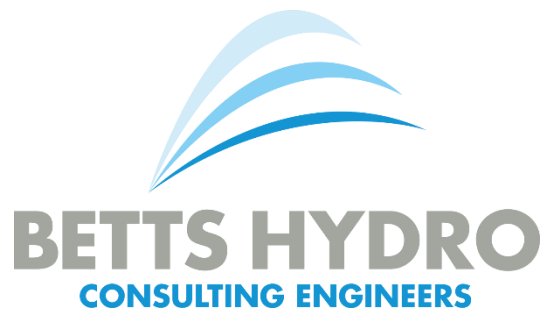




LAND OFF CRABTREE LANE MANCHESTER

DRAINAGE MANAGEMENT STRATEGY



For

Keepmoat
Aviation House
No. 2 Windward Drive
Liverpool
L24 8QR



OCTOBER 2025

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LAND OFF CRABTREE LANE MANCHESTER

DRAINAGE MANAGEMENT STRATEGY

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EXECUTIVE SUMMARY

This Drainage Management Strategy was commissioned by Keepmoat Homes, referred to hereafter as 'the client'. This report has been prepared to support an application for the construction of 194no. residential dwellings on land located off Crabtree Lane in Manchester.

This assessment has been completed in accordance with National Planning Policy Framework and Planning Practice Guidance to consider the most appropriate sustainable drainage options for the proposals in line with the Non-Statutory SuDS Standards. The surface water run-off management options have been assessed in accordance with the sustainable drainage hierarchy.

The site is in part, developed at present. It is understood that there is an existing drainage infrastructure catering for the existing development onsite. The undeveloped areas of the site likely discharge informally via overland runoff into Ashton Canal, and toward Crabtree Lane.

Based on the underlying ground conditions identified, the use of infiltration is not considered to be a suitable surface water management option; this may need to be evidenced by Soakaway Testing to satisfy the Lead Local Flood Authority. The proposals are therefore to discharge surface water generated by the proposals into the culverted watercourse which crosses the site (subject to formal consents). A Preliminary Drainage Layout has been prepared by Betts Associates to demonstrate the feasibility of the scheme.

In accordance with the SuDS Manual (CIRIA) and the Non-Technical Standards for SuDS (March 2015) all sites should endeavour to achieve as close to pre-development greenfield rates as is viable. Based on the development area, the pre-development greenfield rate (QBar) is calculated to be 27.8l/s (9.2l/s/ha).

The proposed surface water drainage system will need to be designed to cater for the surface water run-off generated in the events up to and including the 1 in 100yr return period event with 45% allowance for Climate Change.

In terms of conveyance given the site constraints this will likely be in the form of belowground pipework. Stormwater storage will be provided below ground (cellular storage/oversized pipes) due to the engineering constraints associated with crossing and out falling into the culvert which crosses the site.

This Drainage Management Strategy has been prepared in consultation with the relevant interested parties. The report is commensurate with the scale and nature of the development, and the development is appropriate in accordance with the Non-Statutory Standards.

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CONTENTS

Document Tracking Sheet	iii
EXECUTIVE SUMMARY	v
Figures & Tables.....	vii
Specialist Software	viii
Abbreviations & Acronyms	ix
1.0 INTRODUCTION	11
1.1 Planning Policy Context	11
1.2 Site Context	11
1.3 Consultation	11
2.0 EXISTING SITE LOCATION	12
2.1 Location	12
2.2 Existing and Historical Land Use	12
2.3 Topography	13
3.0 DEVELOPMENT PROPOSALS	14
3.1 Nature of the Development	14
4.0 SURFACE WATER MANAGEMENT	16
4.1 Pre-Development Surface Water Run-off	16
4.2 Post Development Surface Water Run-Off	16
4.3 Sustainable Drainage Systems (SuDS)	16
4.4 Methods of Surface Water Management	18
4.5 Discharge via Infiltration	18
4.6 Discharge to Watercourse.....	18
<i>Proposed Discharge Rates</i>	20
4.7 Discharge to the Public Sewer Network	20
4.8 Climate Change	21
5.0 FOUL WATER MANAGEMENT	22
6.0 SUMMARY AND CONCLUSIONS.....	23
7.0 RECOMMENDATIONS.....	24
BIBLIOGRAPHY & REFERENCES	25
Web-based References	25

Figures & Tables

Figure 1: Existing Features Plan (Google Maps, 2025)	12
Figure 2: General Arrangement Landscape Plan (Urban Green, 2025)	14
Table 1: Pre-Development Surface Water Run-Off Rates (Betts Hydro, 2025)	16
Table 2: Post-Development Un-Restricted Run-Off Rates (Betts Hydro, 2025)	16

Figure 3: SuDS Photographs (SusDrain, 2012)	17
Figure 4: Preliminary Drainage Layout (Betts Associates, 2025)	19
Table 3: Estimated Stormwater Storage Requirements (Betts Hydro, 2025)	20
Table 4: Change to Peak Rainfall Compared to Baseline (Environment Agency, 2022)	21
APPENDIX A: NPPF + PPG EXTRACTS	
APPENDIX B: EA INFORMATION & CORRESPONDENCE	
APPENDIX C: UU CORRESPONDENCE.....	
APPENDIX D: LPA/LLFA CORRESPONDENCE	
APPENDIX E: CRT CORRESPONDENCE.....	
APPENDIX F: LOCATION PLAN	
APPENDIX G: TOPOGRAPHICAL SURVEY	
APPENDIX H: PROPOSED PLANNING LAYOUT	
APPENDIX I: EXISTING UTILITIES INFORMATION.....	
APPENDIX J: SURFACE WATER RUN-OFF CALCULATIONS	
APPENDIX K: CULVERT CCTV SURVEY.....	
APPENDIX L: PRELIMINARY DRAINAGE LAYOUT.....	
APPENDIX M: SUDS EXAMPLES	
APPENDIX N: NOTES OF LIMITATIONS	

Specialist Software

-  MicroDrainage WinDES (v.2020.1.3) – Calculation of Greenfield run-off volumes, rates of rainfall and stormwater storage estimates.

Abbreviations & Acronyms

BGS	British Geological Survey
CRT	Canal & River Trust
DMS	Drainage Management Strategy
EA	Environment Agency
FEH	Flood Estimation Handbook
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
MCC	Manchester City Council
QBAR	Mean Annual Flood
NPPF	National Planning Policy Framework
PPG	Planning Practice Guidance
QSE	Quick Storage Estimate
SuDS	Sustainable Drainage Systems
UU	United Utilities

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1.0 INTRODUCTION

1.1 Planning Policy Context

- 1.1.1 All forms of flooding and their impact on the natural and built environment are material planning considerations. The National Planning Policy Framework (NPPF) sets out the Government's objectives for the planning system, and how planning should facilitate and promote sustainable patterns of development, avoiding flood risk and accommodating the impacts of climate change.
- 1.1.2 Government policy with respect to development in flood risk areas is contained within the NPPF and the supporting Planning Practice Guidance (PPG) (refer to extracts in **Appendix A**). This Drainage Management Strategy (DMS) has been completed in accordance with NPPF/PPG to consider the most appropriate sustainable surface water and foul water drainage options for the proposals.
- 1.1.3 The purpose of this assessment is to ensure that there is no increased flood risk because of the development in line with the NPPF guidance. The use of Sustainable Drainage Systems (SuDS) to manage surface water run-off has also been considered as part of the assessment in line with the Non-Statutory Standards.

1.2 Site Context

- 1.2.1 This DMS been prepared to support a planning application the construction of 194no. residential dwellings on land located off Crabtree Lane, Manchester. The proposals will be complete with access, car parking, external works, boundary fencing, external services, and drainage.

1.3 Consultation

- 1.3.1 The preparation of this report has been undertaken in consultation with the Environment Agency (EA), United Utilities (UU), Manchester City Council (MCC) and Canal and River Trust (CRT). The consultation responses can be seen in **Appendix B, C, D and E** respectively.

2.0 EXISTING SITE LOCATION

2.1 Location

2.1.1 The site is located off Crabtree Lane, Manchester. The nearest Ordnance Survey National Grid Reference is E: 388788, N: 398077 and the nearest postcode is M11 1GY (see the Location Plan in **Appendix F**). The whole site covers 3.053ha and is edged in red in **Figure 1**.

2.1.2 In terms of the surrounding land-use, the site is bound to the north by Ashton Canal, with industrial and commercial development beyond. To the west sits Clayton Industrial Estate off Claytonbrook Road, and to the east sits the Edge Lane Allotments. Further residential development can be found to the south of the site.



2.2 Existing and Historical Land Use

2.2.1 The site is currently a combination of undeveloped greenfield land, forested land, and existing industrial buildings. Historical mapping from between 1830 to 1880 shows a culvert to be present on the eastern side of the site. Discussion with the client, and review of both the historic mapping and topographic survey has identified that the culvert is still present and active onsite.

- 2.2.2 Historical mapping from between 1888 to 1915 shows a series of buildings to the north-west and north-east of the site referred to as Clayton Gardens and Crabtree Forge. 2005 satellite imagery shows more buildings located towards the west of the site than exist at present.

2.3 Topography

- 2.3.1 A topographic survey has been completed for the eastern half of the site, showing levels to vary by less than 2m across this area. Levels in this half of the site fall from east to west, then to rise slightly once reaching a north-to-south ridge running down the centre of the site (see topographic survey in **Appendix G**).
- 2.3.2 Since there has been no topographic survey of the western half of the site, a qualitative approach has been taken to assess levels using LiDAR data. The LiDAR data shows levels in the western half of the site to be relatively flat but following a shallow gradient from east to west. LiDAR again shows a relatively steeper ridge running from north to south down the centre of the site. The arrows shown in **Figure 1** indicate the general falls across the site.

3.0 DEVELOPMENT PROPOSALS

3.1 Nature of the Development

3.1.1 This planning application is for the construction of 194no. residential dwellings off Crabtree Lane, Manchester. The proposals will be complete with access, footpaths, car parking, external works, landscaping, boundary fencing, and drainage. The site plan is included within **Figure 2** (see full plan in **Appendix H**).

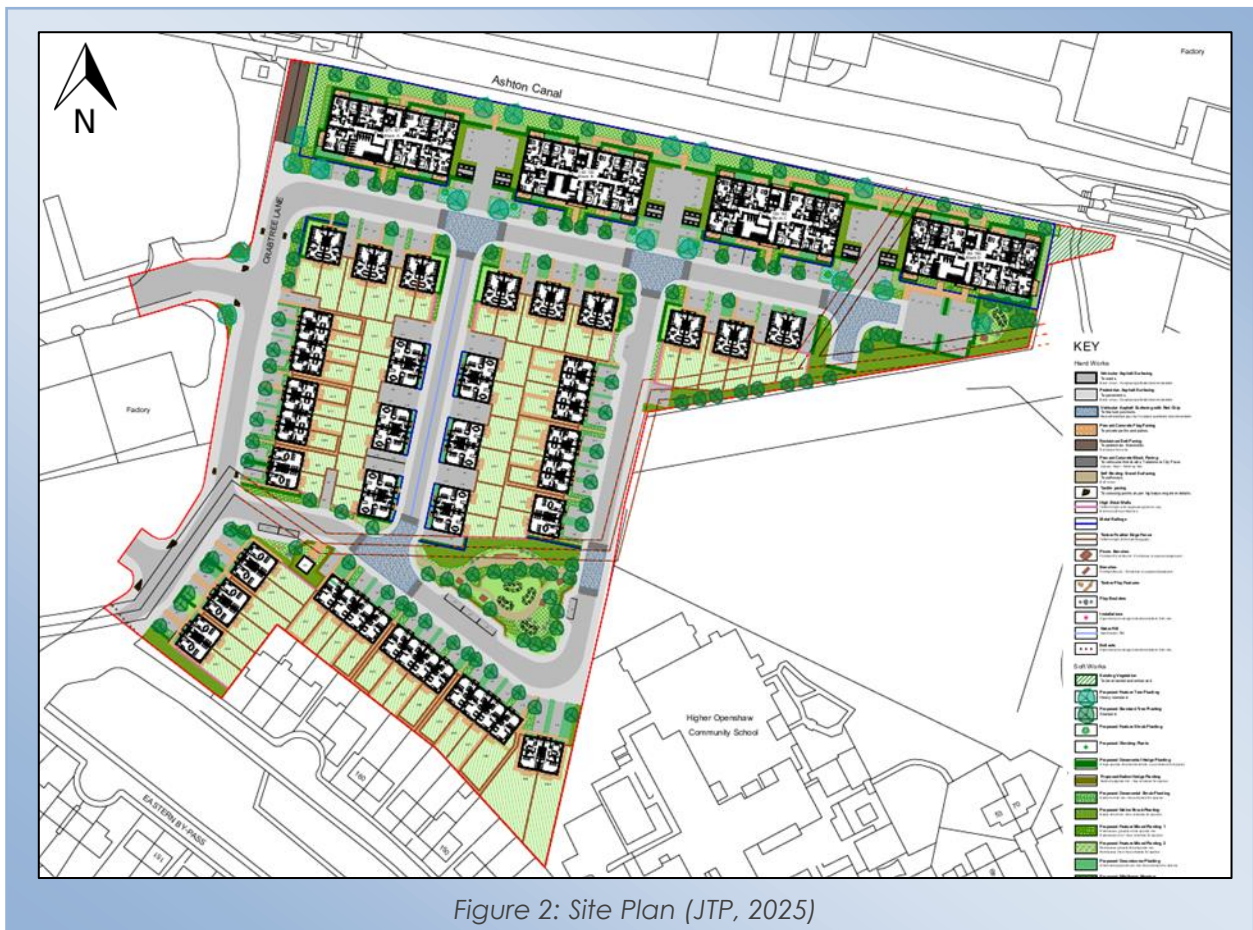


Figure 2: Site Plan (JTP, 2025)

- 3.1.2 As shown in the planning layout (extract in **Figure 2**), there are existing culverts crossing the wider site from the east to west. The LLFA typically require a 6-8m offset to be maintained from the centreline of the culverted watercourses crossing the site. No development can take place within this zone without prior written approval from the LLFA.
- 3.1.3 A culverted system exists beneath the eastern part of the site. This culvert connects to a culverted watercourse running through the site from east to west. The function of this culvert is currently unknown; consultation with CRT has recommended further investigation into this system to determine whether it serves as a canal feeder / overflow or runs beneath the canal (see consultation response in **Appendix E**). The proposals are to maintain offsets from this system. This system is also likely predominantly dry, meaning it poses minimal risk to proposed onsite development.

- 3.1.4 A full survey of the culverted watercourse has now been undertaken and is included within **Appendix K**. The survey has identified a collapse and blockage of the culvert, and therefore remedial works are required to ensure this asset remains operational post-development.
- 3.1.5 The culvert as surveyed is 450mm in diameter, with depths varying up to 6m. In accordance with the guidance provided by the Lead Local Flood Authority a 6m wide easement has been added (3m either side of the pipe). This is subject to agreement and formal consent from the LLFA.
- 3.1.6 The total site covers 3.053ha, with an approximate current impermeable area of 1.098ha. Based on the above planning layout, the impermeable areas will increase to 55% of the total site area post-development. Opportunities to provide soft landscaping on the site would provide added benefits to water quality and ecology.
- 3.1.7 National and local policy identifies that SUDS should be incorporated into new development where feasible to manage surface water run-off generated. Betterment in the form of permeable surfaces opposed to external hardstanding should also be considered to reduce the surface water run-off.

4.0 SURFACE WATER MANAGEMENT

4.1 Pre-Development Surface Water Run-off

- 4.1.1 The total site covers 3.053ha and is 100% permeable within the drainage calculations. The development area covers a smaller 3.037ha, excluding a small area in the north-eastern corner.
- 4.1.2 The site is in part, developed at present. It is understood that there is an existing drainage infrastructure catering for the existing development onsite (see existing utilities information in **Appendix I**). The undeveloped areas of the site likely discharge informally via overland runoff into Ashton Canal, and toward Crabtree Lane.
- 4.1.3 The peak rates and volumes of run-off generated by the site have been calculated for the peak events shown in **Table 1**. The surface water run-off rates have been calculated using the FEH Method. The full calculations in **Appendix J** are based on an area of 1ha and these rates and volumes are calculated pro-rata for the development area of 3.037ha.

Dev. Area	Run-Off Rates				Run-Off Volumes	
	1 In 1yr	1 In 30yr	1 In 100yr	QBar	1 In 1yr	1 In 100yr
3.037ha	24.2l/s	47.3l/s	57.9l/s	27.8l/s	364.9cu.m	1097.0cu.m

Table 1: Pre-Development Surface Water Run-Off Rates (Betts Hydro, 2025)

4.2 Post Development Surface Water Run-Off

- 4.2.1 Based on the planning layout, the impermeable areas will increase to 55% of the development area, which will equate to 1.670ha. An additional 10% allowance has also been added to the estimated proposed impermeable area for this assessment to account for urban creep (totalling 1.974ha). The unrestricted post-development run-off rates have also been detailed in **Table 2**.

Proposed Imp. Area (+10% UC)	Run-Off Rates			Run-Off Volumes	
	1 In 1yr	1 In 30yr	1 In 100yr + 45% CC	1 in 1yr	1 in 100yr
1.974ha	93.0l/s	185.8l/s	366.3l/s	480.1cu.m	1222.4cu.m

Table 2: Post-Development Un-Restricted Run-Off Rates (Betts Hydro, 2025)

4.3 Sustainable Drainage Systems (SuDS)

- 4.3.1 In accordance with national and local planning policy, including the Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015) and the SuDS

Manual (CIRIA 753), peak surface water discharge rates from new development should be appropriately managed and where possible reduced.

- 4.3.2 To manage surface water run-off policy shows that preference should always be given to Sustainable Drainage Systems (SuDS) over the traditional methods wherever possible and practical. Opportunities should also be taken to provide soft landscaping where at all possible on site to assist in minimising surface water run-off.
- 4.3.3 SuDS can (if designed and situated appropriately) address the four key sustainability objectives embedded in planning policy including providing space for water (water quantity), improving water quality and biodiversity, along with providing valuable amenity/recreational space within new development sites. These benefits of SuDS depend on the type of features being proposed; some typical examples relevant to this nature of development are illustrated in **Figure 3**.



Figure 3: SuDS Photographs (SusDrain, 2012)

- 4.3.4 Promoting SuDS to deal with surface water at the source, will limit the required attenuation and in turn reduce the volume of surface water in the nearby watercourse and sewer infrastructure. In accordance with the Non-Statutory Technical Standards for Sustainable Drainage Systems and the SuDS Manual (CIRIA 753), the proposed SuDS features are discussed below in terms of hierarchy of use.
- 4.3.5 It is recommended that permeable surfacing and bio-filtration be included within the main residential areas where practical to provide opportunity for natural uptake but also added benefit to water quality of run-off generated in these areas.
- 4.3.6 There may also be scope to incorporate rainwater butts/rain garden style raised planters (as illustrated in **Figure 3**) within the plot drainage elements to provide added water quality, amenity, and biodiversity benefit. When designed appropriately the smaller-scale SuDS features discussed can aid with attenuation and provide added benefits in terms of water quality, biodiversity, and amenity value.
- 4.3.7 In terms of conveyance given the site constraints this will likely be in the form of belowground pipework. Stormwater storage will be provided below ground (cellular storage/oversized pipes) due to the engineering constraints associated with crossing and out falling into the culvert which crosses the site.

4.4 Methods of Surface Water Management

4.4.1 There are three methods that have been reviewed for the management and discharge of surface water. These may be applied individually or collectively to form a complete strategy and should be applied in the order of priority listed below:

-  Discharge via infiltration
-  Discharge to watercourse
-  Discharge to the public sewerage system

4.5 Discharge via Infiltration

4.5.1 Any impermeable areas that can drain to soakaway or an alternative method of infiltration would significantly improve the sustainability of any new surface water systems. The published online datasets have been reviewed to consider how favourable the underlying strata is to support a potential infiltration-based solution at the site.

4.5.2 The British Geology Survey (BGS) mapping data indicates that the bedrock geology consists of Manchester Marls Formation (mudstone), with superficial deposits of Devensian Till (diamicton). The underlying strata (noted above) appears to suggest that underlying permeability is low-medium.

4.5.3 The online Cranfield Soil and AgriFood Institute (CSAI), Soilscales viewer identifies that most of the site is underlain by 'slowly permeable seasonally wet acid loamy and clayey soils'. The soil factor for the area is also identified to be 0.47, which suggests that the underlying soils have a low permeability (0.1 is very high and 0.5 is very low permeability).

4.5.4 Based on the ground conditions identified by the published datasets and onsite investigations, infiltration is unlikely to offer a fully viable drainage management solution for the wider proposals. To confirm whether infiltration rates at the site would promote the use of permeable surfacing and other infiltration solutions, it is recommended that Soakaway Testing (to BRE365) is undertaken at an early stage.

4.5.5 The proposals are still to utilise permeable surfaces in external areas where an engineerable solution can be achieved (given the existing ground levels), even if a full infiltration solution is not viable. The permeable surfaces themselves will be lined with a connection to the proposed main drainage system serving the new development. The presence of the permeable surfaces will still allow the first 5mm of rainfall to be dealt with at source as identified in the SuDS Manual (CIRIA 753).

4.6 Discharge to Watercourse

4.6.1 The next method is to discharge surface water run-off to a nearby watercourse/waterbody. The nearest watercourse to the site is the culverted watercourse crossing the site. This culverted watercourse routes through the site in a south-easterly direction, toward Crabtree Lane.

4.6.2 Further consultation was undertaken with CRT regarding the culverted watercourse, given the proximity to Ashton Canal. Ultimately, little/no information regarding this asset

is available. There is no evidence indicating that it was a feeder, nor that it conveyed canal waste flows (overflow). It may historically have conveyed a small watercourse from a pond indicated north of the canal (1888 OS Mapping), under the canal and toward Clayton Brook (see correspondence in **Appendix E**).

