



# Drainage Report

Bowlee Park Golf Range | Heywood Old Road

Birch | Middleton | Rochdale | M24 4TH

April 2025

## Document Control Sheet

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**Project Name:** Bowlee Park Golf Range, Heywood Old Road,  
Birch, Middleton, Rochdale, M24 4TH

**Project Number:** 062D22

**Client:** Philip Wright Associates

## Issue Record

| Revision | Date       | Status      | Comment            |
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|          |            |             |                    |

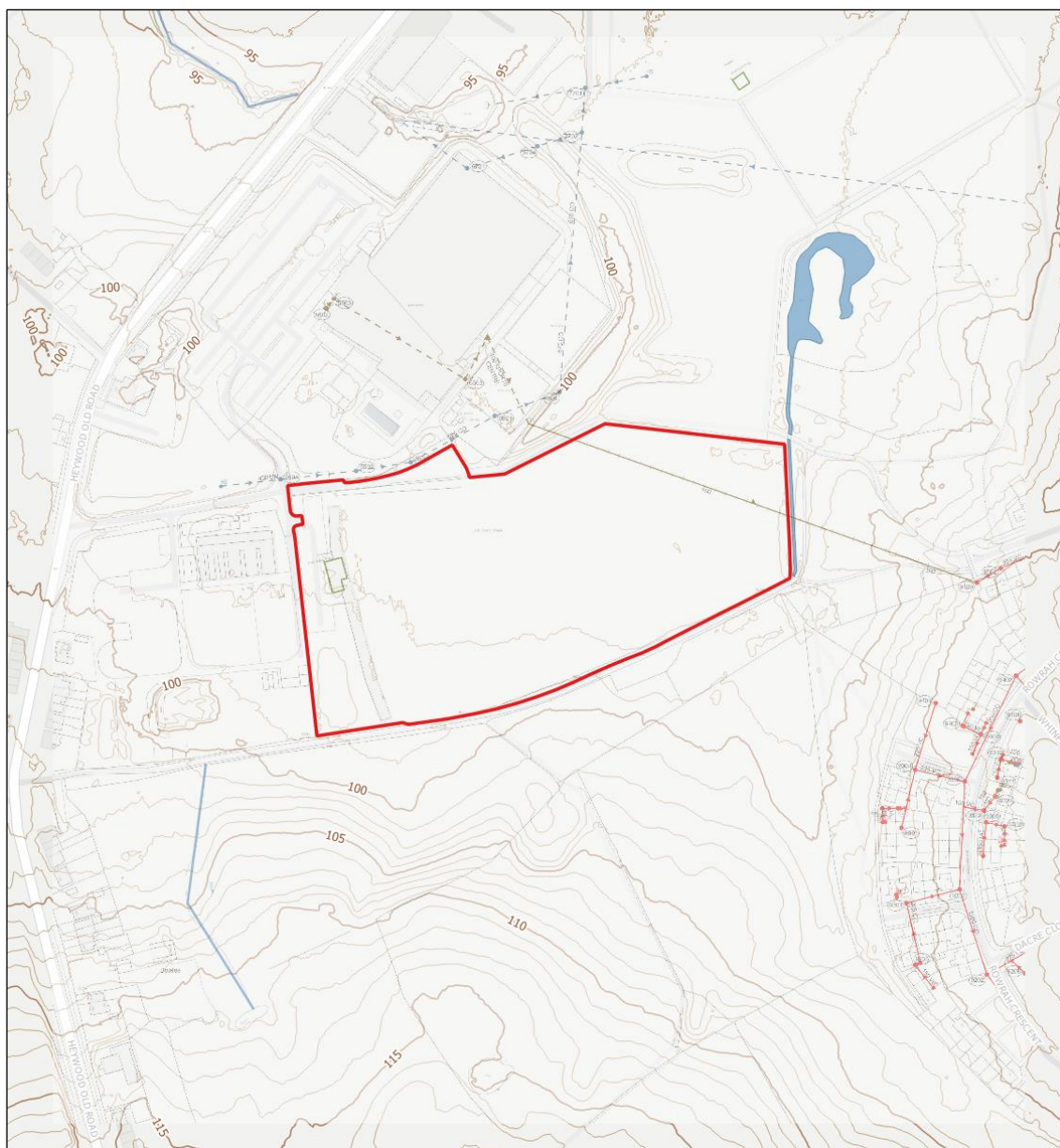
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## 1.0 Introduction

It is proposed to redevelop the Bowlee Park Driving Range to include first floor driving bays, indoor golf, a new adventure golf facility, ball servant enclosure, extension to existing car park & main entrance alterations.

The development planning application area shown outlined in red on figure 1 below is circa 3.767ha as per the proposed site plan at Appendix A. The nearest surface water features as per ordnance survey mapping are also shown on the plan at figure 1 together with United Utilities sewer records.



**FIGURE 1 - SITE LOCATION PLAN**

## 2.0 Ground Conditions

A desk top screening study reveals the following key points:

- The site is not located in a groundwater source protection zone.
- Bedrock Geology is described as '*Pennine Lower Coal Measures Formation – Mudstone, Siltstone and Sandstone*' and is classified as a '*Secondary A*' aquifer comprising '*permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers*'.
- Superficial Geology is described as '*Till, Devensian – Diamicton*' and is classified as a '*Secondary (undifferentiated)*' which represents an aquifer classification that '*has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type*'.
- A '*Medium - Low*' vulnerability class has been assigned to groundwater resources.
- The Soilscape Soil Map records '*slowly permeable seasonally wet acid loamy and clayey soils*' across the southern portion of the site '*draining to stream network*' and '*naturally wet very acid sandy and loamy soils*' across the northern portion of the site draining to shallow groundwater.

Whilst there are several confidential borehole records held with the British Geological Survey (BGS) relating to land to the north west and west of the site, the nearest publicly available record<sup>1</sup> is located approx. 0.2km to the north of the red line area where the bedrock and superficial geology is consistent with the site. The record describes the findings of a borehole drilled in August 2005 with made ground to 2m below ground level over soft and very soft clay to 2.5m and 3.0m depth respectively. Subsequently there is a 0.5m thick band of silt over very sandy and silty clay to 4.5m depth. Ground conditions then change to a very clayey sand and gravel to 5.5m below ground level and in turn sand and gravel is recorded to a depth of 10.5m. The final strata logged is a soft to very soft clay to the base of borehole at 18.5m depth. No groundwater strikes or other observations are recorded.

Given the near ground clay soils encountered to the north of the site and assuming similar are present at the subject site, it is not expected that infiltration drainage techniques will be suitable for the proposed re-development. This conclusion is reinforced by the Soilscape Soil Map classifications with clayey and therefore low permeability soils to the south of the site and sandy soils with shallow groundwater to the north of the site.

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<sup>1</sup> BGS reference SD80NW508, National Grid reference 384700,406500

### 3.0 Hierarchy of SW Disposal Methods

Paragraph 056 of the Planning Practice Guidance for Flood Risk and Coastal Change (PPG-FRCC) advises a hierarchy which reflects the guidance of the Building Regulations Approved Document H:

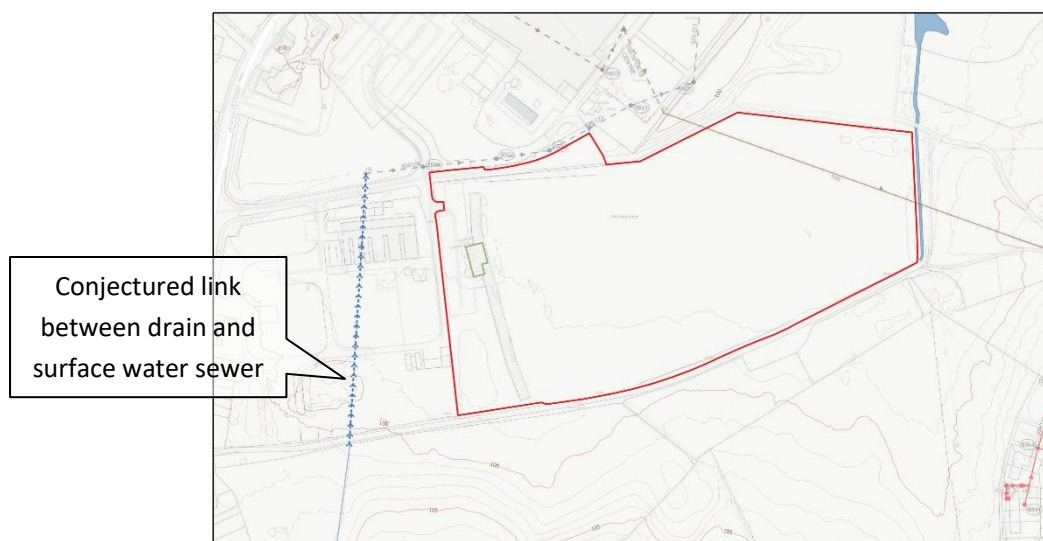
*'Where possible, preference should be given to multi-functional sustainable drainage systems, and to solutions that allow surface water to be discharged according to the following hierarchy of drainage options:*

- 1. into the ground (infiltration);*
- 2. to a surface water body;*
- 3. to a surface water sewer, highway drain, or another drainage system;*
- 4. to a combined sewer.'*

The ground information presented in section 2 above implies that the disposal of surface water runoff directly to the ground via infiltration will not be appropriate and instead a positive outfall will be required.

The nearest significant watercourse is Whittle Brook situated circa 0.56km to the north / north-west. An un-named tributary is shown on ordnance survey plans flowing from the western side of Heywood Old Road from an issue point circa 0.23km to the north of the development area (SD 84544 06785). Upstream of this point and to the east of the highway United Utility sewer records (refer to figure 1 and appendix B) show a short length of open channel watercourse noted as 'Langley Brook'. This receives flows from two surface water sewers and potentially a pond which also has a surface water sewer inflow.

With reference to United Utilities sewer record plan, it is surmised that the surface water sewer shown to the north of the development may represent the subsumed route of an ordinary watercourse with the upstream 'drain' shown to the east of Bowlee potentially flowing through the construction training and nursery curtilages to the west of the subject site as indicated at figure 2 below.



**FIGURE 2 - CONJECTURED DRAIN TO SEWER CONNECTIVITY**

As such, it is considered that discharging surface water from the proposed re-development into the surface water sewer is in line with the hierarchy as the sewer provides a linkage to the watercourse further north (and the sewer may effectively be a culverted watercourse itself).

## 4.0 SW Drainage

### 4.1 Climate Change Allowances

The Environment Agency provide climate change allowances for rainfall intensities to suit various epochs and percentiles. The site location falls within the '*Irwell Management Catchment*' where peak rainfall allowances are as follows for the 2070s epoch:

| Annual Exceedance Rainfall Event | Central Allowance | Upper End Allowance |
|----------------------------------|-------------------|---------------------|
| 3.3% (1in30year return period)   | 30%               | 40%                 |
| 1% (1in100year return period)    | 30%               | 45%                 |

### 4.2 Discharge Rate and Runoff Areas

The Non-statutory technical standards for sustainable drainage systems (DEFRA 2005) advise that discharge from previously developed sites should be as close as reasonably practicable to greenfield but no greater than the discharge prior to development.

The greenfield runoff rate at the site location has been determined using H R Wallingford's online tool as detailed at Appendix C. This shows flow rates for the overall red line area of 3.767ha and the rates associated with the extent of the area where works are proposed which is approximately 0.794ha. If a  $q_{bar}$  rate to suit the works area extent of 0.794ha was selected, discharge would be limited to 5.9l/s.

However, as the site has previously been developed, the existing flow rate discharging from site has been determined in line with section 24.5 of The SuDS Manual via the simulation of a drainage model of the existing pipe network. The drainage model is based on a CCTV survey that has been undertaken as presented on the plan at appendix D and detailed via the report at Appendix E.

The pre-development roof and paved areas are highlighted on the plan at Appendix F and total 0.211ha. However, the car parking bays comprise gravel without any apparent land drainage system connection to the network. Therefore, the network plan at Appendix F which also shows the connected areas has excluded these bays and only accounts for the main access route which has positive drainage via gullies. The connected area in the model totals 0.155ha and the resulting discharge rates passing from the site at

pn1.003 are shown on the plan. Based on LASOO guidance<sup>2</sup>, there is no requirement for an urban creep uplift. Therefore, the total area to drain is 0.124ha.

The 2009 Bury Rochdale and Oldham (BRO) Strategic Flood Risk Assessment advises that '*development should aim for a reduction in surface water runoff rates of 30% for Brownfield sites up to a 1 in 100 year storm event, considering climate change*'. However, where sites are in areas at high risk of flooding, the SFRA advises that '*development should aim for a reduction in surface water runoff rates of 50% for Brownfield sites, with an aim of reducing runoff to Greenfield rates up to a 1 in 100 year storm event, considering climate change*'.

The risk of surface water flooding at the development site is high at and in proximity to the site entrance area. It should be noted that the surface water flood maps essentially present an exceedance scenario for the routing and ponding of rainfall, although varying allowance for loss via infiltration or reduced rainfall representing drainage in urban areas is included. As such, the extent and level of risk of surface water flooding is not likely to be experienced to the degree shown on the Environment Agency's surface water flood maps.

However, based on the high level of surface water risk, it is appropriate to reduce existing flow rates by 50%. The post development drainage system has therefore been designed to not exceed 11.3l/s. A variable rate (complex) flow control has not been used, so the limiting rate applies to all rainfall events up to and including 1in100year+45% which is less than the 12.3l/s greenfield flow rate determined for the development works area of 0.794ha (refer to Appendix C). This is deemed to comply with the guidance of the SFRA as noted above.

### 4.3 Proposed Drainage

Due to the extent of new runoff areas to be connected to the drainage system, it is necessary to upgrade the majority of pipe runs to accommodate the conveyance of flows to the attenuation facility via the car park sub-base voids.

The areas requiring runoff to be managed for the post-development scenario are presented on the plan at Appendix G and total 0.469ha. These have been split to suit the extent of catchment attributed to each pipeline as shown on the network plan at Appendix G. The drainage model has been simulated in Causeway Flow and the model details and simulation results are also provided at Appendix G.

A hydrobrake optimum flow control is to be provided at the penultimate chamber (EX MHB) whilst the final chamber (MH1) requires repositioning to avoid conflict with the permeable pavement sub-base which is providing the attenuation volume via the coarse graded aggregate interstices.

The design limiting rate of 11.3l/s as determined in section 4.1 above is not exceeded for any of the modelled rainfall events up to and including 1in100year with +45% increase in intensity for the predicted

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<sup>2</sup> Best practice guidance to the Non-statutory Technical Standards for SuDS by LASOO (Local Authority SuDS Officer Organisation) now known as the Association of SuDS Authorities (ASA)

effects of climate change. The main attenuation facility is the sub-base reservoir formed using the new northern car park area. The sub-base formation level is to be 96.7m as shown on section X-X on the detailed drainage strategy layout plan at Appendix H. This allows 0.7m sub-base depth below the pavement surfacing. The car park plan area is approximately 53m long x 17m wide = 901sqm. Allowing 30% void capacity, the volume available is 189.21m<sup>3</sup> which has been modelled at JCT5. It can be seen that this is adequate with the 1in100yr+45% water level for the critical duration event of 3hours reaching 97.295m compared to top of sub-base of 97.4m.

Due to the limitations of pipeline capacity there is localised modelling of approx. 0.7m<sup>3</sup> (700lites) predicted at RE4. However, this is on the basis of the drainage model which applies the area for pipeline pn8.000 of 0.047ha at RE4 rather than distributed along the length of the pipeline. Whilst some capacity along the pipeline is included in the drainage model to represent the 450mm wide trench, the remaining pavement sub-base capacity is not included in the model. As such, it is not expected that there will be any flooding for the 1in100yr+45% scenario.

#### 4.4 Water Quality

The SuDS Manual advises that non-residential roof areas have a 'low' pollution hazard level. However, given the location is not in an industrial area and the rainscreen cladding proposed for the building envelope will not have a metallic finish with leaching potential, it is considered that the 'very low' pollution hazard level as per residential roofs is applicable. Table 4.3 of The SuDS Manual (CIRIA C753) advises that '*Removal of gross solids and sediments only*' is an adequate water quality management measure for very low pollution hazard level land use. Therefore, a catchpit chamber has been included at S5 as shown on the drainage strategy layout plan at Appendix H.

Runoff from vehicle use areas carries a higher potential pollutant load and is considered to have the following hazard indices as per table 26.2 of The SuDS manual. However these are below the mitigation indices attributed to permeable pavement as per table 26.3 of The SuDS Manual shown below.

| Non-residential car parking with infrequent change   | Total suspended solids (TSS) | Metals | Hydrocarbons |
|------------------------------------------------------|------------------------------|--------|--------------|
| <b>low pollution hazard level</b><br>Hazard Indices: | 0.5                          | 0.4    | 0.4          |
| <b>Permeable Paving</b><br>Mitigation Indices:       | 0.7                          | 0.6    | 0.7          |

Therefore, the use of permeable paving as a SuDS component to treat runoff at source is deemed to adequately address the management of pollutants in runoff. The proposed arrangement is that access aisles and main traffic routes within the site would have a sealed (impermeable) finish to suit frequency of use and robustness to manoeuvring. However, these will be cambered to generally shed runoff into the permeable paved parking bays where runoff is filtered and therefore treated.

## 5.0 Drainage Management & Maintenance

It is important that all drainage systems are adequately managed and maintained. An important part of this is regular inspection to monitor where action will be required (eg silt accumulation). The default responsibility for managing and maintaining the drainage system rests with the land owner. The drainage system for the proposed re-development of the golf range site is to be entirely private and will be the responsibility of the golf range site owner as landowner to manage and maintain.

The following tables present the recommended schedule of activities for each significant element of the drainage system:

|                   | <b>General Drainage System</b>                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Regular</i>    | <p>Inspect and identify any areas that are not operating correctly. If required, take remedial action. Monthly for 3 months then annually.</p> <p>Maintain vegetation to designed limits within the vicinity of below ground drainage pipes to avoid damage to system. Monthly or as required.</p> <p>Inspect rainwater gutters and down pipes, removing obstructions and silt as necessary. Check there is no physical damage. Monthly</p> |
| <i>Occasional</i> | <p>Remove silt and leaf build up from manholes, gutters etc. Annually (or as required).</p> <p>Remove inspection covers and inspect, ensuring that the water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Annually.</p> <p>Survey inside of pipe runs for sediment build up and remove if necessary. Every 5 years or as required.</p>                                                      |
| <i>Remedial</i>   | <p>Replacement of malfunctioning parts. As required.</p> <p>Repair physical damage if necessary. As required.</p>                                                                                                                                                                                                                                                                                                                           |

|                   | <b>Flow Control – Hydrobrake Optimum in chamber EX MHB</b>                                                                                         |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Regular</i>    | Inspect monthly and after every significant rainfall event.                                                                                        |
| <i>Occasional</i> | Check functionality of pivoting by-pass door facility and ensure steel operating rope is adequately secured within reach of chamber cover opening. |
| <i>Remedial</i>   | Cleansing of the chamber sump will be required possibly annually, but this can be assessed when the by-pass door facility is inspected.            |

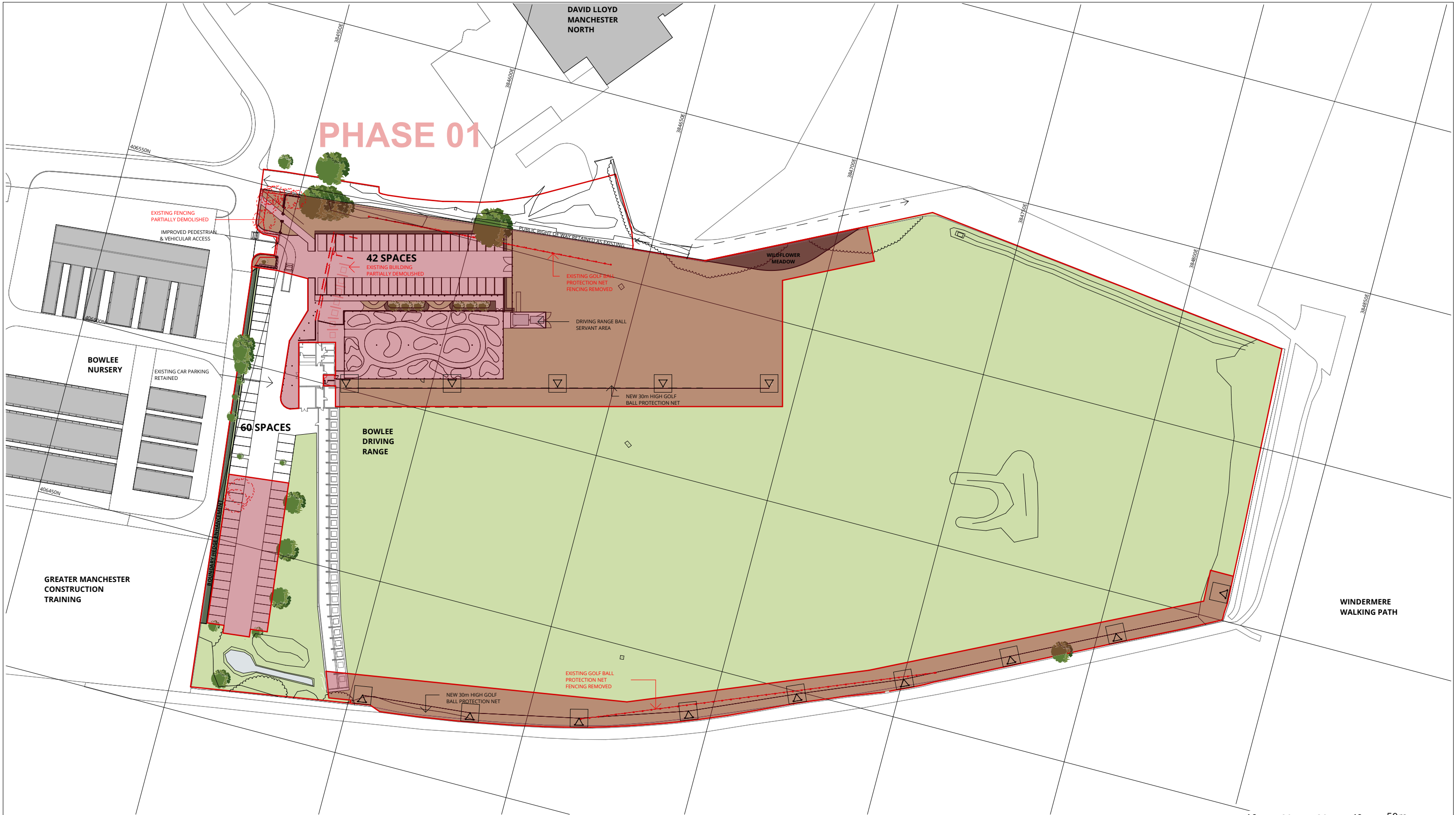
|                   | <b>Linear Drainage Channels – ACO (or equivalent)</b>                                                          |
|-------------------|----------------------------------------------------------------------------------------------------------------|
| <i>Regular</i>    | Inspect grating for signs of damage annually. Inspect universal sump unit for signs of silt build up annually. |
| <i>Occasional</i> | Adjust / re-secure grating as necessary if dislodged. Remove silts from sump unit as necessary.                |
| <i>Remedial</i>   | Replace grating if damaged.                                                                                    |

|                   | <b>Silt Traps &amp; Catch Pit</b>                                                                        |
|-------------------|----------------------------------------------------------------------------------------------------------|
| <i>Regular</i>    | Inspect every 4-6 months and after every significant rainfall event.                                     |
| <i>Occasional</i> | Cleansing of the sump will be required possibly annually, but this can be assessed when it is inspected. |
| <i>Remedial</i>   | No remedial works are envisaged.                                                                         |

|                   | <b>Permeable Pavements – Concrete Block Construction</b>                                                                                                                                                                                                                                         |
|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Regular</i>    | Inspect Weekly. Removal of litter and debris by sweeping is recommended on at least a monthly interval or as informed by inspection.<br><br>Inspect silt trap chambers, initially monthly for the first year and then every 4-6 months subsequently.                                             |
| <i>Occasional</i> | To prevent sedimentation of joints it is recommended that vacuum sweeping of the pavement is undertaken annually with appropriate disposal of the sediment and replenishment of pavement joints with grit.<br><br>Remove silts from silt trap chambers, annually or as determined by inspection. |
| <i>Remedial</i>   | Regular sweeping should prevent weed and moss growth. If necessary, weed removal or treatment with herbicide can be undertaken with jet washing to clear moss and algae, providing joints are replenished with grit as necessary.                                                                |



## Appendix A – Proposed Site Plan



1

Proposed Site Location Plan - Phase 01

1 : 1000

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PROJECT TITLE

Bowlee Park Golf Driving Range

RDP JOB NUMBER

P0019

ISO 27001 CLASSIFICATION

Planning

DRAWING TITLE

Proposed Ground Floor Site Plan - Phase 01

SCALE

@ A3

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REVISION

P00

DATE FIRST ISSUED

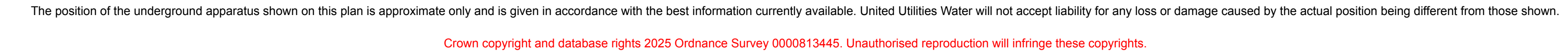
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SCALE

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## Appendix B – United Utilities Sewer Records

[illegible]

The schematic diagram illustrates the sewer network layout. It consists of several parallel horizontal lines representing different types of sewer infrastructure. From left to right, the components are: Abandoned (solid black line), Foul (dashed brown line), Surface Water (dashed blue line), Combined (dashed red line), Public Sewer (solid black line), Private Sewer (dashed brown line), Section 104 (dashed blue line), Rising Main (solid black line), Sludge Main (dashed brown line), Overflow (solid purple line), Water Course (dashed blue line), and Highway Drain (dashed blue line). Arrows on the lines indicate the direction of flow, generally from left to right. Some lines have specific markers, such as dots or small circles, which may represent manholes or specific points of interest within the network.

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

|    |               |
|----|---------------|
| FO | Foul          |
| SW | Surface Water |
| CO | Combined      |
| OV | Overflow      |

|    |             |    |             |
|----|-------------|----|-------------|
| CI | Circular    | TR | Trapezoidal |
| EG | Egg         | AR | Arch        |
| OV | Oval        | BA | Barrel      |
| FT | Flat Top    | HO | HorseShoe   |
| RE | Rectangular | UN | Unspecified |
| SQ | Square      |    |             |

|     |                           |
|-----|---------------------------|
| AC  | Asbestos Cement           |
| BR  | Brick                     |
| PE  | Polyethylene              |
| RP  | Reinforced Plastic Matrix |
| CO  | Concrete                  |
| CSB | Concrete Segment Bolted   |
| CSU | Concrete Segment Unbolted |
| CB  | Concrete Box Culverted    |
| PSC | Plastic / Steel Composite |
| GRG | Glass Reinforced Plastic  |
| DI  | Ductile Iron              |
| PVC | Polyvinyl Chloride        |
| CI  | Cast Iron                 |
| SI  | Spun Iron                 |
| ST  | Steel                     |
| VC  | Vitrified Clay            |
| PP  | Polypropylene             |
| PF  | Pitch Fibre               |
| MAC | Masonry, Coursed          |
| MAR | Masonry, Random           |
| U   | Unspecified               |

BOWLEE PARK GOLF RANGE HEYWOOD OLD  
ROAD,  
MIDDLETON,  
MANCHESTER,  
M24 4TH

**Sheet:** 1 of 1



Water for the North West

## Appendix C – Greenfield Runoff Rates

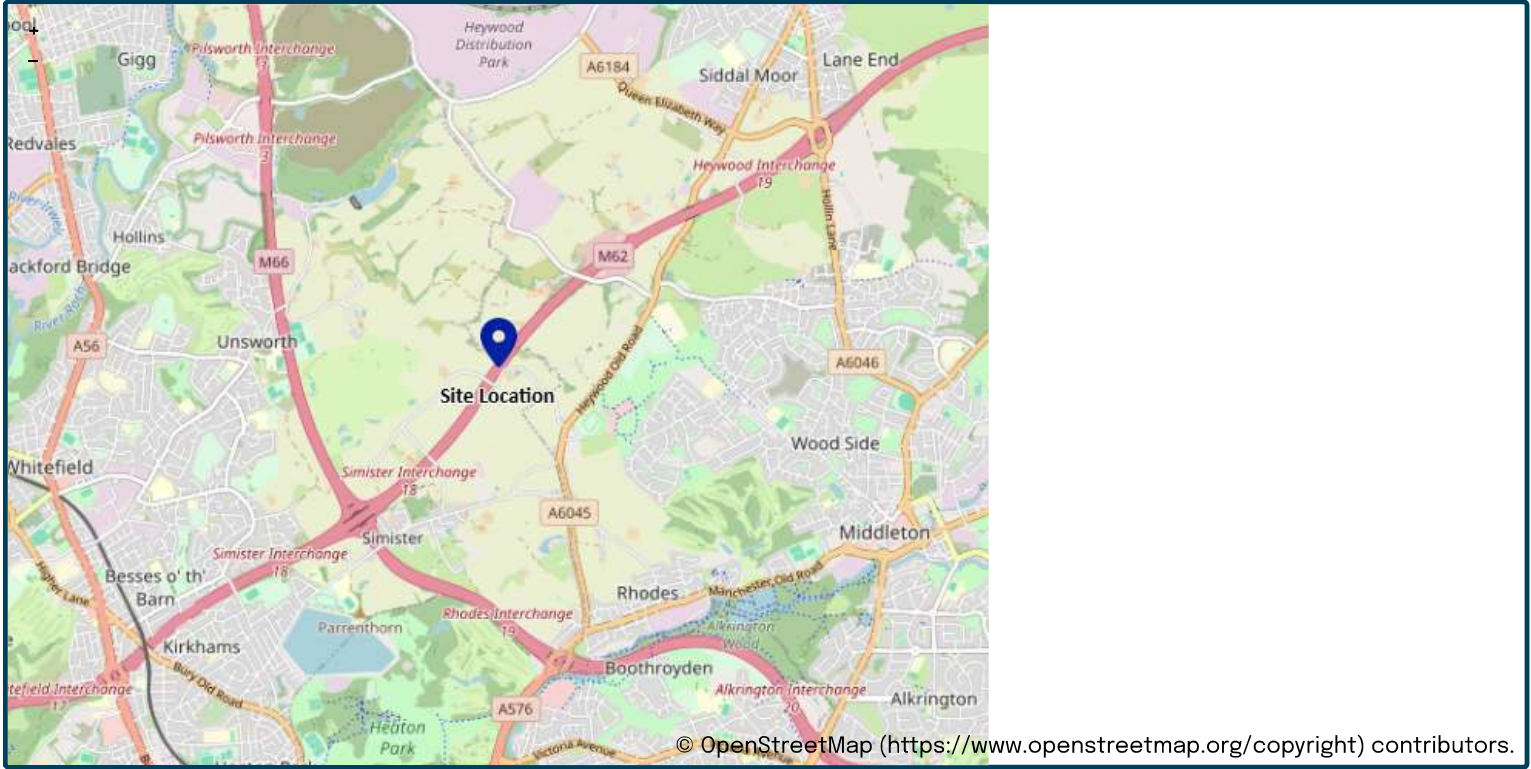
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015).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

## Project details

|               |                                         |
|---------------|-----------------------------------------|
| Date          | <input type="text" value="25/04/2025"/> |
| Calculated by | <input type="text" value="cje"/>        |
| Reference     | <input type="text" value="062D22"/>     |
| Model version | <input type="text" value="2.0.0"/>      |

## Location

|               |                                                     |
|---------------|-----------------------------------------------------|
| Site name     | <input type="text" value="Bowlee Park Golf Range"/> |
| Site location | <input type="text" value="Rochdale"/>               |



|               |                                     |
|---------------|-------------------------------------|
| Site easting  | <input type="text" value="383908"/> |
| Site northing | <input type="text" value="406932"/> |

## Site details

|                      |                                    |    |
|----------------------|------------------------------------|----|
| Total site area (ha) | <input type="text" value="3.767"/> | ha |
|----------------------|------------------------------------|----|

# Greenfield runoff

## Method

|                            |                                |             |                  |
|----------------------------|--------------------------------|-------------|------------------|
| Method                     | <div>IH124</div>               |             |                  |
|                            |                                |             |                  |
|                            | <u>My value</u>                | <div></div> | <u>Map value</u> |
| SAAR (mm)                  | <div>1017</div> <div>mm</div>  | <div></div> | <div>1017</div>  |
| How should SPR be derived? | <div>WRAP soil type</div>      |             |                  |
| WRAP soil type             | <div>4</div>                   | <div></div> | <div>4</div>     |
| SPR                        | <div>0.47</div> <div></div>    |             |                  |
| QBar (IH124) (l/s)         | <div>28.2</div> <div>l/s</div> |             |                  |

## Growth curve factors

|                        |                             |             |                  |
|------------------------|-----------------------------|-------------|------------------|
|                        | <u>My value</u>             | <div></div> | <u>Map value</u> |
| Hydrological region    | <div>10</div>               | <div></div> | <div>10</div>    |
| 1 year growth factor   | <div>0.87</div> <div></div> |             |                  |
| 2 year growth factor   | <div>0.93</div> <div></div> |             |                  |
| 10 year growth factor  | <div>1.38</div> <div></div> |             |                  |
| 30 year growth factor  | <div>1.7</div> <div></div>  |             |                  |
| 100 year growth factor | <div>2.08</div> <div></div> |             |                  |
| 200 year growth factor | <div>2.37</div> <div></div> |             |                  |

## Results

|                           |                                |
|---------------------------|--------------------------------|
| Method                    | <div>IH124</div> <div></div>   |
| Flow rate 1 year (l/s)    | <div>24.5</div> <div>l/s</div> |
| Flow rate 2 year (l/s)    | <div>26.2</div> <div>l/s</div> |
| Flow rate 10 years (l/s)  | <div>38.9</div> <div>l/s</div> |
| Flow rate 30 years (l/s)  | <div>47.9</div> <div>l/s</div> |
| Flow rate 100 years (l/s) | <div>58.6</div> <div>l/s</div> |
| Flow rate 200 years (l/s) | <div>66.7</div> <div>l/s</div> |

### Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.0.0) developed by HR Wallingford and available at uksuds.com (<https://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 [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate 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, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

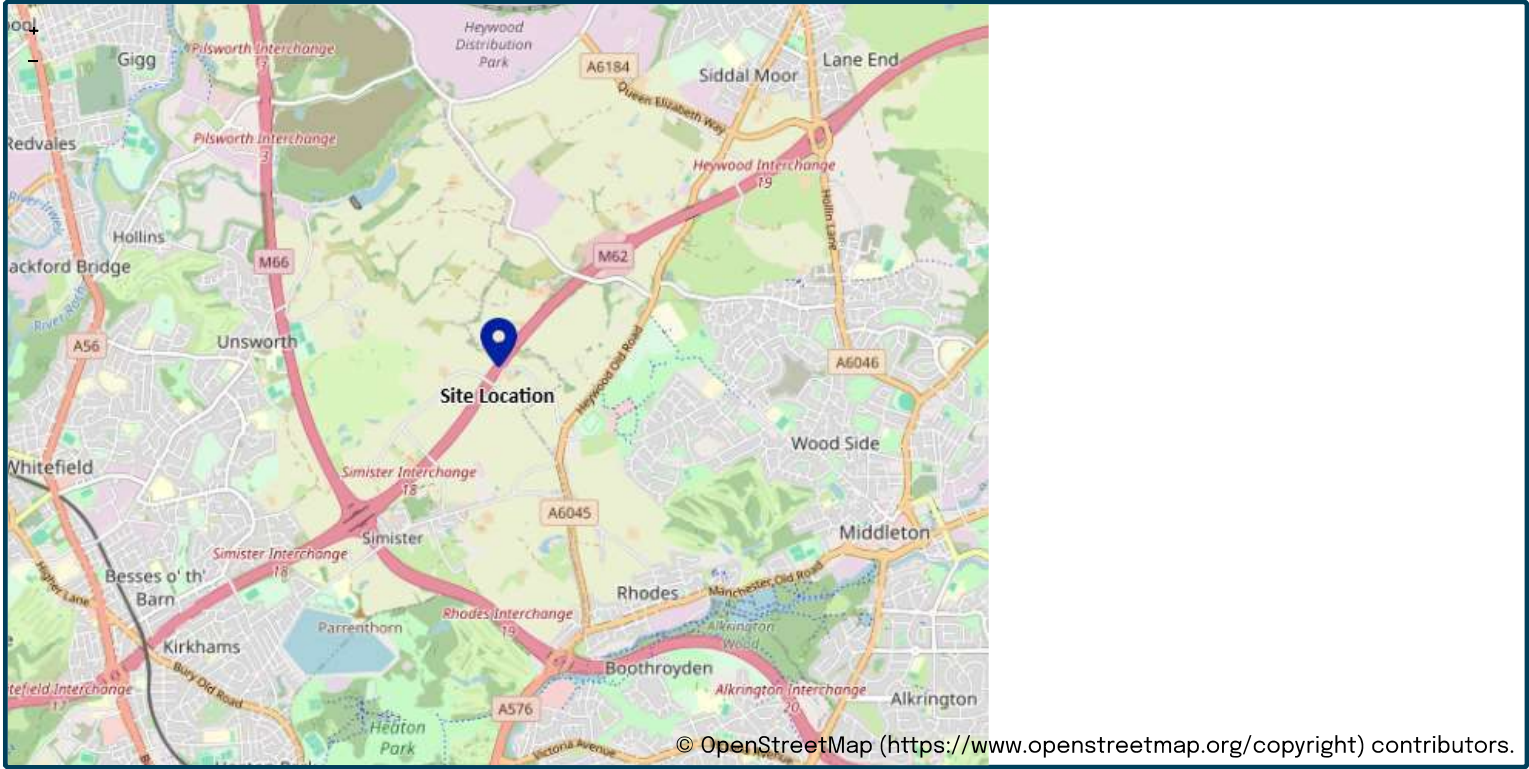
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|               |                                         |
|---------------|-----------------------------------------|
| Date          | <input type="text" value="25/04/2025"/> |
| Calculated by | <input type="text" value="cje"/>        |
| Reference     | <input type="text" value="062D22"/>     |
| Model version | <input type="text" value="2.0.0"/>      |

