Land at Welcomb Street: Lost Watercourse Assessment
Planning Ref: 139997/FO/2024

Overview:

1. The 1845 OS map indicates an open watercourse flowing NE to SW with outfall to Corn Brook. A section of the watercourse is culverted under the Sheffield Railway line. With the development zone overlaid the watercourse is shown beyond (or intersecting) the development boundary.
2. The 1888-1890 OS map indicates the presence of the Armstrong Whitworth Engineering works. Corn Brook is shown, but the referenced watercourse is not shown, including any outfall.
3. The 1915 OS map indicates the expanded Armstrong Whitworth Engineering works. Corn Brook is shown, but the referenced watercourse is not shown, including any outfall.
4. The 1936 aerial image shows the post demolition condition of the Armstrong Whitworth Engineering Works including the Ashbury Sidings.
5. The 1946 aerial image shows the constructed New Crossley Forge Complex. The eastern zone remained until demolition in c2004. The site within the development area evolved in to the Mancat College facility (closed c2022).
6. The MCC Critical Area Drainage Plan (MCC SFRA 2011) indicates a 'lost watercourse' within or close to the development site and adjacent industrial plot. The accuracy and level of detail on this plan is unreliable, furthermore this does not reflect the 1845 OS map which shows the watercourse beyond (or intersecting) the SE boundary.
7. Further information provide by MCC, WEL11-A-DAT 911/10/24) is a version of the Critical Area Drainage Plan contained in the SFRA. The date report states *"The position of features shown on this plan is approximate only and is given in accordance with the best information currently available."* Again the accuracy and level of detail on this plan is unreliable, furthermore this does not reflect the 1845 OS map which shows the watercourse beyond (or intersecting) the SE boundary.
8. The United Utilities asset plan indicates Corn Brook to the south of the Railway line. Twin 750mm dia. culvert sections are shown to the east. The existing combined trunk sewer shown bisects the development site, flowing east to west. The sewer as indicated, is routed under existing buildings in the development site and the wider estate. It is known that the section of sewer to the east of the development site actually sits outside of building footprints and within hardstanding areas. The section of sewer to the west of the development site does sit below existing buildings as a 'Building Over Agreement' was granted as part of the c2006 construction. As proven by survey, the depth of the sewer within the development site is c3m to IL, which provides c2.1m to the crown of the sewer.
9. Composite images/plans have been generated to indicate:
    - Existing & Historic buildings.
    - Proposed development.
    - Existing UU trunk sewer bisecting the site.
    - Theoretical line of the lost watercourse using the data from MCC Critical Drainage Area Plan (as a worst case scenario).

10. Intrusive geotechnical investigation was undertaken in June 2022 within the development site. Investigation point WS05a which is located in the SE corner of the site (closest to the watercourse route) comprises of shallow made ground to 1.3mbgl overlying undisturbed glacial till to the base of the WS at 4.0m bgl. Although limited to one excavation point there is no evidence of disturbed ground, organic material or piped structure, normally associated with watercourse, streams and culverts. WS04 to the NW of WS05a has undisturbed glacial till to the base of the WS at 5.0m bgl.

Likelihood of Existence of Lost Watercourse

11. The 1845 OS map shows the watercourse beyond (or intersecting) the SE boundary of the development boundary.
12. The Armstrong Whitworth Engineering works existed in the late 1800's comprising of substantial buildings, substructure, railway sidings etc. which would have significantly altered existing ground profiles and land features such as watercourses. There is no indication of watercourse culverting.
13. Expansion of the AWE works are evident on the 1915 OS map which again comprises of substantial buildings, substructure, railway sidings etc. further disturbing/altering site conditions and ground profiles. There is no indication of watercourse culverting.
14. Demolition and redevelopment between 1936 – 1946 for the Crossley New Forge Complex, comprised of clearance, construction of heavy engineering works, substantial substructure, basements, removal of sidings etc. further disturbing/altering site conditions and ground profiles. The likely preservation of any culverts is limited. The buildings eventually became MCC and Mancat facilities.
15. Site clearance and demolition of the existing buildings took place in c2004 comprising of removal of buildings, substructure, voids, infilling basements etc. There was no recorded evidence of the presence of any culverts during these works.
16. Redevelopment of the land immediately to the east and west of the development plot in c2006, comprised of removal of relic substructure and ground treatment in the form of Vibro Stone Columns (VSC) to depth range 8-10m, construction of new buildings and infrastructure. Any below ground features i.e. culverts, will have been disturbed/destroyed during the groundworks.
17. The MCC Critical Drainage Area plan extracted from the SFRA and latest plan issued by MCC (11/10/24) indicates a 'lost watercourse' routed through the SE corner of the site. The accuracy and level of detail on this plan is unreliable, furthermore, this does not reflect the 1845 OS map. Additionally, the information does not take account of the UU trunk sewer which is on a similar alignment and bisects the 'lost watercourse' line.
18. The UU asset plan indicates the culverted section of Corn Brook to the south of the railway land and a 750mm dia. combined trunk sewer that bisects the existing site, development site and watercourse route. The sewer is likely to have been constructed as part of the AWE or Crossley New Forge Complex and will have disturbed or terminated the watercourse route. The depth of the sewer is c3m bgl to the SE corner of the site.
19. UU in their capacity as statutory undertaker, approved the development SW drainage strategy based on controlled discharge to sewer due to a lack of watercourse outfall tested as part of the SUDS hierarchy assessment.

