



Flood Risk Assessment

Former Syntor Fine Chemicals,

Acornfield Road, Liverpool, L33 7UW

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Client: Applied Nutrition

Prepared: Robbie Lash

Checked: Calvin Agar

Approved: Andrew Webb

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1.0 Background

1.1 Brief

BDN Ltd. has been commissioned by Applied Nutrition to undertake a Level 1 Flood Risk Assessment (FRA) for a proposed portal frame industrial storage unit and office premises with associated infrastructure. The site is centered around Ordnance Survey Grid Ref: SJ 43476 99416 with the nearest post code of L33 7UW. This site-specific FRA has been completed to support the planning application. The site location plan presented in Figure 1.1 indicates the development boundary (red).

Developments have the potential to be at risk of a range of flooding mechanisms and increase the potential flood risk to the development and the surrounding area. As such flood risk is assessed with respect to risk to human life, damage to properties and the effect the development may have on surrounding watercourses, bodies of water and drainage systems. This Level 1 FRA has been prepared to examine the possible sources of flooding, within the context of the National Planning Policy Framework (NPPF) and Technical Guidance.

Consultation will be undertaken with the Environment Agency (EA), United Utilities (UU) and Knowsley Council (KC) as part of the planning application. Data has also been gathered from a number of other sources including National Soil Research Institute (NSRI), local ground investigations, aerial photographs, Ordnance Survey (OS), EA online tools and anecdotal evidence.

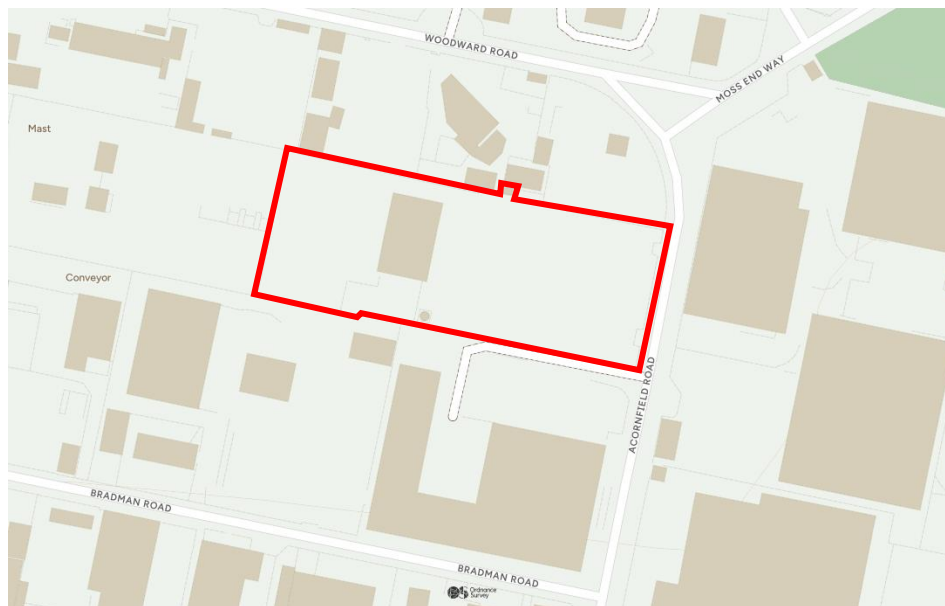


Figure 1.1 Ordnance Survey Map – Site Location

1.2 Report Scope

The Level 1 FRA is based on readily available existing information, including reference to the Knowsley Council Level 1 & 2 Strategic Risk Assessment (SFRA) to confirm the extent of flood risk at the site. The report includes the review of site information and likely extent of any flood risk on the site; identification of whether there are any flooding or surface water management issues related to the development that may warrant further consideration; identification and scoping of other flood risks as required i.e. groundwater flooding; and determining whether further assessment is required i.e. a level 2 FRA.

An FRA should consider a range of flooding mechanisms to satisfy the following three key objectives:

- To assess flood risk to the proposed development and to demonstrate whether any residual risk to the development and its user would be acceptable.
- To assess the potential impact of the proposed development on flood risk elsewhere and to demonstrate that the development would not increase flood risk elsewhere; and
- To satisfy the requirements of national planning policy.

Flood risk should be considered alongside other spatial planning matters such as transport, housing, economic growth, natural resources, regeneration, biodiversity, the historic environment, and the management of other hazards. Policies should recognize the positive contribution that avoidance and management of flood risk can make to the development of sustainable communities, including improving local amenities and better overall quality of life.

An FRA should be carried out to an appropriate degree at all levels of the planning process. It should assess the risks of all forms of flooding to and from development, considering climate change, and should inform the application of the sequential approach if applicable.

CIRIA C624 “Development and Flood Risk – Guidance for the Construction Industry” recommend a phase approach with three levels of assessment as define below:

- Level 1: Screening Study to identify whether there are any flooding or surface water management issues related to a development site that may warrant further consideration. The screening study will ascertain whether a Level 2 or 3 FRA is required.
- Level 2: Scoping Study to be undertaken if the Level 1 FRA indicates that the site may lie within an area that is at risk of flooding, or that the site may increase flood risk due to increase run-off. This study should confirm the sources of flooding which may affect the site.
- Level 3: Detailed Study to be undertaken if the Level 2 study concludes that quantitative analysis is required to assess the flood risk related to the development site.

2.0 Relevant Policy, Legislation and Guidance

2.1 Potential Flood Mechanisms

A Level 1 FRA has been undertaken using the following legislation and guidance:

- National Planning Policy Framework
- Flood and Water Management Act
- Knowsley Council and Sefton Council Level 1 Strategic Flood Risk Assessment
- Northwest River Basin Local Flood Risk Management Strategy
- Alt Crossens Catchment Flood Management Plan

2.2 National Planning Policy Framework

The NPPF published in December 2024, is a key part of the government's reform to make the planning system less complex and more accessible; to protect the environment and to promote sustainable growth.

In addition, the Technical Guidance to the NPPF published by the Department for Communities and Local Government has also been reviewed in relation to flood risk. This document provides additional guidance to ensure the effective implementation of the planning policy set out in the NPPF on development in areas at risk of flooding.

