

# Drainage Technical Note

|          |                                                   |            |               |
|----------|---------------------------------------------------|------------|---------------|
| Project  | Pyramid Park, Bury                                | Project No | 14111         |
| Subject  | Drainage                                          | Date       | 22 April 2024 |
| File Ref | 14111-CRH-XX-XX-RP-C-0002 Drainage Technical Note | Pages      | 12            |

## INTRODUCTION

### Objective

- 1.1 This technical note is intended to provide an initial high level review of the flood risk and drainage elements for Pyramid Park, Bury.

### The site

- 1.2 The site is located directly south of Bury Town Centre and is currently public open space. On site, pyramid structures are present, and a former pond was situated in the central/eastern section of the site. The B6218 crosses the site from approximately 3m above in the east, the site is bound by buildings and car parks to the north, a residential area to the east, Bury college to the south and further buildings to the west. In addition, a railway line borders the site to the south and west, and the current use of the line to the west is for Metrolink trams.
- 1.3 The nearest postcode for the site is BL9 0EQ and the approximate National Grid Reference for the centre of the site is 380500 E, 410315 N.
- 1.4 Bury Metropolitan Borough Council is the Local Planning Authority (LPA) for the site and act as the Lead Local Flood Authority (LLFA) for the area.

### Proposed development

- 1.5 The proposed development is still subject to final confirmation however at this stage proposals are for a mixed-density residential development. The first stage of work is to provide an advanced infrastructure package consisting of earthworks, providing a new ramped access and associated drainage.
- 1.6 The advanced infrastructure package will include a new access road with an approximate impermeable area of 0.187 ha.

## PRELIMINARY FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY

### Site Elevations

- 2.1 The topographic survey of the site (displayed in the Appendix) has shown that the site ranges in levels from approximately 85mAOD in the centre of the site to approximately 90mAOD in the southeast and the west. Generally, the site is lower in the centre.

### Existing Drainage

- 2.2 The United Utilities Sewer Records as contained in the Technics Underground Utility Report reveal an existing 900mm diameter public surface water sewer that appears to discharge into the former onsite waterbody. However, a review of the records indicate what appears to be an abandoned sewer upstream of this outfall and so it has been assumed that no flows discharge into the site. An additional 225mm diameter public surface water also exists that runs parallel to this waterbody to the south, running from east to west, and connects into an existing combined public sewer. Another existing combined public sewer that ranges in diameter from 450mm to 525mm runs from east to west along the southern site boundary. These records are attached in the Appendix D.

