



# SUSTAINABLE DRAINAGE STRATEGY & FLOOD RISK ASSESSMENT REPORT

PROJECT: BARNSELY ACTIVITY PARK

CLIENT: BARNSELY METROPOLITAN BC

JOB No: 882

REPORT REFERENCE: BAP-HLE-XX-XX- RP-C-00001

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RIBA Stage 2 issue

# CONTENTS

|                                                                          |   |
|--------------------------------------------------------------------------|---|
| INTRODUCTION .....                                                       | 1 |
| <i>Site Location</i> .....                                               | 1 |
| <i>Site Current Use</i> .....                                            | 1 |
| <i>Flood Zone Classification</i> .....                                   | 2 |
| DEVELOPMENT PROPOSALS .....                                              | 2 |
| <i>Planning Application</i> .....                                        | 2 |
| SEQUENTIAL TEST .....                                                    | 3 |
| EXCEPTION TEST .....                                                     | 3 |
| CLIMATE CHANGE .....                                                     | 3 |
| SITE SPECIFIC FLOOD RISK .....                                           | 3 |
| <i>Flood Risk from Rivers or Sea (Including Tidal)</i> .....             | 3 |
| <i>Flood Risk from Surface Water (Land)</i> .....                        | 3 |
| <i>Flood Risk from Reservoirs, Canals &amp; Artificial Sources</i> ..... | 3 |
| EXISTING DRAINAGE .....                                                  | 4 |
| SURFACE WATER MANAGEMENT .....                                           | 4 |
| <i>Pre-Development Surface Water Run-off</i> .....                       | 5 |
| <i>Post-Development Surface Water Run-off</i> .....                      | 5 |
| <i>Sustainable Drainage Systems (SuDS)</i> .....                         | 5 |
| <i>Methods of Surface Water Management</i> .....                         | 6 |
| <i>Infiltration</i> .....                                                | 6 |
| <i>Rainwater Harvesting</i> .....                                        | 6 |
| <i>Watercourse</i> .....                                                 | 6 |
| <i>Public Sewer</i> .....                                                | 6 |
| <i>Surface Water Storage Requirements</i> .....                          | 7 |
| <i>Surface Water Drainage Strategy</i> .....                             | 7 |
| OCCUPANTS AND USERS OF THE DEVELOPMENT .....                             | 7 |
| Overland Flow Routes and Exceedance Path .....                           | 7 |
| RESIDUAL FLOOD RISK .....                                                | 7 |
| FOUL WATER MANAGEMENT .....                                              | 8 |
| <i>Foul Water Drainage Strategy</i> .....                                | 8 |

|                                                                |    |
|----------------------------------------------------------------|----|
| DRAINAGE MANAGEMENT PLAN.....                                  | 8  |
| CONSULTATION .....                                             | 8  |
| <i>Water Authority (Yorkshire Water)</i> .....                 | 8  |
| <i>Lead Local Flood Authority (Essex County Council)</i> ..... | 8  |
| CONCLUSION .....                                               | 8  |
| Appendix A – Calculations .....                                | 1  |
| Appendix B – EA Flood Zone Map For Planning.....               | 1  |
| Appendix C – Proposed Site Layout.....                         | 2  |
| Appendix D – EA Long Term Flood Risk Maps .....                | 3  |
| Appendix E – Existing Drainage Records.....                    | 4  |
| Appendix F – Proposed below ground Drainage layout .....       | 6  |
| Appendix G – Topographical Survey.....                         | 7  |
| Appendix H – Existing & Proposed Impermeable Area Plans .....  | 8  |
| appendix I – Pre-Planning Enquiry.....                         | 9  |
| Appendix J – Flood Flow Routing Plan .....                     | 10 |
| Appendix K – Drainage Maintenance Plan .....                   | 11 |
| Appendix L – CCTV Drainage Survey.....                         | 12 |

## INTRODUCTION

This Sustainable Drainage Strategy and Flood Risk Assessment Report has been prepared in support of the planning application for the proposed Barnsley Activity Park.

The document will be used for discussions with the Local Planning Authority, Lead Local Flood Authority, the Local Water and Drainage Authority and the Environment Agency as required.

### *Site Location*

The development is approximately 1.17 hectares, it is located in Barnsley, South Yorkshire and accessed off Harbrough Hill Road (A61). The nearest postal address is S71 1AH. The approximate National Grid reference is **SE 34837 06629**. The approximate location of the site is shown on **Figure 1** below.

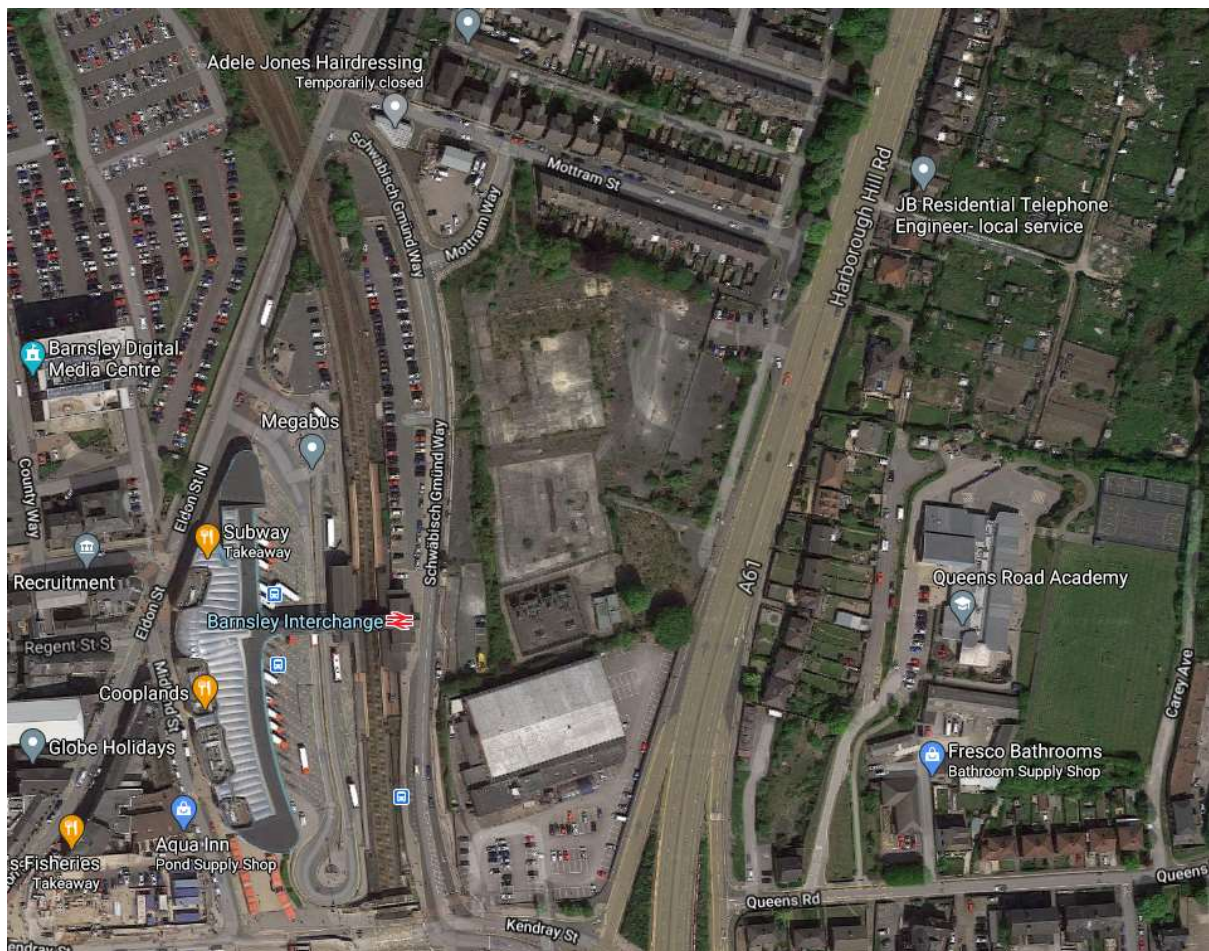


**FIGURE 1 – AERIAL PHOTOGRAPH OF SITE**

### *Site Current Use*

The site currently used as a builders storage yard and is predominantly hard paved with concrete paving, asphalt with a small amount of soft landscaping adjacent to the north and eastern boundary.

A copy of the existing site layout can be found in **Appendix G**.

## Flood Zone Classification

The Flood Zone classification for the site has been obtained from the Environment Agency (EA) website and online map tool which is shown in **Appendix B**.

The EA Flood Map for Planning shows that the site is wholly located in Flood Zone 1.

## DEVELOPMENT PROPOSALS

The proposed Activity Park development will comprise of the following:

- Club house / Café
- Service road for existing substation maintenance vehicles
- Various activity and play areas

The proposed site plan can be found in **Appendix C**.

## Vulnerability

The vulnerability classification for the proposed use of the site is “**Less Vulnerable**” (Table 2 of the Technical Guidance to the NPPF).

**Table 8-4 Flood Risk Vulnerability and Flood Zone 'Compatibility' (PPG, 2014)**

| Flood Risk Vulnerability Classification |       | Essential Infrastructure | Highly Vulnerable       | More Vulnerable         | Less Vulnerable | Water Compatible |
|-----------------------------------------|-------|--------------------------|-------------------------|-------------------------|-----------------|------------------|
| Flood Zone                              | 1     | ✓                        | ✓                       | ✓                       | ✓               | ✓                |
|                                         | 2     | ✓                        | Exception test Required | ✓                       | ✓               | ✓                |
|                                         | 3a    | Exception Test Required  | *                       | Exception Test Required | ✓               | ✓                |
|                                         | 3b *1 | Exception Test Required* | *                       | *                       | *               | ✓*               |

✓ - Development is appropriate \* - Development should not be permitted

**FIGURE 2 – TABLE 8-4 OF THE FLOOD RISK VULNERABILITY AND FLOOD ZONE COMPATIBILITY (PPG 2014)**

As the site is located in **Flood Zone 1**, Table 8-4 of the Flood Risk Vulnerability and Flood Zone Compatibility (PPG 2014) states the development is appropriate.

## Development Design Life

The expected lifetime of the buildings on the site are to be 60 years.

## Planning Application

The development currently does not have planning permission. This document will be submitted as part of an outline planning application.

## SEQUENTIAL TEST

Development is wholly in Flood Zone 1, therefore it is not subject to the Sequential Test.

## EXCEPTION TEST

Development is wholly in Flood Zone 1, therefore it is not subject to the Exception Test as per the guidance set out in the National Planning Policy Framework.

## CLIMATE CHANGE

Climate change allowances can be found in the Environment Agency guidance “Flood risk assessments: climate change allowances” ([link](#)) in the government website. Table 2 of the guidance provides information on peak rainfall intensity allowance in small catchments (less than 5km<sup>2</sup>).

Based on a typical lifespan for this type of development of up to 60 years the above guidance recommends an allowance of **40%** for increase in rainfall intensity.

## SITE SPECIFIC FLOOD RISK

### *Flood Risk from Rivers or Sea (Including Tidal)*

The EA ‘Long Term Flood Risk’ maps for England (see **Appendix D**) show that the site is located in an area of “**Very Low**” Risk of flooding from Rivers or Sea.

“**Very low**” means that each year, this area has a chance of flooding of less than 1 in 1000 (0.1%).

### *Flood Risk from Surface Water (Land)*

The EA ‘Long Term Flood Risk’ maps for England (see **Appendix D**) show that the majority of the site is located in an area of “**Very Low**” Risk of flooding from Surface Water Drainage.

“**Very low**” means that each year, this area has a chance of flooding of less than 1 in 1000 (0.1%).

### *Flood Risk from Reservoirs, Canals & Artificial Sources*

The EA ‘Long Term Flood Risk’ maps for England show that the site is located in an area of “**Very Low**” risk of flooding from reservoirs.

“**Very low**” means that each year, this area has a chance of flooding of less than 1 in 1000 (0.1%).

## EXISTING DRAINAGE

A copy of the Yorkshire Water public sewer records can be found in **Appendix E** which show the following assets:

- 225mm diameter surface water sewer on A61 to the East of the site.
- 225mm diameter foul water sewer on A61 to the East of the site.
- 225mm diameter foul water sewer to the North (running along the back of the existing terrace houses)

A copy of the Barnsley City Council Highways Drainage can be found in **Appendix E** which show the following assets:

- 150mm diameter surface water pipe (and manhole) on the site connected to the SYPTE drainage network beyond Schwabisch Gmund Way
- 225mm diameter surface water pipe (and manhole) on the site connected to the Public Sewer network on Mottram Way
- 150mm diameter foul water pipe (and manhole) on the site connected to the Public Sewers on Mottram St

*\* Drawing provided by the Lead Local Flood Authority who confirmed that this is a Design Drawing and information contained in it may not represent what was constructed. To be confirmed with Drainage Survey.*

A CCTV drainage survey was carried out in November 2021 to confirm the presence of the existing drainage system and to confirm the extent of existing drainage which needs to be diverted and/or abandoned as well as identification of potential points of connection. The CCTV Survey plan and report can be found in **Appendix L**. This survey and subsequent liaison with Yorkshire Water confirmed that 150mm diameter foul drain in Mottram Way is an unrecorded public foul sewer. Yorkshire Water confirmed that the 225mm diameter surface water pipe in Mottram Way is probably an unrecorded public sewer but have requested further survey work to confirm this drain connects to the recorded surface water sewer in Eldon Street North. This additional survey work is to be confirmed in the next stage of the project.

## SURFACE WATER MANAGEMENT

The National Planning Policy Framework (NPPF) and accompanying Technical Guidance indicate that surface water run-off should be controlled as near to its source as possible through a sustainable drainage approach to surface water management.

Consideration should therefore firstly be given to using sustainable drainage (SuDS) techniques including soakaways, infiltration trenches, permeable pavements, grassed swales, ponds and wetlands to reduce flood risk by attenuating the rate and quantity of surface water run-off from a site. This approach can also offer other benefits in terms of promoting groundwater recharge, water quality improvement and amenity enhancements. Approved document Part H of the Building Regulations (2015) sets out a hierarchy for the disposal of surface water which encourages a SuDS approach.

## *Pre-Development Surface Water Run-off*

Most of the existing site is covered with tarmac paving and concrete paving. There is some soft landscaping with bushes and small trees along the boundary. Hard standing is currently used as a builders storage. Extent of existing impermeable area can be found in **Appendix H**. There are existing gullies and manholes within this hard standing area. The drainage survey (Appendix L) indicates this likely connect to the surface water drainage in Mottram Way. Therefore it is assumed there is a positive drainage system. A copy of topographic survey is included in **Appendix G**.

The existing surface water runoff flow has been calculated using Microdrainage by setting up dummy network with existing impermeable area. It is calculated that total existing impermeable area of the site is 0.746ha. Results are summarised in Table 1 below.

| Catchment:    | Catchment (ha) | Brown field Rate (existing) |                       |                        |
|---------------|----------------|-----------------------------|-----------------------|------------------------|
|               |                | 1:2 Year 15min (l/s)        | 1:30 Year 15min (l/s) | 1:100 Year 15min (l/s) |
| Existing Site | 0.746          | 103.7                       | 166.8                 | 198.6                  |

**TABLE 1 – PRE-DEVELOPMENT BROWNFIELD SURFACE WATER RUNOFF RATES**

A copy of predevelopment calculation can be found in **Appendix A**.

## *Post-Development Surface Water Run-off*

During previous consultation for the adjacent Youth Zone site, the Lead Local Flood Authority (LLFA) confirmed that development on previously developed (brownfield) land must reduce the rate of unattenuated runoff by 30%.

Surface water discharge will therefore be restricted to a maximum of 99.3 l/s in accordance with LLFA requirement. This provides 50% reduction over existing brownfield runoff. Proposed discharge rates are summarised in Table 2.

| Catchment:    | Catchment (ha) | Proposed Discharge Rates (50% of existing) |                       |                        |
|---------------|----------------|--------------------------------------------|-----------------------|------------------------|
|               |                | 1:2 Year 15min (l/s)                       | 1:30 Year 15min (l/s) | 1:100 Year 15min (l/s) |
| Proposed Site | 0.746          | 51.85                                      | 83.4                  | 99.3                   |

**TABLE 2 – POST DEVELOPMENT SURFACE WATER DISCHARGE RATES**

The proposed discharge rate is subject to Yorkshire Water confirmation at the next stage of the project.

## *Sustainable Drainage Systems (SuDS)*

Sustainable Drainage Systems (SuDS) have the ability to address four core objectives: water quantity, water quality, amenity and biodiversity. In accordance with the National Planning Policy Framework, the Non-Statutory Technical Standards for Sustainable Drainage Systems (2018) and the SuDS Manual

(CIRIA 753) SuDS should be specified wherever possible to manage surface water run-off generated onsite.

Consideration should therefore firstly be given to using sustainable drainage (SuDS) techniques including soakaways, infiltration trenches, permeable pavements, grassed swales, ponds and wetlands to reduce flood risk by attenuating the rate and quantity of surface water run-off from a site. This approach can also offer other benefits in terms of promoting groundwater recharge, water quality improvement and amenity enhancements. Approved document Part H of the Building Regulations (2015) sets out a hierarchy for the disposal of surface water which encourages a SuDS approach.

### *Methods of Surface Water Management*

There are three methods that have been reviewed for the management and discharge of surface water which are detailed below; these may be applied individually or collectively to form a complete strategy. They should be applied in the order of priority as listed.

- Discharge via infiltration
- Discharge to watercourse
- Discharge to public sewerage system

### *Infiltration*

A limited number of infiltration tests have been carried out on the site as part of the Phase 2 Site Investigation ref. P18-01848 includes soakaway test results at an Appendix. The testing concluded that soakaway drainage is NOT considered suitable for the site.

The coefficient of permeability was calculated as  $2.98 \times 10^{-6}$ , therefore it was determined that this value is too low for soakaways to be viable for the site.

Further soakaway testing will be carried out during the next stage of the project to confirm there are no other areas of site suitable for soakaways.

### *Rainwater Harvesting*

The only notable opportunity for water storage/recycling is for use in WC's as there is no significant water demand for other suitable purposes in the proposed development and the site is almost all hard paved meaning minimal need for vegetation watering. Whilst Rainwater harvesting is technically viable, its' adoption has not been proposed principally due to the relatively low water use of the facilities combined with the high capital costs and ongoing maintenance costs.

### *Watercourse*

The next method in the hierarchical approach is discharge to a watercourse.

There is no watercourse within the vicinity of the site to make a gravity connection to, therefore a watercourse as a means of discharging surface water is deemed to be not viable.

### *Public Sewer*

There are numerous existing surface water drains on, and adjacent to, the proposed site. The site currently drains to these unrestricted, as confirmed via the CCTV drainage survey included in **Appendix L**.

As infiltration is not viable and there is no open or culverted watercourses within the vicinity to connect to, it is proposed to discharge surface water runoff to the existing public sewer network.

### *Surface Water Storage Requirements*

The existing ground conditions for the site were found not to be suitable for infiltration as a means of discharging surface water, this means disposal of surface water off site is required at a restricted maximum rate. When rates are restricted during storm events, attenuation is required to store the water that backs up in the drainage network.

Open storage structures such as ponds and swales have been proposed.

Attenuation will be primarily provided within open pond. A preliminary calculation estimate that the attenuation required for the development site will be **111m<sup>3</sup>** approximately. A copy of the proposed impermeable area plan can be found in **Appendix H** and quick storage calculation can be found in **Appendix A**.

### *Surface Water Drainage Strategy*

Following the surface water discharge hierarchy, it is proposed to discharge surface water flows from the development site to the existing surface water drains within the site. Ownership of these drains are yet to be confirmed with Yorkshire Water following the CCTV drainage survey works.

The surface water runoff storage required will be provided in open pond and a swale.

A copy of the Proposed Drainage Layout can be found in **Appendix F**.

## OCCUPANTS AND USERS OF THE DEVELOPMENT

The vulnerability classification of the site is 'Less Vulnerable' and this demonstrates a level of flood risk to the people using this development but as they will be not be residing here overnight this risk is considered low.

As the site is located in Flood Zone 1 and is not known to be subject to any other forms of flooding, the residual flood risk to the occupants and users is considered to be very low and acceptable.

## OVERLAND FLOW ROUTES AND EXCEEDANCE PATH

Overland flow routes have been assessed and demonstrated that no flooding of building will occur in the event of a failure of the drainage network. A copy of overland flood flow plan can be found in **Appendix J**.

## RESIDUAL FLOOD RISK

The proposed below ground surface water sewer network has been designed to ensure there is no flooding in the 1 in 30 year storm event and no internal flooding in a 1 in 100 year event, inclusive of an additional 40% climate change allowance providing a significant reduced in the pre-development condition. The residual flood risk is in related to storm events above the 1 in 100 year return period or the risk of blockage within the drainage system. The risk is considered to be low.

## FOUL WATER MANAGEMENT

### *Foul Water Drainage Strategy*

It is proposed to discharge foul water flows from the development to the nearest foul water public sewer located in Mottram Way, subject to approval from Yorkshire Water.

The intention is to discharge via a gravity system should existing sewer levels allow, if this is not possible, a private packaged pumping station located within the site boundary will be constructed, pumping flows through a rising main to a new manhole and connection to said public foul manhole. A copy of proposed drainage layout can be found in **Appendix F**.

## DRAINAGE MANAGEMENT PLAN

The proposed drainage will be operated and maintained by Barnsley MBC.

A drainage maintenance plan can be found in **Appendix K** which contains information on the proposed drainage networks, operation and maintenance of these networks and who will undertake these works for the lifetime of the development.

## CONSULTATION

### *Water Authority (Yorkshire Water)*

A pre-development enquiry was submitted to Yorkshire Water in March 2022, a copy of the submitted application can be found in **Appendix I**.

### *Lead Local Flood Authority (Essex County Council)*

A LLFA pre-planning enquiry will be submitted to Barnsley Council during the next stage of the project.

## CONCLUSION

Development is in Flood Zone 1 and at risk of any other sources of surface water flooding.

The site is not subject to the Sequential or Exception Test.

The site is not suitable for infiltration or connection to a watercourse as a means of discharging surface water.

Subject to further consents and design development, surface water flows are to discharge to the existing public surface water sewer in Mottram Way at a maximum rate of 99.3l/s for the 1 in 100 year storm event.

Surface water attenuation will be provided to ensure no flooding occurs for all storms up to and including the 1 in 100 year storm event with a 40% additional allowance for future climate change.

The setting of proposed levels and existing topography conclude that flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance).

Subject to further detailed design and approval, foul water is to discharge to the public foul sewer to the north.

