



CIVIL AND STRUCTURAL ENGINEERS

1 The Grove
Felpham
West Sussex
PO22 7EY

Email: info@abmh.co.uk
Web: www.abmh.co.uk

Drainage Impact Assessment

for

Store Property Investments Ltd

at

**Micro Drive Thru
Worthing Road
Littlehampton
West Sussex
BN16 3JX**

Project: F2476
Date: Nov 2016
Author: MH
Status: Planning Issue
Revision: C

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Drainage Impact Assessment

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	Access Road and Car park GCP 2561/15 J	
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Drainage Impact Assessment

1. Introduction

- 1.1 We have been appointed by Landbuild Ltd on behalf of Store Property Investments Ltd to provide a Drainage Impact Assessment (DIA) to accompany the proposed planning application for the Micro Drive Thru at Worthing Road, Littlehampton, West Sussex, BN16 3JX.
- 1.2 The aim of the report is to review how the existing site is drained and how the proposed site can be drained in accordance with current design standards.
- 1.3 The report details the existing and proposed flows that are/will be generated and how these proposed storm water and foul water flows can be managed and discharged in a safe manner.
- 1.4 The DIA has been based upon the following documentation;
 - 1.4.1 Existing Site Levels SHA dwg 8204.003
 - 1.4.2 Existing Services plan SHA dwg 8204.002
 - 1.4.3 Proposed Site Plan SHA dwg 8204.001
 - 1.4.4 SW Sewer Records dated 02/06/2014
 - 1.4.5 ASI Site Investigation Reprt No 6066 dated Feb 1987
 - 1.4.6 GE Site Investigation Report GE10063-DSR-May 14
 - 1.4.7 WSP Phase 1 Environmental Audit Report No 200232L dated 08/03/2000
 - 1.4.8 Ex Drainage Records dwgs:
 - Shell Garage dwg MBP 2831/1A
 - Access Road and Car park GCP 2561/15 J
 - Watermead Services MCA 2626/146B

2. Existing Site Use

2.1 Site Setting

2.1.1 The site is located at Worthing Road, Littlehampton, West Sussex, BN16 3JX, just south of the Travelodge and Shell Service Station.

2.1.2 A site location plan is shown in Appendix A.

2.2 Site Topography

2.2.1 A topographical survey has been carried out and the existing topography information is shown on SHA drawing 8204.003.

2.2.2 The site is currently an undeveloped area of the site consisting of landscaped/grass area. The existing site area is 1012m², which is regarded as permeable areas.

2.2.3 The survey is assumed to be based on Above Ordinary Datum (mAOD). Existing levels within this proposed development site range from 5.80m at the eastern boundary to 6.80m at the western boundary.

2.3 Watercourses

2.3.1 No watercourses or ditches are present within or adjacent to the site.

2.3.2 The nearest watercourse, Black Ditch, is approximately 1000m north of the site and is designated a Main River by the Environment Agency.

2.4 Hydrology & Geology

2.4.1 The geotechnical investigations have been undertaken by the client in the vicinity of the site as follows:

2.4.2 ASI Site Investigation Report No 6066 dated Feb 1987

- *Area assessed in the locality of the Body Shop site*
- *Ground water level 7m below existing ground level*
- *Geology consisting of Brickearth overlying Upper Chalk at a depth of 3.5m*

2.4.3 GE Site Investigation Report GE10063-DSR-May 14

- *Desk Study only*
- *British geological Survey geological mapping indicated the geology of the site to comprise River Terrace Deposits overlying the Upper Chalk.*

2.4.4 WSP Phase 1 Environmental Audit Report No 200232L dated 08/03/2000

- Geological Mapping Sheet 332 shows the following geological sequence, Brickearth on Upper Chalk
- *'The Brickearth is classified as a non-aquifer, a formation with negligible permeability.'*

2.4.5 Based on the anticipated soil characteristics it is anticipated that soil infiltration within the site may not be viable, though this is to be determined within the on-site geotechnical investigation to be conducted following planning.

2.5 Existing Drainage

- 2.5.1 Existing drainage records drawings, Shell Garage dwg MBP 2831/1A, Access Road and Car park GCP 2561/15 J, Watermead Services MCA 2626/146B, indicate the foul and storm water drainage in the vicinity of the site. The information is subject to confirmation on site through a detailed CCTV survey, but there is no reason to perceive that a significant variation from that shown on these drawings is present on site.
- 2.5.2 Given the positive storm water drainage system on site it would suggest that soil permeability is very low resulting in soakaways not being viable within this locality.
- 2.5.3 The limited records drawings would suggest that the adjacent sites are drained north of the A259 Rustington Bypass. It is assumed that the storm water drainage system probably discharges into a watercourse/ditch that in turn discharges to the Black Ditch, approx. 1000m north of the site, which in turn discharges to the River Arun to the west of Littlehampton.
- 2.5.4 The Travelodge and petrol site are understood from the record drawings to discharge to an adopted pumping station situated to the north of the A259, just east of the Watermead Business park. The effluent is then pumped southwards, across the Travelodge site to an adopted gravity sewer in Worthing Road, situated east of our proposed development.
- 2.5.5 It is anticipated that our client will connect to this third party drainage system within the general site.
- 2.5.6 The sewer network within the locality of the site is shown on Southern Waters Sewer Records, Appendix A.

2.6 Indicative Site Flood Risk

- 2.6.1 An initial inspection of the EA website to determine the flood risk of the site would appear to suggest that the site is within a Flood Zone 1 for fluvial and coastal flood risk.
- 2.6.2 Site's situated within a Flood Zone 1, are defined as an area where the chance of flooding from both rivers and the sea has been assessed as less than 0.1% in any year (less than 1 chance in 1,000 in any year), or 0.1% Annual Exceedance Probability (AEP).
- 2.6.3 Other flood risks may be present to the site or its locality though this is outside the scope of our services.

3. Foul Drainage

3.1 Existing Foul Drainage

- 3.1.1 There is no foul drainage within the proposed development site, and currently no foul discharges from site to the foul drainage/sewer network.
- 3.1.2 However, existing foul drainage serving the Travelodge development is anticipated to be present in close proximity to the proposed development. This drainage is anticipated to discharge to the adopted foul sewer system.

3.2 Proposed Foul Drainage

- 3.2.1 The proposed development is to consist of a drive through coffee shop, as shown on Proposed Site Plan SHA dwg 8204.001, appendix B.
- 3.2.2 It is anticipated that a drive through coffee shop would have peak flows similar to say 2 dwellings, though actual flow rates are yet to be ascertained.
- 3.2.3 In accordance with Sewers for Adoption 7th Edition the peak flows will be as follows:
- $2 \text{ No dwellings @ } 4000 \text{ l/day} = 8,000 \text{ l/day} = 0.09 \text{ l/s}$
- 3.2.4 The proposed foul flow will result in a net increase from the site, given the undeveloped nature of the site.
- 3.2.5 A foul drainage scheme for the proposed development is indicated on drawing F2476/02A Appendix B, though this is subject to detailed design in due course. The design is based on forming a new connection to the foul drain serving the Travelodge.
- 3.2.6 It is anticipated that a Section 106 sewer connection application is to be submitted to Southern Water for approval regarding the proposed indirect connection and revised foul flows from the development.
- 3.2.7 On the basis of the anticipated low flows to the foul sewer from the development we see no reason at this stage why the proposed design would not be acceptable to Southern Water.

Storm Water Drainage

3.3 Existing Storm Water Drainage

3.3.1 Given the undeveloped nature of the site the existing storm runoff from site is regarded as very low.

3.3.2 The existing site area has been calculated to be 1012m², as shown on ABMH drawing F2476/02A, Appendix B.

3.3.3 Existing greenfield runoff rates for the site are listed in Appendix B, but summarised below:

- 0.26 l/s 1 in 1 years
- 0.66 l/s 1 in 30 years
- 0.96 l/s 1 in 100 years

3.4 Proposed Storm Water Drainage

3.4.1 The proposed impermeable area drained to the storm water drainage system has been calculated to be 386m², as shown on ABMH drawing F2476/02A, Appendix B.

3.4.2 In line with Building Regulations and good drainage practice the surface water from any new development and hard paved areas would be required to have separate drainage systems, ie foul and storm systems.

3.4.3 Furthermore, the outlets for storm water drainage systems should be, in order of priority; to soakaways, watercourses and latterly to sewers.

3.4.4 In addition, in order to comply with normal design standards, BS EN 752, stipulates that the system should not surcharge for a storm return period of 1 in 2 years and not flood for a storm return period of 1 in 20 years.

3.4.5 However, the storm return period may be required to be increased to 1 in 100 years to accord with PPS 25, including an allowance of plus 20-30% to take account of climate change. The actual return period to be provided will depend on the planning conditions and Local Planning Authority (LPA) and Environment Agency (EA) requirements, which in turn will be governed by the potential flood risk to neighbouring properties downstream of the proposed site.

3.4.6 The options for the proposed surface water drainage system outlets are as follows:

3.5 Option 1: Soakaways (On site)

3.5.1 No in depth geotechnical investigations on site have been undertaken to date. Given the initial geotechnical view based on the likely geology beneath the site the viability of soakaways on site has been discounted at this stage. However, in line with the Building Regulation requirements soakaways tests will be undertaken to ascertain the viability of soakaways in due course.

3.5.2 However, the viability is subject to confirmation of the following:

- 3.5.2..1 Existing tree root protection zones
- 3.5.2..2 Actual soil infiltration rates
- 3.5.2..3 Geotechnical soil characteristics and horizons
- 3.5.2..4 Ground water table and likely seasonal variations
- 3.5.2..5 EA approval
- 3.5.2..6 Minimum 5m distance from existing and proposed structures

3.5.3 Based on the level of assumptions to be confirmed, this option is viewed at best as a potential fall-back position, with a connection to the storm water sewer/culvert being preferred, outlined later.

3.6 Option 2: Watercourse

3.6.1 There are no watercourses within or adjacent to the site and thus the option to discharge runoff from the proposed development into them is not present.

3.7 Option 3: Connection to Storm Water Sewer

- 3.7.1 The aim of any new drainage system would be to limit the discharge from the new development to no more than the existing greenfield runoff rate. However, for small sites, such as this one, restricting flows to greenfield runoff rates below 5l/s is impractical.
- 3.7.2 In these circumstances the minimum discharge flow rate generally accepted as practical is 5l/s. The scheme has therefore been designed to discharge flows to the existing adjacent storm water system at a maximum rate of 5l/s.
- 3.7.3 Storage is proposed to be provided using a below ground attenuation tank with flows controlled using a HRD flow control. Storage has been provided to cater for a 1 in 100-year storm return period with a 30% climate change allowance.
- 3.7.4 Windes calculation confirming the storage provision are included in Appendix B.
- 3.7.5 A preliminary scheme as indicated on drawing F2476/02A Appendix B.
- 3.7.6 The proposed scheme will control the flows off site mitigating the flood risks to downstream properties.
- 3.7.7 Pollution control using trapped road gullies is deemed to be adequate without further measures being required.
- 3.7.8 It is anticipated that the existing system, to which the proposed drainage will connect to, discharges to the Black Ditch watercourse.

