

06<sup>th</sup> October 2022

Bloor Homes North West  
2 - 4 Whiteside Business Park  
Station Road  
Holmes Chapel  
Cheshire  
CW4 8AA



## LAND OFF HOLLINGWORTH ROAD, LITTLEBOROUGH HYDROLOGICAL ASSESSMENT

We have undertaken a hydrological assessment of the site located off Hollingworth Road in Littleborough. The purpose of this exercise is to establish the pre-development hydrological characteristics of the site and to determine any mitigation that might be required to avoid drainage impact that could potentially result from the development proposals.

### SITE CONTEXT

The proposed development site is located on land off Hollingworth Road in Littleborough and covers 19.2ha. The Ordnance Survey National Grid Reference (OS NGR) for the site is E:393361, N:415522 and the nearest postcode is OL15 0AE (see Location Plan in **Appendix A**). The site is bounded to the north by Rochdale Canal and beyond is a railway and the River Roch. To the north-east of site is land that has planning permission for residential development (Ref: 11/D55085) and adjacent to the eastern boundary of site is Hollingworth Road. To the south is Lake Bank (road) with Hollingworth Lake beyond and to the west of site are residential dwellings, as illustrated within **Figure 1**.

### Existing and Historical Land Use

The development site is currently grazed agricultural land with no other historical land-uses being identified during the preparation of this report. The development site currently comprises low-density vegetation and taller shrubs/trees along the site boundaries. There are existing land drainage features such as ponds, located onsite and the Rochdale Canal is located adjacent to the northern boundary.

### Topography

A full topographical survey has been carried out and is included in **Appendix B**. The existing ground levels vary across the site, although there is a general fall from the south-east (179.36mAOD) to the north-west (157.65mAOD).

### Site Walkover

A site walkover was undertaken by Betts Hydro in March 2019 and identified that the site is irregular in shape and comprises agricultural grazing land. The eastern third of the site comprises grass with localised areas of reeds and waterlogged ground which increases in frequency as the site topography decreases from Hollingworth Road in the east, as illustrated within **Figure 1** (see onsite photographs included within **Appendix C**).

A track runs through the centre of the site north-south and bisects Lower Cleggs Wood Farm which is located in the centre of the site. The farm comprises a few buildings in various conditions (but generally poor), including a stone farmhouse and outbuildings, timber and steel framed corrugated metal clad outbuildings and sheds. To the north of the farm and to the west of the track a former small earth works/quarry appears to have been used to dispose of general farm waste with plastic sheeting visible at ground surface. The western third of site is covered in grass

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Old Marsh Farm Barns  
Welsh Road, Sealand  
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and the lack of reeds indicates that this area is better draining, residential housing borders the site to the west, with several roads (future access routes) terminating adjacent to the western boundary including Higher Bank Road and Brown Lodge Drive, as shown in **Figure 1**.

In the south of the site to the east of the track is a fenced area containing a static caravan and shed type building, to the east of this the land appears to be poorly draining with reeds present. To the south-east is a wooded area which leads into a council owned car park, which sits below the main 'dam' embankment for Hollingworth Lake.



Figure 1: Site Location and Features (Betts Hydro, 2022)



## HYDROLOGICAL ASSESSMENT

### Geology

The published online datasets of the underlying geology have also been reviewed to identify how favourable the underlying strata is for infiltration and if this would have an impact on the surrounding hydrology. The British Geology Survey (BGS) mapping data indicates the main ground conditions are composed of a bedrock of Pennine Lower Coal Measures Formation with superficial deposits of till, diamicton and sandstone.

The Cranfield Soil and AgriFood Institute (CSAI), Soilscape viewer identifies the soils to be slowly permeable, seasonally wet, acid, loamy and clayey soils. The underlying strata appears to suggest that permeability is low, and the FEH soil factor of 0.4 suggests a low permeability for the area (0.1 is very high and 0.5 is very low permeability). This suggests that the site had a low permeability pre-development and overland flows will occur during periods of prolonged rainfall, which corresponds with observations during the site walkover, as shown in **Figure 2**.



Figure 2: Photograph showing standing water taken during the walkover (Betts Hydro, 2019)

A ground investigation report undertaken by Betts Geo in 2019 (Ref; 18BLH008/GI) identified the topsoil was made ground comprising soft dark brown very sandy gravel clay. Below the made ground was peat within the area of the historical quarry suggesting the material above was reworked natural material. Soft becoming firm becoming stiff sandy gravelly brown/orange/grey Clay was encountered in the majority of trial pits between the depths of 0.2 and 3.5m+ (depth not encountered in all areas) underlain by weathered Sandstone. Localised bands of sand or

sand and gravel circa 1-2m in depth were encountered some areas within the clay glacial material.

#### Hydrogeology

High groundwater levels are usually the key source of groundwater flooding, which occurs when excess water emerges at the grounds surface. The EA mapping data for groundwater shows that the site is underlain by a Secondary A Bedrock Aquifer with Secondary (undifferentiated) superficial deposits. The site is also located within a Low Groundwater Vulnerability Zone to a Minor Aquifer.

No historical groundwater flooding of the site has been identified during consultation with the Environment Agency and the LLFA. Review of the councils' Strategic Flood Risk Assessment (SFRA) has not noted any specific flood risk associated with groundwater flooding to the site area.

#### Hydrology

The nearest Main River to site is the River Roch located 450m to the north of site. The mapping also identified Featherstall Brook (Main River) to be located 500m to the north of site and another Main River as designated by the EA to be located 600m to the south-east of site which is shown to flow through Hollingworth Lake. There are no Ordinary Watercourses located in close proximity to the development site.

Hollingworth Lake (reservoir) is on the southern side of Lake Bank (road) which bounds the site and is elevated in comparison to the majority of the existing ground levels onsite. Review of United Utilities sewer records also identified a LDTM Raw Water Main to cross the site from Hollingworth Lake (adjacent to the southern boundary of site) to the Rochdale Canal, located adjacent to the northern boundary of the site.

There is a pond located adjacent to the north-eastern boundary of the site and was observed during the site walkover; beyond this a 'crown hole' was identified by Betts Geo (Ref; 18BLH008/GI) possibly indicating the collapse of a culvert or drain. The former 'Clough Field Works/Refinery' borders the northeast of the site and is secured by 'heras' type fencing.

From review of the drainage strategy for the adjacent Vistry site (Ref; 11/D55085), the drainage plan for the former Clough Field Works/Refinery and site observations it is currently understood that surface water runs overland from the site north into the Vistry land where it is intercepted by existing slot drains which enter a larger piped network. This network then directs flows under the canal and outfalls into the River Roch, as illustrated in **Figure 3** (subsequently).

Supporting photographic evidence and plans have been included within **Appendix E**. This is further supported by the surface water flood risk mapping which shows areas onsite at high risk from surface water flooding are associated with a naturally low-lying depression acting as a conveyance route through site towards the adjacent Vistry development.



