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Flood Risk Assessment

Site Redevelopment

Link Road Huyton, Liverpool

Link Recycling, Link Road, Huyton, Liverpool

Ref : 1676-FRA-001-A

02 September 2025

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Executive Summary

The Flood Risk Assessment has been prepared for Green Recovery Southwest Ltd for the site located at Link Road, Huyton, Liverpool, OS Grid Ref E: 345,002 & N: 390,225.

The current proposal looks to redevelop the land to incorporate a single building of 2,890m² total footprint with external service yards and parking totalling an additional 2,278m².

The finished ground floor levels of the site will be set close the existing site levels with the ground being regraded for vehicle access.

The Site is located within flood zone 1 including the 0.1% (1 in 1000 year) annual probability of flooding for tidal events. The main conclusions are therefore as follows:

The risk of tidal flooding is assessed as low;

The risk of flooding from overland flow is considered to be low;

The risk of flooding from ground water is assessed as low;

The risk associated with flooding from sewers is assessed as low;

The risks associated with flooding from reservoirs, canals and other artificial sources of flooding are considered low to very low.

An initial assessment of existing ground conditions appear to indicate the site is unlikely to be suitable for soakaways as the sub soil is generally clay in and around Huyton, Liverpool present at varying depths.

The existing site levels across the site will be regraded to suit the proposed building and service yard layout while in principle maintaining the current topographical levels as close as possible and not look to alter the current overland flood flow direction while also looking to adopt a finished floor level of the building to mitigate the risk of flooding in the future.

In conclusion the Development is not at risk of flooding and it will not increase flood risk at the Site or elsewhere.

1. Introduction

1.1 The Brief

The Site is located on Link Road, Huyton, Liverpool

The Site is centred on National Grid Reference E: 345,002 & N: 390,225 and extends to 0.4548 hectares.

Design Coordination Ltd (hereafter 'Design Co') have been appointed to undertake a Flood Risk Assessment (FRA), as required by the National Planning Policy Framework (NPPF): Development and Flood Risk, published in March 2012.

The report describes the existing Site conditions and proposed development. It assesses the potential sources of flooding to the Site from tidal, fluvial, groundwater, surface water and other sources, taking a risk based approach in accordance with National Planning Policy.

2. Site Description and Proposals

The Site is located on Link Road, Huyton, Liverpool.

The proposal is to redevelop the site for Industrial use with a new building and service yard.

A site location plan can be seen in Appendix A.

3. Scope of the Assessment

In accordance with the National Planning Policy Framework (NPPF), the aim of the planning document is: *Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. For these purposes:*

"Area at risk of flooding" means land within Flood Zones 2 and 3; or land within Flood Zone 1 which has been notified to the local planning authority by the Environment Agency;

"flood risk" means risk from all sources of flooding – including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

4. Sources of Flooding

4.1 Flooding from Rivers

From a review of the flood risk maps for Planning the site is located in flood zone 1 Low Risk.

4.2 Flooding from the Sea

From a review of the flood risk maps for Planning the site is located in flood zone 1 Low Risk.

4.3 Flooding from Land

Overland flow occurs when intense rainfall exceeds the infiltration capacity of the ground, when the ground is saturated or when the water runoff exceeds the capacities of sewers and/or water courses. Overland flow can cause localised flooding in natural valley bottoms as normally dry areas become covered in flowing water and in natural low spots where the water may pond. Flooding from this source is most likely to occur in relatively low lying areas, or where the pathway for runoff is restricted by terrain or man-made obstructions.

Following redevelopment of the Site it is expected that the surface ground levels around the perimeter of the Site and boundary constraints will remain similar and the risk of overland flooding to areas adjacent to the Site is not exacerbated.

4.4 Flooding from Groundwater

Groundwater flooding tends to occur after much longer periods of sustained high rainfall. The areas that are at risk tend to be those low-lying areas where the water table is shallow. Flooding tends to occur in areas that are underlain by major aquifers, although groundwater flooding is also noted in localised floodplain sands and gravels. The main causes of groundwater flooding are:

- Natural groundwater rising due to tidal influence, or exceptionally wet periods leading to rapid recharge;
- Groundwater rebound due to cessation of abstraction and mine dewatering;
- Existence of confined aquifers and springs.

The PFRA refers to the EA Areas Susceptible to Ground Water Flooding Map (AStGWF) which identifies that North West Wirral is likely to be susceptible to ground water flooding. The document indicates there were no records identified of known groundwater flooding within Wirral and that it is not possible to conclude if any past groundwater flooding had any significant effect on existing recorded surface water flooding.

The report does suggest that future requirements to deal with surface water by the adoption of Sustainable Urban Drainage systems (SUDs) may increase the number of ground water flooding incidents.

There are no recorded incidents of flooding associated with groundwater levels within the Site we would conclude the risk of flooding from groundwater in the area is considered to be low.

4.5 Flooding from Sewers

There are no recorded incidents of flooding to the Site via the public sewerage system. The proposed development will look to mimic the existing scenario of ground infiltration across the site by way of placement of permeable surfacing across the site. Whilst some minor ponding may occur on site during extreme rainfall, it is envisaged that this will be for relatively short periods.

Considering the above, the risk of flooding from sewers and the drainage systems is considered low.

4.6 Flooding from Reservoirs, Canals and other Artificial Sources

Reservoirs

The EA's map flood mapping data includes maps identifying the Risk of Flooding from a reservoir breach. The mapping data does not indicate the Site being at risk of flooding from a reservoir breach.

Considering the above, the risk of flooding from reservoirs is considered to be very low.

Canals

There are no canals in close proximity to the Site.

Considering the above, the risk of flooding from canals is considered to be very low.

Artificial Sources

There are no artificial sources within or adjacent to the Site boundary;

Considering the above, the risk of flooding from Other Artificial sources is considered to be low.