4. **Flood Risk**

- 4.1 As highlighted previously the site is understood to be situated within a Flood Zone 1, defined as an area where the chance of flooding from both rivers and the sea has been assessed as less than 0.1% in any year (less than 1 chance in 1,000 in any year), or 0.1% Annual Exceedance Probability (AEP).
- 4.2 Risks of flooding by other sources should be determined by others.
- 4.3 Given the anticipated proposed levels and the adjacent site level differences it should be viable to enable flood flows to pass through and around the site, without causing flooding to internal properties within the site.

5. Summary

- 5.1 The foul drainage scheme from the proposed development is to be connected to the existing foul drainage system within the general site, subject to third party and Southern Water approvals. Foul water discharges from this site will increase, but given the nature of the development proposed the actual peak flow is not envisaged to be high, and thus no peak discharge issues are envisaged within the private or the assumed adopted drainage system. Actual flow rates to be determined with the operator in due course.
- 5.2 The storm water runoff from the proposed development will be restricted to 5l/s by a HRD flow control into the existing adjacent storm water drainage system within the general site. It is assumed that the existing system discharges to the Black Ditch system situated to the north of the site.
- 5.3 Attenuation measures are proposed to the on-site storm water system which will comply with normal design standards, BS EN 752, ensuring that that the system will not surcharge for a storm return period of 1 in 2 years and not flood for a storm return period of 1 in 20 years.
- 5.4 In addition, in order to comply with PPS 25 the storm return period will be increased to 1 in 100 years including an allowance of plus 30% to take account of climate change. The actual return period to be provided will depend on the planning conditions and Environment Agency (EA) requirements, which in turn will be governed by the potential flood risk to neighbouring properties downstream of the proposed site
- 5.5 On site storage will be provided using an attenuation tank comprising of plastic crates.
- 5.6 The net effect of these proposed measures will be that the storm water runoff will be controlled thus providing flood protection within the site and to adjacent neighbours and properties in line with current requirements.
- 5.7 The alternative options for discharging the storm water to soakaways may be viable, subject to further geotechnical reports, but a discharge to an existing on site storm drain as existing is deemed the most viable option at present.
- 5.8 In line with Building Regulations the Local Building Control office/NHBC will be contacted to determine if any special drainage considerations are required to be adhered with, such as rodent control, sealed systems etc, though none are deemed likely.
- 5.9 On the basis of the findings within this report, and the proposed outline drainage designs, we are of the opinion that adequate drainage provision can be provided for the development without increasing flood risk to neighbours or their property. On this basis we trust that the above meets with your approval.

A

Site Location Plan

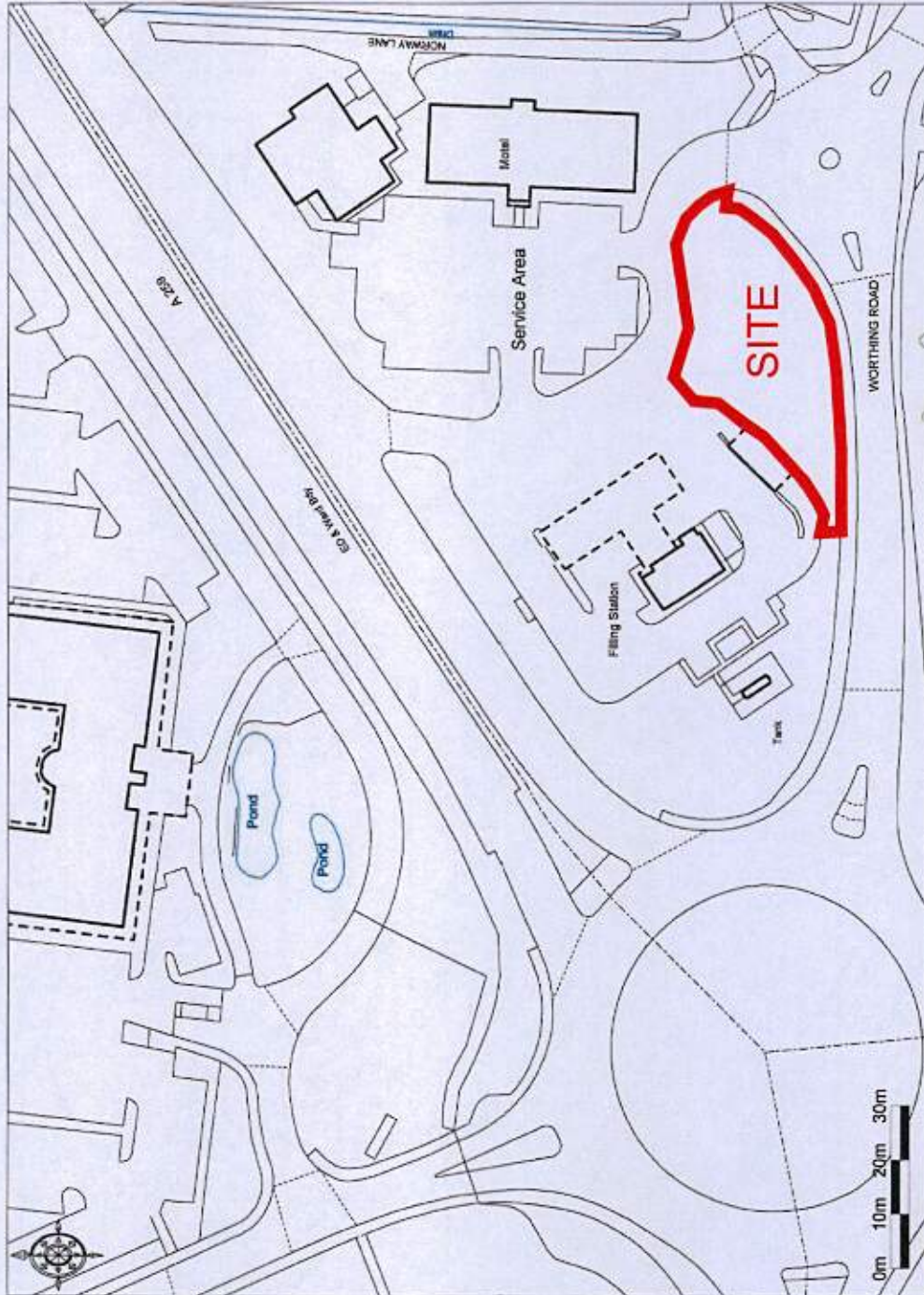
Existing Site Levels SHA dwg 8204.003

Existing Services plan SHA dwg 8204.002

SW Sewer Records dated 02/06/2014

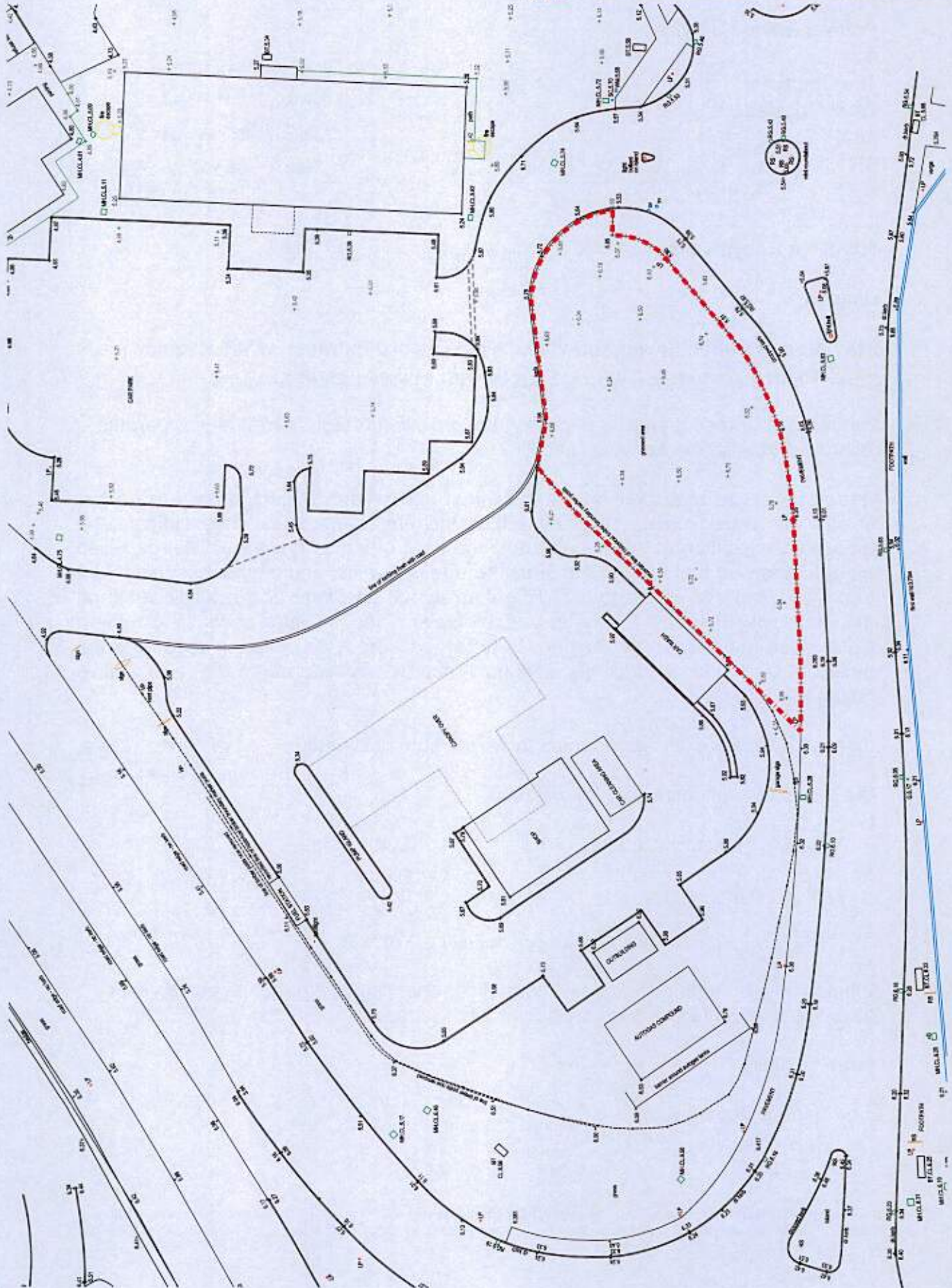
Ex Drainage Records dwgs:

- Shell Garage dwg MBP 2831/1A
- Access Road and Car park GCP 2561/15 J
- Watermead Services MCA 2626/146B



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FORWARDING TO ARUN DISTRICT COUNCIL FOR CONSIDERATION AND ADOPTION OF THE PLAN. THE PLAN IS NOT TO BE USED FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN PERMISSION OF THE PLANNING DEPARTMENT.