Figure 3: Existing Drainage Plan (Betts Hydro, 2022)

## CATCHMENT ANALYSIS

The site has been identified to be located within the catchment area for the River Roch, the FEH point, and catchment data has been obtained for the site via the FEH web service.

The key FEH catchment point data is displayed in **Table 1** on the subsequent page.

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Table 1: FEH Catchment Point Data (2022)

| Description     | Catchment Point Data |
|-----------------|----------------------|
| <b>SAAR</b>     | 1205mm               |
| <b>PROPWET</b>  | 0.57                 |
| <b>BFI HOST</b> | 0.403                |

It has however been identified that not all of the site drains into the River Roch, the pre-development catchments for the hydrologically important features have therefore been calculated using a review of the site-specific topographical survey, LiDAR and site observations. From review of the datasets, land adjacent to the northern boundary of site, coloured in yellow in **Figure 4**, drains via overland run-off into the Rochdale Canal. Areas located adjacent to the Vistry site (coloured in pink in **Figure 4**) drain into a piped system, which eventually outfalls into the River Roch, as previously discussed.

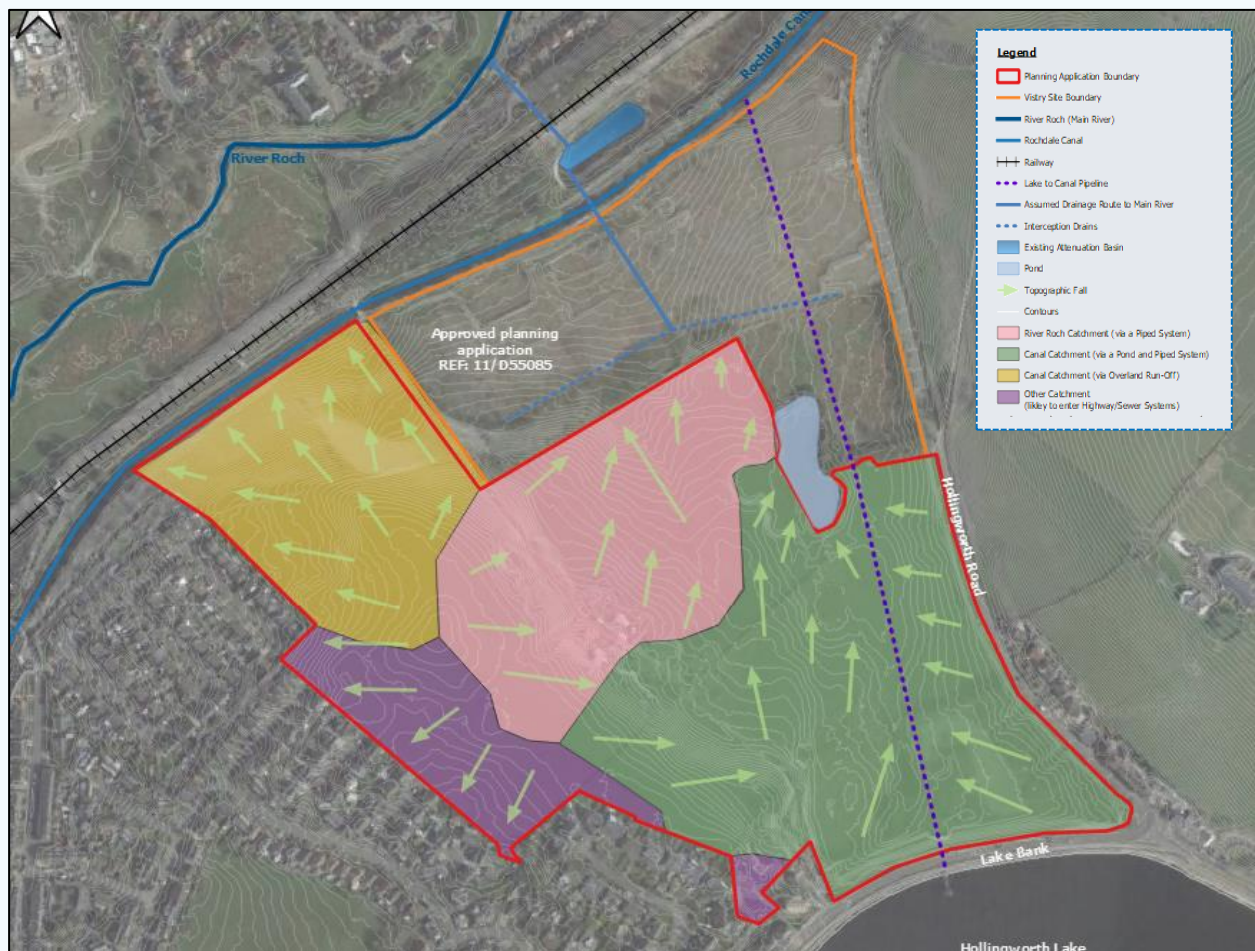


Figure 4: Catchment Analysis Plan (Betts Hydro, 2022)

Land located within the south-east of the site has been identified to drain into the pond located outside of the planning application boundary (coloured in green in **Figure 4**). This pond may potentially connect into the LDTM Raw Water Main or into the existing drainage network for the adjacent Vistry site, this would need to be confirmed by further drainage investigation. There is also some small areas onsite coloured in purple (**Figure 4**), which is land that has been identified to fall towards development areas, it is understood that any surface water run-off from these areas would be intercepted by Highway or Sewer Systems.

## PROPOSED CHANGES TO HYDROLOGY

Based on the development proposals the impermeable areas onsite will increase to 55% (6.813ha) of the development area (12.388ha). The new positive drainage system proposed to cater for the roads, roofs and areas of hard landscaping will intercept surface water runoff and formally discharge into the adjacent canal at a restricted rate of discharge as agreed in principle with the Canals & Rivers Trust. Any proposed public open space or undeveloped areas will be left to continue to discharge surface water run-off as they currently do so post-development. The proposals mean that there will be no detrimental increase or changes to the current run-off discharging into the downstream canal compared to the existing situation.

## SUMMARY

Overall, it has been identified that there are several hydrological features in proximity to site which play an important key factor in the drainage of the existing site. As previously discussed, the proposals are to ensure that the future development proposals on the site consider the existing drainage catchments onsite and propose a sustainable surface water management regime post development.

I trust that the above information has identified that the existing hydrology can be maintained in accordance with policy. If you have any further queries, please do not hesitate to contact us.

