



Hydrotec and Engineering Consultants

Develop Design Deliver

FRA and Drainage Strategy at 591a Stockport Road, Manchester

February 2022

CLIENT:

Mr Wahid Hamid

Reference: 22/FRA/Stockport_Rd

INSTRUCTION:

Hydrotec and Engineering Consultants was commissioned by Mr Wahid Hamid to carry out a flood risk assessment and surface water drainage strategy for the proposed commercial development at 591a Stockport Road, Longsight, Manchester.

SCHEME:

The change of use from the retail business class E to assembly class F2, especially a wedding reception hall.

REQUIREMENT:

Flood risk assessment and drainage strategy for the proposed change of use of the development to fulfil the planning application.

DOCUMENT REVIEW & APPROVAL

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Approved by	Mr Wahid Hamid

Executive Summary

A flood risk assessment (FRA) and drainage strategy for the sustainable drainage systems (SuDS) was conducted to assist the planning application for the proposed development on the land of 591a Stockport Road, Longsight, Manchester, M13 0RX. The national grid reference number of the development site is SJ 86950 95485 (“the Site”). The existing condition of the Site comprises a part of a two-storey 1960s terraces of commercial/retail buildings which extend at a single storey to the rear providing retail/storage space. The proposed development is the change of use from the retail business class E (memorials) to assembly class F2, i.e. hall, especially for the wedding reception and meeting place with associated VIP car parking, toilets and servery areas at the rear side.

A detailed FRA and drainage strategy of the Site was made with the available information including the Environment Agency’s flood maps, the latest FEH hydrological data, topographic elevation data (LiDAR) and sewer maps data of United Utilities.

The present investigation suggests that the Site is in flood zone 1, and therefore the Site is considered to be out of the fluvial or coastal flood risk. The actual land of the Site itself is at no risk from surface water drainage. In addition, hydrological and topographic elevation data suggest that the impact of the overland flow from the surroundings of the Site would become very minimal. Moreover, the Site would not be susceptible to groundwater flow as the existing ground surface as well as the proposed ground surface footprint are impermeable. In addition, the proposed layout of the Site would assist a sustainable drainage distribution of the overland flow while it is highly recommended to adopt rainwater harvesting to utilise the runoff from the roof surface within the Site.

The finished floor level of the proposed development could be at the existing ground level as the actual ground surface of the building is not at risk to surface water runoff. The access and egress from the Site during any flooding incident could be at Brook Terrace located in front of the Site.

The generated wastewater flow by the proposed development was estimated to be 0.05 litres/sec, however, a confirmation of the compliance agreement is required from United Utilities to

discharge the generated wastewater flow into the existing drainage network systems before the construction of the proposed infrastructure.

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Abbreviations

AEP	Annual Exceedance Probability
CCA	Climate Change Allowance
DWF	Dry Weather Flow
EA	Environment Agency
FEH	Flood Estimation Handbook
FRA	Flood Risk Assessment
LLFA	Lead Local Flood Authority
mAOD	meter Above Ordnance Datum
NGR	National Grid Reference

OS Map Ordnance Survey Map
SuDS Sustainable Drainage Systems

1 Introduction

Sustainable drainage strategies for the flood risk are now important aspects for the new and existing development sites. The flood, which is being enhanced in the recent time due to the global climate change effects, could make vulnerable to the property, community and many aspects of human life. Therefore, it is important nowadays to assess the flood risk of any new developments; and the National Planning Policy Framework¹ (NPPF) guidelines have given the authority to the Environment Agency² (EA) and local councils to make sure that any developments should be considered the flood risk assessment from all possible sources for the planning authorisation. These are not only securing the minimum risk at the proposed development site but also reducing the risk to the other existing developments.

Generally, new development would provide an improvement in the communities, but it should also make a satisfaction that the proposed development would not and should not deteriorate to on-site and/or off-site other existing developments in the surrounding areas during its design life. Therefore, it has been a policy of the NPPF, lead local flood authority (LLFA), Water Utilities companies and other relevant authorities to assess and manage the sustainable surface water drainage systems of all possible sources for a proposed development before granting the planning permission.

1.1 Background of the project site

The proposed development (hereafter “the Site”) is the change of use from the retail business class E (memorials) to assembly class F2, i.e. hall, especially for the wedding reception and meeting place for principal use of the local community. The property would be converted within its existing structure and footprint to incorporate the hall, toilet and servery areas while cooking foods and alcohol license would not be required. The rear of the property would be adopted with parking facilities and access to delivery vehicles.

¹ [National Planning Policy Framework - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/432424/NPPF_2019.pdf)

² [Flood risk assessments if you're applying for planning permission - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/432424/NPPF_2019.pdf)

The Site is located on the land of 591a Stockport Road, Longsight, Manchester, M13 0RX. The national grid reference number (NGR) of the Site is SJ 86950 95485. The geographical boundary of the project site lies within Manchester Council's remit who are the lead local flood authority (LLFA) providing advice and guidance for sustainable drainage systems (SuDS) for this development site. The existing condition of the Site comprises a part of a two-storey 1960s terraces of commercial/retail buildings which extend at a single storey to the rear providing retail/storage space. Generally, the surrounding of the adjacent area is distinctively commercial, with retail units facing both sides of the street and providing a variety of shops, services and leisure facilities. Stockport Road, the main road, is located in the west and the national railway track line is situated to the east, next to the eastern boundary of the Site. Gore Brook, which is culverted, passes adjacent to the southern boundary and flows westerly while an underpass is situated at the edge of Brook Terrace under the railway lines. A satellite photograph of the existing condition of the project site is shown in Figure 1.1 and the proposed layout of the development is given in Figure 1.2. The total area of the Site is approximately 743m².

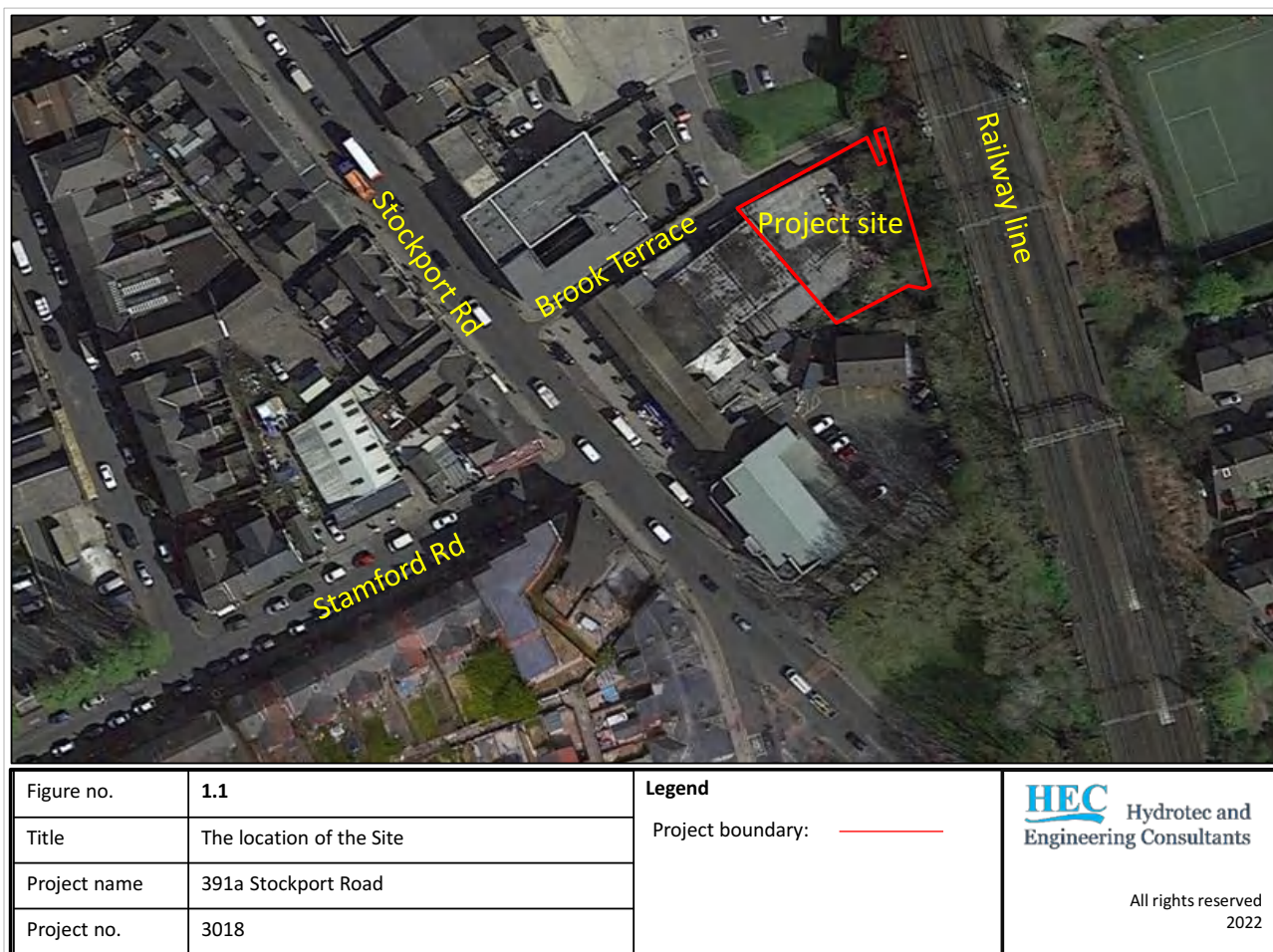


Figure 1.1: The location and existing condition of the proposed development site.