THE PLAN IS NOT TO BE USED FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN PERMISSION OF THE PLANNING DEPARTMENT.

SIMPSON HILDER
ASSOCIATES LIMITED
100 High Street, Brighton
BN1 1AB
Tel: 01273 200000
Fax: 01273 200001
E: info@simpsonhilder.co.uk

EXISTING SITE PLAN (SURVEY)

PLANNING	
PROPOSED COFFEE - DRIVE - THRU WORKING ROAD LITTLEHAMPTON WEST SUSSEX, BN16 3JX	
DATE	10/02/2016
BY	10/02/2016
FOR	10/02/2016
BY	10/02/2016
FOR	10/02/2016

820x4

102

EXISTING SITE PLAN / SITE SURVEY SCALE 1:1250



Premier Energy Services
4
The Courtyard
West Grinstead
Kent
RH13 8LN

Your Ref SI313370 - Body Shop Roundabout
Our Ref 174724
Date 02 June 2014
Contact searches@southernwater.co.uk
Fax 01634 844514
DX:400450 Chatham 5

Attention: Robyn Taylor

Dear Sirs

**Provision of Public Sewer and Water Main Record Extracts – VAT Receipt
Sites 1 and 2 Body Shop Roundabout Worthing Road West Sussex**

Further to your recent enquiry regarding the provision of Southern Water apparatus record extracts for the above location.

Please be aware that there are areas within our region in which there are neither sewers nor water mains. Similarly, whilst the enclosed extract may indicate the approximate location of our apparatus in the area of interest, it should not be relied upon as showing that further infrastructure does not exist and may subsequently be found following site investigation. Therefore actual positions of the disclosed (and any undisclosed) infrastructure should be determined on site, because Southern Water does not accept any responsibility for inaccuracy or omission regarding the enclosed plan and accordingly it should not be considered to be a definitive document.

I confirm payment of the appropriate fee in the sum of £ **48.00**

The breakdown of costs is as follows: -

- Provision of record extracts £ 40.00
- VAT @ 20.0% £ 8.00

VAT Registration Number 813 0378 56

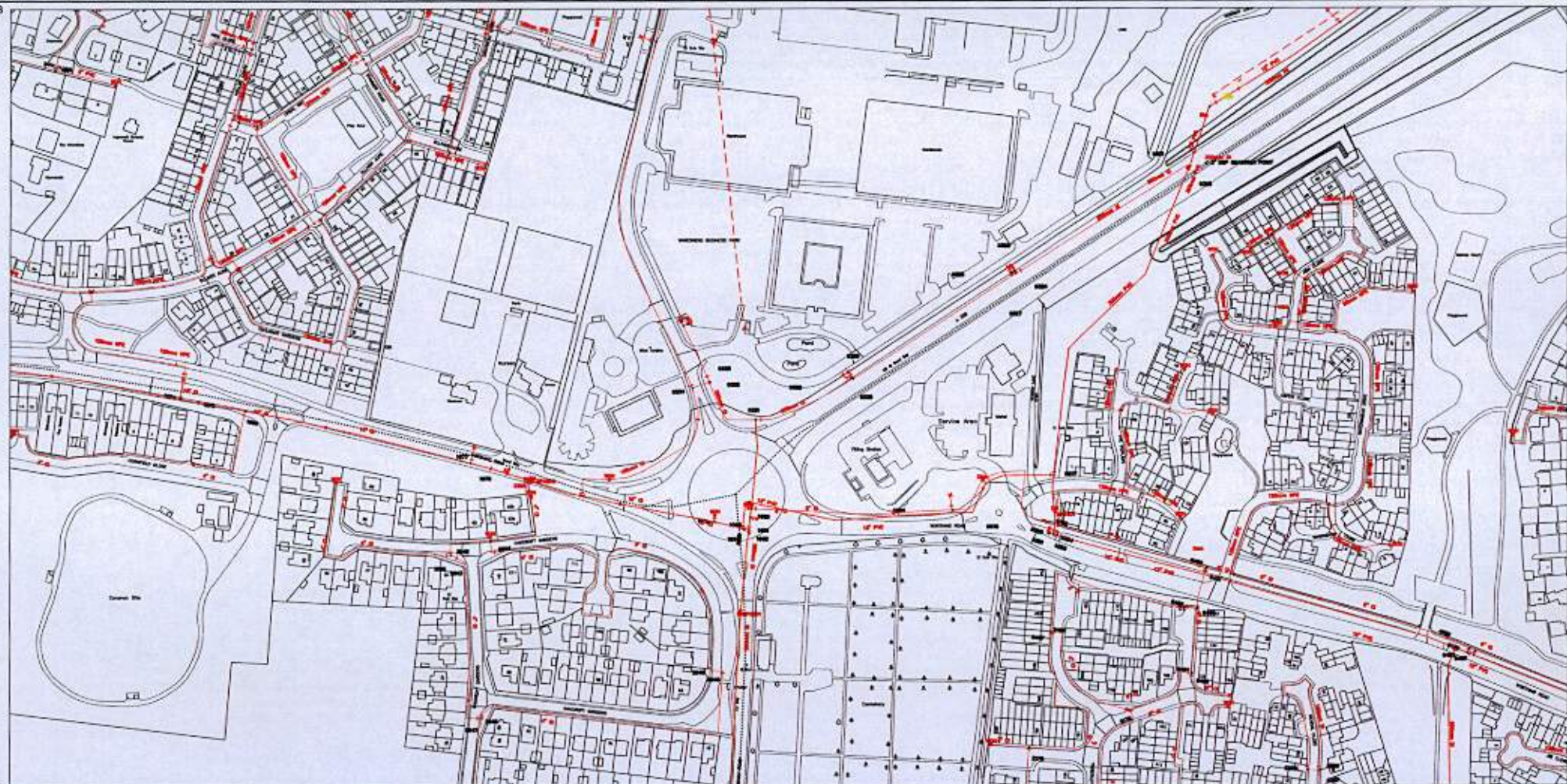
Should you require any additional information regarding this matter please contact this office at the address given at the foot of this letter.

Yours faithfully

Land Search Department

103818

103130



LEGEND - MAINS

MATERIALS

	Claytile machine		Alkathene
	Break pressure tank		Cast iron
	Change node		Span (gray) iron
	Pumping station		Concrete
	Booster station		Ductile iron
	Insertion Flow Meter Point		Bonded Asbestos Cement
	Water tower		Glass reinforced plastic
	Service reservoir		Glass reinforced epoxy
	Water Supply Works		(Unplasticized) Polyvinyl chloride
	Bore hole / Well		Polyethylene
	Intake		Steel
	Customer site		Concrete segments bolted
	Sewer insertion point		Concrete segments unbolted
			Galvanized iron
			Ductile sleeve
			Concrete pre-stressed
			High performance polyethylene
			Unknown

Drawn by: mondalb

O.S.Ref: TQ0303SE

Scale: 1:2500

Date: 02/06/2014

TITLE: 174724_Sites 1 and 2 Body Shop

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd. accept no responsibility in the event of inaccuracy. The actual positions of pipes should be determined on site.

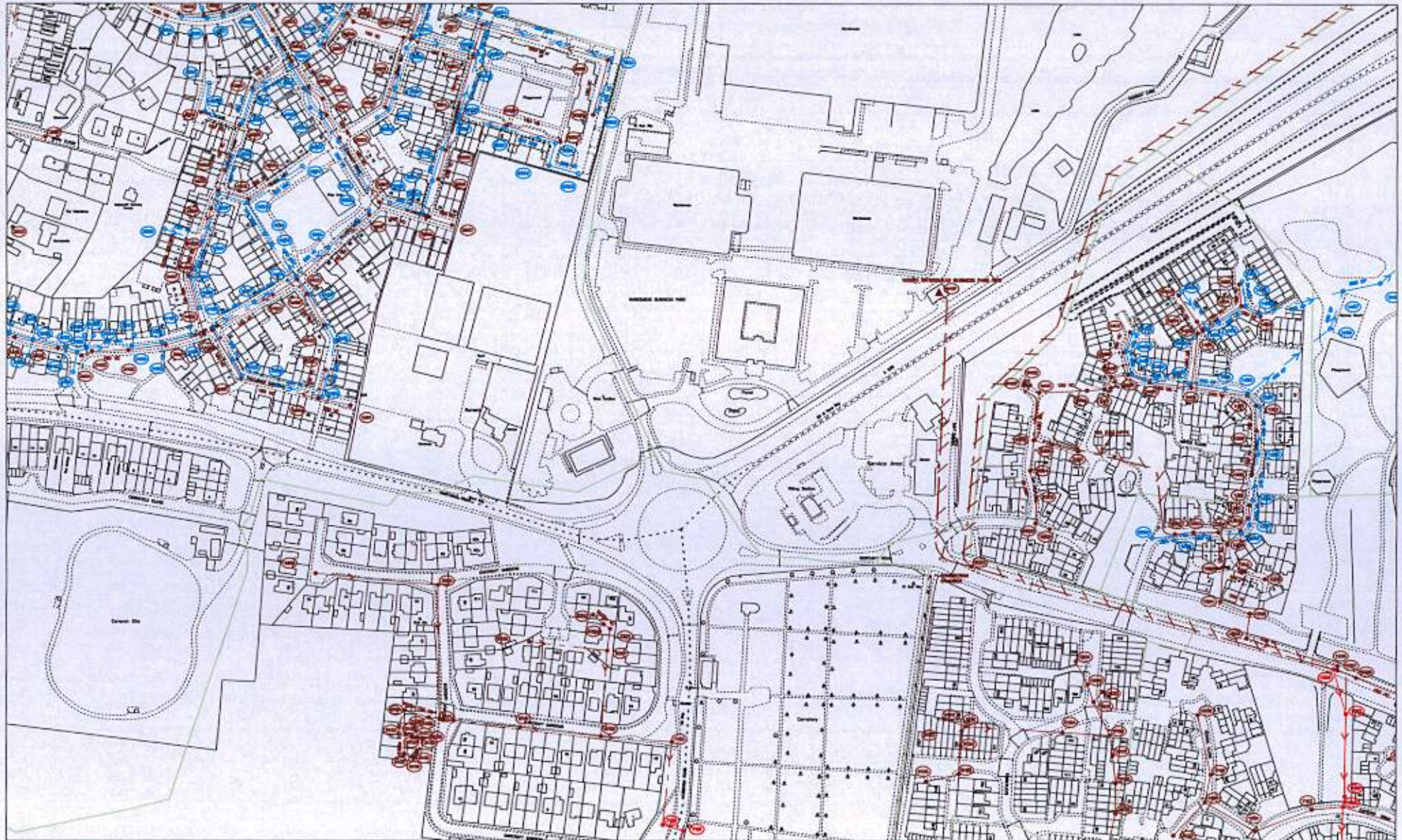


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SEWER RECORDS PAGE 1 OF 2

103675



103098

O.S. REF. TQ0303SE	Drawn by: mondalb	The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. WARNING: SAC pipes are constructed of Bonded Asbestos Cement WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement		
	Scale: 1:2500			
Title: 174724_Sites 1 and 2 Body Shop	Date: 02/06/2014	Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530.		