Yours sincerely



**Megan Berry** BSc (Hons) MCIWEM  
 Flood Risk Analyst

### Attached:

Appendix A – Location Plan  
 Appendix B – Topographic Survey  
 Appendix C - Site Photographs  
 Appendix D – Drainage Investigations  
 Appendix E – Existing Drainage Plan  
 Appendix F – Catchment Plan and Data

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 Flintshire CH5 2LY  
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**APPENDIX A – LOCATION PLAN**

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## Location Plan

DATE: 14.02.2024  
SCALE: 1:1250 @ A1  
DRAWN: TJW  
CHECKED: RTD



Drawing No. NW111-PD-1002

# Hollingworth Rd, Littleborough

## APPENDIX B – TOPOGRAPHIC SURVEY

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## APPENDIX C – SITE PHOTOGRAPHS

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## APPENDIX D – DRAINAGE INVESTIGATIONS

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56

70

71

IF THIS AREA IS DEVELOPED IT SHOULD  
BE ON A SEPERATE SYSTEM WITH THE  
FOUL FLOW S GOING TO MANHOLE 973 (ON SHEET 50)  
AS THIS BYPASSES THE SSO

50

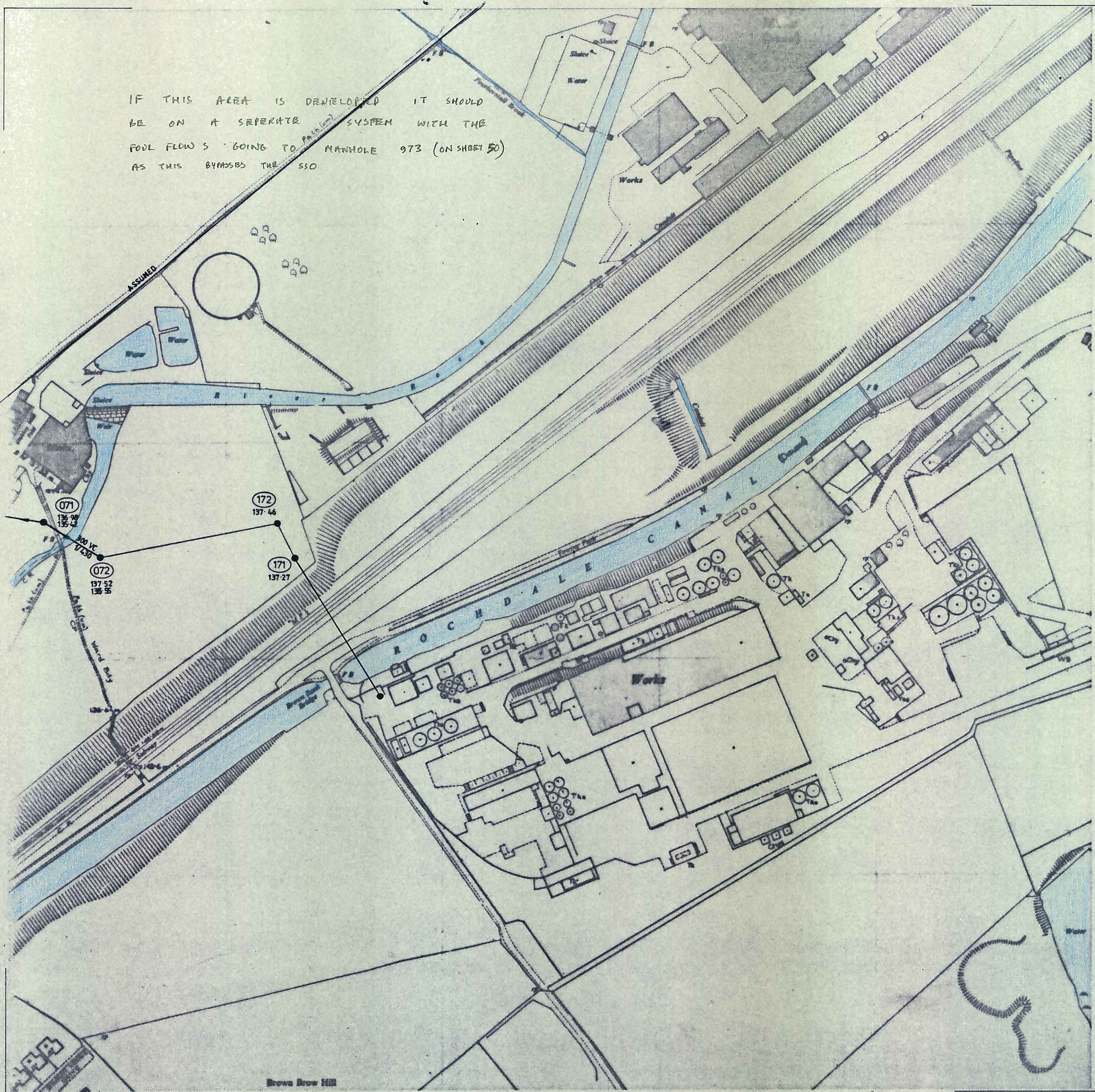
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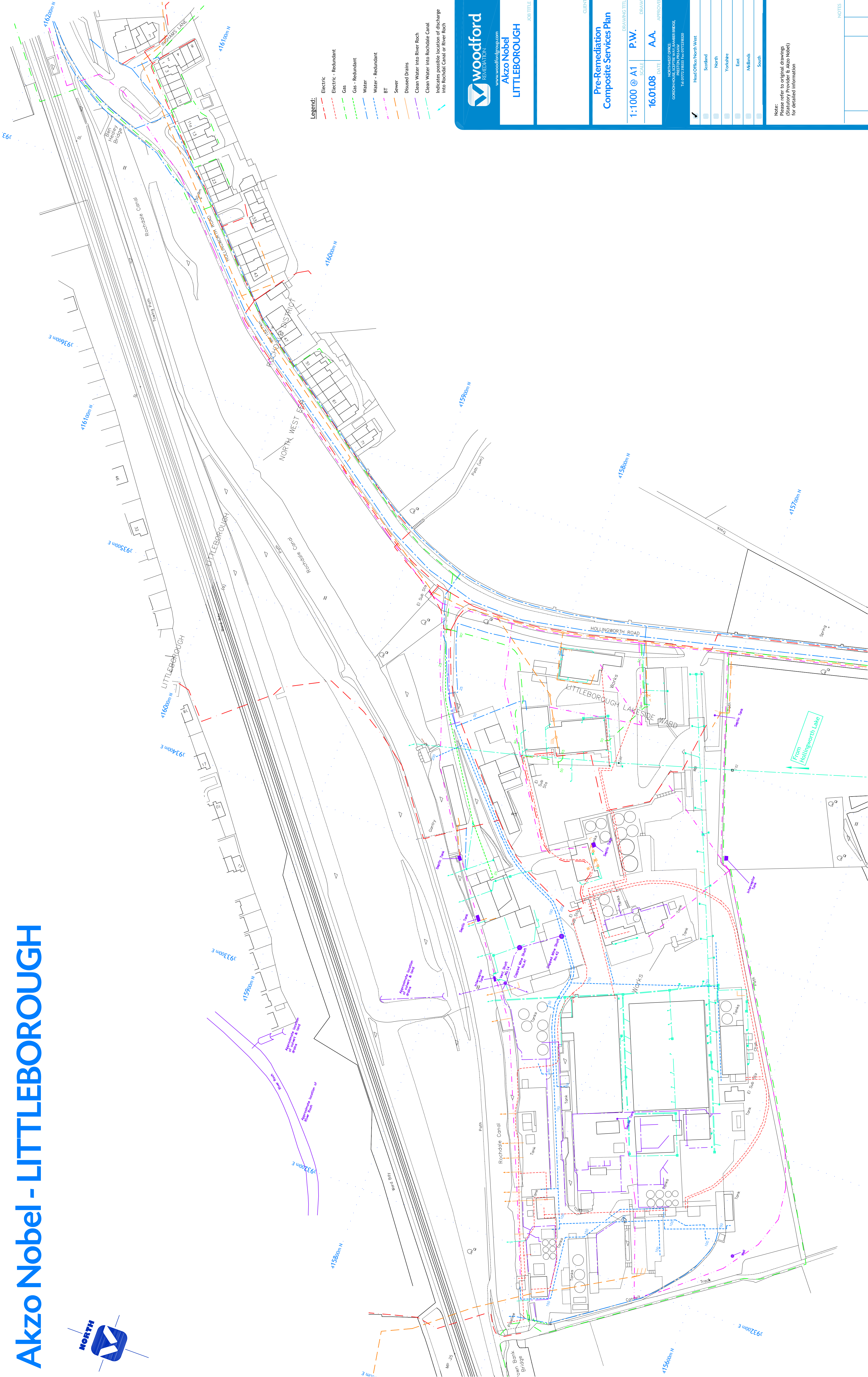
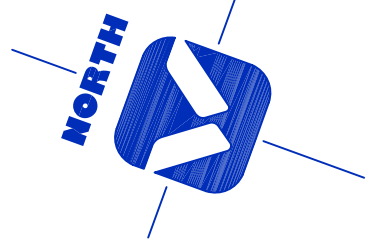
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9315NW





