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Project:	
Greenheys Redevelopment Manchester Science Park Supplementary Flood Risk Assessment	
Client:	
Bruntwood SciTech Limited	

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Report status: **Planning**

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**Manchester Science Park
Greenheys Redevelopment**

Greenheys Lane

Supplementary Flood Risk Assessment

**384268E, 396287N
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1.0 Introduction

The existing Greenheys Building at Manchester Science Park is to be demolished and a new building constructed. The site is bounded to the West by Greenheys Lane, to the South by the BASE Building and to the East by Pencroft Way.

This report is intended as a supplementary / local update on the previously approved Flood Risk Assessment issued for the Bright Building in 2014/2015 together with the previously approved Supplementary FRA prepared for the BASE Building in 2019 and considers potential flood risk from all sources and the surface water aspects of the proposals.

This assessment covers the Phase 2 site area only, as shown on BDP drawing number GRE-BDP-ZZ-XX-DR-A-00-020 contained in Appendix A. The additional Phase 1 areas indicate enabling works only and any drainage and flood risk aspects for these will be considered by future development applications.

2.0 Executive Summary

The new Greenheys redevelopment includes a small access road together with areas of soft and hard landscaping.

The proposed building, roadway and hard landscaping will have a reduction in 'hard' surfaced area than existing, and surface water runoff rates from the site will decrease.

All foul and surface water from the existing site currently discharge to the adopted combined sewer in Greenheys Lane.

The proposed Greenheys redevelopment and external areas are within "Flood-zone 1"; above the 1 in 1000 year risk levels from the Corn Brook river culvert which flows underground alongside Greenheys Lane, as advised by The Environment Agency.

The proposed building is to have a ground floor level of 35.150m, which is approximately 700mm above the 1 in 1000 year flood level for the site.

Sustainable drainage options have been considered but due to the underlying strata, no type of infiltration methods are feasible. Therefore, the current proposals incorporate a 'blue' roof to the majority of the main building footprint with additional surface water attenuation provided below ground, under the access road, in storage crates.

New foul and surface water drainage will be via separate systems within the site.

Foul water will connect into the existing Adopted Combined public sewer within the external areas of the adjacent BASE Building.

The surface water discharge is proposed to be to Corn Brook, near the junction of Greenheys Lane and Bronte Street, subject to agreement with Manchester City Council, with run-off from site restricted to 'Greenfield' values.

3.0 Existing site flood zoning and river systems

The existing site is in Manchester Science Parks ownership with car parking, access roads and footpaths and is bounded to the West by Greenheys Lane, to the South by the BASE Building and to the East by Pencroft Way. Refer to Appendix A for site location.

There is an existing river system next to the site. It is the Corn Brook which is a historic watercourse and a historic map of the old Manchester watercourses is attached in Appendix D.

Corn Brook is shown on the United Utilities sewer records, contained in Appendix E, and is marked as a 'Private' surface water sewer, 3300mm width and 1805mm height next to Greenheys Lane. The Environment agency has a hydraulic river model of the Brook and risk level data has been purchased from the Agency. Risk level data is contained in Appendix C.

The risk levels have been used by the Agency to map flood risk in the area and the issued EA mapping is likely to be based on land levels derived from LIDAR aeroplane surveying. Private land surveys to Ordnance Datum are more accurate and the Agency data plus accurate survey levels have been used to accurately flood-zone the proposals sites. The overall site slopes westwards from the main MSP site towards Greenheys Lane and the Corn Brook culvert line.

The Corn Brook watercourse siphons under the Bridgwater Canal at Cornbrook and outfalls to the Manchester Ship Canal at Pomona Dock. Manchester has many culverted streams and rivers and these have even been the subject of books and papers over the years- in particular the Geoffrey Ashworth book 'The Lost Rivers of Manchester' which is no longer in print. We attach the North West Geography Society's list of historic flooding in Appendix D. The head of the brook is to the west of Ashton Old Road near to the New Smithfield Market and it can be seen in open channel at Pottery Lane in the Gorton area. Its catchment area is much more extensive as public surface water sewers connect to it. Photos of parts of Corn Brook do appear on the internet with websites such as:-

28dayslater
Goneeightyfive.com
Substormflow.blogspot.co.uk

The existing overall MSP site slopes downhill westwards with levels of approx. 35.40m at Lloyd Street North and approx. 33.90m at Charles Halle Road.

The gross area of the Greenheys redevelopment site is approx. 5,350m² (0.535 Ha). Refer to Appendix B for the proposed site layout.

The EA risk level data for Corn Brook gives the following risk levels for the Greenheys redevelopment site. Refer to Appendix C for the EA flood data.

Greenheys Site

EA Node 3 Is on Greenheys Lane, approx. 20m South of the site

1 in 100 year risk level – 34.09m
1 in 1000 year risk level – 34.23m

EA Node 4 Is on Boundary Lane, approx. 70m North of the site

1 in 100 year risk level – 34.47m
1 in 1000 year risk level – 34.63m

Interpolation between the EA Nodes gives approx. levels on the Greenheys site North Boundary of:-

1 in 100 year risk level – 34.28m

1 in 1000 year risk level – 34.43m

The ground floor level of the existing Greenheys building is 34.91m and the site is therefore categorised as Flood-zone 1.

Refer to the topographical data within the drawings in Appendix B.

4.0 Strategic Flood Risk Assessments

The Manchester SFRA documents and maps have been viewed and the area is a Critical Drainage Area (CDA) and as such existing run-off rates are to be reduced by at least 50%. The reports also stress the importance of considering and implementing sustainable urban drainage systems where possible.

5.0 Proposals for the Building & Drainage

The proposals are for the redevelopment of the existing Greenheys building, to replace the existing low rise building and car park together with reconfiguring of soft and hard areas as attached proposals plan in Appendix B.

The existing building ground floor level is 34.91m.

The proposed Greenheys redevelopment is to have a finished ground floor level of 35.150m; approx. 700mm above the 1 in 1000 year flood level for the site. This is also the same ground floor level as the recently constructed BASE building, immediately to the South of the Greenheys site.

The existing site is fully hard landscaped. The proposed redevelopment will approx. 740m² of 'soft' landscaping / planting areas.

New drainage will be separate system within the site.

Foul water is to discharge into the Adopted combined sewer near Greenheys Lane and sited within the external paved area to the BASE building.