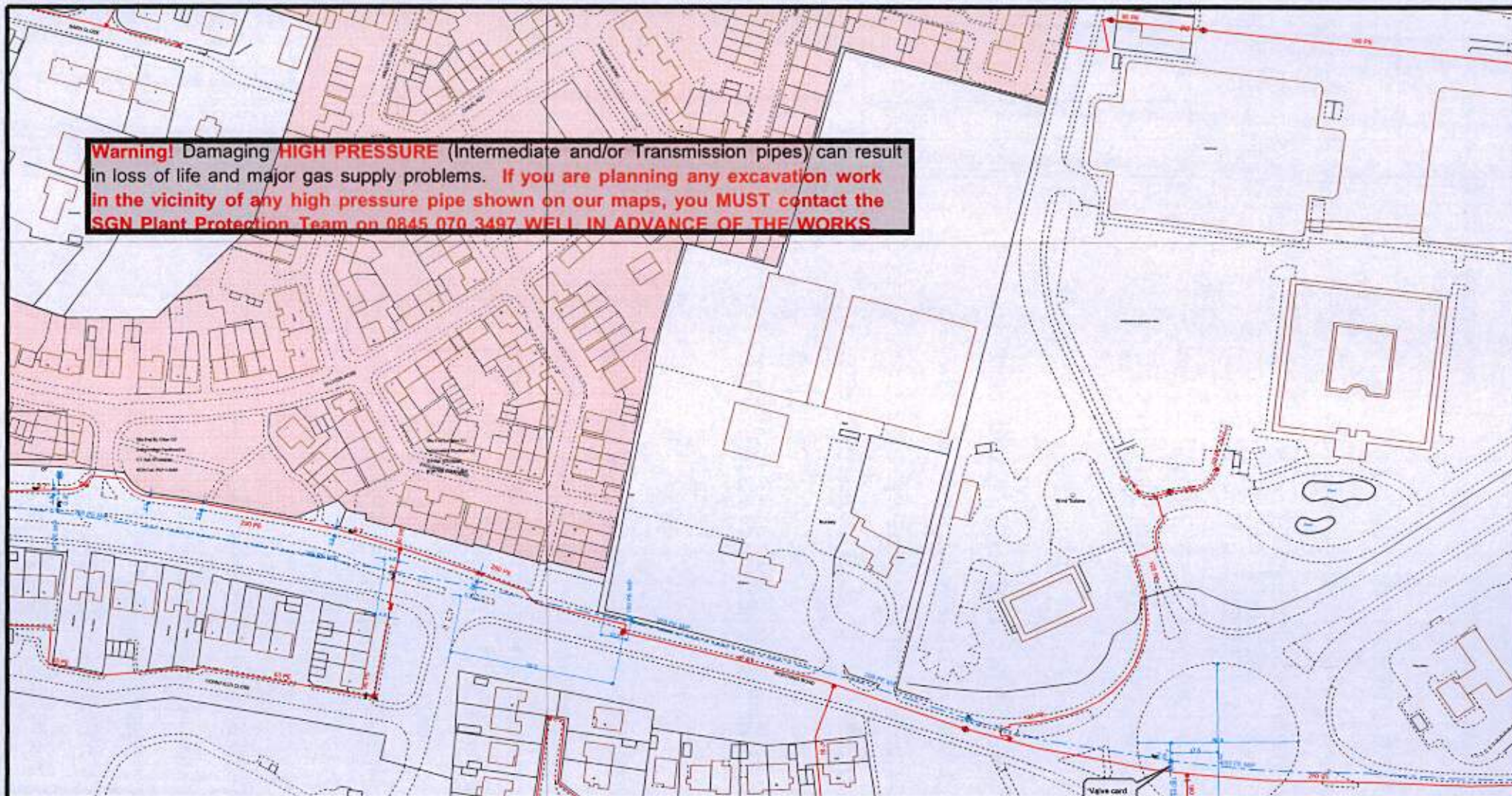
504230

SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	
0101X	3.77	4.1	150	VC	CIRC	1403X	5.855	4.43	150	VC	CIRC	4508X			100	RPM	CIRC	5601X			3.8	150	VC	CIRC
0102X	6.32	3.86	225	VC	CIRC	1404X	6.025	4.17	150	VC	CIRC	4509X	6.61	5.04	300	GRC	CIRC	5602X			2.43	150	VC	CIRC
0103X	6.4	3.78	225	VC	CIRC	1405X	6.17	3.8	150	VC	CIRC	4510X	6.43	4.64	375	GRC	CIRC	5604X			4.24	150	VC	CIRC
0104X	5.93	4.03	150	VC	CIRC	1450X	6.55	3.4	450	CP	CIRC	4552X	8.49	5.07	225	VC	CIRC	5605X			3.8	150	VC	CIRC
0105X	5.55	3.73	225	VC	CIRC	1451X	6.89	1.83	300	CP	CIRC	4553X	8.05	4.36	375	GRC	CIRC	5606X			5.4	375	GRC	CIRC
0106X	6.8	3.67	225	VC	CIRC	1452X	5.975	3.625	300	CP	CIRC	4554X	5.77	4.62	300	GRC	CIRC	5607X			2.73	150	VC	CIRC
0107X	6.34	4.8	150	VC	CIRC	1454X	5.864	3.825	225	VC	CIRC	4555X	6.31	4.26	375	GRC	CIRC	5608X			2.75	150	VC	CIRC
0108X	6.46	5.16	150	VC	CIRC	1455X	6.146	3.575	300	CP	CIRC	4557X	6.5	4.86	225	VC	CIRC	5609X			2.46	150	VC	CIRC
0201X	5.97	4.8	150	VC	CIRC	1456X	5.895	3.225	450	CP	CIRC	4601X		5.1	150	VC	CIRC	5611X			3.86	150	VC	CIRC
0202X	5.91	4.2	150	VC	CIRC	1457X	5.89	3.06	325	CP	CIRC	4602X		4.02	150	VC	CIRC	5612X			3.5	150	VC	CIRC
0203X	5.11	4.97	150	VC	CIRC	1458X	6.121	3.97	225	VC	CIRC	4603X		3.85	150	VC	CIRC	5650X	8.35		5.08	225	VC	CIRC
0301X	5.434	4	150	VC	CIRC	1459X	6.11	3.87	225	VC	CIRC	4606X		3.46	225	VC	CIRC	5651X	8.27		4.73	300	GRC	CIRC
0302X	6.38	5.14	150	VC	CIRC	2104X	6.05	4.72	150	VC	CIRC	4608X		4.16	150	VC	CIRC	5652X	6.1		4.53	300	GRC	CIRC
0303X	6.43	5.075	150	VC	CIRC	2205X			150	VC	CIRC	4609X		3.4	225	VC	CIRC	5653X	6		4.5	300	GRC	CIRC
0350X	6.505	4.4	225	VC	CIRC	2450X	6.13	4.87	300	GRC	CIRC	4610X		3.33	225	VC	CIRC	5654X	6.27		4.32	225	VC	CIRC
0351X	6.38	4.26	225	VC	CIRC	2451X	5.655	3.025	325	CP	CIRC	4650X	8.22	5.08	225	VC	CIRC	5656X	6.13		4.68	450	GRC	CIRC
0401X	6.55	3.475	150	VC	CIRC	2451X			150	VC	CIRC	4651X	8.21	5.02	225	VC	CIRC	5657X	6.41		4.61	450	GRC	CIRC
0402X	6.255	3.74	150	VC	CIRC	2503X			150	VC	CIRC	4652X	8.3	5.14	225	VC	CIRC	6101X	7.01		5.4	225	CP	CIRC
0403X	6.14	4.84	150	VC	CIRC	3401X			150	VC	CIRC	4653X	8.44	5.03	225	VC	CIRC	6102X	6.88		5.19	225	CP	CIRC
0404X			150	VC	CIRC	3402X			150	VC	CIRC	4654X	8.02	4.85	300	GRC	CIRC	6201X	6.78		5.66	150	CP	CIRC
0405X	6.398	3.28	150	VC	CIRC	3403X			150	VC	CIRC	4654X	8.16	4.52	375	GRC	CIRC	6202X	6.9		6.01	150	CP	CIRC
0406X	6.235	3.157	150	VC	CIRC	3404X			150	VC	CIRC	4656X	5.83	4.29	375	GRC	CIRC	6203X				150	VC	CIRC
0407X	5.965	4.158	150	VC	CIRC	3405X			150	VC	CIRC	4657X	5.87	4.22	375	GRC	CIRC	6204X				150	VC	CIRC
0408X	6.12	3.715	150	VC	CIRC	3406X			150	VC	CIRC	4658X	6.04	4.28	375	GRC	CIRC	6501X				150	VC	CIRC
0409X	5.979	3.09	150	VC	CIRC	3409X	6.35		300	GRC	CIRC	4659X	6	4.18	300	GRC	CIRC	6502X				150	VC	CIRC
0410X	5.7	2.95	150	VC	CIRC	3451X	6.62	4.71	300	GRC	CIRC	5101X	7.15	5.57	225	CP	CIRC	6503X				150	VC	CIRC
0411X	6.12	3.03	150	VC	CIRC	3452X	6.81	4.67	300	GRC	CIRC	5102X			100	PF	CIRC	6550X	6.19		4.88	300	GRC	CIRC
0450X	6.255	4.42	225	VC	CIRC	3453X	6.56	5.01	150	VC	CIRC	5103X			100	PF	CIRC	6551X	6.54		5.28	300	GRC	CIRC
0451X	6.245	4.09	225	VC	CIRC	3454X	6.98	4.84	300	GRC	CIRC	5104X			150	VC	CIRC	6552X	6.68		5.41	225	VC	CIRC
0452X	6.395	4.025	225	VC	CIRC	3455X	7.3	4.51	300	GRC	CIRC	5105X			150	VC	CIRC	6553X	6.7			150	VC	CIRC
0453X	6.585	3.75	300	CP	CIRC	3456X	7.1	4.43	300	GRC	CIRC	5106X			150	VC	CIRC	6601X				150	VC	CIRC
0454X	6.14	4.35	150	VC	CIRC	3457X			150	VC	CIRC	5107X			150	VC	CIRC	6602X				150	VC	CIRC
0455X	6.28	4.105	225	VC	CIRC	3458X			150	VC	CIRC	5108X			150	VC	CIRC	6603X				150	VC	CIRC
0456X	6.255	4.74	150	VC	CIRC	3459X			150	VC	CIRC	5109X			150	VC	CIRC	6650X	5.9		3.754	600	GRC	CIRC
1101X	6.85	3.91	150	VC	CIRC	3460X			150	VC	CIRC	5110X			150	VC	CIRC	6651X	5.3		3.73	600	GRC	CIRC
1102X	6.85	3.19	450	BAC	CIRC	3461X			150	VC	CIRC	5110X			150	VC	CIRC	6653X	6.37		5.06	225	VC	CIRC
1103X	6.78	3.7	150	VC	CIRC	3463X			150	VC	CIRC	5120X			150	VC	CIRC	6654X	5.42		4.05	375	GRC	CIRC
1104X	6.57	4.44	150	VC	CIRC	3501X	4.74	3.06	150	VC	CIRC	5130X			150	VC	CIRC	7101X	6.31		4.77	225	CP	CIRC
1105X	6.78	3.2	450	BAC	CIRC	3502X			225	VC	CIRC	5201X	7.52	5.92	225	CP	CIRC	7102X	6.58		4.85	225	CP	CIRC
1106X	6.81	4.85	150	VC	CIRC	3501X			225	VC	CIRC	5301X			150	VC	CIRC	7103X	7.27		5.04	225	CP	CIRC