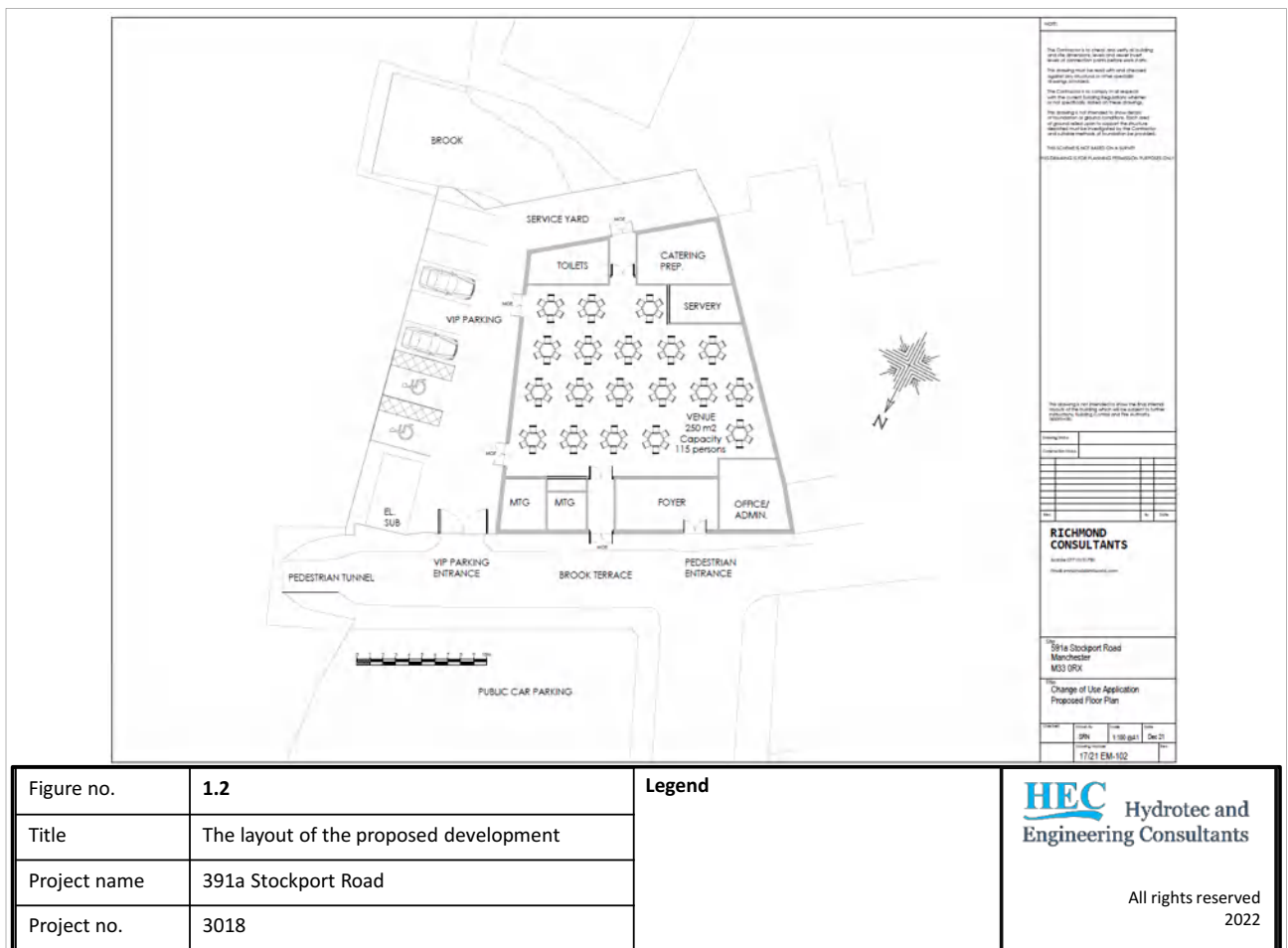


Figure 1.2: The layout of the proposed development.

2 The requirement of the drainage strategy

Since the proposed development is the conversion of the existing property from the retail business class E to the class F2, a wedding reception hall with associated toilet and server facilities, it is a requirement of the LLFA to ensure the provision of appropriate sustainable flood risk management within the development, to promote safe and resilient communities, assisting by Environment Agency³ (EA).

³ [Flood risk assessments if you're applying for planning permission - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/flood-risk-assessments-if-youre-applying-for-planning-permission)

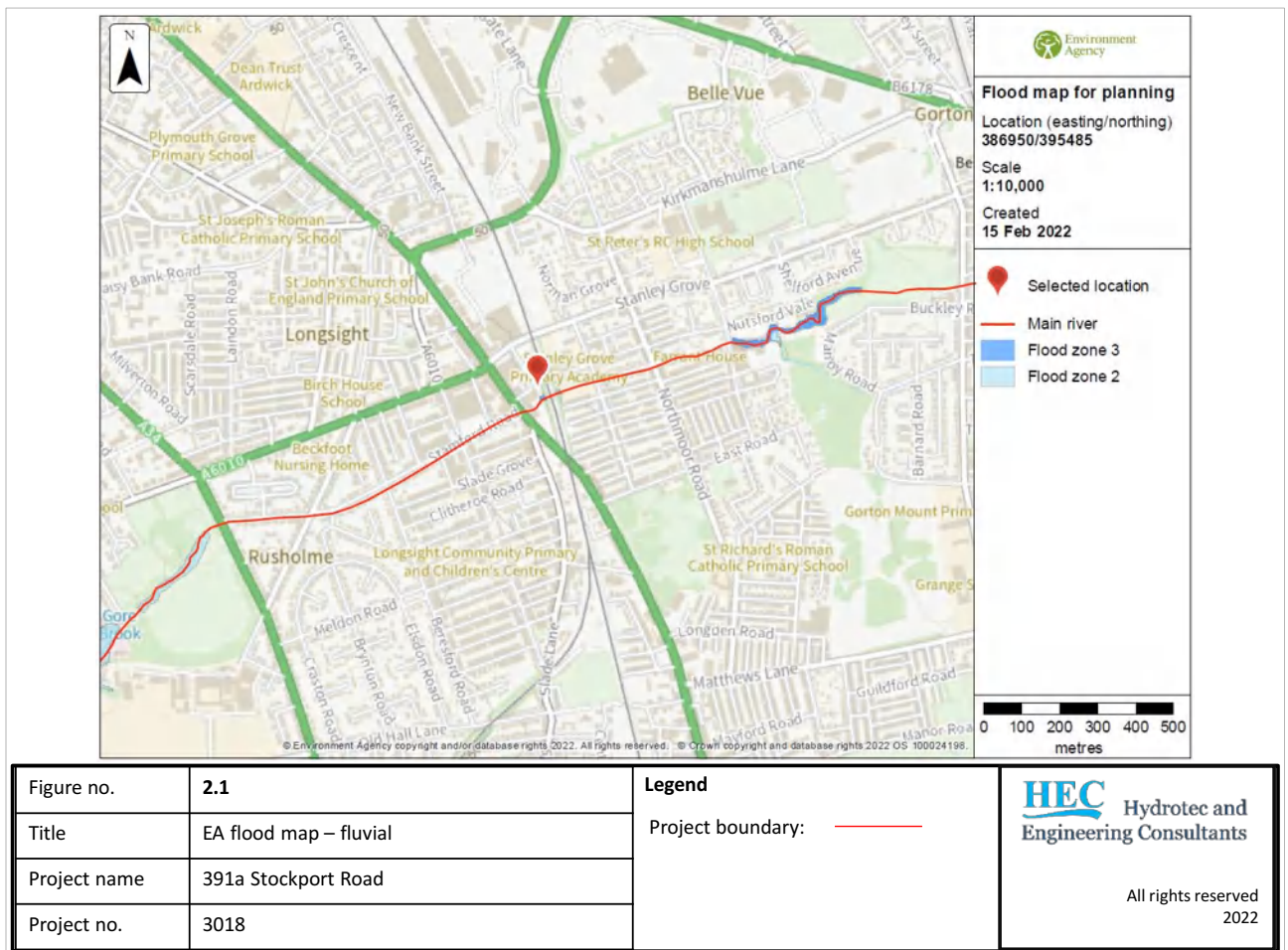


Figure 2.1: The fluvial and coastal flood risk at the Site - flood zone 1, the land having flood risk less than a 0.1% AEP of the river or coastal flows (reference – EA’s flood map⁴).

