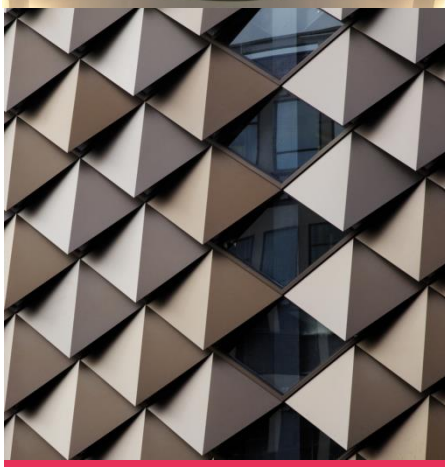




# Proposed Site at Trinity Island, Trinity Way, Manchester

## Flood Risk Assessment and Drainage Strategy

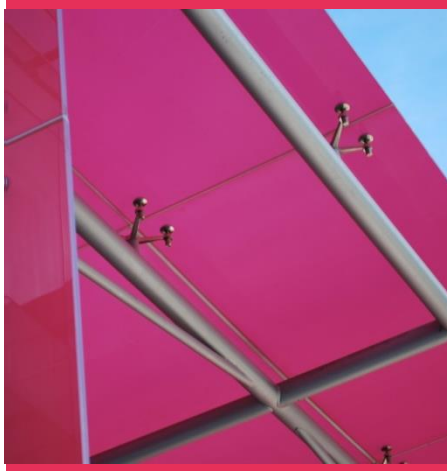
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Revision: V03

Issue Date: 12 November 2021

Client Name: Renaker Build Ltd

Site Address: Trinity Island, Trinity Way, Manchester (Site C and Site D)



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# Control Sheet

| Rev | Description | Issued by | Checked | Date |
|---|---|---|---|---|
| V01 | DRAFT - Issue for Planning | CG | CG | 31/08/2021 |
| V02 | Issued for Planning | DE | CG | 14/10/2021 |
| V03 | Updated after comments | DE | CG | 20/10/2021 |

This report has been prepared for the sole benefit, use, and information for the client. The liability of Curtins with respect to the information contained in the report will not extend to any third party.

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| *Reviewed* | *Signature* | *Date* |
|---|---|---|
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# Table of contents

1.0 Introduction ..... 5
1.1 Project Background ..... 5
1.2 Scope of Assessment ..... 5
1.3 Proposed Development ..... 6
2.0 Existing Site Details ..... 7
2.1 History and Current Use ..... 7
2.2 Existing Watercourses and Other Waterbodies ..... 7
2.3 Existing Drainage ..... 8
2.4 Topography ..... 10
2.5 Geology ..... 11
3.0 Development and Flood Risk ..... 12
3.1 National Planning Policy Framework (NPPF) and Planning Practice Guidance ..... 12
3.2 Site Specific NPPF Flood Risk Categorisation ..... 16
3.3 Site Specific Flood Zone Compatibility ..... 16
3.4 Sequential Test ..... 16
4.0 Hydrological Assessment ..... 17
4.1 Sources of Flood Risk ..... 17
4.2 Fluvial Flooding (Rivers and Streams) ..... 17
4.3 Tidal Flooding (Coastal or Estuarine) ..... 19
4.4 Reservoir Flooding ..... 19
4.5 Canal Flooding ..... 20
4.6 Groundwater Flooding ..... 21
4.7 Public Sewers or Highway Drainage Flooding (Infrastructure Failure) ..... 21
4.8 Surface Water Flooding to the site ..... 21
4.9 Surface Water Flooding from the site ..... 23
4.10 Summary of Flood Risk ..... 23
5.0 Mitigation ..... 24

5.1 Fluvial Flood Mitigation ..... 24
5.2 Reservoir Flood Mitigation ..... 26
5.3 Groundwater Flood Mitigation ..... 26
5.4 Surface Water Flooding to the site Mitigation ..... 27
5.5 Surface Water Flooding from the site Mitigation ..... 27
6.0 Drainage Strategy ..... 30
6.1 Existing Drainage ..... 30
6.2 Proposed Foul Water Drainage ..... 31
6.3 Proposed Surface Water Drainage ..... 31
6.4 Maintenance ..... 37

# Appendices

**Appendix A**

Proposed Site Layout – Ground

Proposed Site Layout – B1

Proposed Site Layout – B2

Proposed Landscaping Layout

**Appendix B**

CCTV Drainage Survey of CSO

Correspondence with United Utilities

**Appendix C**

Topographical Survey

**Appendix D**

Environment Agency Flood Map for Planning

**Appendix E**

Environment Agency Flood Level Data – Manchester Ship Canal Study 2018

Existing Flood Zone Extents

**Appendix F**

Manchester City Council LLFA Correspondence

**Appendix G**

Drainage Strategy

# 1.0 Introduction

## 1.1 Project Background

1.1.1 Curtins was appointed by Renaker Build Ltd to provide a Flood Risk Assessment (FRA) and Drainage Strategy for a proposed development of land at Trinity Island, Manchester.

1.1.2 The report provides information on the nature of flood risk at the site and follows Government guidance regarding development and flood risk.

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 design proposals to mitigate any potential risk of flooding determined to be present; and
- Consider foul & surface water drainage proposals for the proposed development.

1.2.3 The site is split into two plots C (0.86ha) and D (0.82Ha), the total site area is approximately 1.68 hectares and following scrutiny of the Environment Agency flood maps it has been identified that site lies within Flood Zones 1 and 2. According to local council Strategic Flood Risk Assessment the site lies within a Critical Drainage Area (CDA). A Flood Risk Assessment is therefore required to support a planning application.

1.2.4 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.

1.2.5 A Drainage Strategy will therefore be required as part of the Planning Application for the development, as the site is considered to be 'major' development by the Town and Country Planning Order 2015.

1.2.6 This Flood Risk Assessment and Drainage Strategy reviews the following information:

- Environment Agency flood maps for rivers and sea flooding.
- UK Government Flood Warning Information Service maps 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.
- Manchester City Council SuDS Requirements for New Developments.
- Environment Agency Flood Level Data – Manchester Ship Canal Study 2018
- United Utilities Public Sewer Records Extract.
- CCTV Drainage Survey of CSO completed by IWJS dated December 2020.
- Topographical Survey completed by Survey Operations dated December 2020.

## 1.3 Proposed Development

1.3.1 The development comprises of two distinct plots of land 'Site C' to the north-east and 'Site D' to the south-west divided by the A6042. The site until recently was used as a compound for the Ordsall Chord development, however it is now currently being used as a surface level car park.

1.3.2 Site C will comprise of two residential towers of 39 and 48 residential storeys, providing 935 residential units. Site D will comprise of two residential towers of 55 and 60 residential storeys providing approximately 1015 residential units. Each tower sits above a two-deck podium with associated two-storey underground resident parking.

1.3.3 The Proposed Site Layout (Ground Floor, Basement 1 and Basement 2 levels) and proposed Landscaping Layouts are enclosed in *Appendix A.*

# 2.0 Existing Site Details

## 2.1 History and Current Use

2.1.1 Site C comprises of brownfield land is bounded by the River Irwell to the north, Trinity Way to the west, Water Street to the south and a railway viaduct to the east. The Site can be accessed by vehicle or foot via Water Street on the southern boundary. The Site slopes downwards to the north towards the River Irwell and there is a limited amount of vegetation running along this boundary.

2.1.2 Site D comprises of brownfield land is bounded by the River Irwell to the north and west, Regent Road to the south and Trinity Way to the east. The Site can be accessed by vehicle or foot via Trinity Way on the eastern boundary. The Site slopes downwards to the north and west towards the River Irwell and there is a limited amount of vegetation running along this boundary.

2.1.3 The approximate postcode of the application site is M3 4JH and the approximate Ordnance Survey grid reference of the site is SJ27978.

***Figure 1: Aerial Photograph (© Google 2020)***




## 2.2 Existing Watercourses and Other Waterbodies

2.2.1 No above ground watercourses have been identified within the proposed site.

2.2.2 The River Irwell is located along the north-western boundary of the site.

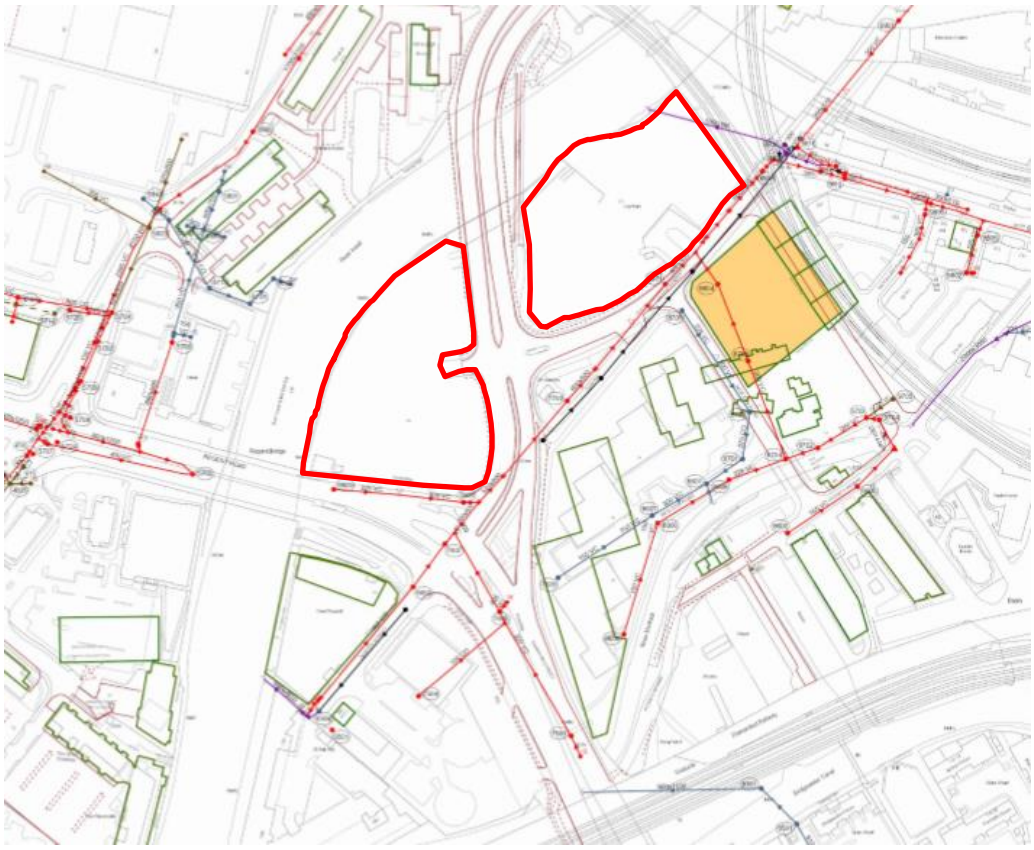
2.2.3 The River Medlock is located approximately 125m south-east of the site.

2.2.4 The Bridgewater Canal is located approximately 170m south-east of the site

## 2.3 Existing Drainage

2.3.1 An extract from the public sewer records has been obtained for the development site and is shown in Figure 2.

***Figure 2: United Utilities Public Sewer Record (extract)***

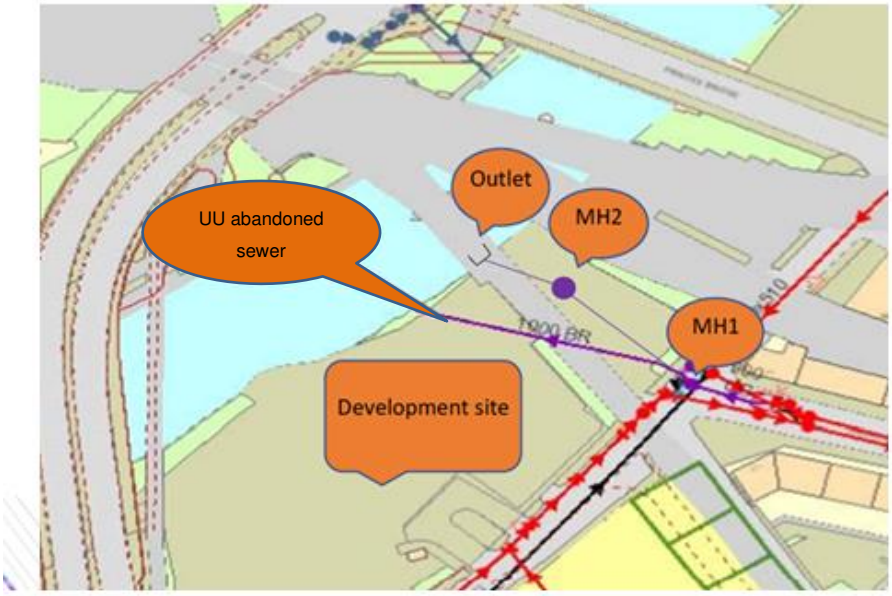


2.3.2 The public sewer records indicate the following public sewers within the proposed development boundary:

- Site C shows and 1000mm diameter combined sewer overflow pipe crossing the north-east of the site and discharging into the River Irwell.

2.3.3 However, following receipt of installed drainage and sewer survey works as part of the Ordsall Chord development works east of Site D, this confirms that the CSO pipe has been surveyed and located outside of the Trinity Islands site boundary and not as shown on the United Utilities mapping. Figure 3 shows the indicative route of the CSO pipe, and this is mapped based on the survey setting out points provided. A CCTV Survey was also commissioned which confirms the location of the CSO pipeline outside of the Trinity Islands site boundary. The CCTV Survey is enclosed in *Appendix B.*

***Figure 3: United Utilities CSO surveyed route***




2.3.4 The information has been issued to United Utilities and they have confirmed that they are happy with the conclusions from this information and concur that the United Utilities mapping is incorrect. The correspondence with United Utilities is also enclosed in *Appendix B*.

2.3.5 The following public sewers are shown within the vicinity of the site:

- There is a 520 x 800mm combined public sewer crossing south-west to north-east under Regent Road which flows in a north-easterly direction towards Water Street where the sewer is mapped as a 600 x 920mm sewer up to the junction with Liverpool Road.
- There is a 225mm combined sewer within Regent Road flowing in an easterly direction which connects to the 520 x 800mm combined public sewer noted above.
- There is an existing public sewer shown (in black) on the records south of the site parallel with the 600 x 90mm above mentioned sewer. This suggests a historical sewer has been formally abandoned and likely to be removed.

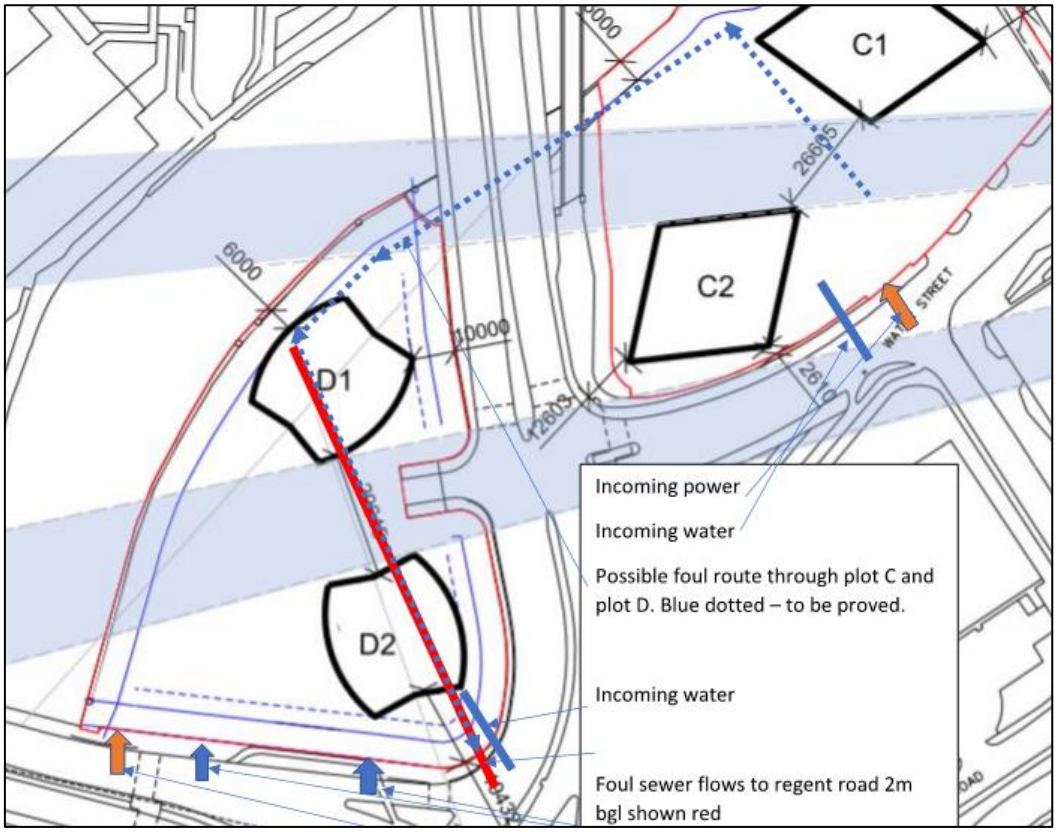
2.3.6 There are further sewers within the vicinity of the site, but they are not considered of relevance to the development.

