

This City Residential Development, Ancoats, Manchester

Flood Risk Assessment and Drainage Strategy

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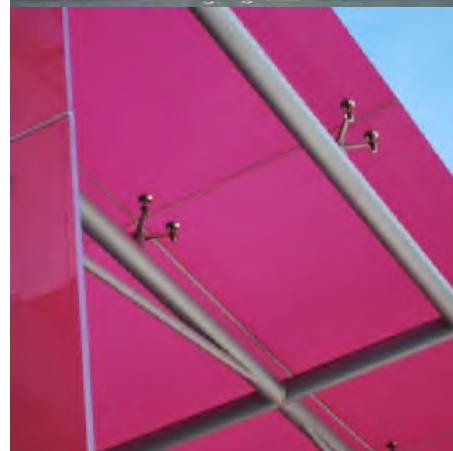
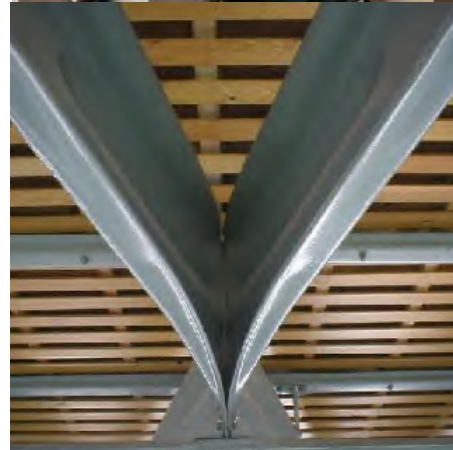
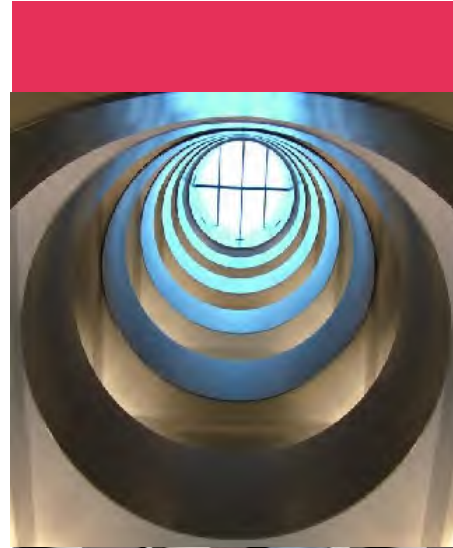
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Client Name: Wates Construction Ltd

Site Address: Land to the west of Rodney Street, Manchester, M4 6JJ

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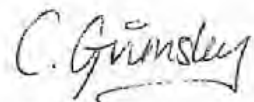


Control Sheet

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Proposed Drainage Layout

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Executive Summary

Curtins was appointed by Wates Construction to provide a Flood Risk Assessment (FRA) and Drainage Strategy (DS) for the proposed residential development site situated at land to the west of Rodney Street, Manchester M4 6JJ.

The total site area is approximately 0.76 hectares and following scrutiny of the UK Government Flood Map for Planning it has been identified that the existing site lies entirely within an area classified as Flood Zone 1 indicating that the probability of flooding from rivers or sea (not taking into account flood defences or climate change) is low.

Although the site area is less than 1 hectare, it is located in a Critical Drainage Area and therefore a Flood Risk Assessment is required to support a planning application also taking into consideration the management of surface water run-off.

This report assesses the risk from different types of flooding to the development and the risk of flooding from the development, taking into consideration climate change, as well as how flood risks should be managed. The approach to assessing flood risk at the development site was informed by the requirements of NPPF in conjunction with the client and Environment Agency requirements.

From the evidence collated and subsequent negotiations the main types of flooding that may apply to the proposed development site are as follows:

- Public Sewers Flooding - Infrastructure Failure (residual risk).
- Surface water flooding to the site (residual risk); and
- Surface water flooding from the site (potential).

It is recommended that external ground levels across the site should fall away from the proposed buildings and that the creation of low points is avoided (other than those used intentionally for drainage features) in order that in the unlikely event of flooding, the flood water is safely routed away from the buildings on site.

The existing and proposed drainage assets both on site and in the vicinity of the site should be maintained by the relevant parties.

A minimum of 40% climate change allowance for peak rainfall intensities should be applied to the new development drainage system.

There are various public sewers located on site; All sewers are shown with a 6m easement which is 3m offset from centreline.

All existing sewers on site should be marked out and protected throughout the construction works.

United Utilities will be consulted further to report on final proposed ground levels and to agree any reconfiguration of existing manhole covers to suit proposed ground levels.

A separate foul and surface water system is proposed, with a combined outfall into the existing combined public sewer in Wadeford Close.

The invert level of the public combined sewer at the existing manhole adjacent to the north of the site is approximately 47.205m AoD (Layer Surveys Manhole Card depths interpolated to the intermediate connection point).

Proposed Flows have not yet been determined in detail from the development site; however, based on Sewer Sector Guidance Appendix C Design and Construction Guidance for the Construction of Sewers cl. B3.1 we have assumed 4000 l/d/d (litres per dwelling per day). The peak foul discharge is therefore estimated as 5.92 l/s based on 128 dwellings.

United Utilities have confirmed that foul will be allowed to drain to the public combined sewer network at an unrestricted rate into the combined sewer in Wadeford Close.

In following the standard hierarchy of drainage solutions, consideration should firstly be given to the discharge of surface water runoff by sustainable methods such as infiltration. Connection to the existing combined public sewer system is considered the only viable solution.

The existing greenfield run-off rate QBAR has been estimated as 3.6 l/s. Generally, we would aim to reduce flows to greenfield run-off rate in line with local policy guidance, however, in accordance with EA report SC030219 – Rainfall runoff management for developments and Building Regulations 2015, to limit blockage risk the proposed discharge from the development has been set at a maximum of 5 l/s.

United Utilities have confirmed that discharge to the public sewer should be at a maximum of 5 l/s to the sewer in Wadeford Close.

In accordance with the National Planning Policy Framework (NPPF) a sustainable drainage system (SuDS) should be provided unless demonstrated to be inappropriate.

The development is proposing potential options to include:

- Permeable Paving
- Rain gardens

A detailed model of the drainage system has been generated to confirm the system capacity and co-ordinate space requirements within the site. The required volume is estimated to be approximately 206m³ within two attenuation tanks. Currently, capacity within the permeable paving and rain gardens has not been modelled and this will be included once final construction build ups are confirmed.

The proposed development is unlikely to require any significant pollution treatment systems. The proposed development is likely to be considered a low hazard and it may be necessary to introduce a pre-treatment solution prior to outfall, unless all external areas can be adequately treated through either the rain gardens or permeable paving filter medium.

All drainage on site is to remain private and therefore connection to the public sewer will be subject to a Section 106 Agreement with United Utilities.

1.0 Introduction

1.1 Project Background

- 1.1.1 Curtins was appointed by Wates Construction to provide a Flood Risk Assessment (FRA) and Drainage Strategy (DS) for the proposed residential development site situated at Land to the west of Rodney Street, Manchester. The nearest postcode to the site is M4 6JJ, and the site is centred around Grid Reference 385307, 398965.
- 1.1.2 The FRA provides information on the nature of flood risk at the site, following Government guidance with regards to development and flood risk. The FRA outlines the drainage requirements for the proposed site, with regards to relevant standards, guidance, and good practice.
- 1.1.3 The report is based on currently available information and preliminary discussions.
- 1.1.4 Proposals contained or forming part of this report represent the design intent and may be subject to alteration or adjustment in completing the detailed design for this project. Where such adjustments are undertaken as part of the detailed design and are deemed a material deviation from the intent contained in this document, prior approval shall be obtained from the relevant authority in advance of commencing such works.
- 1.1.5 Where the proposed works to which this report refers are undertaken more than twelve months following the issue of this report, Curtins shall reserve the right to re-validate the findings and conclusions by undertaking appropriate further investigations at no cost to Curtins.

1.2 Scope of Assessment

- 1.2.1 The assessment is to be undertaken in accordance with the standing advice and requirements of the Environment Agency (EA) for Flood Risk Assessments as outlined in the Communities and Local Governments Planning Policy Guidance to the National Planning Policy Framework (NPPF).
- 1.2.2 The assessment will:
 - Investigate all potential risks of flooding to the site,
 - Consider the impact the development may have elsewhere with regards to flooding,
 - Consider proposals to mitigate any potential risk of flooding determined to be present; and
 - Consider foul and surface water drainage proposals to mitigate flood risk from the site.
- 1.2.3 The Site lies within the Manchester Conurbation Core Critical Drainage Area (as identified in the Manchester, Salford and Trafford Level 2 Hybrid SFRA).
- 1.2.4 The total site area is approximately 0.76 hectares and following scrutiny of the UK Government Flood Map for Planning it has been identified that the existing site lies entirely within an area classified as

Flood Zone 1 indicating that the probability of flooding from rivers or sea (not taking into account flood defences or climate change) is low. Following scrutiny of the UK Government Long Term Flood Risk Assessment maps, it has been identified that the existing site lies within an area which is at 'very low' residual risk of flooding from surface water and does not lie within the maximum extents of reservoir flooding risk.

- 1.2.5 Although the site area is less than 1 hectare, it is located in a Critical Drainage Area and therefore a Flood Risk Assessment is required to support a planning application also taking into consideration the management of surface water run-off.
- 1.2.6 In April 2015, the Government made changes to the National Planning Policy Framework which made Sustainable Urban Drainage Systems (SuDS) a material consideration in the determination of planning applications for 'major' developments.
- 1.2.7 A Drainage Strategy will therefore be required as part of the Full Planning Application for the development, as the development is considered to be 'major' development by the Town and Country Planning (Development Management Procedure) (England) Order 2015.
- 1.2.8 This FRA reviews the following information:
 - Environment Agency flood maps for rivers and sea flooding.
 - UK Government Long Term Flood Risk Information for surface water flooding and reservoir flooding.
 - Manchester City, Salford City and Trafford Councils Level 1 Hybrid Strategic Flood Risk Assessment (SFRA) published in March 2010.
 - Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA, User Guide, Final, dated May 2010.
 - Manchester City, Salford City and Trafford Councils Level 2 Hybrid Strategic Flood Risk Assessment (SFRA) published in March 2011.
 - Preliminary Flood Risk Assessment (PFRA) for Manchester County Council dated May 2011.
 - United Utilities Public Sewer Records dated September 2020.
 - Manchester City Council SuDS Requirements for New Developments.
 - Topographical Survey carried out by Survey Operations, dated July 2021.
 - GPR Survey carried out by Survey Operations, dated August 2021.
 - CCTV Drainage Survey carried out by Layer Surveys, dated August 2021 and May 2022.
 - Phase 1 Desk Study carried out by Curtins dated July 2021.
 - Phase 2 Geo-Environmental Assessment carried out by EPS dated December 2021.

1.3 Proposed Development

- 1.3.1 The development comprises the erection of two residential apartment buildings (Use Class C3), one of 8 storeys (68 apartments) and one of 5 storeys (50 apartments), to form a total of 118 residential apartments; and the erection of 10, three-storey townhouses (Use Class C3); together with car and cycle parking provision, hard and soft landscaping including public realm, access, substation and other associated works
- 1.3.2 The Proposed Site Layout is enclosed in *Appendix A*.

2.0 Existing Site Details

2.1 History and Current Use

- 2.1.1 The Site is located in Ancoats, approximately 1.5 km to the northeast of Manchester City Centre. The site lies west of Rodney Street and Butler Street, north of Jersey Street and includes Wadeford close, which runs along the site's western boundary. See Figure 1.
- 2.1.2 The site is irregular in shape and the majority of the Site is currently greenfield land but includes the existing Wadeford Close public highway and a small carpark on the north-western area of the site. Any historical buildings which have previously occupied the site have been demolished to ground level with ground floor slabs either removed or covered.
- 2.1.3 Vehicle access to the site is currently via Wadeford Close.
- 2.1.4 The site is located in a predominantly residential area, with Ancoats Green to the west and residential properties to the north, south and east. Oldham Road is approximately 70m to the north with some industrial businesses also to the north. Industrial estates with car parking areas are located southwest of the site and west of Ancoats Green.



Figure 1: Aerial Photograph (© Google 2021)

2.2 Existing Watercourses and Other Waterbodies

- 2.2.1 No above ground watercourses have been identified within the proposed site or immediately adjacent to the site.
- 2.2.2 LLFA Data suggests there is a culverted watercourse approximately 100m north of the site.

- 2.2.3 The Rochdale canal is located 110m southeast of the site, flowing in a southwest direction towards Manchester City Centre.
- 2.2.4 The Ashton Canal is located 520m southeast of the site, flowing in a southwest direction towards Manchester City Centre.
- 2.2.5 The River Medlock is located 920m southeast of the site, flowing in a southwest direction towards Manchester City Centre.
- 2.2.6 The River Irwell (which is a 'main river') is located approximately 1.4km west of the site from which point it flows in a westerly direction along the boundary of Manchester and Salford.

2.3 'Hidden' Watercourses

- 2.3.1 The Manchester, Salford and Trafford Level 2 Hybrid SFRA identifies where they may be historical hidden or lost watercourses. No hidden (or 'lost') watercourses have been identified within the site boundary, as shown in Figure 2.
- 2.3.2 It is difficult to locate the specific routes of lost watercourses since they are culverted underneath the urban areas around Manchester and in some cases may have been abandoned over time.
- 2.3.3 Both CCTV and GPR surveys confirmed that within the site boundary there are no watercourses.

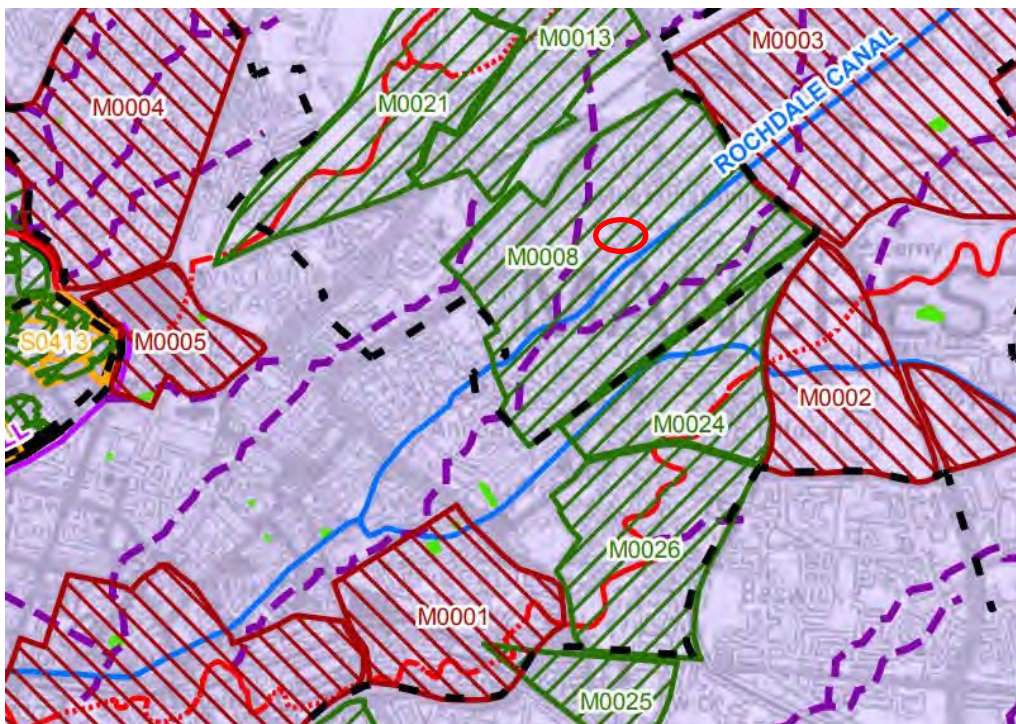


Figure 2: Extract from Manchester, Salford and Trafford Level 2 SFRA Surface Water Flooding Maps (approximate routes of lost watercourse shown as purple dashed line). Approximate site location marked by the red circle.

- 2.3.4 A data screening was obtained from Manchester City Council Lead Local Flood Authority (LLFA), and this confirmed that there are no known assets on the site. The data screen correspondence is enclosed in *Appendix F* with the correspondence from the LLFA.

2.4 Existing Drainage

- 2.4.1 The public sewer records, shown in Figure 3, have been obtained for the development site, and are enclosed in *Appendix B*.



Figure 3: United Utilities Public Sewer Record (extract).

- 2.4.2 The public sewer records indicate that the following public sewers are recorded within the site:
- An existing 580x700mm combined public sewer crossing through the site northwest boundary, this then turns 90° south-east and runs as a 600 x 750mm combined sewer and reduces to a 375mm sewer on site where it follows the route of Wadford Close towards its junction with Jersey Street.
 - A 225mm combined public sewer within the north-western area of the site, which connects on site to the above-mentioned 375mm combined sewer.
 - A 375mm combined public sewer close to the eastern boundary along Rodney Street.
- 2.4.3 The public sewer records indicate that the following public sewers are located within the vicinity of the site:

- A 450mm combined public sewer is located south of the development site, within Jersey Street and appears to flow in an east-westerly direction. This combined line increases to 525mm as the flow changes direction to the South.
- 2.4.4 There are further public sewers identified on the public sewer records within the wider vicinity of the site, but these are not considered relevant to the scheme.
- 2.4.5 A GPR Utilities Survey has been carried out and is enclosed in *Appendix C*.
- 2.4.6 A CCTV Drainage Survey has also been carried out and is enclosed in *Appendix D*.
- 2.4.7 The GPR/CCTV Surveys confirm that:
- The survey appears to identify that there are existing private drainage assets within the site local to the south and east boundaries, however this drainage appears either fully surcharged or filled. The existing outfall(s) are redundant, but they are likely to have historically discharged south towards the public sewer in Jersey Street.
 - The appears to be an existing outfall into the public sewer east of the site into the combined sewer in Rodney Street. It is not clear what this connection served but is appears to be redundant.
 - The existing 580 x 700mm sewer along the northern boundary has been identified during the survey and follows the route and size shown on the UU Asset records.
 - The existing 600 x 750mm combined sewer which reduces to a 375mm sewer on site has been surveyed, and this confirms that the route follows the approximate position on the UU Asset records but that the sewer is a 600 x 750mm sewer which reduces to a 450mm pipe.
 - The existing 225mm combined sewer has been located during the surveys and follows the route and size shown on the UU Asset records.
 - The existing 375mm combined public sewer along the footpath adjacent to the site eastern boundary along Rodney Street has been surveyed and follows the route and size shown on the UU Asset records, the sewer is within the footpath.

2.5 Topography

- 2.5.1 A topographical survey has been carried out on the proposed site, and is enclosed in *Appendix C*.
- 2.5.2 The site topography is relatively flat, with a slight slope from north to south. The levels at the north-east adjacent to Butler Street are at approximately 52.5m AoD and decrease to approximately 51.1m AoD at the south boundary of the site on Jersey Street.

2.6 Geology

- 2.6.1 BGS mapping indicates the site is underlain by Glacial Till superficial deposits and bedrock geology of the Collyhurst Sandstone Formation. The BGS records a borehole log off-site (22m N) which recorded Boulder Clay to 35.66m bgl (comprising bands of sand and gravels) overlying weathered bedrock of soft, friable, fine-grained sandstone from 35.66m to 36.58m bgl.
- 2.6.2 The site is underlain by a Secondary, undifferentiated, Aquifer associated with the superficial deposits and a Principal Aquifer (Collyhurst Formation).
- 2.6.3 The site is not located within a Source Protection Zone (SPZ).
- 2.6.4 There are no groundwater abstraction points within 500m of the site.

3.0 Development and Flood Risk

3.1 National Planning Policy Framework (NPPF) and Planning Practice Guidance

- 3.1.1 In July 2021, the Department of Communities and Local Government published the National Planning Policy framework document (NPPF) and the Planning Practice Guidance was published in March 2014 and updated in August 2021, which provides guidance on how flood risk should be assessed during the planning and development process.

Table 1: (Extract from Planning Practice Guidance) Flood Zone Classifications

These Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences. They are shown on the Environment Agency's Flood Map for Planning (Rivers and Sea [\[2\]](#)), available on the Environment Agency's web site, as indicated in the table below.

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

Table 2: (Extract from Planning Practice Guidance) Flood Risk Vulnerability Classification

Essential Infrastructure • Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind turbines.
Highly Vulnerable • Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as ‘Essential Infrastructure’).
More Vulnerable • Hospitals • Residential institutions such as residential care homes, children’s homes, social services homes, prisons and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill* and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.

Less Vulnerable

- Police, ambulance and fire stations which are **not** required to be operational during flooding.
- Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'More Vulnerable' class; and assembly and leisure.
- Land and buildings used for agriculture and forestry.
- Waste treatment (except landfill* and hazardous waste facilities).
- Minerals working and processing (except for sand and gravel working).
- Water treatment works which do not need to remain operational during times of flood.
- Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.

Water-Compatible Development

- Flood control infrastructure.
- Water transmission infrastructure and pumping stations.
- Sewage transmission infrastructure and pumping stations.
- Sand and gravel working.
- Docks, marinas and wharves.
- Navigation facilities.
- Ministry of Defence defence installations.
- Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.
- Water-based recreation (excluding sleeping accommodation).
- Lifeguard and coastguard stations.
- Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.
- Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

Table 3: (Extract from Planning Practice Guidance) Flood Risk Vulnerability and Flood Zone Compatibility

Flood Zones	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 *	✗	✗	✗	✓*

Key:

✓ Development is appropriate

✗ Development should not be permitted.

Notes to table 3:

- This table does not show the application of the Sequential Test which should be applied first to guide development to Flood Zone 1, then Zone 2, and then Zone 3; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea;
- The Sequential and Exception Tests do not need to be applied to minor developments and changes of use, except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site;
- Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

† In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere.

3.2 Site Specific NPPF Flood Risk Categorisation

- 3.2.1 To assess the NPPF flood risk classification for the site, the first step was to inspect the UK Government web based 'Flood Map for Planning' which is used to inform planning of a site's Flood Zone(s) and the probability of flooding from rivers or sea (not taking into account the presence of flood defences or climate change). However, the web based 'Long Term Flood Risk Assessment for Locations in England' should also be used to identify the long-term flood risks from rivers and seas, surface water and reservoirs.
- 3.2.2 The Flood Map for Planning report is enclosed in *Appendix E*, and it can be seen that the pre-development site and the surrounding area is located in an area classified as Flood Zone 1 (low probability of flooding from rivers or sea).

3.3 Site Specific Flood Zone Compatibility

- 3.3.1 The proposals for the development site are likely to fall within the following category:
- Buildings used for dwelling houses
- These types of development are classed as 'More Vulnerable' development in the Flood Risk Vulnerability Classification, as per Table 2.
- 3.3.2 The site is located within Flood Zone 1, for which 'More Vulnerable' development is deemed to be appropriate, and neither the sequential nor the exception test is required (refer to the Flood Zone compatibility table in the NPPF technical guidance).

4.0 Hydrological Assessment

4.1 Sources of Flood Risk

- 4.1.1 This study assesses the risk from different types of flooding to the development and the risk of flooding from the development, taking into consideration climate change, as well as how flood risks should be managed. The approach to assessing flood risk at the development site was informed by the requirements of NPPF in conjunction with the client and Environment Agency requirements.

4.2 Fluvial Flooding (Rivers and Streams)

- 4.2.1 Flooding to the site from rivers and sea is indicated below in Figure 4, taken from the UK Government's Long Term Flood Risk Information.

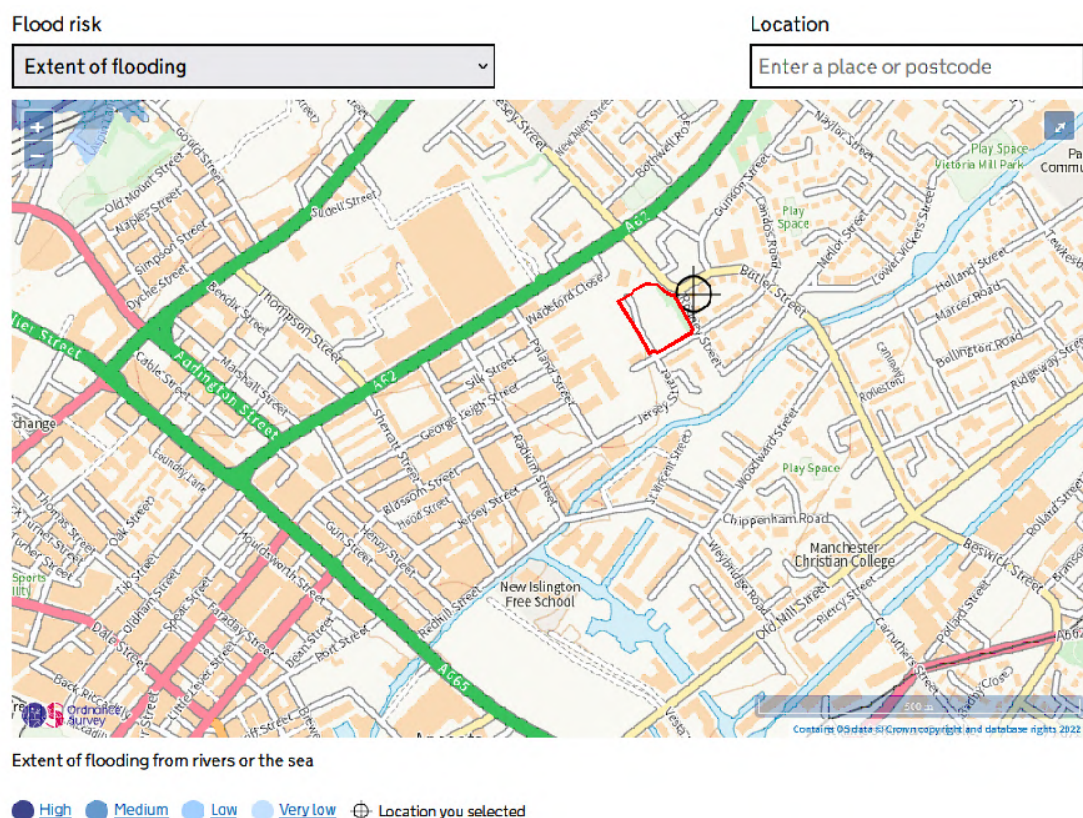


Figure 4: Long Term Flood Risk Assessment Map – Flood Risk from Rivers or Sea (© Crown Copyright)

- 4.2.2 The detailed flood risk information taken from the UK Government Long Term Flood Risk Assessment website indicates that the area within the existing site is at 'Very Low' residual risk from fluvial flooding (Figure 5).

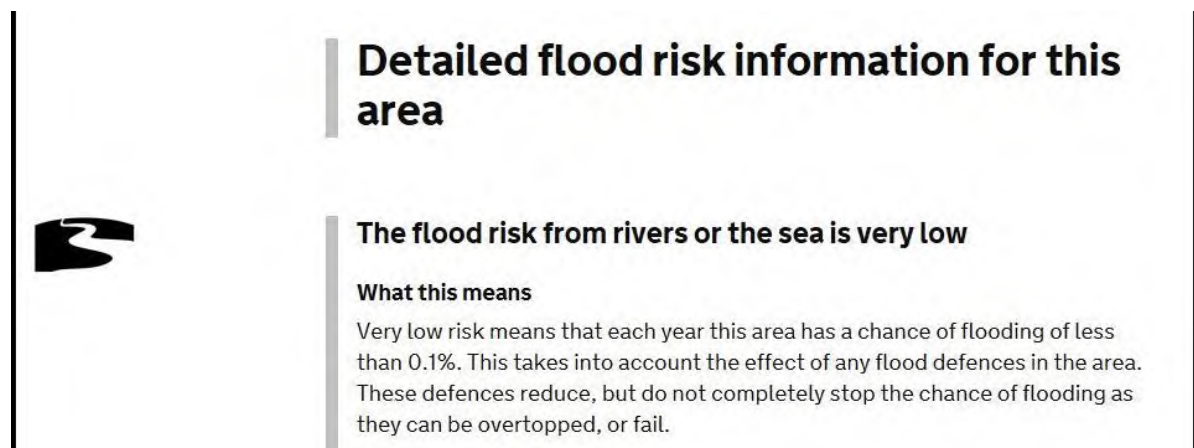


Figure 5: Long Term Flood Risk Assessment (Detailed Information) – Flood Risk from Rivers or Sea (© Crown Copyright)

4.3 Tidal Flooding (Coastal or Estuarine)

- 4.3.1 There is currently no flood risk identified on the Environment Agency flood maps for the site and it is therefore regarded to be at low risk from tidal flooding.

4.4 Reservoir Flooding

- 4.4.1 Reservoir flooding is extremely unlikely to happen and there has been no loss of life in the UK from reservoir flooding since 1925. The Environment Agency is the enforcement authority and ensures that reservoirs are inspected regularly, and essential safety work is carried out.
- 4.4.2 The Long-Term Flood Risk Assessment (Flood Risk from Reservoirs) map shows the largest area that might be flooded if a reservoir were to fail and release the water it holds (see Figure 6). Since this is a prediction of a worst-case scenario, it is very low risk that a reservoir flood would be this large
- 4.4.3 The site does not lie within the maximum extents of flooding due to reservoir breach; therefore, the site is considered to be at low risk from reservoir flooding.

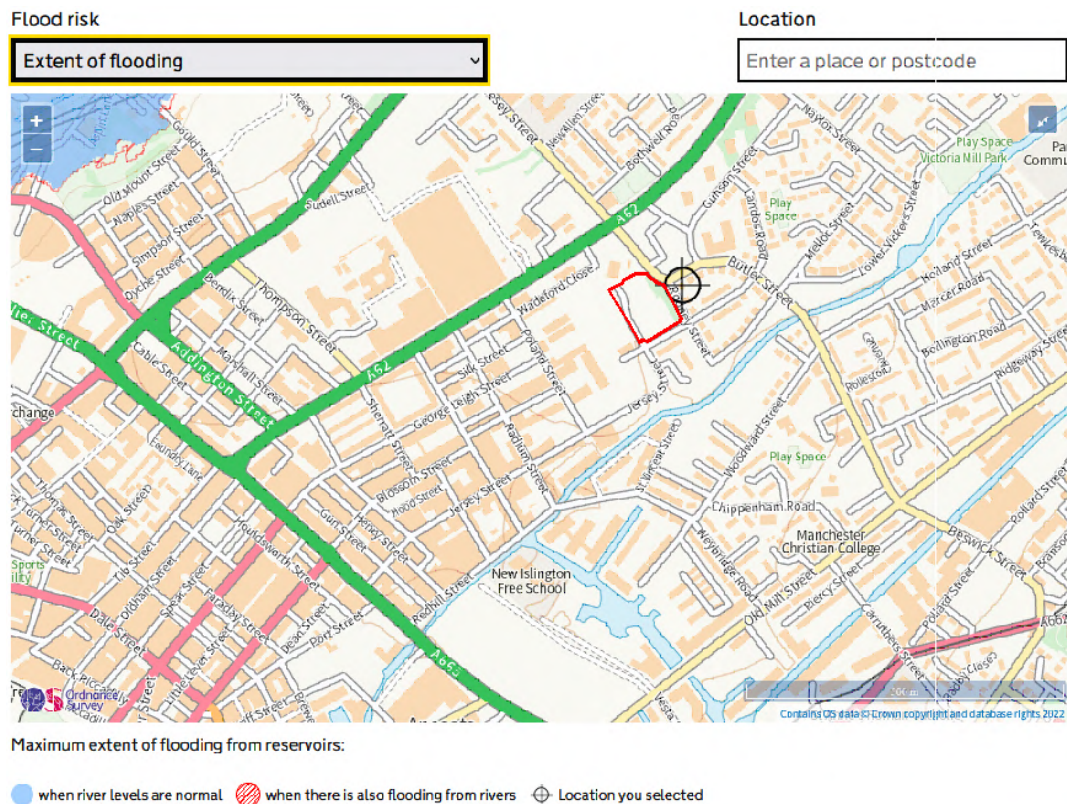


Figure 6: Long Term Flood Risk Assessment Map – Flood Risk from Reservoirs (© Crown Copyright)

4.5 Canal Flooding

- 4.5.1 The Rochdale Canal (Canal & River Trust) is approximately 110m south-east of the site. The Ashton Canal (Canal & River Trust) is approximately 520m south-east of the site. The Manchester Ship Canal (which is privately owned and maintained) is located approximately 600m west of the site.
- 4.5.2 The broad canals are identified in the SFRA as not generally posing a direct flood risk as they are a controlled water body. Therefore, the residual risk of canal flooding is usually associated with lower probability events such as overtopping and/or the breaching of embankments.
- 4.5.3 A lack of information results in an inability to quantify the risk of canal breach or overtopping but the Level 2 SFRA maps the areas at potential risk of flooding from all canal sources.
- 4.5.4 The Canal Hazard Mapping (Figure 7) indicates that the site is not within the Canal Hazard breach zones.

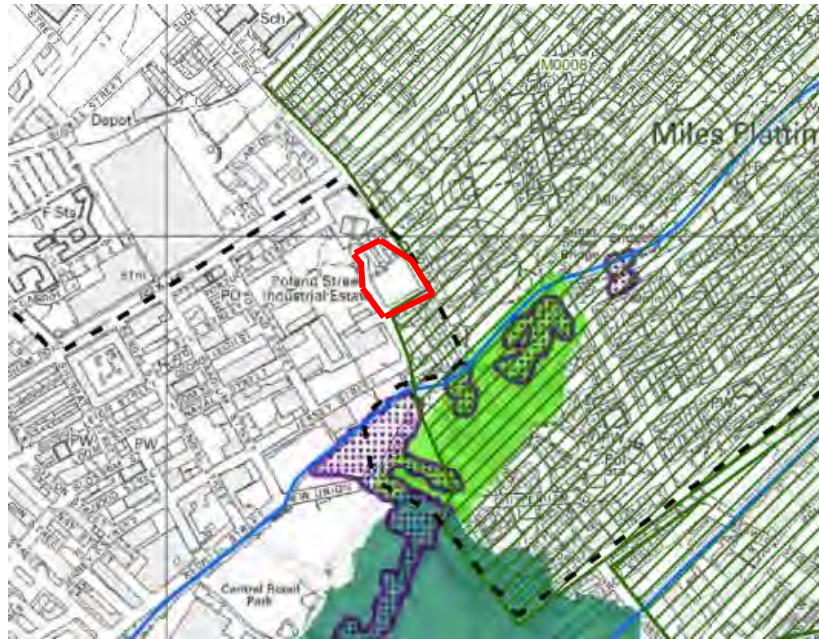


Figure 7: Extract from MST SFRA – Canal Hazard Mapping – MM_32B

4.5.5 Given the above information, it is considered that there is low risk of canal flooding to the site.

4.6 Groundwater Flooding

4.6.1 The site is not shown to be within an area at risk of groundwater flooding according to the groundwater flooding map shown within the Manchester, Salford and Trafford SFRA.

4.6.2 There are no proposed basement levels, and proposed ground levels are generally at or above existing ground levels, therefore risk of groundwater flooding to the current status of the site is not increased as a result of development.

4.6.3 A Site investigation has been carried out by EPS in December 2021.

4.6.4 The ground conditions comprise of 0.6m to 2.6m of made ground overlying firm becoming stiff slightly sandy slightly gravelly clay over very dense sand with weak sandstone noted at circa 22.8mAOD.

4.6.5 Groundwater has only been encountered in one of the boreholes at depths between 22 to 26.5m. The ground water which has been noted within the made ground is considered representative of perched water given the nature of the impermeable layer of clay directly beneath.

4.6.6 It is recommended that external ground levels across the site should fall away from the proposed buildings and that the creation of low points is avoided (other than those used intentionally for drainage features) in order that in the unlikely event of groundwater flooding, the flood water is safely routed away from the buildings on site.

4.6.7 Ground water flooding is therefore considered **low** risk.

4.7 Public Sewers or Highway Drainage Flooding (Infrastructure Failure)

- 4.7.1 It is likely that there will be localised highway drainage within Wadeford Close site (such as gullies and connections). It is also likely that there will be additional drainage connections within the wider highways surrounding the site.
- 4.7.2 A data screening was obtained from Manchester City Council Lead Local Flood Authority (LLFA), and this confirmed that there was record of a drainage flooding incident on site located at Wadeford Close in July 2019. Given that Wadeford Close is at a lower elevation to the remainder of the site, it is anticipated that if flooding were to occur within the existing highway at Wadeford Close, overland routes would be in a southerly direction towards Jersey Street.
- 4.7.3 The data also suggests that there was an offsite incident south of the site boundary in Jersey Street noted as a blocked gully or drain in July 2021. Given that Jersey Street is at a lower elevation to the site, it is anticipated that if flooding were to occur within the existing highway at Jersey Street, overland routes would be in a southerly direction away from site.
- 4.7.4 The data screen correspondence is enclosed in *Appendix F* with the correspondence from the LLFA
- 4.7.5 United Utilities have not confirmed any historical flood events at the site.
- 4.7.6 Given the number of public sewers located within the site boundary, there is a residual risk of sewer flooding on site therefore mitigation measures are presented in section 5.

4.8 Surface Water Flooding to the site

- 4.8.1 Surface water flooding can be caused when rainwater during extreme rainfall events does not drain away through the normal drainage system or soak into the ground with flooding occurring, principally from manholes and gullies. Surcharging sewers can result in overland flows which if originating at a higher elevation than a development site can potentially pose a flood risk.
- 4.8.2 From the UK Government's Flood Risk from Surface Water (extent of flooding) map;
- Where a site is located in a dark blue shaded zone, this indicates that the site is at high risk of flooding, where flooding occurs as a result of rainfall with a greater than 1 in 30 (3.3%) chance in any given year.
 - Where a site is located in a mid-blue shaded zone, this indicates that the site is at medium risk of flooding, where flooding occurs as a result of rainfall of between 1 in 100 (1%) and 1 in 30 (3.3%) chance in any given year.
 - Where a site is located in a light blue shaded zone, this indicates that the site is at low risk of flooding, where flooding occurs as a result of rainfall of between 1 in 1000 (0.1%) and 1 in 100 (1%) chance in any given year.

- Where a site is located in a clear (unshaded) area; this indicates that the site is at very low risk of flooding, where flooding occurs as a result of rainfall with less than 1 in 1000 (0.1%) chance in any given year.

4.8.3 The extent of flooding to the site from surface water is indicated in Figure 8 and it can be seen that the majority of the site is located in an area classified as being at 'Very Low' risk of flooding from surface water. There is an area at 'Low' risk of flooding from surface water in the centre of the site.

4.8.4 The localised elevated risk is likely to be caused by a localised depression with no positive drainage, which can be seen on the topographical survey drawing.



Figure 8: Risk of Flooding from Surface Water - Extent of Flooding

4.8.5 Considering the above information, the risk of surface water flooding to the site is generally considered very low, with localised areas of low risk. As such, mitigation measures are proposed in Section 5 to ensure that the site will be 'very low' risk following development

4.9 Surface Water Flooding from the site

4.9.1 Developers are responsible for ensuring that new development does not increase the flood risk elsewhere. Where new development is proposed, the proposed surface water drainage network shall be designed to not flood for the critical 1 in 30-year storm event and flood water generated up to the

critical 1 in 100-year plus climate change storm event shall be constrained within areas on site so as not to cause damage to buildings, essential services or adjoining developments and services.

- 4.9.2 Although the development proposals do not indicate a significant change to the impermeable areas on the site, the development has the potential to increase flood risk where additional run-off from proposed roads, paved areas and building roofs are discharged freely into the downstream drainage network. It is therefore encouraged to propose permeable areas, landscaping areas and incorporate sustainable drainage features utilising infiltration or attenuation where possible.
- 4.9.3 The SFRA places the site within the Manchester Conurbation Core Critical Drainage Area (CDA). CDAs generally have local flooding problems associated with drainage and are particularly sensitive to an increase in the rate of surface water runoff and/or volume from new development. Specific drainage requirements are required in these areas to help reduce local flood risk. The LLFA usually require that surface water discharge from new developments on brownfield sites must meet a 50% betterment or more, and that this must be calculated from the existing impermeable area of the site / capacity of the existing outfall from the site.
- 4.9.4 An assessment of the proposed surface flows is carried out within the drainage strategy within section 6 of this report.

4.10 Historical Flooding

- 4.10.1 As noted in section 4.7, a data screening was obtained from Manchester City Council Lead Local Flood Authority (LLFA), and this confirmed that there was record of a drainage flooding incident on site located at Wadeford Close in July 2019 and there was an offsite incident south of the site boundary in Jersey Street noted as a blocked gully or drain in July 2021.
- 4.10.2 United Utilities have not confirmed any historical flood events at the site

4.11 Summary of Flood Risk

- 4.11.1 From the evidence collated and subsequent negotiations the main types of flooding that may apply to the proposed development site are as follows:
- Public Sewers Flooding - Infrastructure Failure (residual risk).
 - Surface water flooding to the site (residual risk); and
 - Surface water flooding from the site (potential).

5.0 Mitigation

5.1 Infrastructure Failure

- 5.1.1 As noted in section 4, there are various existing public sewer within and in the vicinity of the site, therefore there is a residual risk of sewer flooding on site.
- 5.1.2 When comparing current and proposed ground levels where public sewers are located; there are marginal increases in existing ground levels which will not reduce capacity within the current sewer network and increase the risk of sewers surcharging to ground level.
- 5.1.3 It is recommended that external ground levels across the site should fall away from the proposed buildings and that the creation of low points is avoided (other than those used intentionally for drainage features) in order that in the unlikely event of sewer flooding, the flood water is safely routed away from the buildings on site.
- 5.1.4 United Utilities have not confirmed any surcharging criteria in the sewers surrounding the site. A 1 metre surcharge above existing sewer soffits will be applied for 24 hours to the outfall of any proposed drainage connections.
- 5.1.5 Providing United Utilities and Manchester City Council maintain their drainage assets in the vicinity of the site, the risk of flooding to the proposed redevelopment site from public sewers or highway drainage is considered as **low**.

5.2 Surface Water Flooding to the site Mitigation

- 5.2.1 The UK Government Long Term Flood Risk Assessment surface water flood maps indicate that the site is at very low risk of surface water flooding. However, the site topography is likely to be reprofiled as part of the development proposals, and the site is located within a CDA. Therefore, measures outlined in this section are recommended in order to ensure that the risk of surface water flooding to the post-development site shall not be increased.
- 5.2.2 Existing footway levels along the outside perimeter of the site are determined by the highway authority. It is recommended that these levels should be maintained, in order that surface water shall fall away from the site boundary and into the highway gullies. It is assumed that the highway drainage will be subject to the local highway authority regular drainage maintenance schedule.
- 5.2.3 It is recommended that proposed external ground levels across the site should fall away from the proposed buildings in a manner which does not create low points where water might collect unintentionally. This will ensure that any surface water will not flow towards the proposed buildings. The proposed surface water drainage network shall be designed to accommodate flows generated from within the site.

- 5.2.4 Providing the above measures are implemented the flooding risk to the development site from surface water is considered **low** post development.

5.3 Surface Water Flooding from the site Mitigation

- 5.3.1 Developers are responsible for ensuring that new development does not increase the flood risk elsewhere. Any new development site drainage should be designed in accordance with current best practice to provide adequate capacity not to flood for the critical 1 in 30-year storm event and flood water generated from up to the critical 1 in 100-year plus climate change storm event shall be constrained within the areas on site so not to cause damage to buildings, essential services or adjoining developments & services.
- 5.3.2 The SFRA places the site within the Manchester Conurbation Core Critical Drainage Area (CDA). CDAs generally have local flooding problems associated with drainage and are particularly sensitive to an increase in the rate of surface water runoff and/or volume from new development. Specific drainage requirements are required in these areas to help reduce local flood risk. The LLFA usually require that surface water discharge from new developments on brownfield sites must meet a 50% betterment or more, and that this must be calculated from the existing impermeable area of the site / capacity of the existing outfall from the site.
- 5.3.3 For sites, which are located within a CDA, the following guidance is provided in the SFRA User Guide:
- Development should aim for a minimum reduction in surface water runoff rates of 50% for Brownfield sites, with an aim of reducing runoff to Greenfield rates up to a 1 in 100-year storm event, considering climate change.
- 5.3.4 However, as the site appears to be largely undrained, with only small areas of the existing car park currently positively draining the site, it is likely to be considered greenfield.
- 5.3.5 During consultation with United Utilities and Manchester LLFA, their requirement is to restrict proposed flow rates to the equivalent greenfield flow rates. This is further discussed in section 6.
- 5.3.6 In February 2016, the Environment Agency released updated climate change allowances for peak rainfall intensities which should be applied to new developments. Table 4 demonstrates the climate change allowances with central and upper end allowances being considered.
- 5.3.7 Based on the nature of the development, a lifespan in excess of 60 years is anticipated. Therefore, the potential climate change allowance for 2070-2115 ranges between 20% for the central allowance and 40% for the upper end allowance. The design will take into account the upper allowance of 40%.

Table 4: (Extract Environment Agency Guidance) Peak Rainfall Intensity Allowance in small and urban catchments

Applies across all of England	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Upper end	10%	20%	40%
Central	5%	10%	20%

- 5.3.8 In May 2022, the Environment Agency released updated climate change allowances by Management Catchment for peak rainfall intensities which should be applied to new developments.
- 5.3.9 As the requirements were introduced after the design had been significantly developed, the previous guidance has been applied using +40% allowances, however we have reviewed the potential impact of the updated guidance.
- 5.3.10 Figure 9 demonstrates the climate change increases for the central and upper allowances for the Irwell Management Catchment.



Figure 9: Irwell Management Catchment peak rainfall allowances

- 5.3.11 For residential development current guidance suggests 100 years should be used and the upper end allowance for the 2070s epoch (2061 to 2125) should be applied.
- 5.3.12 Therefore, the potential climate change allowance in the Irwell Management Catchment for the 2070s Epoch; 2061-2115 is +45% allowance. Manchester City Council should advise whether any further increases are required given the development to date.
- 5.3.13 We have assessed the current drainage system and simulated the system with an additional 45% rainfall for the 1 in 100-year design event and no flooding currently occurs.

- 5.3.14 In following the standard hierarchy of drainage solutions, consideration should firstly be given to the discharge of surface water runoff by sustainable methods such as infiltration.
- 5.3.15 Section 6 reviews the surface water discharge options, and it is proposed (in accordance with United Utilities Pre-Development Enquiry response) that the surface water will outfall into the public combined sewers within Wadeford Close (subject to a Section 106 Agreement with United Utilities) via a new connection at a maximum pass forward rate of 5 l/s.
- 5.3.16 To minimise localised flooding within the site, the drainage design should ensure that gullies, drainage channels and drains are all suitably sized to accommodate peak storm flows. Also, all inlet features should have suitably sized sumps to catch silts and should be subject to a documented routine maintenance and cleansing regime.
- 5.3.17 Flood water exceedance routes should be identified, both on and off site.
- 5.3.18 For any sustainable drainage systems employed in the development, an appropriate management and maintenance plan for the sustainable drainage system for the lifetime of the development should be submitted which should include:
- Any arrangements for adoption by an appropriate public body or statutory undertaker, or management and maintenance by a Residents' Management Company
 - Arrangements concerning appropriate funding mechanisms for the on-going maintenance of all elements of the sustainable drainage system (i.e. inspections, regular maintenance)
 - Means of access for maintenance and easements where applicable
- 5.3.19 Assuming that the proposed drainage system is designed to provide adequate capacity, and that the private and adopted sewers will be maintained by their adopted authority, it can be assumed risk of flood from blockage or overloading is minimal.
- 5.3.20 The final design of the drainage networks shall be in accordance with the legislation set by the Environment Agency, Manchester City Council, and United Utilities.

6.0 Drainage Strategy

6.1 Existing Drainage

6.1.1 The public sewer records have been obtained for the development site, and are enclosed in *Appendix B*.

6.1.2 The public sewer records indicate that the following public sewers are recorded within the site:

- An existing 580x700mm combined public sewer crossing through the site northwest boundary, this then turns 90° south-east and runs as a 600 x 750mm combined sewer and reduces to a 375mm sewer on site where it follows the route of Wadeford Close towards its junction with Jersey Street.
- A 225mm combined public sewer within the north-western area of the site, which connects on site to the above-mentioned 375mm combined sewer.
- A 375mm combined public sewer close to the eastern boundary along Rodney Street.

6.1.3 A GPR Utilities Survey has been carried out and is enclosed in *Appendix C*.

6.1.4 A CCTV Drainage Survey has also been carried out and is enclosed in *Appendix D*.

6.1.5 The GPR/CCTV Surveys confirm that:

- The survey appears to identify that there are existing private drainage assets within the site local to the south and east boundaries, however this drainage appears either fully surcharged or filled. The existing outfall(s) are redundant, but they are likely to have historically discharged south towards the public sewer in Jersey Street.
- There appears to be an existing outfall into the public sewer east of the site into the combined sewer in Rodney Street. It is not clear what this connection served but it appears to be redundant.
- The existing 580 x 700mm sewer along the northern boundary has been identified during the survey and follows the route and size shown on the UU Asset records.
- The existing 600 x 750mm combined sewer which reduces to a 375mm sewer on site has been surveyed, and this confirms that the route follows the approximate position on the UU Asset records but that the sewer is a 600 x 750mm sewer which reduces to a 450mm pipe.
- The existing 225mm combined sewer has been located during the surveys and follows the route and size shown on the UU Asset records.
- The existing 375mm combined public sewer along the footpath adjacent to the site eastern boundary along Rodney Street has been surveyed and follows the route and size shown on the UU Asset records, the sewer is within the footpath.

- 6.1.6 Based on United Utilities advice, it is noted in the correspondence a discrepancy between the easement requirements. UU advice is to measure 3m from centreline, however they also advise that building regulations references a requirement of 3m from centreline and works within 3m of a sewer indicating the edge of sewer). Given the constraints on site, United Utilities have advised that based on the nearest sewer to the proposed building being a 225mm sewer and given that the proposed foundation solution is piled, they will accept the 3m offset from the centreline.
- 6.1.7 All sewers are therefore shown with a 6m easement which is 3m offset from centreline.
- 6.1.8 All existing sewers on site should be marked out and protected throughout the construction works.
- 6.1.9 United Utilities will be consulted further to report on final proposed ground levels and to agree any reconfiguration of existing manhole covers to suit proposed ground levels.

6.2 Proposed Foul Water Drainage

- 6.2.1 A separate foul and surface water system is proposed.
- 6.2.2 The foul drainage created by the post-development site is proposed to be collected by new foul drains which will connect into the existing combined public sewer in Wadeford Close by gravity.
- 6.2.3 The invert level of the public combined sewer at the existing manhole adjacent to the north of the site is approximately 47.205m AoD (Layer Surveys Manhole Card depths interpolated to the intermediate connection point).
- 6.2.4 Proposed Flows have not yet been determined in detail from the development site; however, based on Sewer Sector Guidance Appendix C Design and Construction Guidance for the Construction of Sewers cl. B3.1 we have assumed 4000 l/d/d (litres per dwelling per day). The peak foul discharge is therefore estimated as 5.92 l/s based on 128 dwellings.
- 6.2.5 A Pre-Development Enquiry has been submitted to United Utilities, and they have confirmed that foul will be allowed to drain to the public combined sewer network at an unrestricted rate into the combined sewer on Wadeford Close.
- 6.2.6 All drainage on site is to remain private and therefore connection to the public sewer will be subject to a Section 106 Agreement with United Utilities.
- 6.2.7 The Proposed Drainage Strategy is enclosed in *Appendix H*.

6.3 Proposed Surface Water Drainage

- 6.3.1 Any new development site drainage should be designed in accordance with current best practice to provide adequate capacity not to flood for the critical 1 in 30-year storm event and flood water generated for up to the critical 1 in 100-year plus climate change storm event shall be constrained within the areas on site so not to cause damage to buildings, essential services or adjoining developments and services.

- 6.3.2 In following the standard hierarchy of drainage solutions, consideration should firstly be given to the discharge of surface water runoff by sustainable methods such as infiltration.

Infiltration

- 6.3.3 Made Ground is likely to be present to a significant depth, based on the historic use of the site.
- 6.3.4 A Site investigation has been carried out by EPS in December 2021, which confirms that ground conditions comprise of 0.6m to 2.6m of made ground overlying firm becoming stiff slightly sandy slightly gravelly clay over very dense sand with weak sandstone noted at circa 22.8mAOD.
- 6.3.5 As part of the Site Investigation falling head infiltration testing was undertaken in two locations on site. This confirmed that:

The testing was undertaken despite the presence of perched groundwater within the wells and identified negligible infiltration across the test period. This combined with the nature of the shallow soils, which comprise a significant thickness of cohesive soils, are indicative that infiltration drainage is unlikely to be suitable at this site and alternative means of surface water disposal will need to be investigated.

- 6.3.6 Based on the ground conditions, infiltration is unsuitable.

Watercourse

- 6.3.7 No above ground watercourses have been identified within the proposed site or in the immediate vicinity of the site. Connection to the nearest known watercourse would require crossing numerous third-party land ownerships, therefore, discharge to watercourse is not considered to be a viable option.

Surface Water Sewer

- 6.3.8 There are no surface water sewers identified within the vicinity of the site.

Combined Water sewer

- 6.3.9 There are various existing combined public sewers within the vicinity of the development site, as described in section 2.3 and 6.1, therefore connection to the existing combined public sewer system is considered viable.
- 6.3.10 Table 5 summarises the options for surface water disposal:

Table 5: Surface Water Disposal

Surface Water Disposal	Potential	Description
Infiltration	X	Based on the ground conditions, infiltration is unsuitable.

Watercourse	X	Discharge to watercourse is not considered to be a viable option.
Surface Water Public Sewer	X	There are no surface water sewers identified within the vicinity of the site.
Combined Public Sewer	✓	There are various existing combined public sewers within the vicinity of the development site, therefore connection to the existing combined public sewer system is considered viable.

- 6.3.11 The proposed drainage network is therefore proposed to discharge via a new connection into the existing combined public sewer within Wadeford Close at a restricted rate of 5 l/s.
- 6.3.12 The invert level of the public combined sewer at the existing manhole adjacent to the north of the site is approximately 47.205m AoD (Layer Surveys Manhole Card depths interpolated to the intermediate connection point).
- 6.3.13 The existing greenfield run-off rate QBAR has been estimated as 3.6 l/s. Generally, we would aim to reduce flows to greenfield run-off rate in line with local policy guidance, however, in accordance with EA report SC030219 – Rainfall runoff management for developments and Building Regulations 2015, to limit blockage risk the proposed discharge from the development has been set at a maximum of 5 l/s.
- 6.3.14 United Utilities have confirmed that discharge to the public sewer should be at a maximum of 5 l/s to the sewer in Wadeford Close.
- 6.3.15 The Manchester LLFA and United Utilities correspondence is enclosed in *Appendix F and G*.

6.4 Sustainable Drainage Considerations

- 6.4.1 In accordance with the National Planning Policy Framework (NPPF) a sustainable drainage system (SuDS) should be provided unless demonstrated to be inappropriate. The following options have been considered for the site:

Infiltration Systems:

- 6.4.2 Systems such as infiltration trenches and soakaways were considered as part of the surface water management strategy however, the ground conditions indicate significant depths of made ground across the site and the testing completed to date indicates negligible results for infiltration. Therefore, infiltration systems are not considered suitable for the site.

Green/Blue roofs:

- 6.4.3 Green/Blue roofs were considered for the site however, they are not considered viable.

Swales, Wetlands and Attenuation Ponds:

- 6.4.4 Due to the nature of the site and the limited space available, pre-treatment steps and retention systems such as swales, wetlands and ponds are not considered suitable for the site due to their space requirements.

Permeable Paving

- 6.4.5 Permeable paving has been considered and will be used in various areas across the site.
- 6.4.6 The hardstanding areas noted as permeable construction will have a variety of permeable surface finishes which will be constructed over a permeable sub-base.
- 6.4.7 The sub-base construction will provide approximately 30% of its depth as storage capacity which will intercept run-off prior to discharge into the wider drainage system and traditional storage provision on site.
- 6.4.8 As the sub-base is being used to create voids, it is important that this is not heavily trafficked by construction vehicle prior to completion as this can cause crushing of the stone and affect the ability of water to percolate through the granular material. Areas likely to be subject to continuous overrun during construction will be directed towards a rain garden, where surface falls or connection depths allow.

Rain Gardens and Drained Soft Landscaping

- 6.4.9 It is currently proposed to include localised rain gardens which will locally drain external paved areas.
- 6.4.10 The rain gardens will be planted shallow basins constructed over a free draining sub-base.
- 6.4.11 The rain gardens are proposed in areas where localised run-off from hardstanding can be directed towards the rain gardens. The rain garden will act as a collection facility which will intercept run-off prior to discharge into the wider drainage system and traditional storage provision on site.
- 6.4.12 Further co-ordination of the detail and capacity is required with the Landscape Architect.

Rainwater Recycling

- 6.4.13 The extensive planting around the site within the public realm, is located in Manchester, a city well known for its rainfall. Whilst future climate change may well decrease the rainfall or make the weather patterns more sporadic, the plant species selected will be robust, whether native or ornamental.
- 6.4.14 A percentage of planting will be selected to create 'Rain Gardens' capable of accommodating surges of surface water and periods of dry-spells.

- 6.4.15 The growing medium will be a minimum of 450mm soil, with a mulch material to suppress weeds and retain moisture.
- 6.4.16 Inclusion of an extensive irrigation system is not considered necessary and omission of this will remove future liability and maintenance - accidental damage (replanting) or vandalism.
- 6.4.17 It has been concluded that an irrigation system will be excluded.
- 6.4.18 We have alternatively looked at the opportunity to introduce rainwater harvesting for the WCs for example, but this would require a large tank to accommodate the necessary demand for each building.
- 6.4.19 As an example, for Block A there are 116 WCs which would be 6 litres per flush, estimating say 8 uses per day, this would require a 6 m³ storage tank, pump system, header tank, control unit and backup water supply. On this basis, this would not be viable in the current scheme.

SuDS Conclusion

- 6.4.20 The development is proposing potential options to include:
- Permeable Paving
 - Rain gardens
- 6.4.21 A detailed model of the drainage system has been generated to confirm the system capacity and co-ordinate space requirements within the site. The required volumes is estimated to be approximately 206m³ within two attenuation tanks. Currently, capacity within the permeable paving and rain gardens has not been modelled and this will be included once final construction build ups are confirmed.
- 6.4.22 Surface water run-off from hard paved areas at risk of contamination should receive water quality treatment. Sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, or used are consider high hazard in terms of contamination. Figure 10 illustrates the pollution hazard indices for different land use classifications from The CIRIA SuDS Manual C753 (2015).

Figure 10: Pollution Hazard Indices for Land Use Classification (Table 26.2 the CIRIA SuDS Manual 2015)

TABLE 26.2 Pollution hazard indices for different land use classifications				
Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

6.4.23 Figure 11 illustrates the SuDS Component mitigation indices from The CIRIA SuDS Manual C753 (2015).

Figure 11: Indicative SuDS Mitigation Indices (Table 26.3 the CIRIA SuDS Manual 2015)

TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters			
Type of SuDS component	Mitigation Indices¹		
	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4 ²	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.6
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Pond ⁴	0.7 ³	0.7	0.5
Wetland	0.8 ³	0.8	0.6
Proprietary treatment systems ^{5,6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

Notes

- 1 SuDS components only deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters.
- 2 Filter drains can remove coarse sediments, but their use for this purpose will have significant implications with respect to maintenance requirements, and this should be taken into account in the design and Maintenance Plan.
- 3 Ponds and wetlands can remove coarse sediments, but their use for this purpose will have significant implications with respect to the maintenance requirements and amenity value of the system. Sediment should normally be removed upstream, unless they are specifically designed to retain sediment in a separate part of the component, where it cannot easily migrate to the main body of water.
- 4 Where a wetland is not specifically designed to provide significantly enhanced treatment, it should be considered as having the same mitigation indices as a pond.
- 5 See Chapter 14 for approaches to demonstrate product performance. A British Water/Environment Agency assessment code of practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at: <http://tinyurl.com/qf7yuj7>
- 6 SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution where there is a requirement to retrofit treatment. SEPA (2014) also provides a flowchart with a summary of checks on suitability of a proprietary system.

- 6.4.24 The selection of treatment should ensure that the SuDS mitigation component index (Figure 11) exceeds the pollution hazard index (Figure 10). Treatment could be provided using a combination of sustainable methods. Where two stages of treatment are required, the second stage of treatment should account for reduced performance due to lower inflows; therefore 0.7 (mitigation index) should be used.
- 6.4.25 The proposed development is unlikely to require any significant pollution treatment systems. The proposed development is likely to be considered a low hazard as defined in Figure 10 and it may be necessary to introduce a pre-treatment solution prior to outfall, unless all external areas can be adequately treated through either the rain gardens or permeable paving filter medium.
- 6.4.26 The proposals for pollution protection should be agreed with Manchester City Council.
- 6.4.27 The Proposed Drainage Strategy is enclosed in *Appendix H*.
- 6.4.28 All drainage on site is to remain private and therefore connection to the public sewer will be subject to a Section 106 Agreement with United Utilities.

- 6.4.29 The final design of the drainage networks shall be in accordance with the legislation set by the Environment Agency, Manchester City Council, and United Utilities.

6.5 Maintenance

- 6.5.1 A suitable maintenance strategy should be adopted to ensure the drainage network is cleaned regularly and the routine maintenance and cleansing regime should be documented.
- 6.5.2 It is recommended that the drainage system is inspected as a minimum twice a year, with the system also being inspected after any major storm event. Significant sediment deposition is likely in areas used for storage, so a post clean-up operation may be required including the removal of litter, vegetation, sewerage debris and larger objects.
- 6.5.3 A management company may be required for the maintenance of attenuation facilities.

Appendix A

Proposed Site Layout



NOTES:
1. DO NOT SCALE FROM THIS DRAWING. ALWAYS WORK TO NOTED DIMENSIONS.
2. ALL SETTING OUT, LEVELS AND DIMENSIONS TO BE CHECKED ON SITE PRIOR TO THE INSTALLATION OF MATERIALS AND ANY DISCREPANCIES ARE TO BE BROUGHT TO THE ATTENTION OF THE CONTRACT ADMINISTRATOR IMMEDIATELY.
3. THIS DRAWING MUST BE READ WITH THE RELEVANT SPECIFICATION DOCUMENTS AND DETAIL DRAWINGS. ANY DISCREPANCIES MUST BROUGHT TO THE ATTENTION OF THE CONTRACT ADMINISTRATOR IMMEDIATELY.
4. THIS DRAWING IS COPYRIGHT PROTECTED AND MAY NOT BE REPRODUCED IN WHOLE OR PART WITHOUT WRITTEN AUTHORITY.
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.

THIS DRAWING WAS PLOTTED ON:
08/06/2022

REVISION HISTORY				
DATE	REV	ZONE	DESCRIPTION	CHK
16/05/2022	1		Planting Mix	
19/05/2022	2		Tree Update	
08/06/2022	3		General Amends	

- GENERAL INFORMATION**
 - Application Site Boundary
- HARDWORKS**
 - Hardsurfacing Type 1**
Coloured Tarmac (Light Buff) - Porous & Non-porous - vehicular / MWPE loadings
 - Hardsurfacing Type 2**
Safer Surfacing resin bound surface / wet pour (SBR base layer and an EPDM top layer), over tarmac & MOT type 1 sub base
 - Hardsurfacing Type 3**
Driveways - concrete block - inish 200 x 50 x 60
 - Hardsurfacing Type 4**
Porcelain tile - assume 20mm tile
 - Green Gap Paving**
Subject to Future Detail
 - Macadam (Vehicular)**
To Engineer's Detail
 - Macadam (Pedestrian)**
To Engineer's Detail
- FURNITURE & BOUNDARY TREATMENT**
 - Boundary Brick Wall**
Subject to future detail
 - Fence**
Subject to future detail
 - Timber Play Equipment**
Subject to future detail
 - Feature Seat**
Subject to future detail
 - Boundary Brick Entrance Pier**
Subject to future detail
 - Metal Pedestian Gate**
Subject to future detail
 - Cycle Store**
Subject to future detail
 - External Light Fittings**
Lighting provisions to M&E consultant
- SOFTWORKS**
 - Existing Tree Retained**
 - Clear-stem Tree Planting**
Girth 20-35 (Refer to drawing: RODSTA-LYR-XX-ZZ-DWG-L-3001)
 - Clear-stem Tree Planting**
Girth 20-25 (Refer to drawing: RODSTA-LYR-XX-ZZ-DWG-L-3001)
 - Clear-stem Tree Planting**
Girth 18-20 (Refer to drawing: RODSTA-LYR-XX-ZZ-DWG-L-3001)
 - Multi-stem Tree Planting**
Refer to drawing: RODSTA-LYR-XX-ZZ-DWG-L-3001
 - Native and Ornamental Planting**
Refer to drawing: RODSTA-LYR-XX-ZZ-DWG-L-3001
 - Shade Tolerant Wildflower (Woodland) Mix**
Refer to drawing: RODSTA-LYR-XX-ZZ-DWG-L-3001
 - Rain Gardens**
Refer to drawing: RODSTA-LYR-XX-ZZ-DWG-L-3001
 - Hedge Planting**
Refer to drawing: RODSTA-LYR-XX-ZZ-DWG-L-3001
 - Lawn**

ORIGINATOR

W layer.studio
T 01625 523 167
E manchester or newcastle@layer.studio
MANCHESTER The Barn One Hollin Lane 1 Salters Road Styal Cheshire SK9 4JH
NEWCASTLE Flintfab Gosforth Newcastle upon Tyne NE3 1DH

CLIENT
Wates Construction Ltd.

PROJECT
Land to the west of Rodney Street
Manchester

DRAWING TITLE
Landscape Masterplan

DRAWING NUMBER	REV	STATUS
RODSTA-LYR-XX-ZZ-DWG-L-1001	3	PLANNING

SCALE	CREATED BY	CHECKED BY
1:250 @ A1	AD	ST

Appendix B

Public Sewer Records

Commercial drainage and water enquiry

Responses to a drainage and water enquiry for commercial premises or development sites.

Client:

Client ref: LP2/GCI/CVL2010/20789

Manchester City Council

PO Box 532
Town Hall, Albert Square
Manchester,
M60 2LA

Order number: UUPS-ORD-191527

Received date: 01/09/2020

Response date: 07/09/2020

FAO:

The following records were searched in compiling this report:

The map of public sewers
The map of waterworks
Water and sewerage billing records
Adoption of public sewers records
Building over public sewer records
Adoption of public water mains records
Water supply clarification

Property address: Land at Rodney Street Manchester

Please Note - We must make you aware that due to the introduction of the open market with effect from 1st April 2017 for commercial customers, Property Searches will no longer be able to resolve issues regarding some discrepancies within the report. Due to the change in the structure of the market the retailer is now responsible for taking ownership of certain issues, particularly relating to billing/tariff charges as well as, but not limited to change of usage of a property.

Enquiries and Responses

The records were searched by Nick Howel for United Utilities who does not have, nor is likely to have, any personal or business relationship with any person involved in the sale of the property.

This search report was prepared by Nick Howel for United Utilities who does not have, nor is likely to have, any personal or business relationship with any person involved in the sale of the property.

How to contact us:

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

Telephone: 0370 7510101

E-mail: propertysearches@uuplc.co.uk

What is included:

1. Summary of findings and key
2. Detailed findings of the CON29DW
3. Guidance for interpretation
4. Terms and conditions
5. Complaints policy

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

To help understand the implications of the drainage and water enquiries report a summary guide to the content of the full report is provided below.

✓ This response represents the typical situation for a property.

⚠ The attention of the purchaser is drawn to this response. The purchaser may wish to make further investigations into this situation.

✗ This response represents an uncommon situation for a property and the purchaser should carefully consider its implications.

Question	Report Schedule	Answer	
1	Where relevant, please include a copy of an extract from the public sewer map.	Yes & in vicinity	✓
2	Where relevant, please include a copy of an extract from the map of waterworks.	Yes & in vicinity	✓
3	Does foul water from the property drain to a public sewer?	Not connected	✗
4	Does surface water from the property drain to a public sewer?	Not connected	✗
5	Is a surface water drainage charge payable?	No	✗
6	Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundaries of the property?	Public	✗
6.1	Does the public sewer map indicate any pumping station or any other ancillary apparatus within the boundaries of the property?	None	✓
7	Does the public sewer map indicate any public sewer within 30.48 metres (100 feet) of any buildings within the property?	None	⚠
7.1	Does the public sewer map indicate any public pumping station or any other ancillary apparatus within 50 metres of any buildings within the property?	None	✓
8.1	Are any foul sewers or lateral drains serving or which are proposed to serve the property the subject of an existing adoption agreement or an application for such an agreement?	No	✓
8.2	Are any surface water pipes or lateral drains serving, or which are proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?	No	✓
9	Has a sewerage undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?	None	✓
10	Is the building which is or forms part of the property at risk of internal flooding due to overloaded public sewers?	No	✓
11	Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.	Yes	✓
12	Is the property connected to mains water supply?	Not Connected	✗
13	Are there any water mains, resource mains or discharge pipes within the boundaries of the property	Yes	✗

Question	Report Schedule	Answer	
14	Is any water main or service pipe serving or which is proposed to serve the property the subject of an existing adoption agreement or an application for such an agreement?	No	✓
15	Is the building at risk of receiving low water pressure or flow?	No	✓
16	What is the clarification of the water supply for the property?	Very Soft	✓
18	Please include details of the location of any water meter serving the property.	No meter	✓
19.1	Who is responsible for providing the sewerage services for the property?	United Utilities	✓
19.2	Who is responsible for providing the water services for the property?	United Utilities	✓
20	Who bills the property for sewerage services?	Retailer sewer	✓
21	Who bills the property for water services?	Retailer water	✓
22	Has a customer been granted a trade effluent consent at this property?	No	✓
23	Is there an easement affecting the property?	No	✓

SEWER RECORD

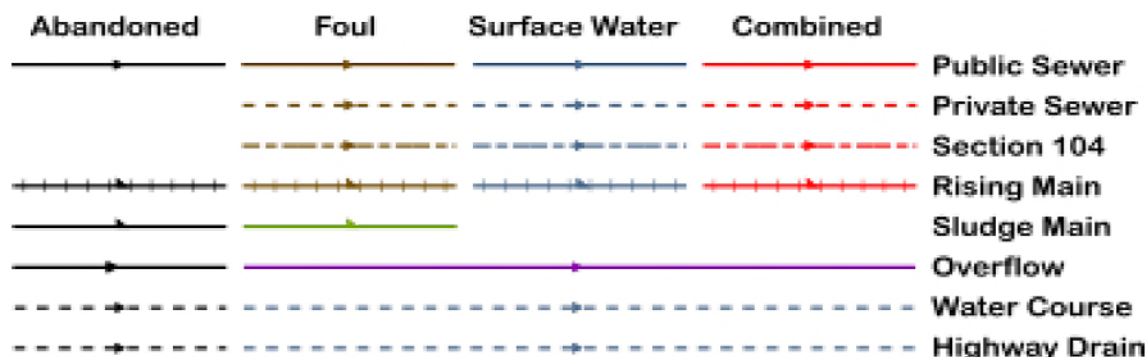
Land at Rodney Street Manchester



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	
Drop Shaft	Change of Characteristic
Orifice Plate	

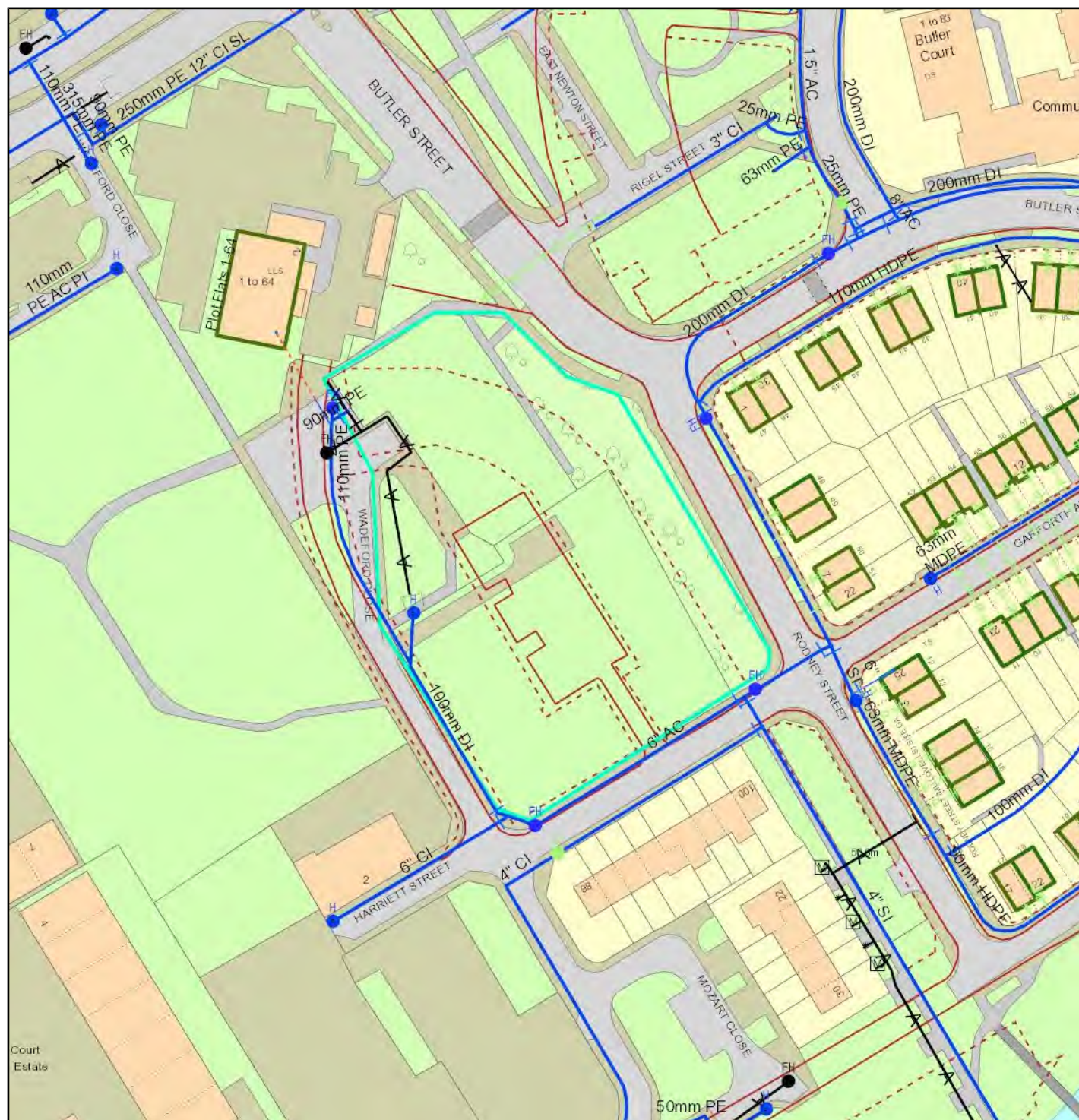
Clean Water Symbolology

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

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

WATER RECORD

Land at Rodney Street Manchester



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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Question 1	Where relevant, please include a copy of an extract from the public sewer map.
Answer	A copy of an extract of the public sewer map within the vicinity of the property is included.
Guidance	1. The Water Industry Act 1991 defines Public Sewers as those which (United Utilities) have responsibility for. Other assets and rivers, water courses, ponds, culverts or highway drains may be shown for information purposes only. 2. Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an 'as constructed' record. It is recommended these details be checked with the developer. 3. The Sewerage Undertaker has a statutory right of access to carry out work on its assets, subject to notice. This may result in employees of the Sewerage Undertaker or its contractors needing to enter the property to carry out work.
Question 2	Where relevant, please include a copy of an extract from the map of waterworks.
Answer	A copy of an extract of the map of waterworks is included, showing water mains, resource mains or discharge pipes in the vicinity of the property.
Guidance	The "water mains" in this context are those which are vested in and maintainable by the Water Undertaker under statute. Assets other than public water mains may be shown on the plan, for information only. Water Undertakers are not responsible for private supply pipes connecting the property to the public water main and do not hold details of these. These may pass through land outside of the control of the seller, or may be shared with adjacent properties. The buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal. If an extract of the public water main record is enclosed, it will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network. The presence of a public water main running within the boundary of the property may restrict further development within it. Water Undertakers have a statutory right of access to carry out work on their assets, subject to notice. This may result in employees of the Water Undertaker or its contractors needing to enter the property to carry out work.
Question 3	Does foul water from the property drain to a public sewer?
Answer	Records indicate that foul water from the property does not drain to a public sewer.
Guidance	Sewerage Undertakers are not responsible for any private drains or sewers that connect the property to the public sewerage system, and do not hold details of these. The property owner will normally have sole responsibility for private drains serving the property and may have shared responsibility, with other users, if the property is served by a private sewer which also serves other properties. These may pass through land outside of the control of the seller and the buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal. If foul water does not drain to the public sewerage system the property may have private facilities in the form of a cesspit, septic tank or other type of treatment plant. If an extract from the public sewer map is enclosed, this will show known public sewers in the vicinity of the property and it should be possible to estimate the likely length and route of any private drains and/or sewers connecting the property to the public sewerage system.
Question 4	Does surface water from the property drain to a public sewer?

Answer **Records indicate that surface water from the property does not drain to a public sewer. If the property was constructed after the 6th April 2015 the surface water drainage may be served by a sustainable drainage system.**

Guidance Sewerage Undertakers are not responsible for any private drains or sewers that connect the property to the public sewerage system and do not hold details of these.

The property owner will normally have sole responsibility for private drains serving the property and may have shared responsibility with other users, if the property is served by a private sewer which also serves other properties. These may pass through land outside of the control of the seller and the buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.

In some cases, Sewerage Undertakers' records do not distinguish between foul and surface water connections to the public sewerage system. If on inspection the buyer finds that the property is not connected for surface water drainage, the property may be eligible for a rebate of the surface water drainage charge. Details can be obtained from the Sewerage Undertaker.

If surface water does not drain to the public sewerage system the property may have private facilities in the form of a soakaway or private connection to a watercourse. If an extract from the public sewer map is enclosed, this will show known public sewers in the vicinity of the property and it should be possible to estimate the likely length and route of any private drains and/or sewers connecting the property to the public sewerage system.

Question 5 **Is a surface water drainage charge payable?**

Answer **Records indicate that a surface water drainage charge is not applicable for the property.**

Guidance Since 1st April 2017 commercial customers can choose their retailer for clean, waste or both services. For more information on any applicable surface water charges you will need to contact the current owner of the property to find out who the current retailer is. Details of the retailer for a property can be found on the current occupiers bill. For a list of all potential retailers of water and waste water services for the property please visit www.open-water.org.uk.

Please note if the property was constructed after 6th April 2015 the Surface Water drainage may be served by a Sustainable Drainage System. Further information may be available from the Developer.

Question 6 **Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundaries of the property?**

Answer **The public sewer map included indicates that there are public sewers, disposal mains or lateral drains within the boundary of the property. However from the 1st October 2011 there may be additional public sewers, disposal mains or lateral drains which are not recorded on the public sewer map which may further prevent or restrict development of the property. If you are considering any future development at this property which may require build over consent, please complete the enquiry form by accessing the following link <http://www.unitedutilities.com/planning-wastewater-guidance.aspx>.**

Guidance The approximate boundary of the property has been determined by reference to the Ordnance Survey record. A property of this type will normally be served by a shared sewer passing through the boundaries of several properties. It is therefore likely that a public sewer or lateral drain is present within the property boundary.

Please note that from 1st October 2011 the majority of private sewers and lateral drains connected to the public network as of 1st July 2011 transferred into public ownership and therefore it is possible there may be additional public assets which may not be shown on the public sewer plan.

The presence of public assets running within the boundary of the property may restrict further development. If there are any plans to develop the property further enquiries should be made to United Utilities Build Over department.

United Utilities Water has a legal right of access to carry out work on its assets, subject to notice. This may result in employees of the Company or its contractors needing to enter the property to carry out work.

Question 6.1 Does the public sewer map indicate any pumping station or any other ancillary apparatus within the boundaries of the property?

Answer The public sewer map included indicates that there is no public pumping station or other ancillary apparatus within the boundaries of the property. However, from the 1st October 2016 private pumping stations which serve more than one property will be transferred into public ownership but may not be recorded on the public sewer map until that time

Guidance From 1 October 2016 United Utilities will be responsible for private pumping stations (though we may take ownership of some stations before this date) that either:

* serve a single property, and are outside the property boundary or

* serves two or more properties

Only private pumping stations installed before 1st July 2011 will be transferred into our ownership. United Utilities will be responsible for all associated costs, maintenance, repairs and any necessary upgrade work.

Where the property is part of a very recent or ongoing development and the sewers/pumping station are not the subject of an adoption application, buyers should consult with the developer to ascertain the extent of private drains, sewers and pumping stations for which they will hold maintenance and renewal liabilities.

Question 7 Does the public sewer map indicate any public sewer within 30.48 metres (100 feet) of any buildings within the property?

Answer The public sewer map included indicates that there are no public sewers within 30.48 metres (100 feet) of a building within the boundary of the property. However from the 1st October 2011 private sewers will be transferred into public ownership and may not be recorded on the public sewer map and it is our professional opinion that there will be a public sewer within 30.48 (100 feet) of a building within the boundary of the property.

Guidance From 1st October 2011 there may be additional lateral drains and/or public sewers which are not recorded on the public sewer map but are also within 30.48 metres (100 feet) of a building within the property.

The presence of a public sewer within 30.48 metres (100 feet) of the building(s) within the property can result in the Local Authority requiring a property to be connected to the public sewer.

The measure is estimated from the Ordnance Survey record, between the building(s) within the boundary of the property and the nearest public sewer.

Sewers indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an 'as constructed' record. It is recommended that these details are checked with the developer, if any.

Assets other than public sewers may be shown on the copy extract for information only.

Question 7.1 Does the public sewer map indicate any public pumping station or any other ancillary apparatus within 50 metres of any buildings within the property?

Answer The public sewer map included indicates that there is no public pumping station or other ancillary apparatus within 50 metres of any buildings within the property. However, from 1st October 2016 private pumping stations which serve more than one property will be transferred into public ownership but may not be recorded on the public sewer map until that time.

Guidance From 1 October 2016 United Utilities will be responsible for private pumping stations (though we may take ownership of some stations before this date) that either:

* serve a single property, and are outside the property boundary or

* serves two or more properties.

Only private pumping stations installed before 1st July 2011 will be transferred into our ownership. United Utilities will be responsible for all associated costs, maintenance, repairs and any necessary upgrade work.

If you think there might be a private pumping station on your land or near your business property, please let us know by completing this questionnaire with as much information as possible, please visit our website <http://www.unitedutilities.com/ppstransfer.aspx>.

Where the property is part of a very recent or ongoing development and the sewers/pumping station are not the subject of an adoption application, buyers should consult with the developer to ascertain the extent of private drains, sewers and pumping stations for which they will hold maintenance and renewal liabilities.

Question 8.1 **Are any foul sewers or lateral drains serving or which are proposed to serve the property the subject of an existing adoption agreement or an application for such an agreement?**

Answer **Records confirm that foul sewers and/or lateral drains serving the development, of which the property forms part are not the subject of an existing adoption agreement or an application for such an agreement.**

Guidance This enquiry is of interest to purchasers of new property who will want to know whether or not the property will be linked to a public sewer.

Where the property is part of a very recent or ongoing development and the sewers are not the subject of an adoption application, buyers should consult with the developer to ascertain the extent of private drains and sewers for which they will hold maintenance and renewal liabilities.

Final adoption is subject to the developer complying with the terms of the adoption agreement under Section 104 of the Water Industry Act 1991.

Question 8.2 **Are any surface water pipes or lateral drains serving, or which are proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?**

Answer **Records confirm that the surface water sewer(s) and/or surface water lateral drain(s) are not the subject of an adoption agreement and it is recommended that responsibility for maintenance of these is checked with the developer as this may be due to a Sustainable Drainage Scheme (SUDS)**

Guidance This enquiry is of interest to purchasers of new property who will want to know whether or not the property will be linked to a public sewer.

Where the property is part of a very recent or ongoing development and the sewers are not the subject of an adoption application, buyers should consult with the developer to ascertain the extent of private drains and sewers for which they will hold maintenance and renewal liabilities.

Final adoption is subject to the developer complying with the terms of the adoption agreement under Section 104 of the Water Industry Act 1991.

Question 9 **Has a sewerage undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?**

Answer **There are no records in relation to any approval or consultation about plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain. However, the sewerage undertaker might not be aware of a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain.**

Guidance	From the 1st October 2011 private sewers, disposal mains and lateral drains were transferred into public ownership and the sewerage undertaker may not have granted approval or been consulted about any plans to erect a building or extension on the property over or in the vicinity of these assets. Prior to 2003 United Utilities Water Limited had sewerage agency agreements with the local authorities therefore details of any agreements/consents or rejections may not have been forwarded on to our offices before this date. Buildings or extensions erected over a sewer in contravention of building controls may have to be removed or altered.
Question 10	Is the building which is or forms part of the property at risk of internal flooding due to overloaded public sewers?
Answer	The building is not recorded as being at risk of internal flooding due to overloaded public sewers. From the 1st October 2011 private sewers, disposal mains and lateral drains were transferred into public ownership it is therefore possible that a property may be at risk of internal flooding due to an overloaded public sewer which the sewerage undertaker is not aware of. For further information it is recommended that enquiries are made of the vendor.
Guidance	1. A sewer is "overloaded" when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded. 2. "Internal flooding" from public sewers is defined as flooding, which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes. 3. These are defined as properties that have suffered or are likely to suffer internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Sewerage Undertaker's reporting procedure. 4. Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included. 5. Properties may be at risk of flooding but not included where flooding incidents have not been reported to the Sewerage Undertaker. 6. Public sewers are defined as those for which the Sewerage Undertaker holds statutory responsibility under the Water Industry Act 1991. 7. It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Sewerage Undertaker. 8. This report excludes flooding from private sewers and drains and the Sewerage Undertaker makes no comment upon this matter. For reporting purposes buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.
Question 11	Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.
Answer	The nearest Sewage Treatment Works is 2.63 miles (4.23 km), North East of the property. The name of the Sewage treatment works is Failsworth WwTW. The owner is United Utilities
Guidance	The nearest sewage treatment works will not always be the sewage treatment works serving the catchment within which the property is situated i.e. the property may not necessarily drain to this works. The Sewerage Undertaker's records were inspected to determine the nearest sewage treatment works.

It should be noted therefore that there may be a private sewage treatment works closer than the one detailed above that has not been identified. As a responsible utility operator, United Utilities Water Limited seeks to manage the impact of odour from operational sewage works on the surrounding area.

This is done in accordance with the "Code of Practice on Odour Nuisance from Sewage Treatment Works" issued via the Department of Environment, Food and Rural Affairs (DEFRA).

This Code recognises that odour from sewage treatment works can have a detrimental impact on the quality of the local environment for those living close to works.

However DEFRA also recognises that sewage treatment works provide important services to communities and are essential for maintaining standards in water quality and protecting aquatic based environments. For more information visit www.unitedutilities.com.

Question 12 **Is the property connected to mains water supply?**

Answer **Records indicate that the property is not connected to mains water supply and water is therefore likely to be provided by virtue of a private supply.**

Guidance If the property is supplied by private water mains please note that details of private supplies are not kept by the Water Undertaker. The situation should be checked with the current owner of the property.

Question 13 **Are there any water mains, resource mains or discharge pipes within the boundaries of the property**

Answer **The map of waterworks indicates that there are water mains, resource mains or discharge pipes within the boundaries of the property.**

Guidance The boundary of the property has been determined by reference to the Ordnance Survey record.

The presence of a public water main within the boundary of the property may restrict further development within it. Water Undertakers have a statutory right of access to carry out work on their assets, subject to notice.

This may result in employees of the Water Undertaker or its contractors needing to enter the property to carry out work.

Question 14 **Is any water main or service pipe serving or which is proposed to serve the property the subject of an existing adoption agreement or an application for such an agreement?**

Answer **Records confirm that water mains or service pipes serving the property are not the subject of an existing adoption agreement or an application for such an agreement.**

Guidance This enquiry is of interest to purchasers of new premises who will want to know whether or not the property will be linked to the mains water supply.

Question 15 **Is the building at risk of receiving low water pressure or flow?**

Answer **Records confirm that the building is not recorded by the water undertaker as being at risk of receiving low water pressure or flow.**

Guidance The boundary of the property has been determined by reference to the Ordnance Survey record. "Low water pressure" means water pressure below the regulatory reference level which is the minimum pressure when demand on the system is not abnormal. Water undertakers report properties receiving pressure below the reference level, provided that allowable exclusions do not apply (i.e. events which can cause pressure to temporarily fall below the reference level). Reference level: The reference level of service is a flow of 9l/min at a pressure of 10m head on the customer's side of the main stop tap (mst). The reference level applies to a single property. The reference level of

service must be applied on the customer's side of a meter or any other company fittings that are on the customer's side of the main stop tap. Where a common service pipe serves more than one property, the flow assumed in the reference level must be appropriately increased to take account of the total number of properties served. Surrogate for the reference level: Because of the difficulty in measuring pressure and flow at the mst, companies may measure against a surrogate reference level. Companies should use a surrogate of 15m head in the adjacent distribution main unless a different level can be shown to be suitable. In some circumstances companies may need to use a surrogate pressure greater than 15m to ensure that the reference level is supplied at the customer's side of the mst (for example in areas with small diameter or shared communication pipes).

There are a number of circumstances under which properties identified as receiving low pressure should be excluded from the reported figure. The aim of these exclusions is to exclude properties which receive a low pressure as a result of a one-off event and which, under normal circumstances (including normal peaks in demand), will not receive pressure or flow below the reference level. Companies must maintain verifiable, auditable records of all the exclusions that they apply in order to confirm the accuracy and validity of their information. Allowable exclusions includes Abnormal demand, Planned maintenance, One off incidents, Low pressure incidents of short duration and common supply.

Abnormal demand:

This exclusion is intended to cover abnormal peaks in demand and not the daily, weekly or monthly peaks in demand, which are normally expected. Water undertakers exclude figures from properties which are affected by low pressure only on those days with the highest peak demands. During the yearly report water undertakers may exclude, for each property, up to five days of low pressure caused by peak demand.

Planned maintenance:

Water undertakers will not report low pressures caused by planned maintenance. It is not intended that water undertakers identify the number of properties affected in each instance. However, water undertakers must maintain sufficiently accurate records to verify that low-pressure incidents that are excluded because of planned maintenance, are actually caused by maintenance.

One-off incidents:

This exclusion covers a number of causes of low pressure; mains bursts; failures of company equipment (such as pressure reducing valves or booster pumps); fire fighting and action by a third party. However, if problems of this type affect a property frequently, they cannot be classed as one-off events and further investigation will be required before they can be excluded.

Low pressure incidents of short duration:

Properties affected by low pressures that only occur for a short period, and for which there is evidence that incidents of a longer duration would not occur during the course of the year, may be excluded.

A company must maintain a minimum pressure in the communication pipe of seven metres static head (0.7 bar). If pressure falls below this on two occasions, each occasion lasting more than one hour, within a 28-day period, the company must automatically make a GSS payment to the customer. There are exceptions to the requirement to make a GSS payment if the pressure standard is not met. These are: a payment has already been made to the same customer in respect of the same financial year; it is impractical for the company to have identified the particular customer as being affected, and the customer has not made a claim within three months of the date of the latter occasion; industrial action by the company's employees makes it not feasible to maintain the pressure standard; the act or default of a person other than the company's representative make it not feasible to maintain the pressure standard; or the pressure falls below the minimum standard due to necessary works taking place or due to a drought.

It should be noted that low water pressure can occur from private water mains, private supply pipes (the pipework from the external stop cock to the property) or internal plumbing which are not the responsibility of the Water Undertaker. This report excludes low water pressure from private water mains, supply pipes and internal plumbing and the Water Undertaker makes no comment upon this matter. For reporting purposes buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.

Question 16

What is the clarification of the water supply for the property?

Answer

The water supplied to the property has an average water hardness of 31mg/l calcium carbonate, which is defined as very soft by United Utilities

Guidance

The hardness of water is due to the presence of calcium and magnesium minerals that are naturally present in the water. The usual signs of a hard water supply are scaling inside kettles, poor lathering of soaps and scum.

What is water hardness?

Hard water is formed when water passes through or over limestone or chalk areas and calcium and magnesium ions dissolve into the water. The hardness is made up of two parts: temporary (carbonate) and permanent (non-carbonate) hardness. When water is boiled, calcium carbonate scale can form, which can deposit on things like kettle elements. The scale will not stick to kettles that have a plastic polypropylene lining but will float on the surface. The permanent hardness that comprises calcium and magnesium sulphate does not go on to form scale when heated or boiled.

How is water hardness measured?

Hardness is usually expressed in terms of the equivalent quantity of calcium carbonate (CaCO_3) in milligrams per litre or parts per million. You may also see hardness expressed as degrees of hardness in Clark (English) degrees, French or German degrees. Interconversion between the different measurements can be made by using the appropriate conversion factors below. There are no standard levels as to what constitutes a hard or a soft water. Table 1 gives an indication of the equivalents of calcium and calcium carbonate and the relative degree of hardness.

Water quality standards

There are no regulatory standards for water hardness in drinking water.

Water hardness in the North West

The majority of raw water in the United Utilities region comes from upland surface water reservoirs. The water in the reservoirs has little chance of passing through rocks and to dissolve the minerals that make water hard. Therefore, the majority of water in this region is soft or very soft. We supply water from a number of boreholes in the south of the region that are reasonably hard, but these tend to be blended with softer sources to meet demand. No water supply in the North West is artificially softened.

Can hard water be softened?

Yes, water can be softened artificially by the installation of a water softener or the use of 'jug type' filters. Medical experts recommend that a non-softened supply is maintained for drinking purposes because softened water may contain high levels of sodium. Softeners should be fitted after the drinking water tap and comply with the requirements of the Water Supply (Water Fittings) Regulations 1999. They should be maintained in accordance with manufacturers' instructions.

If you're interested in finding out more about the quality of your drinking water, please visit www.unitedutilities.com/waterquality and enter your postcode.

The Drinking Water Inspectorate is responsible for ensuring the quality of public water supplies. Visit their website at: www.dwi.defra.gov.uk.

Question 18

Please include details of the location of any water meter serving the property.

Answer

Records indicate that the property is not served by a water meter.

Guidance

Where the property is not served by a meter the current occupier can contact the retailer directly to advise on the current charging method, details of the retailer can also be found on the current occupiers bill.

Question 19.1

Who is responsible for providing the sewerage services for the property?

Answer **United Utilities Water Limited, Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP**

Guidance Not applicable

Question 19.2 **Who is responsible for providing the water services for the property?**

Answer **United Utilities Water Limited, Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington, WA5 3LP**

Guidance Not Applicable

Question 20 **Who bills the property for sewerage services?**

Answer **Since 1st April 2017 commercial customers can choose their retailer. If you wish to know who currently bills the property for sewerage services you will need to contact the owner of the property to find out who the retailer is.**

Guidance For a list of all potential retailers of wastewater services for the property please visit www.open-water.org.uk

Question 21 **Who bills the property for water services?**

Answer **Since 1st April 2017 commercial customers can choose their retailer. If you wish to know who currently bills the property for water services you will need to contact the owner of the property to find out who the retailer is.**

Guidance For a list of all potential retailers of water services for the property please visit www.open-water.org.uk

Question 22 **Has a customer been granted a trade effluent consent at this property?**

Answer **There is no record of a Trade Effluent consent at this property. Applications for Trade Effluent consents should be submitted via your retailer for info please visit <https://www.unitedutilities.com/services/wholesale-services/trade-effluent/>**

Guidance The owner/occupiers of Trade Premises do not have the right to discharge Trade Effluent to the public wastewater network. Any Trade Effluent Discharge Consent will be issued under Section 118 of the Water Industry Act 1991 and will be subject to conditions set by the Sewerage Undertaker.

Generally these conditions are to ensure:

- a) The Health and Safety of staff working within the wastewater network and at wastewater treatment plants.
- b) The apparatus of the wastewater network is not damaged.
- c) The flow of the contents of the wastewater network is not restricted.
- d) Equipment, plant, and processes at treatment works are not disrupted or damaged.
- e) Treatment of sewage sludge is not impeded and sludges are disposed of in an environmentally friendly manner.
- f) Final effluent discharge from wastewater treatment plants has no impact on the environment or prevents the receiving waters from complying with EU Directives.
- g) Potential damage to the environment via storm water overflows is minimised.

Disputes between an occupier of a Trade Premise and the Sewerage Undertaker can be referred to the Director General of Water Services (OFWAT).

Protecting Public Sewers - Discharges Section 111 of the Water Industry Act 1991, places prohibition on the discharge of the following into a public sewer, drain or a sewer that communicates with a public sewer.

i) Any matter likely to injure the sewer or drain, to interfere with the free flow of its contents or to affect prejudicially the treatment or disposal of its contents.

ii) Any chemical refuse or waste steam or any liquid of temperature higher than 43.3 degrees Celsius (110 degrees Fahrenheit).

iii) Any petroleum spirit or carbide of calcium. On summary conviction offences under this Section carry a fine not exceeding the statutory maximum or a term of imprisonment not exceeding two years, or both.

Please note any existing consent is dependant on the business being carried out at the property and will not transfer automatically upon change of ownership.

Question 23

Is there an easement affecting the property?

Answer

There is no record of a formal easement affecting this property.

Guidance

Not Applicable

Appendix 1- General interpretation

1. (1) In this Schedule-

"the 1991 Act" means the Water Industry Act 1991(a);

"the 2000 Regulations" means the Water Supply (Water Quality) Regulations 2000(b);

"the 2001 Regulations" means the Water Supply (Water Quality) Regulations 2001(c);

"adoption agreement" means an agreement made or to be made under Section 51A(1) or 104(1) of the 1991 Act (d);

"bond" means a surety granted by a developer who is a party to an adoption agreement;

"bond waiver" means an agreement with a developer for the provision of a form of financial security as a substitute for a bond;

"calendar year" means the twelve months ending with 31st December;

"discharge pipe" means a pipe from which discharges are made or are to be made under Section 165(1) of the 1991 Act;

"disposal main" means (subject to Section 219(2) of the 1991 Act) any outfall pipe or other pipe which-

- (a) is a pipe for the conveyance of effluent to or from any sewage disposal works, whether of a sewerage undertaker or of any other person; and
- (b) is not a public sewer;

"drain" means (subject to Section 219(2) of the 1991 Act) a drain used for the drainage of one building or any buildings or yards appurtenant to buildings within the same curtilage;

"effluent" means any liquid, including particles of matter and other substances in suspension in the liquid;

"financial year" means the twelve months ending with 31st March;

"lateral drain" means-

- (a) that part of a drain which runs from the curtilage of a building (or buildings or yards within the same curtilage) to the sewer with which the drain communicates or is to communicate; or
- (b) (if different and the context so requires) the part of a drain identified in a declaration of vesting made under Section 102 of the 1991 Act or in an agreement made under Section 104 of that Act (e);

"licensed water supplier" means a company which is the holder for the time being of a water supply licence under Section 17A(1) of the 1991 Act(f);

"maintenance period" means the period so specified in an adoption agreement as a period of time-

- (a) from the date of issue of a certificate by a Sewerage Undertaker to the effect that a developer has built (or substantially built) a private sewer or lateral drain to that undertaker's satisfaction; and
- (b) until the date that private sewer or lateral drain is vested in the Sewerage Undertaker;

"map of waterworks" means the map made available under Section 198(3) of the 1991 Act (g) in relation to the information specified in subsection (1A);

"private sewer" means a pipe or pipes which drain foul or surface water, or both, from premises, and are not vested in a Sewerage Undertaker;

"public sewer" means, subject to Section 106(1A) of the 1991 Act(h), a sewer for the time being vested in a Sewerage Undertaker in its capacity as such, whether vested in that undertaker-

- (a) by virtue of a scheme under Schedule 2 to the Water Act 1989(i);
- (b) by virtue of a scheme under Schedule 2 to the 1991 Act (j);
- (c) under Section 179 of the 1991 Act (k); or
- (d) otherwise;

"public sewer map" means the map made available under Section 199(5) of the 1991 Act (l);

"resource main" means (subject to Section 219(2) of the 1991 Act) any pipe, not being a trunk main, which is or is to be used for the purpose of-

- (a) conveying water from one source of supply to another, from a source of supply to a regulating reservoir or from a regulating reservoir to a source of supply; or
- (b) giving or taking a supply of water in bulk;

"sewerage services" includes the collection and disposal of foul and surface water and any other services which are required to be provided by a Sewerage Undertaker for the purpose of carrying out its functions;

"Sewerage Undertaker" means the company appointed to be the Sewerage Undertaker under Section 6(1) of the 1991 Act for the area in which the property is or will be situated;

"surface water" includes water from roofs and other impermeable surfaces within the curtilage of the property;

"water main" means (subject to Section 219(2) of the 1991 Act) any pipe, not being a pipe for the time being vested in a person other than the water Undertaker, which is used or to be used by a Water Undertaker or licensed water supplier for the purpose of making a general supply of water available to customers or potential customers of the undertaker or supplier, as distinct from for the purpose of providing a supply to particular customers;

"water meter" means any apparatus for measuring or showing the volume of water supplied to, or of effluent discharged from any premises;

"water supplier" means the company supplying water in the water supply zone, whether a water undertaker or licensed water supplier;

"water supply zone" means the names and areas designated by a Water Undertaker within its area of supply that are to be its water supply zones for that year; and

"Water Undertaker" means the company appointed to be the Water Undertaker under Section 6(1) of the 1991 Act for the area in which the property is or will be situated.

(2) In this Schedule, references to a pipe, including references to a main, a drain or a sewer, shall include references to a tunnel or conduit which serves or is to serve as the pipe in question and to any accessories for the pipe.

- (a) 1991 c. 56.
- (b) S.I. 2000/3184. These Regulations apply in relation to England.
- (c) S.I. 2001/3911. These Regulations apply in relation to Wales.
- (d) Section 51A was inserted by Section 92(2) of the Water Act 2003 (c. 37). Section 104(1) was amended by Section 96(4) of that Act.
- (e) Various amendments have been made to Sections 102 and 104 by Section 96 of the Water Act 2003.
- (f) Inserted by Section 56 of and Schedule 4 to the Water Act 2003.
- (g) Subsection (1A) was inserted by Section 92(5) of the Water Act 2003.
- (h) Section 106(1A) was inserted by Section 99 of the Water Act 2003.
- (i) 1989 c. 15.
- (j) To which there are various amendments made by Section 101(1) of and Schedule 8 to the Water Act 2003.
- (k) To which there are various amendments made by Section 101(1) of and Schedule 8 to the Water Act 2003.
- (l) Section 199 was amended by Section 97(1) and (8) of the Water Act 2003.

Appendix 2 - DRAINAGE AND WATER ENQUIRY (COMMERCIAL) AGREEMENT

The Customer, the Client and the Purchaser are asked to note this Agreement which govern the basis on which this drainage and water report is supplied

Definitions

'Company' means United Utilities Water Limited who produce the Report; its registered office being at Haweswater House, Lingley Mere Business Park, Lingley Green Avenue, Great Sankey, Warrington WA5 3LP, company number 2366678.

'Order' means any request completed by the Customer requesting the Report.

'Report' means the drainage and water report prepared by the Company in respect of the Property.

'Property' means the address or location supplied by the Customer in the Order.

'Customer' means the person, company, firm or other legal body placing the Order, either on their own behalf as Client, or, as an agent for a Client.

'Client' means the person, company or body who is the intended recipient of the Report with an actual or potential interest in the Property.

'Purchaser' means the actual or potential purchaser of the Property including their mortgage lender.

Agreement

1.1 The Company agrees to supply the Report to the Customer and the Client subject to this Agreement. The scope and limitations of the Report are described in clause 2 of this Agreement.

Where the Customer is acting as an agent for the Client then the Customer shall be responsible for bringing this Agreement to the attention of the Client and the Purchaser.

1.2 The Customer, the Client and the Purchaser agree that the placing of an Order for a Report and the subsequent provision of a copy of the Report to the Client and/ or the Purchaser indicates their acceptance of this Agreement.

The Report

Whilst the Company will use reasonable care and skill in producing the Report, it is provided to the Customer, the Client and the Purchaser on the basis that they acknowledge and agree to the following:

2.1 The information contained in the Report can change on a regular basis so the Company cannot be responsible to the Customer, the Client and the Purchaser for any change in the information contained in the Report after the date on which the Report was produced and sent to the Client.

2.2 The Report does not give details about the actual state or condition of the Property nor should it be used or taken to indicate or exclude actual suitability or unsuitability of the Property for any particular purpose, or relied upon for determining saleability or value, or used as a substitute for any physical investigation or inspection. Further advice and information from appropriate experts and professionals should always be obtained.

2.3 The information contained in the Report is based upon the accuracy, completeness and legibility of the address and/or plans supplied by the Customer or Client or Purchaser.

2.4 The Report provides information as to the location and connection status of existing services and other information in relation to drainage and water enquiries and should not be relied on for any other purpose. The Report may contain opinions or general advice to the Customer, the Client and the Purchaser. The Company cannot ensure that any such opinion or general advice is accurate, complete or valid and therefore accepts no liability in relation thereto.

2.5 The position and depth of apparatus shown on any maps attached to the Report are approximate and are furnished as a general guide only, and no warranty as to its correctness is given or implied. The exact positions and depths should be obtained by excavation trial holes and the maps must not be relied on in the event of excavation or other works made in the vicinity of the Company's apparatus.

Liability

3.1 The Company shall not be liable to the Client or the Purchaser for any failure defect or non-performance of its obligations arising from any failure to provide or delay in providing the Report to the extent that such failure or delay is due to an event or circumstance beyond the reasonable

control of the Company including but not limited to any delay, failure of or defect in any machine, processing system or transmission link or any failure or default of a supplier or sub-contractor of the Company or any provider of any third party Information except to the extent that such failure or delay is caused by the negligence of the Company.

3.2 Where a Report is requested for an address falling within a geographical area where two different companies separately provide Water and Sewerage Services, then it shall be deemed that liability for the information given by either company will remain with that company in respect of the accuracy of the information supplied.

A company supplying information which has been provided to it by another company for the purposes outlined in this agreement will therefore not be liable in any way for the accuracy of that information and will supply that information as an agent for the company from which the information was obtained.

3.3 The Report is produced for use in relation to individual commercial property transactions where the property is used solely for carrying on a trade or business, the property is intended to be developed for commercial gain or the property is not a single residential, domestic property. The Company's entire liability (except to the extent provided by clause 3.5) in respect of all causes of action arising by reason of or in connection with the Report (whether for breach of contract, negligence or any other tort, under statute or statutory duty or otherwise at all) shall be limited to £2,000,000

In any event, the Company shall not have any liability in contract, negligence or any other tort or for breach of statutory duty or otherwise in respect of any loss of profit, loss of revenue, loss of opportunity or anticipated savings, or any indirect or consequential loss or damage that may be suffered by the Customer, the Client or the Purchaser howsoever arising. The plans attached to the report are provided pursuant to the Company's statutory duty to make such plans available for inspection (notwithstanding the provisions of this clause) and attention is drawn to the notice on the plan(s) attached to the report which applies to the plan and its contents.

3.4 Where the Customer sells this Report to a Client or Purchaser under its own name or as a reseller of the Company (other than in the case of a bona fide legal adviser recharging the cost of the Report as a disbursement) the Company shall not in any circumstances (whether for breach of contract, negligence or any other tort, under statute or statutory duty, restitution or otherwise at all) be liable to the Customer for any loss (whether direct, indirect or consequential loss (all three of which terms include without limitation, pure economic loss, loss of profit, loss of business, depletion of goodwill and like loss)) or damage whatsoever caused in respect of the Report or any use of the Report or reliance placed upon it and the Customer shall indemnify and keep indemnified the Company in respect of any claim by the Client or the Purchaser that the Company may incur or suffer.

3.5 Nothing in this Agreement shall exclude the Company's liability for death or personal injury arising from its negligence or for fraud.

Copyright and Confidentiality

4.1 The Customer, the Client and the Purchaser acknowledge that the Report is confidential and is intended for the personal use of the Client and the Purchaser. The copyright and any other intellectual property rights in the Report shall remain the property of the

Company. No intellectual or other property rights are transferred or licensed to the Customer, the Client or the Purchaser except to the extent expressly provided herein.

4.2 The Customer or the Client or the Purchaser is entitled to make copies of the Report but may only copy Ordnance Survey mapping or data contained in or attached to the Report if they have an appropriate licence from the originating source of that mapping or data.

4.3 The Customer, The Client and the Purchaser agree (in respect of both the original and any copies made) to respect and not to alter any part of the Report including but not limited to the trademark, copyright notice or other property marking which appears on the Report.

4.4 The maps contained in the Report are protected by Crown Copyright and must not be used for any purpose outside the context of the Report.

4.5 The enquiries in the Report are protected by copyright by the Law Society of 113 Chancery Lane, London WC2A 1PL and must not be used for any purpose outside the context of the Report.

4.6 The Customer, the Client and the Purchaser agree to indemnify the Company against any losses, costs, claims and damage suffered by the Company as a result of any breach by either of them of the provisions of clauses 4.1 to 4.4 inclusive.

Payment

5.1 Unless otherwise stated all prices are inclusive of VAT. The Customer shall pay the price of the Report specified by the Company, without any set off, deduction or counterclaim.

5.2 Payment must be received in advance unless an account has been set up with the Company. In these cases, payment terms will be as agreed with the Company, but in any event any invoice must be paid within 30 days.

5.3 The Company reserves the right to increase fees on reasonable prior written notice at any time.

Data Protection

6.1 We will process any personal data you provide to us in accordance with applicable data protection laws and our Data Protection and Privacy Notice (<https://www.unitedutilities.com/privacy/>). In addition we will use your personal data to manage and administer the provision of the Report under this Agreement and to develop and improve the business and services we provide to our customers. We may also disclose it to other companies in the United Utilities group (being United Utilities Water Limited, its holding companies (and their subsidiary companies) and its subsidiary companies) and their sub-contractors in connection with those purposes, but it will not be processed for other purposes or disclosed to other third parties without your express permission or without lawful purpose under data protection law.

General

7.1 If any provision of this Agreement is or becomes invalid or unenforceable, it will be taken to be removed from the rest of this Agreement to the extent that it is invalid or unenforceable. No other provision of this Agreement shall be affected.

7.2 This Agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts.

7.3 Nothing in this Agreement and conditions shall in any way restrict the Customer's the Client's or the Purchaser's statutory or any other rights of access to the information contained in the Report.

7.4 This Agreement and conditions may be enforced by the Customer, the Client and the Purchaser.

7.5 Before you agree to this Agreement, please note it is your responsibility to ensure your client/customer is aware of them and that any objections are raised accordingly.

Property Searches complaints procedure

In the event of any queries relating to this Report please e-mail, write or phone our customer team quoting the United Utilities reference detailed on the Report, We will endeavor to resolve any telephone contact or complaint at the time of the call.

Whilst we always try to resolve all complaints straight away, if this is not possible and you are not happy with the course of action taken by us you can ask us to escalate the issues internally via the complaints process detailed below.

We will listen to your complaint and do our best to deal with it immediately.

If we fail to give you a written substantive response within 5 working days the Company will compensate the Customer or the Client (as applicable) the amount of the original fee paid to the Company for the Report, regardless of the outcome of your complaint.

If it is a complex issue requiring more time, we will still get back to you within 5 working days and notify you of progress and update you with the new timescales.

If we consider your complaint to be justified or we have made any errors that substantially change the outcome of the search we will:

- Refund your Report fee
- Provide you with a revised Report (if requested)
- Take the necessary action within our power to put things right which may (where appropriate) include, at our complete discretion, financial compensation or the relocation/removal/installation of our affected water or sewerage assets.
- Keep you informed of any action required

If your complaint has gone through our full internal complaints procedure and you are not satisfied with the response or you believe that we have failed to comply with our internal complaints procedure you may be able to refer your complaint for consideration under The Property Ombudsman Scheme (TPOs). You can obtain further information by visiting www.tpos.co.uk or email admin@tpos.co.uk

Appendix C

Topographical Survey

Underground Utility Survey

Appendix D

CCTV Drainage Survey (Layout)

Appendix E

Environment Agency Flood map for Planning Report

Flood map for planning

Your reference
Rodney Street

Location (easting/northing)
385303/398943

Created
20 May 2022 10:06

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

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

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

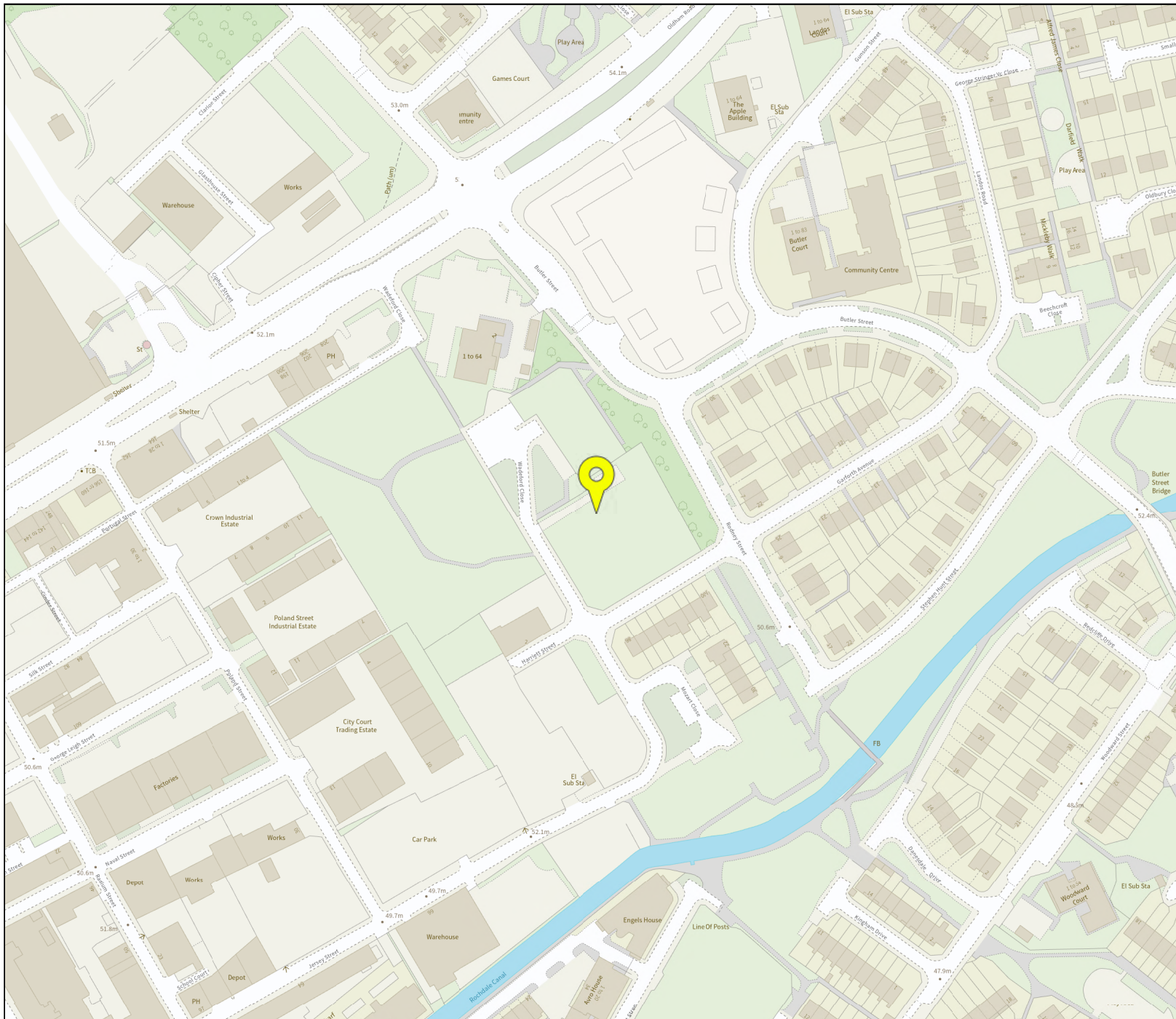
Notes

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

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

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

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2021 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference
Rodney Street

Location (easting/northing)
385303/398943

Scale
1:2500

Created
20 May 2022 10:06

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

0 20 40 60m

Appendix F

Manchester LLFA Correspondence

Manchester LLFA Data Screening Request

Chloé Grimsley

From: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Sent: 20 April 2022 16:44
To: Chloé Grimsley
Cc: Jennifer Atkinson; anne.hargreaves@avisonyoung.com
Subject: FW: Land west of Rodney Street, Manchester
Attachments: PrePayment Letter Data Screening - Rodney Street_20Apr22.pdf

Importance: High

Follow Up Flag: Follow up
Flag Status: Flagged

Good afternoon Chloé,

Thank you for your two emails & patience awaiting our response. I hope you also had a nice Easter Break,

Please find comments in [blue](#) below.

Regarding the data screening, please find a link to the payment page [here](#).

I've **attached** a letter detailing the deliverable. We will process & issue the screening on receipt of payment.

Should you require any assistance or have any queries please let me know.

Kind Regards,
Laura

From: Chloé Grimsley <Chloe.Grimmsley@curtins.com>
Sent: 05 April 2022 21:13
To: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Subject: Land west of Rodney Street, Manchester
Importance: High

Dear Sir/Madam,

We are currently looking at a new social housing development at existing land at Rodney Street, Ancoats, Manchester.

The Grid Reference for the site is:
X=385307 , Y=398965

The site is bound by Butler St to the north/north-east, Rodney Street to the east, Jersey Street to the south and Wadeford Close to the west.

The site location/boundary is shown below:



I understand my colleague Marta has previously engaged with yourselves regarding the requirement for a Flood Risk Assessment, as whilst the site is in Flood Zone 1, it is located within a CDA therefore we will be preparing a FRA.

With regards to the proposed drainage strategy for the development, we have completed an initial assessment of potential discharge:

Existing Drainage

There is evidence of existing drainage on site, however the drainage appears to be disused with the majority of the site considered to be greenfield.

Proposed Foul Drainage

We propose to discharge foul drainage to the combined public sewer network via new connection(s). Subject to agreement with United Utilities.

United Utilities have advised at this stage that we can discharge at an unrestricted discharge preferably to the sewer in Wadford Close.

Proposed Surface Water Drainage

We have assessed discharge based on the sustainability hierarchy.

Infiltration

No specific infiltration tests have been undertaken by the Geoenvironmental Engineer. A site investigation was completed in December 2021 and a summary of ground conditions is shown below.

4.1 Ground Conditions

A total of 23 exploratory holes were formed at the site and the ground conditions encountered, from surface level, have been interpreted to comprise:

- Made Ground
- Devensian Till
- Collyhurst Sandstone

Site specific borehole logs are included as Appendix C and give descriptions and depths of strata encountered. A summary of the general strata encountered across the site is provided in the table below, with more detailed description given in the following sub sections.

Geological Strata	Maximum Depth to Base of Strata (m bgl)	Strata Thickness (m)
Made Ground	2.60	0.50 - 2.60
Devensian Till	28.00	16.90 – 25.60
Collyhurst Sandstone	>35.00 (Not proven)	>7.00 - >15.50 (Not proven)

Based on the above, we have assumed that infiltration would be unsuitable for the development. [Please support your statement by reviewing the borehole/trial pit logs to confirm composition and from there decide whether infiltration testing is worthwhile. If the strata look potentially suitable, further aspects of SI results such as groundwater levels and contamination, and any other site constraints, should be considered to determine if infiltration investigation should be pursued further. Please present this reasoning in your strategy to show adherence to the Drainage Hierarchy.](#)

Watercourse

The nearest watercourse is the Rochdale Canal, approximately 115m south-east of the site and is therefore considered unviable to provide a new connection to this waterbody due to the distance and various third-party land crossings. [Agreed.](#)

Surface Water Sewer

There are no known surface water sewers in the vicinity of the site.

Combined Sewer

There are various combined sewers within or in the vicinity of the site, please advise whether connection could be made to the combined sewer network and if there is a preferred outfall location?

The existing greenfield run-off rate QBAR has been estimated as 3.6 l/s.

Based on achieving a minimum throttle size to minimise blockage risk, we would propose to discharge at 5 l/s.

United Utilities have confirmed that discharge to the public sewer should be at a maximum of 5 l/s to the sewer in Wadeford Close.

Please see attached UU correspondence.

Please can you confirm the above is acceptable? [If infiltration is demonstrated to be infeasible as per our above advice, it will be acceptable to discharge to the public sewer at 5l/s with the preferred outfall location to be in accordance with United Utilities' advice.](#)

[Please also make sure evidence of UU acceptance is obtained for any necessary diversions/easements concerning the public sewer, as noted on your attached layout.](#)

With regards to attenuation, we are currently exploring options of introduction of SuDS features, however we are somewhat limited in areas due to existing services and existing tree root protection zones but would welcome your input.

I have attached a in progress site layout we are currently assessing the viability of. Thank you for noting your intention to explore options for maximised green SuDS. We would be pleased to see integration of these features wherever possible. We can't be too prescriptive and direct your design components, but we would recommend considering the open spaces from 2 viewpoints: 1) for siting bioretentive green SuDs at scales appropriate to your constraints, and 2) to consider if rainwater harvesting could be introduced to serve landscaped areas with irrigation (this would also help you deliver volume control). We would also encourage considering if SuDS can be introduced at rooftop level, e.g. green roofs.

Please could you also confirm if you have any historic records of flood at or near the site and any information that may inform our drainage strategy – watercourse, highway drainage information. Please see our attached letter detailing data screening. If you require specific information on the highway drainage network, please advise your request & we can forward you on to appropriate colleagues.

If you require any further information, please let me know.

Kind Regards,
Chloé

Chloé Grimsley
Principal Engineer
T. 0161 236 2394
chloe.grimsley@curtins.com

Merchant Exchange
17-19 Whitworth Street West
Manchester M1 5WG



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Chloé Grimsley

From: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Sent: 26 April 2022 13:15
To: Hargreaves, Anne (Avison Young - UK); Chloé Grimsley
Cc: Jennifer Atkinson
Subject: MCC026/04/2022 data screen Rodney Street
Attachments: MCC026042022_Rodney_Street.pdf

Thank you both for your emails and for completing payment,

Please find attached your data screen results.

Please note in particular,

- p.3 results commentary
- p.4 – 5 mapped results

We hope this is beneficial to your project. Should you have any queries regarding your results, please do not hesitate to contact us.

Kind Regards,
Laura

From: Hargreaves, Anne (Avison Young - UK) <Anne.Hargreaves@avisonyoung.com>
Sent: 26 April 2022 12:47
To: Chloé Grimsley <Chloe.Grimmsley@curtins.com>; Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Subject: RE: Land west of Rodney Street, Manchester

Many thanks Chloe,

Anne

Anne Burke-Hargreaves (she/her/hers)
Director

Mobile +44 7962 360547
anne.hargreaves@avisonyoung.com | avisonyoung.com

From: Chloé Grimsley <Chloe.Grimmsley@curtins.com>
Sent: 26 April 2022 11:31
To: Hargreaves, Anne (Avison Young - UK) <Anne.Hargreaves@avisonyoung.com>; Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Subject: RE: Land west of Rodney Street, Manchester

CAUTION: External Sender

Hi Anne/Laura,

I have submitted the request this morning – I was having issues getting payment approved.

Laura – I have also issued a copy of the site plan which shows the boundary.

Kind Regards,
Chloé

Chloé Grimsley Principal Engineer
Curtins
T. 0161 236 2394 | chloe.grimsley@curtins.com

From: Hargreaves, Anne (Avison Young - UK) <Anne.Hargreaves@avisonyoung.com>
Sent: 26 April 2022 10:04
To: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Cc: Chloé Grimsley <Chloe.Grimmsley@curtins.com>
Subject: RE: Land west of Rodney Street, Manchester

Hi Laura – no problem at all re the name!

Chloe from Curtins is progressing the data screen.

Chloe – has it been submitted as yet?

Many thanks,

Anne

Anne Burke-Hargreaves (she/her/hers)
Director

Mobile +44 7962 360547
anne.hargreaves@avisonyoung.com | avisonyoung.com

From: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Sent: 26 April 2022 09:49
To: Hargreaves, Anne (Avison Young - UK) <Anne.Hargreaves@avisonyoung.com>
Subject: RE: Land west of Rodney Street, Manchester

CAUTION: External Sender

Good morning Anne,

Firstly apologies for previously missing the E off of your name. My mother's name is Ann and this has been the spelling drilled into me for too long.

I just wanted to check whether you've commissioned a data screen from us yet (we have not received an automated receipt, and I want to check nothing has been missed).

Kind Regards,
Laura

From: Hargreaves, Anne (Avison Young - UK) <Anne.Hargreaves@avisonyoung.com>
Sent: 21 April 2022 09:45
To: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Subject: RE: Land west of Rodney Street, Manchester

Many thanks Laura,

Anne

Anne Burke-Hargreaves (she/her/hers)

Director

Mobile +44 7962 360547

anne.hargreaves@avisonyoung.com | avisonyoung.com

From: Flood Risk Management <floodriskmanagement@manchester.gov.uk>

Sent: 20 April 2022 16:45

To: Hargreaves, Anne (Avison Young - UK) <Anne.Hargreaves@avisonyoung.com>

Cc: Chloé Grimsley <Chloe.Grimley@curtins.com>; Jennifer Atkinson <jennifer.atkinson@manchester.gov.uk>

Subject: RE: Land west of Rodney Street, Manchester

CAUTION: External Sender

Good afternoon Ann,

Thank you for your email and for noting the checks you undertake with your own mapping. I would advise that the data screen is recommended because it searches our statutory asset register (which includes GIS and archived surveys only held by MCC).

I've provided the link to complete the payment in my email to Chloé with yourselves copied. If you have any further queries please do not hesitate to contact us.

Kind Regards,

Laura

Laura Peacock

Flood Risk Engineer – LLFA

Highways Service,

Growth and Neighbourhoods Directorate

Manchester City Council

PO Box 532

Town Hall

Manchester

M60 2LA

Web: <http://www.manchester.gov.uk>

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From: Hargreaves, Anne (Avison Young - UK) <Anne.Hargreaves@avisonyoung.com>

Sent: 10 April 2022 20:08

To: Chloé Grimsley <Chloe.Grimley@curtins.com>; Flood Risk Management

<floodriskmanagement@manchester.gov.uk>; Jennifer Atkinson <jennifer.atkinson@manchester.gov.uk>

Cc: 'Atkins, Nicola' <Nicola.Atkins@Wates.co.uk>; Wood, David <david.wood@wates.co.uk>; Abigail Patel

<apatel@buttreass.net>; Sebastian Drayson <sdrayson@buttreass.net>; Ben Tabiner <btabiner@buttreass.net>; Laura

Rodriguez <Laura.Rodriguez@curtins.com>

Subject: RE: Land west of Rodney Street, Manchester

You don't often get email from anne.hargreaves@avisonyoung.com. [Learn why this is important](#)

Dear LLFA,

Further to the below, MCC Planning (Jen Atkinson) has requested that you also undertake a culvert check of the site. We have our own mapping but for completeness I would be grateful if you could pick this up when responding to Chloe's email below. Please could you also copy me and Jen in on your response to Chloe. (I am the planning consultant acting for the developer).

Many thanks,

Anne

Anne Burke-Hargreaves (she/her/hers)

Director

Mobile +44 7962 360547

anne.hargreaves@avisonyoung.com | avisonyoung.com

From: Chloé Grimsley <Chloe.Grimmsley@curtins.com>

Sent: 05 April 2022 21:13

To: floodriskmanagement@manchester.gov.uk

Subject: Land west of Rodney Street, Manchester

Importance: High

Dear Sir/Madam,

We are currently looking at a new social housing development at existing land at Rodney Street, Ancoats, Manchester.

The Grid Reference for the site is:

X=385307 , Y=398965

The site is bound by Butler St to the north/north-east, Rodney Street to the east, Jersey Street to the south and Wadeford Close to the west.

The site location/boundary is shown below:



I understand my colleague Marta has previously engaged with yourselves regarding the requirement for a Flood Risk Assessment, as whilst the site is in Flood Zone 1, it is located within a CDA therefore we will be preparing a FRA.

With regards to the proposed drainage strategy for the development, we have completed an initial assessment of potential discharge:

Existing Drainage

There is evidence of existing drainage on site, however the drainage appears to be disused with the majority of the site considered to be greenfield.

Proposed Foul Drainage

We propose to discharge foul drainage to the combined public sewer network via new connection(s). Subject to agreement with United Utilities.

United Utilities have advised at this stage that we can discharge at an unrestricted discharge preferably to the sewer in Wadford Close.

Proposed Surface Water Drainage

We have assessed discharge based on the sustainability hierarchy.

Infiltration

No specific infiltration tests have been undertaken by the Geoenvrinmental Engineer. A site investigation was completed in December 2021 and a summary of ground conditions is shown below.

4.1 Ground Conditions

A total of 23 exploratory holes were formed at the site and the ground conditions encountered, from surface level, have been interpreted to comprise:

- Made Ground
- Devensian Till
- Collyhurst Sandstone

Site specific borehole logs are included as Appendix C and give descriptions and depths of strata encountered. A summary of the general strata encountered across the site is provided in the table below, with more detailed description given in the following sub sections.

Geological Strata	Maximum Depth to Base of Strata (m bgl)	Strata Thickness (m)
Made Ground	2.60	0.50 - 2.60
Devensian Till	28.00	16.90 – 25.60
Collyhurst Sandstone	>35.00 (Not proven)	>7.00 - >15.50 (Not proven)

Based on the above, we have assumed that infiltration would be unsuitable for the development.

Watercourse

The nearest watercourse is the Rochdale Canal, approximately 115m south-east of the site and is therefore considered unviable to provide a new connection to this waterbody due to the distance and various third-party land crossings.

Surface Water Sewer

There are no known surface water sewers in the vicinity of the site.

Combined Sewer

There are various combined sewers within or in the vicinity of the site, please advise whether connection could be made to the combined sewer network and if there is a preferred outfall location?

The existing greenfield run-off rate QBAR has been estimated as 3.6 l/s.

Based on achieving a minimum throttle size to minimise blockage risk, we would propose to discharge at 5 l/s.

United Utilities have confirmed that discharge to the public sewer should be at a maximum of 5 l/s to the sewer in Wadeford Close.

Please see attached UU correspondence.

Please can you confirm the above s acceptable?

With regards to attenuation, we are currently exploring options of introduction of SuDS features, however we are somewhat limited in areas due to existing services and existing tree root protection zones but would welcome your input.

I have attached a in progress site layout we are currently assessing the viability of.

Please could you also confirm if you have any historic records of flood at or near the site and any information that may inform our drainage strategy – watercourse, highway drainage information.

If you require any further information, please let me know.

Kind Regards,
Chloé

Chloé Grimsley
Principal Engineer
T. 0161 236 2394
chloe.grimsley@curtins.com

Merchant Exchange
17-19 Whitworth Street West
Manchester M1 5WG



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Lead Local Flood Authority

Highways Service
Growth and Neighbourhoods Directorate
Manchester City Council
PO Box 532
Town Hall
Manchester
M60 2LA

Email: floodriskmanagement@manchester.gov.uk

DATE 26/04/2022

Dear Sir or Madam,

RE: Our Ref: MCC026/04/2022

We acknowledge with thanks your payment received on 26/04/2022 for our LLFA data screen service.

Please find enclosed plan showing the results of the data screen. The position of features shown on this plan is approximate only and is given in accordance with the best information currently available.

The enclosed plan cannot be used to substitute a competent site investigation.

The enclosed plan is being provided to you subject to Manchester City Council's terms and conditions which are shown attached.

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

If you have any queries regarding this matter, please do not hesitate to contact us.

Yours Faithfully,



Neil Bayliss-Rowe, Highways Development Control & Flood Risk Manager, Lead Local Flood Authority

TERMS AND CONDITIONS – LLFA DATA SCREEN

These provisions apply to LLFA data supplied by Manchester City Council (“MCC”).

TERMS AND CONDITIONS:

- This data Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- MCC has taken all reasonable care to compile this data Map. This data Map and any information supplied with it is provided for general guidance only and MCC makes no representation, undertaking or warranty of any kind as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position of any culverted assets shown on the data Map are approximate only. MCC strongly recommends that a comprehensive site investigation is undertaken in addition to reviewing this data Map to determine and ensure the precise location of any assets. The exact location, positions and depths should be obtained by an appropriate survey which may include but shall not be limited to GPR and CCTV.
- The data screened may be modified over time without notice and therefore this data Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the data Map have been made subsequent to issue and prior to any works being carried out.
- This data Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) or for the purpose of determining the suitability of a point of connection to discharge.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising from damages of any kind caused to assets by reason of the actual position and/or existence of assets being different from those shown on the data Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent MCC from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

DATA SCREEN SYMBOLOGY

Bridge

-  Good
-  Fair
-  Poor
-  Very Poor
-  Unknown

Trash Screen

-  Good
-  Fair
-  Poor
-  Very Poor
-  Unknown

Culvert Orifice

-  Very Good
-  Good
-  Fair
-  Poor
-  Very Poor
-  Unknown

Culvert Conduit

-  CCTV surveyed
-  Not CCTV surveyed
-  Ordinary Watercourse Conduit
-  MCC SuDS
-  MCC Flood Incident Points
-  MCC Section 19 Report
-  MCC Flood Incident Polygons
-  MCC Local Authority Boundary

Supplementary Information where available:

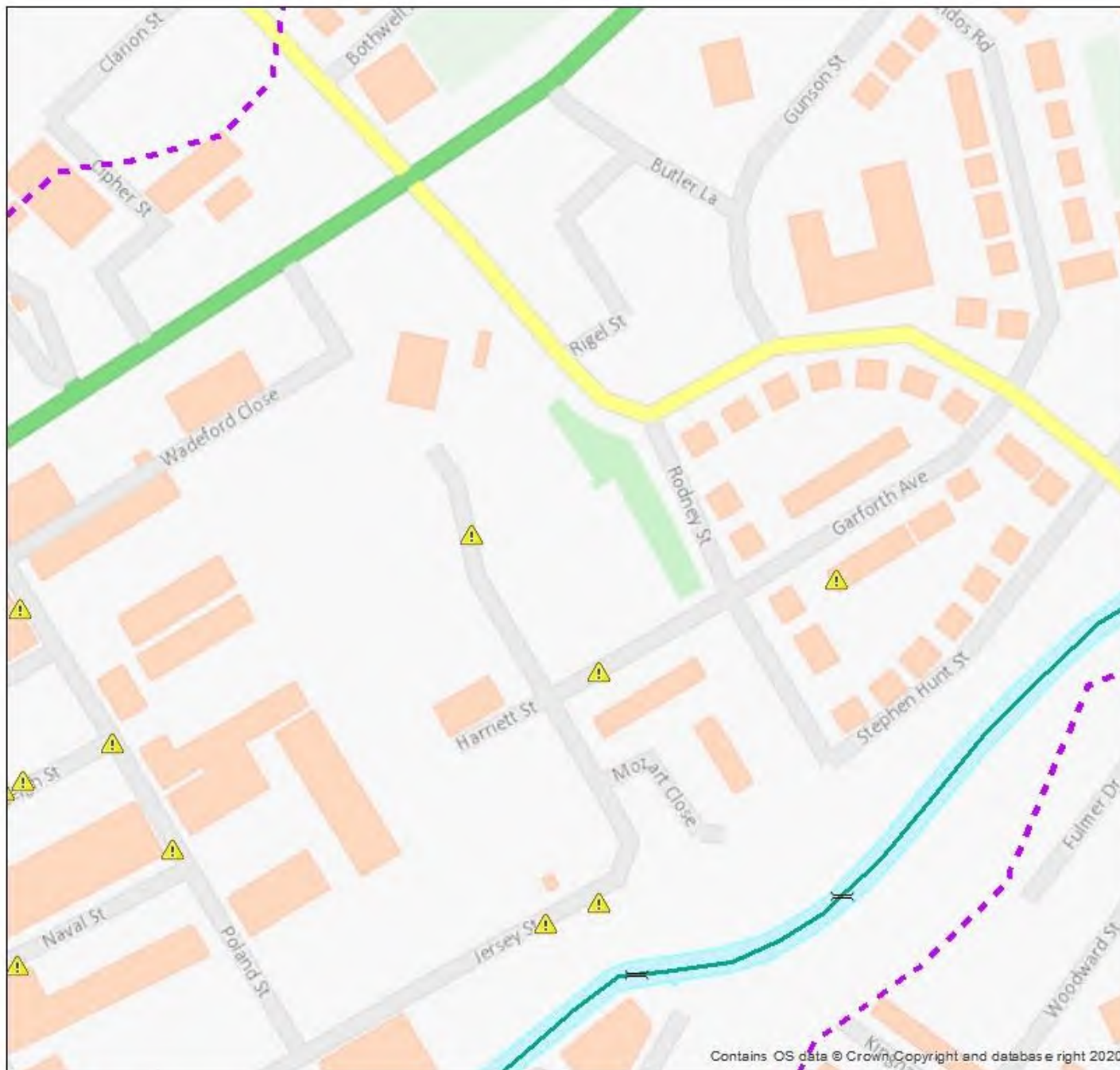
Critical Drainage Area – The Site is within the Conurbation Core CDA.

Flood Incidents – The nearest recorded drainage incident is onsite (Wadeford Close) - 22/07/2019 unspecified defect. The nearest offsite drainage incident (south of the Site boundary) is 22/07/2021 blocked highway gully or drain.

Culvert Conduits – The LLFA asset register does not record any known or indicative culverted ordinary watercourses within the Site boundary. The closest indicative culverted ordinary watercourses are approximately 100m to the northwest and approximately 160m to the southeast.

Survey and Design Archive – The 1984 Manchester City Council drainage survey does not record any known or indicative ordinary watercourses within the Site boundary. A georeferenced extract is enclosed which features the indicative culvert 160m to the southeast.

Any other information identified by LLFA officer during screening – None.



**MANCHESTER
CITY COUNCIL**

LLFA DATA SCREEN

Address/Site Ref:

Rodney Street

Our Ref:

MCC026/04/2022

Author: Manchester City Council LLFA

Date: 26/04/2022

Scale: 1:1,998

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

0 12.5 25 50
Meters

N



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**MANCHESTER
CITY COUNCIL**

LLFA DATA SCREEN

Address/Site Ref:

Rodney Street

Our Ref:

MCC026/04/2022

Author: Manchester City Council LLFA

Date: 26/04/2022

Scale: 1:1,998

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

0 12.5 25 50
Meters

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Appendix G

United Utilities Correspondence

Chloé Grimsley

From: Perry, Graham <Graham.Perry@uuplc.co.uk>
Sent: 27 July 2021 21:54
To: Chloé Grimsley
Cc: Wastewater Developer Services
Subject: Pre Development Enquiry for : Rodney Street Manchester M4 6JJ UU ref : 4200041853

Follow Up Flag: Follow up
Flag Status: Completed

Pre Development Enquiry for: Rodney Street Manchester M4 6JJ UU ref : 4200041853

We have carried out an assessment of your application which is based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your drainage strategy will need to be reviewed by other competent authorities as part of the planning process, and we advise that you carry out the necessary site investigations to confirm the viability of your proposals.

If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 3723223 or refer to the link below:

<https://www.unitedutilities.com/builders-developers/working-near-our-assets/>

Foul Water

Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.

Our preferred point of discharge would be to the 375mm diameter public combined sewer within Wadeford Close located to the west of your proposed development at a maximum pass forward flow of XXX l/s / an unrestricted rate.

If you are able to identify an alternative, more suitable point of discharge, we request that you contact us at your earliest convenience so that we can assess suitability.

Surface Water

All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80, (Reference ID: 7-080-20150323), of the National Planning Practice Guidance. We also recommend you prioritise the use of multi-functional sustainable drainage systems for the management of surface water in accordance with national planning policy.

Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.

This is outlined as follows, in order of priority:

- 1. into the ground (infiltration);**
- 2. to a surface waterbody;**
- 3. to a surface water sewer or highway drain;**
- 4. to a combined sewer.**

For guidance, The **North West SuDS Pro-Forma** provides information on the appropriate evidence required at each stage of the hierarchy, to demonstrate how each level has been discounted.

The Lead Local Flood Authority has responsibility for all surface water drainage concerns and their input to your proposal is critical. You should also consider whether it is necessary to discuss your proposal with the Environment Agency, or Internal Drainage Board (if operating in your area).

The Local Planning Authority are the determining authority for any application for planning permission and the appropriate authority for determining cost viability of a proposed drainage scheme, such assessments are outside of the jurisdiction of United Utilities.

Infiltration

Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible.

A detailed evidence based feasibility assessment must be carried out in line with Chapter 25 of the CIRIA SuDS Manual 2015 to determine whether infiltration is a suitable method of surface water disposal.

Particular attention must be paid to Ground Water Source Protection Zones to ensure that the risk of pollution to these valuable resources is not compromised. Details can be obtained from the government website:

<https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs#find-groundwater-spzs>

If your site is in a Groundwater Source Protection Zone, you should have regard to the Environment Agency's approach to Groundwater Protection. Information on this is available via the link below:

<https://www.gov.uk/government/publications/groundwater-protection-position-statements>

Please note that such a location could have implications for the principle of your development and the need for additional mitigating measures to protect the groundwater environment and public water supply in the detailed design of your site.

Public Sewer

In accordance with the hierarchy of drainage options within the National Planning Practice Guidance, both discharge to ground via infiltration and discharge to a waterbody should be discounted prior to consideration of discharging surface water to the public sewer system. Evidence should be provided to demonstrate how these have been discounted, as outlined in the North West SuDS pro-forma.

Once evidence is provided as outlined above, United Utilities will consider a connection to the 375mm diameter public combined sewer within Wadeford Close located west of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities request that any agreed rate does not exceed 5 l/s.

As a Water Company, we have no obligation to accept highway drainage into our public sewer network. However, should your proposals include runoff from highways, we would request that consideration is given to SuDS components that deliver source control are incorporated within the design of the scheme to reduce the volume and frequency of discharges of these flows to the public sewer.

Levels

For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist, we recommend that you contact us to discuss further. It could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Land drainage / Overland flows / track drainage

United Utilities have no obligation, and furthermore we do not accept land drainage, overland flows or track drainage into the public sewerage network under any circumstances

Existing Wastewater Assets Crossing the Site

We have significant assets crossing this site that cannot realistically be diverted. We would ask that you obtain a copy of our asset data records from your provider and plan your development around them ensuring that all legal easements are observed. If any work is required that may impart vibration into the ground we would ask that you contact us for further advice.

According to our public sewer records there are public sewers located within your site boundary. We will require unrestricted access to the sewer for maintenance purposes, we would ask that you maintain a minimum clearance of 6m which is measured 3m from the centre line of the pipe unless there happens to be a formal easement agreement in place, in which case the specified easement width would apply. If you cannot achieve this then you may wish to consider diverting and or abandoning the public sewer.

Please refer to the link below to obtain full details of the processes involved with sewer diversions:

<https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sewer-diversions/>

I can confirm that there are no formal legal easements over the sewers around your proposed development so if you do not intend to submit the scheme for adoption then we would have to rely on the minimum offset as outlined in Part H4 of the Building Regulations which is 3m from the edge of the sewer.

There is no distinction in the Building Regulations between sewers within the boundary or sewers in carriageway therefore the minimum 3m offset must be observed.

Looking at our records I would suggest that all the sewers in and around the development site are non-critical. This includes the 580mm x 700mm sewer running along the northern boundary but I would have to take advice on this from network colleagues to be certain.

Existing Water Assets Crossing the Site

It is the developer responsibility to identify utilities on-site. Where clean water assets are shown on our records, we recommend that you contact our Water Pre-Development Team, via the following email address:

DeveloperServicesWater@uuplc.co.uk. Further information for this service can be found on our website via the link below:

<https://www.unitedutilities.com/builders-developers/larger-developments/pre-development/water-pre-dev/>

Connection Application

Although we may discuss and agree discharge points and rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below:

<https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sewer-connections/>

We recommend that the detailed design should confirm the locations of all utilities in the area and ensure that any proposed drainage solution considers routing and clash checks where required.

If we can be of any further assistance please don't hesitate to contact us further.

Kind regards,

Graham Perry



Graham Perry
Development Engineer
Developer Services
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Chloé Grimsley

From: Perry, Graham <Graham.Perry@uuplc.co.uk>
Sent: 19 May 2022 10:01
To: Victoria Checkley
Cc: Chloé Grimsley
Subject: RE: Repeat 3 Pre Development Enquiry for : Rodney Street Manchester M4 6JJ UU
ref : 4200041853

Hello Victoria

I must maintain my view that there is a clear discrepancy in building regulations but I am comforted by the fact that the foundations are going to be piles so in the event of failure of the sewer, the building will remain unaffected. I am also comforted by the fact that the sewer is only affected by a pinch point but the whole issue could be avoided by constructing the diversion as originally proposed.

Looking at the plan, it would appear that the sewer in question is a 225mm pipe which, if we worked to the edge would only give an additional 112mm protection which in reality is insignificant in this case so I am happy to agree to take the measurement from the centre line in this instance

You must also ensure that the appointed Building Control officer is satisfied with the arrangement because they will sign the building regulations certificate off.

Thanks

Graham Perry



Graham Perry
Development Engineer
Developer Services
M: 07557 577548
T: 01925 679405
unitedutilities.com

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From: Victoria Checkley [mailto:Victoria.Checkley@curtins.com]

Sent: 18 May 2022 15:06

To: Perry, Graham <Graham.Perry@uuplc.co.uk>

Cc: Chloé Grimsley <Chloe.Grimmsley@curtins.com>

Subject: RE: Repeat 3 Pre Development Enquiry for : Rodney Street Manchester M4 6JJ UU ref : 4200041853

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Hi Graham,

Just to let you know why we are questioning this requirement, on this particular site there is a local pinch point just on the corner of one of the buildings where we are constrained by the UU sewer on one side and a gas main on the other (both needing an easement).

We can confirm that the building foundations comprise a piles foundation which have been specifically designed to ensure that the sewer is not surcharged by the building loads (and that the building foundations are not affected by the sewer). We can provide detailed sections to demonstrate this if required.

I don't think there is any disagreement that UU easements are normally based on an easement which is based on the centreline of the surveyed drain location.

As Chloe has highlighted, the only clause in Building Regulations that actually make specific reference to the positioning of the offset, clearly denotes it as from the centreline and that is what we have done on all previous projects.

Can you let me know if you need any further information to enable you to agree to the 3m from centreline offset?

Happy to get Building Control involved in the conversation?

Thanks

Victoria

Victoria Checkley (She/her) Design Director

Curtins

T. 0161 236 2394 | M. 07855 109421 | victoria.checkley@curtins.com

From: Perry, Graham <Graham.Perry@uuplc.co.uk>

Sent: 18 May 2022 14:41

To: Chloé Grimsley <Chloe.Grimmsley@curtins.com>

Cc: Victoria Checkley <Victoria.Checkley@curtins.com>

Subject: RE: Repeat 3 Pre Development Enquiry for : Rodney Street Manchester M4 6JJ UU ref : 4200041853

Hello Chloe

It would seem that we are at an impass because the same document states the following: I would suggest that you work with 3m from the edge of the pipe rather than trying to squeeze it to an absolute limit because as you know sewers can deviate slightly.

More importantly has the foundation been designed to ensure that the building is not at risk from collapse in the event of failure?

0.3 Where it is proposed to construct a building over or near a drain or sewer shown on any map of sewers, the developer should consult the owner of the drain or sewer, if the owner is not the developer himself. In the case of a public sewer the owner is the sewerage undertaker, who may be able to advise on the condition of the sewer or arrange an inspection.

0.4 If repair or replacement of a public sewer is required it will be carried out by the sewerage undertaker.

0.5 Where it is proposed to construct a building or extension over a sewer which is intended for adoption, it is advisable to consult the sewerage undertaker.

Undue risk in the event of failure of the drain or sewer

1.1 Some soils are easily eroded by groundwater leaking into the drain or sewer. Examples of such soils include fine sands, fine silty sands, saturated silts and peat. Buildings should not be constructed over or within 3m of drains or sewers in such soils unless special measures are taken in the design and construction of foundations to prevent undue risk to the building in the event of failure of the drain or sewer. Special measures will not be needed if the invert of the drain or sewer is:

- a. above the level of the foundations; and
- b. above the groundwater level; and
- c. no more than 1m deep.

1.2 A building constructed over or within 3m of:

- a. any rising main (except those used solely to drain the building);
- b. any drain or sewer constructed from brick or masonry;
- c. any drain or sewer in poor condition (e.g. the pipes are cracked, fractured, deformed more than 5% or misaligned)

would be exposed to a high level of risk in the event of failure of the drain or sewer. Buildings should not be constructed in such a position unless special measures are taken.

Maintaining access

1.3 Buildings or extensions should not be constructed over a manhole or inspection chamber or other access fitting on any sewer (serving more than one property). Approved

1.4 A satisfactory diversionary route should be available so that the drain or sewer could be reconstructed without affecting the building. This route should not pass within 3m from the building. Where the drain or sewer is more than 1.5m deep and the drain or sewer is accessible to mechanical excavators the alternative route should also have such access.

1.5 The length of drain or sewer under a building should not exceed 6m except with the permission of the owners of the drain or sewer (i.e. the sewerage undertaker in case of a public sewer).

1.6 Buildings or extensions should not be constructed over or within 3m of any drain or sewer more than 3m deep, or greater than 225mm in diameter except with the permission of the owners of the drain or sewer (i.e. the sewerage undertaker in the case of a public sewer).

Protection of the drain or sewer during construction

1.7 Any drain or sewer should be protected from damage by construction traffic and heavy machinery. Protection may be provided by providing barriers to keep such traffic away from the line of the sewer. Heavy materials should not be stored over drains or sewers.

1.8 Where piling works are being carried out care should be taken to avoid damage to any drain or sewer. The position of the drain or sewer should be established by survey. If the drain or sewer is within 1m of the piling, trial holes should be excavated to establish the exact position of the sewer. The location of any connections should also be established. Piling should not be carried out where the distance from the outside of the sewer to the outside of the pile is less than twice the diameter of the pile.

Protection from settlement

1.9 Where a drain or sewer runs under a building at least 100mm of granular or other suitable flexible filling should be provided round the pipe. On sites where excessive subsidence is possible additional flexible joints may be advisable or other solutions adopted such as suspended drainage. Where the crown of the pipe is within 300mm of the underside of the slab, special protection should be provided (see Approved Document H1, Section 2, paragraph 2.44).

1.10 Where a drain or sewer running below a building is less than 2m deep, the foundation

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From: Chloé Grimsley [<mailto:Chloe.Grimley@curtins.com>]

Sent: 18 May 2022 12:18

To: Perry, Graham <Graham.Perry@uuplc.co.uk>

Cc: Victoria Checkley <Victoria.Checkley@curtins.com>

Subject: RE: Repeat 3 Pre Development Enquiry for : Rodney Street Manchester M4 6JJ UU ref : 4200041853

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Hi Graham,

H4 states 3m from centreline?

Part H 2010

(a) 1991 c. 56; Section 199 was amended by Section 97 of the Water Act 2003 (c. 37).

Guidance

Performance

In the Secretary of State's view the requirements of H4 will be met if:

- the building or extension or work involving underpinning:
 - is constructed or carried out in a manner which will not overload or otherwise cause damage to the drain, sewer or disposal main either during or after the construction;
 - will not obstruct reasonable access to any manhole or inspection chamber on the drain, sewer or disposal main;
- in the event of the drain, sewer or disposal main requiring replacement, there is a satisfactory diversionary route or the building or the extension will not unduly obstruct work to replace the drain, sewer or disposal main, on its present alignment;
- the risk of damage to the building as a result of failure of the drain, sewer or disposal main is not excessive having regard to:
 - the nature of the ground;
 - the condition, location or construction of the drain, sewer or disposal main;
 - the nature, volume and pressure of the flow in the drain, sewer or disposal main;
 - the design and construction of the foundations of the building.

Introduction to provisions

0.1 These provisions apply to the construction, extension or underpinning of a building over or within 3m of the centreline of an existing drain, sewer or disposal main shown on the sewerage undertaker's sewer records whether that sewer is a public sewer or not.

0.2 Copies of the sewer record maps are held by the sewerage undertaker and by local authorities. These are available for inspection during office hours.

Drainage and waste disposal
48

ONLINE VERSION

Approved Document H

Chloé Grimsley Principal Engineer

Curtins

T. 0161 236 2394 | chloe.grimsley@curtins.com

From: Perry, Graham <Graham.Perry@uuplc.co.uk>

Sent: 18 May 2022 11:33

To: Chloé Grimsley <Chloe.Grimmsley@curtins.com>

Subject: RE: Repeat 3 Pre Development Enquiry for : Rodney Street Manchester M4 6JJ UU ref : 4200041853

Hello Cloe

If the easement is going to be 3m then I would suggest that you take the measurement from the edge of the pipe because building regs say that you should not build within 3m of any sewer . if you went to the centre line it would be less than the 3m

Hope this makes sense



Graham Perry
Development Engineer
Developer Services
M: 07557 577548
T: 01925 679405
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From: Chloé Grimsley [<mailto:Chloe.Grimmsley@curtins.com>]

Sent: 18 May 2022 10:31

To: Perry, Graham <Graham.Perry@uuplc.co.uk>

Cc: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Subject: FW: Repeat 3 Pre Development Enquiry for : Rodney Street Manchester M4 6JJ UU ref : 4200041853

Importance: High

EXTERNAL EMAIL This email originated outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Hi Graham,

Just following on from my email below, we are co-ordinating easement positions within the site.

The original PDE advises 3m from the edge of the pipe in one paragraph and another states from centre line – please can you confirm which is correct?

Kind Regards,
Chloé

Chloé Grimsley Principal Engineer

Curtins

T. 0161 236 2394 | chloe.grimsley@curtins.com

From: Perry, Graham <Graham.Perry@uuplc.co.uk>

Sent: 05 April 2022 16:41

To: Chloé Grimsley <Chloe.Grimmsley@curtins.com>

Cc: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Subject: FW: Repeat Pre Development Enquiry for : Rodney Street Manchester M4 6JJ UU ref : 4200041853

Importance: High

Hello Chloe

In principle the proposal to divert would be acceptable but you would need to check that there are no live connections on the section being abandoned and that all levels / diameters are acceptable.

Please submit a formal Section 185 application when you have all the details

Thanks



Graham Perry
Development Engineer
Developer Services
M: 07557 577548
T: 01925 679405
unitedutilities.com

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From: Chloé Grimsley [<mailto:Chloe.Grimmsley@curtins.com>]

Sent: 24 March 2022 15:14

To: Perry, Graham <Graham.Perry@uuplc.co.uk>

Cc: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Subject: RE: Pre Development Enquiry for : Rodney Street Manchester M4 6JJ UU ref : 4200041853

Importance: High

EXTERNAL EMAIL This email originated outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Hi Graham,

Following on from my previous email, the design team are currently looking at potentially relocating the building more west than shown below – there a Gas main on site along the east which is proving difficult to service the site in its current form. If the building is moved west – would UU accept a diversion of the 225mm sewer into the adjacent sewer - please see below. Ultimately they both connect to the same point at the manhole downstream. Please can you provide some initial advice on whether this is feasible?



Kind Regards,
Chloé

Chloé Grimsley Principal Engineer
Curtins
T. 0161 236 2394 | chloe.grimsley@curtins.com

From: Chloé Grimsley
Sent: 17 March 2022 22:46
To: Perry, Graham <Graham.Perry@uuplc.co.uk>
Cc: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>
Subject: RE: Pre Development Enquiry for : Rodney Street Manchester M4 6JJ UU ref : 4200041853
Importance: High

Good Evening Graham,

Further to my email below, I have two queries which has been raised by the design team if you could assist:

- 1) The 225mm public sewer within the site (north-western corner) is close to the proposed building line but does not sit within the easement based on 3m from the outer edge of the pipe. The construction methodology of the foundation installation is being reviewed - would it be possible to excavate the ground to install foundations – excavation would be within the easement? This would be temporary while they install foundations and would minimise costs of installing sheet piles along the easement line to temporarily support the excavation to install the foundations.



- 2) There is a 450mm public sewer in the public footpath along Rodney Street (eastern boundary) – we have indicated that there will be a 3m easement on the sewer which encroaches the site – please can you confirm if this applies where the sewer is in the public highway boundary? Locations for the substation is currently being reviewed and one option is to locate this along the eastern boundary which would be within 3m of the sewer.



Just as a general comment – the easement on this site has been advised as from the outer edge of the pipe – is there a reason it isn't from centreline as usual advice?

Kind Regards,
Chloé

Chloé Grimsley Principal Engineer

Curtins

T. 0161 236 2394 | chloe.grimsley@curtins.com

From: Perry, Graham <Graham.Perry@uuplc.co.uk>

Sent: 27 July 2021 21:54

To: Chloé Grimsley <Chloe.Grimmsley@curtins.com>

Cc: Wastewater Developer Services <WastewaterDeveloperServices@uuplc.co.uk>

Subject: Pre Development Enquiry for : Rodney Street Manchester M4 6JJ UU ref : 4200041853

Pre Development Enquiry for: Rodney Street Manchester M4 6JJ UU ref : 4200041853

We have carried out an assessment of your application which is based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your drainage strategy will need to be reviewed by other competent authorities as part of the planning process, and we advise that you carry out the necessary site investigations to confirm the viability of your proposals.

If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 3723223 or refer to the link below:

<https://www.unitedutilities.com/builders-developers/working-near-our-assets/>

Foul Water

Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.

Our preferred point of discharge would be to the 375mm diameter public combined sewer within Wadeford Close located to the west of your proposed development at a maximum pass forward flow of XXX l/s / an unrestricted rate.

If you are able to identify an alternative, more suitable point of discharge, we request that you contact us at your earliest convenience so that we can assess suitability.

Surface Water

All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80, (Reference ID: 7-080-20150323), of the National Planning Practice Guidance. We also recommend you prioritise the use of multi-functional sustainable drainage systems for the management of surface water in accordance with national planning policy.

Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.

This is outlined as follows, in order of priority:

1. **into the ground (infiltration);**
2. **to a surface waterbody;**
3. **to a surface water sewer or highway drain;**
4. **to a combined sewer.**

For guidance, The **North West SuDS Pro-Forma** provides information on the appropriate evidence required at each stage of the hierarchy, to demonstrate how each level has been discounted.

The Lead Local Flood Authority has responsibility for all surface water drainage concerns and their input to your proposal is critical. You should also consider whether it is necessary to discuss your proposal with the Environment Agency, or Internal Drainage Board (if operating in your area).

The Local Planning Authority are the determining authority for any application for planning permission and the appropriate authority for determining cost viability of a proposed drainage scheme, such assessments are outside of the jurisdiction of United Utilities.

Infiltration

Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible.

A detailed evidence based feasibility assessment must be carried out in line with Chapter 25 of the CIRIA SuDS Manual 2015 to determine whether infiltration is a suitable method of surface water disposal.

Particular attention must be paid to Ground Water Source Protection Zones to ensure that the risk of pollution to these valuable resources is not compromised. Details can be obtained from the government website:

<https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs#find-groundwater-spzs>

If your site is in a Groundwater Source Protection Zone, you should have regard to the Environment Agency's approach to Groundwater Protection. Information on this is available via the link below:

<https://www.gov.uk/government/publications/groundwater-protection-position-statements>

Please note that such a location could have implications for the principle of your development and the need for additional mitigating measures to protect the groundwater environment and public water supply in the detailed design of your site.

Public Sewer

In accordance with the hierarchy of drainage options within the National Planning Practice Guidance, both discharge to ground via infiltration and discharge to a waterbody should be discounted prior to consideration of discharging surface water to the public sewer system. Evidence should be provided to demonstrate how these have been discounted, as outlined in the North West SuDS pro-forma.

Once evidence is provided as outlined above, United Utilities will consider a connection to the 375mm diameter public combined sewer within Wadeford Close located west of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities request that any agreed rate does not exceed 5 l/s.

As a Water Company, we have no obligation to accept highway drainage into our public sewer network. However, should your proposals include runoff from highways, we would request that consideration is given to SuDS components that deliver source control are incorporated within the design of the scheme to reduce the volume and frequency of discharges of these flows to the public sewer.

Levels

For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist, we recommend that you contact us to discuss further. It could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Land drainage / Overland flows / track drainage

United Utilities have no obligation, and furthermore we do not accept land drainage, overland flows or track drainage into the public sewerage network under any circumstances

Existing Wastewater Assets Crossing the Site

We have significant assets crossing this site that cannot realistically be diverted. We would ask that you obtain a copy of our asset data records from your provider and plan your development around them ensuring that all legal easements are observed. If any work is required that may impart vibration into the ground we would ask that you contact us for further advice.

According to our public sewer records there are public sewers located within your site boundary. We will require unrestricted access to the sewer for maintenance purposes, we would ask that you maintain a minimum clearance of 6m which is measured **3m from the centre line** of the pipe unless there happens to be a formal easement agreement in place, in which case the specified easement width would apply. If you cannot achieve this then you may wish to consider diverting and or abandoning the public sewer.

Please refer to the link below to obtain full details of the processes involved with sewer diversions:

<https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sewer-diversions/>

I can confirm that there are no formal legal easements over the sewers around your proposed development so if you do not intend to submit the scheme for adoption then we would have to rely on the minimum offset as outlined in Part H4 of the Building Regulations which is **3m from the edge of the sewer.**

There is no distinction in the Building Regulations between sewers within the boundary or sewers in carriageway therefore the minimum 3m offset must be observed.

Looking at our records I would suggest that all the sewers in and around the development site are non-critical. This includes the 580mm x 700mm sewer running along the northern boundary but I would have to take advice on this from network colleagues to be certain.

Existing Water Assets Crossing the Site

It is the developer responsibility to identify utilities on-site. Where clean water assets are shown on our records, we recommend that you contact our Water Pre-Development Team, via the following email address:

DeveloperServicesWater@uuplc.co.uk. Further information for this service can be found on our website via the link below:

<https://www.unitedutilities.com/builders-developers/larger-developments/pre-development/water-pre-dev/>

Connection Application

Although we may discuss and agree discharge points and rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below:

<https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sewer-connections/>

We recommend that the detailed design should confirm the locations of all utilities in the area and ensure that any proposed drainage solution considers routing and clash checks where required.

If we can be of any further assistance please don't hesitate to contact us further.

Kind regards,

Graham Perry



Graham Perry
Development Engineer
Developer Services
M: 07557 577548
T: 01925 679405
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Appendix H

Proposed Drainage Layout

Proposed Surface Water Calculations



GENERAL NOTES:

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
- DESIGN BASED ON TOPOGRAPHICAL SURVEY AND CCTV SURVEY INFORMATION AVAILABLE AT THE TIME OF DESIGN.
- ALL EXISTING SEWERS, CONNECTIONS, PIPE SIZES AND INVERT LEVELS TO BE CONFIRMED BY CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS TO ENSURE CONNECTIVITY. ANY VARIANCE FROM THE INFORMATION SHOWN SHOULD BE REPORTED TO THE ENGINEER FOR REVIEW.
- DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
- ALL DIMENSIONS ARE IN METRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE NOTED.
- WHERE EXISTING DRAINAGE IS BEING USED, ALLOWANCES SHOULD BE MADE TO REMEDIATE THIS DRAINAGE IN LINE WITH AVAILABLE CCTV SURVEY INFORMATION. IF NO SURVEY IS AVAILABLE, IT IS ADVISED TO OBTAIN ONE PRIOR TO COMMENCEMENT OF WORKS.
- ALL EXISTING SERVICES TO BE LOCATED PRIOR TO COMMENCEMENT OF ANY DRAINAGE WORKS, AND WHERE NECESSARY PROTECTION OR DIVERSIONS TO BE UNDERTAKEN TO AVOID CONFLICT WITH THE PROPOSED WORK.
- ALL RAINWATER AND FOUL POP UPS LOCATIONS AND SIZES INDICATIVE ONLY AND TO BE CONFIRMED BY THE ARCHITECT AND M&E ENGINEER.
- COVER LEVELS, GULLY POSITIONS, AND BUILDINGS LOCATION ARE APPROXIMATE AND SHALL BE CONFIRMED BY ARCHITECT/ LANDSCAPE ARCHITECT.
- ALL PIPE DIAMETERS GIVEN ARE NOMINAL INTERNAL PIPE DIAMETERS. THESE ARE TO BE CONFIRMED ONCE A DETAILED CAPACITY CHECK HAS BEEN UNDERTAKEN AT A LATER DESIGN STAGE.
- OUTFALL CONNECTION(S) SUBJECT TO AGREEMENT WITH THE APPROVING AUTHORITY.

KEY

- SITE BOUNDARY - TAKEN FROM LANDSCAPE ARCHITECT DRAWING REF: 2805-PLA-XX-XX-DR-L-1001 REV P01 LANDSCAPE GA
- EXISTING PUBLIC SEWER (APPROXIMATE)
- PROPOSED COMBINED DRAINAGE
- PROPOSED FOUL DRAINAGE
- INDICATIVE RISING MAIN ROUTE - TO M&E DESIGN
- PROPOSED SURFACE WATER DRAINAGE
- EXISTING SURFACE WATER DRAINAGE
- EXISTING SURFACE FOUL DRAINAGE
- EXISTING DRAIN TO BE REMOVED
- PROPOSED LINEAR (SLOT) DRAINAGE CHANNEL
- PROPOSED VENT PIPE
- PROPOSED COMBINED MANHOLE
- PROPOSED FOUL WATER MANHOLE/PPIC
- PROPOSED SURFACE WATER MANHOLE/PPIC
- PROPOSED SURFACE WATER RODDING EYE
- PROPOSED LINEAR DRAIN ACCESS BOX
- PROPOSED LINEAR DRAIN OUTLET BOX
- PROPOSED SURFACE WATER GULLY
- PROPOSED FOUL WATER GULLY
- PROPOSED FLOW CONTROL CHAMBER
- BACK DROP
- PIPE PASSES ABOVE FOUNDATION
- PIPE PASSES BELOW FOUNDATION
- PIPE PASSES THROUGH FOUNDATION
- PROPOSED RAIN GARDEN
DETAIL TBC BY LANDSCAPE ARCHITECT

DRAWING IS BASED ON:

- ARCHITECT - BUTTRESS DRAWING
RODSTA-BUT-ZZ-00-DP-A-01001 - Proposed Site Plan - REV P02
- LANDSCAPE ARCHITECT - LAYER STUDIO DRAWING
253-LYR-XX-ZZ-DWG-L-1001-Landscape Masterplan (RECEIVED 04/05/2022)
- TOPOGRAPHICAL & GRP UTILITY SURVEY - SURVEY OPERATION REF: 21G134/001 AUG 2021.
- "ESP" SITE INVESTIGATION: UK21.5551 PHASE I & II
GEO-ENVIRONMENTAL ASSESSMENT - LAND OF RODNEY STREET, MANCHESTER (ISSUE 1)

P04	ISSUED FOR PLANNING	09/06/22	LK	CG
P03	STAGE 3 ISSUE	27/05/22	LK	AR
P02	DRAFT STAGE 3 ISSUE	13/05/22	LK	CG
P01	STAGE 2	20/10/21	CG	CG

Rev:	Description:	Date:	By:	Chkd:

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Status: **ISSUED FOR PLANNING**

Project: **RODNEY STREET**

Orig Title: **DRAINAGE LAYOUT**

Size:	Date:	Drawn By:	Designed By:	Checked By:
A1	20/10/21	CG	CG	CG

Scale: 1:250

Project No:	Originator:	Volume:	Level:	Type:	Role:	Category / Number:	Rev:

RODSTA- CUR - XX - XX - DR - C - 92500 - P04

HAZARD REGISTER			
Hazard Ref.	Item (Feature, Element or Activity)	Potential Hazard Identified	Action (Information to Assist Control)
2.00 Side Wide Issues			
2.01	Handling / Contact with Contaminated Substances during construction / end users - site contaminants / asbestos containing material	Contamination	Intrusive Site investigation works to be undertaken - works to include testing and analyses of ground samples to determine risk from ground contaminants
2.02	Ground Gases	Contamination	Intrusive Site investigation works to be undertaken - works to include gas monitoring and analyses to determine gas regime and requirements for any gas protection measures
2.03	Ground instability during deep excavations	Trench collapse	Excavation depths to be minimised in design, assessment of excavation stability to be made within Phase 2 Report.
3.00 Existing Buried & Overhead Services			
3.01	Electrocution / explosion due to presence of services in site	Services	GPR survey to be undertaken to determine position of services
3.02	Ground Stability - Collapse of sewer crossing site	Existing Drainage	Sewer to be located and CCTV'd to assess condition
3.03	Gas main crosses site	Striking services during excavation	Gas main location and depth to be confirmed by contractor prior to works commencing.

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	2.744	100.0	150	Circular	51.900	50.500	1.250	51.885	50.473	1.262
1.001	19.109	100.0	150	Circular	51.885	50.473	1.262	51.774	50.282	1.342
1.002	13.413	100.0	150	Circular	51.774	50.282	1.342	51.514	50.148	1.216
1.003	22.662	100.0	225	Circular	51.514	50.073	1.216	51.408	49.846	1.337
1.004	10.805	100.0	225	Circular	51.408	49.846	1.337	51.291	49.738	1.328
2.000	7.212	100.0	150	Circular	51.197	49.772	1.275	51.291	49.700	1.441
1.005	17.981	100.0	225	Circular	51.291	49.625	1.441	51.448	49.445	1.778
1.006	15.040	100.0	225	Circular	51.448	49.445	1.778	51.230	49.295	1.710
1.007	1.889	100.0	150	Circular	51.230	49.295	1.785	51.134	49.276	1.708
1.008	1.589	100.0	150	Circular	51.134	49.201	1.783	51.066	49.185	1.731
1.009	6.154	100.0	150	Circular	51.066	49.196	1.720	50.994	49.134	1.710

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	1200	Manhole	Adoptable	2	1200	Manhole	Adoptable
1.001	2	1200	Manhole	Adoptable	3	450	Manhole	Adoptable
1.002	3	450	Manhole	Adoptable	4	450	Manhole	Adoptable
1.003	4	450	Manhole	Adoptable	5	450	Manhole	Adoptable
1.004	5	450	Manhole	Adoptable	7	450	Manhole	Adoptable
2.000	6	450	Manhole	Adoptable	7	450	Manhole	Adoptable
1.005	7	450	Manhole	Adoptable	8	450	Manhole	Adoptable
1.006	8	450	Manhole	Adoptable	9	1200	Manhole	Adoptable
1.007	9	1200	Manhole	Adoptable	10	450	Manhole	Adoptable
1.008	10	450	Manhole	Adoptable	11	1200	Manhole	Adoptable
1.009	11	1200	Manhole	Adoptable	12	1200	Manhole	Adoptable

Node 9 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	49.295	Product Number	CTL-SHE-0106-5000-1000-5000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node 2 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	50.473	Product Number	CTL-SHE-0106-5000-1000-5000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	50.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	68

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	70.0	0.0	0.800	70.0	0.0	0.801	0.0	0.0

Node 7 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	49.625
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	150.0	0.0	1.200	150.0	0.0	1.201	0.0	0.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.35%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	1	26	50.618	0.118	16.7	8.6530	0.0000	OK
30 minute winter	2	26	50.616	0.143	4.6	0.1615	0.0000	OK
30 minute winter	3	26	50.336	0.054	4.6	0.0085	0.0000	OK
15 minute winter	4	10	50.190	0.117	26.0	0.2619	0.0000	OK
15 minute winter	5	11	49.968	0.122	25.5	0.0194	0.0000	OK
15 minute winter	6	10	49.905	0.133	17.0	0.2257	0.0000	OK
120 minute winter	7	116	49.848	0.223	17.5	33.5452	0.0000	OK
120 minute winter	8	116	49.846	0.401	8.5	0.0638	0.0000	SURCHARGED
120 minute winter	9	116	49.845	0.550	7.2	0.7925	0.0000	SURCHARGED
60 minute winter	10	177	49.271	0.070	5.0	0.0111	0.0000	OK
60 minute winter	11	177	49.254	0.069	5.0	0.0783	0.0000	OK
480 minute winter	12	416	49.188	0.054	5.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	1	1.000	2	4.6	0.391	0.260	0.0442	
30 minute winter	2	Hydro-Brake®	3	4.6				
30 minute winter	3	1.002	4	4.6	0.826	0.257	0.0741	
15 minute winter	4	1.003	5	25.5	1.201	0.490	0.4827	
15 minute winter	5	1.004	7	25.7	1.240	0.494	0.2240	
15 minute winter	6	2.000	7	16.6	1.073	0.934	0.1113	
120 minute winter	7	1.005	8	8.5	0.835	0.163	0.7145	
120 minute winter	8	1.006	9	6.0	0.314	0.115	0.5982	
120 minute winter	9	Hydro-Brake®	10	5.0				
60 minute winter	10	1.008	11	5.0	0.624	0.280	0.0127	
60 minute winter	11	1.009	12	5.0	0.828	0.280	0.0370	50.8

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.35%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	1	49	50.766	0.266	21.2	19.4743	0.0000	SURCHARGED
60 minute winter	2	49	50.762	0.289	5.1	0.3267	0.0000	SURCHARGED
60 minute winter	3	49	50.338	0.056	5.0	0.0090	0.0000	OK
15 minute winter	4	10	50.259	0.186	48.2	0.4168	0.0000	OK
240 minute winter	5	232	50.173	0.327	12.9	0.0519	0.0000	SURCHARGED
240 minute winter	6	232	50.172	0.400	6.1	0.6815	0.0000	SURCHARGED
240 minute winter	7	232	50.172	0.547	20.2	82.3058	0.0000	SURCHARGED
240 minute winter	8	232	50.170	0.725	6.4	0.1153	0.0000	SURCHARGED
240 minute winter	9	232	50.169	0.874	6.0	1.2591	0.0000	SURCHARGED
960 minute summer	10	870	49.271	0.070	5.0	0.0111	0.0000	OK
960 minute summer	11	870	49.254	0.069	5.0	0.0783	0.0000	OK
960 minute summer	12	870	49.188	0.054	5.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	1	1.000	2	5.1	0.373	0.289	0.0483	
60 minute winter	2	Hydro-Brake®	3	5.0				
60 minute winter	3	1.002	4	5.0	0.845	0.280	0.0790	
15 minute winter	4	1.003	5	47.1	1.336	0.907	0.7995	
240 minute winter	5	1.004	7	13.0	1.018	0.250	0.4297	
240 minute winter	6	2.000	7	5.8	0.820	0.329	0.1270	
240 minute winter	7	1.005	8	6.4	0.813	0.124	0.7151	
240 minute winter	8	1.006	9	5.3	0.326	0.102	0.5982	
240 minute winter	9	Hydro-Brake®	10	5.0				
960 minute summer	10	1.008	11	5.0	0.624	0.280	0.0127	
960 minute summer	11	1.009	12	5.0	0.828	0.280	0.0370	177.3

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.35%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	1	100	51.090	0.590	24.1	43.1928	0.0000	SURCHARGED
60 minute winter	2	60	51.087	0.614	5.5	0.6946	0.0000	SURCHARGED
15 minute winter	3	11	50.817	0.535	5.0	0.0851	0.0000	SURCHARGED
15 minute winter	4	11	50.814	0.741	78.9	1.6605	0.0000	SURCHARGED
360 minute winter	5	344	50.708	0.862	15.8	0.1371	0.0000	SURCHARGED
15 minute winter	6	11	50.824	1.052	57.8	1.7912	0.0000	SURCHARGED
360 minute winter	7	344	50.707	1.082	25.0	162.8671	0.0000	SURCHARGED
360 minute winter	8	344	50.705	1.260	5.8	0.2003	0.0000	SURCHARGED
360 minute winter	9	344	50.703	1.408	5.9	2.0282	0.0000	SURCHARGED
360 minute winter	10	344	49.278	0.077	5.9	0.0122	0.0000	OK
360 minute winter	11	344	49.260	0.075	5.9	0.0848	0.0000	OK
360 minute winter	12	344	49.193	0.059	5.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute winter	1	1.000	2	5.3	0.366	0.296	0.0483	
60 minute winter	2	Hydro-Brake®	3	5.0				
15 minute winter	3	1.002	4	8.8	0.845	0.494	0.2361	
15 minute winter	4	1.003	5	73.2	1.842	1.409	0.9013	
360 minute winter	5	1.004	7	15.5	0.992	0.298	0.4297	
15 minute winter	6	2.000	7	53.8	3.057	3.031	0.1270	
360 minute winter	7	1.005	8	5.8	0.805	0.111	0.7151	
360 minute winter	8	1.006	9	5.8	0.322	0.111	0.5982	
360 minute winter	9	Hydro-Brake®	10	5.9				
360 minute winter	10	1.008	11	5.9	0.657	0.330	0.0142	
360 minute winter	11	1.009	12	5.9	0.863	0.330	0.0418	178.2

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