## APPENDIX A – CALCULATIONS

|                                                       |                                                                                     |
|-------------------------------------------------------|-------------------------------------------------------------------------------------|
| HL Engineers                                          | Page 1                                                                              |
| 131 Mount Pleasant<br>Liverpool<br>L3 5TF             |  |
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| XP Solutions                                          | Network 2020.1.3                                                                    |

# STORM SEWER DESIGN by the Modified Rational Method

## Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

|                                      |        |                                       |       |
|--------------------------------------|--------|---------------------------------------|-------|
| Return Period (years)                | 2      | PIMP (%)                              | 100   |
| M5-60 (mm)                           | 14.900 | Add Flow / Climate Change (%)         | 0     |
| Ratio R                              | 0.250  | Minimum Backdrop Height (m)           | 0.200 |
| Maximum Rainfall (mm/hr)             | 50     | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Time of Concentration (mins) | 30     | Min Design Depth for Optimisation (m) | 1.200 |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Vel for Auto Design only (m/s)    | 1.00  |
| Volumetric Runoff Coeff.             | 0.750  | Min Slope for Optimisation (1:X)      | 500   |

Designed with Level Soffits

## Network Design Table for Storm

| PN     | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section Type | Auto<br>Design                                                                        |
|--------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|---------------------------------------------------------------------------------------|
| S1.004 | 23.962        | 0.099       | 241.6          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |  |

## Network Results Table

| PN     | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|--------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| S1.004 | 37.37           | 7.07           | 97.195       | 0.746            | 0.0                  | 0.0           | 0.0               | 1.16         | 128.3        | 75.5          |

|                                                       |                                              |                                                                                     |
|-------------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------|
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| XP Solutions                                          | Network 2020.1.3                             |                                                                                     |

Network 2020.1.3

#### Area Summary for Storm

| Pipe Number | PIMP Type | PIMP Name | PIMP (%) | Gross Area (ha) | Imp. Area (ha) | Pipe Total (ha) |
|-------------|-----------|-----------|----------|-----------------|----------------|-----------------|
| 1.004       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
|             |           |           |          | Total           | Total          | Total           |
|             |           |           |          | 0.000           | 0.000          | 0.000           |

#### Simulation Criteria for Storm

|                                 |       |                                            |       |
|---------------------------------|-------|--------------------------------------------|-------|
| Volumetric Runoff Coeff         | 0.750 | Additional Flow - % of Total Flow          | 0.000 |
| Areal Reduction Factor          | 1.000 | MADD Factor * 10m <sup>3</sup> /ha Storage | 2.000 |
| Hot Start (mins)                | 0     | Inlet Coefficient                          | 0.800 |
| Hot Start Level (mm)            | 0     | Flow per Person per Day (l/per/day)        | 0.000 |
| Manhole Headloss Coeff (Global) | 0.500 | Run Time (mins)                            | 60    |
| Foul Sewage per hectare (l/s)   | 0.000 | Output Interval (mins)                     | 1     |

|                             |   |                              |   |
|-----------------------------|---|------------------------------|---|
| Number of Input Hydrographs | 0 | Number of Storage Structures | 0 |
| Number of Online Controls   | 0 | Number of Time/Area Diagrams | 0 |
| Number of Offline Controls  | 0 | Number of Real Time Controls | 0 |

#### Synthetic Rainfall Details

|                       |                   |                       |        |
|-----------------------|-------------------|-----------------------|--------|
| Rainfall Model        | FSR               | Profile Type          | Summer |
| Return Period (years) | 2                 | Cv (Summer)           | 0.750  |
| Region                | England and Wales | Cv (Winter)           | 0.840  |
| M5-60 (mm)            | 19.000            | Storm Duration (mins) | 30     |
| Ratio R               | 0.358             |                       |        |

|                                                       |                                              |                                                                                     |
|-------------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------|
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FSR Rainfall Model - Scotland and Ireland

|                                      |        |                                       |       |
|--------------------------------------|--------|---------------------------------------|-------|
| Return Period (years)                | 2      | PIMP (%)                              | 100   |
| M5-60 (mm)                           | 14.900 | Add Flow / Climate Change (%)         | 0     |
| Ratio R                              | 0.250  | Minimum Backdrop Height (m)           | 0.200 |
| Maximum Rainfall (mm/hr)             | 50     | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Time of Concentration (mins) | 30     | Min Design Depth for Optimisation (m) | 1.200 |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Vel for Auto Design only (m/s)    | 1.00  |
| Volumetric Runoff Coeff.             | 0.750  | Min Slope for Optimisation (1:X)      | 500   |

Designed with Level Soffits

#### Network Design Table for Storm

| PN     | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section Type | Auto<br>Design                                                                        |
|--------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|---------------------------------------------------------------------------------------|
| S1.004 | 23.962        | 0.099       | 241.6          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |  |

#### Network Results Table

| PN     | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|--------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| S1.004 | 37.37           | 7.07           | 97.195       | 0.746            | 0.0                  | 0.0           | 0.0               | 1.16         | 128.3        | 75.5          |

|                                                       |                                              |                                                                                     |
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| HL Engineers                                          |                                              | Page 2                                                                              |
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#### Area Summary for Storm

| Pipe Number | PIMP Type | PIMP Name | PIMP (%) | Gross Area (ha) | Imp. Area (ha) | Pipe Total (ha) |
|-------------|-----------|-----------|----------|-----------------|----------------|-----------------|
| 1.004       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
|             |           |           |          | Total           | Total          | Total           |
|             |           |           |          | 0.000           | 0.000          | 0.000           |

#### Simulation Criteria for Storm

|                                 |       |                                            |       |
|---------------------------------|-------|--------------------------------------------|-------|
| Volumetric Runoff Coeff         | 0.750 | Additional Flow - % of Total Flow          | 0.000 |
| Areal Reduction Factor          | 1.000 | MADD Factor * 10m <sup>3</sup> /ha Storage | 2.000 |
| Hot Start (mins)                | 0     | Inlet Coefficient                          | 0.800 |
| Hot Start Level (mm)            | 0     | Flow per Person per Day (l/per/day)        | 0.000 |
| Manhole Headloss Coeff (Global) | 0.500 | Run Time (mins)                            | 60    |
| Foul Sewage per hectare (l/s)   | 0.000 | Output Interval (mins)                     | 1     |
| Number of Input Hydrographs     | 0     | Number of Storage Structures               | 0     |
| Number of Online Controls       | 0     | Number of Time/Area Diagrams               | 0     |
| Number of Offline Controls      | 0     | Number of Real Time Controls               | 0     |

#### Synthetic Rainfall Details

|                       |                   |                       |        |
|-----------------------|-------------------|-----------------------|--------|
| Rainfall Model        | FSR               | Profile Type          | Summer |
| Return Period (years) | 2                 | Cv (Summer)           | 0.750  |
| Region                | England and Wales | Cv (Winter)           | 0.840  |
| M5-60 (mm)            | 19.000            | Storm Duration (mins) | 30     |
| Ratio R               | 0.358             |                       |        |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                                                     |        |         |              |           |            |          |            |           |           |          |       |    |      |       |        |        |           |       |          |       |          |  |  |  |  |       |        |       |  |  |     |        |    |           |       |      |              |       |            |  |        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------------------------------------------------------------------------------|--------|---------|--------------|-----------|------------|----------|------------|-----------|-----------|----------|-------|----|------|-------|--------|--------|-----------|-------|----------|-------|----------|--|--|--|--|-------|--------|-------|--|--|-----|--------|----|-----------|-------|------|--------------|-------|------------|--|--------|
| HL Engineers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       | Page 3                                                                              |        |         |              |           |            |          |            |           |           |          |       |    |      |       |        |        |           |       |          |       |          |  |  |  |  |       |        |       |  |  |     |        |    |           |       |      |              |       |            |  |        |
| 131 Mount Pleasant<br>Liverpool<br>L3 5TF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |  |        |         |              |           |            |          |            |           |           |          |       |    |      |       |        |        |           |       |          |       |          |  |  |  |  |       |        |       |  |  |     |        |    |           |       |      |              |       |            |  |        |
| Date 08/04/2022 18:37<br>File EXISRING SW NETWORK.MDX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                                                                     |        |         |              |           |            |          |            |           |           |          |       |    |      |       |        |        |           |       |          |       |          |  |  |  |  |       |        |       |  |  |     |        |    |           |       |      |              |       |            |  |        |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       | Network 2020.1.3                                                                    |        |         |              |           |            |          |            |           |           |          |       |    |      |       |        |        |           |       |          |       |          |  |  |  |  |       |        |       |  |  |     |        |    |           |       |      |              |       |            |  |        |
| <p><u>Summary of Critical Results by Maximum Outflow (Rank 1) for Storm</u></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                                                     |        |         |              |           |            |          |            |           |           |          |       |    |      |       |        |        |           |       |          |       |          |  |  |  |  |       |        |       |  |  |     |        |    |           |       |      |              |       |            |  |        |
| <p>Simulation Criteria</p> <p>Areal Reduction Factor 1.000    Additional Flow - % of Total Flow 0.000<br/>Hot Start (mins) 0    MADD Factor * 10m³/ha Storage 2.000<br/>Hot Start Level (mm) 0    Inlet Coefficient 0.800<br/>Manhole Headloss Coeff (Global) 0.500    Flow per Person per Day (l/per/day) 0.000<br/>Foul Sewage per hectare (l/s) 0.000</p> <p>Number of Input Hydrographs 0    Number of Storage Structures 0<br/>Number of Online Controls 0    Number of Time/Area Diagrams 0<br/>Number of Offline Controls 0    Number of Real Time Controls 0</p>               |       |                                                                                     |        |         |              |           |            |          |            |           |           |          |       |    |      |       |        |        |           |       |          |       |          |  |  |  |  |       |        |       |  |  |     |        |    |           |       |      |              |       |            |  |        |
| <p>Synthetic Rainfall Details</p> <p>Rainfall Model    FSR    Ratio R 0.359<br/>Region England and Wales Cv (Summer) 0.750<br/>M5-60 (mm)    19.000 Cv (Winter) 0.840</p> <p>Margin for Flood Risk Warning (mm) 300.0    DVD Status OFF<br/>Analysis Timestep    Fine Inertia Status OFF<br/>DTS Status    ON</p>                                                                                                                                                                                                                                                                      |       |                                                                                     |        |         |              |           |            |          |            |           |           |          |       |    |      |       |        |        |           |       |          |       |          |  |  |  |  |       |        |       |  |  |     |        |    |           |       |      |              |       |            |  |        |
| <p>Profile(s) Summer and Winter</p> <p>Duration(s) (mins) 15<br/>Return Period(s) (years) 30<br/>Climate Change (%) 0</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                                                                     |        |         |              |           |            |          |            |           |           |          |       |    |      |       |        |        |           |       |          |       |          |  |  |  |  |       |        |       |  |  |     |        |    |           |       |      |              |       |            |  |        |
| <table><tr><td></td><td>US/MH</td><td></td><td>Return</td><td>Climate</td><td>First (X)</td><td>First (Y)</td><td>First (Z)</td><td>Overflow</td><td>Water</td></tr><tr><td>PN</td><td>Name</td><td>Storm</td><td>Period</td><td>Change</td><td>Surcharge</td><td>Flood</td><td>Overflow</td><td>Act.</td><td>Level</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>(m)</td></tr><tr><td>S1.004</td><td>S5</td><td>15 Winter</td><td>30</td><td>+0%</td><td>30/15 Summer</td><td></td><td></td><td></td><td>97.681</td></tr></table> |       |                                                                                     |        |         | US/MH        |           | Return     | Climate  | First (X)  | First (Y) | First (Z) | Overflow | Water | PN | Name | Storm | Period | Change | Surcharge | Flood | Overflow | Act.  | Level    |  |  |  |  |       |        |       |  |  | (m) | S1.004 | S5 | 15 Winter | 30    | +0%  | 30/15 Summer |       |            |  | 97.681 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | US/MH |                                                                                     | Return | Climate | First (X)    | First (Y) | First (Z)  | Overflow | Water      |           |           |          |       |    |      |       |        |        |           |       |          |       |          |  |  |  |  |       |        |       |  |  |     |        |    |           |       |      |              |       |            |  |        |
| PN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Name  | Storm                                                                               | Period | Change  | Surcharge    | Flood     | Overflow   | Act.     | Level      |           |           |          |       |    |      |       |        |        |           |       |          |       |          |  |  |  |  |       |        |       |  |  |     |        |    |           |       |      |              |       |            |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                                                     |        |         |              |           |            |          | (m)        |           |           |          |       |    |      |       |        |        |           |       |          |       |          |  |  |  |  |       |        |       |  |  |     |        |    |           |       |      |              |       |            |  |        |
| S1.004                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | S5    | 15 Winter                                                                           | 30     | +0%     | 30/15 Summer |           |            |          | 97.681     |           |           |          |       |    |      |       |        |        |           |       |          |       |          |  |  |  |  |       |        |       |  |  |     |        |    |           |       |      |              |       |            |  |        |
| <table><tr><td></td><td>US/MH</td><td>Depth</td><td>Volume</td><td>Flow /</td><td>Half Drain</td><td>Pipe</td><td></td><td></td><td></td></tr><tr><td>PN</td><td>Name</td><td>(m)</td><td>(m³)</td><td>Cap.</td><td>Time</td><td>Flow</td><td>Status</td><td>Level</td><td>Exceeded</td></tr><tr><td></td><td></td><td></td><td></td><td>(l/s)</td><td>(mins)</td><td>(l/s)</td><td></td><td></td><td></td></tr><tr><td>S1.004</td><td>S5</td><td>0.111</td><td>0.000</td><td>1.51</td><td></td><td>166.8</td><td>SURCHARGED</td><td></td><td></td></tr></table>                       |       |                                                                                     |        |         | US/MH        | Depth     | Volume     | Flow /   | Half Drain | Pipe      |           |          |       | PN | Name | (m)   | (m³)   | Cap.   | Time      | Flow  | Status   | Level | Exceeded |  |  |  |  | (l/s) | (mins) | (l/s) |  |  |     | S1.004 | S5 | 0.111     | 0.000 | 1.51 |              | 166.8 | SURCHARGED |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | US/MH | Depth                                                                               | Volume | Flow /  | Half Drain   | Pipe      |            |          |            |           |           |          |       |    |      |       |        |        |           |       |          |       |          |  |  |  |  |       |        |       |  |  |     |        |    |           |       |      |              |       |            |  |        |
| PN                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Name  | (m)                                                                                 | (m³)   | Cap.    | Time         | Flow      | Status     | Level    | Exceeded   |           |           |          |       |    |      |       |        |        |           |       |          |       |          |  |  |  |  |       |        |       |  |  |     |        |    |           |       |      |              |       |            |  |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                                                                                     |        | (l/s)   | (mins)       | (l/s)     |            |          |            |           |           |          |       |    |      |       |        |        |           |       |          |       |          |  |  |  |  |       |        |       |  |  |     |        |    |           |       |      |              |       |            |  |        |
| S1.004                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | S5    | 0.111                                                                               | 0.000  | 1.51    |              | 166.8     | SURCHARGED |          |            |           |           |          |       |    |      |       |        |        |           |       |          |       |          |  |  |  |  |       |        |       |  |  |     |        |    |           |       |      |              |       |            |  |        |
| ©1982-2020 Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                                                                                     |        |         |              |           |            |          |            |           |           |          |       |    |      |       |        |        |           |       |          |       |          |  |  |  |  |       |        |       |  |  |     |        |    |           |       |      |              |       |            |  |        |

|                                                       |                                              |                                                                                     |
|-------------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------|
| HL Engineers                                          |                                              | Page 1                                                                              |
| 131 Mount Pleasant<br>Liverpool<br>L3 5TF             |                                              |  |
| Date 08/04/2022 18:05<br>File EXISRING SW NETWORK.MDX | Designed by karthi.palaniappan<br>Checked by |                                                                                     |
| XP Solutions                                          | Network 2020.1.3                             |                                                                                     |

### STORM SEWER DESIGN by the Modified Rational Method

#### Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

|                                      |        |                                       |       |
|--------------------------------------|--------|---------------------------------------|-------|
| Return Period (years)                | 2      | PIMP (%)                              | 100   |
| M5-60 (mm)                           | 14.900 | Add Flow / Climate Change (%)         | 0     |
| Ratio R                              | 0.250  | Minimum Backdrop Height (m)           | 0.200 |
| Maximum Rainfall (mm/hr)             | 50     | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Time of Concentration (mins) | 30     | Min Design Depth for Optimisation (m) | 1.200 |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Vel for Auto Design only (m/s)    | 1.00  |
| Volumetric Runoff Coeff.             | 0.750  | Min Slope for Optimisation (1:X)      | 500   |

Designed with Level Soffits

#### Network Design Table for Storm

| PN     | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section Type | Auto<br>Design                                                                        |
|--------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|---------------------------------------------------------------------------------------|
| S1.004 | 23.962        | 0.099       | 241.6          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |

#### Network Results Table

| PN     | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|--------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| S1.004 | 36.68           | 7.40           | 97.270       | 0.373            | 0.0                  | 0.0           | 0.0               | 1.01         | 71.2         | 37.1          |

|                                                       |                                              |                                                                                     |
|-------------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------|
| HL Engineers                                          |                                              | Page 2                                                                              |
| 131 Mount Pleasant<br>Liverpool<br>L3 5TF             |                                              |  |
| Date 08/04/2022 18:05<br>File EXISRING SW NETWORK.MDX | Designed by karthi.palaniappan<br>Checked by |                                                                                     |
| XP Solutions                                          | Network 2020.1.3                             |                                                                                     |

#### Area Summary for Storm

| Pipe Number | PIMP Type | PIMP Name | PIMP (%) | Gross Area (ha) | Imp. Area (ha) | Pipe Total (ha) |
|-------------|-----------|-----------|----------|-----------------|----------------|-----------------|
| 1.004       | -         | -         | 100      | 0.000           | 0.000          | 0.000           |
|             |           |           |          | Total           | Total          | Total           |
|             |           |           |          | 0.000           | 0.000          | 0.000           |

#### Free Flowing Outfall Details for Storm

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D,L (mm) | W (mm) |
|---------------------|--------------|--------------|--------------|------------------|----------|--------|
|---------------------|--------------|--------------|--------------|------------------|----------|--------|

|        |   |         |        |       |   |   |
|--------|---|---------|--------|-------|---|---|
| S1.004 | S | 100.000 | 97.171 | 0.000 | 0 | 0 |
|--------|---|---------|--------|-------|---|---|

#### Simulation Criteria for Storm

|                                 |       |                                            |       |
|---------------------------------|-------|--------------------------------------------|-------|
| Volumetric Runoff Coeff         | 0.750 | Additional Flow - % of Total Flow          | 0.000 |
| Areal Reduction Factor          | 1.000 | MADD Factor * 10m <sup>3</sup> /ha Storage | 2.000 |
| Hot Start (mins)                | 0     | Inlet Coefficient                          | 0.800 |
| Hot Start Level (mm)            | 0     | Flow per Person per Day (l/per/day)        | 0.000 |
| Manhole Headloss Coeff (Global) | 0.500 | Run Time (mins)                            | 60    |
| Foul Sewage per hectare (l/s)   | 0.000 | Output Interval (mins)                     | 1     |
| Number of Input Hydrographs     | 0     | Number of Storage Structures               | 0     |
| Number of Online Controls       | 0     | Number of Time/Area Diagrams               | 0     |
| Number of Offline Controls      | 0     | Number of Real Time Controls               | 0     |

#### Synthetic Rainfall Details

|                       |                   |                       |        |
|-----------------------|-------------------|-----------------------|--------|
| Rainfall Model        | FSR               | Profile Type          | Summer |
| Return Period (years) | 2                 | Cv (Summer)           | 0.750  |
| Region                | England and Wales | Cv (Winter)           | 0.840  |
| M5-60 (mm)            | 19.000            | Storm Duration (mins) | 30     |
| Ratio R               | 0.358             |                       |        |



## CALCULATIONS

Company: HL Structural Engineers

Sheet No: 1

Project No: 882

By Karthi P

Date 11.04.22

Checked: Nick H

Date 11.04.22

**Project Title** **Barnsley Activity Park**

| Calculations Title | Surface Water Storage |
|--------------------|-----------------------|
|--------------------|-----------------------|

| LOCATION | CALCULATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | OPTIONS  |                       |        |  |  |          |       |    |                       |        |  |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------|--------|--|--|----------|-------|----|-----------------------|--------|--|
|          | <p>In order to calculate the volume of surface water attenuation required for the Site, Windes Microdrainage version 2021, Source Control module, Quick Storage Estimate has been used. The input and output data for which are shown below;</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |          |                       |        |  |  |          |       |    |                       |        |  |
| Input:   | <div><div><div><div>Quick Storage Estimate</div><div><div><div>Micro Drainage</div><div>Variables</div><div>Results</div><div>Design</div><div>Overview 2D</div><div>Overview 3D</div><div>Vt</div></div><div><div>FSR Rainfall</div><div>Return Period (years)100</div><div>RegionEngland and Wales</div><div>MapM5-60 (mm)19.000</div><div>Ratio R0.354</div></div><div><div>Cv (Summer)0.750</div><div>Cv (Winter)0.840</div><div>Impervious Area (ha)0.582</div><div>Maximum Allowable Discharge (l/s)99.3</div><div>Infiltration Coefficient (m/hr)0.00000</div><div>Safety Factor2.0</div><div>Climate Change (%)40</div></div></div><div><div>Analyse</div><div>OK</div><div>Cancel</div><div>Help</div></div><div>Enter Maximum Allowable Discharge between 0.0 and 999999.0</div></div></div></div> |          |                       |        |  |  |          |       |    |                       |        |  |
| Output:  | <div><div><div><div>Quick Storage Estimate</div><div><div><div>Micro Drainage</div><div>Variables</div><div>Results</div><div>Design</div><div>Overview 2D</div><div>Overview 3D</div><div>Vt</div></div><div><div>Global Variables require approximate storage of between 62 m³ and 160 m³.</div><div>These values are estimates only and should not be used for design purposes.</div></div></div><div><div>Analyse</div><div>OK</div><div>Cancel</div><div>Help</div></div><div>Enter Maximum Allowable Discharge between 0.0 and 999999.0</div></div></div></div>                                                                                                                                                                                                                                        |          |                       |        |  |  |          |       |    |                       |        |  |
|          | <p>As Windes Quick Storage Estimate provides a range of attenuation volumes it is considered that an average value of the range is suitable for preliminary design sizing.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          |                       |        |  |  |          |       |    |                       |        |  |
|          | <table><tr><td>Minimum:</td><td>62.0</td><td>m³</td><td></td><td></td></tr><tr><td>Maximum:</td><td>160.0</td><td>m³</td><td>Preliminary Estimate:</td><td>111 m³</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Minimum: | 62.0                  | m³     |  |  | Maximum: | 160.0 | m³ | Preliminary Estimate: | 111 m³ |  |
| Minimum: | 62.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | m³       |                       |        |  |  |          |       |    |                       |        |  |
| Maximum: | 160.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | m³       | Preliminary Estimate: | 111 m³ |  |  |          |       |    |                       |        |  |

## APPENDIX B – EA Flood Zone Map For Planning

# Flood map for planning

Your reference  
**BAR**

Location (easting/northing)  
**434795/406493**

Created  
**25 Feb 2021 22:43**

**Your selected location is in flood zone 1, an area with a low probability of flooding.**

## This means:

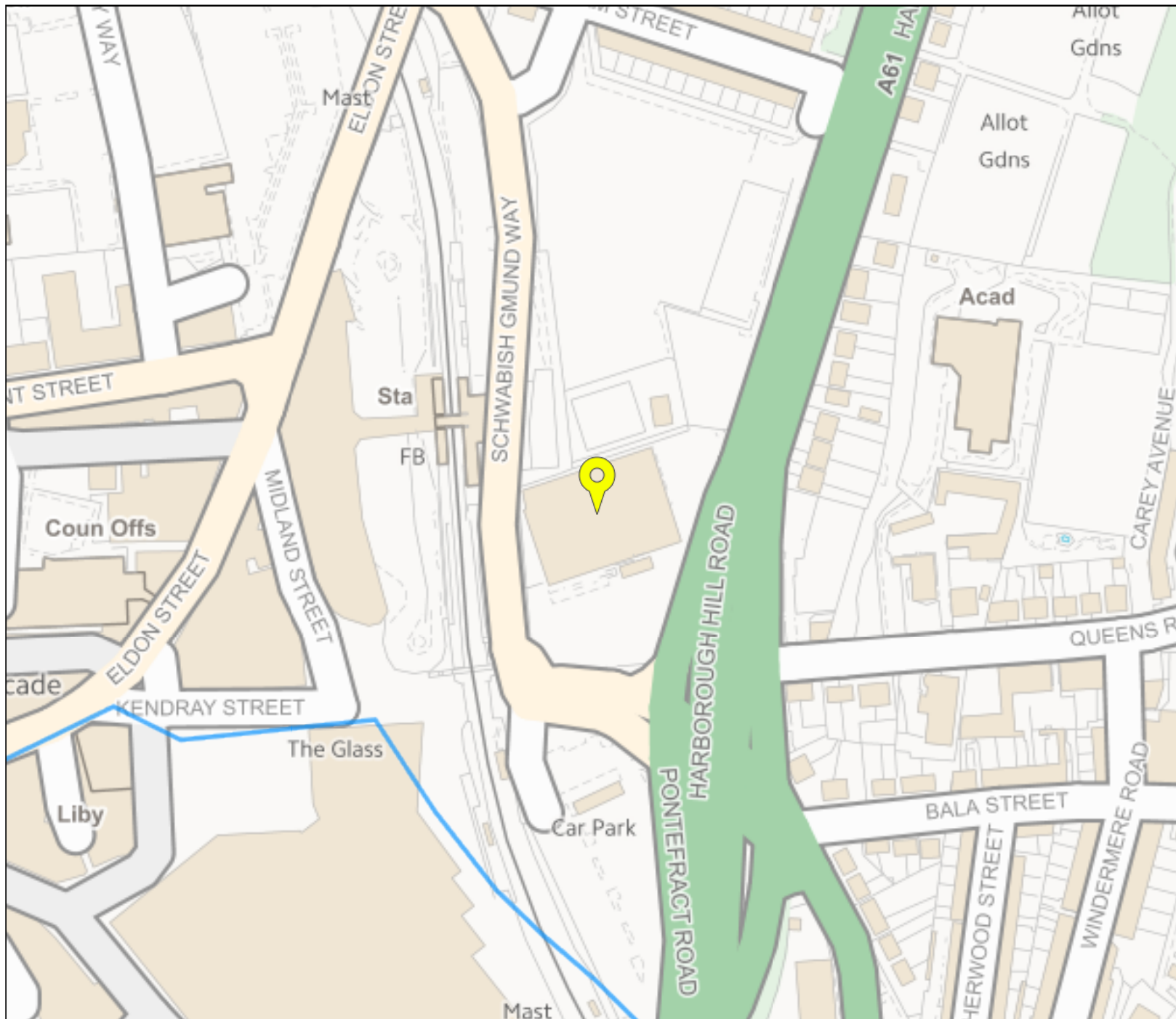
- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

## Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

The Open Government Licence sets out the terms and conditions for using government data.  
<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>



## Flood map for planning

Your reference

**BAR**

Location (easting/northing)

**434795/406493**

Scale

**1:2500**

Created

**25 Feb 2021 22:43**

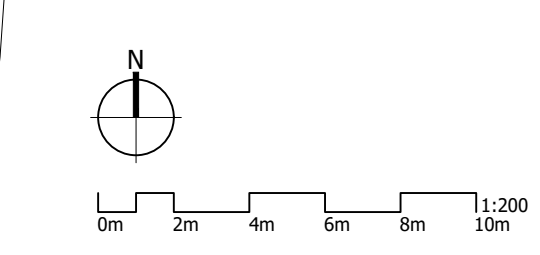
-  Selected point
-  Flood zone 3
-  Flood zone 3: areas benefitting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Flood storage area

0 20 40 60m

## APPENDIX C – Proposed Site Layout



- Existing footpath widened for new cycle way, work by others not part of this application
- Tarmac (vehicular loadings)  
On sub-base to Engineers details, generally half battered PC concrete kerbs, coloured tarmac to cyleway
- Tarmac (vehicular loadings to Activity Park)  
On sub-base to Engineers details, generally half battered PC concrete kerbs to roads and 50mm flat top kerbs to edges
- Tarmac cycle path (vehicular loadings)  
On sub-base to Engineers details, generally half battered PC concrete kerbs to roads and 50mm flat top kerbs to edges
- Paving  
Block laying pattern and unit sizes to Landscape Architects details on sub-base to engineers details
- Play Area  
Specialist play surface on sub-base to Engineers details
- Self Binding Gravel (pedestrian loadings)  
On sub-base to Engineers details, generally timber boards to edges
- Specialist Skate Surface (varied heights)  
On sub-base to Engineers details
- Existing Landscaping / Banking  
Enhance and extend existing soft landscaping with native species in accordance with Ecologist / Landscape Architects details
- Soft Landscaping  
Subject to detail design by Landscape Architects, indicates low level species rich grassland, such as wild flowers
- Soft Landscaping  
Subject to detail design by Landscape Architects, shrub and herbaceous planting which is native wildlife friendly
- Gravel Perimeter to Buildings  
300mm maintenance strip to Landscape Architects details on weed suppressant membrane adjacent to building and soft landscaping
- Existing object to be demolished / removed
- Existing Tree - Retained
- Proposed new trees



|                                         |                                       |               |
|-----------------------------------------|---------------------------------------|---------------|
| Revision                                | DC                                    | Drawn         |
| Project                                 | Barnsley Activity Park                | DC            |
| Land Off Schwäbisch Gmünd Way, Barnsley | Date                                  | 04.04.2022    |
| Client                                  | Barnsley Metropolitan Borough Council | Scale(s) @ A0 |
| Sheet Title                             | Proposed Activity Park Site Plan      | 1:200         |
| Planning Issue                          | 83-18                                 | Rev           |
| Project No.                             | BAR-HBA-V5-00-DR-A-P56                |               |

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The Old Telephone Exchange, Albert Street, Rugby, Warks, CV21 3SA  
info@h-architects.co.uk | www.h-architects.co.uk | 01788 576137

## APPENDIX D – EA Long Term Flood Risk Maps



Extent of flooding from surface water

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

## APPENDIX E – Existing Drainage Records

## YORKSHIRE WATER PROTECTION OF MAINS AND SERVICES

1. The position of Yorkshire Water Services Ltd (YWS) apparatus shown on the existing mains record drawing(s) indicates the **general** position and nature of our apparatus and the accuracy of this information cannot be guaranteed. Any damage to YWS apparatus as a result of your works may have serious consequences and you will be held responsible for all costs incurred. Prior to commencing major works, the exact location of apparatus must be determined on site, if necessary by excavating trial holes. The actual position of such apparatus and that of service pipes which have not been indicated must be established on site by contacting the Customer Helpline on 0845 124 24 24 for both water and sewerage.
2. The public sewer and water network is lawfully retained in its existing position and the sewerage and water undertaker is entitled to have it remain so without any disturbance. The provisions of section 159 of the Water Industry Act 1991 provides that the undertaker may "inspect, maintain, adjust, repair or alter" the network. Those rights are given to enable the undertaker to perform its statutory duties. Any development of the land or any other action that unacceptably hindered the exercise of those rights would be unlawful. The provisions contained in Section 185 of the Water Industry Act 1991 state that where it is reasonable to do so, a person may require the water supply undertaker to alter or remove a pipe where it is necessary to enable that person to carry out a proposed change of use of the land. The provisions contained in Section 185 also require the person making the request to pay the full cost of carrying out the necessary works.
3. Ground levels over existing YWS apparatus are to be maintained. Sewers in highways will **generally** be laid to give 1200mm of cover from finished ground level working to kerb races, other permanent identification of the limits of the road or to an agreed line and level. Substantial increases or decreases to this 1200mm depth of cover will result in the sewer being re-laid at your expense. Water mains and services will **generally** be laid with a minimum of 750mm depth of cover however some mains and services usually those installed over 50 years ago may have less ground cover.
4. If surface levels are to be decreased / increased significantly the effects on existing water supply apparatus will be carefully considered and if any alterations are necessary, the costs of the alterations will be recharged to you in full. Outlets on fire hydrants must be no more than 300mm below the new levels and all surface boxes must be adjusted as part of the scheme.
5. To enable future repair works to be carried out without hindrance; any pipe, cable, duct, etc. installed parallel to a water main or service pipe should not be installed directly over or within 300mm of a water main or service pipe or 1000mm of a waste water asset. Where a pipe, cable, duct, etc. crosses a main or service it should preferably cross perpendicular or at an angle of no less than 45° and with a minimum clearance of 150mm. These requirements apply to activities within an existing highway and are relevant to the installation of pipes, cables, ducts, etc. up to and including 250mm in diameter (*see illustration below*). Necessary protection measures for installations greater than 250mm in diameter and/or in private land will need to be agreed on an individual basis. Installations within a new development site must comply with the National Joint Utilities Group publication Volume 2: NJUG Guidelines On The Positioning Of Underground Utilities Apparatus For New Development Sites.
6. All excavation works near to YW apparatus should be by hand digging only.
7. Backfilling with a suitable material to a minimum 300mm above YW apparatus is required.
8. Adequate support must be provided where any works pass under YW apparatus.
9. Jointing chambers, lighting columns and other structures must be installed in such a way that future repair or maintenance works to YW apparatus will not be hindered.
10. Apparatus such as; railings, sign posts, etc. must not be placed in such a way that they prevent access to or full operation of controlling valves, hydrants or similar apparatus. YWS surface boxes must not be covered or buried. Any adjustment, alteration or replacement of manhole covers must be agreed on site prior to the commencement of the works with a YWS Inspector who may be contacted via our Call Centre on 0845 124 24 24.
11. Explosives shall not be used within 100 metres of any Yorkshire Water Services apparatus or installations.
12. Vibrating plant should not be used directly over any apparatus. Movement or operation by vehicles or heavy plant is not to be permitted in the immediate vicinity of YWS plant or apparatus unless there has been prior consultation and, if necessary, adequate protection provided without cost to YWS.
13. **Under no circumstances** should thrust boring or similar trenchless techniques commence until the actual position of the Company's mains/services along the proposed route have been confirmed by trial holes.
14. Any alterations to the highway should be notified following the procedures outlined in the New Road and Street Works Act 1991 Code of Practice; Measures Necessary Where Apparatus Is Affected By Major Works (Diversiary Works).
15. You will be held responsible for any damage or loss to YWS apparatus during and after completion of work, caused by yourselves, your servant or agent. Any damage caused or observed to YWS plant or apparatus should be immediately reported to YWS. Should YW incur any costs as a result of non-compliance with the above, all costs will be rechargeable in full.
16. You should ensure that nothing is done on the site to prejudice the safety or operation of YWS employees, plant or apparatus.
17. In accordance with the New Roads and Street Works Act 1991, Chapter 22, Part 3, Section 80. The location of any identified YW asset "which is not marked, or is wrongly marked, on the records made available" should be communicated back to Yorkshire Water. The location of the apparatus should be identified on copies of the supplied plans which should be returned to Yorkshire Water (Asset Records Team) with photographic supporting evidence where possible.
18. The Government has decided that responsibility for private sewers serving two or more properties and lateral drains (the section of pipe beyond the boundary of a single property, connecting it to the public sewer) will be transferred to the water companies on Oct 1 2011.

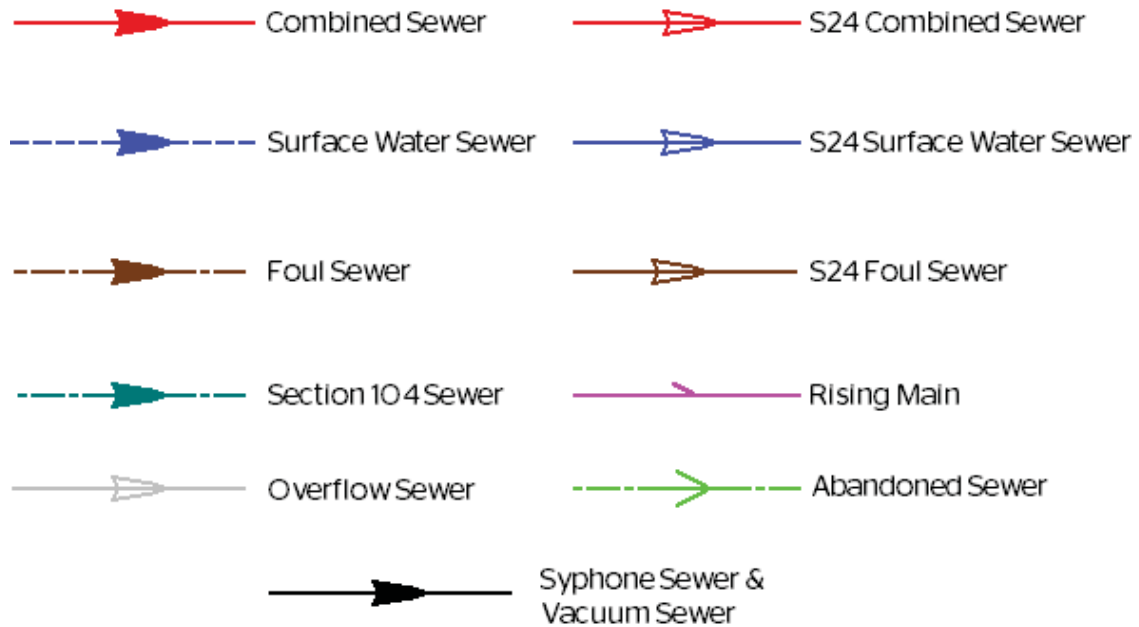
Private pumping stations will also transfer during the period 1 October 2011 – 1 Oct 2016. Records of these assets may not yet be shown on the existing mains record drawing(s). If you encounter any of these assets you must inform Yorkshire Water Services Ltd (YWS).

19. Please note that the information supplied on the enclosed plans is reproduced from Ordnance Survey material with the permission of the Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office, © Crown Copyright. Unauthorised reproduction infringes Crown Copyright and may lead to prosecution or civil proceedings. Licence Number 1000019559.
20. This information is for guidance only and the position and depth of any YW apparatus is approximate only. Likewise, the nature and condition of any YW apparatus cannot be guaranteed. YW has no responsibility for recording the locations of privately owned apparatus. As of 1 October 2011, there may be some lateral drains and/or public sewers which are not documented on YW records but may still be present. For the avoidance of doubt, this information is not a substitute for appropriate professional and/or legal advice. YW accepts no responsibility for any inaccuracy or omissions in this information. The actual position of YW apparatus must be determined on site by excavating trial holes by hand. YW requires a minimum of two working days' written notice of the intention to excavate any trial holes before any excavation can be undertaken. If there are any queries in this respect please contact Yorkshire Water on 0845 124 24 24.

## Property Identifier



## Sewer Legend

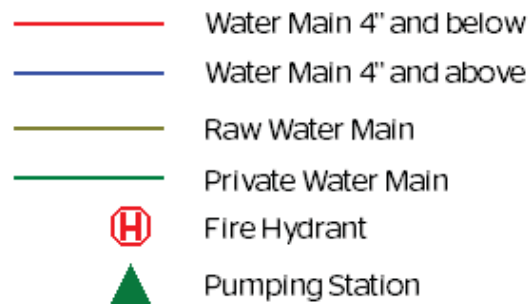


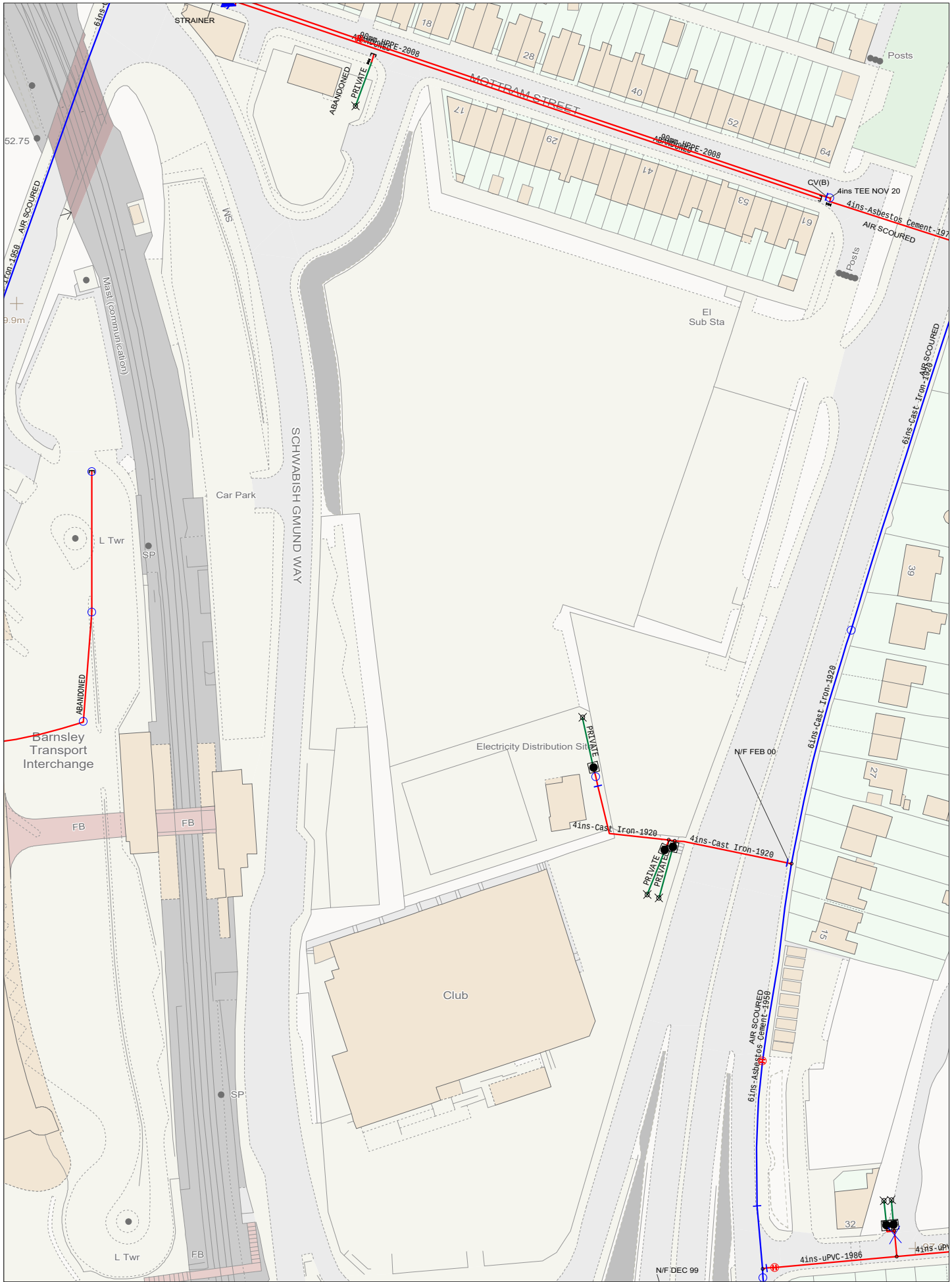
Pumping Station



Public Sewer Treatment Works

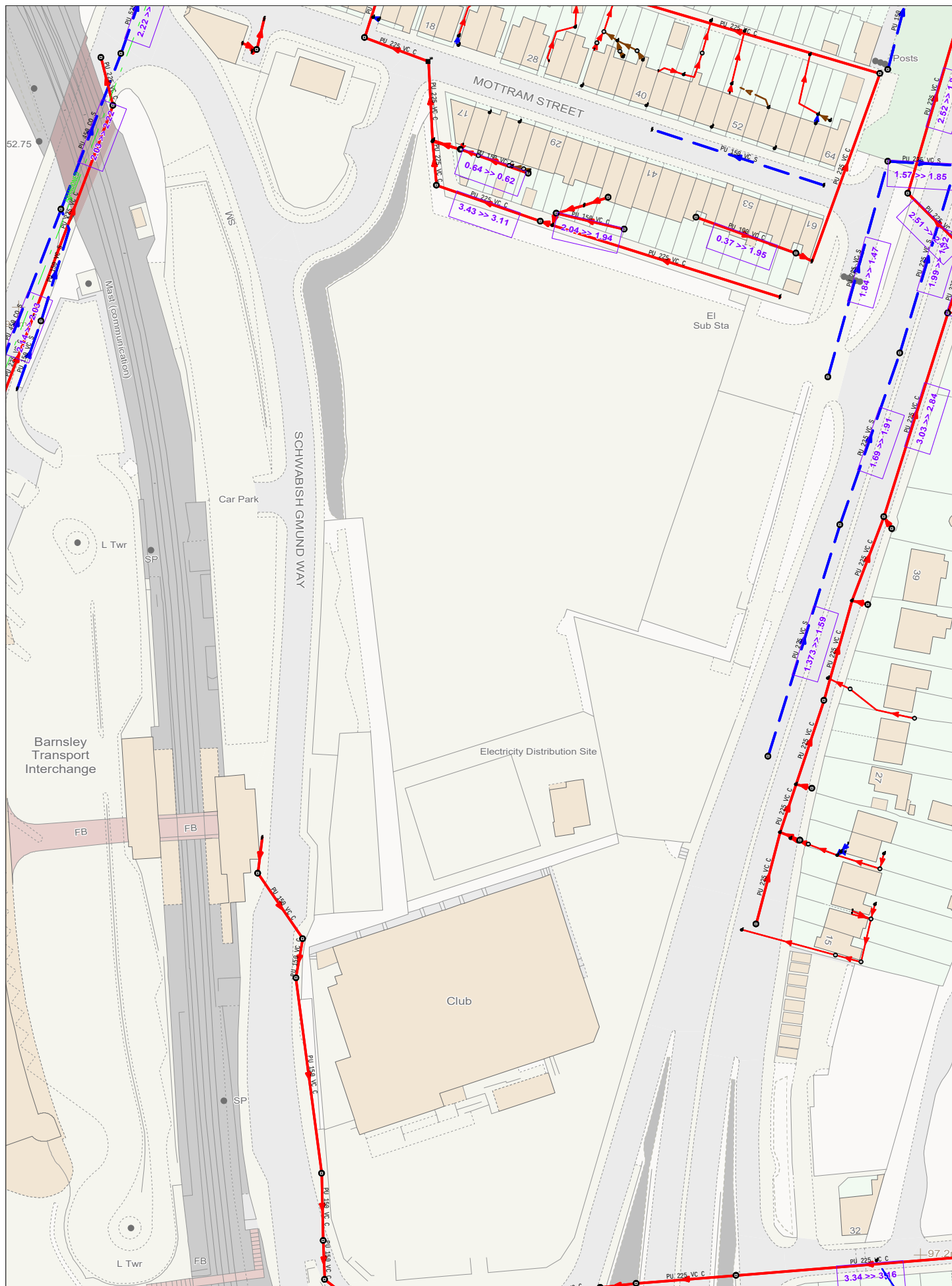
## Water Legend





Date Requested : 01/02/2021, 10:38:35

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Date Requested : 01/02/2021, 10:37:59

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## Existing Highway Drainage

\* Drawing provided by the Lead Local Flood Authority who confirmed that this is a Design Drawing and information contained in it may not represent what was constructed. To be confirmed with Drainage Survey on future design stages

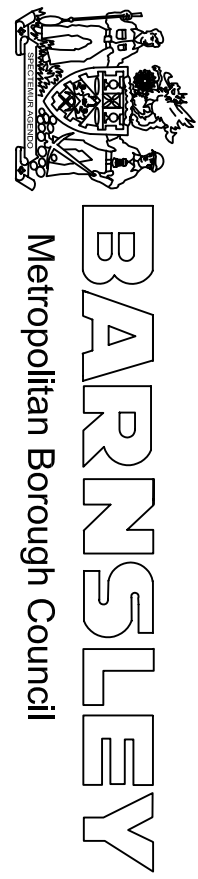
NOTES:

- Proposed highway drain
- Proposed private SYPTE drain
- Proposed Surface Water drain diversion
- Proposed Foul drain diversion
- Existing drain
- Existing drain to be abandoned
- Proposed mini heavy blocks or equal approved keep drains
- Proposed manhole
- Proposed manhole on site of existing rodding eye or Manhole
- Existing manhole
- Proposed gully
- Existing gully
- Existing gully to be abandoned
- Proposed beany outlet
- Proposed beany access unit
- Proposed petrol interceptor

1. Petrol interceptor to be Klageser unit ref. no. NS910 or equal approved
2. Concrete surround required to petrol interceptor
3. No alarm facility required to petrol interceptor
4. Longitudinal sections of the drains can be found on drawing H-HW-104.2
5. All levels relate to station No 1, value 94.97 m, located in Eldon Street, opposite Midtram Street.
6. Where combined drainage and kerb blocks are to continue through a pedestrian crossing point, these units are to be plated over and taper/drop kerbs for crossing are to be laid on top of plate.
7. Drain lengths MH30 to JN 'A' and MH34 to JN 'B' may be laid in dual pipe trench.

