

Construction of New Access Road Carr Lane, Prescott

Flood Risk Assessment

784-B028286

First Issue

United Utilities

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1.0 INTRODUCTION

1.1 PURPOSE OF THIS REPORT

Tetra Tech Ltd have been appointed by United Utilities (UU) (the 'Client') to prepare a Flood Risk and Drainage Strategy (FRADS) in support of a full planning application for the construction of a new access into its site at Carr Lane, Prescott (the 'site').

1.2 PROPOSED DEVELOPMENT

The proposed development comprises;

The construction of 1 No. vehicular access from Prescott Parkway together with engineering works consisting of the excavation of a drainage swale and other associated works.

Location: Land to the south west of the junction of Carr Lane and Prescott Park Way., Prescott. Planning Reference No. 22/00376/FUL

Appendix 1 – Site Plans includes the proposed site layout.

1.3 REQUIREMENT FOR A FLOOD RISK AND DRAINAGE ASSESSMENT

The application site is partially located within Flood Zone 3, therefore in accordance with the National Planning Policy Framework (NPPF)¹, a Flood Risk Assessment is required.

The proposed development is classed as 'minor development'² on the basis of being 0.23 ha in area. The NPPF states that Minor Developments are unlikely to raise significant flood risk issues unless they would:

- have an adverse effect on a watercourse, floodplain, or its flood defences;
- would impede access to flood defence and management facilities; or
- where the cumulative impact of such developments would have a significant effect on local flood storage capacity or flood flows.

The use of SuDS is also strongly advocated by Knowsley Borough Council (KBC), as the Lead Local Flood Authority (LLFA) for the site.

¹ Ministry for Homes, Communities & Local Government (June 2019), *National Planning Policy Framework Para 163 Note 50*

² Ministry for Housing, Communities & Local Government (August 2021), *Guidance: Flood risk and coastal change*

1.4 SCOPE OF THE REPORT

The FRA will be undertaken in accordance with the NPPF, Planning Practice Guidance (PPG) (Flood Risk and Coastal Change)³, Environment Agency guidance⁴, Knowsley Borough Council's SFRA (2012), Flood Risk Management Strategy. The FRA will consider all potential sources of flood risk including Main Rivers, Ordinary Watercourses, overland flow routes, groundwater, sewers, reservoirs and canals.

The FRA will identify a surface water drainage strategy for the site such that flood risk to the site and adjoining areas is not exacerbated, as required by the NPPF, and there will be a particular focus on the provision of SuDS on the site. The drainage strategy will be produced in accordance with the NPPF, the Non-Statutory Technical Standards for Sustainable Drainage and The SUDS Manual (Ciria C753).

1.5 LIMITATIONS OF THIS REPORT

This report has been prepared by Tetra Tech Ltd on behalf of the Client in connection with the scope of the report as described in Section 1.4 and takes into account the particular instructions and requirements set out in our fee proposal and the acceptance. It is not intended for and should not be relied on by any third party and no responsibility is undertaken to any third party.

Tetra Tech Ltd accepts no duty or responsibility (including in negligence) to any party other than the Client and disclaims all liability of any nature whatsoever to any such party in respect of this report.

This report cannot be reproduced without Tetra Tech's written consent.

³ Ministry for Housing, Communities & Local Government (August 2021), *Guidance: Flood risk and coastal change*

⁴ Environment Agency (February 2017), *Flood risk assessment in flood zones 2 and 3*

2.0 SITE DESCRIPTION

2.1 EXISTING SITE

The site is located south of Carr Lane, Prescott. The site is owned by United Utilities and is located within Knowsley Borough Council (KBC) District.

The central grid reference of the site is SJ461921 and the site's postcode is L34 1AX.

The site is bounded by Logwood Mill Brook / Prescott Brook and Carr Lane Woods to the west, The M57 motorway to the southwest, new residential property development to the southwest and west, and Carr Lane/Prescot Parkway/Cables Way roundabout and highway, and adjacent woodland to the north.

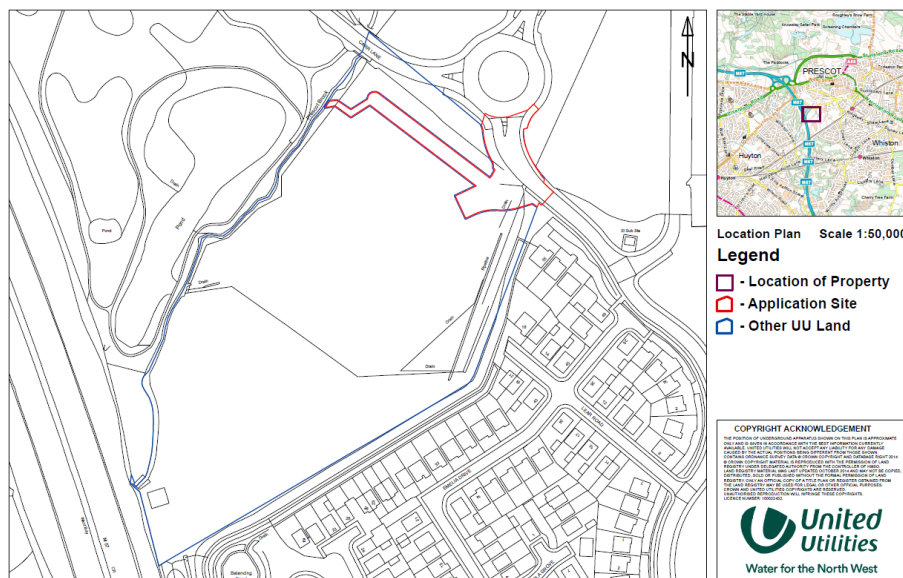


Figure 2-1: Site Location and boundary⁵

The site location and area shown above covers 0.23ha. Topographical data provided by Survey Operations (Appendix 2) shows that the highest ground levels are located along the northern boundary of the site adjacent to Carr Lane with level ranging between 43.42 and 45.58m AOD.

Levels within the main area of the site generally fall from the east and west to a lower valley orientated northeast / southwest, and approximately 50m east of Logwood Mill Brook, and 70m from the eastern site boundary. An embankment lies along the north west boundary of the site between the site area and Logwood Mill Brook. Levels on the top of the embankment range between 42.8m and 43.1m AOD. Logwood Mill Brook levels are shown between 41.0m to 41.8m AOD adjacent to the site. Logwood Mill Brook is the natural land drainage outfall for the site.

⁵ © Crown copyright and database rights (2022) Ordnance Survey 0100031673

Below is a contour map created from the Topographical point data obtained from the survey.

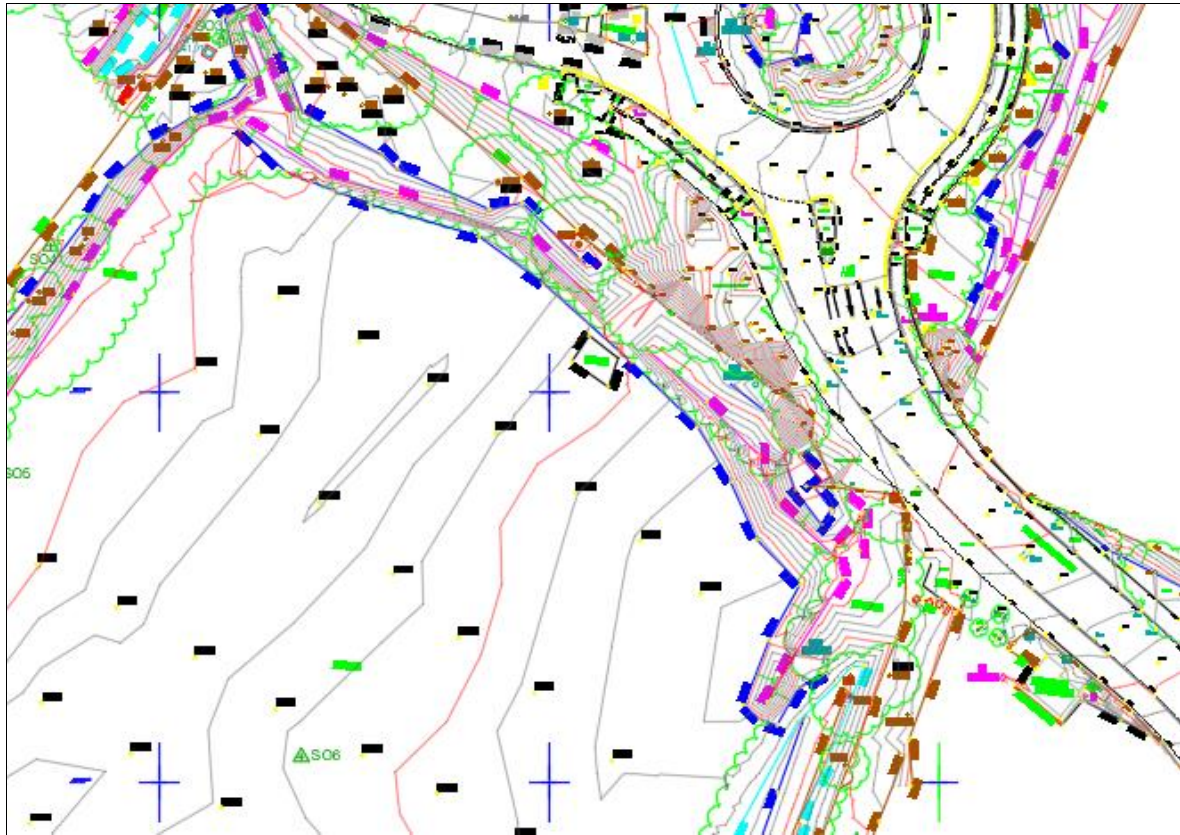


Figure 2-2: Site Location and boundary

Legend:

Red Contour 1.0m Interval

Grey Contour 0.25m Interval

2.2 EXISTING DRAINAGE

2.2.1 WATERCOURSES

Logwood Mill Brook is the nearest Main River to the site and forms the sites western boundary. The map provided by the Environment Agency below (Fig. 2) shows that the Logwood Mill Brook runs along the west boundary of the site. The river is culverted beneath the M57 and continues to flow south through the Huyton and Prescott Golf Club. The watercourse continues south past the M57/M62 Tarbock Island intersection. It continues south, joining other tributaries and eventually discharging into the River Mersey at Widnes.

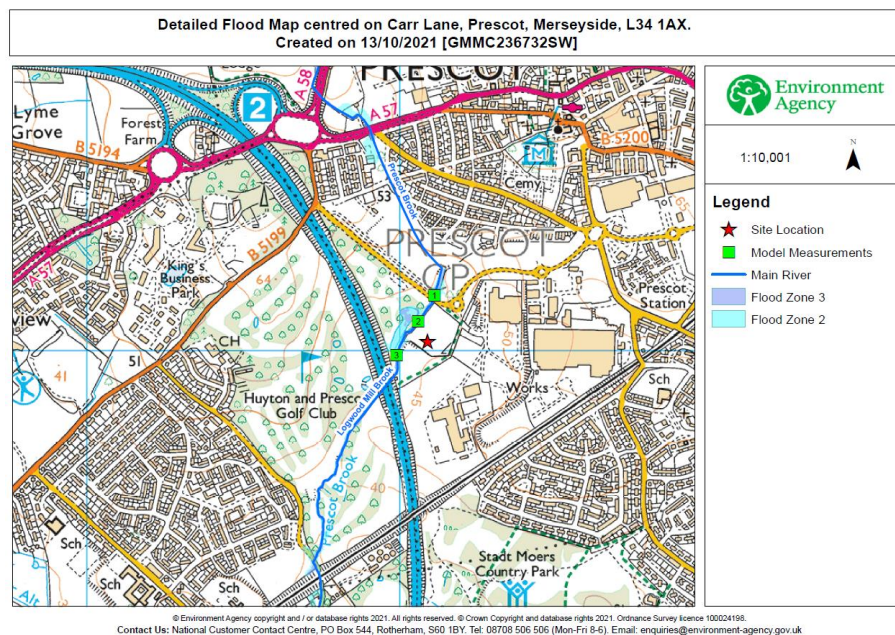


Figure 2-3 – Main River Map

A review of online mapping and resources supplied by the client do not indicate the presence of any ordinary watercourse on the site. The topographic survey identifies low points / valleys that convey surface water to the western boundary and Logwood Mill Brook.