# Akzo Nobel - LITTLEBOROUGH



- Legend:**
- Electric
  - Electric - Redundant
  - Gas
  - Gas - Redundant
  - Water
  - Water - Redundant
  - BT
  - Sewer
  - Disused Drains
  - Clean Water into River Roch
  - Clean Water into Rochdale Canal
  - Indicates possible location of discharge into Rochdale Canal or River Roch



www.woodfordrem.com  
**Akzo Nobel**  
**LITTLEBOROUGH**

JOB TITLE

CLIENT  
**Pre-Remediation  
Composite Services Plan**

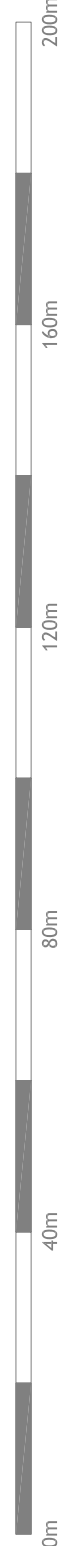
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WOODFORD REMEDIATION  
GORDON HOUSE, SCOTCH WAY, LAMBERT BARDE,  
LEICESTER, LE19 5JH  
Tel: 01772 34555 Fax: 01772 34530

|                                     |                        |
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| <input type="checkbox"/>            | Scotland               |
| <input type="checkbox"/>            | North                  |
| <input type="checkbox"/>            | Yorkshire              |
| <input type="checkbox"/>            | East                   |
| <input type="checkbox"/>            | Midlands               |
| <input type="checkbox"/>            | South                  |

Note:  
Please refer to original drawings  
for details of the Akzo Nobel  
for detailed information

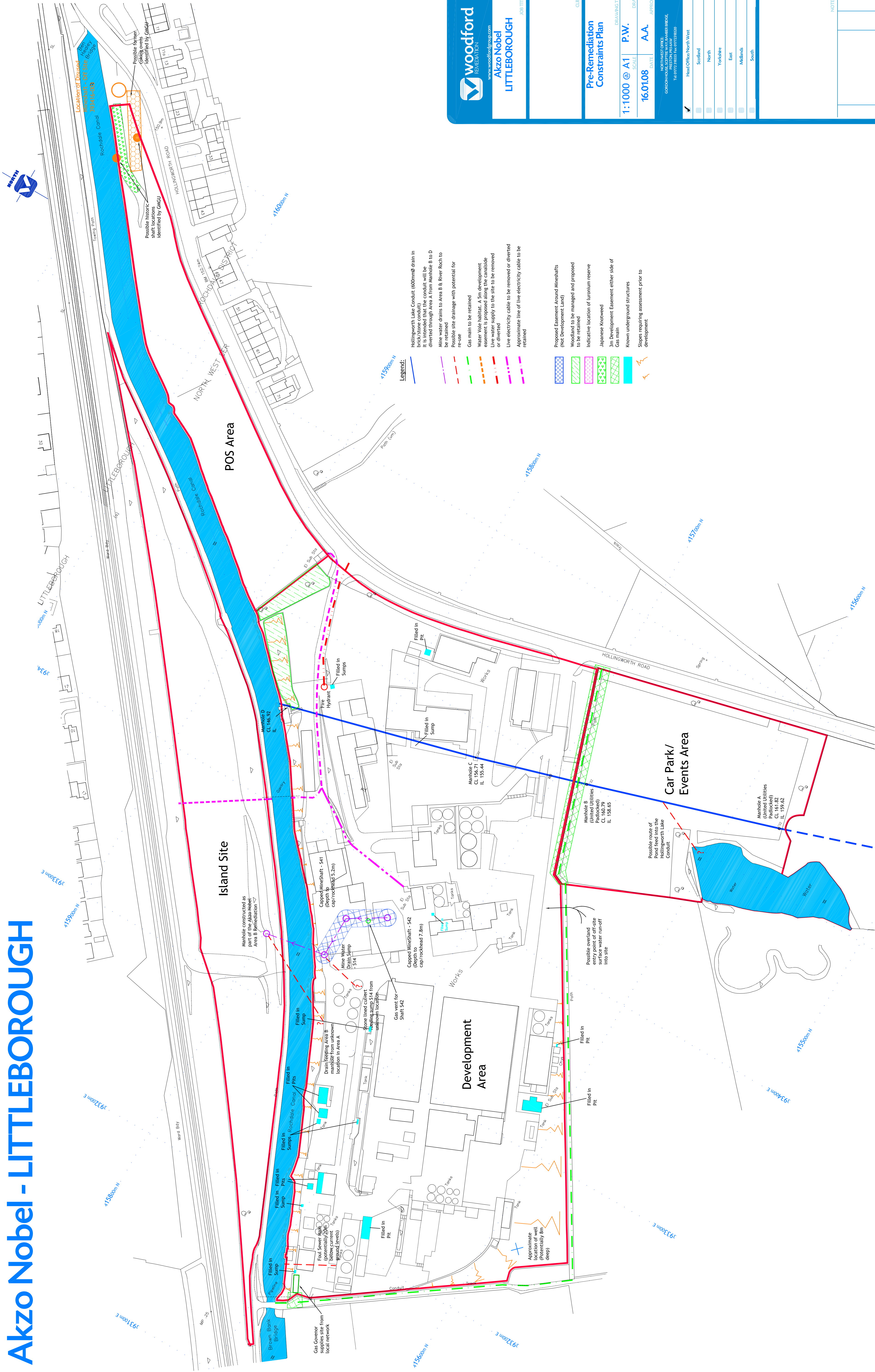
NOTES



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|------|------|-------------|-------------|------|------|
| W789 | 23   | PROJECT No. | DRAWING No. | REV  |      |