5. Flood Risk Assessment

With reference to the points raised in the previous section, the following is a summary of the likely risk associated with each potential source of flooding.

5.1 Rivers

Having reviewed the EA's latest flood mapping information and the SFRA, the Site is identified as being located within Flood Zone 1

5.2 Sea

The Site is a considerable distance from the sea with the existing site levels being significantly above sea level.

5.3 Land

Following a review of the SFRA and a Site visit to review the local topography it is believed that the risk associated with pluvial flooding is low.

5.4 Groundwater

There are no recorded events of flooding associated with ground water; it is therefore considered the risk of flooding from groundwater is low.

5.5 Sewers

There are no recorded incidents of flooding to the Site via the existing private sewerage system, however a review of the flood maps does show some flooding occurring to the north east boundary of the site and along Riverbank Road.

Should this be as result of overland flows from the site the proposals will look to improve the situation by way of the perimeter bund being used to contain any overland flows generated from the site would be retained.

The risk of flooding to the Site is considered to be low.

5.6 Reservoirs, Canals and Other Artificial Sources

The risk of flooding associated with a reservoir breach, canals and other artificial sources is considered to be low to very low.

5.7 Climate Change

It is generally accepted that man-induced climate change will increase the risk of flooding. Projections of future climate change indicate that more frequent short-duration, high-intensity rainfall and more frequent periods of long duration rainfall could be expected. These changes would have implications for river flooding and for local flash flooding.

The implications for climate change for this period should be made using the precautionary allowances and indicative sensitivity ranges in Technical Guidance to NPPF Tables 4 and 5.

5.8 Surface Water Runoff & Proposed Surface Water Drainage

Previous sections of the Assessment discuss the potential flood risk to the Site itself. However, it is equally important to ensure that the Development does not increase flood risk elsewhere by increasing surface water runoff.

Guidance for the disposal of surface water from a development Site is for infiltration systems to be considered as the primary solution. If this is not practical, discharge to a watercourse is to be considered as the next available alternative. Only if these options are unavailable, and other sustainable drainage methods not possible, should the use of the public sewerage system be considered.

5.9 Sustainable Drainage Systems

The use of SuDS will be considered to reduce runoff from the development. SuDS fall into three broad categories; the techniques aim to:

- Reduce the quantity of runoff from the Site (source control techniques);
- Slow the velocity of runoff to allow settlement, filtering and infiltration (permeable conveyance); and
- Provide passive treatment to collected surface water before discharge into land or to a watercourse (end of pipe system).

The detailed design of SuDS is beyond the scope of this FRA. However, this study does present an evaluation of potential SuDS methodology available for surface water drainage on the Site.

As recognised in CIRIA C697 (ref 10), Site characteristics have a significant influence on the suitability of SuDS methods, and as such has been given due consideration.

Rainwater Harvesting and Greywater Recycling

Rainwater harvesting allows for reuse of rainwater within the Site and in doing so reduces the demand on potable water resources and decreases runoff from the development. Grey water includes non-industrial wastewater generated from domestic processes such as dish washing, laundry and bathing.

The attenuation provided by rainwater harvesting systems cannot be included in the surface water runoff calculations, as it is possible that there may not be any spare attenuation volume available when required. i.e. during a significant rainfall event.

This is because the design standard for the storage offered by rainwater harvesting systems is significantly less than runoff generated during a 1in100 year event, therefore it is possible that the structure used to store recycled water would be near to capacity and unable to provide any additional attenuation.

This also depends on the end use of the recycled water, for example there would be regular demand for recycled water used for toilet flushing, however demand for irrigation would be more variable and seasonally dependant. Rainwater harvesting and greywater recycling may be considered during the detailed design (reserved matters) stage in order to deliver reductions in potable water usage.

Infiltration Techniques

The use of infiltration based drainage techniques is preferable because they reduce the total volume of runoff reaching the surface water sewer and river system, rather than just the peak discharge. Examples of infiltration techniques include soakaways, detention basins and infiltration trenches.

The underlying strata and high water table may preclude the use of infiltration based techniques.

Soakage tests in accordance with BRE Digest 365, and consultation with the EA should be undertaken to confirm the feasibility of using infiltration techniques during the detailed design stage.

Permeable Surfaces

Permeable surfaces, such as permeable block paving and porous resin bound gravel or macadam, can mimic soft landscaping by allowing surface water to drain through the surface and into granular sub-base, from where infiltration into the underlying subsoil can occur.

Permeable paving should ideally discharge into the ground, and soakage tests, in line with BRE Digest 365 should be undertaken to assess the suitability of permeable surfaces for the development. If infiltration techniques are not found to be suitable for the Site, the sub-base of permeable paving units could still be used to provide attenuation storage.

Basins, Ponds and Swales

The most sustainable means of drainage are open, vegetative features that allow for evaporation and can effectively remove pollutants through biological action, such as wet swales, filter strips, ponds and wetlands. Given the spatial constraints within the site it is unlikely there will be sufficient space to include surface ponds and non-infiltrating features.

Below Ground Storage Tanks

Over-sized pipes and/or below ground storage tanks are likely to be an option for the provision of surface water attenuation. These may be installed to attenuate peak runoff from the Site with a flow control device limiting the discharge to the agreed rate.

Summary

A review of sustainable drainage techniques outlined within the detailed Site investigation shows that below ground soakaways are unlikely to be an appropriate solution.

The use of below ground storage tanks combined with the pipes drainage network on site will be design to limit the discharge to site to similar greenfield rates while providing capacity for the system to accommodate a 1 in 100 year + 40% climate change allowance for the developed site area.

The drainage design will adopt a volumetric runoff value cv of 1.0 as this will be specifically detailed for the impermeable areas of the site, namely the roofs and hardstanding areas while the landscaped areas will remain to use infiltration.