2.2.1 DRAINS AND SEWERS

A review of information provided by United Utilities confirms the presence of a combined sewer that flows in a southerly direction along the western boundary of the site (Fig. 4). A number of pipe outfalls from the site have been observed outfalling to Logwood Mill Brook (shown below).

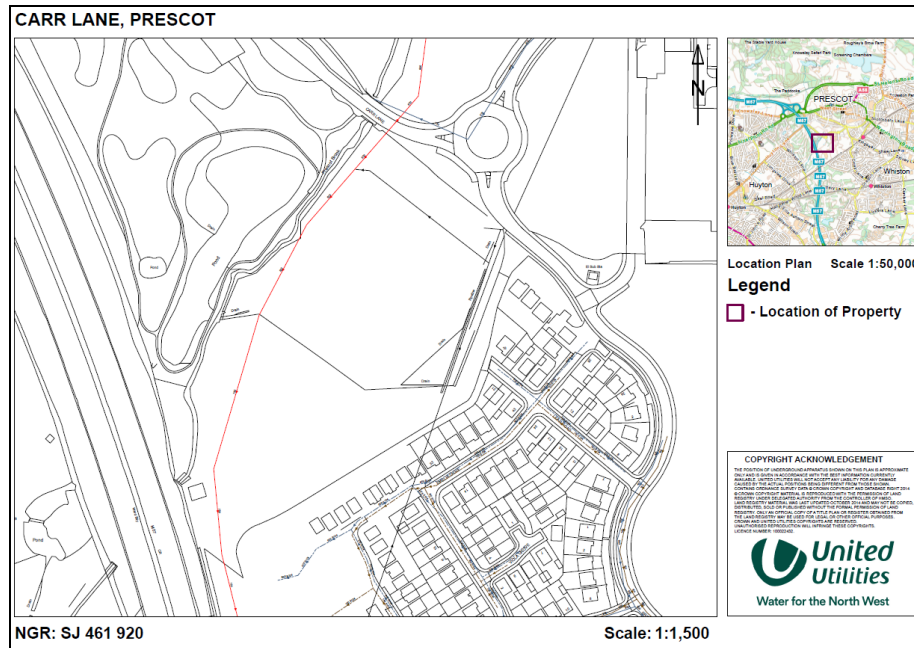


Figure 2-4 – Drainage Network on Site

2.3 GROUND CONDITIONS

2.3.1 GEOLOGY

The Phase I and II Geo Environmental Site Assessment February 2021 report provides the following information.

Details of the intrusive ground investigation comprising mechanically excavated trial pits, window sample boreholes, cable percussive boreholes, BRE365 soakaway tests, trial trenching and rotary open boreholes. The following summarises the ground conditions encountered.

Ground Investigation

Made Ground – 0.50 m bgl to 5.45 m bgl

Made Ground deposits were encountered in all exploratory hole locations to depths between 0.50 m and in excess of 5.45 m. The full depth of Made Ground could not be proven in 18 locations due to concrete obstructions, collapse or rapid water ingress.

In the northern and central areas, Made Ground comprises a dark brown fine to medium sand with gravel of brick, concrete and mudstone with occasional fragments of glass, ceramic and metal pipe with the majority of locations encountering cobbles and isolated areas encountering boulders of concrete. In selected areas these were underlain by black gravelly fine to medium sand with gravel of brick. Strong hydrocarbon odours were noted within TP102 and TP106.

Yellow brown silty sand with gravel of brick was also noted within TP102. Where the former unlicensed open cast mine/refuse tip was located in the south, Made Ground deposits generally comprise black fine to medium sand with gravel of clinker, ash, occasional glass bottles and ceramic. Black pseudo fibrous peat with strong organic odour was encountered with two isolated areas of site measuring a thickness of 0.10 m within WS105 at 2.40m bgl and 0.05 m within WS112 at 3.50m bgl.
DRIFT – 0.50 m bgl to 9.50 m bgl Where depth of Made Ground has been proven, drift deposits generally comprise a firm to stiff, medium strength, brown slightly gravelly sandy CLAY with gravel of sandstone and mudstone with occasional areas encountering brown silty fine to medium SAND with occasional areas encountering CLAY pockets.
SOLID – 6.00 m bgl to 9.70 m bgl The solid bedrock geology was encountered between 6.00 m and in excess of 9.70 m bgl (CP102), becoming deeper in the northern sector of the site. The solid geology comprises-grey/brown MUDSTONE which is underlain by grey SILTSTONE. Occasional SANDSTONE bands were noted within RB102 and RB104. Coal has not been identified within any exploratory hole locations. MUDSTONE, with coal traces, has been identified between 9.30 m and 10.40 m bgl, 27.60 m and 28.40 m bgl within RB101, between 9.80 m and 10.90 m bgl, 12.00 m and 13.00 m bgl within RB102 and 8.40 m and 9.80 m bgl.
GROUNDWATER – Groundwater was encountered between 0.70 m bgl and 4.00 m bgl during the site investigation with monitoring recording groundwater levels between 0.66 m and 3.22 m bgl.

Table 1 – Ground Investigation Summary

2.3.2 HYDROGEOLOGY

Defra's online 'Magic' mapping indicates that the superficial deposits are classified as Secondary (Undifferentiated) Aquifers. Secondary undifferentiated are aquifers that have rock types with variable characteristics. The bedrock is classified as Secondary A which means it contains permeable layers that can support local water supplies and an important source of flow to rivers.

2.3.3 SOAKAWAY SITE TESTS

BRE365 soakaways testing has been undertaken across the site within designated locations to assess the effective permeability for sustainable drainage.

The Phase 1 and 2 Geo Environmental Site Assessment states that, Geo testing was terminated within all locations due to the water level remaining constant over a prolonged period or increasing due to weather conditions, therefore it is not recommended that soakaways are utilised within the proposed development. However, the E3P report also states the application of soakaway drainage will ultimately be dependent on the specific requirements of the development.

3.0 FLOOD RISK

3.1 FLUVIAL FLOOD RISK

Fluvial flood risk is the risk arising from Main Rivers and Ordinary Watercourses. A floodplain is the area that would naturally be affected by flooding if a river rises above its banks. In England, floodplains of Main Rivers are divided into flood zones for planning purposes. These show the extent of the natural floodplain area at risk of inundation if there were no flood defences or certain other manmade structures and channel improvements. They are divided as follows:

- Flood Zone 1 is the land assessed as having an annual probability of river flooding of less than 1 in 1000 ($< 0.1\%$).
- Flood Zone 2 is land assessed as having between an annual probability of river flooding of 1 in 1000 (0.1%) and 1 in 100 (1%).
- Flood Zone 3 is the area of land assessed as having an annual probability of flooding of 1 in 100 or greater ($\geq 1\%$).

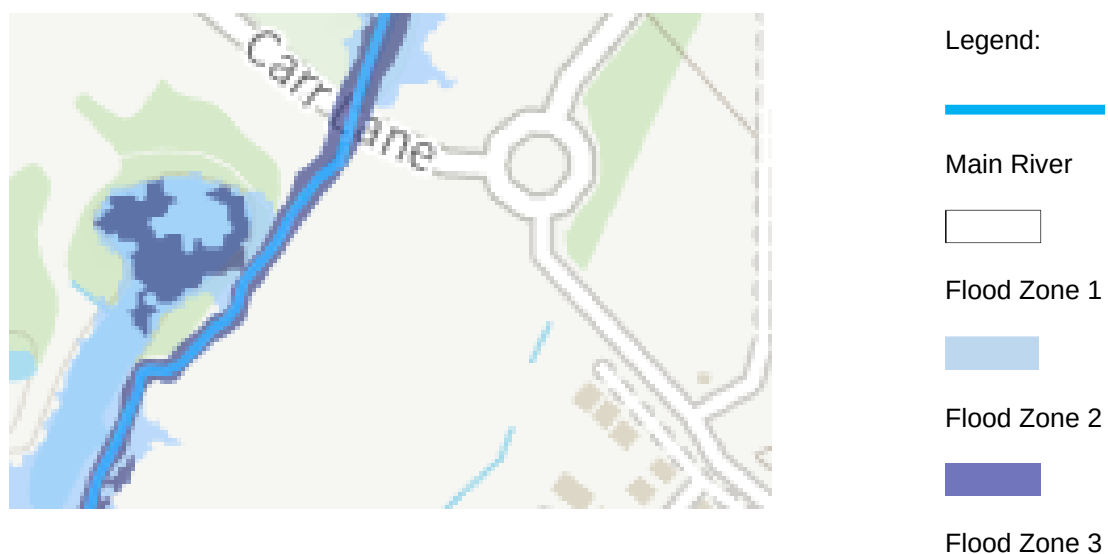


Figure 3-1: Flood Map for Planning (Environment Agency, August 2022)

The Environment Agency's Flood Map for Planning (Fig. 3-1) indicates that the majority of the site is located within Flood Zone 1 and therefore at low risk of fluvial flooding from the Logwood Mill Brook. Along the western boundary of the site there are areas of the site shown within Flood Zone 2 and Flood Zone 3. The area is at medium and high risk respectively. However, these areas are small and directly adjacent to Logwood Mill Brook and at a lower elevation.

Information received from the EA (Appendix B) includes modelled undefended flood data for Logwood Mill Brook. The level data indicates that the majority of the site lies within Flood Zone 1 for the 1 in 100 year event as shown on Flood Map for Planning. EA data indicates that in the 1 in 100 year event flood level to be 42.57m AOD.

3.2 SURFACE WATER AND OVERLAND FLOWS

Surface water flooding occurs where high rainfall events exceed the drainage capacity in an area, leading to flooding.

The Environment Agency's Flood Risk from Surface Water Map, see Figure 3-, indicates that the site is at very low to low risk of surface water flooding throughout the majority of the site with potentially a small area with medium risk in the west of the site area. The Environment Agency surface water flood risk map shows no flood depths in the high-risk scenario.

Therefore, the risk to the site can be classed as low, with areas of Low risk along the site boundary.



Figure 3-2: Flood Risk from Surface Water (Environment Agency, August 2022)

3.3 GROUNDWATER FLOODING

Groundwater flooding occurs when groundwater emerges at the surface under conditions where the 'normal' range of groundwater levels and groundwater flows is exceeded.

The KBC local flood risk strategy, published in 2017, indicates that there is a lack of historical information available in relation to groundwater flooding in the district. Groundwater models covering the Knowsley Borough district indicate that groundwater level rise will be minimal, but groundwater levels are rising in the Mersey catchment due to a decline in water abstractions resulting in an increase in risk in low lying areas. The risk from Groundwater flooding is considered low.

3.4 SEWER FLOODING

Sewer flooding occurs when intense rainfall overloads the sewer system capacity and/or when sewers cannot discharge properly to watercourses due to high water levels. Sewer flooding can also be caused when problems such as blockages, collapses or equipment failure occur in the sewerage system.

A United Utilities combined sewer is located on the west boundary of the site. The sewer is potentially a source of flood risk. The combined sewer is at a lower elevation to the site and any failure of the sewer is unlikely to affect the site.

A history of flooding does not necessarily indicate current risk as sewers condition could deteriorate over time leading to an increased but unrecorded risk of flooding. Conversely, areas which have experienced significant sewer flooding may have been the subject of remediation work which subsequently reduces the risk of flooding from this source.

Developers will need to observe the sewer easement and any constraints that this may have on the development layout.

3.5 CRITICAL DRAINAGE AREA

The Knowsley Metropolitan Borough Council Level 2 Strategic Flood Risk Assessment 2012 identifies the site to be within a location designated as a Critical Drainage Area.

3.6 RESERVOIR FLOODING

Flooding from reservoirs occurs when a reservoir dam is overtopped or breaches due to structural failure. The consequence of such an event would be severe but the probability of a catastrophic dam failure is considered to be extremely low due to the management and maintenance required under the Reservoirs Act 1975.

The Environment Agency's Flood Map for Reservoirs, Figure 3-, illustrates that the site is at risk of flooding in the event of a reservoir breach. The likelihood of a reservoir breach occurring is low, the risk can therefore be considered as low.



Figure 3-6: Environment Agency's Flood Map for Reservoirs, June 2022

3.7 CANAL FLOODING

Flooding from a canal occurs when the canal is overtopped or breaches due to failure. The closest canal to the site is approximately 10km northwest of the site. The site is also at an elevated level by comparison to the nearest canal and therefore the risk of flooding from canals is considered to be very low for the site.

3.8 SUMMARY OF FLOOD RISK

The flood risk to the site from all sources are categorised below:

Fluvial	Medium
Surface Water	Low
Groundwater	Low
Sewer	Low
Reservoir	Low
Canal	Low

It will be essential to ensure that no increase in flood risk occurs in adjacent areas as a result of this development. The proposed mitigation measures are discussed in more detail within Section 4.0.

4.0 DEVELOPMENT PROPOSALS

4.1 PROPOSED DEVELOPMENT

The proposed development will include the construction of 1 No. vehicular access from Prescott Parkway together with engineering works consisting of earthworks and the excavation of a drainage swale and other associated works.

The proposed site plans are included in Appendix 1 – Site Plans.

4.2 PLANNING POLICY AND GUIDANCE

The Lead Local Flood Authority for the site is Knowsley Borough Council.

4.2.1 NATIONAL PLANNING POLICY FRAMEWORK

In accordance with the NPPF⁶ a formal Flood Risk Assessment (FRA) is required in support of a planning application for development sites greater than 1ha in size within Flood Zone 1 or any development located within Flood Zones 2 and 3. The level of detail within an FRA should be appropriate to the scale and nature of the development.

4.2.2 SEQUENTIAL AND EXCEPTION TESTS

One of the aims of the NPPF is to steer development away from zones of high flood risk towards Flood Zone 1. KBC has allocated the site for 72 residential units, which is classed as a 'more vulnerable' use, and as outlined in Section 3, the majority of the wider site is located within Flood Zone 1.

The majority of the proposed development will be located within Flood Zone 1, with only drainage outfall located within Flood Zone 2 and 3.

4.2.3 KNOWSELY BOROUGH COUNCIL LOCAL FLOOD RISK MANAGEMENT STRATEGY 2017

The KBC LFRMS was undertaken to assess the local flood risk and set objectives to manage flooding under the Flood and Water Management Act 2010. As part of this strategy the council has set out six key objectives for management of flood risk in the KBC district.

The main objectives that will apply to any planning application for the site at Carr Lane are summarised below:

⁶ NPPF (February 2019) Chapter 14 Paragraph 163 Note 50

Objective 2: To work in partnership with other risk management authorities, key stakeholders, partners, organisations, and the community, to reduce the risk of flooding to communities, the economy, and the environment from all sources.

- Develop an effective local governance framework for managing flood risk, including engagement with Senior Officer and Elected Members to support prompt decision making and to steer local flood risk management in Knowsley.
- Set up, lead, and deliver regular operational flood meetings for Knowsley to provide a local forum in which flooding issues can be discussed with RMAs and other partners.

Objective 3: To support the delivery of flood-appropriate sustainable development and ensure that the guiding principles for sustainable development are applied and inappropriate development is avoided in existing and future areas at risk of flooding.

- Develop a formalised process for responding to planning application consultations.
- Develop best-practice drainage guidance to assist developers in reducing flood risk to and from their schemes.
- Adopt a consistent and proportionate approach to assessing development proposals.
- Work in partnership with other RMAs in the planning process to ensure a consistent approach is taken when commenting on planning applications in our consultee roles.
- Agree common principles and refer to each other consents and permits as and when needed in planning consultation responses.
- Work with the local planning authority and the planning committee to build knowledge and understanding in relation to the role and responsibility of each RMA in the different areas of flood risk management and the risks associated with flooding in Knowsley so that informed planning decisions can be made.

4.2.4 LOCAL PLANNING POLICIES

The KBC Local Plan identifies the Carr Lane site as a Sustainable Urban Extension for residential use (Site Ref. KGBS 10) for 74 dwellings. The area of the site is stated as 3.249ha and the Local Plan Policy for the site development is LP-SUE1 & SUE2.

<https://localplanmaps.knowsley.gov.uk/documents/knowsley-local-plan-adopted-core-strategy.pdf>

Policy SC24 Flood Risk is shown below.

Policy CS24

Managing Flood Risk

- 1) New development that may cause an unacceptable risk of flooding on the site or elsewhere will not be permitted.
- 2) New development should preferably be located in areas of low probability of flooding. New development in areas of medium or high flood risk will only be permitted if evidence has been submitted demonstrating that the development could not be practicably located in an area of lower flood risk and if applicable the 'exception test' has been complied with, in accordance with national guidance.
- 3) All development which is within or otherwise affects an area of flood risk or is larger than one hectare in size shall be accompanied by a site-specific Flood Risk Assessment (FRA).
- 4) New development shall include flood mitigation measures, where necessary, to manage flood risk associated with or caused by the development. These measures shall be derived from the Strategic Flood Risk Assessment (SFRA), relevant FRA(s) or a local strategy for flood risk management, and:
 - a) Be designed to contribute to the biodiversity of the borough unless it can be demonstrated that this would not be technically feasible;
 - b) Incorporate a Sustainable Drainage System;
 - c) Be fully described in the planning application; and
 - d) Be funded by the developer, including long term maintenance.
- 5) The drainage of new development shall be designed to reduce surface water run-off rates to those associated with a green-field site by treating it at its source. The chosen method of implementation should take account of site size, ground contamination or conditions, and potential damage to adjacent buildings or sites.
- 6) Further guidance on these issues will be provided in a proposed Supplementary Planning Document.

4.3 DEVELOPMENT AND FLOOD RISK

4.3.1 FLOOD RISK TO THE DEVELOPMENT

As assessed in Section 3.0, the majority of the proposed development is within Flood Zone 1 with only the drainage outfall to Logwood Mill Brook located within FZ 2 and FZ 3.

4.3.1 FLOOD RISK ARISING FROM THE DEVELOPMENT

The site is considered to be a greenfield site. The proposed new development will increase the impermeable area within the site and therefore there will be an increased in runoff from the site.

In accordance with the NPPF, and KBC, surface water runoff will be managed on site to avoid increasing flood risk to areas elsewhere, see the surface water management plan in section 5.0.

5.0 SURFACE WATER MANAGEMENT

5.1 DRAINAGE HIERARCHY

In order to ensure that surface water runoff from the site does not increase the risk of flooding, the management of runoff should be considered via a sequential approach, in line with Building Regulations⁷. The following options for the disposal of runoff have been considered, in order of preference:

- Discharge to an adequate soakaway or some other adequate infiltration system (i.e., to ground);
- Discharge to a watercourse; and
- Discharge to a sewer (surface water before combined).

Discharge to Ground

BRE365 soakaways testing undertaken across the site was terminated within all locations due to the water level remaining constant over a prolonged period or increasing due to weather conditions, therefore it is not recommended that soakaways are utilised within the proposed development.

Discharge to Watercourse

Logwood Mill Brook is located adjacent to the site and is the natural surface water outfall for the site. The topography of the site falls towards the central area and towards the south. A new surface water outfall to the main river will be required.

Discharge to Sewer

A United Utilities combined sewer is located along the western boundary of the site adjacent to Logwood Mill Brook. UU has advised that surface water discharge to its combined sewer will not be permitted and flows from the site should discharge to Logwood Mill Brook. Further to this, there are no public surface water sewers adjacent to the site.

5.2 IMPERMEABLE AREAS

The application area comprises of existing highway (KBC) and greenfield site owned by UU with an area of 0.228ha. The development area within the UU greenfield site is 0.161ha of which only 0.0578ha (578m²) will be new impermeable area (highway). However, for the purpose of this report it has been assumed that the new access road may receive runoff from the carriageway area of Prescott Park Way, and therefore an additional area of 122 m² has been included.

The UU site area which will include the construction of new road and footway pavement is 0.161ha in area and is a greenfield site.

⁷ HM Government (2010), *The Building Regulations 2010, Approved Document H (Part H3)*

The areas are shown in Table 5-1 below.

Table 5-1: pre-and post-development areas (ha)

Status	Impermeable Area	Permeable Area
Pre-development Total	0	0.161
Post-development Total	0.070	0.091

5.3 DISCHARGE RATES

Attenuation of surface water runoff is required to maintain the restricted discharge rate and manage surface water runoff appropriately within the site. No flooding must occur during a rainfall event up to and including the 1 in 30-year return period, and any flooding during the 1 in 100-year return period plus climate change is limited to external surfaces and retained within the site boundaries. KBC require greenfield run-off rates be maintained on brownfield sites where possible.

The greenfield site runoff rates were calculated using the UK SuDS tool as shown in table 5-2 below, the Qbar was 0.45 l/s for this site.

Table 5-2: Runoff rates for site

Situation	Qbar (l/s)	1 in 1 year	1 in 30 year	1 in 100 year	1 in 200 year
Greenfield rate per ha	6.35	5.53	10.8	13.21	15.05
Post- Development Pro rata 0.07ha	0.45	0.38	0.76	0.92	1.05

As the greenfield runoff rate for the site area is very low, the minimum flow rate of 2l/s will be used to reduce the risk of blockage to the outfall. The 2l/s rate was used in HR Wallingford Storage Estimates to assess the required attenuation volumes.

5.4 REQUIRED ATTENUATION

The attenuation volumes to be provided by SuDS is shown below in Table 5-3 with full calculations contained within Appendix 5 – Development Flood Zone .

Table 5-3: Estimated attenuation volume

Area	Impermeable Area (ha)	1 in 100 year + 40% CC (m ³)
Post-development Total	0.07	28

An assessment of the suitability of the different SuDS features that could provide the required attenuation volumes is included in Section 5 below.

5.5 SUSTAINABLE DRAINAGE

5.5.1 REVIEW OF SUDS OPTIONS

To comply with the national guidelines and policies set by the NPPF and the Non-Statutory Technical Standards for Sustainable Drainage, as well as those of the KBC, the design of the surface water drainage system should seek to maximise the use of SuDS techniques. This section reviews the suitability of the different SuDS features available for the proposed development site.

5.5.2 THE SUDS MANAGEMENT TRAIN

The main purpose of SuDS is to manage the surface water runoff generated by a development within the development site, attenuating additional flows generated by the introduction of impermeable areas whilst providing water quality treatment to the runoff and amenity and landscape benefits to the community. SuDS features can be categorised as follows:

- **Source Control:** manage runoff at its source
 - E.g., Water butts, green/brown roofs, permeable pavements, rainwater harvesting systems, bio-retention systems.
- **Site Control:** manage runoff generated by a wider area
 - E.g., Swales, ponds, infiltration devices, filter strip, French drains.
- **Regional Control:** manage runoff generated by several sites
 - E.g., Basins, ponds and wetlands

Figure 5-1 provides an illustration of the SuDS principles and how they may be applied to a development via a SuDS Management Train.

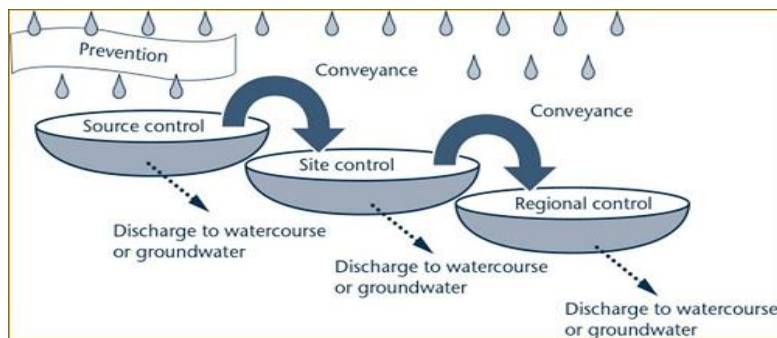


Figure 5-1: SuDS Management Train

Table 5-4 below summarises the suitability of the different SuDS elements for the proposed development.

Table 5-4: Review of SuDS elements for the proposed development

Type of SuDS	Description	Applicability to the Site	Appropriate option?
Source Control			
Water butts	Small storage tanks on the new building.	These may be appropriate on the new buildings.	X
Rainwater harvesting	Recycling of water from roofs and impermeable areas.		X
Green roofs	Vegetated roofs that reduce runoff and remove pollutants.		X
Pervious surfaces	Pavements that allow surface water to flow into underlying layers of the pavement and either infiltrate to ground or drain to an on-site drainage network.	This could be an appropriate option for the proposed car parking. Infiltration is not viable, but it may be appropriate to drain to an underdrain system.	X
Rain Gardens & Bioretention Systems	Shallow depressions with free draining soil and planted with vegetation that withstands occasional flooding.	This could be an appropriate option as filtered runoff is collected by an underdrain system and used as part of a connected system of SuDS features.	X
Site & Regional Control			
Filter Drains	Linear drains or trenches filled with granular material that allow infiltration to the surrounding ground.	Infiltration is assumed to be not feasible, so this is not an appropriate option.	X

Type of SUDS	Description	Applicability to the Site	Appropriate option?
Swales	Vegetated channels to convey, store and treat runoff.	Swales may be appropriate if used to convey flows as part of a connected system of SuDS features, dependent on space constraints.	✓
Detention basins & ponds	Shallow areas of open space that temporarily hold water and collect silt.	A pond or detention basin may be appropriate dependent on space constraints.	✓
Infiltration basins	Shallow depression that stores runoff before it infiltrates into the subsoil.	Infiltration is assumed to be not feasible, so this is not an appropriate option.	✗
Infiltration devices	Generally granular trenches or soakaways that store water and allow infiltration to the surrounding ground.	Infiltration is assumed to be not feasible, so this is not an appropriate option.	✗

Table 5-4 identifies that there are two SUDS components that could be used within the development site, subject to detailed design which will consider their constructability within existing constraints. Above ground attenuation is preferred to below ground attenuation, for reasons including biodiversity, amenity benefits and maintainability.

All SuDS are to be designed in accordance with 'The SuDS Manual' and the relevant British Standards.

5.6 PROPOSED SURFACE WATER DRAINAGE STRATEGY

This strategy has been completed based on assumption that infiltration is not feasible, this will need to be reassessed if infiltration proven possible. It is proposed to discharge surface water runoff from the site's impermeable surfaces into the nearby watercourse. Surface water will be discharged to Logwood Mill Brook to the west of the site via a surface water drainage system on site. Surface water retention via a SuDS swale will be incorporated as part of the drainage strategy. The proposed strategy is shown in Appendix 8.

The implementation of the swale has been designed using The SuDS Manual CIRIA C753. This area can host a linear swale with a proposed depth of 0.5m, a base width of 0.5m, side slopes of 1:3, void ratio of 1 providing a capacity of 35m³. The swale will be online; it will receive flows from the new access road pavement and will outfall via a vortex flow control manhole to Logwood mill Brook at a rate of 2l/s.

Table 5-5: Storage volumes in proposed drainage strategy

SuDS feature	Volume stored (m ³)
Swale	35
Total	35

5.6.1 WATER QUALITY

In accordance with Table 26.2 of The SuDS Manual CIRIA C753, pollution hazard indices are attributed to the areas serviced by SuDS. The area being developed can be considered to have a 'low' pollution hazard level as runoff will be from a road access. The requirements for discharge to surface waters state that the 'Simple index approach' should be used.

Step 1 of the simple index approach is to identify the pollution hazard indices for the proposed land use. An extract of Table 26.2 of The SuDS Manual can be seen in Table 5-6 below.

Table 5-6: Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Individual property driveways, residential car parks, low traffic roads (e.g., cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (e.g., schools, offices) i.e., < 300 traffic movements/day	Low	0.5	0.4	0.4

Table 26.3 of The SuDS Manual states the various mitigation indices for different SuDS elements. These are shown below in Table 5-7. Provided that the mitigation indices of the treatment techniques are greater than or equal to the hazard indices for the proposed development then there should be no reduction in the overall water quality within the receiving system

Table 5-7: SuDS Mitigation Indices (discharge to surface waters)

SuDS Feature	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Swale	0.5	0.6	0.6

Provided that the mitigation indices of the treatment techniques are greater than or equal to the hazard indices for the proposed development then there should be no reduction in the overall water quality within the receiving system. Table 5-7 above demonstrates that the runoff from the site will receive treatment to the required level through the SuDS swale.

5.6.2 DRAINAGE AND SUDS MAINTENANCE

SuDS require regular maintenance to keep them working effectively. It is anticipated that maintenance will be undertaken by NSCG. Table 5-8 below shows the maintenance requirements of each of the proposed SuDS features.

Table 5-8: Maintenance tasks and frequency required

SuDS Feature	Maintenance Task	Recommended Frequency
Swale	Inspection	Regularly
	Litter and debris removal	Regularly
	Vegetation management (grass cutting, weed and invasive species control, shrub management, aquatic vegetation management)	Regularly as required
	Sediment management	Occasionally
	Vegetation replacement	As required
	Structure rehabilitation/repair	As required

5.7 EXCEEDENCE FLOW ROUTES AND RESIDUAL RISK

In setting the final external levels for the development it is important to ensure that if flows in exceedance of the 1 in 100-year event plus 40% allowance for climate change occur, or a failure of the site surface water drainage system occurs, suitable overland flood routes are provided.

It is therefore proposed to let overland exceedance flows follow the natural contours of the ground towards the south of the site and the ordinary watercourse Logwood Mill Brook. Overland flows will not exit the site to the north due to the site topography.

6.0 CONSENTS REQUIRED

6.1 ENVIRONMENTAL PERMIT

Under the Environmental Permitting (England and Wales) Regulations 2016, an environmental permit(s) will be required from the Environment Agency for any 'flood risk activities'. These include temporary and permanent works within the floodplain of a Main River or within 8m of the top of bank. An environmental permit(s) will also be required for any discharges of surface water to a Main River (known as 'water discharge activities'). The type and number of permits required should be checked with the Environment Agency before applying.

6.2 SECTION 104

If any new sewers on the site were to be adopted an application would be required to United Utilities under Section 104 of the Water Industry Act 1991.

6.3 SECTION 106

Where a new connection is to be made to the public sewer network, an application would be required to United Utilities for the new outfall and connection under Section 106 of the Water Industry Act 1991.

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

This FRA has been produced in support of a full planning application for the construction of 1 No. vehicular access from Prescott Parkway together with engineering works consisting of the excavation of a drainage swale and other associated works.

The site area covers 0.161 ha and falls mainly within Flood Zone 1 with areas of Flood Zone 2 and 3, to accommodate the drainage outfall.

The western boundary of the site adjacent to Logwood Mill Brook is at risk of fluvial flooding. Other areas of the site are at low and medium risk of surface water flooding. The site is at low risk of flooding from all other sources assessed.

Surface water runoff from the site will be discharged to Logwood Mill Brook via a new onsite drainage network, which will include a pipe drainage system, SuDS swale and flow control manhole chamber which will restrict discharge rates to a maximum of 2l/s.

Attenuation up to the 1 in 100-year event + 40% climate change allowance will be provided on site within the drainage system / swale. It is anticipated that UU or an appointed maintenance company will maintain the onsite SuDS.

7.2 RECOMMENDATIONS

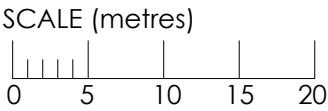
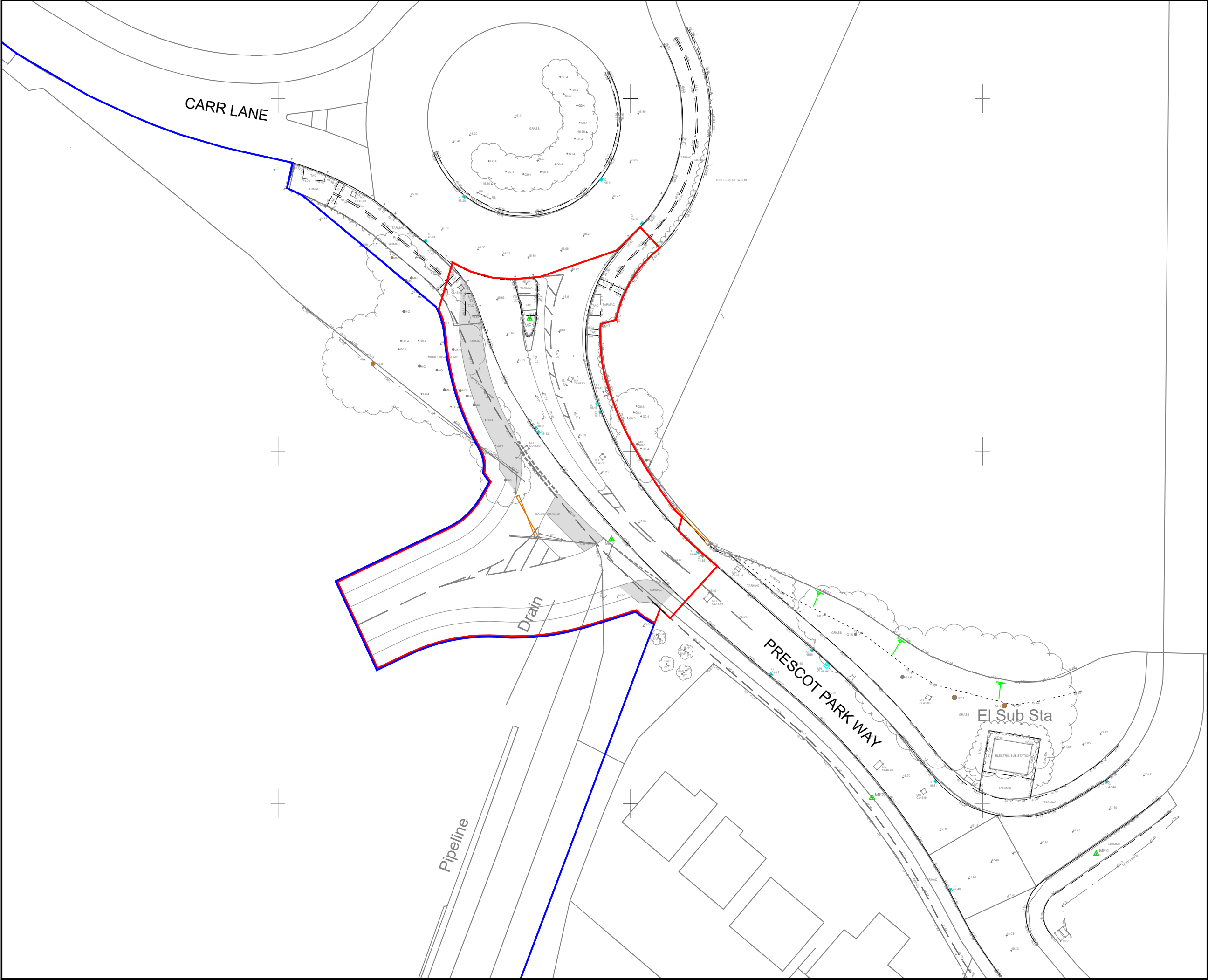
Consultation with the EA should begin to confirm discharge rate.

All SUDS should be designed in accordance with The SUDS Manual (CIRIA C753) and Defra's Non-technical standards for sustainable drainage systems.

A comprehensive inspection and maintenance schedule shall be provided and implemented to ensure that the drainage system is maintained in a good operational manner.

APPENDICES

APPENDIX 1 – SITE PLANS



A	12.01.22	General amendments		SFB	SFB PRC
Rev.	Date	Revision Details		Drawn	Check App.



CBO
TRANSPORT

Jactin House
24 Hood Street
Ancoats
Manchester
M4 6WX
T: 0161 327 1931
E: info@cbotransport.co.uk
W: www.cbotransport.co.uk

Client

United Utilities

Project

Carr Lane, Prescott

Drawing Title

Redline Boundary

Drawn	Checked	Approved
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SFB	PRC	PRC
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Scale / Size	Date
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1:500 @ A3	12.01.22
------------	----------

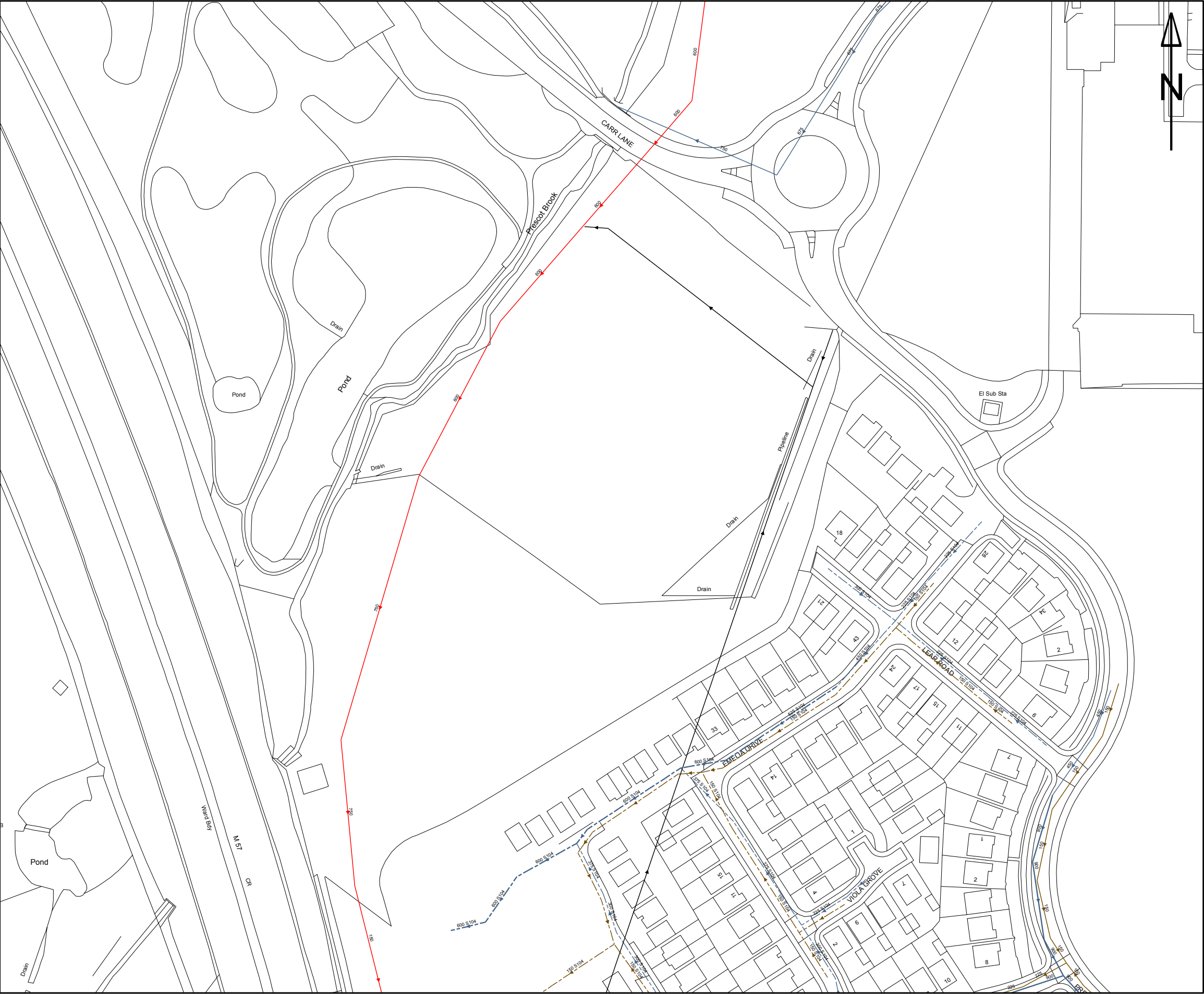
Status	Drg No	Rev
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Information	CBO-0206-100	A
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APPENDIX 2 – TOPOGRAPHICAL SURVEY

APPENDIX 3 – SEWER RECORDS

CARR LANE, PRESCOT



Location Plan Scale 1:50,000

Legend

 - Location of Property

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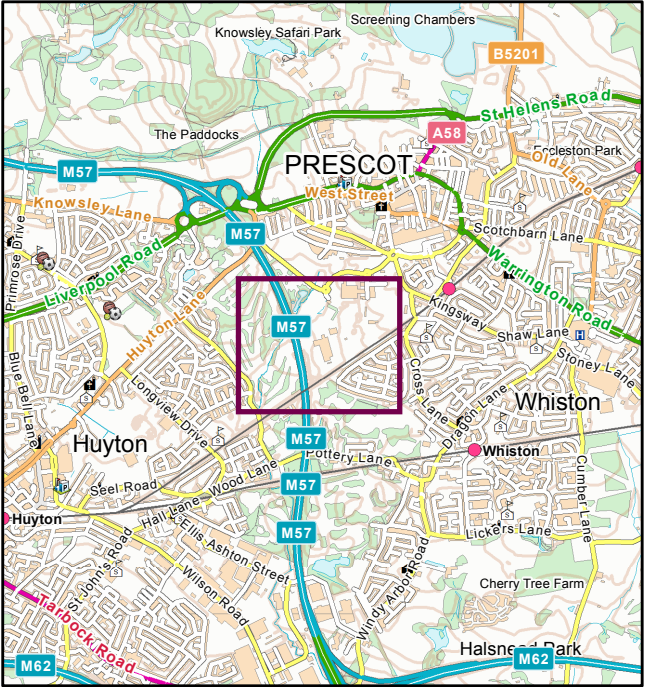
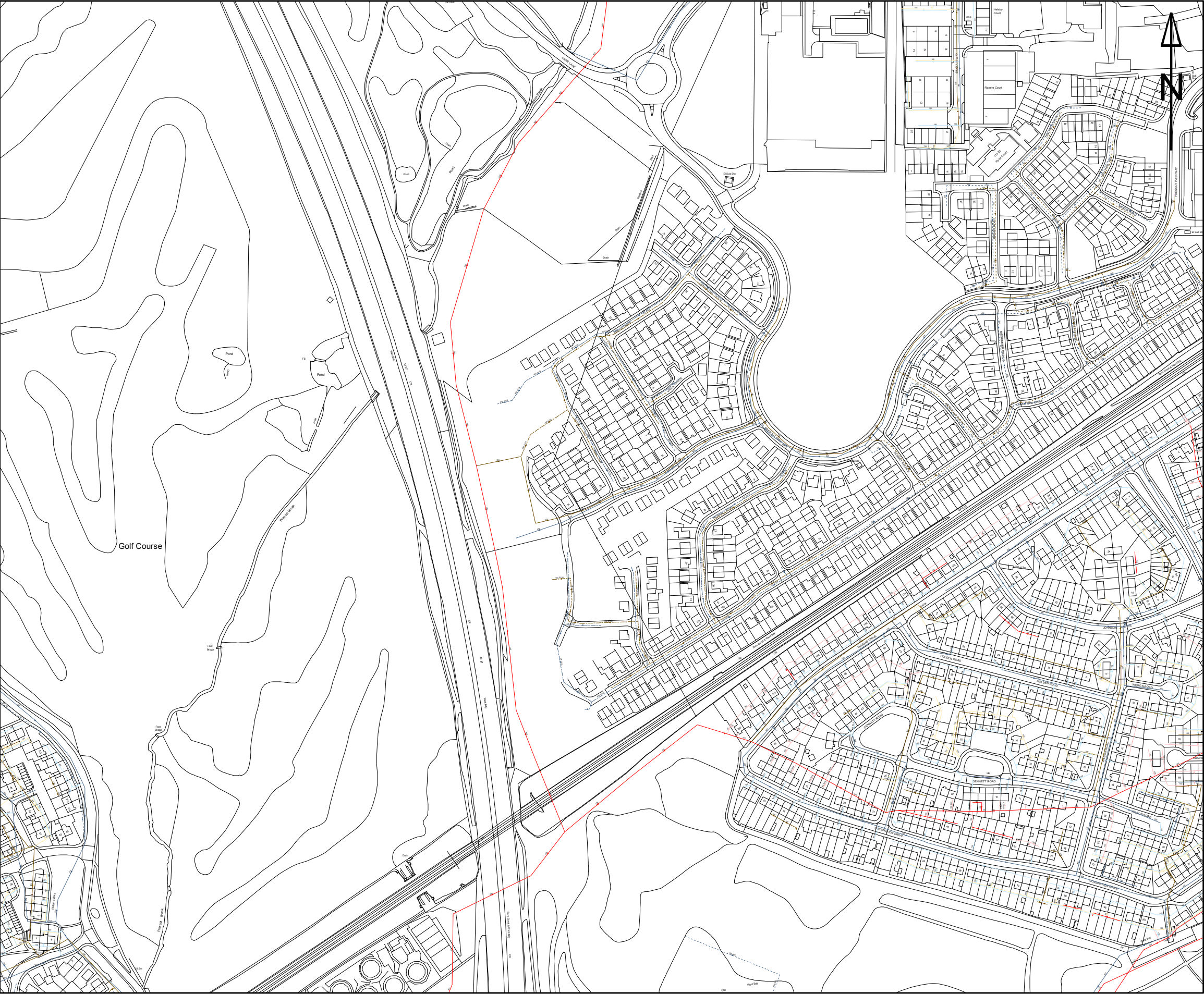
LICENCE NUMBER: 100022432.



United Utilities

Water for the North West

CARR LANE, PRESCOT (2)



Location Plan Scale 1:50,000

Legend
□ - Location of Property

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United Utilities

Water for the North West

CCTV Drainage Survey

Carr Lane, Prescot, L34 1JZ.

CCTV DRAINAGE SURVEY REPORT



Job Number:

Survey By:

Grid Ref:

Node Number: MH1

Cover Level:

Location: CARR LANE PRESCOT

Year Laid: Z

Status: PU

Function: C

Node Type: MH

Survey Date:

Manufacturer:

Grating:

COVER

Shape: S

Hinged

Lockable: Y

Duty: H

Size:700X700

Toxic atmos:

SHAFT

Side Entry:/

Regulating Courses 2

Depth 260

Size: 610X610

Vermin: /

CHAMBER

Soffit Type: S

No. of Step Irons: 8

No. of Ladders:

No. of Landings:

Size:1500X1500

Const'n Code: PCC

Depth of Flow:

Depth of Silt:

H of S:

	Pipe	U/S D/S node Reference	Shape	Pipe Size		Backdrop Diameter	Pipe Material	Lining Material	Depth from Cover (M)	Invert Level (M)
INCOMING PIPES	A	UNK	C	600	600		CO		3.21	
	B									
	C									
	D									
	E									
	F									
OUTGOING PIPES	X	MH2	C	600	600		CO		3.28	
	Y									

CONDITION INFORMATION Enter Y if attention required. Use Remarks to clarify

Cover	Irons/Ladders	Shaft	Chamber	Benching	Other
-------	---------------	-------	---------	----------	-------

Remarks:



Job Number:	Survey By:
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Grid Ref:	Node Number: MH2	Cover Level:
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Location: CARR LANE PRESCOT

Year Laid: Z	Status: PU	Function: C	Node Type: MH	Survey Date:
--------------	------------	-------------	---------------	--------------

Manufacturer:	Grating:
---------------	----------

COVER	Shape: S	Hinged	Lockable: Y	Duty: H	Size:700X700	Toxic atmos:
-------	----------	--------	-------------	---------	--------------	--------------

SHAFT	Side Entry:/	Regulating Courses 1	Depth 110	Size: 610X610	Vermin: /
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CHAMBER	Soffit Type: S	No. of Step Irons: 4	No. of Ladders:	No. of Landings:
---------	----------------	----------------------	-----------------	------------------

Size:1500X1500	Const'n Code: PCC	Depth of Flow:	Depth of Silt:	H of S:
----------------	-------------------	----------------	----------------	---------

	Pipe	U/S D/S node Reference	Shape	Pipe Size		Backdrop Diameter	Pipe Material	Lining Material	Depth from Cover (M)	Invert Level (M)
INCOMING PIPES	A	MH1	C	600	600		CO		2.13	
	B	UNK	C	225	225		VC		1.71	
	C									
	D									
	E									
	F									
OUTGOING PIPES	X	MH3	C	600	600		CO		2.19	
	Y									

CONDITION INFORMATION Enter Y if attention required. Use Remarks to clarify

Cover	Irons/Ladders	Shaft	Chamber	Benching	Other
-------	---------------	-------	---------	----------	-------

Remarks:



Job Number:	Survey By:
-------------	------------

Grid Ref:	Node Number: MH3	Cover Level:
-----------	------------------	--------------

Location: CARR LANE PRESCOT

Year Laid: Z	Status: PU	Function: C	Node Type: MH	Survey Date:
--------------	------------	-------------	---------------	--------------

Manufacturer:	Grating:
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COVER	Shape: S	Hinged	Lockable: Y	Duty: H	Size:700X700	Toxic atmos:
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SHAFT	Side Entry:/	Regulating Courses 4	Depth 550	Size: 610X610	Vermin: /
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CHAMBER	Soffit Type: S	No. of Step Irons: 4	No. of Ladders:	No. of Landings:
---------	----------------	----------------------	-----------------	------------------

Size:1500X1500	Const'n Code: PCC	Depth of Flow:	Depth of Silt:	H of S:
----------------	-------------------	----------------	----------------	---------

	Pipe	U/S D/S node Reference	Shape	Pipe Size		Backdrop Diameter	Pipe Material	Lining Material	Depth from Cover (M)	Invert Level (M)
INCOMING PIPES	A	MH2	C	600	600		CO		2.26	
	B									
	C									
	D									
	E									
	F									
OUTGOING PIPES	X	MH4	C	600	600		CO		2.33	
	Y									

CONDITION INFORMATION Enter Y if attention required. Use Remarks to clarify

Cover	Irons/Ladders	Shaft	Chamber	Benching	Other
-------	---------------	-------	---------	----------	-------

Remarks:



Job Number: Survey By:

Grid Ref: Node Number: MH4 Cover Level:

Location: CARR LANE PRESCOT

Year Laid: Z Status: PU Function: C Node Type: MH Survey Date:

Manufacturer: Grating:

COVER Shape: S Hinged Lockable: Y Duty: H Size:700X700 Toxic atmos:

SHAFT Side Entry:/ Regulating Courses 3 Depth 550 Size: 610X610 Vermin: /

CHAMBER Soffit Type: S No. of Step Irons: 4 No. of Ladders: No. of Landings:

Size:1500X1500 Const'n Code: PCC Depth of Flow: Depth of Silt: H of S:

	Pipe	U/S D/S node Reference	Shape	Pipe Size		Backdrop Diameter	Pipe Material	Lining Material	Depth from Cover (M)	Invert Level (M)
INCOMING PIPES	A	MH3	C	600	600		CO		2.40	
	B									
	C									
	D									
	E									
	F									
OUTGOING PIPES	X	MH5	C	600	600		CO		2.46	
	Y									

CONDITION INFORMATION Enter Y if attention required. Use Remarks to clarify

Cover	Irons/Ladders	Shaft	Chamber	Benching	Other
-------	---------------	-------	---------	----------	-------

Remarks:



Job Number: Survey By:

Grid Ref: Node Number: MH6 Cover Level:

Location: CARR LANE PRESCOT

Year Laid: Z Status: PU Function: S Node Type: MH Survey Date:

Manufacturer: Grating:

COVER Shape: S Hinged Lockable: Duty: H Size: 600X600 Toxic atmos:

SHAFT Side Entry:/ Regulating Courses Depth 780 Size: 600X600 Vermin: /

CHAMBER Soffit Type: S No. of Step Irons: 3 No. of Ladders: No. of Landings:

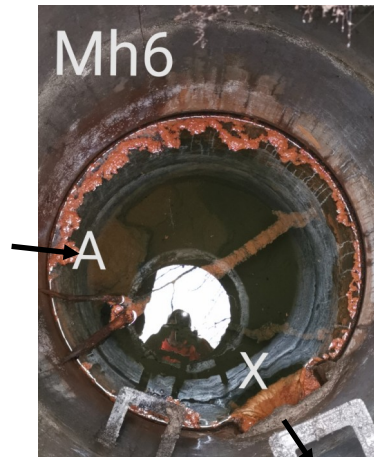
Size: 1050X1050 Const'n Code: PCC Depth of Flow: Depth of Silt: H of S:

	Pipe	U/S D/S node Reference	Shape	Pipe Size		Backdrop Diameter	Pipe Material	Lining Material	Depth from Cover (M)	Invert Level (M)
INCOMING PIPES	A	UNK	C	300	300		VC		3.85	
	B									
	C									
	D									
	E									
	F									
OUTGOING PIPES	X		OUTFALL	300	300		CO		2.30	
	Y									

CONDITION INFORMATION Enter Y if attention required. Use Remarks to clarify

Cover	Irons/Ladders	Shaft	Chamber	Benching	Other
-------	---------------	-------	---------	----------	-------

Remarks:



Job Number:

Survey By:

Grid Ref:

Node Number: MH7

Cover Level:

Location: CARR LANE PRESCOT

Year Laid: Z

Status: PU

Function: C

Node Type: MH

Survey Date:

Manufacturer:

Grating:

COVER

Shape: S

Hinged

Lockable: Y

Duty: H

Size:700X700

Toxic atmos:

SHAFT

Side Entry:/

Regulating Courses 2

Depth 450

Size: 610X610

Vermin: /

CHAMBER

Soffit Type: S

No. of Step Irons:

No. of Ladders: 1

No. of Landings:

Size:1500X1500

Const'n Code: PCC

Depth of Flow:

Depth of Silt:

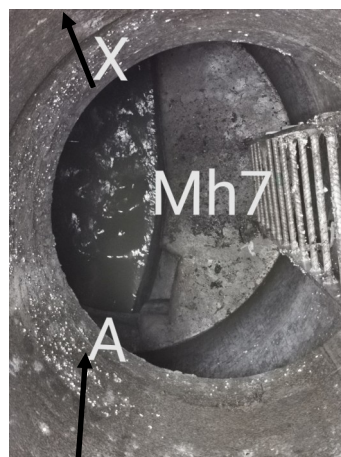
H of S:

	Pipe	U/S D/S node Reference	Shape	Pipe Size		Backdrop Diameter	Pipe Material	Lining Material	Depth from Cover (M)	Invert Level (M)
INCOMING PIPES	A	MH5	C	750	750		CO		5.20	
	B									
	C									
	D									
	E									
	F									
OUTGOING PIPES	X	MH8	C	750	750		CO		5.24	
	Y									

CONDITION INFORMATION Enter Y if attention required. Use Remarks to clarify

Cover	Irons/Ladders	Shaft	Chamber	Benching	Other
-------	---------------	-------	---------	----------	-------

Remarks:



Job Number:	Survey By:
-------------	------------

Grid Ref:	Node Number: MH8	Cover Level:
-----------	------------------	--------------

Location: CARR LANE PRESCOT

Year Laid: Z	Status: PU	Function: C	Node Type: MH	Survey Date:
--------------	------------	-------------	---------------	--------------

Manufacturer:	Grating:
---------------	----------

COVER	Shape: S	Hinged	Lockable:	Duty: H	Size: 620X620	Toxic atmos:
-------	----------	--------	-----------	---------	---------------	--------------

SHAFT	Side Entry: /	Regulating Courses 3	Depth 600	Size: 610X610	Vermin: /
-------	---------------	----------------------	-----------	---------------	-----------

CHAMBER	Soffit Type: S	No. of Step Irons:	No. of Ladders: 1	No. of Landings:
---------	----------------	--------------------	-------------------	------------------

Size: 1500X1500	Const'n Code: PCC	Depth of Flow:	Depth of Silt:	H of S:
-----------------	-------------------	----------------	----------------	---------

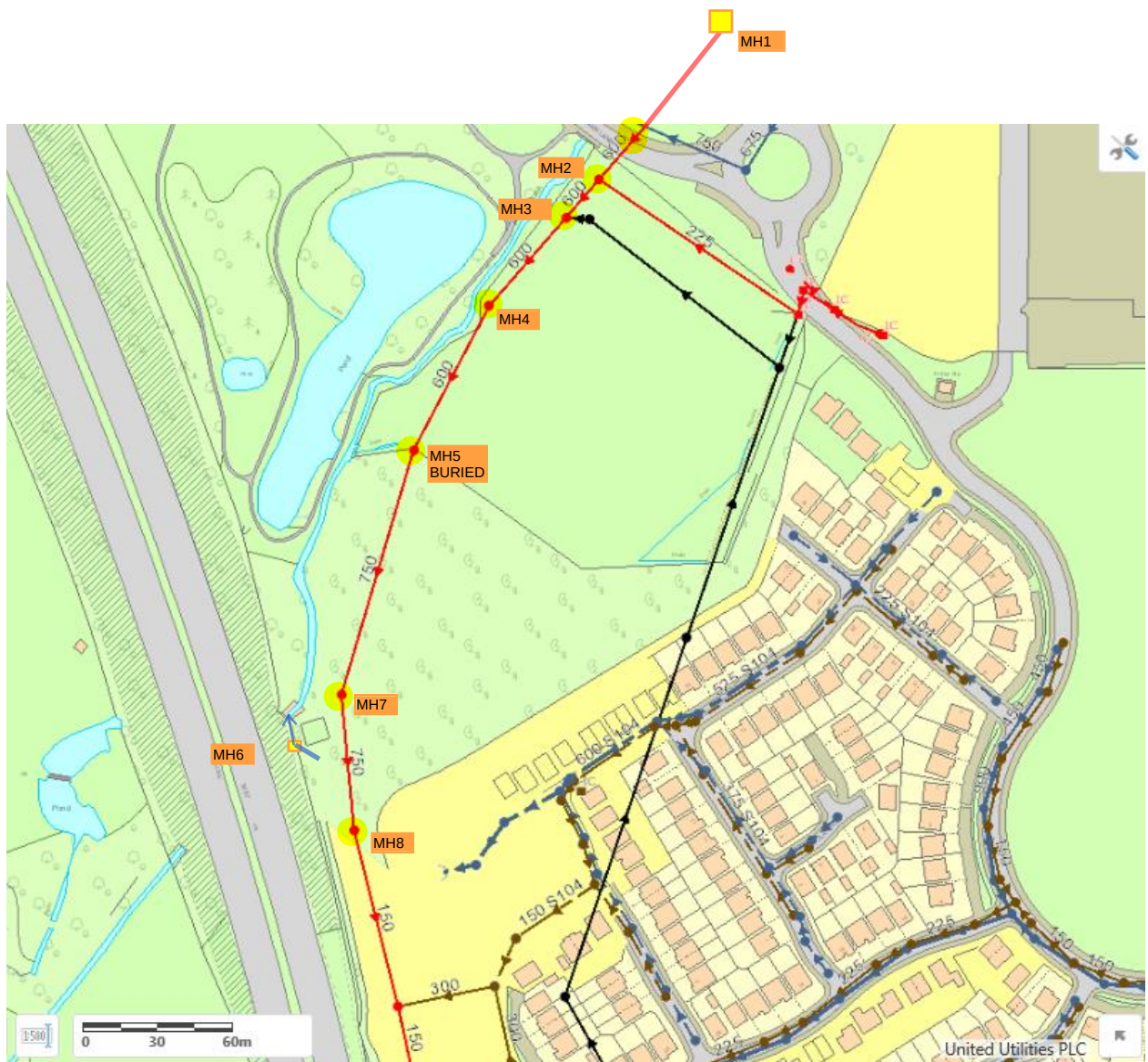
	Pipe	U/S D/S node Reference	Shape	Pipe Size		Backdrop Diameter	Pipe Material	Lining Material	Depth from Cover (M)	Invert Level (M)
INCOMING PIPES	A	MH7	C	750	750		CO		5.26	
	B									
	C									
	D									
	E									
	F									
OUTGOING PIPES	X	UNK	C	750	750		CO		5.32	
	Y									

CONDITION INFORMATION Enter Y if attention required. Use Remarks to clarify

Cover	Irons/Ladders	Shaft	Chamber	Benching	Other
-------	---------------	-------	---------	----------	-------

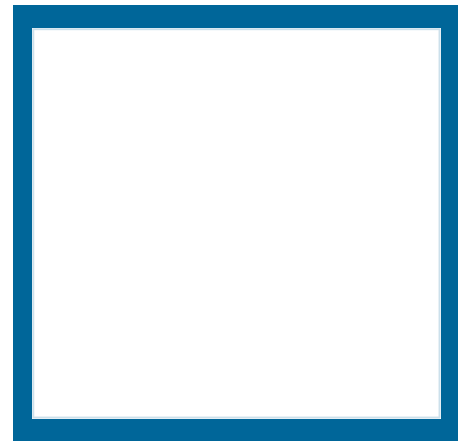
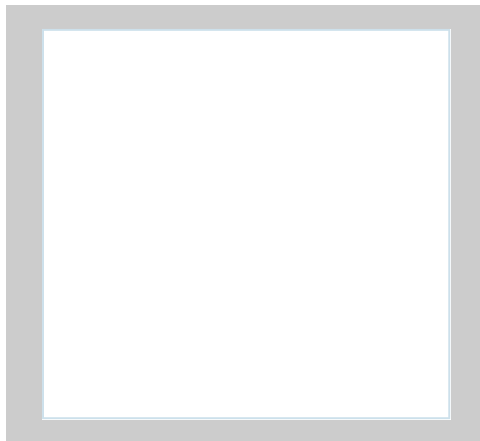
Remarks:





● Sewer manhole survey location. Anticipated number of manholes to be surveyed is between 3 to 7 no.

<u>MH Ref</u>	<u>Easting's</u>	<u>Northing's</u>	<u>Cover Level</u>
MH01	346116.62	392168.07	43.313
Pont 2	346124.17	392160.05	43.598
Point 3	346155.53	392155.7	45.155
MH7	346007.73	391927.4	43.057
MH8	346013.56	391873.84	42.933



APPENDIX 4 – ENVIRONMENT AGENCY CONSULTATION

Mawdsley, Graham

From: GMMC Info Requests <InfoRequests.GMMC@environment-agency.gov.uk>
Sent: 26 October 2021 10:22
To: Mawdsley, Graham
Subject: GMMC236732SW Response attached from the Environment Agency
Attachments: GMMC236732SW - DFM.pdf; GMMC236732SW - Table.pdf

Importance: High

Dear Graham,

Thank you for your enquiry which was received on 08/10/21.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

Please find attached the data requested and my colleagues supporting comments below;

We have no records of flooding affecting the site. However, this does not mean flooding has not occurred in the past or that it will not flood in future. We recommend that you also contact United Utilities and Knowsley Council who may hold additional information (the former especially in relation to sewer flooding).

There are no flood defences in the vicinity of the site.

There is no 2D modelling data for this site

The ShareFile link contains the following data:

<https://ea.sharefile.com/d-s9d3c9d0100064cafb40add39a5da5f6e>

Logwood Mill Brook 2012 model & Report

Please can you advise that the link will expire in 30 days. It is therefore advisable that the client saves this data to their own system.

Here are some additional links that may be of use:

<https://www.gov.uk/guidance/flood-risk-assessment-local-planning-authorities>

<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

Product 5/6/7

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- 4.1 The Information may contain some data that we believe is within the definition of "personal data" under the Data Protection Act 1998 but we consider that we will not be in breach of the Act if we disclose it to you with conditions set out in this condition and the conditions above. This personal data

comprises names of individuals or commentary relating to property that may be owned by an individual or commentary relating to the activities of an individual.

4.2 Under the Act a person who holds and uses or passes to others personal data is responsible for any compliance with the Act and so we have no option but to warn you that this means you have responsibility to check that you are compliant with the Act in respect of this personal data.

5 The location of public water supply abstraction sources must not be published to a resolution more detailed than 1km². Information about the operation of flood assets should not be published.

6 .1 Where we have supplied model data which may include model inputs or outputs you agree to supply to the Environment Agency copies of any assessments/studies and related outputs, modifications or derivatives created pursuant to the supply to you of the Information, all of which are hereinafter referred to as "the Data".

6.2 You agree, in the public interest to grant to the Environment Agency a perpetual royalty free non-exclusive licence to use the Data or any part thereof for its internal purposes or to use it in any way as part of Environment Agency derivative products which it supplies free of charge to others such as incorporation into the Environment Agency's Open Data mapping products.

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Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Kind regards,

Sarah

Sarah Walters | Customer and Engagement Officer
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From: Mawdsley, Graham [<mailto:Graham.Mawdsley@tetrattech.com>]

Sent: 08 October 2021 14:30

To: Enquiries, Unit <enquiries@environment-agency.gov.uk>

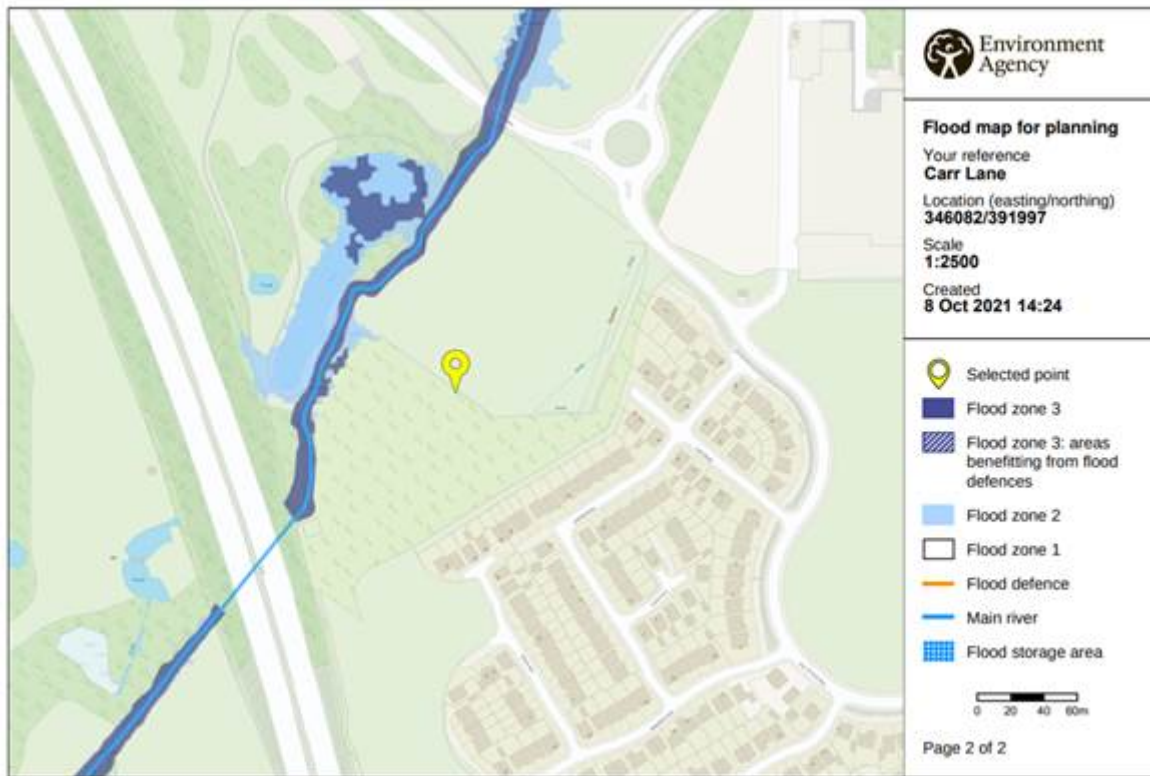
Subject: Urgent Request - Carr Lane Prescott

Importance: High

Email Enquiries – Environment Agency

I am currently preparing a Flood Risk Assessment for land owned by United Utilities off Carr Lane, Prescott, Merseyside

The red line boundary is shown on the plan below (left) and on the attached PDF. The Prescott Brook (Main River) lies partly within the western boundary of the site as shown below and on the attached plan. Flood Map for planning also identifies a narrow strip of FZ3 along this boundary.



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The site location

OS X (Easting) 346115
 OS Y (Northing) 391988
 Nat Grid SJ461919 / SJ4611591988
 Nearest Post Code L34 1AX

The site is located within FZ1, FZ2 and FZ3.

1. I would be grateful if you could provide **Products 4, 5, 6 and 7** for the site (For products 5, 6 & 7 please provide a data link for download if available).
2. Could you also provide records of any historic site flooding that the EA is aware of.

Many thanks.

Regards, Graham

Graham Mawdsley
 Associate

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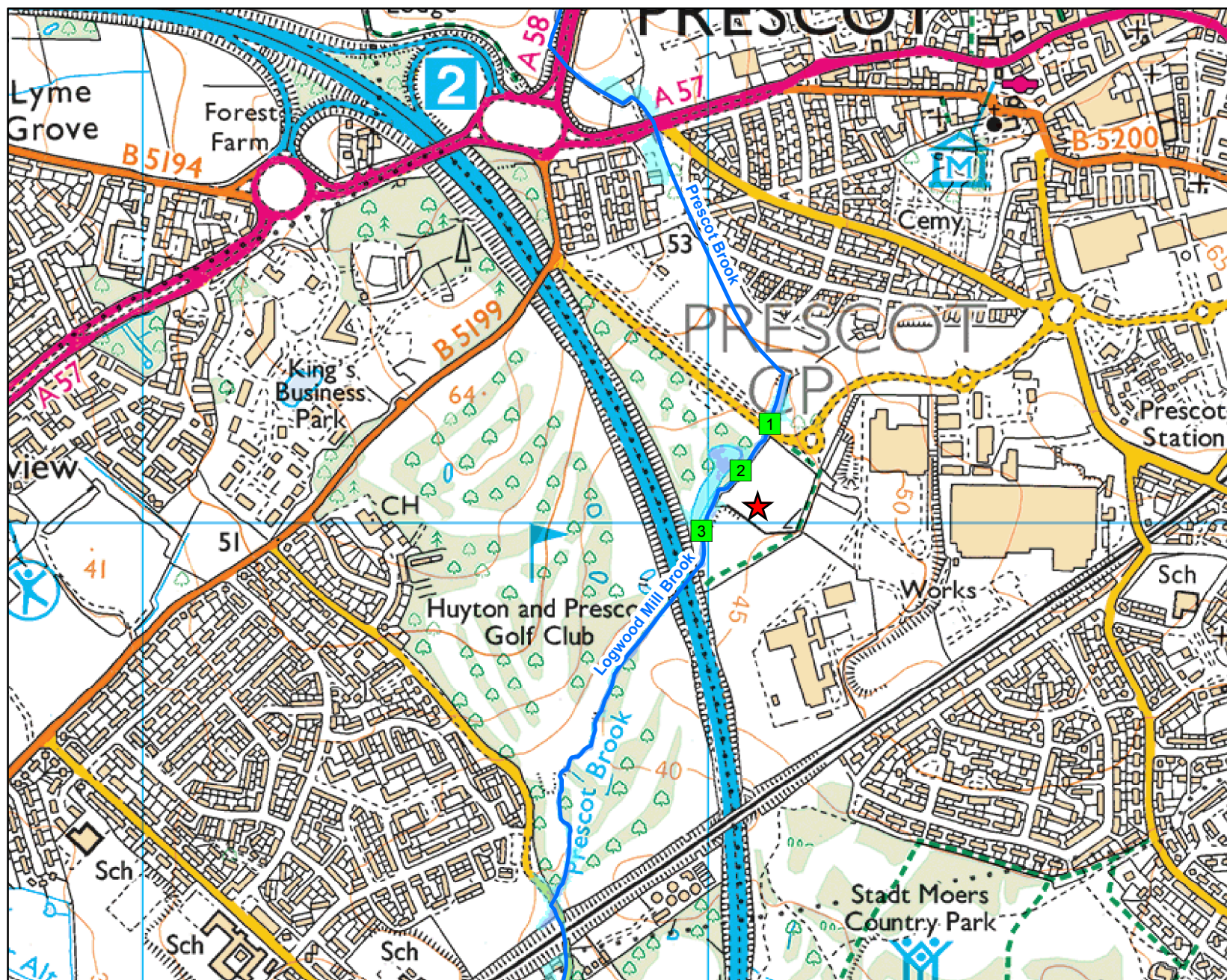
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Detailed Flood Map centred on Carr Lane, Prescott, Merseyside, L34 1AX.
Created on 13/10/2021 [GMMC236732SW]