The NPPF aims to prevent inappropriate development in areas at risk of flooding and to ensure that, where development is necessary in areas at risk of flooding, it is safe without increasing flood risk elsewhere. Local Authorities should only consider development in flood risk areas appropriate where informed by a site-specific FRA, based upon the EA's Standing Advice on flood risk.

The NPPF requires that a site-specific FRA is required for proposals of 1 hectare or greater in Flood Zone 1; all proposals for new development (including minor development and change of use) in Flood Zones 2 and 3, or in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the EA); and where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding. This means that the FRA should identify and assess the risks of all forms of flooding to and from the development and demonstrate how flood risks will be managed so that the development remains safe throughout its lifetime, taking climate change into account.

Development should be directed as far as practicable towards Flood Zone 1 areas (Low Probability (<0.1% Annual Exceedance Probability (AEP) of fluvial/ sea flooding)) to avoid fluvial flood risks wherever this is possible. For development proposed in Flood Zone 1, if the development area is greater than 1 hectare an FRA will still be required to address design issues related to the control of surface water runoff and climate change, as well as considering any other potential sources of flood risk for the development site.

2.3 The Flood and Water Management Act 2010

The Flood and Water Management Act 2010 determined the need for flood risk to be managed within the framework of National Strategies for England and Wales and within Local Strategies for each Local Flood Authority Area. The national strategy for England sets out the principles for flood risk management and which organisations are responsible for implementation.

In accordance with the national strategy for England, Lead Local Flood Authorities (LLFAs) have been allocated responsibility for developing independent Local Flood Risk Management Strategy's (LFRMS's) to address sources of local flooding. Each LFRMS identifies which local organisation is accountable for managing flood risk and establishes partnership agreements, as well as undertaking an assessment of flood risk and developing plans / actions, for tackling these risks.

2.4 Knowsley Council & Sefton Council Level 1 Strategic Flood Risk Assessment

The SFRA is a hybrid of a Level 1 assessment at a Borough wide level for each Borough combined with a more detailed assessment. The detailed aspects incorporate elements of; a Level 2 SFRA for specified regeneration /development areas and sites; and sites identified in the strategic housing land assessment and employment land study.

The purpose of the SFRA is to clarify and refine available flood risk information and to inform the planning decision making processes. This will enable robust and reliable decisions to be made on locations for development and growth. The information is firstly used by Local Planning Authorities (LPAs), in preparing their Core Strategies and other future Local Development Documents (LDDs). It can also be used by developers in their appraisal of potential development sites and the scoping of site specific Flood Risk Assessment (FRAs) should they be necessary.

2.5 North West River Basin Flood Risk Management Strategy

The second cycle Flood Risk Management Plan (FRMP) is a plan to manage significant flood risks within the Northwest River Basin District (RBD). The plan focuses in particular on areas that have been designated as being at particular risk of flooding from either rivers and sea or surface water.

The Environment Agency and other RMAs, in particular Lead Local Flood Authorities (LLFAs) worked together to develop the first cycle FRMP. This was in order to create a plan to manage the risk from all sources of flooding. The second cycle FRMP will build on this approach.

2.6 Alt Crossens Catchment Flood Management Plan

CFMPs help us to understand the scale and extent of flooding now and in the future and set policies for managing flood risk within the catchment. CFMPs should be used to inform planning and decision making by key stakeholders such as:

- The Environment Agency, who will use the plan to guide decisions on investment in further plans, projects, or actions.
- Regional planning bodies and local authorities who can use the plan to inform spatial planning activities and emergency planning.
- IDBs, water companies and other utilities to help plan their activities in the wider context of the catchment.
- Landowners, farmers, and land managers that manage and operate land for agriculture, conservation, and amenity.
- The public and businesses to enhance their understanding of flood risk and how it will be managed.

3.0 Relevant Policy, Legislation and Guidance

3.1 Site Location and Description

The site currently comprises approximately 1.456 hectares of brownfield land and is surrounded by industrial development. The site is located on Acornfield Road, which runs along the eastern boundary of the site. The site is currently vacant after being previously occupied by Syntor Fine Chemicals.

The existing access and boundary are to remain as existing.

3.2 Topography

A topographical survey has been completed for the site. Following a review of the information, it appears that the site is relatively flat, with there being around a 1 metre range of 39.1mAOD – 40.1mAOD across the whole site. Refer to Appendix A for more information.

3.3 Hydrology

The Ordnance Survey and EA maps show that the site is situated within the catchment of the River Mersey. The river lies approximately 11.5km to the northwest.

Other unnamed watercourses can be found within the vicinity of the site although all lie outside of the commercial area.

3.4 Drainage

Records of the existing drainage have been obtained for the site. Existing United Utilities foul and surface water infrastructure is located within Acornfield Road. A United Utilities foul water sewer runs east to west along the southern boundary of the site. Refer to Appendix C for the United Utilities drainage map.

3.5 Water Mains

Records of the potable water have been obtained for the site. A United Utilities distribution main runs within Acornfield Road. Refer to Appendix C for the United Utilities service map.

3.6 Flood Defence

The site does not benefit from any flood defences.

3.7 Reservoir

There are no reservoirs recorded within 1km of the site.

3.8 Geology and Hydrology

A site investigation has been completed for the site by Spire Geotechnical, which can be summarised as follows:

Made ground was recorded in each position to depths of between 0.20m and 1.20m depth below surface. Made ground generally includes concrete or gravel surfacing. In the west, the made ground included roadstone/aggregate locally overlying a thin clay fill. In the site centre, a placed stone backfill is present (part of previous remedial work in 2017).

The made ground overlies firm and stiff cohesive glacial till deposits. The till was initially soft in nature. The clay overlies solid geological deposits of sandstone at an approximate depth of 10m from surface.

Localised areas of shallow trapped/perched groundwater were observed generally at the made ground and natural clay interface.

4.0 Current Site Flood Classification

4.1 Flood Risk and Probability

The risk framework outlined in the SFRA defines the flood risk using the categories in Table 4.1. The EA flood map defines the geographical extent of fluvial flooding for Flood Zones 1, 2, 3a and 3b.

