

ADEPT

CIVIL AND STRUCTURAL CONSULTING ENGINEERS



Drainage Strategy & Flood Risk Assessment 100.23083 - Sovereign Industrial Estate, Huyton

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Client: Davos Property Developments Ltd
Project Name: Sovereign Industrial Estate, Huyton
Report Title: Drainage Strategy & Flood Risk Assessment
Document ref: 100.23083-ACE-ZZ-ZZ-RP-C-0001
Date: 12/10/23

Revision	Suitability	Date	Author	Checked	Approved	Description
P1	S2	12.10.23	RP	RP	NB	First Issue

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1.0 Introduction and brief

Adept Consulting Engineers Ltd was commissioned to provide a Drainage Strategy and Flood Risk Assessment (FRA) for Davos Property Developments Ltd relating to the partial demolition and refurbishment of industrial warehouses and the erection of a retail unit at Sovereign Industrial Estate, Huyton.

2.0 Limitations of report

Preliminary calculations and a concept drainage design have been undertaken as part of this study. The preliminary calculations and concept design are based on the information and assumptions covered in this report at the time of preparation and provide a concept design for points of connection and general design parameters only.

The report is based on the interpretation and assessment of data provided by third parties. Adept Consulting Engineers Limited cannot guarantee the reliability of the third-party information obtained. The conclusions and findings of the report may change if the third-party data is subsequently amended or updated.

3.0 Executive Summary

SECTION	SUMMARY
Location	Former Sovereign Distillery, Sovereign Industrial Estate, Wilson Road, Wilson Road, Huyton. The nearest postcode is L36 6AW.
Proposed Development	Partial demolition, reconfiguration and refurbishment of existing employment floorspace to create 2no. industrial warehouse buildings with ancillary offices (Classes E(g)(iii), B2 and B8) with dedicated servicing and car parking arrangements; erection of 1no. retail unit (Class E) with external display area and dedicated car parking and servicing arrangements; retention and amendment of existing site accesses along with internal estate roads; 2no. substations; landscaping; and associated works
Land use	Hardstanding/warehouses Impermeable area = 4.631 ha / Gross site Area = 6.53 ha
Topography	This site is largely made up of 1 building (Units A, B & D), it is a relatively flat site. There is a small brick retaining wall standing about 400mm in height along the Wilson Road boundary.
Sequential and Exception Tests	Development is thought to be within the most sequentially preferable location when considering the area within the site boundary. Exception Test will not be required.
Fluvial (River) flooding	Very low risk – There is a brook 240m East of the site and the River Mersey is 5km South and West of site. This doesn't appear to provide any potential risk of fluvial flooding, hence the very low risk rating.
Pluvial (Surface water) flooding	Low/Medium Risk – The site is mostly shown as very low risk with scattered patches of medium to high risk. Given the proportion of these patches a low/medium risk rating feels appropriate. It is believed a lot of the current risks are due to the lack of maintenance on the current surface water system which will be rectified following the refurbishment.
Flooding from artificial sources	Low risk – The site is not at risk of flooding from artificial sources

Groundwater Flood Risk	Groundwater is relatively shallow, recorded at 0.6m below site levels. This will affect construction phase only.
Development Impacts on Flood Risk	Whilst the construction of hard standings and buildings without mitigation will theoretically increase flood risk to downstream properties, this risk can be, and will be, safely managed as demonstrated within this report.
Flood Risk Mitigation/management	In accordance with recommendations from the LLFA finished floor levels set generally 150mm above external levels
Surface Water Management	Soakaway testing is yet to be done. However, based on the adjacent site, soakaway/infiltration is not viable due the made ground under the site The proposed surface water strategy leaves as much as possible of the existing in place and any new drainage connects to the existing private networks within the site. There are 3 attenuation tanks to accommodate the proposed storm water system. These are sized to a 1 in 100 year storm plus 40% climate change. There are 3 flow controls discharging the proposed drainage into the existing private network
Foul Water Management	Foul water from the new and reburbished units drains to the existing private drains on site. Existing unused drainage will be abandoned
Residual Risks	None
Recommendations for Further work	None required
Maintenance	Private drainage will be the responsibility of Davos Property Developments Ltd.

4.0 Description of the existing site

The site is located off Wilson Road (adjacent to the A5080) in Huyton. The nearest postcode is L36 6AW and the grid reference is SJ 45686 89518. The site is a brownfield site, with housing to the west, a service station to the south and industrial park to the east.

A site location plan is appended.

Site description	
Total Site Area	Approx. 6.53 Hectares
Existing Impermeable Area	4.631 Hectares
Land use	Former industrial site
Topography	The southern portion of the site is relatively flat around 23-25m AOD
Known Site Constraints	Former brownfield

A topographical survey is appended.

Sequential test

The Sequential Test aims to steer developments and redevelopments to areas of lower flood risk. The test compares the proposed development site with other available sites, in terms of flood risk, to aid the steering process.

The developed parts of the site all lies with in flood zone 1 and is in the most sequentially preferable location.

Exception test

Where the Sequential Test is undertaken and alternative sites of lower flood risk are not available, then the proposed development may require an Exception Test in order to be granted planning permission. Where the exception test is required, it should be applied as soon as possible to all local development document allocations for developments and all planning applications other than for minor developments.

All three elements of the exception test have to be passed before development is allocated or permitted. For the exception test to be passed:

1. It must demonstrate that the development provides wider sustainability benefits to the community that outweigh the flood risk, informed by an SFRA, where one has been prepared;
2. The development should be on developed land or on previously developed land;
3. A flood risk assessment must demonstrate that the development will be safe without increasing flood risk elsewhere, and where possible will reduce the overall flood risk.

As the development passes the sequential test the exception test is not required.

5.0 Hydrology, hydrogeology and geology

Watercourses and waterbodies

Chapel Brook is located due Northeast of the site. Stadt Moers Park is also located due Northeast of the site contains a substantial pond/lake.

Sewerage

Public sewerage is located on the site and is indicated on the appended United Utilities asset plans. Further detailed assessment of this sewer is programmed.

Geology

An extract of the geological investigation is appended. Due to the made ground underneath the site, soakaways are not considered a viable solution.

6.0 Proposed Development

Development Outline

The proposed development involves partial demolition, reconfiguration and refurbishment of existing employment floorspace to create 2no. industrial warehouse buildings with ancillary offices (Classes E(g)(iii), B2 and B8) with dedicated servicing and car parking arrangements; erection of 1no. retail unit (Class E) with external display area and dedicated car parking and servicing arrangements; retention and amendment of existing site accesses along with internal estate roads; 2no. substations; landscaping; and associated works

Architectural plans are appended.

Proposed Surface Water Drainage Strategy

In accordance with the building regulations hierarchical approach discharge via infiltration has been considered but is unsuitable due to the made ground under the site.

A discharge to a watercourse has not been considered due to the distance to the watercourse.

Due to the above, and in accordance with building regulations hierarchical approach, it is proposed to drain surface water run-off from the site to the existing drainage on site. The discharge rate for redeveloped parts of the site has been based on brownfield calculations following Knowsley Councils Proforma One and Knowsley Council's Strategic Flood Risk Assessment.

It is proposed that the existing buildings on site along with the service yard to Warehouse A which remain in place will continue to drain to existing outfalls and will not drain through the new system. There are some diversions to existing drainage required between Warehouse B and Warehouse C.

All new surface water run off will be collected by a traditional piped sewerage system and attenuated within storage tanks. Attenuated surface water will discharge from the tanks to receiving surface water drainage on site.

The design has put together following the guidance in the Ciria Suds Guide and Knowsley Councils Strategic Flood Risk Assessment. A 40% allowance has been made in calculations.

Below is a summary of the internal catchments within the site and should be read in accordance with our impermeable area plans appended to this report.

TIA (Ex) = Total Existing Impermeable Area

TIA (New) = Total New Impermeable Area

Q (Ex) = Existing discharge from site

Q (New) = Proposed discharge from site – 50% reduction on redeveloped parts of the site.

Vol = Maximum attenuation volume required to accommodate the peak 1 in 100 year + 40% CC storm

Catchment	TIA (Ex) m ²	Q (Ex) l/s	TIA (New) m ²	Q (New) l/s	Vol m ³
Area 1	5,480	76.2	5,290	38.086	183
Area 2	10,100	140.4	11,050	70.195	418
Area 3	13,370	185.8	13,370	185.80	0
Area 4	8,300	115.37	10,680	57.68	429.3
Area 5	5,900	82	5,900	82	0
Area 6	3,180	44.2	3,160	44.2	0

Existing redundant drainage will be abandoned, and grout filled.

A drainage strategy drawing is appended, based upon these figures.

Foul Drainage

Foul water discharges will be made to the existing foul drainage on site.

Outline drainage is indicated on the appended drainage strategy plan.

Existing redundant drainage will be abandoned and grubbed up where required or be grout filled.

SuDS Assessment and Water Quality

The surface water discharge train has been assessed in line with the SuDS manual. The provisions are detailed below:

Silt trapping chambers and appropriately specified petrol interceptors will provide water quality treatment.

SuDS Operation and Maintenance

A SuDS operation and maintenance schedule specific to the site is appended to this report.

7.0 Flood risk sources and extents

Summary

A summary of the sources and level of flood risk (negligible, low, medium or high) is given in Table 6.1 below.

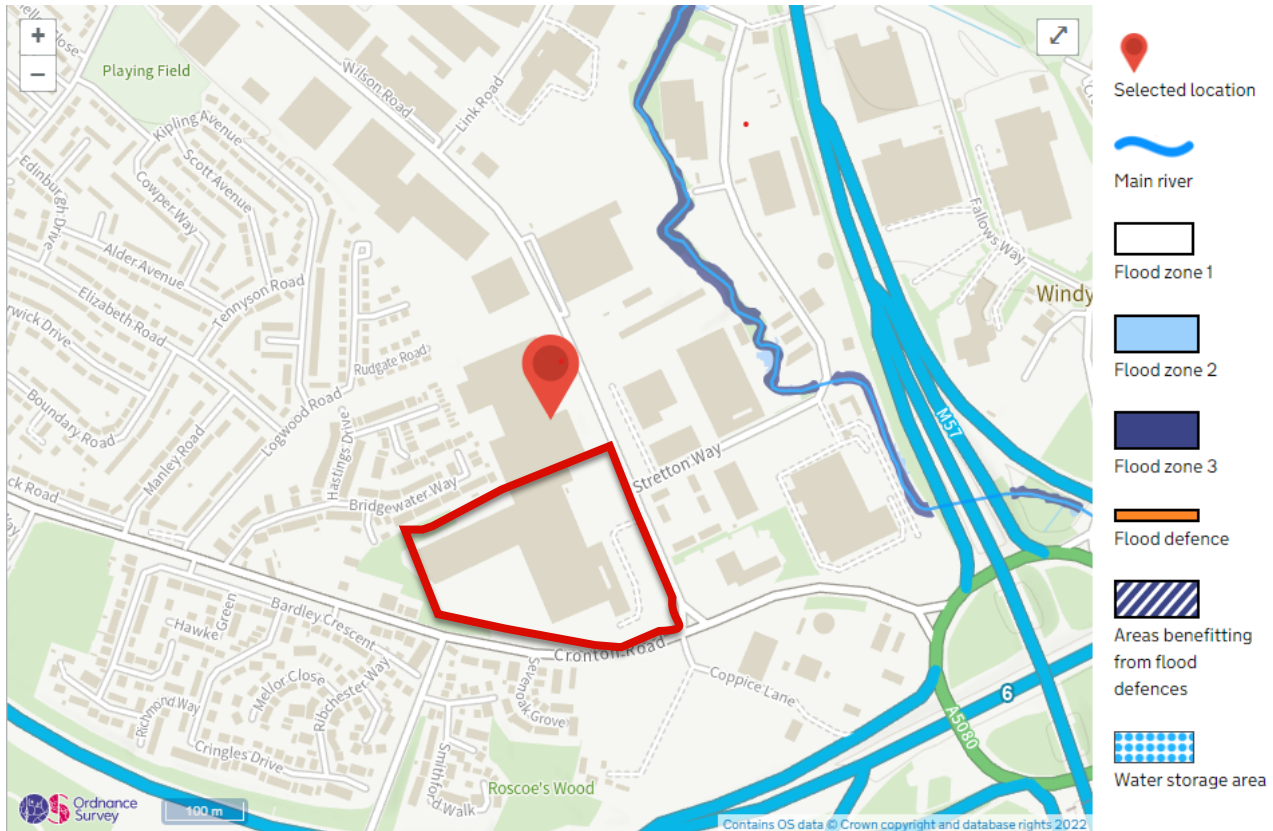
Table 6.1 Summary of the sources and level of Flood Risk	
Source	Risk Level
Fluvial	Very Low
Tidal - Coastal	Very Low
Surface Water / Pluvial	Low
Groundwater	Low
Surcharged Sewers	Low
Other Man Made Sources	Very ow

The sources and level of flood risk are demonstrated below.