- 4.6.3 CRT have recommended undertaking further investigation (CCTV survey/GPR survey) to trace the incoming connection from the direction of Ashton Canal. A full survey of the culverted watercourse has now been undertaken and is included within **Appendix K**. The survey has identified a collapse and blockage of the culvert, and therefore remedial works are required to ensure this asset remains operational post-development.
- 4.6.4 Should infiltration not offer a full drainage solution for the site; the proposals are to discharge surface water generated by the proposals into the culverted watercourse which crosses the site (subject to formal consents). A Preliminary Drainage Layout has been prepared as part of a Technical Due Diligence exercise completed by Betts Associates, to demonstrate the feasibility of the scheme. An extract is included within **Figure 4** below (see full drawing in **Appendix L**).

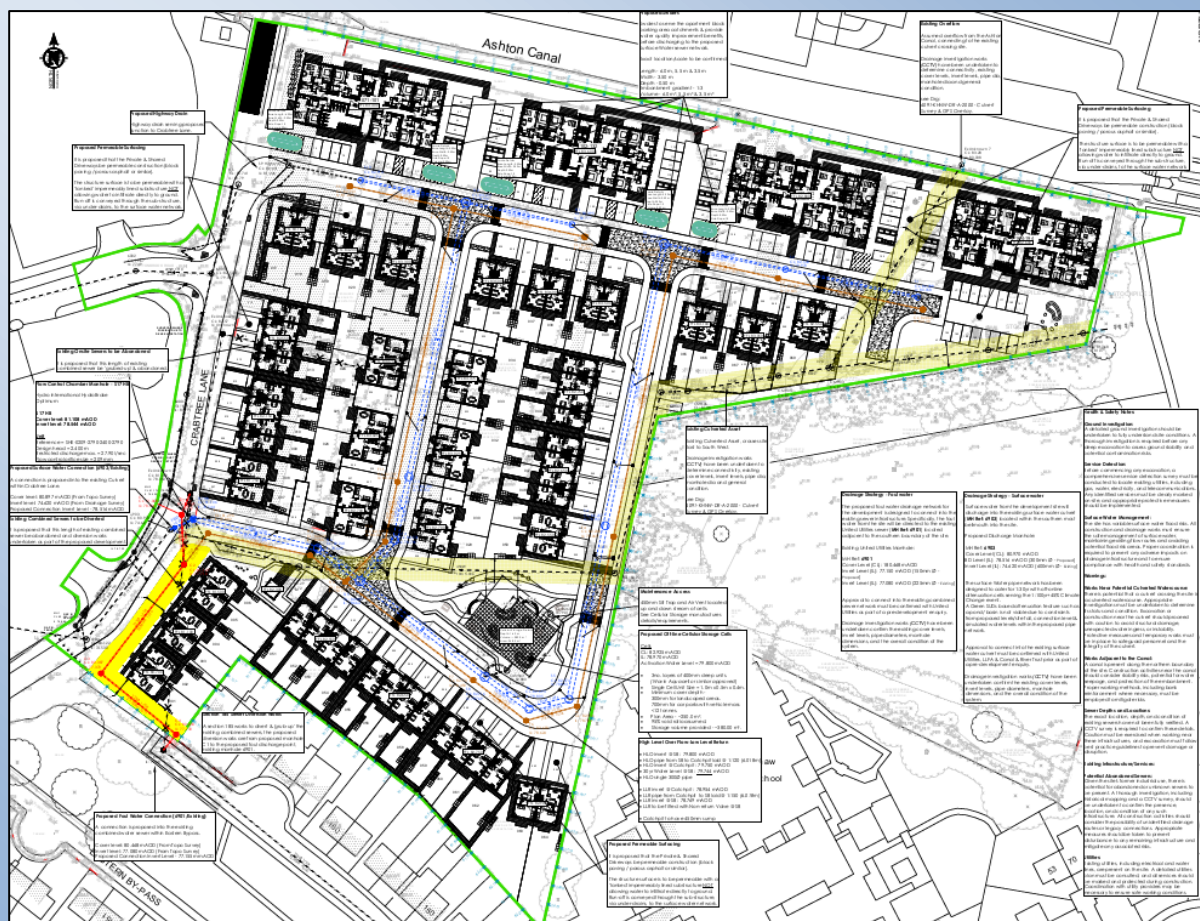


Figure 4: S104 Main Drainage Layout (Betts Associates, 2025)

- 4.6.5 Consent and formal agreement will be required from the LLFA for any works to the culverted watercourse. Early discussion will be needed to identify any additional

capacity constraints. It is understood that no offsite works will be required to form a connection to the culverted watercourse onsite.

- 4.6.6 In terms of conveyance given the site constraints this will likely be in the form of belowground pipework. Stormwater storage will be provided below ground (cellular storage/oversized pipes), due to the engineering constraints associated with crossing and out falling into the culvert which crosses the site.

Proposed Discharge Rates

- 4.6.7 In accordance with the SuDS Manual (CIRIA) and the Non-Technical Standards for SuDS (March 2015) all sites should endeavour to achieve as close to pre-development greenfield rates as is viable. Based on the development area, the pre-development greenfield rate (QBar) is calculated to be 27.8l/s (9.2l/s/ha).
- 4.6.8 Restricting the rate of discharge will generate a requirement to provide onsite stormwater storage for the extreme rainfall events. The stormwater storage figures quoted in **Table 3 (Appendix M)** are estimates only based on a maximum discharge rate of 27.8l/s and an estimated post-development impermeable area of 1.974ha (which is inclusive of urban creep). Detailed design in due course will determine with accuracy the attenuation requirements considering engineering constraints and hydraulics.

	1 In 1 Year	1 In 30 Year	1 In 100 Year + 45% CC
Restricted Run-Off Rate	27.8l/s	27.8l/s	27.8l/s
Estimated Stormwater Storage Volume *	181cu.m-340cu.m	562cu.m-879cu.m	1437cu.m-2050cu.m

Table 3: Estimated Stormwater Storage Requirements (Betts Hydro, 2025)

**Based on an impermeable area of 1.974ha plus an allowance for urban creep.*

- 4.6.9 The surface water scheme for the development will be designed to cater for the surface water run-off generated in the events up to and including the 1 in 100yr return period event with 45% allowance for climate change.
- 4.6.10 In terms of conveyance given the site constraints this will likely be in the form of belowground pipework. Stormwater storage will be provided below ground (cellular storage/oversized pipes) due to the engineering constraints associated with crossing and out falling into the culvert which crosses the site.

4.7 Discharge to the Public Sewer Network

- 4.7.1 UU sewer records have identified a public combined sewer within Eastern Bypass to the south of the site and within Clayton Brook Road to the west of the site. If infiltration is not feasible, then the surface water run-off should discharge into the nearest watercourse or waterbody, and not the existing public sewer network. A connection from the site for surface water to the public combined sewer would only be acceptable if all other methods in the discharge hierarchy are discounted and early dialogue with United Utilities would be recommended.

4.8 Climate Change

- 4.8.1 There are indications that the climate in the UK is changing significantly, and it is widely believed that the nature of climate change will vary greatly by region. Expert opinion indicates the likelihood that future climate change would produce more frequent short duration and high intensity rainfall events with the addition of more frequent periods of long duration rainfall.
- 4.8.2 It is believed that the impact of climate change means there is likely to be a long-term increase in the average sea levels, with an expectation that sea levels will rise gradually. An increase in flood water levels means that future flooding events will occur more frequently and will have a greater impact.
- 4.8.3 In light of the future uncertainties Climate Change should be accounted for within the design of all new developments. Climate change factors have been considered and any increase in the level of flood risk (to the site) from climate change is likely to be related to the increase in rainfall intensity and duration and its impact upon the surface water drainage system.
- 4.8.4 In accordance with the Irwell Management Catchment peak rainfall allowances, the upper end allowance (**Table 4**) for the 2070's has been utilised (based on 100yr design life).

PROJECTIONS	TOTAL POTENTIAL CHANGE ANTICIPATED FOR THE 2070'S
Upper End Allowance	45%
Central Allowance	40%

Table 4: Change to Peak Rainfall Compared to 1981-2000 Baseline (Environment Agency, 2022)

5.0 FOUL WATER MANAGEMENT

- 5.1 The proposals are to discharge foul water generated by the development into the nearest public combined sewer, which is located within Eastern Bypass to the south of the site (UU MH ref.: 6901). A Preliminary Drainage Layout has been prepared to demonstrate the feasibility of the scheme (see previously in **Figure 4**).
- 5.2 To facilitate the foul water drainage proposals, an existing combined sewer asset located onsite will need to be abandoned and diverted (subject to formal consent). It is recommended that further investigations are undertaken in due course, to confirm the presence, location and condition of this asset.
- 5.3 Based on the proposals for the construction of 194no. residential dwellings, the approximate peak foul water flows generated by the site have been calculated at 9.0/s, based on 4000 litres per dwelling per 24 hours as per the guidance contained within Sewers for Adoption.
- 5.4 Any offsite asset routing works will need to be considered in terms of consents with the relevant offsite landowners (Highways Authority). Consent for work to the public sewer network will be required from UU at an early stage, this includes consent for the proposed rates of discharge and the points of connection. A pre-development enquiry has been submitted to United Utilities; however, a response is currently outstanding (see correspondence in **Appendix C**).

6.0 SUMMARY AND CONCLUSIONS

- 6.1 The key focus of this assessment is on the sustainable management of surface water run-off to ensure no increased flood risk results from the development proposals. The surface water run-off management options have been assessed in accordance with the sustainable drainage hierarchy.
- 6.2 The site is in part, developed at present. It is understood that there is an existing drainage infrastructure catering for the existing development onsite. The undeveloped areas of the site likely discharge informally via overland runoff into Ashton Canal, and toward Crabtree Lane.
- 6.3 Based on the underlying ground conditions identified, the use of infiltration is not considered to be a suitable surface water management option; this may need to be evidenced by Soakaway Testing to satisfy the Lead Local Flood Authority.
- 6.4 The proposals are therefore to discharge surface water generated by the proposals into the culverted watercourse which crosses the site (subject to formal consents). A Preliminary Drainage Layout has been prepared by Betts Associates to demonstrate the feasibility of the scheme.
- 6.5 In accordance with the SuDS Manual (CIRIA) and the Non-Technical Standards for SuDS (March 2015) all sites should endeavour to achieve as close to pre-development greenfield rates as is viable. Based on the development area, the pre-development greenfield rate (QBar) is calculated to be 27.8l/s (9.2l/s/ha).
- 6.6 Restricting the rate of discharge will generate a requirement to provide onsite stormwater storage for the extreme rainfall events. The proposed surface water drainage system will need to be designed to cater for the surface water run-off generated in the events up to and including the 1 in 100yr return period event with 45% allowance for Climate Change.
- 6.7 In terms of conveyance given the site constraints this will likely be in the form of belowground pipework. Stormwater storage will be provided below ground (cellular storage/oversized pipes) due to the engineering constraints associated with crossing and out falling into the culvert which crosses the site.
- 6.8 The proposals are to discharge foul water generated by the development into the nearest public combined sewer, which is located within Eastern Bypass to the south of the site (UU MH ref.: 6901). Consent for work to the public sewer network will be required from UU at an early stage, this includes consent for the proposed rates of discharge and the points of connection.
- 6.9 This Drainage Management Strategy has been prepared in consultation with the relevant interested parties. The report is commensurate with the scale and nature of the development, and the development is appropriate in accordance with the Non-Statutory Standards.

7.0 RECOMMENDATIONS

- 7.1 To confirm whether infiltration rates at the site would promote the use of permeable surfacing and other infiltration solutions, it is recommended that Soakaway Testing (to BRE365) is undertaken at an early stage.
- 7.2 CRT have recommended undertaking further investigation (CCTV survey/GPR survey) to trace the incoming connection from the direction of Ashton Canal. A full survey of the culverted watercourse has now been undertaken and is appended to this report for completeness. The survey has identified a collapse and blockage of the culvert, and therefore remedial works are required to ensure this asset remains operational post-development.
- 7.3 To facilitate the foul water drainage proposals, an existing combined sewer asset located onsite will need to be abandoned and diverted (subject to formal consent). It is recommended that further investigations are undertaken in due course, to confirm the presence, location and condition of this asset.
- 7.4 By keeping the Finished Floor Levels elevated relative to the externals, this should help create an overland flood flow route in the event of a breach or any other source of flooding that could lead to overland flow.
- 7.5 Any overland flows generated by the development must be carefully controlled. Safe avenues directing overland flow away from any existing and proposed buildings are advised.
- 7.6 To minimise the flood risk to the neighbouring properties it is recommended that the surface water run-off generated by the proposals be managed effectively with the peak rates of run-off being restricted to the equivalent of the pre-development situation (with betterment where required).
- 7.7 The proposed onsite surface water drainage system will need to be sized to contain up to and including the 1 in 100yr return period storm event with a 45% allowance for climate change being contained onsite.
- 7.8 Any offsite works to accommodate the drainage proposals will need to be discussed with the relevant parties during the detailed design stage.
- 7.9 As with any drainage system, blockages within either the foul or surface water system have the potential to cause flooding or disruption. It is important that should any drainage systems not be offered for adoption to either the Water Company or the Local Authority then an appropriate maintenance regime should be scheduled with a suitably qualified management company for these private drainage systems.
- 7.10 If an extreme rainfall event exceeds the design criteria for the drainage system it is likely that there will be some overland flows that are unable to enter the system, it is important that these potential overland flows are catered for within the proposed development site if the capacity of the drainage system is exceeded.

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Web-based References

Bingmaps – <http://www.bing.com/Maps/>

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Chronology of British Hydrological Events – www.dundee.ac.uk/

CIRIA – <http://www.ciria.org/>

Cranfield University – <http://www.landis.org.uk/soilscapes/>

Environment Agency – www.environment-agency.gov.uk/

FloodProBE – <http://www.floodprobe.eu/>

Flood Forum – <http://www.floodforum.org.uk/>

Google Maps – <http://maps.google.co.uk/>

HR Wallingford UK SuDS – <https://www.uksuds.com/>

Rainfall Climate Change Allowance - <https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall>

Streetmap – <http://www.streetmap.co.uk/>

United Utilities - <https://www.unitedutilities.com/>

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APPENDIX A: NPPF + PPG EXTRACTS

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14. Meeting the challenge of climate change, flooding and coastal change

157. The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.

Planning for climate change

158. Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures⁵⁶. Policies should support appropriate measures to ensure the future resilience of communities and infrastructure to climate change impacts, such as providing space for physical protection measures, or making provision for the possible future relocation of vulnerable development and infrastructure.
159. New development should be planned for in ways that:
- a) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and
 - b) can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.
160. To help increase the use and supply of renewable and low carbon energy and heat, plans should:
- a) provide a positive strategy for energy from these sources, that maximises the potential for suitable development, and their future re-powering and life extension, while ensuring that adverse impacts are addressed appropriately (including cumulative landscape and visual impacts);
 - b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and

⁵⁶ In line with the objectives and provisions of the Climate Change Act 2008.

- c) identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.
161. Local planning authorities should support community-led initiatives for renewable and low carbon energy, including developments outside areas identified in local plans or other strategic policies that are being taken forward through neighbourhood planning.
162. In determining planning applications, local planning authorities should expect new development to:
- a) comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and
 - b) take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.
163. When determining planning applications⁵⁷ for renewable and low carbon development, local planning authorities should:
- a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and recognise that even small-scale projects provide a valuable contribution to significant cutting greenhouse gas emissions;
 - b) approve the application if its impacts are (or can be made) acceptable⁵⁸. Once suitable areas for renewable and low carbon energy have been identified in plans, local planning authorities should expect subsequent applications for commercial scale projects outside these areas to demonstrate that the proposed location meets the criteria used in identifying suitable areas; and
 - c) in the case of applications for the repowering and life-extension of existing renewable sites, give significant weight to the benefits of utilising an established site, and approve the proposal if its impacts are or can be made acceptable.
164. In determining planning applications, local planning authorities should give significant weight to the need to support energy efficiency and low carbon heating improvements to existing buildings, both domestic and non-domestic (including

⁵⁷ Wind energy development involving one or more turbines can also be permitted through Local Development Orders, Neighbourhood Development Orders and Community Right to Build Orders. In the case of Local Development Orders, it should be demonstrated that the planning impacts identified by the affected local community have been appropriately addressed and the proposal has community support.

⁵⁸ Except for applications for the repowering and life-extension of existing wind turbines, a planning application for wind energy development involving one or more turbines should not be considered acceptable unless it is in an area identified as suitable for wind energy development in the development plan or a supplementary planning document; and, following consultation, it can be demonstrated that the planning impacts identified by the affected local community have been appropriately addressed and the proposal has community support.

through installation of heat pumps and solar panels where these do not already benefit from permitted development rights). Where the proposals would affect conservation areas, listed buildings or other relevant designated heritage assets, local planning authorities should also apply the policies set out in chapter 16 of this Framework.

Planning and flood risk

165. Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.
166. Strategic policies should be informed by a strategic flood risk assessment, and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards.
167. All plans should apply a sequential, risk-based approach to the location of development – taking into account all sources of flood risk and the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property. They should do this, and manage any residual risk, by:
 - a) applying the sequential test and then, if necessary, the exception test as set out below;
 - b) safeguarding land from development that is required, or likely to be required, for current or future flood management;
 - c) using opportunities provided by new development and improvements in green and other infrastructure to reduce the causes and impacts of flooding, (making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management); and
 - d) where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to relocate development, including housing, to more sustainable locations.
168. The aim of the sequential test is to steer new development to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding.
169. If it is not possible for development to be located in areas with a lower risk of flooding (taking into account wider sustainable development objectives), the exception test may have to be applied. The need for the exception test will depend on the potential vulnerability of the site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in Annex 3.

170. The application of the exception test should be informed by a strategic or site-specific flood risk assessment, depending on whether it is being applied during plan production or at the application stage. To pass the exception test it should be demonstrated that:
- a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and
 - b) the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.
171. Both elements of the exception test should be satisfied for development to be allocated or permitted.
172. Where planning applications come forward on sites allocated in the development plan through the sequential test, applicants need not apply the sequential test again. However, the exception test may need to be reapplied if relevant aspects of the proposal had not been considered when the test was applied at the plan-making stage, or if more recent information about existing or potential flood risk should be taken into account.
173. When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment⁵⁹. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:
- a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;
 - b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;
 - c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;
 - d) any residual risk can be safely managed; and
 - e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

⁵⁹ A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

174. Applications for some minor development and changes of use⁶⁰ should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments set out in footnote 59.
175. Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems used should:
- a) take account of advice from the lead local flood authority;
 - b) have appropriate proposed minimum operational standards;
 - c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and
 - d) where possible, provide multifunctional benefits.

Coastal change

176. In coastal areas, planning policies and decisions should take account of the UK Marine Policy Statement and marine plans. Integrated Coastal Zone Management should be pursued across local authority and land/sea boundaries, to ensure effective alignment of the terrestrial and marine planning regimes.
177. Plans should reduce risk from coastal change by avoiding inappropriate development in vulnerable areas and not exacerbating the impacts of physical changes to the coast. They should identify as a Coastal Change Management Area any area likely to be affected by physical changes to the coast, and:
- a) be clear as to what development will be appropriate in such areas and in what circumstances; and
 - b) make provision for development and infrastructure that needs to be relocated away from Coastal Change Management Areas.
178. Development in a Coastal Change Management Area will be appropriate only where it is demonstrated that:
- a) it will be safe over its planned lifetime and not have an unacceptable impact on coastal change;
 - b) the character of the coast including designations is not compromised;
 - c) the development provides wider sustainability benefits; and
 - d) the development does not hinder the creation and maintenance of a continuous signed and managed route around the coast⁶¹.

⁶⁰ This includes householder development, small non-residential extensions (with a footprint of less than 250m²) and changes of use; except for changes of use to a caravan, camping or chalet site, or to a mobile home or park home site, where the sequential and exception tests should be applied as appropriate.

⁶¹ As required by the Marine and Coastal Access Act 2009.

179. Local planning authorities should limit the planned lifetime of development in a Coastal Change Management Area through temporary permission and restoration conditions, where this is necessary to reduce a potentially unacceptable level of future risk to people and the development.

(<http://www.legislation.gov.uk/ukxi/2015/596/article/4/made>) to require planning permission to be sought in each case.

Paragraph: 075 Reference ID: 7-075-20220825

Revision date: 25 08 2022

How can neighbourhood plans and neighbourhood development/community right to build orders take account of coastal change?

In any instance where a Neighbourhood Area is proposed in a Coastal Change Management Area, careful attention should be paid to the guidance on [what development would be appropriate in such an area](#), including whether [time-limiting planning permissions](#) are needed. The local planning authority will need to be consulted about existing and anticipated levels of risk, and the types of development that may or may not be appropriate.

See related policy in [paragraphs 170 to 173 of the National Planning Policy Framework](#) (<https://www.gov.uk/guidance/national-planning-policy-framework/14-meeting-the-challenge-of-climate-change-flooding-and-coastal-change>).

Paragraph: 076 Reference ID: 7-076-20220825

Revision date: 25 08 2022

Flood Zone and flood risk tables

- Table 1: Flood Zones
- [National Planning Policy Framework Annex 3 - Flood risk vulnerability classification](#) (<https://www.gov.uk/guidance/national-planning-policy-framework/annex-3-flood-risk-vulnerability-classification>)
- [Table 2: Flood risk vulnerability and flood zone 'incompatibility'](#)

Paragraph: 077 Reference ID: 7-077-20220825

Revision date: 25 08 2022

Table 1: Flood Zones

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 0.1% annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map for Planning – all land outside Zones 2, 3a and 3b)
Zone 2 Medium Probability	Land having between a 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual

Flood Zone	Definition
	probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1% or greater annual probability of river flooding; or Land having a 0.5% or greater annual probability of sea. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise: • land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or • land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding). Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

Note: The Flood Zones shown on the Environment Agency's Flood Map for Planning (Rivers and Sea) do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding. Reference should therefore also be made to the [Strategic Flood Risk Assessment](https://www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment) (<https://www.gov.uk/guidance/local-planning-authorities-strategic-flood-risk-assessment>) when considering location and potential future flood risks to developments and land uses.