The majority of the new building roof is to incorporate a 'blue roof' to store rainwater and restrict flow into the underground system.

Surface water is to discharge into the culverted Corn Brook in Greenheys Lane and will be restricted to 'Greenfield' run-off levels, subject to permission being granted by owners.

The Phase 2 site investigation has shown heavy clay soils to underly the site and the use of permeable surfacing and soakaways would not be possible. Therefore, surface water storage may be needed underground utilising Versavoid or Polystorm type unit under the external service road areas.

The schematic site drainage layout is contained within Appendix G.

6.0 National Planning Policy Framework and Technical Guidance

The proposals are commercial and are classed in the Technical Guidance to the National Planning Policy Framework as 'more vulnerable' in Table 2 and are 'appropriate' in Flood-zone 1 as per Table 3.

All sources of flooding risk are:-

Rivers	– Corn Brook- see above
Sea	– no tidal influence
Land	– no un-drained land slopes towards the sites
Groundwater	– no springs or weep areas on site
Sewers	– no reported incidents of on-site sewer flooding
Reservoirs, canals	– no canals nearby.

The EA reservoir risk mapping shows the site as at risk from the Audenshaw reservoirs and Gorton Upper. These reservoirs are all maintained by United Utilities to a 1 in 10,000 year standard which is the high standard required by the Reservoirs Acts and Water Acts and there is little risk to the site.

Pluvial risk - see EA mapping, which is based on a 1 hour, 1 in 200 year storm with all existing drainage assumed full. There is little risk to the site.

Refer to Appendix F for risk of flooding maps for:-

Flooding from Rivers & Sea

Site is shown as being affected by river flooding to the existing yard area off Greenheys Lane. However, the detailed EA data confirms that the site is actually well above the 1 in 1000 year event.

Flooding from Surface Water

Site is shown as being affected by Surface Water flooding, again to the yard area off Greenheys Lane. The proposed building level is well above the existing yard level and therefore no affect upon occupied areas will occur.

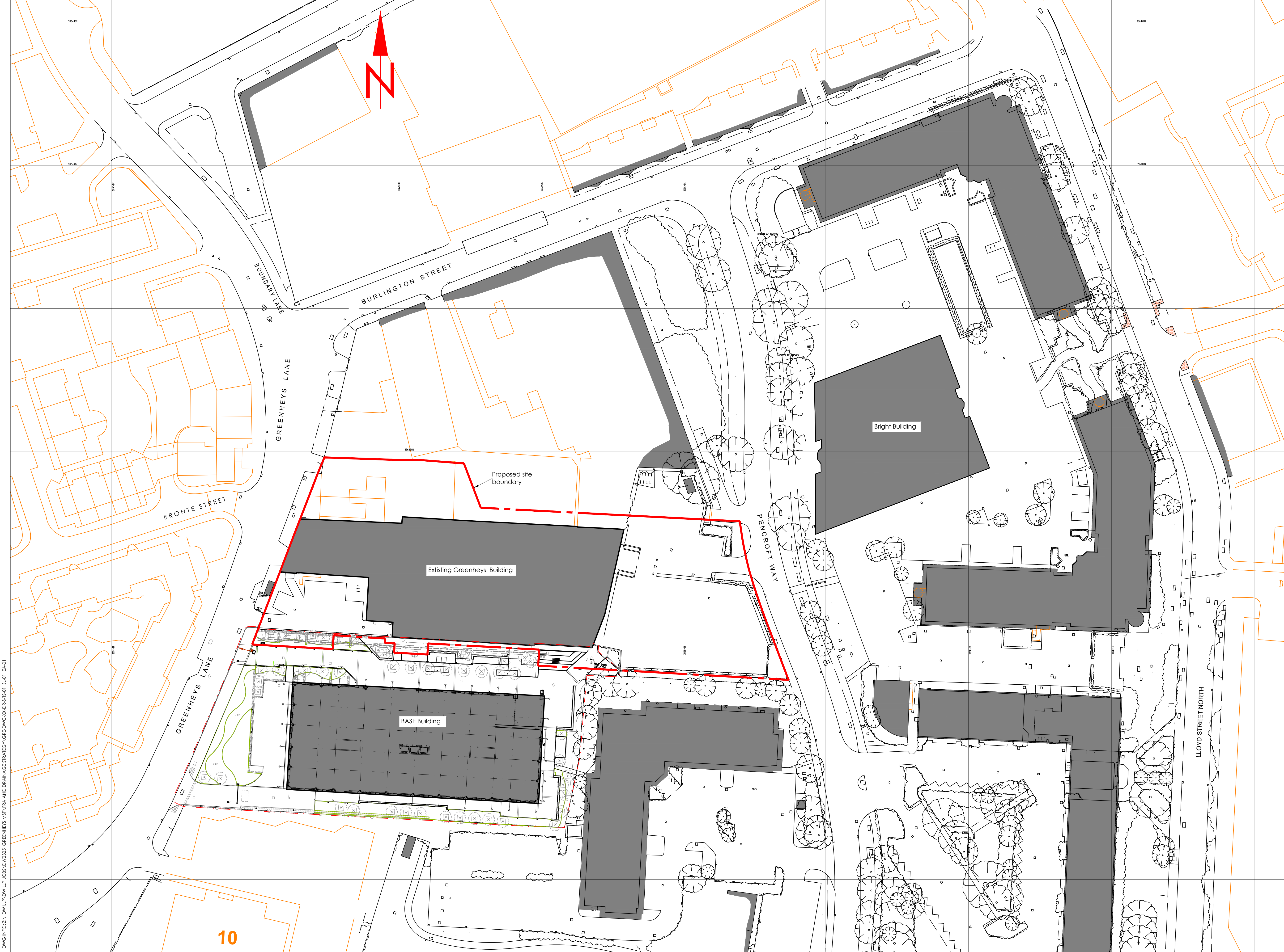
Flooding from Reservoirs

As noted above the site is shown as being at risk, along with most of Manchester, but there is actually very little risk to the site.

Appendix A

Site Location Plan - Drawing GRE-DWC-XX-DR-S-SL-01-P01

Project Red & Blue line - Phase 1 & 2 – Drawing GRE-BDP-ZZ-XX-DR-A-00-020



GENERAL NOTES

Do not scale this drawing.
Contractor to check all dimensions and report all errors and omissions to the Engineer.

