	18.3	24.1
7.5	0.43	8.1	1.47	1.86	95	121	158	43	54	71	17.8	23.1	30.4
10	0.50	9.5	1.48	1.90	84	108	140	38	48	63	20.9	27.2	35.9
12.5	0.55	10.5	1.49	1.92	75	97	126	34	43	56	23.0	30.2	39.9
15	0.60	11.4	1.50	1.93	68	88	114	31	39	51	24.8	32.8	43.4
22	0.69	13.2	1.51	1.96	54	71	92	24	32	41	28.2	37.7	50.2
30	0.78	14.8	1.53	1.99	45	59	77	20	26	34	31.1	42.1	56.4
35	0.83	15.7	1.53	2.00	41	54	70	18	24	31	32.3	44.1	59.3
60	1.00	19.0	1.54	2.02	29	38	50	13	17	22	36.3	51.1	69.7
100	1.18	22.3	1.54	2.02	21	27	35	9	12	16	37.4	54.7	76.5
120	1.25	23.7	1.54	2.02	18	24	31	8	11	14	37.0	55.2	78.3
240	1.56	29.7	1.51	1.97	11	15	19	5	7	9	29.3	51.3	79.6
360	1.81	34.4	1.49	1.93	9	11	14	4	5	6	18.0	42.5	74.7
600	2.12	40.2	1.47	1.89	6	8	10	3	3	4	0.0	14.3	51.0
1440	2.81	53.4	1.41	1.79	3	4	5	1	2	2	0.0	0.0	0.0



EXECUTIVE SUMMARY

Site location	Land adjacent to 67 Chapel Gate, Scholes, Holmfirth, HD9 1SX	
Development scheme	Ten affordable two-storey residential properties with private gardens.	
NGR	415861, 407155	
Current use	On-site: Disused overgrown quarry with public footpath running through.	On-site: Residential and agricultural.
Historical use And UXO	<p>The site was undeveloped agricultural land in 1854 and was then quarried by 1888. The shape and size of the quarry did not change from 1888 until 1965-1970, when the topography of the north-western corner of the site changed, with a slope shown falling south-east into the centre of the site; this may represent the site being partially filled with road chippings – as per local anecdotal evidence. The site then remained the same until the present day.</p> <p>In 1854, the surrounding area was mostly occupied by small agricultural fields, with several small villages around the north and east of the site, including residential properties and several inns and mills. There were also several quarries – most of which were labelled as sandstone quarries – immediately north of the site, and between 300m to 750m south and west of the site. By 1888 there were several new mill ponds 250m north of the site, and along Dean Dike, 250m to 400m east of the site. The area around the site largely remained the same until the present day.</p> <p>A low UXO risk has been identified at the site.</p>	
Geology	Rough Rock (sandstone) – Rossendale Formation.	
Hydrogeology	Secondary A Aquifer.	
Hydrology	The Dean Dike / New Mill Dike runs south-west to north-east 270m south-east of the site.	
Environmentally sensitive sites	Based on report ref 4046-CWS-01, Produced by Cotswold Wildlife Services, Dated 20/06/21, the site was concluded to be of low wildlife interest.	
Geology (from GI)	<p>Made ground</p> <p>Rough Rock</p>	<p>Brown to dark brown to black, clay, sand and gravel. The proportion of clay, sand and gravel varied between exploratory holes. The gravel fraction comprised tarmac, brick, pottery, mudstone and glass with rare clinker.</p> <p>Soft/very loose becoming medium dense, yellowish light brown, clayey sandy to very sandy gravel, occasionally gravelly clay, in the upper zones. With all the holes terminating on a strong yellow sandstone with the exception of WS05, this terminating on a weathered grey sandstone.</p>
Groundwater	Trapped pockets of surface water infiltration within the made ground.	

<p>Foundation design</p>	<p>Traditional strip / trench foundations recommended placed within the intact sandstone of the Rough Rock assuming levels are not altered significantly.</p> <p>Should foundations be constructed within the influence of trees, a void may be required due to heave forces, this should be in line with NHBC guidance.</p> <p>Design Sulphate Class of DS4, with an ACEC of AC-4, would apply for the made ground in WS02. Made ground in WS6 and natural soils of the Rough Rock Formation recorded a Design Sulphate Class of DS1 and a ACEC of AC-1</p>
<p>Road construction</p>	<p>A CBR of 3% is anticipated for the natural shallow strata and <2% for the made ground. This should be checked on site with plate bearing tests.</p>
<p>Contamination</p>	<p>Medium Risk - elevated concentrations of lead, beryllium, PAH and TPH in the near surface soils, hence remedial actions at the site are considered necessary in these areas.</p>
<p>Ground gas</p>	<p>Characteristic situation 1 / Green – Gas monitoring is still ongoing. To date, no gas protection measures required (slightly elevated CO₂). Risk to construction workers during below ground works due to depleted O₂ levels.</p> <p>.</p> <p>No radon protection measures required.</p>

7.6 Preliminary Risk Assessment

7.6.1 From the information obtained from the desk study JNP Group has undertaken a preliminary risk assessment.

Table 7.2 Preliminary Risk Assessment

Risk Receptor	Risk		Justification
HUMAN HEALTH	MEDIUM		Historical land use as a quarry, suspected to be partially infilled with road chippings, suggests potential sources of contamination present on site. Potential for direct contact / inhalation of vapours or gases with residential receptors.
GROUNDWATER	MEDIUM		The site is located on productive strata (Secondary Aquifer) and is not within a SPZ, although there is a well 30m east of the site.
SURFACE WATER	MEDIUM		The nearest surface water course is located 270m to the south-west, hydrologically downgradient of the site.
ECOLOGY	NONE		Based on the assumption that there are no sensitive/ protected species on site (subject to any ecological survey undertaken).
PROPERTY & INFRASTRUCTURE	MEDIUM		Historic land use as a partially infilled quarry suggests potential sources of contamination present on site. Potential sources of vapours or gases on-site or migration of gases may occur from off-site sources.

7.6.2 In line with BS ISO 18400-202:2018 based on the conceptual site model as above the site is considered to be probably contaminated.

8 CONCLUSIONS OF DESK STUDY & RECOMMENDATIONS

8.1 Conclusions

8.1.1 The desk-based research has identified that:

- The geological succession below the site comprises the Rough Rock sandstone of the Rossendale Formation.
- It identifies that the site has an historic potentially contaminative use as a partially infilled quarry.