1107X	7.16		450	BAC	CIRC	4201X	7.62	6.24	225	CP	CIRC	5401X			150	VC	CIRC	7201X	6.72		5.8	150	CP	CIRC
1202X			450	BAC	CIRC	4401X			150	VC	CIRC	5402X			150	VC	CIRC	7650X	5.97		4.64	300	GRC	CIRC
1203X	6.86	4.63	150	VC	CIRC	4402X			150	VC	CIRC	5403X			150	VC	CIRC	9101X	6.15		4.34	150	VC	CIRC
1204X	6.52	4.47	150	VC	CIRC	4403X			150	VC	CIRC	5404X	6.89		150	VC	CIRC	9102X	6.38		4.65	150	VC	CIRC
1205X	6.53	4.453	150	VC	CIRC	4404X			150	VC	CIRC	5451X	0.56		300	GRC	CIRC	9103X	6.38		4.47	150	VC	CIRC
1206X	6.885	4.08	225	VC	CIRC	4405X			150	VC	CIRC	5501X			150	VC	CIRC	9104X	6.47		4.8	150	VC	CIRC
1207X	6.85		150	VC	CIRC	4406X			150	VC	CIRC	5502X			150	VC	CIRC	9105X	6.8		4.83	150	VC	CIRC
1208X	6.87	3.878	150	VC	CIRC	4407X			150	VC	CIRC	5503X			150	VC	CIRC	9106X	6.83		5.04	150	VC	CIRC
1209X	6.338	5.107	150	VC	CIRC	4450X	6.84	5.2	225	VC	CIRC	5504X			150	VC	CIRC	9301X	5.34		3.85	150	VC	CIRC
1210X	6.24		150	VC	CIRC	4451X			150	VC	CIRC	5505X			150	VC	CIRC	9302X	5.285		3.821	150	VC	CIRC
1301X	6.45	5.31	150	VC	CIRC	4452X	7.18	5.65	225	VC	CIRC	5506X			150	VC	CIRC	9303X	5.13		3.233	150	VC	CIRC
1302X	6.56	5.13	150	VC	CIRC	4453X	6.25	4.88	300	GRC	CIRC	5507X			150	VC	CIRC	9304X	4.835		3.109	150	VC	CIRC
1303X	6.65	4.93	150	VC	CIRC	4454X	6.13	4.46	450	GRC	CIRC	5508X			150	VC	CIRC	9305X	5.079		3.4	150	VC	CIRC
1304X	6.57	4.968	150	VC	CIRC	4455X	7.08	5.5	225	VC	CIRC	5550X	6.79		225	VC	CIRC	9306X	4.955		4.65	150	VC	CIRC
1305X	6.27	4.83	150	VC	CIRC	4456X	6.78	5.11	375	GRC	CIRC	5551X	6.19	4.86	225	VC	CIRC	9401X	5.195		2.744	150	VC	CIRC
1306X	6.339	4.334	150	VC	CIRC	4457X	6.33	4.68	450	GRC	CIRC	5552X	7.05	5.83	225	VC	CIRC	9402X	4.585			125	OTHER	CIRC
1307X	6.44	4.1	150	VC	CIRC	4458X	6.82	5.51	300	GRC	CIRC	5553X	6.67	5.53	225	VC	CIRC							
1308X	6.88	4.81	150	VC	CIRC	4459X	6.89	5.41	300	GRC	CIRC	5554X	6.38	5.25	225	VC	CIRC							
1350X	6.638	3.93	300	CP	CIRC	4501X			150	VC	CIRC	5555X	6.4	5.18	225	VC	CIRC							
1351X	6.546	3.88	300	CP	CIRC	4502X			150	VC	CIRC	5556X	5.97	4.47	375	GRC	CIRC							
1352X	6.441	3.72	375	CP	CIRC	4503X			150	VC	CIRC	5557X	6.03	4.63	300	GRC	CIRC							
1353X	6.22	3.81	375	CP	CIRC	4504X			150	VC	CIRC	5558X	8.21	4.73	300	GRC	CIRC							
1354X	6.426	3.52	375	CP	CIRC	4505X			150	VC	CIRC	5559X	8.95	5.45	225	VC	CIRC							
1401X	6.56	3.961	150	VC	CIRC	4506X			150	VC	CIRC	5560X	8.75	5.24	225	VC	CIRC							
1402X	5.845	4.41	150	VC	CIRC	4507X			150	VC	CIRC	5561X	8.45	5.12	225	VC	CIRC							

LINE STYLES / COLOURS		MATERIALS		LEGEND - SEWERS		OTHER	
Blue	Steel	200	Manholes	100	Manholes (SIP)	100	Manholes (SIP)
Blue	Post Tension Beam	200	Manholes (SIP)	100	Manholes (SIP)	100	Manholes (SIP)
Blue	Post Tension Beam	200	Manholes (SIP)	100	Manholes (SIP)	100	Manholes (SIP)
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Blue	Post Tension Beam	200	Manholes (SIP)	100	Manholes (SIP)	100	Manholes (S

Warning! Damaging **HIGH PRESSURE** (Intermediate and/or Transmission pipes) can result in loss of life and major gas supply problems. **If you are planning any excavation work in the vicinity of any high pressure pipe shown on our maps, you MUST contact the SGN Plant Protection Team on 0845 070 3497 WELL IN ADVANCE OF THE WORKS.**



USER ID: anthony
DATE: 17 Jul 2014
EXTRACT DATE: 28 May 2014
MAP REF: TQ0303SE
CENTRE: 503579, 103439
SCALE: 1:2,027

LP Mains ————
MP Mains ————
IP Mains ————
LHP Mains ————
NHP Mains ————

This plan shows those pipes owned by Scotia Gas Networks plc in their role as a Licensed Gas Transporter (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy thereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc. are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Scotia Gas Networks plc or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HS(G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue.

Product: UtilityMaps
Version: 1.6.6.1
Template: 'Scotia Gas Networks (A4 Landscape)'

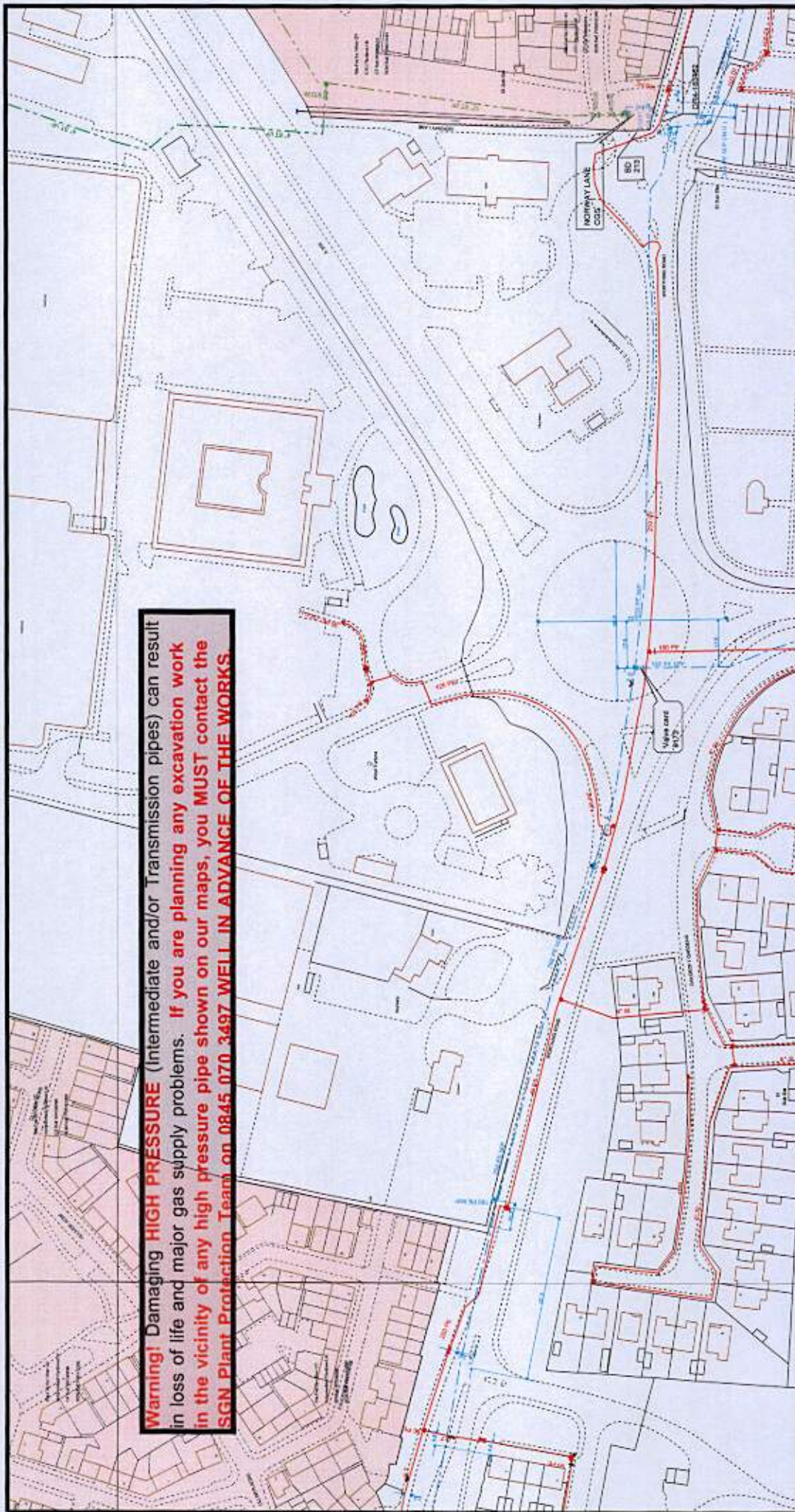


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Valve Depth of Cover Syphon Diameter Change Material Change



Warning! Damaging HIGH PRESSURE (Intermediate and/or Transmission pipes) can result in loss of life and major gas supply problems. If you are planning any excavation work in the vicinity of any high pressure pipe shown on our maps, you MUST contact the SGN Plant Protection Team on 0845 070 3497 WELL IN ADVANCE OF THE WORKS.