6. Conclusions and Recommendations

The Site is located within Flood Zone 1; the 0.1% (1 in 1000 year) annual probability of flooding. The main conclusions are therefore as follows:

The risk of flooding from overland flow is considered to therefore be low;

The risk of flooding from ground water is assessed as low;

The risk associated with flooding from sewers is assessed as low;

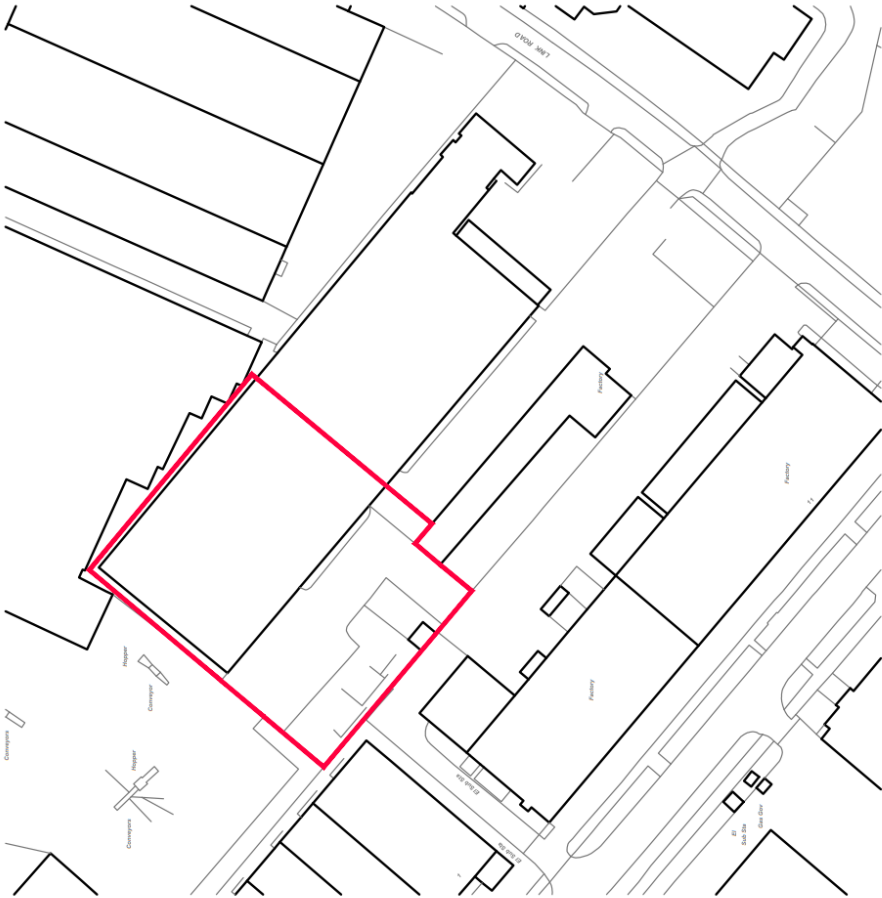
The risks associated with flooding from reservoirs, canals and other artificial sources of flooding are considered low to very low.

A review of sustainable drainage techniques indicates that infiltration will be suitable for the site and subject to further investigation and testing of the below ground soils.

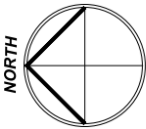
In conclusion the Development site is at minimal risk of flooding as the below ground storage will provide sufficient capacity to deal with the 1 in 100 year + 40% climate change allowance for the drainage areas of the site while maintaining 50% betterment to the existing 1 in 2 year 15 minute runoff rates of 48.3 l/s which the proposal intends to limit the pass forward flow to 24 l/s/24 l/s discharge.

Appendices

Appendix A. Site Location Plan



NOTES	
1.	Do not scale this drawing.
2.	All dimensions to be checked on Site.
3.	Final positions of all equipment to be agreed on Site.
4.	This drawing is subject to Copyright and is not to be reproduced in part or whole without approval.



Rev	By	Date	Description
0	TS	08.10.2024	First Issue.

Client Green Recovery Southwest Ltd.	
Project Former Waste Site Land off Link Road Huyton L36 6AP	
Drawing Title Location Plan	
Drawn By TS	Date October 2024
Job No. P499	Status Preliminary
Dwg No. L01	Rev 0
Scale 1:1250	
 ARCHITECTURE WORKS RESIDENTIAL COMMERCIAL INDUSTRIAL	
The Coach House Warrington Road Middle Trafford Cheshire CH2 6EA Tel: 01244 300199 Mobile: 07914 674074 Email: info@architectureworks.co.uk	

Appendix B. Flood Risk Maps



Flood map for planning

Your reference	Location (easting/northing)	Created
Link Road, Huyton	345502/390227	2 September 2025 11:29

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following**:

- bigger than 1 hectare (ha)
- in an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