# Akzo Nobel - LITTLEBOROUGH



www.woodfordremediation.com

AKZO NOBEL  
LITTLEBOROUGH

JOB TITLE

CLIENT  
**Pre-Remediation  
Constraints Plan**

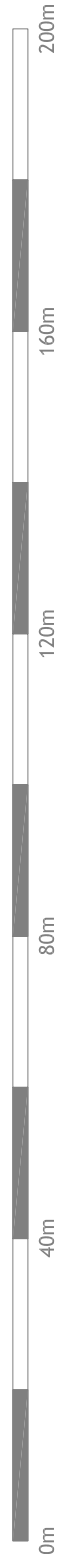
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| APPROVED      |      |

NOTES  
GORDON HOUSE, SCOTCH WAY, LAMAR BRIDGE,  
LITTLEBOROUGH, LANCASHIRE, LA1 1JY  
141 8772 34553 Fax 01273 8320

|   |                        |
|---|------------------------|
| ✓ | Head Office/North West |
| ☐ | Scotland               |
| ☐ | North                  |
| ☐ | Yorkshire              |
| ☐ | East                   |
| ☐ | Midlands               |
| ☐ | South                  |

| NOTES |                                         |
|-------|-----------------------------------------|
| A     | 10-04-08<br>Mineshaft Easements amended |
| REV   | DATE                                    |

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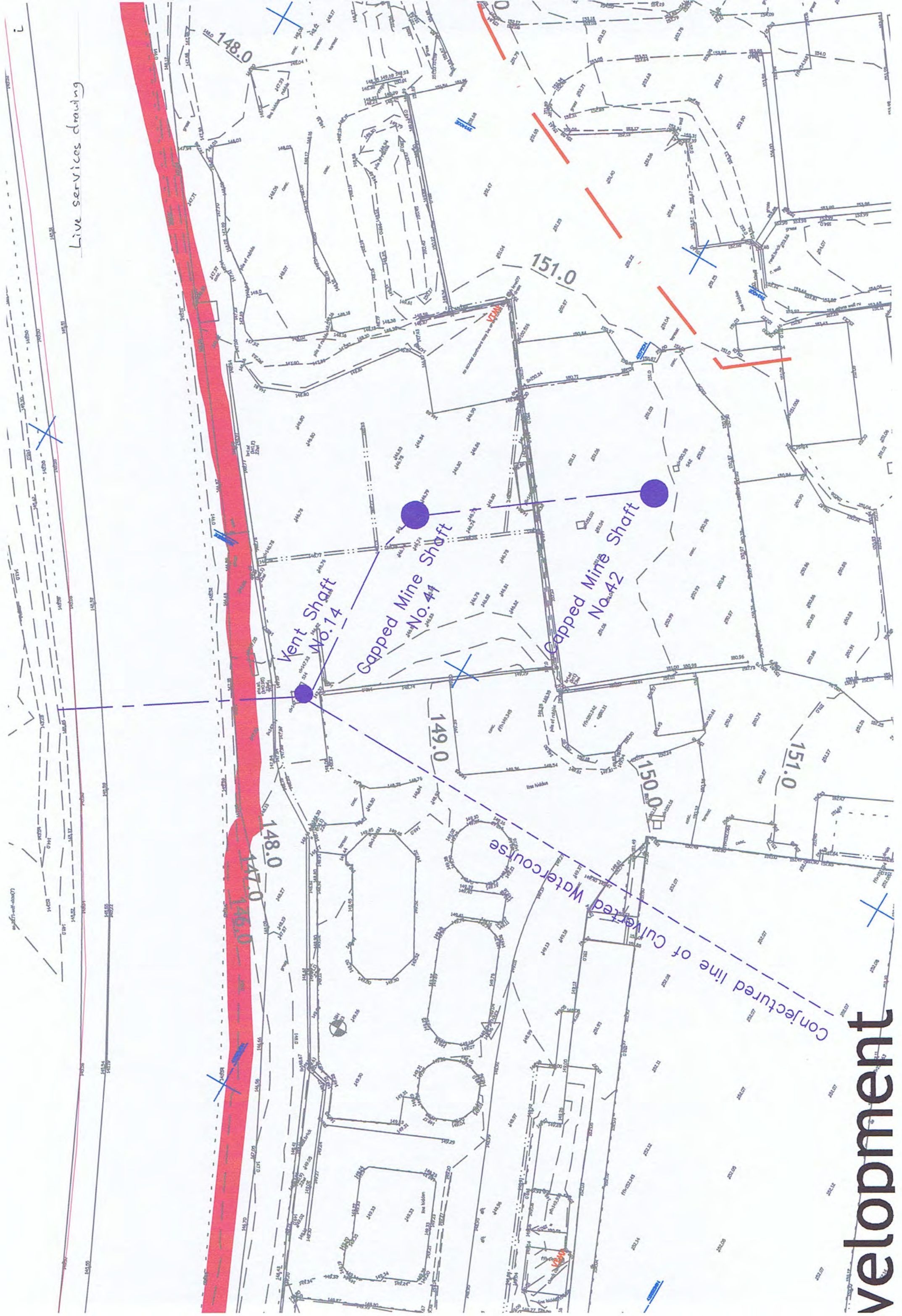






