

DRAINAGE DESIGN - TECHNICAL NOTE

154-XOS-XX-XX-RP-C-5000

VILLAGE BAKERY

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09 March 2022

DOCUMENT ISSUE RECORD

Document Number		154-XOS-XX-XX-RP-C-5000			
Status	Revision	Date of Issue	Author	Checked	Approved
Planning	P1	09.03.2022	U.Malik	M.Walsh	E. Parry

Report Limitation

All comments and proposals contained in this report are based on information available to XOsquare Limited during recent investigations.

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1 INTRODUCTION & SITE LOCATION

This drainage technical note has been produced by XOsquare Limited on behalf of Village Bakery in respect of a planning application for the new Bakery Unit. The Bakery unit consists of a lightweight steel portal frame building with associated external works including car park and service yard. The site is located at Wrexham Industrial estate, the national Grid reference for the site is SJ375497 and the nearest postcode to the site is LL13 9UH. Extent of Phase 1 is shown below:



Figure 1-Site Location Plan

A copy of the proposed site plan is included in **Appendix A**.

This Drainage Technical Note sets out the principles of the drainage design for the proposed development and summarizes the reasoning behind the chosen design. This includes justification of specific flow rates, volumes of attenuation and the level of treatment provided for site run-off.

A site summary and summary of the local agencies is found below in Table 1.1

Site Name	Village Bakery, Wrexham Industrial Estate
Location	Wrexham Industrial Estate, LL13 9UH
Application Site Area phase 1	Circa 1.78 Acres
Development	Commercial
Environment Agency Office	WCBC
Lead Local Flood Authority	WCBC
Local Planning Authority	WCBC
Water Supplier	Dee Valley Water

Table 1-Development Summary

2 DRAINAGE SUMMARY

The site is brownfield (as an existing working drainage network is in place) from a land-use perspective and for the purposes of estimating surface water run-off and setting discharge rates. Table 2.1 summarizes the findings of this document.

Outfall Location	The surface water outfall is to connect into the public sewer on Coen Aben Road south of the site. The Foul Water is to connect into the private road east of the site which discharges into the foul public sewer on Coen Aben Road.
Existing Site Peak Run-off Rate	The existing surface water discharge rate is limited to 7l/s through an existing cellular attenuation system.
Infiltration Rate	None
Proposed Site Peak Run-off Rate	The discharge rate will be set to 7l/s as per previous planning application ABE P /2013/0856. This value will be lower than the calculated 60% betterment of Qbar through the Modified rational method therefore the existing consent will be used.
Proposed Storage Volume	342 m ³
Flow Control Type	Hydrobrake Optimum
SuDS Features	Catchpits Sump outfall units/gullies Attenuation Tank Oil separators Flow Controls

Table 2.1 - Drainage Summary

2.1 Existing Site

The site is an irregularly shaped plot of land, of approximately 0.72 hectares, that was formerly a bakery.

The site is located 5km East of Wrexham; The A525 provides a link into Wrexham and can be accessed via Clywedog Road South. Redwither Brook runs from East to West through the industrial estate.

The former bakery building has been demolished following a fire and the site now is free of any buildings. The site is flat with areas of stockpiled material from demolition rubble and infrastructure to slab level.

An existing working drainage network on the site has been established therefore classified as brownfields.

Ground levels apart from the spoil are consistent along the site. The existing carpark remains untouched following the demolition of the building.

The site is drained by separate drainage systems; both surface water and foul drainage connects to a public sewer on Coen Aben Road.

The existing topographical survey is included in **Appendix B**.

2.2 Proposed Development

The application relates to the construction of one industrial unit, the unit will be located on the site that had been demolished following a fire in 2019, the current site is vacant. Internal floor area totals to approximately 30,139 Sqm, suitable for B2, B8 Use classes with ancillary E(g)(i) Office space. Dedicated car parking allocations and footpaths are linked to an upgraded site access road to afford appropriate and inclusive access. Scheme proposals include localised soft landscape treatment and planting that complement the existing surroundings and boundary treatments.