Rev	Detail	By	Auth	Date
Revisions				

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Project

Greenheys Redevelopment
Manchester Science Park

Drawing Title

Site Location Plan

Drawing Status

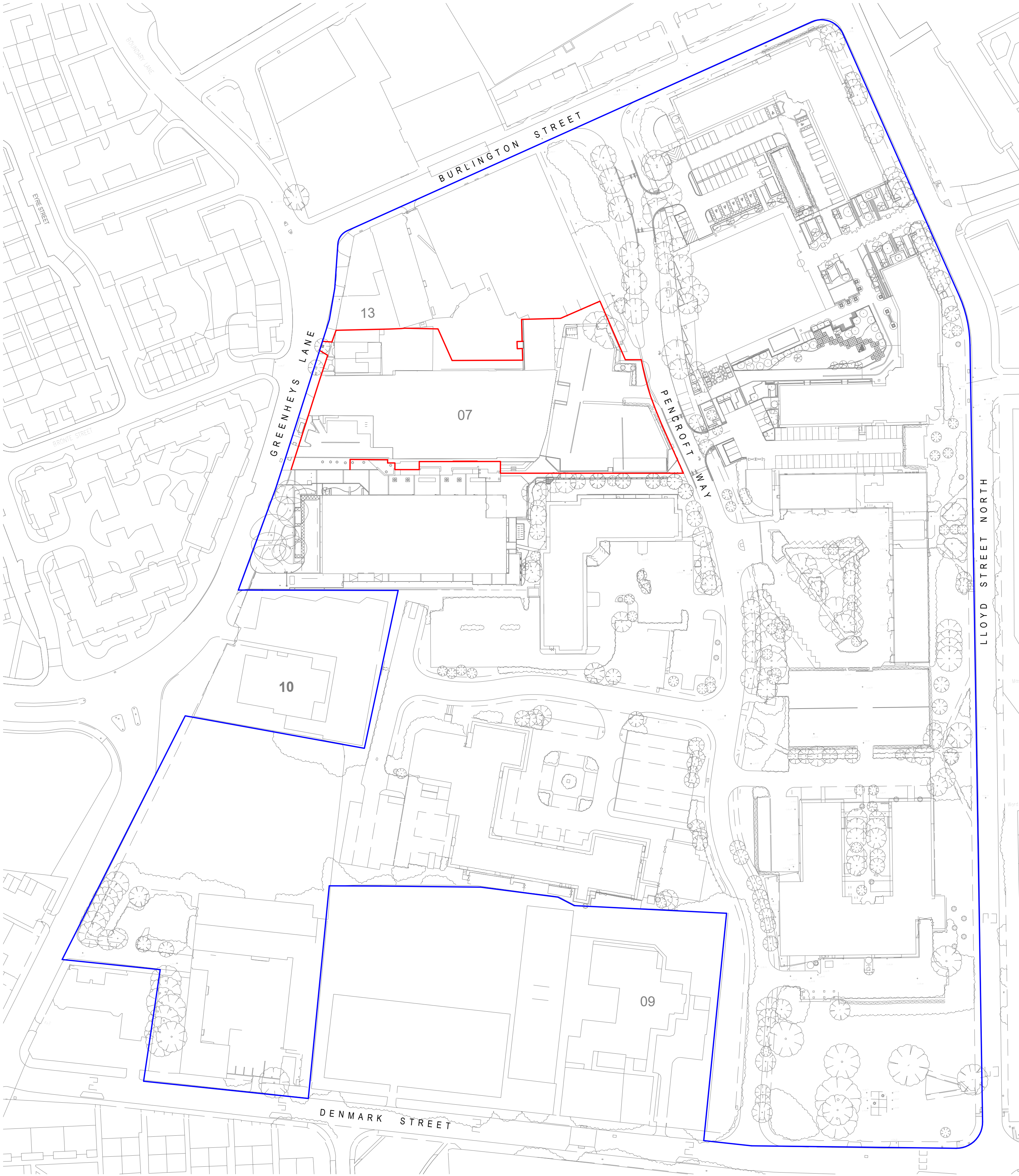
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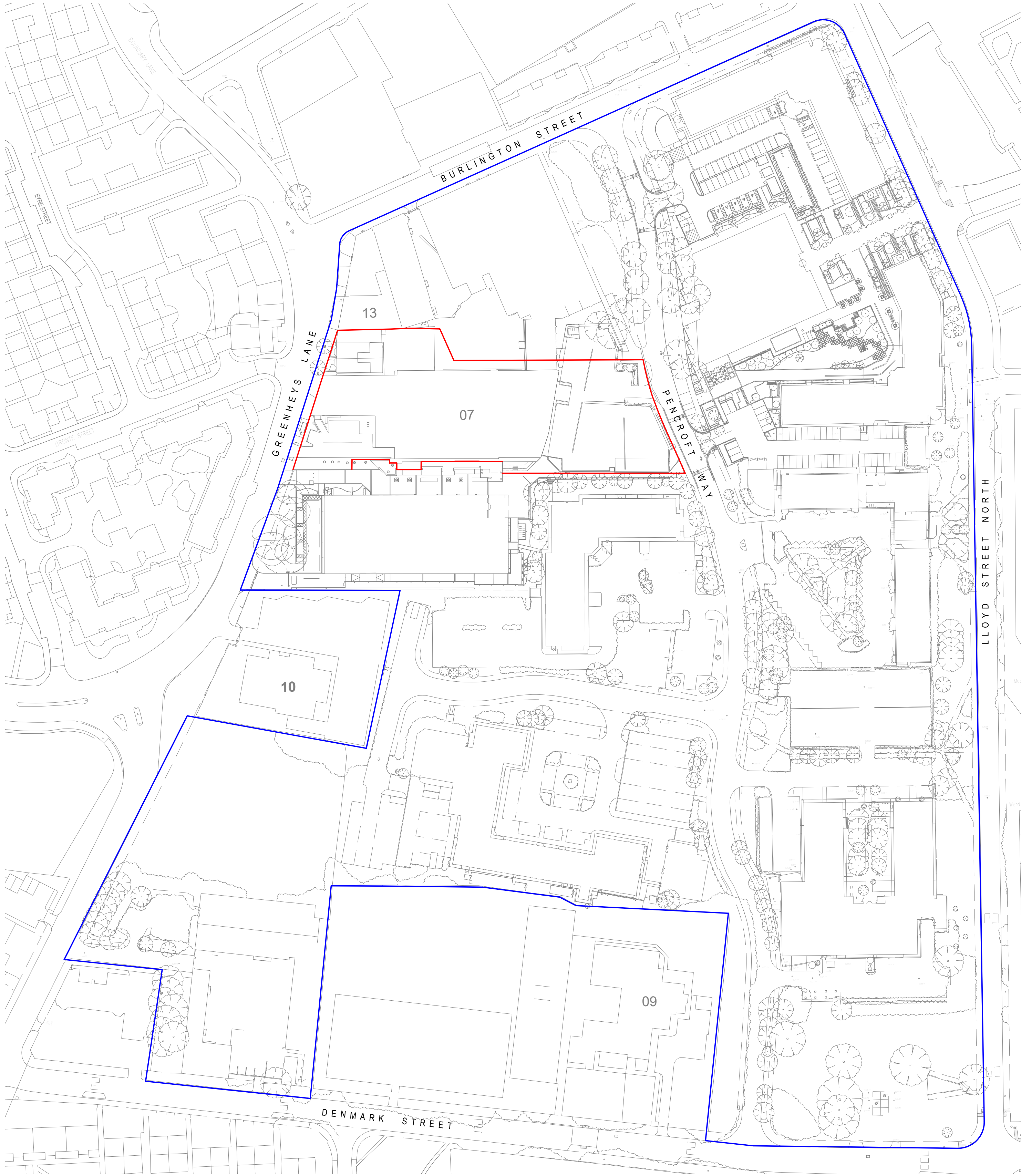
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Date	Drawn	Checked	Auth
Jan'23			

DWG INFO: 2, DW LLE/DWLIP, 2085/DW2255, GREENHEYS MSP VPA AND DRAINAGE STRATEGY/GRE-DWC-XX-DR-S-SL-01, SLO1, EA-01



MSP SRF overlay of Greenheys Redevelopment Project Redline - Phase 1



MSP SRF overlay of Greenheys Redevelopment Project Redline - Phase 2

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REVISION										DESCRIPTION										DRAWN				CHECKED				DATE					
REVISION										DESCRIPTION										DRAWN				CHECKED				DATE					

PROJECT TITLE	
MSP Greenheys (Private & Confidential)	
BDP JOB NUMBER	
P3001624	
DRAWING TITLE	
Project Red & Blue line - Phase 1 & 2	
SCALE	@ A1 1 : 1000
DATE FIRST ISSUED	April 2023
DRAWING No.	GRE-BDP-ZZ-XX-DR-A-00-020
REVISION	P01

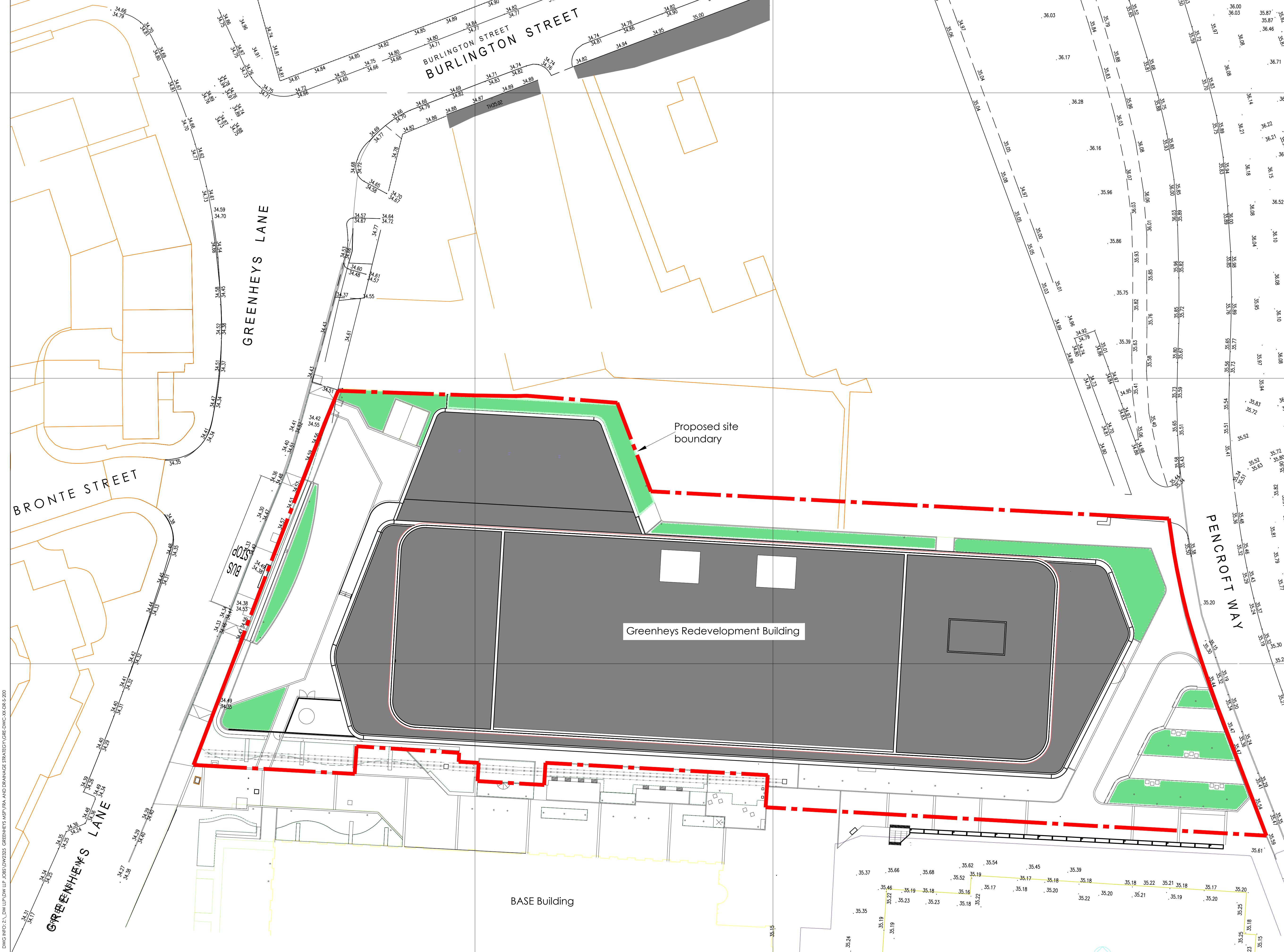
MSP MANCHESTER SCIENCE PARTNERSHIPS		11 Ducie Street PO Box 85 Piccadilly Basin Manchester M60 3JA United Kingdom T +44 [0]161 828 2200 www.bdp.com		BDP.	
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Appendix B

Existing and Proposed Site Layouts

Drawing GRE-DWC-XX-DR-C-199-P01

Drawing GRE-DWC-XX-DR-C-200-P01



GENERAL NOTES

Do not scale this drawing.
Contractor to check all dimensions and report all errors and omissions to the Engineer.

Details shown on this drawing are schematic only and are subject to detailed design by architect

Rev	Detail	By	Auth	Date
Revisions				

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**Greenheys Redevelopment
Manchester Science Park**

Drawing Title

Proposed Site Layout

Drawing Status

scheme

Drawing No.

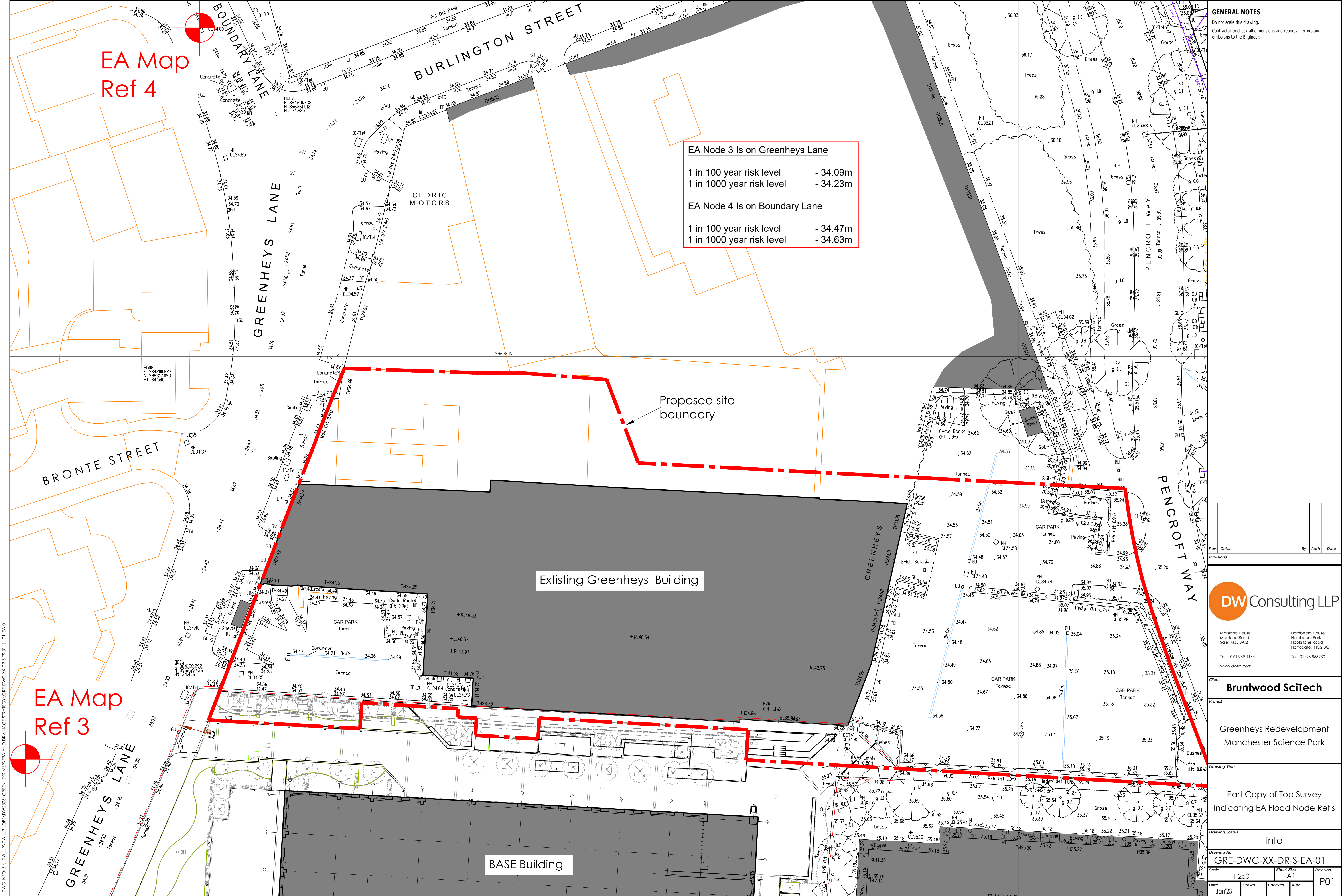
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1:250	A1	P01
Date	Drawn	Checked
Jan'23		Auth

Appendix C - Environment Agency Flood Risk Data

Drawing GRE-DWC-XX-DR-S-EA-01-P01 indicating EA Flood Data Node Locations

EA Flood Levels Data at Node Points on Corn Brook



GENERAL NOTES
Do not scale this drawing.
Contractor to check all dimensions and report all errors and omissions to the Engineer.

EA Node 3 Is on Greenheys Lane

1 in 100 year risk level - 34.09m
1 in 1000 year risk level - 34.23m

EA Node 4 Is on Boundary Lane

1 in 100 year risk level - 34.47m
1 in 1000 year risk level - 34.63m

Proposed site boundary

Existing Greenheys Building

BASE Building

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Project
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Manchester Science Park

Drawing Title
Part Copy of Top Survey
Indicating EA Flood Node Ref's

Drawing No.
GRE-DWC-XX-DR-S-EA-01

Scale
1:250

Sheet Size
A1

Revision
P01

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12th March 2014

PRRSTH1897

					Undefended Levels					
Map Reference	Model Node Reference	Easting	Northing	Data	2 % AEP (1 in 50 year)	1.33 % AEP (1 in 75 year)	1 % AEP (1 in 100 year)	1 % AEP (1 in 100 year) + Climate Change*	0.5 % AEP (1 in 200 year)	0.1 % AEP (1 in 1000 year)
1	ea013_Model_CORN02_00012	384001	396008	Modelled Water Level (m aod)	33.09	33.14	33.17	33.24	33.23	33.46
				Modelled Flow (cumecs)	8.71	8.79	8.84	8.96	8.96	8.85
2	ea013_Model_CORN02_00013	384101	396118	Modelled Water Level (m aod)	33.63	33.67	33.70	33.75	33.75	33.86
				Modelled Flow (cumecs)	8.1	8.11	8.12	8.13	8.15	8.13
3	ea013_Model_CORN02_00014	384172	396260	Modelled Water Level (m aod)	33.96	34.01	34.04	34.09	34.09	34.23
				Modelled Flow (cumecs)	8.18	8.19	8.21	8.23	8.25	8.13
4	ea013_Model_CORN02_00015	384198	396369	Modelled Water Level (m aod)	34.32	34.38	34.41	34.47	34.47	34.63
				Modelled Flow (cumecs)	8.16	8.17	8.18	8.19	8.21	8.1
5	ea013_Model_CORN02_00019	384140	396511	Modelled Water Level (m aod)	34.84	34.89	34.92	34.99	34.98	35.16
				Modelled Flow (cumecs)	8.24	8.27	8.29	8.32	8.34	8.3
6	ea013_Model_CORN02_00022	384237	396664	Modelled Water Level (m aod)	35.72	35.76	35.78	35.84	35.83	35.98
				Modelled Flow (cumecs)	8.3	8.34	8.35	8.36	8.37	8.09

Model data taken from the Corn Brook 2009 study

Notes:

AEP - Annual Exceedence Probability

m aod - metres above ordnance datum

*Climate Change Scenario for fluvial only - 20% increase in flow

Appendix D – Historic Flooding Data

Extract from North West Geography Society List of Historic Flooding

Historic Map of Old Watercourses

Table 1: Major flood events in Greater Manchester. (Source: Compiled by Ian Douglas and Nigel Lawson from Municipal and Environment Agency records, the press and literature reviews.)

Year	Location	Cause	Effect
1616	Irwell in Salford	No data	No data
1649	Irwell in Salford	No data	No data
1662	Mersey	No data	Cut Chester and London Roads.
1750	Mersey	No data	Cost many lives.
1767	Mersey	No data	Washed away bridge at Stretford.
1799	Mersey	Banks burst	No data
1828	Mersey	No data	No data
1799-1852	Irwell – 10 events	Siltation	No data
1866	Irwell	No data	No data
1868	Irwell	Siltation by urban debris	No data
1871	Irwell	Loss of channel capacity	No data
1880	Irwell	No data	Severe damage to city centre riverbank properties.
1881	Irwell	No data	Severe flooding in Lower Broughton.
1886	Irwell at Salford	Channel capacity exceeded (No raised Defences)	800 ha with crowded tenements in Lower Broughton flooded up to 2m in depth.
1896	Mersey	No data	Floods in many parts, including Stockport.
1923	Mersey and Irwell	No data	Flooding in Lower Broughton and along Mersey.
1930	Mersey	No data	Flooding and severe bank erosion at Ashton in Mersey.
1940	Mersey and Irwell	Snowfall and Snowmelt	Severe flooding.
1946	Irwell	Channel capacity exceeded	Severe flooding in Salford, 5,300 properties and 243 ha in Lower Broughton.
1954	Irwell	Channel capacity exceeded	600 properties in Lower Kersal and Lower Broughton.
1964	Irwell, Mersey and Beal	Overtopping of banks at Northenden and Douglas Green, Salford	350 properties evacuated in Shaw. Didsbury widespread flooding of fields and property.
1965	Roch	No data	No data
1973	Mersey	No data	Flooding in Stockport.
1980	Irwell	Riverine and sewer flooding	Severe flooding, particularly in Lower Kersal.
1981	Chorlton and Sinderland Brooks	South Manchester 75 mm rain over 3 hours in early August	Widespread flooding along the Chorlton and Sinderland Brook catchments.
1995	Irwell, Roch and culverts	No data	60 houses and 21 industrial units flooded.
2000	Mersey, Irwell, Roch and culverts	Banks overtopped, blocked culverts	Widespread flooding.
2002	Irwell, Roch and culverts	Overtopping of Irwell, backing up drains in Rochdale	11 properties flooded in Irwell Vale.
2004	Netherley, Shaw, Cringle and Chorlton brooks. Heywood	2 nd wettest August on record, surface water, blocked culverts (Cringle Brook) pumping station breakdown	Cheadle: 22 properties and 2 industrial units affected. M60 motorway near Whitefield closed for 7 hours. Heywood: back-up sewage flooding in a number of homes.
2006	Heywood	July storm (33.2mm rainfall in 1 hour); culvert and sewer overflows	200 homes flooded, 40 homes evacuated.

Riverine flooding

Flood protection from major rivers is the responsibility of the Environment Agency which continuously seeks to reduce the risk of flooding, according to the risk scales expressed in Table 2. In spite of the Agency's efforts, levels of protection to the Mersey, Irwell and Roch, the three major rivers draining Greater Manchester, vary considerably. Much of the Mersey Valley is now low risk with protection to 1:200 years or more

following the development in the 1970s of temporary flood storage basins on park land and golf courses in the natural flood plain. Bypass channels, channel adjustments, bank reinforcements, storm-water tanks and increased drainage and sewerage capacity intend to protect the River Roch in Rochdale and Littleborough to a standard of 1:100 years. However, Lower Kersal and Lower Broughton, the two areas in Greater Manchester to have suffered most from flooding



CHEETHAM

Great Horrocks

BROOKTON

STRANGWAYS

MILES PLATTING

Abolition

PHILIPS PARK CEMETERY

PHILIPS PARK

MANCHESTER

CLAYTON

BESING

BLACK AA

CLAYTON

WHITWORTH ST. WEST

FAIRFIELD

ARND

COBB

COAD

COBB

SITE GREENHEYS

CHORLTON

MEDLOCK

LONGSIGHT

BELLE VUE ZOOLOGICAL GARDENS

GOAA

Appendix E

United Utilities Sewer Records

Mark Up of UU Sewer Records Indicating Manholes & Combined Sewer that were Unadopted during BASE Building development.

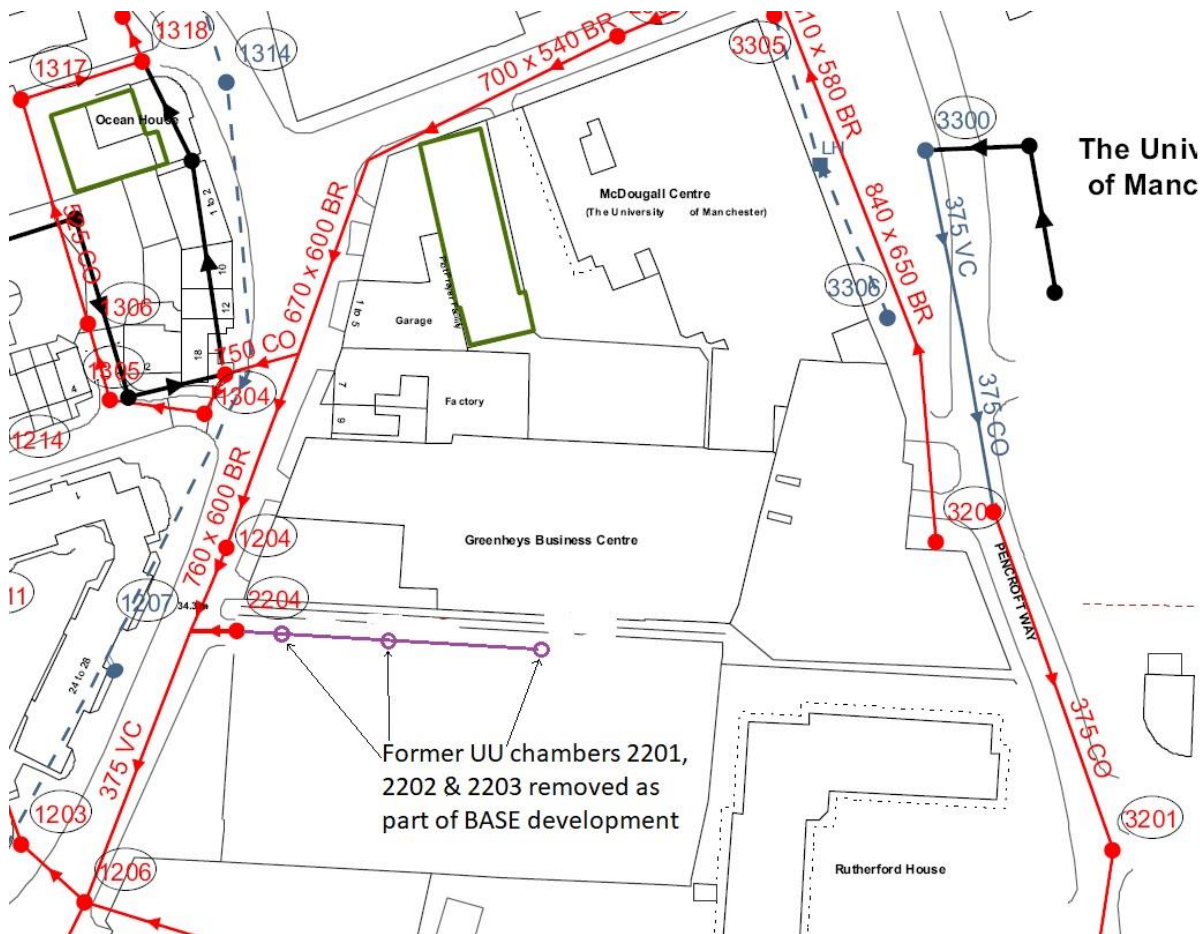


WASTE WATER SYMBOLOGY				
Foul	Surface	Combined	Overflow	
				Manhole
				MainSewer, Private
				MainSewer, S104
				Rising Main, Public
				Rising Main, Private
				Rising Main, S104
				Highway Drain, Private
Foul	Surface	Combined		
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				
				

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Scale: 1: 1250 Date: 17/02/2014



SEWER RECORDS



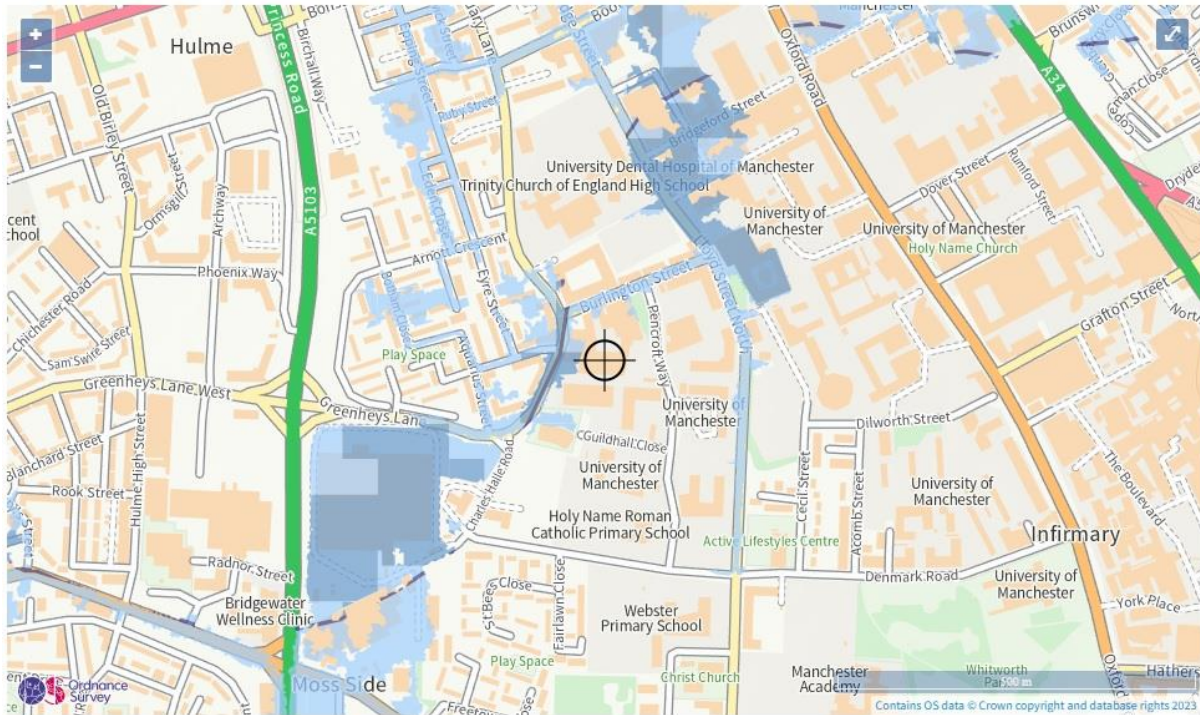
Mark Up of UU Sewer Records Indicating Manholes & Combined Sewer that were Unadopted during BASE Building development

Appendix F – Environment Agency Long Term Flood Maps

Rivers & Sea

Surface Water

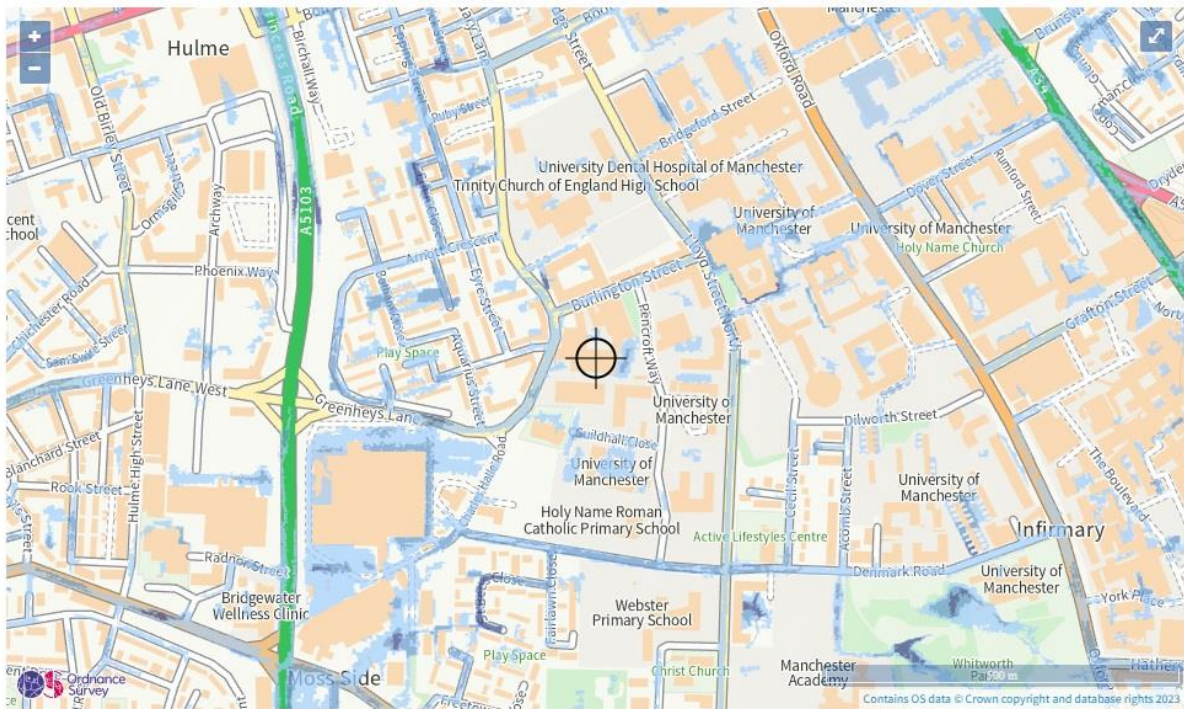
Reservoirs



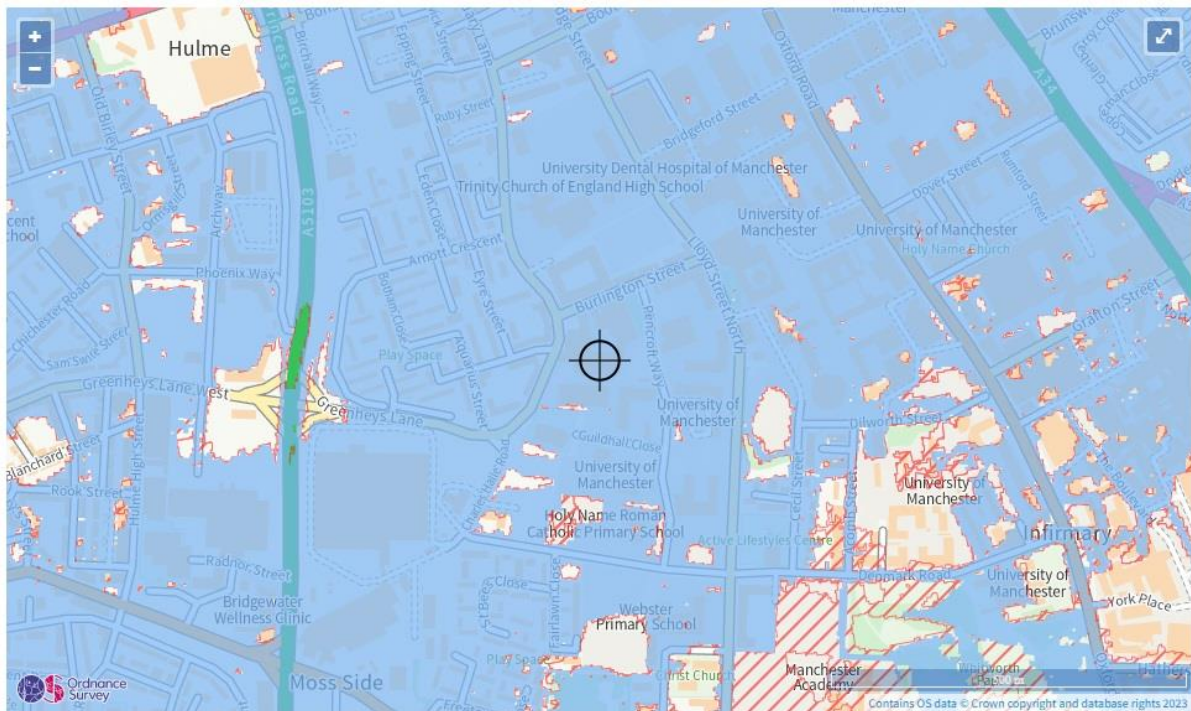
Extent of flooding from rivers or the sea

● High ● Medium ● Low ● Very low ⊕ Location you selected

Flooding from Rivers and Sea



Flooding from Surface Water



Maximum extent of flooding from reservoirs:

● when river levels are normal ■ when there is also flooding from rivers ⊕ Location you selected

Flooding from Reservoirs

Appendix G

Schematic site drainage layout drawing GRE-DWC-XX-DR-S-DR100-P01