## Location

|               |                                                     |
|---------------|-----------------------------------------------------|
| Site name     | <input type="text" value="Bowlee Park Golf Range"/> |
| Site location | <input type="text" value="Rochdale"/>               |



|               |                                     |
|---------------|-------------------------------------|
| Site easting  | <input type="text" value="383908"/> |
| Site northing | <input type="text" value="406932"/> |

## Site details

|                      |                                    |    |
|----------------------|------------------------------------|----|
| Total site area (ha) | <input type="text" value="0.794"/> | ha |
|----------------------|------------------------------------|----|

# Greenfield runoff

## Method

|                            |                               |             |                  |
|----------------------------|-------------------------------|-------------|------------------|
| Method                     | <div>IH124</div>              |             |                  |
|                            |                               |             |                  |
|                            | <u>My value</u>               | <div></div> | <u>Map value</u> |
| SAAR (mm)                  | <div>1017</div> <div>mm</div> | <div></div> | <div>1017</div>  |
| How should SPR be derived? | <div>WRAP soil type</div>     |             |                  |
| WRAP soil type             | <div>4</div>                  | <div></div> | <div>4</div>     |
| SPR                        | <div>0.47</div> <div></div>   |             |                  |
| QBar (IH124) (l/s)         | <div>5.9</div> <div>l/s</div> |             |                  |

## Growth curve factors

|                        |                             |             |                  |
|------------------------|-----------------------------|-------------|------------------|
|                        | <u>My value</u>             | <div></div> | <u>Map value</u> |
| Hydrological region    | <div>10</div>               | <div></div> | <div>10</div>    |
| 1 year growth factor   | <div>0.87</div> <div></div> |             |                  |
| 2 year growth factor   | <div>0.93</div> <div></div> |             |                  |
| 10 year growth factor  | <div>1.38</div> <div></div> |             |                  |
| 30 year growth factor  | <div>1.7</div> <div></div>  |             |                  |
| 100 year growth factor | <div>2.08</div> <div></div> |             |                  |
| 200 year growth factor | <div>2.37</div> <div></div> |             |                  |

## Results

|                           |                                |
|---------------------------|--------------------------------|
| Method                    | <div>IH124</div> <div></div>   |
| Flow rate 1 year (l/s)    | <div>5.2</div> <div>l/s</div>  |
| Flow rate 2 year (l/s)    | <div>5.5</div> <div>l/s</div>  |
| Flow rate 10 years (l/s)  | <div>8.2</div> <div>l/s</div>  |
| Flow rate 30 years (l/s)  | <div>10.1</div> <div>l/s</div> |
| Flow rate 100 years (l/s) | <div>12.3</div> <div>l/s</div> |
| Flow rate 200 years (l/s) | <div>14.1</div> <div>l/s</div> |

### Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.0.0) developed by HR Wallingford and available at uksuds.com (<https://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 [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate 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, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

## Appendix D – Topographic & Utility Survey Plans







Where chamber extents are significantly greater than the cover size, their approximate extents are shown thus;



|     |                     |
|-----|---------------------|
| AB  | assumed route       |
| BS  | base band           |
| BD  | cable pit           |
| CL  | cover level         |
| CR  | cable riser         |
| ED  | down pipe           |
| ERB | external back drop  |
| FC  | fire control        |
| FE  | electricity pole    |
| FH  | fire hydrant        |
| FR  | flooded             |
| G   | gully               |
| GV  | gas valve           |
| HOR | head of run         |
| HC  | high level          |
| IC  | inspection chamber  |
| IB  | internal back drop  |
| IL  | invert level        |
| IM  | manhole             |
| PL  | pit level           |
| PR  | pipe riser          |
| RWR | rodding eye         |
| RWP | rainwater pipe      |
| SIL | sited               |
| SL  | slit level          |
| ST  | stop valve          |
| SVP | said vent pipe      |
| TFR | trespass exc.       |
| UD  | taken from records  |
| UTD | telegraph pole      |
| UO  | unable to determine |
| UDF | unable to find      |
| UT  | unable to fit       |
| UTS | unable to survey    |
| UTV | unable to trace     |
| UV  | vent pipe           |
| WE  | water level         |
| WM  | water meter         |
| WO  | wash out valve      |

[illegible]

1. The survey has been accurately positioned on the Ordnance Survey National Grid system using GPS observations to the OS Active Network and the latest Ordnance Survey transformation (OSTN15/OSGM15).
2. All levels relate to Ordnance Survey Datum (Newlyn). Vertical control has been established using GPS observations to the OS Active Network and the latest Ordnance Survey transformation (OSTN15/OSGM15).
3. Local Scale Factor has been removed to transform the survey to a flat earth grid (scale factor 1.00000).  
Local Grid Origin is Control Station C1  
This is the only point where OS Grid coordinates are true.



Project  
Bowlee Park Driving Range, Middleton

Drawing title

Utility Survey

|                |            |              |
|----------------|------------|--------------|
| Scale          | 1:200 @ A0 | DO NOT SCALE |
| SSS Job No.    | S250179    |              |
| Client Job No. | N/A        |              |

S250179-DR-U-001

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

## Appendix E – Existing Drainage CCTV Survey Report

# CCTV Survey Report

Drain Condition  
Reporting  
Software  
PT/430/0918



Prepared For

**Bowlee Park Golf  
Heywood Old Road  
Middleton  
Manchester  
M24 4TH**

Site

**Bowlee Park Golf  
Heywood Old Road  
Middleton  
Manchester  
M24 4TH**



**SITE SURVEYING SERVICES**  
**Surveyor: Carl Lopeman**

**01200 438320**

Total Defects for Project



Total DRB Grades for Project



## Bowlee Park Golf - CCTV Survey Report : 11/03/25

### Prepared by:

Name : SITE SURVEYING SERVICES  
 Contact : Samual Knott  
 Location : Unit 1 Shawbridge Sawmill  
 Town : Taylor Street  
 Region : Clitheroe  
 Postcode : Lancashire, BB7 1LY  
 Email :  
 Web :  
 Contact Number : 01200 438320  
 Surveyor : Carl Lopeman  
 Valid Certification No :

### Client Information

Client Name : Bowlee Park Golf  
 Contact : Driving Range  
 Location : Heywood Old Road  
 Town : Middleton  
 Region : Manchester  
 Postcode : M24 4TH  
 Tel :  
 Mobile :  
 Email :  
 Fax :

### Site Information

Site Name : Bowlee Park Golf  
 Contact : Driving Range  
 Location : Heywood Old Road  
 Town : Middleton  
 Region : Manchester  
 Postcode : M24 4TH  
 Tel :  
 Mobile :  
 Email :  
 Fax :

Total Defects for Project



Total DRB Grades for Project



## Report interpretation.

### Overview:

Each section of the drainage system is allocated a score indicating areas that require attention. These areas are detailed in the Overview section on the following page and also at the bottom right of the first few pages. We use colour coding as an indicator of severity. Additional information concerning rehabilitation options/recommendations is included in the Overview page, which can also be used as an, "at a glance" indication of system condition. More in depth information for each section, including images can be found later in the report. Grade indicators are as follows:

**Grade A:** Drain is serviceable no recommendations required

**Grade B:** There is an issue that might require remedial works

**Grade C:** There is a defect that requires remedial works, the drain is not serviceable.

### Observations:

Each section of drainage reported on (manhole to manhole for example), contains detailed information about that drain and any observations made concerning condition are detailed below the header section. The observations are colour coded and given a severity score, with more significant defects being given a higher score, using a scale from 1 to 5 as detailed below:

**Severity 1 to 2:** These defects may require remedial monitoring

**Severity 3:** These defects probably require some form of remedial works

**Severity 4 to 5:** Defects that will require remedial repair or replacement

### General:

The information provided is relevant at the time of survey. The coding system in this report is based on the Manual of Sewer Condition Classification, 5th edition (MSCC5) domestic codes ( BS EN 13508-1:2003 ). This is the official standard for the water industry.

The severity system is based on significant experience in general practice and the 1 -5 grades represent the severity of individual defects: 5 representing a more serious defect.

Please feel free to contact us for further explanation or pricing for remedial works required.

Total Defects for Project



Total DRB Grades for Project



## Overview

|                                                               |                                                                                                                                                                                                                                                                                          |                                                                             |                                                                                                                                  |
|---------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Section: 1</b><br><b>From: MH1</b><br><b>To: EOT</b>       |                                                                                                                                                                                                                                                                                          | Purpose of Inspection: Investigation of known structural or service defects | <b>DRB Grade: A</b><br><b>Pipe Size: 300</b><br><b>Material: Concrete</b><br><b>Use: Surface Water</b>                           |
| MH                                                            | Cover <br>Benching <br>Channel        | Grade A                                                                     |                                                                                                                                  |
| <b>Section: 2</b><br><b>From: MH1</b><br><b>To: MH UTL</b>    |                                                                                                                                                                                                                                                                                          | Purpose of Inspection: Investigation of known structural or service defects | <b>DRB Grade: B</b><br><b>Pipe Size: 225</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Surface Water</b> |
| MH                                                            | Cover <br>Benching <br>Channel        | Grade B                                                                     |                                                                                                                                  |
| <b>Section: 3</b><br><b>From: MH2</b><br><b>To: EOT</b>       |                                                                                                                                                                                                                                                                                          | Purpose of Inspection: Investigation of known structural or service defects | <b>DRB Grade: B</b><br><b>Pipe Size: 100</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Surface Water</b> |
| CP                                                            | Cover <br>Benching <br>Channel        | Grade B                                                                     |                                                                                                                                  |
| <b>Section: 4</b><br><b>From: MH2</b><br><b>To: EOT</b>       |                                                                                                                                                                                                                                                                                          | Purpose of Inspection: Investigation of known structural or service defects | <b>DRB Grade: B</b><br><b>Pipe Size: 100</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Surface Water</b> |
| CP                                                            | Cover <br>Benching <br>Channel  | Grade B                                                                     |                                                                                                                                  |
| <b>Section: 5</b><br><b>From: MH3</b><br><b>To: Pump</b>      |                                                                                                                                                                                                                                                                                          | Purpose of Inspection: Investigation of known structural or service defects | <b>DRB Grade: B</b><br><b>Pipe Size: 100</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Foul</b>          |
| MH                                                            | Cover <br>Benching <br>Channel  | Grade B                                                                     |                                                                                                                                  |
| <b>Section: 6</b><br><b>From: MH3</b><br><b>To: Gully</b>     |                                                                                                                                                                                                                                                                                          | Purpose of Inspection: Investigation of known structural or service defects | <b>DRB Grade: B</b><br><b>Pipe Size: 100</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Foul</b>          |
| MH                                                            | Cover <br>Benching <br>Channel  | Grade B                                                                     |                                                                                                                                  |
| <b>Section: 7</b><br><b>From: MH3</b><br><b>To: Rest Bend</b> |                                                                                                                                                                                                                                                                                          | Purpose of Inspection: Investigation of known structural or service defects | <b>DRB Grade: B</b><br><b>Pipe Size: 100</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Foul</b>          |
| MH                                                            | Cover <br>Benching <br>Channel  | Grade B                                                                     |                                                                                                                                  |

Total Defects for Project

Total DRB Grades for Project



|                                                                                                                                                       |                                                                                            |                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Section: 8</b><br><b>From: MH4</b><br><b>To: EOT</b>                                                                                               | Purpose of Inspection: Investigation of known structural or service defects<br><br>Grade A | <b>DRB Grade: A</b><br><b>Pipe Size: 225</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Surface Water</b> |
| <b>MH</b><br>Cover <input checked="" type="checkbox"/><br>Benching <input checked="" type="checkbox"/><br>Channel <input checked="" type="checkbox"/> |                                                                                            |                                                                                                                                  |
| <b>Section: 9</b><br><b>From: MH4</b><br><b>To: EOT</b>                                                                                               | Purpose of Inspection: Investigation of known structural or service defects<br><br>Grade B | <b>DRB Grade: B</b><br><b>Pipe Size: 225</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Surface Water</b> |
| <b>MH</b><br>Cover <input checked="" type="checkbox"/><br>Benching <input checked="" type="checkbox"/><br>Channel <input checked="" type="checkbox"/> |                                                                                            |                                                                                                                                  |
| <b>Section: 10</b><br><b>From: MH4</b><br><b>To: MH10</b>                                                                                             | Purpose of Inspection: Investigation of known structural or service defects<br><br>Grade A | <b>DRB Grade: A</b><br><b>Pipe Size: 150</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Surface Water</b> |
| <b>MH</b><br>Cover <input checked="" type="checkbox"/><br>Benching <input checked="" type="checkbox"/><br>Channel <input checked="" type="checkbox"/> |                                                                                            |                                                                                                                                  |
| <b>Section: 11</b><br><b>From: MH5</b><br><b>To: EOT</b>                                                                                              | Purpose of Inspection: Investigation of known structural or service defects<br><br>Grade A | <b>DRB Grade: A</b><br><b>Pipe Size: 100</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Surface Water</b> |
| <b>MH</b><br>Cover <input checked="" type="checkbox"/><br>Benching <input checked="" type="checkbox"/><br>Channel <input checked="" type="checkbox"/> |                                                                                            |                                                                                                                                  |
| <b>Section: 12</b><br><b>From: MH5</b><br><b>To: Rest Bend</b>                                                                                        | Purpose of Inspection: Investigation of known structural or service defects<br><br>Grade B | <b>DRB Grade: B</b><br><b>Pipe Size: 100</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Surface Water</b> |
| <b>MH</b><br>Cover <input checked="" type="checkbox"/><br>Benching <input checked="" type="checkbox"/><br>Channel <input checked="" type="checkbox"/> |                                                                                            |                                                                                                                                  |
| <b>Section: 13</b><br><b>From: MH6</b><br><b>To: EOT</b>                                                                                              | Purpose of Inspection: Investigation of known structural or service defects<br><br>Grade C | <b>DRB Grade: C</b><br><b>Pipe Size: 150</b><br><b>Material: Polyvinyl Chloride</b><br><b>Use: Surface Water</b>                 |
| <b>MH</b><br>Cover <input checked="" type="checkbox"/><br>Benching <input checked="" type="checkbox"/><br>Channel <input checked="" type="checkbox"/> |                                                                                            |                                                                                                                                  |
| <b>Section: 14</b><br><b>From: MH6</b><br><b>To: MH7</b>                                                                                              | Purpose of Inspection: Investigation of known structural or service defects<br><br>Grade A | <b>DRB Grade: A</b><br><b>Pipe Size: 100</b><br><b>Material: Polyvinyl Chloride</b><br><b>Use: Surface Water</b>                 |
| <b>MH</b><br>Cover <input checked="" type="checkbox"/><br>Benching <input checked="" type="checkbox"/><br>Channel <input checked="" type="checkbox"/> |                                                                                            |                                                                                                                                  |

Total Defects for Project

Total DRB Grades for Project



|                                                                |                                                                                                                                                                                                                                                                                          |                                                                             |                                                                                                                                  |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <b>Section: 15</b><br><b>From: MH7</b><br><b>To: Outlet</b>    |                                                                                                                                                                                                                                                                                          | Purpose of Inspection: Investigation of known structural or service defects | <b>DRB Grade: B</b><br><b>Pipe Size: 100</b><br><b>Material: Polyvinyl Chloride</b><br><b>Use: Surface Water</b>                 |
| MH                                                             | Cover <br>Benching <br>Channel        | Grade B                                                                     |                                                                                                                                  |
| <b>Section: 16</b><br><b>From: MH7</b><br><b>To: EOT</b>       |                                                                                                                                                                                                                                                                                          | Purpose of Inspection: Investigation of known structural or service defects | <b>DRB Grade: A</b><br><b>Pipe Size: 100</b><br><b>Material: Polyvinyl Chloride</b><br><b>Use: Surface Water</b>                 |
| MH                                                             | Cover <br>Benching <br>Channel        | Grade A                                                                     |                                                                                                                                  |
| <b>Section: 17</b><br><b>From: MH8</b><br><b>To: Buried MH</b> |                                                                                                                                                                                                                                                                                          | Purpose of Inspection: Investigation of known structural or service defects | <b>DRB Grade: A</b><br><b>Pipe Size: 150</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Surface Water</b> |
| MH                                                             | Cover <br>Benching <br>Channel        | Grade A                                                                     |                                                                                                                                  |
| <b>Section: 18</b><br><b>From: MH8</b><br><b>To: EOT</b>       |                                                                                                                                                                                                                                                                                          | Purpose of Inspection: Investigation of known structural or service defects | <b>DRB Grade: B</b><br><b>Pipe Size: 150</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Surface Water</b> |
| MH                                                             | Cover <br>Benching <br>Channel  | Grade B                                                                     |                                                                                                                                  |
| <b>Section: 19</b><br><b>From: MH8</b><br><b>To: EOT</b>       |                                                                                                                                                                                                                                                                                          | Purpose of Inspection: Investigation of known structural or service defects | <b>DRB Grade: B</b><br><b>Pipe Size: 150</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Surface Water</b> |
| MH                                                             | Cover <br>Benching <br>Channel  | Grade B                                                                     |                                                                                                                                  |
| <b>Section: 20</b><br><b>From: MH19</b><br><b>To: Gully</b>    |                                                                                                                                                                                                                                                                                          | Purpose of Inspection: Investigation of known structural or service defects | <b>DRB Grade: B</b><br><b>Pipe Size: 150</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Surface Water</b> |
| MH                                                             | Cover <br>Benching <br>Channel  | Grade B                                                                     |                                                                                                                                  |
| <b>Section: 21</b><br><b>From: MH9</b><br><b>To: EOT</b>       |                                                                                                                                                                                                                                                                                          | Purpose of Inspection: Investigation of known structural or service defects | <b>DRB Grade: B</b><br><b>Pipe Size: 150</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Surface Water</b> |
| MH                                                             | Cover <br>Benching <br>Channel  | Grade B                                                                     |                                                                                                                                  |

Total Defects for Project

Total DRB Grades for Project



|                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                             |                                                                                                                                  |       |             |  |          |             |  |         |             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------|-------------|--|----------|-------------|--|---------|-------------|
| <b>Section: 22</b><br><b>From: MH9</b><br><b>To: EOT</b>                                                                                                                                                                                                                                                                                                                                                               | Purpose of Inspection: Investigation of known structural or service defects | <b>DRB Grade: B</b><br><b>Pipe Size: 150</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Surface Water</b> |       |             |  |          |             |  |         |             |
| <table border="1"> <tr> <td data-bbox="108 389 167 421">MH</td><td data-bbox="172 389 327 421">Cover</td><td data-bbox="331 389 379 421"><div></div></td></tr> <tr> <td></td><td data-bbox="172 421 327 452">Benching</td><td data-bbox="331 421 379 452"><div></div></td></tr> <tr> <td></td><td data-bbox="172 452 327 483">Channel</td><td data-bbox="331 452 379 483"><div></div></td></tr> </table>               | MH                                                                          |                                                                                                                                  | Cover | <div></div> |  | Benching | <div></div> |  | Channel | <div></div> |
| MH                                                                                                                                                                                                                                                                                                                                                                                                                     | Cover                                                                       | <div></div>                                                                                                                      |       |             |  |          |             |  |         |             |
|                                                                                                                                                                                                                                                                                                                                                                                                                        | Benching                                                                    | <div></div>                                                                                                                      |       |             |  |          |             |  |         |             |
|                                                                                                                                                                                                                                                                                                                                                                                                                        | Channel                                                                     | <div></div>                                                                                                                      |       |             |  |          |             |  |         |             |
| <b>Section: 23</b><br><b>From: MH9</b><br><b>To: Gully</b>                                                                                                                                                                                                                                                                                                                                                             | Purpose of Inspection: Investigation of known structural or service defects | <b>DRB Grade: A</b><br><b>Pipe Size: 100</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Surface Water</b> |       |             |  |          |             |  |         |             |
| <table border="1"> <tr> <td data-bbox="108 622 167 654">MH</td><td data-bbox="172 622 327 654">Cover</td><td data-bbox="331 622 379 654"><div></div></td></tr> <tr> <td></td><td data-bbox="172 654 327 685">Benching</td><td data-bbox="331 654 379 685"><div></div></td></tr> <tr> <td></td><td data-bbox="172 685 327 716">Channel</td><td data-bbox="331 685 379 716"><div></div></td></tr> </table>               | MH                                                                          |                                                                                                                                  | Cover | <div></div> |  | Benching | <div></div> |  | Channel | <div></div> |
| MH                                                                                                                                                                                                                                                                                                                                                                                                                     | Cover                                                                       | <div></div>                                                                                                                      |       |             |  |          |             |  |         |             |
|                                                                                                                                                                                                                                                                                                                                                                                                                        | Benching                                                                    | <div></div>                                                                                                                      |       |             |  |          |             |  |         |             |
|                                                                                                                                                                                                                                                                                                                                                                                                                        | Channel                                                                     | <div></div>                                                                                                                      |       |             |  |          |             |  |         |             |
| <b>Section: 24</b><br><b>From: MH9</b><br><b>To: EOT</b>                                                                                                                                                                                                                                                                                                                                                               | Purpose of Inspection: Investigation of known structural or service defects | <b>DRB Grade: A</b><br><b>Pipe Size: 150</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Surface Water</b> |       |             |  |          |             |  |         |             |
| <table border="1"> <tr> <td data-bbox="108 851 167 882">MH</td><td data-bbox="172 851 327 882">Cover</td><td data-bbox="331 851 379 882"><div></div></td></tr> <tr> <td></td><td data-bbox="172 882 327 913">Benching</td><td data-bbox="331 882 379 913"><div></div></td></tr> <tr> <td></td><td data-bbox="172 913 327 945">Channel</td><td data-bbox="331 913 379 945"><div></div></td></tr> </table>               | MH                                                                          |                                                                                                                                  | Cover | <div></div> |  | Benching | <div></div> |  | Channel | <div></div> |
| MH                                                                                                                                                                                                                                                                                                                                                                                                                     | Cover                                                                       | <div></div>                                                                                                                      |       |             |  |          |             |  |         |             |
|                                                                                                                                                                                                                                                                                                                                                                                                                        | Benching                                                                    | <div></div>                                                                                                                      |       |             |  |          |             |  |         |             |
|                                                                                                                                                                                                                                                                                                                                                                                                                        | Channel                                                                     | <div></div>                                                                                                                      |       |             |  |          |             |  |         |             |
| <b>Section: 25</b><br><b>From: MH9</b><br><b>To: Rest Bend</b>                                                                                                                                                                                                                                                                                                                                                         | Purpose of Inspection: Investigation of known structural or service defects | <b>DRB Grade: A</b><br><b>Pipe Size: 100</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Surface Water</b> |       |             |  |          |             |  |         |             |
| <table border="1"> <tr> <td data-bbox="108 1079 167 1111">MH</td><td data-bbox="172 1079 327 1111">Cover</td><td data-bbox="331 1079 379 1111"><div></div></td></tr> <tr> <td></td><td data-bbox="172 1111 327 1142">Benching</td><td data-bbox="331 1111 379 1142"><div></div></td></tr> <tr> <td></td><td data-bbox="172 1142 327 1173">Channel</td><td data-bbox="331 1142 379 1173"><div></div></td></tr> </table> | MH                                                                          |                                                                                                                                  | Cover | <div></div> |  | Benching | <div></div> |  | Channel | <div></div> |
| MH                                                                                                                                                                                                                                                                                                                                                                                                                     | Cover                                                                       | <div></div>                                                                                                                      |       |             |  |          |             |  |         |             |
|                                                                                                                                                                                                                                                                                                                                                                                                                        | Benching                                                                    | <div></div>                                                                                                                      |       |             |  |          |             |  |         |             |
|                                                                                                                                                                                                                                                                                                                                                                                                                        | Channel                                                                     | <div></div>                                                                                                                      |       |             |  |          |             |  |         |             |
| <b>Section: 26</b><br><b>From: MH9</b><br><b>To: Gully</b>                                                                                                                                                                                                                                                                                                                                                             | Purpose of Inspection: Investigation of known structural or service defects | <b>DRB Grade: B</b><br><b>Pipe Size: 100</b><br><b>Material: Vitrified Clay (i.e. all clayware)</b><br><b>Use: Surface Water</b> |       |             |  |          |             |  |         |             |
| <table border="1"> <tr> <td data-bbox="108 1308 167 1339">MH</td><td data-bbox="172 1308 327 1339">Cover</td><td data-bbox="331 1308 379 1339"><div></div></td></tr> <tr> <td></td><td data-bbox="172 1339 327 1370">Benching</td><td data-bbox="331 1339 379 1370"><div></div></td></tr> <tr> <td></td><td data-bbox="172 1370 327 1402">Channel</td><td data-bbox="331 1370 379 1402"><div></div></td></tr> </table> | MH                                                                          |                                                                                                                                  | Cover | <div></div> |  | Benching | <div></div> |  | Channel | <div></div> |
| MH                                                                                                                                                                                                                                                                                                                                                                                                                     | Cover                                                                       | <div></div>                                                                                                                      |       |             |  |          |             |  |         |             |
|                                                                                                                                                                                                                                                                                                                                                                                                                        | Benching                                                                    | <div></div>                                                                                                                      |       |             |  |          |             |  |         |             |
|                                                                                                                                                                                                                                                                                                                                                                                                                        | Channel                                                                     | <div></div>                                                                                                                      |       |             |  |          |             |  |         |             |

Total Defects for Project



Total DRB Grades for Project





Site: Heywood Old Road, Middleton

Section 1

|         |                                             |                                |               |                                 |                     |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client: | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|

|                        |      |                         |      |            |    |             |     |
|------------------------|------|-------------------------|------|------------|----|-------------|-----|
| Start Node Ref:        | MH1  | Finish Node Ref:        | EOT  | Direction: | D  | Height/Dia: | 300 |
| Start Node Depth:      | 0.00 | Finish Node Depth:      | 0.00 | Use:       | S  | Shape:      | C   |
| Start Node Coordinate: |      | Finish Node Coordinate: |      | Material:  | CO | Cleaned     | N   |

|           |                 |                    |                   |                        |
|-----------|-----------------|--------------------|-------------------|------------------------|
| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition Remarks |
| MH        | Good ✓          | Good ✓             | Good ✓            |                        |

|            |             |             |             |         |            |        |                 |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
| A          |             |             |             | D       | N          | 06.3   |                 |

| Position | Code | Description              | CD | Pic  | Video Ref |  |
|----------|------|--------------------------|----|------|-----------|--|
| 00.00m   | MH   | Start node type, manhole |    |      |           |  |
| 00.00m   | WL   | Water level 15%          |    | 0_1  | 0:00:00   |  |
| 00.59m   | CU   | S1 Loss of vision        | S1 | 0_2  | 0:00:05   |  |
| 06.27m   | CU   | F1 Loss of vision        | F1 | 0_-2 | 0:00:05   |  |
| 06.30m   | SA   | Survey abandoned         |    | 0_99 |           |  |

Total Defects for section

DRB Grade for Section

0 0 0 0 0



## Descriptive Report with Remarks and Observation Images

## Section 1

| Pos    | Video Ref | Code  | Description                                            | Image                                                                                                                    |
|--------|-----------|-------|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH    | Start node type, manhole MH1                           |                                                                                                                          |
| 00.00m | 0:00:00   | WL    | Water level: 15% Height/Diameter                       | <p>Image Provided - Ref: 0_1</p>       |
| 00.59m | 0:00:05   | S1 CU | Loss of vision 0.59m - 6.27m                           | <p>Image Provided - Ref: 0_2</p>      |
| 06.27m | 0:00:05   | F1 CU | Loss of vision Defect End                              |                                                                                                                          |
| 06.30m |           | SA    | Survey abandoned EOT. Loss of vision. Survey abandoned | <p>Image Provided - Ref: 0_9999</p>  |

Total Defects for section

DRB Grade for Section





## Site: Heywood Old Road, Middleton

## Section 2

|                        |                                             |                                |               |                                 |                     |
|------------------------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client:                | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
| Start Node Ref:        | MH1                                         | Finish Node Ref:               | MH UTL        | Direction:                      | U                   |
| Start Node Depth:      | 0.00                                        | Finish Node Depth:             | 0.00          | Use:                            | S                   |
| Start Node Coordinate: |                                             | Finish Node Coordinate:        |               | Material:                       | VC                  |
|                        |                                             |                                |               | Cleaned                         | N                   |

|           |                 |                    |                   |                        |
|-----------|-----------------|--------------------|-------------------|------------------------|
| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition Remarks |
| MH        | Good ✓          | Good ✓             | Good ✓            |                        |

|            |             |             |             |         |            |        |                 |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
| A          |             |             |             | D       | N          | 21.5   |                 |

| Position | Code | Description                           | CD | Pic  | Video Ref |  |
|----------|------|---------------------------------------|----|------|-----------|--|
| 00.00m   | MH   | Start node type, manhole              |    |      |           |  |
| 00.36m   | CUW  | S1 Loss of vision, camera under water | S1 | 1_2  | 0:00:04   |  |
| 04.97m   | CUW  | F1 Loss of vision, camera under water | F1 | 1_-2 | 0:00:04   |  |
| 04.97m   | REM  | General remark                        |    | 1_3  | 0:00:12   |  |
| 08.52m   | DER  | Settled deposits coarse 5%            |    | 1_4  | 0:00:24   |  |
| 14.20m   | REM  | General remark                        |    | 1_5  | 0:00:38   |  |
| 19.87m   | REM  | General remark                        |    | 1_6  | 0:00:48   |  |
| 21.45m   | MHF  | Finish node type, manhole             |    | 1_99 |           |  |

Total Defects for section

DRB Grade for Section



Descriptive Report with Remarks and Observation Images

Section 2

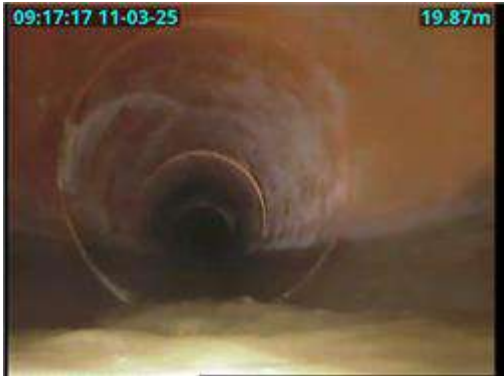
| Pos    | Video Ref | Code   | Description                                                              | Image                                                                                                             |
|--------|-----------|--------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH     | Start node type, manhole MH1                                             |                                                                                                                   |
| 00.36m | 0:00:04   | S1 CUW | Loss of vision, camera under water 0.36m - 4.97m                         | Image Provided - Ref: 1_2<br>   |
| 04.97m | 0:00:04   | F1 CUW | Loss of vision, camera under water Defect End                            |                                                                                                                   |
| 04.97m | 0:00:12   | REM    | General remark<br>General Condition Photo                                | Image Provided - Ref: 1_3<br>  |
| 08.52m | 0:00:24   | DER    | Settled deposits coarse: 5%<br>Cross sectional area loss -<br>Severity 3 | Image Provided - Ref: 1_4<br> |

Total Defects for section



DRB Grade for Section



| Pos    | Video Ref | Code | Description                                    | Image                                                                                                                    |
|--------|-----------|------|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| 14.20m | 0:00:38   | REM  | General remark<br>General Condition Photo      | <p>Image Provided - Ref: 1_5</p>       |
| 19.87m | 0:00:48   | REM  | General remark<br>General Condition Photo      | <p>Image Provided - Ref: 1_6</p>      |
| 21.45m |           | MHF  | Finish node type, manhole<br>Buried MH Reached | <p>Image Provided - Ref: 1_9999</p>  |

Total Defects for section



DRB Grade for Section





## Site: Heywood Old Road, Middleton

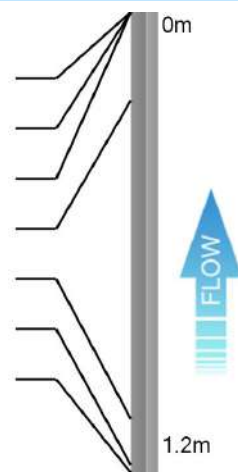
## Section 3

|                        |                                             |                                |               |                                 |                     |
|------------------------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client:                | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
| Start Node Ref:        | MH2                                         | Finish Node Ref:               | EOT           | Direction:                      | U                   |
| Start Node Depth:      | 0.00                                        | Finish Node Depth:             | 0.00          | Use:                            | S                   |
| Start Node Coordinate: |                                             | Finish Node Coordinate:        |               | Material:                       | VC                  |
|                        |                                             |                                |               | Height/Dia:                     | 100                 |
|                        |                                             |                                |               | Shape:                          | C                   |
|                        |                                             |                                |               | Cleaned                         | N                   |

| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition Remarks |
|-----------|-----------------|--------------------|-------------------|------------------------|
| CP        | Good ✓          | Good ✓             | Good ✓            |                        |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| A          |             |             |             | D       | N          | 01.2   |                 |

| Position | Code | Description                | CD | Pic  | Video Ref |  |
|----------|------|----------------------------|----|------|-----------|--|
| 00.00m   | CP   | Start node type, catch pit |    | 2_0  |           |  |
| 00.00m   | DES  | Settled deposits fine 10%  |    | 2_1  | 0:00:00   |  |
| 00.00m   | FL   | Fracture longitudinal 02   |    | 2_2  | 0:00:04   |  |
| 00.23m   | DES  | Settled deposits fine 25%  |    | 2_3  | 0:00:12   |  |
| 01.06m   | DES  | Settled deposits fine 45%  |    | 2_4  | 0:00:15   |  |
| 01.18m   | JDM  | Joint displaced medium     |    | 2_5  | 0:00:19   |  |
| 01.20m   | SA   | Survey abandoned           |    | 2_99 |           |  |



Total Defects for section

DRB Grade for Section



## Descriptive Report with Remarks and Observation Images

## Section 3

| Pos    | Video Ref | Code | Description                                                       | Image                                                                                                             |
|--------|-----------|------|-------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | CP   | Start node type, catch pit MH2                                    | Image Provided - Ref: 2_0<br>   |
| 00.00m | 0:00:00   | DES  | Settled deposits fine: 10% Cross sectional area loss - Severity 3 | Image Provided - Ref: 2_1<br>  |
| 00.00m | 0:00:04   | FL   | Fracture longitudinal at 02 o'clock - Severity 3                  | Image Provided - Ref: 2_2<br> |
| 00.23m | 0:00:12   | DES  | Settled deposits fine: 25% Cross sectional area loss - Severity 3 | Image Provided - Ref: 2_3<br> |

Total Defects for section

DRB Grade for Section



| Pos    | Video Ref | Code | Description                                                             | Image                                                                                                                |
|--------|-----------|------|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| 01.06m | 0:00:15   | DES  | Settled deposits fine: 45%<br>Cross sectional area loss -<br>Severity 3 | Image Provided - Ref: 2_4<br>      |
| 01.18m | 0:00:19   | JDM  | Joint displaced medium -<br>Severity 3                                  | Image Provided - Ref: 2_5<br>     |
| 01.20m |           | SA   | Survey abandoned<br>EOT. Unable to camera<br>further. Survey abandoned  | Image Provided - Ref: 2_9999<br> |

Total Defects for section



DRB Grade for Section





## Site: Heywood Old Road, Middleton

## Section 4

|                        |                                             |                                |               |                                 |                     |
|------------------------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client:                | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
| Start Node Ref:        | MH2                                         | Finish Node Ref:               | EOT           | Direction:                      | D                   |
| Start Node Depth:      | 0.00                                        | Finish Node Depth:             | 0.00          | Use:                            | S                   |
| Start Node Coordinate: |                                             | Finish Node Coordinate:        |               | Material:                       | VC                  |
|                        |                                             |                                |               | Height/Dia:                     | 100                 |
|                        |                                             |                                |               | Shape:                          | C                   |
|                        |                                             |                                |               | Cleaned                         | N                   |

| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition | Remarks |
|-----------|-----------------|--------------------|-------------------|----------------|---------|
| CP        | Good ✓          | Good ✓             | Good ✓            |                |         |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| A          |             |             |             | D       | N          | 01.1   |                 |

| Position | Code | Description                 | CD | Pic  | Video Ref |  |
|----------|------|-----------------------------|----|------|-----------|--|
| 00.00m   | CP   | Start node type, catch pit  |    | 3_0  |           |  |
| 00.00m   | WL   | S1 Water level 15%          | S1 | 3_1  | 0:00:00   |  |
| 00.24m   | OB   | Other obstacles 25%         |    | 3_2  | 0:00:05   |  |
| 00.71m   | DER  | Settled deposits coarse 30% |    | 3_3  | 0:00:06   |  |
| 01.00m   | WL   | F1 Water level 15%          | F1 | 3_-1 | 0:00:00   |  |
| 01.06m   | SA   | Survey abandoned            |    | 3_99 |           |  |