20. Drainage surveys undertaken in 2022, to support development have not located any culverts in the SE corner of the site.
21. The SI did not locate any culverts or disturbed ground in the SE corner of the site.
22. Land to the south of the development plot has been developed as a cement works further disturbing/altering site conditions and ground profiles and likely impacting on any existing watercourse/culvert.
23. Corn Brook is located c450m from the SE boundary. Based on a top water level of 53.0m, assumed outfall level of 53.50m and a watercourse gradient of 1/500, the depth of the watercourse at the SE corner would equate to 54.40m. This would effectively put the culverted watercourse at 5.3m bgl. Allowing for a steeper gradient of say 1/250, the depth of the watercourse at the SE corner would equate to 55.30m which puts the culverted watercourse at 4.4m bgl. Due to the existence of the combined sewer the watercourse would have to be located below the sewer IL, therefore ignoring gradient to Corn Brook, this would place the watercourse at c55.50, which equates to 4.2m bgl.
24. The development masterplan shows new buildings further away from the SE corner, thereby reducing risk of impacting any preserved/existing culvert.

Summary:

Based on a review of available historical information, development-demolition-development cycle, existence of a trunk sewer bisecting the site, lack of evidence through surveys, the likelihood of the 'lost watercourse' being present within the site is negligible. Furthermore, in the unlikely event it exists, the potential for the watercourse to be affected by the proposed development is also negligible as it is likely to sit outside of proposed building footprints and at a depth that would not be disturbed or provide benefit to the scheme.

Conclusion:

No further surveys or intrusive investigations are necessary.

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Composite Image (Existing & Proposed)

Land at Welcomb Street: Lost Watercourse Assessment
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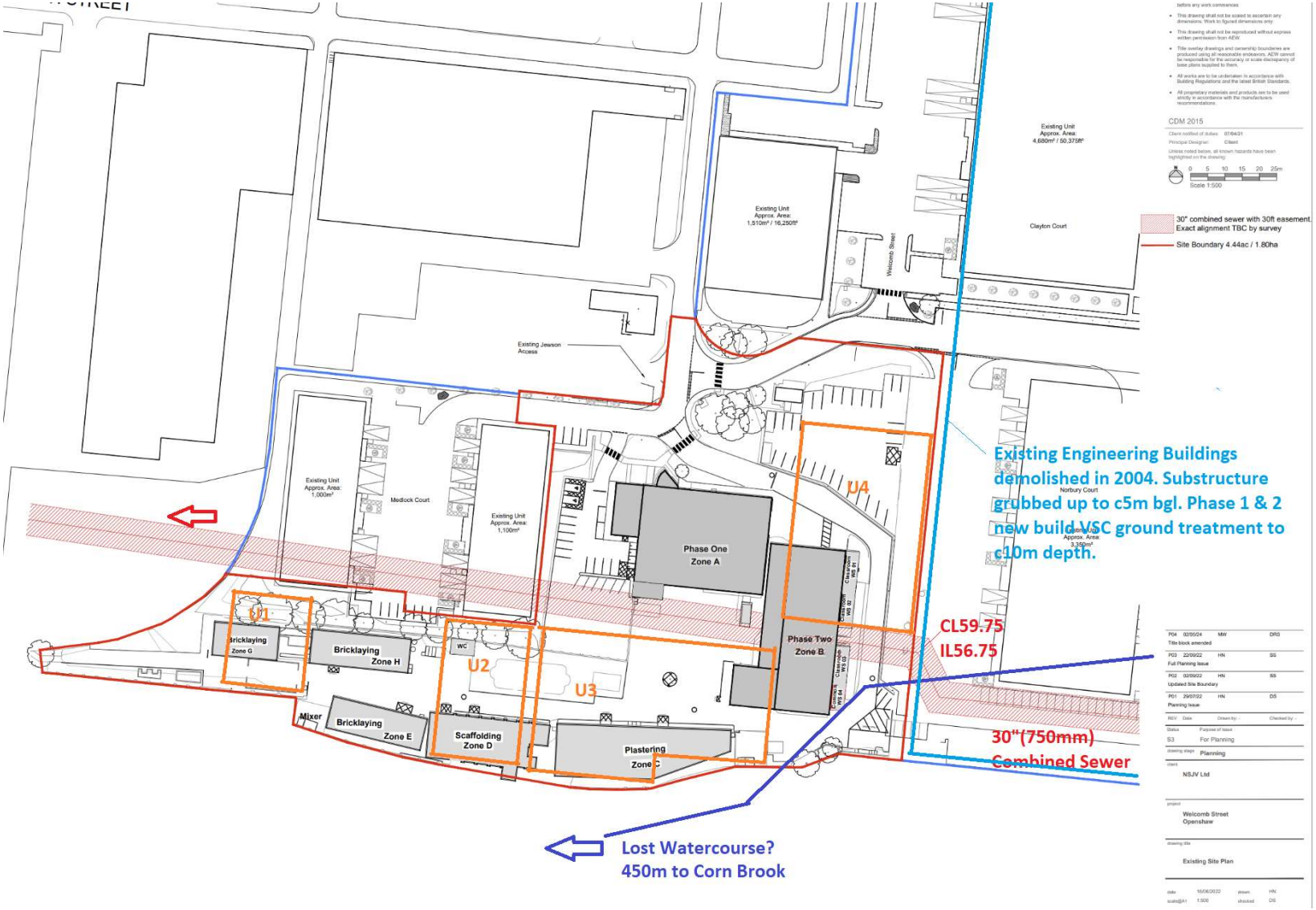
Composite Plan (Existing & Proposed)