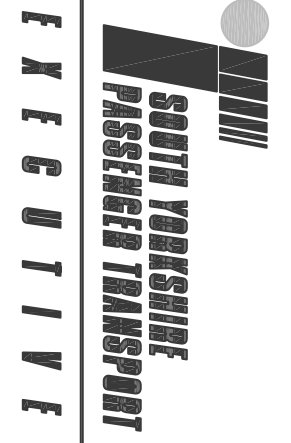
| Rev | Date | Drawn | Description | Chd | Asst |
|-----|------|-------|-------------|-----|------|
| 1   |      |       |             |     |      |
| 2   |      |       |             |     |      |
| 3   |      |       |             |     |      |
| 4   |      |       |             |     |      |
| 5   |      |       |             |     |      |
| 6   |      |       |             |     |      |
| 7   |      |       |             |     |      |
| 8   |      |       |             |     |      |
| 9   |      |       |             |     |      |
| 10  |      |       |             |     |      |
| 11  |      |       |             |     |      |
| 12  |      |       |             |     |      |

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BARRACLOUGH  
& WRIGHT  
CHARTERED QUANTITY SURVEYORS  
PLANNING SUPERVISORS

Client



Project  
BARNSELEY TRANSPORT INTERCHANGE

Drawing Status

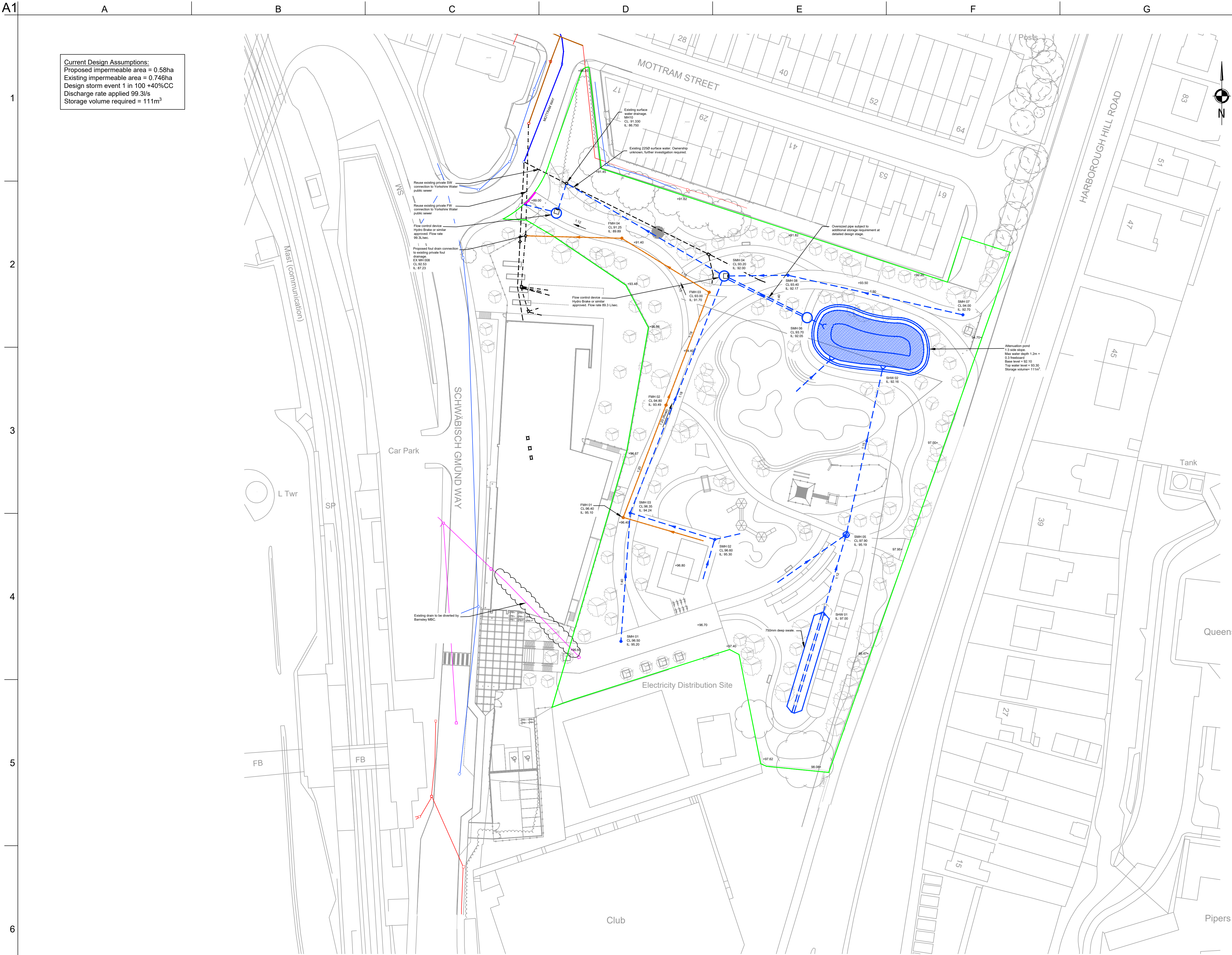
PRELIMINARY LAYOUT

Drawing Title

DRAINAGE LAYOUT

|                            |                          |                    |                   |
|----------------------------|--------------------------|--------------------|-------------------|
| Drawn/Designed By<br>W.A.  | Date<br>JULY 2004        | Checked By<br>D.L. | Date<br>JULY 2004 |
| Approved By Designer (CBE) | Date                     | Project Reference  |                   |
| Scale<br>1:500             | Sheet Size<br>A0         | Revision           |                   |
| Operator<br>BMC            | Drawing No<br>H-HW-104.1 | Revision           |                   |

## APPENDIX F – PROPOSED BELOW GROUND DRAINAGE LAYOUT



Current Design Assumptions:  
Proposed impermeable area = 0.58ha  
Existing impermeable area = 0.746ha  
Design storm event 1 in 100 +40%CC  
Discharge rate applied 99.3/s  
Storage volume required = 111m<sup>3</sup>

- Notes
- This drawing should be read in conjunction with all relevant consultants drawings and specialist contractors/supply chain drawings and specifications.
  - The information presented on this drawing is preliminary and subject to change as detail design is completed.

Key:

- Site Boundary
- Proposed private surface water drain
- Existing public storm sewer
- Existing public foul sewer
- Existing private storm sewer
- Existing private foul sewer
- Proposed ACO channel drain
- Proposed Type 2 manhole
- Proposed Type 3 manhole
- Proposed pond
- Proposed swale
- Proposed finished levels subject to detailed design

| Revision           |          |    |      |      |
|--------------------|----------|----|------|------|
| Issue              | Date     | By | Chkd | Appd |
| P1                 | 21.03.22 | KP | NH   | NH   |
| Issued for comment |          |    |      |      |
| P2                 | 12.04.22 | KP | NH   | NH   |
| RIBA Stage 2 Issue |          |    |      |      |

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t: +44 (0)151 440 2185  
w: www.HLEngineers.co.uk  
Client  
**Barnsley MBC**

Job Title  
**Barnsley Activity Park**

Drawing Title  
**Proposed Below Ground Drainage Layout**

Scale at A1  
**1:500**  
Drawing Status  
**RIBA Stage 2**  
Job No 882 | Drawing No BAP-HLE-XX-00-DR-C-00300 | Issue P2

## APPENDIX G – Topographical Survey



## APPENDIX H – Existing & Proposed Impermeable Area Plans



- Notes
1. This drawing should be read in conjunction with all relevant consultants drawings and specialist contractors/supply chain drawings and specifications.
  2. The information presented on this drawing is preliminary and subject to change as detail design is completed.

Key:

- Site Boundary
- Existing impermeable area =0.746ha

| Revision           |          |    |      |      |
|--------------------|----------|----|------|------|
| Issue              | Date     | By | Chkd | Appd |
| P1                 | 12.04.22 | KP | NH   | NH   |
| RIBA Stage 3 Issue |          |    |      |      |

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Client  
**Barnsley MBC**

Job Title  
**Barnsley Activity Park**

Drawing Title  
**Existing Impermeable Area Plan**

Scale at A1  
**1:200**  
Drawing Status  
**RIBA Stage 3**  
Job No  
**0882**  
Drawing No  
**BAP-HLE-XX-00-DR-C-00302**  
Issue  
**P1**



- Notes
1. This drawing should be read in conjunction with all relevant consultants drawings and specialist contractors/supply chain drawings and specifications.
  2. The information presented on this drawing is preliminary and subject to change as detail design is completed.

| Key:                                                                                                                       |                                    |
|----------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| <span style="color: green;">—</span>                                                                                       | Site Boundary                      |
| <span style="background-color: orange; border: 1px solid black; display: inline-block; width: 20px; height: 10px;"></span> | Proposed impermeable area = 0.58ha |

| Revision           |          |    |      |      |
|--------------------|----------|----|------|------|
| Issue              | Date     | By | Chkd | Appd |
| P1                 | 12.04.22 | KP | NH   | NH   |
| RIBA Stage 2 Issue |          |    |      |      |

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w: www.HLEngineers.co.uk  
Client  
**Barnsley MBC**

Job Title  
**Barnsley Activity Park**

Drawing Title  
**Proposed Impermeable Area Plan**

Scale at A1  
**1:500**  
Drawing Status  
**RIBA Stage 2**  
Job No  
**0882**  
Drawing No  
**BAP-HLE-XX-00-DR-C-00301**  
Issue  
**P1**

## APPENDIX I – Pre-Planning Enquiry

# The Submitted Form

---

## Enquiry Submission Details

**Form Type:** Sewerage Pre-Planning Enquiry (9712)  
**Form Submission ID:** 19206  
**Case Reference:** U603453  
**Submission Made On:** Mon 21 Mar 2022 5:15PM

---

## Application Payment Details

**The application fee of £198.00 is paid by card.**

**Payment Reference:** DS16918  
**Payment Made By User:** karthi.p@hlengineers.co.uk  
**Payment Made On:** Mon 21 Mar 2022 5:16PM

---

## Your Details

**Email Address:**  
karthi.p@hlengineers.co.uk

**Company Telephone:**  
01514402185

**Address:**  
131 Liverpool Science Park  
Mount Pleasant  
Liverpool  
L3 5TF

**Company Name:**  
HL Structural Engineers

**Telephone:**  
07958166272

**Name:**  
Karthi Palanniyappan

---

## Proposed Site

**Address:**  
Harborough Hill Road  
Oakwell  
Monk Bretton  
Barnsley  
S71 1BB

**Site Name:**  
Barnsley Activity Park

**Grid Ref.:**  
E: 434844, N: 406600

**Location map:**



**Site Area In Ha:**  
1.151

**Previous Brownfield Site Usage:**  
Commercial

**How Long Has Site Been Remediated:**  
Existing tarmacked open storage area.

**Previous Site Usage:**  
Brownfield

**Currently Connected To Public Sewer:**  
Unknown

**Site or Drainage Survey Carried Out:**  
No

**Proposal Details**

**Development Type:**  
Mixed

**Employment Population:**  
5

**No. of Units or Dwellings Proposed:**  
Proposed open activity park

**Trade Effluent Discharge:**  
No

**Proposed Peak Foul Flow (l/s):**

2.6

**Proposed Peak Surface Water Flow (l/s):**

106.6

**Proposed Impermeable Area In Ha:**

0.5823

---

#### **Uploaded Documents**

#### **Site / Location Plans:**

- File: Barnsley Activity Park Site Location Plan.pdf

## Appendix J – Flood Flow Routing Plan



- Notes
1. This drawing should be read in conjunction with all relevant consultants drawings and specialist contractors/supply chain drawings and specifications.
  2. The information presented on this drawing is preliminary and subject to change as detail design is completed.

Key

 Denotes direction of overland flow should proposed drainage system block or be overloaded during a storm in excess of the 1 in 100 year event & 40% climate change allowance which the system has been designed for.

13.92 Denotes existing ground levels at boundary

+14.150 Denotes proposed finished levels

| Revision           |          |    |      |      |
|--------------------|----------|----|------|------|
| Issue              | Date     | By | Chkd | Appd |
| P1                 | 12.04.22 | KP | NH   | NH   |
| RIBA Stage 3 Issue |          |    |      |      |

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Client  
**Barnsley MBC**

Job Title  
**Barnsley Activity Park**

Drawing Title  
**Overland Flood Flow Plan**

Scale at A1  
**1:200**

Drawing Status  
**RIBA Stage 3**

|        |                          |       |
|--------|--------------------------|-------|
| Job No | Drawing No               | Issue |
| 0882   | BAP-HLE-XX-00-DR-C-00303 | P1    |

## Appendix K – Drainage Maintenance Plan

# Drainage Maintenance Schedules

| Drainage Element:  | SW - Roofs, External Hard Pavements and Landscaping                                                                                              |             |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Maintenance Regime | Tasks                                                                                                                                            | Frequency   |
| Regular            | Remove all litter and debris from external hard landscaped areas and adjacent landscaping, which may pose a risk blockage to the drainage system | monthly     |
|                    | Inspect and Remove debris from roofs which may pose a risk blockage to the gutters and drainage systems.                                         | as required |
| Remedial Action    | Carry out repairs to roof when required (e.g replacing loose/ broken roof slates and tiles, corrosion, waterproofing, etc).                      |             |

| Drainage Element:  | SW - Gutters and Rain Water Pipes                                                                                                                                                                                                   |           |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Maintenance Regime | Tasks                                                                                                                                                                                                                               | Frequency |
| Regular            | Clear leaves and debris from gutters and downpipes regularly , preferably in spring and autumn after blossom and leaf fall. More frequent attention may be needed if the building is surrounded by trees or perched upon by pigeons | 6 months  |
|                    | Inspect gutters and downpipes for signs of damage by frost/corrosion. Check if gutters slope the wrong way (i.e. away from the outlet) or if gutters allow water to overflow over the wall surface. Carry out repairs if required   |           |
| Remedial Action    | Inspect and check the fixings for downpipes and gutters. If loose carry out repairs.                                                                                                                                                |           |

| Drainage Element:  | SW - Channel Drains and Gullies                                                                             |           |
|--------------------|-------------------------------------------------------------------------------------------------------------|-----------|
| Maintenance Regime | Tasks                                                                                                       | Frequency |
| Regular            | Visual inspections to pay particular attention to: signs of damage of gratings, covers and locking systems. | 6 months  |
|                    | Clear leaves and debris from channel drains and sumps. Gratings to be removed to carry out the task.        |           |

| Drainage Element:  | SW and FW - Inspection Chambers                                                                                                                                               |           |
|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Maintenance Regime | Tasks                                                                                                                                                                         | Frequency |
| Regular            | Open Covers and inspect for signs of damage. Carry out repairs if required.                                                                                                   | 6 months  |
|                    | Open Covers and inspect for signs of debris/sediment in the drainage system. If debris/sediment is found in inspection chambers carry out inspection of drainage pipe network |           |

| Drainage Element:  | SW and FW -Below Ground Pipes |           |
|--------------------|-------------------------------|-----------|
| Maintenance Regime | Tasks                         | Frequency |

# Drainage Maintenance Schedules

|                 |                                                                                                                                                                                           |             |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Remedial Action | In the event of flooding/ponding carry out CCTV Survey of pipework for signs of damage/blockge. Remove debris using rod or jet-wash system and carry out repairs to pipework if required. | as required |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|

| Drainage Element:  | SW - Flow Control Manholes                                                                                                                                                                             |                                    |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| Maintenance Regime | Tasks                                                                                                                                                                                                  | Frequency                          |
| Regular            | Open Covers and inspect for signs of damage. Carry out repairs if required.                                                                                                                            | 6 months and after big storm event |
|                    | Open Covers and inspect for signs of debris/sediment in the sump. If debris/sediment is found in inspection chambers carry out inspection of drainage pipe network and attenuation tank (see schedule) |                                    |

| Drainage Element:  | FW- Above Ground Drainage                                                                                                                           |             |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Maintenance Regime | Tasks                                                                                                                                               | Frequency   |
| Regular            | Carry out visial inspect for signs of damage or leaks in the system. Carry out repairs if required.                                                 | 6 months    |
| Remedial Action    | In the event of flooding/ponding inspect for signs of damage/blockge. Remove debris using rod system and carry out repairs to pipework if required. | as required |

## Appendix L – CCTV Drainage Survey





## Project

**Project Name:** 14429 SURVEY OPS BARNSELEY  
**Project Description:** CCTV Drainage Inspection Report  
**Project Number:** 14429  
**Project Date:** 02/11/2021  
**Inspection Standard:** MSCC5 Sewers & Drainage GB (SRM5 Scoring)

## Table of Contents

| Project Name              | Project Number | Project Date |
|---------------------------|----------------|--------------|
| 14429 SURVEY OPS BARNSELY | 14429          | 02/11/2021   |

|                                          |      |
|------------------------------------------|------|
| Project Information .....                | P-1  |
| Scoring Summary .....                    | P-2  |
| Section Profile .....                    | P-4  |
| Section Summary .....                    | P-5  |
| Project Summary .....                    | P-11 |
| Section: 1; MH01 > MH02 (MH01X) .....    | 1    |
| Section: 2; MH03 > MH04 (MH03X) .....    | 3    |
| Section: 3; MH05 > MH04 (MH05X) .....    | 6    |
| Section: 4; MH06 > MH07 (MH06X) .....    | 8    |
| Section: 5; MH06A > MH06 (MH06AX) .....  | 10   |
| Section: 6; MH08 > MH06 (MH08X) .....    | 12   |
| Section: 7; MH09 > MH05 (MH09X) .....    | 14   |
| Section: 8; MH10 > MH01 (MH10X) .....    | 21   |
| Section: 9; MH12 > MH11 (MH12X) .....    | 23   |
| Section: 10; MH13 > MH11 (MH13X) .....   | 26   |
| Section: 11; MH11 > MH03 (MH11X) .....   | 30   |
| Section: 12; MH13A > MH13 (MH13AX) ..... | 32   |
| Section: 13; MH13B > MH13 (MH13BX) ..... | 33   |
| Disclaimer and FOW Recommendations ..... | 34   |

## Project Information

| Project Name              | Project Number | Project Date |
|---------------------------|----------------|--------------|
| 14429 SURVEY OPS BARNSELY | 14429          | 02/11/2021   |

### Client

**Company:** Survey Operations  
**Contact:** Ian Thompson  
**Street:** Smith Street  
**Town or City:** Skemersdale  
**Post Code:** WN8 8LN

### Site

**Company:** Site Address  
**Department:** Barnsley Youth Zone  
**Town or City:** Barnsley  
**Post Code:** S71 1AY

### Contractor

**Company:** UNDERGROUND SURVEYS UK LTD  
**Contact:** KELLY RICHARDSON  
**Department:** DIRECTOR  
**Street:** UNIT CG17 & 18 WARRINGTON BUSINESS PARK  
**Town or City:** WARRINGTON  
**County:** CHESHIRE  
**Post Code:** WA28TX  
**Phone:** 01925444664  
**Email:** INFO@UNDERGROUNDSURVEYS.CO.UK

## Scoring Summary

**Project Name**  
14429 SURVEY OPS BARNSELY

**Project Number**  
14429

**Project Date**  
02/11/2021

### Structural Defects

- Grade 3: Best practice suggests consideration should be given to repairs in the medium term.
- Grade 4: Best practice suggests consideration should be given to repairs to avoid a potential collapse.
- Grade 5: Best practice suggests that this pipe is at risk of collapse at any time. Urgent consideration should be given to repairs to avoid total failure.

| Section | PLR   | Grade | Description                                       |
|---------|-------|-------|---------------------------------------------------|
| 4       | MH06X | 4     | Fractures, multiple from 12 o'clock to 12 o'clock |
| 7       | MH09X | 4     | Multiple defects                                  |
| 9       | MH12X | 4     | Multiple defects                                  |

### Service / Operational Condition

- Grade 3: Best practice suggests consideration should be given to maintenance activities in the medium term.
- Grade 4: Best practice suggests consideration should be given to maintenance activity to avoid potential blockages.
- Grade 5: Best practice suggests that this pipe is at a high risk of backing up or causing flooding.

| Section | PLR    | Grade | Description                                                                                |
|---------|--------|-------|--------------------------------------------------------------------------------------------|
| 1       | MH01X  | 3     | Multiple defects                                                                           |
| 3       | MH05X  | 3     | Multiple defects                                                                           |
| 4       | MH06X  | 3     | Settled deposits, coarse, 5% cross-sectional area loss                                     |
| 6       | MH08X  | 3     | Attached deposits, encrustation from 5 o'clock to 7 o'clock, 10% cross-sectional area loss |
| 7       | MH09X  | 2     | Multiple defects                                                                           |
| 9       | MH12X  | 3     | Multiple defects                                                                           |
| 10      | MH13X  | 5     | Roots, mass at joint, 20% cross-sectional area loss                                        |
| 11      | MH11X  | 5     | Roots, mass at joint, 20% cross-sectional area loss                                        |
| 12      | MH13AX | 4     | Multiple defects                                                                           |
| 13      | MH13BX | 3     | Multiple defects                                                                           |

### Abandoned Surveys

| Section | PLR    | Description      |
|---------|--------|------------------|
| 7       | MH09X  | Survey abandoned |
| 9       | MH12X  | Survey abandoned |
| 10      | MH13X  | Survey abandoned |
| 10      | MH13X  | Survey abandoned |
| 11      | MH11X  | Survey abandoned |
| 12      | MH13AX | Survey abandoned |
| 13      | MH13BX | Survey abandoned |

## Scoring Summary

| Project Name             | Project Number | Project Date |
|--------------------------|----------------|--------------|
| 14429 SURVEY OPS BARNLEY | 14429          | 02/11/2021   |

### Information

These scoring summaries are based on the SRM grading from the WRc.