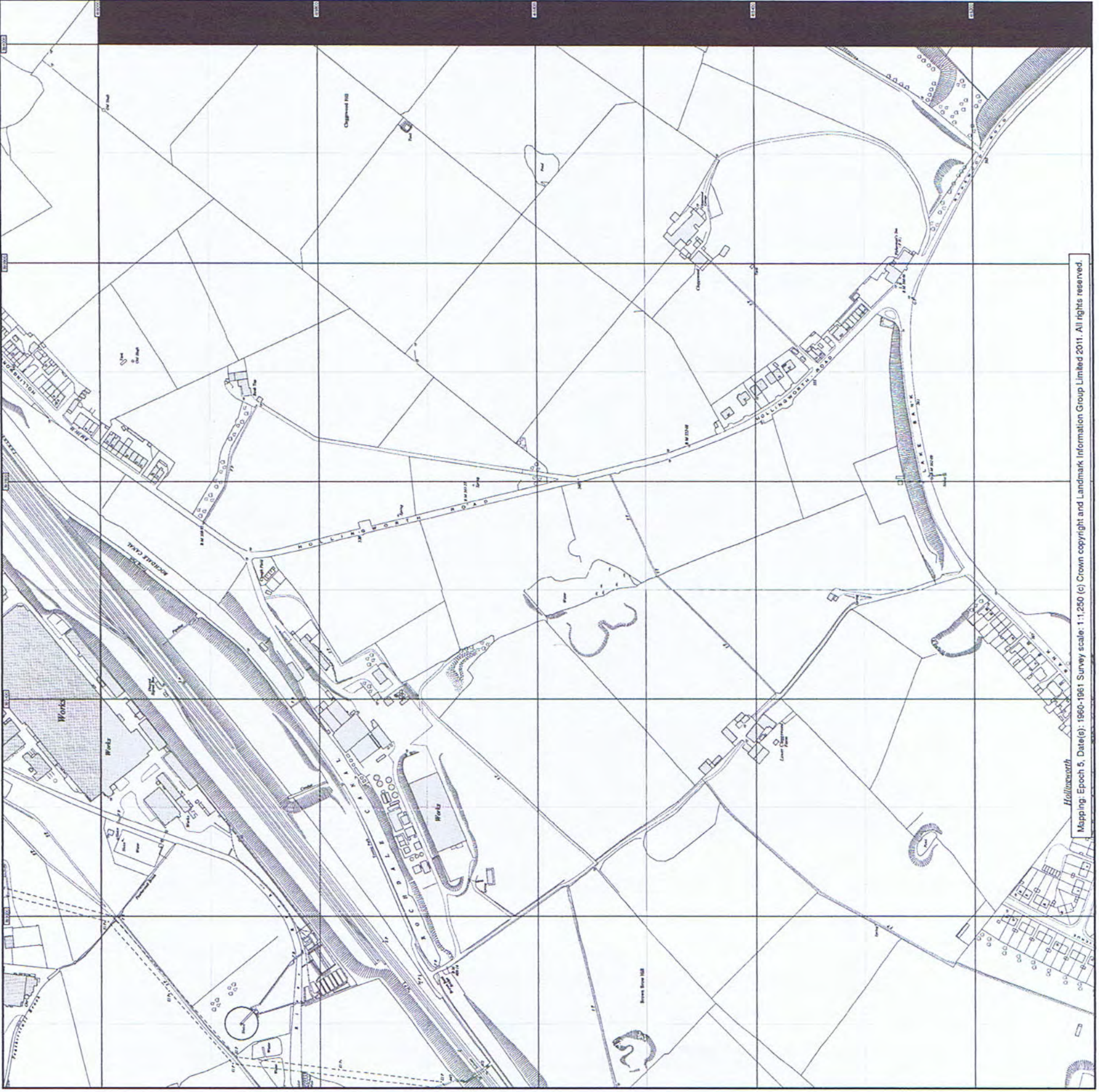


Live services drawing



development





Landmark Historical Map  
Mapping: Epoch 5  
Published Date(s): 1960-1961  
Originally plotted at: 1:1,250





**Drainrite Environmental Services Limited**  
Suite 11, Kirkless House, Kirkless Industrial Estate, Cale Lane, Wigan. WN2 1HF.  
*Tel. (01942) 230023 (24 Hours). Fax. (01942) 230024.*

**Report for the Man Entry Chamber Inspection of**  
**SW MH S14.**

**Site : Former Akzo Nobel Site, Hollingworth Road,**  
**Littleborough, Rochdale.**

**Client : Woodford Group / Countryside**  
**Properties.**

Document Ref : GL1382/MAB

13 August 2015

*Compiled By : Michael A. Bent*



## **General**

A Man Entry Inspection Survey of the MH Chamber was carried out on 20 July 2015.

The inspection was carried out in accordance with the 2013 Confined Spaces Regulations as detailed in the Method Statement.

The weather conditions at the site on the day of the inspection were dry and warm. No rain was predicted at all that day.

Initial Gas Testing of the chamber showed a low level of Oxygen (Approx 15%). Clearance of the Pond Outlets allowed the water levels to drop and for the atmosphere in the chamber to move and be replenished. After approximately 2hrs, the Oxygen level has increased to the correct level of 20.9%.

## **Basic Construction**

A drawing showing a section through the chamber and each landing level plan is attached. The drawing does not include the hand rails and ladders for clarity.

The chamber is constructed from PCC Rings and PCC bolted sections.

There are 2 No. light duty grade metal access covers on the chamber.

One 600x600mm square access for Man Entry purposes.

One 1200x1200mm double cover which allows straight down access to the base of the chamber for works.

There are 3 landing levels in the chamber and the 600x600mm, man entry access holes in each level are staggered from each other.

Access from the Surface to Level 1 is via. plastic coated, studded metal foot irons which are fixed into the MH ring. There are 2 No., 1m deep, 3m diameter MH rings at the first level. There is a mastic seal between the 2 MH rings.

There is a GRP, bolted safety handrail fitted at Level 1 which has a gap in the middle. The gap is crossed and secured with removable stainless chains.

Access from Level 1 to Level 2 is via. a stainless ladder bolted into the chamber wall.

The construction at Level 2 down to the base of the chamber is via. bolted PCC sections. A 900mm high, cast in-situ wall has been built in the corner of the chamber. The position and size of the wall is indicated on the drawing. This wall forms a small pocket chamber which has a 225mm outlet pipe. The outlet pipe discharges into the sump below. The base of this pocket chamber is benched to allow water to drain into the outlet pipe.

There is a Stainless, bolted safety Handrail fitted at Level 2. Two removable safety chains protect the ladder access to Level 3.



Access from Level 2 to Level 3 is via. a stainless ladder bolted into the chamber wall. The construction at Level 3 is via. bolted PCC sections and the chamber is split into two halves.

In one half, a 375mm diameter, SW pipe flows through the base of the chamber and the base is benched around this pipe.

In the opposite half of the chamber is a sump, into which flows a 300mm SW pipe and the 225mm pipe from the pocket chamber at level 2 above. The 300mm pipe was not flowing at the time of the inspection.

Separating the two halves is a 500mm high, 290mm wide wall (measured from the top of the 375mm pipe benching) with a 400mm wide, 300mm deep notch cut into it at the mid point. The water level in the sump side of the chamber is governed by the bottom of the notch in the wall. When flow enters the chamber from the 300mm inlet pipe, the level in the sump side of the chamber rises and overflows the notch into the 375mm pipe.

There is a stainless ladder fixed to the separating wall which allows access into the sump.



## **Condition Report**

### **Surface Level**

There was some build-up of surface vegetation which was cut back from the chamber slab prior to carrying out the inspection.

The chamber access covers are lightweight in duty and non locking. Consideration should be given to replacing them with heavier duty, locking types to prevent as far as possible, any unauthorised entry.

