

**Proposed PFS and Drive Through Restaurant Redevelopment
at 181 Havant Road, Hayling Island**

Drainage Strategy Report

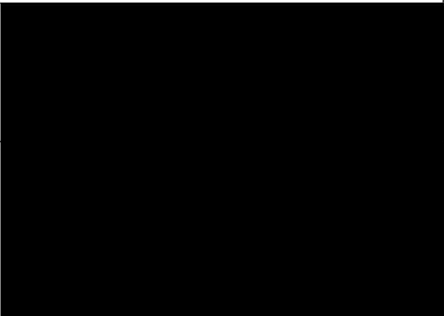
Client: Euro Garages Ltd

Date: 14 March 2023

Project No: P15653

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Revision:		Signature	Date
Prepared by:			
Checked by:			
Revision Notes:			

Contents	Page
1.0 Introduction	1
2.0 Existing Site	1
2.1 General Description	1
2.2 Site Topography	2
2.3 Existing Natural Drainage Features	2
2.4 Existing Drainage Infrastructure	2
3.0 Proposed Development	3
4.0 Flood Risk Assessment	4
5.0 Site Drainage	6
5.1 Foul Drainage	6
5.2 Surface Water System	6
6.0 Drawings and Calculations	7

1.0 Introduction

Goodson Associates have been appointed by Euro Garages Ltd to prepare a Drainage Strategy for the proposed redevelopment of the existing Esso roadside petrol filling station and Greggs bakery at 181 Havant Road, Hayling Island. The purpose of this report is to describe in principle the design approach of the foul and surface water drainage systems for the redevelopment.

2.0 Existing Site

2.1 General Description

The proposed site is located to the western side of the A3023 Havant Road at Hayling Island (Post Code PO11 0LG, Grid Ref: 471788,102995). Figure 1.0 shows the Jennings Design existing site layout plan with the approximate site boundary highlighted in red.

The site is bordered by residential properties to the north and south, with the A3023 Havant Road to the east and residential properties beyond, and to the west is the 'Hayling Billy Trail' footpath and a carparking area with the West Hayling Nature Reserve and Stoke Common Lake beyond. Two adopted foul sewers also meet and cross the site, flowing in a north to south (right to left) direction.

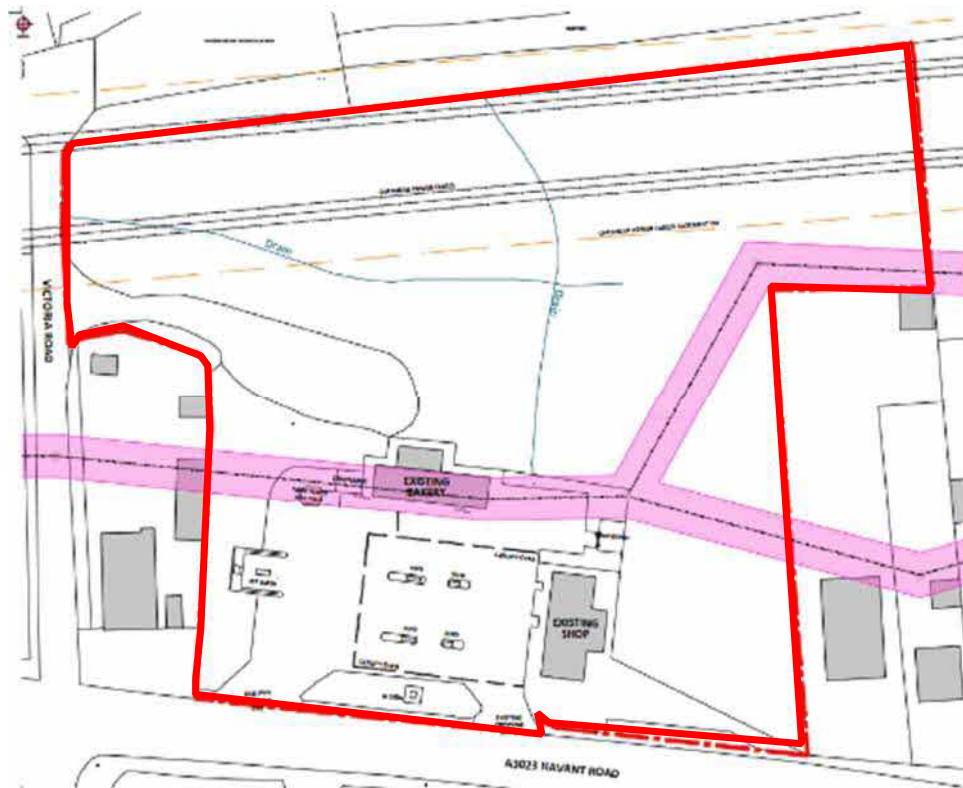


Figure 1.0 –Jennings Design –existing site plan

2.2 *Site Topography*

As indicated in Figure 1.0 above the site currently operates as a petrol filling station. It contains an associated Spar shop, a separate Greggs bakery unit to the west of the forecourt, and a jet wash facility to the southern area of the site.

The remainder of the site which is the majority area contains landscaped areas to the north and west. This area contains dense trees, shrubs, a landscaped mound to the western extent of the site and two connected drainage ditches highlighted on the Ordnance Survey plans for the area.

Overhead power cables also run above the the western area of the site, running wholly above the landscaped area.

The overall application site is of irregular shape on plan and in total is approximately 0.858 ha in area.

The site falls generally from the western boundary at around 3.0m AOD towards the eastern boundary at Havant Road at between 2.22m and 2.43m AOD.

2.3 *Existing Natural Drainage Features*

There are two connected drainage ditches present on site, though given the densely populated landscape area they were reported as being largely being overgrown, difficult to access and not possible to survey.

A utility radar survey has picked up a storm water drain which runs in front of the existing petrol filling station shop, and is shown to discharge from site into Havant Road to the east. This also correlates with the Southern Water sewer records for the area. This sewer is shown to run close to one of the anticipated drainage ditch locations to the west of the site, and consequently a CCTV drainage survey is required to confirm the existing arrangements and particularly to see if the ditches are connected to the on-site drainage network.

An extract of this underground utility survey is included in Figure 2.0 below, and an extract of the Southern Water sewer records included in the following Figure 3.0, with full copies and further extracts included in the appendices to this report.



Figure 2.0 –Underground Utility Survey –extract

2.4 Existing Drainage Infrastructure

The initial underground utility survey carried out on the site (extract in Figure 2.0 above) shows the existing foul and surface water sewers that serve the current development.

As can be seen the survey showed that the storm drainage for the current development connects to a 375mm diameter sewer that crosses the site in an east-west direction located in front of the existing PFS shop, and is suggested to discharge off-site into the Southern Water adopted sewer in Havant Road to the east. There is a possibility that this may be connected to the ditch to the west, hence a detailed CCTV Survey investigation is required to clarify the existing situation.