Paragraph: 078 Reference ID: 7-078-20220825

Revision date: 25 08 2022

Table 2: Flood risk vulnerability and flood zone 'incompatibility'

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 †	X	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	X	X	X	✓ *

Key:

✓ Exception test is not required

X Development should not be permitted

Notes to table 2:

- This table does not show the application of the [Sequential Test](#) which should be applied first to guide development to the lowest flood risk areas; 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 those developments set out in [National Planning Policy Framework footnote 56](#) (<https://www.gov.uk/guidance/national-planning-policy-framework/14-meeting-the-challenge-of-climate-change-flooding-and-coastal-change>). The Sequential and Exception Tests should be applied to ‘major’ and ‘non major’ development;
- 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 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.

Paragraph: 079 Reference ID: 7-079-20220825

Revision date: 25 08 2022

Site-specific flood risk assessment: Checklist

1 - Development site and location

You can use this section to describe the site you are proposing to develop. It would be helpful to include, or make reference to, a location map which clearly indicates the development site.

- a. Where is the development site located? (e.g. postal address or national grid reference)
- b. What is the current use of the site? (e.g. undeveloped land, housing, shops, offices)
- c. Which Flood Zone (for river or sea flooding) is the site within? (i.e. Flood Zone 1, Flood Zone 2, Flood Zone 3). As a first step, you should check the [Flood Map for Planning \(https://flood-map-for-planning.service.gov.uk/\)](https://flood-map-for-planning.service.gov.uk/). Check the Strategic Flood Risk Assessment for the area available from the local planning authority to identify if the site is within Flood Zone 1 but at increased risk of flooding in future due to climate change
- d. Also check the Strategic Flood Risk Assessment to identify if there are any other sources of flooding that may affect the site now or in the future.

2 - Development proposals

You can use this section to provide a general summary of the development proposals. It would be helpful to include, or make reference to, an existing block plan and a proposed block plan, where appropriate.

- a. What are the development proposal(s) for this site? Will this involve a change of use of the site and, if so, what will that change be?
- b. In terms of vulnerability to flooding, what is the vulnerability classification of the proposed development? See [National Planning Policy Framework Annex 3 \(https://www.gov.uk/guidance/national-planning-policy-framework/annex-3-flood-risk-vulnerability-classification\)](https://www.gov.uk/guidance/national-planning-policy-framework/annex-3-flood-risk-vulnerability-classification) for an explanation of the vulnerability classifications.
- c. What is the expected or estimated lifetime of the proposed development likely to be (e.g. 100 years or 75 years)? See [paragraph 006](#) of this guidance for further advice on how to assess the lifetime of developments for flood risk and coastal

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APPENDIX B: EA INFORMATION & CORRESPONDENCE

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Jabez Thomas

From: GMMC Info Requests <[REDACTED]>
Sent: 29 October 2024 15:06
To: Jabez Thomas
Subject: GMMC382396LB Response attached from the Environment Agency
Attachments: Location Plan.pdf; MNDB311D5BUH.pdf

Dear Jabez,

Thank you for your enquiry which was received on 28/10/2024.

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

I enclose the data requested, please see supporting comments from my colleague.
Please refer to the [Open Government Licence](#) which explains the permitted use of this information.

Please be aware you can check your risk of flooding on our external website <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>

Here are some useful links below:

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

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

For surface information please use link: <https://check-long-term-flood-risk.service.gov.uk/map?easting=362125.07&northing=388310.97&map=SurfaceWater>

The ShareFile link contains the following data:

<https://ea.sharefile.com/d-seb46a02a4c3447f1975332337316b5e7>

Corn Brook 2017 Report (P5)
Corn Brook 2017 Mapedit (P6)
Corn Brook 2017 Outputs (P6)
Corn Brook 2017 Model (P7)

Please can you advise that the link will expire in 30 days from 29/10/2024. It is therefore advisable that the client saves this data to their own system.

Product 5/6/7

1. You may use the Information for your internal or personal purposes and may only sublicense others to use it if you do so under a written licence which includes the terms of these conditions and the agreement and in particular may not allow any period of use longer than the period licensed to you.
2. Notwithstanding the fact that the standard wording of the Environment Agency Conditional Licence indicates that it is perpetual, this Licence has a limited duration of 5 years at the end of which it will terminate automatically without notice.
3. We have restricted use of the Information as a result of legal restrictions placed upon us to protect the rights or confidentiality of others. In this instance it is because of third party data. If you contact us in writing (this includes email) we will, as far as confidentiality rules allow, provide you with details including, if available, how you might seek permission from a third party to extend your use rights.

- 4.1 The Information may contain some data that we believe is within the definition of “personal data” under the Data Protection Act 1998 but we consider that we will not be in breach of the Act if we disclose it to you with conditions set out in this condition and the conditions above. This personal data comprises names of individuals or commentary relating to property that may be owned by an individual or commentary relating to the activities of an individual.
- 4.2 Under the Act a person who holds and uses or passes to others personal data is responsible for any compliance with the Act and so we have no option but to warn you that this means you have responsibility to check that you are compliant with the Act in respect of this personal data.
- 5 The location of public water supply abstraction sources must not be published to a resolution more detailed than 1km2. Information about the operation of flood assets should not be published.
- 6 .1 Where we have supplied model data which may include model inputs or outputs you agree to supply to the Environment Agency copies of any assessments/studies and related outputs, modifications or derivatives created pursuant to the supply to you of the Information, all of which are hereinafter referred to as “the Data”.
- 6.2 You agree, in the public interest to grant to the Environment Agency a perpetual royalty free non-exclusive licence to use the Data or any part thereof for its internal purposes or to use it in any way as part of Environment Agency derivative products which it supplies free of charge to others such as incorporation into the Environment Agency’s Open Data mapping products.

We are supplying this information to you under the Environment Agency Conditional Licence Please check the special conditions above to determine If the conditions on the use are suitable for your purposes. If they are not, this information is not provided with a licence for use, and the data is provided for read right only.

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

Kind regards,

Lauren Blackley

Customer and Engagement Officer

Greater Manchester, Merseyside and Cheshire

Email: [REDACTED]

From: Jabez Thomas [REDACTED]

Sent: 28 October 2024 15:16

To: GMMC Info Requests [REDACTED]

Subject: GMMC382396LB 22.11 Flood Risk Information Request – Products 4, 5, 6, & 7

To whom it may concern,

Crabtree Lane, Manchester

Please could you confirm whether you have any information (where available, Products 4, 5, 6, & 7) that you feel would be valuable to a Flood Risk Assessment and Drainage Management Strategy for the above site (location plan attached), including details of historical flooding and specific drainage requirements; this would be greatly appreciated. If there are any other specific requirements that you require in a scope of works for this site, please can you advise at this stage so that it can be fully incorporated into the proposals at an early stage.

Please do not hesitate to contact me on the details below to discuss further should you require additional information or clarification.

Kind Regards,

Jabez Thomas BSc(Hons)
Graduate Flood Risk Analyst

BETTS HYDRO

Consulting Engineers

Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, CH5 2LY

[REDACTED]

[REDACTED]

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Flood risk assessment data

Location of site: 388768 / 398011 (shown as easting and northing coordinates)

Document created on: 29 October 2024

This information was previously known as a product 4.

Customer reference number: MNDB311D5BUH

Map showing the location that flood risk assessment data has been requested for.



How to use this information

You can use this information as part of a flood risk assessment for a planning application. To do this, you should include it in the appendix of your flood risk assessment.

We recommend that you work with a flood risk consultant to get your flood risk assessment.

Included in this document

In this document you'll find:

- how to find information about surface water and other sources of flooding
- information on the models used
- definitions for the terminology used throughout
- flood map for planning (rivers and the sea)
- modelled data
- climate change modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice

Information that's unavailable

This document **does not** contain:

- past floods
- flood defences and attributes

We do not have past flooding data for this location.

Please note that:

- flooding may have occurred that we do not have records for
- flooding can come from a range of different sources
- we can only supply flood risk data relating to flooding from rivers or the sea

You can contact your Lead Local Flood Authority or Internal Drainage Board to see if they have other relevant local flood information. Please note that some areas do not have an Internal Drainage Board.

We aren't able to display flood defence locations and attributes as there are no formal flood defences in the area of interest.

Surface water and other sources of flooding

Use the [long term flood risk service](#) to find out about the risk of flooding from:

- surface water
- ordinary watercourses
- reservoirs

Or you can contact your Lead Local Flood Authority for further information.

Your Lead Local Flood Authority is Manchester District.

For information about sewer flooding, contact the relevant water company for the area.

About the models used

Model name: Corn Brook 2017

Scenario(s): No defences exist fluvial, no defences exist climate change fluvial

Date: 31 December 2017

This model contains the most relevant data for your area of interest.

Terminology used

Annual exceedance probability (AEP)

This refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which is calculated to have a 1% chance of occurring in any one year, is described as 1% AEP.

Metres above ordnance datum (mAOD)

All flood levels are given in metres above ordnance datum which is defined as the mean sea level at Newlyn, Cornwall.

Flood map for planning (rivers and the sea)

Your selected location is in flood zone 1.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- between a 0.1% and 0.5% probability of occurring in any year for flooding from the sea
- between a 0.1% and 1% probability of occurring in any year for fluvial (river) flooding

It's important to remember that the flood zones on this map:

- refer to the land at risk of flooding and do not refer to individual properties
- refer to the probability of river and sea flooding, ignoring the presence of defences
- do not take into account potential impacts of climate change

The flood zones are not currently being updated. The last update was in November 2023. Some of the flood zones may have changed, however all source data is included in the models below.



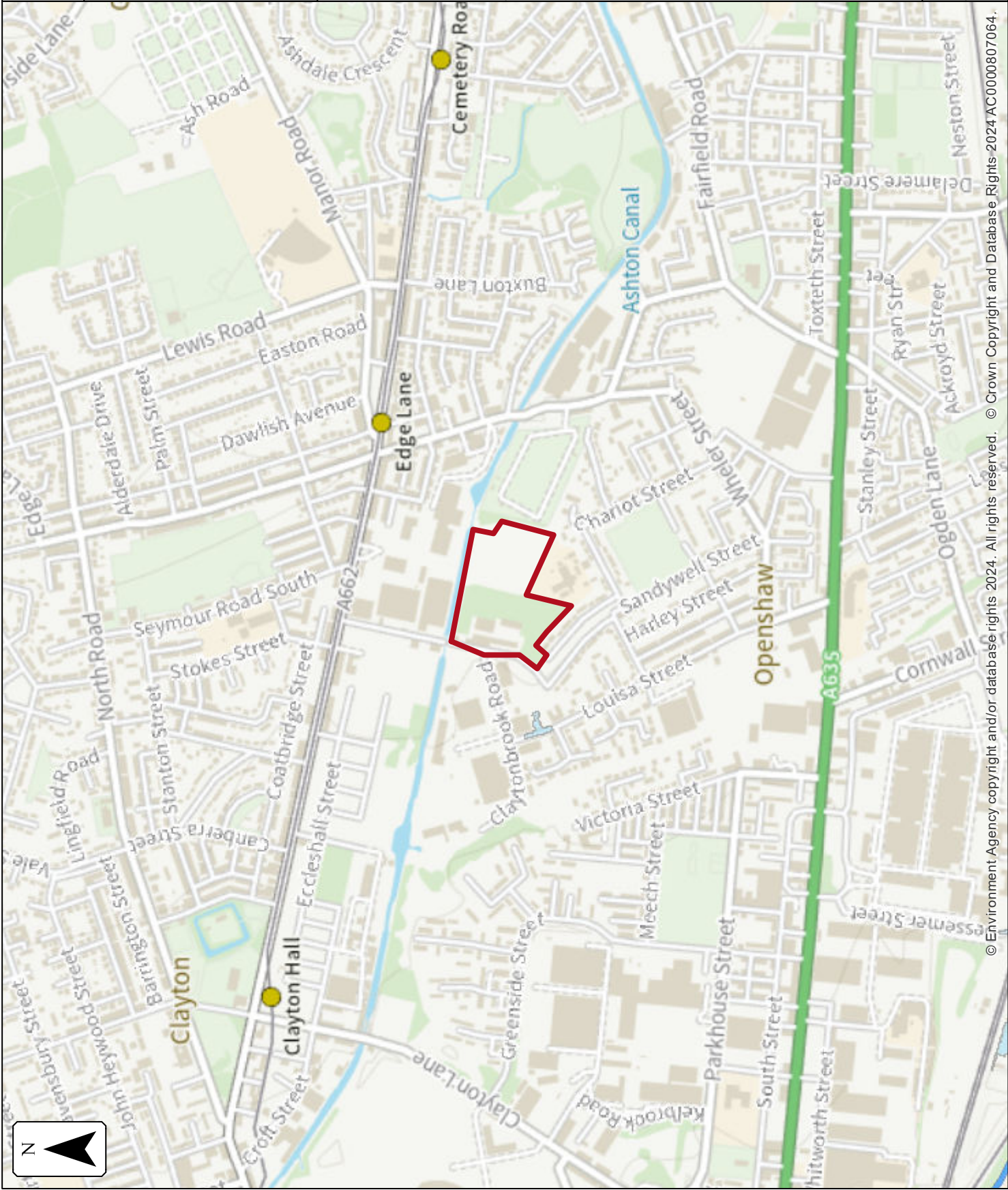
Flood map for planning
Location (easting/northing)
388768/398011
Scale
1:10,000
Created
29 Oct 2024

Selected area

Flood zone 3

Flood zone 2





Modelled data

This section provides details of different scenarios we have modelled and includes the following (where available):

- outline maps showing the area at risk from flooding in different modelled scenarios
- modelled node point map(s) showing the points used to get the data to model the scenarios and table(s) providing details of the flood risk for different return periods
- map(s) showing the approximate water levels for the return period with the largest flood extent for a scenario and table(s) of sample points providing details of the flood risk for different return periods

Climate change

The climate change data included in the models may not include the latest [flood risk assessment climate change allowances](#). Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

The Environment Agency will incorporate the new allowances into future modelling studies. For now, it's your responsibility to demonstrate that new developments will be safe in flood risk terms for their lifetime.

Modelled scenarios

The following scenarios are included:

- No defences exist modelled fluvial: risk of flooding from rivers where there are no flood defences
- No defences exist climate change modelled fluvial: risk of flooding from rivers where there are no flood defences, including estimated impact of climate change



Environment

Agency

No defences exist

modelled fluvial extent

Location (easting/northing)

388768/398011

Scale

Created

1:10,000

29 Oct 2024

Model name

Corn Brook 2017

Selected area

Modelled flood extent

5% AEP

2% AEP

1.33% AEP

1% AEP

0.5% AEP

0.1% AEP

Flood extents may not be visible where they overlap other return periods

0

100

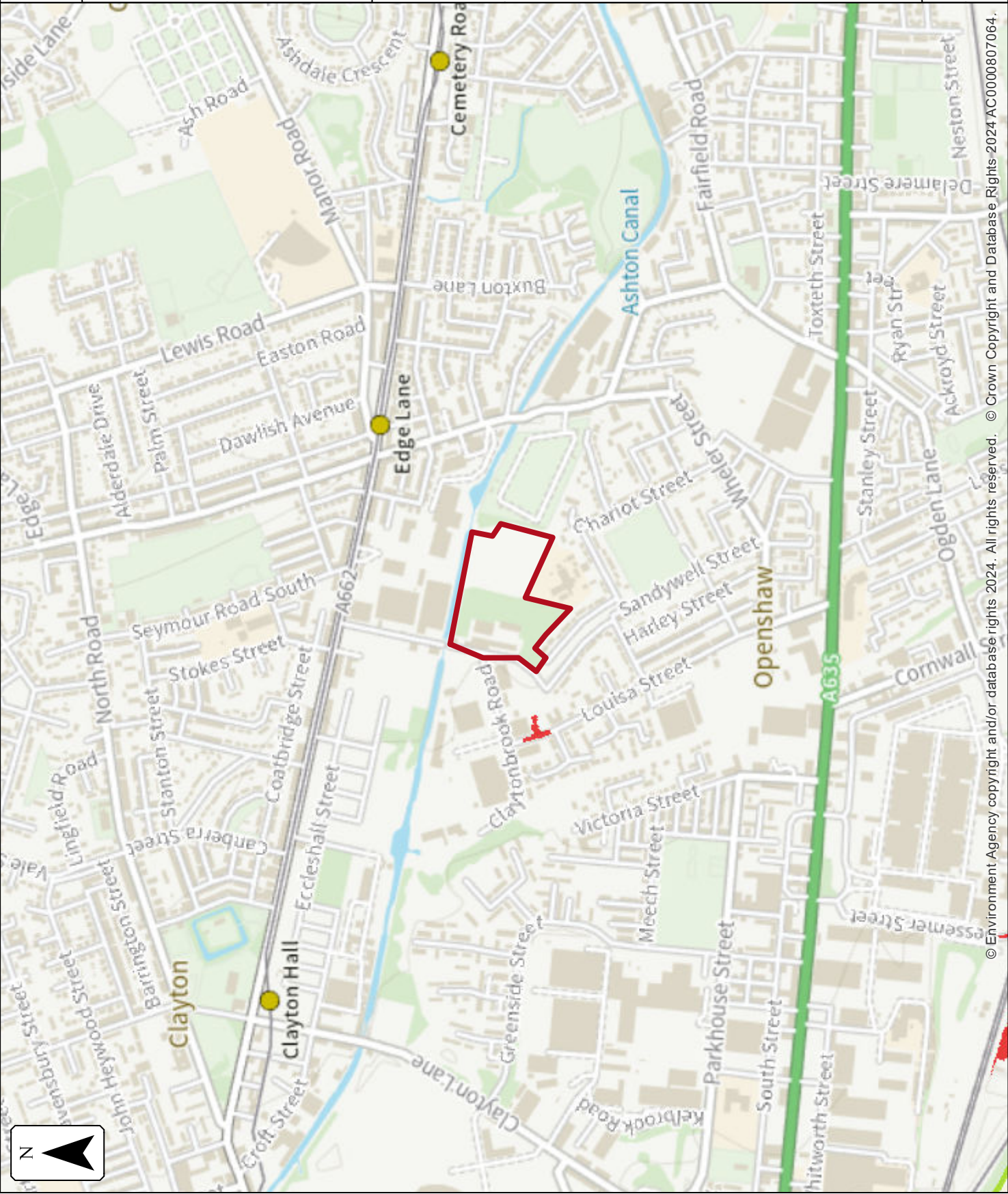
200

300

400

500

metres





Environment Agency

**No defences exist
climate change
modelled fluvial extent**

Location (easting/northing)
388768/398011

Scale Created
1:10,000 29 Oct 2024

Model name
Corn Brook 2017

Selected area

Main river

Modelled flood extent

1.0% AEP (+30%)

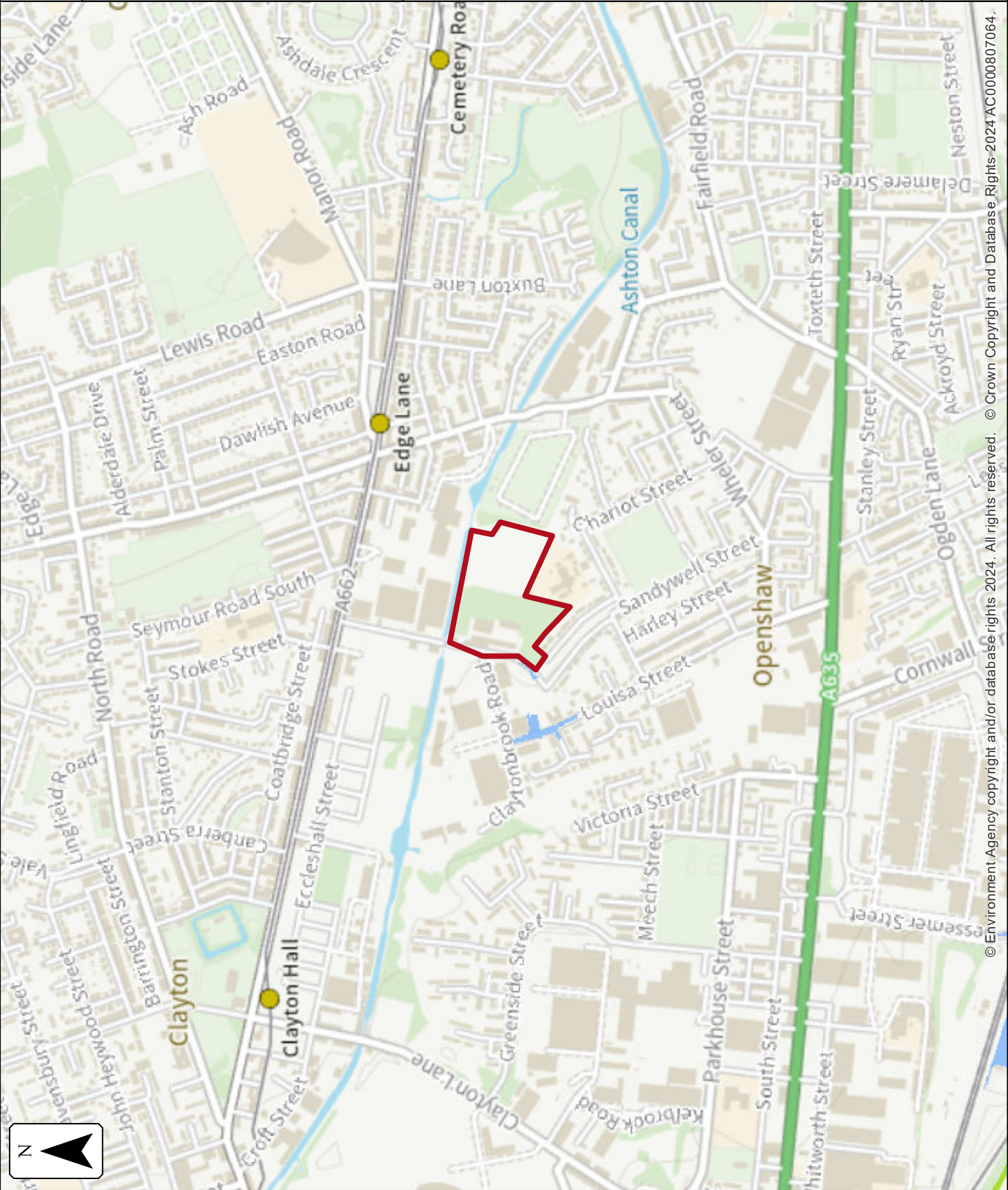
1.0% AEP (+35%)