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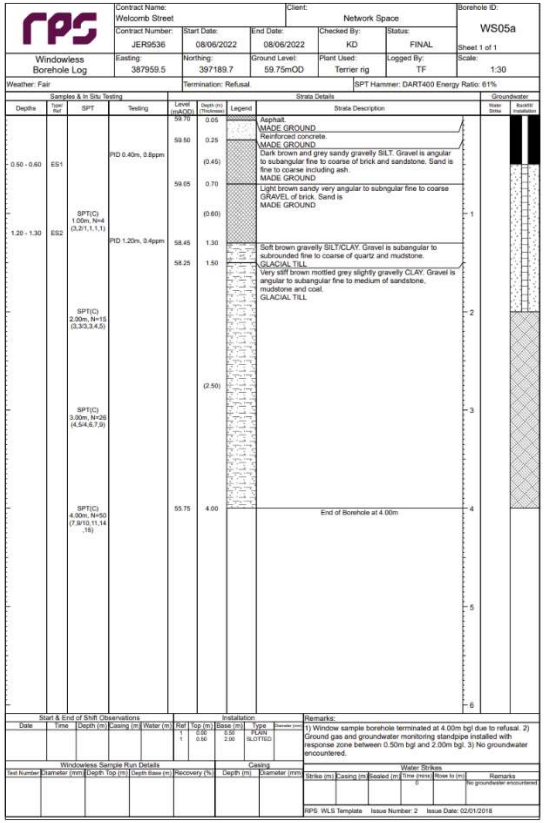
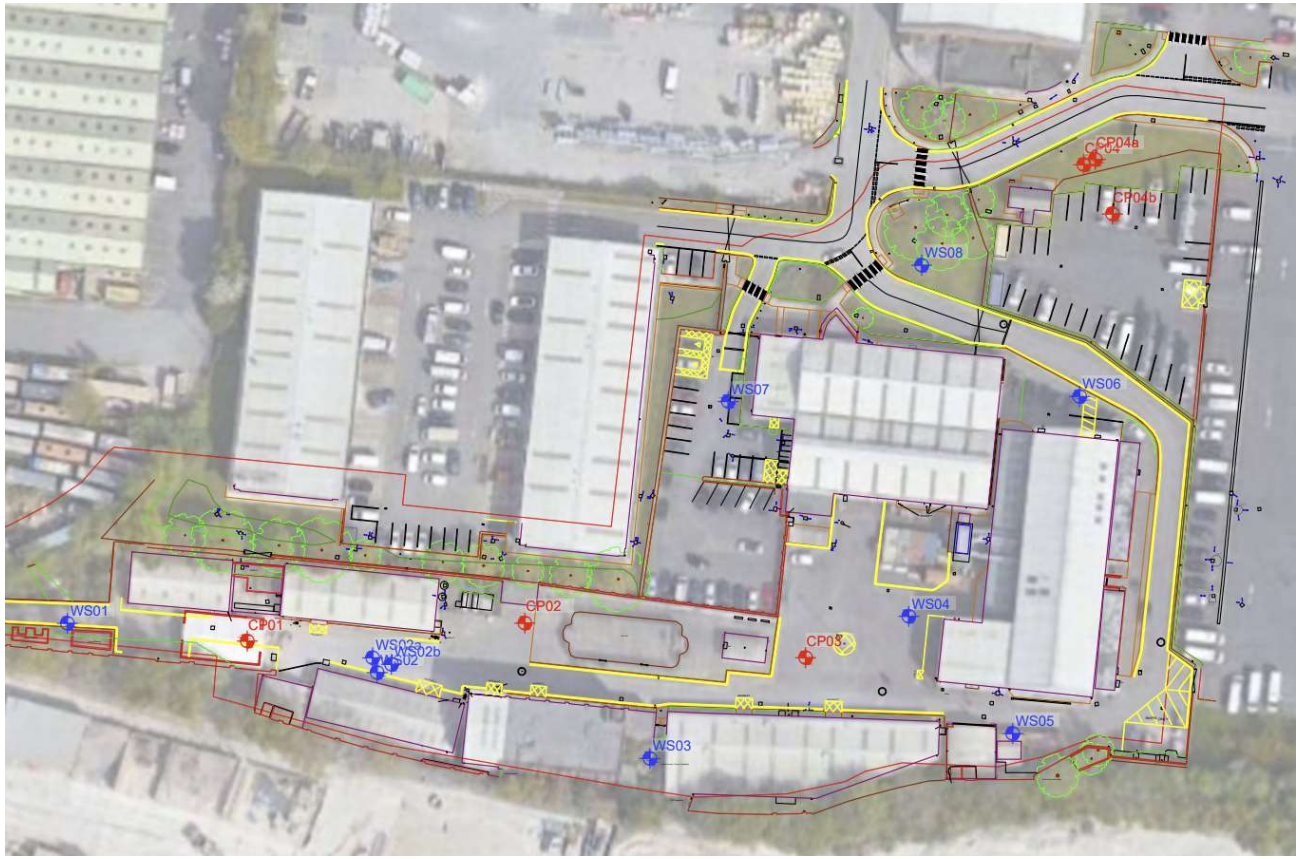
BH WS05a