The nearest public foul water sewers cross through the site flowing in a north to south direction, and are shown to run underneath the existing Greggs bakery building. These sewers will require a diversion under a formal Section 185 agreement with Southern Water to facilitate the redevelopment of the site. An extract from the Southern Water sewer records is included in Figure 3.0 below, with a full copy included in the appendices.

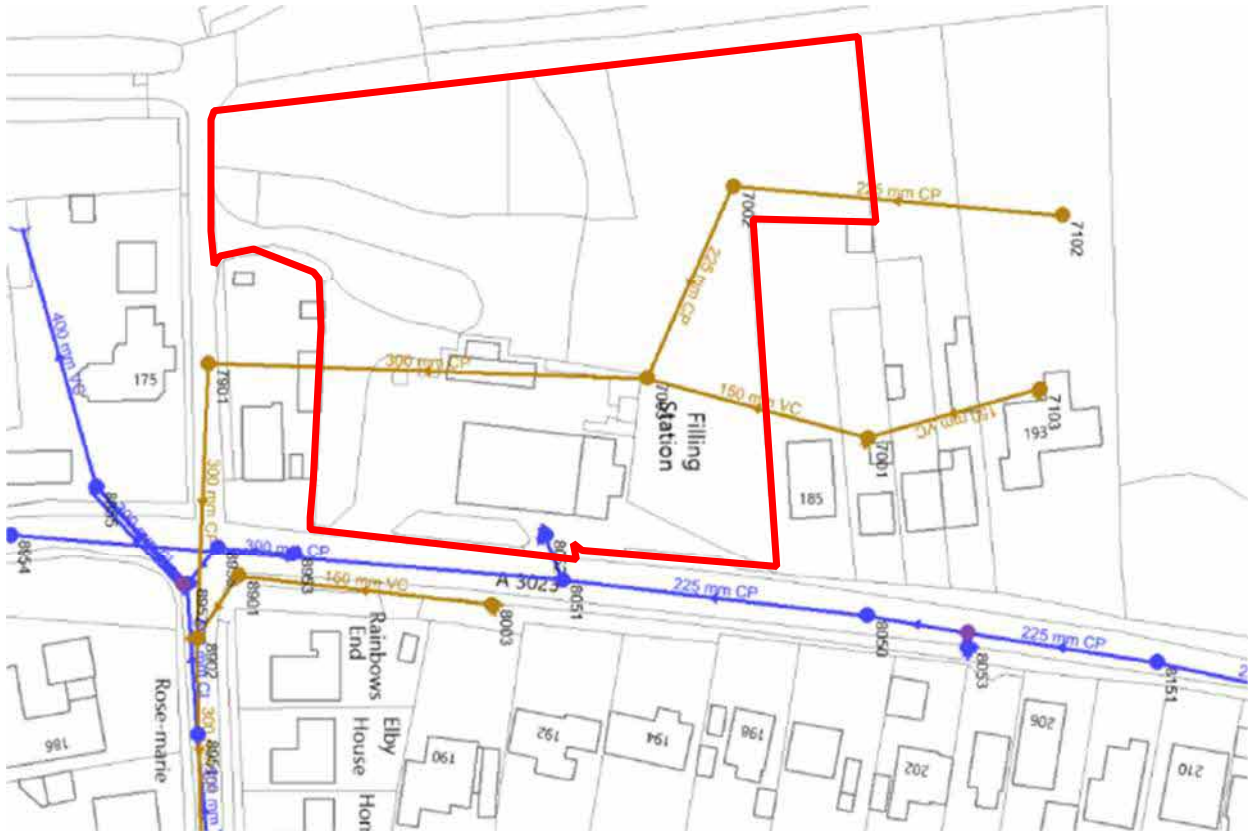


Figure 3.0 –Southern Water Sewer Records –extract

3.0 Proposed

4.0 Flood Risk Assessment

The possible sources of flooding have been considered for the site and figures 4.0 and 5.0 below show the extent of flooding in the site location for fluvial and surface water flooding from the Gov.uk Flood Risk website.

A flooding from rivers or sea extract is shown in Figure 4.0 below and indicates that the site is within a classified flood risk area. Consequently a detailed Flood Risk Assessment Report for the proposed redevelopment has been provided by NSugg Limited, referenced NS_0124_74, and has been included as part of this Planning Application.

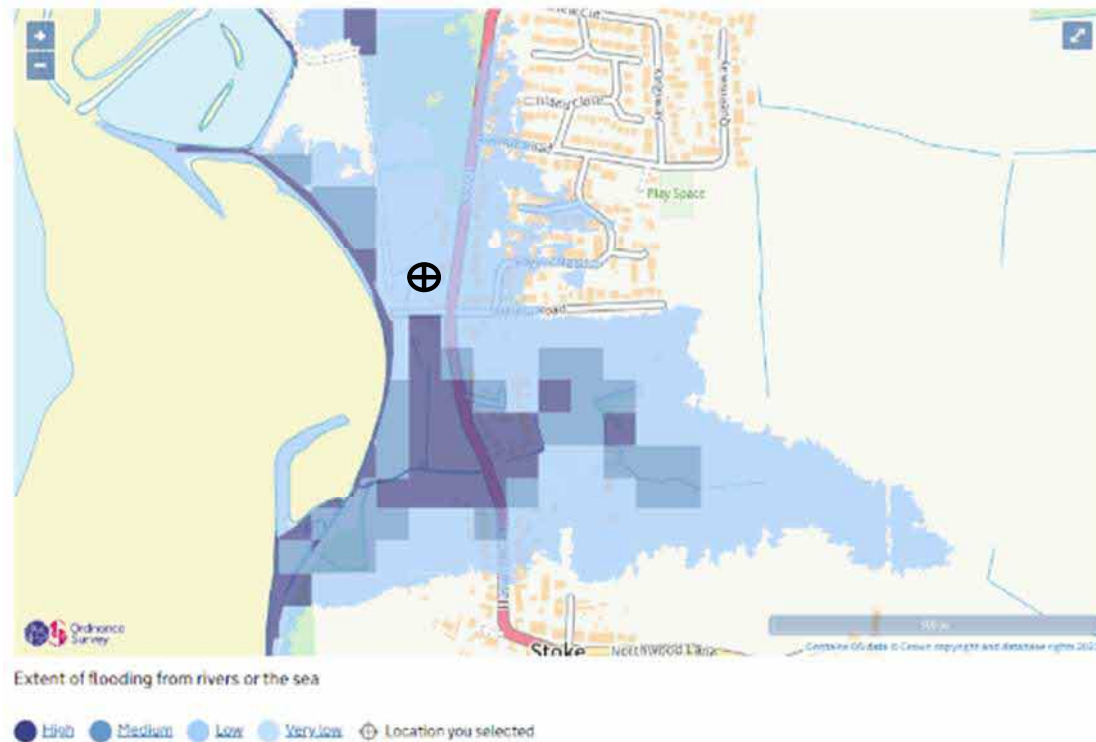


Figure 4.0 Flood Risk from Rivers and the Sea

From Figure 5.0 below it appears that the site is not directly at risk of surface water flooding, though Havant Road to the eastern perimeter is shown to be at a low risk. The proposed development will be designed to current surface water standards and the building will be set as high as possible within acceptable site gradient limits and with external areas falling away, to minimise surface water flood risk for the new development.