1.0% AEP (+70%)

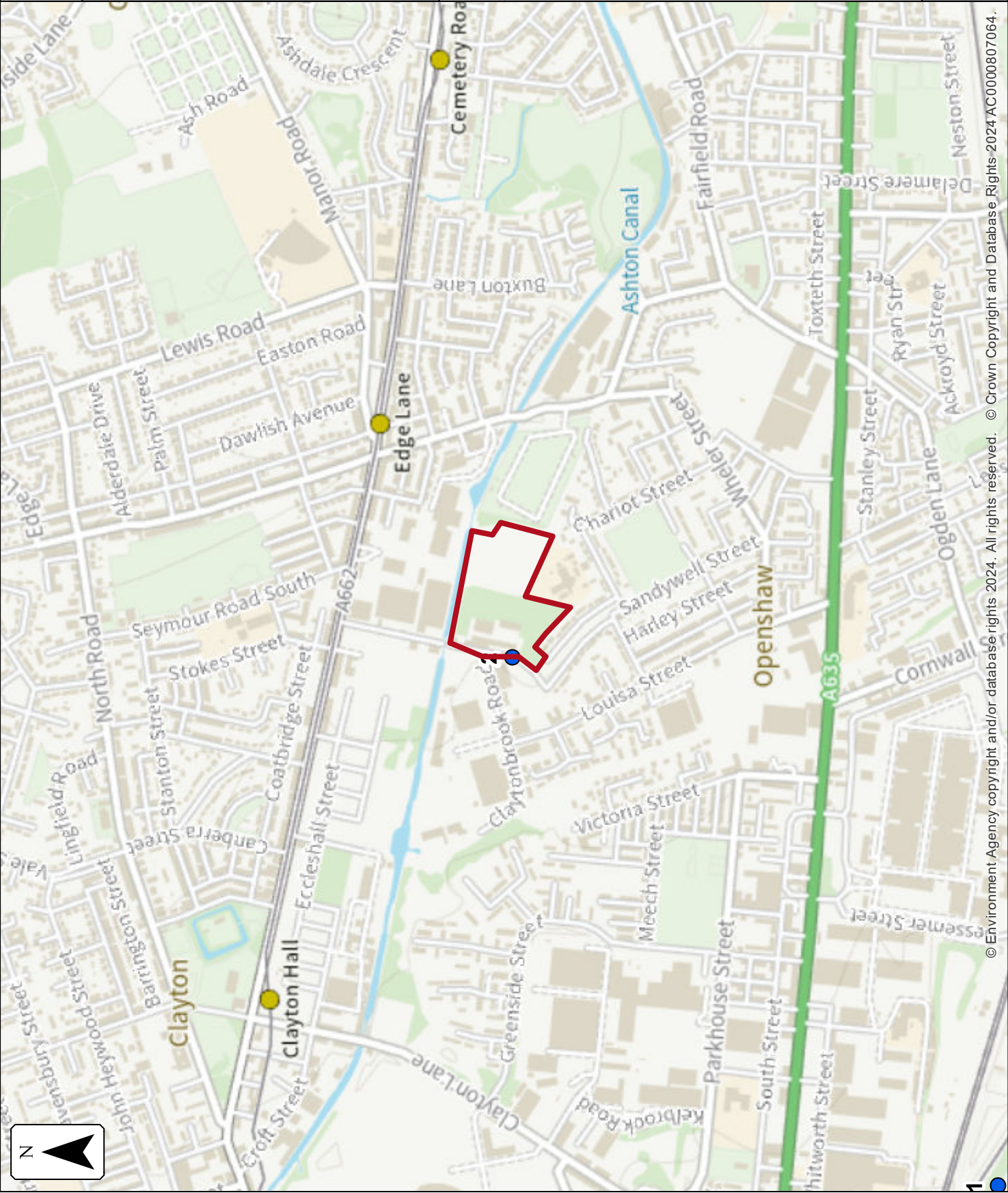
0.1% AEP (+30%)

Flood extents may not be visible where they overlap other return periods

0 100 200 300 400 500 metres



	No defences exist modelled fluvial node locations Location (easting/northing) 388768/398011 Scale Created 1:10,000 29 Oct 2024 Model name Corn Brook 2017	Selected area Modelled location	
--	---	--	--



Modelled node locations data

No defences exist

Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Level	Level	Level	Level	Level	Level	Level	Level	Level	Level	Level
1	952463	387631	397055	52.49	52.56	52.62	52.65	52.67	52.71	52.79	52.85	52.90	53.05	53.48
2	952446	388653	397993	74.18	74.21	74.23	74.25	74.26	74.29	74.36	74.50	75.0	76.88	81.30

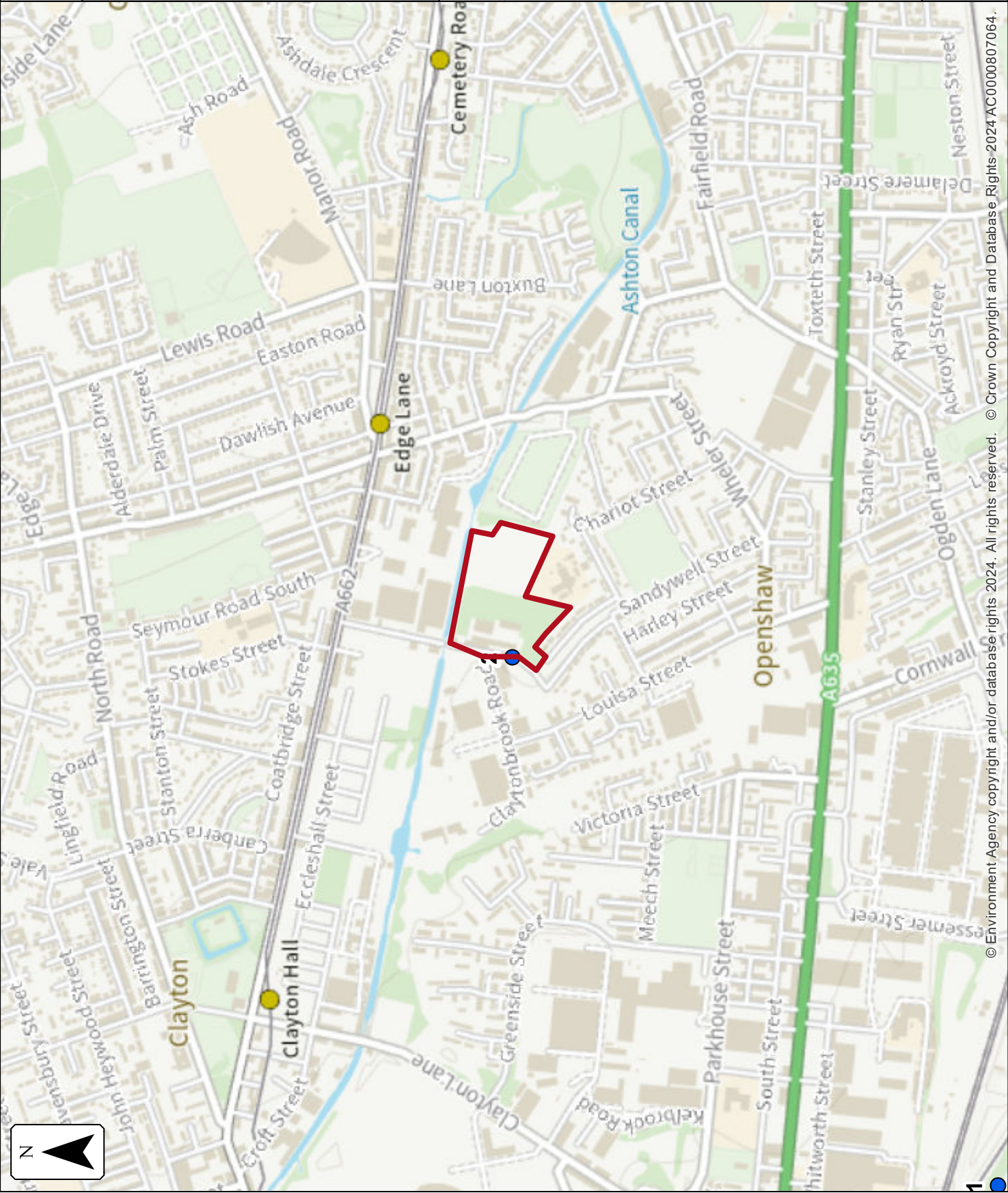
Data in this table comes from the Corn Brook 2017 model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.
If no level or flow data is available for a scenario, no table will be shown.

No defences exist

Label	Modelled location ID	Easting	Northing	50% AEP	20% AEP	10% AEP	5% AEP	4% AEP	3.33% AEP	2% AEP	1.33% AEP	1% AEP	0.5% AEP	0.1% AEP
				Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow	Flow
1	952463	387631	397055	0.71	1.01	1.26	1.43	1.59	1.79	2.37	2.92	3.38	4.88	10.14
2	952446	388653	397993	3.08	2.54	5.15	6.69	0.46	0.66	0.81	0.95	1.09	1.03	2.04

Data in this table comes from the Corn Brook 2017 model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.
If no level or flow data is available for a scenario, no table will be shown.

	No defences exist climate change modelled fluvial node locations Location (easting/northing) 388768/398011 Scale Created 1:10,000 29 Oct 2024 Model name Corn Brook 2017	Selected area Modelled location	
--	--	--	--



Modelled node locations data

No defences exist climate change

Label	Modelled location ID	Easting	Northing	1% AEP (+30%)	1% AEP (+35%)	1% AEP (+70%)	0.1% AEP (+30%)	1% AEP (+30%)	1% AEP (+35%)	1% AEP (+70%)	0.1% AEP (+30%)
				Level	Level	Level	Level	Flow	Flow	Flow	Flow
1	952463	387631	397055	53.01	53.03	53.21	53.59	4.49	4.67	6.49	12.20
2	952446	388653	397993	76.46	76.74	78.88	81.48	1.26	1.78	2.26	2.66

Data in this table comes from the Corn Brook 2017 model.
Level values are shown in mAOD, and flow values are shown in cubic metres per second.
Any blank cells show where a particular scenario has not been modelled for this location.
If no level or flow data is available for a scenario, no table will be shown.

Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

Your Lead Local Flood Authority is Manchester District.

About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

Flood risk activity permits

Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

[Find out more about flood risk activity permits](#)

Help and advice

Contact the Greater Manchester Merseyside and Cheshire Environment Agency team at inforequests.gmmc@environment-agency.gov.uk for:

- [more information about getting a product 5, 6, 7 or 8](#)
- general help and advice about the site you're requesting data for

APPENDIX C: UU CORRESPONDENCE

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Jabez Thomas

From: [REDACTED]
Sent: 30 October 2024 09:46
To: Jabez Thomas
Subject: RE: United Utilities - Our reference - 06540338 Crabtree Lane, Manchester

Hi Jabez,

Thank you for your email, please see below response:

UU REF 06540338 – Sewer Model Check, Crabtree Lane, Manchester

I can confirm that we do have modelled flood risk within the vicinity of the proposed development.

Please note that United Utilities Water Limited (UW) can only record and check flooding events which are reported to us and we have to comply with our Regulators instructions on the qualification of flooding events.

Our response does not include:

- any sewer flooding events caused by blockages or collapses which are the result of third party actions, natural events or other actions over which UW has no control and not a facet of sewer capacity; or
- any historical sewer flooding events that have been resolved as a result of investment in our infrastructure.

As with all development sites, we recommend you liaise with our water and wastewater engineers by contacting our Developer Services team so the details of your development proposal can be considered further. Details can be found at the following link.

<https://www.unitedutilities.com/services/builders-developers/>

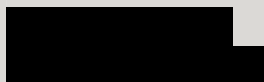
Should you require any further information please do not hesitate to contact me.

Regards

Anthony



Anthony Laithwaite
Ww Engineer
Developer Services & Metering
Customer Services



----- Original Message -----

From: [REDACTED]
Sent: 30/10/2024 08:30
To: [REDACTED]
Subject: United Utilities - Our reference - 06540338 Crabtree Lane, Manchester



Good Morning

Thank you for contacting United Utilities

I have logged your query to an engineer who will respond on or before
06/11/2024

Kind Regards

If you feel you have received a good service from myself, please
can you take two minutes to fill in the survey below. This will be
much appreciated



Visit: <https://unitedutilities.thewowawards.co.uk/nominate>

 United Utilities Water for the North West	Olivia Morley Customer Advisor Advanced Developer Services & Metering Customer Services unitedutilities.com [REDACTED] (r Services)
--	---



----- Original Message -----

From: Jabez Thomas [REDACTED]
Sent: 28/10/2024 15:16
To: [REDACTED]

Subject: Sewer Flood Risk Information Request

To whom it may concern,

Crabtree Lane, Manchester

Please could you confirm whether you have any information that you feel would be valuable to a Flood Risk Assessment and Drainage Management Strategy for the above site (location plan attached), including details of historical flooding and specific drainage requirements; this would be greatly appreciated. If there are any other specific requirements that you require in a scope of works for this site, please can you advise at this stage so that it can be fully incorporated into the proposals at an early stage.

Please do not hesitate to contact me on the details below to discuss further should you require additional information or clarification.

Kind Regards,

Jabez Thomas BSc(Hons)

Graduate Flood Risk Analyst

BETTS HYDRO

Consulting Engineers

Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, CH5 2LY

[REDACTED]

[REDACTED]

www.betts-associates.co.uk

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SUDS | STRUCTURAL SURVEYS | PARTY WALL DUTIES | INFILTRATION | GEOTECHNICAL

Atkins - Utility Solutions

The Hub
500 Park Avenue,, Aztec West, Almondsbury
Bristol,
BS32 4RZ

FAO:

How to contact us:

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

Your Ref: 227665
Our Ref: UUPS-ORD-587476
Date: 18/07/2024

Dear Sirs**Location: Site off Crabtree Lane Openshaw**

I acknowledge with thanks your request dated 17/07/2024 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

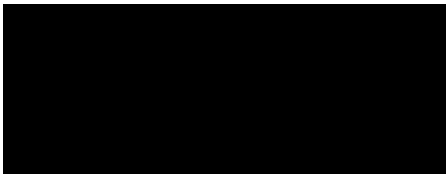
The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

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

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

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,



Karen McCormack
Property Searches Manager

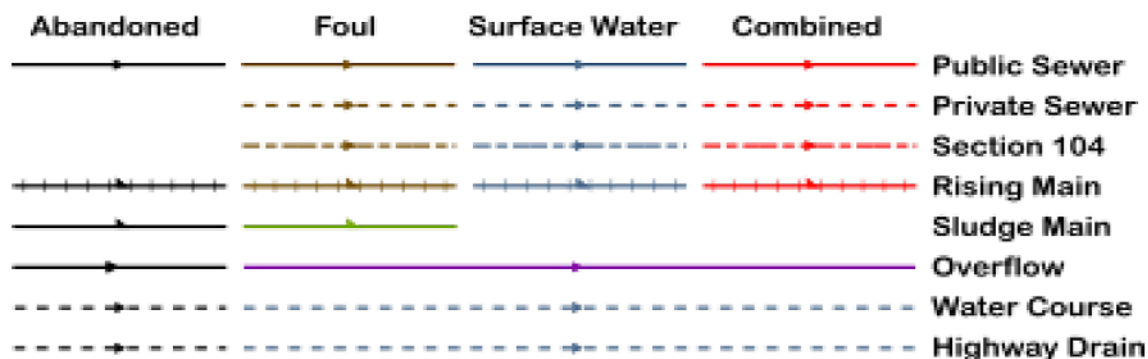
TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

TERMS AND CONDITIONS:

- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

Wastewater Symbolology



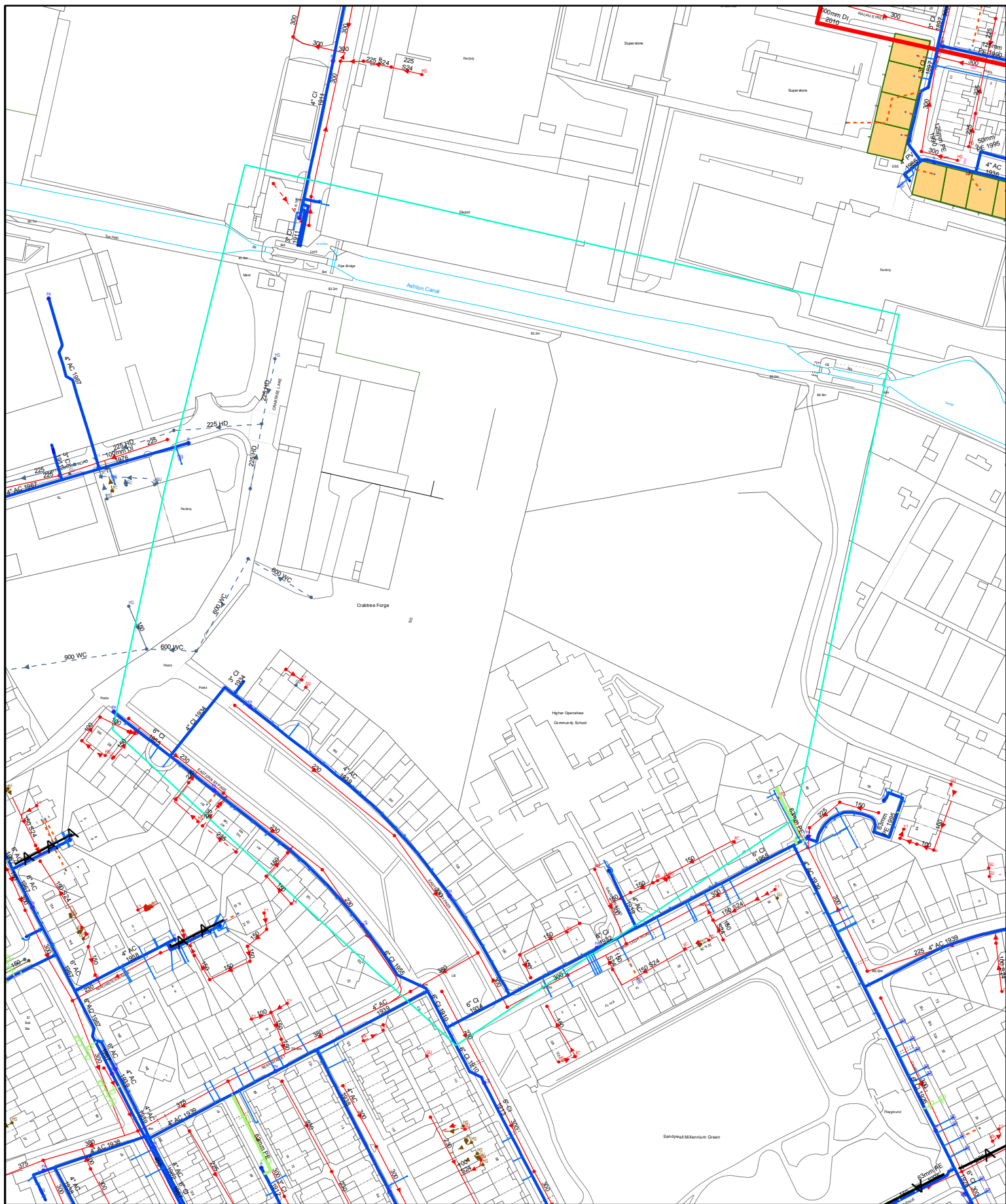
All point assets follow the standard colour convention: **red** – combined **brown** - foul
blue – surface water **purple** - overflow

Manhole	Side Entry Manhole
Head of System	Outfall
Extent of Survey	Screen Chamber
Rodding Eye	Inspection Chamber
Inlet	Bifurcation Chamber
Discharge Point	Lamp Hole
Vortex	T Junction / Saddle
Penstock	Catchpit
Washout Chamber	Valve Chamber
Valve	Vent Column
Air Valve	Vortex Chamber
Non Return Valve	Penstock Chamber
Soakaway	Network Storage Tank
Gully	Sewer Overflow
Cascade	Ww Treatment Works
Flow Meter	Ww Pumping Station
Hatch Box	Septic Tank
Oil Interceptor	Control Kiosk
Summit	DNM Network Monitoring Point
Drop Shaft	Change of Characteristic
Orifice Plate	

Clean Water Symbolology

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

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



Date: 18/07/2024

Extract from maps of public sewers and water mains

Printed By:
Property Searches

Site off Crabtree Lane Openshaw



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

© United Utilities Water PLC 2024. The plan is based upon the Ordnance Survey Map with the sanction of the Controller of H.M. Stationery Office, Crown copyright 100022432 and United Utilities Water PLC copyrights are reserved. Unauthorised reproduction will infringe these copyrights.