## Section Profile

**Project Name**  
14429 SURVEY OPS BARNSELY

**Project Number**  
14429

**Project Date**  
02/11/2021

### Circular, 150 mm

| Item No. | Upstream Node | Downstream Node | Date       | Road                          | Material       | Total Length | Inspected Length |
|----------|---------------|-----------------|------------|-------------------------------|----------------|--------------|------------------|
| 1        | MH01          | MH02            | 02/11/2021 | MOTTRAM ROAD                  | Vitrified clay | 28.05 m      | 28.05 m          |
| 4        | MH06          | MH07            | 02/11/2021 | SCHWABISH GMUND WAY           | Vitrified clay | 17.80 m      | 17.80 m          |
| 5        | MH06A         | MH06            | 02/11/2021 | SCHWABISH GMUND WAY           | Vitrified clay | 0.60 m       | 0.60 m           |
| 6        | MH08          | MH06            | 02/11/2021 | SCHWABISH GMUND WAY           | Vitrified clay | 32.48 m      | 32.48 m          |
| 8        | MH10          | MH01            | 02/11/2021 | LAND OFF HARBOROUGH HILL ROAD | Vitrified clay | 13.06 m      | 13.06 m          |

**Total: 5 Inspections x Circular 150 mm = 91.99 m Total Length and 91.99 m Inspected Length**

### Circular, 225 mm

| Item No. | Upstream Node | Downstream Node | Date       | Road         | Material       | Total Length | Inspected Length |
|----------|---------------|-----------------|------------|--------------|----------------|--------------|------------------|
| 2        | MH03          | MH04            | 02/11/2021 | MOTTRAM ROAD | Vitrified clay | 12.42 m      | 12.42 m          |
| 3        | MH05          | MH04            | 02/11/2021 | MOTTRAM ROAD | Vitrified clay | 21.11 m      | 21.11 m          |

**Total: 2 Inspections x Circular 225 mm = 33.52 m Total Length and 33.52 m Inspected Length**

**Total: 7 Inspections = 125.51 m Total Length and 125.51 m Inspected Length**

## Section Summary

|                                                  |                                |                                   |
|--------------------------------------------------|--------------------------------|-----------------------------------|
| <b>Project Name</b><br>14429 SURVEY OPS BARNSELY | <b>Project Number</b><br>14429 | <b>Project Date</b><br>02/11/2021 |
|--------------------------------------------------|--------------------------------|-----------------------------------|

|                                            |          |
|--------------------------------------------|----------|
| Number of sections                         | 13       |
| Total length of sections                   | 309.46 m |
| Total length of inspected sections         | 319.29 m |
| Total length of abandoned inspections      | -9.83 m  |
| Number of abandoned inspections            | 7        |
| Number of section inspection photos        | 28       |
| Number of section inspection videos        | 14       |
| Number of section inspection scans         | 0        |
| Number of section inclination measurements | 0        |

|                              |         |                         |                |
|------------------------------|---------|-------------------------|----------------|
| <b>PLR:</b>                  | MH01X   | <b>Upstream Node:</b>   | MH01           |
| <b>Inspection Direction:</b> | 2       | <b>Downstream Node:</b> | MH02           |
| <b>Inspected Length:</b>     | 28.05 m | <b>Dia/Height:</b>      | 150 mm         |
| <b>Total Length:</b>         | 28.05 m | <b>Material:</b>        | Vitrified clay |

| No. | m+    | Code | Observation                                                               |
|-----|-------|------|---------------------------------------------------------------------------|
| 1   | 0.00  | MH   | Start node, manhole, reference: MH02                                      |
| 2   | 0.00  | WL   | Water level, 5% of the vertical dimension                                 |
| 3   | 0.02  | ING  | Ingress of soil from 3 o'clock to 4 o'clock, 5% cross-sectional area loss |
| 4   | 0.02  | ING  | Ingress of soil from 7 o'clock to 9 o'clock, 5% cross-sectional area loss |
| 5   | 9.91  | LR   | Line deviates right                                                       |
| 6   | 18.83 | DEX  | Settled deposits, other, 5% cross-sectional area loss                     |
| 7   | 25.61 | RFJ  | Roots, fine at joint                                                      |
| 8   | 26.60 | RFJ  | Roots, fine at joint                                                      |
| 9   | 28.05 | MHF  | Finish node, manhole, reference: MH01                                     |

|                              |         |                         |                |
|------------------------------|---------|-------------------------|----------------|
| <b>PLR:</b>                  | MH03X   | <b>Upstream Node:</b>   | MH03           |
| <b>Inspection Direction:</b> | 2       | <b>Downstream Node:</b> | MH04           |
| <b>Inspected Length:</b>     | 12.42 m | <b>Dia/Height:</b>      | 225 mm         |
| <b>Total Length:</b>         | 12.42 m | <b>Material:</b>        | Vitrified clay |

| No. | m+    | Code | Observation                               |
|-----|-------|------|-------------------------------------------|
| 1   | 0.00  | MH   | Start node, manhole, reference: MH04      |
| 2   | 0.00  | WL   | Water level, 5% of the vertical dimension |
| 3   | 6.50  | RFJ  | Roots, fine at joint                      |
| 4   | 8.26  | RFJ  | Roots, fine at joint                      |
| 5   | 10.88 | RFJ  | Roots, fine at joint                      |
| 6   | 12.42 | MHF  | Finish node, manhole, reference: MH03     |

## Section Summary

|                                                  |                                |                                   |
|--------------------------------------------------|--------------------------------|-----------------------------------|
| <b>Project Name</b><br>14429 SURVEY OPS BARNSELY | <b>Project Number</b><br>14429 | <b>Project Date</b><br>02/11/2021 |
|--------------------------------------------------|--------------------------------|-----------------------------------|

|                              |         |                         |                |
|------------------------------|---------|-------------------------|----------------|
| <b>PLR:</b>                  | MH05X   | <b>Upstream Node:</b>   | MH05           |
| <b>Inspection Direction:</b> | 2       | <b>Downstream Node:</b> | MH04           |
| <b>Inspected Length:</b>     | 21.11 m | <b>Dia/Height:</b>      | 225 mm         |
| <b>Total Length:</b>         | 21.11 m | <b>Material:</b>        | Vitrified clay |

| No. | m+    | Code | Observation                                                  |
|-----|-------|------|--------------------------------------------------------------|
| 1   | 0.00  | MH   | Start node, manhole, reference: MH04                         |
| 2   | 0.00  | WL   | Water level, 5% of the vertical dimension                    |
| 3   | 0.70  | DES  | Settled deposits, fine, 5% cross-sectional area loss, start  |
| 4   | 14.68 | DES  | Settled deposits, fine, 5% cross-sectional area loss, finish |
| 5   | 14.68 | LR   | Line deviates right                                          |
| 6   | 19.83 | RFJ  | Roots, fine at joint                                         |
| 7   | 20.51 | DES  | Settled deposits, fine, 5% cross-sectional area loss         |
| 8   | 21.11 | MHF  | Finish node, manhole, reference: MH05                        |

|                              |         |                         |                |
|------------------------------|---------|-------------------------|----------------|
| <b>PLR:</b>                  | MH06X   | <b>Upstream Node:</b>   | MH06           |
| <b>Inspection Direction:</b> | 1       | <b>Downstream Node:</b> | MH07           |
| <b>Inspected Length:</b>     | 17.80 m | <b>Dia/Height:</b>      | 150 mm         |
| <b>Total Length:</b>         | 17.80 m | <b>Material:</b>        | Vitrified clay |

| No. | m+    | Code | Observation                                            |
|-----|-------|------|--------------------------------------------------------|
| 1   | 0.00  | MH   | Start node, manhole, reference: MH06                   |
| 2   | 0.00  | WL   | Water level, 5% of the vertical dimension              |
| 3   | 0.58  | JN   | Junction at 2 o'clock, 100mm dia                       |
| 4   | 0.60  | DER  | Settled deposits, coarse, 5% cross-sectional area loss |
| 5   | 7.77  | FM   | Fractures, multiple from 12 o'clock to 12 o'clock      |
| 6   | 8.09  | JN   | Junction at 11 o'clock, 100mm dia                      |
| 7   | 17.80 | MHF  | Finish node, manhole, reference: MH07                  |

|                              |        |                         |                |
|------------------------------|--------|-------------------------|----------------|
| <b>PLR:</b>                  | MH06AX | <b>Upstream Node:</b>   | MH06A          |
| <b>Inspection Direction:</b> | 2      | <b>Downstream Node:</b> | MH06           |
| <b>Inspected Length:</b>     | 0.60 m | <b>Dia/Height:</b>      | 150 mm         |
| <b>Total Length:</b>         | 0.60 m | <b>Material:</b>        | Vitrified clay |

| No. | m+   | Code | Observation                                          |
|-----|------|------|------------------------------------------------------|
| 1   | 0.00 | MH   | Start node, manhole, reference: MH06                 |
| 2   | 0.00 | WL   | Water level, 5% of the vertical dimension            |
| 3   | 0.60 | OCF  | Finish node, other special chamber, reference: MH06A |

|                              |         |                         |                |
|------------------------------|---------|-------------------------|----------------|
| <b>PLR:</b>                  | MH08X   | <b>Upstream Node:</b>   | MH08           |
| <b>Inspection Direction:</b> | 2       | <b>Downstream Node:</b> | MH06           |
| <b>Inspected Length:</b>     | 32.48 m | <b>Dia/Height:</b>      | 150 mm         |
| <b>Total Length:</b>         | 32.48 m | <b>Material:</b>        | Vitrified clay |

| No. | m+    | Code | Observation                                                                                |
|-----|-------|------|--------------------------------------------------------------------------------------------|
| 1   | 0.00  | MH   | Start node, manhole, reference: MH06                                                       |
| 2   | 0.00  | WL   | Water level, 5% of the vertical dimension                                                  |
| 3   | 31.90 | DEE  | Attached deposits, encrustation from 5 o'clock to 7 o'clock, 10% cross-sectional area loss |
| 4   | 32.48 | MHF  | Finish node, manhole, reference: MH08                                                      |

## Section Summary

|                                                  |                                |                                   |
|--------------------------------------------------|--------------------------------|-----------------------------------|
| <b>Project Name</b><br>14429 SURVEY OPS BARNSELY | <b>Project Number</b><br>14429 | <b>Project Date</b><br>02/11/2021 |
|--------------------------------------------------|--------------------------------|-----------------------------------|

|                              |         |                         |                |
|------------------------------|---------|-------------------------|----------------|
| <b>PLR:</b>                  | MH09X   | <b>Upstream Node:</b>   | MH09           |
| <b>Inspection Direction:</b> | 2       | <b>Downstream Node:</b> | MH05           |
| <b>Inspected Length:</b>     | 27.82 m | <b>Dia/Height:</b>      | 225 mm         |
| <b>Total Length:</b>         | 27.82 m | <b>Material:</b>        | Vitrified clay |

| No. | m+    | Code | Observation                                        |
|-----|-------|------|----------------------------------------------------|
| 1   | 0.00  | MH   | Start node, manhole, reference: MH05               |
| 2   | 0.00  | WL   | Water level, 5% of the vertical dimension          |
| 3   | 0.70  | REM  | General remark                                     |
| 4   | 1.41  | JN   | Junction at 6 o'clock, 225mm dia                   |
| 5   | 2.35  | SC   | Pipe size changes, new size(s), 150mm high         |
| 6   | 2.57  | RFJ  | Roots, fine at joint                               |
| 7   | 3.73  | RFJ  | Roots, fine at joint                               |
| 8   | 6.78  | RFJ  | Roots, fine at joint                               |
| 9   | 12.96 | FM   | Fractures, multiple from 3 o'clock to 9 o'clock    |
| 10  | 13.23 | H    | Hole in drain or sewer from 7 o'clock to 9 o'clock |
| 11  | 13.23 | LL   | Line deviates left                                 |
| 12  | 16.81 | RFJ  | Roots, fine at joint                               |
| 13  | 18.25 | JN   | Junction at 3 o'clock, 100mm dia                   |
| 14  | 18.58 | RFJ  | Roots, fine at joint                               |
| 15  | 21.57 | RFJ  | Roots, fine at joint                               |
| 16  | 25.06 | RFJ  | Roots, fine at joint                               |
| 17  | 27.82 | REM  | General remark                                     |
| 18  | 27.82 | SA   | Survey abandoned                                   |

|                              |         |                         |                |
|------------------------------|---------|-------------------------|----------------|
| <b>PLR:</b>                  | MH10X   | <b>Upstream Node:</b>   | MH10           |
| <b>Inspection Direction:</b> | 2       | <b>Downstream Node:</b> | MH01           |
| <b>Inspected Length:</b>     | 13.06 m | <b>Dia/Height:</b>      | 150 mm         |
| <b>Total Length:</b>         | 13.06 m | <b>Material:</b>        | Vitrified clay |

| No. | m+    | Code | Observation                               |
|-----|-------|------|-------------------------------------------|
| 1   | 0.00  | MH   | Start node, manhole, reference: MH01      |
| 2   | 0.00  | WL   | Water level, 5% of the vertical dimension |
| 3   | 0.60  | JN   | Junction at 6 o'clock, 150mm dia          |
| 4   | 0.60  | RFJ  | Roots, fine at joint                      |
| 5   | 2.80  | LL   | Line deviates left                        |
| 6   | 3.43  | RFJ  | Roots, fine at joint                      |
| 7   | 13.06 | MHF  | Finish node, manhole, reference: MH10     |

|                              |         |                         |                |
|------------------------------|---------|-------------------------|----------------|
| <b>PLR:</b>                  | MH12X   | <b>Upstream Node:</b>   | MH12           |
| <b>Inspection Direction:</b> | 2       | <b>Downstream Node:</b> | MH11           |
| <b>Inspected Length:</b>     | 48.28 m | <b>Dia/Height:</b>      | 225 mm         |
| <b>Total Length:</b>         | 48.28 m | <b>Material:</b>        | Vitrified clay |

| No. | m+    | Code | Observation                               |
|-----|-------|------|-------------------------------------------|
| 1   | 0.00  | MH   | Start node, manhole, reference: MH11      |
| 2   | 0.00  | WL   | Water level, 5% of the vertical dimension |
| 3   | 3.50  | RFJ  | Roots, fine at joint                      |
| 4   | 17.42 | JN   | Junction at 9 o'clock, 100mm dia          |

## Section Summary

|                                                   |                                |                                   |
|---------------------------------------------------|--------------------------------|-----------------------------------|
| <b>Project Name</b><br>14429 SURVEY OPS BARNSELEY | <b>Project Number</b><br>14429 | <b>Project Date</b><br>02/11/2021 |
|---------------------------------------------------|--------------------------------|-----------------------------------|

| No. | m+    | Code | Observation                                             |
|-----|-------|------|---------------------------------------------------------|
| 5   | 17.42 | DES  | Settled deposits, fine, 5% cross-sectional area loss    |
| 6   | 33.04 | JN   | Junction at 9 o'clock, 100mm dia                        |
| 7   | 33.04 | FC   | Fracture, circumferential from 4 o'clock to 8 o'clock   |
| 8   | 39.59 | JN   | Junction at 2 o'clock, 100mm dia                        |
| 9   | 44.33 | H    | Hole in drain or sewer at 10 o'clock                    |
| 10  | 45.48 | DER  | Settled deposits, coarse, 10% cross-sectional area loss |
| 11  | 45.48 | RF   | Roots, fine                                             |
| 12  | 48.28 | B    | Broken pipe from 1 o'clock to 6 o'clock                 |
| 13  | 48.28 | SA   | Survey abandoned                                        |

|                              |         |                         |                |
|------------------------------|---------|-------------------------|----------------|
| <b>PLR:</b>                  | MH13X   | <b>Upstream Node:</b>   | MH13           |
| <b>Inspection Direction:</b> | 2       | <b>Downstream Node:</b> | MH11           |
| <b>Inspected Length:</b>     | 9.83 m  | <b>Dia/Height:</b>      | 225 mm         |
| <b>Total Length:</b>         | 41.60 m | <b>Material:</b>        | Vitrified clay |

| No. | m+   | Code | Observation                                                                                |
|-----|------|------|--------------------------------------------------------------------------------------------|
| 1   | 0.00 | MH   | Start node, manhole, reference: MH11                                                       |
| 2   | 0.00 | WL   | Water level, 5% of the vertical dimension                                                  |
| 3   | 1.22 | CXI  | Connection defective, connecting pipe is intruding at 1 o'clock, 100mm dia, intrusion: 10% |
| 4   | 4.55 | RFJ  | Roots, fine at joint                                                                       |
| 5   | 6.12 | RFJ  | Roots, fine at joint, start                                                                |
| 6   | 9.83 | RFJ  | Roots, fine at joint, finish                                                               |
| 7   | 9.83 | RMJ  | Roots, mass at joint, 10% cross-sectional area loss                                        |
| 8   | 9.83 | SA   | Survey abandoned                                                                           |

|                              |         |                         |                |
|------------------------------|---------|-------------------------|----------------|
| <b>PLR:</b>                  | MH13X   | <b>Upstream Node:</b>   | MH13           |
| <b>Inspection Direction:</b> | 1       | <b>Downstream Node:</b> | MH11           |
| <b>Inspected Length:</b>     | 41.60 m | <b>Dia/Height:</b>      | 225 mm         |
| <b>Total Length:</b>         | 41.60 m | <b>Material:</b>        | Vitrified clay |

| No. | m+    | Code | Observation                                                                                 |
|-----|-------|------|---------------------------------------------------------------------------------------------|
| 1   | 0.00  | MH   | Start node, manhole, reference: MH13                                                        |
| 2   | 0.00  | WL   | Water level, 5% of the vertical dimension                                                   |
| 3   | 17.65 | JN   | Junction at 3 o'clock, 100mm dia                                                            |
| 4   | 22.75 | RFJ  | Roots, fine at joint                                                                        |
| 5   | 32.81 | JN   | Junction at 9 o'clock, 100mm dia                                                            |
| 6   | 32.81 | SC   | Pipe size changes, new size(s), 225mm high                                                  |
| 7   | 34.81 | JN   | Junction at 3 o'clock, 100mm dia                                                            |
| 8   | 34.81 | RFJ  | Roots, fine at joint                                                                        |
| 9   | 38.06 | RFJ  | Roots, fine at joint                                                                        |
| 10  | 41.34 | WL   | Water level, 30% of the vertical dimension                                                  |
| 11  | 41.34 | DER  | Settled deposits, coarse, 20% cross-sectional area loss                                     |
| 12  | 41.34 | RMJ  | Roots, mass at joint, 20% cross-sectional area loss                                         |
| 13  | 41.34 | CXI  | Connection defective, connecting pipe is intruding at 10 o'clock, 100mm dia, intrusion: 10% |
| 14  | 41.60 | SA   | Survey abandoned                                                                            |

## Section Summary

|                                                  |                                |                                   |
|--------------------------------------------------|--------------------------------|-----------------------------------|
| <b>Project Name</b><br>14429 SURVEY OPS BARNSELY | <b>Project Number</b><br>14429 | <b>Project Date</b><br>02/11/2021 |
|--------------------------------------------------|--------------------------------|-----------------------------------|

|                              |         |                         |                |
|------------------------------|---------|-------------------------|----------------|
| <b>PLR:</b>                  | MH11X   | <b>Upstream Node:</b>   | MH11           |
| <b>Inspection Direction:</b> | 1       | <b>Downstream Node:</b> | MH03           |
| <b>Inspected Length:</b>     | 23.60 m | <b>Dia/Height:</b>      | 225 mm         |
| <b>Total Length:</b>         | 23.60 m | <b>Material:</b>        | Vitrified clay |

| No. | m+    | Code | Observation                                         |
|-----|-------|------|-----------------------------------------------------|
| 1   | 0.00  | MH   | Start node, manhole, reference: MH11                |
| 2   | 0.00  | WL   | Water level, 5% of the vertical dimension           |
| 3   | 8.98  | JN   | Junction at 3 o'clock, 100mm dia                    |
| 4   | 16.99 | RFJ  | Roots, fine at joint                                |
| 5   | 23.20 | WL   | Water level, 20% of the vertical dimension          |
| 6   | 23.20 | RMJ  | Roots, mass at joint, 20% cross-sectional area loss |
| 7   | 23.60 | SA   | Survey abandoned                                    |

|                              |         |                         |                |
|------------------------------|---------|-------------------------|----------------|
| <b>PLR:</b>                  | MH13AX  | <b>Upstream Node:</b>   | MH13A          |
| <b>Inspection Direction:</b> | 2       | <b>Downstream Node:</b> | MH13           |
| <b>Inspected Length:</b>     | 15.11 m | <b>Dia/Height:</b>      | 150 mm         |
| <b>Total Length:</b>         | 15.11 m | <b>Material:</b>        | Vitrified clay |

| No. | m+    | Code | Observation                                                                                |
|-----|-------|------|--------------------------------------------------------------------------------------------|
| 1   | 0.00  | MH   | Start node, manhole, reference: MH13                                                       |
| 2   | 0.00  | WL   | Water level, 5% of the vertical dimension                                                  |
| 3   | 2.69  | LR   | Line deviates right                                                                        |
| 4   | 4.49  | DES  | Settled deposits, fine, 30% cross-sectional area loss                                      |
| 5   | 6.09  | JN   | Junction at 9 o'clock, 100mm dia                                                           |
| 6   | 6.09  | DER  | Settled deposits, coarse, 20% cross-sectional area loss                                    |
| 7   | 11.47 | DES  | Settled deposits, fine, 10% cross-sectional area loss                                      |
| 8   | 15.11 | DEE  | Attached deposits, encrustation from 5 o'clock to 7 o'clock, 10% cross-sectional area loss |
| 9   | 15.11 | SA   | Survey abandoned                                                                           |

|                              |         |                         |                |
|------------------------------|---------|-------------------------|----------------|
| <b>PLR:</b>                  | MH13BX  | <b>Upstream Node:</b>   | MH13B          |
| <b>Inspection Direction:</b> | 2       | <b>Downstream Node:</b> | MH13           |
| <b>Inspected Length:</b>     | 27.54 m | <b>Dia/Height:</b>      | 150 mm         |
| <b>Total Length:</b>         | 27.53 m | <b>Material:</b>        | Vitrified clay |

| No. | m+    | Code | Observation                                                  |
|-----|-------|------|--------------------------------------------------------------|
| 1   | 0.00  | MH   | Start node, manhole, reference: MH13                         |
| 2   | 0.00  | WL   | Water level, 5% of the vertical dimension                    |
| 3   | 3.31  | DER  | Settled deposits, coarse, 10% cross-sectional area loss      |
| 4   | 7.82  | JN   | Junction at 3 o'clock, 100mm dia                             |
| 5   | 10.53 | RFJ  | Roots, fine at joint                                         |
| 6   | 10.53 | CN   | Connection other than junction at 10 o'clock, 100mm dia      |
| 7   | 13.21 | JN   | Junction at 3 o'clock, 100mm dia                             |
| 8   | 13.21 | RF   | Roots, fine                                                  |
| 9   | 19.94 | JN   | Junction at 3 o'clock, 100mm dia                             |
| 10  | 19.94 | RF   | Roots, fine                                                  |
| 11  | 23.06 | DES  | Settled deposits, fine, 10% cross-sectional area loss, start |
| 12  | 23.06 | RF   | Roots, fine                                                  |
| 13  | 26.74 | JN   | Junction at 3 o'clock, 150mm dia                             |



## Section Summary

|                                                  |                                |                                   |
|--------------------------------------------------|--------------------------------|-----------------------------------|
| <b>Project Name</b><br>14429 SURVEY OPS BARNSELY | <b>Project Number</b><br>14429 | <b>Project Date</b><br>02/11/2021 |
|--------------------------------------------------|--------------------------------|-----------------------------------|

| No. | m+    | Code | Observation                                                   |
|-----|-------|------|---------------------------------------------------------------|
| 14  | 27.29 | DES  | Settled deposits, fine, 10% cross-sectional area loss, finish |
| 15  | 27.53 | SA   | Survey abandoned                                              |

## Project Summary

|                                                 |                                |                                   |
|-------------------------------------------------|--------------------------------|-----------------------------------|
| <b>Project Name</b><br>14429 SURVEY OPS BARNLEY | <b>Project Number</b><br>14429 | <b>Project Date</b><br>02/11/2021 |
|-------------------------------------------------|--------------------------------|-----------------------------------|

## Pipe Summary

| No.           | Type | PLR    | Upstream Node | Downstream Node | Road                             | Town    | Use | Mat. | Profile        | Length          |
|---------------|------|--------|---------------|-----------------|----------------------------------|---------|-----|------|----------------|-----------------|
| 1             | SEC  | MH01X  | MH01          | MH02            | Mottram Road                     | Barnley | F   | VC   | Circular 150mm | 28.05 m         |
| 2             | SEC  | MH03X  | MH03          | MH04            | Mottram Road                     | Barnley | S   | VC   | Circular 225mm | 12.42 m         |
| 3             | SEC  | MH05X  | MH05          | MH04            | Mottram Road                     | Barnley | S   | VC   | Circular 225mm | 21.11 m         |
| 4             | SEC  | MH06X  | MH06          | MH07            | Schwabish Gmund Way              | Barnley | S   | VC   | Circular 150mm | 17.80 m         |
| 5             | SEC  | MH06AX | MH06A         | MH06            | Schwabish Gmund Way              | Barnley | S   | VC   | Circular 150mm | 0.60 m          |
| 6             | SEC  | MH08X  | MH08          | MH06            | Schwabish Gmund Way              | Barnley | S   | VC   | Circular 150mm | 32.48 m         |
| 7             | SEC  | MH09X  | MH09          | MH05            | Land Off<br>Harborough Hill Road | Barnley | S   | VC   | Circular 225mm | 27.82 m         |
| 8             | SEC  | MH10X  | MH10          | MH01            | Land Off<br>Harborough Hill Road | Barnley | F   | VC   | Circular 150mm | 13.06 m         |
| 9             | SEC  | MH12X  | MH12          | MH11            | Land Off<br>Harborough Hill Road | Barnley | F   | VC   | Circular 225mm | 48.28 m         |
| 10            | SEC  | MH13X  | MH13          | MH11            | Land Off<br>Harborough Hill Road | Barnley | F   | VC   | Circular 225mm | 41.60 m         |
| 11            | SEC  | MH11X  | MH11          | MH03            | Land Off<br>Harborough Hill Road | Barnley | S   | VC   | Circular 225mm | 23.60 m         |
| 12            | SEC  | MH13AX | MH13A         | MH13            | Land Off<br>Harborough Hill Road | Barnley | S   | VC   | Circular 150mm | 15.11 m         |
| 13            | SEC  | MH13BX | MH13B         | MH13            | Land Off<br>Harborough Hill Road | Barnley | S   | VC   | Circular 150mm | 27.53 m         |
| <b>Total:</b> |      |        |               |                 |                                  |         |     |      |                | <b>309.46 m</b> |

## Project Summary

|                                                  |                                |                                   |
|--------------------------------------------------|--------------------------------|-----------------------------------|
| <b>Project Name</b><br>14429 SURVEY OPS BARNSELY | <b>Project Number</b><br>14429 | <b>Project Date</b><br>02/11/2021 |
|--------------------------------------------------|--------------------------------|-----------------------------------|