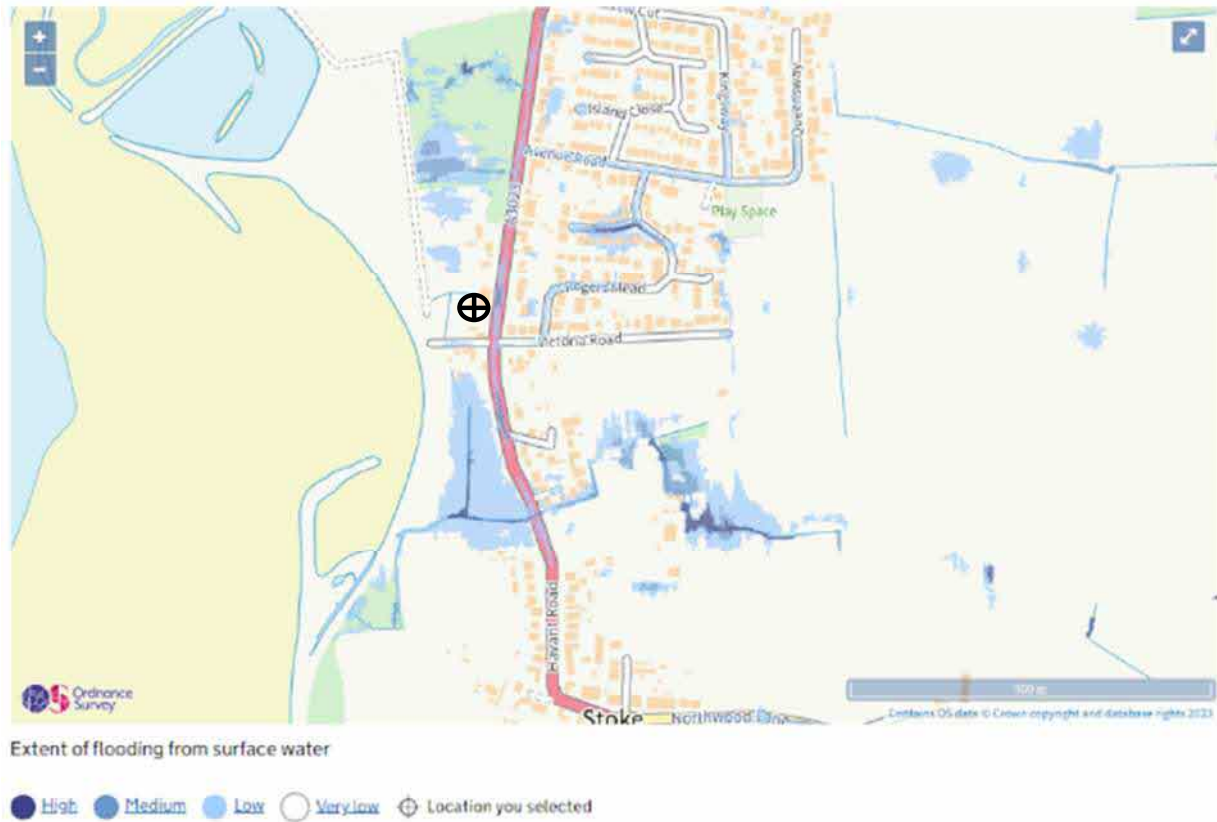


Figure 5.0 Flood Risk from Surface Water

5.0 Site Drainage

The proposed development will have separate foul and surface water drainage systems, with discharge arrangements proposed as detailed below. Drainage layout proposals for the on-site drainage are contained in Section 6.0 below.

5.1 Foul Drainage

The existing Southern Water adopted foul sewers crossing the site will require to be diverted under a formal Section 185 agreement to facilitate the proposed redevelopment works.

It is proposed that foul flows from the redevelopment will discharge into the diverted adopted foul sewer at two points across the site, the PFS Shop and Drive Through Restaurant will connect into the adopted foul sewer towards the northern end of the site, the remainder of the foul network connecting at the southern boundary of the site.

An assessment of the proposed and existing foul discharge rates for the site was requested by Southern Water and has been provided by RA Dalton Limited, which estimates that the foul discharge for the proposed redevelopment will reduce from an existing rate of 2,820 litres a day to 2,340 litres a day. An extract of this emailed correspondence is included in the appendices to this report.

5.2 Surface Water System

SuDS hierarchy has been used for the surface water design.

The surface water design flows are calculated on the proposed new development impermeable area of 0.37 ha and a design storm intensity of a 100-year return period plus 40% climate change allowance.

The EPS Phase 1&2 Geo-Environmental Assessment Report highlights ground conditions of Made Ground, overlying a varying mixture of peaty and clayey subsoil, overlying Chalk. The EPS Report also highlights shallow groundwater is present across the site. Consequently it is concluded that surface water infiltration to ground would be an unreliable and inappropriate option for draining surface water for this development. Extracts of the EPS Report are included in the appendices.

Given the current uncertainty over the location and depth of the existing ditches to the west of the site a stormwater discharge into the ditch should not be ruled out. This will be investigated with further topographic and CCTV drainage surveys and assessed once accurate information is available. However it is expected that the ditch will be too shallow to discharge into without incorporating a pumped discharge arrangement.

It is therefore proposed that surface water from the roof and hardstanding areas will be collected and directed into the existing surface water network within the site boundary before discharging from site in the manner it is understood to do so at present, via the existing Southern Water adopted storm connection present at the eastern boundary of the site.

It is proposed that the surface water will discharge from site at a reduced rate of 30% from the existing 0.158 ha impermeable area, which has been calculated at $2.78 \times 0.158 \times 50 = 22.0$ l/s, hence the reduced discharge rate will be $22.0 \times 0.7 = 15.4$ l/s.

MicroDrainage calculations provided in Section 6.0 determine that a minimum 132.4 m³ of storage will be required to achieve the desired maximum discharge rate of 15.4 l/s to manage flood risk up to the 1 in 100 year + 40% climate change storm event. An attenuation tank has therefore been detailed to provide 136.8 m³ of attenuation.

From the drainage modelling and knowledge of the wider area topography, should extreme storms exceed the design allowance or there be a malfunction of the drainage system, exceedance routing would direct storm water away from the building and on to the forecourt area and then away from the site onto Havant Road to the east.