The Cover Slab of the chamber appears to be in good condition.

### **Level 1**

The access foot irons are in good condition with no visible deterioration. All were tested and are secure.

Water infiltration and associated scaling has occurred at Level 1 of the chamber. Water appears to be ingressing at the joint between at the top most MH ring and the reducing slab. Some of the grouted up lifting holes in the MH rings are weeping slightly.

The mastic seal is intruding by approximately 50mm along the entire perimeter of the chamber, although there was no visible infiltration. The landing at Level 1 is secure and clean. The GRP safety hand rails are secure and in good condition.

### **Level 2**

The stainless ladder from Level 1 to Level 2 is in good condition and is secure. The landing at Level 2 has some debris (stones and broken masonry) which does not appear to have been part of the original chamber structure. The reducing slab structure appears to be in good condition.

The wall forming the pocket chamber is in good condition as is the outlet pipe and concrete benching.

There is infiltration through some of the PCC bolted sections and minor rusting of the bolts and fasteners. None appeared to be missing or broken at the time of our inspection.

The stainless hand rails and chains are secure and in good condition.

### **Level 3**

The stainless ladder from Level 2 to Level 3 is in good condition and is secure. The benching around the 375mm pipe has a thin layer of greasy material and slime. A bag (possibly rat control) is lying on the benching.

There is some infiltration at the side of the inlet pipe on top of the benching. The area is blackened.



The 375mm channel is lined with an ochre deposit and is clearly visible in the photographs. There was very little loose debris in the channel in the pipe at the time of the inspection. The water level in the channel was fast moving ( $>0.5\text{m/s}$ ) and at approximately 30% level.

The separating wall appears to be in good condition and the notch is sharply defined.

The Sump was not easily inspected due to the water level, however the chamber base appears to be benched as shown on the drawing. The level of silt in the chamber was not easily determined but appears to be 300mm – 400mm deep at the base of the chamber.

The stainless ladder into the sump is in good condition and was tested at the top rung only. It appeared to be safely fixed.

### **Photographs**





Views from Surface Level  
to Level 1 and Chamber  
Base





Views From Surface Level to Level 1  
Landing



View from Level 1 to underside of MH cover.







View from Level 1 of MH rings showing infiltration.

Level 1 Access Ladders



Views of Infiltration from Cover Slab at Level 1







View from Level 1 through to Level 2







Views from Level 2 Landing  
Showing Debris, Ladders and  
Cover Slab above.







View of Access Ladder to Level 3, Hand  
Rails and Safety Chains.

‘Pocket Chamber’ Walls.







Typical Detail of PCC Bolted Sections and Fasteners.

Pocket Chamber Outlet Pipe







Views from Level 2

Foot of Ladder and Outlet Pipe at Level 3







225mm Drop  
Pipe



Views of MH Walls at Level 3







375mm Inlet Pipe and Channel

300mm Inlet Pipe into Sump and 225mm Drop Pipe.

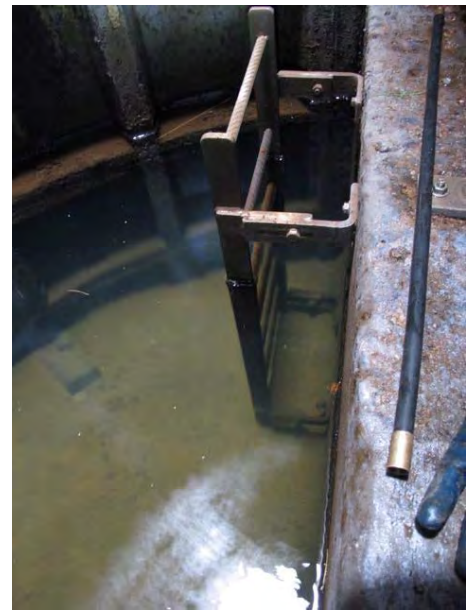


Notch in Dividing Wall





View into Sump



Outlet Pipe

Channel

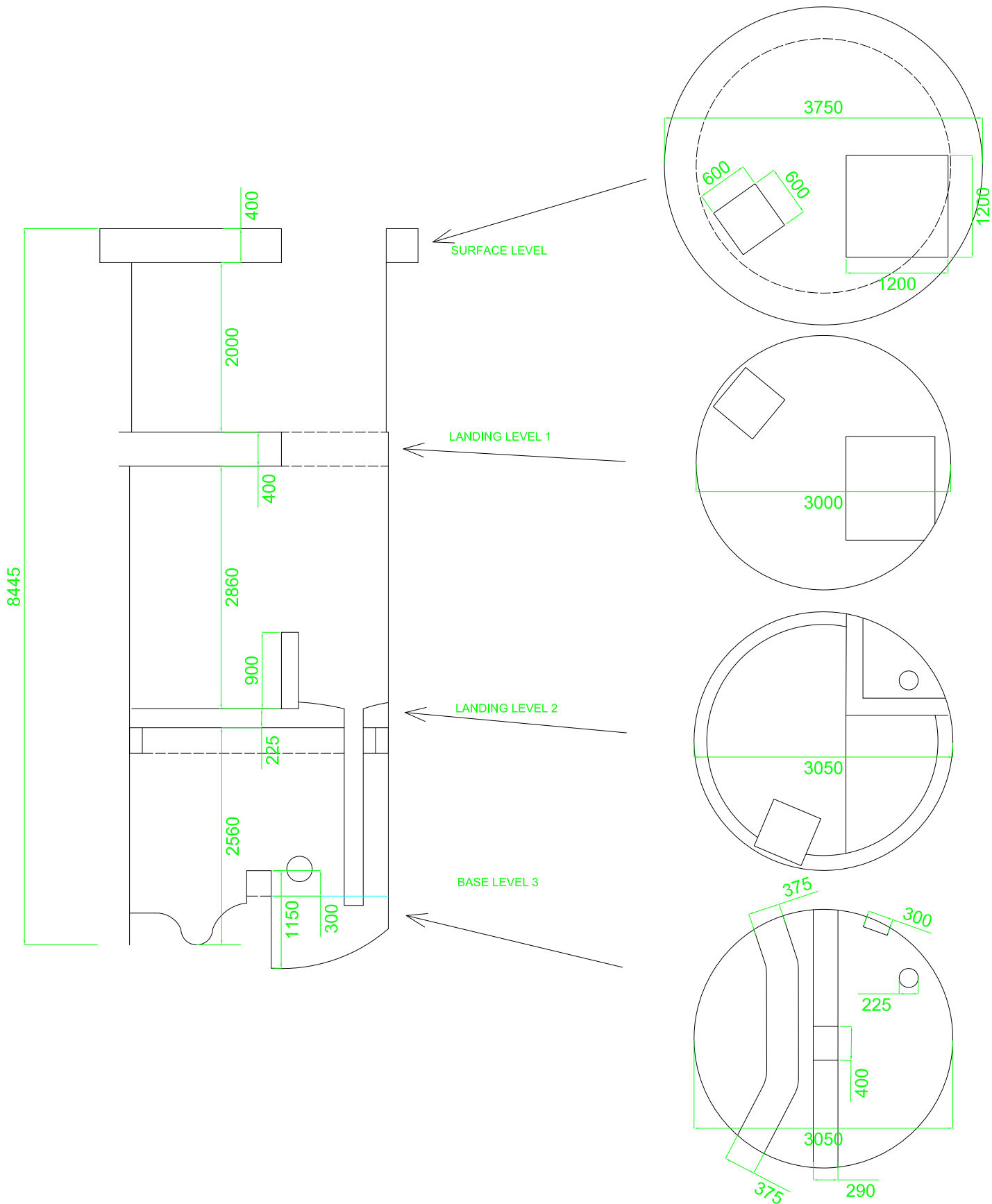


Access Ladder

Outlet Area









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## APPENDIX E – EXISTING DRAINAGE PLAN