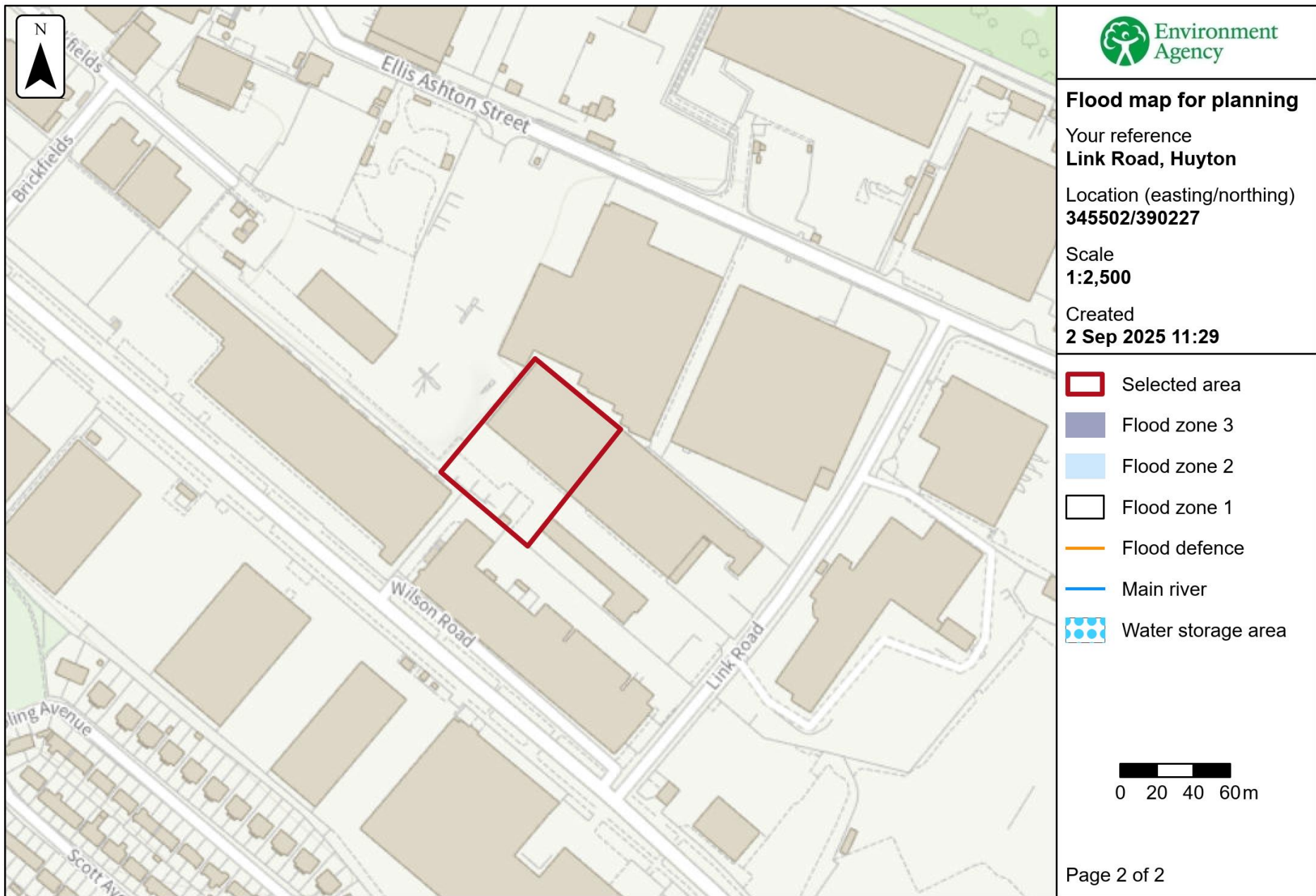
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2025 AC0000807064. <https://flood-map-for-planning.service.gov.uk/os-terms>



Extent of Flooding from Rivers & Sea

Rivers and the sea

[More about your rivers and sea flood risk](#)

Yearly chance of flooding

Very low

Low

Medium

High

Yearly chance of flooding between 2036 and 2069

Very low

Low

Medium

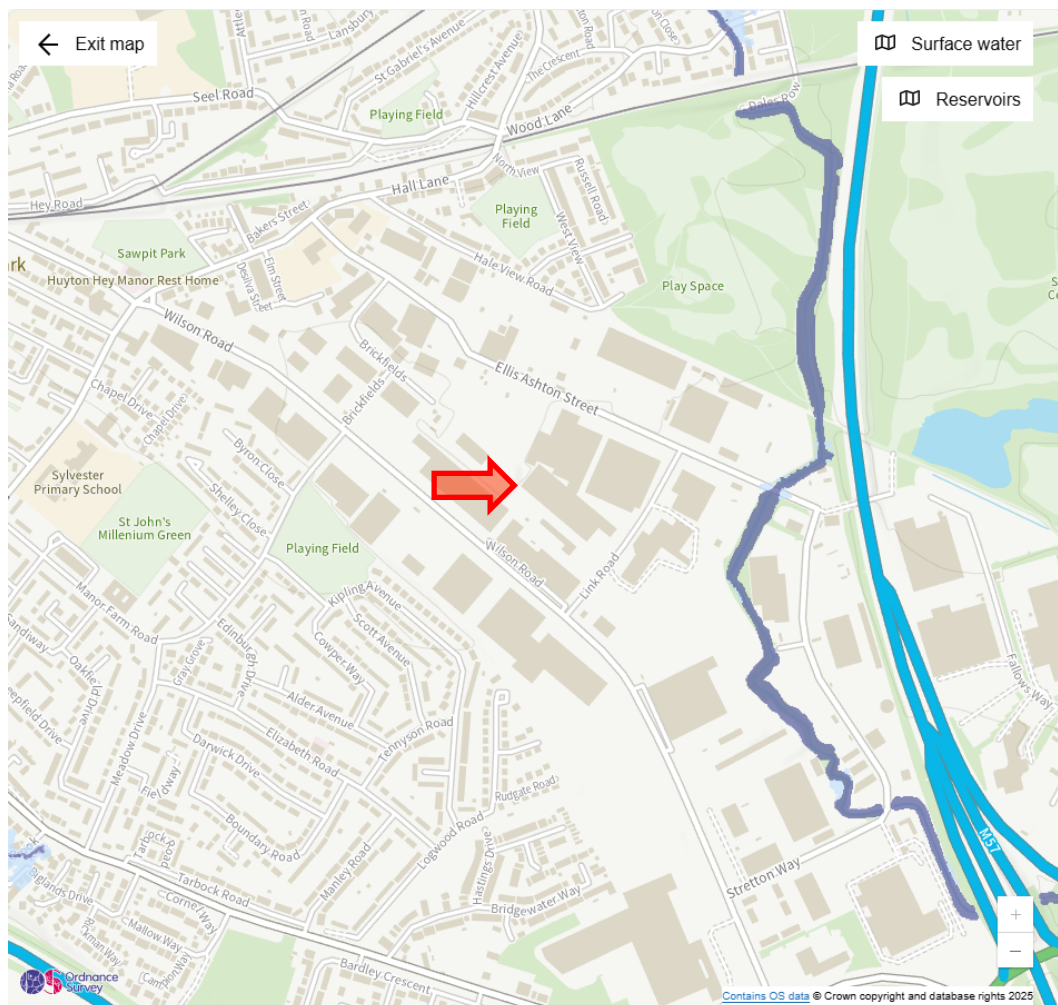
High

What makes rivers and sea flooding more likely

Low-lying areas that are close to rivers or the sea are more likely to flood when water levels rise.