6.0 Drawings and Calculations

Proposed Site Layout (Jennings Design Ltd)

Existing Site Layout (Jennings Design Ltd)

Topographic Survey (Sumo Services Ltd)

Underground Services Survey Plan and extracts (Subsite Surveys)

Phase 1&2 Geo-Environmental Assessment Report extracts (EPS)

Southern Water correspondence and Sewer Records

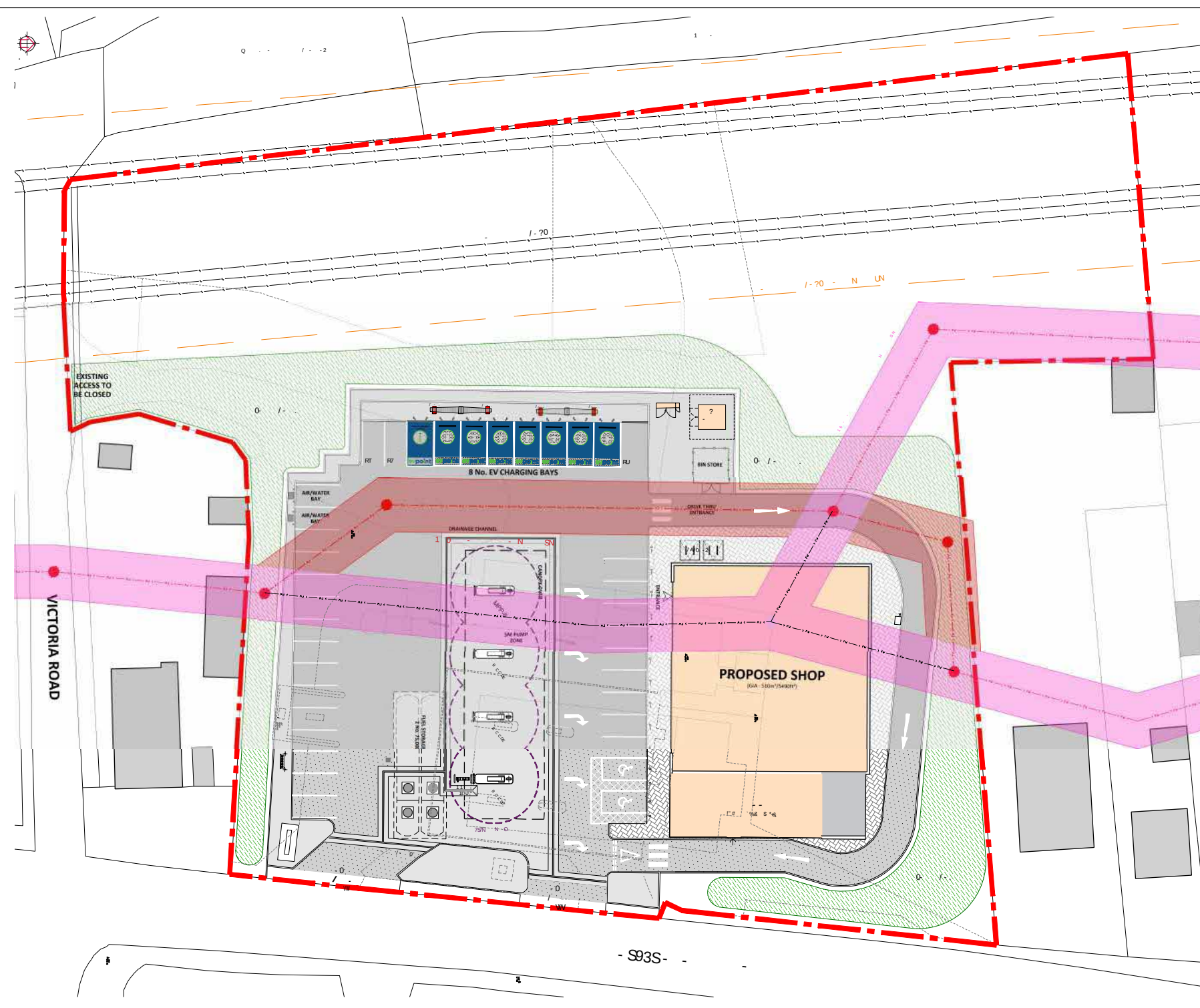
Existing & proposed foul drainage flow rate estimates (RA Dalton)

P15653-500 Drainage Layout Plan (Goodson Associates)

P15653-501 Impermeable Area Plan (Goodson Associates)

P15653-502 Proposed Foul Sewer Diversion (Goodson Associates)

P15653 MicroDrainage Network Modelling Calculations (Goodson Associates)