⁴ [Flood map for planning - GOV.UK \(flood-map-for-planning.service.gov.uk\)](https://www.gov.uk/flood-map-for-planning.service.gov.uk)

The Environment Agency's flood map⁵ indicates that the Site is located in flood zone 1, a risk of flooding less than 0.1% AEP (Annual Exceedance Probability, i.e. less than 1 in 1000-year flood event) for the fluvial or coastal flows (Figure 2.1). In addition, the EA's defended and undefended flood modelling extents also suggest that the Site is not at risk of fluvial flood risk (see Appendix I and II). Moreover, the maximum water levels in the channel next to the Site (i.e. Railway Bridge) at 1% AEP and 1% AEP+35% climate change allowance are 45.26mAOD and 45.54mAOD for the undefended scenario and 45.26mAOD and 45.54mAOD for the defended scenario, respectively (see also Appendix III). It should, however, be noted that the average ground level on the Site is 47.5mAOD. Therefore, the proposed development site is not a risk to either fluvial or coastal flows. Furthermore, a site visit was made and the current conditions of the Railway Bridge (Figure 2.2 and 2.3) and culvert (Figure 2.4) suggest that the fluvial flood risk due to the blockage of the structures would be very low. However, the EA's flood map⁶ indicates that the Site is at flood risk from the groundwater or reservoir flows (Figure 2.5). The ground surface of the development site would mainly remain the same, i.e. impermeable land surface and therefore the risk of underground flood risk would be very minimal.

The surrounding of the Site is a risk from the surface water drainage. Therefore, the present flood risk investigations were assessed further details for the surface water drainage, i.e. pluvial flow.

⁵ Op.cit.

⁶ [Check the long term flood risk for an area in England - GOV.UK \(flood-warning-information.service.gov.uk\)](https://www.gov.uk/flood-warning-information.service.gov.uk)



Figure no.	2.2	Legend	 All rights reserved 2022
Title	Photograph of Railway Bridge - upstream		
Project name	391a Stockport Road		
Project no.	3018		

Figure 2.2: Photograph of the Railway Bridge – looking upstream.



Figure no.	2.3	Legend	 All rights reserved 2022
Title	Photograph of Railway Bridge - downstream		
Project name	391a Stockport Road		
Project no.	3018		

Figure 2.3: Photograph of the Railway Bridge – looking downstream.



Figure no.	2.4	Legend	 All rights reserved 2022
Title	Photograph of culvert - upstream		
Project name	391a Stockport Road		
Project no.	3018		

Figure 2.4: Photograph of the culvert – looking upstream.

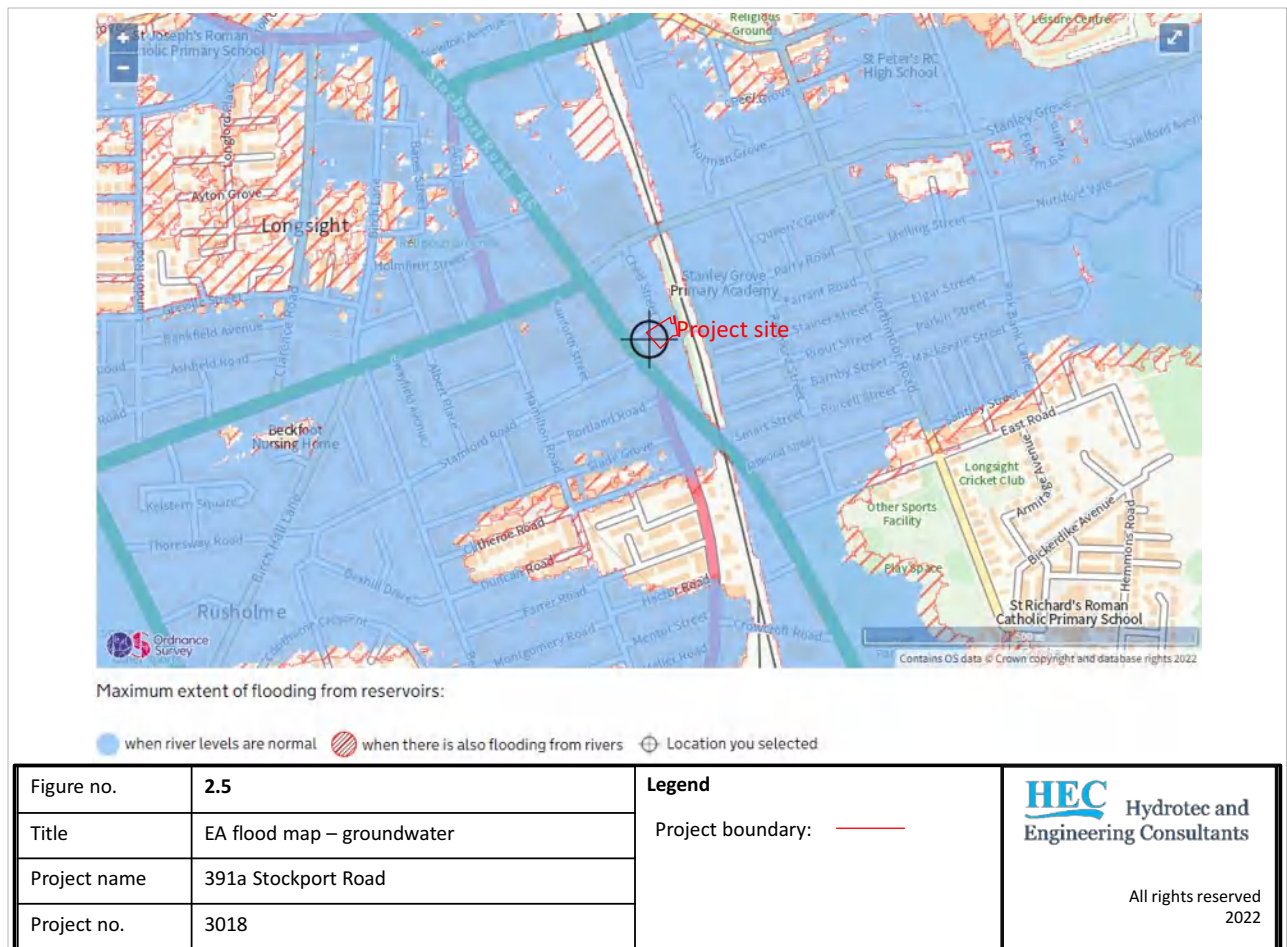


Figure 2.5: Groundwater flow at the Site – a low flood risk against the groundwater flow (reference – EA’s flood map⁷).

3 Surface water drainage

The guidance of the Environment Agency and LLFA based on the national planning policy framework⁸ (NPPF) recommends the avoidance of the increase of the surface water flooding through requirements for sustainable drainage systems (SuDS) and minimising the area of impermeable surface. Moreover, the NPPF para 167 suggests “when determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere.

⁷ Op.cit.

⁸ Op. cit.

Where appropriate, applications should be supported by a site-specific flood-risk assessment.” Therefore, the surface water drainage measures should have a neutral or better effect on the risk of flooding both on and off the site, taking into account rain falling on the site and runoff from adjacent areas.

NPPF and EA guidance takes a presumption against development in the 1 in 30-year hydrological event to the surface water drainage. Development should only be allowed in an area at risk from a 1 in 100-year (with climate change allowance (CCA)) if surface water drainage is manageable without any major risk to the development itself or other surrounding areas. It should be shown that in such cases surface water flows can be contained within the development and any flooding flood volumes do not affect third party lands, flood the property or obstruct the key access/egress routes.

Therefore, to achieve the guidance requirements of the surface water drainage at the Site, the surface water flooding mechanism at the on-site and off-site was assessed with appropriate consideration.

The EA’s surface water flood map⁹ (Figure 3.1) indicates that the Site is at medium risk to surface water drainage (i.e. a medium risk means that each year this area has a chance of flooding of between 1% AEP and 3.3% AEP). Generally, the surface water overland flow is highly affected by the topographic conditions which define hydrological sub-catchments. For a better understanding of the surface water runoff around the Site, the hydrological sub-catchments were obtained from the Flood Estimation Handbook¹⁰ (FEH) and the data are presented in Figure 3.2.

⁹ Op.cit.