## Pipe Levels

| No. | PLR    | Upstream Node | Upstream C.L. | Upstream I.L. | Upstream I.D. | Downstream Node | Downstream C.L. | Downstream I.L. | Downstream I.D. |
|-----|--------|---------------|---------------|---------------|---------------|-----------------|-----------------|-----------------|-----------------|
| 1   | MH01X  | MH01          |               |               | 0.000 m       | MH02            |                 |                 | 2.000 m         |
| 2   | MH03X  | MH03          |               |               | 0.000 m       | MH04            |                 |                 | 0.000 m         |
| 3   | MH05X  | MH05          |               |               | 0.000 m       | MH04            |                 |                 | 1.500 m         |
| 4   | MH06X  | MH06          |               |               | 1.350 m       | MH07            |                 |                 | 2.300 m         |
| 5   | MH06AX | MH06A         |               |               | 0.000 m       | MH06            |                 |                 | 1.350 m         |
| 6   | MH08X  | MH08          |               |               | 0.000 m       | MH06            |                 |                 | 1.350 m         |
| 7   | MH09X  | MH09          |               |               | 0.000 m       | MH05            |                 |                 | 4.800 m         |
| 8   | MH10X  | MH10          |               |               | 0.000 m       | MH01            |                 |                 | 5.300 m         |
| 9   | MH12X  | MH12          |               |               | 0.000 m       | MH11            |                 |                 | 0.000 m         |
| 10  | MH13X  | MH13          |               |               | 0.000 m       | MH11            |                 |                 | 0.800 m         |
| 11  | MH11X  | MH11          |               |               | 0.800 m       | MH03            |                 |                 | 3.600 m         |
| 12  | MH13AX | MH13A         |               |               | 0.000 m       | MH13            |                 |                 | 0.000 m         |
| 13  | MH13BX | MH13B         |               |               | 0.000 m       | MH13            |                 |                 | 0.000 m         |

## Pipe Summary by Profile

| Profile          | Total Length | No. Pipes |
|------------------|--------------|-----------|
| Circular 150mm   | 28.05 m      |           |
| Circular 150mm   | 17.80 m      |           |
| Circular 150mm   | 0.60 m       |           |
| Circular 150mm   | 32.48 m      |           |
| Circular 150mm   | 13.06 m      |           |
| Circular 150mm   | 15.11 m      |           |
| Circular 150mm   | 27.53 m      |           |
| Circular 150mm = | 134.63 m     | 7         |
| Circular 225mm   | 12.42 m      |           |
| Circular 225mm   | 21.11 m      |           |
| Circular 225mm   | 27.82 m      |           |
| Circular 225mm   | 48.28 m      |           |
| Circular 225mm   | 41.60 m      |           |
| Circular 225mm   | 23.60 m      |           |
| Circular 225mm = | 174.82 m     | 6         |

## Project Summary

|                                                 |                                |                                   |
|-------------------------------------------------|--------------------------------|-----------------------------------|
| <b>Project Name</b><br>14429 SURVEY OPS BARNLEY | <b>Project Number</b><br>14429 | <b>Project Date</b><br>02/11/2021 |
|-------------------------------------------------|--------------------------------|-----------------------------------|

|                |                     |                  |
|----------------|---------------------|------------------|
| <b>Profile</b> | <b>Total Length</b> | <b>No. Pipes</b> |
| <b>Total</b> = | <b>309.46 m</b>     | <b>13</b>        |

## Inspection Summary

| Pipe No.      | Insp. No. | Upstream Node | Downstream Node | Dir. | Operator | Insp. Date | Insp. Time | Str | Ser | Final Observation        | Length          |
|---------------|-----------|---------------|-----------------|------|----------|------------|------------|-----|-----|--------------------------|-----------------|
| 1             | 1         | MH01          | MH02            | US   | Pk       | 02/11/2021 | 8:12       | 1   | 4   | MHF                      | 28.05 m         |
| 2             | 1         | MH03          | MH04            | US   | Pk       | 02/11/2021 | 8:32       | 1   | 2   | MHF, NO COVER ON MANHOLE | 12.42 m         |
| 3             | 1         | MH05          | MH04            | US   | Pk       | 02/11/2021 | 8:40       | 1   | 3   | MHF                      | 21.11 m         |
| 4             | 1         | MH06          | MH07            | DS   | Pk       | 02/11/2021 | 9:31       | 4   | 3   | MHF                      | 17.80 m         |
| 5             | 1         | MH06A         | MH06            | US   | Pk       | 02/11/2021 | 9:38       | 1   | 1   | OCF, CAPPED              | 0.60 m          |
| 6             | 1         | MH08          | MH06            | US   | Pk       | 02/11/2021 | 9:39       | 1   | 3   | MHF, FILLED WITH DEBRIS  | 32.48 m         |
| 7             | 1         | MH09          | MH05            | US   | Pk       | 02/11/2021 | 10:11      | 4   | 5   | SA, HARD TO PUSH RODS    | 27.82 m         |
| 8             | 1         | MH10          | MH01            | US   | Pk       | 02/11/2021 | 10:31      | 1   | 2   | MHF                      | 13.06 m         |
| 9             | 1         | MH12          | MH11            | US   | Pk       | 02/11/2021 | 11:55      | 4   | 3   | SA, DUE TO DER           | 48.28 m         |
| 10            | 1         | MH13          | MH11            | US   | Pk       | 02/11/2021 | 12:05      | 1   | 5   | SA, DUE TO RMJ           | 9.83 m          |
| 10            | 2         | MH13          | MH11            | DS   | Pk       | 02/11/2021 | 12:50      | 1   | 5   | SA, DUE TO DER RM        | 41.60 m         |
| 11            | 1         | MH11          | MH03            | DS   | Pk       | 02/11/2021 | 12:12      | 1   | 5   | SA, DUE TO RMJ           | 23.60 m         |
| 12            | 1         | MH13A         | MH13            | US   | Pk       | 02/11/2021 | 13:02      | 1   | 4   | SA, DUE TO DEE           | 15.11 m         |
| 13            | 1         | MH13B         | MH13            | US   | Pk       | 02/11/2021 | 13:13      | 1   | 3   | SA, DUE TO DES           | 27.54 m         |
| <b>Total:</b> |           |               |                 |      |          |            |            |     |     |                          | <b>319.29 m</b> |

## Inspection Summary by Profile

| Profile          | Total Length | No. Inspections |
|------------------|--------------|-----------------|
| Circular 150mm   | 28.05 m      |                 |
| Circular 150mm   | 17.80 m      |                 |
| Circular 150mm   | 0.60 m       |                 |
| Circular 150mm   | 32.48 m      |                 |
| Circular 150mm   | 13.06 m      |                 |
| Circular 150mm   | 15.11 m      |                 |
| Circular 150mm   | 27.54 m      |                 |
| Circular 150mm = | 134.64 m     | 7               |

## Project Summary

|                                                 |                                |                                   |
|-------------------------------------------------|--------------------------------|-----------------------------------|
| <b>Project Name</b><br>14429 SURVEY OPS BARNLEY | <b>Project Number</b><br>14429 | <b>Project Date</b><br>02/11/2021 |
|-------------------------------------------------|--------------------------------|-----------------------------------|

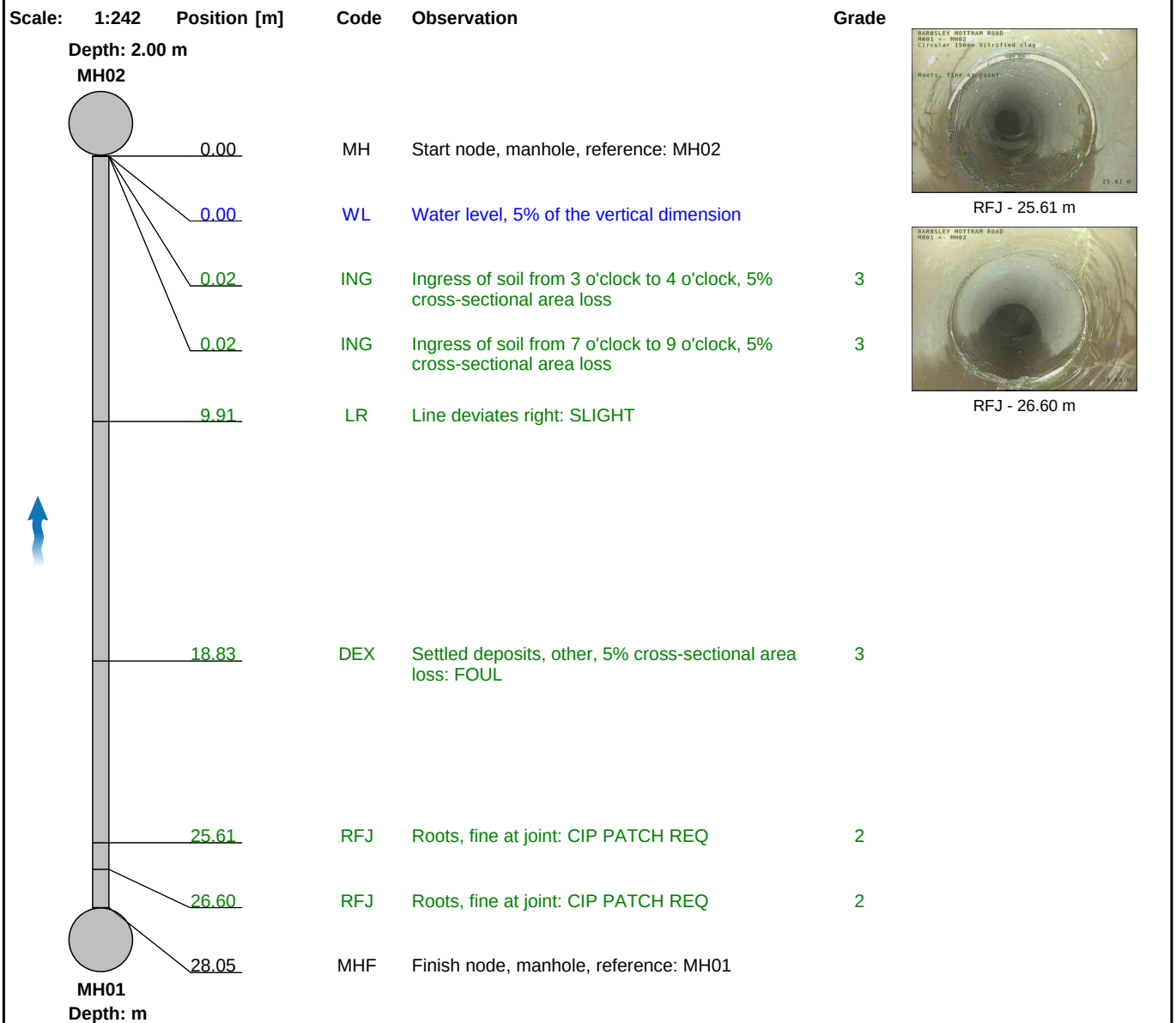
| Profile          | Total Length    | No. Inspections |
|------------------|-----------------|-----------------|
| Circular 225mm   | 12.42 m         |                 |
| Circular 225mm   | 21.11 m         |                 |
| Circular 225mm   | 27.82 m         |                 |
| Circular 225mm   | 48.28 m         |                 |
| Circular 225mm   | 9.83 m          |                 |
| Circular 225mm   | 41.60 m         |                 |
| Circular 225mm   | 23.60 m         |                 |
| Circular 225mm = | 184.66 m        | 7               |
| <b>Total =</b>   | <b>319.29 m</b> | <b>14</b>       |

| Defect Summary |           |               |                 | CCTV Drainage Survey Observation Count |                    |                  |                    |                      |           |        |          |           |       |                |                  |                   |       |              |              |      |        |             |             |               |
|----------------|-----------|---------------|-----------------|----------------------------------------|--------------------|------------------|--------------------|----------------------|-----------|--------|----------|-----------|-------|----------------|------------------|-------------------|-------|--------------|--------------|------|--------|-------------|-------------|---------------|
|                |           |               |                 | General                                |                    |                  |                    | Structural Condition |           |        |          |           |       |                |                  | Service Condition |       |              |              |      |        |             |             |               |
| Sect. No.      | Insp. No. | Upstream Node | Downstream Node | Insp. Length (m)                       | No. Grade 4/5 Obs. | Survey Abandoned | Camera Under Water | Cracks               | Fractures | Broken | Deformed | Collapsed | Holes | Surface Damage | Displaced Joints | Open Joints       | Roots | Infiltration | Encrustation | Silt | Grease | Obstruction | Water Level | Line Deviates |
| 1              | 1         | MH01          | MH02            | 28.0                                   |                    |                  |                    |                      |           |        |          |           |       |                |                  |                   | 2     |              |              |      |        |             | 1           | 1             |
| 2              | 1         | MH03          | MH04            | 12.4                                   |                    |                  |                    |                      |           |        |          |           |       |                |                  |                   | 3     |              |              |      |        |             | 1           |               |
| 3              | 1         | MH05          | MH04            | 21.1                                   |                    |                  |                    |                      |           |        |          |           |       |                |                  |                   | 1     |              |              | 3    |        |             | 1           | 1             |
| 4              | 1         | MH06          | MH07            | 17.8                                   | 1                  |                  |                    |                      | 1         |        |          |           |       |                |                  |                   |       |              |              |      |        |             | 1           |               |
| 5              | 1         | MH06A         | MH06            | 0.6                                    |                    |                  |                    |                      |           |        |          |           |       |                |                  |                   |       |              |              |      |        |             | 1           |               |
| 6              | 1         | MH08          | MH06            | 32.5                                   |                    |                  |                    |                      |           |        |          |           |       |                |                  |                   |       |              | 1            |      |        |             | 1           |               |
| 7              | 1         | MH09          | MH05            | 27.8                                   | 2                  | 1                |                    |                      | 1         |        |          |           | 1     |                |                  |                   | 7     |              |              |      |        |             | 1           | 1             |
| 8              | 1         | MH10          | MH01            | 13.1                                   |                    |                  |                    |                      |           |        |          |           |       |                |                  |                   | 2     |              |              |      |        |             | 1           | 1             |
| 9              | 1         | MH12          | MH11            | 48.3                                   | 2                  | 1                |                    |                      | 1         | 1      |          |           | 1     |                |                  |                   | 2     |              |              | 1    |        |             | 1           |               |
| 10             | 1         | MH13          | MH11            | 9.8                                    |                    | 1                |                    |                      |           |        |          |           |       |                |                  |                   | 4     |              |              |      |        |             | 1           |               |
| 10             | 2         | MH13          | MH11            | 41.6                                   | 1                  | 1                |                    |                      |           |        |          |           |       |                |                  |                   | 4     |              |              |      |        |             | 2           |               |
| 11             | 1         | MH11          | MH03            | 23.6                                   | 1                  | 1                |                    |                      |           |        |          |           |       |                |                  |                   | 2     |              |              |      |        |             | 2           |               |
| 12             | 1         | MH13A         | MH13            | 15.1                                   | 1                  | 1                |                    |                      |           |        |          |           |       |                |                  |                   |       |              | 1            | 2    |        |             | 1           | 1             |
| 13             | 1         | MH13B         | MH13            | 27.5                                   |                    | 1                |                    |                      |           |        |          |           |       |                |                  |                   | 4     |              |              | 2    |        |             | 1           |               |
| Total:         |           |               |                 | 319.3                                  | 8                  | 7                |                    |                      | 3         | 1      |          |           | 2     |                |                  |                   | 31    |              | 2            | 8    |        |             | 16          | 5             |

## Completed section inspection - 02/11/2021 - MH01X

| Item No. | Insp. No. | Date     | Time | Client's Job Ref | Weather         | Pre Cleaned  | PLR            |
|----------|-----------|----------|------|------------------|-----------------|--------------|----------------|
| 1        | 1         | 02/11/21 | 8:12 | SURVEY OPS       | No Rain Or Snow | No           | MH01X          |
| Operator |           | Vehicle  |      | Camera           | Preset Length   | Legal Status | Alternative ID |
| PK       |           | SC15NYG  |      | Ipek Ex          | 0.60 m          | Public Sewer | Not Specified  |

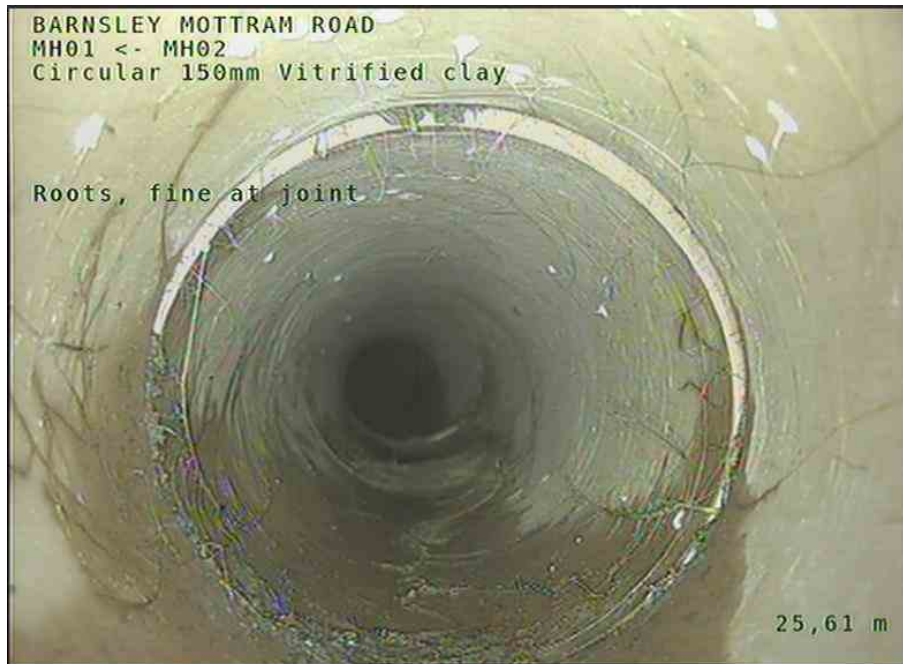
|                            |                           |                              |                |                               |         |
|----------------------------|---------------------------|------------------------------|----------------|-------------------------------|---------|
| <b>Town or Village:</b>    | Barnsley                  | <b>Inspection Direction:</b> | 2              | <b>Upstream Node:</b>         | MH01    |
| <b>Road:</b>               | Mottram Road              | <b>Inspected Length:</b>     | 28.05 m        | <b>Upstream Pipe Depth:</b>   |         |
| <b>Location:</b>           | Road                      | <b>Total Length:</b>         | 28.05 m        | <b>Downstream Node:</b>       | MH02    |
| <b>Surface Type:</b>       | Asphalt Highway           | <b>Joint Length:</b>         |                | <b>Downstream Pipe Depth:</b> | 2.000 m |
| <b>Use:</b>                | Foul                      | <b>Pipe Shape:</b>           | Circular       |                               |         |
| <b>Type of Pipe:</b>       | Gravity drain/sewer       | <b>Dia/Height:</b>           | 150 mm         |                               |         |
| <b>Flow Control:</b>       | No flow control           | <b>Material:</b>             | Vitrified clay |                               |         |
| <b>Year Constructed:</b>   | Not Specified             | <b>Lining Type:</b>          | No Lining      |                               |         |
| <b>Inspection Purpose:</b> | Sample condition survey   | <b>Lining Material:</b>      | No Lining      |                               |         |
| <b>Comments:</b>           | None                      |                              |                |                               |         |
| <b>Recommendations:</b>    | Repair (incl Patch line ) |                              |                |                               |         |



| Construction Features |          |          |           |           | Miscellaneous Features             |          |          |           |           |
|-----------------------|----------|----------|-----------|-----------|------------------------------------|----------|----------|-----------|-----------|
| Structural Defects    |          |          |           |           | Service & Operational Observations |          |          |           |           |
| STR No. Def           | STR Peak | STR Mean | STR Total | STR Grade | SER No. Def                        | SER Peak | SER Mean | SER Total | SER Grade |
| 0                     | 0.0      | 0.0      | 0.0       | 1.0       | 5                                  | 8.0      | 0.5      | 12.0      | 4.0       |

## Section Pictures - 02/11/2021 - MH01X

| Item No. | Inspection Direction | PLR   | Client's Job Ref | Contractor's Job Ref |
|----------|----------------------|-------|------------------|----------------------|
| 1        | 2                    | MH01X | SURVEY OPS       | 14429                |



1, 00:02:51, 25.61 m  
Roots, fine at joint, CIP PATCH REQ

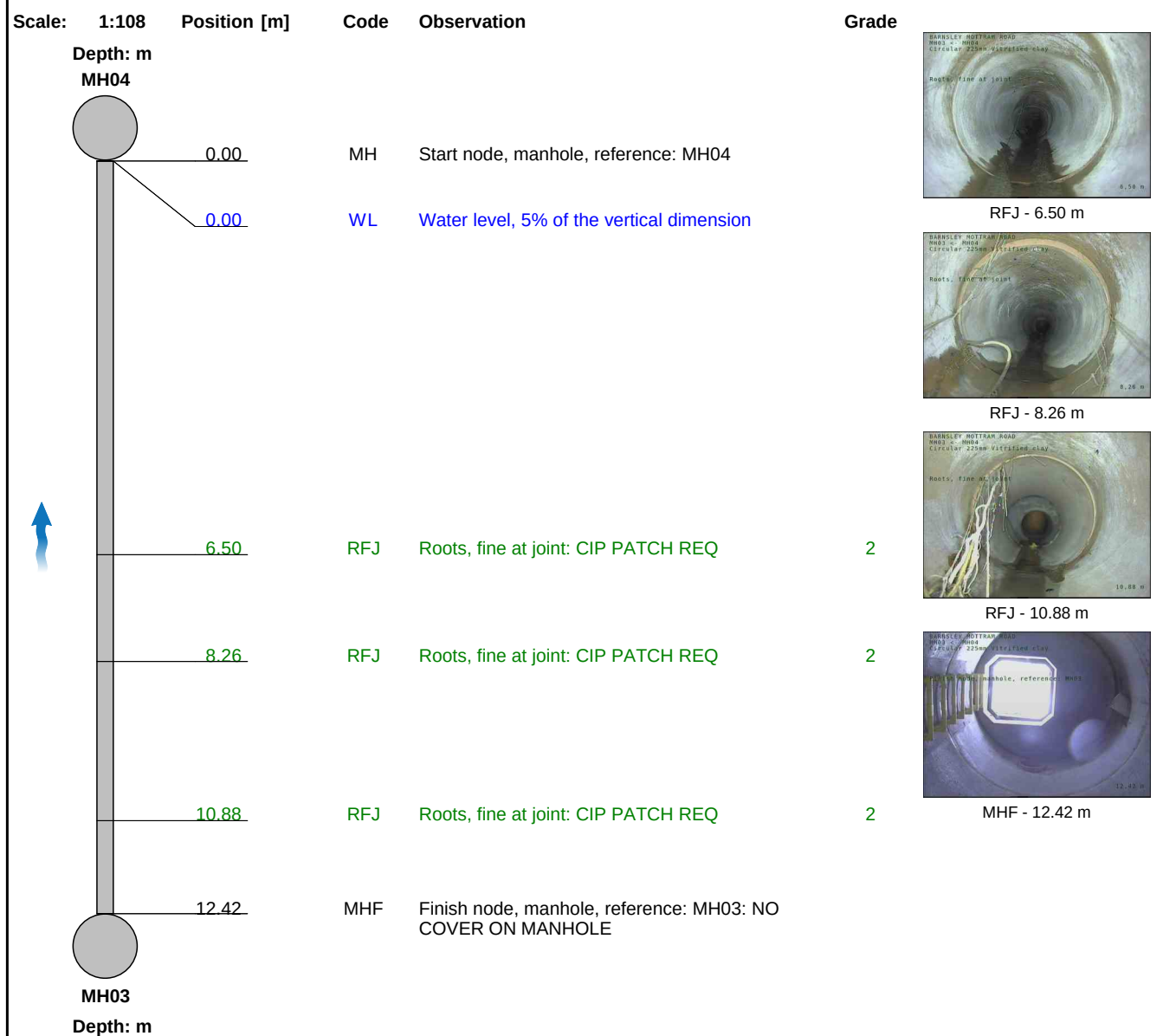


2, 00:03:01, 26.60 m  
Roots, fine at joint, CIP PATCH REQ

## Completed section inspection - 02/11/2021 - MH03X

| Item No. | Insp. No. | Date     | Time | Client's Job Ref | Weather         | Pre Cleaned  | PLR            |
|----------|-----------|----------|------|------------------|-----------------|--------------|----------------|
| 2        | 1         | 02/11/21 | 8:32 | SURVEY OPS       | No Rain Or Snow | No           | MH03X          |
| Operator |           | Vehicle  |      | Camera           | Preset Length   | Legal Status | Alternative ID |
| PK       |           | SC15NYG  |      | Ipek Ex          | 0.70 m          | Public Sewer | Not Specified  |