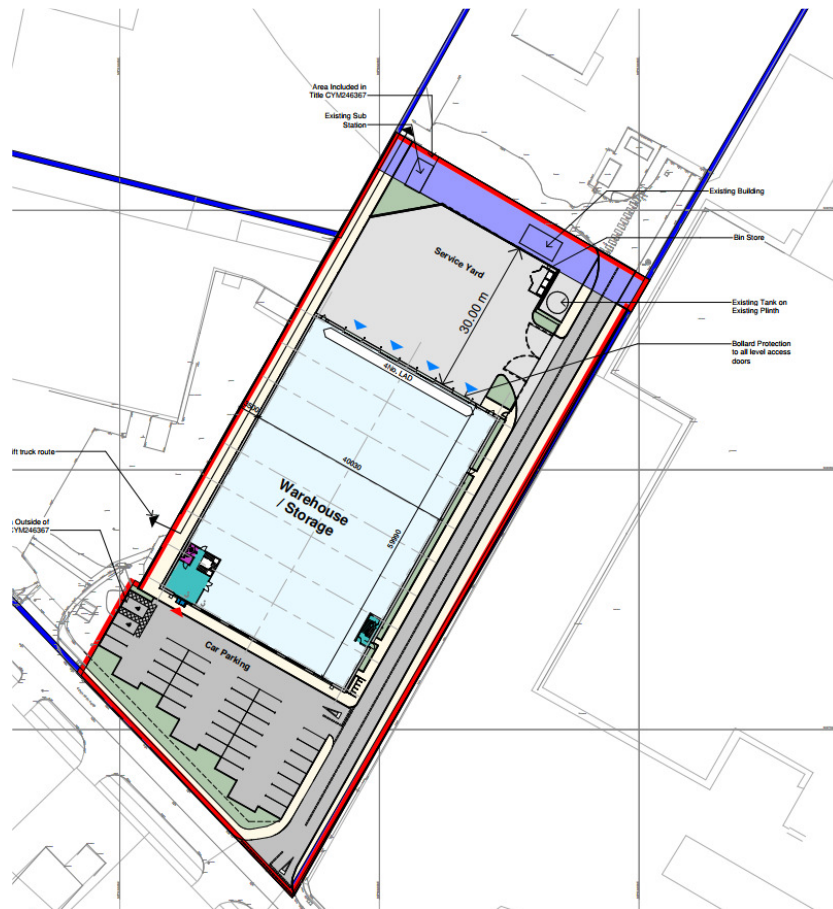


Figure 2 - Overall site layout

3 Surface Water Management

The site is brownfield from a surface water run-off perspective. An existing drainage network is currently in place which discharges to the separate public sewer systems in Coen Aben Road.

Surface water discharge rates remains at the existing 7l/s which is attenuated on site through a cellular tank.

3.1 Methods of Surface Water Managements

There are four methods that have been reviewed for the management and discharge of surface water which are detailed below; these may be applied individually or collectively to form a complete strategy. They should be applied in the order of priority as listed;

- Infiltration via soakaways
- Watercourse
- Surface Water Sewer
- Combined Water Sewer

Based on investigations undertaken to date, the ground conditions show stiff clays therefore infiltration will not be viable. It is therefore proposed to mimic the existing drainage arrangement on the site to dispose the surface water run off to the public sewers.

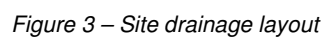
No existing water courses are in the vicinity of the site.

The existing drainage from the former bakery building connects to separate surface water and foul public sewers.

The existing road drainage along the site connects into the existing attenuation tank within the carpark.

Service yard and car park are drained by aco channels to the middle of the yard.

All surface water is attenuated on site and restricted using a hydro brake manhole and connects to the public sewer on Coen Aben Road.



3.2 Attenuation Requirements

The proposed restricted discharge rates outlined above and development runoff generated by proposed impermeable roof and hard standing areas results in a storage requirement during periods of intense rainfall.

The primary form of attenuation proposed for the site is through the use of an attenuation cellular crates.

An infradrainage model has been constructed for the entire site to ensure that below ground pipework and volumes of attenuation are sized accurately. The table below summarizes the main attenuation volumes and restricted discharge rates.

Attenuation Location	Maximum Volume (m ³)	Discharge Rate (l/s)
Bakery Carpark	342	7

Table 2 - Attenuation Requirements

Microdrainage calculations can be found in **Appendix D**

3.3 CLIMATE CHANGE

The issue of climate change is discussed in the NPPF Technical guidance with impacts likely on sea levels, peak rainfall intensities, peak river flows, wind speeds and wave heights. The current DEFRA and EA recommended allowances for possible future climate change are summarized on in Table 2 on Gov.uk website (<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>) and are summarized below.

Applies across all of England	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Upper end	10%	20%	40%
Central	5%	10%	20%

Table 3 - Climate Change

Planning Practice Guidance current advice on Climate Change for peak rainfall intensity allowance in small and urban catchments for a development with a lifespan of greater than 50 years '2080s' (2070 to 2115) is Central 20% and Upper End 40%

Climate change allowances has been agreed with the LLFA as part of the formal reserved matters application and within NYCC suds design Guidance.

The attenuation volumes above and current drainage strategy includes an allowance of **40%**.

3.4 Sustainable Drainage Systems

As discussed earlier in this document, infiltration-based drainage is considered unsuitable due to the nature of the ground conditions.

It is therefore proposed that non-infiltration-based SuDS solutions alongside traditional drainage measures will be employed across the site, these include:

- Filter Drains/ Strips.
- High-Capacity Drainage Channels & Road Gully's.
- Silt traps & Catchpits.
- Oil Separators.

3.5 Residual Risk and Designing for Exceedance

In the event that the capacity of the attenuation is exceeded, flood water will be retained on site within the service yards, dock levelers and car parks up to the 100 year event + 40% allowance for climate change.

Beyond this storm event exceedance will be safely directed away from buildings and allowed to leave the site where it will follow natural flow paths.

3.6 Maintenance

Requirements for ongoing maintenance of the drainage network will form part of the Operation and Maintenance manual for the site and will be undertaken by the building management. Any specialist or proprietary products that are specified at detailed design will have a manufacturer specific maintenance regime which will be included within the document.

All drainage features should be located in open areas which are accessible. All surface water arrangements outlined above are subject to detailed design.

3.7 Water Quality

The LLFA has requested for the foul water to be treated for phosphates prior to leaving site. we have provided a Kingspan foul water treatment plant ref: 'biodisc +p' rotating biological contactor (rbc) with chemical dosing equipment, removing 95% of phosphate content.

4 Management and Maintenance Plan

Based on Chapter 32 on the CIRIA report C753 The SuDS Manual and manufacturer recommendations a maintenance strategy has been outlined. The responsibility for maintenance will lie with the Facilities management.

System	Maintenance Type	Action	Frequency
General Drainage Systems: -Surface water drainage -Surface water Manhole -Gully -Channel train outlet -Sprinkler tank drain down position -Rain water pipe connection	Routine Maintenance	Remove debris from catchment surface – any debris entering system may cause risks to performance.	Monthly or as required by inspection.
		Inspect sediment and silt accumulation rates.	Six monthly.
		Clearing of catchpits.	Annually or as required by inspection.
		Clearing of drainage channels, gullies and their outlets.	Annually or as required by inspection.
	Remedial Actions	Repair pipework and manholes.	As required from inspection.
	Monitoring	CCTV survey of drainage system in full.	As required by inspection

Table 4 - Maintenance Frequency: General Drainage System

System	Maintenance Type	Action	Frequency
Storage Tanks *Manufacturers O&M manual maintenance requirements are to take precedent to this document	Routine maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly
		Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
		For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary	Annually
		Remove sediment from pre-treatment structures and/or internal forebays	As required.
	Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
		Survey inside of tank for sediment build-up and remove if necessary	Every 5 years.
	Remedial Actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required

Table 5 - Maintenance frequency: Storage Tanks

System	Maintenance Type	Action	Frequency
Full Retention Separator. *Manufacturers O&M manual maintenance requirements are to take precedent to this document	Routine maintenance	Removal of Litter and Debris and inspect for sediment, silt, oil and grease levels.	Six monthly or as required by inspection.
		Change Filter Media.	As recommended by Manufacturer.
		Remove sediment, silt, oil and grease.	As required based on inspection or following significant spill.
	Remedial Actions	Replacement of parts and/or units.	As required by inspection.
	Monitoring	Inspect for evidence of poor operation.	Six monthly.
		Inspect filter media and establish appropriate replacement frequencies based on usage and observations.	Six monthly.
		Inspect sediment and silt accumulation rates and establish appropriate replacement frequencies based on usage and observations.	Monthly during initial use until a robust replacement regime can be established.

Table 6 - Maintenance frequency: separators

5 Foul Water Management

It is proposed to install a new foul drainage system to serve the proposed development.

The foul water system will be designed and constructed in accordance with the current Building Regulations, BS EN:752 'Drainage and Sewer Systems Outside Buildings', the Local Authority Building Control specifications and requirements, Sewerage Sector Guidance (Appendix C) and the Civil Engineering Specification for the Water Industry.

A foul water connection connects into the existing run in the road along the site which then connects into the public sewer on Coen Aben Road.

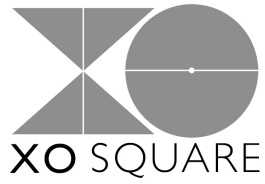
The foul water will be treated for phosphates prior to leaving site. We have provided a Kingspan foul water treatment plant ref: 'biodisc +p' rotating biological contactor (rbc) with chemical dosing equipment, removing 95% of phosphate content.

The final connection will be subject to S104 application with Welsh water.

The proposed foul network is presented on the drainage general arrangement drawings located in **Appendix C**.

6 Summary

1. This statement and supporting appendices demonstrate that the drainage design for the development will satisfy the discharge requirements of Wrexham County Borough Council as LLFA.
2. Infiltration is considered unsuitable for the site due to the existing ground conditions.
3. On site attenuation is proposed in the form of a cellular system.
4. The site will connect foul sewerage to the public foul drainage network via an existing manhole to the east of the site.
5. The site will connect surface water to the public surface water network on Coen Aben Road.

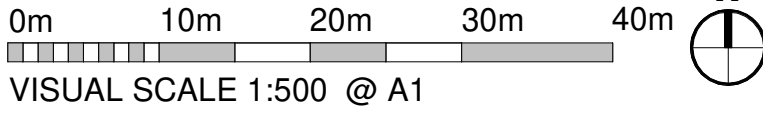
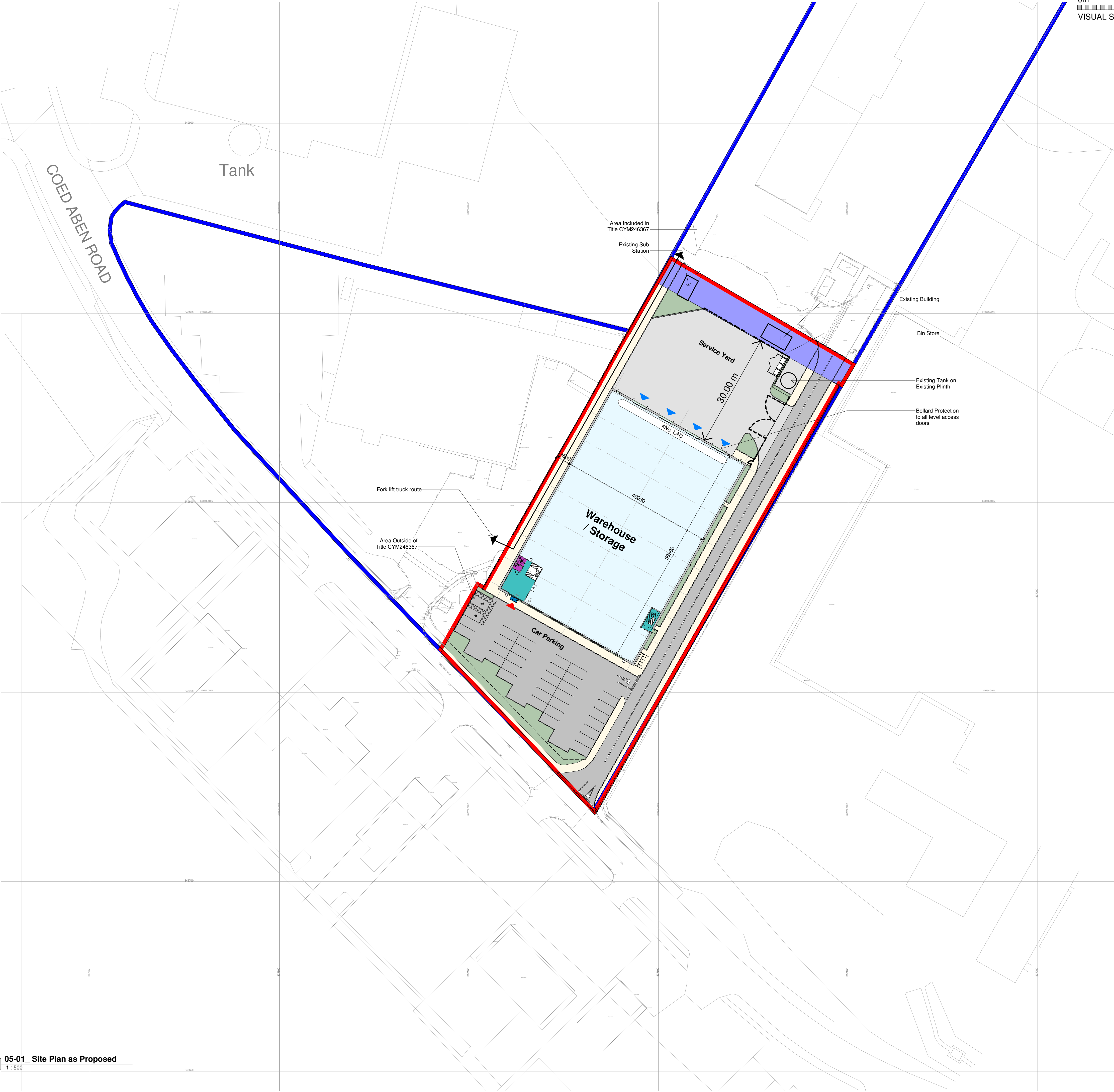


Drainage Technical Note

KONECT 62 KNOTTINGLEY

project	XOS-110
Sheet	App. A

APPENDIX A – Site Masterplan



Drawing Status

PLANNING

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Hazard Identification

ref	hazard	date
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Site		
Name	Area	Site Density %
Site (Application)	1.78 acres	33.257134

Note: Boundary Lines shown are indicative, based on information provided - Land Registry title ownership to be confirmed by client.

Site areas are subject to change to suit confirmed land title plans ,topographic survey data and any site related constraints.

Area Schedule (GIA)		
Name	Area	
	Metric	Imperial
GF GIA	2,400.00 m²	25,633 ft²
FF GIA	400.00 m²	4,306 ft²
TOTAL	2,800.00 m²	30,139 ft²

Parking Schedule	
Description	Count
Standard Car Parking Bay	31
Accessible Parking Bay	2
TOTAL	33

P3 Planning Issue (Full App)	BE	06.12.21	DC
P2 Radius updated	BE	30.09.21	
P1 Planning Issue (Consultation)	BE	23.08.21	DC
Rev	Revision Details	Drawn	Date Checked

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Widenspool Business Park,
Stockton Heath,
W44 6HL,
t: 01552 751 852
e: info@c4projects.co.uk
www.c4projects.co.uk

Project Management • Architecture • Building Surveying • Cost Consultancy

Client
Village Bakery

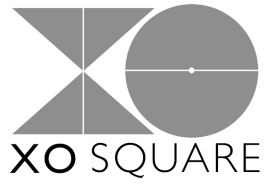
Project
Village Bakery
Wrexham Industrial Estate

Drawing Title
Site Plan as Proposed

Status Purpose of Issue

S2 SUITABLE FOR INFORMATION

Drawn by	BE	Created	23.08.21
C4 Job no.	21077	Scale	As indicated @ A1
Drg no.	21077-C4P-AV-XX-DR-A-0501	Rev	P3



APPENDIX B – Topographic Survey



Topographical Survey Legend

[illegible]

BENCH MARK INFORMATION

All levels relate to O.S. (Newlyn) Datum, Established using network RTK. Survey plotted on a plane grid, orientated to National Grid.

NOTES

TIME OF SURVEY SHOWN

DRAINAGE INFORMATION MUST BE CHECKED AND VERIFIED WITH LOCAL AUTHORITY RECORDS PRIOR TO WORK COMMENCING

Levels defining edge of carriageway are observed at channel (bottom of kerb). Unless otherwise stated.

TREE SPREADS ARE SYMBOLIC ONLY AND ARE REPRESENTATIVE OF THE THE AVERAGE SPREAD

THE DRIP LINE LAYER DENOTES THE TREES EXTR

SURVEY STATIONS

STN1	337595.764	349741.620	31
STN1A	337548.699	349755.360	31
STN2	337621.086	349786.281	32
STN3	337651.742	349840.010	32
RS1	337564.176	349760.148	31

REVISIONS

DESCRIPTION	SURVEYED	DRAWN
STANTIONS SURVEYED WHERE POSSIBLE PLEASE NOTE MOSTLY BURIED ON SITE	NG	P2H

ULP Surveying

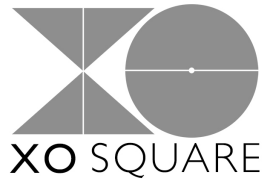
Surveying Consultants Ltd,
c/o 45 Rodney House,
150 High Street,
London
EC1A 3BB
Tel: 01942 243113
Fax: 01942 492230
Mobile: 07710 428498
All:- patrick@sls.co.uk

WREXHAM INDUSTRIAL ESTATE

Topographical Land Survey

FILE NO.	SHEET SIZE	No. of SHEETS	DATE	REMARKS
200	A0	1	19.05.2021	

DRAWING NUMBER
21-468



APPENDIX C – Drainage General Arrangements



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AGREEMENT OR IMPLIED AGREEMENT BETWEEN POPULOUS AND THE
INSTRUCTING PARTY.

USE FIGURED DIMENSIONS, DO NOT SCALE. CHECK ALL DIMENSIONS
ON SITE BEFORE FABRICATION OR SETTING OUT.

LEGEND

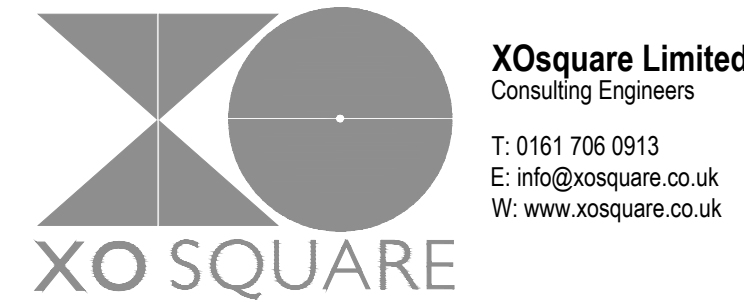
- SITE BOUNDARY
- EXISTING SW CARRIER DRAIN
- EXISTING FW CARRIER DRAIN
- PROPOSED SURFACE WATER CARRIER DRAIN & MANHOLE
- PROPOSED FOUL WATER DRAIN & MANHOLE
- PROPOSED CHANNEL DRAIN & SILT CHAMBER/ACCESS CHAMBER
- PROPOSED HYDROBRAKE FLOW CONTROL CHAMBER
- EXISTING TRAPPED ROAD GULLY

GENERAL NOTES

- DO NOT SCALE.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS.
- SHOULD THERE BE ANY DISCREPANCY BETWEEN DETAILS INDICATED ON THIS DRAWING AND THOSE INDICATED ON OTHER DRAWINGS THE ENGINEER SHOULD BE INFORMED PRIOR TO CONSTRUCTION ON SITE.
- UNTIL TECHNICAL APPROVAL HAS BEEN OBTAINED FROM THE RELEVANT AUTHORITIES IT SHOULD BE UNDERSTOOD THAT ALL DRAWINGS ISSUED ARE PRELIMINARY AND NOT FOR CONSTRUCTION. SHOULD THE CONTRACTOR START SITE WORK PRIOR TO APPROVAL BEING GIVEN, IT IS ENTIRELY AT HIS OWN RISK.
- ALL DIMENSIONS SHOWN ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
- ALL SURVEY INFORMATION IS PROVIDED BY THE SURVEYING COMPANY AND XOSQUARE LIMITED CANNOT ACCEPT ANY LIABILITY FOR ANY DISCREPANCIES THERE IN. ALL SURVEY INFORMATION TO BE VERIFIED ON SITE BY CONTRACTOR. SHOULD DISCREPANCIES BE IDENTIFIED, XOSQUARE LIMITED TO BE NOTIFIED IMMEDIATELY.
- POSITION AND NUMBER OF PROPOSED SIPHONIC RWP'S IS INDICATIVE ONLY AND SUBJECT TO DETAILED DESIGN BY OTHERS
- POSITION AND NUMBER OF ALL FOUL WATER POP-UPS IS TO BE CONFIRMED BY THE ARCHITECT/ MEP ENGINEER.
- ALL MANHOLE/ INSPECTION CHAMBERS IN SERVICE YARDS TO BE FITTED WITH E600 SCORPION SERIES CAST IRON COVERS BY EJ GROUP OR EQUIVALENT APPROVED. 150m FRAME DEPTH. 600x600 CLEAR OPENING.
- ALL MANHOLE/ INSPECTION CHAMBERS IN OTHER TRAFFICKED AREAS TO BE FITTED WITH D400 SCORPION SERIES CAST IRON ACCESS COVERS BY EJ GROUP OR EQUIVALENT APPROVED. 100m FRAME DEPTH. 600x600 CLEAR OPENING.
- ACO QMAX CHANNEL TO BE FITTED WITH Q-FLOW DUCTILE IRON EDGE RAIL (32801). ACCESS & SILT CHAMBER TO BE FITTED WITH E600 DUCTILE IRON SOLD COVER & FRAME (44317).
- SURFACE WATER DRAINAGE DESIGN HAS BEEN DEVELOPED ON THE BASIS OF THE EXISTING DESIGN OF:
 $Q_{MAX} = 7 \text{ l/s}$
- ATTENUATION VOLUMES INCLUDE A CLIMATE CHANGE ALLOWANCE OF 40% IN ACCORDANCE WITH WREXHAM COUNTY COUNCIL SUDS GUIDANCE.
- NO ALLOWANCE HAS BEEN INCLUDED FOR URBAN CREEP BASED ON THE TYPE OF DEVELOPMENT. TO BE AGREED WITH THE LLFA.
- REFER TO DRAINAGE STRATEGY BY ADS Structural REF 6595-ADS-XX-XX-RP-S-500.

T2	08.03.22	MW		TENDER ISSUE
T1	21.02.22	MW		TENDER ISSUE
Rev	Date	By		Description

REVISIONS



Client

VILLAGE BAKERY

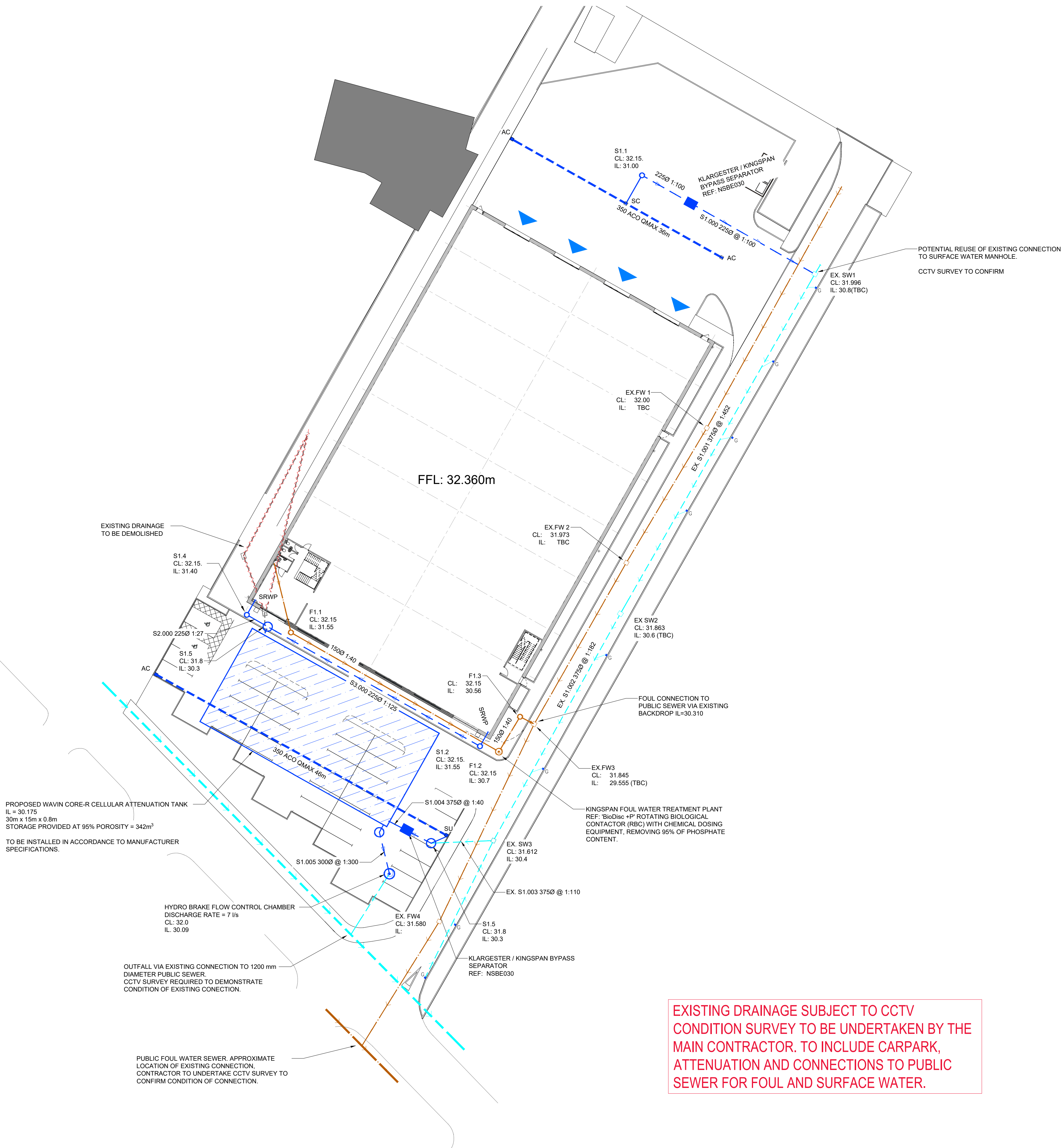
Project Name

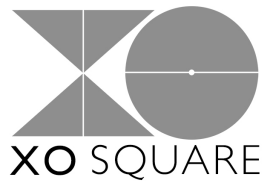
VILLAGE BAKERY

Drawing Title

PROPOSED DRAINAGE LAYOUT

Drawing Status		Project No	
TENDER		XOS-110	
Drawn	Approved	Scale	First Issue
MW	EP	1:300	20.02.2022
JOB No.	COMPANY	ZONE	LEVEL
154	XOS	XX	XX
TYPE	ROLE	DRAWING No.	REVISION
DR	C	5570	T2





APPENDIX D – Microdrainage Calculations

Project:	Date: 07/03/2022			
	Designed by:	Checked by:	Approved By:	
Report Title: Rainfall Analysis Criteria	User			
	Company Address:			

Runoff Type	Dynamic
Output Interval (mins)	1
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	0
Perform No Discharge Analysis	☐