Potential On-Site Sources of Contamination:

- The earliest available maps show the site was a sandstone quarry from the late 19th century and has not been developed since. Local anecdotal evidence suggests that the quarry was later partially infilled with road chippings, and the historical maps indicate that the topography of the site changed slightly between 1955 and 1965, which could be a result of this infilling. However, there is nothing to suggest the original depth of the quarry, and the thickness of any infill material.
- Heavy metals, hydrocarbons, and soil gas associated with limited made ground materials may be present due to the quarry being partially infilled with imported and site generated fill materials – particularly given the potential composition of the infill material (road chippings, containing coal tar), which may cause significantly elevated concentrations of hydrocarbons to be present.
- Based upon guidance given in CL:AIRE research bulletin RB17 (CL:AIRE 2012), as likely depth of the infilled ground is unlikely to be greater than 5.00m, and the soil atmosphere is likely to be aerobic and of small area, the former quarry is unlikely to generate significant volumes of ground gas. RB17 indicates that even where ground gas is present from made ground and recycled soils, it generally does not pose a risk. In addition, RB17 indicates that based upon available case studies, sites where fill is >30 years old, the gassing regime results in a characteristic situation 1 classification, where gas protection measures are not required. The likely date of infilling was between 1955 and 1965, so if the pit was backfilled or partially backfilled, it was over 50 years ago.

Potential Off-Site Sources of Contamination:

- There are several disused quarries around the site, which may have been infilled or partially infilled. The material used to infill these quarries is unknown and should therefore be considered a potential source of hazardous land gas. However, based on the age of the quarries, and the likely age of the fill, JNP Group considers the risk of ground gas generation to be low. In addition, JNP Group consider that material used would have most likely to have been inert, with a low organic content, such as recycled soils, or rubble rather than domestic waste, chemical or industrial waste.
- Based upon guidance given in CL:AIRE research bulletin RB17 (CL:AIRE 2012), as likely depth of the infilled ground is unlikely to be greater than 5m, and the soil atmosphere is likely to be aerobic and of small area, the former quarries are unlikely to generate significant volumes of ground gas. RB17 indicates that even where ground gas is present from made ground and recycled soils, it generally does not pose a risk. In addition, RB17

indicates that based upon available case studies, sites where fill is > 30 years old, the gassing regime results in a characteristic situation 1 classification, where gas protection measures are not required. The quarry 70m north-west of the site does not change shape from 1893, although it does appear to be partially infilled by 1976-1977 – if it was infilled or partially infilled, it was over 40 years ago.

- There are no other potential off-site sources of contamination that could impact on ground conditions at the site. The site is surrounded by residential properties and agricultural fields. In addition, all the mills to the north, north-east, and east of the site are topographically and hydrologically downgradient of the site, and as such should not have had any impact on the site.

8.1.2 No radon protection measures are required.

8.1.3 The site is not in an area predicted to be at risk of fluvial flooding. The centre of the site has a surface water flooding risk of 1 in 30 year, 0.3m – 1.0m.

8.1.4 Based on information contained within desk study or from the previous investigation, it is the opinion of JNP Group that the potential site conditions provide a MEDIUM to LOW environmental risk and hence further investigation and assessment is required.

8.2 Recommendations

8.2.1 Based on the conclusions from the desk study and the intended redevelopment of the site JNP Group recommends that the following intrusive works are undertaken:

- One day of dynamic sampling boreholes (to target depths of 5m bgl) with representative sampling and in-situ testing.
- Three gas and groundwater monitoring standpipe installations with 6 monitoring visits over 3 months.
- Engineering laboratory testing of recovered soil samples, including testing to identify volume change potential of any cohesive material, and concrete classification.
- Chemical laboratory testing of soil samples. The testing should comprise an extensive suite of contaminants, particularly those associated with road chippings/asphalt, including metals, Total Petroleum Hydrocarbons, and Polycyclic Aromatic Hydrocarbons.

8.2.2 The site lies with an area of Low risk of unexploded ordnance (UXO).

Soakaway test hole locations Chippings HD9 1SX

Trial holes for Phase 2 requested locations ▲
Actual location of gas test holes ▲

Soakaway test hole 1

0.8m wide, 3.3m long, 1.4m deep
Base of hole was bed rock
Water started seeping into hole immediately from fractured rock layer approx. 0.5 – 1.4m deep

Soakaway test hole 2

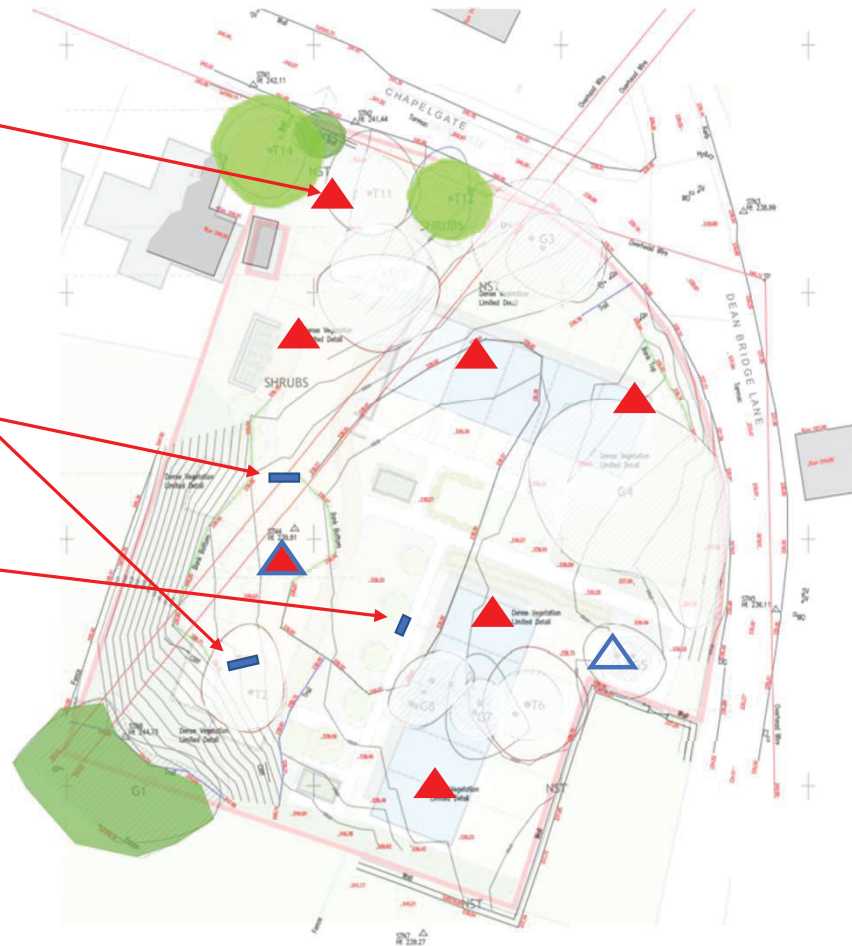
0.45m wide x 3.0 long x 1.8-1.9m deep
base of hole was fractured rock, but water started seeping into hole from around 1m deep

Soakaway test hole 3

0.45m wide x 1.6m long x 1.0-1.4m deep
Base of hole was rock
Water seeping in quickly

Note all holes backfilled on same day, hole 3 ground was 'like porridge' with fine chippings and a lot of water. Extra layer of chippings added but still very soft.