Total Defects for section

DRB Grade for Section



## Descriptive Report with Remarks and Observation Images

## Section 4

| Pos    | Video Ref | Code  | Description                                                         | Image                                                                                                             |
|--------|-----------|-------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | CP    | Start node type, catch pit MH2                                      | Image Provided - Ref: 3_0<br>   |
| 00.00m | 0:00:00   | S1 WL | Water level 0m - 1m: 15% Height/Diameter                            | Image Provided - Ref: 3_1<br>  |
| 00.24m | 0:00:05   | OB    | Other obstacles: 25% Cross sectional area loss - Severity 3         | Image Provided - Ref: 3_2<br> |
| 00.71m | 0:00:06   | DER   | Settled deposits coarse: 30% Cross sectional area loss - Severity 3 | Image Provided - Ref: 3_3<br> |

Total Defects for section

DRB Grade for Section



| Pos    | Video Ref | Code  | Description                                                      | Image                                                                                                                  |
|--------|-----------|-------|------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 01.00m | 0:00:00   | F1 WL | Water level Defect End: 15% Height/Diameter                      |                                                                                                                        |
| 01.06m |           | SA    | Survey abandoned EOT. Unable to camera further. Survey abandoned | <p>Image Provided - Ref: 3_9999</p>  |

Total Defects for section



DRB Grade for Section





Site: Heywood Old Road, Middleton

Section 5

|         |                                             |                                |               |                                 |                     |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client: | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|

|                        |      |                         |      |            |    |             |     |
|------------------------|------|-------------------------|------|------------|----|-------------|-----|
| Start Node Ref:        | MH3  | Finish Node Ref:        | Pump | Direction: | D  | Height/Dia: | 100 |
| Start Node Depth:      | 0.00 | Finish Node Depth:      | 0.00 | Use:       | F  | Shape:      | C   |
| Start Node Coordinate: |      | Finish Node Coordinate: |      | Material:  | VC | Cleaned     | N   |

|           |                 |                    |                   |                        |
|-----------|-----------------|--------------------|-------------------|------------------------|
| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition Remarks |
| MH        | Good ✓          | Good ✓             | Good ✓            |                        |

|            |             |             |             |         |            |        |                 |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
| A          |             |             |             | D       | N          | 01.2   |                 |

| Position | Code | Description                                 | CD | Pic  | Video Ref |  |
|----------|------|---------------------------------------------|----|------|-----------|--|
| 00.00m   | MH   | Start node type, manhole                    |    | 4_0  |           |  |
| 00.24m   | LLQ  | Line of drain/sewer deviates left [quarter] |    | 4_1  |           |  |
| 01.18m   | REM  | General remark                              |    | 4_2  | 0:00:12   |  |
| 01.20m   | BRF  | Finish node type, major connection without  |    | 4_99 |           |  |

Total Defects for section

DRB Grade for Section



## Descriptive Report with Remarks and Observation Images

## Section 5

| Pos    | Video Ref | Code | Description                                             | Image                                                                                                                    |
|--------|-----------|------|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH   | Start node type, manhole MH3                            | <p>Image Provided - Ref: 4_0</p>       |
| 00.24m |           | LLQ  | Line of drain/sewer deviates left [quarter]             | <p>Image Provided - Ref: 4_1</p>      |
| 01.18m | 0:00:12   | REM  | General remark<br>General Condition Photo               | <p>Image Provided - Ref: 4_2</p>     |
| 01.20m |           | BRF  | Finish node type, major connection without manhole Pump | <p>Image Provided - Ref: 4_9999</p>  |

Total Defects for section

DRB Grade for Section



## Site: Heywood Old Road, Middleton

## Section 6

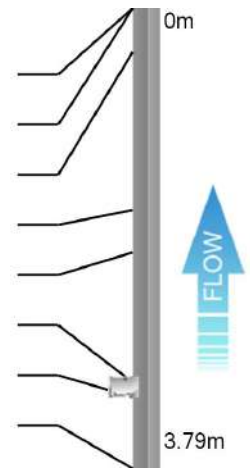
|         |                                             |                                |               |                                 |                     |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client: | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|

|                        |      |                         |       |            |    |             |     |
|------------------------|------|-------------------------|-------|------------|----|-------------|-----|
| Start Node Ref:        | MH3  | Finish Node Ref:        | Gully | Direction: | U  | Height/Dia: | 100 |
| Start Node Depth:      | 0.00 | Finish Node Depth:      | 0.00  | Use:       | F  | Shape:      | C   |
| Start Node Coordinate: |      | Finish Node Coordinate: |       | Material:  | VC | Cleaned     | N   |

| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition Remarks |
|-----------|-----------------|--------------------|-------------------|------------------------|
| MH        | Good            | Good               | Good              |                        |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| A          |             |             |             | D       | N          | 03.8   |                 |

| Position | Code | Description                                  | CD | Pic  | Video Ref |  |
|----------|------|----------------------------------------------|----|------|-----------|--|
| 00.00m   | MH   | Start node type, manhole                     |    | 5_0  |           |  |
| 00.00m   | LUQ  | Line of drain/sewer deviates up [quarter]    |    | 5_1  | 0:00:00   |  |
| 00.36m   | LRQ  | Line of drain/sewer deviates right [quarter] |    | 5_2  | 0:00:10   |  |
| 01.66m   | JDM  | Joint displaced medium                       |    | 5_3  | 0:00:16   |  |
| 02.01m   | LDQ  | Line of drain/sewer deviates down [quarter]  |    | 5_4  | 0:00:19   |  |
| 03.08m   | JDM  | Joint displaced medium                       |    | 5_5  | 0:00:22   |  |
| 03.20m   | JN   | Junction 03 : 100mm Diameter                 |    | 5_6  | 0:00:23   |  |
| 03.79m   | GYF  | Finish node type Gully                       |    | 5_99 |           |  |



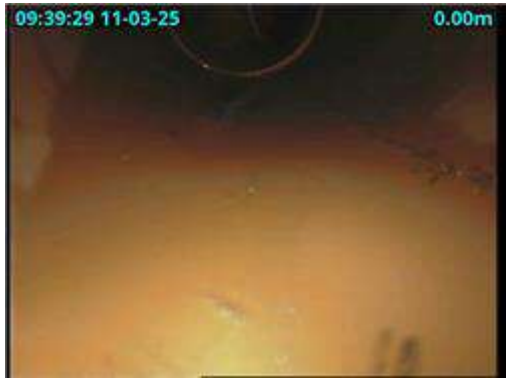
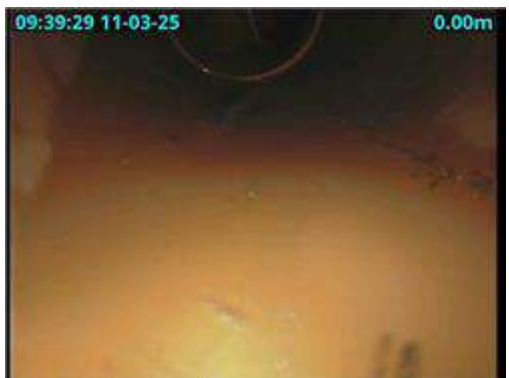
Total Defects for section

DRB Grade for Section



## Descriptive Report with Remarks and Observation Images

## Section 6

| Pos    | Video Ref | Code | Description                                  | Image                                                                                                                 |
|--------|-----------|------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH   | Start node type, manhole MH3                 | <p>Image Provided - Ref: 5_0</p>    |
| 00.00m | 0:00:00   | LUQ  | Line of drain/sewer deviates up [quarter]    | <p>Image Provided - Ref: 5_1</p>   |
| 00.36m | 0:00:10   | LRQ  | Line of drain/sewer deviates right [quarter] | <p>Image Provided - Ref: 5_2</p>  |
| 01.66m | 0:00:16   | JDM  | Joint displaced medium - Severity 3          | <p>Image Provided - Ref: 5_3</p>  |

Total Defects for section

DRB Grade for Section



| Pos    | Video Ref | Code | Description                                 | Image                                                                                                                |
|--------|-----------|------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| 02.01m | 0:00:19   | LDQ  | Line of drain/sewer deviates down [quarter] | Image Provided - Ref: 5_4<br>      |
| 03.08m | 0:00:22   | JDM  | Joint displaced medium - Severity 3         | Image Provided - Ref: 5_5<br>     |
| 03.20m | 0:00:23   | JN   | Junction at 03 o'clock: 100mm Diameter      | Image Provided - Ref: 5_6<br>    |
| 03.79m |           | GYF  | Finish node type Gully Gully reached        | Image Provided - Ref: 5_9999<br> |

Total Defects for section



DRB Grade for Section





## Site: Heywood Old Road, Middleton

## Section 7

|                        |                                             |                                |               |                                 |                     |
|------------------------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client:                | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
| Start Node Ref:        | MH3                                         | Finish Node Ref:               | Rest Bend     | Direction: U                    | Height/Dia: 100     |
| Start Node Depth:      | 0.00                                        | Finish Node Depth:             | 0.00          | Use: F                          | Shape: C            |
| Start Node Coordinate: |                                             | Finish Node Coordinate:        |               | Material: VC                    | Cleaned N           |

| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition Remarks |
|-----------|-----------------|--------------------|-------------------|------------------------|
| MH        | Good ✓          | Good ✓             | Good ✓            |                        |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| A          |             |             |             | D       | N          | 02.8   |                 |

| Position | Code | Description                                 | CD | Pic  | Video Ref |  |
|----------|------|---------------------------------------------|----|------|-----------|--|
| 00.00m   | MH   | Start node type, manhole                    |    | 6_0  |           |  |
| 00.36m   | DEE  | S1 Attached deposits, encrustation 04-08 5% | S1 | 6_1  |           |  |
| 01.66m   | JDM  | Joint displaced medium                      |    | 6_2  | 0:00:12   |  |
| 02.61m   | DEE  | Attached deposits, encrustation 0 15%       |    | 6_3  | 0:00:15   |  |
| 02.84m   | DEE  | F1 Attached deposits, encrustation 04-08 5% | F1 | 6_-1 |           |  |
| 02.84m   | OCF  | Finish node type, other special chamber     |    | 6_99 |           |  |

Total Defects for section

DRB Grade for Section



## Descriptive Report with Remarks and Observation Images

## Section 7

| Pos    | Video Ref | Code   | Description                                                                                                            | Image                                                                                                                 |
|--------|-----------|--------|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH     | Start node type, manhole MH3                                                                                           | <p>Image Provided - Ref: 6_0</p>    |
| 00.36m |           | S1 DEE | Attached deposits, encrustation 0.36m - 2.84m from 04 o'clock to 08 o'clock: 5% Cross sectional area loss - Severity 3 | <p>Image Provided - Ref: 6_1</p>   |
| 01.66m | 0:00:12   | JDM    | Joint displaced medium - Severity 3                                                                                    | <p>Image Provided - Ref: 6_2</p>  |
| 02.61m | 0:00:15   | DEE    | Attached deposits, encrustation: 15% Cross sectional area loss - Severity 3                                            | <p>Image Provided - Ref: 6_3</p>  |

Total Defects for section

DRB Grade for Section



| Pos    | Video Ref | Code   | Description                                                                                                         | Image                                                                                                                  |
|--------|-----------|--------|---------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 02.84m |           | F1 DEE | Attached deposits, encrustation Defect End from 04 o'clock to 08 o'clock: 5% Cross sectional area loss - Severity 3 |                                                                                                                        |
| 02.84m |           | OCF    | Finish node type, other special chamber<br>Rest Bend reached                                                        | <p>Image Provided - Ref: 6_9999</p>  |

Total Defects for section



DRB Grade for Section





## Site: Heywood Old Road, Middleton

## Section 8

|                        |                                             |                                |               |                                 |                     |
|------------------------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client:                | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
| Start Node Ref:        | MH4                                         | Finish Node Ref:               | EOT           | Direction:                      | D                   |
| Start Node Depth:      | 0.00                                        | Finish Node Depth:             | 0.00          | Use:                            | S                   |
| Start Node Coordinate: |                                             | Finish Node Coordinate:        |               | Material:                       | VC                  |
|                        |                                             |                                |               | Cleaned                         | N                   |

| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition | Remarks |
|-----------|-----------------|--------------------|-------------------|----------------|---------|
| MH        | Good ✓          | Good ✓             | Good ✓            |                |         |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| A          |             |             |             | D       | N          | 08.5   |                 |

| Position | Code | Description                  | CD | Pic  | Video Ref |  |
|----------|------|------------------------------|----|------|-----------|--|
| 00.00m   | MH   | Start node type, manhole     |    | 7_0  |           |  |
| 00.00m   | WL   | S1 Water level 10%           | S1 | 7_1  |           |  |
| 00.47m   | DES  | S2 Settled deposits fine 10% | S2 | 7_4  | 0:01:47   |  |
| 04.73m   | JN   | Junction 02 : 150mm Diameter |    | 7_3  | 0:01:32   |  |
| 07.57m   | DES  | F2 Settled deposits fine 10% | F2 | 7_-4 | 0:01:47   |  |
| 07.57m   | DES  | Settled deposits fine 15%    |    | 7_2  | 0:01:08   |  |
| 08.51m   | WL   | F1 Water level 10%           | F1 | 7_-1 |           |  |
| 08.51m   | SA   | Survey abandoned             |    | 7_99 |           |  |

Total Defects for section

DRB Grade for Section



## Descriptive Report with Remarks and Observation Images

## Section 8

| Pos    | Video Ref | Code   | Description                                                                     | Image                                                                                                             |
|--------|-----------|--------|---------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH     | Start node type, manhole MH4                                                    | Image Provided - Ref: 7_0<br>   |
| 00.00m |           | S1 WL  | Water level 0m - 8.51m: 10% Height/Diameter                                     | Image Provided - Ref: 7_1<br>  |
| 00.47m | 0:01:47   | S2 DES | Settled deposits fine 0.47m - 7.57m: 10% Cross sectional area loss - Severity 3 | Image Provided - Ref: 7_4<br> |
| 04.73m | 0:01:32   | JN     | Junction at 02 o'clock: 150mm Diameter                                          | Image Provided - Ref: 7_3<br> |

Total Defects for section

DRB Grade for Section



| Pos    | Video Ref | Code   | Description                                                                  | Image                                                                                                                   |
|--------|-----------|--------|------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| 07.57m | 0:01:47   | F2 DES | Settled deposits fine Defect End: 10% Cross sectional area loss - Severity 3 |                                                                                                                         |
| 07.57m | 0:01:08   | DES    | Settled deposits fine: 15% Cross sectional area loss - Severity 3            | <p>Image Provided - Ref: 7_2</p>      |
| 08.51m |           | F1 WL  | Water level Defect End: 10% Height/Diameter                                  |                                                                                                                         |
| 08.51m |           | SA     | Survey abandoned EOT. Loss of leverage. Survey abandoned                     | <p>Image Provided - Ref: 7_9999</p>  |

Total Defects for section



DRB Grade for Section





## Site: Heywood Old Road, Middleton

## Section 9

|         |                                             |                                |               |                                 |                     |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client: | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|

|                        |      |                         |      |            |    |             |     |
|------------------------|------|-------------------------|------|------------|----|-------------|-----|
| Start Node Ref:        | MH4  | Finish Node Ref:        | EOT  | Direction: | U  | Height/Dia: | 225 |
| Start Node Depth:      | 0.00 | Finish Node Depth:      | 0.00 | Use:       | S  | Shape:      | C   |
| Start Node Coordinate: |      | Finish Node Coordinate: |      | Material:  | VC | Cleaned     | N   |

| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition | Remarks |
|-----------|-----------------|--------------------|-------------------|----------------|---------|
| MH        | Good ✓          | Good ✓             | Good ✓            |                |         |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| A          |             |             |             | D       | N          | 33.0   |                 |

| Position | Code | Description                              | CD | Pic  | Video Ref |  |
|----------|------|------------------------------------------|----|------|-----------|--|
| 00.00m   | MH   | Start node type, manhole                 |    | 8_0  |           |  |
| 00.00m   | DER  | Settled deposits coarse 5%               |    | 8_1  | 0:00:00   |  |
| 00.65m   | SC   | Dimension of drain/sewer changes : 100mm |    | 8_2  | 0:00:07   |  |
| 03.20m   | REM  | General remark                           |    | 8_3  | 0:00:16   |  |
| 08.87m   | REM  | General remark                           |    | 8_4  | 0:00:33   |  |
| 12.30m   | REM  | General remark                           |    | 8_5  | 0:00:43   |  |
| 17.57m   | REM  | General remark                           |    | 8_6  | 0:01:00   |  |
| 22.18m   | REM  | General remark                           |    | 8_7  | 0:01:21   |  |
| 27.15m   | JDM  | Joint displaced medium                   |    | 8_8  | 0:01:38   |  |
| 27.20m   | JN   | Junction 02 : 100mm Diameter             |    | 8_9  | 0:01:39   |  |
| 33.00m   | REM  | General remark                           |    | 8_10 | 0:01:56   |  |
| 33.00m   | SA   | Survey abandoned                         |    | 8_99 |           |  |

Total Defects for section

DRB Grade for Section



## Descriptive Report with Remarks and Observation Images

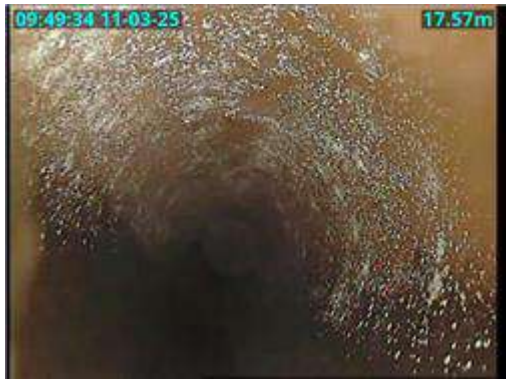
## Section 9

| Pos    | Video Ref | Code | Description                                                              | Image                                                                                                             |
|--------|-----------|------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH   | Start node type, manhole MH4                                             | Image Provided - Ref: 8_0<br>   |
| 00.00m | 0:00:00   | DER  | Settled deposits coarse: 5%<br>Cross sectional area loss -<br>Severity 3 | Image Provided - Ref: 8_1<br>  |
| 00.65m | 0:00:07   | SC   | Dimension of drain/sewer<br>changes: 100mm Diameter                      | Image Provided - Ref: 8_2<br> |
| 03.20m | 0:00:16   | REM  | General remark<br>General Condition Photo                                | Image Provided - Ref: 8_3<br> |

Total Defects for section

DRB Grade for Section

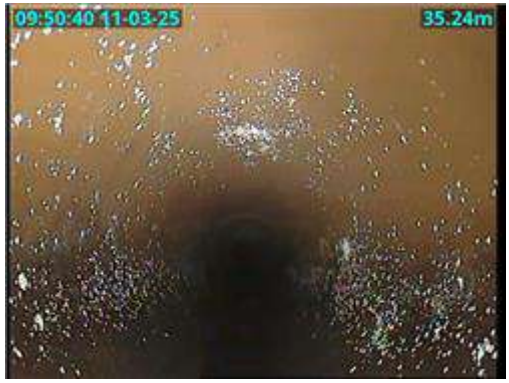


| Pos    | Video Ref | Code | Description                               | Image                                                                                                             |
|--------|-----------|------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| 08.87m | 0:00:33   | REM  | General remark<br>General Condition Photo | Image Provided - Ref: 8_4<br>   |
| 12.30m | 0:00:43   | REM  | General remark<br>General Condition Photo | Image Provided - Ref: 8_5<br>  |
| 17.57m | 0:01:00   | REM  | General remark<br>General Condition Photo | Image Provided - Ref: 8_6<br> |
| 22.18m | 0:01:21   | REM  | General remark<br>General Condition Photo | Image Provided - Ref: 8_7<br> |

Total Defects for section

DRB Grade for Section



| Pos    | Video Ref | Code | Description                                                  | Image                                                                                                                |
|--------|-----------|------|--------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| 27.15m | 0:01:38   | JDM  | Joint displaced medium - Severity 3                          | Image Provided - Ref: 8_8<br>      |
| 27.20m | 0:01:39   | JN   | Junction at 02 o'clock: 100mm Diameter                       | Image Provided - Ref: 8_9<br>     |
| 33.00m | 0:01:56   | REM  | General remark<br>General Condition Photo                    | Image Provided - Ref: 8_10<br>   |
| 33.00m |           | SA   | Survey abandoned<br>EOT. Loss of leverage.<br>Overlap on R11 | Image Provided - Ref: 8_9999<br> |

Total Defects for section



DRB Grade for Section





## Site: Heywood Old Road, Middleton

## Section 10

|                        |                                             |                                |               |                                 |                     |
|------------------------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client:                | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
| Start Node Ref:        | MH4                                         | Finish Node Ref:               | MH10          | Direction:                      | U                   |
| Start Node Depth:      | 0.00                                        | Finish Node Depth:             | 0.00          | Use:                            | S                   |
| Start Node Coordinate: |                                             | Finish Node Coordinate:        |               | Material:                       | VC                  |
|                        |                                             |                                |               | Height/Dia:                     | 150                 |
|                        |                                             |                                |               | Shape:                          | C                   |
|                        |                                             |                                |               | Cleaned                         | N                   |

| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition Remarks |
|-----------|-----------------|--------------------|-------------------|------------------------|
| MH        | Good ✓          | Good ✓             | Good ✓            |                        |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| A          |             |             |             | D       | N          | 08.8   |                 |

| Position | Code | Description               | CD | Pic  | Video Ref |  |
|----------|------|---------------------------|----|------|-----------|--|
| 00.00m   | MH   | Start node type, manhole  |    | 9_0  |           |  |
| 00.00m   | WL   | S1 Water level 5%         | S1 | 9_1  |           |  |
| 03.20m   | REM  | General remark            |    | 9_2  | 0:00:15   |  |
| 08.70m   | WL   | F1 Water level 5%         | F1 | 9_-1 |           |  |
| 08.75m   | MHF  | Finish node type, manhole |    | 9_99 |           |  |

Total Defects for section

DRB Grade for Section

0 0 0 0 0



Descriptive Report with Remarks and Observation Images

Section 10

| Pos    | Video Ref | Code  | Description                                | Image                                                                                                                 |
|--------|-----------|-------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH    | Start node type, manhole MH4               | <p>Image Provided - Ref: 9_0</p>    |
| 00.00m |           | S1 WL | Water level 0m - 8.7m: 5% Height/Diameter  | <p>Image Provided - Ref: 9_1</p>   |
| 03.20m | 0:00:15   | REM   | General remark<br>General Condition Photo  | <p>Image Provided - Ref: 9_2</p>  |
| 08.70m |           | F1 WL | Water level Defect End: 5% Height/Diameter |                                                                                                                       |

Total Defects for section



DRB Grade for Section



| Pos    | Video Ref | Code | Description                               | Image                                                                                                                  |
|--------|-----------|------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 08.75m |           | MHF  | Finish node type, manhole<br>MH10 reached | <p>Image Provided - Ref: 9_9999</p>  |

Total Defects for section

DRB Grade for Section





## Site: Heywood Old Road, Middleton

## Section 11

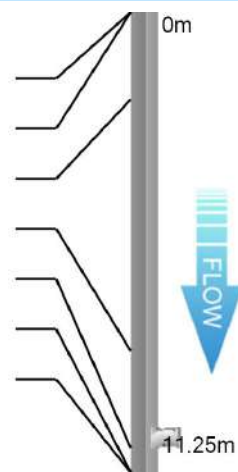
|         |                                             |                                |               |                                 |                     |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client: | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|

|                        |      |                         |      |            |    |             |     |
|------------------------|------|-------------------------|------|------------|----|-------------|-----|
| Start Node Ref:        | MH5  | Finish Node Ref:        | EOT  | Direction: | D  | Height/Dia: | 100 |
| Start Node Depth:      | 0.00 | Finish Node Depth:      | 0.00 | Use:       | S  | Shape:      | C   |
| Start Node Coordinate: |      | Finish Node Coordinate: |      | Material:  | VC | Cleaned     | N   |

| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition Remarks |
|-----------|-----------------|--------------------|-------------------|------------------------|
| MH        | Good ✓          | Good ✓             | Good ✓            |                        |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| A          |             |             |             | D       | N          | 11.3   |                 |

| Position | Code | Description                  | CD | Pic  | Video Ref |  |
|----------|------|------------------------------|----|------|-----------|--|
| 00.00m   | MH   | Start node type, manhole     |    | 10_0 |           |  |
| 00.00m   | WL   | S1 Water level 5%            | S1 | 10_1 | 0:00:00   |  |
| 02.13m   | REM  | General remark               |    | 10_2 | 0:00:13   |  |
| 08.28m   | REM  | General remark               |    | 10_3 | 0:00:29   |  |
| 10.65m   | JN   | Junction 11 : 100mm Diameter |    | 10_4 | 0:00:36   |  |
| 11.24m   | WL   | F1 Water level 5%            | F1 | 10_- | 0:00:00   |  |
| 11.25m   | SA   | Survey abandoned             |    | 10_9 |           |  |



Total Defects for section

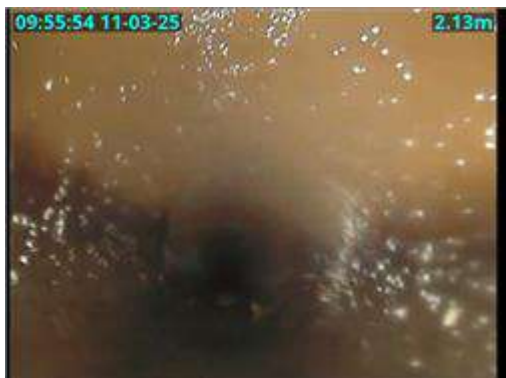
DRB Grade for Section

0 0 0 0 0



## Descriptive Report with Remarks and Observation Images

## Section 11

| Pos    | Video Ref | Code  | Description                                 | Image                                                                                                              |
|--------|-----------|-------|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH    | Start node type, manhole MH5                | Image Provided - Ref: 10_0<br>   |
| 00.00m | 0:00:00   | S1 WL | Water level 0m - 11.24m: 5% Height/Diameter | Image Provided - Ref: 10_1<br>  |
| 02.13m | 0:00:13   | REM   | General remark<br>General Condition Photo   | Image Provided - Ref: 10_2<br> |
| 08.28m | 0:00:29   | REM   | General remark<br>General Condition Photo   | Image Provided - Ref: 10_3<br> |

Total Defects for section

DRB Grade for Section



| Pos    | Video Ref | Code  | Description                                | Image                                                                                                                    |
|--------|-----------|-------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| 10.65m | 0:00:36   | JN    | Junction at 11 o'clock: 100mm Diameter     | <p>Image Provided - Ref: 10_4</p>      |
| 11.24m | 0:00:00   | F1 WL | Water level Defect End: 5% Height/Diameter |                                                                                                                          |
| 11.25m |           | SA    | Survey abandoned<br>Overlap Met            | <p>Image Provided - Ref: 10_9999</p>  |

Total Defects for section

DRB Grade for Section





## Site: Heywood Old Road, Middleton

## Section 12

|         |                                             |                                |               |                                 |                     |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client: | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|

|                        |      |                         |           |            |    |             |     |
|------------------------|------|-------------------------|-----------|------------|----|-------------|-----|
| Start Node Ref:        | MH5  | Finish Node Ref:        | Rest Bend | Direction: | U  | Height/Dia: | 100 |
| Start Node Depth:      | 0.00 | Finish Node Depth:      | 0.00      | Use:       | S  | Shape:      | C   |
| Start Node Coordinate: |      | Finish Node Coordinate: |           | Material:  | VC | Cleaned     | N   |

|           |                 |                    |                   |                        |
|-----------|-----------------|--------------------|-------------------|------------------------|
| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition Remarks |
| MH        | Good ✓          | Good ✓             | Good ✓            |                        |

|            |             |             |             |         |            |        |                 |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
| A          |             |             |             | D       | N          | 15.0   |                 |

| Position | Code | Description                                  | CD | Pic  | Video Ref |  |
|----------|------|----------------------------------------------|----|------|-----------|--|
| 00.00m   | MH   | Start node type, manhole                     |    | 11_0 |           |  |
| 00.00m   | WL   | S1 Water level 5%                            | S1 | 11_1 | 0:00:00   |  |
| 03.32m   | REM  | General remark                               |    | 11_2 | 0:00:14   |  |
| 08.05m   | REM  | General remark                               |    | 11_3 | 0:00:30   |  |
| 13.25m   | LRQ  | Line of drain/sewer deviates right [quarter] |    | 11_4 | 0:00:45   |  |
| 13.72m   | DEE  | Attached deposits, encrustation 04-08 5%     |    | 11_5 | 0:00:48   |  |
| 14.32m   | JDM  | Joint displaced medium                       |    | 11_6 | 0:01:00   |  |
| 14.40m   | JN   | Junction 09 : 100mm Diameter                 |    | 11_7 | 0:01:02   |  |
| 14.79m   | LRQ  | Line of drain/sewer deviates right [quarter] |    | 11_8 | 0:01:28   |  |
| 15.03m   | OCF  | Finish node type, other special chamber      |    | 11_9 |           |  |

Total Defects for section

DRB Grade for Section



## Descriptive Report with Remarks and Observation Images

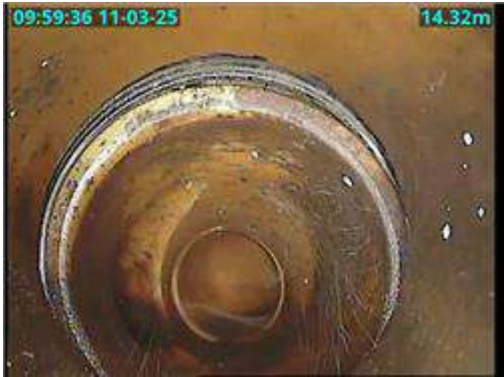
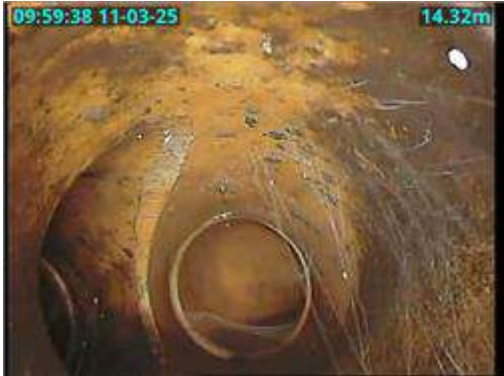
## Section 12

| Pos    | Video Ref | Code  | Description                               | Image                                                                                                              |
|--------|-----------|-------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH    | Start node type, manhole MH5              | Image Provided - Ref: 11_0<br>   |
| 00.00m | 0:00:00   | S1 WL | Water level 0m - 0m: 5% Height/Diameter   | Image Provided - Ref: 11_1<br>  |
| 03.32m | 0:00:14   | REM   | General remark<br>General Condition Photo | Image Provided - Ref: 11_2<br> |
| 08.05m | 0:00:30   | REM   | General remark<br>General Condition Photo | Image Provided - Ref: 11_3<br> |

Total Defects for section

DRB Grade for Section



| Pos    | Video Ref | Code | Description                                                                                              | Image                                                                                                                  |
|--------|-----------|------|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 13.25m | 0:00:45   | LRQ  | Line of drain/sewer deviates right [quarter]                                                             | <p>Image Provided - Ref: 11_4</p>    |
| 13.72m | 0:00:48   | DEE  | Attached deposits, encrustation from 04 o'clock to 08 o'clock: 5% Cross sectional area loss - Severity 3 | <p>Image Provided - Ref: 11_5</p>   |
| 14.32m | 0:01:00   | JDM  | Joint displaced medium - Severity 3                                                                      | <p>Image Provided - Ref: 11_6</p>  |
| 14.40m | 0:01:02   | JN   | Junction at 09 o'clock: 100mm Diameter                                                                   | <p>Image Provided - Ref: 11_7</p>  |

Total Defects for section



DRB Grade for Section



| Pos    | Video Ref | Code | Description                                                  | Image                                                                                                                    |
|--------|-----------|------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| 14.79m | 0:01:28   | LRQ  | Line of drain/sewer deviates right [quarter]                 | <p>Image Provided - Ref: 11_8</p>      |
| 15.03m |           | OCF  | Finish node type, other special chamber<br>Rest Bend reached | <p>Image Provided - Ref: 11_9999</p>  |

Total Defects for section



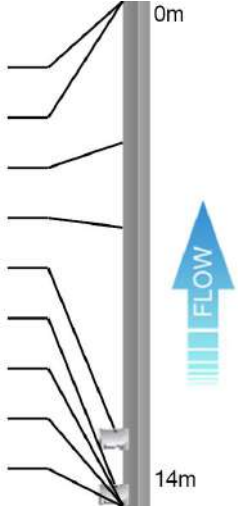
DRB Grade for Section





## Site: Heywood Old Road, Middleton

## Section 13

|                                                                |                                             |                                                                   |                   |                                         |                                           |                                                                                      |                 |
|----------------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------|-------------------|-----------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------|-----------------|
| Client:                                                        | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton                                    | Cust Job Ref.     | Surveyors Name:<br>Carl Lopeman         | Date:<br>11/03/2025                       |                                                                                      |                 |
| Start Node Ref:<br>Start Node Depth:<br>Start Node Coordinate: | MH6<br>0.00                                 | Finish Node Ref:<br>Finish Node Depth:<br>Finish Node Coordinate: | EOT<br>0.00       | Direction: U<br>Use: S<br>Material: PVC | Height/Dia: 150<br>Shape: C<br>Cleaned: N |                                                                                      |                 |
| Node Type                                                      | Cover Condition                             | Benching Condition                                                | Channel Condition | Node Condition Remarks                  |                                           |                                                                                      |                 |
| MH                                                             | Good ✓                                      | Good ✓                                                            | Good ✓            |                                         |                                           |                                                                                      |                 |
| Drain Type                                                     | Lining Type                                 | Lining Mat.                                                       | Year Const.       | Weather                                 | Flow Cont.                                | Length                                                                               | General Remarks |
| A                                                              |                                             |                                                                   |                   | D                                       | N                                         | 14.0                                                                                 |                 |
| Position                                                       | Code                                        | Description                                                       | CD                | Pic                                     | Video Ref                                 |  |                 |
| 00.00m                                                         | MH                                          | Start node type, manhole                                          |                   | 12_0                                    |                                           |                                                                                      |                 |
| 00.00m                                                         | WL                                          | S1 Water level 5%                                                 | S1                | 12_1                                    |                                           |                                                                                      |                 |
| 03.91m                                                         | REM                                         | General remark                                                    |                   | 12_2                                    | 0:00:15                                   |                                                                                      |                 |
| 06.27m                                                         | REM                                         | General remark                                                    |                   | 12_3                                    | 0:00:22                                   |                                                                                      |                 |
| 12.42m                                                         | CN                                          | Connection other than junction 03 : 150mm                         |                   | 12_4                                    | 0:00:40                                   |                                                                                      |                 |
| 13.96m                                                         | CN                                          | Connection other than junction 03 : 150mm                         |                   | 12_5                                    | 0:00:46                                   |                                                                                      |                 |
| 13.96m                                                         | H                                           | Hole in drain/sewer 12                                            |                   | 12_6                                    | 0:00:46                                   |                                                                                      |                 |
| 13.96m                                                         | DER                                         | Settled deposits coarse 35%                                       |                   | 12_7                                    | 0:00:49                                   |                                                                                      |                 |
| 14.00m                                                         | SA                                          | Survey abandoned                                                  |                   | 12_9                                    |                                           |                                                                                      |                 |

Total Defects for section

DRB Grade for Section



## Descriptive Report with Remarks and Observation Images

## Section 13

| Pos    | Video Ref | Code  | Description                               | Image                                                                                                                  |
|--------|-----------|-------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH    | Start node type, manhole MH6              | <p>Image Provided - Ref: 12_0</p>    |
| 00.00m |           | S1 WL | Water level 0m - 0m: 5% Height/Diameter   | <p>Image Provided - Ref: 12_1</p>   |
| 03.91m | 0:00:15   | REM   | General remark<br>General Condition Photo | <p>Image Provided - Ref: 12_2</p>  |
| 06.27m | 0:00:22   | REM   | General remark<br>General Condition Photo | <p>Image Provided - Ref: 12_3</p>  |