This information takes into account any flood defences.

- Why flood defences cannot completely prevent flooding



Rivers and sea map

Yearly chance of flooding

Extent

■ High chance

More than 3.3% chance each year

Medium chance

Between 1% and 3.3% chance
each year

Low chance

Between 0.1% and 1% chance
each year

Very low chance

Less than 0.1% chance each year

○ Depth

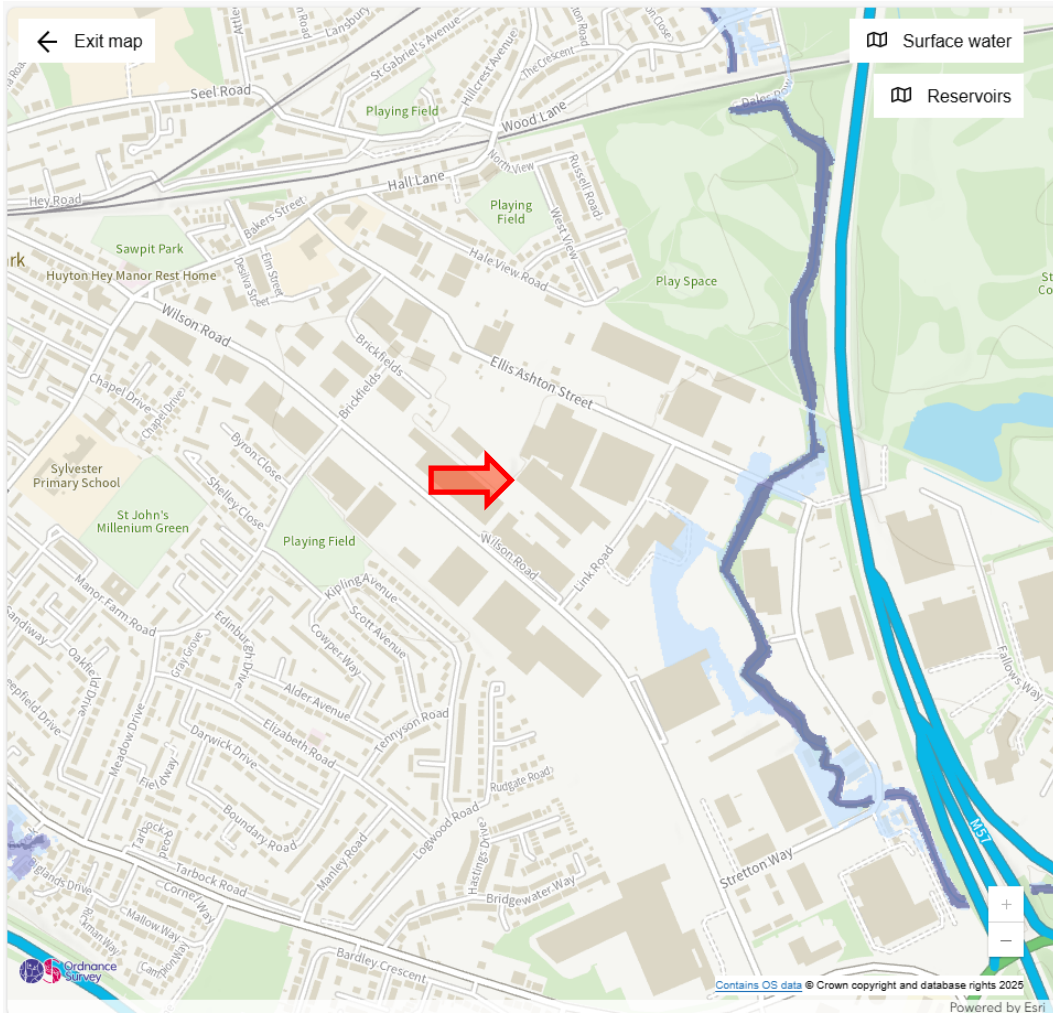
**Yearly chance of flooding
between 2036 and 2069**

○ Extent

○ Depth

Map details

☒ Show flooding



Rivers and sea map

Yearly chance of flooding

☐ Extent

☐ Depth

Yearly chance of flooding between 2036 and 2069

☒ Extent

High chance

More than 3.3% chance each year

Medium chance

Between 1% and 3.3% chance each year

Low chance

Between 0.1% and 1% chance each year

Very low chance

Less than 0.1% chance each year

No data available

☐ Depth

Map details

☒ Show flooding

Extent of flooding from Surface Water

Surface water

[More about your surface water flood risk](#)