Fluvial

Shown to be in Flood Zone 1 no further discussion required.

An extract from the gov.uk website is shown below,



Tidal

The site is not at risk of tidal flooding.

Surface Water / Pluvial

Surface water flood risk mapping from the gov.uk website shows that the site is in general at low risk of flooding. There is evidence of flooding to the eastern portion of the site, this is shown to be below 300mm depth and of low velocity risk. The new retail store will be set at a level above existing levels to ensure the building is not at risk of flooding.

An extract from the gov.uk website is shown below.

Learn more about this area's flood risk

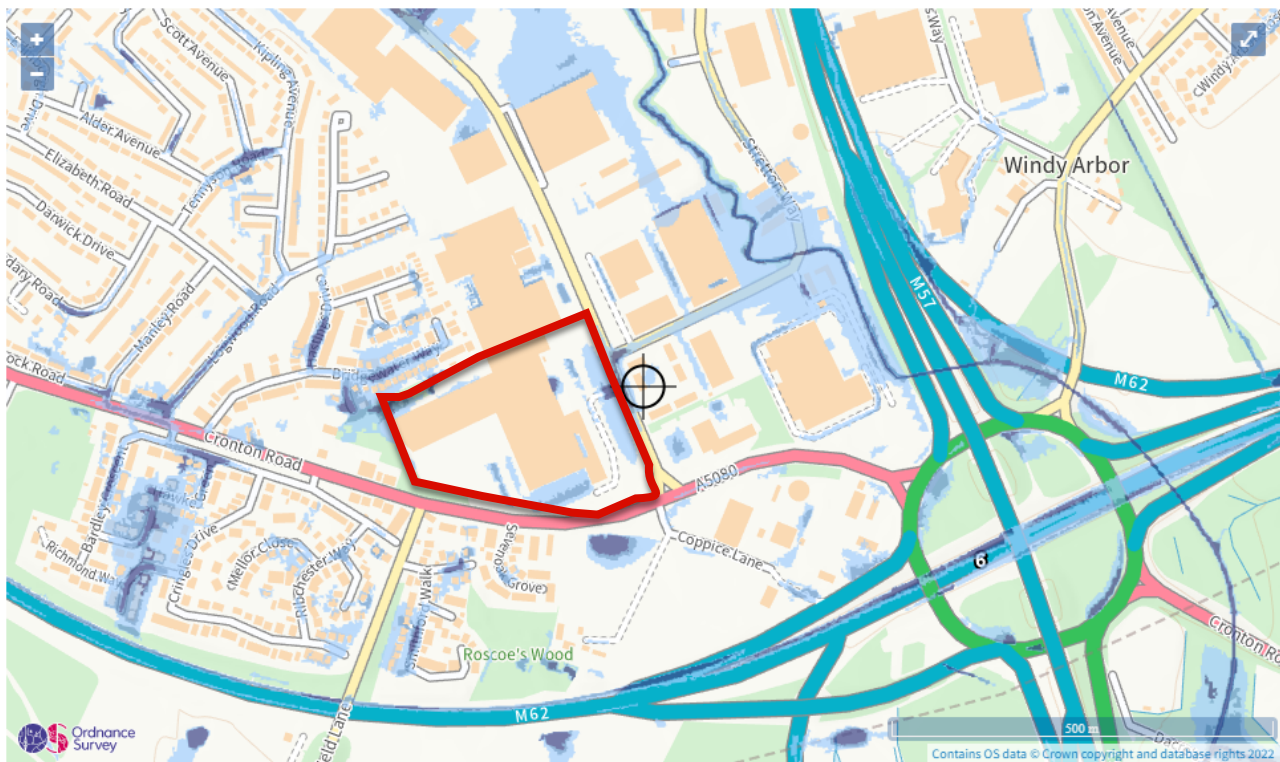
Select the type of flood risk information you're interested in. The map will then update.

Flood risk

Extent of flooding

Location

Enter a place or postcode



Extent of flooding from surface water

● High ● Medium ● Low ○ Very low ⊕ Location you selected

Groundwater Flooding

The land falling toward the northwest of the site suggests ground water would emanate downslope from the site.

Surcharged Sewers

Existing sewerage is located on site and remains the responsibility of the statutory undertaker. Normal threshold elevations to surrounding ground, 150mm would offer suitable protection.

Other Man Made Sources

The site is not at risk of reservoir or canal flooding.

Climate Change

Adept Consulting Engineers have applied a climate change factor of 40% to proposed calculations.

Design Consideration and Flood Mitigation

Ground levels are to be set to ensure surface water flooding does not impact proposed buildings.

8.0 Communications

Discussions with Environment Agency: No consultation required.

Discussions with the Lead Local Flood Authority: The principals of the Phase 1 development have been followed along with Knowsley Council guidance.

Discussions with Sewerage Undertaker: A pre-development enquiry has not been sent to United Utilities as we are connecting to existing drainage within the development site and not directly to the sewer.

9.0 Conclusions

Proposed Drainage Strategy

The flows from redeveloped parts of the site will be restricted to brownfield run-off rates with surface water storage provided for the 100 year event + 40%.

Foul flows will connect to the existing drains on site and into the public combined water sewer system.

The site will drain by gravity.

A SuDS maintenance schedule is appended.

Flood Risk

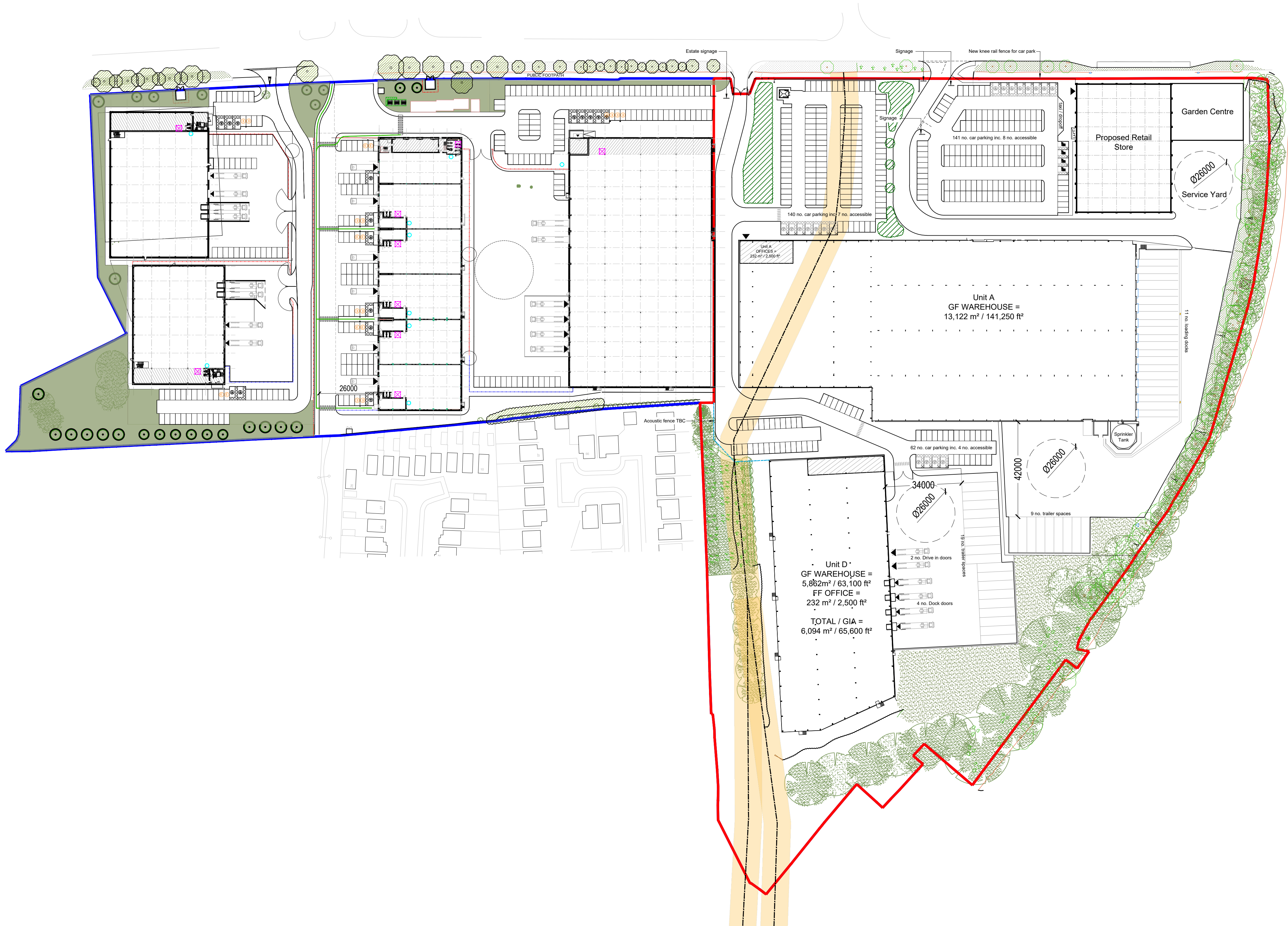
The site has a “low” flood risk classification from all sources.

Appendix A

- Location Plan (Aerial Photograph)



- Architectural Plans



Schedule of Accommodation				
Unit	Ground Floor GIA	First Floor / Office GIA	TOTAL UNIT GIA	Car Parking (Accessible)
Unit A & B	13,122 m² / 141,250 ft²	232 m² / 2,500 ft²	13,354 m² / 143,750 ft²	191 (8)
Unit D	5,862 m² / 63,100 ft²	232 m² / 2,500 ft²	6,094 m² / 65,600 ft²	62 (4)
TOTAL SITE GIA			19,448 m² / 209,350 ft²	253(12)
Proposed Retail Store			2,272 m² / 24,455 ft²	105 (6)

- NOTES
- AEWTP026C
- All dimensions and levels are to be checked on site.
 - Any discrepancies are to be reported to the architect before any work commences
 - This drawing shall not be scaled to ascertain any dimensions. Work to figured dimensions only.
 - This drawing shall not be reproduced without express written permission from AEW.
 - Title overlay drawings and ownership boundaries are produced using all reasonable endeavors. AEW cannot be responsible for the accuracy or scale discrepancy of base plans supplied to them.
 - All works are to be undertaken in accordance with Building Regulations and the latest British Standards.
 - All proprietary materials and products are to be used strictly in accordance with the manufacturers recommendations.

CDM 2015

Client notified of duties: **27/11/20**

Principal Designer: **Client**

Unless noted below, all known hazards have been highlighted on the drawing:

0 10 20 30 40 50m

Scale 1:1000 @ A3

Key:

Red line site boundary (TBC): 16.32acres / 6.60ha

Existing sewer and easment

P03	22/08/23	SG	DRS
Layout updated. Acoustic fence and existing sewer added.			
P02	22/08/23	SG	DRS
Retail Store service yard kerb revised			
P01	17/08/23	SG	DRS
Initial Issue			
REV	Date	Drawn by: -	Checked by: -
Status	Purpose of Issue		
S3	For Review & Comment		
drawing stage	Feasibility		
client			

Davos Industrial Ltd.