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APPENDIX D: LPA/LLFA CORRESPONDENCE

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Jabez Thomas

From: Jabez Thomas
Sent: 28 October 2024 15:16
To: [REDACTED]
Subject: Historic Flood Risk and Drainage Information Request
Attachments: Location Plan.pdf

To whom it may concern,

Crabtree Lane, Manchester

Please could you confirm whether you have any information that you feel would be valuable to a Flood Risk Assessment and Drainage Management Strategy for the above site (location plan attached), including details of historical flooding and specific drainage requirements; this would be greatly appreciated. If there are any other specific requirements that you require in a scope of works for this site, please can you advise at this stage so that it can be fully incorporated into the proposals at an early stage.

Please do not hesitate to contact me on the details below to discuss further should you require additional information or clarification.

Kind Regards,

Jabez Thomas BSc(Hons)
Graduate Flood Risk Analyst

BETTS HYDRO

Consulting Engineers

Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, CH5 2LY
[REDACTED]
[REDACTED]

www.betts-associates.co.uk

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Please consider the environment before printing this email

APPENDIX E: CRT CORRESPONDENCE

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Kirsty Halliday

From: Tim Bettany-Simmons <[REDACTED]>
Sent: 30 January 2025 15:08
To: Kirsty Halliday
Cc: Hannah Buchanan; Jabez Thomas
Subject: RE: Land at, Crabtree Lane, Openshaw, Manchester (HYD1015) [Filed 05 Feb 2025 12:57]

Follow Up Flag: Follow up
Flag Status: Completed

Categories: Filed by Mail Manager

Hi Kirsty

Thank you for your email. I have shared your email with a Senior Engineer in our Tunnels and Culverts team who has advised the following:

Ultimately, we don't know a great deal about this alleged culvert, the information we hold is limited to what's shown on the Terrier plan (below), which was only checked due to pre-application documentation showing a historical watercourse running from the direction of the canal on Page 12 of the Pre-App documentation.

An extract of the Terrier plan is shown below which shows the line of the 2ft culvert (apologies, I incorrectly stated 2" in the consultation response) crossing the canal adjacent to the Hope Boiler Works/Iron Foundry, with reference to a 16" pipe to the southern extent of what's mapped, potentially an indication of a connection to a 16" pipe as part of a larger culverted network.

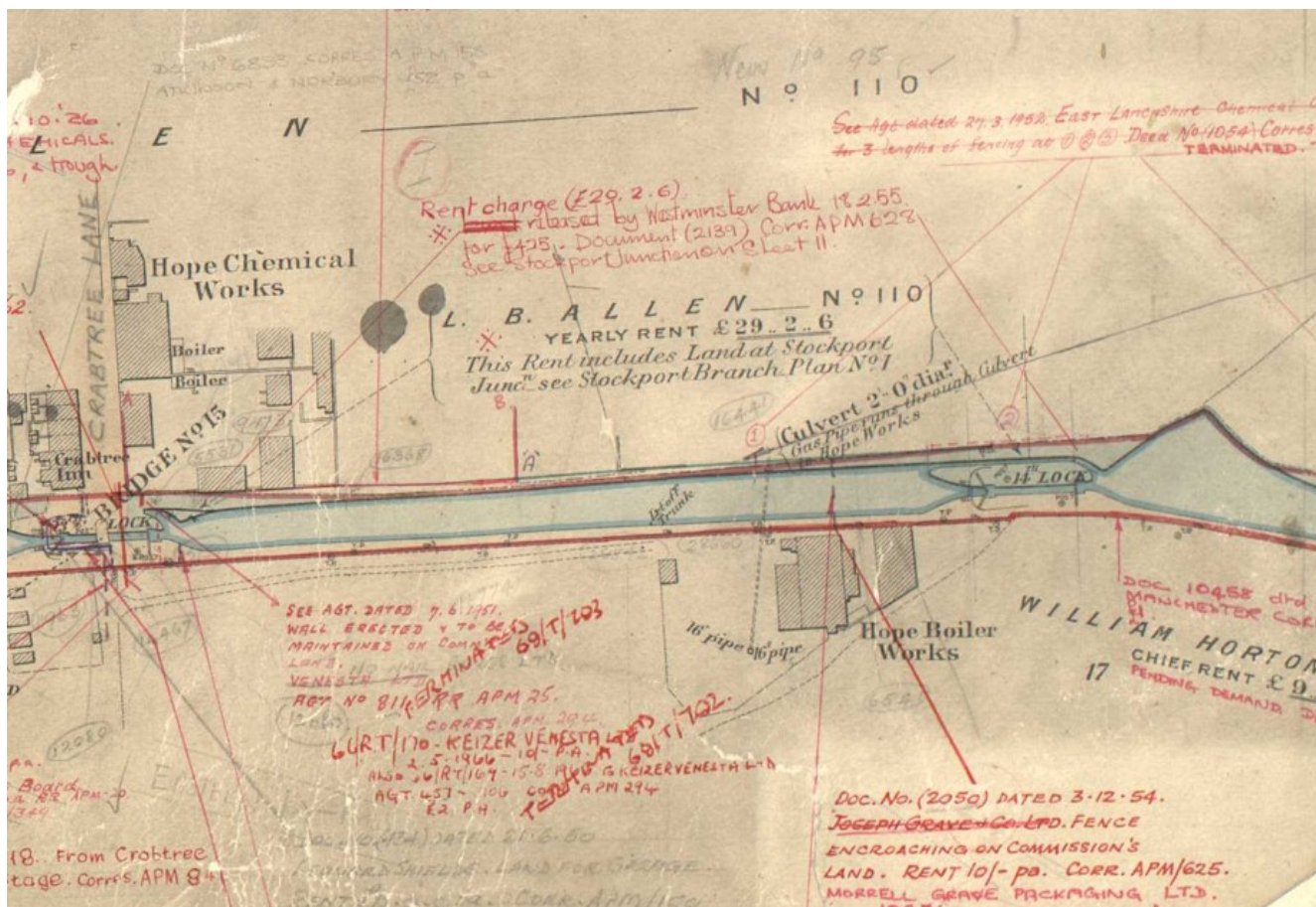
We don't know the nature of the culvert or whether it still exists. The land either side of the canal in this location has been re-developed, so there is the possibility that the culvert may have been formally abandoned, hence why we have no current knowledge of it, but this is not always the case.

I doubt the alleged culvert provided a feed to the canal, and there is no evidence to suggest it conveyed canal waste flows (overflow). The [1888 OS map](#) shows a small pond to the north of the canal, so I suspect that the culvert may have carried a small watercourse from the pond under the canal towards Clayton Brook, however, these are just assumptions in the absence of information.

With canal culverts, there is potential that they feature bed valves which would have allowed the canal to be drained, however, having looked on Google Streetview along the towpath, there is no evidence such as rollers on the towpath to indicate that is the case here.

I would recommend that the developer investigates further to CCTV survey and trace the incoming connection which they mention came from the direction of the canal. This would allow the Trust to clarify what level of remedial work (if any) would be required as part of the development. They could also carry out a GPR survey which may show up any pipework/culvert in the ground.

I'm not sure if the Trust have a standardised easement width, however, in line with the Land Drainage Act, we wouldn't be the riparian owner of the culverted watercourse beyond our land boundary, so I don't believe we'd place easement restrictions on a section of culvert passing under a third-party owned site.



I hope that this is of assistance.

Kind regards

Tim Bettany-Simmons BA (HONS), MSc, MRTPI
Senior Planner – Major Projects & Infrastructure

[REDACTED]

Canal & River Trust / Glandwr Cymru,
National Waterway Museum Ellesmere Port, South Pier Road, Ellesmere Port, Cheshire, England, CH65 4FW

From: Kirsty Halliday [REDACTED]
Sent: 23 January 2025 13:11
To: Tim Bettany-Simmons <[REDACTED]>
Cc: Hannah Buchanan [REDACTED]; Jabez Thomas [REDACTED]
Subject: Land at, Crabtree Lane, Openshaw, Manchester (HYD1015)

[REDACTED]

Site Reference: Land at, Crabtree Lane, Openshaw, Manchester –

Good Afternoon Tim,

I trust this email finds you well. I have been asked by the client to liaise directly with you on the topic of flood risk associated with the Ashton Canal which bounds the site. I gather you have

already had a TEAMS call with the client and planning team on the issues for future development. CRT have provided a formal response attached.

In terms of my remit, I've been asked to establish flood risk associated with the canal, but also the feeder/overflow pipe that is understood to be in the north-eastern corner of the site. Do your records show flood risk associated with the canal itself, the upstream lock nearby or the canal feeder/overflow culvert onsite.

In the "pollution prevention" section of the document attached you refer to the canal culvert, although you note that you do not hold record of this. I understand that survey work has been previously undertaken by the client of the other culvert system (I think you refer to it as Clayton Brook in your letter attached) and this work did identify an incoming connection from the canal direction (it was not traced at that time). The client is currently trying to locate the relevant information for us to integrate further. Do your historic records pick up whether this canal culvert length was a feeder into the canal or overflow from the canal? Also are there any drawings or routing information from the historic records that you can share with us at this stage?

If the watercourse culvert is confirmed to still have a connection from the canal, then there are a few questions I am hoping you or your team can advise upon. So in the attached you mention:

"If an operational culvert is found to be present, then it would need to be inspected, maintained, and protected. It may be that during the construction phase that a watching brief (or similar) is undertaken in case this culvert is found. If disused/redundant and no longer required operationally, it would be important that it is located, plugged, and grouted to prevent runoff/pollution to the canal during the demolition/construction phase."

So questions we would like answering are:

1. If investigation shows the length of culvert between the canal and the culverted watercourse through the site to be present, but we assume this is a feeder to the canal and not an overflow from the canal can it simply be "plugged and grouted" to render it dis-used formally and therefore the existing route would not need to be maintained through offset or easement?
2. If investigation shows the length of culvert between the canal and the culverted watercourse through the site to be present, but you confirm it is an overflow from the canal not the above then would the route need to be maintained and offsets for development above included etc? if some what would be CRT's minimum offsets in this case?

I trust the above is understandable but if you need anything else from us then please do not hesitate to let me know by return. Thank you again in advance.

Kind Regards

Kirsty Halliday BSc(Hons) MCIWEM
Associate

Please note, I usually work Tuesdays through Thursdays and I will not always have access to emails on Mondays and Fridays.

BETTS HYDRO

Consulting Engineers

Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire, CH5 2LY

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APPENDIX F: LOCATION PLAN

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LOCATION PLAN

Crabtree Lane, Manchester



OS X (Eastings)	388788
OS Y (Northings)	398077
Nat Grid	SJ887980 / SJ8878898077
Nearest Post Code	M11 1GY
Lat (WGS84)	N53:28:45 (53.47929515618655)
Long (WGS84)	W2:10:13 (-2.1704081131393984)
Lat,Long (WGS84)	53.47929515618655,-2.1704081131393984
Lat (OSGB36)	N53:28:45 (53.479045773940705)
Long (OSGB36)	W2:10:08 (-2.1689602916686552)
Lat,Long (OSGB36)	53.479045773940705,-2.1689602916686552



APPENDIX G: TOPOGRAPHICAL SURVEY

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APPENDIX H: PROPOSED PLANNING LAYOUT

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Factory



U R B A N
G R E E N

A: Ground Floor, The Tower,
Deva City Office Park, Trinity Way,
Manchester M3 7BF

T: +44 (0) 161 312 3131
weareurbangreen.co.uk

Client:

KEEPMOAT HOMES

**THE IRONWORKS
LAND AT CRABTREE LANE**

GENERAL ARRANGEMENT

PLANNING	Dwg No:	UG_2791_LAN_GA_DRW_101		Revision:	P17
	Project:	UG2791	Scale @ A1:	1:500	
	Drawn:	IG	Checked:	AL	Approved: SA
ISSUED:					Date: 22/11/24

Dwg No:	IIC 2794 I AN CA DBW 101	Revision:	D17
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APPENDIX I: EXISTING UTILITIES INFORMATION

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APPENDIX J: SURFACE WATER RUN-OFF CALCULATIONS

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Calculated by:

Hannah Buchanan

Site name:

Crabtree Lane

Site location:

Manchester

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

Site Details

Latitude:

53.47884° N

Longitude:

2.17177° W

Reference:

3590686469

Date:

Dec 11 2024 11:01

Runoff estimation
approach

FEH Statistical

Site characteristics

Total site area (ha):

1

Methodology

Q_{MED} estimation method:

Calculate from BFI and SAAR

BFI and SPR method:

Specify BFI manually

HOST class:

N/A

BFI / BFIHOST:

0.333

Q_{MED} (l/s):

Q_{BAR} / Q_{MED} factor:

1.08

Hydrological
characteristics

	Default	Edited
SAAR (mm):	919	919
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

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

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

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

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

(3) Is $\text{SPR}/\text{SPR}_{\text{HOST}} \leq 0.3$?

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

Greenfield runoff rates

	Default	Edited
Q _{BAR} (l/s):		9.16
1 in 1 year (l/s):		7.97
1 in 30 years (l/s):		15.58
1 in 100 year (l/s):		19.06
1 in 200 years (l/s):		21.72

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

SURFACE WATER RUN-OFF CALCULATION SHEET



Development	Crabtree Lane, Manchester
Project No.	HYD1015

Revision	B	Completed by	HB
Date	11/12/2024	Checked by	KH

Areas			
Total Site	3.053	ha	
Development Area ¹	3.037	ha	
Existing Impermeable		ha	
Existing Impermeable ²		ha	
Existing Pervious	3.053	ha	
Existing Pervious ²	0.000	ha	
Proposed total impermeable	1.974	ha	65%

Catchment Characteristics			
SAAR	913	mm	
SPR	0.47		
BFI	0.333		
i_1	17.0	mm/hr	d_1 24.3 mm
i_{30}	33.9	mm/hr	d_{30} 49.0 mm
i_{100}	46.1	mm/hr	d_{100} 61.9 mm

Run-off Rates - FEH Method			
Pre-development			
Impermeable -----	1yr	0.0	l/s
	30yr	0.0	l/s
	100yr	0.0	l/s
	50mm/hr ³	0.0	l/s
Pervious ⁴ -----	1yr	24.2	l/s
	30yr	47.3	l/s
	100yr	57.9	l/s
	QBar ⁵	27.8	l/s
Total -----	1yr	24.2	l/s
	30yr	47.3	l/s
	100yr	57.9	l/s
Post-development (without control)			
Impermeable ⁶ -----	1yr	93.0	l/s
	30yr	185.8	l/s
	100yr+45%CC	366.3	l/s

Volumes			
Pre-development			
Impermeable -----	1yr	0.0	cu.m
	30yr	0.0	cu.m
	100yr	0.0	cu.m
Pervious ⁴ -----	1yr	364.9	cu.m
	30yr	769.3	cu.m
	100yr	1097.0	cu.m
Total -----	1yr	364.9	cu.m
	30yr	769.3	cu.m
	100yr	1097.0	cu.m
Post-development			
Impermeable ⁶ -----	1yr	480.1	cu.m
	30yr	967.5	cu.m
	100yr	1222.4	cu.m

Stormwater Storage Estimates				
Based on Greenfield run-off QBar				
Microdrainage Quick Storage Estimates (using FEH catchment data)				
Return Period	Rate	lower	upper	mean
1yr	27.8 l/s	181	340	260.5 cu.m
30yr	27.8 l/s	562	879	720.5 cu.m
30yr+40%CC	27.8 l/s	879	1383	1131 cu.m
100yr+45%CC	27.8 l/s	1437	2050	1743.5 cu.m

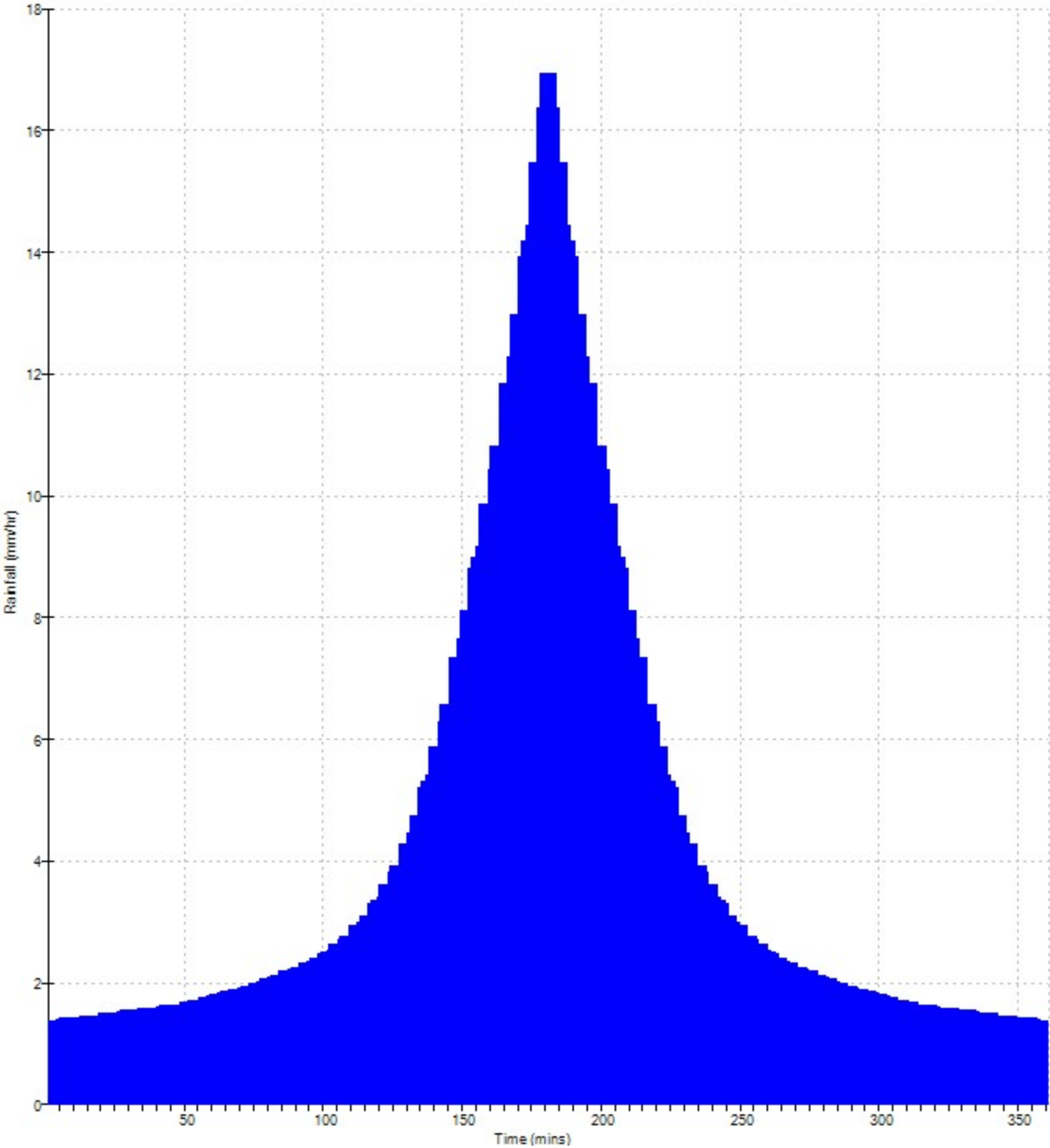
1/ The 'development area' removes areas of POS and/or landscaped areas of the wider site that are to remain as existing.
 2/ On occasion the existing impermeable area cannot be evidenced to connect and a reduction is applied.
 3/ 50mm/hr is used for BRegs calculations and often used by Water Companies when considering allowable post-development rates of discharge. (Rational Method)
 4/ The Greenfield rates and of run-off have been calculated using the UK SUDS Calculator
 5/ QBar is the estimated flood flow for the 2.33yr return period event and is often used as a post-development rate restriction.
 6/ Post-development run-off is only considered from the impermeable area when the proposed post-development impermeable area >50% in accordance with the EA Guidance Preliminary rainfall runoff management for developments (WS-074/A/TR1/1 rev E (2012)).