¹⁰ [Home Page - FEH Web Service \(ceh.ac.uk\)](http://www.ceh.ac.uk)

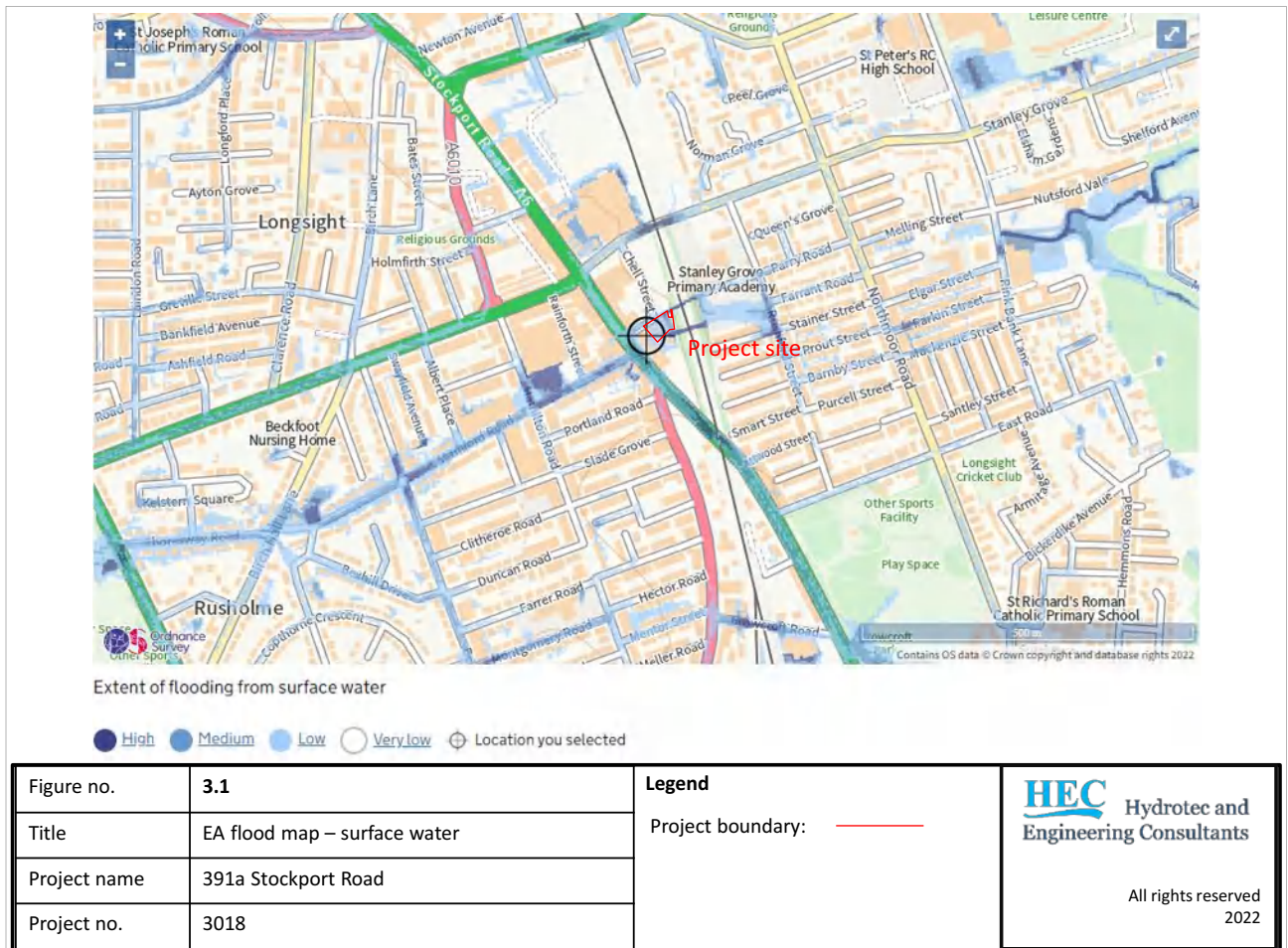


Figure 3.1: Surface water drainage at the Site – medium flood risk against the surface water flow (reference – EA’s flood map¹¹).

The hydrological sub-catchments that could have a possible impact on the Site are presented in Figure 3.2 and the indicative flow paths of the surface water runoff are shown in blue arrow-lines. The Site is located within a sub-catchment of the main brook and the surface water runoff of this sub-catchment would flow laterally to the brook. In addition, the Site is bounded by a railway track line situated in the east and subsequently, the overland flow from the upstream (e.g. from the east) would not pass through the Site. However, it is very unlikely that any substantial overland flow passing through the underpass of the Railway Bridge would have an impact on the Site. Moreover, adjacent to the northern side, the existing ground level is bulging shape and

¹¹ Op.cit.

would make an obstruction of the overland flow from the northern area. Subsequently, the overland flow of the adjacent sub-catchments would flow westerly along Brook Terrace and would have no impact on the surface water drainage on the Site.

The sub-catchments located in the northern areas would flow northerly and northwesterly and would not have any surface water drainage contribution at the Site. Similarly, the sub-catchments situated in the southern area would not have surface water drainage impact at the Site.

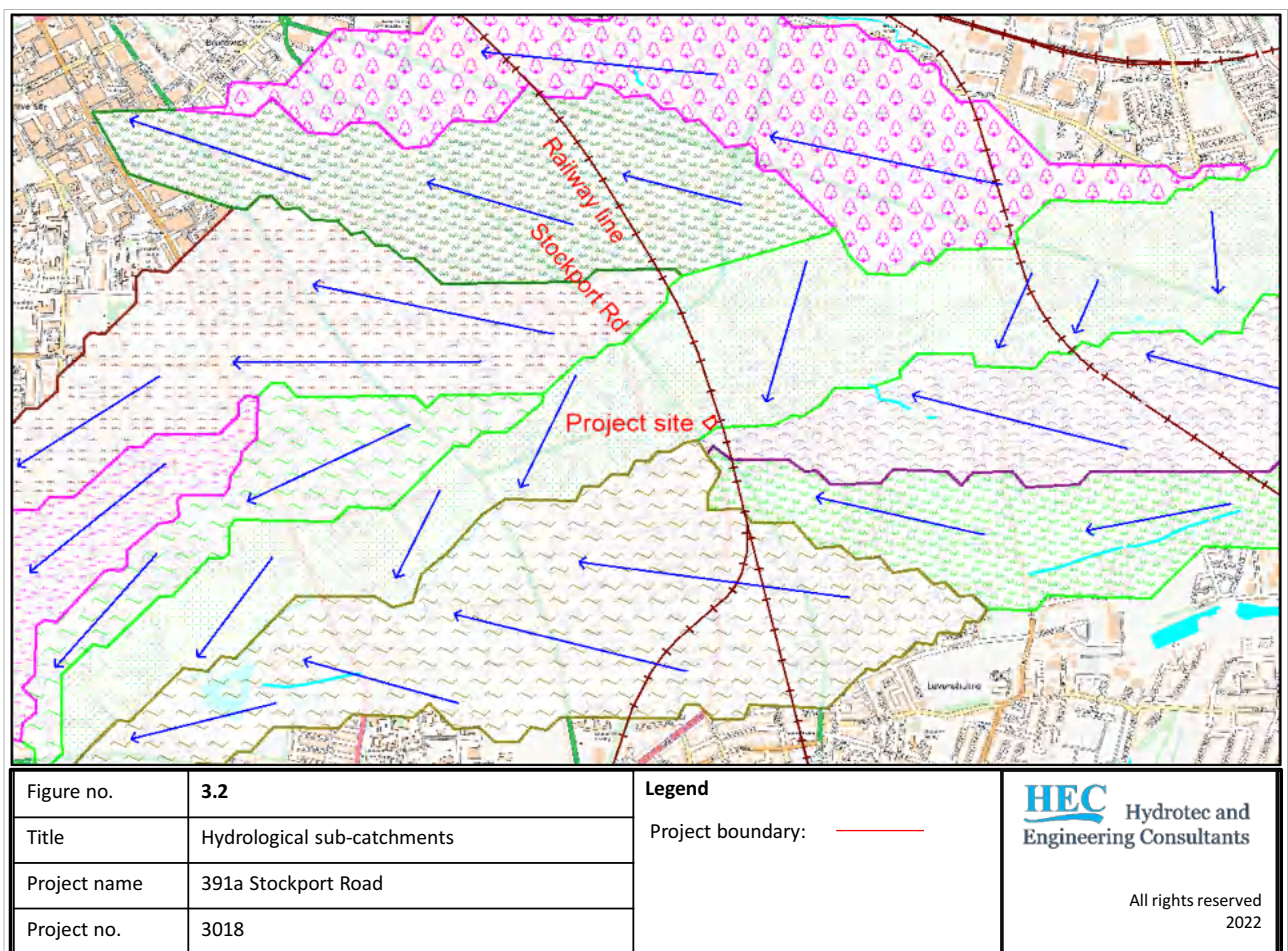


Figure 3.2: The hydrological sub-catchments at the Site (indicative overland flow paths in blue arrow-lines); reference of the FEH¹².

¹² op. cit.