project

Sovereign Distillery
Huyton

drawing title

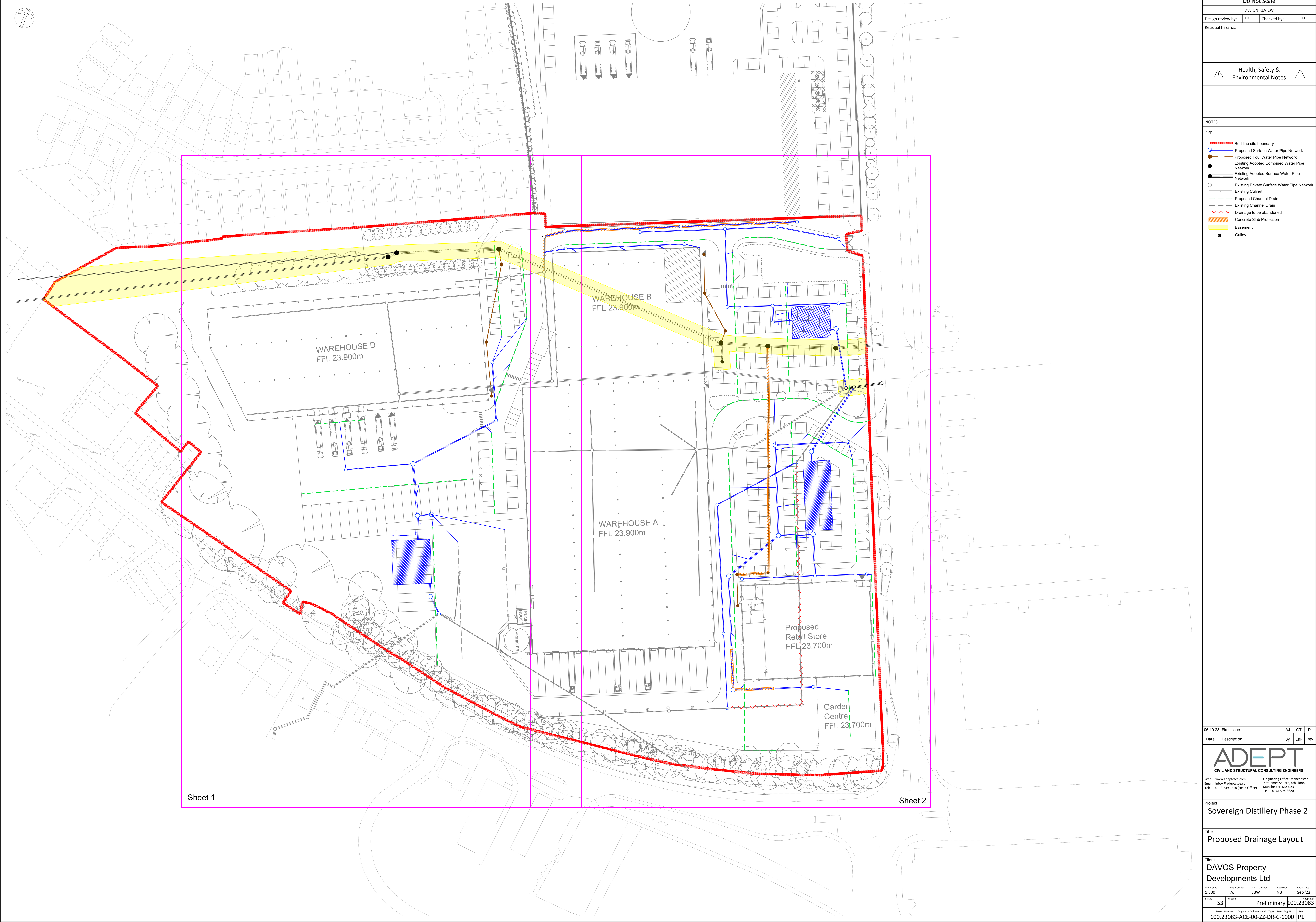
Proposed Site Plan Option 2A

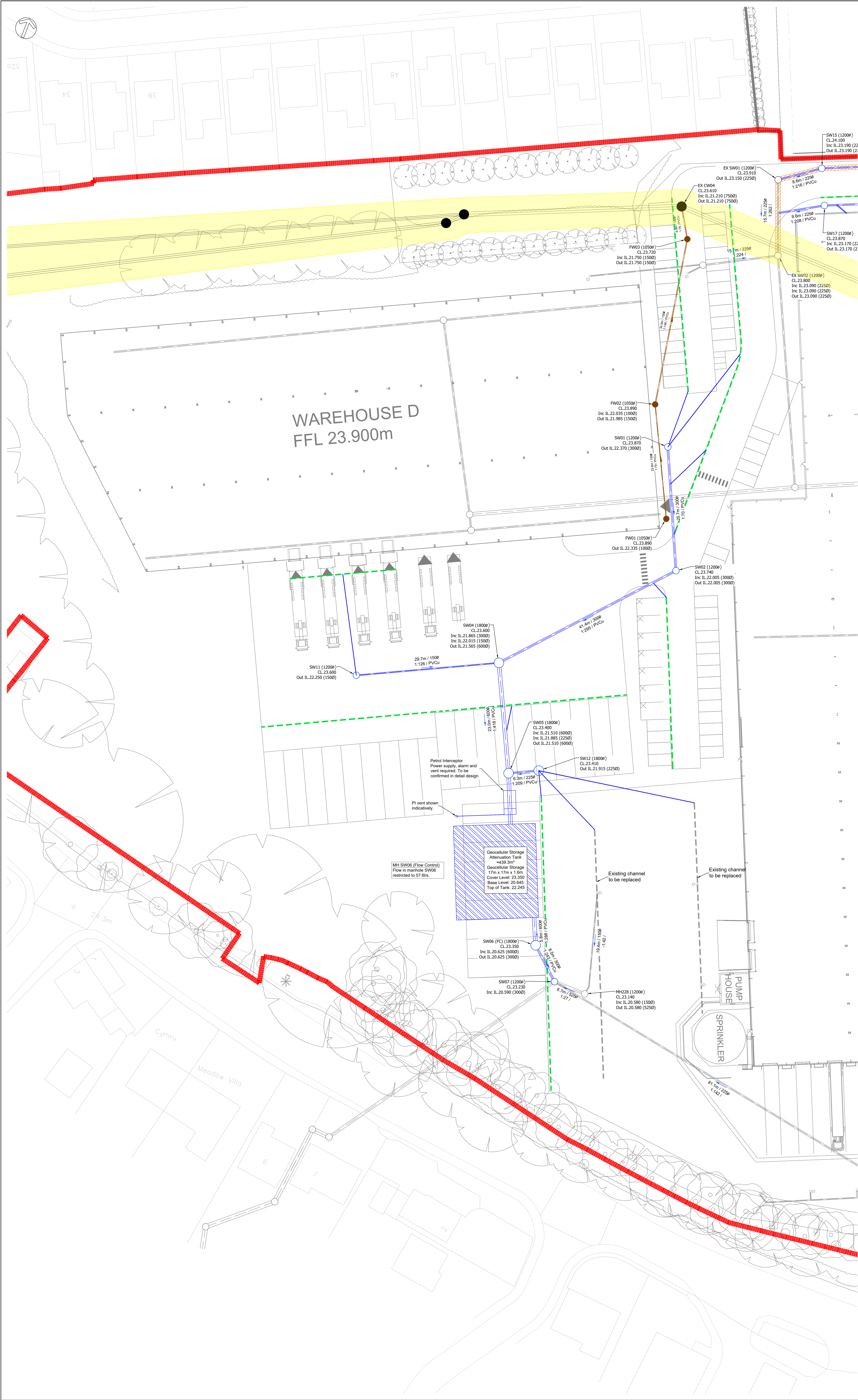
date 17/08/23 drawn SG

scale@A1 1:1000 checked DRS

Appendix B

- Drainage Strategy
- Drainage Summary and Calculations
- Existing Sewer Records
- Topographical Survey
- Existing Drainage with Impermeable Areas
- SuDs Maintenance Schedule





Do Not Scale

DESIGN REVIEW

Design review by: ** Checked by: **

Residual hazards:

Health, Safety & Environmental Notes

NOTES

Key

Red line site boundary

Proposed Surface Water Pipe Network

Proposed Foul Water Pipe Network

Existing Adopted Combined Water Pipe Network

Existing Adopted Surface Water Pipe Network

Existing Private Surface Water Pipe Network

Existing Culvert

Proposed Channel Drain

Existing Channel Drain

Drainage to be abandoned

Concrete Slab Protection

Easement

Gully

09.10.23 First Issue

AJ GT P1

Date Description

By Chk Rev

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Originating Office: Manchester 7 St James Square, 4th Floor, Manchester, M2 6DN Tel: 0161 574 1620

Project

Sovereign Distillery Phase 2

Title

Proposed Drainage Layout Sheet 1 of 2

Client

DAVOS Property Developments Ltd

Status

S3

Purpose

Preliminary

Author

100.23083

Revision

1:250

Author

AJ

GT

Approved

NB

Issue Date

Sep '23

Project Number

100.23083-ACE-00-ZZ-DR-C-1001

Originator

DAVOS

Volume

1

Level

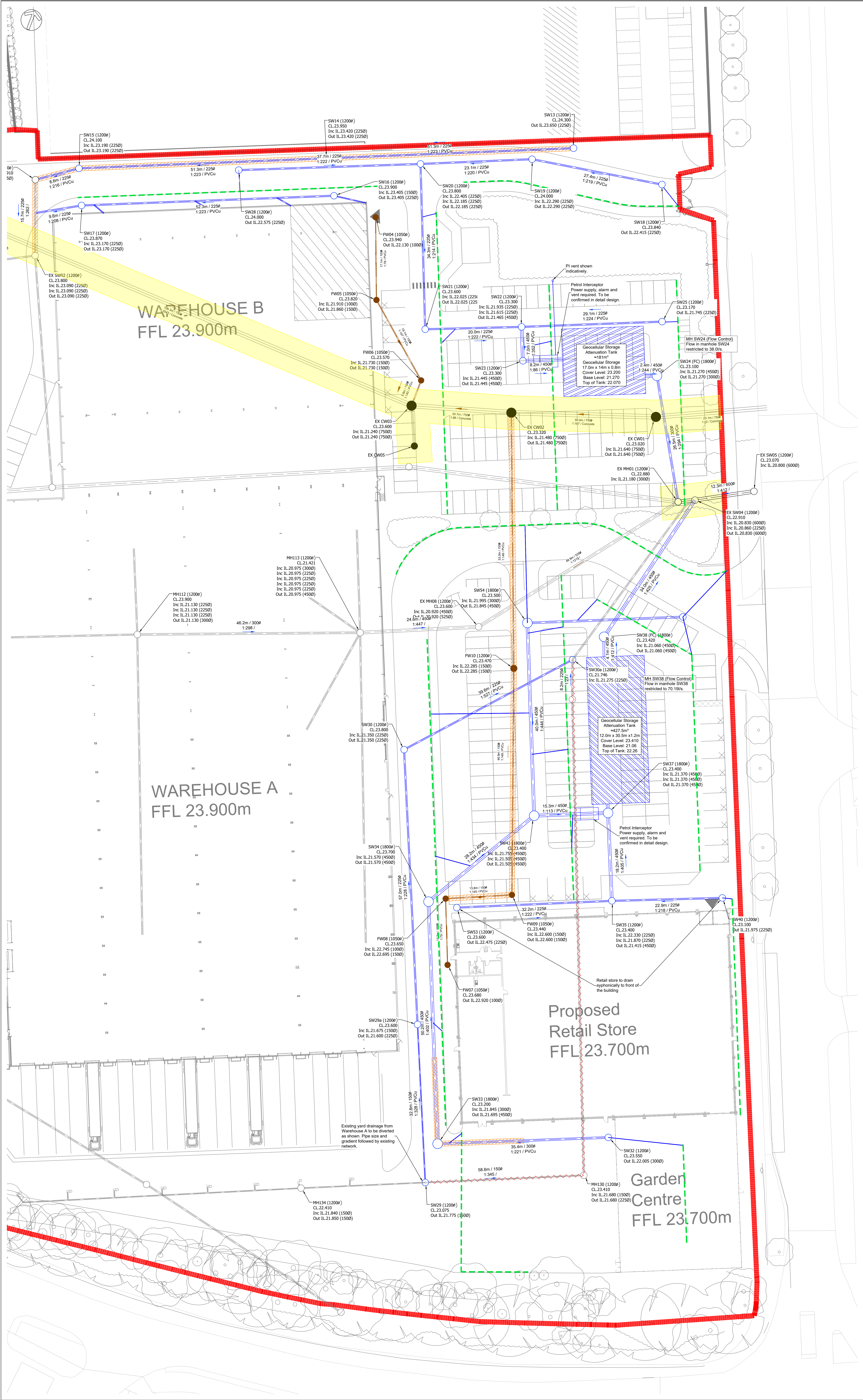
1

Type

DR

City No.

P1



Do Not Scale

DESIGN REVIEW

Design review by: ** Checked by: **

Residual hazards:

Health, Safety & Environmental Notes

NOTES

Key

Red line site boundary

Proposed Surface Water Pipe Network

Proposed Foul Water Pipe Network

Existing Adopted Combined Water Pipe Network

Existing Adopted Surface Water Pipe Network

Existing Private Surface Water Pipe Network

Existing Culvert

Proposed Channel Drain

Existing Channel Drain

Drainage to be abandoned

Concrete Slab Protection

Easement

Gully

06.10.23 First Issue

AJ GT P1

Date Description

By Chk Rev

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Project

Sovereign Distillery Phase 2

Title

Proposed Drainage Layout Sheet 2 of 2

Client

DAVOS Property Developments Ltd

Scale of Plot

1:250

Initial author

AJ

Initial checker

GT

Approved

NB

Initial Date

Sep '23

Status

S3

Purpose

Preliminary

Project Number

100.23083

Originator

100.23083-ACE-00-ZZ-DR-C-1002

Rev

P1



Do Not Scale

DESIGN REVIEW

Design review by: **Checked by: **

Residual hazards:

Health, Safety & Environmental Notes

NOTES

Key

Area 1

Proposed Impermeable ≈ 0.529ha

Area 2

Proposed Impermeable ≈ 1.105ha

Area 3

Proposed Impermeable ≈ 1.337ha

Area 4

Proposed Impermeable ≈ 1.068ha

Area 5

Proposed Impermeable ≈ 0.590ha

Area 6

Proposed Impermeable ≈ 0.316ha

Total Proposed Impermeable Area ≈ 4.945ha

05.10.23First Issue

AJJBWP1

DateDescription

ByChkRev

ADEPT

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Project

Sovereign Distillery Phase 2,
Huyton

Title

Proposed Impermeable
Area Layout

Client

DAVOS Property
Developments Ltd

Scale @ A1

1:500

Initial author

AJ

Initial checker

JBW

Approver

NB

Initial Date

Sep '23

Status

S3

Purpose

Preliminary

Adept Ref

100.23083

Project Number

Originator

Volume

Level

Type

Role

Orig. No.