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DO NOT SCALE

Legend

- Planning Application Boundary
- Vistry Site Boundary
- Railway
- Topographic Fall
- Contours
- Pond
- Existing Attenuation Basin
- Reeds
- Waterlogged Ground
- Main River
- Canal
- Lake to Canal Pipeline
- Interception Drains
- Assumed Drainage Route to Main River

| REV             | DATE     | BY | DESCRIPTION           | CHK |
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| A               | 23/09/22 | MB | PRELIMINARY FOR ISSUE | RDN |
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**BETTS HYDRO**  
CONSULTING ENGINEERS

Unit 6, Old Marsh Farm Barns, Welsh Road, Sealand, Flintshire CH5 2LY  
Tel: 01244 288178 enquiries@betts-associates.co.uk



PROJECT:  
HOLLINGWORTH ROAD  
LITTLEBOROUGH

TITLE:  
EXISTING DRAINAGE PLAN

|             |               |        |          |
|-------------|---------------|--------|----------|
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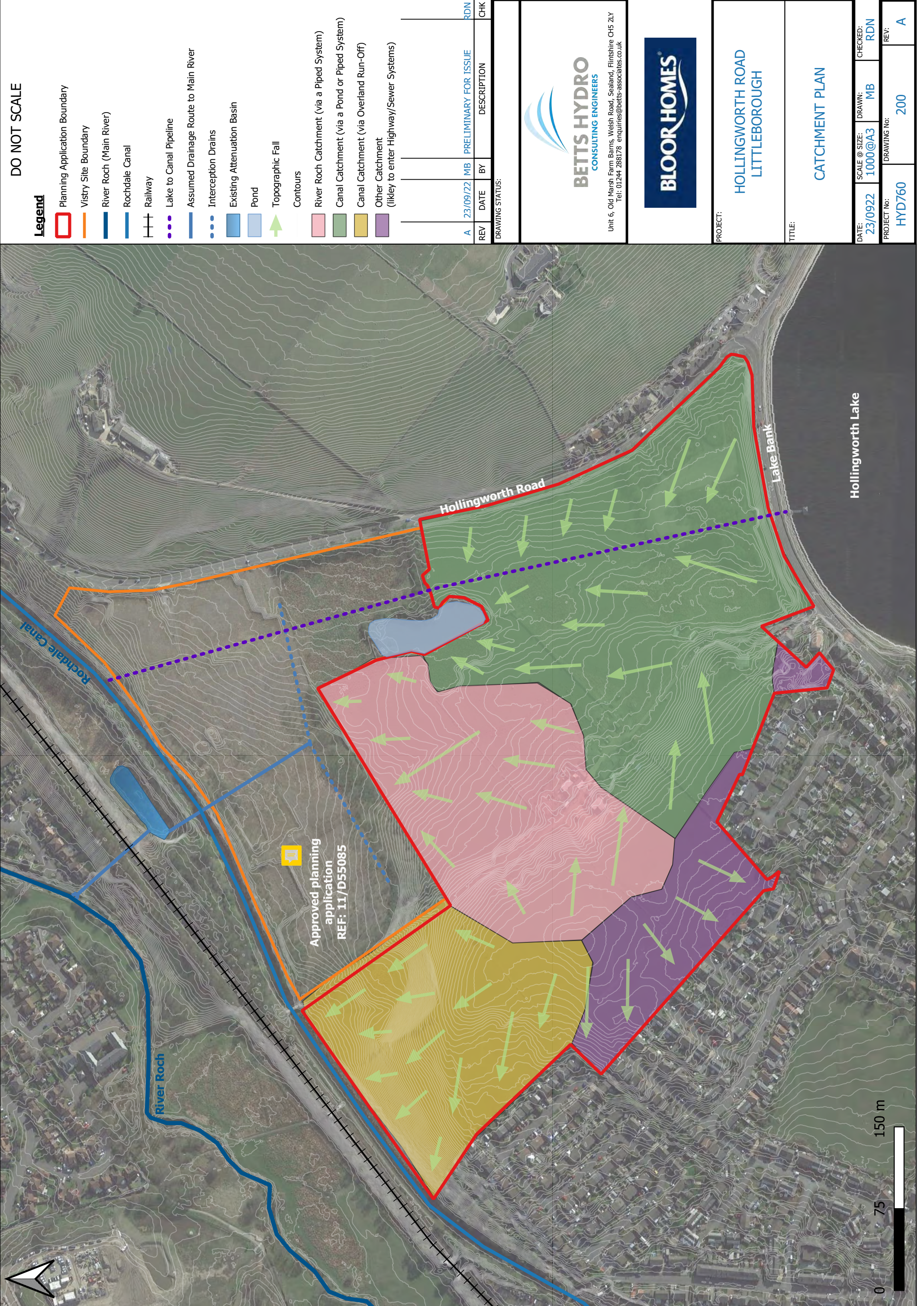


## APPENDIX F – CATCHMENT PLAN AND DATA

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DO NOT SCALE

Legend

- Planning Application Boundary
- Vistry Site Boundary
- River Roch (Main River)
- Rochdale Canal
- Railway
- Lake to Canal Pipeline
- Assumed Drainage Route to Main River
- Interception Drains
- Existing Attenuation Basin
- Pond
- Topographic Fall
- Contours
- River Roch Catchment (via a Piped System)
- Canal Catchment (via a Pond or Piped System)
- Canal Catchment (via Overland Run-Off)
- Other Catchment (likely to enter Highway/Sewer Systems)

| REV             | DATE     | BY | DESCRIPTION           | CHK |
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| DRAWING STATUS: |          |    |                       |     |

**BETTS HYDRO**  
CONSULTING ENGINEERS

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|                                    |               |        |          |  |
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| PROJECT:                           |               |        |          |  |
| HOLLINGWORTH ROAD<br>LITTLEBOROUGH |               |        |          |  |
| TITLE:                             |               |        |          |  |
| CATCHMENT PLAN                     |               |        |          |  |
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