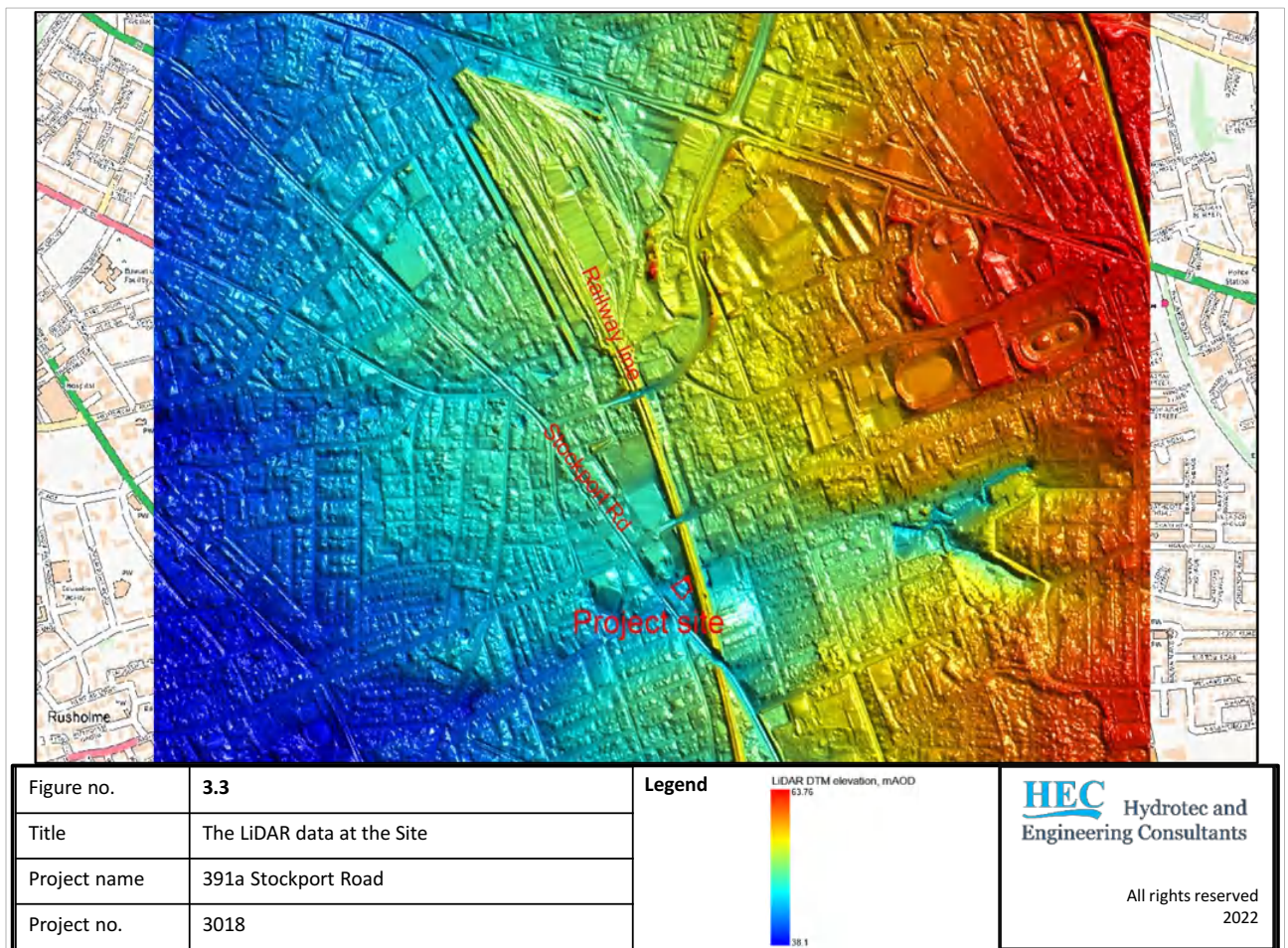


Figure 3.3: The LiDAR topographic elevation at Site.

The intensity and magnitude of the overland flow paths on the ground surface would have a significant effect on the ground elevation. Therefore, for an understanding of the complexity of the overland flow mechanisms, the topographic elevation at the Site was assessed based on the recent LiDAR¹³ (Light Detection and Ranging) DTM (Digital Terrian Model) data (Figure 3.3). The elevation data suggest that generally, the ground surface of the surrounding areas inclines to the west. For a better understanding of the adjacent lands to the Site, the topographic elevation levels along the lines, i.e. from the east to west on Brook Terrace located in front of the Site and along Stockport Road from the north to south (see also Figure 3.4), were obtained from the LiDAR DTM data and presented in Figure 3.5. The elevation data suggest that the average

¹³ [Defra Data Services Platform](#)

ground level on Brook Terrace in front of the Site is approximately 47.5mAOD and declines further to the west. On the other hand, the ground level on Stockport Road varies from 49.7mAOD in the north to 47.7mAOD in the south while there is a depression at the junction of Stamford Road, approximately 30m south of Brook Terrace. However, Stamford Road situated in the west declines further compared to the junction at Stockport Road. Therefore, this localised ground depression on Stockport Road would not have a surface water ponding and surface water runoff would drain to the west. Consequently, the surface water runoff from the surrounding areas would not have an impact on the Site and therefore the surface water flood risk at the Site would become very minimal. Subsequently, the surface water runoff generated at the Site would be mainly been by the rainfall on the Site and therefore, a drainage strategy for this generated runoff would be required to be managed by sustainable drainage systems (SuDS).

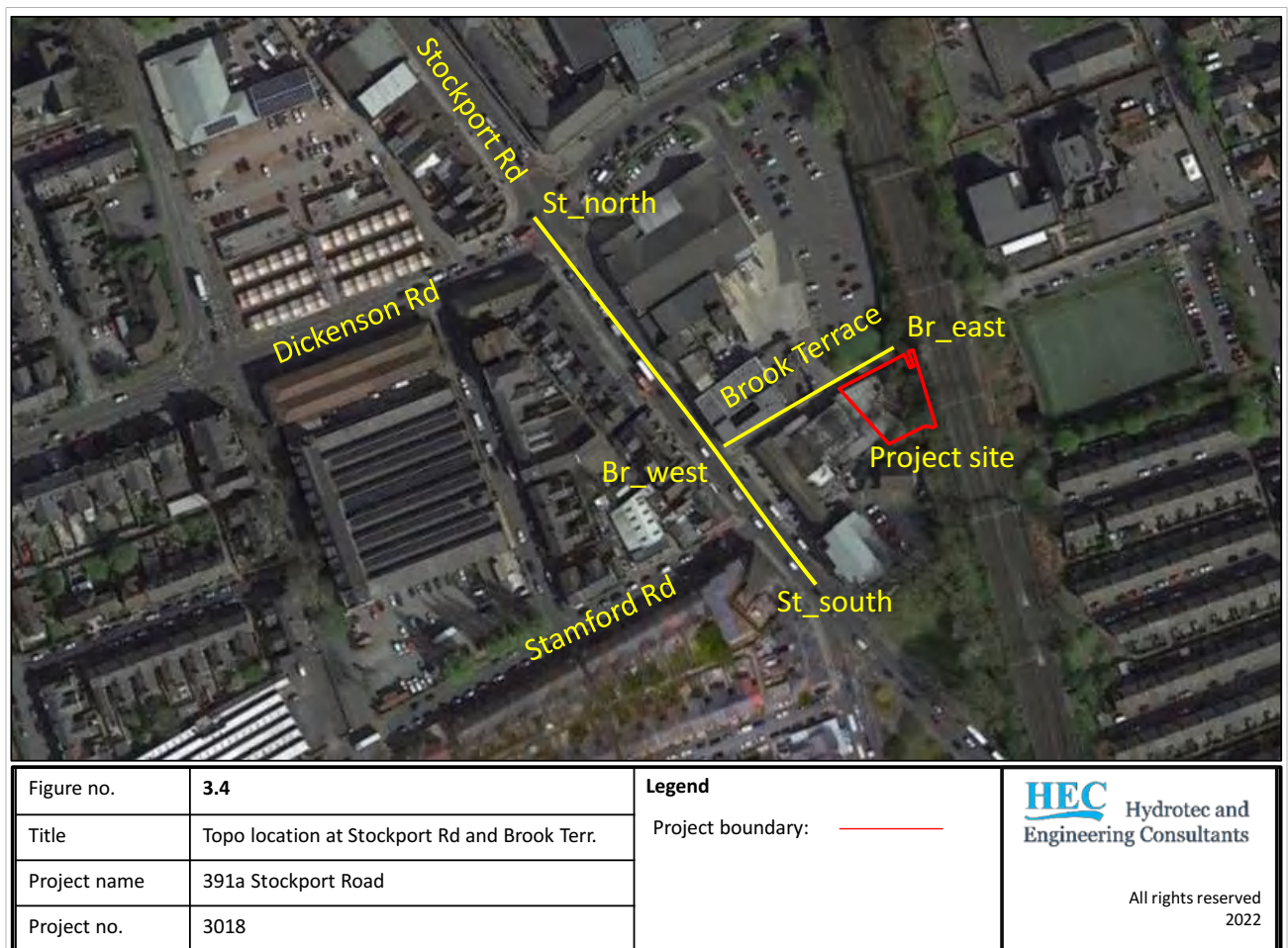


Figure 3.4: Topographic location at Stockport Road and Brook Terrace.