SI Plan



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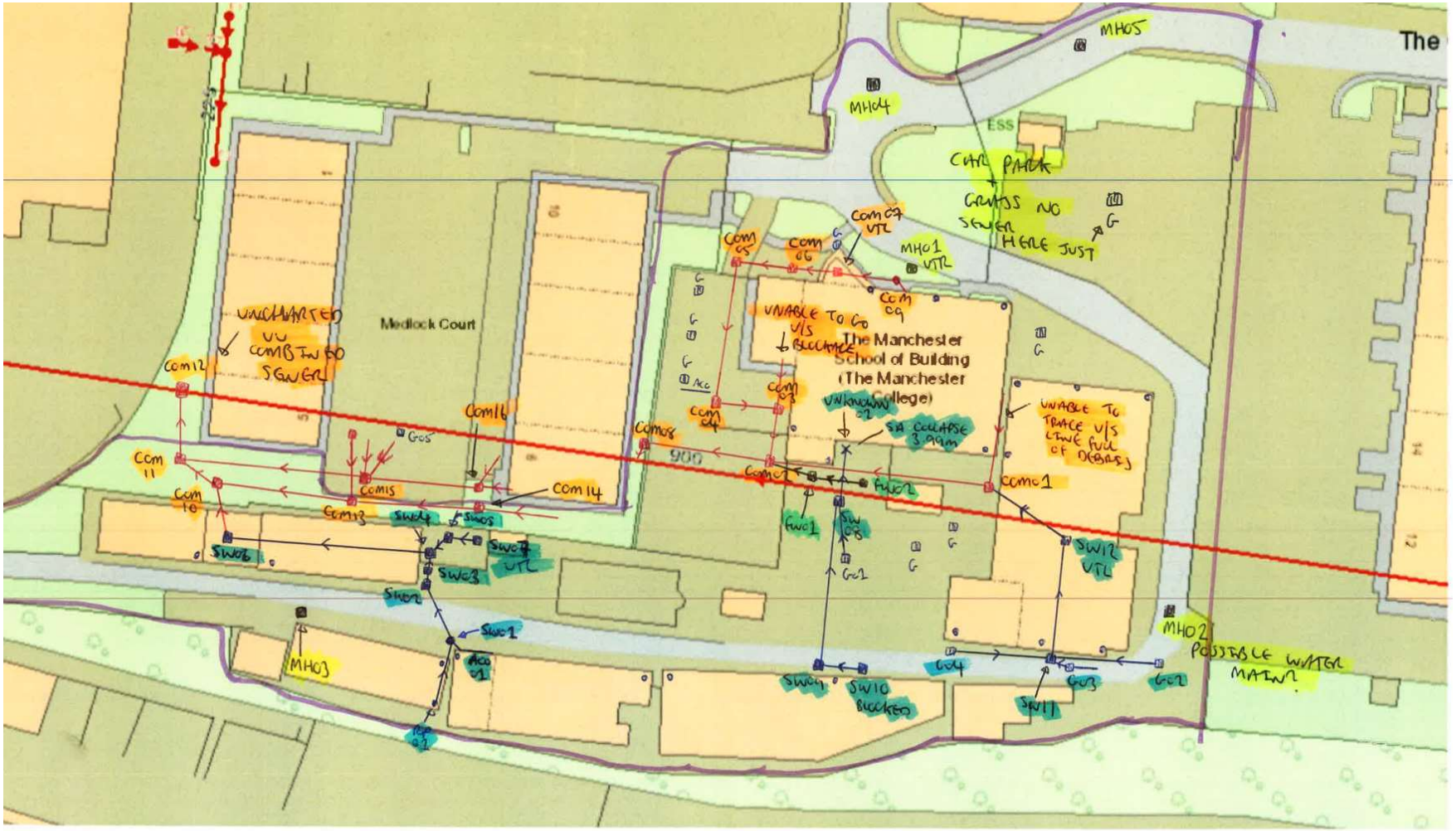
Extracts from Drainage Survey (June 2022)