NB. The catchment characteristics are from the FEH catchment, the UK SUDS Calculator and Microdrainage.
 NB. The rainfall intensities and depths are calculated for the 6hr duration rainfall event (peak summer intensity)

Rainfall profile

Storm duration (mins) 360

FEH Data	
FEH Rainfall Version	2013
Site Location	GB 388707 398018 SJ 88707 98018
Data Type	Point
Peak Intensity (mm/hr)	16.955
Ave. Intensity (mm/hr)	4.325
Return Period (years)	2.0

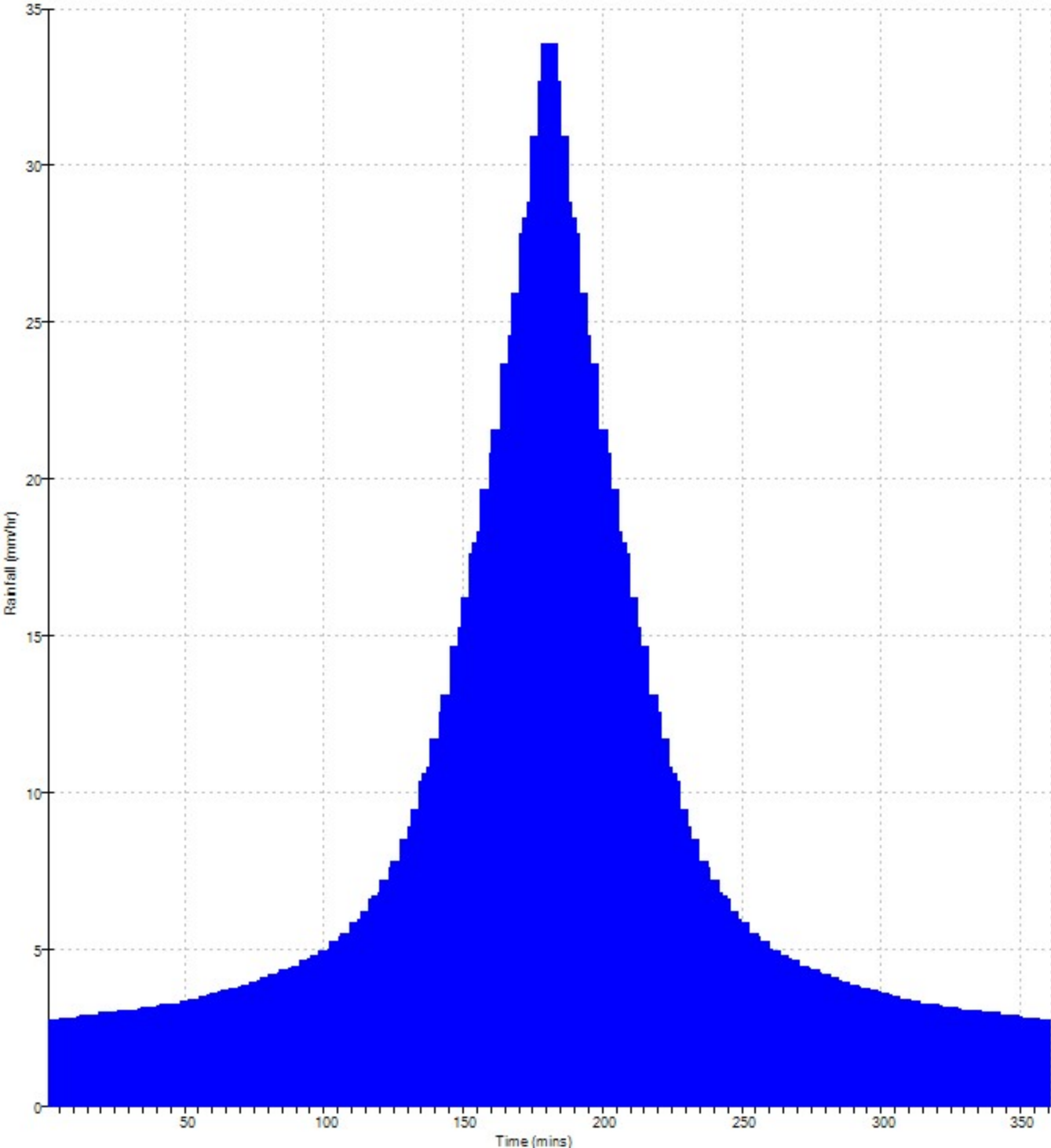


Rainfall profile

Storm duration (mins) 360

FEH Data

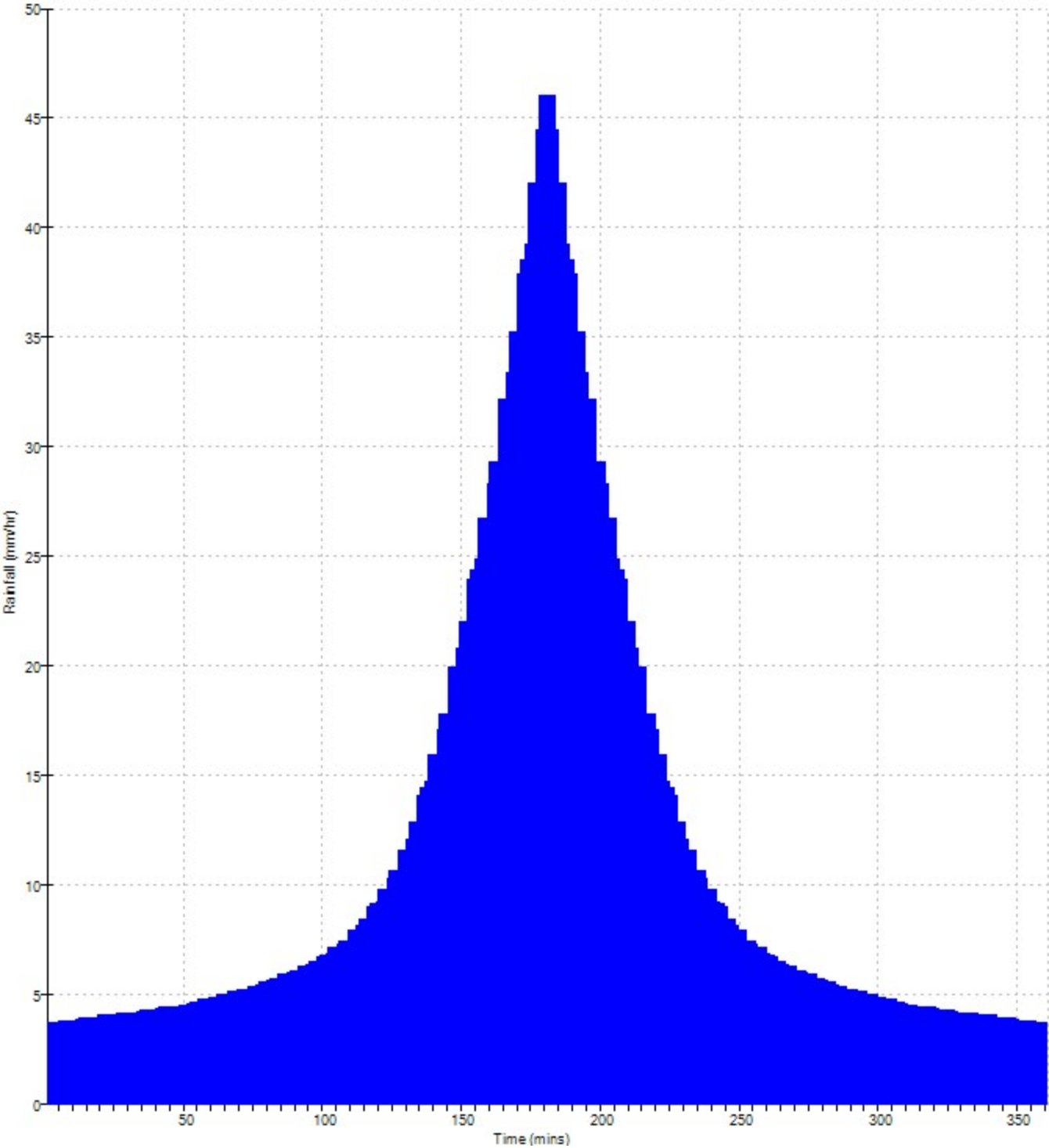
FEH Rainfall Version	2013
Site Location	GB 388707 398018 SJ 88707 98018
Data Type	Point
Peak Intensity (mm/hr)	33.885
Ave. Intensity (mm/hr)	8.644
Return Period (years)	30.0



Rainfall profile

Storm duration (mins) 360

FEH Data	
FEH Rainfall Version	2013
Site Location	GB 388707 398018 SJ 88707 98018
Data Type	Point
Peak Intensity (mm/hr)	46.069
Ave. Intensity (mm/hr)	11.752
Return Period (years)	100.0



Betts Associates Ltd		Page 1
Old Marsh Farm Barns	Crabtree Lane	
Welsh Road	Manchester	
Sealand Flintshire CH5 2LY		
Date 11/12/2024	Designed by HB	
File	Checked by KH	
Micro Drainage	Source Control 2020.1.3	

Greenfield Runoff Volume

FEH Data

Return Period (years)	2
Storm Duration (mins)	360
FEH Rainfall Version	2013
Site Location	GB 388707 398018 SJ 88707 98018
Data Type	Point
Areal Reduction Factor	1.00
Area (ha)	3.037
SAAR (mm)	913
CWI	122.199
SPR Host	47.000
URBEXT (1990)	0.0000

Results

Percentage Runoff (%)	46.30
Greenfield Runoff Volume (m³)	364.910

Betts Associates Ltd		Page 1
Old Marsh Farm Barns Welsh Road Sealand Flintshire CH5 2LY	Crabtree Lane Manchester	
Date 11/12/2024	Designed by HB	
File	Checked by KH	
Micro Drainage		Source Control 2020.1.3

Greenfield Runoff Volume

FEH Data

Return Period (years)	30
Storm Duration (mins)	360
FEH Rainfall Version	2013
Site Location	GB 388707 398018 SJ 88707 98018
Data Type	Point
Areal Reduction Factor	1.00
Area (ha)	3.037
SAAR (mm)	913
CWI	122.199
SPR Host	47.000
URBEXT (1990)	0.0000

Results

Percentage Runoff (%)	48.84
Greenfield Runoff Volume (m³)	769.316

Greenfield Runoff Volume

FEH Data

Return Period (years)	100
Storm Duration (mins)	360
FEH Rainfall Version	2013
Site Location	GB 388707 398018 SJ 88707 98018
Data Type	Point
Areal Reduction Factor	1.00
Area (ha)	3.037
SAAR (mm)	913
CWI	122.199
SPR Host	47.000
URBEXT (1990)	0.0000

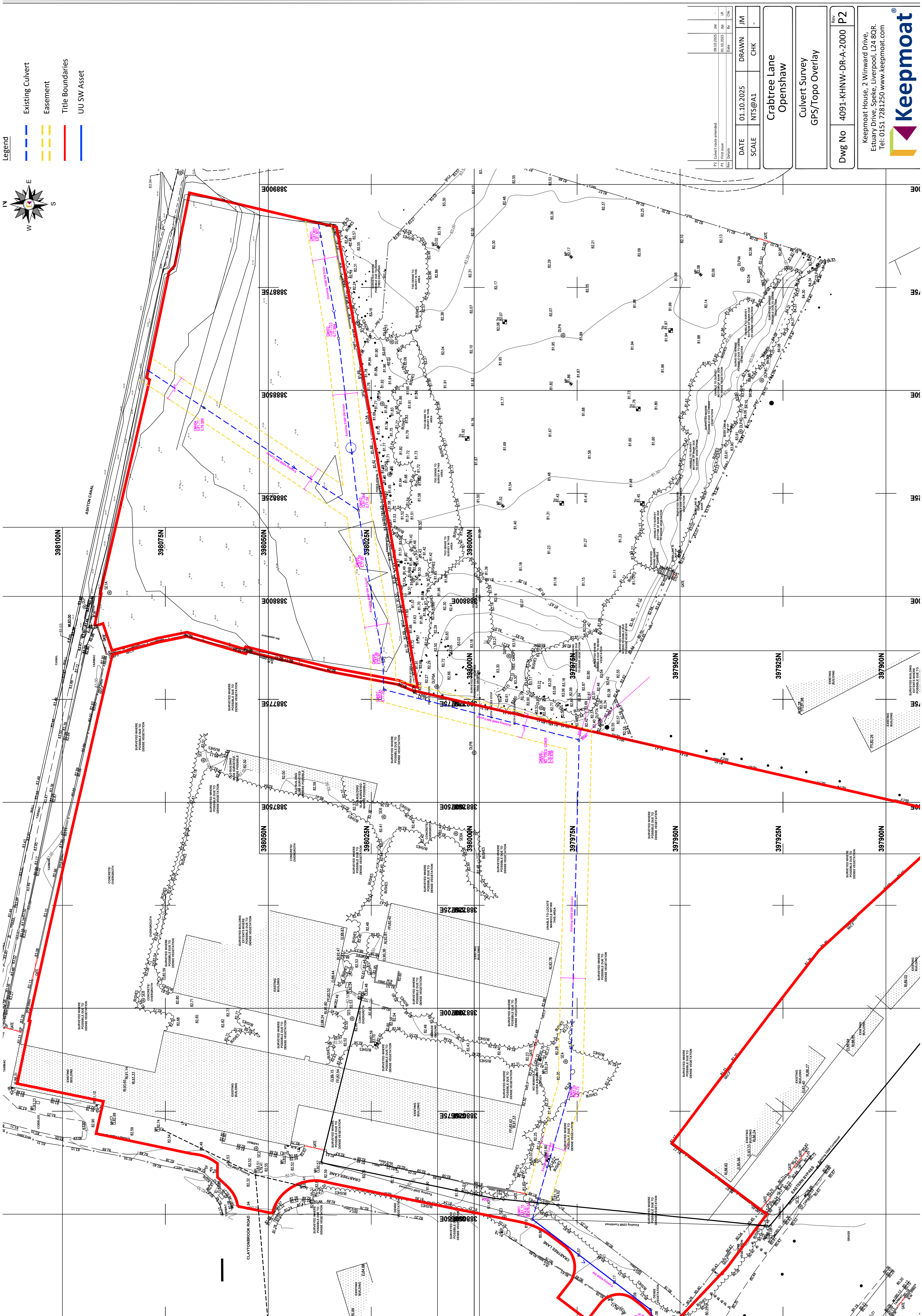
Results

Percentage Runoff (%)	51.22
Greenfield Runoff Volume (m³)	1096.972

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APPENDIX K: CULVERT CCTV SURVEY

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DATE	01.10.2025	DRAWN	JM
SCALE	NTS@A1	CHK	-

Culvert Survey
GPS/Topo Overlay

Keepmoat House, 2 Winward Drive,
Estuary Drive, Speke, Liverpool, L24 8QR.
Tel: 0151 7281250 www.keepmoat.com



Project

Project Name: 005828 - Keepmoat Ltd - Crabtree Lane

Project Date: 04/06/2024

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



Table of Contents

Project Name	Project Number	Project Date
005828 - Keepmoat Ltd - Crabtree Lane		04/06/2024

Project Information	P-1
Scoring Summary	P-2
Section Profile	P-3
Section Item 1: UP01 > EX01 (UP01X)	1
Section Item 2: EX01 > MH03 (EX01X)	4
Section Item 3: MH01 > MH02 (MH01X)	6
Section Item 4: MH01 > MH02 (MH01X)	8
Section Item 5: MH02 > MH03 (MH02X)	10
Section Item 6: MH03 > MH04 (MH03X)	12
Section Item 7: MH04 > MH05 (MH04X)	13
Section Item 8: MH05 > MH06 (MH05X)	14

Project Information

Project Name
005828 - Keepmoat Ltd - Crabtree Lane

Project Number

Project Date
04/06/2024

Client

Company: Keepmoat Homes
Street: Lakeside Boulevard
County: South Yorkshire
Post Code: DN4 5PL



Site

Company: KEEPMOAT LIMITED
Street: Crabtree Lane
Town or City: Openshaw

Contractor

Company: RAM Utility Solutions Ltd
Street: 3 Pitt Street
Town or City: Widnes
County: Cheshire
Post Code: WA8 0TG



Scoring Summary

Project Name 005828 - Keepmoat Ltd - Crabtree Lane	Project Number	Project Date 04/06/2024
--	-----------------------	-----------------------------------

Structural Defects

Grade 3: Best practice suggests consideration should be given to repairs in the medium term.

Grade 4: Best practice suggests consideration should be given to repairs to avoid a potential collapse.

Grade 5: Best practice suggests that this pipe is at risk of collapse at any time. Urgent consideration should be given to repairs to avoid total failure.

Section	PLR	Grade	Description
1	UP01X	5	Collapsed drain or sewer
2	EX01X	5	Collapsed drain or sewer
5	MH02X	3	Multiple defects

Service / Operational Condition

Grade 3: Best practice suggests consideration should be given to maintenance activities in the medium term.

Grade 4: Best practice suggests consideration should be given to maintenance activity to avoid potential blockages.

Grade 5: Best practice suggests that this pipe is at a high risk of backing up or causing flooding.

Section	PLR	Grade	Description
1	UP01X	3	Deformed sewer or drain, 10%, finish
3	MH01X	3	Multiple defects
4	MH01X	3	Multiple defects
5	MH02X	3	Connection defective, connecting pipe is intruding at 9 o'clock, 150mm dia, intrusion: 15%

Abandoned Surveys

Section	PLR	Description
1	UP01X	Survey abandoned
2	EX01X	Survey abandoned
3	MH01X	Survey abandoned
4	MH01X	Survey abandoned

Information

These scoring summaries are based on the SRM grading from the WRC.

Section Profile

Project Name

005828 - Keepmoat Ltd - Crabtree Lane

Project Number
Project Date

04/06/2024

Circular, 225 mm

Item No.	Upstream Node	Downstream Node	Date	Road	Material	Total Length	Inspected Length
5	MH02	MH03	04/06/2024	off Crabtree Lane	Vitrified clay	41.31 m	41.31 m

Total: 1 Inspection x Circular 225 mm = 41.31 m Total Length and 41.31 m Inspected Length

Circular, 450 mm

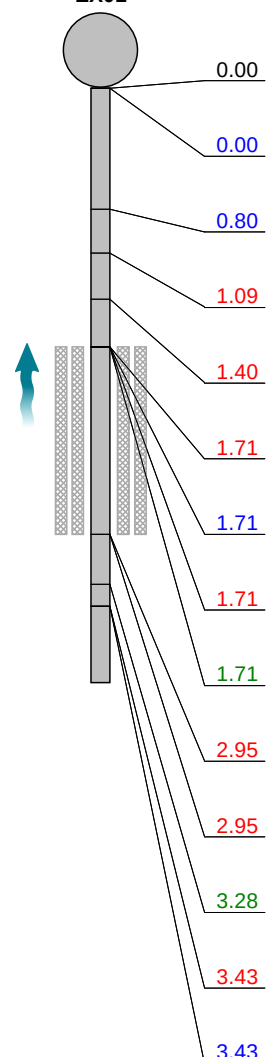
Item No.	Upstream Node	Downstream Node	Date	Road	Material	Total Length	Inspected Length
6	MH03	MH04	04/06/2024	off Crabtree Lane	Vitrified clay	11.61 m	11.61 m
7	MH04	MH05	04/06/2024	off Crabtree Lane	Vitrified clay	22.95 m	22.95 m
8	MH05	MH06	04/06/2024	off Crabtree Lane	Vitrified clay	5.92 m	5.92 m

Total: 3 Inspections x Circular 450 mm = 40.48 m Total Length and 40.48 m Inspected Length
Total: 4 Inspections = 81.80 m Total Length and 81.80 m Inspected Length

Section Inspection - 04/06/2024 - UP01X

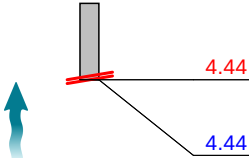
Item No.	Insp. No.	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
1	1	04/06/24	9:31	Not Specified	No Rain Or Snow	Yes	UP01X
Operator G.Smith		Vehicle OY22AOX		Camera Mainline	Preset Length 0.00 m	Legal Status Not Specified	Alternative ID Not Specified

Town or Village:	Openshaw, Manchester	Inspection Direction:	Upstream	Upstream Node:	UP01
Road:	Off Crabtree Lane	Inspected Length:	4.44 m	Upstream Pipe Depth:	
Location:	Difficult access	Total Length:	4.44 m	Downstream Node:	EX01
Surface Type:		Joint Length:		Downstream Pipe Depth:	
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	300 mm		
Flow Control:	No flow control	Material:	Vitrified clay		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Routine inspection	Lining Material:	No Lining		
Comments:	EX01 is an excavation.				
Recommendations:					

Scale:	1:50	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: m EX01 							
		0.00	OC	Start node, other special chamber, reference: EX01: EXCAVATION	00:00:00		
		0.00	WL	Water level, 15% of the vertical dimension	00:00:08		
		0.80	WL	Water level, 10% of the vertical dimension	00:00:26		
		1.09	CM	Cracks, multiple from 9 o'clock to 5 o'clock	00:00:36		3 / 2
		1.40	H	Hole in drain or sewer from 11 o'clock to 1 o'clock: POSSIBLE REPAIR	00:00:51	UP01X_0e bc5ec2-70 73-45f7-84	4
		1.71	S01	Fractures, multiple from 12 o'clock to 12 o'clock, start	00:01:10	UP01X_41 79f33c-7a 94-48cf-8a	
		1.71	WL	Water level, 5% of the vertical dimension	00:01:30		
		1.71	S02	Deformed sewer or drain, 10%, start	00:01:31		
		1.71	LL	Line deviates left: SLIGHT	00:01:32		
		2.95	F01	Fractures, multiple from 12 o'clock to 12 o'clock, finish	00:01:53		4 / 2
		2.95	F02	Deformed sewer or drain, 10%, finish	00:01:52		4 / 3
		3.28	LR	Line deviates right: SLIGHT	00:02:01		
		3.43	FM	Fractures, multiple from 8 o'clock to 4 o'clock	00:02:03		4 / 2
		3.43	WL	Water level, 40% of the vertical dimension	00:02:05	UP01X_5b cc3133-30 77-4964-8	

Section Inspection - 04/06/2024 - UP01X

Item No.	Insp. No.	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
1	1	04/06/24	9:31	Not Specified	No Rain Or Snow	Yes	UP01X
Operator		Vehicle		Camera	Preset Length	Legal Status	Alternative ID
G.Smith		OY22AOX		Mainline	0.00 m	Not Specified	Not Specified

Scale:	1:50	Position [m]	Code	Observation	MPEG	Photo	Grade		
	4.44	XP	Collapsed drain or sewer: 100%		00:03:10	UP01X_d2	5		
	4.44	SA	Survey abandoned: PIPE HAS COLLAPSED		00:03:45	48183a-be f2-40cf-9e			
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
6	280.0	154.3	685.0	5.0	4	4.0	1.8	8.0	3.0

Section Pictures - 04/06/2024 - UP01X

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
1	Upstream	UP01X		005828



UP01X_0ebc5ec2-7073-45f7-8403-21ec87af57ab_20240604_093311_873.jpg, 00:00:51, 1.40 m
Hole in drain or sewer from 11 o'clock to 1 o'clock, POSSIBLE REPAIR



UP01X_4179f33c-7a94-48cf-8a82-e2556515ddb4_20240604_093351_814.jpg, 00:01:10, 1.71 m
Fractures, multiple from 12 o'clock to 12 o'clock, start



UP01X_5bcc3133-3077-4964-8679-81de97dabb64_20240604_093536_827.jpg, 00:02:05, 3.43 m
Water level, 40% of the vertical dimension