Rev.

100.23083-ACE-00-ZZ-DR-C-1011

P1

By	AJ	Date	04/10/23
Checked	GT	Date	

Brownfield Run-off Calculation Statement

Area 1

Existing input to the existing adopted sewerage system has been calculated to be 0.548 ha of existing building and highway.

Utilising the Rational Method

50mm x 0.548 ha x 2.78 = 76.172 L/s⁻¹

With a 50% reduction this equates to 38.086 L/s⁻¹

Applying a total discharge of 38.086 L/s⁻² to a new impermeable area of 0.529 ha requires a storage volume of 183 m³ to be provided in M100 year + 40% CC factor.

By	AJ	Date	04/10/23
Checked	GT	Date	

Brownfield Run-off Calculation Statement

Area 2 (Retail Store)

Existing input to the existing adopted sewerage system has been calculated to be 1.010 ha of existing building and highway.

Utilising the Rational Method

50mm x 1.010 ha x 2.78 = 140.390 L/s⁻¹

With a 50% reduction this equates to 70.195 L/s⁻¹

Applying a total discharge of 70.195 L/s⁻² to a new impermeable area of 1.105 ha requires a storage volume of 418 m³ to be provided in M100 year + 40% CC factor.

By	AJ	Date	06/10/23
Checked	GT	Date	

Brownfield Run-off Calculation Statement

Area 4 (Unit D)

Existing input to the existing adopted sewerage system has been calculated to be 0.830 ha of existing building and highway.

Utilising the Rational Method

50mm x 0.830 ha x 2.78 = 115.37 L/s⁻¹

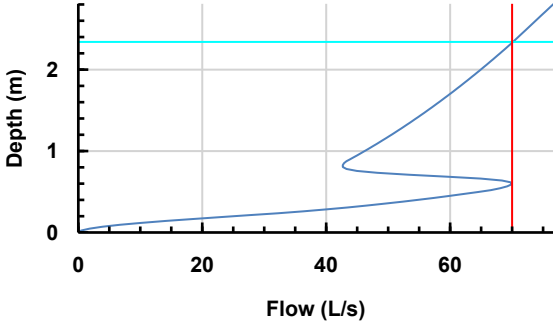
With a 50% reduction this equates to 57.68 L/s⁻¹

Applying a total discharge of 57.68 L/s⁻² to a new impermeable area of 1.068 ha requires a storage volume of 429.3 m³ to be provided in M100 year + 40% CC factor.

Project: 100.23083 - Sovereign Phase 2	Date: 06/10/2023		
	Designed by: GT	Checked by: RP	Approved By: RP
Report Details: Type: Junctions Storm Phase: Retail Store SW Network	Company Address: Adept CSCE		



Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
SW33	Outlet	1.001	Free Discharge
SW34	Outlet	1.002	Free Discharge
SW53	Outlet	4.000	Free Discharge
SW32	Outlet	1.000	Free Discharge
SW43	Outlet	1.003	Free Discharge
SW38 (FC)	Outlet	1.006	Hydro-Brake®
	Invert Level (m)	21.060	
	Design Depth (m)	2.340	
	Design Flow (L/s)	70.19	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0299-7019-2340-7019	
			
SW54	Outlet	2.002	Free Discharge
SW37	Outlet	1.004	Free Discharge
SW40	Outlet	5.000	Free Discharge
SW52	Outlet	Pipe	Free Discharge
SW35	Outlet	4.001	Free Discharge

Project: 100.23083 - Sovereign Phase 2	Date: 06/10/2023			
	Designed by: GT	Checked by: RP	Approved By: RP	
Report Details: Type: Stormwater Controls Storm Phase: Retail Store SW Network	Company Address: Adept CSCE			



Tank

Type : Tank

Dimensions

Exceedance Level (m)	23.400
Depth (m)	2.330
Base Level (m)	21.070
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	95
Average Slope (1:X)	0.00
Total Volume (m³)	418.717

Depth (m)	Area (m²)	Volume (m³)
0.000	366.000	0.000
1.200	366.000	417.240
1.201	366.001	417.588

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	1.004
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	1.005
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	30.500

Project: 100.23083 - Sovereign Phase 2		Date: 06/10/2023		
Report Details: Type: Connections Storm Phase: Retail Store SW Network		Designed by: GT	Checked by: RP	
		Approved By: RP		
		Company Address: Adept CSCE		

Name	Length (m)	Connection Type	Slope (1:X)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Upstream Cover Level (m)	Upstream Invert Level (m)
1.000	35.388	Pipe	214.474		0.6	300	23.550	22.010
1.001	54.273	Pipe	434.187		0.6	450	23.750	21.695
5.000	22.891	Pipe	218.007		0.6	225	23.100	21.975
4.001	18.236	Pipe	405.253		0.6	450	23.400	21.415
1.002	25.980	Pipe	399.685		0.6	450	23.700	21.570
1.006	31.895	Pipe	398.690		0.6	450	23.420	21.060
2.002	39.973	Pipe	444.141		0.6	450	23.400	21.845
1.003	15.313	Pipe	113.430		0.6	450	23.400	21.505
4.000	32.177	Pipe	221.909		0.6	225	23.600	22.475
1.004	2.045	Pipe	409.030		0.6	450	23.400	21.370
1.005	4.124	Pipe	412.366		0.6	450	23.400	21.070
Pipe	32.242	Pipe	293.109		0.6	300	23.300	22.105

Name	Downstream Cover Level (m)	Downstream Invert Level (m)	Part Family	Lock	Flow Restriction (L/s)
1.000	23.750	21.845		All	
1.001	23.700	21.570		All	
5.000	23.400	21.870		All	
4.001	23.400	21.370		All	
1.002	23.400	21.505		All	
1.006	21.681	20.980		All	70.4
2.002	23.400	21.755		All	
1.003	23.400	21.370		All	
4.000	23.400	22.330		All	
1.004	23.400	21.365		All	
1.005	23.420	21.060		All	
Pipe	23.400	21.995		All	

Project: 100.23083 - Sovereign Phase 2		Date: 06/10/2023			
		Designed by: GT	Checked by: RP		Approved By: RP
Report Details: Type: Inflow Summary Storm Phase: Retail Store SW Network		Company Address: Adept CSCE			

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (m²)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (m²)
1	SW52		Time of Concentration	296.00	100	0	100	296.00
2	SW52		Time of Concentration	653.40	100	0	100	653.40
3	SW54		Time of Concentration	3367.80	100	0	100	3367.80
4	SW52		Time of Concentration	1238.70	100	0	100	1238.70
5	SW33		Time of Concentration	784.60	100	0	100	784.60
6	SW40		Time of Concentration	1139.50	100	0	100	1139.50
7	SW53		Time of Concentration	1244.00	100	0	100	1244.00
8	SW32		Time of Concentration	2326.50	100	0	100	2326.50
TOTAL		0.0		11050.50				11050.50

Project: 100.23083 - Sovereign Phase 2	Date: 06/10/2023			
	Designed by: GT	Checked by: RP	Approved By: RP	
Report Title: Rainfall Analysis Criteria	Company Address: Adept CSCE			

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Shortest
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall		
FSR	Type: FSR	
Region	England And Wales	
M5-60 (mm)	20.0	
Ratio R	0.400	
Summer	☒	
Winter	☒	

Return Period	
Return Period (years)	Increase Rainfall (%)
100.0	40.000

Storm Durations	
Duration (hrs)	Run Time (hrs)
0.25	0.50
0.50	1.00
1.00	2.00
2.00	4.00
4.00	8.00
6.00	12.00
8.00	16.00
16.00	32.00
24.00	48.00

Project: 100.23083 - Sovereign Phase 2		Date: 06/10/2023			
		Designed by: GT	Checked by: RP		Approved By: RP
Report Details: Type: Junctions Summary Storm Phase: Retail Store SW Network		Company Address: Adept CSCE			



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Depth

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
SW33	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.750	21.695	23.004	1.309	183.2	3.330	0.000	173.8	90.003	Surcharged
SW34	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.700	21.570	22.804	1.234	173.8	3.142	0.000	164.0	87.312	Surcharged
SW53	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.600	22.475	23.286	0.811	78.0	0.917	0.000	73.8	36.092	Surcharged
SW32	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.550	22.010	23.550	1.540	145.9	1.817	0.075	134.0	66.552	Flood
SW43	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.400	21.505	22.702	1.197	458.4	3.046	0.000	450.4	245.210	Surcharged
SW38 (FC)	FSR: 100 years: +40 %: 2.00 hrs: Winter	23.420	21.060	22.161	1.101	70.6	2.803	0.000	69.8	544.935	Surcharged
SW54	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.400	21.845	23.106	1.261	297.8	1.426	0.000	294.4	159.138	Flood Risk
SW37	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.400	21.370	22.210	0.840	586.4	1.202	0.000	584.1	309.155	Surcharged
SW40	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.100	21.975	22.709	0.734	71.5	0.830	0.000	66.9	32.902	Surcharged
EX MH 01	FSR: 100 years: +40 %: 2.00 hrs: Summer	21.681	20.980	21.186	0.206	69.9	0.000	0.000	69.9	493.993	OK
SW52	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.300	22.105	23.301	1.196	137.2	2.797	1.446	86.7	63.137	Flood
SW35	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.400	21.415	22.265	0.850	140.7	2.163	0.000	135.9	67.127	Surcharged

Project: 100.23083 - Sovereign Phase 2	Date: 06/10/2023		
	Designed by: GT	Checked by: RP	Approved By: RP
Report Details: Type: Stormwater Controls Summary Storm Phase: Retail Store SW Network	Company Address: Adept CSCE		





FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Avg. Depth

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
Tank	FSR: 100 years: +40 %: 2.00 hrs: Winter	22.164	22.164	1.094	1.094	208.1	380.406	0.000	0.000	70.6	545.814	9.150	OK

Project: 100.23083 - Sovereign Phase 2	Date: 06/10/2023		
	Designed by: GT	Checked by: RP	Approved By: RP
Report Details: Type: Connections Summary Storm Phase: Retail Store SW Network	Company Address: Adept CSCE		



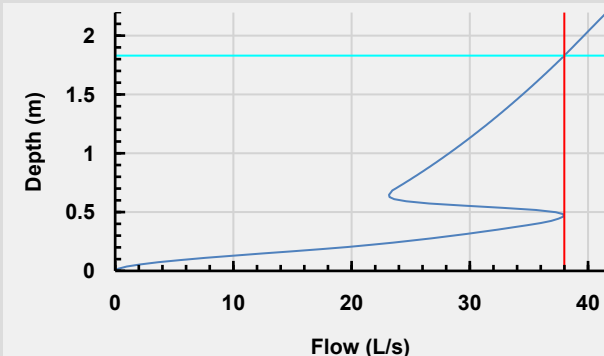


FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW32	SW33	23.550	23.550	0.300	66.552	1.9	1.77	134.0	Flood
1.001	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW33	SW34	23.750	23.004	0.450	89.932	1.1	1.13	173.8	Surcharged
5.000	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW40	SW35	23.100	22.709	0.225	32.902	1.7	1.91	66.9	Surcharged
4.001	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW35	SW37	23.400	22.265	0.450	67.127	0.9	0.85	135.9	Surcharged
1.002	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW34	SW43	23.700	22.804	0.450	87.224	1.0	1.02	164.0	Surcharged
1.006	FSR: 100 years: +40 %: 2.00 hrs: Summer	Pipe	SW38 (FC)	EX MH 01	23.420	22.045	0.214	493.993	0.9	0.43	69.9	Surcharged
2.002	FSR: 100 years: +40 %: 0.25 hrs: Summer	Pipe	SW54	SW43	23.400	23.041	0.450	142.027	1.9	1.93	294.5	Surcharged
1.003	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW43	SW37	23.400	22.702	0.450	245.194	2.8	1.48	450.4	Surcharged
4.000	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW53	SW35	23.600	23.286	0.225	36.092	1.9	2.12	73.8	Surcharged
1.004	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW37	Tank	23.400	22.210	0.450	309.155	3.7	3.68	584.1	Surcharged
1.005	FSR: 100 years: +40 %: 2.00 hrs: Summer	Pipe	Tank	SW38 (FC)	23.400	22.048	0.450	495.036	0.4	0.45	70.7	Surcharged
Pipe	FSR: 100 years: +40 %: 0.25 hrs: Summer	Pipe	SW52	SW54	23.300	23.301	0.300	56.405	1.4	1.52	98.3	Flood

Project: 100.23083 - Sovereign Phase 2	Date: 05/10/2023		
	Designed by: GT	Checked by: RP	Approved By: RP
Report Details: Type: Junctions Storm Phase: Unit A SW Network	Company Address: Adept CSCE		