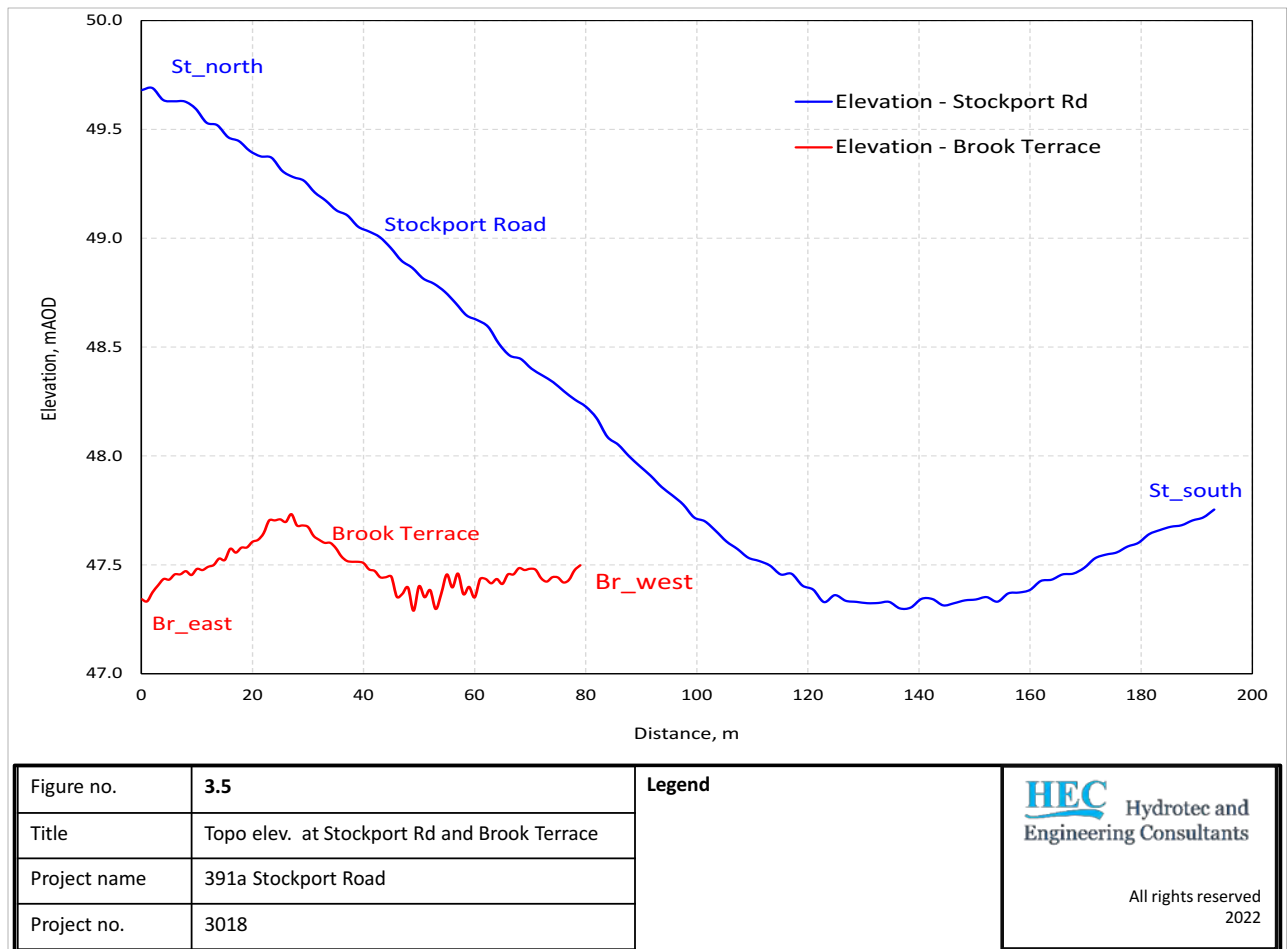


Figure 3.5: Topographic elevation at Stockport Road and Brook Terrace.

4 Flood attenuation storage requirement

The proposed development is the change of use from the retail business class E to assembly class F2, a hall especially for the wedding reception and meeting place. The existing condition of the land surface is impermeable and would remain the same, and therefore the proposed change of use would not increase the additional footprint of the impermeable land surface, see also Figure 4.1 and 4.2 for the existing ground surface in the front and rear sides. Subsequently, attenuation requirements for the proposed development could be avoided.

However, the layout of the proposed development particularly the parking area and service yard were considered a well-thought, eco-friendly and sustainable drainage system. These proposed

features would assist the SuDS at a considerable level and therefore, the generated surface water runoff would be discharged into the Gore Brook, next to the Site in the eastern boundary, while it is recommended to adopt and utilise rainwater harvesting (e.g. toilet flashing) from the roof surface.



Figure no.	4.1	Legend	 All rights reserved 2022
Title	The existing ground surface on the front side		
Project name	391a Stockport Road		
Project no.	3018		

Figure 4.1: The existing ground surface at the front side of the Site.

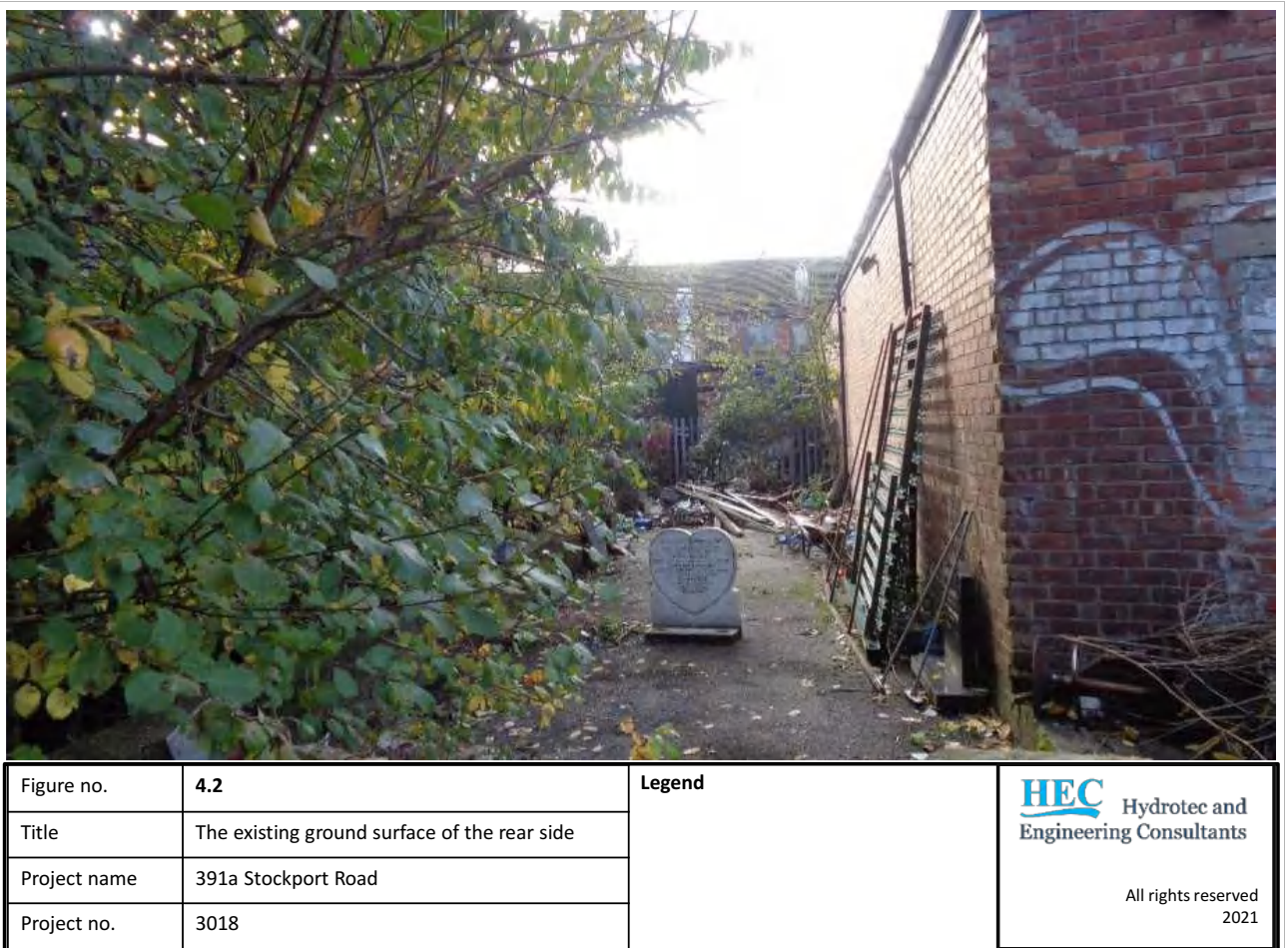


Figure 4.2: The existing ground surface at the rear side of the Site.

5 Finished floor level and access/egress from the Site

The actual land surface of the building, parking area and service yard would not have a flood risk from fluvial, coastal or surface water flows. Therefore, the finished floor level of the proposed development would be the existing ground level.

There would not be any issues with the access and egress from the proposed development site and Brook Terrace located in front of the Site could be used as an access and egress during any unexpected flooding incident.