Matthew Tulley
10/3/2022



Soakaway test hole 1

Soakaway test hole 1
 0.8m wide, 3.3m long, 1.4m deep
 Base of hole was bed rock
 Water started seeping into hole immediately from fractured rock layer approx. 0.5 – 1.4m deep

At end, water level was approx. same as base of quarry (water table is just below quarry base and very permeable)



Time	Depth of water (mm)	Top of water to top of hole (mm)	Comments
11:20	175		Water running in
11:40	325		
12:25	350		
12:50		785	
13:20		785	
13:33		785	
13:49		785	Water level with quarry base

Soakaway test hole 2

Soakaway test hole 2
0.45m wide x 3.0 long x 1.8-1.9m deep
base of hole was fractured rock, but water started seeping into hole from around 1m deep

At end, water level still rising slowly, but not much below quarry base. (water table is just below quarry base and very permeable)



Time	Depth of water (mm)	Top of water to top of hole (mm)	Comments
11:30	200		Water running in
11:45	400		
12:20	925		
12:51		840	
13:13		750	
13:34		680	
13:48		660	Water level not much above quarry base

Soakaway test hole 3

Soakaway test hole 3
 0.45m wide x 1.6m long x 1.0-1.4m deep
 Base of hole was rock
 Water seeping in quickly

This was not an 'official test' but wanted to see how far below the surface the water table was. In centre of quarry 1.5m from centre path

At end water was 100 below surface

Any digging in quarry for footings will need drainage ditches first, or a BIG pump. Maybe a land drain around cliff base to pick up and divert aquifer water?



Time	Depth of water (mm)	Top of water to top of hole (mm)	Comments
13:15	50		Just digging
13:27	700		
13:36	940	100	Sides falling in, bottom rising

Soakaway Summary

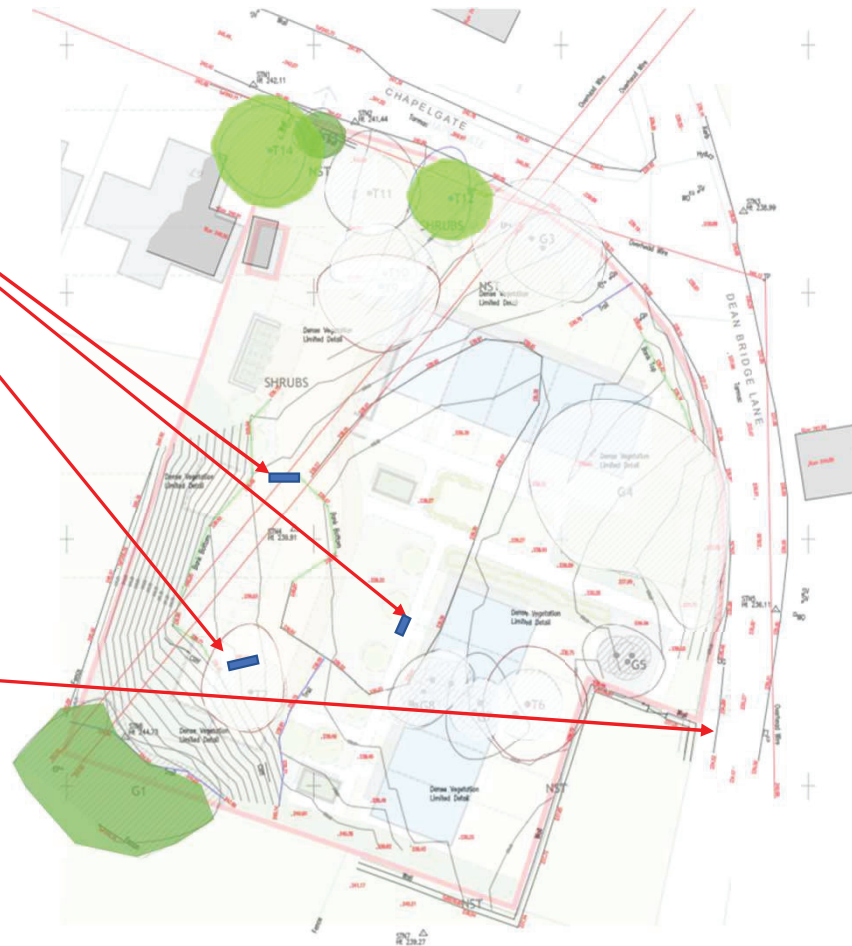
Soakaways are unlikely to work

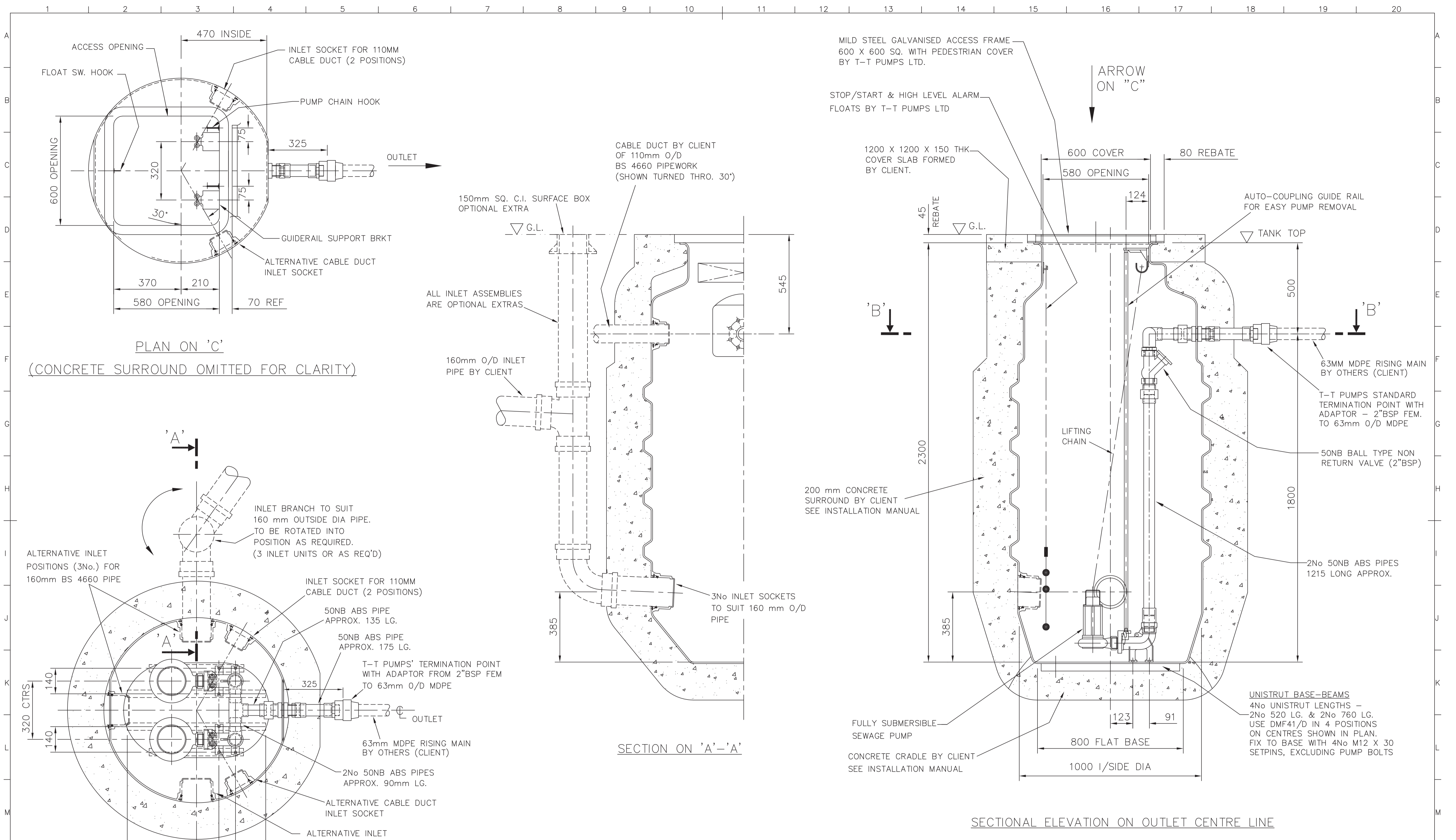
Water table is just below quarry base, about 100mm. Broken stone at 0.5 – 1.5m down (virgin ground) is very permeable and running with water. Springs are seen in the quarry base during wet weather (eg at S quarry face under rock overhang)