Outlets			
Junction	Outlet Name	Outgoing Connection	Outlet Type
SW19	Outlet	1.001	Free Discharge
SW28	Outlet	2.000	Free Discharge
SW18	Outlet	1.000	Free Discharge
SW20	Outlet	1.002	Free Discharge
SW21	Outlet	1.003	Free Discharge
SW25	Outlet	3.000	Free Discharge
SW24 (FC)	Outlet	1.007	Hydro-Brake®
	Invert Level (m)	21.270	
	Design Depth (m)	1.830	
	Design Flow (L/s)	38.0	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0234-3800-1830-3800	
			
	SW22	Outlet	1.004
SW23	Outlet	Pipe	Free Discharge

Project: 100.23083 - Sovereign Phase 2	Date: 05/10/2023			
	Designed by: GT	Checked by: RP	Approved By: RP	
Report Details: Type: Stormwater Controls Storm Phase: Unit A SW Network	Company Address: Adept CSCE			



Tank

Type : Tank

Dimensions

Exceedance Level (m)	23.100
Depth (m)	1.820
Base Level (m)	21.280
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	95
Average Slope (1:X)	0.00
Total Volume (m³)	182.125

Depth (m)	Area (m²)	Volume (m³)
0.000	238.000	0.000
0.800	238.000	180.880
0.801	238.001	181.106

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Pipe
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (1)
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	14.000

Project: 100.23083 - Sovereign Phase 2		Date: 05/10/2023		
Report Details: Type: Connections Storm Phase: Unit A SW Network		Designed by: GT	Checked by: RP	
		Approved By: RP		
		Company Address: Adept CSCE		

Name	Length (m)	Connection Type	Slope (1:X)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Upstream Cover Level (m)	Upstream Invert Level (m)
2.000	37.675	Pipe	221.615		0.6	225	24.000	22.575
1.002	34.270	Pipe	298.002		0.6	300	23.800	21.800
1.000	27.404	Pipe	219.236		0.6	225	23.840	22.415
1.003	19.986	Pipe	285.509		0.6	225	23.600	21.685
1.007	26.485	Pipe	294.274		0.6	300	23.100	21.270
1.001	23.141	Pipe	55.761		0.6	300	24.000	22.215
1.004	7.033	Pipe	351.659		0.6	450	23.300	21.465
3.000	29.116	Pipe	223.966		0.6	225	23.170	21.745
Pipe	7.294	Pipe	76.779		0.6	450	23.300	21.445
Pipe (1)	3.453	Pipe	345.263		0.6	450	23.100	21.280

Name	Downstream Cover Level (m)	Downstream Invert Level (m)	Part Family	Lock	Flow Restriction (L/s)
2.000	23.800	22.405		All	
1.002	23.600	21.685		All	
1.000	24.000	22.290		All	
1.003	23.300	21.615		All	
1.007	22.880	21.180		All	38.0
1.001	23.800	21.800		All	
1.004	23.300	21.445		All	
3.000	23.300	21.615		All	
Pipe	23.100	21.350		All	
Pipe (1)	23.100	21.270		All	

Project: 100.23083 - Sovereign Phase 2		Date: 05/10/2023			
		Designed by: GT	Checked by: RP		Approved By: RP
Report Details: Type: Inflow Summary Storm Phase: Unit A SW Network		Company Address: Adept CSCE			

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (m²)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (m²)
1	SW18		Time of Concentration	722.80	100	0	100	722.80
2	SW28		Time of Concentration	840.70	100	0	100	840.70
3	SW22		Time of Concentration	1160.40	100	0	100	1160.40
4	SW20		Time of Concentration	1109.10	100	0	100	1109.10
5	SW25		Time of Concentration	1453.40	100	0	100	1453.40
TOTAL		0.0		5286.40				5286.40

Project: 100.23083 - Sovereign Phase 2	Date: 05/10/2023			
	Designed by: GT	Checked by: RP	Approved By: RP	
Report Title: Rainfall Analysis Criteria	Company Address: Adept CSCE			

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Shortest
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall		
FSR	Type: FSR	
Region	England And Wales	
M5-60 (mm)	20.0	
Ratio R	0.399	
Summer	☒	
Winter	☒	

Return Period	
Return Period (years)	Increase Rainfall (%)
100.0	40.000

Storm Durations	
Duration (hrs)	Run Time (hrs)
0.25	0.50
0.50	1.00
1.00	2.00
2.00	4.00
4.00	8.00
6.00	12.00
8.00	16.00
16.00	32.00
24.00	48.00

Project: 100.23083 - Sovereign Phase 2	Date: 05/10/2023		
	Designed by: GT	Checked by: RP	Approved By: RP
Report Details: Type: Junctions Summary Storm Phase: Unit A SW Network	Company Address: Adept CSCE		





FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Depth

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
SW19	FSR: 100 years: +40 %: 0.25 hrs: Winter	24.000	22.215	23.521	1.306	34.2	1.477	0.000	33.4	20.964	Surcharged
SW28	FSR: 100 years: +40 %: 0.25 hrs: Winter	24.000	22.575	23.754	1.179	52.7	1.333	0.000	40.8	24.089	Flood Risk
SW18	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.840	22.415	23.652	1.237	45.3	1.399	0.000	34.2	20.812	Flood Risk
SW20	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.800	21.800	23.506	1.706	133.7	1.929	0.000	122.4	77.505	Flood Risk
SW21	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.600	21.685	23.046	1.361	122.4	1.539	0.000	114.1	76.524	Surcharged
SW25	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.170	21.745	22.805	1.060	91.1	1.199	0.000	84.9	41.376	Surcharged
SW24 (FC)	FSR: 100 years: +40 %: 1.00 hrs: Winter	23.100	21.270	22.061	0.791	38.9	2.012	0.000	37.9	165.102	Surcharged
EX MH01	FSR: 100 years: +40 %: 2.00 hrs: Winter	22.880	21.180	21.344	0.164	37.9	0.000	0.000	37.9	269.722	OK
SW22	FSR: 100 years: +40 %: 1.00 hrs: Winter	23.300	21.465	22.062	0.597	159.0	1.521	0.000	157.4	250.755	Surcharged
SW23	FSR: 100 years: +40 %: 1.00 hrs: Winter	23.300	21.445	22.062	0.617	157.4	1.570	0.000	154.6	249.498	Surcharged

Project: 100.23083 - Sovereign Phase 2	Date: 05/10/2023		
	Designed by: GT	Checked by: RP	Approved By: RP
Report Details: Type: Stormwater Controls Summary Storm Phase: Unit A SW Network	Company Address: Adept CSCE		





FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Avg. Depth

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
Tank	FSR: 100 years: +40 %: 1.00 hrs: Winter	22.061	22.061	0.781	0.781	154.6	176.675	0.000	0.000	38.9	166.304	2.992	OK

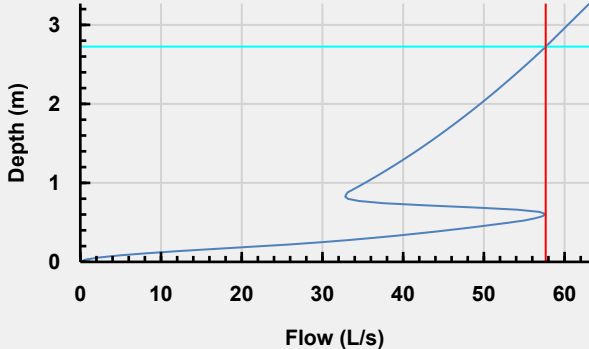
Project: 100.23083 - Sovereign Phase 2		Date: 05/10/2023			
		Designed by: GT	Checked by: RP		Approved By: RP
Report Details: Type: Connections Summary Storm Phase: Unit A SW Network		Company Address: Adept CSCE			



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
2.000	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW28	SW20	24.000	23.754	0.225	24.089	1.0	1.18	40.8	Flood Risk
1.002	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW20	SW21	23.800	23.506	0.300	77.505	1.7	1.91	122.4	Flood Risk
1.000	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW18	SW19	23.840	23.652	0.225	20.812	0.9	0.98	34.2	Flood Risk
1.003	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW21	SW22	23.600	23.046	0.225	76.524	2.9	3.73	114.1	Surcharged
1.007	FSR: 100 years: +40 %: 2.00 hrs: Winter	Pipe	SW24 (FC)	EX MH01	23.100	22.056	0.171	269.722	0.9	0.59	37.9	Surcharged
1.001	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW19	SW20	24.000	23.521	0.300	20.964	0.5	0.22	33.4	Surcharged
1.004	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW22	SW23	23.300	21.947	0.416	150.702	1.7	1.56	267.0	Surcharged
3.000	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW25	SW22	23.170	22.805	0.225	41.313	2.1	2.45	84.9	Surcharged
Pipe	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW23	Tank	23.300	21.833	0.436	148.579	2.2	0.71	262.5	OK
Pipe (1)	FSR: 100 years: +40 %: 1.00 hrs: Winter	Pipe	Tank	SW24 (FC)	23.100	22.061	0.450	166.304	0.2	0.22	38.9	Surcharged

Project: 100.23083 - Sovereign Phase 2		Date: 09/10/2023			
		Designed by: GT	Checked by: RP		Approved By: RP
Report Details: Type: Junctions Storm Phase: Unit D SW Network		Company Address: Adept CSCE			

Outlets			
Junction	Outlet Name	Outgoing Connection	Outlet Type
SW01	Outlet	1.000	Free Discharge
SW11	Outlet	3.000	Free Discharge
SW02	Outlet	1.001	Free Discharge
SW04	Outlet	1.003	Free Discharge
SW12	Outlet	4.000	Free Discharge
SW05	Outlet	1.004	Free Discharge
SW06 (FC)	Outlet	1.006	Hydro-Brake®
	Invert Level (m)	20.625	
	Design Depth (m)	2.725	
	Design Flow (L/s)	57.68	
	Objective	Minimise Upstream Storage Requirements	
	Application	Surface Water Only	
	Sump Available	☐	
	Unit Reference	CHE-0268-5768-2725-5768	
			

Project: 100.23083 - Sovereign Phase 2	Date: 09/10/2023			
	Designed by: GT	Checked by: RP	Approved By: RP	
Report Details: Type: Stormwater Controls Storm Phase: Unit D SW Network	Company Address: Adept CSCE			



Tank

Type : Tank

Dimensions

Exceedance Level (m)	23.350
Depth (m)	2.705
Base Level (m)	20.645
Freeboard (mm)	0
Initial Depth (m)	0.000
Porosity (%)	95
Average Slope (1:X)	0.00
Total Volume (m³)	440.659

Depth (m)	Area (m²)	Volume (m³)
0.000	289.000	0.000
1.600	289.000	439.280
1.601	289.001	439.555

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	1.004
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	1.005
Outlet Type	Free Discharge

Advanced

Perimeter	Circular
Length (m)	19.499

Project: 100.23083 - Sovereign Phase 2		Date: 09/10/2023			
Report Details: Type: Connections Storm Phase: Unit D SW Network		Designed by: GT	Checked by: RP		Approved By: RP
		Company Address: Adept CSCE			

Name	Length (m)	Connection Type	Slope (1:X)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Upstream Cover Level (m)	Upstream Invert Level (m)
3.000	29.656	Pipe	126.195		0.6	150	23.600	22.250
1.003	22.965	Pipe	417.547		0.6	600	23.600	21.565
1.006	8.489	Pipe	242.545		0.6	300	23.350	20.625
1.000	25.691	Pipe	70.387		0.6	300	23.870	22.370
1.005	8.149	Pipe	407.456		0.6	600	23.350	20.645
1.004	12.924	Pipe	430.807		0.6	600	23.400	21.510
4.000	6.270	Pipe	208.994		0.6	225	23.410	21.915
1.001	41.355	Pipe	295.394		0.6	300	23.740	22.005

Name	Downstream Cover Level (m)	Downstream Invert Level (m)	Part Family	Lock	Flow Restriction (L/s)
3.000	23.600	22.015		All	
1.003	23.400	21.510		All	
1.006	23.230	20.590		All	57.7
1.000	23.740	22.005		All	
1.005	23.350	20.625		All	
1.004	23.350	21.480		All	
4.000	23.400	21.885		All	
1.001	23.600	21.865		All	

Project: 100.23083 - Sovereign Phase 2		Date: 09/10/2023			
		Designed by: GT	Checked by: RP		Approved By: RP
Report Details: Type: Inflow Summary Storm Phase: Unit D SW Network		Company Address: Adept CSCE			

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (m²)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (m²)
1	SW01		Time of Concentration	2532.30	100	0	100	2532.30
2	SW02		Time of Concentration	966.90	100	0	100	966.90
3	SW04		Time of Concentration	3823.60	100	0	100	3823.60
4	SW11		Time of Concentration	416.60	100	0	100	416.60
5	SW12		Time of Concentration	2976.20	100	0	100	2976.20
TOTAL		0.0		10715.60				10715.60

Project: 100.23083 - Sovereign Phase 2	Date: 09/10/2023			
	Designed by: GT	Checked by: RP	Approved By: RP	
Report Title: Rainfall Analysis Criteria	Company Address: Adept CSCE			