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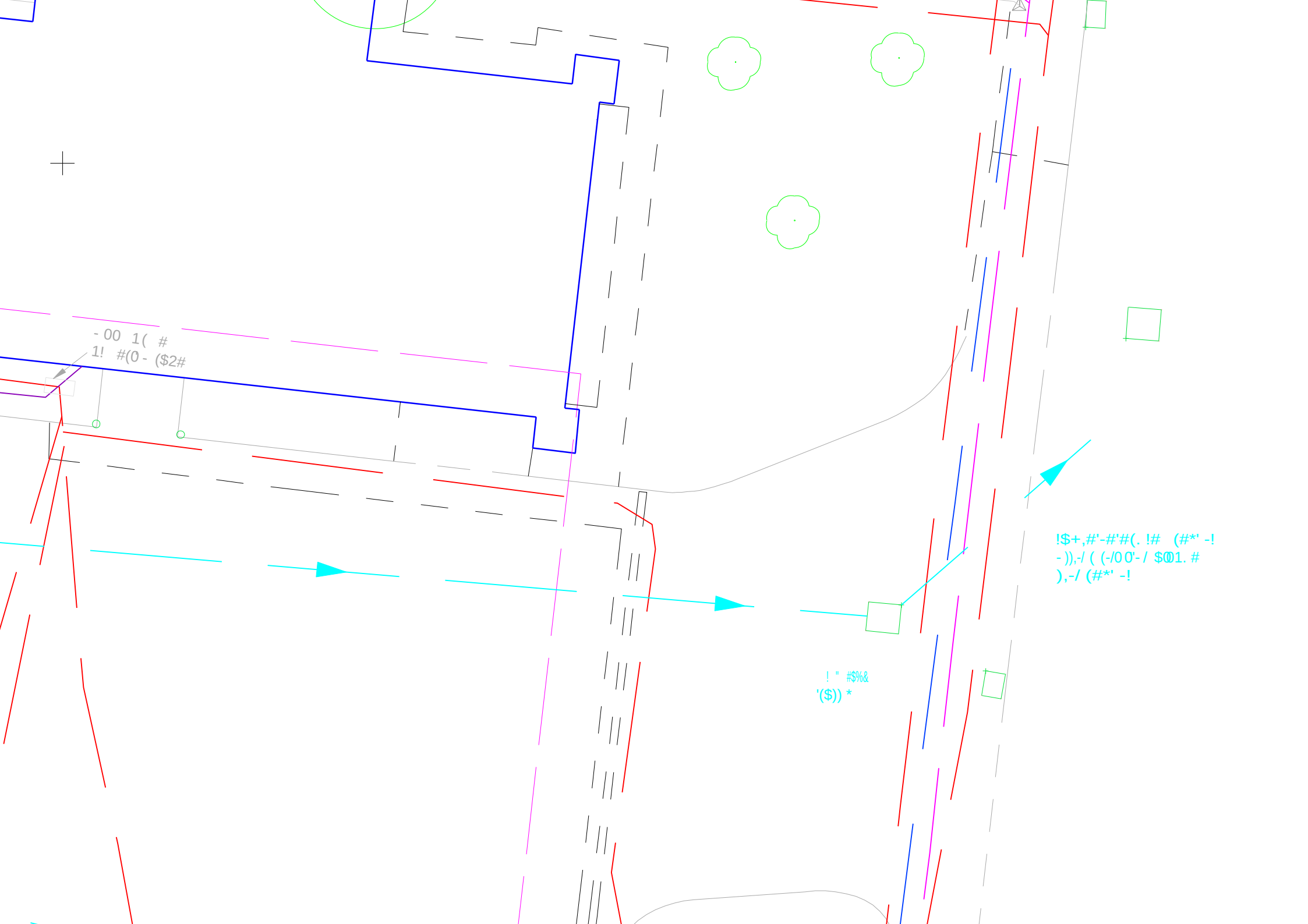
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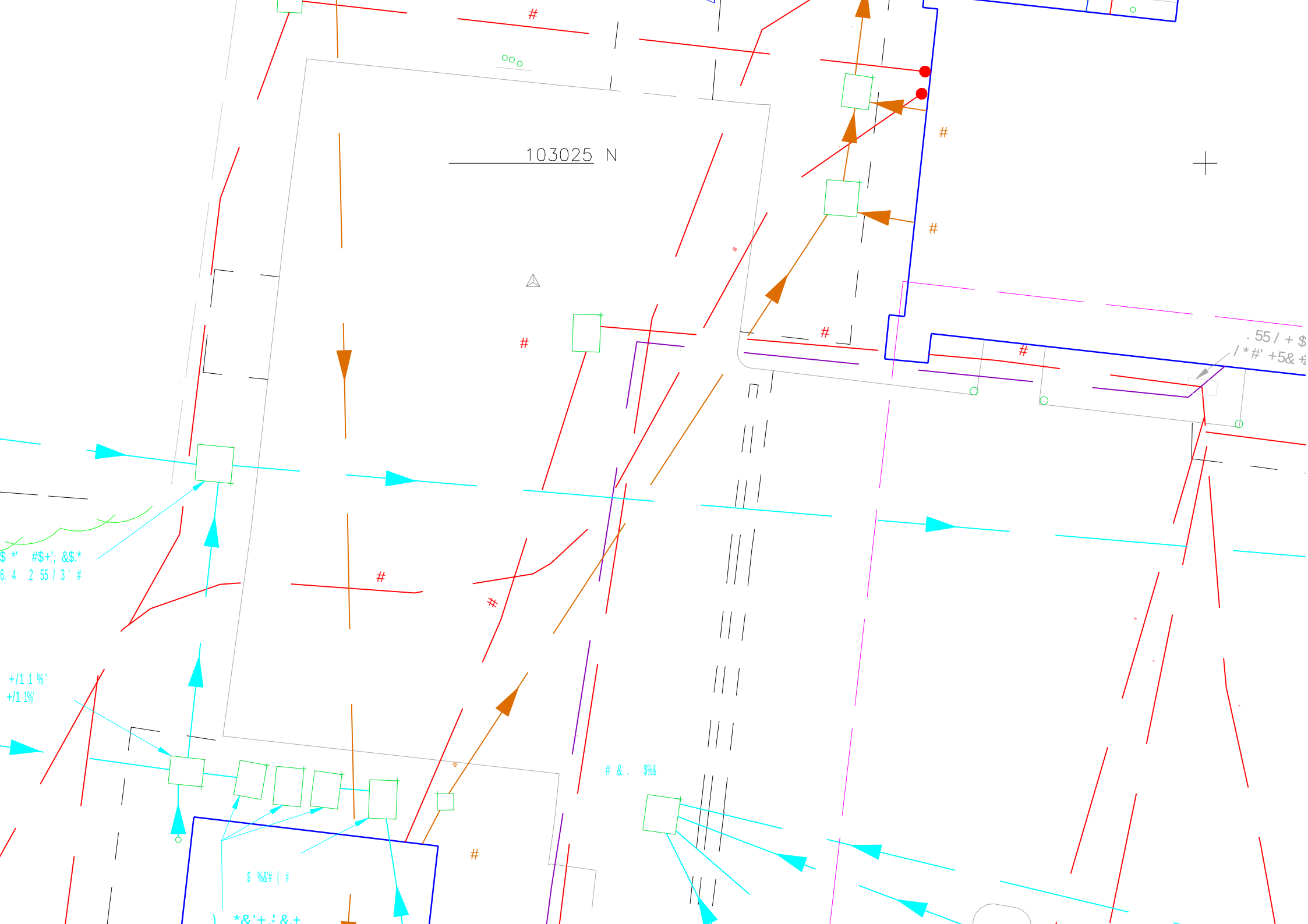