After backfilling the holes the ground was like porridge! Should settle down after a few days but lots of water and a bit of JCB = bit of a mess. NOTE we didn't add any water for any of these tests – all of it came for free from underground

Road gully on corner of site takes surface water down Dean Bridge Lane. Shown on Utility Scan as a 300mm drain. Flood water from quarry currently spills into road anyway

Matthew Tulley
Survey and report date 10/3/2022
Weather dry, dry yesterday too.





PLAN ON 'C'
(CONCRETE SURROUND OMITTED FOR CLARITY)

SECTION ON 'A'-A'

SECTIONAL ELEVATION ON OUTLET CENTRE LINE

UNCONTROLLED DRAWING
PLEASE CHECK WITH T-T PUMPS LTD
THAT THIS DRAWING IS OF THE LATEST ISSUE

- NOTES**
1. POLYETHYLENE TANK SUPPLIED C/W PIPEWORK & VALVES TO TERMINATION POINT, FOR CLIENT TO INSTALL INTO GROUND - SEE SEPARATE INSTALLATION DATA SHEET.
 2. ALL CIVILS WORK TO BE BY CLIENT.
 3. PUMP STARTER OR CONTROL PANEL MUST BE FIXED INDOORS OR IN A WEATHERPROOF ENCLOSURE.

ISSUE	AMENDMENT	DATE	BY	APPROVED BY
G	NEW AUTOCOUPLING & BALL TYPE NRV SHOWN	22.09.05	D.J.P.	D.C.
F	ADDITIONAL UNION SHOWN ON PIPEWORK	08.10.04	D.J.P.	D.C.
E	INLET SOCKET & CABLE DUCT SOCKET RE-DESIGNED	02.04.04	T.R.P.	D.C.
D	PUMP LISTING DELETED	23.10.02	T.R.P.	D.C.
C	TERMINATION POINT EXTENDED BEYOND CONCRETE SURROUND	21.01.02	T.R.P.	D.C.
B	PUMP DESIGNATIONS UPDATED	05.06.01	T.R.P.	D.C.
A	SIZE OF CABLE DUCT ENTRY AMENDED	29.11.00	T.R.P.	D.C.

ENSURE THAT THIS IS THE LATEST ISSUE
DIMENSIONS IN mm UNLESS STATED OTHERWISE
TOLERANCE EXCEPT WHERE OTHERWISE STATED ± 5mm
DO NOT SCALE IF IN DOUBT ASK

THIS DRAWING IS THE PROPERTY OF T-T PUMPS LTD. IT MUST NOT BE COPIED, LOANED OR INFORMATION CONTAINED HEREIN BE TRANSFERRED TO A THIRD PARTY WITHOUT WRITTEN CONSENT OF T-T PUMPS LTD.

© Copyright T-T PUMPS Ltd. 2003

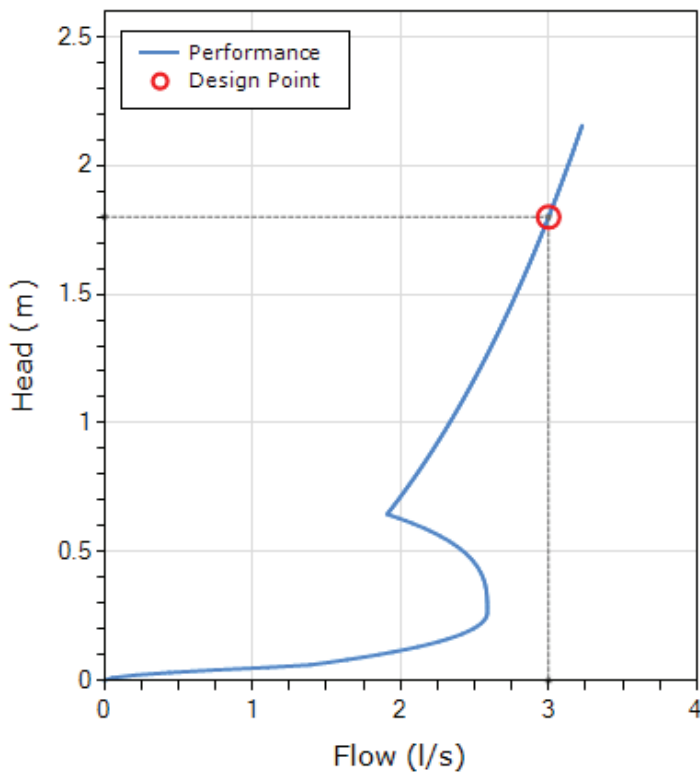
TITLE	GENERAL ARRANGEMENT FOR VENUS DUAL (50 NB ABS P'WK) PACKAGE PUMPING STATION
CLIENT	
SCHEME	