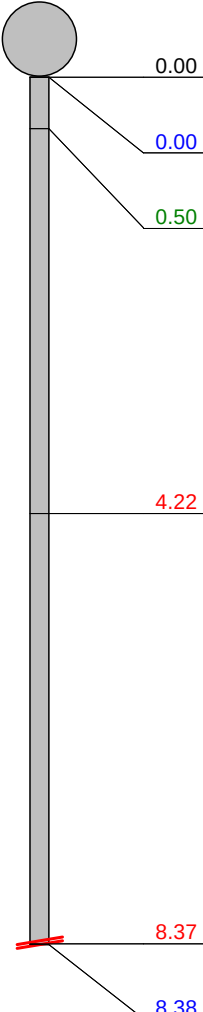


UP01X_d248183a-bef2-40cf-9ece-b15934de1512_20240604_093654_879.jpg, 00:03:10, 4.44 m
Collapsed drain or sewer, 100%

Section Inspection - 04/06/2024 - EX01X

Item No.	Insp. No.	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
2	1	04/06/24	10:22	Not Specified	No Rain Or Snow	Yes	EX01X
Operator		Vehicle		Camera	Preset Length	Legal Status	Alternative ID
G.Smith		OY22AOX		Mainline	0.00 m	Not Specified	Not Specified

Town or Village:	Openshaw, Manchester	Inspection Direction:	Downstream	Upstream Node:	EX01
Road:	Off Crabtree Lane	Inspected Length:	8.38 m	Upstream Pipe Depth:	
Location:	Difficult access	Total Length:	8.38 m	Downstream Node:	MH03
Surface Type:		Joint Length:		Downstream Pipe Depth:	
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	450 mm		
Flow Control:	No flow control	Material:	Vitrified clay		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Routine inspection	Lining Material:	No Lining		
Comments:	EX01 is an excavation.				
Recommendations:					

Scale:	1:73	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: m EX01 							
		0.00	OC	Start node, other special chamber, reference: EX01: EXCAVATION	00:00:00		
		0.00	WL	Water level, 5% of the vertical dimension	00:00:07		
		0.50	LR	Line deviates right: SLIGHT	00:00:09		
		4.22	CCJ	Crack, circumferential at joint from 9 o'clock to 3 o'clock	00:00:32		2 / 2
		8.37	XP	Collapsed drain or sewer: 100%	00:01:44	EX01X_9d ed35e4-c1 0f-454f-a2	5
		8.38	SA	Survey abandoned: COLLAPSED PIPE	00:02:32	EX01X_91 472800-c2 1d-4980-9	

Construction Features

Structural Defects

Miscellaneous Features

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
2	165.0	20.9	175.0	5.0	1	1.0	0.1	1.0	2.0

Section Pictures - 04/06/2024 - EX01X

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
2	Downstream	EX01X		005828



EX01X_9ded35e4-c10f-454f-a2a1-fa3eb9e97bb7_20240604_102543_161.jpg, 00:01:44, 8.37 m
Collapsed drain or sewer, 100%



EX01X_91472800-c21d-4980-93ed-87aae1a343d1_20240604_102627_716.jpg, 00:02:32, 8.38 m
Survey abandoned, COLLAPSED PIPE



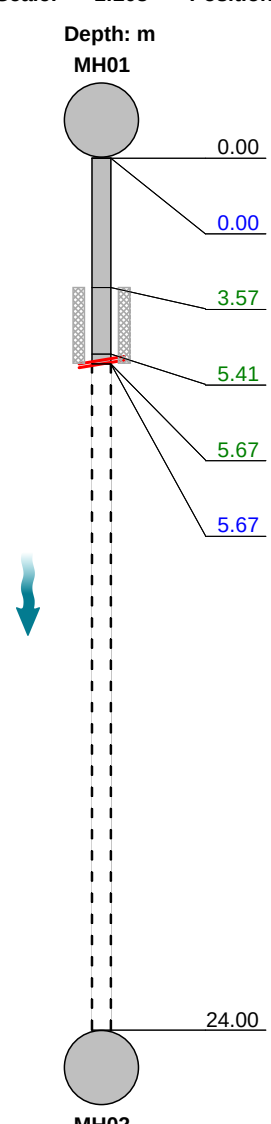
EX01X_c373c107-d9d9-4575-a5f7-a1e859cbf025_20240604_102632_009.jpg, 00:02:32, 8.38 m
Survey abandoned, COLLAPSED PIPE

Section Inspection - 04/06/2024 - MH01X

Item No.	Insp. No.	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
3	1	04/06/24	10:53	Not Specified	No Rain Or Snow	Yes	MH01X
Operator		Vehicle		Camera	Preset Length	Legal Status	Alternative ID
G.Smith		OY22AOX		Mainline	0.00 m	Not Specified	Not Specified

Town or Village:	Openshaw, Manchester	Inspection Direction:	Downstream	Upstream Node:	MH01
Road:	Off Crabtree Lane	Inspected Length:	5.67 m	Upstream Pipe Depth:	
Location:	Difficult access	Total Length:	24.00 m	Downstream Node:	MH02
Surface Type:		Joint Length:		Downstream Pipe Depth:	
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	150 mm		
Flow Control:	No flow control	Material:	Vitrified clay		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Routine inspection	Lining Material:	No Lining		

Comments:
Recommendations:

Scale:	1:208	Position [m]	Code	Observation	MPEG	Photo	Grade																																																
Depth: m MH01  <table><tr><th>Position [m]</th><th>Code</th><th>Observation</th><th>MPEG</th><th>Photo</th><th>Grade</th></tr><tr><td>0.00</td><td>MH</td><td>Start node, manhole, reference: MH01</td><td>00:00:00</td><td></td><td></td></tr><tr><td>0.00</td><td>WL</td><td>Water level, 10% of the vertical dimension</td><td>00:00:07</td><td></td><td></td></tr><tr><td>3.57</td><td>S01</td><td>DEEJ Attached deposits, encrustation at joint from 9 o'clock to 5 o'clock, 5% cross-sectional area loss, start: CLOCKS VARY</td><td>00:01:00</td><td></td><td></td></tr><tr><td>5.41</td><td>DEEJ</td><td>Attached deposits, encrustation at joint from 7 o'clock to 10 o'clock, 15% cross-sectional area loss</td><td>00:01:30</td><td>MH01X_8f5b6865-c3ca-404c-b</td><td>3</td></tr><tr><td>5.67</td><td>F01</td><td>DEEJ Attached deposits, encrustation at joint from 9 o'clock to 5 o'clock, 5% cross-sectional area loss, finish: CLOCKS VARY</td><td>00:02:23</td><td></td><td>3</td></tr><tr><td>5.67</td><td>SA</td><td>Survey abandoned: ENCRUSTATION, SCALE 15%</td><td>00:02:24</td><td>MH01X_bc62be9-2ae3-41de-a</td><td></td></tr><tr><td>24.00</td><td></td><td>End of pipe</td><td></td><td></td><td></td></tr></table>								Position [m]	Code	Observation	MPEG	Photo	Grade	0.00	MH	Start node, manhole, reference: MH01	00:00:00			0.00	WL	Water level, 10% of the vertical dimension	00:00:07			3.57	S01	DEEJ Attached deposits, encrustation at joint from 9 o'clock to 5 o'clock, 5% cross-sectional area loss, start: CLOCKS VARY	00:01:00			5.41	DEEJ	Attached deposits, encrustation at joint from 7 o'clock to 10 o'clock, 15% cross-sectional area loss	00:01:30	MH01X_8f5b6865-c3ca-404c-b	3	5.67	F01	DEEJ Attached deposits, encrustation at joint from 9 o'clock to 5 o'clock, 5% cross-sectional area loss, finish: CLOCKS VARY	00:02:23		3	5.67	SA	Survey abandoned: ENCRUSTATION, SCALE 15%	00:02:24	MH01X_bc62be9-2ae3-41de-a		24.00		End of pipe			
Position [m]	Code	Observation	MPEG	Photo	Grade																																																		
0.00	MH	Start node, manhole, reference: MH01	00:00:00																																																				
0.00	WL	Water level, 10% of the vertical dimension	00:00:07																																																				
3.57	S01	DEEJ Attached deposits, encrustation at joint from 9 o'clock to 5 o'clock, 5% cross-sectional area loss, start: CLOCKS VARY	00:01:00																																																				
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5.67	SA	Survey abandoned: ENCRUSTATION, SCALE 15%	00:02:24	MH01X_bc62be9-2ae3-41de-a																																																			
24.00		End of pipe																																																					

Construction Features
Structural Defects
Miscellaneous Features
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	2.0	1.4	8.0	3.0

Section Pictures - 04/06/2024 - MH01X

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
3	Downstream	MH01X		005828



MH01X_8f5b6865-c3ca-404c-b066-ae3b44a98915_20240604_105605_389.jpg, 00:01:30, 5.41 m
Attached deposits, encrustation at joint from 7 o'clock to 10 o'clock, 15% cross-sectional area loss



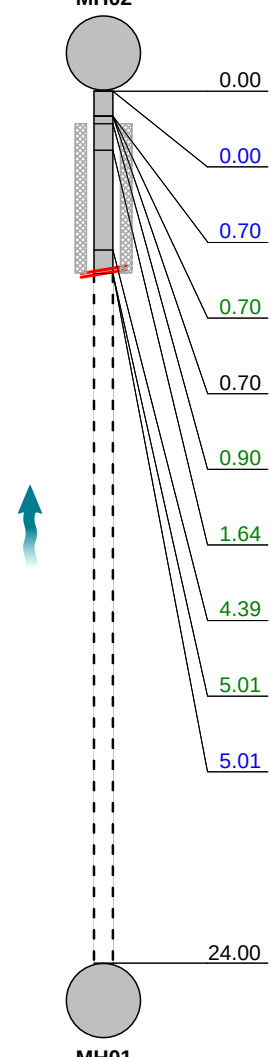
MH01X_bcc62be9-2ae3-41de-a47b-d78b27a57ecd_20240604_105731_164.jpg, 00:02:24, 5.67 m
Survey abandoned, ENCRUSTATION, SCALE 15%

Section Inspection - 04/06/2024 - MH01X

Item No.	Insp. No.	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
4	1	04/06/24	11:03	Not Specified	No Rain Or Snow	Yes	MH01X
Operator G.Smith		Vehicle OY22AOX		Camera Mainline	Preset Length 0.00 m	Legal Status Not Specified	Alternative ID Not Specified

Town or Village:	Openshaw, Manchester	Inspection Direction:	Upstream	Upstream Node:	MH01
Road:	Off Crabtree Lane	Inspected Length:	5.01 m	Upstream Pipe Depth:	
Location:	Difficult access	Total Length:	24.00 m	Downstream Node:	MH02
Surface Type:		Joint Length:		Downstream Pipe Depth:	
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	225 mm		
Flow Control:	No flow control	Material:	Vitrified clay		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Routine inspection	Lining Material:	No Lining		

Comments:	
Recommendations:	

Scale:	1:208	Position [m]	Code	Observation	MPEG	Photo	Grade																																																																																				
Depth: m MH02  <table><tr><th>Position [m]</th><th>Code</th><th>Observation</th><th>MPEG</th><th>Photo</th><th>Grade</th></tr><tr><td>0.00</td><td>MH</td><td>Start node, manhole, reference: MH02</td><td>00:00:00</td><td></td><td></td></tr><tr><td>0.00</td><td>WL</td><td>Water level, 5% of the vertical dimension</td><td>00:00:07</td><td></td><td></td></tr><tr><td>0.70</td><td>WL</td><td>Water level, 10% of the vertical dimension</td><td>00:00:21</td><td></td><td></td></tr><tr><td>0.70</td><td>LL</td><td>Line deviates left: SLIGHT</td><td>00:00:22</td><td></td><td></td></tr><tr><td>0.70</td><td>SC</td><td>Pipe size changes, new size(s), 150mm high</td><td>00:00:22</td><td></td><td></td></tr><tr><td>0.90</td><td>S01 DEEJ</td><td>Attached deposits, encrustation at joint from 3 o'clock to 6 o'clock, 5% cross-sectional area loss, start: CLOCKS VARY</td><td>00:00:33</td><td></td><td></td></tr><tr><td>1.64</td><td>LR</td><td>Line deviates right: SLIGHT</td><td>00:00:40</td><td></td><td></td></tr><tr><td>4.39</td><td>DEEJ</td><td>Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 15% cross-sectional area loss</td><td>00:00:57</td><td>MH01X_7 07ffc7-f1 86-42af-b5</td><td>3</td></tr><tr><td>5.01</td><td>F01 DEEJ</td><td>Attached deposits, encrustation at joint from 3 o'clock to 6 o'clock, 5% cross-sectional area loss, finish: CLOCKS VARY</td><td>00:02:15</td><td></td><td>3</td></tr><tr><td>5.01</td><td>SA</td><td>Survey abandoned: ENCRUSTATION,SCALE 15%</td><td>00:02:17</td><td>MH01X_6 84ee632-c a36-4d4a-</td><td></td></tr><tr><td>24.00</td><td></td><td>End of pipe</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td>MH01</td><td></td><td></td><td></td></tr><tr><td></td><td></td><td>Depth: m</td><td></td><td></td><td></td></tr></table>								Position [m]	Code	Observation	MPEG	Photo	Grade	0.00	MH	Start node, manhole, reference: MH02	00:00:00			0.00	WL	Water level, 5% of the vertical dimension	00:00:07			0.70	WL	Water level, 10% of the vertical dimension	00:00:21			0.70	LL	Line deviates left: SLIGHT	00:00:22			0.70	SC	Pipe size changes, new size(s), 150mm high	00:00:22			0.90	S01 DEEJ	Attached deposits, encrustation at joint from 3 o'clock to 6 o'clock, 5% cross-sectional area loss, start: CLOCKS VARY	00:00:33			1.64	LR	Line deviates right: SLIGHT	00:00:40			4.39	DEEJ	Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 15% cross-sectional area loss	00:00:57	MH01X_7 07ffc7-f1 86-42af-b5	3	5.01	F01 DEEJ	Attached deposits, encrustation at joint from 3 o'clock to 6 o'clock, 5% cross-sectional area loss, finish: CLOCKS VARY	00:02:15		3	5.01	SA	Survey abandoned: ENCRUSTATION,SCALE 15%	00:02:17	MH01X_6 84ee632-c a36-4d4a-		24.00		End of pipe						MH01						Depth: m			
Position [m]	Code	Observation	MPEG	Photo	Grade																																																																																						
0.00	MH	Start node, manhole, reference: MH02	00:00:00																																																																																								
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24.00		End of pipe																																																																																									
		MH01																																																																																									
		Depth: 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	2.0	2.4	12.0	3.0

Section Pictures - 04/06/2024 - MH01X

Item No.	Inspection Direction	PLR	Client's Job Ref	Contractor's Job Ref
4	Upstream	MH01X		005828



MH01X_707ffdc7-f186-42af-b54b-9dd9e84b2793_20240604_110601_419.jpg, 00:00:57, 4.39 m
Attached deposits, encrustation at joint from 12 o'clock to 12 o'clock, 15% cross-sectional area loss



MH01X_684ee632-ca36-4d4a-974c-0a5df5008eea_20240604_110802_901.jpg, 00:02:17, 5.01 m
Survey abandoned, ENCRUSTATION, SCALE 15%

Section Inspection - 04/06/2024 - MH02X

Item No.	Insp. No.	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
5	1	04/06/24	11:15	Not Specified	No Rain Or Snow	Yes	MH02X
Operator		Vehicle		Camera	Preset Length	Legal Status	Alternative ID
G.Smith		OY22AOX		Mainline	0.00 m	Not Specified	Not Specified

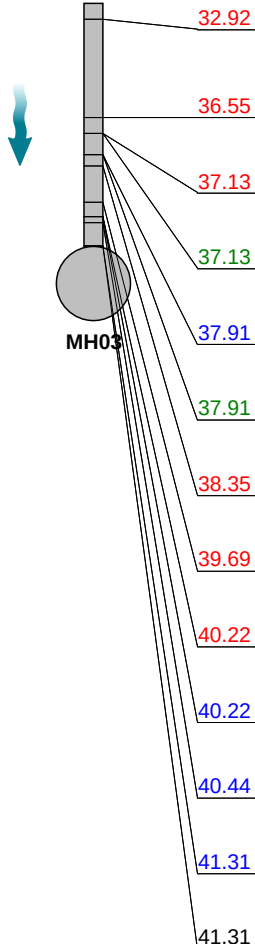
Town or Village:	Openshaw, Manchester	Inspection Direction:	Downstream	Upstream Node:	MH02
Road:	Off Crabtree Lane	Inspected Length:	41.31 m	Upstream Pipe Depth:	
Location:	Difficult access	Total Length:	41.31 m	Downstream Node:	MH03
Surface Type:		Joint Length:		Downstream Pipe Depth:	
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	225 mm		
Flow Control:	No flow control	Material:	Vitrified clay		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Routine inspection	Lining Material:	No Lining		

Comments:
Recommendations:

Scale: 1:280	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: m MH02 0.00 0.00 0.82 3.35 6.39 6.39 13.01 13.69 15.82 18.04 20.10 20.18 22.95 30.50 31.69 0.00 0.00 0.82 3.35 6.39 6.39 13.01 13.69 15.82 18.04 20.10 20.18 22.95 30.50 31.69						
	0.00	MH	Start node, manhole, reference: MH02	00:00:00		
	0.00	WL	Water level, 5% of the vertical dimension	00:00:06		
	0.82	JN	Junction at 10 o'clock, 150mm dia	00:00:33		
	3.35	CXI	Connection defective, connecting pipe is intruding at 9 o'clock, 150mm dia, intrusion: 15%	00:01:05		3
	6.39	JN	Junction at 3 o'clock, 150mm dia	00:01:34		
	6.39	CLJ	Crack, longitudinal at joint at 12 o'clock	00:01:45		2 / 2
	13.01	JNC	Junction, closed at 9 o'clock, 150mm dia	00:02:27		
	13.69	JN	Junction at 3 o'clock, 150mm dia	00:02:48		
	15.82	WL	Water level, 10% of the vertical dimension	00:03:05		
	18.04	WL	Water level, 5% of the vertical dimension	00:03:17		
	20.10	JN	Junction at 3 o'clock, 150mm dia	00:03:36		
	20.18	CMJ	Cracks, multiple at joint from 9 o'clock to 2 o'clock	00:03:56		3 / 2
	22.95	CMJ	Cracks, multiple at joint from 7 o'clock to 5 o'clock	00:04:17		3 / 2
	30.50	JN	Junction at 3 o'clock, 150mm dia	00:05:03		
	31.69	JN	Junction at 9 o'clock, 150mm dia	00:05:32		

Section Inspection - 04/06/2024 - MH02X

Item No.	Insp. No.	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
5	1	04/06/24	11:15	Not Specified	No Rain Or Snow	Yes	MH02X
Operator		Vehicle		Camera	Preset Length	Legal Status	Alternative ID
G.Smith		OY22AOX		Mainline	0.00 m	Not Specified	Not Specified

Scale: 1:280  Depth: m	Position [m]	Code	Observation	MPEG	Photo	Grade
	32.92	CCJ	Crack, circumferential at joint from 8 o'clock to 2 o'clock	00:05:51		2 / 2
	36.55	CCJ	Crack, circumferential at joint from 6 o'clock to 8 o'clock	00:06:16		2 / 2
	37.13	CCJ	Crack, circumferential at joint from 6 o'clock to 9 o'clock	00:06:27		2 / 2
	37.13	LR	Line deviates right: SLIGHT	00:06:28		
	37.91	WL	Water level, 25% of the vertical dimension	00:06:35		
	37.91	LR	Line deviates right: SLIGHT	00:06:36		
	38.35	CMJ	Cracks, multiple at joint from 10 o'clock to 2 o'clock	00:06:45		3 / 2
	39.69	CMJ	Cracks, multiple at joint from 10 o'clock to 2 o'clock	00:07:05		3 / 2
	40.22	CM	Cracks, multiple from 9 o'clock to 3 o'clock	00:07:16		3 / 2
	40.22	WL	Water level, 20% of the vertical dimension	00:07:21		
	40.44	WL	Water level, 10% of the vertical dimension	00:07:25		
	41.31	REM	General remark: LINE ENTERS MH03 AT HIGH LEVEL	00:07:48		
41.31	MHF	Finish node, manhole, reference: MH03	00:08:13			

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
9	80.0	5.8	240.0	3.0	10	2.0	0.3	11.0	3.0

Section Inspection - 04/06/2024 - MH03X

Item No.	Insp. No.	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
6	1	04/06/24	12:19	Not Specified	No Rain Or Snow	Yes	MH03X
Operator		Vehicle		Camera	Preset Length	Legal Status	Alternative ID
G.Smith		OY22AOX		Mainline	0.00 m	Not Specified	Not Specified

Town or Village:	Openshaw, Manchester	Inspection Direction:	Downstream	Upstream Node:	MH03
Road:	Off Crabtree Lane	Inspected Length:	11.61 m	Upstream Pipe Depth:	
Location:	Difficult access	Total Length:	11.61 m	Downstream Node:	MH04
Surface Type:		Joint Length:		Downstream Pipe Depth:	
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	450 mm		
Flow Control:	No flow control	Material:	Vitrified clay		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Routine inspection	Lining Material:	No Lining		

Comments:

Recommendations:

Scale:	1:101	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: m MH03 0.00 0.00 11.61 MH04 Depth: m							
		0.00	MH	Start node, manhole, reference: MH03	00:00:00		
		0.00	WL	Water level, 5% of the vertical dimension	00:00:09		
		11.61	MHF	Finish node, manhole, reference: MH04	00:01:25		

Construction Features

Structural Defects

Miscellaneous Features

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

Section Inspection - 04/06/2024 - MH04X

Item No.	Insp. No.	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
7	1	04/06/24	12:22	Not Specified	No Rain Or Snow	Yes	MH04X
Operator		Vehicle		Camera	Preset Length	Legal Status	Alternative ID
G.Smith		OY22AOX		Mainline	0.00 m	Not Specified	Not Specified