• ← CIRCLES ON BUILDINGS = RAIN WATER PIPES

SWC8 = CATCH PIT

UNABLE TO SURVEY FWC2 FULL OF CLAY

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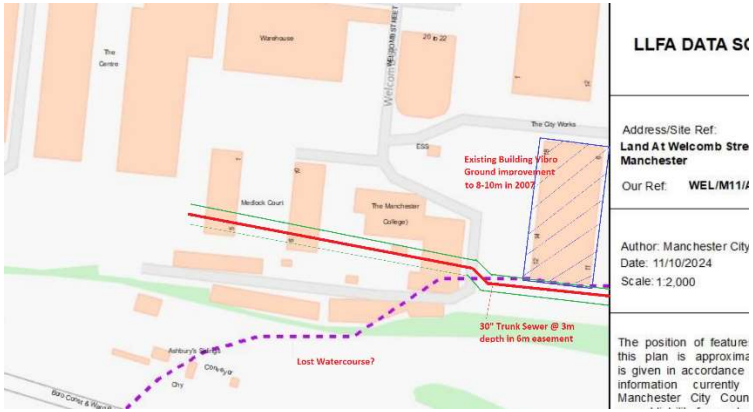
Extracts from MCC Level 2 Strategic Flood Risk Assessment (2011)

Critical Drainage Area Plan

Purple dashed line = Lost Watercourse
Orange solid line = Corn Brook Open Watercourse
Orange dashed line = Corn Brook Culverted Watercourse
Green line = Other Waterbodies

Groundwater Flooding Plan



MCC_WEL11-A-Dat (11/10/24)

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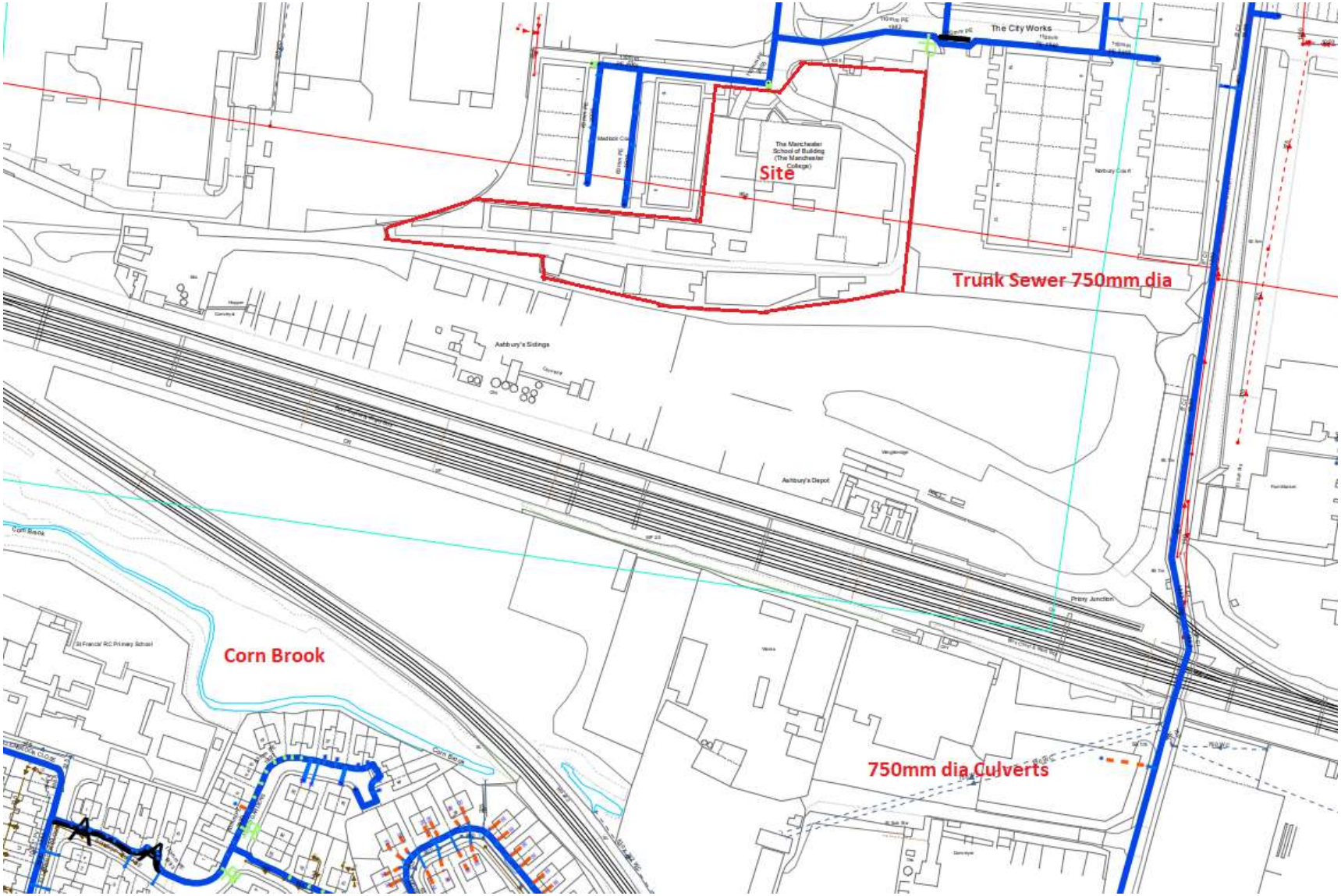
UU Sewer Map