DRAWN BY	P.S.T.	
APPROVED BY	R.D.	
DATE	06.10.99	WOORE CW3 9RU ENGLAND TEL. 01630 647200 FAX. 01630 642100
ORIGINAL SCALE	1:10	PROJECT NUMBER STD.
		DRAWING NUMBER PP/5200/G
		ISSUE SHEET 1 OF 1

Contractor: Dudleys Consulting Engineers L
 Site: Scholes
 Date: 06/04/2022
 Created By: Seb Reid
 Device Ref: FPM-SB1-01800-00300-0100

Head(m): 1.8
 Flow(l/s): 3
 Chamber Ref: FCMH
 Mounting Style: LUGS (Default)

StormBrake™ Performance



Head (m)	Flow (l/s)
0	0.00
0.07	1.57
0.15	2.25
0.22	2.55
0.3	2.59
0.37	2.57
0.45	2.51
0.52	2.38
0.59	2.15
0.67	1.94
0.74	2.04
0.82	2.13
0.89	2.21
0.97	2.30
1.04	2.37
1.11	2.45
1.19	2.52
1.26	2.58
1.34	2.65
1.41	2.71
1.49	2.77
1.56	2.83
1.63	2.88
1.71	2.94
1.78	2.99
1.86	3.04
1.93	3.09
2.01	3.14
2.08	3.18
2.16	3.23

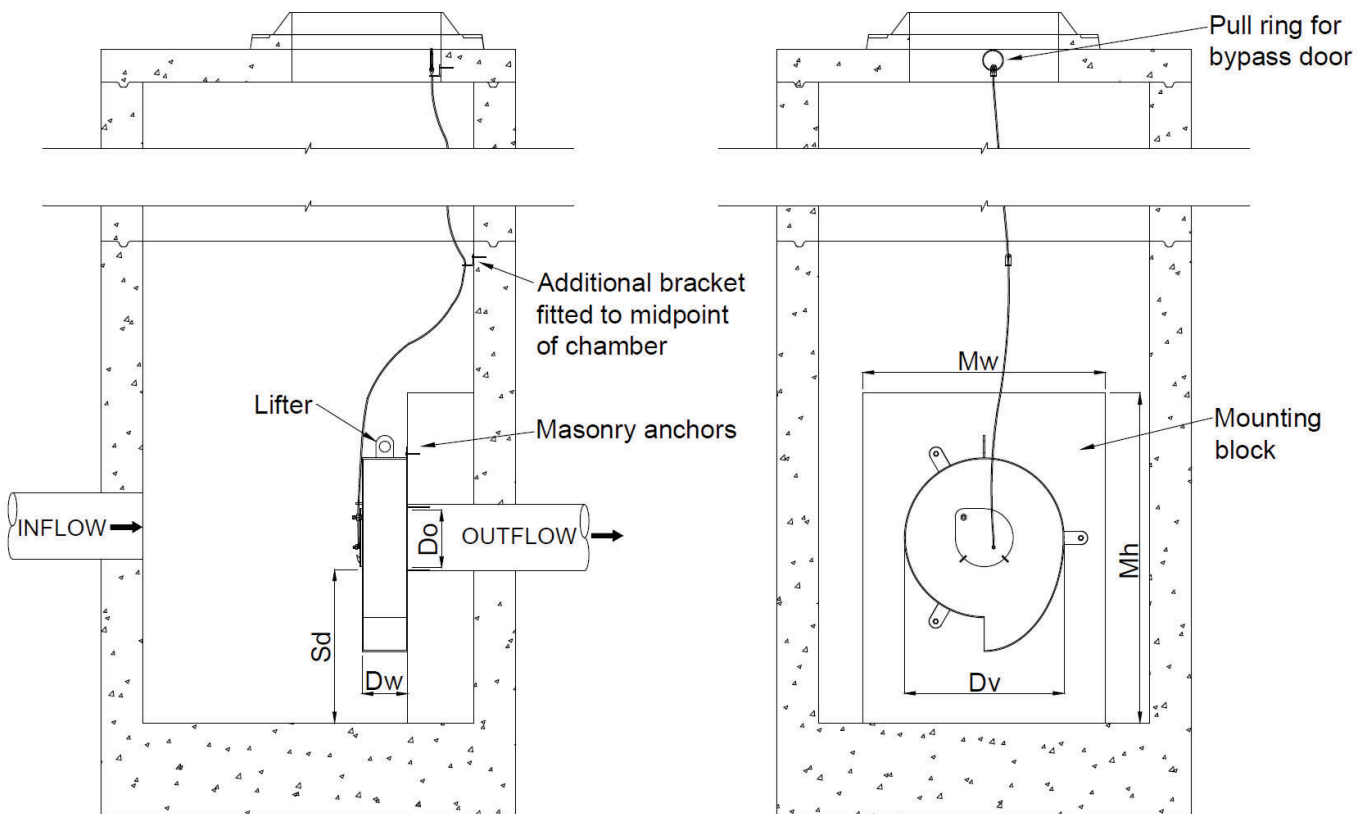
	Head (m)	Flow (l/s)
Design Point	1.80	3.00
Flush Flow	0.26	2.59
Kick Back	0.65	1.91

	Dims (mm)
Min. Chamber Diameter	1200
Min. Outlet Pipe Diameter	100
Min. Sump Depth	250

The unique performance characteristics of this StormBrake™ are derived from extensive dynamic modelling using parametric experimental testing and computational fluid dynamics.

INSTALLATION INSTRUCTIONS

1. Position the StormBrake™ so that the inlet is at the bottom and the device outlet is in line with the chamber outlet pipe.
2. Mark the locations of the mounting points on the chamber/mounting wall.
3. Using the marked locations, drill holes to the required thickness and depth for the supplied masonry anchors (M10 throughbolts require 11 mm holes). Fit the bolts to the holes.
4. Attach the StormBrake™ to the anchor points, ensuring the neoprene gasket is flush with the chamber wall, and fasten the device by tightening the bolts. This will compress the neoprene gasket to provide a watertight seal between the StormBrake™ and the wall.
5. Fix the stainless steel wire cable from the front bypass door to the underside of the manhole cover, vertically above the device. A secondary bracket is supplied and should be fitted halfway up the chamber to guide the bypass door cable to the top.
6. Adjust the length of the bypass door cable accordingly, so that it reaches the ground level whilst ensuring the bypass door can open if required. Ensure the bypass door is closed for normal operating conditions.



Geometry	Annotation	(mm)
Device Vortex Diameter	Dv	373
Device Width	Dw	82
Device Orifice	Do	75
Sump Depth (outlet Ø100mm)	Sd	250
Mounting Block Width	Mw	610
Mounting Block Height	Mh	650

Dimensions quoted are minimum values based on the geometry of this unique StormBrake™ unit. These ensure the device can be fitted to the flow control chamber without restriction and meet the performance specification.