Total Defects for section

DRB Grade for Section



| Pos    | Video Ref | Code | Description                                                         | Image                                                                                                                  |
|--------|-----------|------|---------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 12.42m | 0:00:40   | CN   | Connection other than junction at 03 o'clock: 150mm Diameter        | <p>Image Provided - Ref: 12_4</p>    |
| 13.96m | 0:00:46   | CN   | Connection other than junction at 03 o'clock: 150mm Diameter        | <p>Image Provided - Ref: 12_5</p>   |
| 13.96m | 0:00:46   | H    | Hole in drain/sewer at 12 o'clock - Severity 4                      | <p>Image Provided - Ref: 12_6</p>  |
| 13.96m | 0:00:49   | DER  | Settled deposits coarse: 35% Cross sectional area loss - Severity 3 | <p>Image Provided - Ref: 12_7</p>  |

Total Defects for section

DRB Grade for Section



| Pos    | Video Ref | Code | Description                                       | Image                                                                                                                                                   |
|--------|-----------|------|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14.00m |           | SA   | Survey abandoned<br>EOT. Unable to camera further | <p>Image Provided - Ref: 12_9999</p>  <p>10:06:53 11-03-25 14.33m</p> |

Total Defects for section



DRB Grade for Section





## Site: Heywood Old Road, Middleton

## Section 14

|         |                                             |                                |               |                                 |                     |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client: | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|

|                        |      |                         |      |            |     |             |     |
|------------------------|------|-------------------------|------|------------|-----|-------------|-----|
| Start Node Ref:        | MH6  | Finish Node Ref:        | MH7  | Direction: | U   | Height/Dia: | 100 |
| Start Node Depth:      | 0.00 | Finish Node Depth:      | 0.00 | Use:       | S   | Shape:      | C   |
| Start Node Coordinate: |      | Finish Node Coordinate: |      | Material:  | PVC | Cleaned     | N   |

|           |                 |                    |                   |                        |
|-----------|-----------------|--------------------|-------------------|------------------------|
| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition Remarks |
| MH        | Good ✓          | Good ✓             | Good ✓            |                        |

|            |             |             |             |         |            |        |                 |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
| A          |             |             |             | D       | N          | 34.0   |                 |

| Position | Code | Description                                  | CD | Pic  | Video Ref |  |
|----------|------|----------------------------------------------|----|------|-----------|--|
| 00.00m   | MH   | Start node type, manhole                     |    | 13_0 |           |  |
| 03.08m   | REM  | General remark                               |    | 13_1 |           |  |
| 05.56m   | WL   | Water level 10%                              |    | 13_2 | 0:00:24   |  |
| 12.00m   | REM  | General remark                               |    | 13_3 | 0:00:40   |  |
| 17.27m   | REM  | General remark                               |    | 13_4 | 0:00:54   |  |
| 23.91m   | REM  | General remark                               |    | 13_5 | 0:01:06   |  |
| 30.70m   | REM  | General remark                               |    | 13_6 | 0:01:18   |  |
| 33.49m   | LRQ  | Line of drain/sewer deviates right [quarter] |    | 13_7 | 0:01:22   |  |
| 34.00m   | MHF  | Finish node type, manhole                    |    | 13_9 |           |  |

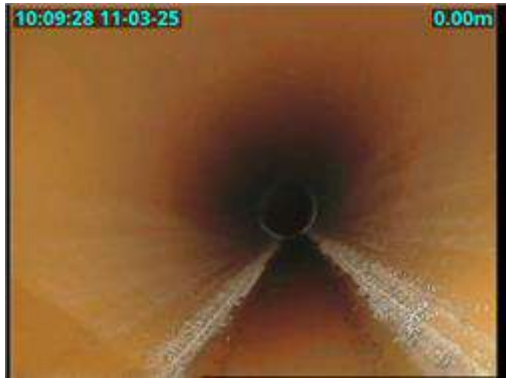
Total Defects for section

DRB Grade for Section



Descriptive Report with Remarks and Observation Images

Section 14

| Pos    | Video Ref | Code | Description                               | Image                                                                                                                  |
|--------|-----------|------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH   | Start node type, manhole MH6              | <p>Image Provided - Ref: 13_0</p>    |
| 03.08m |           | REM  | General remark<br>General Condition Photo | <p>Image Provided - Ref: 13_1</p>   |
| 05.56m | 0:00:24   | WL   | Water level: 10%<br>Height/Diameter       | <p>Image Provided - Ref: 13_2</p>  |
| 12.00m | 0:00:40   | REM  | General remark<br>General Condition Photo | <p>Image Provided - Ref: 13_3</p>  |

Total Defects for section

DRB Grade for Section



| Pos    | Video Ref | Code | Description                                  | Image                                                                                                                  |
|--------|-----------|------|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 17.27m | 0:00:54   | REM  | General remark<br>General Condition Photo    | <p>Image Provided - Ref: 13_4</p>    |
| 23.91m | 0:01:06   | REM  | General remark<br>General Condition Photo    | <p>Image Provided - Ref: 13_5</p>   |
| 30.70m | 0:01:18   | REM  | General remark<br>General Condition Photo    | <p>Image Provided - Ref: 13_6</p>  |
| 33.49m | 0:01:22   | LRQ  | Line of drain/sewer deviates right [quarter] | <p>Image Provided - Ref: 13_7</p>  |

Total Defects for section

DRB Grade for Section



| Pos    | Video Ref | Code | Description                           | Image                                                                                                                   |
|--------|-----------|------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| 34.00m |           | MHF  | Finish node type, manhole MH7 reached | <p>Image Provided - Ref: 13_9999</p>  |

Total Defects for section

DRB Grade for Section

0 0 0 0 0





## Site: Heywood Old Road, Middleton

## Section 15

|         |                                             |                                |               |                                 |                     |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client: | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|

|                        |      |                         |        |            |     |             |     |
|------------------------|------|-------------------------|--------|------------|-----|-------------|-----|
| Start Node Ref:        | MH7  | Finish Node Ref:        | Outlet | Direction: | U   | Height/Dia: | 100 |
| Start Node Depth:      | 0.00 | Finish Node Depth:      | 0.00   | Use:       | S   | Shape:      | C   |
| Start Node Coordinate: |      | Finish Node Coordinate: |        | Material:  | PVC | Cleaned     | N   |

|           |                 |                    |                   |                        |
|-----------|-----------------|--------------------|-------------------|------------------------|
| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition Remarks |
| MH        | Good ✓          | Good ✓             | Good ✓            |                        |

|            |             |             |             |         |            |        |                 |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
| A          |             |             |             | D       | N          | 09.5   |                 |

| Position | Code | Description                                  | CD | Pic  | Video Ref |  |
|----------|------|----------------------------------------------|----|------|-----------|--|
| 00.00m   | MH   | Start node type, manhole                     |    | 14_0 |           |  |
| 00.00m   | LRQ  | Line of drain/sewer deviates right [quarter] |    | 14_1 | 0:00:00   |  |
| 01.89m   | REM  | General remark                               |    | 14_2 | 0:00:11   |  |
| 03.55m   | WL   | S1 Water level 5%                            | S1 | 14_3 | 0:00:16   |  |
| 05.56m   | JDM  | Joint displaced medium                       |    | 14_4 | 0:00:23   |  |
| 06.62m   | WL   | F1 Water level 5%                            | F1 | 14_- | 0:00:16   |  |
| 06.62m   | LUQ  | Line of drain/sewer deviates up [quarter]    |    | 14_5 | 0:00:24   |  |
| 09.46m   | BRF  | Finish node type, major connection without   |    | 14_9 |           |  |

Total Defects for section

DRB Grade for Section



## Descriptive Report with Remarks and Observation Images

## Section 15

| Pos    | Video Ref | Code  | Description                                   | Image                                                                                                                  |
|--------|-----------|-------|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH    | Start node type, manhole MH7                  | <p>Image Provided - Ref: 14_0</p>    |
| 00.00m | 0:00:00   | LRQ   | Line of drain/sewer deviates right [quarter]  | <p>Image Provided - Ref: 14_1</p>   |
| 01.89m | 0:00:11   | REM   | General remark<br>General Condition Photo     | <p>Image Provided - Ref: 14_2</p>  |
| 03.55m | 0:00:16   | S1 WL | Water level 3.55m - 6.62m: 5% Height/Diameter | <p>Image Provided - Ref: 14_3</p>  |

Total Defects for section

DRB Grade for Section



| Pos    | Video Ref | Code  | Description                                                       | Image                                                                                                                                                    |
|--------|-----------|-------|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 05.56m | 0:00:23   | JDM   | Joint displaced medium - Severity 3                               | <p>Image Provided - Ref: 14_4</p>  <p>10:16:51 11-03-25 5.56m</p>      |
| 06.62m | 0:00:16   | F1 WL | Water level Defect End: 5% Height/Diameter                        |                                                                                                                                                          |
| 06.62m | 0:00:24   | LUQ   | Line of drain/sewer deviates up [quarter]                         | <p>Image Provided - Ref: 14_5</p>  <p>10:16:53 11-03-25 6.62m</p>     |
| 09.46m |           | BRF   | Finish node type, major connection without manhole Outlet reached | <p>Image Provided - Ref: 14_9999</p>  <p>10:16:58 11-03-25 9.46m</p> |

Total Defects for section



DRB Grade for Section





## Site: Heywood Old Road, Middleton

## Section 16

|                        |                                             |                                          |                   |                                 |                     |             |                 |
|------------------------|---------------------------------------------|------------------------------------------|-------------------|---------------------------------|---------------------|-------------|-----------------|
| Client:                | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton           | Cust Job Ref.     | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |             |                 |
| Start Node Ref:        | MH7                                         | Finish Node Ref:                         | EOT               | Direction:                      | U                   | Height/Dia: | 100             |
| Start Node Depth:      | 0.00                                        | Finish Node Depth:                       | 0.00              | Use:                            | S                   | Shape:      | C               |
| Start Node Coordinate: |                                             | Finish Node Coordinate:                  |                   | Material:                       | PVC                 | Cleaned     | N               |
| Node Type              | Cover Condition                             | Benching Condition                       | Channel Condition | Node Condition Remarks          |                     |             |                 |
| MH                     | Good ✓                                      | Good ✓                                   | Good ✓            |                                 |                     |             |                 |
| Drain Type             | Lining Type                                 | Lining Mat.                              | Year Const.       | Weather                         | Flow Cont.          | Length      | General Remarks |
| A                      |                                             |                                          |                   | D                               | N                   | 00.0        |                 |
| Position               | Code                                        | Description                              | CD                | Pic                             | Video Ref           |             |                 |
| 00.00m                 | MH                                          | Start node type, manhole                 |                   | 15_0                            | —                   |             |                 |
| 00.00m                 | LLH                                         | Line of drain/sewer deviates left [half] |                   | 15_1                            | 0:00:00             |             |                 |
| 00.00m                 | SA                                          | Survey abandoned                         |                   | 15_9                            | —                   |             |                 |

Total Defects for section

DRB Grade for Section

0

0

0

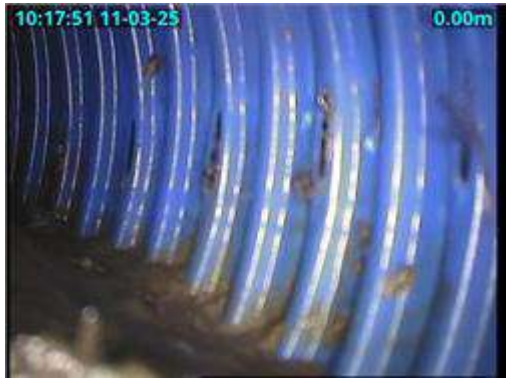
0

0



## Descriptive Report with Remarks and Observation Images

## Section 16

| Pos    | Video Ref | Code | Description                                                      | Image                                                                                                                     |
|--------|-----------|------|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH   | Start node type, manhole MH7                                     | <p>Image Provided - Ref: 15_0</p>       |
| 00.00m | 0:00:00   | LLH  | Line of drain/sewer deviates left [half]                         | <p>Image Provided - Ref: 15_1</p>      |
| 00.00m |           | SA   | Survey abandoned EOT. Unable to camera further. Survey abandoned | <p>Image Provided - Ref: 15_9999</p>  |

Total Defects for section



DRB Grade for Section





## Site: Heywood Old Road, Middleton

## Section 17

|                        |                                             |                                |               |                                 |                     |
|------------------------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client:                | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
| Start Node Ref:        | MH8                                         | Finish Node Ref:               | Buried MH     | Direction:                      | D                   |
| Start Node Depth:      | 0.00                                        | Finish Node Depth:             | 0.00          | Use:                            | S                   |
| Start Node Coordinate: |                                             | Finish Node Coordinate:        |               | Material:                       | VC                  |
|                        |                                             |                                |               | Cleaned                         | N                   |

| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition | Remarks |
|-----------|-----------------|--------------------|-------------------|----------------|---------|
| MH        | Good ✓          | Good ✓             | Good ✓            |                |         |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| A          |             |             |             | D       | N          | 07.6   |                 |

| Position | Code | Description                                  | CD | Pic  | Video Ref |  |
|----------|------|----------------------------------------------|----|------|-----------|--|
| 00.00m   | MH   | Start node type, manhole                     |    | 16_0 |           |  |
| 01.42m   | REM  | General remark                               |    | 16_1 |           |  |
| 05.56m   | WL   | S1 Water level 10%                           | S1 | 16_2 | 0:00:21   |  |
| 07.10m   | LRQ  | Line of drain/sewer deviates right [quarter] |    | 16_3 | 0:00:26   |  |
| 07.60m   | WL   | F1 Water level 10%                           | F1 | 16_- | 0:00:21   |  |
| 07.60m   | MHF  | Finish node type, manhole                    |    | 16_9 |           |  |

Total Defects for section

DRB Grade for Section

0 0 0 0 0



## Descriptive Report with Remarks and Observation Images

## Section 17

| Pos    | Video Ref | Code  | Description                                   | Image                                                                                                                  |
|--------|-----------|-------|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH    | Start node type, manhole MH8                  | <p>Image Provided - Ref: 16_0</p>    |
| 01.42m |           | REM   | General remark<br>General Condition Photo     | <p>Image Provided - Ref: 16_1</p>   |
| 05.56m | 0:00:21   | S1 WL | Water level 5.56m - 7.6m: 10% Height/Diameter | <p>Image Provided - Ref: 16_2</p>  |
| 07.10m | 0:00:26   | LRQ   | Line of drain/sewer deviates right [quarter]  | <p>Image Provided - Ref: 16_3</p>  |

Total Defects for section

DRB Grade for Section



| Pos    | Video Ref | Code  | Description                                 | Image                                                                                                                   |
|--------|-----------|-------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| 07.60m | 0:00:21   | F1 WL | Water level Defect End: 10% Height/Diameter |                                                                                                                         |
| 07.60m |           | MHF   | Finish node type, manhole Buried MH reached | <p>Image Provided - Ref: 16_9999</p>  |

Total Defects for section



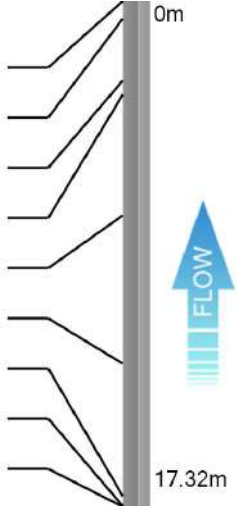
DRB Grade for Section





## Site: Heywood Old Road, Middleton

## Section 18

|                                                                |                                             |                                                                   |                   |                                        |                                           |                                                                                      |                 |
|----------------------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------|-------------------|----------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------|-----------------|
| Client:                                                        | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton                                    | Cust Job Ref.     | Surveyors Name:<br>Carl Lopeman        | Date:<br>11/03/2025                       |                                                                                      |                 |
| Start Node Ref:<br>Start Node Depth:<br>Start Node Coordinate: | MH8<br>0.00                                 | Finish Node Ref:<br>Finish Node Depth:<br>Finish Node Coordinate: | EOT<br>0.00       | Direction: U<br>Use: S<br>Material: VC | Height/Dia: 150<br>Shape: C<br>Cleaned: N |                                                                                      |                 |
| Node Type                                                      | Cover Condition                             | Benching Condition                                                | Channel Condition | Node Condition Remarks                 |                                           |                                                                                      |                 |
| MH                                                             | Good ✓                                      | Good ✓                                                            | Good ✓            |                                        |                                           |                                                                                      |                 |
| Drain Type                                                     | Lining Type                                 | Lining Mat.                                                       | Year Const.       | Weather                                | Flow Cont.                                | Length                                                                               | General Remarks |
| A                                                              |                                             |                                                                   |                   | D                                      | N                                         | 17.3                                                                                 |                 |
| Position                                                       | Code                                        | Description                                                       | CD                | Pic                                    | Video Ref                                 |  |                 |
| 00.00m                                                         | MH                                          | Start node type, manhole                                          |                   | 17_0                                   |                                           |                                                                                      |                 |
| 00.60m                                                         | LLQ                                         | Line of drain/sewer deviates left [quarter]                       |                   | 17_1                                   |                                           |                                                                                      |                 |
| 02.72m                                                         | DER                                         | Settled deposits coarse 10%                                       |                   | 17_2                                   | 0:00:12                                   |                                                                                      |                 |
| 03.20m                                                         | WL                                          | S1 Water level 20%                                                | S1                | 17_3                                   | 0:00:16                                   |                                                                                      |                 |
| 07.34m                                                         | REM                                         | General remark                                                    |                   | 17_4                                   | 0:00:29                                   |                                                                                      |                 |
| 12.42m                                                         | REM                                         | General remark                                                    |                   | 17_5                                   | 0:00:42                                   |                                                                                      |                 |
| 16.96m                                                         | DES                                         | Settled deposits fine 10%                                         |                   | 17_6                                   | 0:00:55                                   |                                                                                      |                 |
| 17.30m                                                         | WL                                          | F1 Water level 20%                                                | F1                | 17_-                                   | 0:00:16                                   |                                                                                      |                 |
| 17.32m                                                         | SA                                          | Survey abandoned                                                  |                   | 17_9                                   |                                           |                                                                                      |                 |

Total Defects for section

DRB Grade for Section



## Descriptive Report with Remarks and Observation Images

## Section 18

| Pos    | Video Ref | Code  | Description                                                               | Image                                                                                                                  |
|--------|-----------|-------|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH    | Start node type, manhole MH8                                              | <p>Image Provided - Ref: 17_0</p>    |
| 00.60m |           | LLQ   | Line of drain/sewer deviates left [quarter]                               | <p>Image Provided - Ref: 17_1</p>   |
| 02.72m | 0:00:12   | DER   | Settled deposits coarse: 10%<br>Cross sectional area loss -<br>Severity 3 | <p>Image Provided - Ref: 17_2</p>  |
| 03.20m | 0:00:16   | S1 WL | Water level 3.2m - 17.3m: 20%<br>Height/Diameter                          | <p>Image Provided - Ref: 17_3</p>  |

Total Defects for section

DRB Grade for Section



| Pos    | Video Ref | Code  | Description                                                             | Image                                                                                                              |
|--------|-----------|-------|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| 07.34m | 0:00:29   | REM   | General remark<br>General Condition Photo                               | Image Provided - Ref: 17_4<br>   |
| 12.42m | 0:00:42   | REM   | General remark<br>General Condition Photo                               | Image Provided - Ref: 17_5<br>  |
| 16.96m | 0:00:55   | DES   | Settled deposits fine: 10%<br>Cross sectional area loss -<br>Severity 3 | Image Provided - Ref: 17_6<br> |
| 17.30m | 0:00:16   | F1 WL | Water level Defect End: 20%<br>Height/Diameter                          |                                                                                                                    |

Total Defects for section



DRB Grade for Section



| Pos    | Video Ref | Code | Description                                     | Image                                                                                                                   |
|--------|-----------|------|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| 17.32m |           | SA   | Survey abandoned EOT. Unable to camera further. | <p>Image Provided - Ref: 17_9999</p>  |

Total Defects for section



DRB Grade for Section



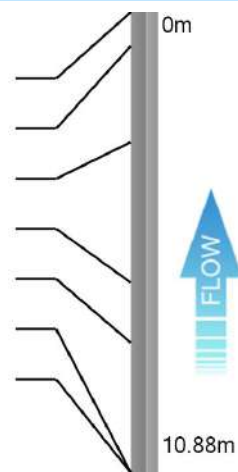


## Site: Heywood Old Road, Middleton

## Section 19

|                        |                 |                                             |                    |                                |                   |               |                 |                                 |  |                     |  |
|------------------------|-----------------|---------------------------------------------|--------------------|--------------------------------|-------------------|---------------|-----------------|---------------------------------|--|---------------------|--|
| Client:                |                 | Location (Street Name):<br>Heywood Old Road |                    | City/Town/Village<br>Middleton |                   | Cust Job Ref. |                 | Surveyors Name:<br>Carl Lopeman |  | Date:<br>11/03/2025 |  |
| Start Node Ref: MH8    |                 |                                             |                    | Finish Node Ref: EOT           |                   |               |                 | Direction: U                    |  | Height/Dia: 150     |  |
| Start Node Depth: 0.00 |                 |                                             |                    | Finish Node Depth: 0.00        |                   |               |                 | Use: S                          |  | Shape: C            |  |
| Start Node Coordinate: |                 |                                             |                    | Finish Node Coordinate:        |                   |               |                 | Material: VC                    |  | Cleaned N           |  |
| Node Type              | Cover Condition |                                             | Benching Condition |                                | Channel Condition |               |                 | Node Condition Remarks          |  |                     |  |
| MH                     | Good ✓          |                                             | Good ✓             |                                | Good ✓            |               |                 |                                 |  |                     |  |
| Drain Type             | Lining Type     | Lining Mat.                                 | Year Const.        | Weather                        | Flow Cont.        | Length        | General Remarks |                                 |  |                     |  |
| A                      |                 |                                             |                    | D                              | N                 | 10.9          |                 |                                 |  |                     |  |

| Position | Code | Description                                  | CD | Pic  | Video Ref |  |
|----------|------|----------------------------------------------|----|------|-----------|--|
| 00.00m   | MH   | Start node type, manhole                     |    | 18_0 |           |  |
| 00.80m   | LRQ  | Line of drain/sewer deviates right [quarter] |    | 18_1 |           |  |
| 03.07m   | REM  | General remark                               |    | 18_2 | 0:00:16   |  |
| 06.39m   | DES  | Settled deposits fine 20%                    |    | 18_3 | 0:00:26   |  |
| 07.81m   | CU   | S1 Loss of vision                            | S1 | 18_4 | 0:00:33   |  |
| 10.88m   | CU   | F1 Loss of vision                            | F1 | 18_- | 0:00:33   |  |
| 10.88m   | SA   | Survey abandoned                             |    | 18_9 |           |  |



Total Defects for section

DRB Grade for Section



Descriptive Report with Remarks and Observation Images

Section 19

| Pos    | Video Ref | Code | Description                                                             | Image                                                                                                                  |
|--------|-----------|------|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH   | Start node type, manhole MH8                                            | <p>Image Provided - Ref: 18_0</p>    |
| 00.80m |           | LRQ  | Line of drain/sewer deviates right [quarter]                            | <p>Image Provided - Ref: 18_1</p>   |
| 03.07m | 0:00:16   | REM  | General remark<br>General Condition Photo                               | <p>Image Provided - Ref: 18_2</p>  |
| 06.39m | 0:00:26   | DES  | Settled deposits fine: 20%<br>Cross sectional area loss -<br>Severity 3 | <p>Image Provided - Ref: 18_3</p>  |

Total Defects for section

DRB Grade for Section



| Pos    | Video Ref | Code  | Description                                            | Image                                                                                                                    |
|--------|-----------|-------|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| 07.81m | 0:00:33   | S1 CU | Loss of vision 7.81m - 10.88m                          | <p>Image Provided - Ref: 18_4</p>      |
| 10.88m | 0:00:33   | F1 CU | Loss of vision Defect End                              |                                                                                                                          |
| 10.88m |           | SA    | Survey abandoned EOT. Loss of vision. Survey abandoned | <p>Image Provided - Ref: 18_9999</p>  |

Total Defects for section



DRB Grade for Section





## Site: Heywood Old Road, Middleton

## Section 20

|                        |                 |                                             |                    |                                |                   |               |                 |                                 |  |                     |  |
|------------------------|-----------------|---------------------------------------------|--------------------|--------------------------------|-------------------|---------------|-----------------|---------------------------------|--|---------------------|--|
| Client:                |                 | Location (Street Name):<br>Heywood Old Road |                    | City/Town/Village<br>Middleton |                   | Cust Job Ref. |                 | Surveyors Name:<br>Carl Lopeman |  | Date:<br>11/03/2025 |  |
| Start Node Ref: MH19   |                 |                                             |                    | Finish Node Ref: Gully         |                   |               |                 | Direction: U                    |  | Height/Dia: 150     |  |
| Start Node Depth: 0.00 |                 |                                             |                    | Finish Node Depth: 0.00        |                   |               |                 | Use: S                          |  | Shape: C            |  |
| Start Node Coordinate: |                 |                                             |                    | Finish Node Coordinate:        |                   |               |                 | Material: VC                    |  | Cleaned N           |  |
| Node Type              | Cover Condition |                                             | Benching Condition |                                | Channel Condition |               |                 | Node Condition Remarks          |  |                     |  |
| MH                     | Good ✓          |                                             | Good ✓             |                                | Good ✓            |               |                 |                                 |  |                     |  |
| Drain Type             | Lining Type     | Lining Mat.                                 | Year Const.        | Weather                        | Flow Cont.        | Length        | General Remarks |                                 |  |                     |  |
| A                      |                 |                                             |                    | D                              | N                 | 05.0          |                 |                                 |  |                     |  |

| Position | Code | Description                               | CD | Pic  | Video Ref |  |
|----------|------|-------------------------------------------|----|------|-----------|--|
| 00.00m   | MH   | Start node type, manhole                  |    | 19_0 |           |  |
| 00.00m   | JDM  | Joint displaced medium                    |    | 19_1 |           |  |
| 04.02m   | JDM  | Joint displaced medium                    |    | 19_2 | 0:00:16   |  |
| 04.38m   | LRH  | Line of drain/sewer deviates right [half] |    | 19_3 | 0:00:17   |  |
| 05.00m   | GYF  | Finish node type Gully                    |    | 19_9 |           |  |

Total Defects for section



DRB Grade for Section



Descriptive Report with Remarks and Observation Images

Section 20

| Pos    | Video Ref | Code | Description                               | Image                                                                                                                  |
|--------|-----------|------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH   | Start node type, manhole MH19             | <p>Image Provided - Ref: 19_0</p>    |
| 00.00m |           | JDM  | Joint displaced medium - Severity 3       | <p>Image Provided - Ref: 19_1</p>   |
| 04.02m | 0:00:16   | JDM  | Joint displaced medium - Severity 3       | <p>Image Provided - Ref: 19_2</p>  |
| 04.38m | 0:00:17   | LRH  | Line of drain/sewer deviates right [half] | <p>Image Provided - Ref: 19_3</p>  |

Total Defects for section

DRB Grade for Section



| Pos    | Video Ref | Code | Description                             | Image                                                                                                                   |
|--------|-----------|------|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| 05.00m |           | GYF  | Finish node type Gully<br>Gully reached | <p>Image Provided - Ref: 19_9999</p>  |

Total Defects for section



DRB Grade for Section





## Site: Heywood Old Road, Middleton

## Section 21

|         |                                             |                                |               |                                 |                     |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client: | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|

|                        |      |                         |      |            |    |             |     |
|------------------------|------|-------------------------|------|------------|----|-------------|-----|
| Start Node Ref:        | MH9  | Finish Node Ref:        | EOT  | Direction: | D  | Height/Dia: | 150 |
| Start Node Depth:      | 0.00 | Finish Node Depth:      | 0.00 | Use:       | S  | Shape:      | C   |
| Start Node Coordinate: |      | Finish Node Coordinate: |      | Material:  | VC | Cleaned     | N   |

| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition | Remarks |
|-----------|-----------------|--------------------|-------------------|----------------|---------|
| MH        | Good ✓          | Good ✓             | Good ✓            |                |         |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| A          |             |             |             | D       | N          | 09.9   |                 |

| Position | Code | Description              | CD | Pic  | Video Ref |  |
|----------|------|--------------------------|----|------|-----------|--|
| 00.00m   | MH   | Start node type, manhole |    | 20_0 |           |  |
| 00.00m   | JDM  | Joint displaced medium   |    | 20_1 |           |  |
| 01.42m   | WL   | S1 Water level 10%       | S1 | 20_2 | 0:00:10   |  |
| 02.84m   | CU   | S2 Loss of vision        | S2 | 20_3 | 0:00:13   |  |
| 06.98m   | CU   | F2 Loss of vision        | F2 | 20_- | 0:00:13   |  |
| 07.81m   | REM  | General remark           |    | 20_5 | 0:00:26   |  |
| 09.34m   | CU   | Loss of vision           |    | 20_4 | 0:00:31   |  |
| 09.82m   | WL   | F1 Water level 10%       | F1 | 20_- | 0:00:10   |  |
| 09.90m   | SA   | Survey abandoned         |    | 20_9 |           |  |

Total Defects for section

DRB Grade for Section



## Descriptive Report with Remarks and Observation Images

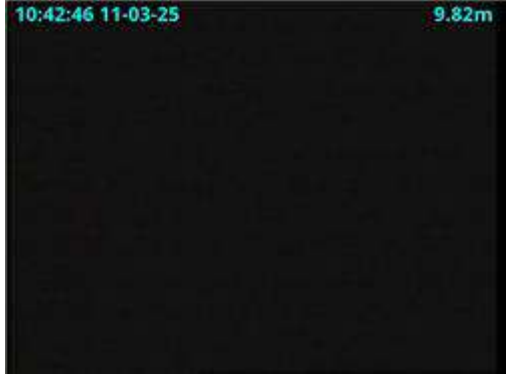
## Section 21

| Pos    | Video Ref | Code  | Description                                    | Image                                                                                                                  |
|--------|-----------|-------|------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH    | Start node type, manhole MH9                   | <p>Image Provided - Ref: 20_0</p>    |
| 00.00m |           | JDM   | Joint displaced medium - Severity 3            | <p>Image Provided - Ref: 20_1</p>   |
| 01.42m | 0:00:10   | S1 WL | Water level 1.42m - 9.82m: 10% Height/Diameter | <p>Image Provided - Ref: 20_2</p>  |
| 02.84m | 0:00:13   | S2 CU | Loss of vision 2.84m - 6.98m                   | <p>Image Provided - Ref: 20_3</p>  |

Total Defects for section

DRB Grade for Section



| Pos    | Video Ref | Code  | Description                                               | Image                                                                                                                     |
|--------|-----------|-------|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| 06.98m | 0:00:13   | F2 CU | Loss of vision Defect End                                 |                                                                                                                           |
| 07.81m | 0:00:26   | REM   | General remark<br>General Condition Photo                 | <p>Image Provided - Ref: 20_5</p>       |
| 09.34m | 0:00:31   | CU    | Loss of vision                                            | <p>Image Provided - Ref: 20_4</p>      |
| 09.82m | 0:00:10   | F1 WL | Water level Defect End: 10% Height/Diameter               |                                                                                                                           |
| 09.90m |           | SA    | Survey abandoned<br>EOT. Loss of vision. Survey abandoned | <p>Image Provided - Ref: 20_9999</p>  |

Total Defects for section



DRB Grade for Section





Site: Heywood Old Road, Middleton

Section 22

|         |                                             |                                |               |                                 |                     |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client: | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|

|                        |      |                         |      |            |    |             |     |
|------------------------|------|-------------------------|------|------------|----|-------------|-----|
| Start Node Ref:        | MH9  | Finish Node Ref:        | EOT  | Direction: | U  | Height/Dia: | 150 |
| Start Node Depth:      | 0.00 | Finish Node Depth:      | 0.00 | Use:       | S  | Shape:      | C   |
| Start Node Coordinate: |      | Finish Node Coordinate: |      | Material:  | VC | Cleaned     | N   |

|           |                 |                    |                   |                        |
|-----------|-----------------|--------------------|-------------------|------------------------|
| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition Remarks |
| MH        | Good ✓          | Good ✓             | Good ✓            |                        |

|            |             |             |             |         |            |        |                 |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
| A          |             |             |             | D       | N          | 01.7   |                 |

| Position | Code | Description               | CD | Pic  | Video Ref |  |
|----------|------|---------------------------|----|------|-----------|--|
| 00.00m   | MH   | Start node type, manhole  |    | 21_0 |           |  |
| 00.00m   | DES  | Settled deposits fine 20% |    | 21_2 | 0:00:03   |  |
| 00.60m   | DES  | Settled deposits fine 25% |    | 21_3 | 0:00:07   |  |
| 01.70m   | SA   | Survey abandoned          |    | 21_9 |           |  |

Total Defects for section

DRB Grade for Section



## Descriptive Report with Remarks and Observation Images

## Section 22

| Pos    | Video Ref | Code | Description                                                       | Image                                                                                                                     |
|--------|-----------|------|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH   | Start node type, manhole MH9                                      | <p>Image Provided - Ref: 21_0</p>       |
| 00.00m | 0:00:03   | DES  | Settled deposits fine: 20% Cross sectional area loss - Severity 3 | <p>Image Provided - Ref: 21_2</p>      |
| 00.60m | 0:00:07   | DES  | Settled deposits fine: 25% Cross sectional area loss - Severity 3 | <p>Image Provided - Ref: 21_3</p>     |
| 01.70m |           | SA   | Survey abandoned EOT. Unable to camera further. Survey abandoned  | <p>Image Provided - Ref: 21_9999</p>  |

Total Defects for section

DRB Grade for Section





Site: Heywood Old Road, Middleton

Section 23

|         |                                             |                                |               |                                 |                     |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client: | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|

|                        |      |                         |       |            |    |             |     |
|------------------------|------|-------------------------|-------|------------|----|-------------|-----|
| Start Node Ref:        | MH9  | Finish Node Ref:        | Gully | Direction: | D  | Height/Dia: | 100 |
| Start Node Depth:      | 0.00 | Finish Node Depth:      | 0.00  | Use:       | S  | Shape:      | C   |
| Start Node Coordinate: |      | Finish Node Coordinate: |       | Material:  | VC | Cleaned     | N   |

|           |                 |                    |                   |                        |
|-----------|-----------------|--------------------|-------------------|------------------------|
| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition Remarks |
| MH        | Good ✓          | Good ✓             | Good ✓            |                        |

|            |             |             |             |         |            |        |                 |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
| A          |             |             |             | D       | N          | 00.4   |                 |

| Position | Code | Description              | CD | Pic  | Video Ref |
|----------|------|--------------------------|----|------|-----------|
| 00.00m   | MH   | Start node type, manhole |    | 22_0 |           |
| 00.40m   | GYF  | Finish node type Gully   |    | 22_9 |           |

Total Defects for section

DRB Grade for Section



Descriptive Report with Remarks and Observation Images

Section 23

| Pos    | Video Ref | Code | Description                          | Image                                                                                                                    |
|--------|-----------|------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH   | Start node type, manhole MH9         | <p>Image Provided - Ref: 22_0</p>      |
| 00.40m |           | GYF  | Finish node type Gully Gully reached | <p>Image Provided - Ref: 22_9999</p>  |

Total Defects for section

DRB Grade for Section





## Site: Heywood Old Road, Middleton

## Section 24

|         |                                             |                                |               |                                 |                     |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client: | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|

|                        |      |                         |      |            |    |             |     |
|------------------------|------|-------------------------|------|------------|----|-------------|-----|
| Start Node Ref:        | MH9  | Finish Node Ref:        | EOT  | Direction: | U  | Height/Dia: | 150 |
| Start Node Depth:      | 0.00 | Finish Node Depth:      | 0.00 | Use:       | S  | Shape:      | C   |
| Start Node Coordinate: |      | Finish Node Coordinate: |      | Material:  | VC | Cleaned     | N   |

| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition | Remarks |
|-----------|-----------------|--------------------|-------------------|----------------|---------|
| MH        | Good ✓          | Good ✓             | Good ✓            |                |         |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| A          |             |             |             | D       | N          | 34.2   |                 |

| Position | Code | Description                  | CD | Pic  | Video Ref |  |
|----------|------|------------------------------|----|------|-----------|--|
| 00.00m   | MH   | Start node type, manhole     |    |      |           |  |
| 01.66m   | REM  | General remark               |    | 23_1 |           |  |
| 03.91m   | WL   | S1 Water level 10%           | S1 | 23_2 | 0:00:13   |  |
| 07.93m   | REM  | General remark               |    | 23_3 | 0:00:24   |  |
| 13.37m   | REM  | General remark               |    | 23_4 | 0:00:35   |  |
| 16.35m   | JN   | Junction 10 : 100mm Diameter |    | 23_5 | 0:00:44   |  |
| 23.03m   | REM  | General remark               |    | 23_6 | 0:00:59   |  |
| 30.30m   | REM  | General remark               |    | 23_7 | 0:01:12   |  |
| 34.24m   | WL   | F1 Water level 10%           | F1 | 23_- | 0:00:13   |  |
| 34.24m   | SA   | Survey abandoned             |    | 23_9 |           |  |