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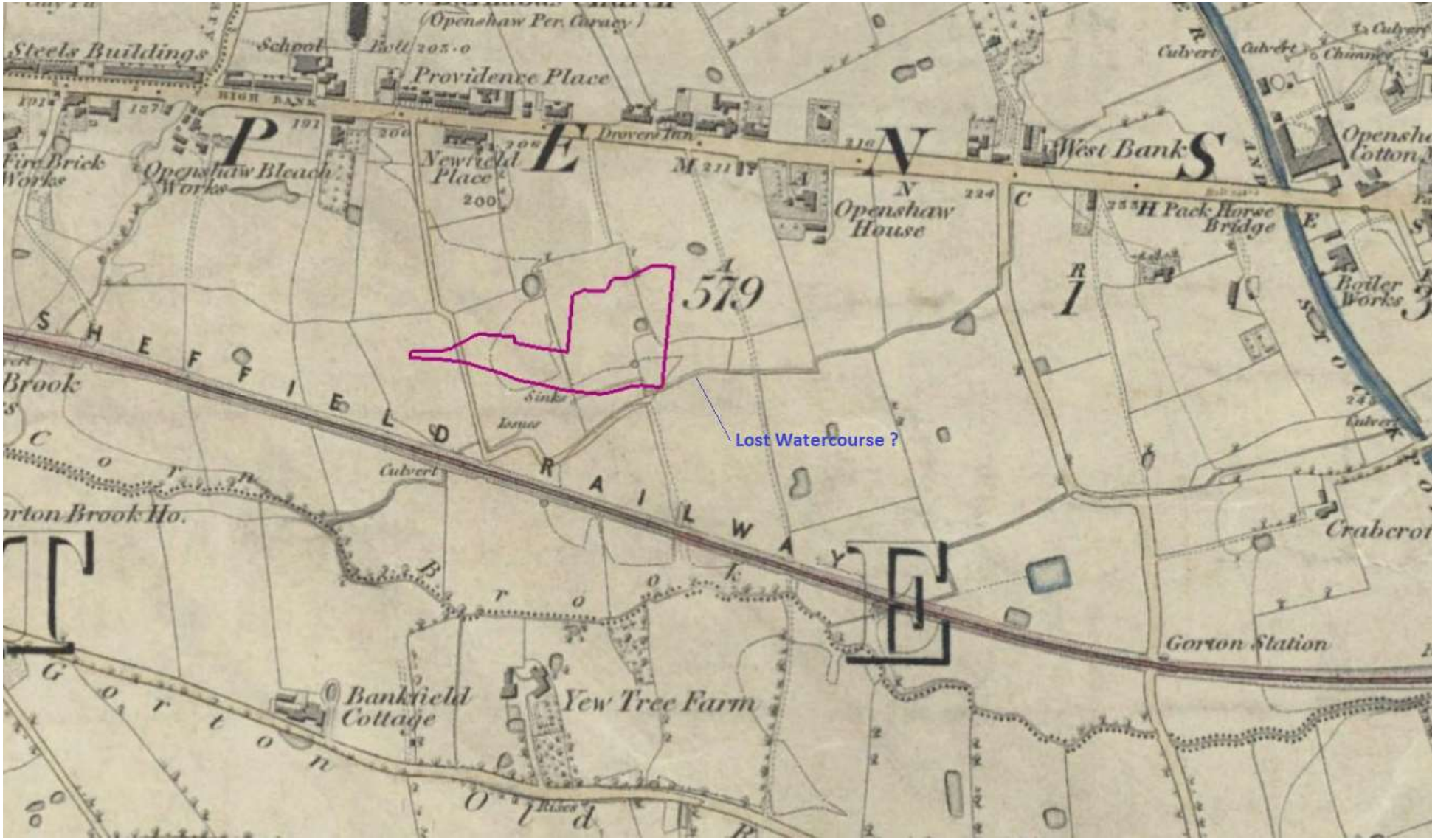
1845 OS Map