Rainfall

FSR 1 in 100 + 40% CC Type: FSR

Region	England and Wales
M5-60 (mm)	18.0
Ratio R	0.324
Summer	☒
Winter	☒

Return Period

Return Period (years)	Increase Rainfall (%)
100.0	40

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Project:	Date: 07/03/2022			
	Designed by:	Checked by:	Approved By:	
Report Title: Rainfall Analysis Criteria	User			
			Company Address:	

FSR 1 in 1	Type: FSR
------------	-----------

Region	England and Wales
M5-60 (mm)	18.0
Ratio R	0.321
Summer	☒
Winter	☒

Return Period

Return Period (years)	Increase Rainfall (%)
1.0	0

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

FSR 1 in 30	Type: FSR
-------------	-----------

Region	England and Wales
M5-60 (mm)	18.0
Ratio R	0.324
Summer	☒
Winter	☒

Return Period

Return Period (years)	Increase Rainfall (%)
30.0	0

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Project:	Date: 07/03/2022		
	Designed by: User	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		



FSR 1 in 100 + 40% CC: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
S1.1	FSR 1 in 100 + 40% CC: 100 years: +40 %: 15 mins: Winter	32.06 3	31.00 0	31.842	0.842	80.8	0.238	0.000	78.0	37.281	Surcharged
EX. SW1	FSR 1 in 100 + 40% CC: 100 years: +40 %: 480 mins: Winter	31.99 6	30.72 1	31.660	0.939	23.5	1.062	0.000	24.8	185.469	Surcharged
EX. SW3	FSR 1 in 100 + 40% CC: 100 years: +40 %: 480 mins: Winter	31.61 2	30.40 0	31.660	1.260	53.4	49.365	47.994	24.6	280.053	Flood
Ex. Interceptor	FSR 1 in 100 + 40% CC: 100 years: +40 %: 960 mins: Winter	31.80 0	30.30 0	31.696	1.396	86.3	1.579	0.000	48.8	472.012	Surcharged
S1.4	FSR 1 in 100 + 40% CC: 100 years: +40 %: 480 mins: Winter	32.19 2	31.40 0	31.690	0.290	10.8	0.082	0.000	14.5	133.247	Surcharged
S1.3	FSR 1 in 100 + 40% CC: 100 years: +40 %: 960 mins: Winter	32.20 2	31.27 5	31.684	0.409	26.6	0.462	0.000	21.7	316.103	Surcharged
S1.2	FSR 1 in 100 + 40% CC: 100 years: +40 %: 15 mins: Winter	32.15 6	31.55 0	32.051	0.501	65.0	0.142	0.000	63.4	30.025	Surcharged
HB1	FSR 1 in 100 + 40% CC: 100 years: +40 %: 960 mins: Winter	32.00 0	30.08 5	31.709	1.624	24.5	1.836	0.000	6.5	507.341	OK
EX. SW2	FSR 1 in 100 + 40% CC: 100 years: +40 %: 480 mins: Winter	31.86 3	30.60 0	31.660	1.060	92.3	1.199	0.000	20.8	240.970	Surcharged

Project:	Date: 07/03/2022		
	Designed by: User	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		



FSR 1 in 1: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
S1.1	FSR 1 in 1: 1 years: +0 %: 15 mins: Winter	32.06 3	31.00 0	31.092	0.092	18.3	0.026	0.000	18.1	8.439	OK
EX. SW1	FSR 1 in 1: 1 years: +0 %: 15 mins: Winter	31.99 6	30.72 1	30.863	0.142	27.1	0.160	0.000	26.5	12.585	OK
EX. SW3	FSR 1 in 1: 1 years: +0 %: 15 mins: Winter	31.61 2	30.40 0	30.517	0.117	34.1	0.132	0.000	33.7	16.323	OK
Ex. Interceptor	FSR 1 in 1: 1 years: +0 %: 15 mins: Winter	31.80 0	30.30 0	30.410	0.110	45.3	0.124	0.000	45.2	22.000	OK
S1.4	FSR 1 in 1: 1 years: +0 %: 15 mins: Winter	32.19 2	31.40 0	31.477	0.077	18.5	0.022	0.000	18.4	8.528	OK
S1.3	FSR 1 in 1: 1 years: +0 %: 15 mins: Winter	32.20 2	31.27 5	31.331	0.056	32.9	0.063	0.000	32.9	15.310	OK
S1.2	FSR 1 in 1: 1 years: +0 %: 15 mins: Winter	32.15 6	31.55 0	31.642	0.092	14.7	0.026	0.000	14.5	6.780	OK
HB1	FSR 1 in 1: 1 years: +0 %: 240 mins: Winter	32.00 0	30.08 5	30.328	0.243	5.6	0.275	0.000	5.5	99.107	OK
EX. SW2	FSR 1 in 1: 1 years: +0 %: 15 mins: Winter	31.86 3	30.60 0	30.727	0.127	34.3	0.144	0.000	34.1	16.376	OK

Project:	Date: 07/03/2022		
	Designed by: User	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address:		