Yearly chance of flooding

Very low

Low

Medium

High

Yearly chance of flooding between 2040 and 2060

Very low

Low

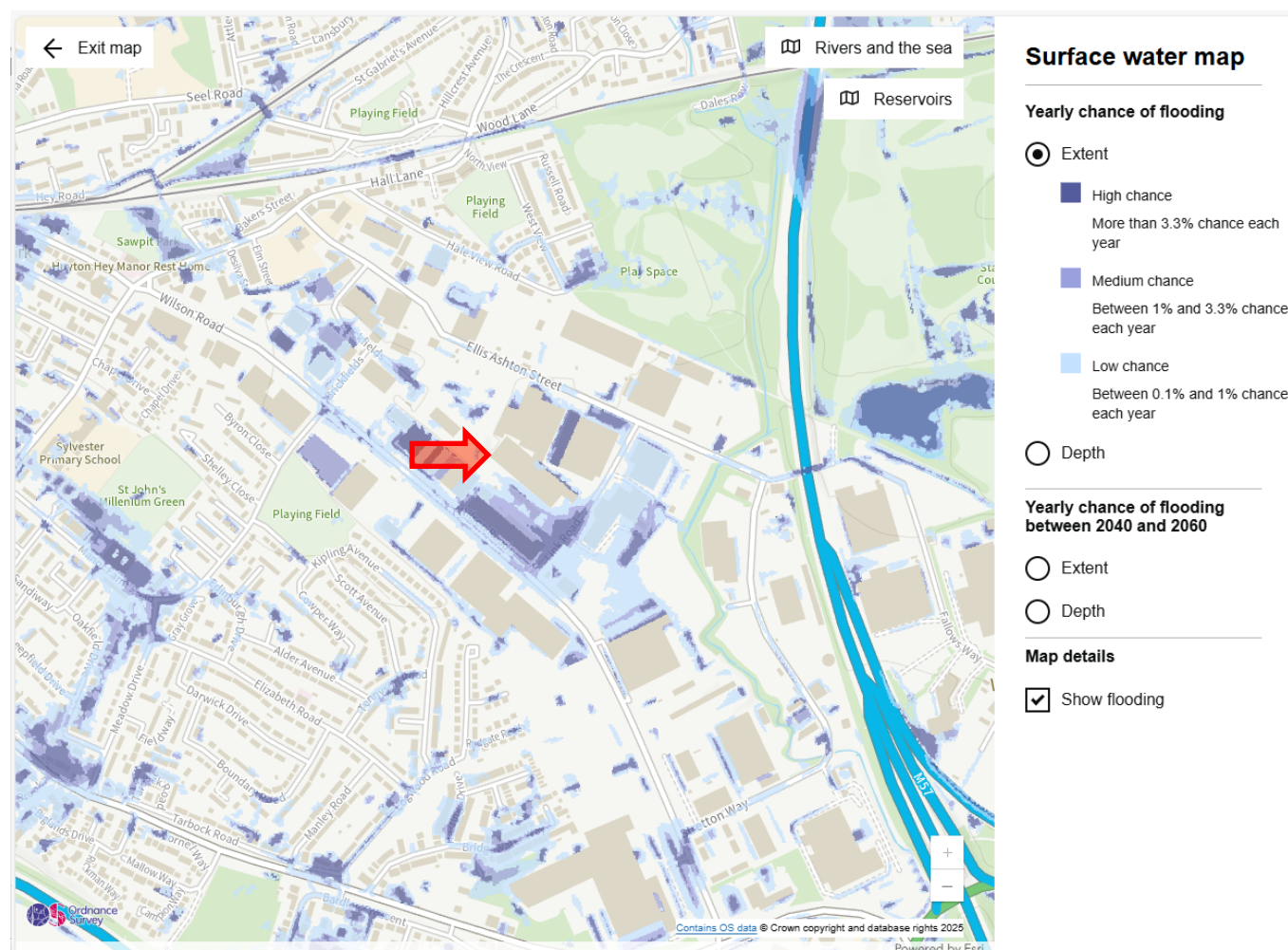
Medium

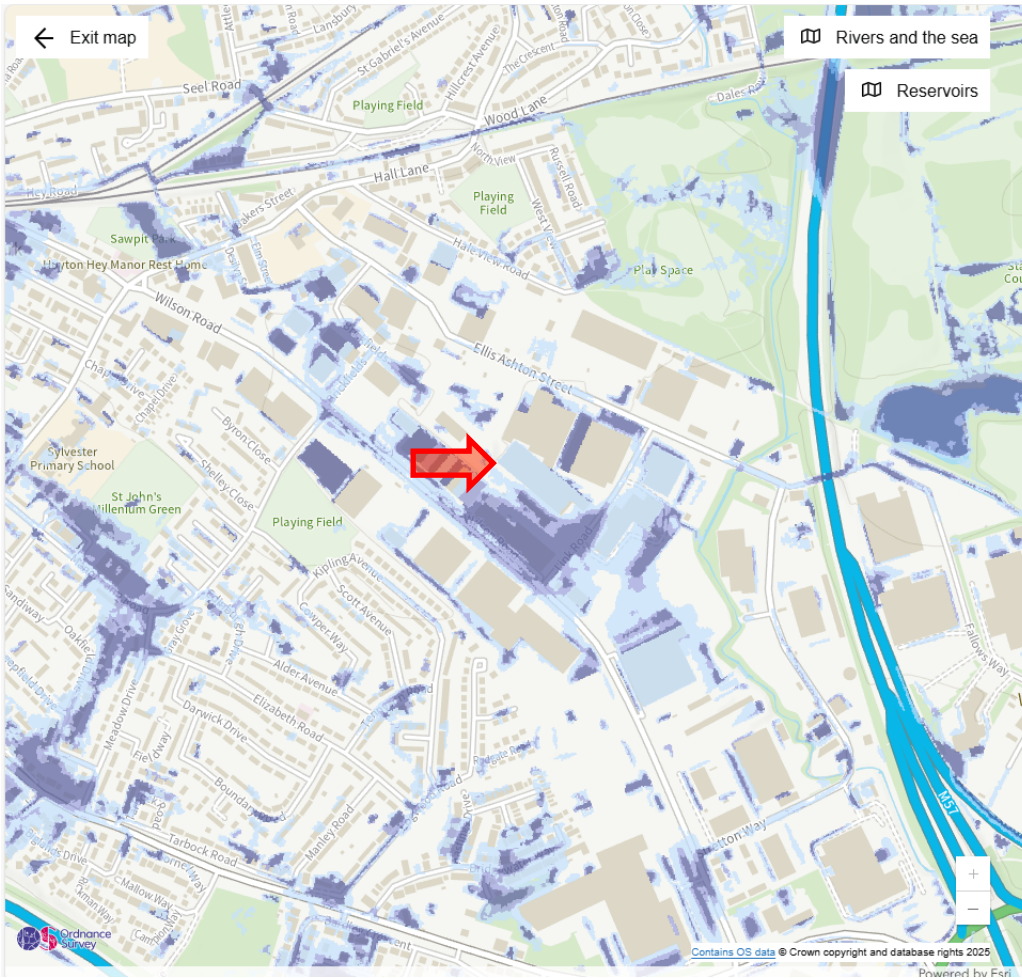
High

What surface water is

Surface water flooding is sometimes known as flash flooding. It happens when rainwater cannot drain away through normal drainage systems.

- ▶ Why surface water flooding is a problem





Surface water map

Yearly chance of flooding

☐ Extent

☐ Depth