1:10,001



Legend

- Site Location
- Model Measurements
- Main River
- Flood Zone 3
- Flood Zone 2

					Undefended						
Map Reference	Model Node Reference	Easting	Northing	Data	10 % AEP (1 in 10 year)	4 % AEP (1 in 25 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + 20% Increase in flow	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)
1	ea013_0168_Logwood_027	346138	392264	Modelled Water Level (m aodN)	41.70	41.78	42.37	42.58	43.18	43.16	43.45
				Modelled Flow (cumecs)	1.01	1.18	1.57	1.70	2.03	1.99	2.31
2	ea013_0168_Logwood_029	346127	392216	Modelled Water Level (m aodN)	41.52	41.67	42.35	42.57	43.18	43.16	43.44
				Modelled Flow (cumecs)	1.10	1.28	1.68	1.80	2.07	2.05	2.37
3	ea013_0168_Logwood_031	346112	392176	Modelled Water Level (m aodN)	41.40	41.57	42.33	42.56	43.18	43.15	43.44
				Modelled Flow (cumecs)	1.18	1.39	1.80	1.92	2.20	2.19	2.77

Model data taken from Logwood Mill Brook 2012 study

Notes:

AEP - Annual Exceedence Probability

m aodN - metres above ordnance datum Newlyn

cumecs - cubic metres per second

*Climate Change Scenario - 20% increase in flow. We only hold climate change measurements based on the previous climate change guidance. The new climate change guidance is available at <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>. The location of the site and the type (vulnerability) of development determine the climate change allowances to consider in any flood risk assessment.

For further guidance on climate change within the GMMC area please see the attachment 'Flood risk assessments: Climate change allowances'. Particularly section 3, table B which shows the Local precautionary allowances for potential climate change impacts.

APPENDIX 5 – DEVELOPMENT FLOOD ZONE MAP

Flood map for planning

Your reference
Carr Lane

Location (easting/northing)
346093/392009

Created
20 Oct 2021 15:46

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 2021 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>

Flood map for planning

Your reference

Carr Lane

Location (easting/northing)

346093/392009

Scale

1:2500

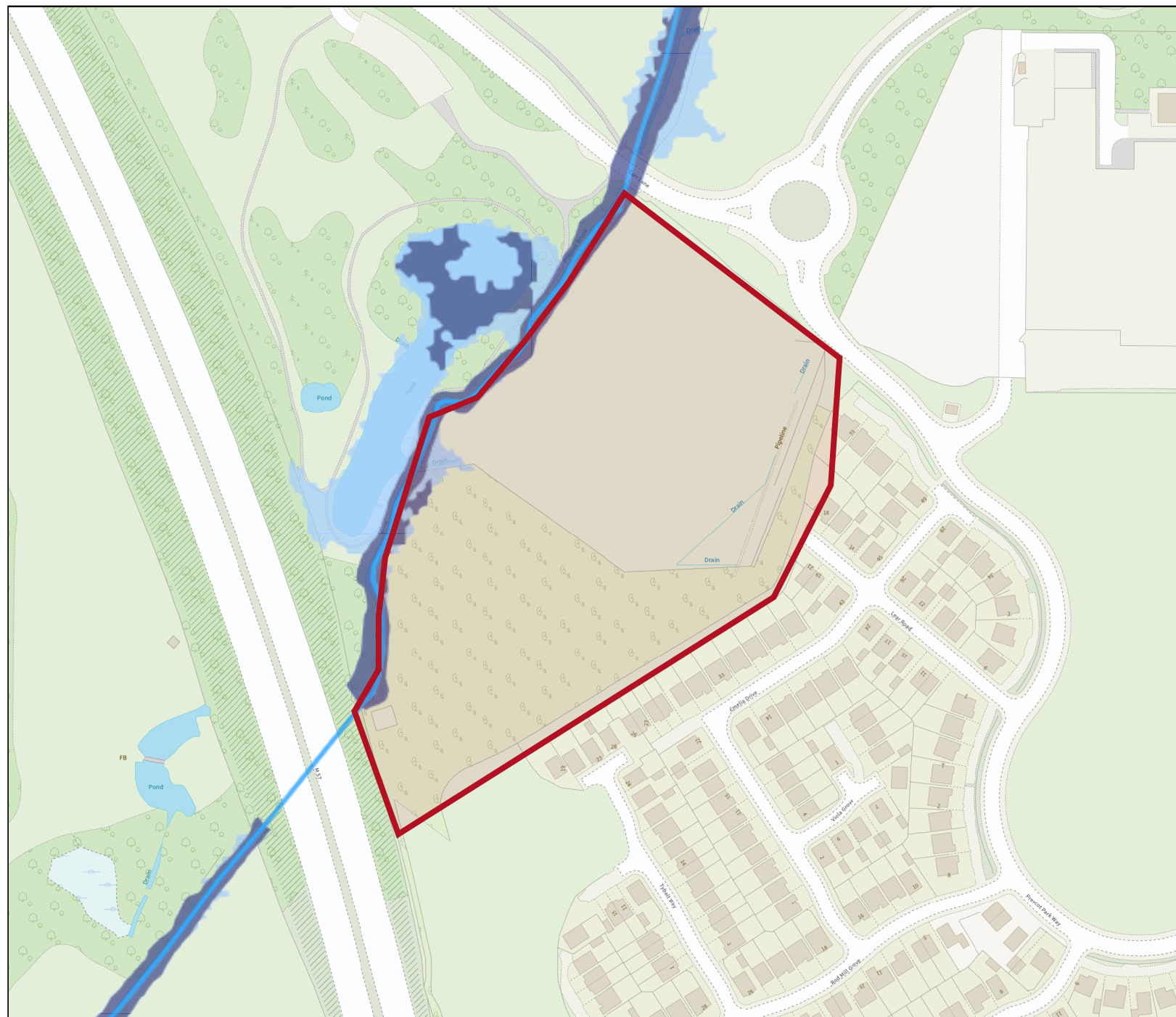
Created

20 Oct 2021 15:46

-  Selected area
-  Flood zone 3
-  Flood zone 3: areas benefitting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Flood storage area

0 20 40 60m

Page 2 of 2



APPENDIX 6 – GREENFIELD RUNOFF RATE CALCULATIONS

[Print](#)[Close Report](#)

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:

Site name:

Site location:

Site Details

Latitude:

Longitude:

Reference:

Date:

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach

Site characteristics

Total site area (ha):

Methodology

Q_{BAR} estimation method:

SPR estimation method:

Soil characteristics

Default Edited

SOIL type:

HOST class:

SPR/SPRHOST:

Hydrological characteristics

Default Edited

SAAR (mm):

Hydrological region:

Growth curve factor 1 year:

Growth curve factor 30 years:

Growth curve factor 100 years:

Growth curve factor 200 years:

Notes

(1) Is $Q_{BAR} < 2.0$ l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is $SPR/SPRHOST \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

Default

Edited

Q_{BAR} (l/s):	6.35	6.35
1 in 1 year (l/s):	5.53	5.53
1 in 30 years (l/s):	10.8	10.8
1 in 100 year (l/s):	13.21	13.21
1 in 200 years (l/s):	15.05	15.05

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

APPENDIX 7 – SURFACE WATER ATTENUATION

Calculated by:

Site name:

Site location:

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site Details

Latitude:

Longitude:

Reference:

Date:

Site characteristics

Total site area (ha):	0.161
Significant public open space (ha):	0.091
Area positively drained (ha):	0.07
Impermeable area (ha):	0.07
Percentage of drained area that is impermeable (%):	100
Impervious area drained via infiltration (ha):	0
Return period for infiltration system design (year):	10
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	10
Compliance factor for rainwater harvesting system (%):	66
Net site area for storage volume design (ha):	0.07
Net impermeable area for storage volume design (ha):	0.07
Pervious area contribution to runoff (%):	30

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other flow rates will have been reduced accordingly.

Design criteria

Climate change allowance factor:	1.4
Urban creep allowance factor:	1.1
Volume control approach	Flow control to max of 2 l/s/ha or
Interception rainfall depth (mm):	Qbar 5
Minimum flow rate (l/s):	2

Methodology

esti	IH124	
Q_{BAR} estimation method:	Calculate from SPR and SAAR	
SPR estimation method:	Calculate from SOIL type	
Soil characteristics	Default	Edited
SOIL type:	4	4
SPR:	0.47	0.47
Hydrological characteristics	Default	Edited

Rainfall 100 yrs 6 hrs:	--	63
Rainfall 100 yrs 12 hrs:	--	80.85
FEH / FSR conversion factor:	1.05	1.05
SAAR (mm):	885	885
M5-60 Rainfall Depth (mm):	20	20
'r' Ratio M5-60/M5-2 day:	0.4	0.4
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 10 year:	1.38	1.38
Growth curve factor 30 year:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Q_{BAR} for total site area (l/s):	1.02	1.02
Q_{BAR} for net site area (l/s):	0.44	0.44

Site discharge rates	Default	Edited	Estimated storage volumes	Default	Edited
1 in 1 year (l/s):	2	2	Attenuation storage 1/100 years (m³):	28	28
1 in 30 years (l/s):	2	2	Long term storage 1/100 years (m³):	0	0
1 in 100 year (l/s):	2	2	Total storage 1/100 years (m³):	28	28

This report was produced using the storage estimation tool developed by HRWallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at <http://uksuds.com/terms-and-conditions.htm>. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

APPENDIX 8 - SURFACE WATER DRAINAGE DESIGN

[illegible]

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 **TETRA TECH**

Client

UNITED UTILITIES

Project Name

CARR LANE, PRESCOT

Sheet Title								
SURFACE WATER DRAINAGE STRATEGY								
TTE Project Number	Drawn By	Date	Checked By	Date	Approved By	Date	Scale @ A1	Suitability
BD028266	DH	JAN 22	GM	JAN 22	GM	JAN 22	1:250	S0
Client Project Number	Originator	Volume/System	Level/Location	Type/Code	Role	Number	Revision	
PRJ01	- TTE	- 00	- ZZ	- DR	- C	- 0001		P03