USER ID: anthony

DATE: 17 Jul 2014

EXTRACT DATE: 28 May 2014

MAP REF: TQ0303SE

CENTRE: 503695, 103391

SCALE: 1:2,027

LP Mains

MP Mains

IP Mains

LHP Mains

NHP Mains

Valve

Depth of Cover

Syphon

Diameter Change

Material Change

This plan shows those pipes owned by Scotia Gas Networks plc in their role as a Licensed Gas Transporter (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy thereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc. are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Scotia Gas Networks plc or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HS(GM7), must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue.

Product: UtilityMaps

Version: 1.6.6.1

Template: Scotia Gas Networks (A4 Landscape)



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NATIONAL BUREAU OF STANDARDS

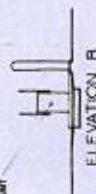
NOTES:
1. See also the drawing
2. All wiring and electronic survey
3. All wiring and electronic survey
4. All wiring and electronic survey

EXISTING SLATE SCREEN



ELEVATION A

AT WASH INT

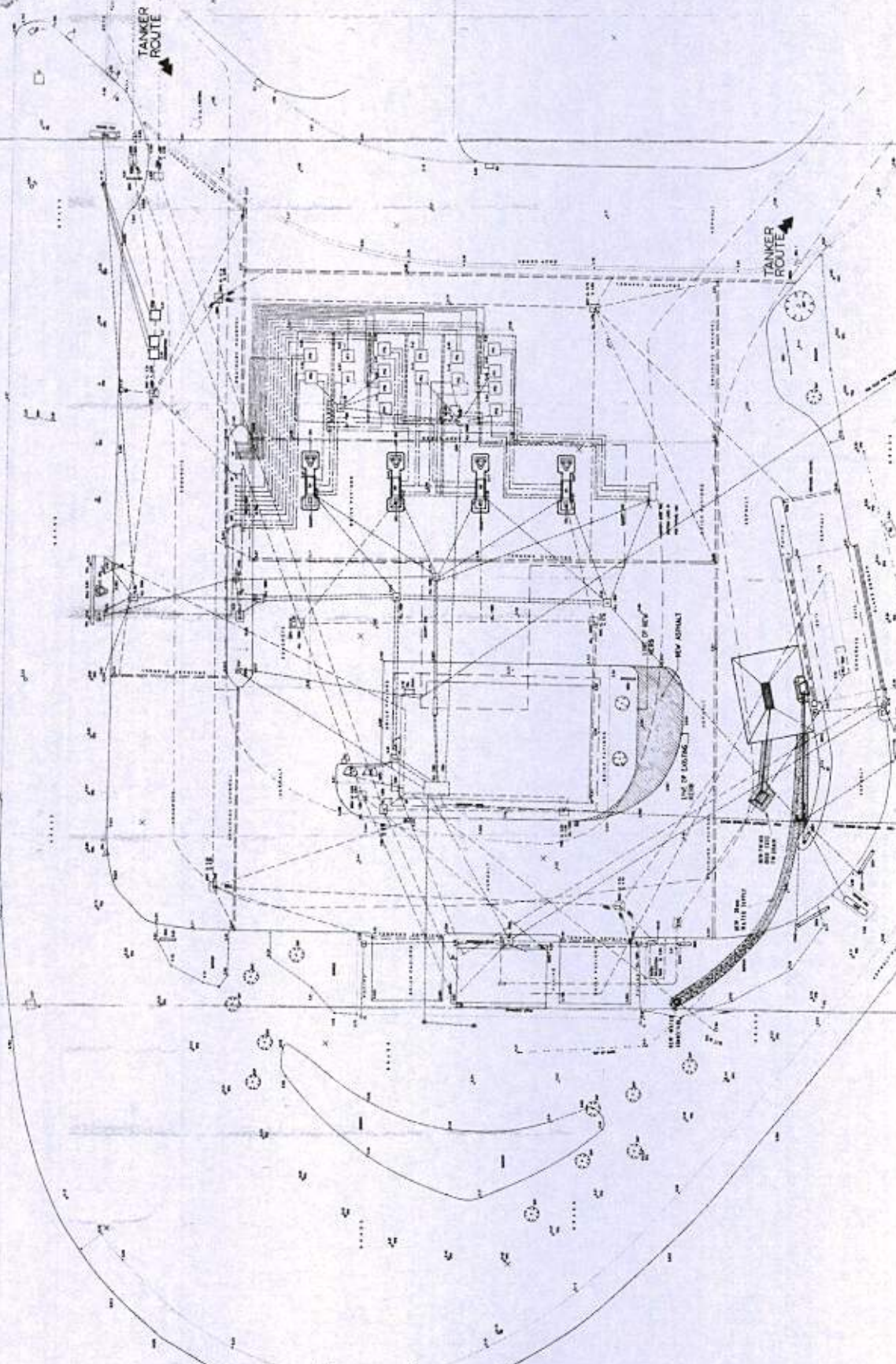


ELEVATION B

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
SHELL EASTFIELD										2259 RUSTINGTON BR PASS										RUSTINGTON										FOR										SHELL OIL																																																											

JET WASH INSTALLATION

DATE	28-11-82	BY	2831/1
PROJECT	JET WASH INSTALLATION		
CLIENT	SHELL OIL		
DESIGNER	SHELL OIL		
CHECKED	SHELL OIL		
APPROVED	SHELL OIL		



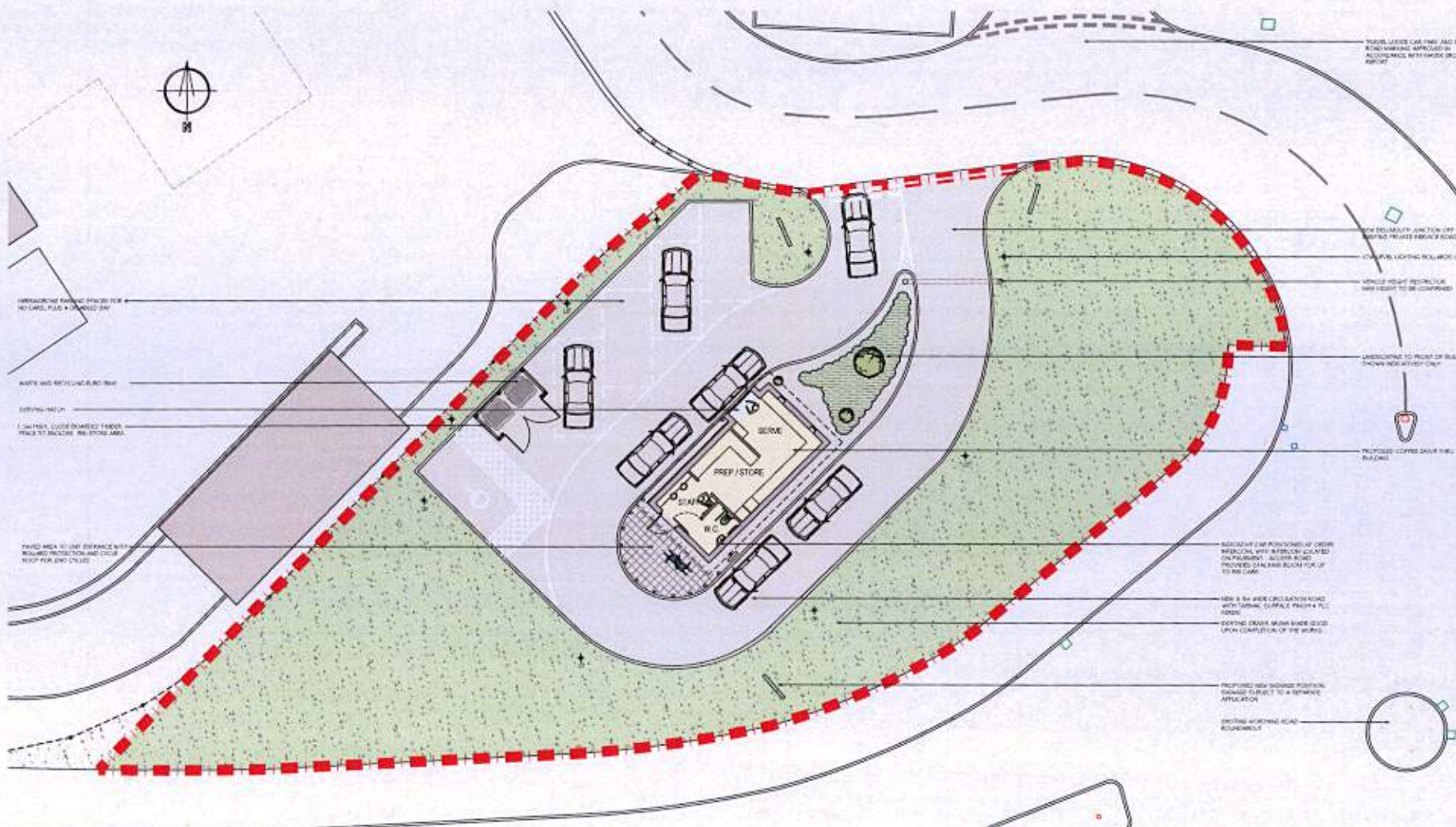
B

Proposed Site Plan	SHA dwg 8204.001
Proposed Drainage Layout	ABMH F2476/02A
Greenfield Runoff Rate Calcs	
Proposed External Levels	ABMH F2476/03A
Proposed Construction Finishes	ABMH F2476/04A
Windes Storage Calcs for Proposed SW Drainage Scheme	