Flood Zone	Definition	Probability
Flood Zone 1	At risk from flood event greater than the 1 in 1000-year event (greater than 0.1% annual probability).	Low Probability
Flood Zone 2	At risk from flood event between the 1 in 100 and 1 in 1000-year event (between 1% and 0.1% annual probability)	Medium Probability
Flood Zone 3a	At risk from a flood event less than or equal to the 1 in 100-year event.	High Probability
Flood Zone 3b	Land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood or otherwise defined by the Local Planning Authority. This zone also comprises land where water has to flow or be stored in times of a flood.	Functional Floodplain

Table 4.1a Fluvial Flood Zone Definition

Flooding is a natural process that can present a range of different risks depending on its form. Flood practitioners and professionals define the risks presented by flooding according to an Annual Exceedance Probability (AEP), or as having a 'return period.'

Flood Risk includes the statistical probability of an event occurring and the scale of the potential consequences. Flood risk is estimated from historical data and expressed in terms of the expected frequency of a flood of a given magnitude. The 10-year, 50 year and the 100-year floods have a 10%, 2%, and 1% chance of occurring in any given year, respectively. However, over a longer period the probability of flooding is considerably greater.

For example, for the 100-year return period flood:

- There is a 1% chance of the 100-year flood occurring or being exceeded in any single year.
- A 26% chance of it occurring or being exceeded in a 30-year period; and
- A 51% chance of it occurring or being exceeded in a 70-year period.

Table 4.2 below provides a summary of the relevant AEP and corresponding return period events of a particular severity.

AEP	Definition
100%	1 in 1 Year
10%	1 in 10 Years
2%	1 in 50 Years
1%	1 in 100 Years
0.5%	1 in 200 Years
0.1%	1 in 1000 Years

Table 4.1b Definition of AEP and Return Period Flood Events

4.2 Flood Risk Vulnerability and Flood Zone Compatibility

In terms of flood risk vulnerability, the existing development is classified as “Less Vulnerable” in the NPPF and SFRA which includes buildings used for general industry, storage and distribution.

The SFRA states that the suitability of all sites in flood risk terms will be subject to ratification by the EA, a detailed site-specific FRA being prepared to support any planning application and demonstration that surface water runoff from the development will pose no detrimental impact to off-site areas.

As this application is located in Flood Zone 2 and is classified as “Less Vulnerable” the site can be considered suitable for the proposed development.

Flood Zone	Flood Risk Vulnerability Classification				
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test Required	✓	✓	✓
Zone 3a	Exception Test Required	✗	Exception Test Required	✓	✓
Zone 3b	Exception Test Required	✗	✗	✗	✓

Table 4.2 Fluvial Flood Zone Definition

4.3 Flood Assessment

Potential sources of flooding and associated mechanisms for review are as follows:

- Tidal Sources - Potential flooding resulting from tidal sources.
- River (Fluvial and Tidal) Sources - Potential flooding resulting from watercourses near to the site or from the sea.
- Groundwater Flooding- Potential flooding because of rising groundwater levels.
- Overland/Surface water (Pluvial) Flooding - Potential flooding because of surface water flows from adjacent land.
- Sewers and Drains - Potential flooding resulting from sewers or drains.
- Canals and Artificial Waterways - Potential flooding resulting from failure or overtopping canal networks.
- Reservoir/Lake Flooding - Potential flooding resulting from overtopping or bursting of reservoirs or lakes.
- Infrastructure - Potential flooding because of failed or burst water mains; and
- Climate Change – Potential rise in sea levels and estimated peak flows of watercourse.

4.4 Tidal Flooding

Coastal flooding occurs when sea levels rise above the normal tidal range. This can happen anywhere around the coast, including the estuaries. Tidal flooding is a result of one or a combination of high tides, storm or tidal surges, wave action and high sea levels combining with high river flows.

The site is located inland and does not lie within an area at risk of tidal flooding. Tidal flooding is therefore not a flood risk associated with this proposed development and requires no further consideration.

4.5 River (Fluvial) Flooding

The existing site is considered as Less Vulnerable Infrastructure and as such is suitable for development within Flood Zones 1, 2 and 3a. The EA mapping service which is used to confirm the extent of a flood zone within the vicinity of a site indicates that the Site is located in Flood Zone 2 and is at low risk of fluvial flooding.



Figure 4.5a Environment Agency – Existing Fluvial Flood Map

Fluvial flooding occurs when water courses receive an increased volume of surface water run-off. This can be exacerbated by new developments introducing increased areas of impermeable surfaces to the catchment and reducing the time of entry of flows to the water course.

The majority of the proposed building is within Flood zone 1 and there will be no practical implications arising from the proposed development.

The DEFRA Paper 'Flood and Coastal Defence Project Appraisal Guidance (1999)' gives indicative standards of protection for existing development against river flooding of 1.0 – 4.0% annual probability of failure for typically less intensively developed urban areas i.e. they defend against a flood with that probability of occurring.

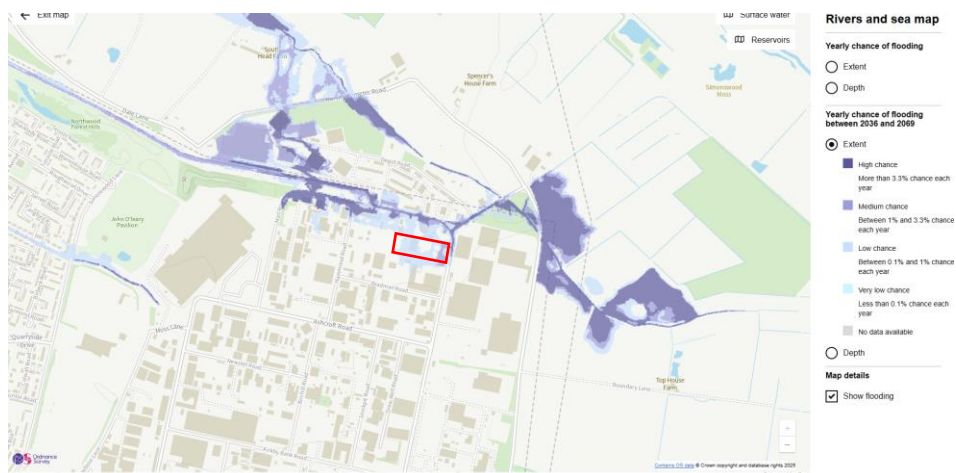


Figure 4.5b Environment Agency – Future Fluvial Flood Map

Figure 4.5b shows the yearly chance of fluvial flooding between 2036 and 2069. The information shows that even when considering future modelling the site will remain at low risk of fluvial flooding, with only the area designated as car-parking for the site falling into a medium risk of flooding.