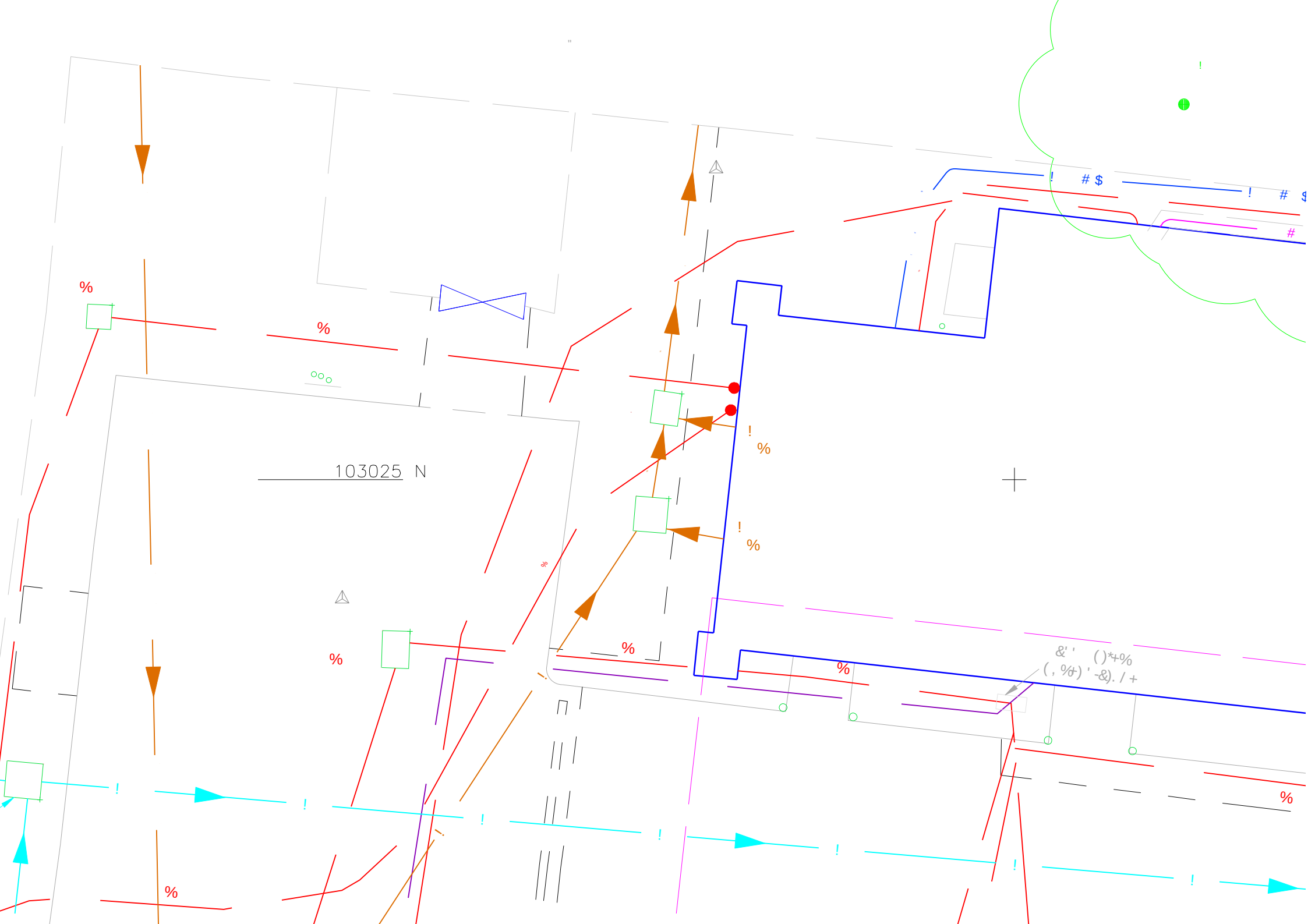
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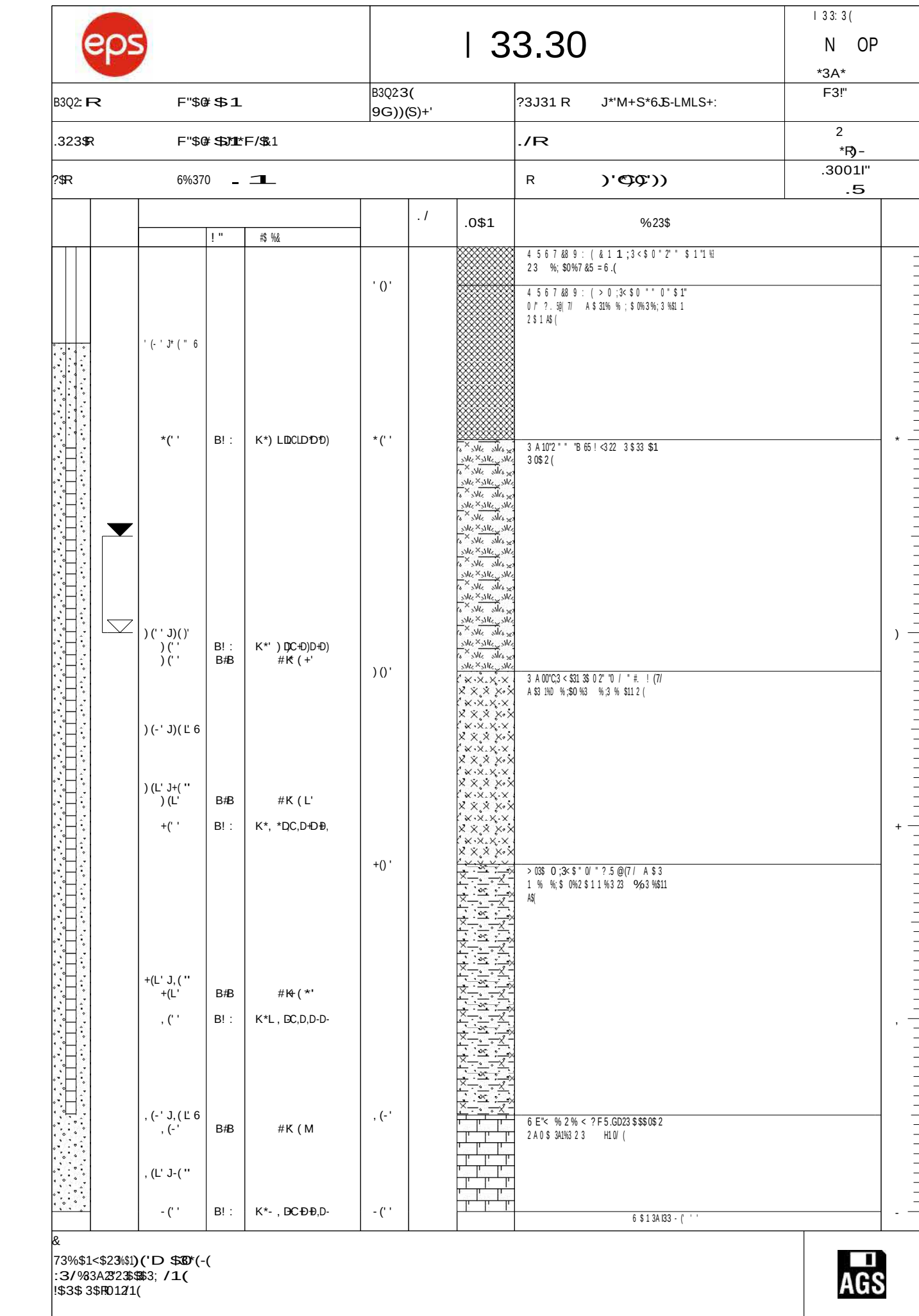
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Phillip Harrington
Goodsons Associates Leeds
Basilica - Studio Eleven
2 King Charles St
Leeds
West Yorkshire
LS1 6LS

Your ref

Our ref
DSA000019699

Date
23 January 2023

Contact
Tel 0330 303 0119

Dear Mr Harrington,

Level 1 Capacity Check Enquiry: 181 Havant Rd, Hayling Island, Hampshire, PO11 0LG.

Thank you for your capacity check application relating to the above site.

We still require the following information to allow us to fully assess your application. Please provide the information to DSAddInfo@southernwater.co.uk. Where files are above 10mb, these will need to be sent to developerservices@swsbcmil.co.uk only.