PROPOSED ELEVATIONS



THIS DRAWING IS BASED ON OFFICIAL LAND SURVEYS
DRAWING NO. 13000114 SITE PLAN 2, DATED MARCH 2014
BOUNDARY LINE IS SHOWN INDICATIVELY ONLY AND IS SUBJECT
TO VERIFICATION



ITEMS OUTLINED WITH A DASHED LINE MAY BE IN COMPLIANCE AND SUBJECT TO SEVERAL CHANGES OR CAN BE EXPECTED TO CHANGE
REVISION LOCAL TRANSPORTATION FUND CHANGED SINCE PREVIOUS ISSUE OF DRAWING

REV	DATE	DESCRIPTION	BY	CHK
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LOCAL AUTHORITIES HAVE REVIEWED THIS DRAWING AND HAVE NO OBJECTION TO THE PROPOSED DEVELOPMENT OF THE SITE
THIS DRAWING IS THE PROPERTY OF SIMPSON HILDER ASSOCIATES LIMITED AND WILL BE REPRODUCED WITHOUT PERMISSION FROM SIMPSON HILDER ASSOCIATES LIMITED

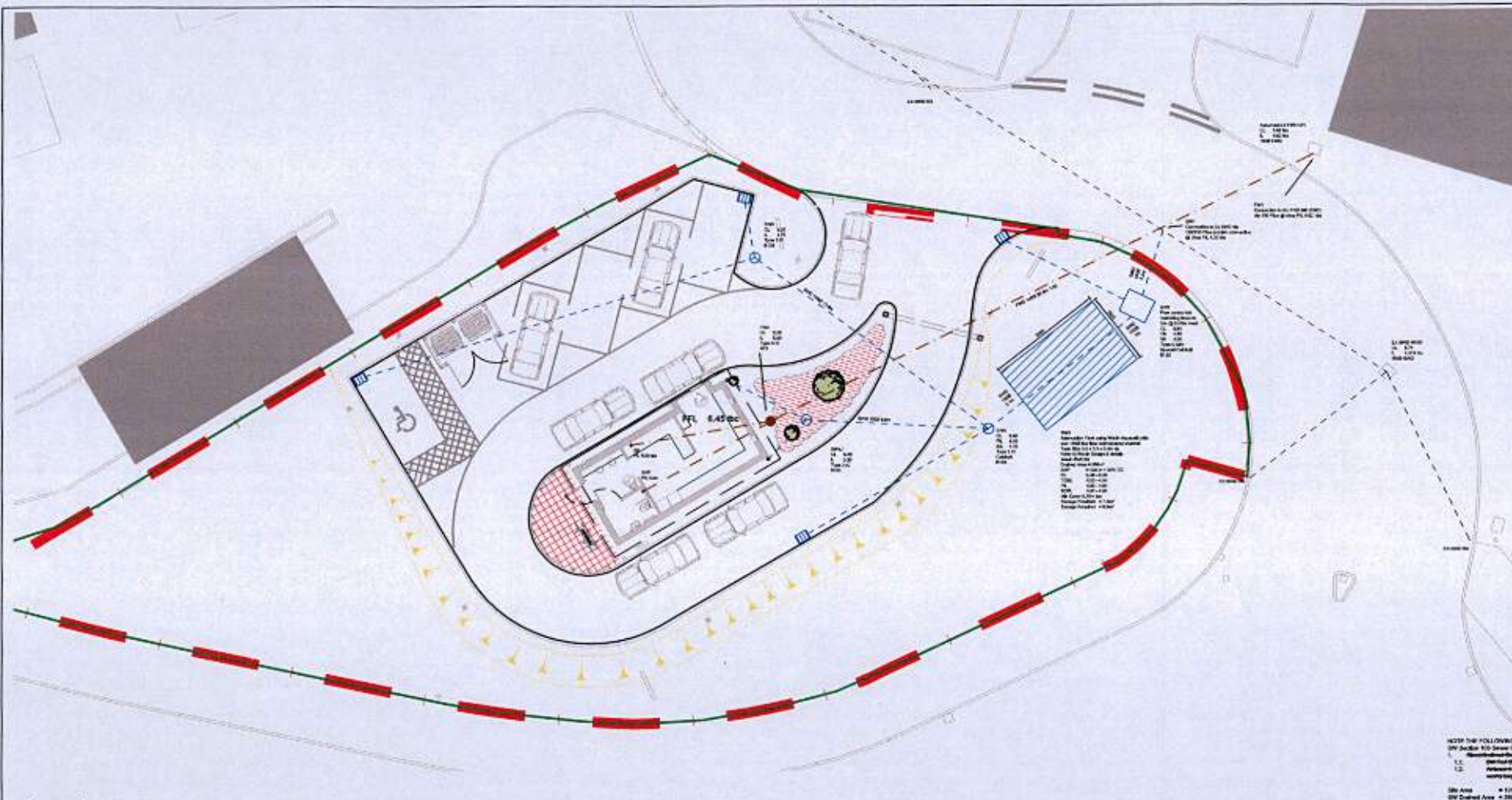
SIMPSON HILDER ASSOCIATES LIMITED
87/89 High Street, Lymington, Hampshire, SO41 1PS
T: 01533 891 200 FAX: 01533 891 201
E: hilder@simpsonhilder.co.uk

PROPOSED FLOOR & SITE PLANS
PROPOSED ELEVATIONS
PLANNING
PROPOSED COFFEE - DRIVE THRU
PORTING ROAD
LITTLEHAMPTON
POST S155 0PM 300

SCALE 1:1000	DATE 15/03/14	BY 103	CHK 8204
8204	103		

PROPOSED FLOOR & SITE PLAN



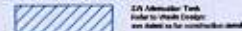


- [illegible]

SUBJECT TO THE APPROVAL OF:
LPA
BUILDING CONTROL/NHBC
SW - S108

[illegible]

Legend



DRAFT - Indicative subject
to detailed design.
Intended for Planning ONLY

A	Issued For BUDGET APPROVAL ONLY	2/2/11
+	Issued For BUDGET APPROVAL ONLY	2/2/11
REV	DESCRIPTION	DATE



10/1/2022	MICRO DRIVE THROUGH WORTHING ROAD RUSTINGTON WEST SUSSEX, BN16 3JX				
20/1/2024	PRELIMINARY DRAINAGE LAYOUT (PLANNING ONLY)				
A	F247502			B	A
DATE	TIME	WEEK TO	WEEK	DATE	
	11:00	10/01/24	10	01/01/24	-

Greenfield runoff estimation for sites

Site name: Micro Drive Through

Site location: Worthing Rd

Site coordinates

Latitude: 50.82009° N

Longitude: 0.52649° W

This is an estimation of the greenfield runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the CIRIA SUDS Manual (2007). It is not to be used for detailed design of drainage systems. It is recommended that every drainage scheme uses hydraulic modelling software to finalise volume requirements and design details before drawings are produced.

Reference: gcp9h5887zkt / 0.1

Date: 7 Nov 2016

Site characteristics

Total site area	0.1	ha
Significant public open space	0	ha
Area positively drained	0.1	ha

Methodology

Greenfield runoff method	IH124
Qbar estimation method	Calculate from SPR and SAAR
SPR estimation method	Calculate from SOIL type
SOIL type	3
HOST class	N/A
SPR	0.37

Hydrological characteristics

	Default	Edited	
SAAR	722	722	mm
M5-60 Rainfall Depth	20	20	mm
'r' Ratio M5-60/M5-2 day	0.4	0.4	
FEH/FSR conversion factor	0.84	0.84	
Hydrological region	7	7	
Growth curve factor: 1 year	0.85	0.85	
Growth curve factor: 10 year	1.62	1.62	
Growth curve factor: 30 year	2.3	2.3	
Growth curve factor: 100 year	3.19	3.19	

Greenfield runoff rates

	Default	Edited	
Qbar	0.30	0.30	l/s
1 in 1 year	0.26	0.26	l/s
1 in 30 years	0.69	0.69	l/s
1 in 100 years	0.96	0.96	l/s

Please note that a minimum flow of 5 l/s applies to any site

Greenfield runoff estimation for sites

Site name: Micro Drive Through
Site location: Worthing Rd

Site coordinates

Latitude: 50.82009° N
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This is an estimation of the greenfield runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the CIRIA SUDS Manual (2007). It is not to be used for detailed design of drainage systems. It is recommended that every drainage scheme uses hydraulic modelling software to finalise volume requirements and design details before drawings are produced.

Reference: gcp9h5887zkt / 0.1
Date: 7 Nov 2016

Site characteristics

Total site area	0.1	ha
Significant public open space	0	ha
Area positively drained	0.1	ha

Methodology

Greenfield runoff method	FEH	
Qmed estimation method	Calculate from BFI and SAAR	
BFI and SPR estimation method	Calculate from dominant HOST	
HOST class	N/A	
BFI / BFIHOST	0.00	
Qmed	N/A	l/s
Qbar / Qmed Conversion Factor	N/A	

Hydrological characteristics

	Default	Edited	
SAAR	722	722	mm
M5-60 Rainfall Depth	20	20	mm
'r' Ratio M5-60/M5-2 day	0.4	0.4	
FEH/FSR conversion factor	0.84	0.84	
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Growth curve factor: 10 year	1.62	1.62	
Growth curve factor: 30 year	2.3	2.3	
Growth curve factor: 100 year	3.19	3.19	