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Shortest
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall		
FSR	Type: FSR	
Region	England And Wales	
M5-60 (mm)	20.0	
Ratio R	0.400	
Summer	☒	
Winter	☒	

Return Period	
Return Period (years)	Increase Rainfall (%)
100.0	40.000

Storm Durations	
Duration (hrs)	Run Time (hrs)
0.25	0.50
0.50	1.00
1.00	2.00
2.00	4.00
4.00	8.00
6.00	12.00
8.00	16.00
16.00	32.00
24.00	48.00

Project: 100.23083 - Sovereign Phase 2	Date: 09/10/2023		
	Designed by: GT	Checked by: RP	Approved By: RP
Report Details: Type: Junctions Summary Storm Phase: Unit D SW Network	Company Address: Adept CSCE		





FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Depth

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
SW01	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.870	22.370	23.871	1.501	158.8	2.873	1.176	118.3	73.451	Flood
SW11	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.600	22.250	22.853	0.603	26.1	0.682	0.000	21.0	12.143	Surcharged
SW02	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.740	22.005	23.549	1.544	178.9	1.746	0.000	177.6	101.506	Flood Risk
SW04	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.600	21.565	22.412	0.847	438.4	2.154	0.000	434.1	224.521	Surcharged
SW12	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.410	21.915	23.410	1.495	186.6	1.697	0.006	179.0	86.369	Flood
SW05	FSR: 100 years: +40 %: 0.25 hrs: Winter	23.400	21.510	22.263	0.753	613.1	1.917	0.000	609.4	309.873	Surcharged
SW06 (FC)	FSR: 100 years: +40 %: 2.00 hrs: Winter	23.350	20.625	22.107	1.482	57.1	3.772	0.000	57.5	489.824	Surcharged
SW07	FSR: 100 years: +40 %: 8.00 hrs: Summer	23.230	20.590	20.793	0.203	57.7	0.000	0.000	57.7	743.923	OK

Project: 100.23083 - Sovereign Phase 2	Date: 09/10/2023		
	Designed by: GT	Checked by: RP	Approved By: RP
Report Details: Type: Stormwater Controls Summary Storm Phase: Unit D SW Network	Company Address: Adept CSCE		





FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Avg. Depth

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
Tank	FSR: 100 years: +40 %: 2.00 hrs: Winter	22.108	22.108	1.463	1.463	210.5	401.594	0.000	0.000	57.1	491.975	8.865	OK

Project: 100.23083 - Sovereign Phase 2		Date: 09/10/2023			
		Designed by: GT	Checked by: RP		Approved By: RP
Report Details: Type: Connections Summary Storm Phase: Unit D SW Network		Company Address: Adept CSCE			



FSR: 100 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
3.000	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW11	SW04	23.600	22.853	0.150	12.143	1.2	1.33	21.0	Surcharged
1.003	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW04	SW05	23.600	22.412	0.600	224.521	1.5	1.3	434.1	Surcharged
1.006	FSR: 100 years: +40 %: 8.00 hrs: Summer	Pipe	SW06 (FC)	SW07	23.350	21.467	0.217	743.923	1.1	0.81	57.7	Surcharged
1.000	FSR: 100 years: +40 %: 0.25 hrs: Summer	Pipe	SW01	SW02	23.870	23.870	0.300	65.596	1.7	0.92	121.6	Flood
1.005	FSR: 100 years: +40 %: 0.50 hrs: Winter	Pipe	Tank	SW06 (FC)	23.350	21.892	0.600	109.783	0.4	0.18	61.4	Surcharged
1.004	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW05	Tank	23.400	22.263	0.600	309.873	2.2	1.85	609.4	Surcharged
4.000	FSR: 100 years: +40 %: 0.25 hrs: Winter	Pipe	SW12	SW05	23.410	23.410	0.225	86.369	4.5	5	179.0	Flood
1.001	FSR: 100 years: +40 %: 0.25 hrs: Summer	Pipe	SW02	SW04	23.740	23.530	0.300	90.630	2.5	2.78	178.6	Flood Risk

Graham Mawdsley

**Quay West at Media City Uk
Trafford Wharf Road,
Manchester,
M17 1HH**

FAO:

How to contact us:

**United Utilities Water Limited
Property Searches
Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP**

Telephone: 0370 7510101

E-mail: propertysearches@uuplc.co.uk

**Your Ref: B029681-Sewer Plans
Our Ref: UUPS-ORD-298068
Date: 15/06/2021**

Dear Sirs

Location: Sovereign Distillery Sovereign Distillery Wilson Road, Huyton, L36 6AD

I acknowledge with thanks your request dated 15/06/2021 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. <http://www.unitedutilities.com/work-near-asset.aspx>.

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,



Karen McCormack
Property Searches Manager

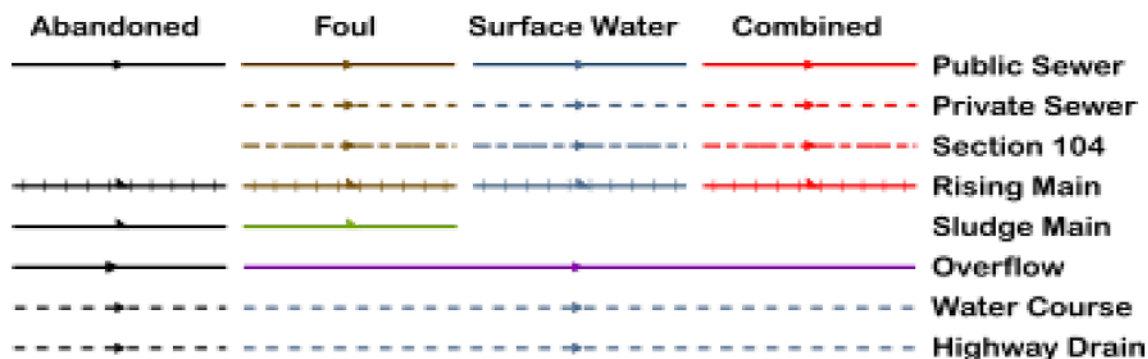
TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

TERMS AND CONDITIONS:

- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

Wastewater Symbolology



All point assets follow the standard colour convention: **red** – combined **brown** - foul
blue – surface water **purple** - overflow

Manhole	Side Entry Manhole
Head of System	Outfall
Extent of Survey	Screen Chamber
Rodding Eye	Inspection Chamber
Inlet	Bifurcation Chamber
Discharge Point	Lamp Hole
Vortex	T Junction / Saddle
Penstock	Catchpit
Washout Chamber	Valve Chamber
Valve	Vent Column
Air Valve	Vortex Chamber
Non Return Valve	Penstock Chamber
Soakaway	Network Storage Tank
Gully	Sewer Overflow
Cascade	Ww Treatment Works
Flow Meter	Ww Pumping Station
Hatch Box	Septic Tank
Oil Interceptor	Control Kiosk
Summit	
Drop Shaft	Change of Characteristic
Orifice Plate	



SEWER RECORDS

Address or Site Reference

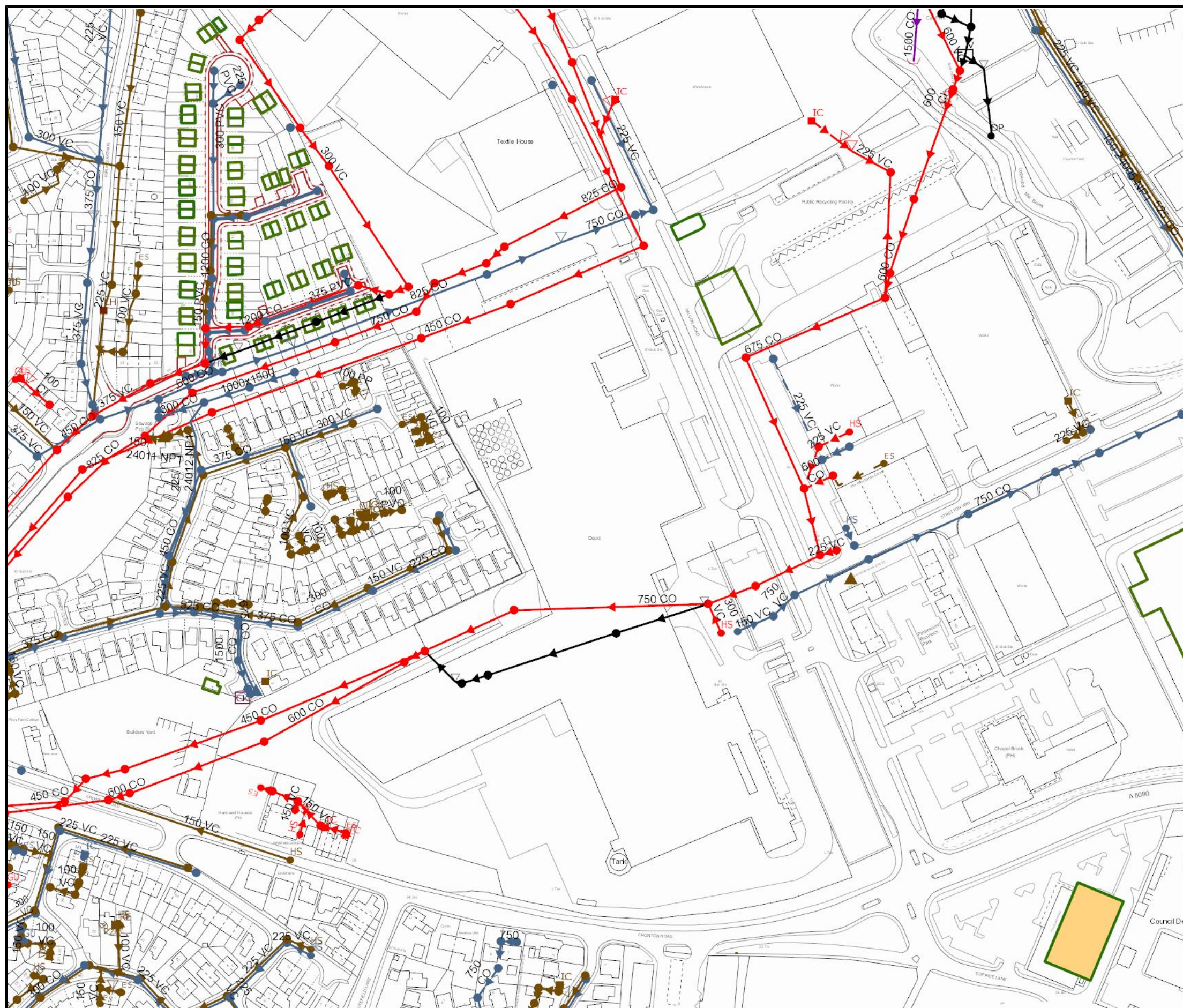
Sovereign Distillery
Sovereign Distillery
Wilson Road,
Huyton,
L36 6AD

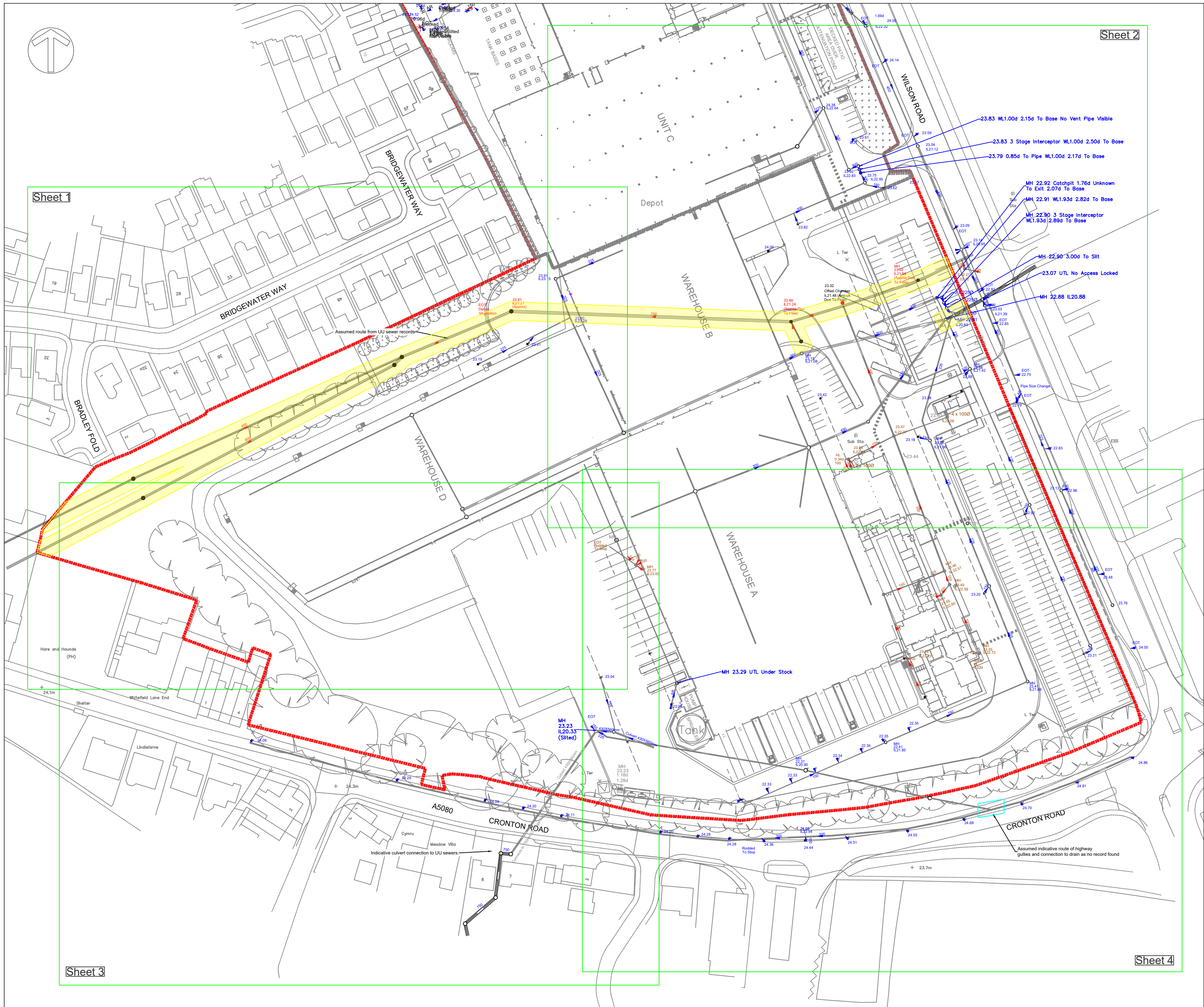
Scale: 1:2500
Date: 15/06/2021

Printed by: Property Searches

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

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Do Not Scale

DESIGN REVIEW

Design review by: ** Checked by: **

Residual hazards:

Health, Safety & Environmental Notes

NOTES

Key

- Red line site boundary
- Existing Adopted Combined Water Pipe Network
- Existing Adopted Surface Water Pipe Network
- Existing Private Surface Water Pipe Network
- Existing Culvert
- Existing Channel Drain
- Easement
- Gully

Refer to HUYTON 40493_T_UG_REV0 SUB GROUP PHASE 1 Underground Utility Survey drawing no. 40493_UG_1 & 40493_UG_2

Refer to Ref no. B029681-Sewer Plans Issued on 15/06/2021

06.10.23	First Issue	AJ	GT	P1
Date	Description	By	Chk	Rev

ADEPT
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Tel: 0113 239 4518 (Head Office)

Originating Office: Manchester
7 St James Square, 4th Floor,
Manchester, M2 6DN
Tel: 0161 974 3620

Project
Sovereign Distillery Phase 2,
Huyton

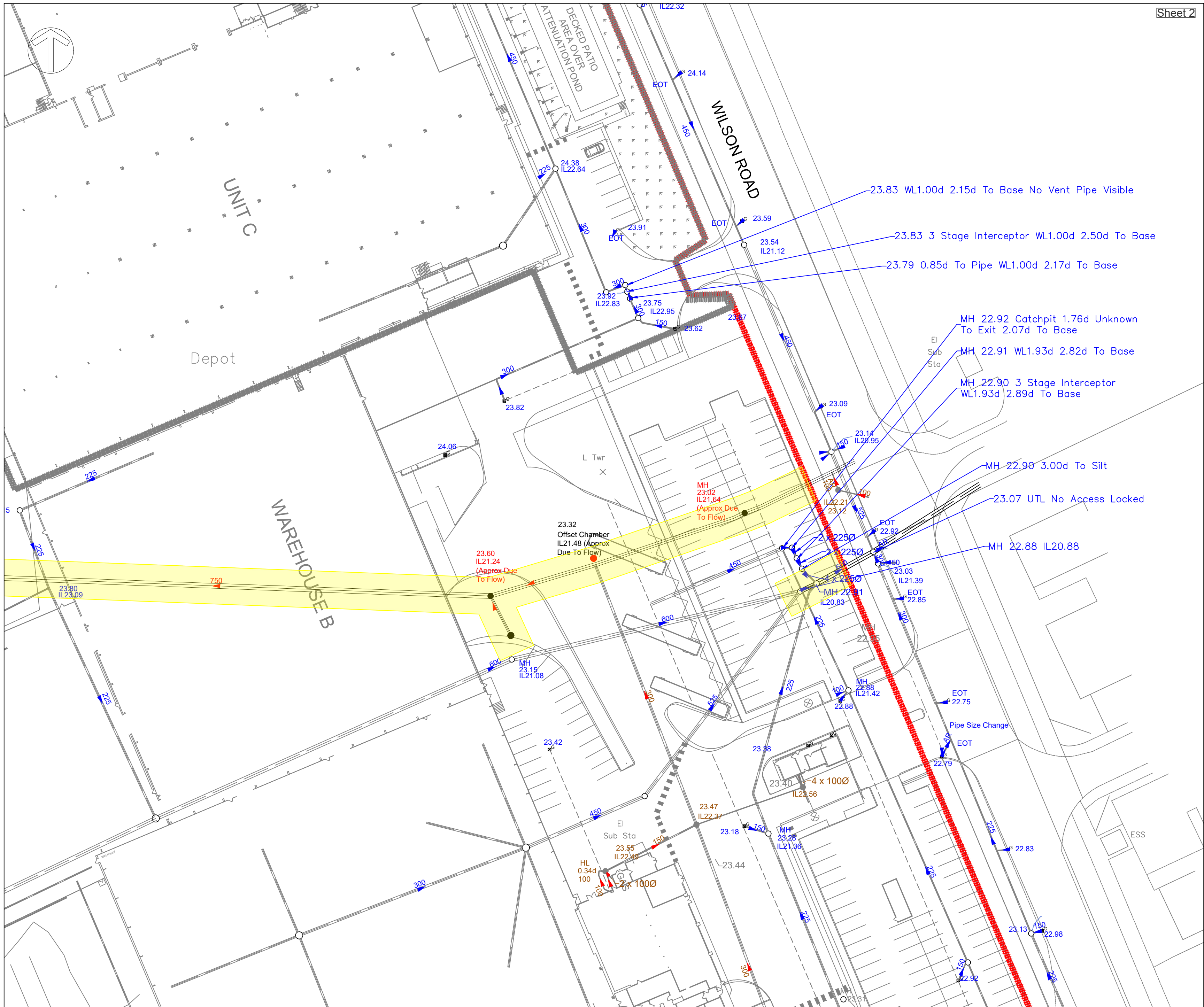
Title
Existing Drainage
Layout Plan

Client
DAVOS Property
Developments Ltd

Scale @ A2	Initial author	Initial checker	Approver	Initial Date
1:1000	AJ	JBW	NB	Sep '23

Status	Purpose	Adept Ref
S1	Preliminary	100.23083

Project Number	Originator	Volume	Level	Type	Role	Drg. No.	Rev.
100.23083-ACE-00-ZZ-SK-C-0002							P1



Sheet 2

Do Not Scale

DESIGN REVIEW

Design review by: ** Checked by: **

Residual hazards:

Health, Safety & Environmental Notes

NOTES

Key

- Red line site boundary
- Existing Adopted Combined Water Pipe Network
- Existing Adopted Surface Water Pipe Network
- Existing Private Surface Water Pipe Network
- Existing Culvert
- Existing Channel Drain
- Easement
- Gully

Refer to HUYTON 40493_T_UG_REV0 SUB GROUP PHASE 1 Underground Utility Survey drawing no. 40493_UG_1 & 40493_UG_2

Refer to Ref no. B029681-Sewer Plans Issued on 15/06/2021

06.10.23	First Issue	AJ	GT	P1
Date	Description	By	Chk	Rev

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Project Sovereign Distillery Phase 2, Huyton

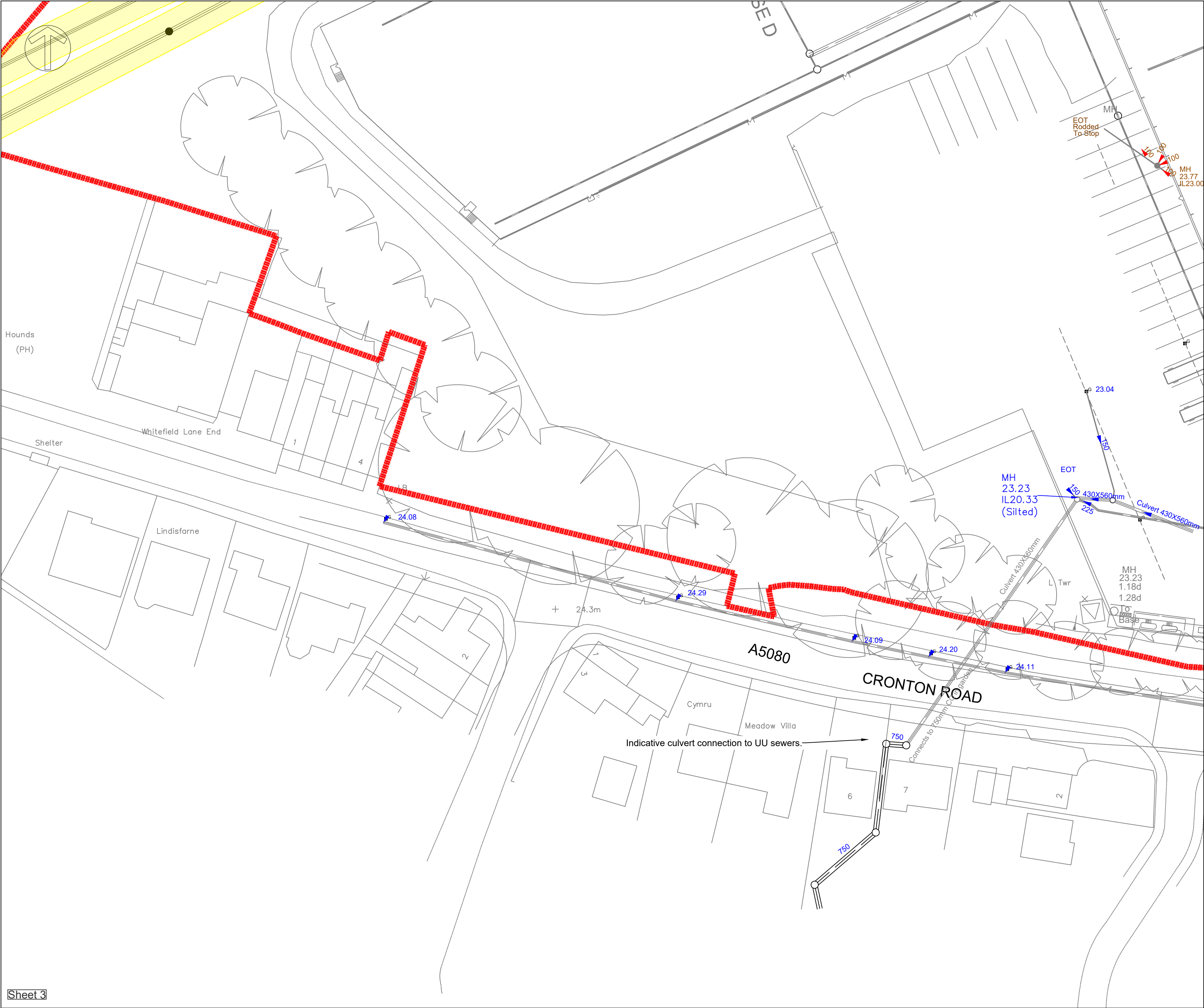
Title Existing Drainage Layout Sheet 2 of 4

Client DAVOS Property Developments Ltd

Scale @ A2	Initial author	Initial checker	Approver	Initial Date
1:500	AJ	JBW	NB	Sep '23

Status	Purpose	Adept Ref
S1	Preliminary	100.23083

Project Number	Originator	Volume	Level	Type	Role	Drg. No.	Rev.
100.23083-ACE-00-ZZ-SK-C-0004							P1



Do Not Scale

DESIGN REVIEW

Design review by:

**

Checked by:

**

Residual hazards:

!

Health, Safety & Environmental Notes

!

NOTES

Key

Red line site boundary

Existing Adopted Combined Water Pipe Network

Existing Adopted Surface Water Pipe Network

Existing Private Surface Water Pipe Network

Existing Culvert

Existing Channel Drain

Easement

Gully

Refer to HUYTON 40493_T_UG_REV0 SUB GROUP PHASE 1 Underground Utility Survey drawing no. 40493_UG_1 & 40493_UG_2

Refer to Ref no. B029681-Sewer Plans Issued on 15/06/2021

06.10.23	First Issue	AJ	GT	P1
Date	Description	By	Chk	Rev

ADEPT

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Tel: 0161 974 3620

Project

Sovereign Distillery Phase 2, Huyton

Title

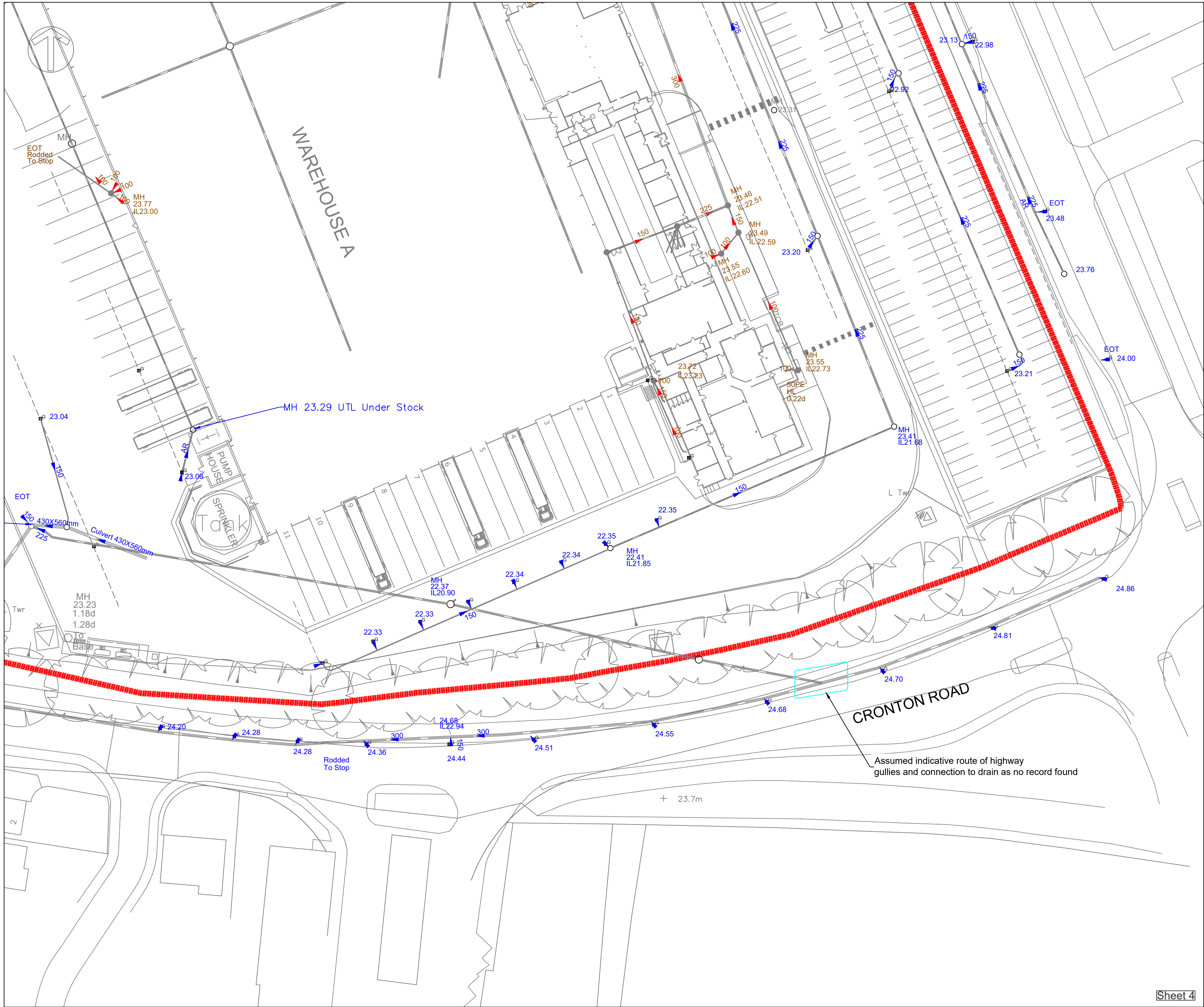
Existing Drainage Layout Sheet 3 of 4

Client

DAVOS Property Developments Ltd

Scale @ A2	Initial author	Initial checker	Approver	Initial Date
1:500	AJ	JBW	NB	Sep '23
Status	Purpose	Adept Ref		
S1	Preliminary	100.23083		

Project Number	Originator	Volume	Level	Type	Role	Drg. No.	Rev.
100.23083-ACE-00-ZZ-SK-C-0005							P1



Sheet 4

Do Not Scale

DESIGN REVIEW

Design review by: ** Checked by: **

Residual hazards:

Health, Safety & Environmental Notes

NOTES

Key

- Red line site boundary
- Existing Adopted Combined Water Pipe Network
- Existing Adopted Surface Water Pipe Network
- Existing Private Surface Water Pipe Network
- Existing Culvert
- Existing Channel Drain
- Easement
- Gully

Refer to HUYTON 40493_T_UG_REV0 SUB GROUP PHASE 1 Underground Utility Survey drawing no. 40493_UG_1 & 40493_UG_2

Refer to Ref no. B029681-Sewer Plans Issued on 15/06/2021

06.10.23	First Issue	AJ	GT	P1
Date	Description	By	Chk	Rev

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Project Sovereign Distillery Phase 2, Huyton

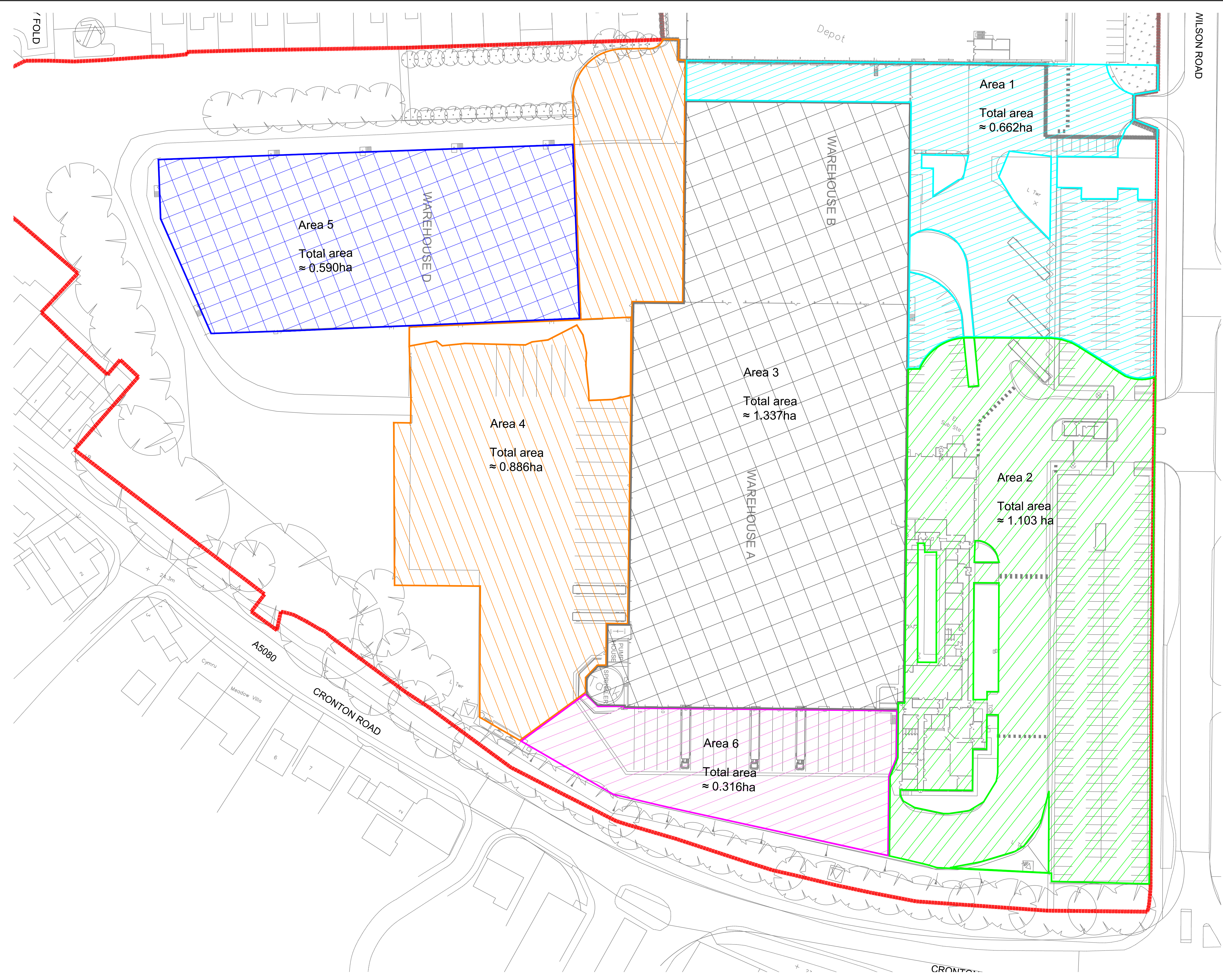
Title Existing Drainage Layout Sheet 4 of 4

Client DAVOS Property Developments Ltd

Scale @ A2 1:500 Initial author AJ Initial checker JBW Approver NB Initial Date Sep '23

Status S1 Purpose Preliminary Adept Ref 100.23083

Project Number 100.23083-ACE-00-ZZ-SK-C-0006 Originator Volume Level Type Role Drg. No. Rev. P1



Do Not Scale

DESIGN REVIEW

Design review by: **

Checked by: **

Residual hazards:

⚠

Health, Safety & Environmental Notes

⚠

NOTES

Key

Area 1

Existing Impermeable ≈ 0.548ha

Area 2

Existing Impermeable ≈ 1.010ha

Area 3

Existing Impermeable ≈ 1.337ha

Area 4

Existing Impermeable ≈ 0.830ha

Area 5

Existing Impermeable ≈ 0.590ha

Area 6

Existing Impermeable ≈ 0.316ha

Total Existing Impermeable Area ≈ 4.631ha

05.10.23

First Issue

AJ

GT

P1

Date

Description

By

Chk

Rev

ADEPT

CIVIL AND STRUCTURAL CONSULTING ENGINEERS

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Project

Sovereign Distillery Phase 2, Huyton

Title

Existing Impermeable Area Layout

Client

DAVOS Property Developments Ltd

Scale @ A1

Initial author

Initial checker

Approver

Initial Date

1:500

AJ

GT

NB

Sep '23

Status

Purpose

Adept Ref

S3

Preliminary

100.23083

Project Number

Originator

Volume

Level

Type

Role

Orig. No.

Rev.

100.23083-ACE-00-ZZ-DR-C-1010

P1

Sovereign Distillery Redevelopment Drainage Asset Maintenance Schedule

■ Surface ■ Foul

Maintenance Activity	Drainage Component	Required Action	Typical Frequency
Visual Inspection	Gully Sump unit Catch pit / silt trap Attenuation structures Channel drain Outlet chamber Flow control chamber	Inspect for sediment and debris Inspect inlets and outlets for blockage (where applicable)	Monthly for first year and twice yearly thereafter, after severe storm
	Pipework		Twice yearly
	Full retention interceptor / Bypass interceptor		Twice yearly or after severe storm as a minimum, refer to manufacturer guidance. Forecourt interceptor requires emptying after fuel spillage
Monitoring	Attenuation structures	Check attenuation inspection points to ensure emptying is occurring (little to no water should be present after consecutive days of dry weather)	Twice yearly, once after heavy rainfall and once after consecutive dry weather
Litter and Debris Removal	Manhole Pervious paving All sump units (gullies, channel drains and catch pits)	Remove all litter and debris	Twice yearly or after severe storm
Litter and Debris Removal - Continued	Access chambers and pre-treatment devices Flow control chamber Gutters & leaf guards		Twice yearly (spring, start of winter), or as required
Jet Wash	Pipework	High pressure jet-wash any pipe work which has silt accumulation. Care must be taken that any silts within	Twice yearly, or as required

Leeds

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Sheffield

Adept Consulting Engineers Ltd,
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Sheffield, S1 2DD
Tel: 0114 279 2795

			the pipework are not unnecessarily flushed into the attenuation structures (use of bungs and jet-vac of chamber prior to removal of bungs)	
		Attenuation structures	High pressure jet-wash all perforated pipework and or access points. All water to be jet vac to remove any suspended silts within the water	Five yearly, or as required
	Sediment Management and Removal	ALL SUDS	Sediment accumulation should be monitored as part of the inspection regime, rate of sediment accumulation noted	Appropriate frequencies determined upon inspection
	Inspection	Pipework Manhole	Check if functioning correctly	Once site is fully operational: twice yearly for 1 st year, annually after
	Sediment Removal	Washdown separator	Inspect for build up of sediment and remove as required. Refer to manufacturer guidance	Quarterly for 1 st year, twice yearly after. Refer to manufacturer guidance

Additional notes:

- Any defects (broken/misaligned pipes, root infestation, damage to soakaways, missing parts, etc.) that are identified during inspections/maintenance should be reported back to the property/site owner so that remedial actions can be undertaken promptly to repair these defects.
- SuDS maintenance based on CIRIA 2015 chapter 32 where further information can also be found.
- Refer to manufacturer guidance for maintenance schedules of all proprietary treatment systems.