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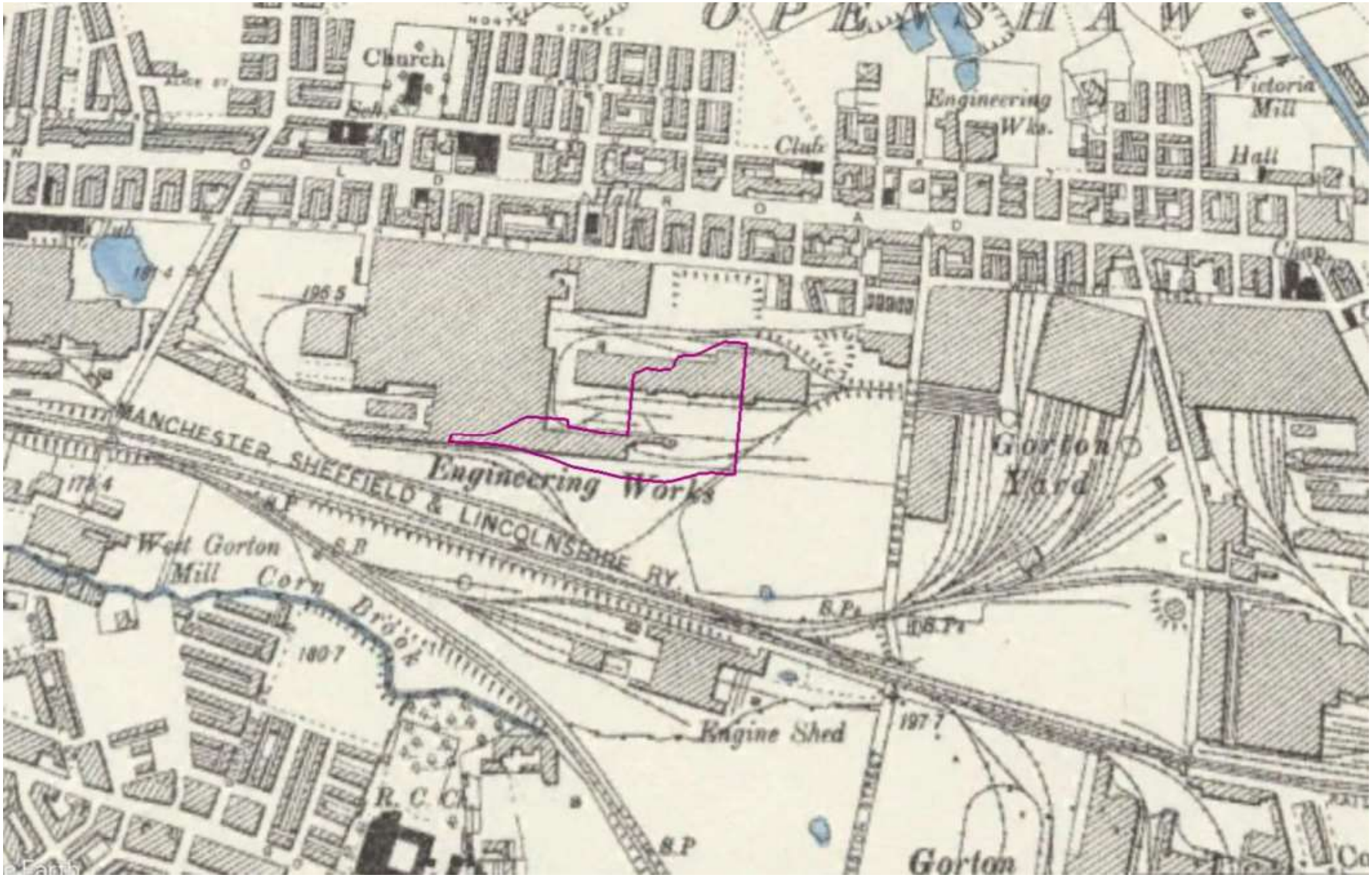
1888-1890 OS Map



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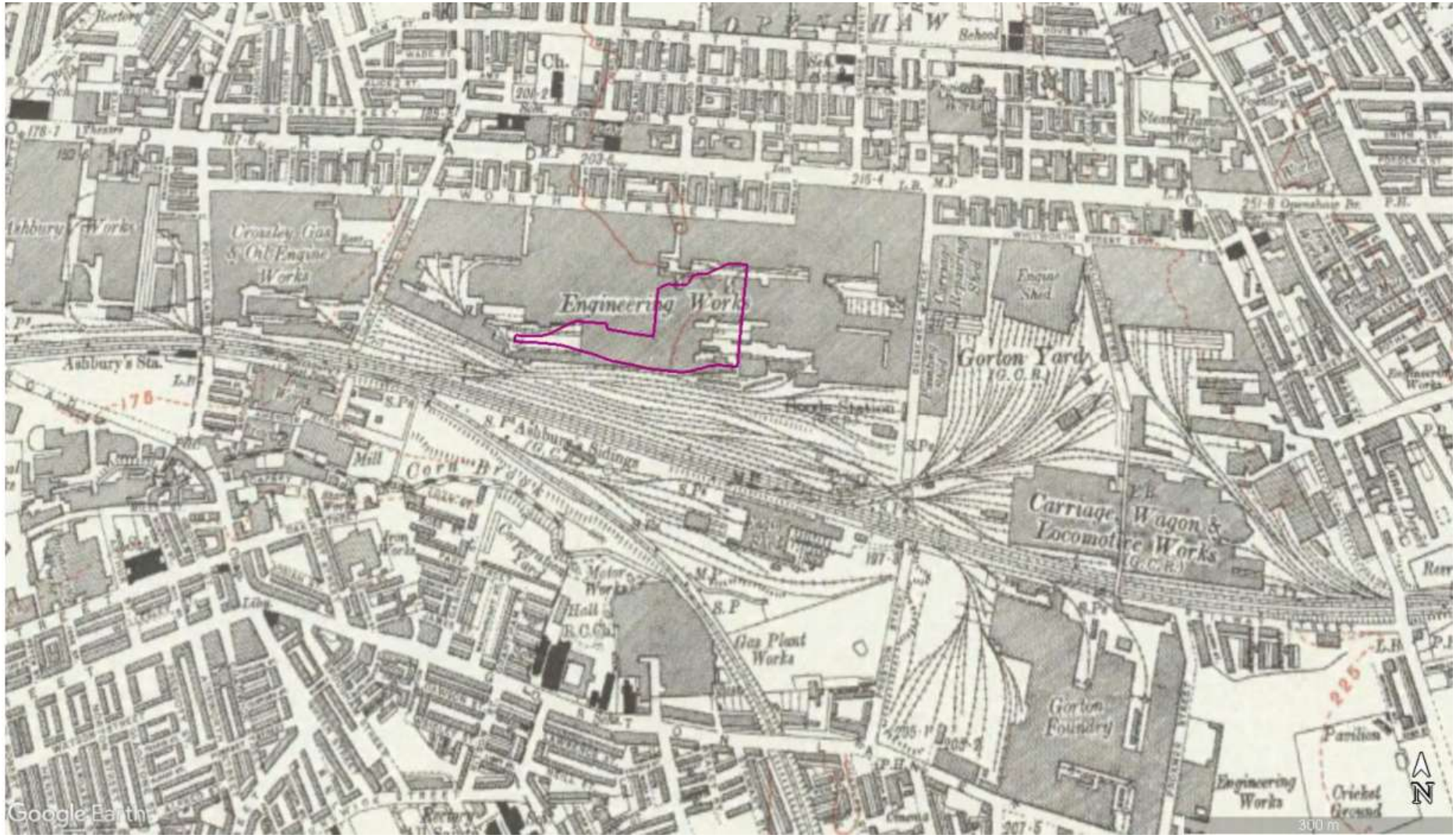
1915 OS Map Armstrong Whitworth Engineering Works