Based on the guidance within the NPPF the site is suitably located with respect to fluvial flooding.

4.6 Groundwater Flooding

Groundwater flooding generally occurs during intense, long-duration rainfall events, when infiltration of rainwater into the ground raises the level of the water table until it exceeds ground levels.

Groundwater flooding may take weeks or months to dissipate as groundwater flow is much slower than surface water flow and water levels thus take much longer to fall. Groundwater flooding is sporadic in time and location, but when it does occur, it usually lasts longer than surface water flooding and interferes with property and infrastructure (such as roads). Groundwater levels may also rise because of reactivating springs.

Based on the geological information available it is unlikely that the geological strata would be highly responsive to rainfall events and therefore the changes in groundwater level over time are unlikely to be significant resulting in groundwater flooding issues.

The information available suggests that the site is not at risk from groundwater flooding.

4.7 Overland/Surface Water (Pluvial) Flooding

Pluvial and overland flow results from rainfall that fails to infiltrate the surface and travels over the ground surface. This is exacerbated by low permeable urban development or low permeability soils and geology (such as clayey soils). Overland flow is likely to occur at the base of an escarpment and low points in terrain. Local topography and built form can have a strong influence on the direction and depth of flow. The design of development down to a micro-level can influence or exacerbate this. Overland flow paths should be considered in spatial planning for urban developments. In addition, surface water flooding can be exacerbated if development increases the percentage of impervious area.

The EA flood map as shown in Figure 4.7a has identified that site is classed as mainly low, with some medium risk -with the majority of the site outside of the area classed as low risk (less than 0.1% annually) of surface water flooding.



Figure 4.7a Environment Agency – Existing Pluvial Flood Map

Surface water flooding can be exacerbated if development increases the percentage of impervious area which has the potential to change the surface water flow regime for the site and the surrounding area. All surface water run-off will be collected and redirected into the existing United Utilities drainage.

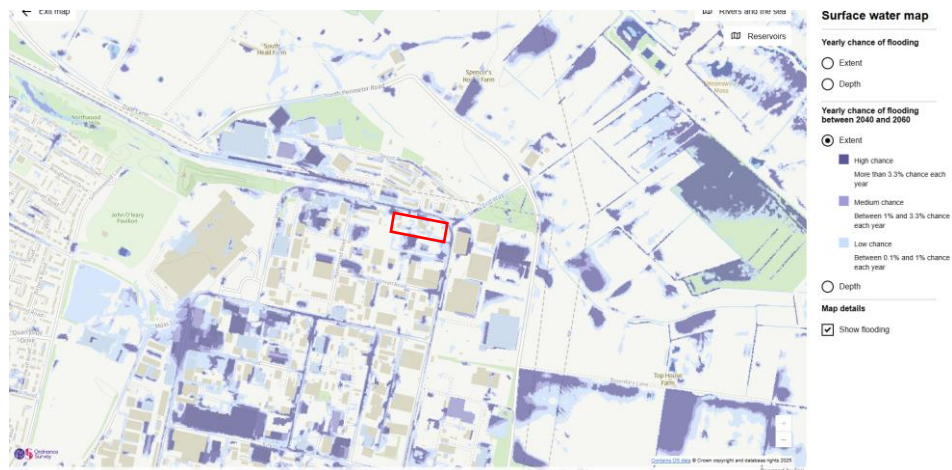


Figure 4.7b Environment Agency – Future Pluvial Flood Map

Future pluvial flood risk is shown in figure 4.7b it shows that between 2040 and 2060 the yearly chance of flooding of the site does increase and part of the site will have a medium to high chance of flooding.

This mapping is based on the current ground levels and does not account for the proposed development which will introduce positive drainage ultimately reducing the risk of future surface water flooding.

There will be no change to the flood risk of the surrounding areas and flow routes. The risk of flooding elsewhere will not increase, and the performance of the flood route will be maintained.

No further consideration of this flooding mechanism is required.

4.8 Sewer Flooding

Flooding can occur when the sewerage infrastructure becomes overwhelmed by heavy rainfall (due to inadequate capacity) or blockages in drain systems (such as silt or debris accumulation). Works above or adjacent to existing sewer networks may also damage buried pipeline to the extent that it leads to flooding through damage during excavations or through damage causing blockages below ground.

There are no recorded flooding incidents caused by incapacity within the sewerage network affecting the site and as such no further consideration of this flooding type is required.

4.9 Canals and Artificial Waterways

There are no canals or artificial waterways within 1km of the site boundary, as such flood risk is considered low as such no further consideration of this flooding type is required.

4.10 Reservoirs and Lakes

When reservoirs and lakes flood, there can be implications beyond the immediate area of the water body.

The likelihood of reservoir flooding is much lower than other forms of flooding. Current reservoir regulation, which has been further enhanced by the Flood and Water Management Act, aims to make sure that all reservoirs are properly maintained and monitored to detect and repair any problem. Due to the flood management and protection regulations, the likelihood of reservoir failure is very low, therefore reservoir flood risk is ultimately very low.

The EA flood map shown in Figure 4.10, shows that in the very unlikely event of a failure of a body of water upstream, the site would still not be at risk of flooding.