Downstream Defender® Advanced Hydrodynamic Vortex Separator

The Downstream Defender® is an advanced hydrodynamic vortex separator for the effective and reliable removal of fine particles, oils and other floatable debris from surface water runoff.

Its innovative design delivers high efficiency across a wide range of flows in a much smaller footprint than conventional or other swirl-type devices and it is the perfect choice for any catchment likely to convey high quantities of contamination.

1. Access for removal of floatables and sediments.
2. Inlet pipe.
3. Inlet chute.
4. Centre shaft.
5. Dip plate.
6. Centre cone.
7. Benching skirt.
8. Floatables and oil storage.
9. Isolated sediment storage zone.
10. Outlet pipe.

Figure 1 - The unique internal components of the Downstream Defender® enhance pollutant removal performance and prevent wash out.

Unique Flow Modifying Components


The Downstream Defender® consists of a choice of concrete or HDPE chamber with unique flow modifying internal components. It is these internal components that differentiate the Downstream Defender® from catchpits, sedimentation basins or sedimentation sumps. They facilitate advanced hydrodynamic vortex separation by reducing turbulence, lengthening the flow path to increase chamber residence time and introducing shear planes.

The internal components also ensure that the pollutant storage zones are isolated and protected from high flows that could cause pollutant re-entrainment or wash out.

Compared to devices that have poorly designed internal components, the Downstream Defender® captures and retains more of the annual pollutant load.

Watch a short video showing the Downstream Defender® components and operation at:

<http://www.hydro-int.com/en-gb/products/downstream-defender-0>



Repeatable, reliable performance

The Downstream Defender® delivers high removal of pollutants through advanced, hydrodynamic separation across a wide range of flows. The device has a proven track record of tackling an assortment of pollutants including:

Sediment (or Total Suspended Solids)



The Downstream Defender® is a highly effective sediment/TSS removal device. It can be sized in a number of ways to suit the application and level of protection required (see Table 1).

Gross Pollutants



100% removal of floatable debris, such as food wrappers, Styrofoam cups and drinks cartons

Liquid Hydrocarbons



Effective spill containment device that meets the BS EN 858-1:2002 Class I and Class II effluent targets at low flow rates. Note these systems are not considered oil separators according to the BS EN 858-1 and must not be used in applications where full certification is required.

Sediment Bound Hydrocarbons (including Polycyclic Aromatic Hydrocarbons - PAHs)



PAHs have low solubility in water and are readily adsorbed onto sediment particles. Effective removal of sediment particles will also ensure the removal of many PAHs.

Sediment Bound Heavy Metals and Nutrients



As an efficient device for removal of fine sediment, the Downstream Defender® is also effective for the removal of sediment bound pollutants.

No Risk of Pollutant Wash Out

The Downstream Defender® has been specially designed to isolate the pollutant storage zones and is proven to prevent pollutant wash out.

The Simple Index Approach (SIA)

The Simple Index Approach outlined in CIRIA C753 The SuDS Manual is a water quality design method for sites with a low to medium risk pollution hazard level. Sites with a high risk pollution hazard level should consider a more precautionary approach.

The approach assigns pollution hazard indices to the given land use for three pollutant groups, total suspended solids (TSS), metals and hydrocarbons. SuDS components are then selected until their combined pollution mitigation index score is greater than the pollution hazard index for each pollutant group.

Downstream Defender® SuDS Mitigation Indices		
Total Suspended Solids (TSS)	Metals	Hydrocarbons
0.5	0.4	0.8
Notes: (a) All mitigation indices supplied by Hydro International Ltd are independently verified and calculated using the methods laid out in the British Water How To Guide: Applying the CIRIA SuDS Manual Simple Index Approach to Proprietary / Manufactured Stormwater Treatment Devices. Performance declarations are available on request or on the British Water website.		

Table 1 - SuDS Mitigation Indices for Downstream Defender®.

Sizing

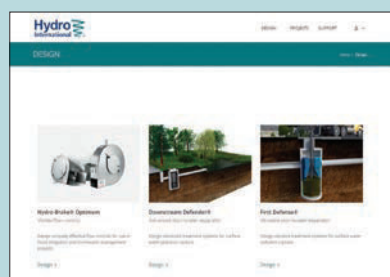
The Downstream Defender® can be sized for different treatment goals and objectives. For design purposes, the selected model's Treatment Flow Rate should be greater than or equal to the site's Water Quality Flow Rate.

The hydraulic capacity of the selected model should be considered with respect to the peak discharge flow rate from the site.

If there is no treatment objective, just betterment, do not use a treatment flow rate and only compare the hydraulic capacity to the peak discharge flow rate.

Model Diameter (m)	Treatment Flow Rate - Fine (a)(b) (l/s)	Hydraulic Capacity (c) (l/s)	Minimum Oil Storage Capacity (l)	Minimum Sediment Storage Capacity (d) (m³)	Maximum Headloss at Treatment Flow Rate (mm)
1.2	30	120	283	0.39	150
1.8	69	270	1356	0.73	225
2.55	138	542	2535	2.89	300
3.0	190	750	4693	3.10	375
Notes: (a) Treatment Flow Rate - Fine is based on an annualised removal efficiency of >50% of all particles up to 1000 microns with a mass-median particle size (D50) of 75 microns and a specific gravity of 2.65. The test procedure is WRC approved and in line with the British Water Code of Practice. (b) Alternative sizing based on different sediment grades available on request. (c) Maximum flow rate that can pass through the chamber with a maximum headloss of 500mm. (d) Additional sediment storage capacity can be provided to extend maintenance intervals if required.					

Table 2 - Downstream Defender® design information.



Design a Downstream Defender® with our Online Design Tool

Our online design tool now enables you to design your own Downstream Defender® or First Defense® stormwater treatment separators as well as Hydro-Brake® Optimum.

The tool also allows you to save project designs and submit them to our expert technical team for a free design review.

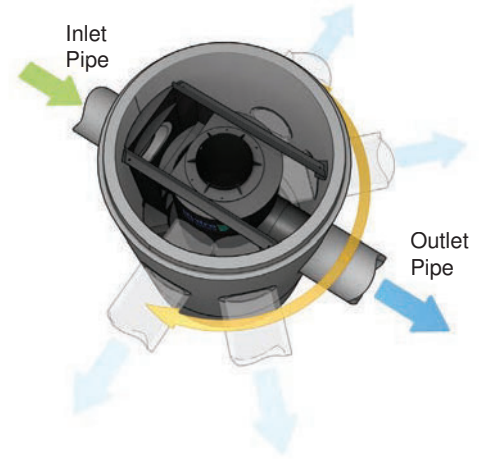
hydro-int.design

Setting out

The Downstream Defender® can accommodate a change in pipe direction to suit site specific requirements. Combined with the high rate internal bypass, this helps to avoid the need for additional manholes on site. Head loss across the chamber is kept to a minimum (see Table 2). The inlet and outlet pipes should be sized in accordance with Table 3 (opposite), and a minimum of 90 degrees between inlet and outlet is required.