6 Sewer flood risk

The proposed change of use of the development site would generate foul water to the existing drainage network systems. Currently, the existing development generates foul water flow and discharges into the existing sewer drainage network. Sewer drainage network data (see also Appendix IV) around the Site were obtained from the United Utilities and indicate that the existing drainage network systems are combined sewer drainage network systems. The sewer drainage pipe of 450mm on Brook Terrace located in front of the Site flows westerly.

The generated wastewater flow by the proposed development would be highly variable in a day or night and throughout the year. Considering the standard guideline from the sewer for Adoption¹⁴, the typical average dry weather flow (DWF) for this type of development is considered to be 0.6 litres per second per hectare. Thus, assuming the area of the development (i.e. 0.0743 hectares) – the generated wastewater flow would be 0.05 litres/sec. The general observation suggests that the proposed development would not have any significant impact on the existing sewer drainage network systems and therefore wastewater flow by the proposed development would be discharged into the existing drainage network systems. It should, however, be noted that it does require a compliance agreement from United Utilities to discharge the estimated wastewater flow into the drainage network systems.

7 Conclusions

A flood risk assessment and drainage strategy were conducted to assist the sustainable drainage systems (SuDS) design on the land of 591a Stockport Road, Longsight, Manchester, M13 0RX. The existing condition of the Site comprises a part of a two-storey 1960s terraces of commercial/retail buildings which extend at a single storey to the rear providing retail/storage space. The proposed development is the change of use from the retail business class E (memorials) to assembly class F2, i.e. hall, especially for the wedding reception and meeting place with associated VIP car parking, toilets and server areas at the rear side. The Site lies

¹⁴ [Sewerage Sector Guidance-approved documents | Water UK](#)

within Manchester Council's remit who are the LLFA providing advice and guidance for sustainable drainage systems for this development site.

The present FRA and drainage strategy for SuDS, which is a requirement for the planning application, was made with available information including the latest EA's flood maps data, FEH hydrological data, topographic elevation data (LiDAR) and sewer network data.

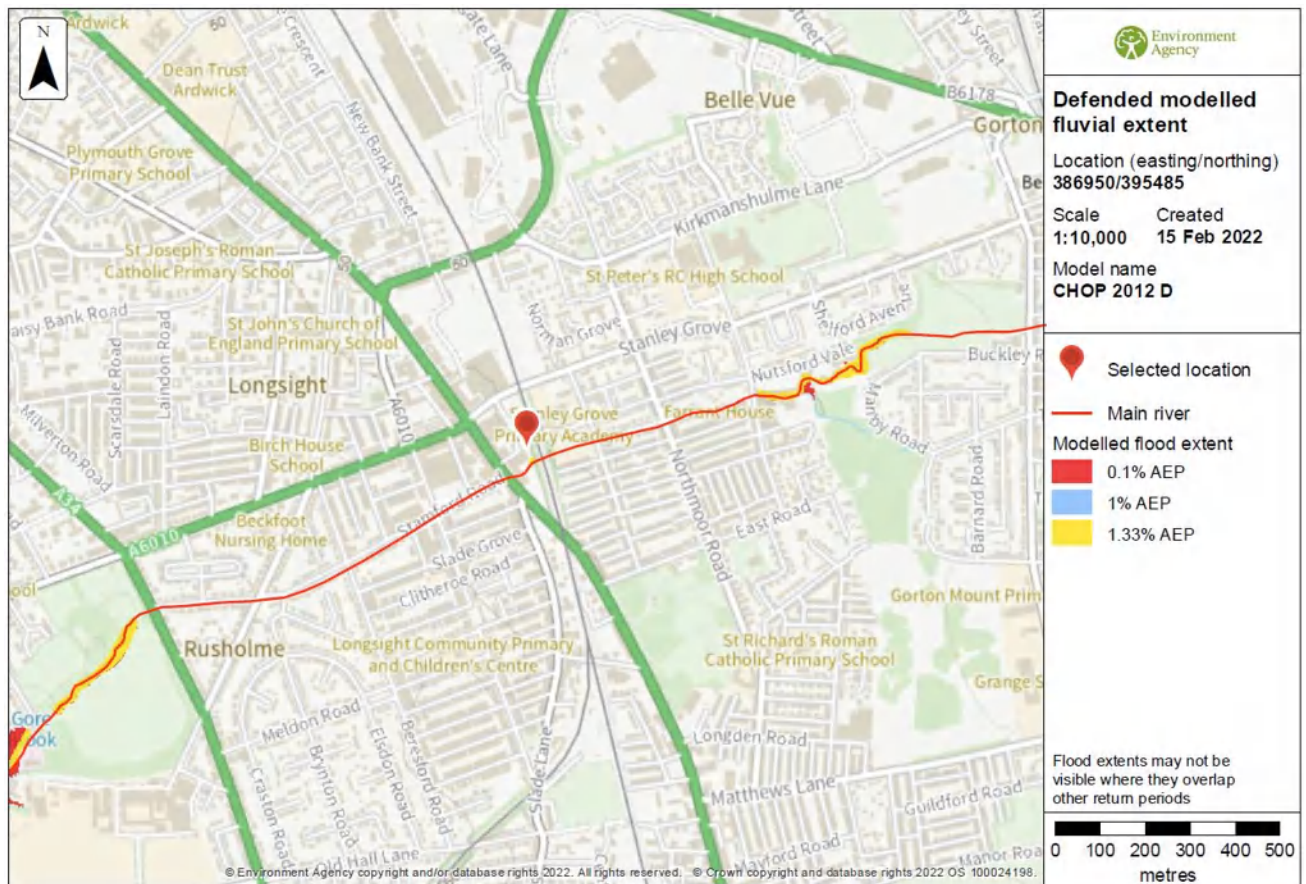
The Site is currently in flood zone 1 and therefore it is not a risk from river or coastal flows. The Site is a risk from groundwater flow but the existing ground floor level is an impermeable surface and would remain the same. Considering ground level and surrounding features, the impact of the groundwater flow at the Site is very minimal. Generally, the surface water runoff around the Site would drain towards the west and the overland flow from the upstream would not have a direct impact on the Site because an elevated railway track line is situated adjacent to the eastern boundary of the Site. Consequently, the risk of surface water drainage at the Site is very low. Moreover, Brook Terrace located in front of the Site inclines to the west, draining away overland flow from the Site.

In the proposed development, there would not have any increase of impermeable surface compared with the existing footprint and subsequently, the proposed development would not deteriorate the surface water drainage to the Site itself or surrounding areas. Therefore, the attenuation requirement of the Site could be avoided. However, it is highly recommended to adopt rainwater harvesting of the roof surface.

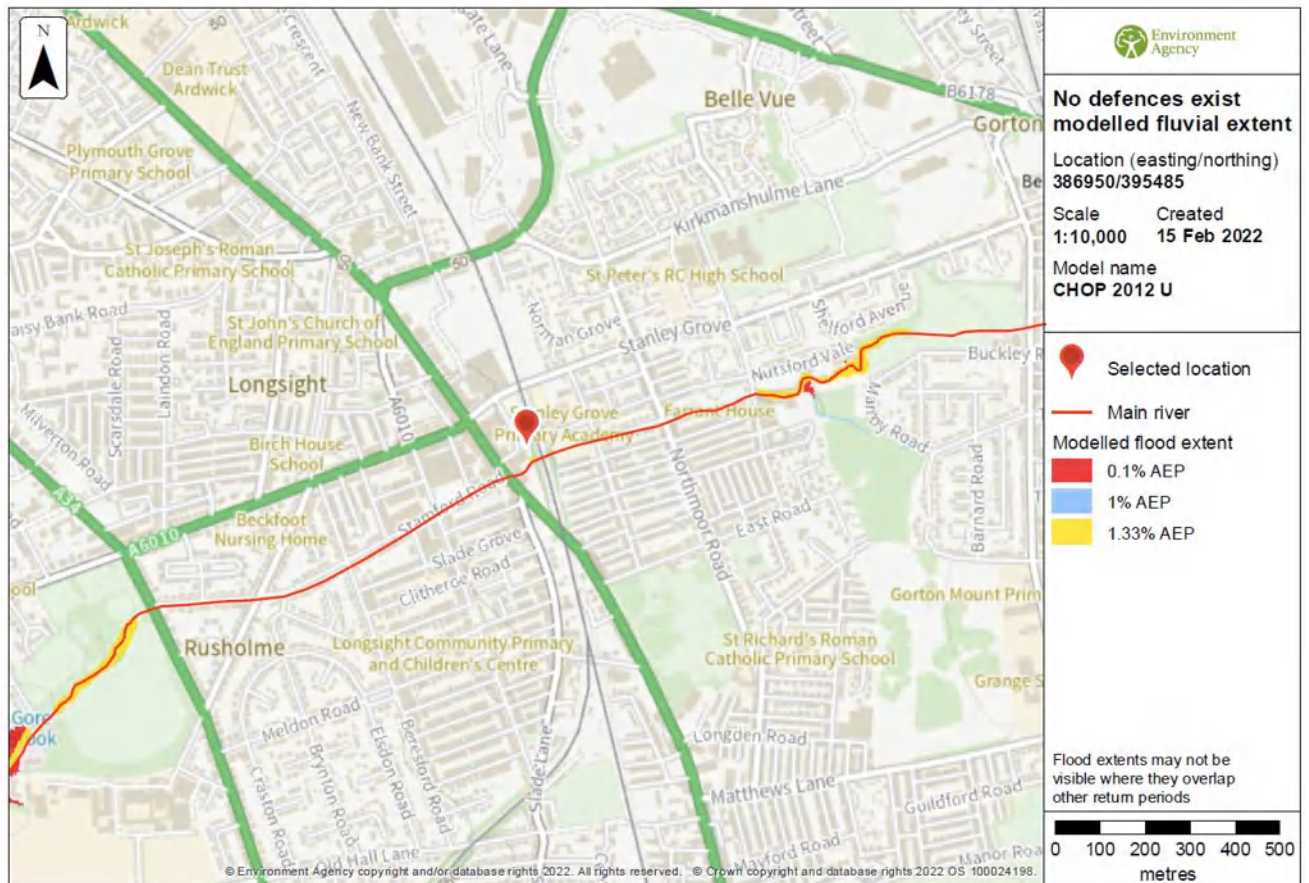
The proposed development would generate wastewater flow and the generated wastewater flow was estimated to be 0.05 litres/sec, however, a confirmation of the compliance agreement is required from United Utilities to discharge the generated wastewater flow into the existing drainage network systems before the construction of the proposed infrastructure.

Since the actual land of the proposed development is not at a risk to surface water drainage, the finished floor level could be at ground level. The access and egress from the Site during any flooding incident could be at Brook Terrace located in front of the Site.

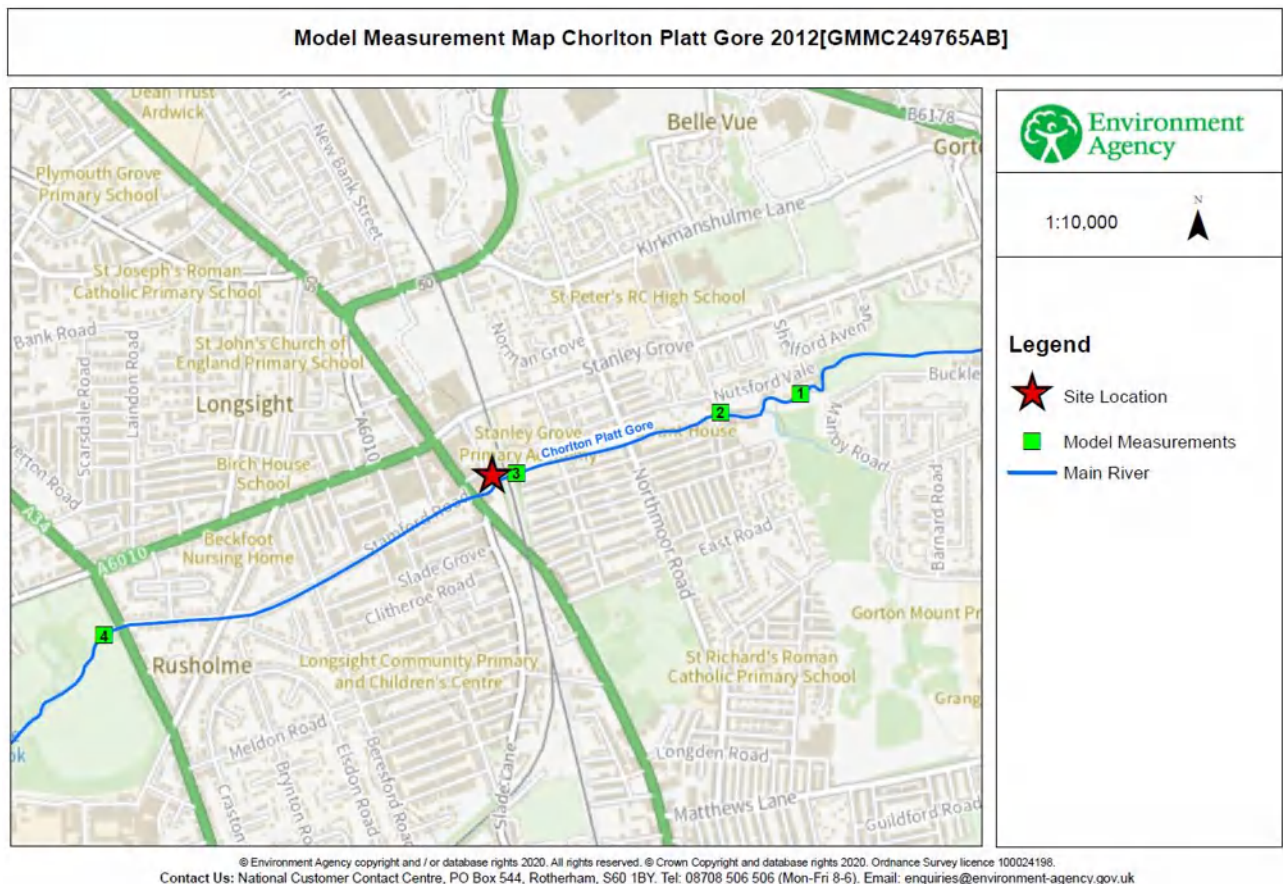
Appendix I: Fluvial flood extent at the Site – defended model, reference - EA.



Appendix II: Fluvial flood extent at the Site – undefended model, reference - EA.



Appendix III: Fluvial flood modelling data at the Site – undefended and defended models, reference - EA.



Sewer Distance	Maid Name Reference	Easting	Northing	Date	10% AEP (1 in 10 years)					1% AEP (1 in 100 years)					0.1% AEP (1 in 1000 years)				
					10% AEP (1 in 10 years)	1.0% AEP (1 in 10 years)	0.1% AEP (1 in 10 years)	1% AEP (1 in 100 years)	0.1% AEP (1 in 100 years)	10% AEP (1 in 10 years)	1.0% AEP (1 in 10 years)	0.1% AEP (1 in 10 years)	1% AEP (1 in 100 years)	0.1% AEP (1 in 100 years)	10% AEP (1 in 10 years)	1.0% AEP (1 in 10 years)	0.1% AEP (1 in 10 years)	1% AEP (1 in 100 years)	0.1% AEP (1 in 100 years)
1	W4713_Maid_C10705_2006	387027	387026	Matched (New Land (p. 100%))	48.17	48.22	48.26	48.22	48.26	48.17	48.22	48.26	48.17	48.22	48.17	48.22	48.17	48.22	48.17
2	W4713_Maid_C10705_2007	387040	387041	Matched (New Land (p. 100%))	47.05	47.14	47.16	47.05	47.16	47.05	47.16	47.16	47.05	47.16	47.05	47.16	47.05	47.16	47.05
3	W4713_Maid_C10705_2006	387030	387031	Matched (New Land (p. 100%))	44.72	44.80	44.82	44.72	44.82	44.72	44.82	44.82	44.72	44.82	44.72	44.82	44.72	44.82	44.72
4	W4713_Maid_C10705_1910	387016	387017	Matched (New Land (p. 100%))	38.17	38.21	38.25	38.17	38.25	38.17	38.25	38.25	38.17	38.25	38.17	38.25	38.17	38.25	38.17

Model data taken from Chorizon Plat Data 2012
 - AEP - Annual Exceedance Probability
 - in 100% - implies more extensive drain flows
 - units - cubic metres per second

Note: Climate Change Scenario - 20% and 1% increases in flow calculated for the 2007-2015. Please see https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220712/2015. Please see https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220712/2015 for more information regarding the new climate change policies. The location of the site and the type of development identified the climate change scenarios to consider in any flood risk assessment.

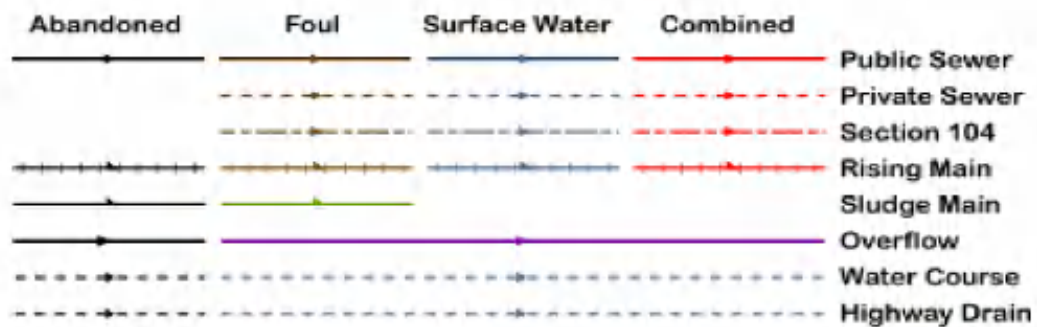
Appendix IV: Sewer network data at the Site, reference - United Utilities.







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	Change of Characteristic
Drop Shaft	
Orifice Plate	