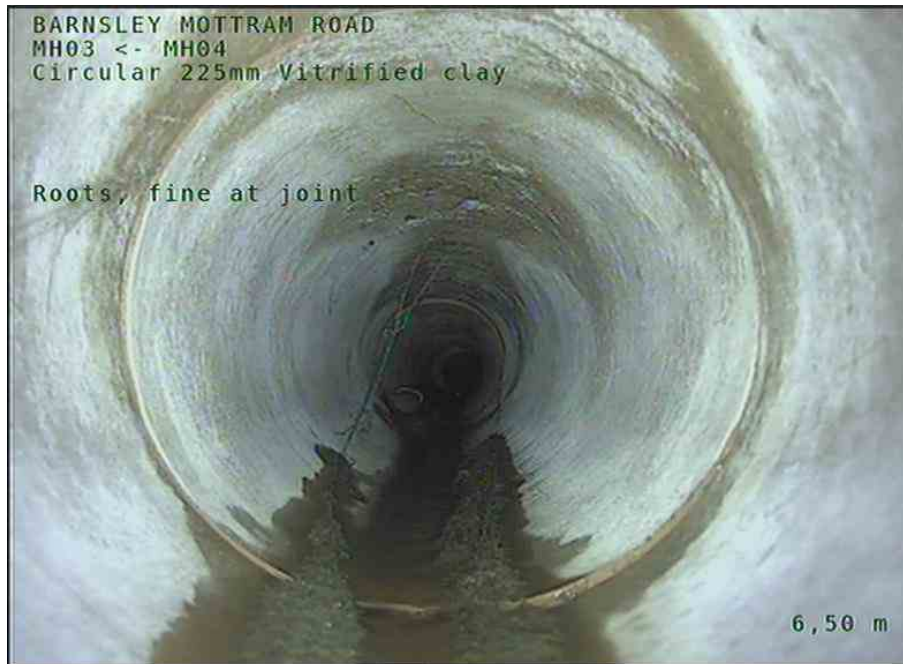
|                            |                         |                                  |  |                               |                |
|----------------------------|-------------------------|----------------------------------|--|-------------------------------|----------------|
| <b>Town or Village:</b>    | Barnsley                | <b>Inspection Direction:</b> 2   |  | <b>Upstream Node:</b>         | MH03           |
| <b>Road:</b>               | Mottram Road            | <b>Inspected Length:</b> 12.42 m |  | <b>Upstream Pipe Depth:</b>   |                |
| <b>Location:</b>           | Road                    | <b>Total Length:</b> 12.42 m     |  | <b>Downstream Node:</b>       | MH04           |
| <b>Surface Type:</b>       | Asphalt Highway         | <b>Joint Length:</b>             |  | <b>Downstream Pipe Depth:</b> |                |
| <b>Use:</b>                | Surface water           |                                  |  | <b>Pipe Shape:</b>            | Circular       |
| <b>Type of Pipe:</b>       | Gravity drain/sewer     |                                  |  | <b>Dia/Height:</b>            | 225 mm         |
| <b>Flow Control:</b>       | No flow control         |                                  |  | <b>Material:</b>              | Vitrified clay |
| <b>Year Constructed:</b>   | Not Specified           |                                  |  | <b>Lining Type:</b>           | No Lining      |
| <b>Inspection Purpose:</b> | Sample condition survey |                                  |  | <b>Lining Material:</b>       | No Lining      |
| <b>Comments:</b>           | None                    |                                  |  |                               |                |
| <b>Recommendations:</b>    | None                    |                                  |  |                               |                |



| Construction Features |          |          |           |           | Miscellaneous Features             |          |          |           |           |
|-----------------------|----------|----------|-----------|-----------|------------------------------------|----------|----------|-----------|-----------|
| Structural Defects    |          |          |           |           | Service & Operational Observations |          |          |           |           |
| STR No. Def           | STR Peak | STR Mean | STR Total | STR Grade | SER No. Def                        | SER Peak | SER Mean | SER Total | SER Grade |
| 0                     | 0.0      | 0.0      | 0.0       | 1.0       | 3                                  | 1.0      | 0.5      | 3.0       | 2.0       |

## Section Pictures - 02/11/2021 - MH03X

| Item No. | Inspection Direction | PLR   | Client's Job Ref | Contractor's Job Ref |
|----------|----------------------|-------|------------------|----------------------|
| 2        | 2                    | MH03X | SURVEY OPS       | 14429                |



1, 00:00:40, 6.50 m  
 Roots, fine at joint, CIP PATCH REQ



2, 00:00:50, 8.26 m  
 Roots, fine at joint, CIP PATCH REQ

## Section Pictures - 02/11/2021 - MH03X

| Item No. | Inspection Direction | PLR   | Client's Job Ref | Contractor's Job Ref |
|----------|----------------------|-------|------------------|----------------------|
| 2        | 2                    | MH03X | SURVEY OPS       | 14429                |



3, 00:01:05, 10.88 m  
 Roots, fine at joint, CIP PATCH REQ

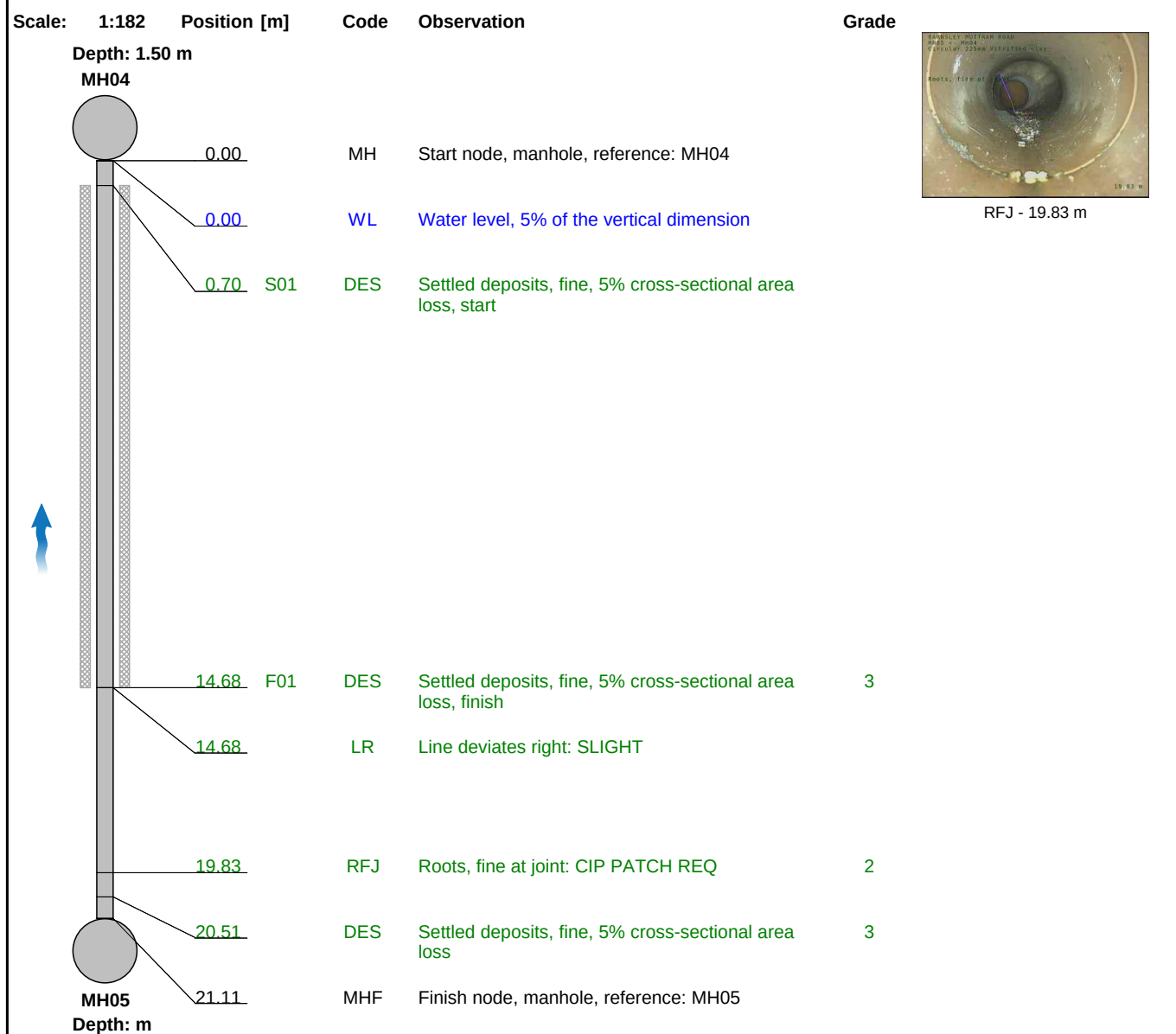


4, 00:01:29, 12.42 m  
 Finish node, manhole, reference: MH03, NO COVER ON MANHOLE

## Completed section inspection - 02/11/2021 - MH05X

| Item No. | Insp. No. | Date     | Time | Client's Job Ref | Weather         | Pre Cleaned  | PLR            |
|----------|-----------|----------|------|------------------|-----------------|--------------|----------------|
| 3        | 1         | 02/11/21 | 8:40 | SURVEY OPS       | No Rain Or Snow | No           | MH05X          |
| Operator |           | Vehicle  |      | Camera           | Preset Length   | Legal Status | Alternative ID |
| PK       |           | SC15NYG  |      | Ipek Ex          | 0.70 m          | Public Sewer | Not Specified  |

|                            |                         |                              |         |                               |                |
|----------------------------|-------------------------|------------------------------|---------|-------------------------------|----------------|
| <b>Town or Village:</b>    | Barnsley                | <b>Inspection Direction:</b> | 2       | <b>Upstream Node:</b>         | MH05           |
| <b>Road:</b>               | Mottram Road            | <b>Inspected Length:</b>     | 21.11 m | <b>Upstream Pipe Depth:</b>   |                |
| <b>Location:</b>           | Road                    | <b>Total Length:</b>         | 21.11 m | <b>Downstream Node:</b>       | MH04           |
| <b>Surface Type:</b>       | Asphalt Highway         | <b>Joint Length:</b>         |         | <b>Downstream Pipe Depth:</b> | 1.500 m        |
| <b>Use:</b>                | Surface water           |                              |         | <b>Pipe Shape:</b>            | Circular       |
| <b>Type of Pipe:</b>       | Gravity drain/sewer     |                              |         | <b>Dia/Height:</b>            | 225 mm         |
| <b>Flow Control:</b>       | No flow control         |                              |         | <b>Material:</b>              | Vitrified clay |
| <b>Year Constructed:</b>   | Not Specified           |                              |         | <b>Lining Type:</b>           | No Lining      |
| <b>Inspection Purpose:</b> | Sample condition survey |                              |         | <b>Lining Material:</b>       | No Lining      |
| <b>Comments:</b>           | None                    |                              |         |                               |                |
| <b>Recommendations:</b>    | None                    |                              |         |                               |                |



| Construction Features |          |          |           |           | Miscellaneous Features             |          |          |           |           |
|-----------------------|----------|----------|-----------|-----------|------------------------------------|----------|----------|-----------|-----------|
| Structural Defects    |          |          |           |           | Service & Operational Observations |          |          |           |           |
| STR No. Def           | STR Peak | STR Mean | STR Total | STR Grade | SER No. Def                        | SER Peak | SER Mean | SER Total | SER Grade |
| 0                     | 0.0      | 0.0      | 0.0       | 1.0       | 3                                  | 2.0      | 1.6      | 31.0      | 3.0       |

## Section Pictures - 02/11/2021 - MH05X

| Item No. | Inspection Direction | PLR   | Client's Job Ref | Contractor's Job Ref |
|----------|----------------------|-------|------------------|----------------------|
| 3        | 2                    | MH05X | SURVEY OPS       | 14429                |

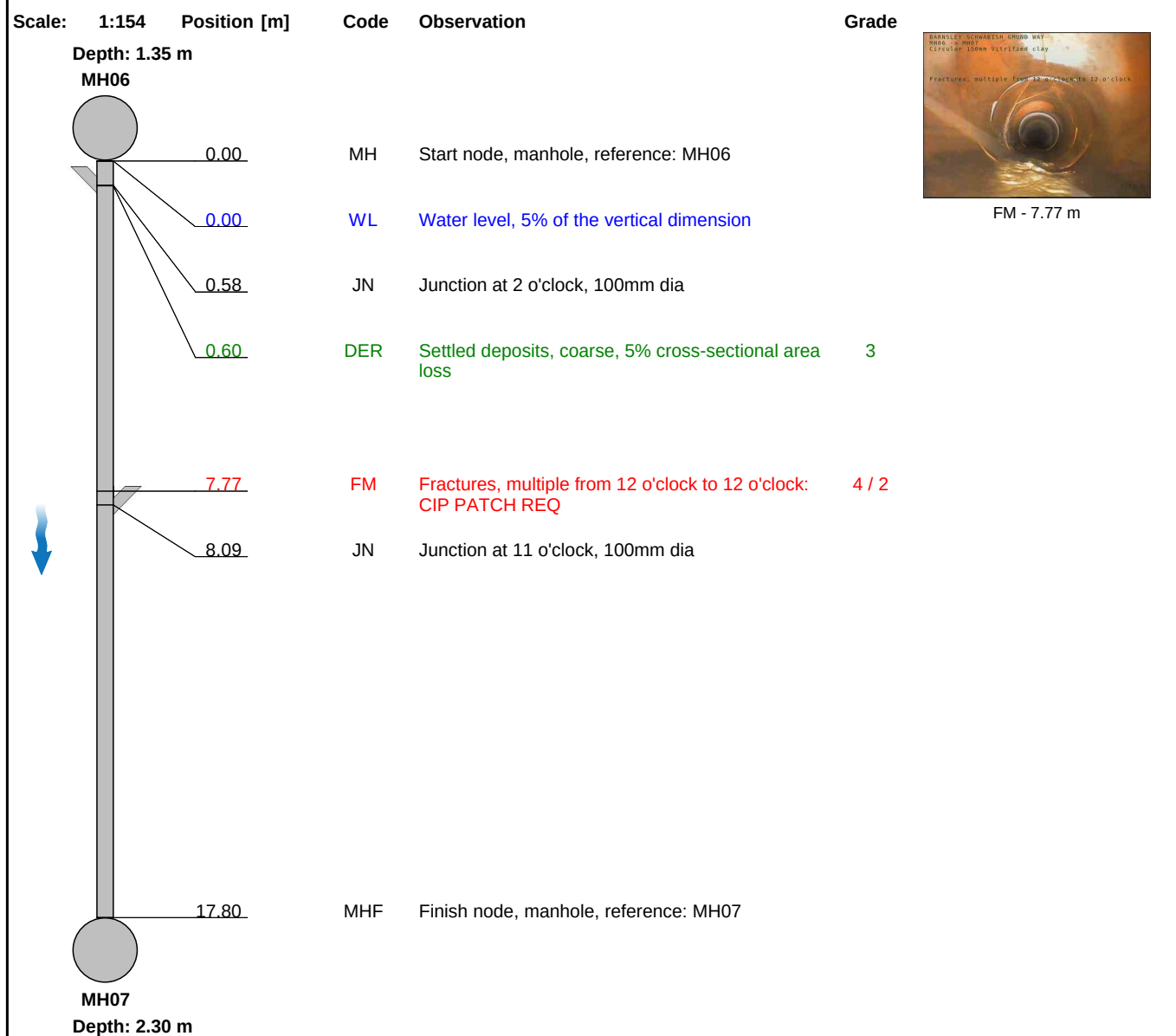


1, 00:01:31, 19.83 m  
Roots, fine at joint, CIP PATCH REQ

## Completed section inspection - 02/11/2021 - MH06X

| Item No. | Insp. No. | Date     | Time | Client's Job Ref | Weather         | Pre Cleaned  | PLR            |
|----------|-----------|----------|------|------------------|-----------------|--------------|----------------|
| 4        | 1         | 02/11/21 | 9:31 | SURVEY OPS       | No Rain Or Snow | No           | MH06X          |
| Operator |           | Vehicle  |      | Camera           | Preset Length   | Legal Status | Alternative ID |
| PK       |           | SC15NYG  |      | Ipek Ex          | 0.60 m          | Public Sewer | Not Specified  |

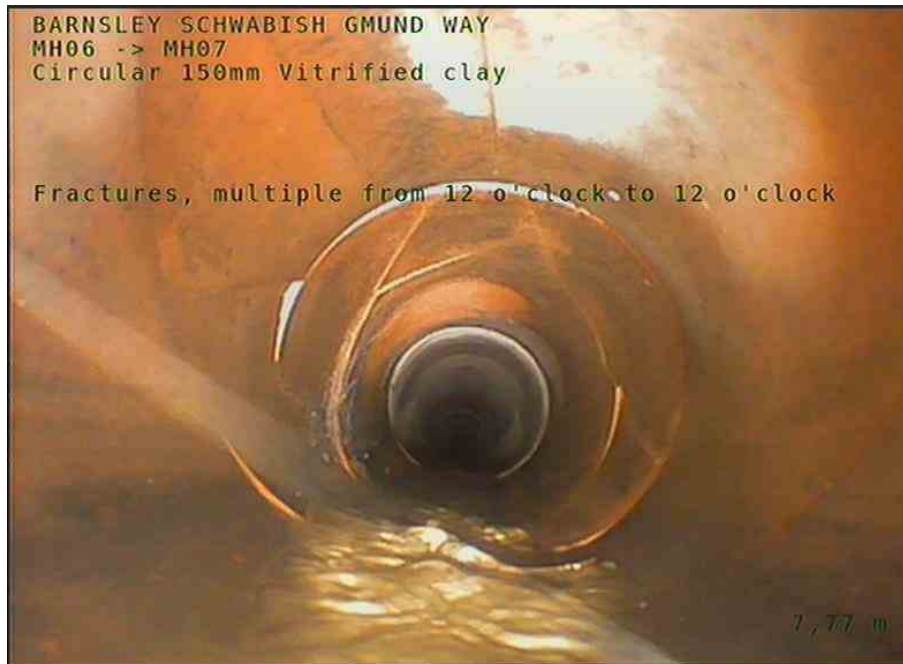
|                            |                         |                              |         |                               |                |
|----------------------------|-------------------------|------------------------------|---------|-------------------------------|----------------|
| <b>Town or Village:</b>    | Barnsley                | <b>Inspection Direction:</b> | 1       | <b>Upstream Node:</b>         | MH06           |
| <b>Road:</b>               | Schwabish Gmund Way     | <b>Inspected Length:</b>     | 17.80 m | <b>Upstream Pipe Depth:</b>   | 1.350 m        |
| <b>Location:</b>           | Other walkway           | <b>Total Length:</b>         | 17.80 m | <b>Downstream Node:</b>       | MH07           |
| <b>Surface Type:</b>       | Asphalt Highway         | <b>Joint Length:</b>         |         | <b>Downstream Pipe Depth:</b> | 2.300 m        |
| <b>Use:</b>                | Surface water           |                              |         | <b>Pipe Shape:</b>            | Circular       |
| <b>Type of Pipe:</b>       | Gravity drain/sewer     |                              |         | <b>Dia/Height:</b>            | 150 mm         |
| <b>Flow Control:</b>       | No flow control         |                              |         | <b>Material:</b>              | Vitrified clay |
| <b>Year Constructed:</b>   | Not Specified           |                              |         | <b>Lining Type:</b>           | No Lining      |
| <b>Inspection Purpose:</b> | Sample condition survey |                              |         | <b>Lining Material:</b>       | No Lining      |
| <b>Comments:</b>           | None                    |                              |         |                               |                |
| <b>Recommendations:</b>    | None                    |                              |         |                               |                |



| Construction Features |          |          |           |           | Miscellaneous Features             |          |          |           |           |
|-----------------------|----------|----------|-----------|-----------|------------------------------------|----------|----------|-----------|-----------|
| Structural Defects    |          |          |           |           | Service & Operational Observations |          |          |           |           |
| STR No. Def           | STR Peak | STR Mean | STR Total | STR Grade | SER No. Def                        | SER Peak | SER Mean | SER Total | SER Grade |
| 1                     | 80.0     | 10.3     | 80.0      | 4.0       | 2                                  | 2.0      | 0.4      | 3.0       | 3.0       |

## Section Pictures - 02/11/2021 - MH06X

| Item No. | Inspection Direction | PLR   | Client's Job Ref | Contractor's Job Ref |
|----------|----------------------|-------|------------------|----------------------|
| 4        | 1                    | MH06X | SURVEY OPS       | 14429                |



1, 00:02:15, 7.77 m

Fractures, multiple from 12 o'clock to 12 o'clock, CIP PATCH REQ



## Section Pictures - 02/11/2021 - MH06AX

| Item No. | Inspection Direction | PLR    | Client's Job Ref | Contractor's Job Ref |
|----------|----------------------|--------|------------------|----------------------|
| 5        | 2                    | MH06AX | SURVEY OPS       | 14429                |