2.3.7 There is evidence from the Topographical Survey that there are various manhole covers and gullies located within the development boundary. This is likely to be associated with the former use of the site and is likely to be used in its current condition as surface level drainage.

2.3.8 Information from the clients suggests that there may be historical drainage across both sites as shown in Figure 4. This information suggests that there is:

- A possible foul drainage connection (size and depth unknown) within Site D which crosses under the Trinity Way Bridge through Site C and connects towards Regent Road – as denoted by the blue dashed line.
- A possible foul drainage connection approximately 2m below ground level (size unknown) within Site C and connects towards Regent Road – as denoted by the red line.

***Figure 4: Extract of possible existing drainage within the site boundary***




2.3.9 No further information is available on the presence of the above drainage, and it is recommended that a full CCTV Survey is completed to confirm the location, route, size, depth, condition and connectivity of all existing drainage within the site.

## 2.4 Topography

2.4.1 A Topographical Survey has been completed at the site and is enclosed in *Appendix C.*

2.4.2 The Survey was completed in December 2020 by Survey Operations.

2.4.3 Levels across the Site C, generally fall in a northern direction towards the river Irwell. The access into the site from Water Street (southern boundary) is at a higher elevation; approximately 26.000m AoD,

where levels slope down towards the main site area and generally level off at a plateau of approximately 25.000m AoD. The levels within the main site area vary between 25.20m AoD around the eastern boundary to 24.50m AoD on the western boundary.

2.4.4 Levels across Site D generally fall towards the River Irwell. The access into the site from the inter ring road (A6042) (eastern boundary) is at a higher elevation; approximately 26.500m AoD, where levels slope down towards the main site area and generally level off at a plateau of approximately 25.000m AoD. The levels within the main site area vary between 24.5-24.00m AoD around the southern boundary and 26.3-27.59m AoD in the remainder of the site.

## 2.5 Geology

2.5.1 The British Geological Survey (BGS) map confirms that the superficial deposits are none recorded.

2.5.2 The bedrock geology is described as Chester Formation – Sandstone, however the nearby boreholes available on the BGS online mapping suggest that the primary material identified is sands and clays over sandstone.

2.5.3 The site is not located within a Groundwater Source Protection Zone.

# 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 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), 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.<br>(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<br>Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding.<br>(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<br>Land having a 1 in 200 or greater annual probability of sea flooding.<br>(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.**<br>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.<br>(Not separately distinguished from Zone 3a on the Flood Map) |

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

| |
|---|
| **Essential Infrastructure**<br>• Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk.<br>• 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.<br>• Wind turbines. |
| **Highly Vulnerable**<br>• Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding.<br>• Emergency dispersal points.<br>• Basement dwellings.<br>• Caravans, mobile homes and park homes intended for permanent residential use.<br>• 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**<br>• Hospitals<br>• Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.<br>• Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels.<br>• Non–residential uses for health services, nurseries and educational establishments.<br>• Landfill* and sites used for waste management facilities for hazardous waste.<br>• 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 D,* and it can be seen that the majority of the site is classified as within Flood Zone 2 and minor areas of Flood Zone 1 along the eastern boundary of Site C and southern boundary of Site D.

3.2.3 Further site-specific review of the flood risk to the site is provided in section 4.

## 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 dwellings;

3.3.2 Buildings used for dwellings are classed as 'More Vulnerable' development in the Flood Risk Vulnerability Classification (Table 2).

3.3.3 The site is located within Flood Zone 2 for which 'More Vulnerable' development is deemed to be appropriate. Therefore, the development passes the sequential test and an exception test is not required (refer to the Flood Zone compatibility table in the NPPF technical guidance).

## 3.4 Sequential Test

3.4.1 The site is categorised as a 'More Vulnerable' development (shown in table 2) and is within Flood Zone 2 and therefore the sequential test is not required to be applied (see table 3).

# 4.0 Hydrological Assessment

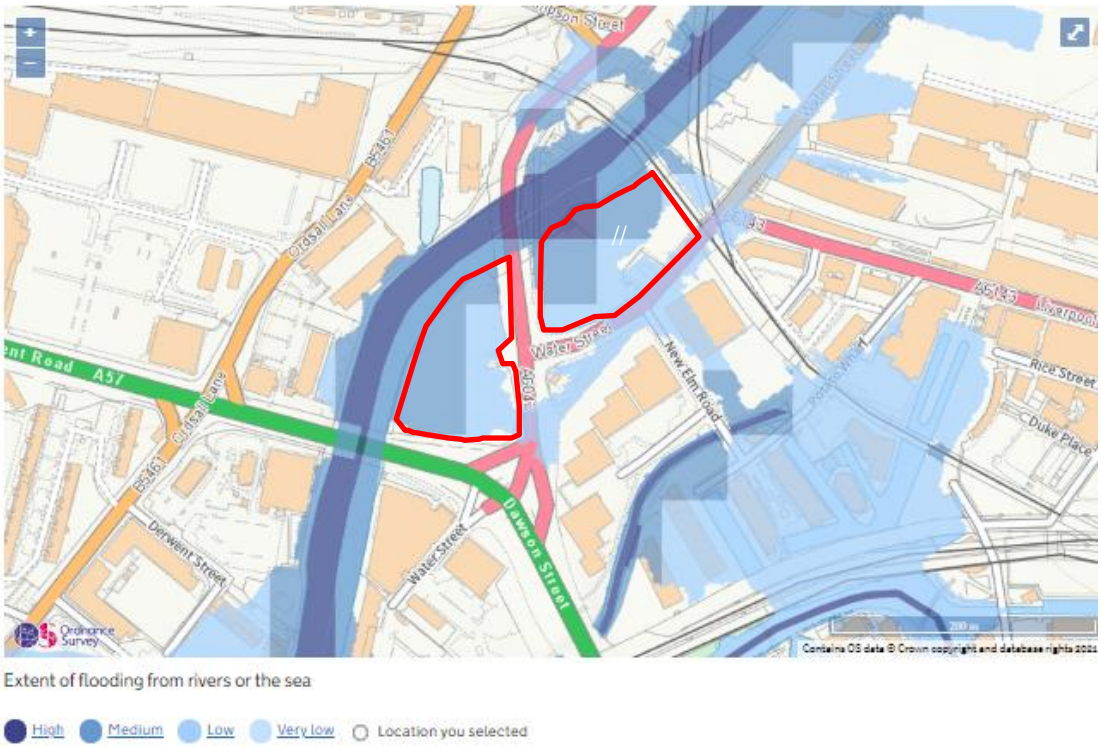
## 4.1 Sources of Flood Risk

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 – Flood Risk from Rivers or Sea (© Crown Copyright)***




4.2.2 The majority of the site can be seen to be within the medium risk Flood Zone 2 (shaded light blue) associated with the River Irwell on the north-western boundary and has a 1-3.3% chance of fluvial flooding each year with the remaining areas considered at low risk of fluvial flooding (less than 1% chance of flooding in each year).

4.2.3 The Manchester Ship Canal/River Irwell is designated as hydraulically controlled under the ownership of the Manchester Ship Canal Company and Peel Energy as 'Main River' shown by the dark blue line.

The flood risk zoning relates to the site's proximity and the inundation extents is likely due to the fact that banks in these locations are generally lower than the surrounding area.

4.2.4 Due to the Flood Zone designation identified on the Environment Agency maps, the predicted flood levels were obtained from the Environment Agency to determine the exact extents of the Flood Zones.

4.2.5 The Environment Agency released updated climate change allowances for peak river flows for catchments across the UK in February 2016 which should be applied to new developments. Table 4 demonstrates the climate change allowances with central and upper end allowances being considered.

***Table 4 (Extract Environment Agency Guidance) Peak River Flow climate change allowances and North-West catchment***

| River basin district | Allowance category | 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) |
|---|---|---|---|---|
| North West | Upper end | 20% | 35% | 70% |
| | Higher central | 20% | 30% | 35% |
| | Central | 15% | 25% | 30% |

4.2.6 Based on the 'More Vulnerable' land use assuming a design life in excess of 50 years; a 35% climate change allowance should be applied using the higher central allowance for up to 2115, however the 70% upper end allowance should also be considered as the residual risk.

4.2.7 It is noted that in July 2021, the Environment Agency updated the climate change allowances further which indicates that the climate change allowances for the Irwell Catchment should consider the 43% climate change allowance for up to 2115 but the upper end allowance of 75% should also be considered. However, the master planning pre-application had already significantly progressed at the time the updates were implemented with the information provided by the Environment Agency based on the historic 35% and 70% criteria.

4.2.8 The Environment Agency current flood data is from the Manchester Ship Canal Study (2018) Refer to Table 5 for the summary of the levels. The Environment Agency Flood Map and Flood Level Data for this Study is enclosed in *Appendix E.*

***Table 5 Environment Agency Flood Levels***

| Map Ref | Node Reference | 1 in 100 Year | 1 in 100 Year + 35%cc | 1 in 100 Year + 70%cc | 1 in 1000 Year | 1 in 1000 Year Gate Closed |
|---|---|---|---|---|---|---|
| **2** | **Ea013_0251_IRWZ01_0691** | **24.13** | **24.62** | **25.54** | **25.79** | **25.80** |
| **3** | **Ea013_0251_IRWZ01_0569** | 23.98 | 24.49 | 25.46 | 25.73 | 25.76 |
| **4** | **Ea013_0251_IRWZ01_0380** | 23.81 | 24.27 | 25.20 | 25.47 | 25.50 |

4.2.9 Model measurements are recorded at 3 nodes (labelled 2 through 4) on the Environment Agency Detailed Flood Map (enclosed in *Appendix E*). The flood levels at node 2 is considered most relevant to the site and the flood levels and flows at this node have been used to estimate the flood levels across the site.

4.2.10 The site would therefore be classified as within Flood Zones 1 and 2, with localised Flood Zone 3 along the existing river walkway, based on the flood model outputs.

4.2.11 The existing Flood Levels across the site have been imposed across the Topographical Survey to confirm more accurate extents of flooding to the site based on the flood level data provided. The existing flood extents drawing is enclosed in *Appendix E*.

4.2.12 The fluvial flood risk to the site is therefore considered low and medium across the topographic regions of the site therefore mitigation Measures are detailed in Section 5.

## 4.3 Tidal Flooding (Coastal or Estuarine)

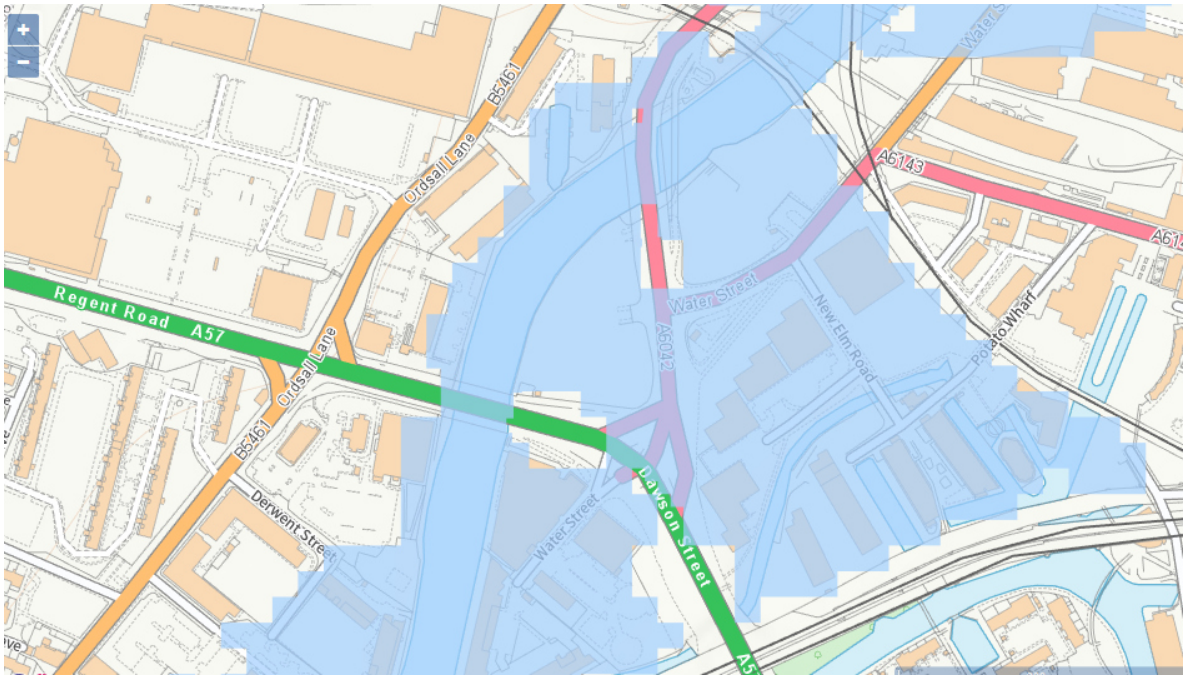
4.3.1 There is currently no flood risk identified on the Environment Agency flood maps for the site and it is therefore regarded to be at **low** risk from tidal flooding.

## 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 5). Since this is a prediction of a worst-case scenario, it is very low risk that a reservoir flood would be this large.

***Figure 5: Long Term Flood Risk Assessment Map – Flood Risk from Reservoirs (© Crown Copyright)***




4.4.3 The extents of flooding due to reservoir breach in the vicinity of the site is shown in Figure 5. It can be seen that there is the potential for the flood extents to inundate the site, with the maximum flood depth varying between 0.3m and 2m depth across the site. Both reservoirs are owned and operated by United Utilities Water plc.

4.4.4 Manchester City Council would be responsible for coordinating emergency plans for the Manchester area which may be affected by reservoir flooding and ensuring communities are well prepared.

4.4.5 Mitigation measures are proposed in Section 5.

## 4.5 Canal Flooding

4.5.1 The nearest canal to the site is the Bridgewater located approximately 165m south-east of the site boundary.

4.5.2 The 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 The Manchester SFRA identifies areas within the Canal Hazard Breach zones. The site is not located within the extent of the breach therefore based on the above information; it is considered that there is **low** risk of canal flooding to the site.

## 4.6 Groundwater Flooding

4.6.1 According to the Manchester, Salford and Trafford SFRA, there are no known reports of groundwater flooding in the Manchester, Trafford and Salford authorities.

4.6.2 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.

4.6.3 It is assumed based on the information available that there is no significant risk of groundwater flooding to the site, however there may be a potential risk where this has not been recorded.

4.6.4 The development proposals also include the construction of basements, therefore the level of risk to the basement levels are increased.

4.6.5 At the time this report was written, no intrusive ground investigation works have taken place or been published; therefore, site specific depths of groundwater have not been confirmed. The results of this investigation will need to be reviewed as part of the detailed design.

4.6.6 Based on the lack of site-specific groundwater levels it is recommended that groundwater levels are monitored during ground investigation works. Typically, groundwater levels are recorded during gas monitoring over a 3-month period. Fluctuations in groundwater levels should be assessed during ground investigation works.

4.6.7 As there are basement levels proposed, there is an elevated risk of groundwater flooding to the current status of the site, therefore, as a precaution, mitigation measures are proposed in section 5, however the measures should be reviewed following site-specific investigations, as part of the detailed design.

## 4.7 Public Sewers or Highway Drainage Flooding (Infrastructure Failure)

4.7.1 There are no highway drains recorded within the site. It is likely that there will be localised highway drainage surrounding the site (such as gullies and connections).

4.7.2 United Utilities and Manchester City Council have not provided any records of flooding to the site or the vicinity.