Total Defects for section

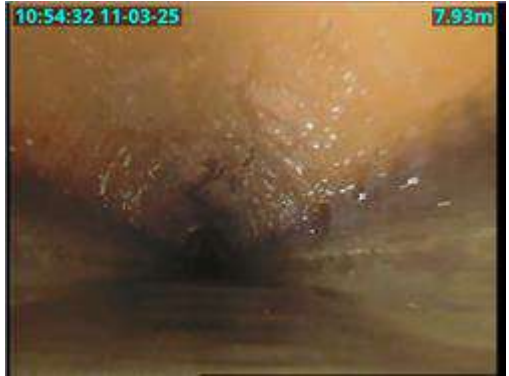
DRB Grade for Section

0 0 0 0 0



Descriptive Report with Remarks and Observation Images

Section 24

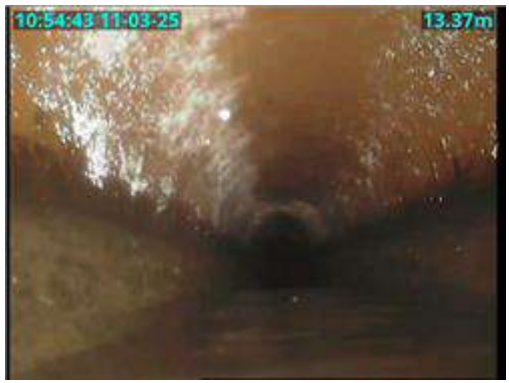
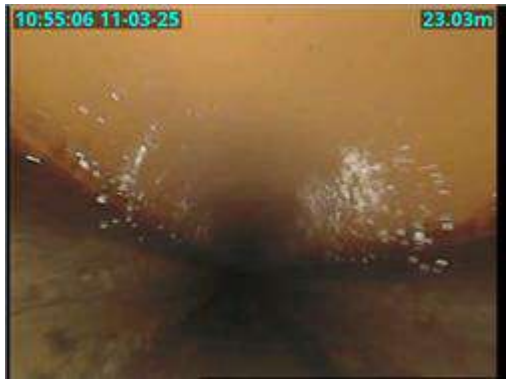
| Pos    | Video Ref | Code  | Description                                        | Image                                                                                                                  |
|--------|-----------|-------|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH    | Start node type, manhole MH9                       |                                                                                                                        |
| 01.66m |           | REM   | General remark<br>General Condition Photo          | <p>Image Provided - Ref: 23_1</p>    |
| 03.91m | 0:00:13   | S1 WL | Water level 3.91m - 34.24m:<br>10% Height/Diameter | <p>Image Provided - Ref: 23_2</p>   |
| 07.93m | 0:00:24   | REM   | General remark<br>General Condition Photo          | <p>Image Provided - Ref: 23_3</p>  |

Total Defects for section



DRB Grade for Section



| Pos    | Video Ref | Code | Description                               | Image                                                                                                              |
|--------|-----------|------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| 13.37m | 0:00:35   | REM  | General remark<br>General Condition Photo | Image Provided - Ref: 23_4<br>   |
| 16.35m | 0:00:44   | JN   | Junction at 10 o'clock: 100mm Diameter    | Image Provided - Ref: 23_5<br>  |
| 23.03m | 0:00:59   | REM  | General remark<br>General Condition Photo | Image Provided - Ref: 23_6<br> |
| 30.30m | 0:01:12   | REM  | General remark<br>General Condition Photo | Image Provided - Ref: 23_7<br> |

Total Defects for section

DRB Grade for Section



| Pos    | Video Ref | Code  | Description                                              | Image                                                                                                                   |
|--------|-----------|-------|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| 34.24m | 0:00:13   | F1 WL | Water level Defect End: 10% Height/Diameter              |                                                                                                                         |
| 34.24m |           | SA    | Survey abandoned EOT. Loss of leverage. Survey abandoned | <p>Image Provided - Ref: 23_9999</p>  |

Total Defects for section



DRB Grade for Section





## Site: Heywood Old Road, Middleton

## Section 25

|                        |                                                                                          |                                             |                                                                                        |                                |                         |                                                                                          |                 |                                 |                        |                     |  |                 |  |
|------------------------|------------------------------------------------------------------------------------------|---------------------------------------------|----------------------------------------------------------------------------------------|--------------------------------|-------------------------|------------------------------------------------------------------------------------------|-----------------|---------------------------------|------------------------|---------------------|--|-----------------|--|
| Client:                |                                                                                          | Location (Street Name):<br>Heywood Old Road |                                                                                        | City/Town/Village<br>Middleton |                         | Cust Job Ref.                                                                            |                 | Surveyors Name:<br>Carl Lopeman |                        | Date:<br>11/03/2025 |  |                 |  |
| Start Node Ref:        |                                                                                          |                                             | MH9                                                                                    |                                | Finish Node Ref:        |                                                                                          |                 | Rest Bend                       |                        | Direction: U        |  | Height/Dia: 100 |  |
| Start Node Depth:      |                                                                                          |                                             | 0.00                                                                                   |                                | Finish Node Depth:      |                                                                                          |                 | 0.00                            |                        | Use: S              |  | Shape: C        |  |
| Start Node Coordinate: |                                                                                          |                                             |                                                                                        |                                | Finish Node Coordinate: |                                                                                          |                 |                                 |                        | Material: VC        |  | Cleaned N       |  |
| Node Type              | Cover Condition                                                                          |                                             | Benching Condition                                                                     |                                |                         | Channel Condition                                                                        |                 |                                 | Node Condition Remarks |                     |  |                 |  |
| MH                     | Good  |                                             | Good  |                                |                         | Good  |                 |                                 |                        |                     |  |                 |  |
| Drain Type             | Lining Type                                                                              | Lining Mat.                                 | Year Const.                                                                            | Weather                        | Flow Cont.              | Length                                                                                   | General Remarks |                                 |                        |                     |  |                 |  |
| A                      |                                                                                          |                                             |                                                                                        | D                              | N                       | 03.3                                                                                     |                 |                                 |                        |                     |  |                 |  |

## Position Code Description

00.00m MH Start node type, manhole

00.23m LRH Line of drain/sewer deviates right [half]

02.83m LLQ Line of drain/sewer deviates left [quarter]

03.30m OCF Finish node type, other special chamber

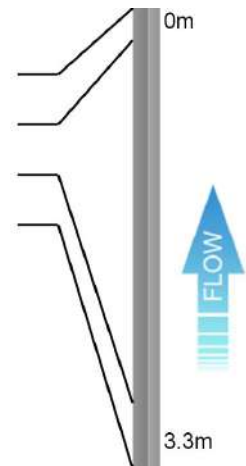
## CD Pic Video Ref

24\_0

24\_1

24\_2 0:00:15

24\_9



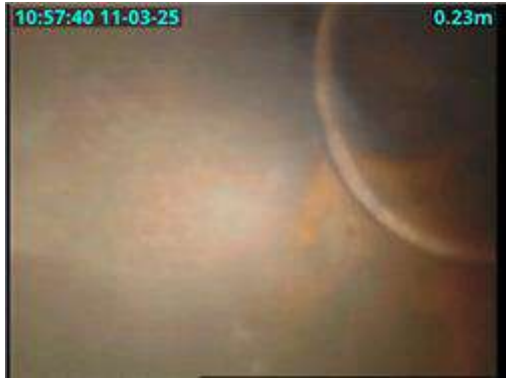
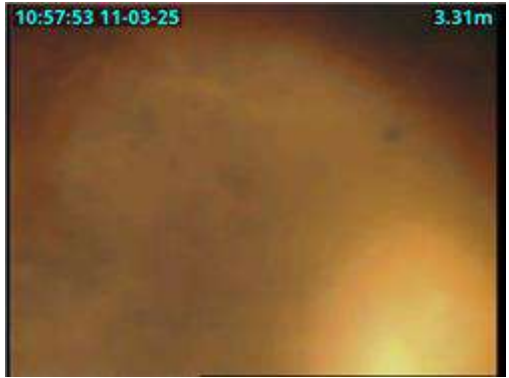
Total Defects for section

DRB Grade for Section



Descriptive Report with Remarks and Observation Images

Section 25

| Pos    | Video Ref | Code | Description                                                  | Image                                                                                                                     |
|--------|-----------|------|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH   | Start node type, manhole MH9                                 | <p>Image Provided - Ref: 24_0</p>       |
| 00.23m |           | LRH  | Line of drain/sewer deviates right [half]                    | <p>Image Provided - Ref: 24_1</p>      |
| 02.83m | 0:00:15   | LLQ  | Line of drain/sewer deviates left [quarter]                  | <p>Image Provided - Ref: 24_2</p>     |
| 03.30m |           | OCF  | Finish node type, other special chamber<br>Rest Bend reached | <p>Image Provided - Ref: 24_9999</p>  |

Total Defects for section

DRB Grade for Section





## Site: Heywood Old Road, Middleton

## Section 26

|         |                                             |                                |               |                                 |                     |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|
| Client: | Location (Street Name):<br>Heywood Old Road | City/Town/Village<br>Middleton | Cust Job Ref. | Surveyors Name:<br>Carl Lopeman | Date:<br>11/03/2025 |
|---------|---------------------------------------------|--------------------------------|---------------|---------------------------------|---------------------|

|                        |      |                         |       |            |    |             |     |
|------------------------|------|-------------------------|-------|------------|----|-------------|-----|
| Start Node Ref:        | MH9  | Finish Node Ref:        | Gully | Direction: | U  | Height/Dia: | 100 |
| Start Node Depth:      | 0.00 | Finish Node Depth:      | 0.00  | Use:       | S  | Shape:      | C   |
| Start Node Coordinate: |      | Finish Node Coordinate: |       | Material:  | VC | Cleaned     | N   |

|           |                 |                    |                   |                        |
|-----------|-----------------|--------------------|-------------------|------------------------|
| Node Type | Cover Condition | Benching Condition | Channel Condition | Node Condition Remarks |
| MH        | Good ✓          | Good ✓             | Good ✓            |                        |

|            |             |             |             |         |            |        |                 |
|------------|-------------|-------------|-------------|---------|------------|--------|-----------------|
| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
| A          |             |             |             | D       | N          | 05.9   |                 |

| Position | Code | Description                                  | CD | Pic  | Video Ref |  |
|----------|------|----------------------------------------------|----|------|-----------|--|
| 00.00m   | MH   | Start node type, manhole                     |    | 25_0 |           |  |
| 00.00m   | WL   | S1 Water level 5%                            | S1 | 25_1 | 0:00:00   |  |
| 01.19m   | LRQ  | Line of drain/sewer deviates right [quarter] |    | 25_2 | 0:00:10   |  |
| 02.01m   | JDM  | Joint displaced medium                       |    | 25_3 | 0:00:13   |  |
| 03.08m   | DES  | Settled deposits fine 10%                    |    | 25_4 | 0:00:15   |  |
| 03.32m   | LLQ  | Line of drain/sewer deviates left [quarter]  |    | 25_5 | 0:00:16   |  |
| 04.97m   | DES  | Settled deposits fine 10%                    |    | 25_6 | 0:00:21   |  |
| 05.92m   | WL   | F1 Water level 5%                            | F1 | 25_- | 0:00:00   |  |
| 05.92m   | GYF  | Finish node type Gully                       |    | 25_9 |           |  |

Total Defects for section

DRB Grade for Section



## Descriptive Report with Remarks and Observation Images

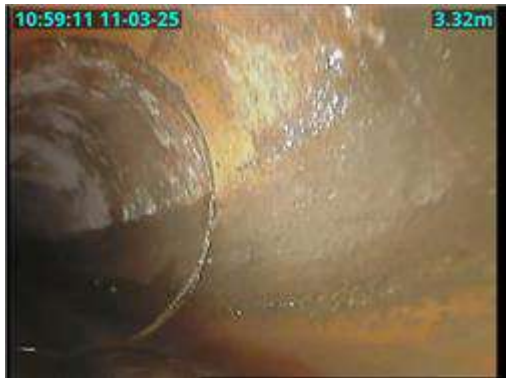
## Section 26

| Pos    | Video Ref | Code  | Description                                  | Image                                                                                                                  |
|--------|-----------|-------|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 00.00m |           | MH    | Start node type, manhole MH9                 | <p>Image Provided - Ref: 25_0</p>    |
| 00.00m | 0:00:00   | S1 WL | Water level 0m - 5.92m: 5% Height/Diameter   | <p>Image Provided - Ref: 25_1</p>   |
| 01.19m | 0:00:10   | LRQ   | Line of drain/sewer deviates right [quarter] | <p>Image Provided - Ref: 25_2</p>  |
| 02.01m | 0:00:13   | JDM   | Joint displaced medium - Severity 3          | <p>Image Provided - Ref: 25_3</p>  |

Total Defects for section

DRB Grade for Section



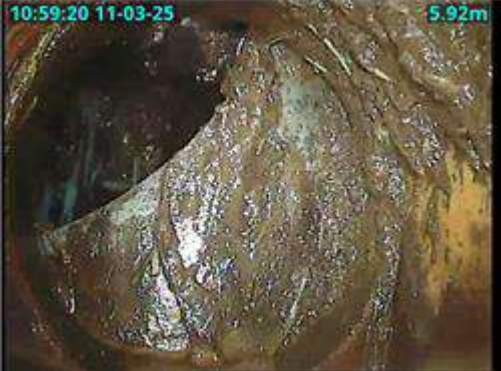
| Pos    | Video Ref | Code  | Description                                                             | Image                                                                                                              |
|--------|-----------|-------|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| 03.08m | 0:00:15   | DES   | Settled deposits fine: 10%<br>Cross sectional area loss -<br>Severity 3 | Image Provided - Ref: 25_4<br>   |
| 03.32m | 0:00:16   | LLQ   | Line of drain/sewer deviates<br>left [quarter]                          | Image Provided - Ref: 25_5<br>  |
| 04.97m | 0:00:21   | DES   | Settled deposits fine: 10%<br>Cross sectional area loss -<br>Severity 3 | Image Provided - Ref: 25_6<br> |
| 05.92m | 0:00:00   | F1 WL | Water level Defect End: 5%<br>Height/Diameter                           |                                                                                                                    |

Total Defects for section



DRB Grade for Section



| Pos    | Video Ref | Code | Description                             | Image                                                                                                                   |
|--------|-----------|------|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| 05.92m |           | GYF  | Finish node type Gully<br>Gully reached | <p>Image Provided - Ref: 25_9999</p>  |

Total Defects for section



DRB Grade for Section



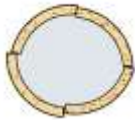
## A guide to defects and other observations in drainage systems

More detailed information can be found in the National Standard (BS EN 13508-1:2003) and in the Manual of Sewer Condition Classification (MSCC) 5th Edition, written by the Water Research Centre (WRC).

| Use  |                       |
|------|-----------------------|
| Code | Description           |
| C    | Combined              |
| F    | Foul                  |
| S    | Surface Water         |
| T    | Trade Effluent        |
| W    | Culverted Watercourse |
| Z    | Other                 |

| Common Materials |                    |
|------------------|--------------------|
| Code             | Description        |
| VC               | Vitrified Clay     |
| PVC              | Polyvinyl Chloride |
| CO               | Concrete           |
| CI               | Cast Iron          |
| PF               | Pitch Fibre        |
| PE               | Polyethylene       |
| DI               | Ductile Iron       |

| Start Node | Description                  | Finish Node |
|------------|------------------------------|-------------|
| MH         | Manhole                      | MHF         |
| IC         | Inspection Chamber           | ICF         |
| GY         | Gulley                       | GYF         |
| RE         | Rodding Eye                  | REF         |
| SK         | Soakaway                     | SKF         |
| BN         | Buchan Trap                  | BNF         |
| BR         | Major Connection without Ref | BRF         |
| CP         | Catch Pit                    | CPF         |
| OC         | Other Special Chamber        | OCF         |
| OF         | Outfall                      | OFF         |
| OS         | Oil Separator                | OSF         |
| WR         | Winner Trap                  | WRF         |
| LH         | Lamphole                     | LHF         |

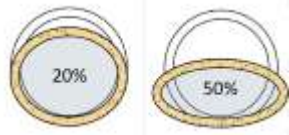
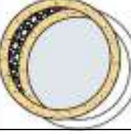
| Code                 | Observation | Description                                                 | Attributes                                                                                                |                                                                                       |
|----------------------|-------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| B                    | Broken      | Pieces pipe have visibly moved                              | Defined by clock references. Associated with deformity in rigid pipe                                      |  |
| CC<br>CL<br>CM<br>CR | Cracks      | Cracks are break lines that are not visibly open            | Defined by clock reference position/s. Longitudinal and radiating cracks attract only one clock reference |  |
| CN                   | Connection  | Lateral pipe has been connected after original construction | Described by clock reference position and diameter                                                        |  |

Total Defects for section



DRB Grade for Section

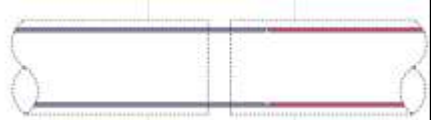
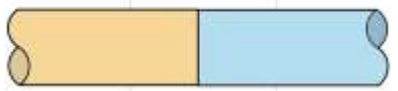
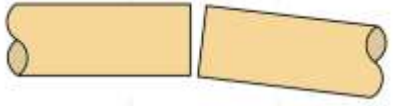
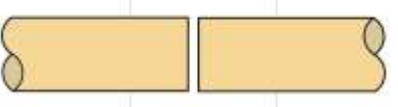
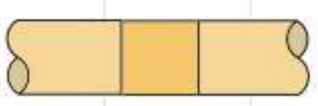


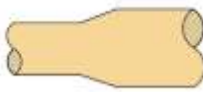
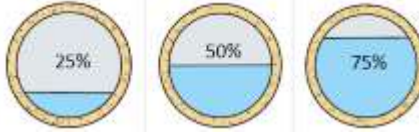
|                    |                                  |                                                                                                         |                                                                                                              |                                                                                       |
|--------------------|----------------------------------|---------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>CX(I)</b>       | Defective Connection (Intruding) | Defective by intrusion or damage due to factors including: cracks, fractures, obstruction, position etc | Described by clock reference position and diameter (+ % intrusion)                                           |    |
| <b>CU</b>          | Loss of Vision                   | Lens of camera is obscured by debris, water etc. Operator is unable to see drain clearly                | "W" can be added if loss of vision is due to water                                                           |    |
| <b>D</b>           | Deformed                         | Pipe has lost its structure                                                                             | Described by percentage loss of height or width. Recorded in 5% increments                                   |    |
| <b>DEE</b>         | Deposits Encrustation            | Eg. Attached scale deposits evident                                                                     | Described by clock referenced position and percentage loss of cross-sectional area (5% increments)           |    |
| <b>DEG</b>         | Deposits Grease                  | Attached grease deposits evident                                                                        | Described by clock referenced position and percentage loss of cross-sectional area (5% increments)           |  |
| <b>DER DES</b>     | Deposits Coarse/Fine             | Settled deposits on the invert of the pipe.                                                             | Described by percentage loss of height or diameter. Recorded in 5% increments.                               |  |
| <b>FC FL FM FR</b> | Fractures                        | Fractures are visibly open. Pieces of pipe have not moved                                               | Defined by clock reference position/s. Longitudinal and radiating fractures attract only one clock reference |  |
| <b>H</b>           | Holes                            | Section of pipe fabric is missing                                                                       | Defined by clock reference location. Normally two clock references                                           |  |
| <b>I</b>           | Infiltration                     | Water is infiltrating the pipe, normally via a joint but could be via another defect                    | Can be described in Remarks using terms such as Seeper, Dripper and Runner                                   |  |
| <b>JDL</b>         | Joint Displaced Large            | Pipe has moved at joint, perpendicular to axis of pipe                                                  | More than 1.5 times the pipe wall thickness must be visible                                                  |  |

Total Defects for section

DRB Grade for Section



|                                |                        |                                                                                            |                                                                                                           |                                                                                       |
|--------------------------------|------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>JDM</b>                     | Joint Displaced Medium | Pipe has moved at joint, perpendicular to axis of pipe                                     | Between 1 and 1.5 times the pipe wall thickness must be visible                                           |    |
| <b>JN</b>                      | Junction               | Lateral pipe was installed at construction                                                 | Described by clock reference position and diameter                                                        |    |
| <b>JX</b>                      | Defective Junction     | Lateral pipe was installed at construction but is defective in some way                    | Joint can be defective due to factors including: cracks, fractures, obstruction, position etc             |    |
| <b>LD<br/>LU<br/>LL<br/>LR</b> | Line Deviation         | LD = Line Down, LU = Line Up, LL = Line Left, LR = Line Right. Not related to CIPP lining. | Additional modifiers are added:<br>Q = Quarter (22.5),<br>H = Half (45),<br>F = Full (90).<br>In degrees. |    |
| <b>LC</b>                      | Lining Changes         | If the drain is lined, the lining material has changed                                     | Position of lining material change                                                                        |  |
| <b>MC</b>                      | Material Change        | The pipe material has changed                                                              | Position of change is noted. Type of material change can be defined                                       |  |
| <b>OB</b>                      | Obstruction/Obstacle   | An obstruction or obstacle is affecting the flow through the pipe                          | Described in percentage loss of cross-sectional area                                                      |  |
| <b>OJL</b>                     | Open Joint Large       | Pipe has moved at joint, along the axis of pipe                                            | More than 1.5 times the pipe wall thickness must be visible                                               |  |
| <b>OJM</b>                     | Open Joint Medium      | Pipe has moved at joint, along the axis of pipe                                            | Between 1 and 1.5 times the pipe wall thickness must be visible                                           |  |
| <b>PC</b>                      | Pipe Length Changes    | Length of individual pipe changes                                                          | New length described at this position                                                                     |  |

|            |                  |                                                                                                           |                                                                                                        |                                                                                       |
|------------|------------------|-----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>R</b>   | Roots            | Evidence of root ingress                                                                                  | Roots will normally infiltrate via bad joints, cracks, fractures, breaks etc                           |    |
| <b>REM</b> | Remark           | General remark                                                                                            | Used for additional information                                                                        |                                                                                       |
| <b>S</b>   | Surface Damage   | This might include corrosion, spalling and chemical attack                                                | Position only. Additional information can be added in Remarks                                          |    |
| <b>SA</b>  | Survey Abandoned | Used when a survey cannot continue for any reason                                                         | The reason for abandoning a survey should be noted in the remarks area                                 |                                                                                       |
| <b>SC</b>  | Shape Changes    | Dimension of drain changes                                                                                | Diameter dimension change recorded. Second dimension is recorded for no circular pipe changes          |    |
| <b>SR</b>  | Sealing Ring     | Sealing ring intrudes into pipe at joint                                                                  | Described by clock reference position                                                                  |   |
| <b>V</b>   | Vermin           | Evidence of Vermin in pipe                                                                                | Can also be used for evidence within manhole etc                                                       |  |
| <b>WL</b>  | Water Level      | Used to record changes in water level. Always shown at the beginning of every survey, if dry noted as 00. | Described by percentage of height or diameter. Recorded in 5% increments                               |  |
| <b>XP</b>  | Collapsed        | Drain is suffering from complete loss of structural integrity. Always followed by SA - Survey Abandoned   | Percentage loss of cross-sectional area is recorded. Other related structural defects are not recorded |  |



**Surveyor Certificate**

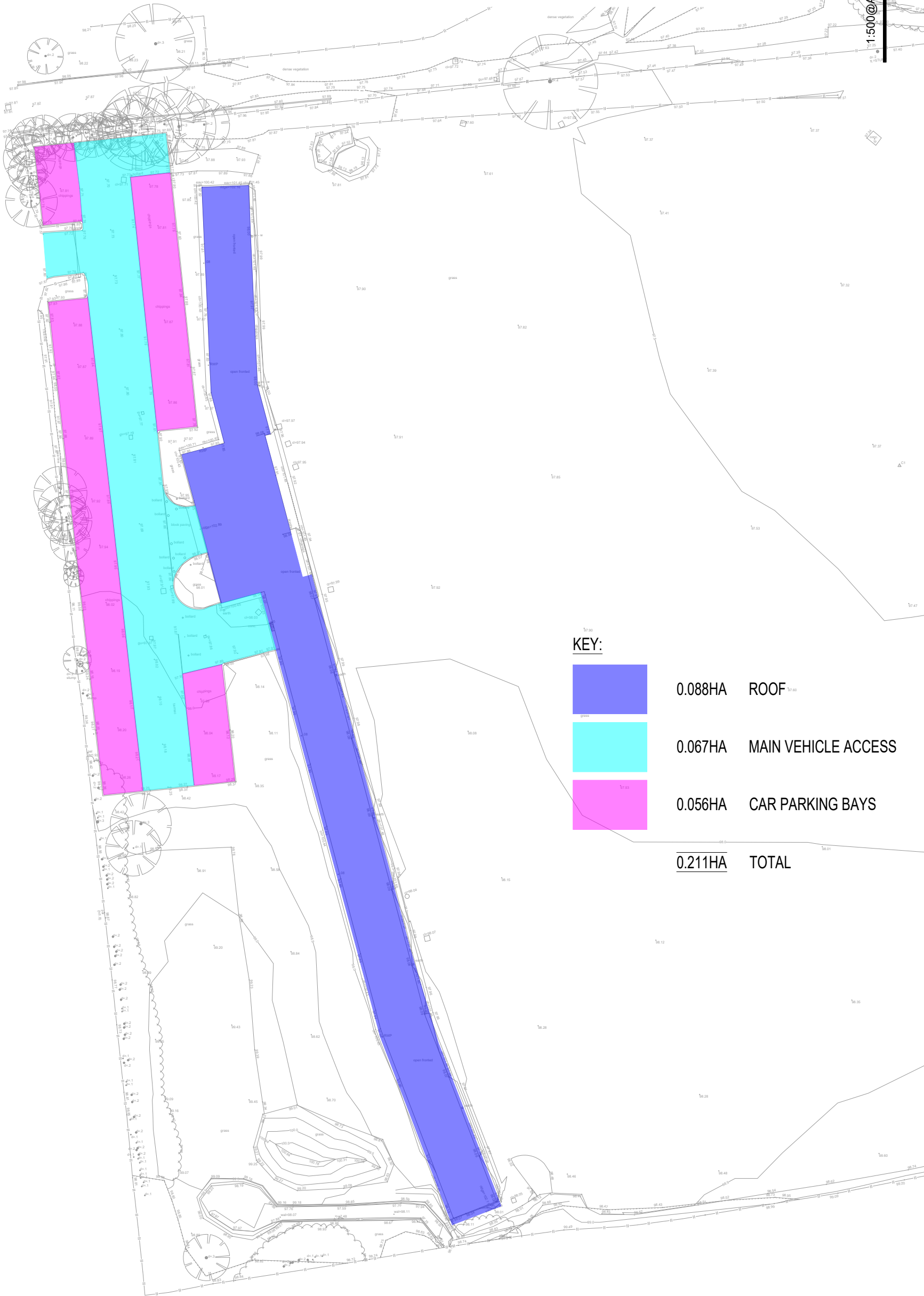
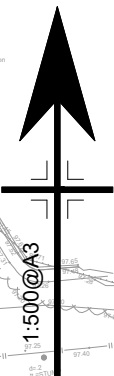


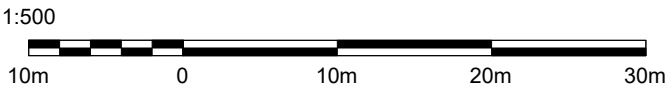
## Appendix F – Pre-Development Drainage Areas and Model



**BOWLEE PARK GOLF RANGE, HEYWOOD OLD ROAD, BIRCH, MIDDLETON, ROCHDALE, M24 4TH**

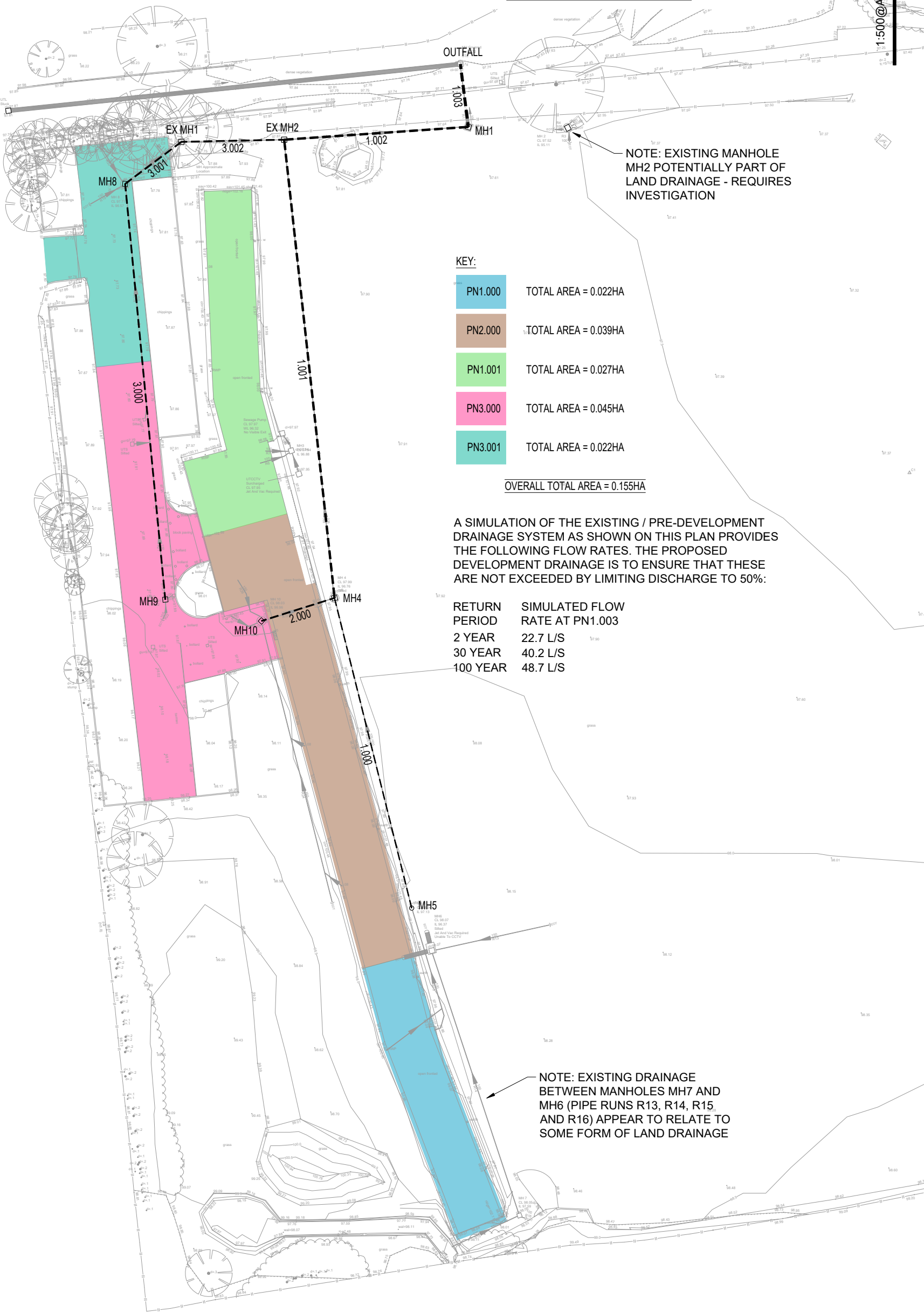
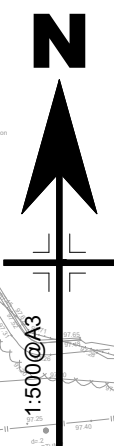
**PRE DEVELOPMENT DRAINAGE AREAS**





**BOWLEE PARK GOLF RANGE, HEYWOOD OLD ROAD, BIRCH, MIDDLETON, ROCHDALE, M24 4TH**

**PRE DEVELOPMENT DRAINAGE NETWORK**



**KEY:**

|         |                      |
|---------|----------------------|
| PN1.000 | TOTAL AREA = 0.022HA |
| PN2.000 | TOTAL AREA = 0.039HA |
| PN1.001 | TOTAL AREA = 0.027HA |
| PN3.000 | TOTAL AREA = 0.045HA |
| PN3.001 | TOTAL AREA = 0.022HA |

**OVERALL TOTAL AREA = 0.155HA**

A SIMULATION OF THE EXISTING / PRE-DEVELOPMENT DRAINAGE SYSTEM AS SHOWN ON THIS PLAN PROVIDES THE FOLLOWING FLOW RATES. THE PROPOSED DEVELOPMENT DRAINAGE IS TO ENSURE THAT THESE ARE NOT EXCEEDED BY LIMITING DISCHARGE TO 50%:

| RETURN PERIOD | SIMULATED FLOW RATE AT PN1.003 |
|---------------|--------------------------------|
| 2 YEAR        | 22.7 L/S                       |
| 30 YEAR       | 40.2 L/S                       |
| 100 YEAR      | 48.7 L/S                       |

NOTE: EXISTING DRAINAGE BETWEEN MANHOLES MH7 AND MH6 (PIPE RUNS R13, R14, R15, AND R16) APPEAR TO RELATE TO SOME FORM OF LAND DRAINAGE



Bowlee Park Golf Range  
Heywood Old Road  
Birch, Middleton  
Rochdale, M24 4TH

File: 063D22.pfd  
Network:  
cje  
22/04/2025

Page 1

P R E - D E V E L O P M E N T

### Design Settings

|                       |                   |                                      |               |
|-----------------------|-------------------|--------------------------------------|---------------|
| Rainfall Methodology  | FSR               | Maximum Time of Concentration (mins) | 30.00         |
| Return Period (years) | 2                 | Maximum Rainfall (mm/hr)             | 50.0          |
| Additional Flow (%)   | 0                 | Minimum Velocity (m/s)               | 1.00          |
| FSR Region            | England and Wales | Connection Type                      | Level Soffits |
| M5-60 (mm)            | 18.400            | Minimum Backdrop Height (m)          | 0.200         |
| Ratio-R               | 0.320             | Preferred Cover Depth (m)            | 1.200         |
| CV                    | 0.750             | Include Intermediate Ground          | ✓             |
| Time of Entry (mins)  | 5.00              | Enforce best practice design rules   | x             |

### Nodes

| Name    | Area<br>(ha) | T of E<br>(mins) | Cover<br>Level<br>(m) | Diameter<br>(mm) | Easting<br>(m) | Northing<br>(m) | Depth<br>(m) |
|---------|--------------|------------------|-----------------------|------------------|----------------|-----------------|--------------|
| MH5     | 0.022        | 5.00             | 98.040                | 1350             | 384587.929     | 406455.769      | 0.910        |
| MH10    | 0.039        | 5.00             | 98.030                | 1350             | 384569.873     | 406490.305      | 1.070        |
| MH4     | 0.027        | 5.00             | 97.990                | 1200             | 384578.644     | 406493.066      | 1.230        |
| MH9     | 0.045        | 5.00             | 97.910                | 1350             | 384558.306     | 406492.877      | 0.890        |
| MH8     | 0.022        | 5.00             | 97.710                | 1350             | 384553.469     | 406542.871      | 1.140        |
| EX MH1  |              |                  | 97.750                | 1200             | 384560.241     | 406547.935      | 1.250        |
| EX MH2  |              |                  | 97.880                | 1200             | 384572.599     | 406548.191      | 1.480        |
| MH1     |              |                  | 97.600                | 1200             | 384594.738     | 406549.728      | 1.340        |
| OUTFALL |              |                  | 97.720                | 1200             | 384593.788     | 406557.262      | 1.490        |

### Links

| Name  | US<br>Node | DS<br>Node | Length<br>(m) | ks (mm) /<br>n | US IL<br>(m) | DS IL<br>(m) | Fall<br>(m) | Slope<br>(1:X) | Dia<br>(mm) | T of C<br>(mins) | Rain<br>(mm/hr) |
|-------|------------|------------|---------------|----------------|--------------|--------------|-------------|----------------|-------------|------------------|-----------------|
| 1.000 | MH5        | MH4        | 38.436        | 0.600          | 97.130       | 96.760       | 0.370       | 103.9          | 100         | 5.85             | 50.0            |
| 2.000 | MH10       | MH4        | 9.196         | 0.600          | 96.960       | 96.760       | 0.200       | 46.0           | 150         | 5.10             | 50.0            |
| 1.001 | MH4        | EX MH2     | 55.455        | 0.600          | 96.760       | 96.400       | 0.360       | 154.0          | 225         | 6.73             | 50.0            |
| 3.000 | MH9        | MH8        | 50.228        | 0.600          | 97.020       | 96.570       | 0.450       | 111.6          | 150         | 5.88             | 50.0            |
| 3.001 | MH8        | EX MH1     | 8.456         | 0.600          | 96.570       | 96.500       | 0.070       | 120.8          | 150         | 6.04             | 50.0            |
| 3.002 | EX MH1     | EX MH2     | 12.360        | 0.600          | 96.500       | 96.400       | 0.100       | 123.6          | 150         | 6.26             | 50.0            |
| 1.002 | EX MH2     | MH1        | 22.193        | 0.600          | 96.400       | 96.260       | 0.140       | 158.5          | 225         | 7.09             | 49.8            |
| 1.003 | MH1        | OUTFALL    | 7.593         | 0.600          | 96.260       | 96.230       | 0.030       | 253.1          | 300         | 7.22             | 49.4            |

| Name  | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) | US<br>Depth<br>(m) | DS<br>Depth<br>(m) | Σ Area<br>(ha) | Σ Add<br>Inflow<br>(l/s) | Pro<br>Depth<br>(mm) | Pro<br>Velocity<br>(m/s) |
|-------|--------------|--------------|---------------|--------------------|--------------------|----------------|--------------------------|----------------------|--------------------------|
| 1.000 | 0.754        | 5.9          | 3.0           | 0.810              | 1.130              | 0.022          | 0.0                      | 50                   | 0.756                    |
| 2.000 | 1.487        | 26.3         | 5.3           | 0.920              | 1.080              | 0.039          | 0.0                      | 45                   | 1.164                    |
| 1.001 | 1.051        | 41.8         | 11.9          | 1.005              | 1.255              | 0.088          | 0.0                      | 82                   | 0.909                    |
| 3.000 | 0.950        | 16.8         | 6.1           | 0.740              | 0.990              | 0.045          | 0.0                      | 62                   | 0.875                    |
| 3.001 | 0.913        | 16.1         | 9.1           | 0.990              | 1.100              | 0.067          | 0.0                      | 81                   | 0.940                    |
| 3.002 | 0.902        | 15.9         | 9.1           | 1.100              | 1.330              | 0.067          | 0.0                      | 81                   | 0.931                    |
| 1.002 | 1.036        | 41.2         | 20.9          | 1.255              | 1.115              | 0.155          | 0.0                      | 114                  | 1.041                    |
| 1.003 | 0.983        | 69.5         | 20.7          | 1.040              | 1.190              | 0.155          | 0.0                      | 112                  | 0.862                    |

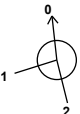
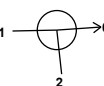


### Pipeline Schedule

| Link  | Length<br>(m) | Slope<br>(1:X) | Dia<br>(mm) | Link<br>Type | US CL<br>(m) | US IL<br>(m) | US Depth<br>(m) | DS CL<br>(m) | DS IL<br>(m) | DS Depth<br>(m) |
|-------|---------------|----------------|-------------|--------------|--------------|--------------|-----------------|--------------|--------------|-----------------|
| 1.000 | 38.436        | 103.9          | 100         | Circular     | 98.040       | 97.130       | 0.810           | 97.990       | 96.760       | 1.130           |
| 2.000 | 9.196         | 46.0           | 150         | Circular     | 98.030       | 96.960       | 0.920           | 97.990       | 96.760       | 1.080           |
| 1.001 | 55.455        | 154.0          | 225         | Circular     | 97.990       | 96.760       | 1.005           | 97.880       | 96.400       | 1.255           |
| 3.000 | 50.228        | 111.6          | 150         | Circular     | 97.910       | 97.020       | 0.740           | 97.710       | 96.570       | 0.990           |
| 3.001 | 8.456         | 120.8          | 150         | Circular     | 97.710       | 96.570       | 0.990           | 97.750       | 96.500       | 1.100           |
| 3.002 | 12.360        | 123.6          | 150         | Circular     | 97.750       | 96.500       | 1.100           | 97.880       | 96.400       | 1.330           |
| 1.002 | 22.193        | 158.5          | 225         | Circular     | 97.880       | 96.400       | 1.255           | 97.600       | 96.260       | 1.115           |
| 1.003 | 7.593         | 253.1          | 300         | Circular     | 97.600       | 96.260       | 1.040           | 97.720       | 96.230       | 1.190           |

| Link  | US<br>Node | Dia<br>(mm) | Node<br>Type | DS<br>Node | Dia<br>(mm) | Node<br>Type |
|-------|------------|-------------|--------------|------------|-------------|--------------|
| 1.000 | MH5        | 1350        | Manhole      | MH4        | 1200        | Manhole      |
| 2.000 | MH10       | 1350        | Manhole      | MH4        | 1200        | Manhole      |
| 1.001 | MH4        | 1200        | Manhole      | EX MH2     | 1200        | Manhole      |
| 3.000 | MH9        | 1350        | Manhole      | MH8        | 1350        | Manhole      |
| 3.001 | MH8        | 1350        | Manhole      | EX MH1     | 1200        | Manhole      |
| 3.002 | EX MH1     | 1200        | Manhole      | EX MH2     | 1200        | Manhole      |
| 1.002 | EX MH2     | 1200        | Manhole      | MH1        | 1200        | Manhole      |
| 1.003 | MH1        | 1200        | Manhole      | OUTFALL    | 1200        | Manhole      |

### Manhole Schedule

| Node   | Easting<br>(m) | Northing<br>(m) | CL<br>(m) | Depth<br>(m) | Dia<br>(mm) | Connections                                                                          | Link | IL<br>(m) | Dia<br>(mm) |     |
|--------|----------------|-----------------|-----------|--------------|-------------|--------------------------------------------------------------------------------------|------|-----------|-------------|-----|
| MH5    | 384587.929     | 406455.769      | 98.040    | 0.910        | 1350        |  | 0    | 1.000     | 97.130      | 100 |
| MH10   | 384569.873     | 406490.305      | 98.030    | 1.070        | 1350        |  | 0    | 2.000     | 96.960      | 150 |
| MH4    | 384578.644     | 406493.066      | 97.990    | 1.230        | 1200        |  | 1    | 2.000     | 96.760      | 150 |
|        |                |                 |           |              |             |                                                                                      | 2    | 1.000     | 96.760      | 100 |
|        |                |                 |           |              |             |                                                                                      | 0    | 1.001     | 96.760      | 225 |
| MH9    | 384558.306     | 406492.877      | 97.910    | 0.890        | 1350        |  | 0    | 3.000     | 97.020      | 150 |
| MH8    | 384553.469     | 406542.871      | 97.710    | 1.140        | 1350        |  | 1    | 3.000     | 96.570      | 150 |
|        |                |                 |           |              |             |                                                                                      | 0    | 3.001     | 96.570      | 150 |
|        |                |                 |           |              |             |                                                                                      | 0    | 3.001     | 96.500      | 150 |
| EX MH1 | 384560.241     | 406547.935      | 97.750    | 1.250        | 1200        |  | 1    | 3.001     | 96.500      | 150 |
|        |                |                 |           |              |             |                                                                                      | 0    | 3.002     | 96.500      | 150 |
|        |                |                 |           |              |             |                                                                                      | 0    | 3.002     | 96.400      | 150 |
| EX MH2 | 384572.599     | 406548.191      | 97.880    | 1.480        | 1200        |  | 2    | 1.001     | 96.400      | 225 |
|        |                |                 |           |              |             |                                                                                      | 0    | 1.002     | 96.400      | 225 |
|        |                |                 |           |              |             |                                                                                      |      |           |             |     |



Manhole Schedule

| Node    | Easting<br>(m) | Northing<br>(m) | CL<br>(m) | Depth<br>(m) | Dia<br>(mm) | Connections                                                                        | Link | IL<br>(m) | Dia<br>(mm) |     |
|---------|----------------|-----------------|-----------|--------------|-------------|------------------------------------------------------------------------------------|------|-----------|-------------|-----|
| MH1     | 384594.738     | 406549.728      | 97.600    | 1.340        | 1200        |  | 1    | 1.002     | 96.260      | 225 |
|         |                |                 |           |              |             |                                                                                    | 0    | 1.003     | 96.260      | 300 |
| OUTFALL | 384593.788     | 406557.262      | 97.720    | 1.490        | 1200        |  | 1    | 1.003     | 96.230      | 300 |

Simulation Settings

|                      |                   |                            |          |
|----------------------|-------------------|----------------------------|----------|
| Rainfall Methodology | FSR               | Analysis Speed             | Detailed |
| Rainfall Events      | Singular          | Skip Steady State          | x        |
| FSR Region           | England and Wales | Drain Down Time (mins)     | 240      |
| M5-60 (mm)           | 18.400            | Additional Storage (m³/ha) | 0.0      |
| Ratio-R              | 0.320             | Starting Level (m)         |          |
| Summer CV            | 0.750             | Check Discharge Rate(s)    | x        |
| Winter CV            | 0.840             | Check Discharge Volume     | x        |

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

| Return Period<br>(years) | Climate Change<br>(CC %) | Additional Area<br>(A %) | Additional Flow<br>(Q %) |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 2                        | 0                        | 0                        | 0                        |
| 30                       | 0                        | 0                        | 0                        |
| 100                      | 0                        | 0                        | 0                        |



**Results for 2 year Critical Storm Duration. Lowest mass balance: 99.57%**

| Node Event       | US<br>Node | Peak<br>(mins) | Level<br>(m) | Depth<br>(m) | Inflow<br>(l/s) | Node<br>Vol (m³) | Flood<br>(m³) | Status |
|------------------|------------|----------------|--------------|--------------|-----------------|------------------|---------------|--------|
| 15 minute winter | MH5        | 11             | 97.183       | 0.053        | 3.4             | 0.0758           | 0.0000        | OK     |
| 15 minute winter | MH10       | 10             | 97.009       | 0.049        | 6.1             | 0.0700           | 0.0000        | OK     |
| 15 minute winter | MH4        | 11             | 96.846       | 0.086        | 13.5            | 0.0974           | 0.0000        | OK     |
| 15 minute winter | MH9        | 10             | 97.085       | 0.065        | 6.9             | 0.0937           | 0.0000        | OK     |
| 15 minute winter | MH8        | 11             | 96.663       | 0.093        | 10.1            | 0.1325           | 0.0000        | OK     |
| 15 minute winter | EX MH1     | 11             | 96.589       | 0.089        | 9.9             | 0.1007           | 0.0000        | OK     |
| 15 minute winter | EX MH2     | 11             | 96.525       | 0.125        | 23.1            | 0.1413           | 0.0000        | OK     |
| 15 minute winter | MH1        | 12             | 96.388       | 0.128        | 22.5            | 0.1443           | 0.0000        | OK     |
| 15 minute winter | OUTFALL    | 12             | 96.345       | 0.115        | 22.7            | 0.0000           | 0.0000        | OK     |

| Link Event<br>(Upstream Depth) | US<br>Node | Link  | DS<br>Node | Outflow<br>(l/s) | Velocity<br>(m/s) | Flow/Cap | Link<br>Vol (m³) | Discharge<br>Vol (m³) |
|--------------------------------|------------|-------|------------|------------------|-------------------|----------|------------------|-----------------------|
| 15 minute winter               | MH5        | 1.000 | MH4        | 3.3              | 0.568             | 0.552    | 0.2186           |                       |
| 15 minute winter               | MH10       | 2.000 | MH4        | 6.0              | 0.800             | 0.230    | 0.0702           |                       |
| 15 minute winter               | MH4        | 1.001 | EX MH2     | 13.2             | 0.749             | 0.316    | 1.0142           |                       |
| 15 minute winter               | MH9        | 3.000 | MH8        | 6.7              | 0.724             | 0.397    | 0.4713           |                       |
| 15 minute winter               | MH8        | 3.001 | EX MH1     | 9.9              | 0.887             | 0.613    | 0.0943           |                       |
| 15 minute winter               | EX MH1     | 3.002 | EX MH2     | 9.9              | 0.734             | 0.618    | 0.1642           |                       |
| 15 minute winter               | EX MH2     | 1.002 | MH1        | 22.5             | 0.985             | 0.547    | 0.5077           |                       |
| 15 minute winter               | MH1        | 1.003 | OUTFALL    | 22.7             | 0.852             | 0.326    | 0.2023           | 11.1                  |



**Results for 30 year Critical Storm Duration. Lowest mass balance: 99.57%**

| Node Event       | US<br>Node | Peak<br>(mins) | Level<br>(m) | Depth<br>(m) | Inflow<br>(l/s) | Node<br>Vol (m³) | Flood<br>(m³) | Status     |
|------------------|------------|----------------|--------------|--------------|-----------------|------------------|---------------|------------|
| 15 minute winter | MH5        | 12             | 97.237       | 0.107        | 6.4             | 0.1538           | 0.0000        | SURCHARGED |
| 15 minute winter | MH10       | 10             | 97.033       | 0.073        | 11.5            | 0.1048           | 0.0000        | OK         |
| 15 minute winter | MH4        | 10             | 96.883       | 0.123        | 25.3            | 0.1389           | 0.0000        | OK         |
| 15 minute winter | MH9        | 10             | 97.117       | 0.097        | 13.1            | 0.1395           | 0.0000        | OK         |
| 15 minute winter | MH8        | 12             | 96.849       | 0.279        | 19.3            | 0.3998           | 0.0000        | SURCHARGED |
| 15 minute winter | EX MH1     | 12             | 96.743       | 0.243        | 17.0            | 0.2753           | 0.0000        | SURCHARGED |
| 15 minute winter | EX MH2     | 12             | 96.596       | 0.196        | 40.8            | 0.2220           | 0.0000        | OK         |
| 15 minute winter | MH1        | 12             | 96.438       | 0.178        | 40.1            | 0.2010           | 0.0000        | OK         |
| 15 minute winter | OUTFALL    | 12             | 96.385       | 0.155        | 40.2            | 0.0000           | 0.0000        | OK         |

| Link Event<br>(Upstream Depth) | US<br>Node | Link  | DS<br>Node | Outflow<br>(l/s) | Velocity<br>(m/s) | Flow/Cap | Link<br>Vol (m³) | Discharge<br>Vol (m³) |
|--------------------------------|------------|-------|------------|------------------|-------------------|----------|------------------|-----------------------|
| 15 minute winter               | MH5        | 1.000 | MH4        | 5.9              | 0.755             | 0.993    | 0.3007           |                       |
| 15 minute winter               | MH10       | 2.000 | MH4        | 11.4             | 0.935             | 0.433    | 0.1102           |                       |
| 15 minute winter               | MH4        | 1.001 | EX MH2     | 24.6             | 0.870             | 0.588    | 1.6208           |                       |
| 15 minute winter               | MH9        | 3.000 | MH8        | 12.8             | 0.809             | 0.760    | 0.7463           |                       |
| 15 minute winter               | MH8        | 3.001 | EX MH1     | 17.0             | 0.964             | 1.052    | 0.1489           |                       |
| 15 minute winter               | EX MH1     | 3.002 | EX MH2     | 17.1             | 0.971             | 1.072    | 0.2176           |                       |
| 15 minute winter               | EX MH2     | 1.002 | MH1        | 40.1             | 1.136             | 0.973    | 0.7814           |                       |
| 15 minute winter               | MH1        | 1.003 | OUTFALL    | 40.2             | 1.003             | 0.578    | 0.3039           | 21.0                  |



**Results for 100 year Critical Storm Duration. Lowest mass balance: 99.57%**

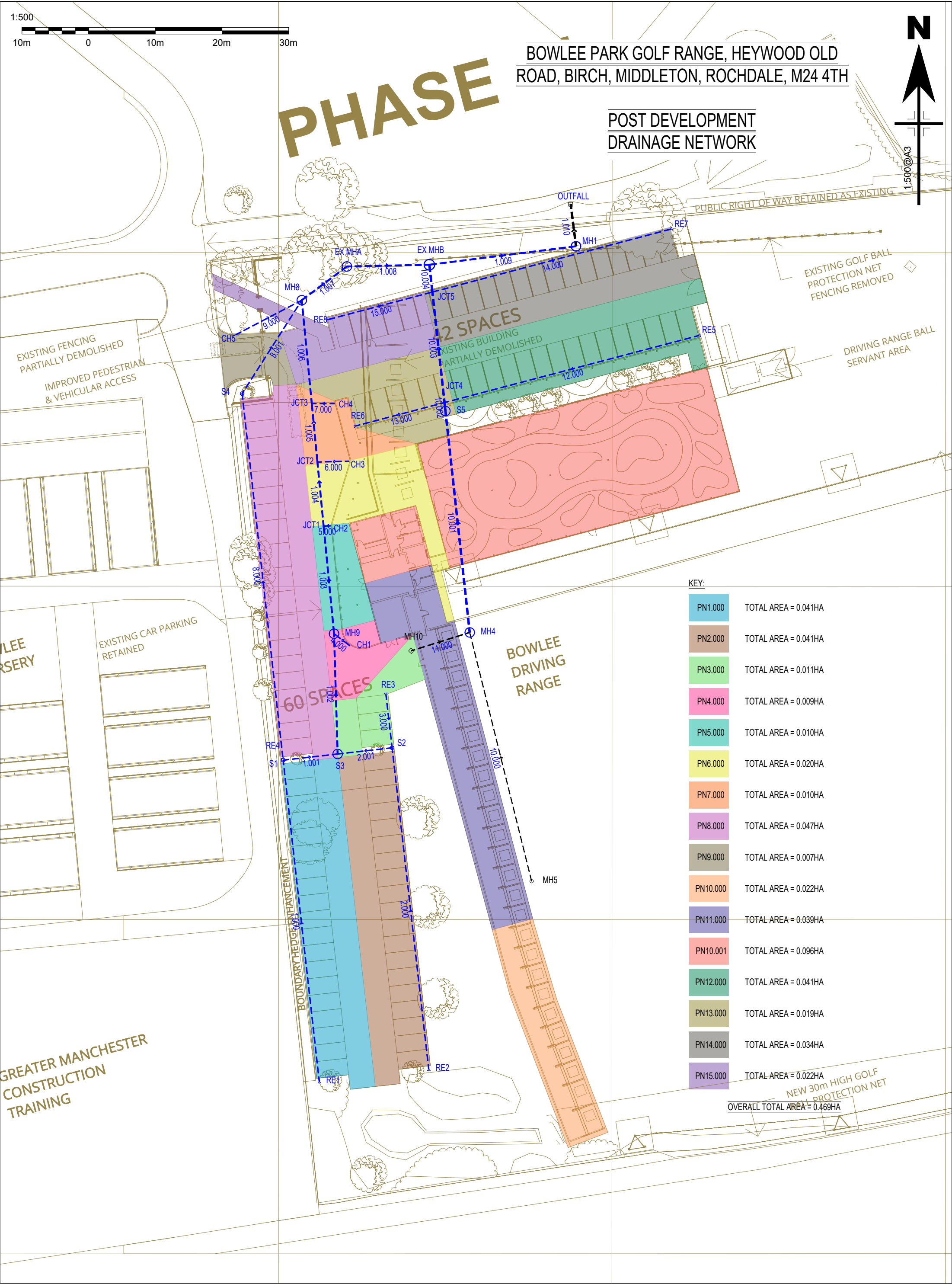
| Node Event       | US<br>Node | Peak<br>(mins) | Level<br>(m) | Depth<br>(m) | Inflow<br>(l/s) | Node<br>Vol (m³) | Flood<br>(m³) | Status     |
|------------------|------------|----------------|--------------|--------------|-----------------|------------------|---------------|------------|
| 15 minute winter | MH5        | 12             | 97.437       | 0.307        | 8.3             | 0.4395           | 0.0000        | SURCHARGED |
| 15 minute winter | MH10       | 10             | 97.047       | 0.087        | 14.8            | 0.1251           | 0.0000        | OK         |
| 15 minute winter | MH4        | 11             | 96.902       | 0.142        | 31.2            | 0.1602           | 0.0000        | OK         |
| 15 minute winter | MH9        | 12             | 97.365       | 0.345        | 16.9            | 0.4935           | 0.0000        | SURCHARGED |
| 15 minute winter | MH8        | 12             | 97.033       | 0.463        | 22.6            | 0.6630           | 0.0000        | SURCHARGED |
| 15 minute winter | EX MH1     | 12             | 96.885       | 0.385        | 20.0            | 0.4350           | 0.0000        | SURCHARGED |
| 15 minute winter | EX MH2     | 12             | 96.684       | 0.284        | 49.4            | 0.3208           | 0.0000        | SURCHARGED |
| 15 minute winter | MH1        | 12             | 96.460       | 0.200        | 48.6            | 0.2261           | 0.0000        | OK         |
| 15 minute winter | OUTFALL    | 12             | 96.401       | 0.171        | 48.7            | 0.0000           | 0.0000        | OK         |

| Link Event<br>(Upstream Depth) | US<br>Node | Link  | DS<br>Node | Outflow<br>(l/s) | Velocity<br>(m/s) | Flow/Cap | Link<br>Vol (m³) | Discharge<br>Vol (m³) |
|--------------------------------|------------|-------|------------|------------------|-------------------|----------|------------------|-----------------------|
| 15 minute winter               | MH5        | 1.000 | MH4        | 6.8              | 0.867             | 1.146    | 0.3007           |                       |
| 15 minute winter               | MH10       | 2.000 | MH4        | 14.7             | 1.026             | 0.560    | 0.1278           |                       |
| 15 minute winter               | MH4        | 1.001 | EX MH2     | 30.7             | 0.913             | 0.735    | 1.8326           |                       |
| 15 minute winter               | MH9        | 3.000 | MH8        | 14.7             | 0.873             | 0.876    | 0.8843           |                       |
| 15 minute winter               | MH8        | 3.001 | EX MH1     | 20.0             | 1.139             | 1.243    | 0.1489           |                       |
| 15 minute winter               | EX MH1     | 3.002 | EX MH2     | 20.3             | 1.152             | 1.271    | 0.2176           |                       |
| 15 minute winter               | EX MH2     | 1.002 | MH1        | 48.6             | 1.224             | 1.181    | 0.8553           |                       |
| 15 minute winter               | MH1        | 1.003 | OUTFALL    | 48.7             | 1.064             | 0.700    | 0.3469           | 27.2                  |

## Appendix G – Post-Development Drainage Areas and Model







Bowlee Park Golf Range  
Heywood Old Road  
Birch, Middleton  
Rochdale, M24 4TH

File: 063D22.pfd  
Network:  
cje  
24/04/2025

Page 1

POST - DEVELOPMENT

### Design Settings

|                       |                   |                                      |               |
|-----------------------|-------------------|--------------------------------------|---------------|
| Rainfall Methodology  | FSR               | Maximum Time of Concentration (mins) | 30.00         |
| Return Period (years) | 2                 | Maximum Rainfall (mm/hr)             | 50.0          |
| Additional Flow (%)   | 0                 | Minimum Velocity (m/s)               | 1.00          |
| FSR Region            | England and Wales | Connection Type                      | Level Soffits |
| M5-60 (mm)            | 18.400            | Minimum Backdrop Height (m)          | 0.200         |
| Ratio-R               | 0.320             | Preferred Cover Depth (m)            | 1.200         |
| CV                    | 0.750             | Include Intermediate Ground          | ✓             |
| Time of Entry (mins)  | 5.00              | Enforce best practice design rules   | x             |

### Nodes

| Name    | Area<br>(ha) | T of E<br>(mins) | Cover<br>Level<br>(m) | Diameter<br>(mm) | Easting<br>(m) | Northing<br>(m) | Depth<br>(m) |
|---------|--------------|------------------|-----------------------|------------------|----------------|-----------------|--------------|
| RE1     | 0.041        | 5.00             | 98.990                | 150              | 384556.090     | 406425.753      | 0.750        |
| S1 ST   |              |                  | 97.960                | 500              | 384550.680     | 406473.922      | 0.750        |
| RE2     | 0.041        | 5.00             | 98.990                | 150              | 384572.499     | 406427.617      | 0.750        |
| RE3     | 0.011        | 5.00             | 97.790                | 150              | 384566.087     | 406483.747      | 0.500        |
| S2 ST   |              |                  | 97.960                | 500              | 384567.015     | 406475.770      | 0.750        |
| S3      |              |                  | 98.060                | 1350             | 384558.847     | 406474.843      | 1.130        |
| CH1     | 0.009        | 5.00             | 97.790                | 150              | 384560.674     | 406491.080      | 0.750        |
| MH9     |              |                  | 97.830                | 1350             | 384558.306     | 406492.877      | 1.010        |
| CH2     | 0.010        | 5.00             | 97.760                | 150              | 384557.785     | 406509.044      | 0.750        |
| JCT1    |              |                  | 97.790                |                  | 384556.745     | 406509.017      | 1.067        |
| CH3     | 0.020        | 5.00             | 97.600                | 150              | 384560.580     | 406518.737      | 0.750        |
| JCT2    |              |                  | 97.760                |                  | 384555.808     | 406518.617      | 1.094        |
| CH4     | 0.010        | 5.00             | 97.600                | 150              | 384558.368     | 406527.368      | 0.750        |
| JCT3    |              |                  | 97.720                |                  | 384554.968     | 406527.391      | 1.107        |
| RE4     | 0.047        | 5.00             | 97.960                | 150              | 384550.615     | 406474.421      | 0.750        |
| S4 ST   |              |                  | 97.700                | 500              | 384544.524     | 406528.869      | 0.960        |
| CH5     | 0.007        | 5.00             | 97.600                | 150              | 384543.572     | 406537.697      | 0.750        |
| MH8     |              |                  | 97.710                | 1350             | 384553.469     | 406542.871      | 1.190        |
| EX MHA  |              |                  | 97.750                | 1350             | 384560.241     | 406547.958      | 1.280        |
| MH5     | 0.022        | 5.00             | 98.040                | 1350             | 384587.929     | 406455.769      | 0.910        |
| MH10    | 0.039        | 5.00             | 97.950                | 1350             | 384569.873     | 406490.305      | 0.990        |
| MH4     | 0.096        | 5.00             | 97.990                | 1200             | 384578.644     | 406493.066      | 1.230        |
| S5 CP   |              |                  | 97.700                | 1350             | 384575.010     | 406526.259      | 1.157        |
| RE5     | 0.041        | 5.00             | 97.600                | 150              | 384612.969     | 406537.567      | 0.600        |
| RE6     | 0.019        | 5.00             | 97.600                | 150              | 384561.545     | 406524.016      | 0.650        |
| JCT4    |              |                  | 97.600                |                  | 384574.871     | 406527.528      | 1.065        |
| RE7     | 0.034        | 5.00             | 97.600                | 150              | 384608.766     | 406553.523      | 0.600        |
| RE8     | 0.022        | 5.00             | 97.600                | 150              | 384557.347     | 406539.952      | 0.650        |
| JCT5    |              |                  | 97.600                |                  | 384573.049     | 406544.096      | 1.173        |
| EX MHB  |              |                  | 97.880                | 1500             | 384572.599     | 406548.224      | 1.480        |
| MH1     |              |                  | 97.600                | 1350             | 384594.582     | 406550.964      | 1.340        |
| OUTFALL |              |                  | 97.720                | 1200             | 384593.788     | 406557.262      | 1.490        |



Links

| Name   | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|--------|---------|---------|------------|-------------|-----------|-----------|----------|-------------|----------|---------------|--------------|
| 1.000  | RE1     | S1 ST   | 48.466     | 0.600       | 98.240    | 97.210    | 1.030    | 47.1        | 150      | 5.55          | 50.0         |
| 1.001  | S1 ST   | S3      | 8.220      | 0.600       | 97.210    | 97.005    | 0.205    | 40.1        | 150      | 5.64          | 50.0         |
| 2.000  | RE2     | S2 ST   | 48.464     | 0.600       | 98.240    | 97.210    | 1.030    | 47.1        | 150      | 5.55          | 50.0         |
| 3.000  | RE3     | S2 ST   | 8.030      | 0.600       | 97.290    | 97.210    | 0.080    | 100.4       | 150      | 5.13          | 50.0         |
| 2.001  | S2 ST   | S3      | 8.220      | 0.600       | 97.210    | 97.005    | 0.205    | 40.1        | 150      | 5.64          | 50.0         |
| 1.002  | S3      | MH9     | 18.042     | 0.600       | 96.930    | 96.820    | 0.110    | 164.0       | 225      | 5.93          | 50.0         |
| 4.000  | CH1     | MH9     | 2.972      | 0.600       | 97.040    | 96.895    | 0.145    | 20.5        | 150      | 5.02          | 50.0         |
| 1.003  | MH9     | JCT1    | 16.215     | 0.600       | 96.820    | 96.723    | 0.097    | 167.2       | 225      | 6.20          | 50.0         |
| 5.000  | CH2     | JCT1    | 1.040      | 0.600       | 97.010    | 96.798    | 0.212    | 4.9         | 150      | 5.00          | 50.0         |
| 1.004  | JCT1    | JCT2    | 9.646      | 0.600       | 96.723    | 96.666    | 0.057    | 169.2       | 225      | 6.36          | 50.0         |
| 6.000  | CH3     | JCT2    | 4.766      | 0.600       | 96.850    | 96.741    | 0.109    | 43.7        | 150      | 5.05          | 50.0         |
| 1.005  | JCT2    | JCT3    | 8.805      | 0.600       | 96.666    | 96.613    | 0.053    | 166.1       | 225      | 6.50          | 50.0         |
| 7.000  | CH4     | JCT3    | 3.400      | 0.600       | 96.850    | 96.688    | 0.162    | 21.0        | 150      | 5.03          | 50.0         |
| 1.006  | JCT3    | MH8     | 15.562     | 0.600       | 96.613    | 96.520    | 0.093    | 167.3       | 225      | 6.76          | 50.0         |
| 8.000  | RE4     | S4 ST   | 54.787     | 0.600       | 97.210    | 96.740    | 0.470    | 116.6       | 150      | 5.98          | 50.0         |
| 8.001  | S4 ST   | MH8     | 16.615     | 0.600       | 96.740    | 96.595    | 0.145    | 114.6       | 150      | 6.28          | 50.0         |
| 9.000  | CH5     | MH8     | 11.168     | 0.600       | 96.850    | 96.595    | 0.255    | 43.8        | 150      | 5.12          | 50.0         |
| 1.007  | MH8     | EX MHA  | 8.456      | 0.600       | 96.520    | 96.470    | 0.050    | 169.1       | 225      | 6.90          | 50.0         |
| 1.008  | EX MHA  | EX MHB  | 12.360     | 0.600       | 96.470    | 96.400    | 0.070    | 176.6       | 225      | 7.11          | 49.7         |
| 10.000 | MH5     | MH4     | 38.436     | 0.600       | 97.130    | 96.760    | 0.370    | 103.9       | 100      | 5.85          | 50.0         |
| 11.000 | MH10    | MH4     | 9.196      | 0.600       | 96.960    | 96.760    | 0.200    | 46.0        | 150      | 5.10          | 50.0         |
| 10.001 | MH4     | S5 CP   | 33.391     | 0.600       | 96.760    | 96.543    | 0.217    | 153.9       | 300      | 6.29          | 50.0         |
| 10.002 | S5 CP   | JCT4    | 1.277      | 0.600       | 96.543    | 96.535    | 0.008    | 159.6       | 300      | 6.31          | 50.0         |
| 12.000 | RE5     | JCT4    | 39.399     | 0.600       | 97.000    | 96.610    | 0.390    | 101.0       | 150      | 5.66          | 50.0         |

| Name   | Vel (m/s) | Cap (l/s) | Flow (l/s) | US Depth (m) | DS Depth (m) | Σ Area (ha) | Σ Add Inflow (l/s) | Pro Depth (mm) | Pro Velocity (m/s) |
|--------|-----------|-----------|------------|--------------|--------------|-------------|--------------------|----------------|--------------------|
| 1.000  | 1.470     | 26.0      | 5.6        | 0.600        | 0.600        | 0.041       | 0.0                | 47             | 1.175              |
| 1.001  | 1.594     | 28.2      | 5.6        | 0.600        | 0.905        | 0.041       | 0.0                | 45             | 1.248              |
| 2.000  | 1.470     | 26.0      | 5.6        | 0.600        | 0.600        | 0.041       | 0.0                | 47             | 1.175              |
| 3.000  | 1.003     | 17.7      | 1.5        | 0.350        | 0.600        | 0.011       | 0.0                | 29             | 0.605              |
| 2.001  | 1.594     | 28.2      | 7.1        | 0.600        | 0.905        | 0.052       | 0.0                | 51             | 1.331              |
| 1.002  | 1.018     | 40.5      | 12.7       | 0.905        | 0.785        | 0.093       | 0.0                | 87             | 0.904              |
| 4.000  | 2.234     | 39.5      | 1.2        | 0.600        | 0.785        | 0.009       | 0.0                | 18             | 1.001              |
| 1.003  | 1.008     | 40.1      | 13.9       | 0.785        | 0.842        | 0.102       | 0.0                | 91             | 0.917              |
| 5.000  | 4.581     | 80.9      | 1.4        | 0.600        | 0.842        | 0.010       | 0.0                | 14             | 1.737              |
| 1.004  | 1.002     | 39.8      | 15.3       | 0.842        | 0.869        | 0.113       | 0.0                | 96             | 0.936              |
| 6.000  | 1.526     | 27.0      | 2.6        | 0.600        | 0.869        | 0.020       | 0.0                | 32             | 0.977              |
| 1.005  | 1.011     | 40.2      | 17.9       | 0.869        | 0.882        | 0.132       | 0.0                | 105            | 0.982              |
| 7.000  | 2.208     | 39.0      | 1.4        | 0.600        | 0.882        | 0.010       | 0.0                | 19             | 1.030              |
| 1.006  | 1.008     | 40.1      | 19.3       | 0.882        | 0.965        | 0.142       | 0.0                | 110            | 0.999              |
| 8.000  | 0.930     | 16.4      | 6.3        | 0.600        | 0.810        | 0.047       | 0.0                | 65             | 0.871              |
| 8.001  | 0.938     | 16.6      | 6.3        | 0.810        | 0.965        | 0.047       | 0.0                | 64             | 0.875              |
| 9.000  | 1.524     | 26.9      | 1.0        | 0.600        | 0.965        | 0.007       | 0.0                | 20             | 0.723              |
| 1.007  | 1.002     | 39.9      | 26.6       | 0.965        | 1.055        | 0.196       | 0.0                | 135            | 1.072              |
| 1.008  | 0.981     | 39.0      | 26.4       | 1.055        | 1.255        | 0.196       | 0.0                | 136            | 1.051              |
| 10.000 | 0.754     | 5.9       | 3.0        | 0.810        | 1.130        | 0.022       | 0.0                | 50             | 0.756              |
| 11.000 | 1.487     | 26.3      | 5.3        | 0.840        | 1.080        | 0.039       | 0.0                | 45             | 1.164              |
| 10.001 | 1.265     | 89.4      | 21.3       | 0.930        | 0.857        | 0.157       | 0.0                | 99             | 1.043              |
| 10.002 | 1.242     | 87.8      | 21.3       | 0.857        | 0.765        | 0.157       | 0.0                | 100            | 1.030              |
| 12.000 | 0.999     | 17.7      | 5.6        | 0.450        | 0.840        | 0.041       | 0.0                | 58             | 0.886              |



### Links

| Name   | US<br>Node | DS<br>Node | Length<br>(m) | ks (mm) /<br>n | US IL<br>(m) | DS IL<br>(m) | Fall<br>(m) | Slope<br>(1:X) | Dia<br>(mm) | T of C<br>(mins) | Rain<br>(mm/hr) |
|--------|------------|------------|---------------|----------------|--------------|--------------|-------------|----------------|-------------|------------------|-----------------|
| 13.000 | RE6        | JCT4       | 13.780        | 0.600          | 96.950       | 96.610       | 0.340       | 40.5           | 150         | 5.14             | 50.0            |
| 10.003 | JCT4       | JCT5       | 16.668        | 0.600          | 96.535       | 96.427       | 0.108       | 154.3          | 300         | 6.53             | 50.0            |
| 14.000 | RE7        | JCT5       | 36.940        | 0.600          | 97.000       | 96.502       | 0.498       | 74.2           | 150         | 5.53             | 50.0            |
| 15.000 | RE8        | JCT5       | 16.240        | 0.600          | 96.950       | 96.502       | 0.448       | 36.3           | 150         | 5.16             | 50.0            |
| 10.004 | JCT5       | EX MHB     | 4.119         | 0.600          | 96.427       | 96.400       | 0.027       | 152.6          | 300         | 6.58             | 50.0            |
| 1.009  | EX MHB     | MH1        | 22.158        | 0.600          | 96.400       | 96.260       | 0.140       | 158.3          | 225         | 7.47             | 48.6            |
| 1.010  | MH1        | OUTFALL    | 6.347         | 0.600          | 96.260       | 96.230       | 0.030       | 211.6          | 300         | 7.57             | 48.3            |

| Name   | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) | US<br>Depth<br>(m) | DS<br>Depth<br>(m) | Σ Area<br>(ha) | Σ Add<br>Inflow<br>(l/s) | Pro<br>Depth<br>(mm) | Pro<br>Velocity<br>(m/s) |
|--------|--------------|--------------|---------------|--------------------|--------------------|----------------|--------------------------|----------------------|--------------------------|
| 13.000 | 1.585        | 28.0         | 2.6           | 0.500              | 0.840              | 0.019          | 0.0                      | 31                   | 0.993                    |
| 10.003 | 1.263        | 89.3         | 29.5          | 0.765              | 0.873              | 0.217          | 0.0                      | 119                  | 1.138                    |
| 14.000 | 1.168        | 20.6         | 4.5           | 0.450              | 0.948              | 0.034          | 0.0                      | 48                   | 0.939                    |
| 15.000 | 1.677        | 29.6         | 3.0           | 0.500              | 0.948              | 0.022          | 0.0                      | 32                   | 1.075                    |
| 10.004 | 1.270        | 89.8         | 37.0          | 0.873              | 1.180              | 0.273          | 0.0                      | 134                  | 1.210                    |
| 1.009  | 1.036        | 41.2         | 61.8          | 1.255              | 1.115              | 0.469          | 0.0                      | 225                  | 1.056                    |
| 1.010  | 1.077        | 76.1         | 61.4          | 1.040              | 1.190              | 0.469          | 0.0                      | 205                  | 1.193                    |