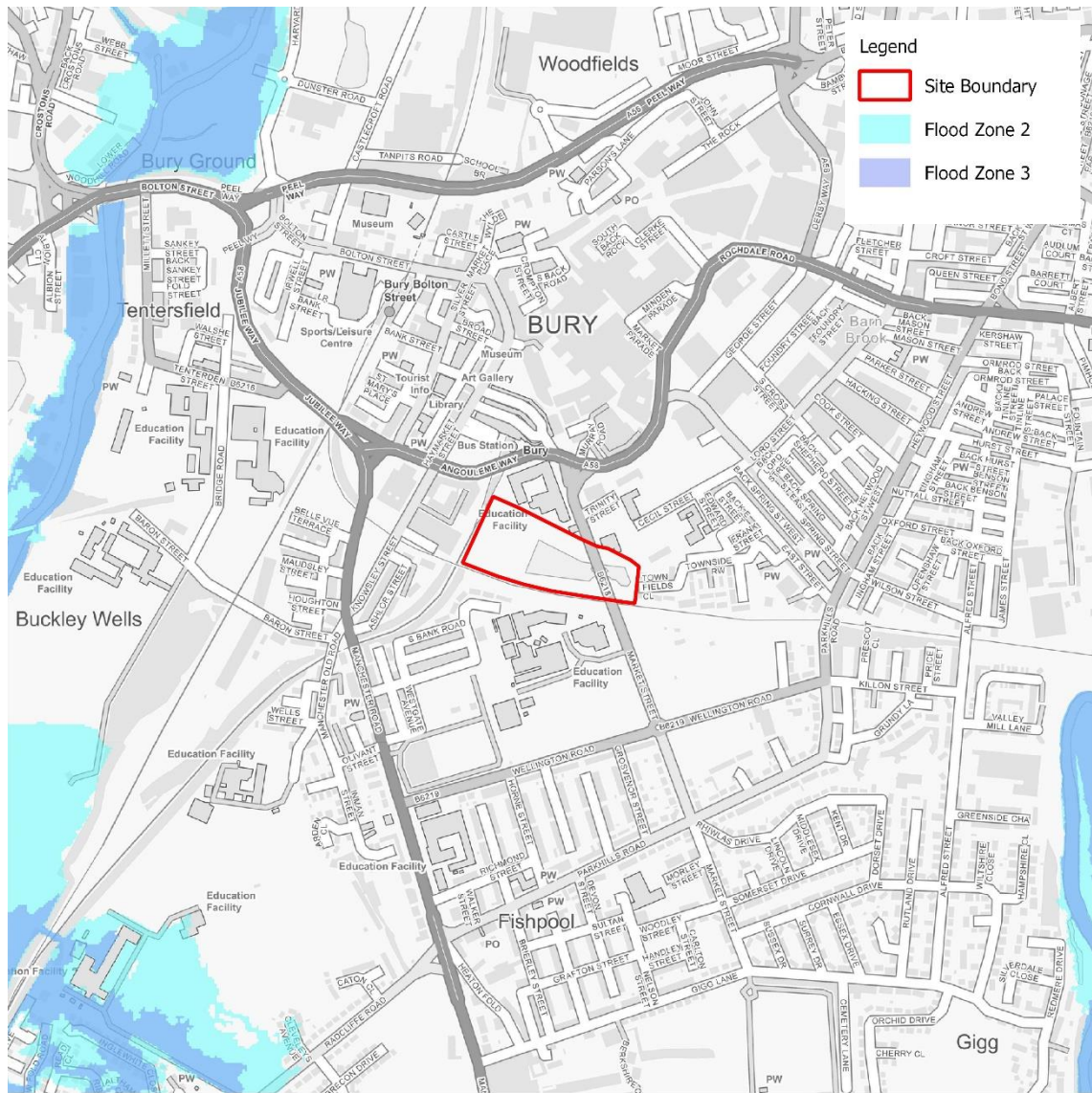
#### **Drainage Survey**

- 2.3 A drainage survey was conducted on 11<sup>th</sup> March 2024 to investigate the location and connectivity of the on site drainage systems. The information from this survey is contained within Appendix E.
- 2.4 Manhole referenced 4202 from the United Utilities plan in Appendix D was identified during the survey and will be the main outfall for the advanced construction works.

#### **Flood Risk**

*Fluvial/Tidal Flood Risk*

- 2.5 Bury is included in the Environment Agency's Greater Manchester indicative Flood Risk Area.
- 2.6 Environment Agency (EA) Flood Maps for Planning (Rivers and Seas) indicates that the site is located within Flood Zone 1 (Low Risk), see Figure 1. This represents an area which has less than a 0.1% chance of flooding each year.



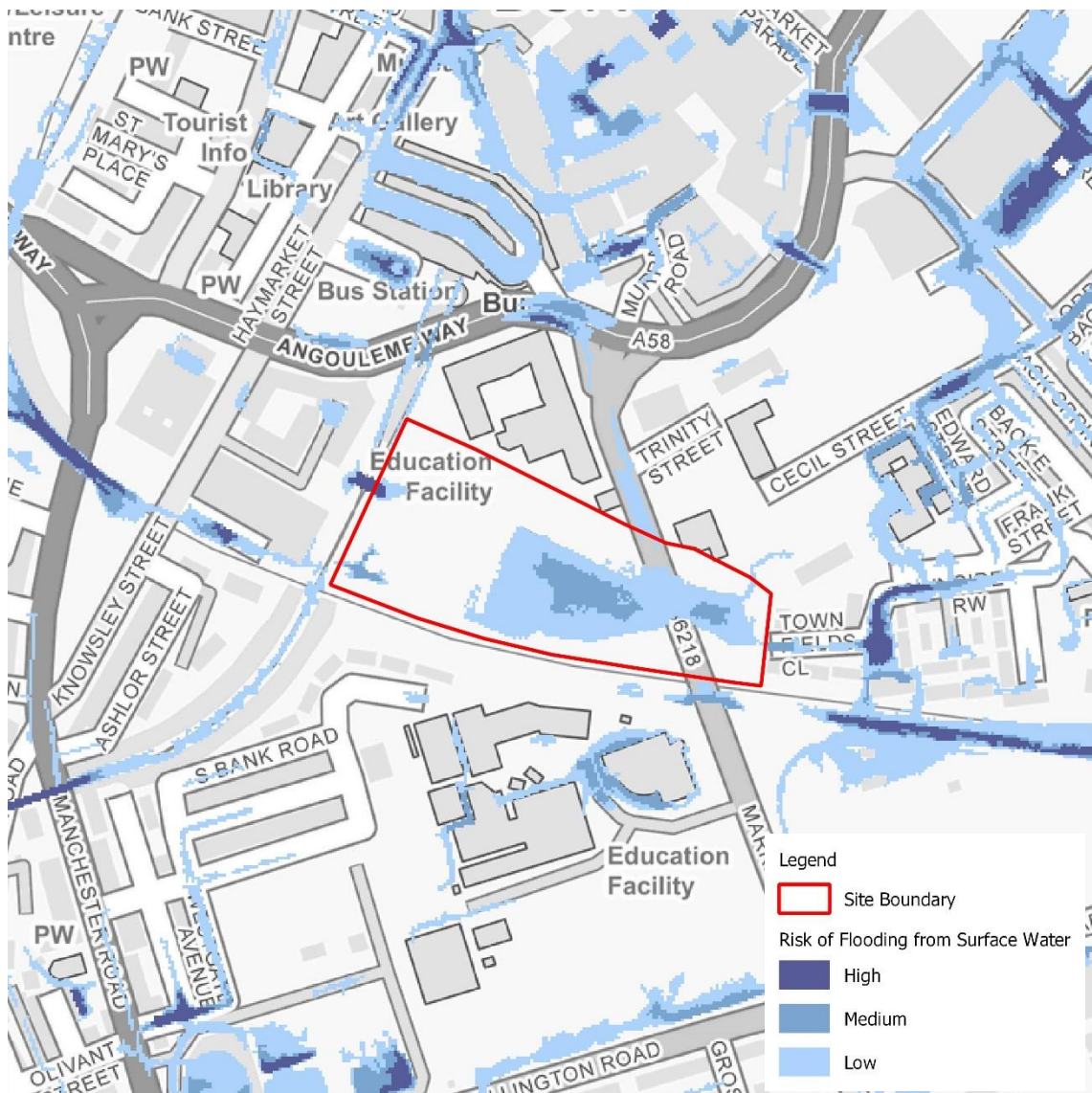
© Crown copyright. All rights reserved. Ordnance Survey Licence number 100020027.  
Contains Ordnance Survey data © Crown copyright and database right 2022.  
Copyright © Environment Agency 2022.