4.7.3 Providing United Utilities and Manchester City Council maintain their drainage assets within and in the vicinity of the site, the risk of flooding to the proposed development site from public sewers or highway drainage is considered as **low.**

## 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

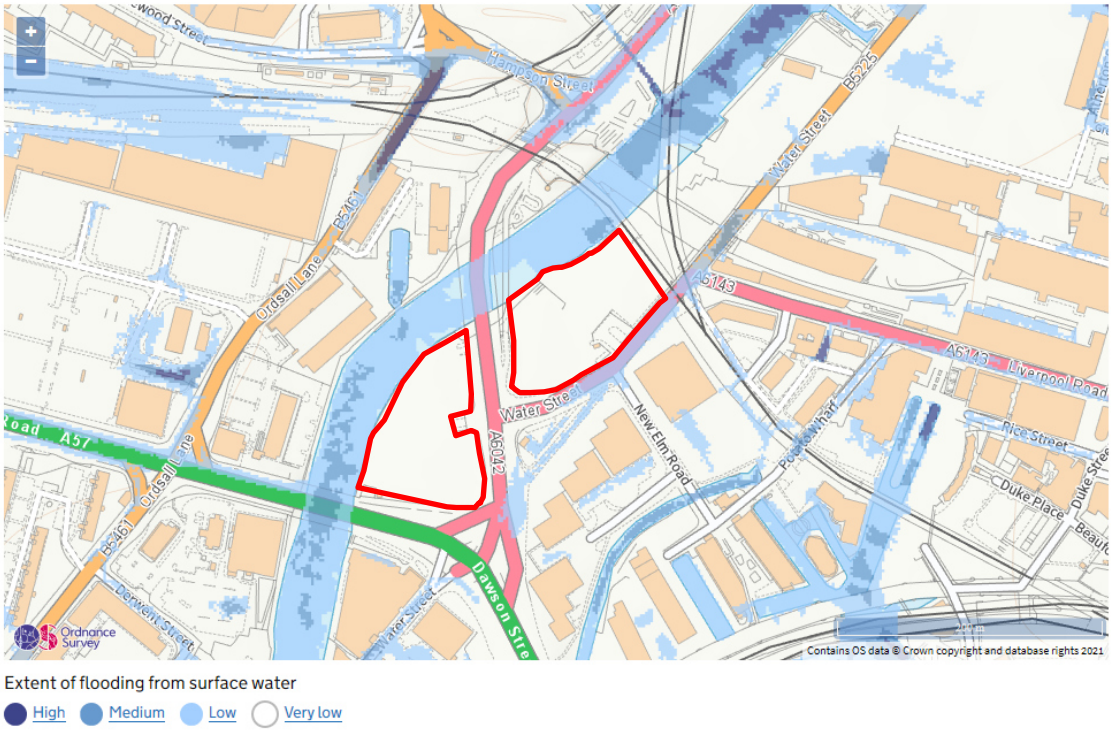
from manholes and gullies. Surcharging sewers can result in overland flows which if originating at a higher elevation than a development site can potentially pose a flood risk.

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 6 and it can be seen that the majority of the site is identified as being at a 'very low' risk of flooding from surface water.

***Figure 6: Risk of Flooding from Surface Water - Extent of Flooding***



4.8.4 Considering the above information, the risk of surface water flooding to the site is generally considered very low. As such, mitigation measures are proposed in Section 5 to ensure that the 'very low' risk can be maintained through 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 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 An assessment of the proposed surface flows is carried out within the drainage strategy within section 6 of this report.

## 4.10 Summary of Flood Risk

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

- Fluvial Flood Risk
- Reservoir flooding (potential)
- Groundwater flooding (potential)
- Surface water flooding to the site (potential)
- Surface water flooding from the site

# 5.0 Mitigation

## 5.1 Fluvial Flood Mitigation

5.1.1 The site is shown by the Environment Agency Flood Map for Planning to be within Flood Zone 2. Table 3: Flood Risk Vulnerability and Flood Zone 'Compatibility' shows More Vulnerable development in Flood Zone 2 as appropriate. On this basis Environment Agency 'Standing Advice' for More Vulnerable development will apply.

5.1.2 The Environment Agency Standing advice has two requirements that should be satisfied:

- Setting of Finished Floor Levels; and
- Implementation of Flood Resilience

***Flood Compensation***

5.1.3 Where development is proposed within areas predicated to be within Flood Zone 3a (flooding during the 1% scenario), development should ensure that the volume of flood water entering the site in the predevelopment state can be provided post-development on a 'like for like', 'level for level' basis (and should be provided within the development site where possible). However, as the site is considered as within Flood Zones 1 and 2, with levels along the river walkway being maintained, Flood Compensation is not considered necessary.

***Finished Floor Levels***

5.1.4 Guidance recommends that residential areas should be set at 600mm above the 1 in 100-year flood level with an allowance for 35% climate change, however due to the increased risk with a gate closure, it has therefore been agreed to set floor levels at a minimum of 300mm above the 1 in 100 +70% climate change scenario. This was a request from the LLFA (Appendix F) and provides a greater level of protection to the site than the 600mm freeboard on the 1 in 100 year plus 35% climate change event. Flood Levels have been taken from Node Point 2 to determine minimum floor levels.

- 1 in 100 Year **=24.130m**
- 1 in 100 Year +35% **=24.620m**
- 1 in 100 Year +70% **=25.540m**
- 1 in 1000 Year **=25.790m**
- 1 in 1000 year with a gate closed **=25.820m**

5.1.5 Proposed floor levels should therefore be set a minimum of 25.840m AoD which also provide some level of freeboard above the 1 in 1000 year and 1 in 1000 year with gate closed scenario's.

5.1.6 The proposed basement areas should be fully sealed up to ground level and adequately waterproofed to ensure that there is no potential route for flood water into the basement areas. Proposed access into

the basement is currently ramped up to provide access at ground level providing the same level of protection as the ground floor levels – in excess of 25.840m AoD. This have been agreed with the correspondence with the LLFA (Appendix F)

***Flood Resilience***

Flood Resilience is based on the anticipated flood depths within the site: -

- Water depth up to 300 mm
  - The design of the building or development should keep water out as much as possible.
  - You should use materials that have low permeability (materials that water cannot pass through, for example, impermeable concrete).
- Water depth from 300 mm to 600 mm
  - The design of the building or development should keep water out (unless there are structural concerns) by:
  - using materials with low permeability to at least 300 mm
  - using flood resilient materials (for example lime plaster) and design (for example raised electrical sockets)
  - making sure there' s access to all spaces to enable drying and cleaning
- Water depth above 600 mm
  - The design of the building or development should allow water to pass through the property to avoid structural damage by:
  - using materials with low permeability to at least 300 mm
  - making it easy for water to drain away after flooding
  - making sure there' s access to all spaces to enable drying and cleaning

5.1.7 When considering the above, we would note that the site is at a level in excess of that of the recorded water levels within the highest adjacent water course and on the basis the first part of the standing advice is satisfied flood depths should not be applicable to the buildings.

5.1.8 Providing the above mitigation measures were imposed, the risk from fluvial flooding would therefore be considered **low** post development.

***Emergency Evacuation***

5.1.9 It is recommended that the building is signed up to the Environment Agency's Floodline Warnings direct, which is updated daily. It will also be necessary to implement a flood evacuation plan under the advice of Manchester City Council, which will be required to be prepared at detailed design, pre-occupation.

## 5.2 Reservoir Flood Mitigation

5.2.1 It can be seen that the site is located within the edge of the extents of flooding due to reservoir breach.

5.2.2 Based on the proposed recommendations to raise ground level to provide mitigation from fluvial flood risk, the likelihood and extent of flooding by reservoir failure impacting on the site has been significantly reduced.

5.2.3 Since the likelihood of a reservoir breach ever occurring is extremely unlikely, providing that the reservoir asset owners conduct appropriate maintenance and regular inspections, the site is considered to be at low risk of flooding from reservoirs.

5.2.4 Manchester City Council is responsible for coordinating emergency plans for reservoir flooding and ensuring communities are well prepared. Following the declaration of a major incident, Manchester City Council would offer support to the emergency services.

5.2.5 However, in considering the residual risk to the site, building occupiers in an area at risk of flooding from reservoirs should have an emergency procedure in place for the unlikely event of reservoir failure. This would include considering safe routes for occupants to a safe haven and be ready to follow the advice of emergency services.

## 5.3 Groundwater Flood Mitigation

5.3.1 Groundwater flooding tends to be more persistent than other sources of flooding, typically lasting for weeks or months rather than hours or days. Groundwater flooding does not generally pose a significant risk to life due to the slow rate at which the water level rises; however, it can cause significant risk to property.

5.3.2 As stated in section 4.6, there may be a risk of groundwater flooding to the site based on the lack of site-specific information, therefore, to mitigate the risk of groundwater flooding it is recommended that groundwater levels are monitored during ground investigation works to determine site specific groundwater levels. Typically, groundwater levels are recorded during gas monitoring over a 3-month period. Fluctuations in groundwater levels should be assessed during ground investigation works and floor levels proposed based on being above the maximum levels recorded, where possible, with all basement structures being sufficiently tanked.

5.3.3 External ground levels across the site should fall away from the proposed buildings and ensure 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.

5.3.4 Providing the above mitigation measures were imposed, the risk from groundwater flooding would therefore be considered **low** post development.

## 5.4 Surface Water Flooding to the site Mitigation

5.4.1 The UK Government Long Term Flood Risk Assessment surface water flood maps indicate that the site is at very low to low risk of surface water flooding. However, the site topography is likely to be partially reprofiled as part of the development proposals. 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 and shall be reduced where possible.

5.4.2 Section 4.8 of the report confirms that the risk of surface water flooding to the site is generally considered very low, however, to ensure that the 'very low' risk can be maintained through development 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.

5.4.3 It is assumed that the surface water drainage outside of the site boundary will be subject to the relevant landowner's regular drainage maintenance schedule.

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

## 5.5 Surface Water Flooding from the site Mitigation

5.5.1 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 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.

5.5.2 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.

5.5.3 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. As such, an allowance of 40% for climate change on peak rainfall intensity will be included in calculations.

***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% |

5.5.4 Section 6 reviews the surface water discharge options, and it is proposed that the surface water will. discharge to the River Irwell (under agreement with Peel) at an unrestricted rate (l/s) on the basis that surface water betterment has been achieved as it relieves the combined sewer system of 100% of surface water flows. The exact locations for discharge will be confirmed upon receipt of the internal building drainage connections and co-ordination with the external and over slab design.

5.5.5 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.

5.5.6 Flood water exceedance routes should be identified, both on and off site.

5.5.7 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, management and maintenance by a Residents' Management Company
- Arrangements concerning appropriate funding mechanisms for its 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

5.5.8 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.

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

# 6.0 Drainage Strategy

## 6.1 Existing Drainage

6.1.1 As noted in section 2.3, the public sewer records indicate the following public sewers within the proposed development boundary:

- Site C shows and 1000mm diameter combined sewer overflow pipe crossing the north-east of the site and discharging into the River Irwell.

6.1.2 However, following receipt of installed drainage and sewer survey works as part of the Ordsall Chord development works east of Site D, this confirms that the CSO pipe has been surveyed and located outside of the Trinity Islands site boundary and not as shown on the United Utilities mapping. (CCTV Survey is enclosed in *Appendix B).*

6.1.3 The information has been issued to United Utilities and they have confirmed that they are happy with the conclusions from this information and concur that the United Utilities mapping is incorrect. The correspondence with United Utilities is also enclosed in *Appendix B*.

6.1.4 The following public sewers are shown within the vicinity of the site:

- There is a 520 x 800mm combined public sewer crossing south-west to north-east under Regent Road which flows in a north-easterly direction towards Water Street where the sewer is mapped as a 600 x 920mm sewer up to the junction with Liverpool Road.
- There is a 225mm combined sewer within Regent Road flowing in an easterly direction which connects to the 520 x 800mm combined public sewer noted above.
- There is an existing public sewer shown (in black) on the records south of the site parallel with the 600 x 90mm above mentioned sewer. This suggests a historical sewer has been formally abandoned and likely to be removed.

6.1.5 There are further sewers within the vicinity of the site, but they are not considered of relevance to the development.

6.1.6 There is evidence from the Topographical Survey that there are various manhole covers and gullies located within the development boundary. This is likely to be associated with the former use of the site and is likely to be used in its current condition as surface level drainage.

6.1.7 Information from the clients suggests that there may be historical drainage across both sites and suggests that there is:

- A possible foul drainage connection (size and depth unknown) within Site D which crosses under the Trinity Way Bridge through Site C and connects towards Regent Road – as denoted by the blue dashed line.
- A possible foul drainage connection approximately 2m below ground level (size unknown) within Site C and connects towards Regent Road – as denoted by the red line.

6.1.8 No further information is available on the presence of the above drainage, and it is recommended that a full CCTV Survey is completed to confirm the location, route, size, depth, condition and connectivity of **all** existing drainage within the site.

## 6.2 Proposed Foul Water Drainage

6.2.1 A separate foul and surface water system is proposed.

6.2.2 The proposed foul drainage from ground floor level and above will be collected and discharged via pipework suspended below the ground floor slab and discharged to the surrounding public sewer network by gravity. We currently propose that each building will have a single outfall. The outfall for Site C Buildings will be into the combined sewer within Water Street and for Site D buildings will be the combined sewer within Regent Road. The proposed outfall locations will be subject to confirmation of internal drainage requirements, however, due to the perimeter of the buildings to pick up the internal connections, therefore, consideration should be directed as follows:

- Plot C - Directed internally to the south-eastern elevation of the buildings.
- Plot D - Directed internally to the south-eastern elevation of the buildings.
- Current basement plans do not show requirements for foul drainage at this stage, however, if foul drainage is required in the basement area, this will require pumping externally to the gravity below ground drainage system, prior to the public combined sewer outfall connections. Any pump systems will need to accommodate 24 hours storage in case of pump failure.

6.2.3 Where sewers remain private, connection to the public sewer network will be subject to a Section 106 Agreement with United Utilities.

6.2.4 The proposed Drainage Strategy is provided in Appendix F

## 6.3 Proposed Surface Water Drainage

6.3.1 A separate foul and surface water system is proposed.

6.3.2 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.

6.3.3 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***

6.3.4 A Phase 2 Intrusive Site Investigation has not yet been carried out at the site, however given the site has had previous use and the existing ground conditions, it is likely that the development will contain depths of made ground and space to infiltrate would be limited. On this basis, it is assumed that infiltration will be unlikely.

***Watercourse***

6.3.5 From discussion with the Peel and Manchester City Council, discharge to the River Irwell can be made at an un-restricted rate (l/s), however the velocity of the flow is likely to be limited. The exact location for discharge will be confirmed upon receipt of the Landscape Layout for co-ordination purposes. Each building and associated landscape will have its own outfall. To that end, the overall scheme will have 4 outfall locations to the River Irwell and a velocity no greater than 2m/s as agreed with Peel Holdings.

6.3.6 The proposed outfalls will be installed and controlled such that it doesn't breach the existing riverbanks or encourage back flows from the canal into the development's drainage network.

6.3.7 The proposed discharge will be subject to formal agreement with Peel.

***Surface Water Sewer***

6.3.8 There are no existing surface water sewers within the vicinity of the site and based on the availability of the watercourse for discharge, connection to surface water sewers has been discounted.

***Combined Water sewer***

6.3.9 There are various combined sewers in the vicinity of the site. However, based on the opportunity to connect to watercourse, this option has currently been discounted

6.3.10 Table 5 summarises the options for surface water disposal.

***Table 5: Surface Water Disposal***

| Surface Water Disposal | Potential | Description |
|---|---|---|
| Infiltration | ✗ | It is assumed that infiltration potential will be limited based on geology, space and existing obstructions. |
| Watercourse | ✓ | Peel have provided options for discharge into their areas of control. Exact locations subject to co-ordination. |
| Surface Water Public Sewer | ✗ | There is limited surface water sewers within the vicinity of the site. However, in line with the drainage hierarchy the site is proposed to drain to watercourse. |
| Combined Public Sewer | ✗ | There are various combined water sewers in the vicinity of the sites. However, in line with the drainage hierarchy the site is proposed to drain to watercourse. |

6.3.11 Based on the discussions currently held with Peel, flows will be able to discharge at an unrestricted rate and limited to a speed of 2m/s therefore attenuation is not required.

6.3.12 The areas of the development site which are subject to rainfall are to be served by the positive surface water gravity system. At ground level the site will be developed with a general gradient which falls towards the river. Collectors for the rainwater will either take the form of channels and gullies in the formal paths or rain gardens at the edge of the general open spaces. Opportunities are currently being explored to incorporate the use of permeable sub-base to encourage sustainable rainwater collection which will require further design at detailed design. Potential for integrated SuDS included in the landscaping design is considered – the idea that the footpaths drain through the green landscape areas and into the outfall point which is routed through the building. A series of the below ground pipes will then convey the water to a single outfall from each building (potentially be submerged) into the River Irwell controlled waterbody.

6.3.13 Basement gullies are required for general cleaning of the car park for wash down purposes, rainwater, snow/ice, etc that cars bring in, once thawed for somewhere to drain to. The car park is flat therefore this type of water would most likely air dry before reaching the gullies however can be washed/brushed to the gullies if required. Spillages i.e. petrol, oil from vehicles should not be washed to the foul gullies and Petrol/oil leaks etc should be isolated at the source and locally cleaned/disposed of.

6.3.14 Surface water run-off from hard paved areas at risk of contamination should receive water quality treatment. Access roads are considered as a low hazard in terms of contamination. Figure 7 illustrates the pollution hazard indices for different land use classifications from The CIRIA SuDS Manual C753 (2015).

***Figure 7: 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] |

6.3.15 Figure 8 illustrates the SuDS Component mitigation indices from The CIRIA SuDS Manual C753 (2015).

***Figure 8: Indicative SuDS mitigation indices (Table 26.3 the CIRIA SuDS manual 2015)***

**TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters**

| | Mitigation indices[1] | | |
|---|---|---|---|
| **Type of SuDS component** | **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 | 0.8 |
| 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 | 0.8 |
| 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.

6.3.16 The selection of treatment should ensure that the SuDS mitigation component index (Figure 8) exceeds the pollution hazard index (Figure 7).

6.3.17 At this stage, opportunities for SuDS have been broadly assessed. It is possible for the SuDs features such as permeable paving to be utilised within the development. The final detail will be developed within the hard landscaping to collect and hold the water while it percolates through the filter layers below which treat the water before it is collected via a network of perforated pipes and then discharged to the proposed site outfalls.

6.3.18 It is assumed that all drainage will remain privately maintained. Where sewers remain private, connection to the public sewer network will be subject to a section 106 agreement with United Utilities.

6.3.19 The proposed Drainage Strategy will be illustrated upon receipt of the internal drainage requirements and co-ordination with the landscape architect and internal drainage engineer.

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

## 6.4 Maintenance

6.4.1 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.

6.4.2 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.

6.4.3 A management company may be required for maintenance of attenuation facilities.

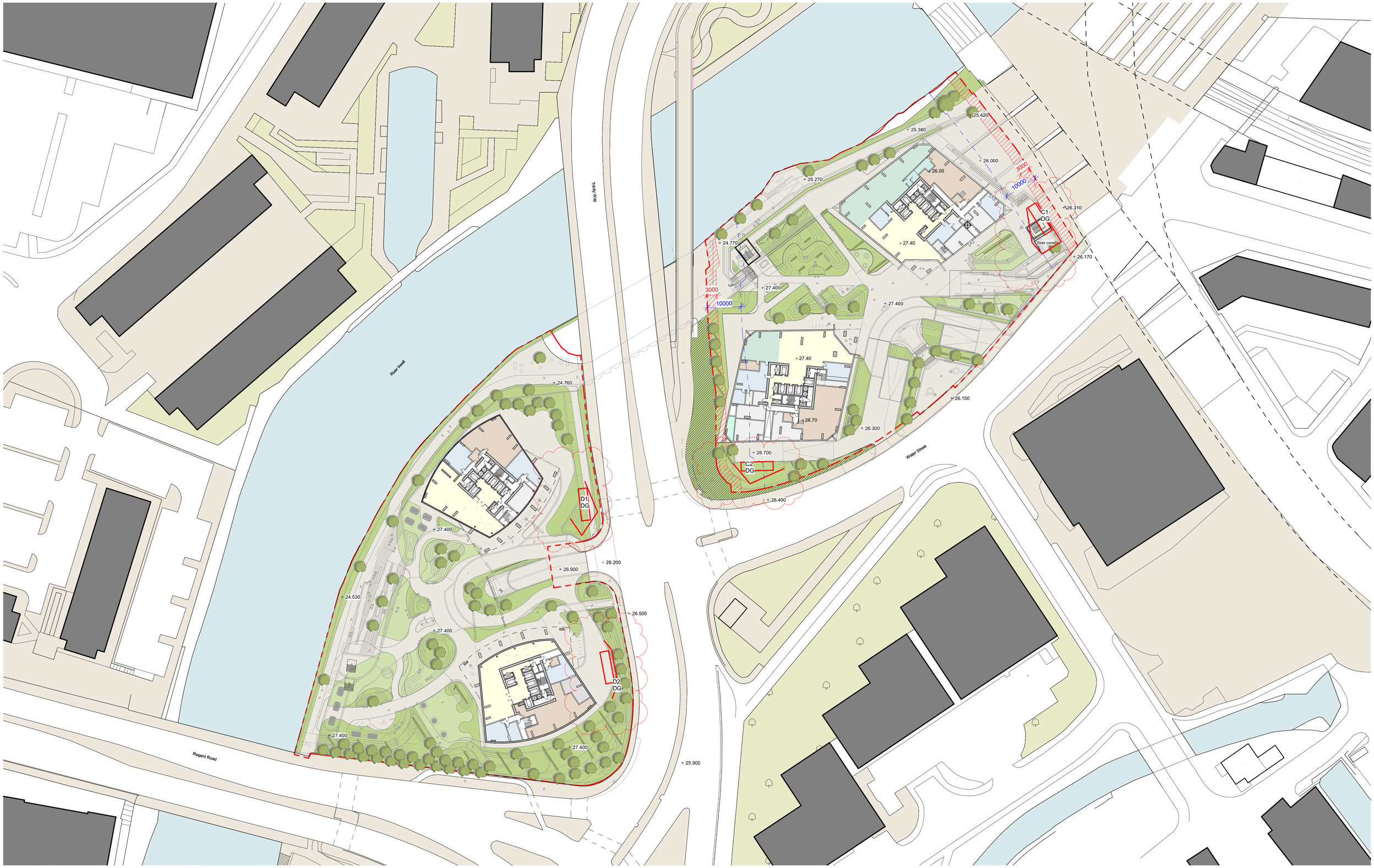
**Appendix A**

Proposed Site Layout – Ground

Proposed Site Layout – B1

Proposed Site Layout – B2

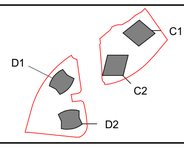
Proposed Landscaping Layout




This drawing is copyright
Do not scale off dimensions.

All dimensions to be checked on site by contractor.

Contractor to report any dimensional discrepancies, errors or omissions prior to commencing on site.




NORTH

| Rev | Date | Description |
|---|---|---|
| P01 | 2021-02-18 | First Issue |
| P02 | 2021-03-08 | Amended site plan |
| P03 | 2021-03-24 | Amended site plan |
| P04 | 2021-03-31 | Amended site plan - previously issued as Z0 |
| P05 | 2021-05-13 | Inclussion of TPM Landscape design |
| D01 | 2021-05-26 | D2 rotated |
| D02 | 2021-07-14 | Updated to reflect wind modelling feedback |
| D03 | 2021-07-16 | Revised to Client and SE information |
| D04 | 2021-08-18 | Diesel generator and screen added |
| D05 | 2021-08-23 | Disel generator positions amended |

Project Title
Trinity Islands
Trinity Way
Manchester

Status
For Information

Drawing Title
Site Z1 Site Wide
Site General
Ground Floor Plan

Project No
10364

Scale
1 : 500@ A1

10364-Z1-SHP-G100-PL-GRD-0001

Revision
D05

simpsonhaugh

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All dimensions to be checked on site by contractor.

Contractor to report any dimensional discrepancies, errors or omissions prior to commencing on site.

NORTH

| Rev | Date | Description |
|---|---|---|
| P01 | 2021-03-24 | First Issue |
| P02 | 2021-03-31 | Amended site plan - previously issued as Z0 |
| D01 | 2021-07-16 | Revised to Client and SE information |

Project Title
Trinity Islands
Trinity Way
Manchester

Drawing Title
Site Plan – Basement 1

Project No
10364

Scale
1 : 500@ A1

Status
For Information

10364-Z1-SHP-G100-PL-B1-0001

Revision
D01

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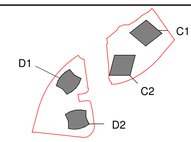
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Contractor to report any dimensional discrepancies, errors or omissions prior to commencing on site.




NORTH

| Rev | Date | Description |
|---|---|---|
| P01 | 2021-03-24 | First Issue |
| P02 | 2021-03-31 | Amended site plan - previously issued as Z0 |
| D01 | 2021-07-16 | Revised to Client and SE information |

Project Title
Trinity Islands
Trinity Way
Manchester

Drawing Title
Site Plan – Basement 2

Project No
10364

Scale
1 : 500@ A1

Status
For Information

10364-Z1-SHP-G100-PL-B2-0001

Revision
D01

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## LEGEND

### HARDWORKS

- **Proposed Adopted Footway**
  Product: Local Pennant Stone Flag and Bloc Trim to match existing on Water Street
  Plan Size: To adoptable standards
  Laying Bond: Staggered
- **Proposed High Quality Block Paving**
  Plan Size: 200x65 (depth tbc)
  Colour: Buff
  Finish: Flamed
  Laying Bond: Herringbone
- **Proposed High Quality Cube Blocks**
  Plan Size: 100x100x80mm
  Colour: Light buff
  Finish: Flamed
  Laying Bond: Stack Bond
- **Proposed Porous Resin Bound Gravel**
  Homogenous porous paving treatment
  Colour: Light buff
- **Proposed Resin Bound Gravel**
  Homogenous impermeable paving treatment
  Colour: Light buff
- **Proposed Asphalt**
  To Engineers specification
- **Proposed Plank Paving**
  Plan Size: 0.2 wide x length varies
  Colour: Silver Grey
  Finish: Flamed
- **Proposed Pimple Tactile Paving**
  To adoptable standards
- **Proposed Corduroy Tactile Paving**
  Product: High quality stone
  Plan Size: 400x400mm
  Colour: SIlver grey
  Laying Bond: Stack Bond
- **Proposed Solid Stone Steps**
  Plan Size: 300mm wide x length varies
  Unit Depth: height varies
  Colour: Silver Grey
  Finish: Flamed
  Other: Contrast nosings
- **Proposed Solid Stone Kerbs**
  Plan Size: 300mm wide x length varies
  Unit Depth: height varies 0 -120mm
  Colour: Silver Grey
  Finish: Flamed
- **Proposed Flush Metal Edge**
  Product: Aluexcel by Kinley (or similar approved)
  Material: Aluminium alloy
  Height above ground: 0mm
  Other: To form edge between grass and resin bound gravel

### FURNITURE

- **Proposed Cycle Racks**
  Product: tbc
- **Proposed Step Seat**
  Product: tbc
- **Proposed Monolithic Seat**
  Product: tbc
- **Proposed Feature Seat**
  Product: tbc
- **Proposed Large Picnic Table**
  Product: tbc
- **Proposed Medium Picnic Table**
  Product: tbc
- **Proposed Feature Swing**
  Product: tbc
- **Proposed Feature Lighting Column**
  Product: tbc
- **Proposed Balustrade**
  Product: tbc
- **Proposed Handrail**
  Product: tbc

### SOFTWORKS

- **Existing Tree / Group Removed**
  Refer to arboricultural reports
- **Existing Tree / Group Retained**
  Refer to arboricultural reports
- **Proposed Tree in Soft Landscape**
  Clear Stem specimen parkland tree
  Height: 6m
- **Proposed Tree in Soft Landscape**
  Clear Stem tree
  Height: 4.5m
- **Proposed Tree in Hard Landscape**
  Clear Stem specimen parkland tree
  Height: 6m
- **Proposed Tree in Hard Landscape**
  Clear Stem tree
  Height: 4.5m
- **Proposed Instant Hedge**
  Height: 1.5m WSP TO CONFIRM
- **Proposed Ornamental Planting**
  Mixed shrub and herbaceous planting
  5-7ltr pots with 10ltr specimens
  Planting beds to receive 75mm depth ornamental bark mulch.
- **Proposed Turf**
  Hard wearing turf
- **Proposed Green Wall**
  Ornamental Wall with inbuilt irrigation system
- **Proposed Sedum Roof**
  Typical specification: Bauder XF301
- **Proposed Vertical Climbers**
  Located on podium wall along river edge to provide valuable wildlife habitat
- **Offsite Proposal - Ornamental Planting**
  Subject to agreement with land owner
- **Offsite Proposal - Wildflower Planting**
  Subject to agreement with land owner
- **Offsite Proposal - Grass**
  Subject to agreement with land owner

### BAFFLES

- **Proposed Feature Entrance Baffles**
  Height: 4.5m
- **Proposed Landscape Baffles**
  Height: 3m
- **Proposed Car Park Acces Ramps Baffles**
  Height: 1.5m
- **Proposed Building Corner Baffles**
  Height: 8.55m / 4.275m

+26.26 EXISTING LEVEL

+27.20 PROPOSED LEVEL

## GENERAL NOTES

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3. This drawing is to be read in conjunction with all relevant Architects', Engineer's, Specialists, Bills of Quantities and Specifications.
4. The insertion of any firm or proprietary brand on this drawing is an indication of the class or quality required and does not exclude the use of alternative materials that are equal in performance, quality and appearance, provided that they have been approved in writing by the Landscape Architect.
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7. All work and materials are to be in accordance with the relevant British Standards and Code of Practice.
8. All Proprietary products are to be used strictly in accordance with the manufacturer's instructions and details.

## REVISION NOTES

| Rev | By | Description | Date |
|---|---|---|---|
| - | XX | - | 00.00 15 |

Client
Renaker Build LTD

Project
Trinity Island

Description
Site C - Landscape Layout

Status
For Information

| Scale @ A1 | Drawn | Checked | Date |
|---|---|---|---|
| 1:250 | KH | KH | 12.08.21 |

Drawing number
Z1-TPM-G710-PL-XX-3852 101

Revision
P1

N

tpm landscape
chartered landscape architects
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tel: 0161 235 0600 fax 0601 email info@tpmlandscape.co.uk

## HARDWORKS

**Proposed Adopted Footway**
Product: Local Pennant Stone Flag and Bloc Trim to match existing on Water Street
Plan Size: To adoptable standards
Laying Bond: Staggered

**Proposed High Quality Block Paving**
Plan Size: 200x65 (depth tbc)
Colour: Buff
Finish: Flamed
Laying Bond: Fish Scale

**Proposed High Quality Cube Blocks**
Plan Size: 100x100x80mm
Colour: Light buff
Finish: Flamed
Laying Bond: Stack Bond

**Proposed Porous Resin Bound Gravel**
Homogenous porous paving treatment
Colour: Light buff

**Proposed Resin Bound Gravel**
Homogenous impermeable paving treatment
Colour: Light buff

**Proposed (Off-site) Resin Bound Gravel**
Homogenous impermeable paving treatment
Colour: Light buff

**Proposed Asphalt**
To Engineers specification

**Proposed Play Surface**
Typical specification: Wet pour play surface

**Proposed Pimple Tactile Paving**
To adoptable standards

**Proposed Corduroy Tactile Paving**
Product: High quality stone
Plan Size: 400x400mm
Colour: Sllver grey
Laying Bond: Stack Bond

**Proposed Solid Stone Steps**
Plan Size: 300mm wide x length varies
Unit Depth: height varies
Colour: Silver Grey
Finish: Flamed
Other: Contrast nosings

**Proposed Solid Stone Kerbs**
Plan Size: 300mm wide x length varies
Unit Depth: height varies 0 -120mm
Colour: Silver Grey
Finish: Flamed

**Proposed Metal Edge**
Product: Aluexcel by Kinley (or similar approved)
Material: Aluminium alloy
Height above ground: 0-150mm
Other: To form edge between grass and resin bound gravel

**Proposed Metal Edge**
Product: Aluexcel by Kinley (or similar approved)
Material: Aluminium alloy
Height above ground: varies
Other: To form edge between planting beds and resin bound gravel

## FURNITURE

**Proposed Cycle Racks**

**Proposed Step Seat**

**Proposed Monolithic Seat**

**Proposed Feature Seat**

**Proposed Large Picnic Table**

**Proposed Medium Picnic Table**

**Proposed Feature Pebble Stone Seat**

**Proposed Bin**

**Proposed Feature Lighting Column**

**Proposed Handrail**

**Proposed Balustrade**

**Proposed Height Barrier / Gateway Structure**

## SOFTWORKS

**Existing Tree / Group Removed**
Refer to arboricultural reports

**Existing Tree / Group Retained**
Refer to arboricultural reports

**Proposed Tree in Soft Landscape**
Clear Stem specimen parkland tree
Height: 6m

**Proposed Tree in Soft Landscape**
Clear Stem tree
Height: 4.5m

**Proposed Tree in Hard Landscape**
Clear Stem specimen parkland tree
Height: 6m

**Proposed Tree in Hard Landscape**
Clear Stem tree
Height: 4.5m

**Proposed Instant Hedge**
Height: Height: 1, 1.5 & 2m refer to planting plans

**Proposed Ornamental Planting**
Mixed shrub and herbaceous planting
5-7ltr pots with 10ltr specimens
Planting beds to receive 75mm depth ornamental bark mulch.

**Proposed Turf**
Hard wearing turf

**Proposed Green Wall**
Ornamental Wall with inbuilt irrigation system

**Proposed Vertical Climbers**
Located on podium wall along river edge to provide valuable wildlife habitat

**Proposed Low Maintenance Planting**
Mixed shrubs and native stock to create buffer

## BAFFLES

**Proposed Landscape Baffles**
Height: 3m (3.5m by generators)

**Proposed Car Park Acces Ramps Baffles**
Height: 1.5m

**Proposed Building / Landscape Baffles**
Height: to alignment with architects First Floor

+26.26 EXISTING LEVEL

+27.20 PROPOSED LEVEL

## GENERAL NOTES

1. This drawing is the copyright of tpm landscape Ltd and cannot be reproduced in any form without the consent of the company.
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3. This drawing is to be read in conjunction with all relevant Architects', Engineer's, Specialists, Bills of Quantities and Specifications.
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7. All work and materials are to be in accordance with the relevant British Standards and Code of Practice.
8. All Proprietary products are to be used strictly in accordance with the manufacturer's instructions and details.




## REVISION NOTES

| Rev | By | Description | Date |
|---|---|---|---|
| P2 | KH | Second Formal Issue | x |
| P1 | KH | First Formal Issue | 08.09.21 |

Client
Renaker Build LTD

Project
Trinity Island

Description
Site D - Landscape Layout

Status
For Information

| Scale @ A1 | Drawn | Checked | Date |
|---|---|---|---|
| 1:250 | KH | KH | 08.09.21 |

Drawing number
ZD-TPM-G710-PL-XX-3852 102

Revision
P2

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**Appendix B**

CCTV Drainage Survey of CSO

Correspondence with United Utilities



IWJS

INDUSTRIAL WATER JETTING SYSTEMS

# CCTV SURVEY INSPECTION REPORT

| | |
|---|---|
| **Client:** | Renaker Constructing Solutions |
| **Location:** | Water Street, Manchester |
| **Date:** | 15.12.2020 |




**Industrial Water Jetting Systems Ltd**

Dickens House, Old Stowmarket Road, Woolpit, Bury St. Edmunds IP22 9QS

Tel: 01359 242606 Fax: 01359 242 621

Web: www.iwjs.co.uk Email: surveys@iwjs.co.uk

**IWJS**
*Unit 3, Bridgeway*
*Tel. 01274 924 580*
*Sara.knight@iwjs.co.uk*




**Project**

**Project Name:** 2020_12_11_129885_Renaker_Water Street_Manchester

**Project Date:** 11/12/2020

**Inspection Standard:** MSCC5 Sewers & Drainage GB (SRM5 Scoring)

**IWJS**
*Unit 3, Bridgeway*
*Tel. 01274 924 580*
*Sara.knight@iwjs.co.uk*

# Table of Contents

| Project Name | Project Number | Project Date |
|---|---|---|
| 2020_12_11_129885_Renaker_Water Street_Manchester | | 11/12/2020 |

Project Information ..... P-1
Section Profile ..... P-2
Section Summary ..... P-3
Section: 1; MH1 > MH2 (MH1X) ..... 1
Section: 2; MH2 > OUTLET (MH2X) ..... 3

**IWJS**
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*Sara.knight@iwjs.co.uk*

# Project Information

| Project Name | Project Number | Project Date |
|---|---|---|
| 2020_12_11_129885_Renaker_Water Street_Manchester | | 11/12/2020 |

## Client

**Company:** Renaker Constructing Solutions
**Contact:** Dafydd Jones
**Street:** NQ Building, 47 Bengal Street
**Town or City:** Ancoats, Manchester
**County:** Greater Manchester

## Site

**Company:** Renaker Constructing Solutions
**Contact:** Dafydd Jones
**Street:** Water Street
**Town or City:** Manchester
**County:** Greater Manchester
**Post Code:** M3 4PU

[redacted]

## Contractor

**Company:** IWJS
**Contact:** Sara Knight
**Department:** Account Executive
**Street:** Unit 3
**Town or City:** Bridgeway
**County:** Bradford
**Post Code:** BD4 9SN

[redacted]

**IWJS**
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*Tel. 01274 924 580*
*Sara.knight@iwjs.co.uk*

# Section Profile

| Project Name | Project Number | Project Date |
|---|---|---|
| 2020_12_11_129885_Renaker_Water Street_Manchester | | 11/12/2020 |

## Circular, 1000 mm

| Section | Upstream Node | Downstream Node | Date | Road | Material | Total Length | Inspected Length |
|---|---|---|---|---|---|---|---|
| 1 | MH1 | MH2 | 11/12/2020 | Water Street | Brick | 45.59 m | 45.59 m |
| 2 | MH2 | OUTLET | 11/12/2020 | Water Street | Brick | 20.00 m | **11.23 m** |

**Total: 2 Inspections x Circular 1000 mm = 65.59 m Total Length and 56.82 m Inspected Length**

**Total: 2 Inspections = 65.59 m Total Length and 56.82 m Inspected Length**

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# Section Summary

| Project Name | Project Number | Project Date |
|---|---|---|
| 2020_12_11_129885_Renaker_Water Street_Manchester | | 11/12/2020 |

| | |
|---|---|
| Number of sections | 2 |
| Total length of sewer network | 65.59 m |
| Total length of inspections | 56.82 m |
| Total length of abandoned inspections | 8.77 m |
| Total abandoned inspections | 1 |
| Number of section inspection photos | 4 |
| Number of section inspection videos | 2 |
| Number of section inspection scans | 0 |
| Number of section inclination measurements | 0 |

| | | | |
|---|---|---|---|
| **PLR:** | MH1X | **Upstream Node:** | MH1 |
| **Inspection Direction:** | Downstream | **Downstream Node:** | MH2 |
| **Inspected Length:** | 45.59 m | **Dia/Height:** | 1,000 mm |
| **Total Length:** | 45.59 m | **Material:** | Brick |

| No. | m+ | Code | Observation |
|---|---|---|---|
| 1 | 0.00 | MH | Start node, manhole, reference: MH1 |
| 2 | 0.00 | WL | Water level, 5% of the vertical dimension |
| 3 | 9.47 | CN | Connection other than junction at 11 o'clock, diameter: 150mm |
| 4 | 11.37 | GP | General photograph taken at this point |
| 5 | 33.98 | GP | General photograph taken at this point |
| 6 | 45.59 | MHF | Finish node, manhole, reference: MH2 |

| | | | |
|---|---|---|---|
| **PLR:** | MH2X | **Upstream Node:** | MH2 |
| **Inspection Direction:** | Downstream | **Downstream Node:** | OUTLET |
| **Inspected Length:** | 11.23 m | **Dia/Height:** | 1,000 mm |
| **Total Length:** | 20.00 m | **Material:** | Brick |

| No. | m+ | Code | Observation |
|---|---|---|---|
| 1 | 0.00 | MH | Start node, manhole, reference: MH2 |
| 2 | 0.00 | WL | Water level, 10% of the vertical dimension |
| 3 | 6.13 | DEE | Attached deposits, encrustation from 7 o'clock to 5 o'clock, 10% cross-sectional area loss |
| 4 | 6.13 | DEF | Attached deposits, fouling from 10 o'clock to 2 o'clock, 10% cross-sectional area loss |
| 5 | 6.13 | SCR | Shape changes to rectangular, new size(s), 1200mm high, 900mm wide, estimated |
| 6 | 10.45 | GP | General photograph taken at this point |
| 7 | 11.23 | LL | Line deviates left |
| 8 | 11.23 | SC | Pipe size changes, new size(s), 600mm high, 900mm wide |
| 9 | 11.23 | WL | Water level, 30% of the vertical dimension |
| 10 | 11.23 | REM | General remark, invert drops down |

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# Section Summary

| Project Name | Project Number | Project Date |
|---|---|---|
| 2020_12_11_129885_Renaker_Water Street_Manchester | | 11/12/2020 |

| No. | m+ | Code | Observation |
|---|---|---|---|
| 11 | 11.23 | SA | Survey abandoned, Due to dropped invert |

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# Section Inspection - 11/12/2020 - MH1X

| Section | Inspection | Date | Time | Client`s Job Ref | Weather | Pre Cleaned | PLR |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 11/12/20 | 9:53 | 1.63.2.001 | Rain | No | MH1X |

| Operator | Vehicle | Camera | Preset Length | Legal Status | Alternative ID |
|---|---|---|---|---|---|
| MS | EO16 FNY | Pan And Tilt | 0.60 m | Public Sewer | Not Specified |

| | | | | | |
|---|---|---|---|---|---|
| **Town or Village:** | Manchester | **Inspection Direction:** | Downstream | **Upstream Node:** | MH1 |
| **Road:** | Water Street | **Inspected Length:** | 45.59 m | **Upstream Pipe Depth:** | 3.950 m |
| **Location:** | Footway | **Total Length:** | 45.59 m | **Downstream Node:** | MH2 |
| **Surface Type:** | Block Paved | **Joint Length:** | 0.00 m | **Downstream Pipe Depth:** | 0.000 m |

| | | | |
|---|---|---|---|
| **Use:** | Combined | **Pipe Shape:** | Circular |
| **Type of Pipe:** | Gravity drain/sewer | **Dia/Height:** | 1,000 mm |
| **Flow Control:** | No flow control | **Material:** | Brick |
| **Year Constructed:** | Not Specified | **Lining Type:** | CIP |
| **Inspection Purpose:** | Sample condition survey | **Lining Material:** | Epoxy |

**Comments:** Wrong d/s node ref on video sewer not to plan
**Recommendations:** None

WEB PROJECT CLICK TO OPEN THIS SECTION

**Scale: 1:394**

| Position [m] | Code | Observation | MPEG | Photo | Grade |
|---|---|---|---|---|---|
| | | **Depth: 3.95 m** | | | |
| | | **MH1** | | | |
| 0.00 | MH | Start node, manhole, reference: MH1 | 00:00:00 | | |
| 0.00 | WL | Water level, 5% of the vertical dimension | 00:02:43 | | |
| 9.47 | CN | Connection other than junction at 11 o'clock, diameter: 150mm | 00:05:35 | | |
| 11.37 | GP | General photograph taken at this point | 00:06:08 | 1 | |
| 33.98 | GP | General photograph taken at this point | 00:09:30 | 2 | |
| 45.59 | MHF | Finish node, manhole, reference: MH2 | 00:12:30 | | |
| | | **MH2** | | | |
| | | **Depth: 0.00 m** | | | |

| Construction Features | | | | | Miscellaneous Features | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Structural Defects | | | | | Service & Operational Observations | | | | |
| **STR No. Def** | **STR Peak** | **STR Mean** | **STR Total** | **STR Grade** | **SER No. Def** | **SER Peak** | **SER Mean** | **SER Total** | **SER Grade** |
| 0 | 0.0 | 0.0 | 0.0 | 1.0 | 0 | 0.0 | 0.0 | 0.0 | 1.0 |

**IWJS**
*Unit 3, Bridgeway*
*Tel. 01274 924 580*
*Sara.knight@iwjs.co.uk*

# Section Pictures - 11/12/2020 - MH1X

| Section | Inspection Direction | PLR | Client`s Job Ref | Contractor`s Job Ref |
|---|---|---|---|---|
| 1 | Downstream | MH1X | 1.63.2.001 | 129885 |




1, 00:06:08, 11.37 m
General photograph taken at this point




2, 00:09:30, 33.98 m
General photograph taken at this point

**IWJS**
*Unit 3, Bridgeway*
*Tel. 01274 924 580*
*Sara.knight@iwjs.co.uk*

# Section Inspection - 11/12/2020 - MH2X

| Section | Inspection | Date | Time | Client`s Job Ref | Weather | Pre Cleaned | PLR |
|---|---|---|---|---|---|---|---|
| 2 | 1 | 11/12/20 | 10:16 | 1.63.2.001 | Rain | No | MH2X |

| Operator | Vehicle | Camera | Preset Length | Legal Status | Alternative ID |
|---|---|---|---|---|---|
| MS | EO16 FNY | Pan And Tilt | 0.00 m | Public Sewer | Not Specified |

| | | | | | |
|---|---|---|---|---|---|
| **Town or Village:** | Manchester | **Inspection Direction:** | Downstream | **Upstream Node:** | MH2 |
| **Road:** | Water Street | **Inspected Length:** | 11.23 m | **Upstream Pipe Depth:** | 0.000 m |
| **Location:** | Other walkway | **Total Length:** | 20.00 m | **Downstream Node:** | OUTLET |
| **Surface Type:** | Block Paved | **Joint Length:** | 0.00 m | **Downstream Pipe Depth:** | 0.000 m |

| | | | |
|---|---|---|---|
| **Use:** | Combined | **Pipe Shape:** | Circular |
| **Type of Pipe:** | Gravity drain/sewer | **Dia/Height:** | 1,000 mm |
| **Flow Control:** | No flow control | **Material:** | Brick |
| **Year Constructed:** | Not Specified | **Lining Type:** | CIP |
| **Inspection Purpose:** | Sample condition survey | **Lining Material:** | Epoxy |

**Comments:** No access to MH2 or outlet
**Recommendations:** None

WEB PROJECT
CLICK TO OPEN THIS SECTION

**Scale:** 1:173



| Position [m] | Code | Observation | MPEG | Photo | Grade |
|---|---|---|---|---|---|
| **Depth: 0.00 m** **MH2** | | | | | |
| 0.00 | MH | Start node, manhole, reference: MH2 | 00:00:00 | | |
| 0.00 | WL | Water level, 10% of the vertical dimension | 00:00:01 | | |
| 6.13 | DEE | Attached deposits, encrustation from 7 o'clock to 5 o'clock, 10% cross-sectional area loss | 00:04:53 | 1 | 3 |
| 6.13 | DEF | Attached deposits, fouling from 10 o'clock to 2 o'clock, 10% cross-sectional area loss | 00:04:55 | | 3 |
| 6.13 | SCR | Shape changes to rectangular, new size(s), 1200mm high, 900mm wide: estimated | 00:04:59 | | |
| 10.45 | GP | General photograph taken at this point | 00:10:16 | 2 | |
| 11.23 | LL | Line deviates left | 00:11:26 | | |
| 11.23 | SC | Pipe size changes, new size(s), 600mm high, 900mm wide | 00:11:28 | | |
| 11.23 | WL | Water level, 30% of the vertical dimension | 00:11:33 | | |
| 11.23 | REM | General remark: invert drops down | 00:11:34 | | |
| 11.23 | SA | Survey abandoned: Due to dropped invert | 00:11:42 | | |
| 20.00 | | End of pipe | | | |
| **OUTLET** **Depth: 0.00 m** | | | | | |

| Construction Features | | | | | Miscellaneous Features | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Structural Defects | | | | | Service & Operational Observations | | | | |
| **STR No. Def** | **STR Peak** | **STR Mean** | **STR Total** | **STR Grade** | **SER No. Def** | **SER Peak** | **SER Mean** | **SER Total** | **SER Grade** |
| 0 | 0.0 | 0.0 | 0.0 | 1.0 | 2 | 4.0 | 0.4 | 4.0 | 3.0 |

**IWJS**
*Unit 3, Bridgeway*
*Tel. 01274 924 580*
*Sara.knight@iwjs.co.uk*

# Section Pictures - 11/12/2020 - MH2X

| Section | Inspection Direction | PLR | Client`s Job Ref | Contractor`s Job Ref |
|---|---|---|---|---|
| 2 | Downstream | MH2X | 1.63.2.001 | 129885 |




1, 00:04:53, 6.13 m
Attached deposits, encrustation from 7 o'clock to 5 o'clock, 10% cross-sectional area loss

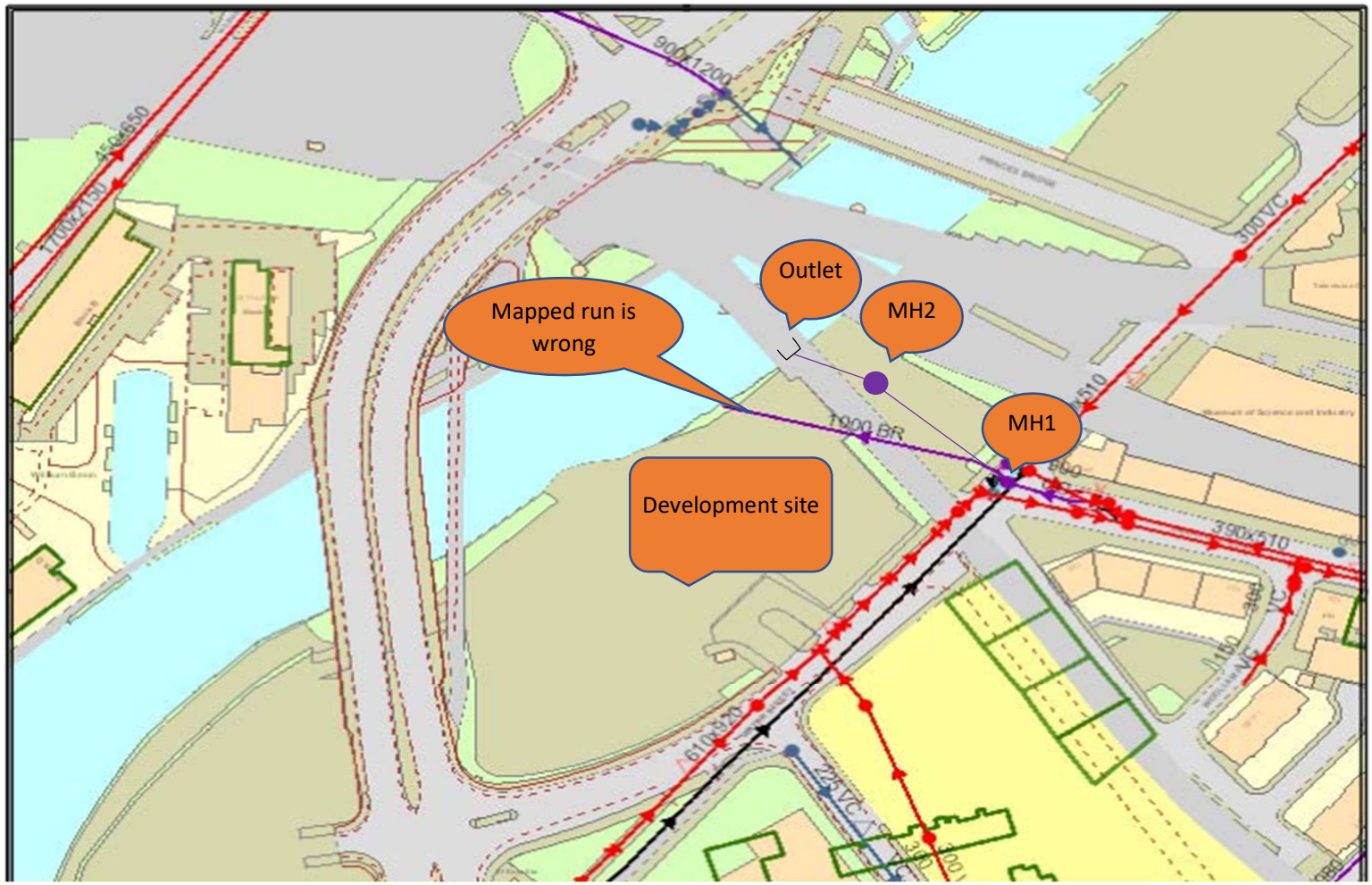



2, 00:10:16, 10.45 m
General photograph taken at this point

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| Grade Defect Report | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Section** | **Road** | **m+** | **Upstream Node** | **Inspection Direction** | **Downstream Node** | **Observation** | **Structural** | **Service** |
| 1 | Water Street | 0 | MH1 | Downstream | MH2 | Start node, manhole, reference: MH1 | | |
| 1 | Water Street | 0 | MH1 | Downstream | MH2 | Water level, 5% of the vertical dimension | | |
| 1 | Water Street | 9.47 | MH1 | Downstream | MH2 | Connection other than junction at 11 o'clock, diameter: 150mm | | |
| 1 | Water Street | 11.37 | MH1 | Downstream | MH2 | General photograph taken at this point | | |
| 1 | Water Street | 33.98 | MH1 | Downstream | MH2 | General photograph taken at this point | | |
| 1 | Water Street | 45.59 | MH1 | Downstream | MH2 | Finish node, manhole, reference: MH2 | | |
| 2 | Water Street | 0 | MH2 | Downstream | OUTLET | Start node, manhole, reference: MH2 | | |
| 2 | Water Street | 0 | MH2 | Downstream | OUTLET | Water level, 10% of the vertical dimension | | |
| 2 | Water Street | 6.13 | MH2 | Downstream | OUTLET | Attached deposits, encrustation from 7 o'clock to 5 o'clock, 10% cross-sectional area loss | | 3 |
| 2 | Water Street | 6.13 | MH2 | Downstream | OUTLET | Attached deposits, fouling from 10 o'clock to 2 o'clock, 10% cross-sectional area loss | | 3 |
| 2 | Water Street | 6.13 | MH2 | Downstream | OUTLET | Shape changes to rectangular, new size(s), 1200mm high, 900mm wide | | |
| 2 | Water Street | 10.45 | MH2 | Downstream | OUTLET | General photograph taken at this point | | |
| 2 | Water Street | 11.23 | MH2 | Downstream | OUTLET | Line deviates left | | |
| 2 | Water Street | 11.23 | MH2 | Downstream | OUTLET | Pipe size changes, new size(s), 600mm high, 900mm wide | | |
| 2 | Water Street | 11.23 | MH2 | Downstream | OUTLET | Water level, 30% of the vertical dimension | | |
| 2 | Water Street | 11.23 | MH2 | Downstream | OUTLET | General remark | | |
| 2 | Water Street | 11.23 | MH2 | Downstream | OUTLET | Survey abandoned | | |

**SEWER RECORD** LAND ON THE NORTH WEST SIDE OF WATER STREET MANCHESTER




**Date:** 11/12/2020

**Job number:** 129885

**Address:** Water Street, Manchester

**Unit:** EO16FNY

**Legend.**

**Foul:**

**Surface:**

**Combined:**

**Manhole:**

**Catch pit:**

**Gully:**

**Completed CCTV:**

**Site times.**

**Start:** 06:30
**On site:** 08:15
**Off site:** 12:00
**Finish:** 15:30
**Travel Hrs:**
**Total HRS:**

**Job summary: CCTV survey complete from MH1 d/s to MH2 45.59m MH2 not mapped and not accessible shown as an orange circle on above plan.**
**Survey from MH2 d/s to outlet abandoned at 11.23m due to drop in invert outlet visible from point of abandonment.**
**Unable to trace, Mark and gps due to no access in to private grounds client is happy that the sewer does not run through there development site.**

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N

....Not to scale....

## Chloé Grimsley

**From:** [redacted]
**Sent:** 23 June 2021 15:54
**To:** Andy Rain
**Cc:** Chloé Grimsley
**Subject:** RE: Trinity CSO - Historic Investigation

Hi Andy

Yep I am happy if you have this further information. It makes more sense, our records aren't always accurate!

Thanks


United Utilities
Water for the North West

**Byron Carter**
Asset Manager (Manchester & Pennine)
Wastewater Services
[redacted]


[redacted]

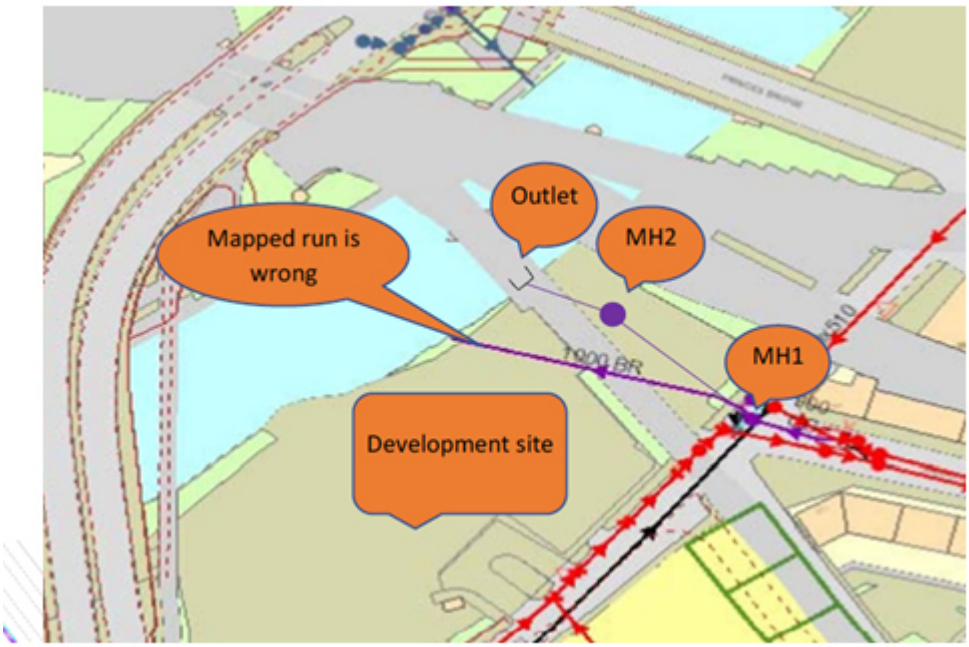
**Subject:** Trinity CSO - Historic Investigation

**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.

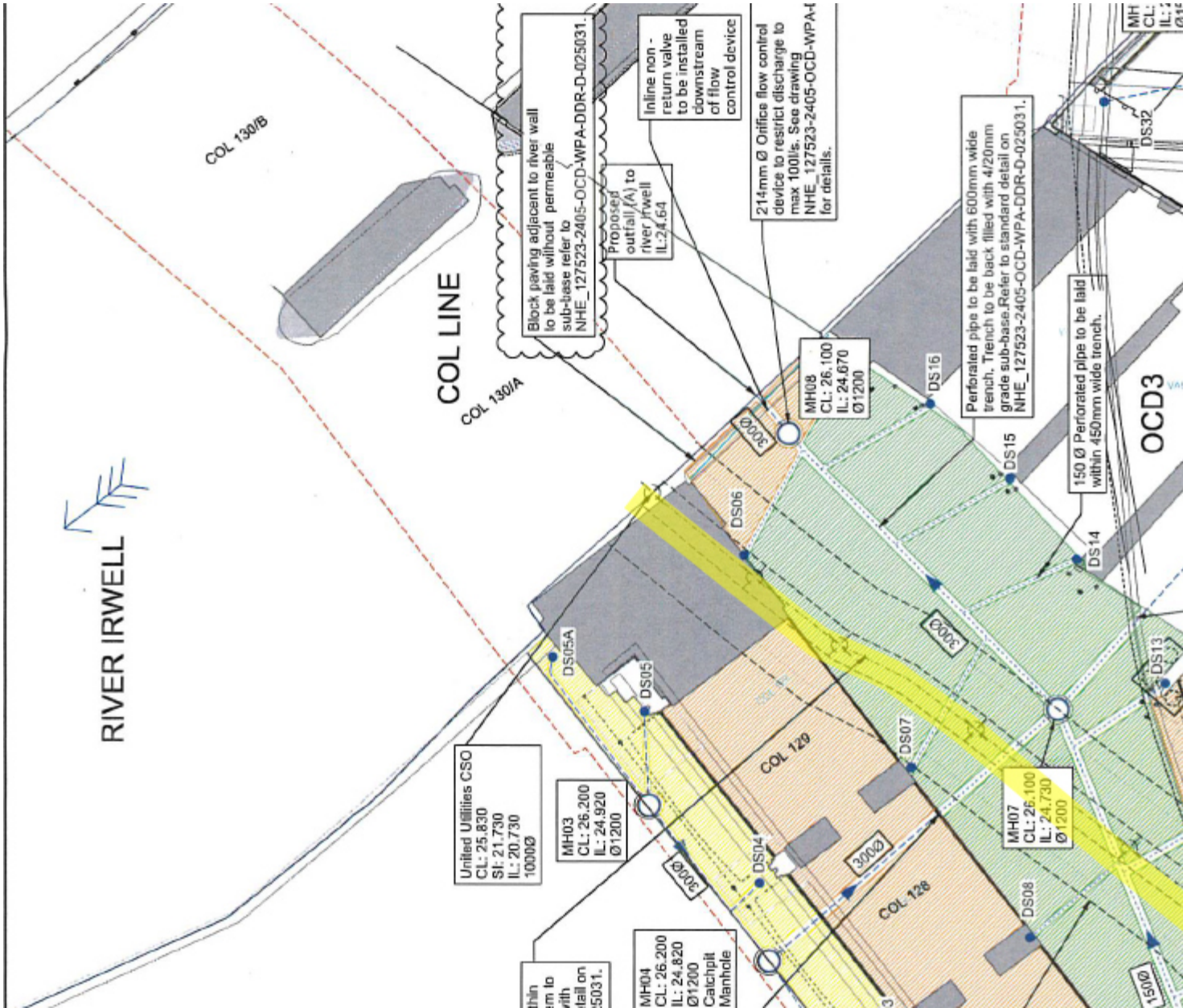
Byron,

Just following on from previous conversation with Graham we have been provided with some additional information regarding the CSO which extend from the UU sewer network in Liverpool Road/Water Street to the River Irwell.

The CSO on the UU networks plans show that the CSO potentially extended into the Trinty Site please see below, the CSO is noted as the 1000BR with a thick purple line:




Following discussions with Northern Hub who completed the Ordsall Chord work they have provided an extract of their “As-Built” information which confirms the route as per the thin purple line on the above. Please see below drawing extract with the route noted in yellow:



Based on the above we would advise that the CSO doesn't run within the Trinity Development Site. Please could you confirm that you are happy with this conclusion or is there any additional survey information that you would require to further confirm? Our intention will be to reference this in the FRA and Drainage Strategy that we are currently preparing for the site.

Kind Regards,

**Andy Rain**

[redacted]

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

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**Appendix C**

Topographical Survey




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Note:

The survey is plotted on a plane local Grid. Orientation to National Grid.

All levels relate to Ordnance Datum, achieved using the OS National GPS Network.

Levels in Parenthesis indicate top of wall or fence.

Survey Control Markers established for Mapping purposes only and should not be used for Construction without the written approval of Survey Operations Ltd.

Survey updated November 2020 and added to Survey Operations drawing 15E169.
New Survey points shown Red.

SURVEY STATIONS

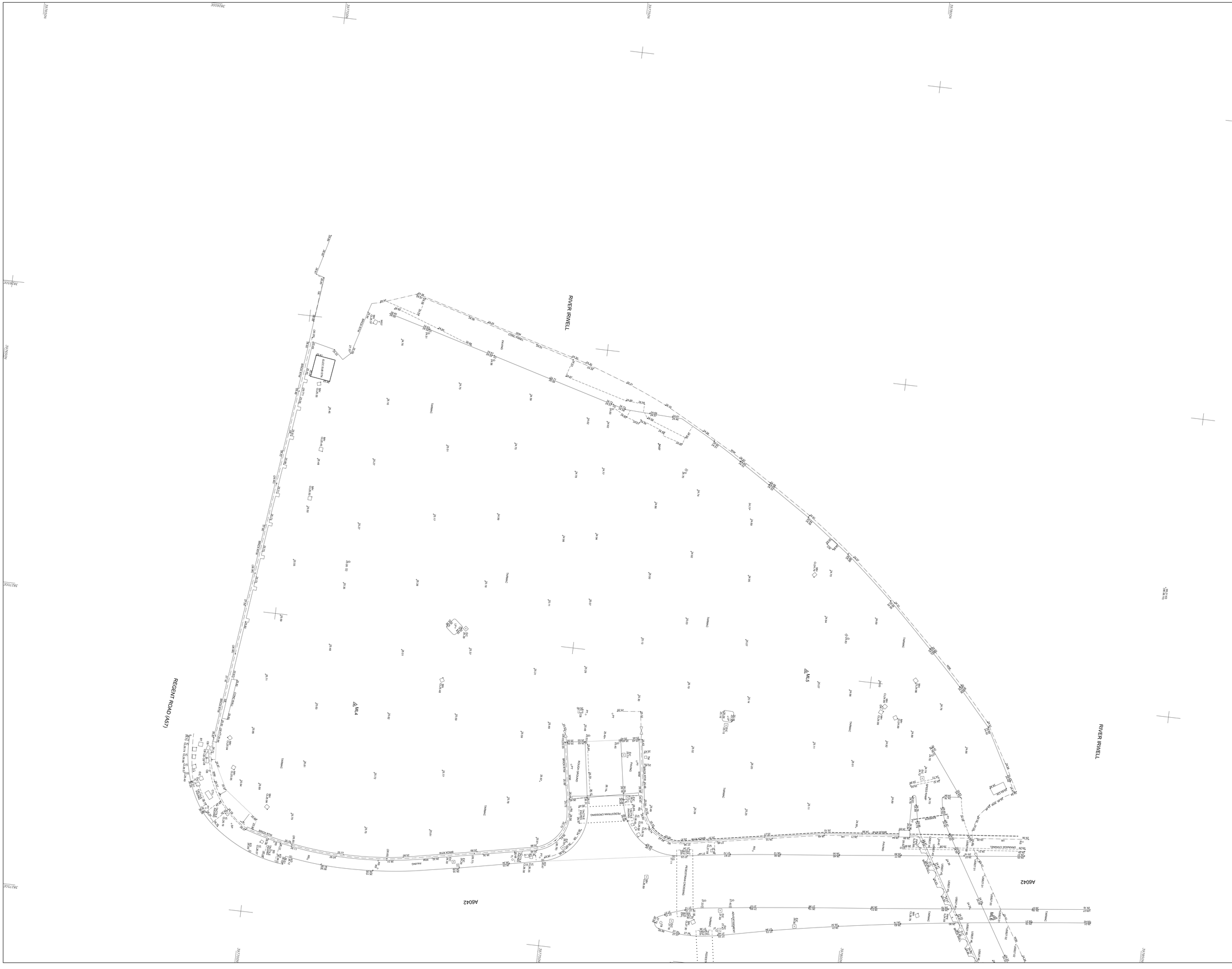
| Name | Easting | Northing | Height |
|---|---|---|---|
| ML1 | 362878.63 | 397834.56 | 26.10 |
| ML2 | 362629.72 | 397755.40 | 26.09 |
| ML3 | 362757.63 | 397777.56 | 26.94 |
| ML4 | 362713.04 | 397714.88 | 25.37 |
| ML5 | 362690.36 | 397789.03 | 25.08 |
| ML6 | 362736.81 | 397825.07 | 24.40 |
| ML7 | 362799.00 | 397843.19 | 25.27 |
| ML8 | 362836.05 | 397840.22 | 26.07 |

STANDARD REFERENCE & ABBREVIATIONS

(AR).....Assumed Route
AB.....Air Brick
AV.....Air Valve
B/W.....Barbed Wire
BAR.....Barrier
BE.....Bellotte Beacon
BH.....Borehole
BL.....Bed Level
BOL.....Bollard
BS.....Bus Stop
BT Box.....British Telecom Box
BT.....Open Paling
BRTW.....Brick Retaining Wall
BW.....Brick Wall
C/B.....Close Boarded
C/I.....Corrugated Iron
C/P.....Chestnut Paling
CB.....Control Box
CBW.....Concrete Block Wall
CCTV.....Closed Circuit TV
CD.....Cable Duct
CL.....Cellar Light
CH.....Chain Link
CHY.....Chimney
CL.....Cover Level
CM.....Cable Marker
COL.....Column
CONC.....Concrete
CP.....Catch Pit
CRTW.....Concrete Retaining Wall
CTV.....Cable Television
CUL.....Culvert
CWW.....Concrete Block Wall
DC.....Drainage Channel
DPC.....Damp Proof Course
DR.....Drain
DSW.....Dry Stone Wall
ECP.....Electricity Cable Pit
ESI.....Electricity Inspection Cover
EJ.....Expansion Joint
EJB.....Electricity Junction Box
EL SUB 6TH..Electricity Sub Station
EL.....Eaves Level
ELB.....Electricity Box
EP.....Electricity Pole
ER.....Earth Rod
ETL.....Electricity Transmission Line
FB.....Flower Bed
FH.....Fire Hydrant
FL.....Floor Level
FP.....Flagpole
GT.*.....Girth (of tree)
GL.....Gulley
GWA.....Gabion
GIP.....Gas Inlet Pipe
GMKR.....Gas Marker
GST.....Gas Stop Tap (Domestic)
GSV.....Gas Stop Valve (Mains)
HSE.....Housing
HT.....Height
HV.....High Voltage
I/R.....Iron Railing
IC.....Inspection Cover
IL.....Invert Level
IP.....Inlet Pipe
KO.....Kerb Outlet
LB.....Letter Box
LP.....Lamp Post
MG.....Multi-Girth
MH.....Manhole
MKR.....Marker
MP.....Mooring Point
NP.....Street Name Plate
O/H.....Overhead
O/P.....Open Paling
OE.....Overhead Electric Wire
OP.....Outfall Pipe
OSBM.....Ordnance Survey Bench Mark
OT.....Overhead Telecom Wire
P/C.....Post & Chain
P/R.....Post & Rail
P/W.....Post & Wire
PAV.....Paving
PB.....Pillar Box
PC.....Pedestrian Crossing
PP.....Petrol Pump
PT.....Post of Pillar
RE.....Rodding Eye
RS.....Road Sign
RTW.....Retaining Wall
RWP.....Rain Water Pipe
SAP.....Sapling
SL.....Sump Level
SOL.....Soffit Level
SP.....Sign Post
SPL.....Springing Level
SRTW.....Stone Retaining Wall
TP.....Stop Valve (unspecified)
TAP.....Tap
TBP.....Soil Vent Pipe
TBW.....Stone Wall
TAC.....Tactile Paving
TB.....Traffic Bollard
TBM.....Temporary Bench Mark
TCB.....Telephone Call Box
TFR.....Taken From Records
TIE.....Anchor Point (Boats/Poles)
TL.....Traffic Light
TLB.....Traffic Light Control Box
TW.....Ticket Machine
TWC.....Tarmac
TP.....Telecommunications Pole
TPIT.....Trial Pit
TS.....Trash Screen
U/C.....Under Construction
U/G.....Underground
UTL.....Unable to Lift (BH,IC etc)
UTS.....Unable to Survey
VDP.....Vehicle Detector Pad
VP.....Vent Pipe
W/M.....Wire Mesh
WL.....Water Level
WM.....Water Meter
WO.....Wash Out
WP.....Waste Pipe
WST.....Water Stop Tap (Domestic)
WSV.....Water Stop Valve (Mains)

Survey Operations
Smith Street, Skelmersdale, Lancs. WN8 8LN
Tel: 01695 725662 Fax: 01695 51816
Email: mail@survops.co.uk – www.survops.co.uk

| | |
|---|---|
| Client | Renaker Build Limited |
| Drawing Title | Topographical Survey of Land at: Trinity Island Manchester Site C |
| Scale(s) | 1:200 |
| Surveyor | MF |
| Date | Dec 20 |
| Drawn | DLH/NR |
| Job Number | 20K269 |
| Checked | SO |
| Sheet Size & Drg Number & Revision | A0 20K269/001 |


RIVER IRWELL
REGENT ROAD (A57)
A6042
M6
M5
M4
BROOK WAY
BROOK STREET
PEDESTRIAN CROSSING
PEDESTRIAN CROSSING
PUBLIC FOOTPATH
PUBLIC FOOTPATH
PUBLIC FOOTPATH

**Appendix D**

Environment Agency Flood Map for Planning

# Flood map for planning

| Your reference | Location (easting/northing) | Created |
|---|---|---|
| **Trinity Islan** | **382693/397747** | **19 Apr 2021 16:30** |

**Your selected location is in flood zone 2, an area with a medium probability of flooding.**

## This means:

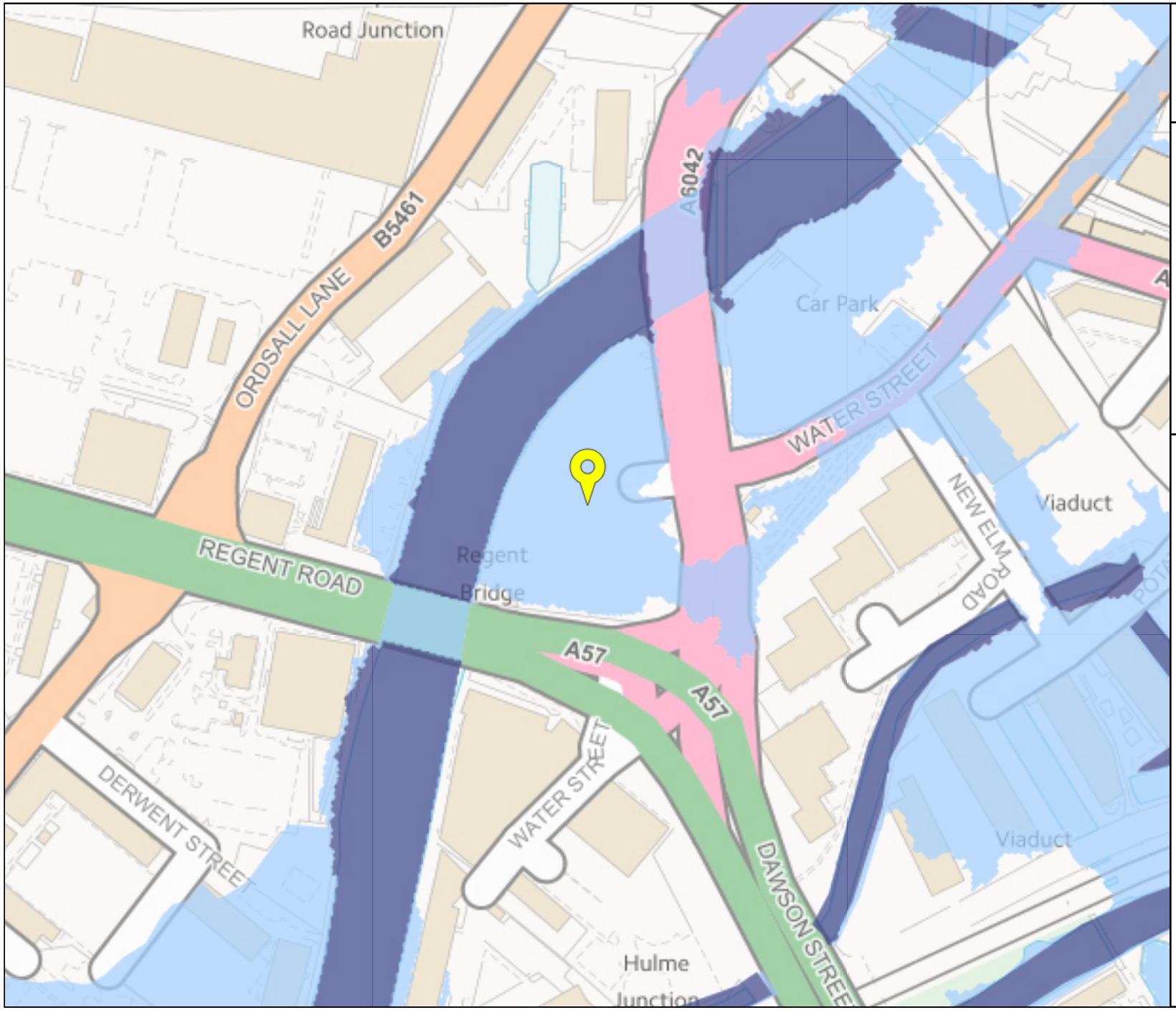
- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see www.gov.uk/guidance/flood-risk-assessment-standing-advice)

**Notes**

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

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

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Environment Agency

## Flood map for planning

Your reference
**Trinity Islan**

Location (easting/northing)
**382693/397747**

Scale
**1:2500**

Created
**19 Apr 2021 16:30**

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

0 20 40 60m



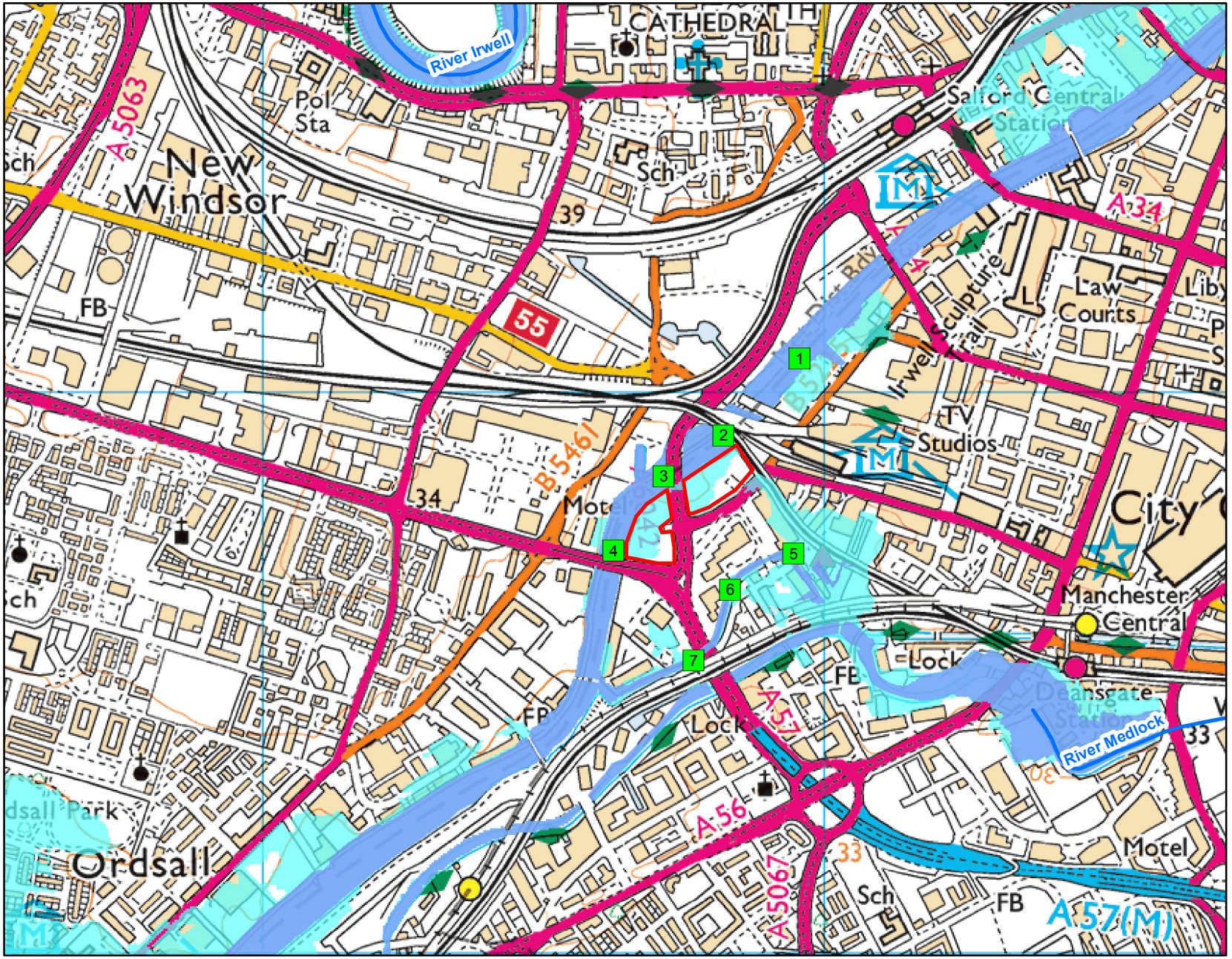
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**Appendix E**

Environment Agency Flood Level Data – Manchester Ship Canal Study 2018

Existing Flood Zone Extents

# Detailed Flood Map centred on Water Street, Manchester, M3 4JH. Created on 21/04/2021 [GMMC213863CC]




Environment Agency

1:10,001

N

## Legend

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

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**Contact Us:** National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 08708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

| | | | | | Undefended (Normal Operation) | | | | | | | | | | | Undefended (Latchford 1 Gate Closed) | | Undefended (Latchford 3 Gates Closed) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Map Reference | Model Node Reference | Easting | Northing | Data | 20 % AEP (1 in 5 year) | 10 % AEP (1 in 10 year) | 4 % AEP (1 in 25 year) | 2 % AEP (1 in 50 year) | 1.33 % AEP (1 in 75 year) | 1 % AEP (1 in 100 year) | 1 % AEP (1 in 100 year) + 30% increase in flow | 1 % AEP (1 in 100 year) + 35% increase in flow | 1 % AEP (1 in 100 year) + 70% increase in flow | 0.5 % AEP (1 in 200 year) | 0.1 % AEP (1 in 1000 year) | 1 % AEP (1 in 100 year) | 0.1 % AEP (1 in 1000 year) | 1 % AEP (1 in 100 year) |
| 1 | ea013_0251_IRWZ01_0882 | 382959 | 398059 | Modelled Water Level (m aodN) | 23.14 | 23.39 | 23.75 | 23.97 | 24.10 | 24.26 | 24.69 | 24.78 | 25.84 | 24.59 | 26.14 | 24.26 | 26.18 | 24.26 |
| | | | | Modelled Flow (cumecs) | 310.32 | 351.42 | 411.40 | 445.39 | 466.68 | 495.83 | 573.50 | 589.26 | 739.39 | 553.15 | 764.65 | 495.83 | 759.68 | 495.82 |
| 2 | ea013_0251_IRWZ01_0691 | 382822 | 397918 | Modelled Water Level (m aodN) | 23.05 | 23.29 | 23.64 | 23.85 | 23.97 | 24.13 | 24.54 | 24.62 | 25.54 | 24.45 | 25.79 | 24.13 | 25.82 | 24.13 |
| | | | | Modelled Flow (cumecs) | 310.37 | 351.46 | 411.45 | 445.46 | 466.75 | 495.90 | 573.59 | 589.34 | 745.05 | 553.25 | 774.19 | 495.90 | 770.47 | 495.88 |
| 3 | ea013_0251_IRWZ01_0569 | 382718 | 397848 | Modelled Water Level (m aodN) | 22.90 | 23.14 | 23.49 | 23.70 | 23.82 | 23.98 | 24.40 | 24.49 | 25.46 | 24.30 | 25.73 | 23.98 | 25.76 | 23.98 |
| | | | | Modelled Flow (cumecs) | 310.41 | 351.50 | 411.50 | 445.52 | 466.82 | 495.98 | 573.68 | 589.44 | 743.74 | 553.34 | 772.15 | 495.98 | 768.43 | 495.95 |
| 4 | ea013_0251_IRWZ01_0380 | 382625 | 397714 | Modelled Water Level (m aodN) | 22.82 | 23.04 | 23.35 | 23.55 | 23.66 | 23.81 | 24.20 | 24.27 | 25.20 | 24.11 | 25.47 | 23.81 | 25.50 | 23.81 |
| | | | | Modelled Flow (cumecs) | 310.48 | 351.57 | 411.59 | 445.63 | 466.93 | 496.10 | 573.81 | 589.58 | 744.72 | 553.50 | 774.76 | 496.10 | 770.43 | 496.08 |
| 5 | ea013_0251_MEDZ01_0480 | 382948 | 397713 | Modelled Water Level (m aodN) | 23.89 | 24.09 | 24.33 | 24.56 | 24.73 | 24.86 | 25.34 | 25.41 | 25.94 | 25.20 | 26.54 | 24.86 | 26.55 | 24.86 |
| | | | | Modelled Flow (cumecs) | 32.90 | 38.44 | 45.39 | 52.77 | 57.93 | 62.30 | 79.44 | 82.26 | 104.14 | 74.52 | 127.74 | 62.30 | 128.29 | 62.30 |
| 6 | ea013_0251_MEDZ01_0322( | 382830 | 397643 | Modelled Water Level (m aodN) | 23.31 | 23.47 | 23.65 | 23.82 | 23.95 | 24.05 | 24.41 | 24.47 | 25.00 | 24.30 | 25.38 | 24.05 | 25.43 | 24.05 |
| | | | | Modelled Flow (cumecs) | 32.96 | 38.51 | 45.48 | 52.87 | 58.04 | 62.42 | 79.60 | 82.42 | 103.68 | 74.66 | 126.57 | 62.42 | 127.02 | 62.42 |
| 7 | ea013_0251_MEDZ01_0191 | 382765 | 397523 | Modelled Water Level (m aodN) | 22.66 | 22.84 | 23.12 | 23.29 | 23.40 | 23.53 | 23.88 | 23.95 | 24.86 | 23.82 | 25.16 | 23.53 | 25.19 | 23.53 |
| | | | | Modelled Flow (cumecs) | 32.97 | 38.54 | 45.51 | 52.90 | 58.05 | 62.43 | 79.60 | 82.43 | 103.25 | 74.68 | 125.99 | 62.44 | 126.42 | 62.44 |

Model data taken from Manchester Ship Canal 2018 Study

AEP - Annual Exceedence Probability

m aodN - metres above ordnance datum Newlyn

cumecs - cubic metres per second

Notes:

*Climate Change Scenario - 30%, 35% and 70% increases in flow calculated for the 2080's (2070 - 2115). Please see https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances for more information regarding the new climate change guidance. The location of the site and the type (vulnerability) of development determine the climate change allowances to consider in any flood risk assessment.

For the Manchester Ship Canal Model, we provide the following three scenarios:

1. Normal Operation: All sluice gates operate automatically to maintain a navigable pounded water level upstream of each set of sluice gates. During times of high flow the gates are opened automatically to allow excess water pass downstream. During extreme conditions the sluice gates can be manually overridden to extend the opening heights.

2. Latchford 1 Gate Closed Scenario: This scenario represents a single operational sluice gate at Latchford Locks fixed closed. Therefore, only operational movements from 2 active sluice gates.The model setup removes the gate from PID controller setup and an IED file is used to define the sluice gate as fixed in the closed position.

3. Latchford 3 Gates Closed Scenario: This scenario has been defined as the removal of operational rules at all three sluice gates at Latchford Locks, thus, all gates are fixed in the closed position resulting in no regulation of upstream water levels. The model setup removes each of the gates from PID controller setup and an IED file is used to define sluice gates fixed in the closed position.

# Flood risk assessments: Climate change allowances

***Application of the allowances and local considerations***

# *Greater Manchester, Merseyside & Cheshire*

## 1) The climate change allowances

The National Planning Practice Guidance refers planners, developers and advisors to the Environment Agency guidance on considering climate change in Flood Risk Assessments (FRAs). This guidance was updated in February 2016 and is available on Gov.uk and should be read in conjunction with this document. The guidance can be used for planning applications, local plans, neighbourhood plans and other projects. It provides climate change allowances for peak river flow, peak rainfall, sea level rise, wind speed and wave height. The guidance provides a range of allowances to assess fluvial flooding, rather than a single national allowance. It advises on what allowances to use for assessment based on vulnerability classification, flood zone and development lifetime.

## 2) Assessment of climate change impacts on fluvial flooding

**Table A** below indicates the level of technical assessment of climate change impacts on fluvial flooding appropriate for new developments depending on their scale and location. This should be used as **a guide only**. Ultimately, the agreed approach should be based on expert local knowledge of flood risk conditions, local sensitivities and other influences. **For these reasons we recommend that applicants and / or their consultants should contact the Environment Agency at the pre-planning application stage to confirm the assessment approach, on a case by case basis**. **Table A** defines three possible approaches to account for flood risk impacts due to climate change, in new development proposals:

- **Basic:** Developer can add an allowance to the 'design flood' (i.e. 1% annual probability) peak levels to account for potential climate change impacts. The allowance should be derived and agreed locally by Environment Agency teams.
- **Intermediate:** Developer can use existing modelled flood and flow data to construct a stage-discharge rating curve, which can be used to interpolate a flood level based on the required peak flow allowance to apply to the 'design flood' flow.
- **Detailed:** Perform detailed hydraulic modelling, through either re-running Environment Agency hydraulic models (if available) or construction of a new model by the developer.

**Table A – Indicative guide to assessment approach**

| VULNERABILITY CLASSIFICATION | FLOOD ZONE | DEVELOPMENT TYPE | | |
|---|---|---|---|---|
| | | MINOR | SMALL-MAJOR | LARGE-MAJOR |
| ESSENTIAL INFRASTRUCTURE | Zone 2 | Detailed | | |
| | Zone 3a | Detailed | | |
| | Zone 3b | Detailed | | |
| HIGHLY VULNERABLE | Zone 2 | Intermediate/ Basic | Intermediate/ Basic | Detailed |
| | Zone 3a | Not appropriate development | | |
| | Zone 3b | Not appropriate development | | |
| MORE VULNERABLE | Zone 2 | Basic | Basic | Intermediate/ Basic |
| | Zone 3a | Basic | Detailed | Detailed |
| | Zone 3b | Not appropriate development | | |
| LESS VULNERABLE | Zone 2 | Basic | Basic | Intermediate/ Basic |
| | Zone 3a | Basic | Basic | Detailed |
| | Zone 3b | Not appropriate development | | |
| WATER COMPATIBLE | Zone 2 | None | | |
| | Zone 3a | Intermediate/ Basic | | |
| | Zone 3b | Detailed | | |

**NOTES:**

- Minor: 1-9 dwellings/ less than 0.5 ha | Office / light industrial under 1ha | General industrial under 1 ha | Retail under 1 ha | Gypsy/traveller site between 0 and 9 pitches
- Small-Major: 10 to 30 dwellings | Office / light industrial 1ha to 5ha | General industrial 1ha to 5ha | Retail over 1ha to 5ha | Gypsy/traveller site over 10 to 30 pitches
- Large-Major: 30+ dwellings | Office / light industrial 5ha+ | General industrial 5ha+ | Retail 5ha+ | Gypsy/traveller site over 30+ pitches | any other development that creates a non residential building or development over 1000 sq m.

**The assessment approach should be agreed with the Environment Agency as part of pre-planning application discussions to avoid abortive work**.

## 3) Specific local considerations

Where the Environment Agency and the applicant and / or their consultant has agreed that a '**basic**´ level of assessment is appropriate the figures in Table B below can be used as a precautionary allowance for potential climate change impacts on peak 'design' (i.e. 1% annual probability) fluvial flood level rather than undertaking detailed modelling.

**Table B – Local precautionary allowances for potential climate change impacts**

| Watercourse | Central | Higher Central | Upper |
|---|---|---|---|
| All | 0.15m | 0.24m | 0.48m |

Use of these allowances will only be accepted after discussion with the Environment Agency.

## 4) Fluvial food risk mitigation

Read the guidance on Gov.uk to find out which allowances to use to **assess** the impact of climate change on flood risk.

For planning consultations where we are a statutory consultee and our Flood risk standing advice **does not** apply we use the following benchmarks to inform flood risk **mitigation** for different vulnerability classifications. **These are a guide only**. **We strongly recommend you contact us at the pre-planning application stage to confirm this on a case by case basis. Please note you may be charged for this advice.** For planning consultations where we are not a statutory consultee or our Flood risk Standing advice applies we recommend local planning authorities and developers use these benchmarks but we do not expect to be consulted.

- For development classed as '**Essential Infrastructure**' our benchmark for flood risk mitigation is for it to be designed to the '**upper end**' climate change allowance for the epoch that most closely represents the lifetime of the development, including decommissioning.

- For **highly vulnerable** in flood zone 2, the '**higher central'** climate change allowance is our minimum benchmark for flood risk mitigation. In sensitive locations it may be necessary to use the **upper end** allowance.

- For **more vulnerable developments** in flood zone 2, the '**central**' climate change allowance is our minimum benchmark for flood risk mitigation, and in flood zone 3 the '**higher central**' climate change allowance is our minimum benchmark for flood risk

mitigation. In sensitive locations it may be necessary to use the **higher central** (in flood zone 2) and the **upper end** allowance (in flood zone 3).

- For **water compatible** or **less vulnerable** development (e.g. commercial), the '**central**' climate change allowance for the epoch that most closely represents the lifetime of the development is our minimum benchmark for flood risk mitigation. In sensitive locations it may be necessary to use the **higher central** (particularly in flood zone 3) to inform built in resilience.

There may be circumstances where local evidence supports the use of other data or allowances. Where you think this is the case we may want to check this data and how you propose to use it.

END.

**Appendix F**

Manchester City Council LLFA Correspondence

## Chloé Grimsley

**From:** [redacted]
**Sent:** 16 July 2021 09:41
**To:** Chloé Grimsley
**Cc:** Andy Rain
**Subject:** RE: Trinity Island

**Follow Up Flag:** Follow up
**Flag Status:** Flagged

Morning Chloe,

Hope you are well.

Yes, I can confirm that raising the finished floor levels above 1 in 1000 year event should be a sufficient level of protection against fluvial flooding. However saying this, due to the nature of the development and its proximity to a main river we would also require a flood evacuation plan as part of the Flood Risk Assessment.

In regards to points of discharge, we would accept this method of discharge provided we receive correspondence evidencing that Peel will accept the outfall and proposed flows. We would also like to see some form of SuDS systems on site to reduce peak flow times and to provide some capacity relief during high level storm events.

Thanks,

Oliver

[redacted]
Lead Local Flood Authority
Highways
Growth & Development and Neighbourhoods Directorate
Manchester City Council
PO Box 532 Town Hall
Manchester
M60 2LA

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

[redacted]

Hi Oliver,

Further to your meeting with Andy regarding the above (and apologies for my absence) just to confirm what was discussed and agreed:

**Flood Risk**

Updated Flood data presented and agreed that the 2018 model data provided by the EA is to be used in Flood Risk Assessment.
Flood Levels appropriate to the site:
1 in 100 Year – 24.130m
1 in 100 Year +35% = 24.620m
1 in 100 Year +70% = 25.540m
1 in 1000 Year = 25.790m
1 in 1000 Year with a gate closed = 25.820m

Based on the above, the approach for the development to mitigate flood risk is to set minimum ground floor levels based on the 1 in 100 Year +70% scenario plus 300mm of freeboard i.e. **25.840m.** This would therefore be in excess of the 1 in 1000 and 1 in 1000 Year with a gate closed scenarios. Basement areas would be protected and suitably waterproofed up to ground floor level therefore offering the same level of protection.

**Drainage**
In line with the approach agreed as part of the St Johns Masterplan, the surface water drainage is to have a free discharge into the Irwell (under agreement with Peel) on the basis that surface water betterment has been achieved as it relieves the combined sewer system of 100% of surface water flows.

Please can you confirm that this is as you understand.

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

Kind Regards,
Chloé

**Chloé Grimsley** Principal Engineer
[redacted]

Hi Chloe,

Sorry for the delay.

Just a quick email to confirm that we do not have any historic records of flooding for the Trinity Islands site.

Thanks,

Oliver

[redacted]
Lead Local Flood Authority
Highways
Growth & Development and Neighbourhoods Directorate
Manchester City Council
PO Box 532 Town Hall
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M60 2LA

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

[redacted]

Hi Oliver,

As per our separate correspondence on Plot F, Great Jackson Street - we are also looking at the Trinity Island site which is plot C and D adjacent to Trinity Way.

The site location is shown below.

*Figure 1: Plot Boundaries*




We are currently preparing a Flood Risk Assessment and Drainage Strategy to support the upcoming planning application, however there has been previous masterplanning in place for this site, and this site was captured in the previous FRA and Drainage Strategy documentation associated with the St Johns/Trinity Island Masterplan originally undertaken by ROC in 2016. However, we are now preparing standalone documentation for this site and would like to discuss the proposals and updated flood information and confirm you are happy with the principles of the drainage strategy.

The development proposals are for four residential towers with residents amenity space at ground level and two-storey basement car parking. Please see attached site plan for information.

**Flood Risk**

The site is located within Flood Zone 2, and we have obtained the latest flood level data from the EA, however the flood levels now potentially impacting on the site are significantly lower than apparent from the previous completed FRA - we would therefore like to agree the approach of minimum protection requirements based on the current flood data. I have attached the flood level data for information, however in summary:

**Existing FRA (based on the 2011 Irwell Study)**
The flood data forming the basis of the previous flood risk to the site was taken from the 2011 River Irwell Study, which indicated that a flood level for the 100 year +20% climate change scenario was 26.600m.

**Proposed FRA (based on the 2018 Irwell Study)**
We have reconsulted with the EA and obtained the up to date flood level information – taken from the 2018 Irwell Study.

The flood levels therefore now applicable to the site are as follows - based on Node 2, which is the most upstream point adjacent to the site:
1 in 100 Year – 24.130m
1 in 100 Year +35% = 24.620m
1 in 100 Year +70% = 25.540m
1 in 1000 Year = 25.790m
1 in 1000 Year with a gate closed = 25.820m

We therefore would propose to set mitigation based on the above levels.

**Drainage**
In relation to the Drainage Strategy, we will be proposing to discharge surface water to the Irwell to the north of the site. The principles that were previously agreed with Esther and Zorica during the masterplanning with St Johns was for a free discharge into the Irwell (under agreement with Peel) on the basis that surface water betterment has been achieved as it relieves the combined sewer system of 100% of surface water flows. Please could you confirm the approach is acceptable?

It would be useful if you could advise if you have any historic flooding records at or in the vicinity of the site and advise on any information you would like to see included within the planning documentation.

Hopefully we can pick the above points up following the Plot F meeting on Tuesday.

Kind Regards,
Chloé

[redacted]

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**Appendix G**

Drainage Strategy




KEY:

SITE BOUNDARY - APPROXIMATE TBC

BASEMENT B1 EXTENTS (TAKEN FROM TPM DRAWING)

INDICATES INITIAL PROPOSAL FOR PERMEABLE SUB-BASE LAYER FOR SURFACE WATER RUN-OFF COLLECTION. TBA

APPROXIMATE INTERNAL ROUTING TBC BY OTHERS

DEVELOPMENT BOUNDARY

## GENERAL NOTES:

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10. 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.
11. OUTFALL CONNECTION(S) SUBJECT TO AGREEMENT WITH THE APPROVING AUTHORITY.

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