### Pipeline Schedule

| Link  | Length<br>(m) | Slope<br>(1:X) | Dia<br>(mm) | Link<br>Type | US CL<br>(m) | US IL<br>(m) | US Depth<br>(m) | DS CL<br>(m) | DS IL<br>(m) | DS Depth<br>(m) |
|-------|---------------|----------------|-------------|--------------|--------------|--------------|-----------------|--------------|--------------|-----------------|
| 1.000 | 48.466        | 47.1           | 150         | Circular     | 98.990       | 98.240       | 0.600           | 97.960       | 97.210       | 0.600           |
| 1.001 | 8.220         | 40.1           | 150         | Circular     | 97.960       | 97.210       | 0.600           | 98.060       | 97.005       | 0.905           |
| 2.000 | 48.464        | 47.1           | 150         | Circular     | 98.990       | 98.240       | 0.600           | 97.960       | 97.210       | 0.600           |
| 3.000 | 8.030         | 100.4          | 150         | Circular     | 97.790       | 97.290       | 0.350           | 97.960       | 97.210       | 0.600           |
| 2.001 | 8.220         | 40.1           | 150         | Circular     | 97.960       | 97.210       | 0.600           | 98.060       | 97.005       | 0.905           |
| 1.002 | 18.042        | 164.0          | 225         | Circular     | 98.060       | 96.930       | 0.905           | 97.830       | 96.820       | 0.785           |
| 4.000 | 2.972         | 20.5           | 150         | Circular     | 97.790       | 97.040       | 0.600           | 97.830       | 96.895       | 0.785           |
| 1.003 | 16.215        | 167.2          | 225         | Circular     | 97.830       | 96.820       | 0.785           | 97.790       | 96.723       | 0.842           |
| 5.000 | 1.040         | 4.9            | 150         | Circular     | 97.760       | 97.010       | 0.600           | 97.790       | 96.798       | 0.842           |
| 1.004 | 9.646         | 169.2          | 225         | Circular     | 97.790       | 96.723       | 0.842           | 97.760       | 96.666       | 0.869           |
| 6.000 | 4.766         | 43.7           | 150         | Circular     | 97.600       | 96.850       | 0.600           | 97.760       | 96.741       | 0.869           |
| 1.005 | 8.805         | 166.1          | 225         | Circular     | 97.760       | 96.666       | 0.869           | 97.720       | 96.613       | 0.882           |
| 7.000 | 3.400         | 21.0           | 150         | Circular     | 97.600       | 96.850       | 0.600           | 97.720       | 96.688       | 0.882           |

| Link  | US<br>Node | Dia<br>(mm) | Node<br>Type | DS<br>Node | Dia<br>(mm) | Node<br>Type |
|-------|------------|-------------|--------------|------------|-------------|--------------|
| 1.000 | RE1        | 150         | Manhole      | S1 ST      | 500         | Manhole      |
| 1.001 | S1 ST      | 500         | Manhole      | S3         | 1350        | Manhole      |
| 2.000 | RE2        | 150         | Manhole      | S2 ST      | 500         | Manhole      |
| 3.000 | RE3        | 150         | Manhole      | S2 ST      | 500         | Manhole      |
| 2.001 | S2 ST      | 500         | Manhole      | S3         | 1350        | Manhole      |
| 1.002 | S3         | 1350        | Manhole      | MH9        | 1350        | Manhole      |
| 4.000 | CH1        | 150         | Manhole      | MH9        | 1350        | Manhole      |
| 1.003 | MH9        | 1350        | Manhole      | JCT1       |             | Junction     |
| 5.000 | CH2        | 150         | Manhole      | JCT1       |             | Junction     |
| 1.004 | JCT1       |             | Junction     | JCT2       |             | Junction     |
| 6.000 | CH3        | 150         | Manhole      | JCT2       |             | Junction     |
| 1.005 | JCT2       |             | Junction     | JCT3       |             | Junction     |
| 7.000 | CH4        | 150         | Manhole      | JCT3       |             | Junction     |



### Pipeline Schedule

| Link   | Length<br>(m) | Slope<br>(1:X) | Dia<br>(mm) | Link<br>Type | US CL<br>(m) | US IL<br>(m) | US Depth<br>(m) | DS CL<br>(m) | DS IL<br>(m) | DS Depth<br>(m) |
|--------|---------------|----------------|-------------|--------------|--------------|--------------|-----------------|--------------|--------------|-----------------|
| 1.006  | 15.562        | 167.3          | 225         | Circular     | 97.720       | 96.613       | 0.882           | 97.710       | 96.520       | 0.965           |
| 8.000  | 54.787        | 116.6          | 150         | Circular     | 97.960       | 97.210       | 0.600           | 97.700       | 96.740       | 0.810           |
| 8.001  | 16.615        | 114.6          | 150         | Circular     | 97.700       | 96.740       | 0.810           | 97.710       | 96.595       | 0.965           |
| 9.000  | 11.168        | 43.8           | 150         | Circular     | 97.600       | 96.850       | 0.600           | 97.710       | 96.595       | 0.965           |
| 1.007  | 8.456         | 169.1          | 225         | Circular     | 97.710       | 96.520       | 0.965           | 97.750       | 96.470       | 1.055           |
| 1.008  | 12.360        | 176.6          | 225         | Circular     | 97.750       | 96.470       | 1.055           | 97.880       | 96.400       | 1.255           |
| 10.000 | 38.436        | 103.9          | 100         | Circular     | 98.040       | 97.130       | 0.810           | 97.990       | 96.760       | 1.130           |
| 11.000 | 9.196         | 46.0           | 150         | Circular     | 97.950       | 96.960       | 0.840           | 97.990       | 96.760       | 1.080           |
| 10.001 | 33.391        | 153.9          | 300         | Circular     | 97.990       | 96.760       | 0.930           | 97.700       | 96.543       | 0.857           |
| 10.002 | 1.277         | 159.6          | 300         | Circular     | 97.700       | 96.543       | 0.857           | 97.600       | 96.535       | 0.765           |
| 12.000 | 39.399        | 101.0          | 150         | Circular     | 97.600       | 97.000       | 0.450           | 97.600       | 96.610       | 0.840           |
| 13.000 | 13.780        | 40.5           | 150         | Circular     | 97.600       | 96.950       | 0.500           | 97.600       | 96.610       | 0.840           |
| 10.003 | 16.668        | 154.3          | 300         | Circular     | 97.600       | 96.535       | 0.765           | 97.600       | 96.427       | 0.873           |
| 14.000 | 36.940        | 74.2           | 150         | Circular     | 97.600       | 97.000       | 0.450           | 97.600       | 96.502       | 0.948           |
| 15.000 | 16.240        | 36.3           | 150         | Circular     | 97.600       | 96.950       | 0.500           | 97.600       | 96.502       | 0.948           |
| 10.004 | 4.119         | 152.6          | 300         | Circular     | 97.600       | 96.427       | 0.873           | 97.880       | 96.400       | 1.180           |
| 1.009  | 22.158        | 158.3          | 225         | Circular     | 97.880       | 96.400       | 1.255           | 97.600       | 96.260       | 1.115           |
| 1.010  | 6.347         | 211.6          | 300         | Circular     | 97.600       | 96.260       | 1.040           | 97.720       | 96.230       | 1.190           |

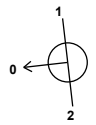
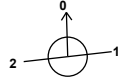
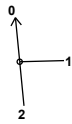
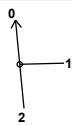
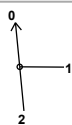
| Link   | US<br>Node | Dia<br>(mm) | Node<br>Type | DS<br>Node | Dia<br>(mm) | Node<br>Type |
|--------|------------|-------------|--------------|------------|-------------|--------------|
| 1.006  | JCT3       |             | Junction     | MH8        | 1350        | Manhole      |
| 8.000  | RE4        | 150         | Manhole      | S4 ST      | 500         | Manhole      |
| 8.001  | S4 ST      | 500         | Manhole      | MH8        | 1350        | Manhole      |
| 9.000  | CH5        | 150         | Manhole      | MH8        | 1350        | Manhole      |
| 1.007  | MH8        | 1350        | Manhole      | EX MHA     | 1350        | Manhole      |
| 1.008  | EX MHA     | 1350        | Manhole      | EX MHB     | 1500        | Manhole      |
| 10.000 | MH5        | 1350        | Manhole      | MH4        | 1200        | Manhole      |
| 11.000 | MH10       | 1350        | Manhole      | MH4        | 1200        | Manhole      |
| 10.001 | MH4        | 1200        | Manhole      | S5 CP      | 1350        | Manhole      |
| 10.002 | S5 CP      | 1350        | Manhole      | JCT4       |             | Junction     |
| 12.000 | RE5        | 150         | Manhole      | JCT4       |             | Junction     |
| 13.000 | RE6        | 150         | Manhole      | JCT4       |             | Junction     |
| 10.003 | JCT4       |             | Junction     | JCT5       |             | Junction     |
| 14.000 | RE7        | 150         | Manhole      | JCT5       |             | Junction     |
| 15.000 | RE8        | 150         | Manhole      | JCT5       |             | Junction     |
| 10.004 | JCT5       |             | Junction     | EX MHB     | 1500        | Manhole      |
| 1.009  | EX MHB     | 1500        | Manhole      | MH1        | 1350        | Manhole      |
| 1.010  | MH1        | 1350        | Manhole      | OUTFALL    | 1200        | Manhole      |

### Manhole Schedule

| Node  | Easting<br>(m) | Northing<br>(m) | CL<br>(m) | Depth<br>(m) | Dia<br>(mm) | Connections                                                                          | Link  | IL<br>(m) | Dia<br>(mm) |     |
|-------|----------------|-----------------|-----------|--------------|-------------|--------------------------------------------------------------------------------------|-------|-----------|-------------|-----|
| RE1   | 384556.090     | 406425.753      | 98.990    | 0.750        | 150         |  |       |           |             |     |
|       |                |                 |           |              |             | 0                                                                                    | 1.000 | 98.240    | 150         |     |
| S1 ST | 384550.680     | 406473.922      | 97.960    | 0.750        | 500         |  | 1     | 1.000     | 97.210      | 150 |
|       |                |                 |           |              |             |  | 0     | 1.001     | 97.210      | 150 |

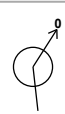
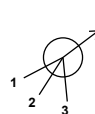
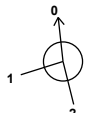
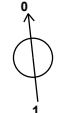
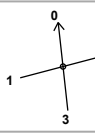


**Manhole Schedule**

| Node  | Easting<br>(m) | Northing<br>(m) | CL<br>(m) | Depth<br>(m) | Dia<br>(mm) | Connections                                                                          | Link | IL<br>(m) | Dia<br>(mm) |     |
|-------|----------------|-----------------|-----------|--------------|-------------|--------------------------------------------------------------------------------------|------|-----------|-------------|-----|
| RE2   | 384572.499     | 406427.617      | 98.990    | 0.750        | 150         |    | 0    | 2.000     | 98.240      | 150 |
| RE3   | 384566.087     | 406483.747      | 97.790    | 0.500        | 150         |    | 0    | 3.000     | 97.290      | 150 |
| S2 ST | 384567.015     | 406475.770      | 97.960    | 0.750        | 500         |    | 1    | 3.000     | 97.210      | 150 |
|       |                |                 |           |              |             |                                                                                      | 2    | 2.000     | 97.210      | 150 |
|       |                |                 |           |              |             |                                                                                      | 0    | 2.001     | 97.210      | 150 |
| S3    | 384558.847     | 406474.843      | 98.060    | 1.130        | 1350        |    | 1    | 2.001     | 97.005      | 150 |
|       |                |                 |           |              |             |                                                                                      | 2    | 1.001     | 97.005      | 150 |
|       |                |                 |           |              |             |                                                                                      | 0    | 1.002     | 96.930      | 225 |
| CH1   | 384560.674     | 406491.080      | 97.790    | 0.750        | 150         |    | 0    | 4.000     | 97.040      | 150 |
| MH9   | 384558.306     | 406492.877      | 97.830    | 1.010        | 1350        |  | 1    | 4.000     | 96.895      | 150 |
|       |                |                 |           |              |             |                                                                                      | 2    | 1.002     | 96.820      | 225 |
|       |                |                 |           |              |             |                                                                                      | 0    | 1.003     | 96.820      | 225 |
| CH2   | 384557.785     | 406509.044      | 97.760    | 0.750        | 150         |  | 0    | 5.000     | 97.010      | 150 |
| JCT1  | 384556.745     | 406509.017      | 97.790    | 1.067        |             |  | 1    | 5.000     | 96.798      | 150 |
|       |                |                 |           |              |             |                                                                                      | 2    | 1.003     | 96.723      | 225 |
|       |                |                 |           |              |             |                                                                                      | 0    | 1.004     | 96.723      | 225 |
| CH3   | 384560.580     | 406518.737      | 97.600    | 0.750        | 150         |  | 0    | 6.000     | 96.850      | 150 |
| JCT2  | 384555.808     | 406518.617      | 97.760    | 1.094        |             |  | 1    | 6.000     | 96.741      | 150 |
|       |                |                 |           |              |             |                                                                                      | 2    | 1.004     | 96.666      | 225 |
|       |                |                 |           |              |             |                                                                                      | 0    | 1.005     | 96.666      | 225 |
| CH4   | 384558.368     | 406527.368      | 97.600    | 0.750        | 150         |  | 0    | 7.000     | 96.850      | 150 |
| JCT3  | 384554.968     | 406527.391      | 97.720    | 1.107        |             |  | 1    | 7.000     | 96.688      | 150 |
|       |                |                 |           |              |             |                                                                                      | 2    | 1.005     | 96.613      | 225 |
|       |                |                 |           |              |             |                                                                                      | 0    | 1.006     | 96.613      | 225 |
| RE4   | 384550.615     | 406474.421      | 97.960    | 0.750        | 150         |  | 0    | 8.000     | 97.210      | 150 |



**Manhole Schedule**

| Node   | Easting<br>(m) | Northing<br>(m) | CL<br>(m) | Depth<br>(m) | Dia<br>(mm) | Connections                                                                                     | Link | IL<br>(m) | Dia<br>(mm) |     |
|--------|----------------|-----------------|-----------|--------------|-------------|-------------------------------------------------------------------------------------------------|------|-----------|-------------|-----|
| S4 ST  | 384544.524     | 406528.869      | 97.700    | 0.960        | 500         | <div></div>   | 1    | 8.000     | 96.740      | 150 |
|        |                |                 |           |              |             |                                                                                                 | 0    | 8.001     | 96.740      | 150 |
| CH5    | 384543.572     | 406537.697      | 97.600    | 0.750        | 150         | <div></div>   |      |           |             |     |
|        |                |                 |           |              |             |                                                                                                 | 0    | 9.000     | 96.850      | 150 |
| MH8    | 384553.469     | 406542.871      | 97.710    | 1.190        | 1350        | <div></div>   | 1    | 9.000     | 96.595      | 150 |
|        |                |                 |           |              |             |                                                                                                 | 2    | 8.001     | 96.595      | 150 |
|        |                |                 |           |              |             |                                                                                                 | 3    | 1.006     | 96.520      | 225 |
|        |                |                 |           |              |             |                                                                                                 | 0    | 1.007     | 96.520      | 225 |
| EX MHA | 384560.241     | 406547.958      | 97.750    | 1.280        | 1350        | <div></div>   | 1    | 1.007     | 96.470      | 225 |
|        |                |                 |           |              |             |                                                                                                 | 0    | 1.008     | 96.470      | 225 |
| MH5    | 384587.929     | 406455.769      | 98.040    | 0.910        | 1350        | <div></div>   |      |           |             |     |
|        |                |                 |           |              |             |                                                                                                 | 0    | 10.000    | 97.130      | 100 |
| MH10   | 384569.873     | 406490.305      | 97.950    | 0.990        | 1350        | <div></div> |      |           |             |     |
|        |                |                 |           |              |             |                                                                                                 | 0    | 11.000    | 96.960      | 150 |
| MH4    | 384578.644     | 406493.066      | 97.990    | 1.230        | 1200        | <div></div> | 1    | 11.000    | 96.760      | 150 |
|        |                |                 |           |              |             |                                                                                                 | 2    | 10.000    | 96.760      | 100 |
|        |                |                 |           |              |             |                                                                                                 | 0    | 10.001    | 96.760      | 300 |
| S5 CP  | 384575.010     | 406526.259      | 97.700    | 1.157        | 1350        | <div></div> | 1    | 10.001    | 96.543      | 300 |
|        |                |                 |           |              |             |                                                                                                 | 0    | 10.002    | 96.543      | 300 |
| RE5    | 384612.969     | 406537.567      | 97.600    | 0.600        | 150         | <div></div> |      |           |             |     |
|        |                |                 |           |              |             |                                                                                                 | 0    | 12.000    | 97.000      | 150 |
| RE6    | 384561.545     | 406524.016      | 97.600    | 0.650        | 150         | <div></div> |      |           |             |     |
|        |                |                 |           |              |             |                                                                                                 | 0    | 13.000    | 96.950      | 150 |
| JCT4   | 384574.871     | 406527.528      | 97.600    | 1.065        |             | <div></div> | 1    | 13.000    | 96.610      | 150 |
|        |                |                 |           |              |             |                                                                                                 | 2    | 12.000    | 96.610      | 150 |
|        |                |                 |           |              |             |                                                                                                 | 3    | 10.002    | 96.535      | 300 |
|        |                |                 |           |              |             |                                                                                                 | 0    | 10.003    | 96.535      | 300 |
| RE7    | 384608.766     | 406553.523      | 97.600    | 0.600        | 150         | <div></div> |      |           |             |     |
|        |                |                 |           |              |             |                                                                                                 | 0    | 14.000    | 97.000      | 150 |
| RE8    | 384557.347     | 406539.952      | 97.600    | 0.650        | 150         | <div></div> |      |           |             |     |
|        |                |                 |           |              |             |                                                                                                 | 0    | 15.000    | 96.950      | 150 |



### Manhole Schedule

| Node    | Easting (m) | Northing (m) | CL (m) | Depth (m) | Dia (mm) | Connections | Link   | IL (m) | Dia (mm) |
|---------|-------------|--------------|--------|-----------|----------|-------------|--------|--------|----------|
| JCT5    | 384573.049  | 406544.096   | 97.600 | 1.173     |          | 1           | 15.000 | 96.502 | 150      |
|         |             |              |        |           |          | 2           | 14.000 | 96.502 | 150      |
|         |             |              |        |           |          | 3           | 10.003 | 96.427 | 300      |
|         |             |              |        |           |          | 0           | 10.004 | 96.427 | 300      |
|         |             |              |        |           |          |             |        |        |          |
| EX MHB  | 384572.599  | 406548.224   | 97.880 | 1.480     | 1500     | 1           | 10.004 | 96.400 | 300      |
|         |             |              |        |           |          | 2           | 1.008  | 96.400 | 225      |
|         |             |              |        |           |          | 0           | 1.009  | 96.400 | 225      |
| MH1     | 384594.582  | 406550.964   | 97.600 | 1.340     | 1350     | 1           | 1.009  | 96.260 | 225      |
|         |             |              |        |           |          | 0           | 1.010  | 96.260 | 300      |
| OUTFALL | 384593.788  | 406557.262   | 97.720 | 1.490     | 1200     | 1           | 1.010  | 96.230 | 300      |

### Simulation Settings

|                      |                   |                                         |          |
|----------------------|-------------------|-----------------------------------------|----------|
| Rainfall Methodology | FSR               | Analysis Speed                          | Detailed |
| Rainfall Events      | Singular          | Skip Steady State                       | x        |
| FSR Region           | England and Wales | Drain Down Time (mins)                  | 240      |
| M5-60 (mm)           | 18.400            | Additional Storage (m <sup>3</sup> /ha) | 0.0      |
| Ratio-R              | 0.320             | Starting Level (m)                      |          |
| Summer CV            | 0.750             | Check Discharge Rate(s)                 | x        |
| Winter CV            | 0.840             | Check Discharge Volume                  | x        |

### Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|-----------------------|-----------------------|-----------------------|-----------------------|
| 2                     | 0                     | 0                     | 0                     |
| 30                    | 40                    | 0                     | 0                     |
| 100                   | 45                    | 0                     | 0                     |

### Node EX MHB Online Hydro-Brake® Control

|                          |        |                         |                                |
|--------------------------|--------|-------------------------|--------------------------------|
| Flap Valve               | x      | Objective               | (HE) Minimise upstream storage |
| Downstream Link          | 1.009  | Sump Available          | ✓                              |
| Replaces Downstream Link | x      | Product Number          | CTL-SHE-0154-1130-1000-1130    |
| Invert Level (m)         | 96.400 | Min Outlet Diameter (m) | 0.225                          |
| Design Depth (m)         | 1.000  | Min Node Diameter (mm)  | 1500                           |
| Design Flow (l/s)        | 11.3   |                         |                                |

### Node JCT5 Depth/Area Storage Structure

|                             |         |               |      |                           |        |
|-----------------------------|---------|---------------|------|---------------------------|--------|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0  | Invert Level (m)          | 96.700 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity      | 0.30 | Time to half empty (mins) | 168    |



Bowlee Park Golf Range  
Heywood Old Road  
Birch, Middleton  
Rochdale, M24 4TH

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Network:  
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POST-DEVELOPMENT

| Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) | Depth<br>(m) | Area<br>(m <sup>2</sup> ) | Inf Area<br>(m <sup>2</sup> ) |
|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|--------------|---------------------------|-------------------------------|
| 0.000        | 901.0                     | 901.0                         | 0.700        | 901.0                     | 975.5                         | 0.701        | 0.0                       | 975.5                         |

#### Node S1 ST Link Surround Storage Structure

|                             |         |                           |        |                |          |
|-----------------------------|---------|---------------------------|--------|----------------|----------|
| Base Inf Coefficient (m/hr) | 0.00000 | Porosity                  | 0.30   | Link           | 1.000    |
| Side Inf Coefficient (m/hr) | 0.00000 | Invert Level (m)          | 97.210 | Surround Shape | (Trench) |
| Safety Factor               | 2.0     | Time to half empty (mins) | 5      | Diameter (mm)  | 450      |

#### Node S2 ST Link Surround Storage Structure

|                             |         |                           |        |                |          |
|-----------------------------|---------|---------------------------|--------|----------------|----------|
| Base Inf Coefficient (m/hr) | 0.00000 | Porosity                  | 0.30   | Link           | 2.000    |
| Side Inf Coefficient (m/hr) | 0.00000 | Invert Level (m)          | 97.210 | Surround Shape | (Trench) |
| Safety Factor               | 2.0     | Time to half empty (mins) | 5      | Diameter (mm)  | 450      |

#### Node S2 ST Link Surround Storage Structure

|                             |         |                           |        |                |          |
|-----------------------------|---------|---------------------------|--------|----------------|----------|
| Base Inf Coefficient (m/hr) | 0.00000 | Porosity                  | 0.30   | Link           | 3.000    |
| Side Inf Coefficient (m/hr) | 0.00000 | Invert Level (m)          | 97.210 | Surround Shape | (Trench) |
| Safety Factor               | 2.0     | Time to half empty (mins) | 6      | Diameter (mm)  | 450      |

#### Node S4 ST Link Surround Storage Structure

|                             |         |                           |        |                |          |
|-----------------------------|---------|---------------------------|--------|----------------|----------|
| Base Inf Coefficient (m/hr) | 0.00000 | Porosity                  | 0.30   | Link           | 8.000    |
| Side Inf Coefficient (m/hr) | 0.00000 | Invert Level (m)          | 96.740 | Surround Shape | (Trench) |
| Safety Factor               | 2.0     | Time to half empty (mins) | 77     | Diameter (mm)  | 450      |

#### Node JCT5 Link Surround Storage Structure

|                             |         |                           |        |                |          |
|-----------------------------|---------|---------------------------|--------|----------------|----------|
| Base Inf Coefficient (m/hr) | 0.00000 | Porosity                  | 0.30   | Link           | 15.000   |
| Side Inf Coefficient (m/hr) | 0.00000 | Invert Level (m)          | 96.502 | Surround Shape | (Trench) |
| Safety Factor               | 2.0     | Time to half empty (mins) |        | Diameter (mm)  | 450      |

#### Node JCT5 Link Surround Storage Structure

|                             |         |                           |        |                |          |
|-----------------------------|---------|---------------------------|--------|----------------|----------|
| Base Inf Coefficient (m/hr) | 0.00000 | Porosity                  | 0.30   | Link           | 14.000   |
| Side Inf Coefficient (m/hr) | 0.00000 | Invert Level (m)          | 96.502 | Surround Shape | (Trench) |
| Safety Factor               | 2.0     | Time to half empty (mins) |        | Diameter (mm)  | 450      |

#### Node JCT4 Link Surround Storage Structure

|                             |         |                           |        |                |          |
|-----------------------------|---------|---------------------------|--------|----------------|----------|
| Base Inf Coefficient (m/hr) | 0.00000 | Porosity                  | 0.30   | Link           | 12.000   |
| Side Inf Coefficient (m/hr) | 0.00000 | Invert Level (m)          | 96.610 | Surround Shape | (Trench) |
| Safety Factor               | 2.0     | Time to half empty (mins) | 240    | Diameter (mm)  | 450      |

#### Node JCT4 Link Surround Storage Structure

|                             |         |                           |        |                |          |
|-----------------------------|---------|---------------------------|--------|----------------|----------|
| Base Inf Coefficient (m/hr) | 0.00000 | Porosity                  | 0.30   | Link           | 13.000   |
| Side Inf Coefficient (m/hr) | 0.00000 | Invert Level (m)          | 96.610 | Surround Shape | (Trench) |
| Safety Factor               | 2.0     | Time to half empty (mins) | 248    | Diameter (mm)  | 450      |



**Results for 2 year Critical Storm Duration. Lowest mass balance: 98.26%**

| Node Event                     | US Node | Peak (mins) | Level (m) | Depth (m)     | Inflow (l/s)   | Node Vol (m³) | Flood (m³)    | Status             |
|--------------------------------|---------|-------------|-----------|---------------|----------------|---------------|---------------|--------------------|
| 15 minute winter               | RE1     | 10          | 98.291    | 0.051         | 6.4            | 0.0009        | 0.0000        | OK                 |
| 15 minute winter               | S1 ST   | 11          | 97.261    | 0.051         | 6.3            | 0.0163        | 0.0000        | OK                 |
| 15 minute winter               | RE2     | 10          | 98.290    | 0.050         | 6.4            | 0.0009        | 0.0000        | OK                 |
| 15 minute winter               | RE3     | 10          | 97.321    | 0.031         | 1.7            | 0.0006        | 0.0000        | OK                 |
| 15 minute winter               | S2 ST   | 11          | 97.268    | 0.058         | 7.9            | 0.0367        | 0.0000        | OK                 |
| 15 minute winter               | S3      | 11          | 97.026    | 0.096         | 14.1           | 0.1378        | 0.0000        | OK                 |
| 15 minute winter               | CH1     | 10          | 97.060    | 0.020         | 1.4            | 0.0004        | 0.0000        | OK                 |
| 15 minute winter               | MH9     | 11          | 96.920    | 0.100         | 15.5           | 0.1432        | 0.0000        | OK                 |
| 15 minute winter               | CH2     | 9           | 97.025    | 0.015         | 1.6            | 0.0003        | 0.0000        | OK                 |
| 15 minute winter               | JCT1    | 12          | 96.836    | 0.113         | 16.9           | 0.0000        | 0.0000        | OK                 |
| 15 minute winter               | CH3     | 10          | 96.884    | 0.034         | 3.0            | 0.0006        | 0.0000        | OK                 |
| 15 minute winter               | JCT2    | 12          | 96.833    | 0.167         | 19.6           | 0.0000        | 0.0000        | OK                 |
| 15 minute winter               | CH4     | 10          | 96.871    | 0.021         | 1.6            | 0.0004        | 0.0000        | OK                 |
| 15 minute winter               | JCT3    | 12          | 96.830    | 0.217         | 19.1           | 0.0000        | 0.0000        | OK                 |
| 15 minute winter               | RE4     | 10          | 97.280    | 0.070         | 7.3            | 0.0013        | 0.0000        | OK                 |
| 15 minute winter               | S4 ST   | 13          | 96.820    | 0.080         | 7.1            | 0.0524        | 0.0000        | OK                 |
| 15 minute winter               | CH5     | 11          | 96.871    | 0.021         | 1.1            | 0.0004        | 0.0000        | OK                 |
| 15 minute winter               | MH8     | 13          | 96.808    | 0.288         | 26.0           | 0.4120        | 0.0000        | SURCHARGED         |
| 15 minute winter               | EX MHA  | 13          | 96.779    | 0.309         | 25.5           | 0.4428        | 0.0000        | SURCHARGED         |
| 15 minute winter               | MH5     | 11          | 97.183    | 0.053         | 3.4            | 0.0758        | 0.0000        | OK                 |
| 15 minute winter               | MH10    | 10          | 97.009    | 0.049         | 6.1            | 0.0700        | 0.0000        | OK                 |
| 15 minute winter               | MH4     | 10          | 96.864    | 0.104         | 24.2           | 0.1181        | 0.0000        | OK                 |
| 60 minute winter               | S5 CP   | 48          | 96.776    | 0.233         | 13.4           | 0.3335        | 0.0000        | OK                 |
| 15 minute winter               | RE5     | 10          | 97.061    | 0.061         | 6.4            | 0.0011        | 0.0000        | OK                 |
| 15 minute winter               | RE6     | 10          | 96.983    | 0.033         | 3.0            | 0.0006        | 0.0000        | OK                 |
| Link Event<br>(Upstream Depth) | US Node | Link        | DS Node   | Outflow (l/s) | Velocity (m/s) | Flow/Cap      | Link Vol (m³) | Discharge Vol (m³) |
| 15 minute winter               | RE1     | 1.000       | S1 ST     | 6.3           | 1.206          | 0.242         | 0.2526        |                    |
| 15 minute winter               | S1 ST   | 1.001       | S3        | 6.2           | 1.235          | 0.222         | 0.0415        |                    |
| 15 minute winter               | RE2     | 2.000       | S2 ST     | 6.3           | 1.109          | 0.241         | 0.2745        |                    |
| 15 minute winter               | RE3     | 3.000       | S2 ST     | 1.7           | 0.390          | 0.095         | 0.0355        |                    |
| 15 minute winter               | S2 ST   | 2.001       | S3        | 7.9           | 1.311          | 0.279         | 0.0493        |                    |
| 15 minute winter               | S3      | 1.002       | MH9       | 14.2          | 0.852          | 0.350         | 0.3000        |                    |
| 15 minute winter               | CH1     | 4.000       | MH9       | 1.4           | 0.983          | 0.035         | 0.0048        |                    |
| 15 minute winter               | MH9     | 1.003       | JCT1      | 15.4          | 0.869          | 0.384         | 0.2952        |                    |
| 15 minute winter               | CH2     | 5.000       | JCT1      | 1.6           | 1.704          | 0.020         | 0.0022        |                    |
| 15 minute winter               | JCT1    | 1.004       | JCT2      | 16.6          | 0.799          | 0.418         | 0.2483        |                    |
| 15 minute winter               | CH3     | 6.000       | JCT2      | 3.0           | 0.969          | 0.112         | 0.0330        |                    |
| 15 minute winter               | JCT2    | 1.005       | JCT3      | 17.9          | 0.821          | 0.444         | 0.3119        |                    |
| 15 minute winter               | CH4     | 7.000       | JCT3      | 1.6           | 0.966          | 0.041         | 0.0314        |                    |
| 15 minute winter               | JCT3    | 1.006       | MH8       | 19.6          | 0.606          | 0.488         | 0.6153        |                    |
| 15 minute winter               | RE4     | 8.000       | S4 ST     | 7.1           | 0.913          | 0.430         | 0.4453        |                    |
| 15 minute winter               | S4 ST   | 8.001       | MH8       | 6.6           | 0.653          | 0.396         | 0.2253        |                    |
| 15 minute winter               | CH5     | 9.000       | MH8       | 1.1           | 0.588          | 0.041         | 0.1065        |                    |
| 15 minute winter               | MH8     | 1.007       | EX MHA    | 25.5          | 0.642          | 0.641         | 0.3363        |                    |
| 15 minute winter               | EX MHA  | 1.008       | EX MHB    | 25.2          | 0.633          | 0.646         | 0.4916        |                    |
| 15 minute winter               | MH5     | 10.000      | MH4       | 3.3           | 0.497          | 0.552         | 0.2312        |                    |
| 15 minute winter               | MH10    | 11.000      | MH4       | 6.0           | 0.667          | 0.230         | 0.0831        |                    |
| 15 minute winter               | MH4     | 10.001      | S5 CP     | 23.8          | 0.870          | 0.266         | 1.1563        |                    |
| 60 minute winter               | S5 CP   | 10.002      | JCT4      | 12.9          | 0.487          | 0.147         | 0.0762        |                    |
| 15 minute winter               | RE5     | 12.000      | JCT4      | 6.2           | 0.806          | 0.354         | 0.4358        |                    |
| 15 minute winter               | RE6     | 13.000      | JCT4      | 3.0           | 0.928          | 0.106         | 0.1300        |                    |



**Results for 2 year Critical Storm Duration. Lowest mass balance: 98.26%**

| Node Event       | US<br>Node | Peak<br>(mins) | Level<br>(m) | Depth<br>(m) | Inflow<br>(l/s) | Node<br>Vol (m³) | Flood<br>(m³) | Status     |
|------------------|------------|----------------|--------------|--------------|-----------------|------------------|---------------|------------|
| 60 minute winter | JCT4       | 48             | 96.776       | 0.241        | 18.0            | 0.2012           | 0.0000        | OK         |
| 15 minute winter | RE7        | 10             | 97.051       | 0.051        | 5.2             | 0.0009           | 0.0000        | OK         |
| 15 minute winter | RE8        | 10             | 96.984       | 0.034        | 3.4             | 0.0006           | 0.0000        | OK         |
| 60 minute winter | JCT5       | 48             | 96.776       | 0.349        | 26.3            | 21.1395          | 0.0000        | SURCHARGED |
| 60 minute winter | EX MHB     | 48             | 96.776       | 0.376        | 15.5            | 0.6637           | 0.0000        | SURCHARGED |
| 60 minute winter | MH1        | 48             | 96.344       | 0.084        | 11.3            | 0.1200           | 0.0000        | OK         |
| 60 minute winter | OUTFALL    | 49             | 96.307       | 0.077        | 11.3            | 0.0000           | 0.0000        | OK         |

| Link Event<br>(Upstream Depth) | US<br>Node | Link   | DS<br>Node | Outflow<br>(l/s) | Velocity<br>(m/s) | Flow/Cap | Link<br>Vol (m³) | Discharge<br>Vol (m³) |
|--------------------------------|------------|--------|------------|------------------|-------------------|----------|------------------|-----------------------|
| 60 minute winter               | JCT4       | 10.003 | JCT5       | 17.6             | 0.516             | 0.197    | 1.0924           |                       |
| 15 minute winter               | RE7        | 14.000 | JCT5       | 5.1              | 0.684             | 0.247    | 0.4219           |                       |
| 15 minute winter               | RE8        | 15.000 | JCT5       | 3.4              | 0.818             | 0.114    | 0.1674           |                       |
| 60 minute winter               | JCT5       | 10.004 | EX MHB     | 10.7             | 0.538             | 0.119    | 0.2901           |                       |
| 60 minute winter               | EX MHB     | 1.009  | MH1        | 11.3             | 0.846             | 0.274    | 0.2961           |                       |
| 60 minute winter               | MH1        | 1.010  | OUTFALL    | 11.3             | 0.744             | 0.149    | 0.0965           | 58.5                  |



**Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 98.26%**

| Node Event        | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|-------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 15 minute winter  | RE1     | 10          | 98.329    | 0.089     | 17.0         | 0.0016        | 0.0000     | OK         |
| 15 minute winter  | S1 ST   | 13          | 97.426    | 0.216     | 16.9         | 0.1636        | 0.0000     | SURCHARGED |
| 15 minute winter  | RE2     | 10          | 98.328    | 0.088     | 17.0         | 0.0016        | 0.0000     | OK         |
| 15 minute winter  | RE3     | 13          | 97.454    | 0.164     | 4.4          | 0.0029        | 0.0000     | SURCHARGED |
| 15 minute winter  | S2 ST   | 13          | 97.450    | 0.240     | 21.1         | 0.3755        | 0.0000     | SURCHARGED |
| 15 minute winter  | S3      | 13          | 97.381    | 0.451     | 32.3         | 0.6453        | 0.0000     | SURCHARGED |
| 15 minute winter  | CH1     | 13          | 97.328    | 0.288     | 3.8          | 0.0052        | 0.0000     | SURCHARGED |
| 15 minute winter  | MH9     | 13          | 97.327    | 0.507     | 33.9         | 0.7257        | 0.0000     | SURCHARGED |
| 15 minute winter  | CH2     | 13          | 97.275    | 0.265     | 4.2          | 0.0048        | 0.0000     | SURCHARGED |
| 15 minute winter  | JCT1    | 13          | 97.275    | 0.552     | 32.6         | 0.0000        | 0.0000     | SURCHARGED |
| 15 minute winter  | CH3     | 13          | 97.246    | 0.396     | 8.0          | 0.0071        | 0.0000     | SURCHARGED |
| 15 minute winter  | JCT2    | 13          | 97.243    | 0.577     | 35.2         | 0.0000        | 0.0000     | SURCHARGED |
| 15 minute winter  | CH4     | 13          | 97.205    | 0.355     | 4.2          | 0.0064        | 0.0000     | SURCHARGED |
| 15 minute winter  | JCT3    | 13          | 97.205    | 0.592     | 37.0         | 0.0000        | 0.0000     | SURCHARGED |
| 15 minute winter  | RE4     | 11          | 97.663    | 0.453     | 19.2         | 0.0082        | 0.0000     | FLOOD RISK |
| 15 minute winter  | S4 ST   | 14          | 97.207    | 0.467     | 16.8         | 1.6629        | 0.0000     | SURCHARGED |
| 30 minute winter  | CH5     | 23          | 97.129    | 0.279     | 2.4          | 0.0050        | 0.0000     | SURCHARGED |
| 30 minute winter  | MH8     | 23          | 97.129    | 0.609     | 44.9         | 0.8709        | 0.0000     | SURCHARGED |
| 120 minute winter | EX MHA  | 116         | 97.078    | 0.608     | 24.5         | 0.8697        | 0.0000     | SURCHARGED |
| 15 minute winter  | MH5     | 12          | 97.549    | 0.419     | 9.0          | 0.5993        | 0.0000     | SURCHARGED |
| 120 minute winter | MH10    | 114         | 97.078    | 0.118     | 5.7          | 0.1683        | 0.0000     | OK         |
| 120 minute winter | MH4     | 114         | 97.077    | 0.317     | 22.8         | 0.3590        | 0.0000     | SURCHARGED |
| 120 minute winter | S5 CP   | 114         | 97.077    | 0.534     | 21.5         | 0.7642        | 0.0000     | SURCHARGED |
| 15 minute winter  | RE5     | 12          | 97.168    | 0.168     | 16.9         | 0.0030        | 0.0000     | SURCHARGED |
| 120 minute winter | RE6     | 114         | 97.077    | 0.127     | 2.8          | 0.0023        | 0.0000     | OK         |

| Link Event (Upstream Depth) | US Node | Link   | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|-----------------------------|---------|--------|---------|---------------|----------------|----------|---------------|--------------------|
| 15 minute winter            | RE1     | 1.000  | S1 ST   | 16.9          | 1.501          | 0.651    | 0.6700        |                    |
| 15 minute winter            | S1 ST   | 1.001  | S3      | 14.6          | 1.410          | 0.518    | 0.1447        |                    |
| 15 minute winter            | RE2     | 2.000  | S2 ST   | 16.7          | 1.384          | 0.644    | 0.6787        |                    |
| 15 minute winter            | RE3     | 3.000  | S2 ST   | 4.4           | 0.478          | 0.246    | 0.1414        |                    |
| 15 minute winter            | S2 ST   | 2.001  | S3      | 17.8          | 1.572          | 0.633    | 0.1447        |                    |
| 15 minute winter            | S3      | 1.002  | MH9     | 30.6          | 0.950          | 0.755    | 0.7175        |                    |
| 15 minute winter            | CH1     | 4.000  | MH9     | 3.3           | 0.997          | 0.085    | 0.0523        |                    |
| 15 minute winter            | MH9     | 1.003  | JCT1    | 28.7          | 0.870          | 0.715    | 0.6449        |                    |
| 15 minute winter            | CH2     | 5.000  | JCT1    | 4.0           | 1.753          | 0.049    | 0.0183        |                    |
| 15 minute winter            | JCT1    | 1.004  | JCT2    | 29.3          | 0.799          | 0.736    | 0.3836        |                    |
| 15 minute winter            | CH3     | 6.000  | JCT2    | 6.5           | 0.987          | 0.243    | 0.0839        |                    |
| 15 minute winter            | JCT2    | 1.005  | JCT3    | 34.2          | 0.871          | 0.850    | 0.3502        |                    |
| 15 minute winter            | CH4     | 7.000  | JCT3    | 3.0           | 1.066          | 0.076    | 0.0599        |                    |
| 15 minute winter            | JCT3    | 1.006  | MH8     | 36.2          | 0.910          | 0.903    | 0.6189        |                    |
| 15 minute winter            | RE4     | 8.000  | S4 ST   | 16.8          | 1.003          | 1.023    | 0.9645        |                    |
| 15 minute winter            | S4 ST   | 8.001  | MH8     | 11.4          | 0.714          | 0.687    | 0.2925        |                    |
| 30 minute winter            | CH5     | 9.000  | MH8     | 1.9           | 0.571          | 0.072    | 0.1966        |                    |
| 30 minute winter            | MH8     | 1.007  | EX MHA  | 44.3          | 1.115          | 1.112    | 0.3363        |                    |
| 120 minute winter           | EX MHA  | 1.008  | EX MHB  | 24.3          | 0.611          | 0.623    | 0.4916        |                    |
| 15 minute winter            | MH5     | 10.000 | MH4     | 7.0           | 0.900          | 1.189    | 0.3007        |                    |
| 120 minute winter           | MH10    | 11.000 | MH4     | 5.7           | 0.644          | 0.217    | 0.1491        |                    |
| 120 minute winter           | MH4     | 10.001 | S5 CP   | 21.5          | 0.575          | 0.241    | 2.3514        |                    |
| 120 minute winter           | S5 CP   | 10.002 | JCT4    | 21.0          | 0.508          | 0.240    | 0.0899        |                    |
| 15 minute winter            | RE5     | 12.000 | JCT4    | 15.7          | 0.912          | 0.890    | 0.6936        |                    |
| 120 minute winter           | RE6     | 13.000 | JCT4    | 2.8           | 0.606          | 0.100    | 0.2309        |                    |



**Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 98.26%**

| Node Event        | US<br>Node | Peak<br>(mins) | Level<br>(m) | Depth<br>(m) | Inflow<br>(l/s) | Node<br>Vol (m³) | Flood<br>(m³) | Status     |
|-------------------|------------|----------------|--------------|--------------|-----------------|------------------|---------------|------------|
| 120 minute winter | JCT4       | 114            | 97.077       | 0.542        | 29.7            | 1.7714           | 0.0000        | SURCHARGED |
| 15 minute winter  | RE7        | 10             | 97.089       | 0.089        | 13.8            | 0.0016           | 0.0000        | OK         |
| 120 minute winter | RE8        | 116            | 97.077       | 0.127        | 3.2             | 0.0023           | 0.0000        | OK         |
| 120 minute winter | JCT5       | 116            | 97.077       | 0.650        | 49.2            | 104.1327         | 0.0000        | SURCHARGED |
| 120 minute winter | EX MHB     | 116            | 97.077       | 0.677        | 24.3            | 1.1954           | 0.0000        | SURCHARGED |
| 120 minute summer | MH1        | 228            | 96.344       | 0.084        | 11.3            | 0.1200           | 0.0000        | OK         |
| 15 minute summer  | OUTFALL    | 72             | 96.307       | 0.077        | 11.3            | 0.0000           | 0.0000        | OK         |

| Link Event<br>(Upstream Depth) | US<br>Node | Link   | DS<br>Node | Outflow<br>(l/s) | Velocity<br>(m/s) | Flow/Cap | Link<br>Vol (m³) | Discharge<br>Vol (m³) |
|--------------------------------|------------|--------|------------|------------------|-------------------|----------|------------------|-----------------------|
| 120 minute winter              | JCT4       | 10.003 | JCT5       | 28.7             | 0.495             | 0.321    | 1.1737           |                       |
| 15 minute winter               | RE7        | 14.000 | JCT5       | 13.6             | 0.857             | 0.659    | 0.5253           |                       |
| 120 minute winter              | RE8        | 15.000 | JCT5       | 3.2              | 0.620             | 0.108    | 0.2719           |                       |
| 120 minute winter              | JCT5       | 10.004 | EX MHB     | -12.9            | 0.519             | -0.143   | 0.2901           |                       |
| 120 minute winter              | EX MHB     | 1.009  | MH1        | 11.3             | 0.846             | 0.274    | 0.2962           |                       |
| 120 minute summer              | MH1        | 1.010  | OUTFALL    | 11.3             | 0.744             | 0.149    | 0.0966           | 175.8                 |



**Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 98.26%**

| Node Event        | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status     |
|-------------------|---------|-------------|-----------|-----------|--------------|---------------|------------|------------|
| 15 minute winter  | RE1     | 11          | 98.349    | 0.109     | 22.7         | 0.0020        | 0.0000     | OK         |
| 15 minute winter  | S1 ST   | 13          | 97.706    | 0.496     | 22.4         | 0.8164        | 0.0000     | FLOOD RISK |
| 15 minute winter  | RE2     | 11          | 98.349    | 0.109     | 22.7         | 0.0020        | 0.0000     | OK         |
| 15 minute winter  | RE3     | 13          | 97.739    | 0.449     | 5.9          | 0.0081        | 0.0000     | FLOOD RISK |
| 15 minute winter  | S2 ST   | 13          | 97.735    | 0.525     | 25.6         | 1.3957        | 0.0000     | FLOOD RISK |
| 15 minute winter  | S3      | 13          | 97.637    | 0.707     | 33.4         | 1.0111        | 0.0000     | SURCHARGED |
| 15 minute winter  | CH1     | 14          | 97.562    | 0.522     | 4.8          | 0.0094        | 0.0000     | FLOOD RISK |
| 15 minute winter  | MH9     | 14          | 97.561    | 0.741     | 34.6         | 1.0603        | 0.0000     | FLOOD RISK |
| 30 minute winter  | CH2     | 22          | 97.499    | 0.489     | 4.6          | 0.0088        | 0.0000     | FLOOD RISK |
| 30 minute winter  | JCT1    | 22          | 97.499    | 0.776     | 32.1         | 0.0000        | 0.0000     | FLOOD RISK |
| 30 minute winter  | CH3     | 22          | 97.466    | 0.616     | 8.6          | 0.0111        | 0.0000     | FLOOD RISK |
| 30 minute winter  | JCT2    | 22          | 97.462    | 0.796     | 38.0         | 0.0000        | 0.0000     | FLOOD RISK |
| 30 minute winter  | CH4     | 23          | 97.419    | 0.569     | 4.5          | 0.0102        | 0.0000     | FLOOD RISK |
| 30 minute winter  | JCT3    | 23          | 97.419    | 0.806     | 40.4         | 0.0000        | 0.0000     | SURCHARGED |
| 15 minute winter  | RE4     | 10          | 97.960    | 0.750     | 25.7         | 0.0135        | 0.6984     | FLOOD      |
| 30 minute winter  | S4 ST   | 23          | 97.421    | 0.681     | 18.8         | 3.1423        | 0.0000     | FLOOD RISK |
| 30 minute winter  | CH5     | 23          | 97.323    | 0.473     | 3.2          | 0.0085        | 0.0000     | FLOOD RISK |
| 30 minute winter  | MH8     | 23          | 97.323    | 0.803     | 53.9         | 1.1485        | 0.0000     | SURCHARGED |
| 180 minute winter | EX MHA  | 172         | 97.296    | 0.826     | 24.9         | 1.1821        | 0.0000     | SURCHARGED |
| 15 minute winter  | MH5     | 12          | 97.990    | 0.860     | 12.0         | 1.2300        | 0.0000     | FLOOD RISK |
| 15 minute winter  | MH10    | 11          | 97.352    | 0.392     | 21.5         | 0.5607        | 0.0000     | SURCHARGED |
| 180 minute winter | MH4     | 172         | 97.296    | 0.536     | 23.4         | 0.6057        | 0.0000     | SURCHARGED |
| 180 minute winter | S5 CP   | 172         | 97.295    | 0.752     | 22.3         | 1.0764        | 0.0000     | SURCHARGED |
| 15 minute winter  | RE5     | 11          | 97.574    | 0.574     | 22.6         | 0.0103        | 0.0000     | FLOOD RISK |
| 180 minute winter | RE6     | 172         | 97.295    | 0.345     | 2.9          | 0.0062        | 0.0000     | SURCHARGED |

| Link Event<br>(Upstream Depth) | US Node | Link   | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|--------------------------------|---------|--------|---------|---------------|----------------|----------|---------------|--------------------|
| 15 minute winter               | RE1     | 1.000  | S1 ST   | 22.4          | 1.533          | 0.861    | 0.7574        |                    |
| 15 minute winter               | S1 ST   | 1.001  | S3      | 15.7          | 1.413          | 0.557    | 0.1447        |                    |
| 15 minute winter               | RE2     | 2.000  | S2 ST   | 22.3          | 1.424          | 0.858    | 0.7599        |                    |
| 15 minute winter               | RE3     | 3.000  | S2 ST   | 5.1           | 0.495          | 0.288    | 0.1414        |                    |
| 15 minute winter               | S2 ST   | 2.001  | S3      | 18.4          | 1.577          | 0.653    | 0.1447        |                    |
| 15 minute winter               | S3      | 1.002  | MH9     | 30.9          | 0.939          | 0.762    | 0.7175        |                    |
| 15 minute winter               | CH1     | 4.000  | MH9     | 3.7           | 1.085          | 0.094    | 0.0523        |                    |
| 15 minute winter               | MH9     | 1.003  | JCT1    | 32.1          | 0.882          | 0.800    | 0.6449        |                    |
| 30 minute winter               | CH2     | 5.000  | JCT1    | 6.8           | 1.668          | 0.084    | 0.0183        |                    |
| 30 minute winter               | JCT1    | 1.004  | JCT2    | 31.7          | 0.796          | 0.795    | 0.3836        |                    |
| 30 minute winter               | CH3     | 6.000  | JCT2    | 7.5           | 0.938          | 0.277    | 0.0839        |                    |
| 30 minute winter               | JCT2    | 1.005  | JCT3    | 37.3          | 0.938          | 0.928    | 0.3502        |                    |
| 30 minute winter               | CH4     | 7.000  | JCT3    | 3.4           | 0.895          | 0.088    | 0.0599        |                    |
| 30 minute winter               | JCT3    | 1.006  | MH8     | 39.7          | 0.998          | 0.991    | 0.6189        |                    |
| 15 minute winter               | RE4     | 8.000  | S4 ST   | 20.5          | 1.163          | 1.247    | 0.9645        |                    |
| 30 minute winter               | S4 ST   | 8.001  | MH8     | 12.5          | 0.712          | 0.757    | 0.2925        |                    |
| 30 minute winter               | CH5     | 9.000  | MH8     | 2.2           | 0.604          | 0.081    | 0.1966        |                    |
| 30 minute winter               | MH8     | 1.007  | EX MHA  | 53.2          | 1.338          | 1.335    | 0.3363        |                    |
| 180 minute winter              | EX MHA  | 1.008  | EX MHB  | 24.7          | 0.621          | 0.633    | 0.4916        |                    |
| 15 minute winter               | MH5     | 10.000 | MH4     | 8.6           | 1.103          | 1.458    | 0.3007        |                    |
| 15 minute winter               | MH10    | 11.000 | MH4     | 19.7          | 1.121          | 0.751    | 0.1619        |                    |
| 180 minute winter              | MH4     | 10.001 | S5 CP   | 22.3          | 0.562          | 0.249    | 2.3514        |                    |
| 180 minute winter              | S5 CP   | 10.002 | JCT4    | 21.8          | 0.493          | 0.248    | 0.0899        |                    |
| 15 minute winter               | RE5     | 12.000 | JCT4    | 20.7          | 1.175          | 1.171    | 0.6936        |                    |
| 180 minute winter              | RE6     | 13.000 | JCT4    | 2.9           | 0.602          | 0.103    | 0.2426        |                    |



**Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 98.26%**

| Node Event        | US<br>Node | Peak<br>(mins) | Level<br>(m) | Depth<br>(m) | Inflow<br>(l/s) | Node<br>Vol (m³) | Flood<br>(m³) | Status     |
|-------------------|------------|----------------|--------------|--------------|-----------------|------------------|---------------|------------|
| 180 minute winter | JCT4       | 172            | 97.295       | 0.760        | 30.7            | 3.2837           | 0.0000        | SURCHARGED |
| 180 minute winter | RE7        | 172            | 97.296       | 0.296        | 5.0             | 0.0053           | 0.0000        | SURCHARGED |
| 180 minute winter | RE8        | 172            | 97.295       | 0.345        | 3.2             | 0.0062           | 0.0000        | SURCHARGED |
| 180 minute winter | JCT5       | 172            | 97.295       | 0.868        | 50.3            | 164.6033         | 0.0000        | SURCHARGED |
| 180 minute winter | EX MHB     | 172            | 97.295       | 0.895        | 24.7            | 1.5809           | 0.0000        | SURCHARGED |
| 120 minute summer | MH1        | 334            | 96.344       | 0.084        | 11.3            | 0.1200           | 0.0000        | OK         |
| 15 minute summer  | OUTFALL    | 113            | 96.307       | 0.077        | 11.3            | 0.0000           | 0.0000        | OK         |

| Link Event<br>(Upstream Depth) | US<br>Node | Link   | DS<br>Node | Outflow<br>(l/s) | Velocity<br>(m/s) | Flow/Cap | Link<br>Vol (m³) | Discharge<br>Vol (m³) |
|--------------------------------|------------|--------|------------|------------------|-------------------|----------|------------------|-----------------------|
| 180 minute winter              | JCT4       | 10.003 | JCT5       | 29.2             | 0.415             | 0.327    | 1.1737           |                       |
| 180 minute winter              | RE7        | 14.000 | JCT5       | 5.0              | 0.502             | 0.242    | 0.6503           |                       |
| 180 minute winter              | RE8        | 15.000 | JCT5       | 3.2              | 0.574             | 0.108    | 0.2859           |                       |
| 180 minute winter              | JCT5       | 10.004 | EX MHB     | -13.7            | 0.490             | -0.153   | 0.2901           |                       |
| 180 minute winter              | EX MHB     | 1.009  | MH1        | 11.3             | 0.846             | 0.274    | 0.2961           |                       |
| 120 minute summer              | MH1        | 1.010  | OUTFALL    | 11.3             | 0.744             | 0.149    | 0.0966           | 222.0                 |

## Technical Specification

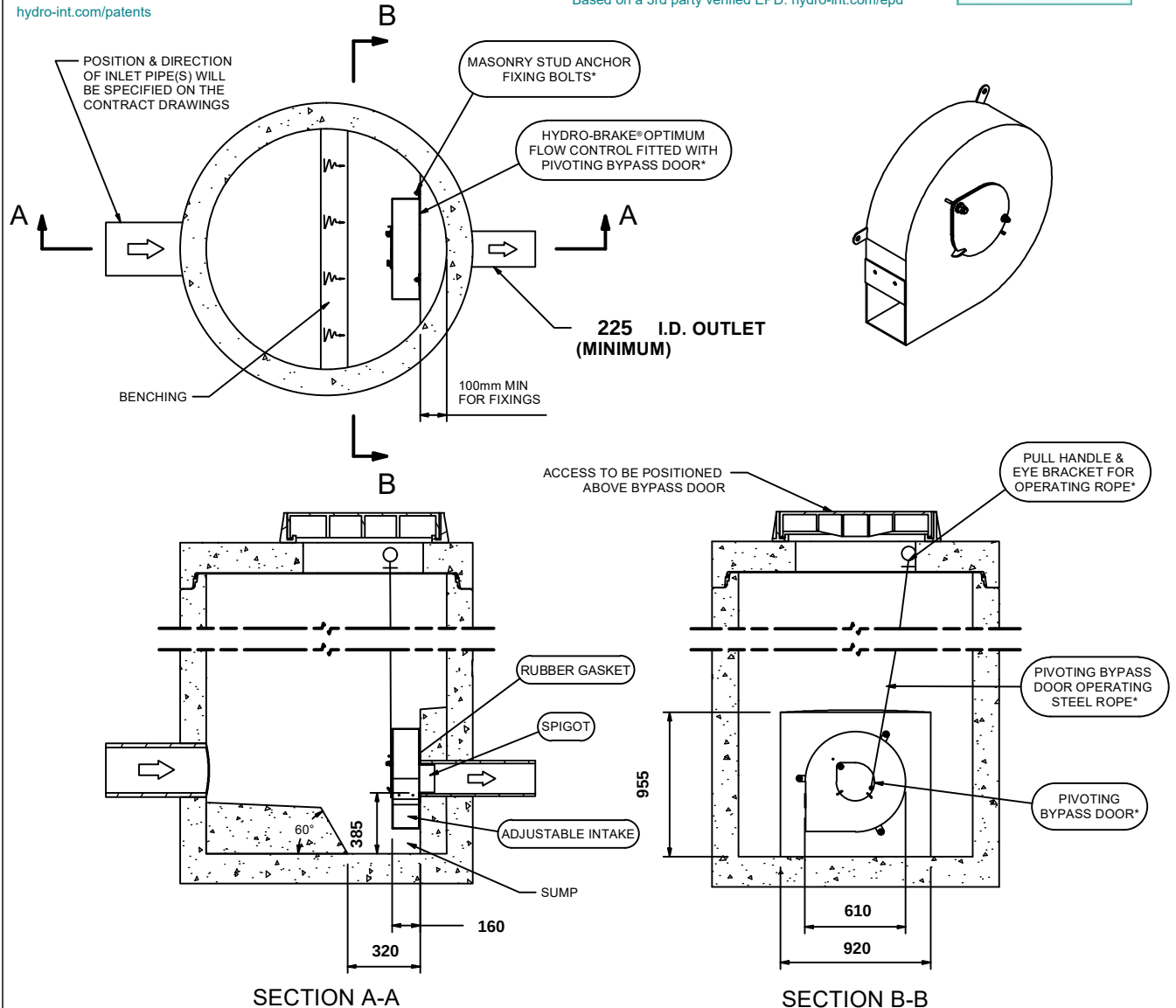
| Control Point  | Head (m) | Flow (l/s) |
|----------------|----------|------------|
| Primary Design | 1.000    | 11.300     |
| Flush-Flo™     | 0.311    | 11.260     |
| Kick-Flo®      | 0.684    | 9.447      |
| Mean Flow      |          | 9.657      |

[hydro-int.com/patents](http://hydro-int.com/patents)

This Hydro-Brake® Optimum includes:

- All in 3 mm Grade 304L stainless steel
- Integral pivoting by-pass door allowing clear line of sight through to outlet, c/w operating rope
- Media blasted for corrosion resistance
- Variable flow rate post installation via adjustable inlet (if necessary)
- Indicative Weight: 25 kg
- Product Carbon Footprint: 94.56 kgCO2e

Based on a 3rd party verified EPD: [hydro-int.com/epd](http://hydro-int.com/epd)



**IMPORTANT:** ○ LIMIT OF HYDRO INTERNATIONAL SUPPLY  
 THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS  
 FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL  
 ALL CIVIL AND INSTALLATION WORK BY OTHERS  
 \* WHERE SUPPLIED  
 HYDRO-BRAKE® IS A REGISTERED TRADEMARK FOR FLOW CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY  
 HYDRO INTERNATIONAL

**THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.**

### DESIGN ADVICE



The head/flow characteristics of this SHE-0154-1130-1000-1130 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.  
**The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.**

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|          |                        |                                                 |
|----------|------------------------|-------------------------------------------------|
| DATE     | 25/04/2025 13:22       | SHE-0154-1130-1000-1130<br>Hydro-Brake® Optimum |
| SITE     | Bowlee Park Golf Range |                                                 |
| DESIGNER | Chris Emm              |                                                 |
| REF      | 062D22                 |                                                 |

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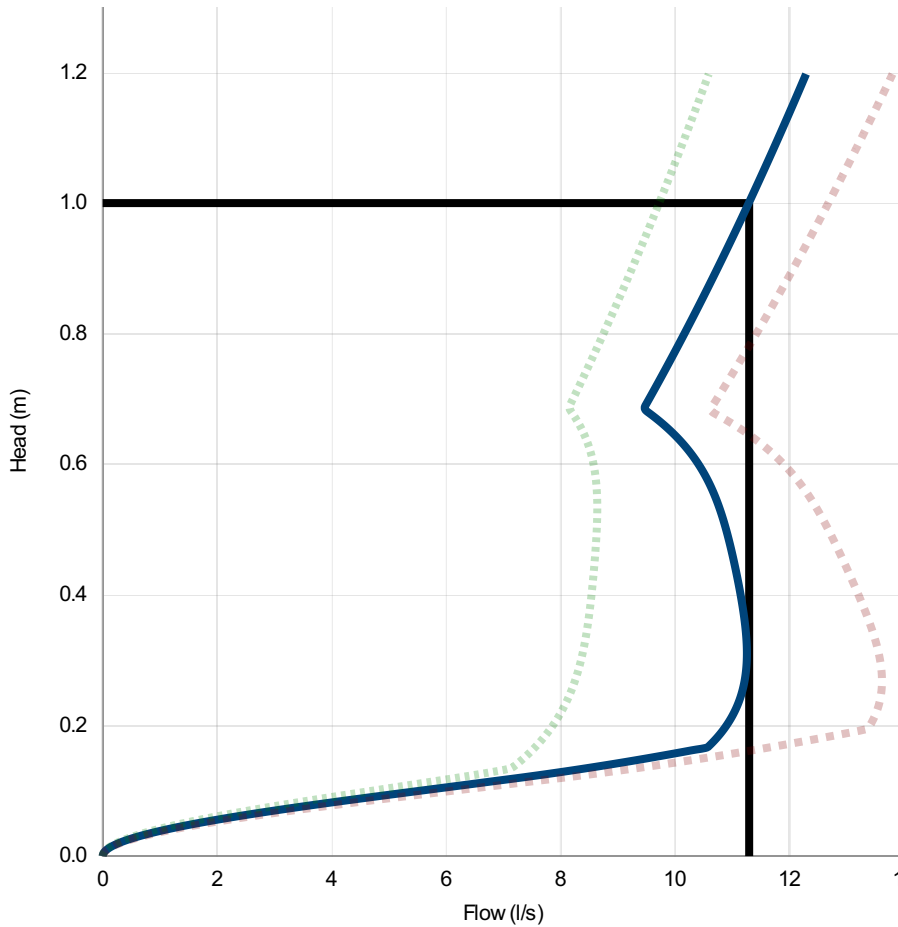
[chris@cjemm.co.uk](mailto:chris@cjemm.co.uk)

## Technical Specification

|                | Original Setting |            | Minimum Setting |            | Maximum Setting |            |
|----------------|------------------|------------|-----------------|------------|-----------------|------------|
| Control Point  | Head (m)         | Flow (l/s) | Head (m)        | Flow (l/s) | Head (m)        | Flow (l/s) |
| Primary Design | 1.000            | 11.300     | 1.000           | 9.726      | 1.000           | 12.684     |
| Flush-Flo™     | 0.311            | 11.260     | 0.533           | 8.645      | 0.268           | 13.621     |
| Kick-Flo®      | 0.684            | 9.447      | 0.685           | 8.136      | 0.681           | 10.599     |
| Mean Flow      |                  | 9.657      |                 | 7.802      |                 | 11.136     |



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| Head (m) | Flow (l/s) |
|----------|------------|
| 0.000    | 0.000      |
| 0.034    | 0.809      |
| 0.069    | 2.942      |
| 0.103    | 5.842      |
| 0.138    | 8.700      |
| 0.172    | 10.642     |
| 0.207    | 10.954     |
| 0.241    | 11.140     |
| 0.276    | 11.234     |
| 0.310    | 11.260     |
| 0.345    | 11.240     |
| 0.379    | 11.190     |
| 0.414    | 11.121     |
| 0.448    | 11.041     |
| 0.483    | 10.949     |
| 0.517    | 10.839     |
| 0.552    | 10.700     |
| 0.586    | 10.510     |
| 0.621    | 10.245     |
| 0.655    | 9.876      |
| 0.690    | 9.484      |
| 0.724    | 9.703      |
| 0.759    | 9.917      |
| 0.793    | 10.126     |
| 0.828    | 10.331     |
| 0.862    | 10.531     |
| 0.897    | 10.727     |
| 0.931    | 10.919     |
| 0.966    | 11.107     |
| 1.000    | 11.292     |

### DESIGN ADVICE



The head/flow characteristics of this SHE-0154-1130-1000-1130 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

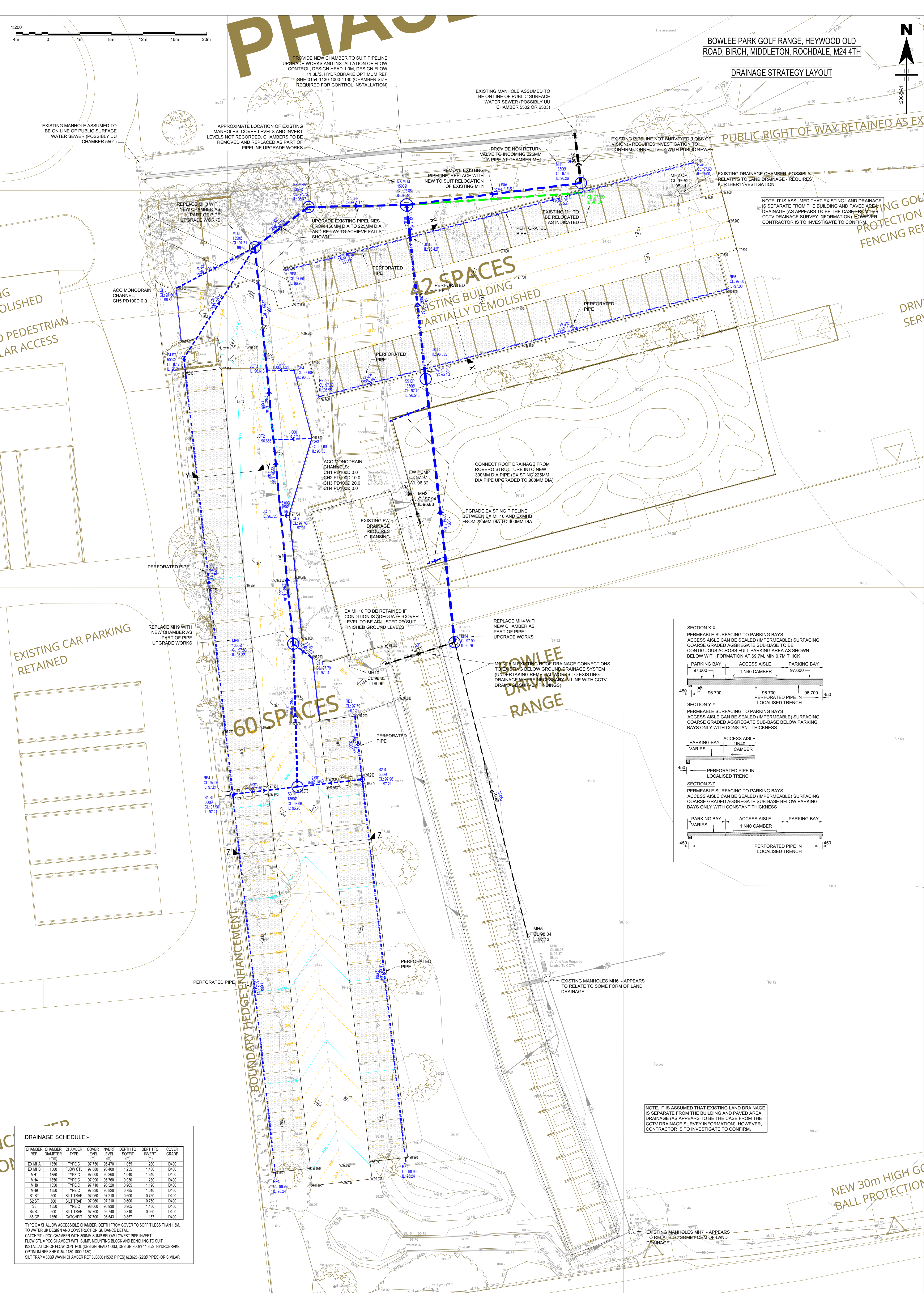
**The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.**

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|          |                        |
|----------|------------------------|
| DATE     | 25/04/2025 13:22       |
| Site     | Bowlee Park Golf Range |
| DESIGNER | Chris Emm              |
| Ref      | 062D22                 |

SHE-0154-1130-1000-1130  
Hydro-Brake® Optimum

## Appendix H – Drainage Strategy Layout Plan



BOWLEE PARK GOLF RANGE, HEYWOOD OLD ROAD, BIRCH, MIDDLETON, ROCHDALE, M24 4TH

DRAINAGE STRATEGY LAYOUT

NOTE: IT IS ASSUMED THAT EXISTING LAND DRAINAGE IS SEPARATE FROM THE BUILDING AND PAVED AREA DRAINAGE (AS APPEARS TO BE THE CASE FROM THE CCTV DRAINAGE SURVEY INFORMATION). HOWEVER, CONTRACTOR IS TO INVESTIGATE TO CONFIRM.

SECTION X-X  
PERMEABLE SURFACING TO PARKING BAYS  
ACCESS AISLE CAN BE SEALED (IMPERMEABLE) SURFACING  
COARSE GRADED AGGREGATE SUB-BASE BELOW  
CONTIGUOUS ACROSS FULL PARKING AREA AS SHOWN  
BELOW WITH FORMATION AT 69.7M, MIN 0.7M THICK

SECTION Y-Y  
PERMEABLE SURFACING TO PARKING BAYS  
ACCESS AISLE CAN BE SEALED (IMPERMEABLE) SURFACING  
COARSE GRADED AGGREGATE SUB-BASE BELOW PARKING  
BAYS ONLY WITH CONSTANT THICKNESS

SECTION Z-Z  
PERMEABLE SURFACING TO PARKING BAYS  
ACCESS AISLE CAN BE SEALED (IMPERMEABLE) SURFACING  
COARSE GRADED AGGREGATE SUB-BASE BELOW PARKING  
BAYS ONLY WITH CONSTANT THICKNESS

DRAINAGE SCHEDULE:-

| CHAMBER REF. | CHAMBER DIAMETER (mm) | CHAMBER TYPE | COVER LEVEL (m) | INVERT LEVEL (m) | DEPTH TO SOFFIT (m) | DEPTH TO INVERT (m) | COVER GRADE |
|--------------|-----------------------|--------------|-----------------|------------------|---------------------|---------------------|-------------|
| EX MH4       | 1350                  | TYPE C       | 97.750          | 96.470           | 1.055               | 1.280               | D400        |
| EX MH6       | 1500                  | FLOW CTL     | 97.880          | 96.400           | 1.225               | 1.480               | D400        |
| MH1          | 1350                  | TYPE C       | 97.600          | 96.260           | 1.040               | 1.340               | D400        |
| MH4          | 1350                  | TYPE C       | 97.990          | 96.760           | 0.830               | 1.230               | D400        |
| MH6          | 1350                  | TYPE C       | 97.710          | 96.530           | 0.965               | 1.190               | D400        |
| MH9          | 1350                  | TYPE C       | 97.830          | 96.820           | 0.785               | 1.010               | D400        |
| S1 ST        | 500                   | SILT TRAP    | 97.960          | 97.210           | 0.600               | 0.750               | D400        |
| S2 ST        | 500                   | SILT TRAP    | 97.960          | 97.210           | 0.600               | 0.750               | D400        |
| S3           | 1350                  | TYPE C       | 98.060          | 96.930           | 0.905               | 1.130               | D400        |
| S4 ST        | 500                   | SILT TRAP    | 97.700          | 96.740           | 0.810               | 0.960               | D400        |
| S5 CP        | 1350                  | CATCHPIT     | 97.700          | 96.543           | 0.857               | 1.157               | D400        |

TYPE C = SHALLOW ACCESSIBLE CHAMBER. DEPTH FROM COVER TO SOFFIT LESS THAN 1.5M, TO WATER UK DESIGN AND CONSTRUCTION GUIDANCE DETAIL  
CATCHPIT = PCC CHAMBER WITH 300MM SLUMP BELOW LOWEST PIPE INVERT  
FLOW CTL = PCC CHAMBER WITH SLUMP, MOUNTING BLOCK AND BENCHING TO SUIT  
INSTALLATION OF FLOW CONTROL (DESIGN HEAD 1.00M, DESIGN FLOW 11.3L/S, HYDROBRAKE OPTIMUM REF SHE-0154-1130-1000-1130)  
SILT TRAP = 5000 WAVIN CHAMBER REF 6LB000 (1500 PIPES) 6LB025 (2250 PIPES) OR SIMILAR

NOTE: IT IS ASSUMED THAT EXISTING LAND DRAINAGE IS SEPARATE FROM THE BUILDING AND PAVED AREA DRAINAGE (AS APPEARS TO BE THE CASE FROM THE CCTV DRAINAGE SURVEY INFORMATION). HOWEVER, CONTRACTOR IS TO INVESTIGATE TO CONFIRM.