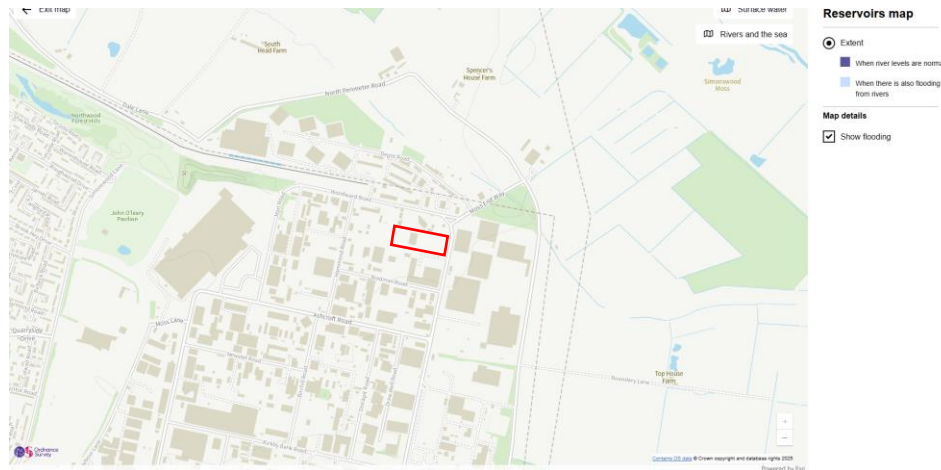


Figure 4.10 Environment Agency - Reservoir Flood Map

4.11 Water Mains

Based on the site topography and water main locations, the risk to the development is considered low and as such no further consideration of this flooding type is required.

4.12 Climate Change

UK Climate Projections is a climate analysis tool that forms part of the Met Office Hadley Centre Climate Programme. The UKCP18 project uses cutting-edge climate science to provide updated observations and climate change projections out to 2100 in the UK and globally.

Climate change will be the major cause of increased flood risk in the future. The CFMP suggests that for climate change the EA tested the following changes up to 2125:

- In the Flood Risk and Coastal Change section of the planning guidance, it is understood that to adequately take climate change into account for the site, it should be within the upper end allowance category for Table 1 peak river flow allowances by river basin district (use 1981 to 2000 baseline). As such a 40% allowance for climate change should be allowed.
- A total sea level rise of 1430 mm by the year 2125. This will increase the probability of tidal flooding and increase the length of time that watercourses will not be able to flow freely to the sea at high tide (tide-locked).
- Climate change was shown to have a significant impact on flood risk.

The Analysis of UK Climate Projections 2022 (UKCP18) found that:

- For the most recent decade (2009-2018), winters have been on average 5% wetter than 1981-2010 and 12% wetter than 1961-1990. Summers in the UK have also been wetter, by 11% and 13% respectively. However, very long-period natural variations are also seen in the longer

observational record. These show periods in earlier parts of the historical record with similar levels of UK summer rainfall to 2009-2018, illustrating the importance of considering long-period natural variations.

- Total rainfall from extremely wet days (days exceeding the 99th percentile of the 1961-1990 rainfall) increased by around 17% in the decade (2008-2017)³, for the UK overall. However, changes are largest for Scotland and not significant for most of southern and eastern England.
- Mean sea level around the UK has risen by about 17 cm since the start of the 20th century (when corrected for land movement).

Climate change allowances are predictions of anticipated change for:

- peak river flow
- peak rainfall intensity
- sea level rise
- offshore wind speed and extreme wave height

To increase resilience to flooding and coastal change, allowances should be made for climate change in the flood risk assessment.

There are allowances for different climate scenarios over different epochs, or periods of time, over the coming century. They include figures for extreme climate change scenarios.

Rainfall patterns across the UK are not uniform and vary on seasonal and regional scales and will continue to vary in the future.

It has been predicted that the UK's coastal flood risk will increase under all the emission scenarios used in UKCP18, because of mean sea level rise. This will result in an increase in the frequency and magnitude of extreme water levels around the UK coastline. This increase in coastal flood risk combined with an increase in precipitation in winter is likely to result in more frequent flooding in various parts of the UK.

The impact of climate change will likely increase the risk of flooding from several of the mechanisms considered, therefore it is recommended that the resident of the property sign up to the EA flood warning service and consider appropriate protection measures. It is not anticipated that an evacuation plan for the site is required as the normal access locations will be available.

Technical Guidance to the NPPF and the PPG include for an increase in the peak rainfall intensity of up to 40%, as well as increase in peak flows in watercourses of up to 61% within 100 years. This will significantly affect smaller urban catchments, leading to rapid runoff into and subsequent increased flows within watercourses, surface water flooding, surcharging of gullies, drains and sewer flooding.

CFMPs have also considered flood risk for the next 50-100 years and have considered the flood risk drivers of climate change, urban development, and changes in land use.

Catchment models and the Modelling and Decision Support Framework (MDSF) software were used in the CFMP to test sensitivity to the flood risk drivers across the catchments in the study area.

The location of future urban developments and flood defences within a catchment can heavily influence flood risk in the area and has the potential to further increase flood risk at areas downstream of such developments. Impacts include the lowering of the SoP offered by flood defences and the carrying capacity of culverts, drains, sewers and watercourse channels. This potentially leads to areas being at risk of flooding that were previously not at risk and highlights the increasing conflicts and pressures that are emerging between climate change scenarios and future development aspirations.

The NPPF sets out important objectives to tackle climate change, sea level rise and avoid flood risk. The purpose of design policies should be to ensure that developments are sustainable, durable, and adaptable to natural hazards such as flooding. Following this guidance, it should be possible to mitigate against increased flood risk through incorporating 'flood proofing' measures such as raised finished

floor levels into the development design, and/or development of compensatory storage and flood storage basins. The Adaptation Strategies for Climate Change in the Urban Environment (ASCCUE) project is a study undertaken collaboratively by the University of Manchester, The University of Cardiff, University of Southampton, and Oxford Brooks University. One of the aspects examined was surface water runoff during extreme rainfall events. With an increase in development, there comes an increase in the number of impermeable areas thus leading to increased runoff during storm events.

5.0 Conclusion and Recommendations

5.1 Conclusions

This Level 1 FRA concludes that:

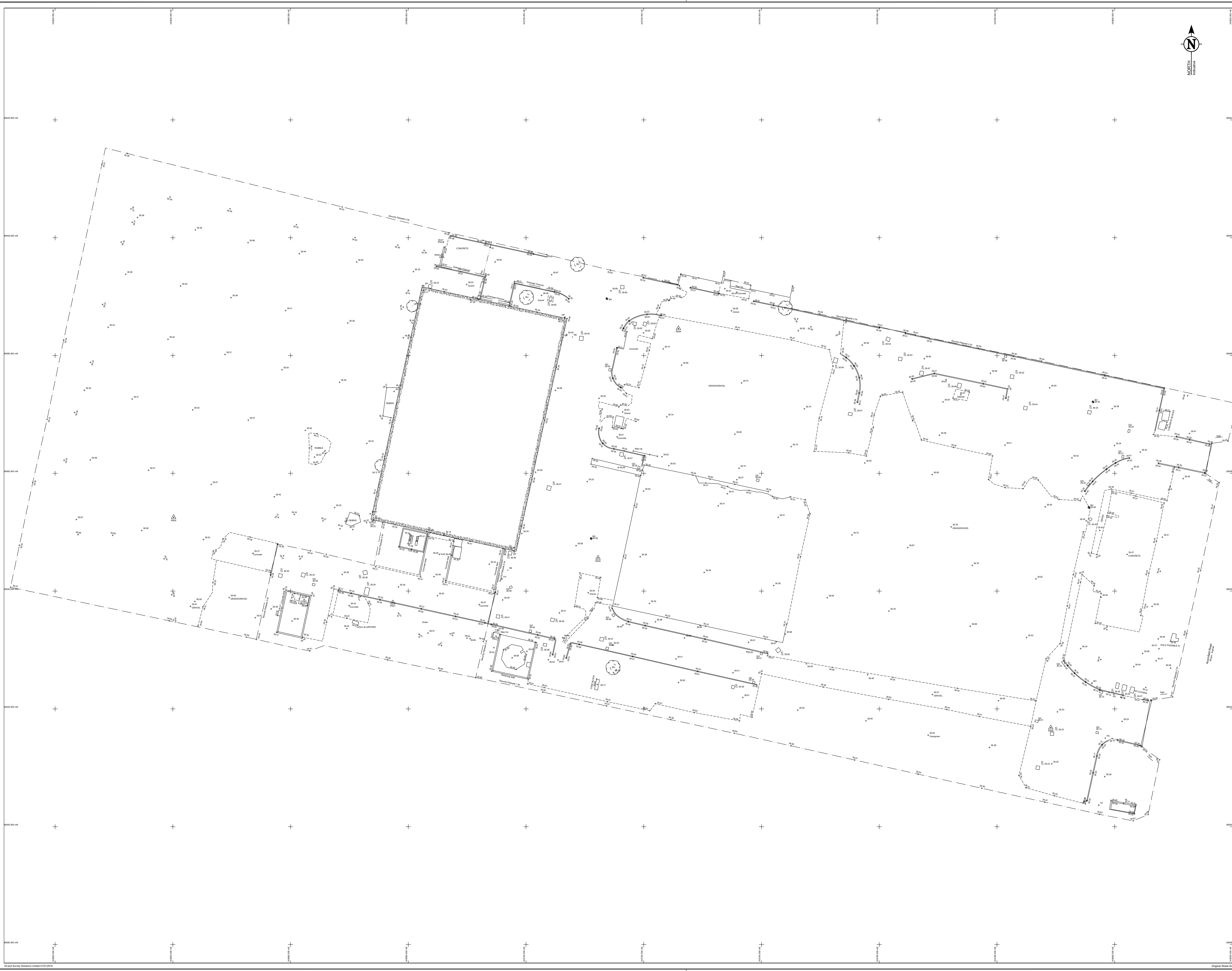
- Tidal Flooding – The Environment Agency mapping shows that the site is not at risk of flooding therefore no further assessment is required with respect to Tidal flooding.
- River Flooding (Fluvial) – The Environment Agency mapping classified the site as Flood Zone 2, the building has as far as possible been located within the Flood Zone 1 extents limiting the flood risk as far as practicable.
- Groundwater Flooding - there is a low risk of groundwater flooding occurring at the site; therefore, no further assessment is required with respect to groundwater flooding.
- Surface Water (Pluvial) Flooding - The Environment Agency mapping shows that the site is at medium-low risk of flooding. The proposed development will change the surface water flow regime for the site and proposals have been developed in line with local and national guidelines.
- Sewer Flooding – There are no recorded previous flooding incidents from the sewers located surrounding the site. The risk of sewer flooding affecting the site is therefore considered low.
- Canals and Artificial Waterways Flooding – The location of canals and artificial waterways are sufficiently far from the site and therefore unlikely to result in flood risk and as such will not require further assessment.
- Reservoirs and Lakes – The Environment Agency mapping shows that the site is at no risk of flooding and as such no further consideration is required.
- Water Mains –United Utilities records show a potable water main passing close to the eastern boundary of the site, it is considered that any flooding would not reach the existing development and so does not require further assessment.
- Climate Change - the potential impacts of climate change will increase the risk of flooding but as there is minimal change to the impermeable area of the site and additional drainage is proposed this requires no further consideration.

5.2 Recommendations

The Level 1 FRA shows that the site is not at risk from the flooding mechanisms assessed in this document with the exception of pluvial and fluvial flooding. The proposed development is considered to be suitably located based on the proposed land use and flood zone classification subject to the resilience measures detailed within this report.

Consideration must be given to the proposed drainage strategy to ensure that any generated surface water across the site is suitably managed. On this basis a Level 2 FRA is not required for the site.

Appendix A – Topographical Survey



DRAWING NOTES

Topographical Notes

Contours are to be shown, including the average canopy spread. Descriptions and heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type including roof type, and other details are to be shown. Distances from ground level are to be shown below ground details including drainage, waste and service have been identified from ground level and therefore all details relating to these features are to be shown. All details are to be shown in plan and section. All critical dimensions and connections should be checked and verified prior to starting construction.

Detail, services and features may not have been surveyed if obstructed or not reasonably visible at the time of the survey.

Survey physical features may not necessarily represent the legal boundary of the site.

Measured Building Surveys

Measurements to internal walls are taken to the wall finish at approx 1m above the floor level and the wall assumed to be vertical.

General

The contractor must check and verify all site and building dimensions, levels, heights and drainage details and concordance prior to commencing work. Any errors or discrepancies must be notified to Survey Solutions immediately.

The accuracy of the digital data is the same as the pictorial sketch implies. All dimensions are to be taken to the centre of the feature unless stated.

The survey control listed is only to be used by the pictorial sketching only. It is stated Survey Solutions Limited holds the copyright to all the information contained within the drawings and that written consent must be obtained before copying or using the data for other purposes. The purpose was originally prepared for the client.

This drawing should only be scaled using digital methods.

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) National Grid at multiple points using GNSS with a scale factor of 1.000.

The level datum established for this survey is related to Ordnance Survey (OS) using GPS Smartnet.

To avoid discrepancies within the survey, adding to the survey or setting out points from the survey, any coordinated data must be directly derived from the original survey control. Survey Solutions are not responsible for any third-party adding survey data to the existing information.



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Appendix B – Environment Agency Flood Map for Planning

Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
343716/399357

Created
26 Feb 2025 8:49

Your selected location is in flood zone 3, an area with a high probability of flooding.

This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see www.gov.uk/guidance/flood-risk-assessment-standing-advice)

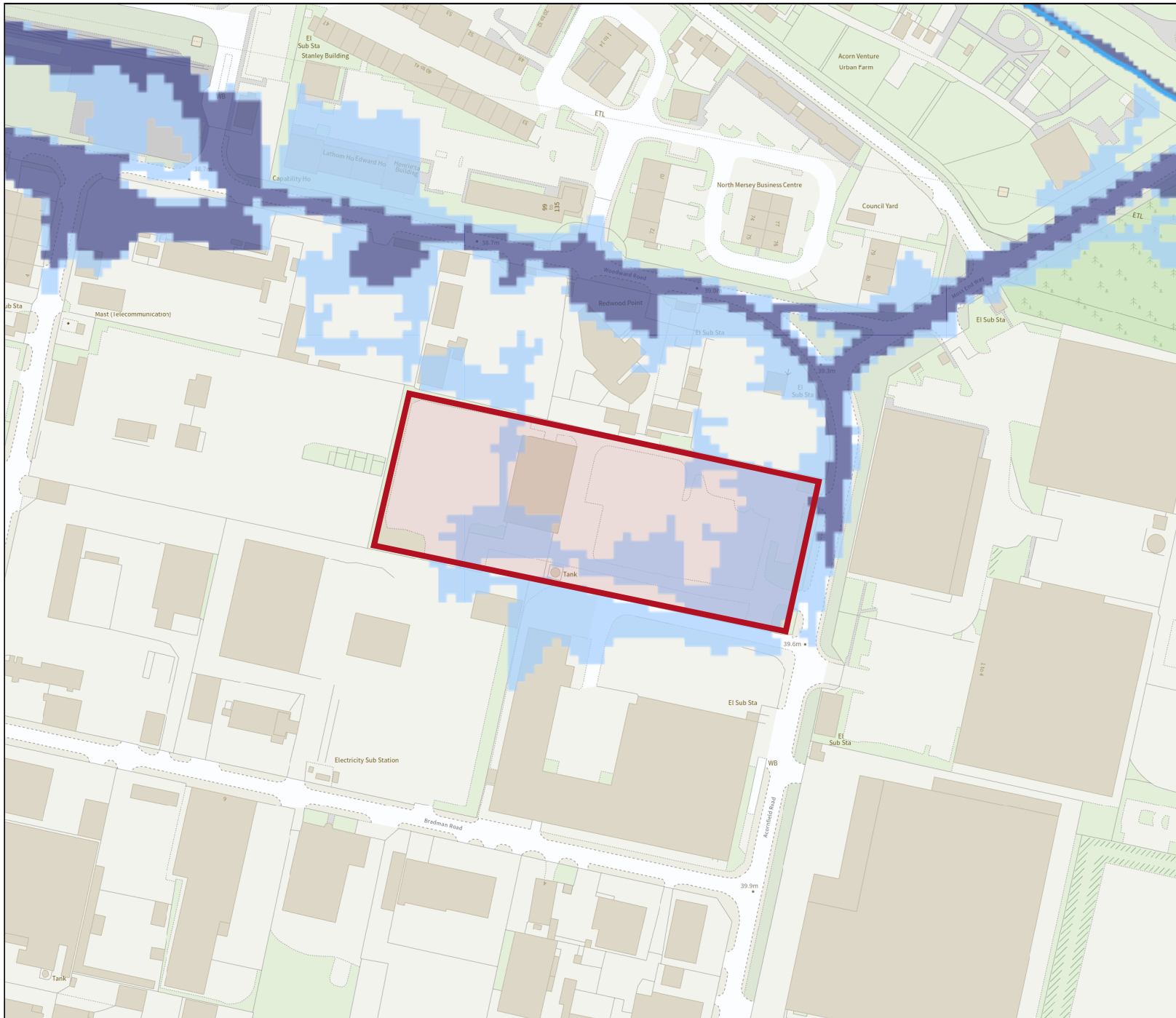
Notes

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 2024 OS AC0000807064. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference
<Unspecified>

Location (easting/northing)
343716/399357

Scale
1:2500

Created
26 Feb 2025 8:49

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area


0 20 40 60m

Appendix B – Environment Agency Flood Map for Planning



Date: 04/10/2024

Extract from Map of Public Sewers

Printed By:
Property Searches

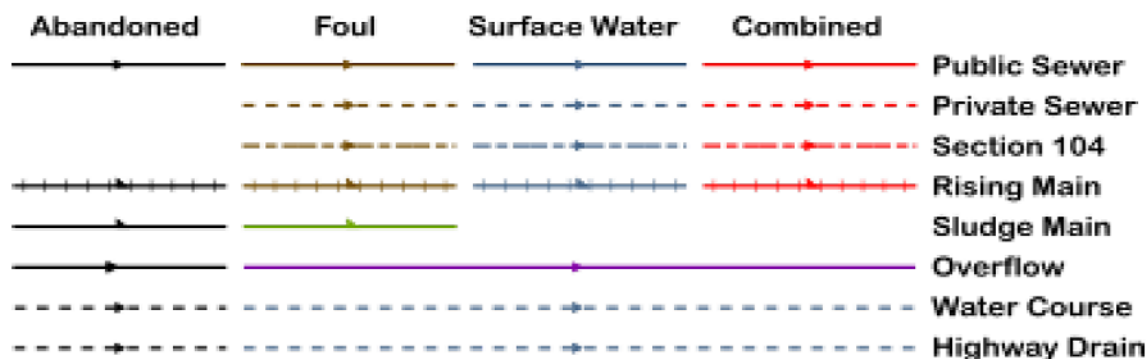
Acornfield Road



The position of underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. The actual positions may be different from those shown on the plan and private pipes, sewers or drains may not be recorded. United Utilities Water PLC will not accept any liability for any damage caused by the actual positions being different from those shown.

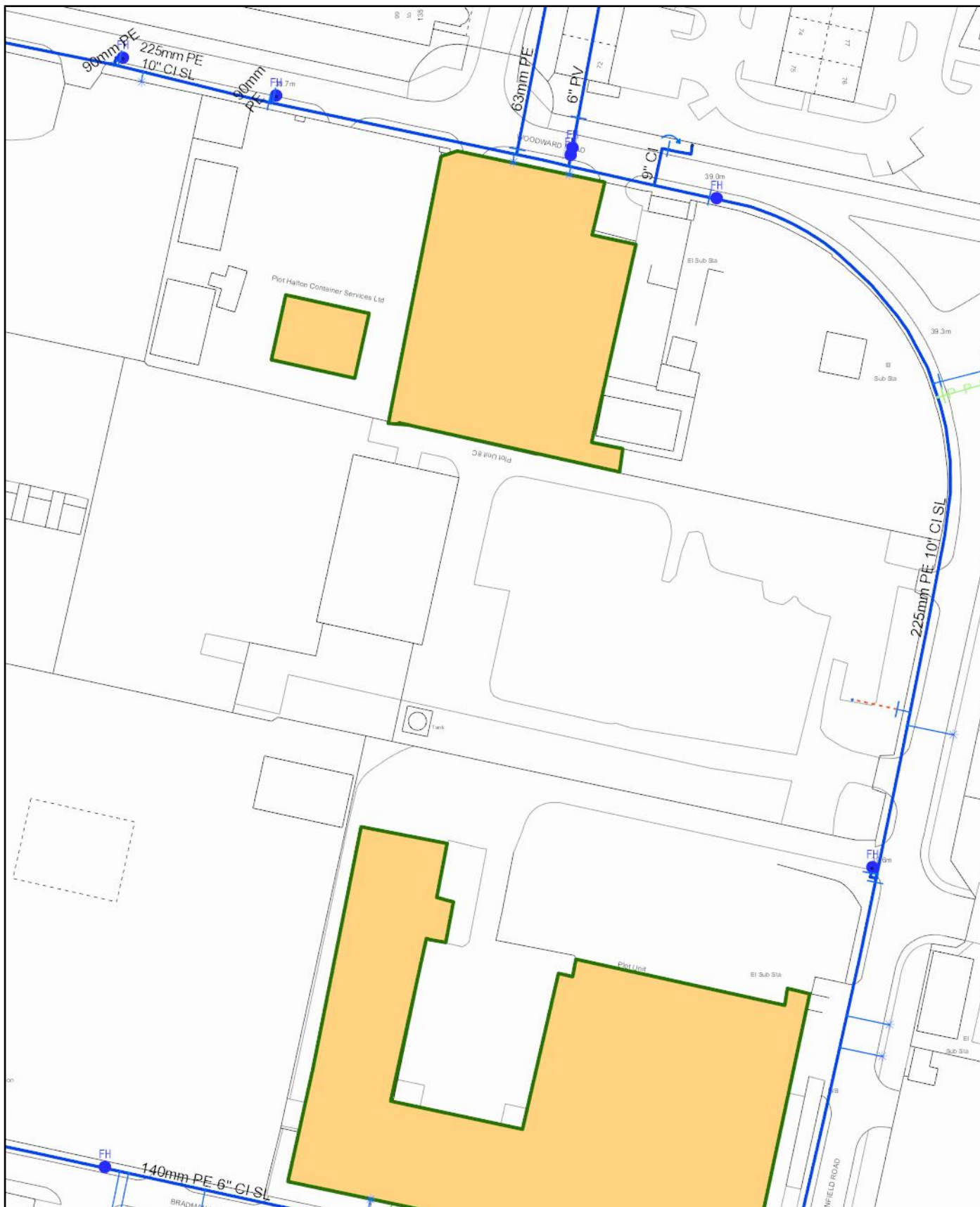
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Wastewater Symbolology



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	DNM Network Monitoring Point
Drop Shaft	Change of Characteristic
Orifice Plate	



Scale: 1:1250
Date: 04/10/2024

WATER MAINS RECORDS



Address or Site Reference: Acornfield Road
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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Clean Water Symbolology

Proposed	Abandoned	Live	
			Distribution Main
			Trunk Main
			Comms Pipe
			Private Pipe
			Concessionary Service
			Raw Water
			LDTM Raw Water
			LDTM Treated Water
			Air Valve
			AC Valve, open
			AC Valve, closed
			CC Valve, open
			CC Valve, closed
			Non Return Valve
			Pressure Management Valve
			OMS Valve
			Stop Tap
			Flow Meter
			Domestic Meter
			Commercial Meter
			Pump
			Hydrant
			Fire Hydrant
			Anode
			Chlorination Point
			De-chlorination Point
			Strainer Point
			Access Point
			Hatch Box
			IP Point
			Sampling Station
			Logger Box
			Bore Hole
			Inlet Point
			Bulk Supply Point
			End Cap
			Site Termination
			Change of Characteristic
			Condition Report
			<u>Property Types</u>
			Water Tower
			Valve House
			Booster Pumping Station
			Intake Pumping Station
			Water Treatment Works
			Supply Reservoir
			Service Reservoir
			Impounding Reservoir
			Pipe Bridge

Symbology for proposed assets is the same as above, but shown in **green**
 Symbology for abandoned assets is the same as above, but shown in **black**