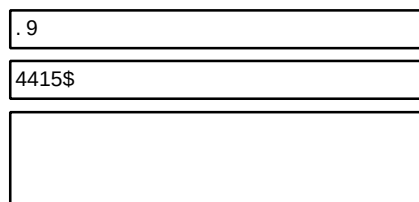
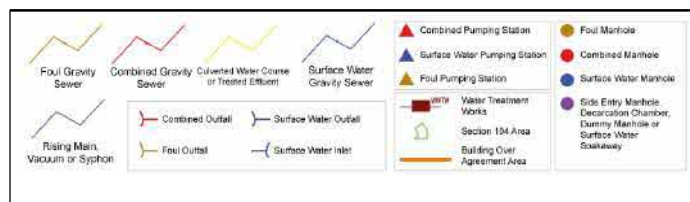
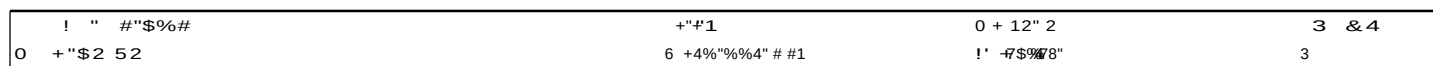
1. Preferred point of connection for both foul and surface water connections (if any).
2. Number of seats in drive through restaurant.
3. Please note, as the development site has existing connection, the proposed foul/surface flow could be accommodated if the existing foul/surface flows from the existing premises are equivalent or greater than the proposed foul/surface water flows and are removed as part of the redevelopment of the site. You will be required to provide a topographical site survey and/or a CCTV survey showing the existing connection points, pipe sizes, gradients and calculations confirming the proposed foul/surface water flows will be no greater than the existing contributing flows.

Upon receipt of your further information, we will reassess your application and provide an acknowledgment to you within 5 calendar days and should all information be available, a final response within 21 calendar days. Should you require any further advice please do not hesitate to contact us on the above telephone number.

Yours sincerely,

Future Growth Planning Team
Developer Services

southernwater.co.uk/developing-building/planning-your-development



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From: [REDACTED]
Sent: 01 February 2023 09:31
To: [REDACTED]
Cc: [REDACTED]
Subject: RE: P15653: Southern Water - Further Info Required (DSA000019699-CC) 181 Havant Rd, Hayling Island, Hampshire, PO11 0LG.

Hi [REDACTED],

Expected flows based on the following provides a peak of 2340 litres a day. 100 covers based on 40 seats (unlikely due to drive through option)

Current peak with Greggs will be less at 75 covers (smaller unit) , PFS toilets (with smaller shop), and jet wash might look like:-

Proposed:-

	NO.OF UNITS	HYDRAULIC LOAD L/HD/D	ORGANIC LOAD G/HD/D	AMMONIA LOAD G/HD/D	TOTAL HYDRAULIC LOAD L/D	TOTAL ORGANIC LOAD G/D	TOTAL AMMONIA LOAD G/D
FULL TIME DAY STAFF	4	90	38	5.0	360.00	152.00	20.00
PART TIME (4hr shift)	4	45	25	3.0	180.00	100.00	12.00
Office / Factory		50	25	5.0	0.00	0.00	0.00
RESTAURANT MEALS pre-prepared		25	30	2.5	0.00	0.00	0.00
RESTAURANT MEALS Luxury		30	38	4.0	0.00	0.00	0.00
Roadside covers	100	12	12	2.5	1200.00	1200.00	250.00
Drinkers		12	15	5.0	0.00	0.00	0.00
Snacks / Bar meals		15	19	2.5	0.00	0.00	0.00
Function Rooms		15	19	2.5	0.00	0.00	0.00
Fast Food - Roadside Restaurants		12	12	2.5	0.00	0.00	0.00
FastFood Meal - Burger chain		12	15	4.0	0.00	0.00	0.00
PUBLIC TOILET (URINAL)	40	5	12	2.5	200.00	480.00	100.00
PUBLIC TOILET (WC)	40	10	12	2.5	400.00	480.00	100.00
TOTAL (CUM/KG)					2.34	2.41	0.48

Existing:-

	NO.OF UNITS	HYDRAULIC LOAD L/HD/D	ORGANIC LOAD G/HD/D	AMMONIA LOAD G/HD/D	TOTAL HYDRAULIC LOAD L/D	TOTAL ORGANIC LOAD G/D	TOTAL AMMONIA LOAD G/D
FULL TIME DAY STAFF	4	90	38	5.0	360.00	152.00	20.00
PART TIME (4hr shift)	4	45	25	3.0	180.00	100.00	12.00
Office / Factory		50	25	5.0	0.00	0.00	0.00
RESTAURANT MEALS pre-prepared		25	30	2.5	0.00	0.00	0.00
RESTAURANT MEALS Luxury		30	38	4.0	0.00	0.00	0.00
Roadside covers	75	12	12	2.5	900.00	900.00	187.50
Drinkers		12	15	5.0	0.00	0.00	0.00
Snacks / Bar meals		15	19	2.5	0.00	0.00	0.00
Function Rooms		15	19	2.5	0.00	0.00	0.00
Fast Food - Roadside Restaurants		12	12	2.5	0.00	0.00	0.00
FastFood Meal - Burger chain		12	15	4.0	0.00	0.00	0.00
PUBLIC TOILET (URINAL)	20	5	12	2.5	100.00	240.00	50.00
PUBLIC TOILET (WC)	20	10	12	2.5	200.00	240.00	50.00
TOTAL (CUM/KG)					1.74	1.63	0.32

Jet Washes use 6-9 litres per minute – therefore in operation 120 minutes a day = 1080 litres. 1740 + 1080 = **2820 litres**