Town or Village:	Openshaw, Manchester	Inspection Direction:	Downstream	Upstream Node:	MH04
Road:	Off Crabtree Lane	Inspected Length:	22.95 m	Upstream Pipe Depth:	
Location:	Difficult access	Total Length:	22.95 m	Downstream Node:	MH05
Surface Type:		Joint Length:		Downstream Pipe Depth:	
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	450 mm		
Flow Control:	No flow control	Material:	Vitrified clay		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Routine inspection	Lining Material:	No Lining		

Comments:

Recommendations:

Scale:	1:199	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: m MH04 0.00 0.00 21.74 22.95 MH05 Depth: m							
		0.00	MH	Start node, manhole, reference: MH04	00:00:00		
		0.00	WL	Water level, 5% of the vertical dimension	00:00:08		
		21.74	CCJ	Crack, circumferential at joint from 9 o'clock to 3 o'clock	00:01:59		2 / 2
		22.95	MHF	Finish node, manhole, reference: MH05	00:02:13		

Construction Features

Structural Defects

Miscellaneous Features

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
1	10.0	0.4	10.0	2.0	1	1.0	0.0	1.0	2.0

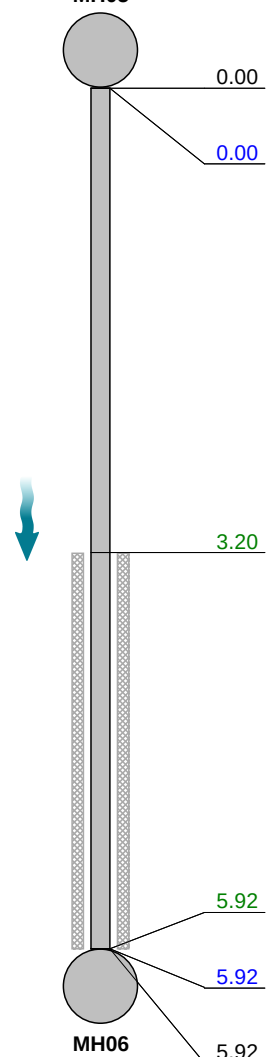
Section Inspection - 04/06/2024 - MH05X

Item No.	Insp. No.	Date	Time	Client's Job Ref	Weather	Pre Cleaned	PLR
8	1	04/06/24	13:07	Not Specified	No Rain Or Snow	Yes	MH05X
Operator		Vehicle		Camera	Preset Length	Legal Status	Alternative ID
G.Smith		OY22AOX		Mainline	0.00 m	Not Specified	Not Specified

Town or Village:	Openshaw, Manchester	Inspection Direction:	Downstream	Upstream Node:	MH05
Road:	Off Crabtree Lane	Inspected Length:	5.92 m	Upstream Pipe Depth:	
Location:	Difficult access	Total Length:	5.92 m	Downstream Node:	MH06
Surface Type:		Joint Length:		Downstream Pipe Depth:	
Use:	Surface water	Pipe Shape:	Circular		
Type of Pipe:	Gravity drain/sewer	Dia/Height:	450 mm		
Flow Control:	No flow control	Material:	Vitrified clay		
Year Constructed:	Not Specified	Lining Type:	No Lining		
Inspection Purpose:	Routine inspection	Lining Material:	No Lining		

Comments:

Recommendations:

Scale:	1:52	Position [m]	Code	Observation	MPEG	Photo	Grade
Depth: m MH05 							
		0.00	MH	Start node, manhole, reference: MH05	00:00:00		
		0.00	WL	Water level, 5% of the vertical dimension	00:00:09		
		3.20	S01 LR	Line deviates right, start: GRADUAL	00:00:42		
		5.92	F01 LR	Line deviates right, finish: GRADUAL	00:01:22		
		5.92	REM	General remark: FRIDGE DOOR DOWN MH06	00:01:23		
		5.92	MHF	Finish node, manhole, reference: MH06	00:01:25		
		Depth: 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

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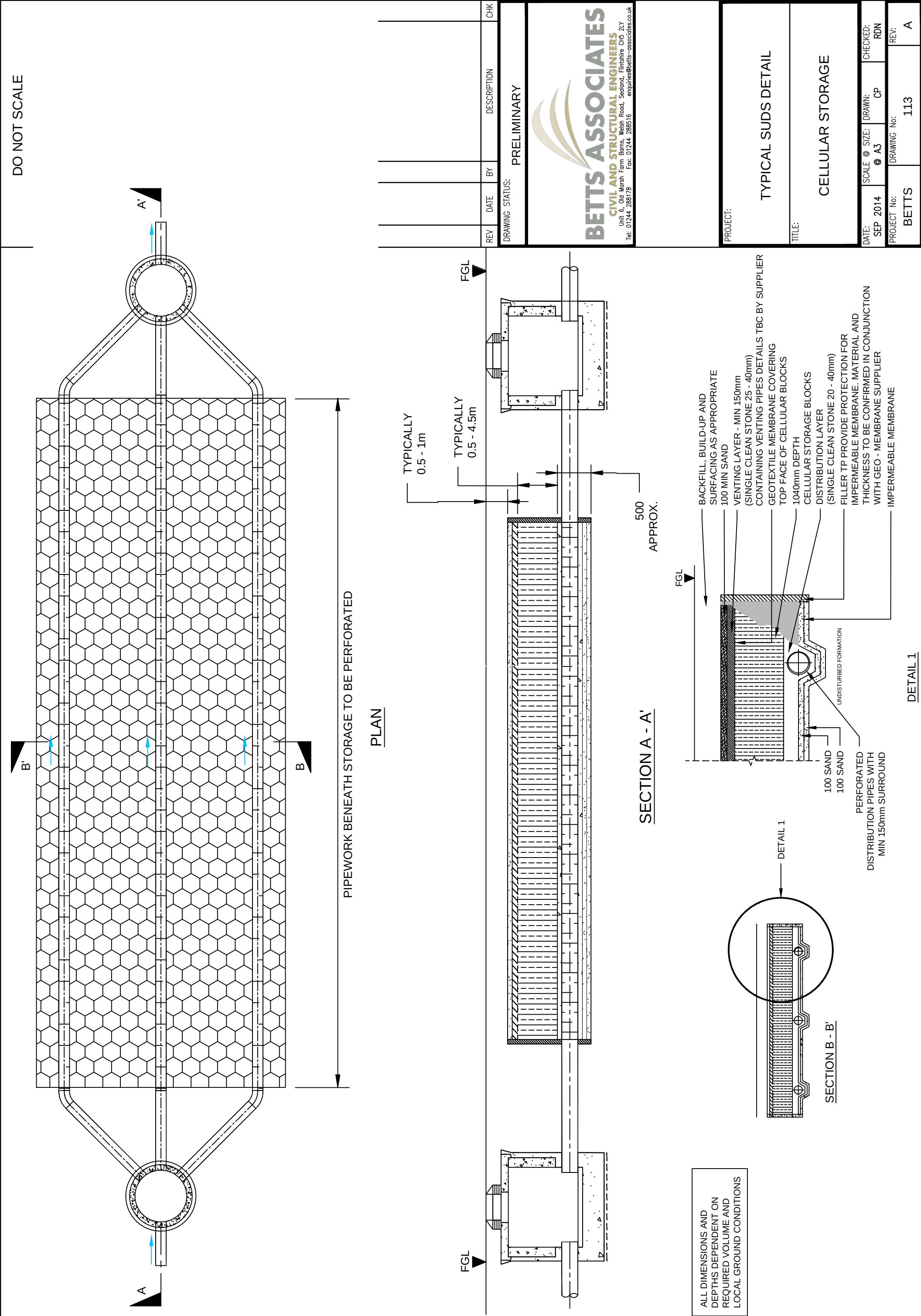
APPENDIX L: PRELIMINARY DRAINAGE LAYOUT

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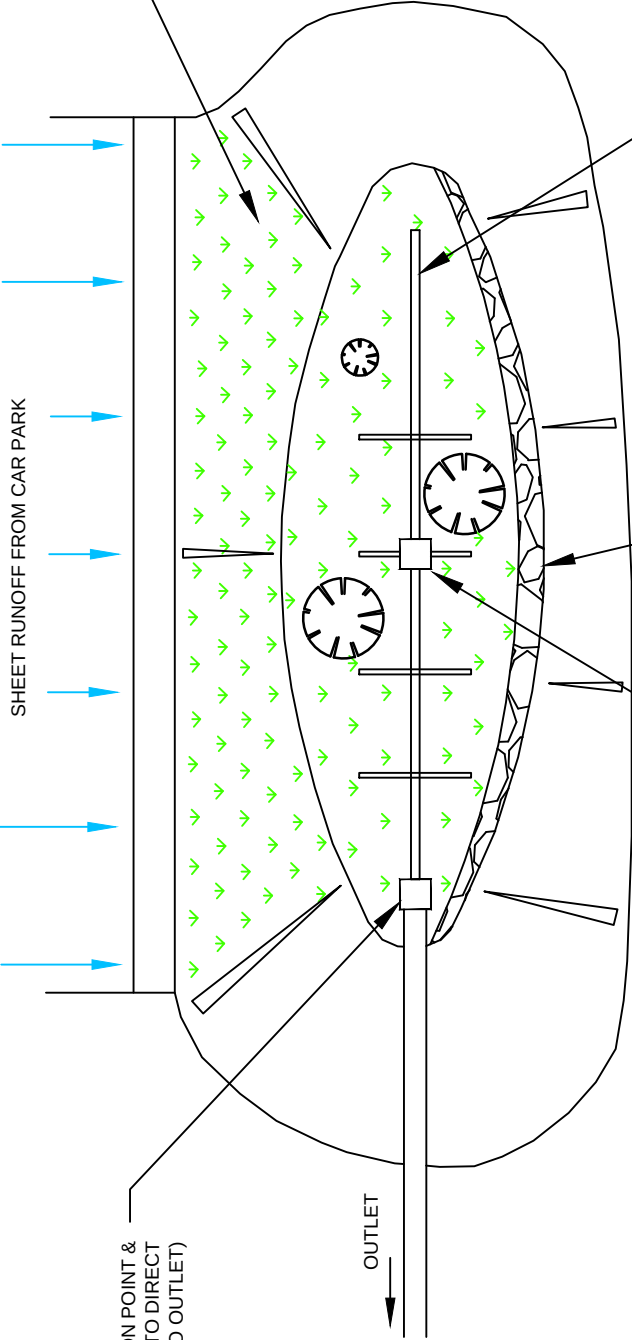


APPENDIX M: SUDS EXAMPLES

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DO NOT SCALE



A cross-sectional diagram of a drainage system. From top to bottom, the layers are: a blue wavy line representing water with the label 'PONDING MAX DEPTH 150mm'; a layer of orange circles representing mulch with the label '75mm MULCH'; a woven fabric layer labeled 'GEOTEXTILE FILTER FABRIC'; a layer of horizontal lines representing soil labeled 'PLANTING SOIL'; a layer of small dots representing sand labeled '300mm SAND LAYER'; a layer of large circles representing gravel labeled 'PEA GRAVEL MIN DEPTH 200mm'; and a horizontal line with arrows pointing to it labeled 'PERFORATED PIPE/ UNDERDRAIN SYSTEM MIN Ø150mm'.

TYPICAL SECTION

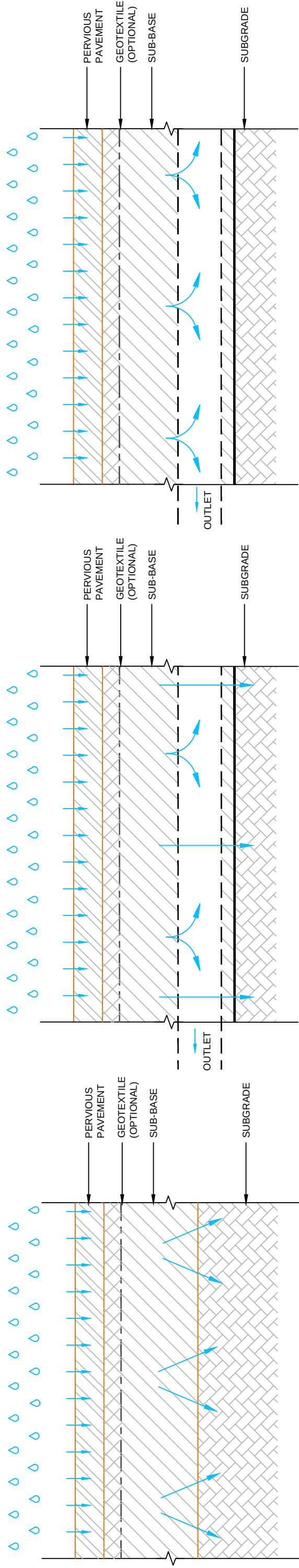
PROJECT: TYPICAL SUDS DETAIL

TITLE:

TITLE: BIORETENTION APPLICATIONS

DATE: SEP 2014	SCALE @ SIZE: @ A3	DRAWN: CP	CHECKED: RDN
PROJECT No: BETTS		DRAWING No: 112	
		REV: A	

	DO NOT SCALE
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TYPE A: TOTAL INFILTRATION

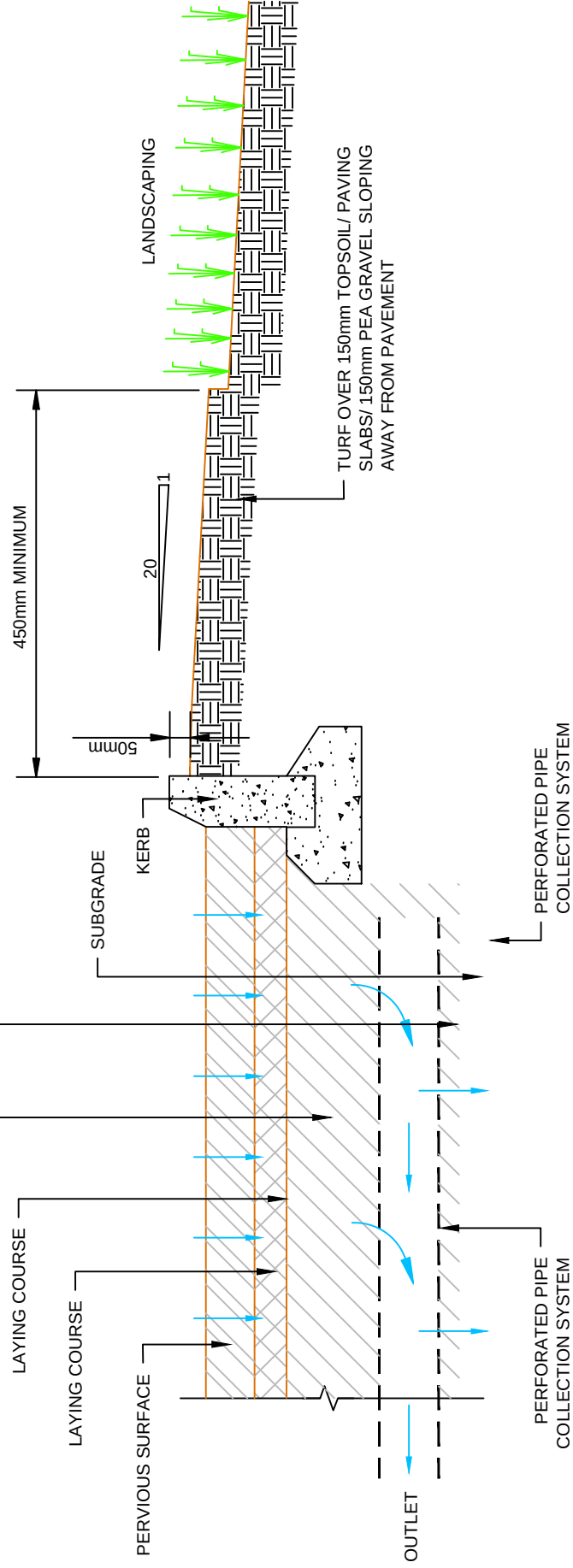
TYPE B: PARTIAL INFILTRATION

TYPE C: NO INFILTRATION

REV	DATE	BY	DESCRIPTION	CHK

AGGREGATE SUB-BASE (MAY BE REPLACED WITH GEOCELLULAR BLOCKS)

— GEOTEXTILE (OPTIONAL - TYPES A & B) OR GEOMEMBRANE (TYPE C)



LANDSCAPING DETAIL

DRAWING STATUS: PRELIMINARY



PROJECT:

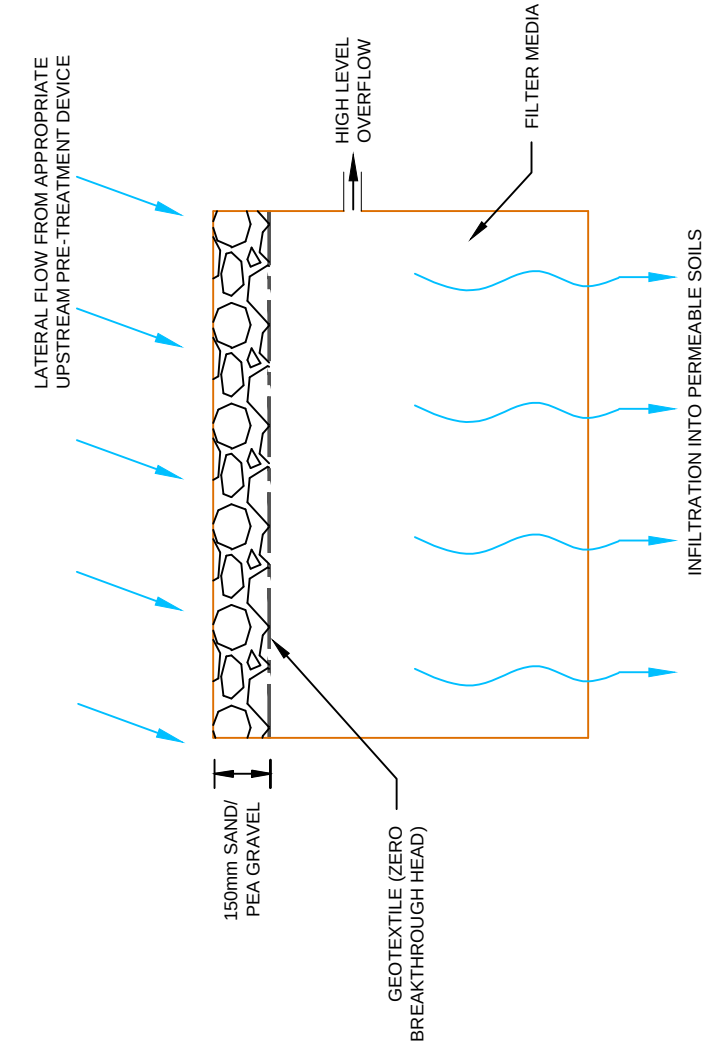
PROJECT: TYPICAL SUDS DETAIL

TITLE:

TITLE: PERVIOUS PAVEMENTS

DATE: SEP 2014	SCALE @ SIZE: @ A3	DRAWN: CP	CHECKED: RDN
PROJECT No: BETTS		DRAWING No: 105	REV: A

DO NOT SCALE



REV	DATE	BY	DESCRIPTION	CHK

DRAWING STATUS: PRELIMINARY



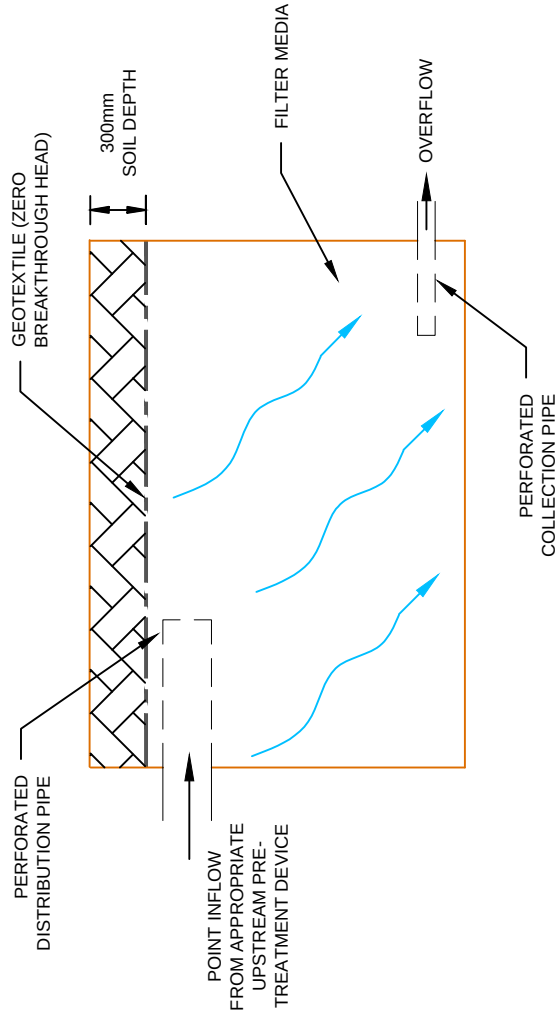
PROJECT:

TYPICAL SUDS DETAIL

TRENCHES

DATE:	SCALE @ SIZE:	DRAWN:	CHECKED:
SEP 2014	@ A3	CP	RDN

PROJECT No:	DRAWING No:	REV:
BETTS	105	A



FILTER TRENCH SCHEMATICS

APPENDIX N: NOTES OF LIMITATIONS

The data essentially comprised a study of available documented information from various sources together with discussions with relevant authorities and other interested parties. There may also be circumstances at the site that are not documented. The information reviewed is not exhaustive and has been accepted in good faith as providing representative and true data pertaining to site conditions. If additional information becomes available which might impact our conclusions, we request the opportunity to review the information, reassess the potential concerns, and modify our opinion if warranted.

It should be noted that any risks identified in this report are perceived risks based on the available information.

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