Inlet and outlet pipe connections are at the same invert level.

Additional manhole sections can be provided to extend the chamber to meet site cover and invert levels or provide additional pollutant storage where required.



Dimensions and weights

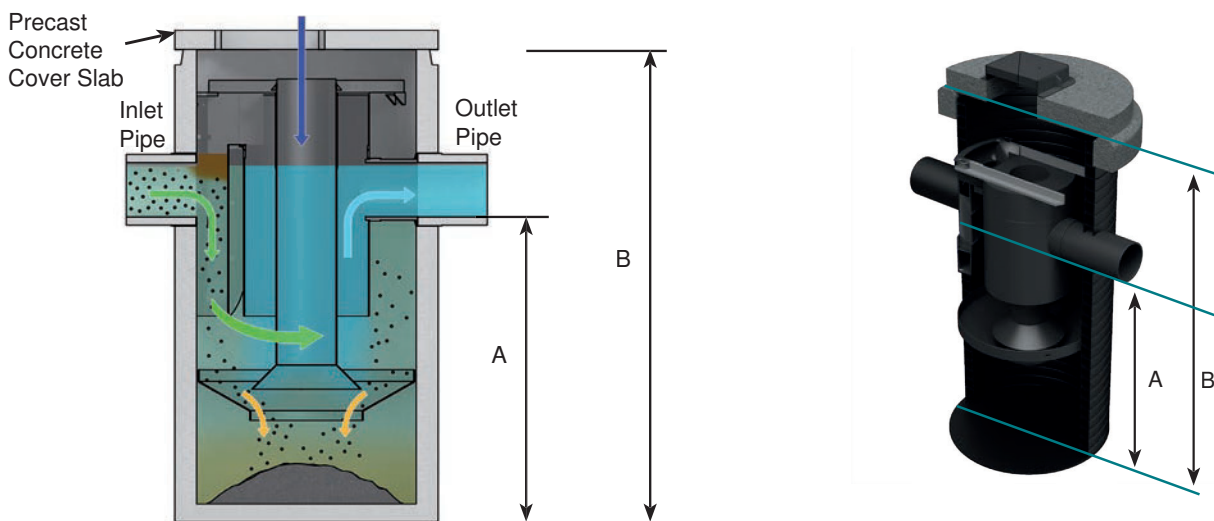
General arrangement drawings of all units are available for download from: <http://www.hydro-int.com/en-gb/products/downstream-defender-0>

Model	Material	Chamber Diameter - Internal (mm)	Chamber Diameter - External (mm)	Inlet and Outlet ID (mm)	Depth to invert (m) (A) ⁽¹⁾	Chamber Depth (m) (B) ⁽²⁾	Maximum Component Lift Weight (kg)
PQL1320.1000	Concrete	1200	1460	300	1.916	2.830	2200
PQL1320.1030	Concrete	1800	2160	450	2.495	4.029	5450
PQL1320.1060	Concrete	2550	2850	600	2.95	4.95	8700
PQL1320.1090	Concrete	3000	3350	750	3.12	5.20	12100
PQL1320.1020	HDPE Single Wall	1188	1200	300	1.55	2.3	140
PQL1320.1051	HDPE Single Wall	1776	1812	500	2.11	3.41	460
PQL1320.1081	HDPE Single Wall	2530	2570	600	2.94	4.8	900
PQL1320.1111	HDPE Single Wall	2974	3000	800	3.13	5.3	1300
PQL1320.1025	HDPE Twin Wall	1200	1300	300	1.56	2.22	400
PQL1320.1055	HDPE Twin Wall	1800	2200	560	2.467	3.75	1100

Notes:

- 1) Minimum depth to invert shown. Depth to invert can be increased if required.
- 2) Minimum chamber depth shown. Additional sediment storage capacity or increased depth to invert can be provided if required.

Table 3 - Downstream Defender® unit types, dimensions and weights.



Easy to install

The Downstream Defender® is delivered to site as a near finished manhole with internal components already installed. Installation is therefore similar to any other manhole installation on site. Full installation guidelines are available.

We can provide structural concrete systems for simple plug-and-play installation or choice of lightweight single and twin wall plastic chambers.

Simple, safe and cost-effective maintenance

Maintenance is carried out from the surface, using a standard vacuum tanker and personnel are not required to enter the device.

With a large capacity to store sediments and oils (see Table 2), and with a proven ability to prevent wash out, maintenance intervals can be years rather than months - depending on site conditions. The unit can also be fitted with a [Hydro-Logic® Smart Monitoring](#) system to alert the site operator when maintenance is required and provide peace of mind that the unit is operating normally at other times.

Additional pollutant storage can be built into the chamber to extend maintenance intervals if required.



Make it Smart

Add Hydro-Logic® Smart Monitoring and your Downstream Defender® will let you know when it needs maintenance

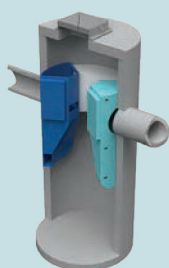
Get monitoring maintenance alerts from your Downstream Defender®

Save time and money by only visiting your Downstream Defender® when it actually needs emptying.

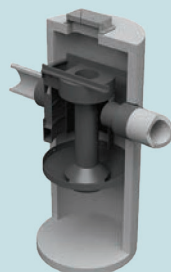


Our full range of surface water treatment devices

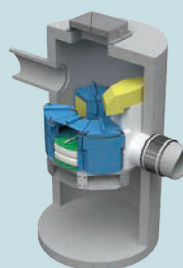
The Downstream Defender® is one of a range of surface water treatment devices. Each device delivers proven, measurable and repeatable surface water treatment performance. Each can be used independently to meet the specific needs of a site or combined to provide higher levels of treatment. They can be used alongside natural SuDS features to protect, enable or enhance them.



First Defense®
Vortex Separator



Downstream Defender®
Advanced Hydrodynamic
Vortex Separator



Up-Flo™ Filter
Fluidised Bed Up Flow
Filtration System



Hydro Biofilter™
Biofiltration System

Patent: www.hydro-int.com/patents

Tel: +44 (0)1275 337937 stormwater@hydro-int.com

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

hydro-int.com

SDS GEOLight®

Stormwater Management System

Product Profile

SDS GEOLight® is an ultra lightweight honeycombed modular structure made from recycled PVC. The ready to install units are preformed to provide an underground stormwater storage facility, for the application of stormwater attenuation or infiltration.

The high void rate (>95%), high compressive strength (to 1000KN/m²) and low resistance to water flow makes

SDS GEOLight® an ideal material for cost efficient and maintainable underground water storage during storm conditions.