FSR 1 in 30: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
S1.1	FSR 1 in 30: 30 years: +0 %: 15 mins: Winter	32.06 3	31.00 0	31.171	0.171	44.8	0.049	0.000	44.2	20.670	OK
EX. SW1	FSR 1 in 30: 30 years: +0 %: 15 mins: Winter	31.99 6	30.72 1	30.963	0.242	66.3	0.273	0.000	64.8	30.865	OK
EX. SW3	FSR 1 in 30: 30 years: +0 %: 360 mins: Winter	31.61 2	30.40 0	30.649	0.249	14.2	0.281	0.000	14.3	121.229	OK
Ex. Interceptor	FSR 1 in 30: 30 years: +0 %: 360 mins: Winter	31.80 0	30.30 0	30.648	0.348	19.3	0.394	0.000	19.2	162.392	OK
S1.4	FSR 1 in 30: 30 years: +0 %: 15 mins: Winter	32.19 2	31.40 0	31.532	0.132	45.3	0.037	0.000	45.2	20.914	OK
S1.3	FSR 1 in 30: 30 years: +0 %: 15 mins: Winter	32.20 2	31.27 5	31.368	0.093	80.8	0.106	0.000	80.6	37.548	OK
S1.2	FSR 1 in 30: 30 years: +0 %: 15 mins: Winter	32.15 6	31.55 0	31.708	0.158	36.0	0.045	0.000	35.6	16.631	OK
HB1	FSR 1 in 30: 30 years: +0 %: 360 mins: Winter	32.00 0	30.08 5	30.648	0.563	5.8	0.637	0.000	5.6	145.946	OK
EX. SW2	FSR 1 in 30: 30 years: +0 %: 15 mins: Winter	31.86 3	30.60 0	30.816	0.216	84.3	0.245	0.000	84.7	40.227	OK

Project:	Date: 07/03/2022		
	Designed by: User	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address:		



FSR 1 in 100 + 40% CC: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Cellular Storage	FSR 1 in 100 + 40% CC: 100 years: +40 %: 360 mins: Winter	31.796	31.796	1.621	1.621	57.4	342.929	0.000	0.000	17.5	255.084	0	OK

Project:	Date: 07/03/2022		
	Designed by: User	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address:		



FSR 1 in 1: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Cellular Storage	FSR 1 in 1: 1 years: +0 %: 240 mins: Winter	30.330	30.330	0.155	0.155	19.2	66.324	0.000	0.000	5.6	99.249	81	OK

Project:	Date: 07/03/2022		
	Designed by: User	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address:		



FSR 1 in 30: 30 years: Increase Rainfall (%): +0: Critical Storm Per Item

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Cellular Storage	FSR 1 in 30: 30 years: +0 %: 360 mins: Winter	30.648	30.648	0.473	0.473	32.5	202.413	0.000	0.000	5.8	147.674	41	OK

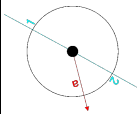
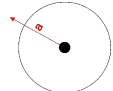
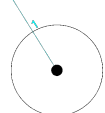
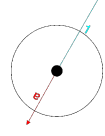
Project:	Date: 07/03/2022		
	Designed by: User	Checked by:	Approved By:
Report Details: Manhole Schedule Phase: Phase	Company Address:		



Name	Cover Level (m) Invert Level (m)	Manhole Schematic	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)			Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
				Outgoing Connections				Cover
S1.1	32.063 31.000		Diameter / Length: 0.600					Manhole - Access not Required
E:337614.191 N:349835.920	1.063			{a} S1.000	Pipe	31.000	Diam/Width:225	Not Applicable
EX. SW1	31.996 30.721		Diameter / Length: 1.200	{1} S1.000	Pipe	30.721	Diam/Width:225	Manhole - Access not Required
E:337638.528 N:349822.362	1.275			{a} S1.001	Pipe	30.721	Diam/Width:375	Not Applicable
EX. SW3	31.612 30.400		Diameter / Length: 1.200	{1} S1.002	Pipe	30.400	Diam/Width:375	Manhole - Access not Required
E:337593.550 N:349743.038	1.212			{a} S1.003	Pipe	30.400	Diam/Width:375	Not Applicable
Interceptor	31.800 30.300		Diameter / Length: 1.200	{1} S1.003	Pipe	30.300	Diam/Width:375	Manhole - Access Required
E:337582.564 N:349742.912	1.500			{a} S1.004	Pipe	30.300	Diam/Width:375	Not Applicable
S1.4	32.192 31.400		Diameter / Length: 0.600					Manhole - Access not Required
E:337558.794 N:349774.631	0.792			{a} S2.000	Pipe	31.400	Diam/Width:225	Not Applicable

Project:	Date: 07/03/2022		
	Designed by: User	Checked by:	Approved By:
Report Details: Manhole Schedule Phase: Phase	Company Address:		



Name	Cover Level (m) Invert Level (m)	Manhole Schematic	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)			Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
S1.3	32.202 31.275		Diameter / Length: 1.200	{1} S2.000	Pipe	31.275	Diam/Width:225	Manhole - Access Required
E:337561.836 N:349772.970	0.927			{2} S3.000	Pipe	31.275	Diam/Width:225	
				{a} S2.001	Pipe	31.275	Diam/Width:225	Not Applicable
S1.2	32.156 31.550		Diameter / Length: 0.600					Manhole - Access not Required
E:337591.654 N:349756.231	0.606			{a} S3.000	Pipe	31.550	Diam/Width:225	Not Applicable
HB1	32.000 30.085		Diameter / Length: 1.200	{1} S1.005	Pipe	30.085	Diam/Width:300	Manhole - Access Required
E:337578.982 N:349738.368	1.915							Not Applicable
EX. SW2	31.863 30.600		Diameter / Length: 1.200	{1} S1.001	Pipe	30.600	Diam/Width:375	Manhole - Access not Required
E:337611.312 N:349774.819	1.263			{a} S1.002	Pipe	30.600	Diam/Width:375	Not Applicable