Figure 1- EA Flood Zone Map (Not to scale)

- 2.7 The River Irwell flows north to south approximately 700m west of the site and the River Roch flows north to south approximately 800m south east. Both are designated as EA main rivers. There is a waterbody shown on site in OS mapping, however this waterbody is not visible on satellite mapping. The site is not within a flood alert or a flood warning area.

### Surface Water Flood Risk

- 2.8 The EA mapping for surface water flood risk indicates the majority of the site where the waterbody is mapped is at a low (between 0.1% and 1%) to medium (between 1% and 3.3%) risk from surface water flooding, see Figure 2. A small section at the western boundary has a high (greater than 3.3%) risk of surface water flooding.



© Crown copyright. All rights reserved. Ordnance Survey Licence number 100020027.  
Contains Ordnance Survey data © Crown copyright and database right 2022.  
Copyright © Environment Agency 2022.

Figure 2- EA Surface Water Flood Risk (Not to scale)

- 2.9 The BRO Level 2 SFRA displays the flood risk in Bury which details areas susceptible to surface water flooding and is contained in the appendix.
- 2.10 The Bury Local Flood Risk Management Strategy (LFRMS) does not identify the site area as a surface water flooding hotspot.
- 2.11 The Bury PFRA Areas above Flood Risk Thresholds map shows the site is in an area above the flood risk threshold meaning there are 200 people, 20 business or 1 critical service at risk. This map is contained in the appendix.

*Groundwater Flood Risk*

- 2.12 A review of the BRO Level 1 SFRA states that there are relatively few incidents of groundwater flooding in Bury. It does mention that the Environment Agency has identified groundwater recharge as a result of ceasing mine dewatering.
- 2.13 The Bury LFRMS indicates the site area is between 25%-50% on the areas susceptible to groundwater flooding map.
- 2.14 The Groundsure report from December 2021 shows the site to be a low risk from groundwater flooding.

*Sewer Flood Risk*

- 2.15 The BRO Level 1 SFRA states that the DG5 database (June 2007) recorded flood incidents with a total of 51 properties in Bury, the least out of Bury, Rochdale and Oldham. It mentions known issues with sewer capacity in Bury but specifically in Radcliffe and Ramsbottom.
- 2.16 The Greater Manchester Surface Water Management Plan has a record of a sewer flood in Bury causing gardens to flood in July 2006.
- 2.17 The PFRA Local Historic Flood Map, shown in the Appendix, highlights UU DG5 flood locations approximately 600m south of the site. The UU Sewerage Incidnet Register System (SIRS) and Wastewater Incident Register System (WIRS) maps several incidents in the surrounding area of the site.
- 2.18 The Flood Risk Topic Paper developed as part of the emerging Bury Local Plan suggests insufficient capacity of the sewer and drainage networks to accommodate increasing amounts of surface water. However, it also reveals that a number of the properties discussed to have suffered from flooding are located in and around Prestwich, Ramsbottom and Tottington.