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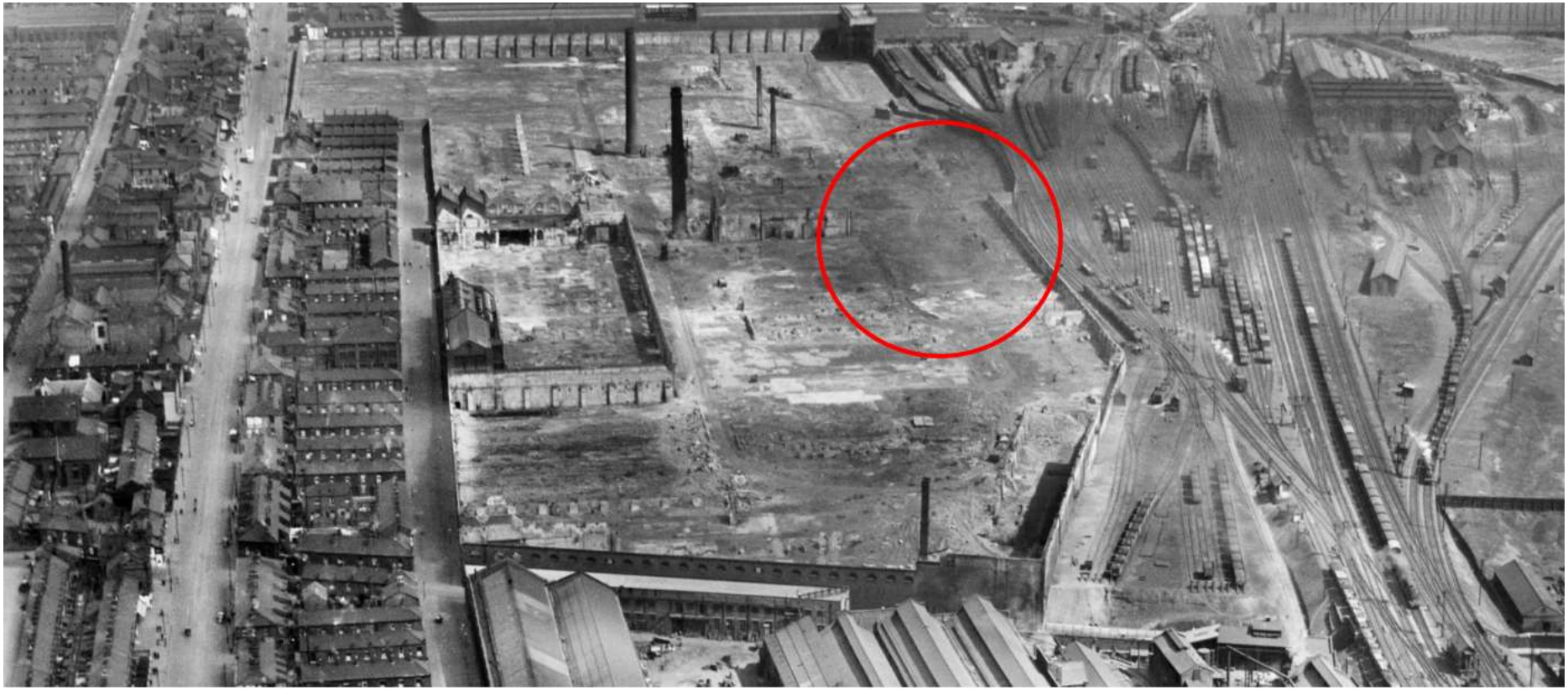
1936 Aerial Post demolition of Armstrong Whitworth Engineering Works



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1946 Aerial Crossley New Forge Complex

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Former Crossley New Forge Complex During MCC Ownership c2003