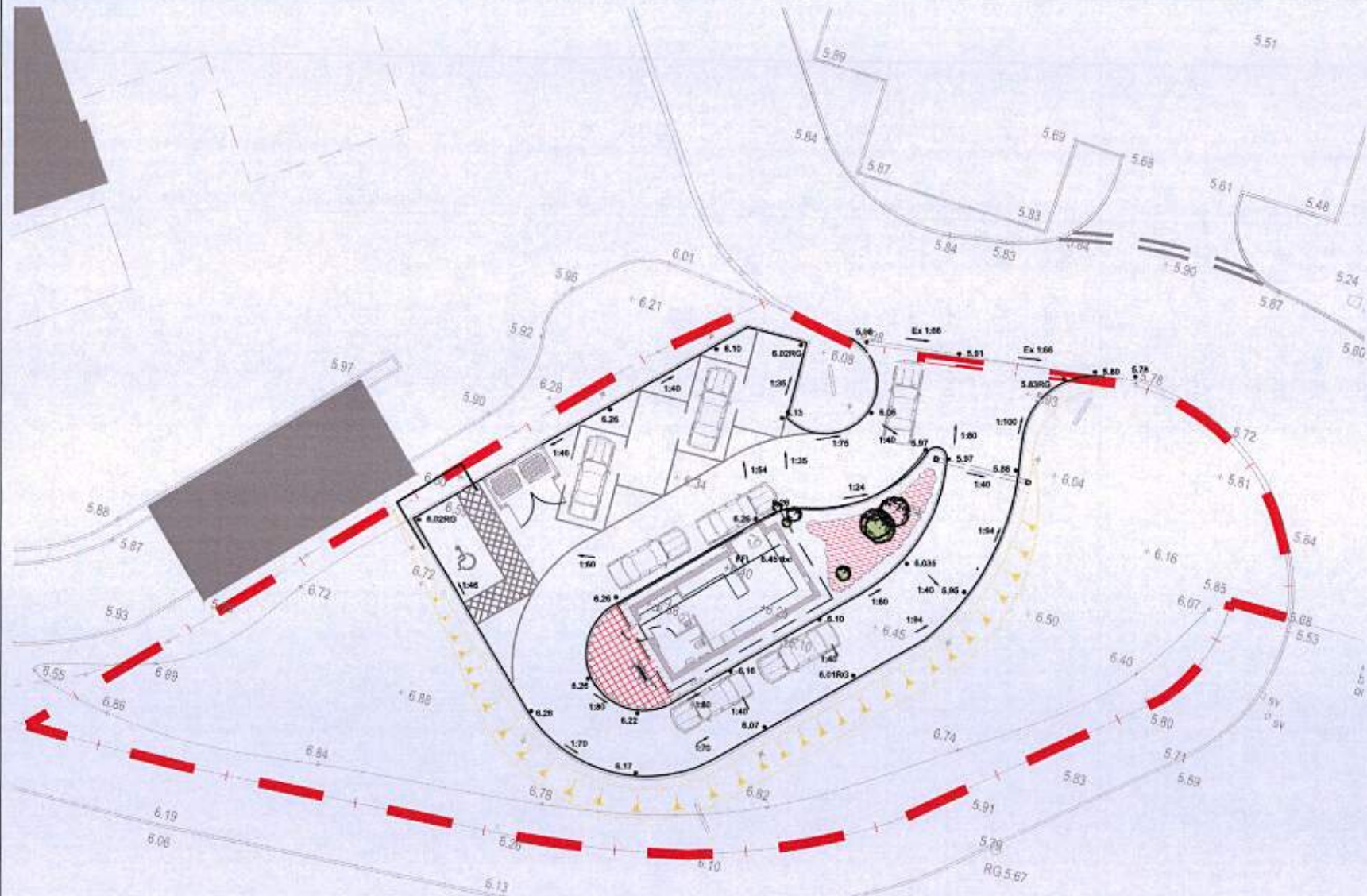
Greenfield runoff rates

	Default	Edited	
Qbar	---	---	l/s
1 in 1 year	---	---	l/s
1 in 30 years	---	---	l/s
1 in 100 years	---	---	l/s

Please note that a minimum flow of 5 l/s applies to any site

NOTES

1. This drawing is to be used in conjunction with drawing No. F2476/03



Legend

- Direction of Fall
- 66.00 Proposed Level
- 66.00 RG/CD/YG Proposed Level with Drainage Point
- Proposed Retaining Wall
- Earthworks/Regrading

DRAFT - Indicative subject to detailed design.
Intended for Planning ONLY

A	Revised For (SUCCESSE) APPROVAL ONLY	DATE
REV	DESCRIPTION	DATE



MICRO DRIVE THROUGH WORTHING ROAD RUSTINGTON WEST SUSSEX, BN16 3JX			
PRELIMINARY PROP' EXTERNAL LEVELS (PLANNING ONLY)			
F2476/03	REV	DATE	BY
1.000	0	NOV 16	AM
0	1	NOV 16	AM
0	2	NOV 16	AM
0	3	NOV 16	AM

ABMH					Page 1
1 The Grove Felpham West Sussex PO22 7EY			Micro Drive Through Rustington		
Date Jan 17 File F2476 SWD Tank Rev A.srcx			Designed by MH Checked by		
Micro Drainage			Source Control 2015.1		
<u>Summary of Results for 100 year Return Period (+30%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	4.834	0.314	5.0	5.5	O K
30 min Summer	4.872	0.352	5.0	6.2	O K
60 min Summer	4.857	0.337	5.0	5.9	O K
120 min Summer	4.764	0.244	5.0	4.3	O K
180 min Summer	4.684	0.164	5.0	2.9	O K
240 min Summer	4.636	0.116	5.0	2.0	O K
360 min Summer	4.604	0.084	4.1	1.5	O K
480 min Summer	4.589	0.069	3.4	1.2	O K
600 min Summer	4.579	0.059	2.9	1.0	O K
720 min Summer	4.573	0.053	2.5	0.9	O K
960 min Summer	4.564	0.044	2.0	0.8	O K
1440 min Summer	4.553	0.033	1.5	0.6	O K
2160 min Summer	4.545	0.025	1.1	0.4	O K
2880 min Summer	4.539	0.019	0.9	0.3	O K
4320 min Summer	4.533	0.013	0.6	0.2	O K
5760 min Summer	4.530	0.010	0.5	0.2	O K
7200 min Summer	4.527	0.007	0.4	0.1	O K
8640 min Summer	4.525	0.005	0.4	0.1	O K
10080 min Summer	4.523	0.003	0.3	0.1	O K
15 min Winter	4.881	0.361	5.0	6.3	O K
30 min Winter	4.916	0.396	5.0	6.9	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	115.731	0.0	8.5	14	
30 min Summer	77.804	0.0	11.4	23	
60 min Summer	49.937	0.0	14.6	40	
120 min Summer	30.956	0.0	18.1	72	
180 min Summer	23.058	0.0	20.2	100	
240 min Summer	18.577	0.0	21.7	128	
360 min Summer	13.656	0.0	24.0	186	
480 min Summer	10.974	0.0	25.7	246	
600 min Summer	9.254	0.0	27.1	306	
720 min Summer	8.046	0.0	28.2	368	
960 min Summer	6.447	0.0	30.2	488	
1440 min Summer	4.709	0.0	33.0	730	
2160 min Summer	3.432	0.0	36.1	1084	
2880 min Summer	2.739	0.0	38.4	1468	
4320 min Summer	1.989	0.0	41.9	2196	
5760 min Summer	1.583	0.0	44.4	2896	
7200 min Summer	1.325	0.0	46.5	3648	
8640 min Summer	1.147	0.0	48.3	4408	
10080 min Summer	1.015	0.0	49.9	5040	
15 min Winter	115.731	0.0	9.5	15	
30 min Winter	77.804	0.0	12.7	24	
©1982-2015 XP Solutions					

ABMH		Page 2
1 The Grove Felpham West Sussex PO22 7EY	Micro Drive Through Rustington	
Date Jan 17	Designed by MH	
File F2476 SWD Tank Rev A.srcx	Checked by	
Micro Drainage	Source Control 2015.1	

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	4.880	0.360	5.0	6.3	O K
120 min Winter	4.726	0.206	5.0	3.6	O K
180 min Winter	4.629	0.109	5.0	1.9	O K
240 min Winter	4.606	0.086	4.1	1.5	O K
360 min Winter	4.583	0.063	3.1	1.1	O K
480 min Winter	4.572	0.052	2.5	0.9	O K
600 min Winter	4.565	0.045	2.1	0.8	O K
720 min Winter	4.560	0.040	1.8	0.7	O K
960 min Winter	4.553	0.033	1.5	0.6	O K
1440 min Winter	4.544	0.024	1.1	0.4	O K
2160 min Winter	4.537	0.017	0.8	0.3	O K
2880 min Winter	4.533	0.013	0.6	0.2	O K
4320 min Winter	4.528	0.008	0.5	0.1	O K
5760 min Winter	4.525	0.005	0.4	0.1	O K
7200 min Winter	4.523	0.003	0.3	0.0	O K
8640 min Winter	4.521	0.001	0.3	0.0	O K
10080 min Winter	4.520	0.000	0.2	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	49.937	0.0	16.4	44
120 min Winter	30.956	0.0	20.3	76
180 min Winter	23.058	0.0	22.6	98
240 min Winter	18.577	0.0	24.3	128
360 min Winter	13.656	0.0	26.8	186
480 min Winter	10.974	0.0	28.7	246
600 min Winter	9.254	0.0	30.3	306
720 min Winter	8.046	0.0	31.6	370
960 min Winter	6.447	0.0	33.8	490
1440 min Winter	4.709	0.0	37.0	734
2160 min Winter	3.432	0.0	40.5	1060
2880 min Winter	2.739	0.0	43.1	1496
4320 min Winter	1.989	0.0	46.9	2180
5760 min Winter	1.583	0.0	49.8	2920
7200 min Winter	1.325	0.0	52.1	3608
8640 min Winter	1.147	0.0	54.1	4376
10080 min Winter	1.015	0.0	55.9	0

ABMH		Page 4
1 The Grove Felpham West Sussex PO22 7EY	Micro Drive Through Rustington	
Date Jan 17	Designed by MH	
File F2476 SWD Tank Rev A.srcx	Checked by	
Micro Drainage		Source Control 2015.1

Model Details

Storage is Online Cover Level (m) 6.040

Tank or Pond Structure

Invert Level (m) 4.520

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	17.5	0.700	0.0	1.400	0.0	2.100	0.0
0.100	17.5	0.800	0.0	1.500	0.0	2.200	0.0
0.200	17.5	0.900	0.0	1.600	0.0	2.300	0.0
0.300	17.5	1.000	0.0	1.700	0.0	2.400	0.0
0.400	17.5	1.100	0.0	1.800	0.0	2.500	0.0
0.401	0.0	1.200	0.0	1.900	0.0		
0.600	0.0	1.300	0.0	2.000	0.0		

Hydro-Brake Optimum® Outflow Control

Unit Reference	MD-SFP-0108-5000-0450-5000
Design Head (m)	0.450
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Future Proof
Diameter (mm)	108
Invert Level (m)	4.500
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.450	5.0
Flush-Flo™	0.151	5.0
Kick-Flo®	0.321	4.3
Mean Flow over Head Range	-	4.0

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	3.9	1.200	7.9	3.000	12.1	7.000	18.3
0.200	4.9	1.400	8.5	3.500	13.0	7.500	18.9
0.300	4.5	1.600	9.0	4.000	13.9	8.000	19.6
0.400	4.7	1.800	9.5	4.500	14.7	8.500	20.2
0.500	5.2	2.000	10.0	5.000	15.4	9.000	20.7
0.600	5.7	2.200	10.5	5.500	16.2	9.500	21.3
0.800	6.5	2.400	10.9	6.000	16.9		
1.000	7.2	2.600	11.3	6.500	17.6		