*Artificial Flood Risk*

- 2.19 Elton Reservoir is approximately 1.4km south west of the site. The Bury LFRMS states that the Elton Reservoir is considerably bigger than any other reservoir within the borough. The Bury, Rochdale and Oldham (BRO) Level 1 SFRA details a historic flood event with Elton Reservoir flooding 70 properties.
- 2.20 However, information available from the EA for risk of inundation from reservoirs indicates that the site is at very low risk of flooding from this source.

## Geology

- 2.21 Information available from British Geological Survey (BGS) records notes the bedrock geology as Pennine Lower Coal Measures formation – mudstone, siltstone and sandstone. The superficial deposits on site are devensian till – Diamicton.
- 2.22 Draft borehole logs recorded by Dunelm Geotechnical and Environmental in January 2022 shows made ground across some areas of the site ranging from depths of 2.1m to 3.2m. These borehole logs also display evidence of clay, silt and sand.
- 2.23 Soilscales describes the soil as freely draining slightly acid loamy soils.

## Foul Water Drainage

- 1.1.1. No foul water connection is required for the advanced construction works.

## Surface Water Drainage

- 2.24 The proposed surface water drainage system should be designed in accordance with the NPPF and the accompanying Guidance and Technical Standards for SuDS. It should also comply with the requirements under Building Regulations Part H and the Lead Local Flood Authorities (LLFA) Policy for the Management of Surface Water.
- 2.25 A review of the site characteristics has informed the following site constraints:
- 2.26 Due to made ground on site and potential contamination from previous land use it is assumed that soakaway drainage will not be possible on the site.
- 2.27 Topography of the site shows that the outer edges are higher than the centre of the site which could cause potential issues with a gravity outfall
- 2.28 Based on approximate site area of 0.187ha, restricting flows to the calculated greenfield runoff rate  $Q_{bar}$  would result in a restricted site discharge of approximately 1.94l/s. Flows should be limited to 4.04 l/s in all storms up to and including the 1 in 100 year +45% climate change event. Table 2.1 below tabulates the greenfield runoff rates based on 0.187 site area. Calculations are contained within the appendix.

Table 2.1: Greenfield runoff rates

| Storm Event   | Greenfield Runoff Rate<br>(litres/sec) |
|---------------|----------------------------------------|
| $Q_{bar}$     | 1.94                                   |
| 1 in 1 Year   | 1.69                                   |
| 1 in 30 Year  | 3.3                                    |
| 1 in 100 Year | 4.04                                   |

- 2.29 Initial surface water storage calculations have been carried out using Infodrainage Source Control. The attenuation calculations are attached within Appendix B.

- 2.30 For the 1 in 100 year + 45% (180 mins: Winter) climate change event, an attenuation tank with 1m depth would require an approximate area of 108m<sup>2</sup>.
- 2.31 The proposal is to provide an attenuation tank within the turning head of the proposed site access which then connects into manhole 4202 at an agreed restricted flow of 5 l/s as per the proposed drainage layout in Appendix A
- 2.32 With regard to surface water outfall for the site, assuming a gravity connection can be made to the public sewer it is envisaged that the connection would be made to the public surface/combined water sewer running across the south of the site into existing manhole 4202. This manhole is quite shallow at 2m, with a cover level of 85.72 and an invert level of 83.72. Due to the site topography, further investigation into any proposed drainage levels would be required to assess whether a gravity connection would be feasible. Should a gravity connection not be feasible due to the location/level of the public sewer system and site topography, a pumped drainage solution may be required. Any connections to the public sewer would be subject to a S106 agreement with UU and any drainage proposals will be subject to the confirmation of existing public sewer levels.
- 2.33 A Pre-Development Wastewater enquiry response from UU has been received and is contained in the Appendix. They confirm a connection to the combined at MH 4202 sewer at 5 l/s for the construction phase of the access road only. Once this is commissioned the full site will require an additional assessment in order to determine flows and location of connections. The response from UU is saved in Appendix E.

## CONCLUSION/FURTHER WORKS

- 3.1 This technical note provides an initial high level review of the flood risk and drainage elements for the advanced infrastructure work at Pyramid Park, Bury. As part of the ongoing development of the site masterplan it is recognised that further investigations and enquiries will be required in order to allow proposals with respect to drainage and surface water management to be developed further.
- 3.2 As a minimum it is recommended that the following activities are undertaken as part of any further works to enable drainage proposals to be developed further:
- 3.3 Undertake on site investigations to confirm the levels of the existing public sewers to enable an assessment of the proposed site outfall position and determine if the foul and surface water connections will be via gravity or pumped.

## APPENDIX A – PROPOSED LAYOUT

## APPENDIX B – DRAINAGE CALCULATIONS

## APPENDIX C – CCTV SURVEY

## APPENDIX D – UNITED UTILITY PLAN

## APPENDIX E – PRE-DEVELOPMENT ENQUIRY