Yearly chance of flooding between 2040 and 2060

☒ Extent

High chance
More than 3.3% chance each year

Medium chance
Between 1% and 3.3% chance each year

Low chance
Between 0.1% and 1% chance each year

☐ Depth

Map details

☒ Show flooding

Extent of flooding from Reservoirs

Other flood risks

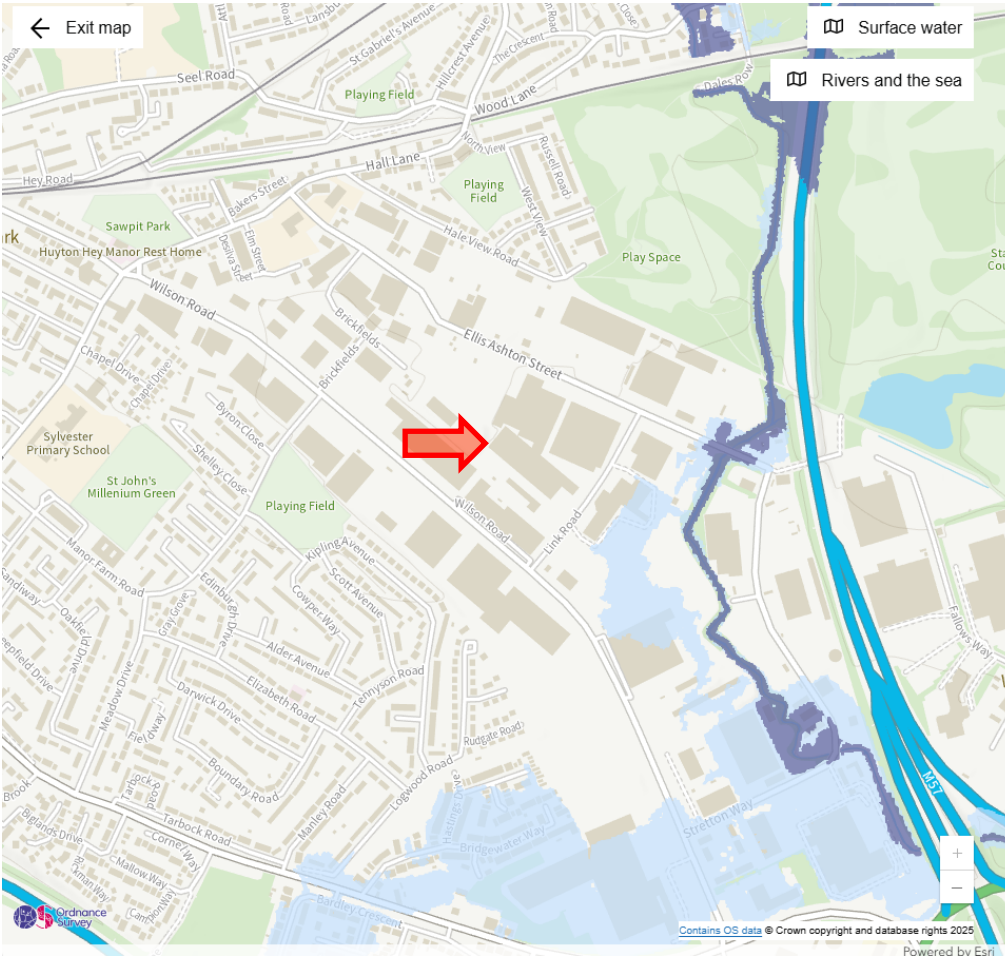
[More about groundwater and reservoirs](#)

Groundwater

Flooding from groundwater is unlikely in this area.

Reservoirs

Flooding from reservoirs is unlikely in this area.



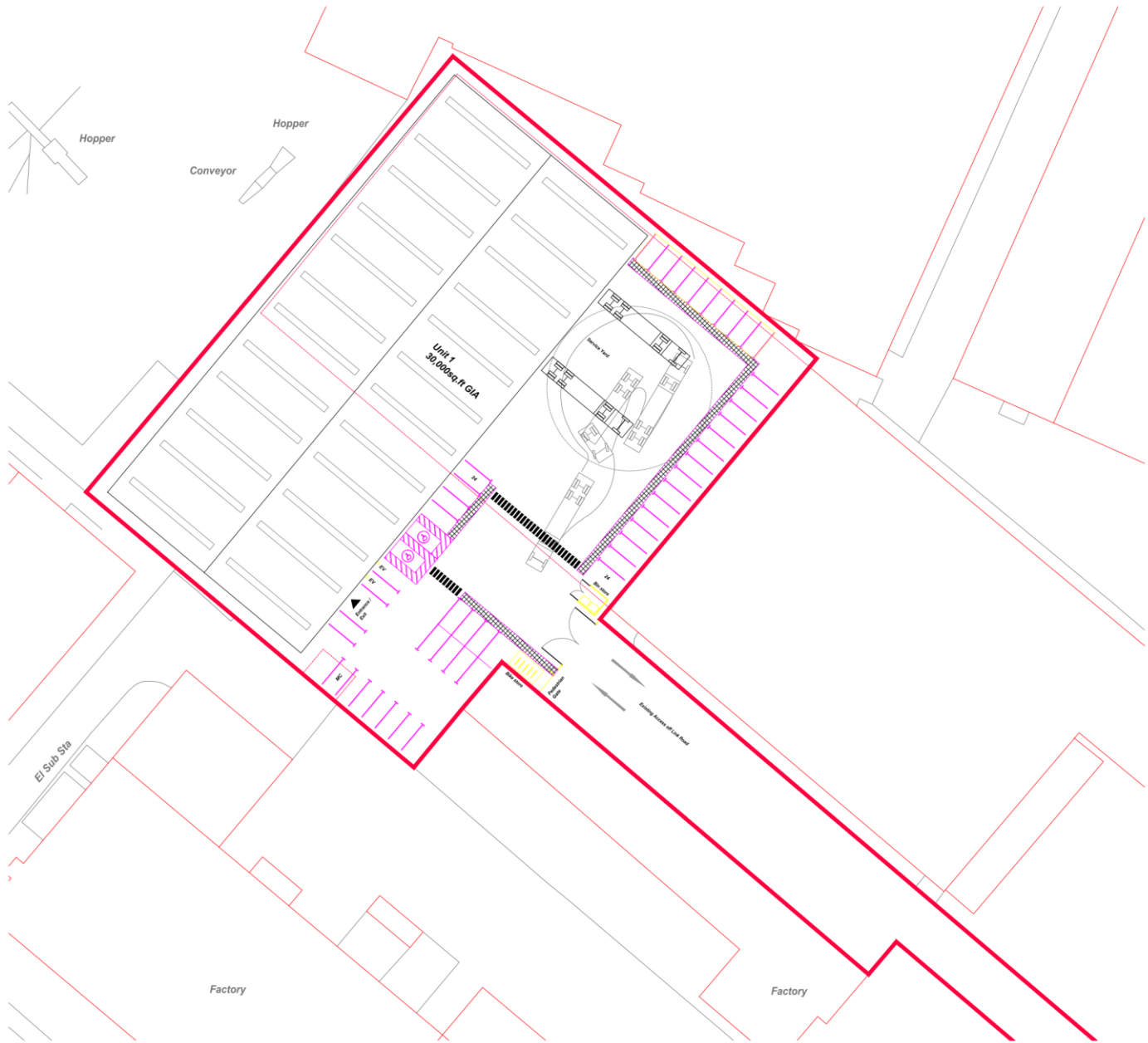
Reservoirs map

- ☒ Extent
 - When river levels are normal
 - When there is also flooding from rivers

Map details

- ☒ Show flooding

Appendix C. Proposed Site Layout



NOTES	
1	As shown on drawing
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100	As shown on drawing



Rev	No	Date	Description
1	1	1/1/2023	Issued

Client
Green Recovery Southwest Ltd

Project
Former Waste Site
Level off Link Road
Hull
L25 5AP

Drawing Title
Proposed Site Layout

Drawn By
TS Date
June 2023

Job No
P429 Date
Planning

Rev No
1.02 Rev 2 Scale
1:200

ARCHITECTURE WORKS
architects

The Green House
Manor Road
Hull
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Email info@architectureworks.co.uk

Appendix D. Proposed Site Drainage Layout

Appendix E. United Utilities Sewer Records



LEGEND

Abandoned Foul Surface Water Combined Public Sewer Section 104 Ring Main Sludge Main Overflow Water Course Highway Drain

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

- Manhole
- Head of System
- Extent of Survey
- Roading Eye
- Islet
- Discharge Point
- Valve
- Non Return Valve
- Sockway
- Gully
- Cascade
- Flow Meter
- Island Box
- Oil Interceptor
- Summit
- Drop Shaft
- Drillage Plate
- Side Entry Manhole
- Outlet
- Screen Chamber
- Inspection Chamber
- Mitigation Chamber
- Lamp Hole
- T Junction / Saddle
- Catchpit
- Valve Chamber
- Vent Column
- Valves Chamber
- Pemstick Chamber
- Network Storage Tank
- Sewer Overflow
- We Treatment Work
- We Pumping Station
- Sepic Tank
- Control Work
- Oil Network Monitoring Point
- Change of Characteristics

MANHOLE FUNCTION

- FO Foul
- SW Surface Water
- CO Combined
- OV Overflow

SEWER SHAPE

- C Circular
- TR Trough
- EG Egg
- AR Arch
- OV Oval
- BA Bore
- FT Flat Top
- HO Horseshoe
- HE Hexagonal
- UR Unspecified
- SQ Square

SEWER MATERIAL

- AC Asbestos Cement
- BR Brick
- PE Polyethylene
- RP Reinforced Plastic Matrix
- CO Concrete
- CBS Concrete Segment Bored
- CSU Concrete Segment Unbored
- CC Concrete Box Culverted
- PSC Plastic / Steel Composite
- GRG Glass Reinforced Plastic
- DI Ductile Iron
- PVC Polyvinyl Chloride
- CI Cast Iron
- SI Spun Iron
- ST Steel
- VC Vitrified Clay
- PP Polypropylene
- FF Fibre Fibre
- MC Masonry, Coursed
- MM Masonry, Random
- U Unspecified

Address or Site Reference:
 LINK RECYCLING UNIT C LINK ROAD,
 HUXTON,
 LIVERPOOL,
 L36 6AP

Scale: 1:1250 Date: 27/08/2025

Sheet: 1 of 1

Printed by: Property Searches

SEWER RECORDS United Utilities
 Water for the North West