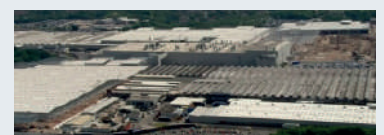
APPLICATIONS



RETAIL



INFRASTRUCTURE



INDUSTRIAL



RESIDENTIAL



COMMERCIAL



PUBLIC SECTOR

SDS GEOLight® Benefits

- High compressive strength – can be located under all roads, car parks and amenity area surfaces.
- Reduced excavation costs – the very high void rate (95%) minimises the required volume of earthworks.
- Speed of installation – 1000m³ reservoir, completed in one week.
- Light and easy to handle.
- Excellent hydraulic characteristics.
- The honeycomb structure is highly permeable, offering low resistance to water flow.
- SDS GEOLight®'s unique lateral and vertical filling arrangement requires a minimum amount of pipework and stone.
- Depth of tank invert reduced by using patented lateral supply.
- Simplified distribution pipe network, easy maintenance – dispensing with costly and complicated pipework configurations.
- Modular format offers design flexibility to overcome topographical constraints and architectural requirements.
- Greatly reduces the risk of flooding when used as stormwater storage.
- Can also be used for water recycling and combining with irrigation systems.
- Can virtually eliminate pollution when used in combination with specialist separation and filtration technology such as SDS Aqua-Swirl™ and SDS Aqua-Filter™.
- Design service available, including calculations.



Material	Recycled Rigid PVC		
Colour	Dark grey to black		
Standard length of a block	2000 mm	2000 mm	2000 mm
Standard width of a block	500 mm	500 mm	500 mm
Standard height of a block*	750 mm	750 mm	750 mm

Void Ratio	> 95%	> 95%	> 95%
Compressive Strength	420 kN/m ²	610 kN/m ²	800 kN/m ²



SDS GEOLight® 400	SDS GEOLight® 600	SDS GEOLight® 800
APPLICATIONS		
Stormwater Management		
Attenuation / Infiltration		
Bacterial filter-bed for biological treatment		
Hydrocarbon Separation		
Filtration and Separation Units		
SPECIFICATIONS		
*Other block sizes available on request		
ADVANTAGES		
Highly cost effective		
Reduced excavation costs		
High void capacity		
Good UV resistance		
Good hydrocarbon resistance		

Pre-Application Consultation Request

Town and Country Planning Act 1990

Observations By:	KC, Lead Local Flood Authority
Application No.	2021/20912
Proposed Development:	Pre application advice for residential development
Location:	Land Adjacent, 67, Chapelgate, Scholes, Holmfirth, HD9 1SX
Applicant/Agent:	Catalina Tudor
Planning Officer	

Your comments on the above proposal are requested. Please e-mail your comments to the DC Admin in either a Microsoft Word or PDF Document to DC.Admin@kirklees.gov.uk by **28-Sep-2021**.

The submitted plans and documents for the application can be viewed using Documents from Anite or Anite, please use the application number above.

If I do not receive your response by **28-Sep-2021** then the application may be decided without the benefit of your views.

Dated: 14-Sep-2021

Mathias Franklin
Head of Planning and Development

Consultation Response from KC, Lead Local Flood Authority		
2021/20912 at Land Adjacent, 67, Chapelgate, Scholes, Holmfirth, HD9 1SX		
Pre application advice for residential development		
Date Responded:	Responding Officer:	Responding Ref:
<p>Contours The proposed site is located on relatively steep land. The Western part of the site is about 240m above ordnance datum (AOD), whereas the East is about 235, AOD.</p> <p>Water Features There are no known water features on the proposed site. The closest water feature is a stream 30m East of the site.</p> <p>Main River Flood Risk Flood Zone 1 - land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%) The proposed site is located in flood zone 1. The closest area within a flood zone is 230m South East in flood zone 3.</p> <p>Sequential Test This application would not be subject to a sequential test.</p> <p>Surface Water Flood Risk The proposed site has some surface water flood risk. The central section of the site has predicted surface water flooding of up to 0.3m, in the 1 in 100 annual flood event.</p> <p>Flood Incidents It is Kirklees Councils statutory duty as the LLFA to record all incidents of flooding in the district. This information gives us a wider understanding of flooding issues. There have been no previously reported flood incidents on the proposed site. The closest reported incident was 105m North, and caused by a culvert.</p> <p>Flood Routing/Site Layout During intense rainfall events drainage systems can often become blocked or overwhelmed. We expect developers to understand where the flow of water will be in these circumstances and avoid unnecessary risk. Any water which makes its way on site will run straight of site, towards the East. The option 2, site layout, poses less risk to the site as it reduces the risk of ponding water at the front of the houses.</p> <p>Surface Water Drainage Strategy At Kirklees Council we aim to promote sustainable drainage throughout the district. As the Lead Local Flood Authority we expect developers to follow our drainage strategy hierarchy.</p> <p>We would encourage the developer to investigate the potential for soakaways on the proposed site. Although the site is relatively steep, the site has a BGS score of 1 which means that the subsurface is likely to be suitable for free-draining infiltration SuDS. Soakaways must be 5m away from properties and should not encroach this sphere of influence on 3rd part land. We recommend early dialogue with our section 38 team on highway soakaways positioning and stand-off. At the moment a landscaped area to be signed over to highways is favoured.</p>		

Connecting to a watercourse would be a viable option as the Dean Dike runs 230m to the South East.

Connecting to a Yorkshire Water sewer is unlikely to be a viable option, as there are few sewers in this location. The most Likely connection point is 35m North of the site and has a diameter of 100mm, which is probably not big enough for the site.

Attenuation must store the critical 1 in 30 year storm. Volumes generated by storms up to and including the 1 in 100 + 30% climate change critical storm also has to be stored on site. Opportunities to store the additional volume in safe areas on the surface can be explored however the majority of sites in Kirklees will be sloping and this volume may also need to be stored in an underground system. If attenuation span is greater than 1500mm and positioned under highway this is likely to preclude adoption by Kirklees Council. Please speak to our Structures department for more information. Storage in landscaped areas or non-adoptable highway is unaffected.

Section 106 – Management Company

The LPA is obligated under House of Commons Written Statement 161 to ensure the maintenance and management of sustainable drainage for the lifetime of the site. This includes the period from construction up until a date of adoption by the statutory undertaker (Yorkshire Water). There is no guarantee that systems will be adopted even if an agreement is signed to do so. It is vital therefore that an undertaking is ensured in the planning process to maintain these systems to manage flood risk. A detailed maintenance plan including access and safety is expected to be included so it can be enforced against non-compliance.

Temporary Drainage

Run off can increase post soil and vegetation strip and the risk of sediment entering the local drainage systems and watercourse. A plan to manage risk of flooding to nearby property and land and to protect watercourses from pollution will be required.