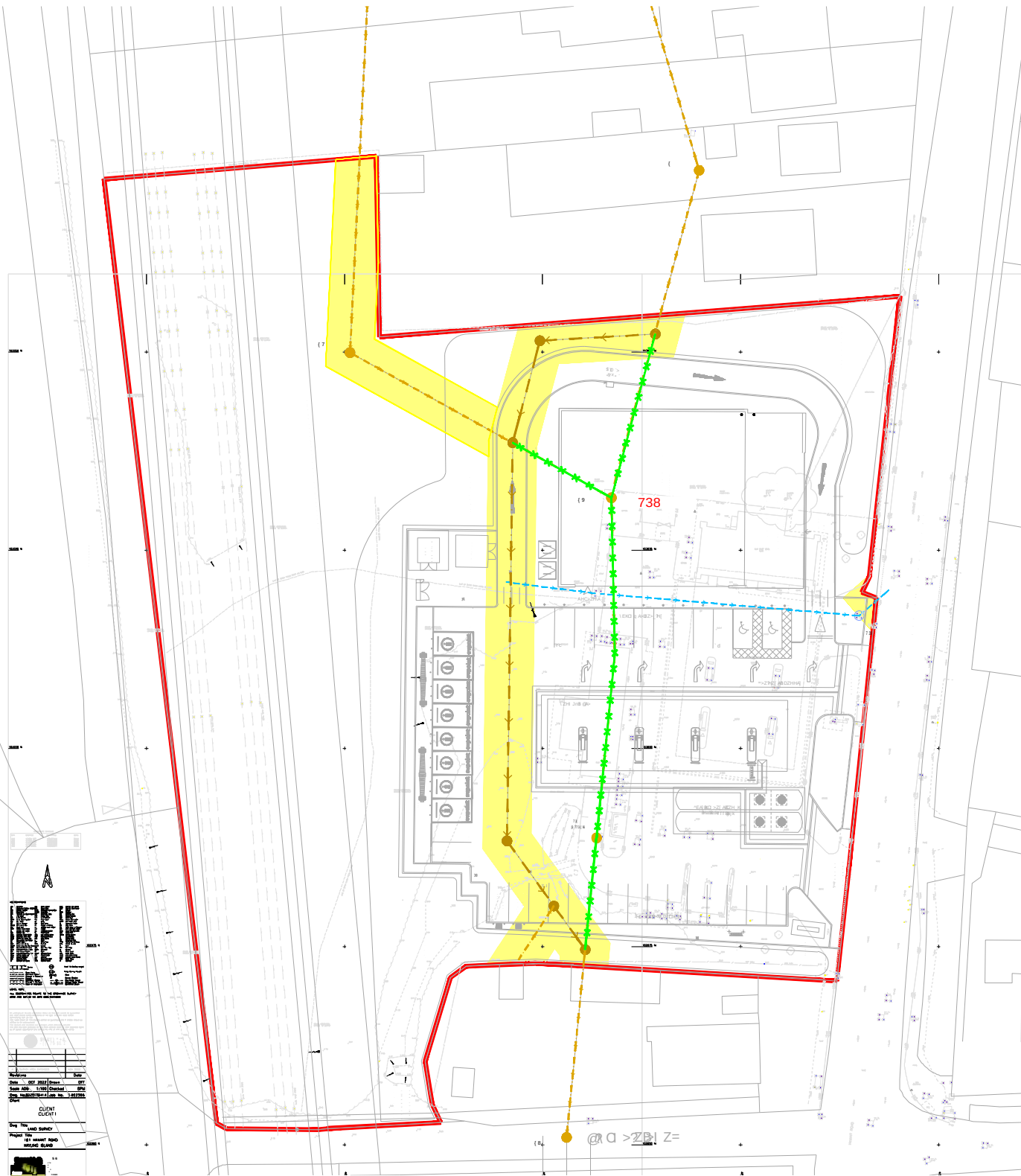
Kind Regards

PROJECT INFORMATION

Project No: 107-2022
 Date: 07/2022
 Scale: 1:1000
 Client: [Name]
 Design: [Name]
 Drawn: [Name]
 Check: [Name]

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Goodson Associates		Page 2
53 Melville Street Edinburgh EH3 7HL		
Date 14/03/2023 10:24 File P15653 HAVANT ROAD SW A...	Designed by PhilH Checked by	
XP Solutions		Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	0.636	0.636	0.0	15.4	15.4	108.7	OK
60 min Winter	0.747	0.747	0.0	15.4	15.4	127.7	OK
120 min Winter	0.774	0.774	0.0	15.4	15.4	132.4	OK
180 min Winter	0.746	0.746	0.0	15.4	15.4	127.5	OK
240 min Winter	0.695	0.695	0.0	15.4	15.4	118.9	OK
360 min Winter	0.571	0.571	0.0	15.4	15.4	97.6	OK
480 min Winter	0.444	0.444	0.0	15.4	15.4	75.9	OK
600 min Winter	0.341	0.341	0.0	15.4	15.4	58.2	OK
720 min Winter	0.263	0.263	0.0	15.3	15.3	44.9	OK
960 min Winter	0.182	0.182	0.0	14.6	14.6	31.0	OK
1440 min Winter	0.142	0.142	0.0	10.9	10.9	24.2	OK
2160 min Winter	0.115	0.115	0.0	8.0	8.0	19.8	OK
2880 min Winter	0.101	0.101	0.0	6.4	6.4	17.2	OK
4320 min Winter	0.084	0.084	0.0	4.7	4.7	14.4	OK
5760 min Winter	0.074	0.074	0.0	3.7	3.7	12.7	OK
7200 min Winter	0.067	0.067	0.0	3.1	3.1	11.5	OK
8640 min Winter	0.062	0.062	0.0	2.7	2.7	10.6	OK
10080 min Winter	0.058	0.058	0.0	2.4	2.4	9.9	OK

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	83.789	0.0	129.7	36
60 min Winter	53.779	0.0	166.9	62
120 min Winter	33.337	0.0	207.0	100
180 min Winter	24.832	0.0	231.3	138
240 min Winter	20.006	0.0	248.5	178
360 min Winter	14.706	0.0	274.0	250
480 min Winter	11.818	0.0	293.6	312
600 min Winter	9.966	0.0	309.5	368
720 min Winter	8.665	0.0	322.9	422
960 min Winter	6.943	0.0	345.0	512
1440 min Winter	5.071	0.0	377.9	748
2160 min Winter	3.696	0.0	413.4	1112
2880 min Winter	2.949	0.0	439.8	1472
4320 min Winter	2.142	0.0	478.9	2200
5760 min Winter	1.705	0.0	508.5	2928
7200 min Winter	1.427	0.0	532.0	3608
8640 min Winter	1.235	0.0	552.6	4344
10080 min Winter	1.093	0.0	570.5	5128

Goodson Associates		Page 3
53 Melville Street Edinburgh EH3 7HL		
Date 14/03/2023 10:24 File P15653 HAVANT ROAD SW A...	Designed by PhilH Checked by	
XP Solutions		
Source Control 2020.1.3		

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.350	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.370

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
From:	To:	From:	To:	From:	To:
0	4	4	8	8	12
	0.124		0.123		0.123

Goodson Associates		Page 4
53 Melville Street Edinburgh EH3 7HL		
Date 14/03/2023 10:24 File P15653 HAVANT ROAD SW A...	Designed by PhilH Checked by	
XP Solutions	Source Control 2020.1.3	

Model Details

Storage is Online Cover Level (m) 2.000

Cellular Storage Structure

Invert Level (m) 0.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	180.0	0.0	0.801	0.0	0.0
0.800	180.0	0.0	2.000	0.0	0.0

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0179-1540-0800-1540
Design Head (m) 0.800
Design Flow (l/s) 15.4
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 179
Invert Level (m) 0.000
Minimum Outlet Pipe Diameter (mm) 225
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	15.4
Flush-Flo™	0.294	15.4
Kick-Flo®	0.593	13.4
Mean Flow over Head Range	-	12.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	6.3	1.200	18.7	3.000	28.9	7.000	43.6
0.200	15.0	1.400	20.1	3.500	31.2	7.500	45.0
0.300	15.4	1.600	21.4	4.000	33.2	8.000	46.5
0.400	15.1	1.800	22.6	4.500	35.2	8.500	47.7
0.500	14.6	2.000	23.8	5.000	37.0	9.000	49.1
0.600	13.4	2.200	24.9	5.500	38.8	9.500	50.4
0.800	15.4	2.400	26.0	6.000	40.4		
1.000	17.1	2.600	27.0	6.500	42.0		