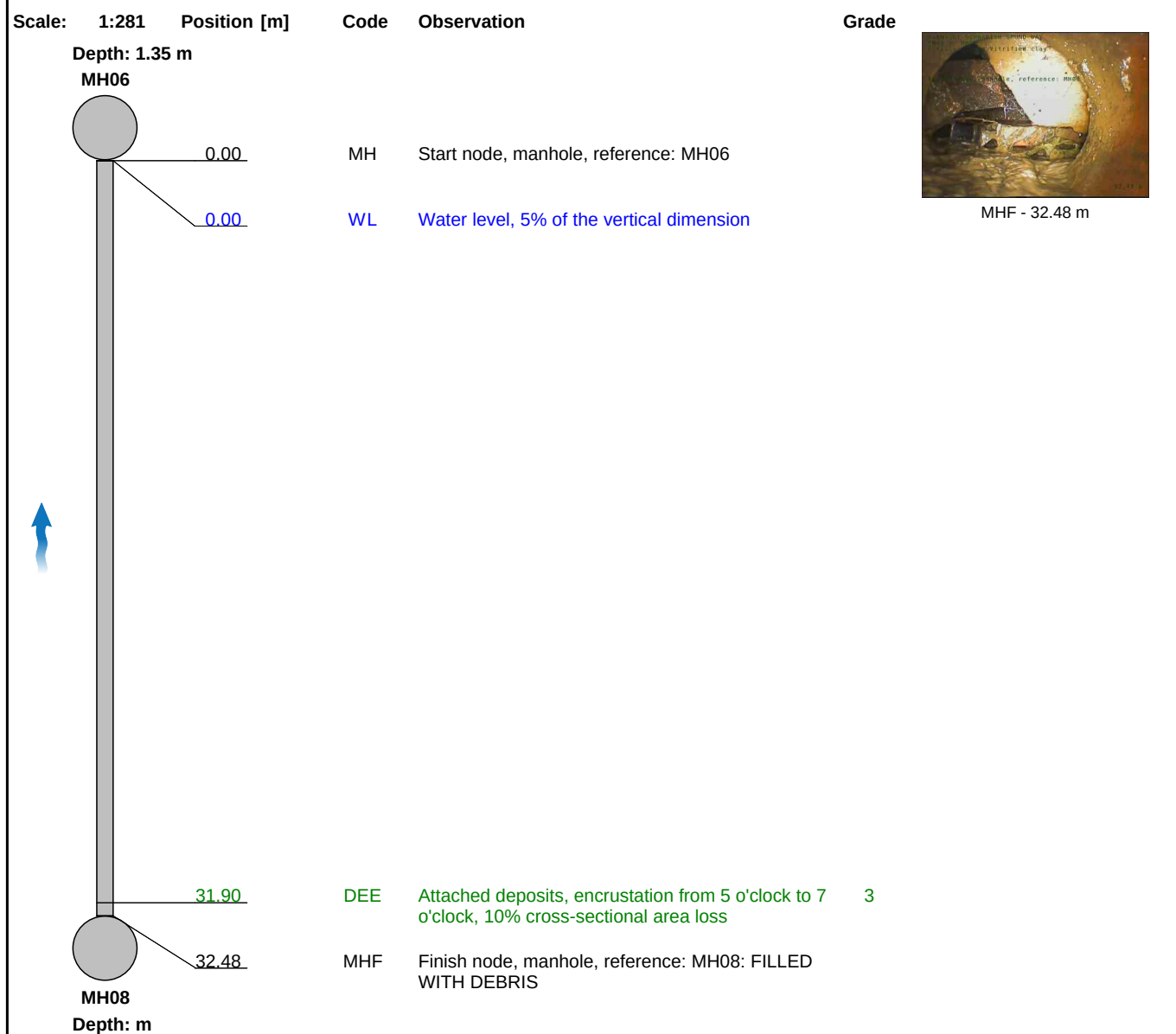
1, 00:00:07, 0.60 m

Finish node, other special chamber, reference: MH06A, CAPPED

## Completed section inspection - 02/11/2021 - MH08X

| Item No. | Insp. No. | Date     | Time | Client's Job Ref | Weather         | Pre Cleaned  | PLR            |
|----------|-----------|----------|------|------------------|-----------------|--------------|----------------|
| 6        | 1         | 02/11/21 | 9:39 | SURVEY OPS       | No Rain Or Snow | No           | MH08X          |
| Operator |           | Vehicle  |      | Camera           | Preset Length   | Legal Status | Alternative ID |
| PK       |           | SC15NYG  |      | Ipek Ex          | 0.60 m          | Public Sewer | Not Specified  |

|                            |                         |                              |                         |                               |         |
|----------------------------|-------------------------|------------------------------|-------------------------|-------------------------------|---------|
| <b>Town or Village:</b>    | Barnsley                | <b>Inspection Direction:</b> | 2                       | <b>Upstream Node:</b>         | MH08    |
| <b>Road:</b>               | Schwabish Gmund Way     | <b>Inspected Length:</b>     | 32.48 m                 | <b>Upstream Pipe Depth:</b>   |         |
| <b>Location:</b>           | Other walkway           | <b>Total Length:</b>         | 32.48 m                 | <b>Downstream Node:</b>       | MH06    |
| <b>Surface Type:</b>       | Asphalt Highway         | <b>Joint Length:</b>         |                         | <b>Downstream Pipe Depth:</b> | 1.350 m |
| <b>Use:</b>                | Surface water           |                              | <b>Pipe Shape:</b>      | Circular                      |         |
| <b>Type of Pipe:</b>       | Gravity drain/sewer     |                              | <b>Dia/Height:</b>      | 150 mm                        |         |
| <b>Flow Control:</b>       | No flow control         |                              | <b>Material:</b>        | Vitrified clay                |         |
| <b>Year Constructed:</b>   | Not Specified           |                              | <b>Lining Type:</b>     | No Lining                     |         |
| <b>Inspection Purpose:</b> | Sample condition survey |                              | <b>Lining Material:</b> | No Lining                     |         |
| <b>Comments:</b>           | None                    |                              |                         |                               |         |
| <b>Recommendations:</b>    | None                    |                              |                         |                               |         |



| Construction Features |          |          |           |           | Miscellaneous Features             |          |          |           |           |
|-----------------------|----------|----------|-----------|-----------|------------------------------------|----------|----------|-----------|-----------|
| Structural Defects    |          |          |           |           | Service & Operational Observations |          |          |           |           |
| STR No. Def           | STR Peak | STR Mean | STR Total | STR Grade | SER No. Def                        | SER Peak | SER Mean | SER Total | SER Grade |
| 0                     | 0.0      | 0.0      | 0.0       | 1.0       | 1                                  | 2.0      | 0.1      | 2.0       | 3.0       |

## Section Pictures - 02/11/2021 - MH08X

| Item No. | Inspection Direction | PLR   | Client's Job Ref | Contractor's Job Ref |
|----------|----------------------|-------|------------------|----------------------|
| 6        | 2                    | MH08X | SURVEY OPS       | 14429                |



1, 00:04:45, 32.48 m

Finish node, manhole, reference: MH08, FILLED WITH DEBRIS

## Abandoned section inspection - 02/11/2021 - MH09X

| Item No. | Insp. No. | Date     | Time  | Client's Job Ref | Weather         | Pre Cleaned   | PLR            |
|----------|-----------|----------|-------|------------------|-----------------|---------------|----------------|
| 7        | 1         | 02/11/21 | 10:11 | SURVEY OPS       | No Rain Or Snow | No            | MH09X          |
| Operator |           | Vehicle  |       | Camera           | Preset Length   | Legal Status  | Alternative ID |
| PK       |           | SC15NYG  |       | Ipek Ex          | 0.70 m          | Private Sewer | Not Specified  |

|                            |                               |                                  |  |                               |                |
|----------------------------|-------------------------------|----------------------------------|--|-------------------------------|----------------|
| <b>Town or Village:</b>    | Barnsley                      | <b>Inspection Direction:</b> 2   |  | <b>Upstream Node:</b>         | MH09           |
| <b>Road:</b>               | Land Off Harborough Hill Road | <b>Inspected Length:</b> 27.82 m |  | <b>Upstream Pipe Depth:</b>   |                |
| <b>Location:</b>           | Property or buildings         | <b>Total Length:</b> 27.82 m     |  | <b>Downstream Node:</b>       | MH05           |
| <b>Surface Type:</b>       | Asphalt Highway               | <b>Joint Length:</b>             |  | <b>Downstream Pipe Depth:</b> | 4.800 m        |
| <b>Use:</b>                | Surface water                 |                                  |  | <b>Pipe Shape:</b>            | Circular       |
| <b>Type of Pipe:</b>       | Gravity drain/sewer           |                                  |  | <b>Dia/Height:</b>            | 225 mm         |
| <b>Flow Control:</b>       | No flow control               |                                  |  | <b>Material:</b>              | Vitrified clay |
| <b>Year Constructed:</b>   | Not Specified                 |                                  |  | <b>Lining Type:</b>           | No Lining      |
| <b>Inspection Purpose:</b> | Sample condition survey       |                                  |  | <b>Lining Material:</b>       | No Lining      |
| <b>Comments:</b>           | None                          |                                  |  |                               |                |
| <b>Recommendations:</b>    | None                          |                                  |  |                               |                |

| Scale:               | 1:201 | Position [m] | Code | Observation                                                    | Grade |
|----------------------|-------|--------------|------|----------------------------------------------------------------|-------|
| <b>Depth: 4.80 m</b> |       |              |      |                                                                |       |
| <b>MH05</b>          |       | 0.00         | MH   | Start node, manhole, reference: MH05                           |       |
|                      |       | 0.00         | WL   | Water level, 5% of the vertical dimension                      |       |
|                      |       | 0.70         | REM  | General remark: UNABLE TO SHOW START DUE TO BACKDROP           |       |
|                      |       | 1.41         | JN   | Junction at 6 o'clock, 225mm dia: BACKDROP                     |       |
|                      |       | 2.35         | SC   | Pipe size changes, new size(s), 150mm high                     |       |
|                      |       | 2.57         | RFJ  | Roots, fine at joint: CIP PATCH REQ                            | 2     |
|                      |       | 3.73         | RFJ  | Roots, fine at joint: CIP PATCH REQ                            | 2     |
|                      |       | 6.78         | RFJ  | Roots, fine at joint: CIP PATCH REQ                            | 2     |
|                      |       | 12.96        | FM   | Fractures, multiple from 3 o'clock to 9 o'clock: CIP PATCH REQ | 4 / 2 |
|                      |       | 13.23        | H    | Hole in drain or sewer from 7 o'clock to 9 o'clock: CIP PATCH  | 4     |
|                      |       | 13.23        | LL   | Line deviates left                                             |       |
|                      |       | 16.81        | RFJ  | Roots, fine at joint: CIP PATCH                                | 2     |
|                      |       | 18.25        | JN   | Junction at 3 o'clock, 100mm dia                               |       |
|                      |       | 18.58        | RFJ  | Roots, fine at joint: CIP PATCH REQ                            | 2     |
|                      |       | 21.57        | RFJ  | Roots, fine at joint: CIP PATCH REQ                            | 2     |



JN - 1.41 m



RFJ - 2.57 m



RFJ - 3.73 m



RFJ - 6.78 m

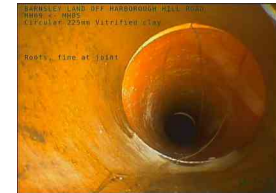


FM - 12.96 m

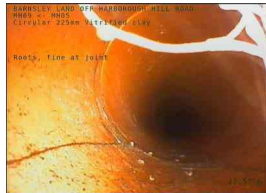
## Abandoned section inspection - 02/11/2021 - MH09X

| Item No. | Insp. No. | Date     | Time  | Client's Job Ref | Weather         | Pre Cleaned   | PLR            |
|----------|-----------|----------|-------|------------------|-----------------|---------------|----------------|
| 7        | 1         | 02/11/21 | 10:11 | SURVEY OPS       | No Rain Or Snow | No            | MH09X          |
| Operator |           | Vehicle  |       | Camera           | Preset Length   | Legal Status  | Alternative ID |
| PK       |           | SC15NYG  |       | Ipek Ex          | 0.70 m          | Private Sewer | Not Specified  |

| Scale: | 1:201 | Position [m] | Code | Observation                         | Grade |
|--------|-------|--------------|------|-------------------------------------|-------|
|        |       | 25.06        | RFJ  | Roots, fine at joint: CIP PATCH REQ | 2     |
|        |       | 27.82        | REM  | General remark: UNABLE TO PUSH RODS |       |
|        |       | 27.82        | SA   | Survey abandoned: HARD TO PUSH RODS |       |



RFJ - 18.58 m



RFJ - 21.57 m



RFJ - 25.06 m



H - 13.23 m



RFJ - 16.81 m

| Construction Features |          |          |           |           | Miscellaneous Features             |          |          |           |           |
|-----------------------|----------|----------|-----------|-----------|------------------------------------|----------|----------|-----------|-----------|
| Structural Defects    |          |          |           |           | Service & Operational Observations |          |          |           |           |
| STR No. Def           | STR Peak | STR Mean | STR Total | STR Grade | SER No. Def                        | SER Peak | SER Mean | SER Total | SER Grade |
| 2                     | 160.0    | 113.2    | 160.0     | 4.0       | 8                                  | 1.0      | 5.7      | 8.0       | 5.0       |

## Section Pictures - 02/11/2021 - MH09X

| Item No. | Inspection Direction | PLR   | Client's Job Ref | Contractor's Job Ref |
|----------|----------------------|-------|------------------|----------------------|
| 7        | 2                    | MH09X | SURVEY OPS       | 14429                |



1, 00:00:23, 1.41 m  
Junction at 6 o'clock, 225mm dia, BACKDROP



2, 00:00:40, 2.57 m  
Roots, fine at joint, CIP PATCH REQ

## Section Pictures - 02/11/2021 - MH09X

| Item No. | Inspection Direction | PLR   | Client's Job Ref | Contractor's Job Ref |
|----------|----------------------|-------|------------------|----------------------|
| 7        | 2                    | MH09X | SURVEY OPS       | 14429                |



3, 00:00:57, 3.73 m  
 Roots, fine at joint, CIP PATCH REQ



4, 00:01:21, 6.78 m  
 Roots, fine at joint, CIP PATCH REQ

## Section Pictures - 02/11/2021 - MH09X

| Item No. | Inspection Direction | PLR   | Client's Job Ref | Contractor's Job Ref |
|----------|----------------------|-------|------------------|----------------------|
| 7        | 2                    | MH09X | SURVEY OPS       | 14429                |



5, 00:02:01, 12.96 m  
 Fractures, multiple from 3 o'clock to 9 o'clock, CIP PATCH REQ



6, 00:02:19, 13.23 m  
 Hole in drain or sewer from 7 o'clock to 9 o'clock, CIP PATCH

## Section Pictures - 02/11/2021 - MH09X

| Item No. | Inspection Direction | PLR   | Client's Job Ref | Contractor's Job Ref |
|----------|----------------------|-------|------------------|----------------------|
| 7        | 2                    | MH09X | SURVEY OPS       | 14429                |



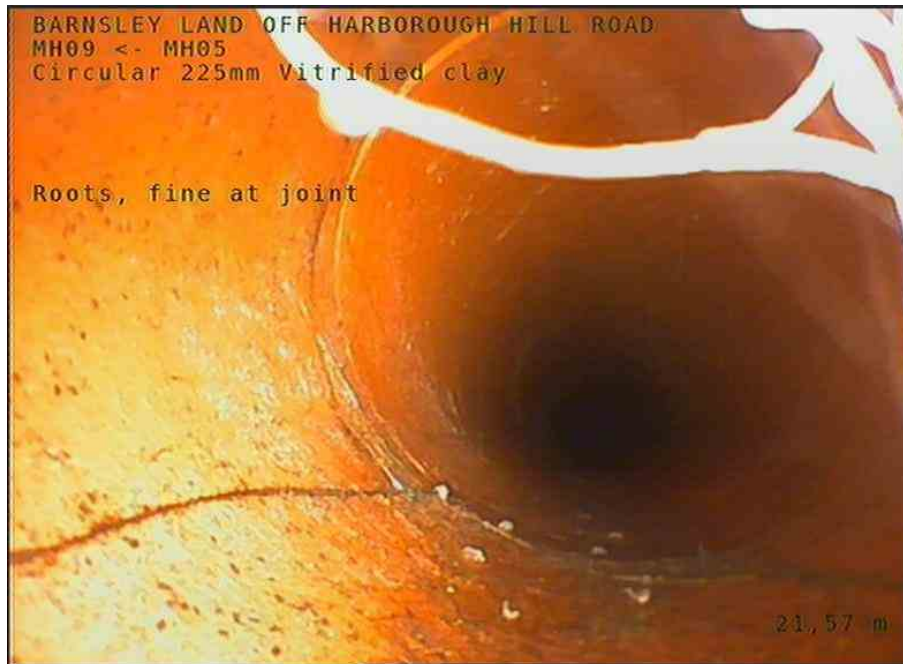
7, 00:02:43, 16.81 m  
 Roots, fine at joint, CIP PATCH



8, 00:02:58, 18.58 m  
 Roots, fine at joint, CIP PATCH REQ

## Section Pictures - 02/11/2021 - MH09X

| Item No. | Inspection Direction | PLR   | Client's Job Ref | Contractor's Job Ref |
|----------|----------------------|-------|------------------|----------------------|
| 7        | 2                    | MH09X | SURVEY OPS       | 14429                |



9, 00:03:19, 21.57 m  
Roots, fine at joint, CIP PATCH REQ

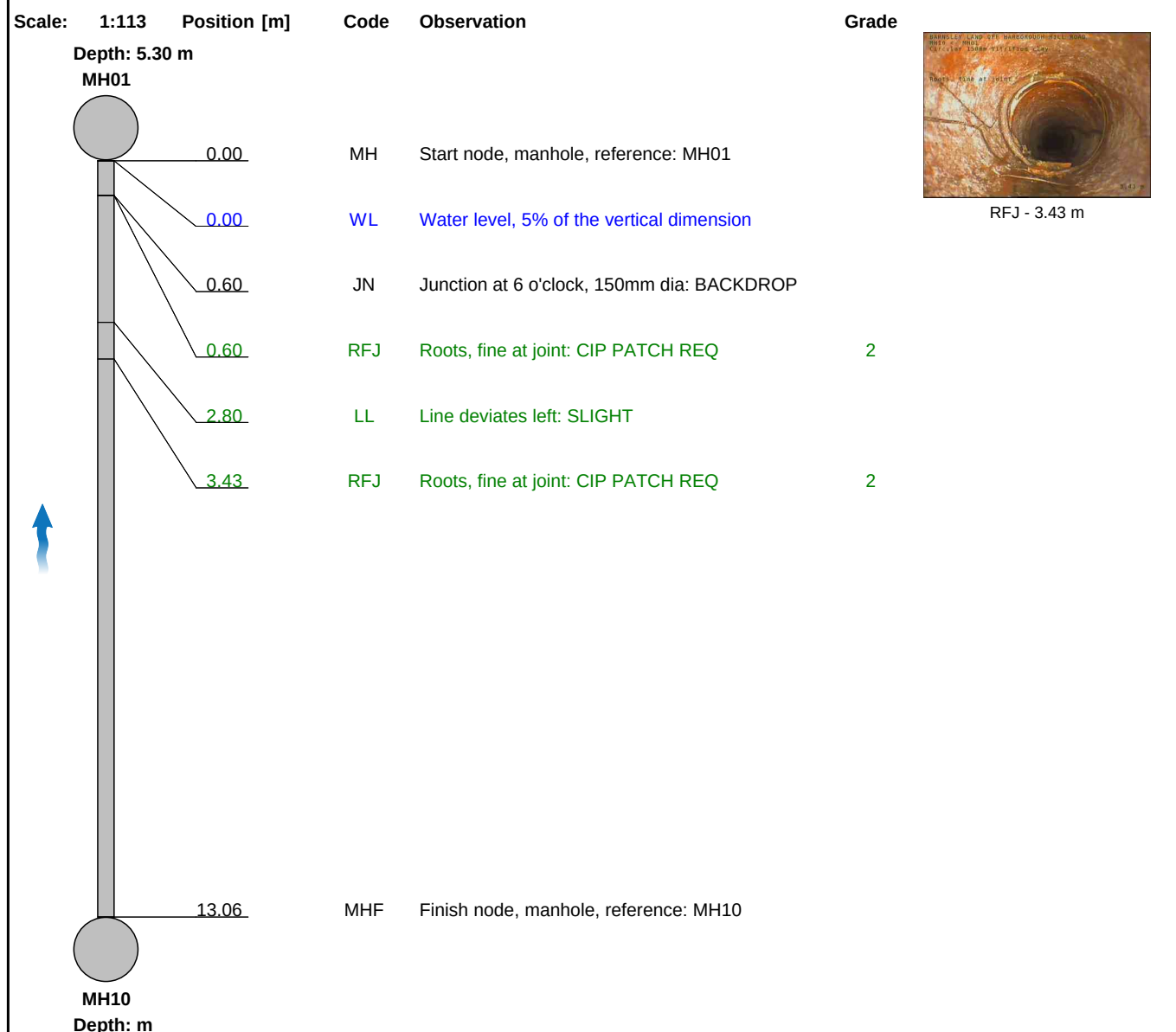


10, 00:04:15, 25.06 m  
Roots, fine at joint, CIP PATCH REQ

## Completed section inspection - 02/11/2021 - MH10X

| Item No. | Insp. No. | Date     | Time  | Client's Job Ref | Weather         | Pre Cleaned   | PLR            |
|----------|-----------|----------|-------|------------------|-----------------|---------------|----------------|
| 8        | 1         | 02/11/21 | 10:31 | SURVEY OPS       | No Rain Or Snow | No            | MH10X          |
| Operator |           | Vehicle  |       | Camera           | Preset Length   | Legal Status  | Alternative ID |
| PK       |           | SC15NYG  |       | Ipek Ex          | 0.60 m          | Private Sewer | Not Specified  |

|                            |                               |                                  |  |                                       |                |
|----------------------------|-------------------------------|----------------------------------|--|---------------------------------------|----------------|
| <b>Town or Village:</b>    | Barnsley                      | <b>Inspection Direction:</b> 2   |  | <b>Upstream Node:</b>                 | MH10           |
| <b>Road:</b>               | Land Off Harborough Hill Road | <b>Inspected Length:</b> 13.06 m |  | <b>Upstream Pipe Depth:</b>           |                |
| <b>Location:</b>           | Property or buildings         | <b>Total Length:</b> 13.06 m     |  | <b>Downstream Node:</b>               | MH01           |
| <b>Surface Type:</b>       | Asphalt Footway               | <b>Joint Length:</b>             |  | <b>Downstream Pipe Depth:</b> 5.300 m |                |
| <b>Use:</b>                | Foul                          |                                  |  | <b>Pipe Shape:</b>                    | Circular       |
| <b>Type of Pipe:</b>       | Gravity drain/sewer           |                                  |  | <b>Dia/Height:</b>                    | 150 mm         |
| <b>Flow Control:</b>       | No flow control               |                                  |  | <b>Material:</b>                      | Vitrified clay |
| <b>Year Constructed:</b>   | Not Specified                 |                                  |  | <b>Lining Type:</b>                   | No Lining      |
| <b>Inspection Purpose:</b> | Sample condition survey       |                                  |  | <b>Lining Material:</b>               | No Lining      |
| <b>Comments:</b>           | None                          |                                  |  |                                       |                |
| <b>Recommendations:</b>    | None                          |                                  |  |                                       |                |



| Construction Features |          |          |           |           | Miscellaneous Features             |          |          |           |           |
|-----------------------|----------|----------|-----------|-----------|------------------------------------|----------|----------|-----------|-----------|
| Structural Defects    |          |          |           |           | Service & Operational Observations |          |          |           |           |
| STR No. Def           | STR Peak | STR Mean | STR Total | STR Grade | SER No. Def                        | SER Peak | SER Mean | SER Total | SER Grade |
| 0                     | 0.0      | 0.0      | 0.0       | 1.0       | 2                                  | 1.0      | 0.6      | 2.0       | 2.0       |

## Section Pictures - 02/11/2021 - MH10X

| Item No. | Inspection Direction | PLR   | Client's Job Ref | Contractor's Job Ref |
|----------|----------------------|-------|------------------|----------------------|
| 8        | 2                    | MH10X | SURVEY OPS       | 14429                |

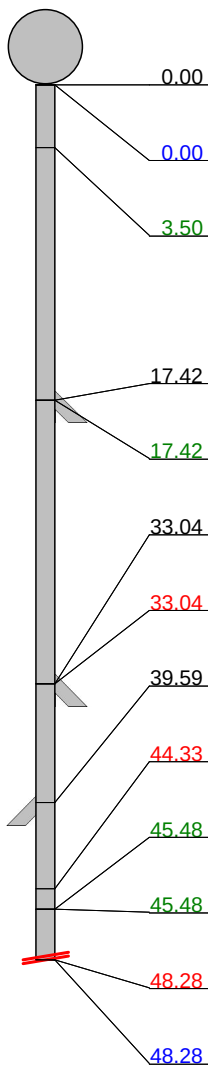


1, 00:01:09, 3.43 m  
Roots, fine at joint, CIP PATCH REQ

## Abandoned section inspection - 02/11/2021 - MH12X

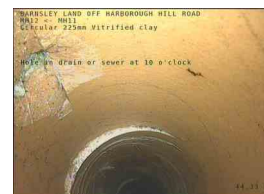
|                |                |                    |               |                                |                            |                               |                                 |
|----------------|----------------|--------------------|---------------|--------------------------------|----------------------------|-------------------------------|---------------------------------|
| Item No.<br>9  | Insp. No.<br>1 | Date<br>02/11/21   | Time<br>11:55 | Client's Job Ref<br>SURVEY OPS | Weather<br>No Rain Or Snow | Pre Cleaned<br>No             | PLR<br>MH12X                    |
| Operator<br>PK |                | Vehicle<br>SC15NYG |               | Camera<br>Ipek Ex              | Preset Length<br>0.70 m    | Legal Status<br>Private Sewer | Alternative ID<br>Not Specified |

|                     |                               |                       |                |                        |      |
|---------------------|-------------------------------|-----------------------|----------------|------------------------|------|
| Town or Village:    | Barnsley                      | Inspection Direction: | 2              | Upstream Node:         | MH12 |
| Road:               | Land Off Harborough Hill Road | Inspected Length:     | 48.28 m        | Upstream Pipe Depth:   |      |
| Location:           | Property or buildings         | Total Length:         | 48.28 m        | Downstream Node:       | MH11 |
| Surface Type:       | Asphalt Footway               | Joint Length:         |                | Downstream Pipe Depth: |      |
| Use:                | Foul                          | Pipe Shape:           | Circular       |                        |      |
| Type of Pipe:       | