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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

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P1	S2	12.10.23	RP	RP	NB	First Issue
P2	S2	01.03.24	RP	RP	NB	Revised to LLFA and UU comments
P3	S2	21.11.24	R Rigge	R Rigge	N Brown	Revised Site Layout
P4	S2	14.05.25	R Rigge	R Rigge	N Brown	80% betterment

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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 3no. 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 = 4.949 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. UU have highlighted a risk of flooding in the combined sewers crossing the site. Floor levels of new and existing buildings are set above

	existing yard levels. Decrease in drained area to combined sewer will reduce flood risk.
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	Based on the adjacent site, soakaway/infiltration is not viable due the made ground under the site. Suds proforma (part 1) is attached 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 four 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 four flow controls discharging the proposed drainage into the existing private network
Foul Water Management	Foul water from the new and refurbished 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	4.949 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.

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 3no. 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 will be utilised including existing outfalls.

The existing site has been hydraulically modelled using InfoDrainage (formerly MicroDrainage), identifying three distinct outfall points:

1. A surface water sewer on Willson Road
2. A private drain discharging into a surface water sewer, ultimately connecting to Netherly Brook
3. Existing private drainage leading to Phase 1 of the development and subsequently to Willson Road

To determine the proposed discharge rate, two models have been developed:

- A model of the existing site based on survey data
- A modified version of the existing model with undeveloped areas removed to isolate discharge rates from these zones

The proposal specifies that runoff from undeveloped areas will remain unattenuated. Conversely, discharge from developed areas will be restricted to **80% of pre-development rates**, exceeding the **50% betterment** requirement stipulated in Knowsley Council's Proforma One and Strategic Flood Risk Assessment.

The existing hydraulic model is provided in **Appendix B**. Depending on the designated outfall point, the applied mitigation measures achieve an overall improvement in runoff management, ranging from **25% to 40% betterment**.

All new surface water runoff will be collected via a conventional piped drainage system and attenuated within storage tanks. The attenuated surface water will subsequently discharge into the site's receiving surface water drainage infrastructure.

The design methodology aligns with the guidance outlined in the **CIRIA SuDS Manual** and **Knowsley Council's Strategic Flood Risk Assessment**. Additionally, a **40% climate change allowance** has been incorporated into all hydraulic calculations.

Below is a summary table detailing the modelling outcomes and proposed discharge rates.

TIA (Ex) = Total Existing Impermeable Area

Q (Ex) = Existing discharge from site

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

Catchment	TIA (Ex) m²	Q (Ex) l/s	Q (New) l/s	Betterment
Outfall 1 – Willson Road				
Un-Developed Areas				
Area 1a	0.279	575.7	575.7	N/A
Area 2	0.684			
Area 4	0.443			
Area 6	0.589			
Area 12a	0.173			
Developed Areas				
Area 3	0.260	371.2	74.24	80%
Area 5a	0.150			
Area 5b	0.083			
Area 8a	0.324			
Area 8b	0.150			
Area 8c	0.162			
Area 9	0.260			
Area 10	0.422			
Outfall 2 - Private drain via SW sewer to Netherly Brook				
Un-Developed Areas				
Area 1b	0.358	168.12	168.12	N/A
Developed Areas				
Area 7	0.281	115.1	23.02	80%
Outfall 3 – to Phase 1				
Un-Developed Areas				
Area 12b	0.172	79.12	79.12	N/A
Developed Areas				
Area 11a	0.043	62.1	12.42	80%
Area 11b	0.108			
Areas are as defined on the drawings within Appendix B & C				

Existing redundant drainage will be abandoned, and grout filled.

A drainage strategy drawing is appended, based upon these figures, attenuation volumes are noted on the proposed plans shown in Appendix B

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.

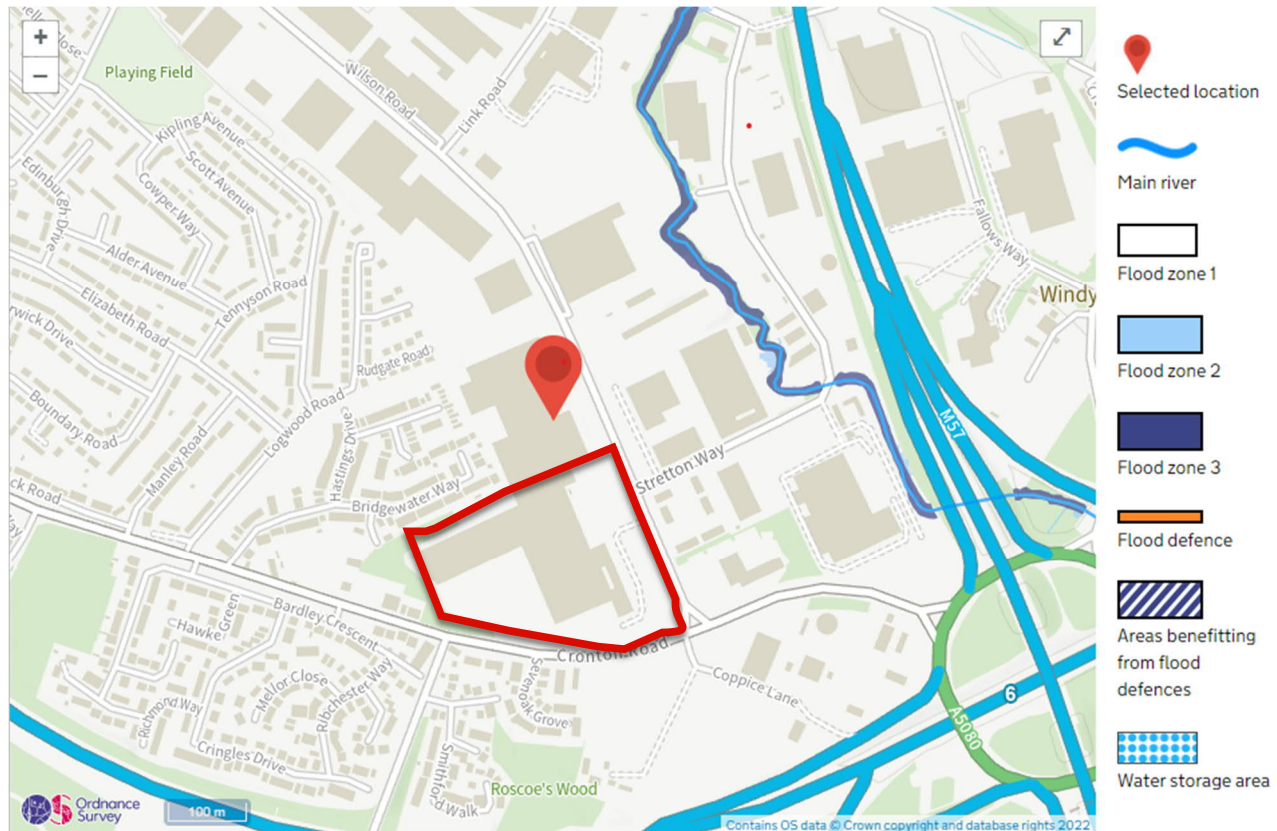
Table 6.1 Summary of the sources and level of Flood Risk	
Source	Risk Level
Fluvial	Very Low
Tidal - Coastal	Very Low
Surface Water / Pluvial	Low
Groundwater	Low
Surcharged Sewers	Low
Other Man Made Sources	Very ow

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,



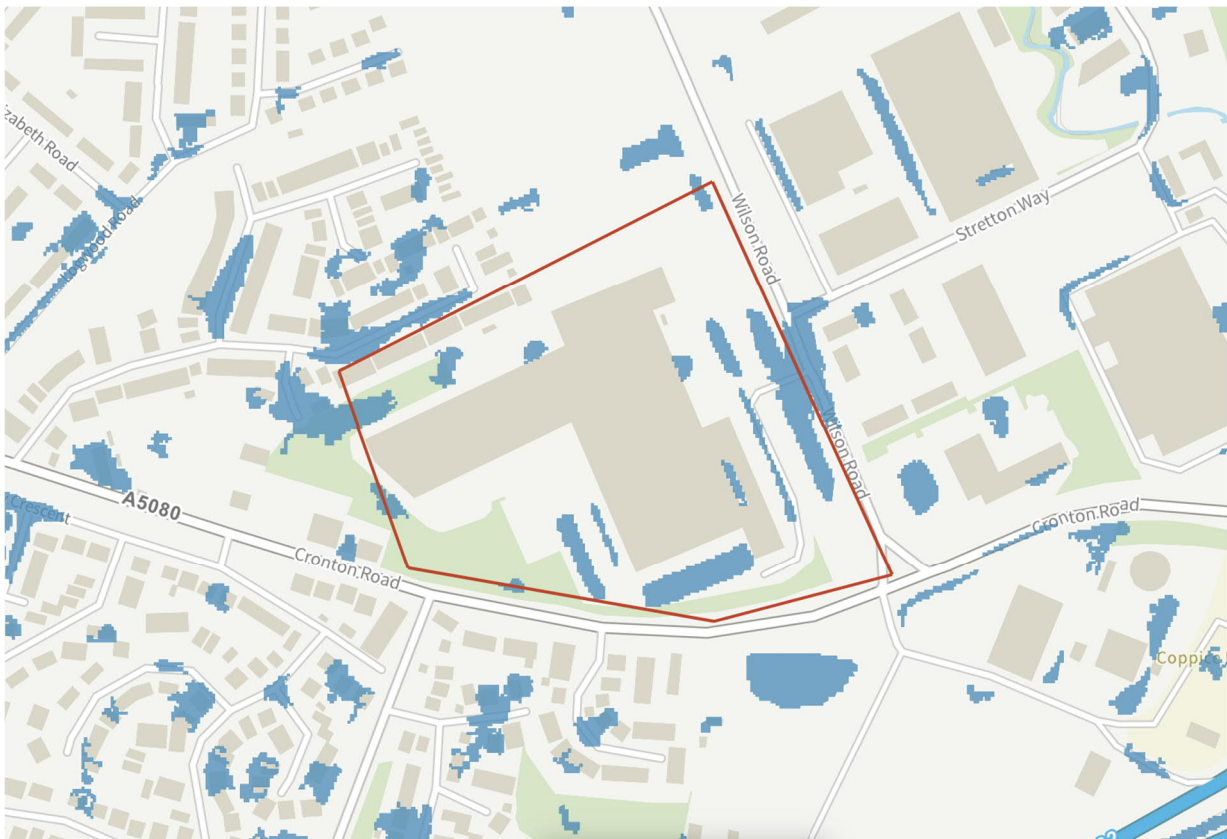
Tidal

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.



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.

The developer is aware via the planning consultations that the Surface Water sewer in Willson Road is at capacity and additional restriction over and above that Knowsley LLFA would normally impose are required on this scheme.

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.

The Knowsley Suds proforma, part 1, is attached to this report.

Finished floor levels and initial proposed ground levels have been shown on the drawings.

The drainage outfalls that are being re-used have been checked and are adequate for re-use. The drainage survey is appended.

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.

United Utilities have asked for more information through planning. Concerns were raised over the existing flooding in the combined system. We have proven that load to the combined sewer will decrease post development. UU acknowledgment is attached.

Both United Utilities and the Lead Local Flood Authority have comments on the original application. Response has been provided to both and this is attached to this document.

9.0 Conclusions

Proposed Drainage Strategy

The flows from redeveloped parts of the site will be restricted to 80% of their existing modelled flows 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

Appendix B

- Knowsley Suds Proforma
- Existing Drainage
- Existing Drainage Impermeable Areas
- Existing Drainage Infodrainage Model

Appendix C

- Proposed Drainage GA
- Proposed Drainage Impermeable plot Areas
- Proposed Drainage Calculations

Appendix D

- UU & LLFA Correspondence
- SuDs Maintenance Schedule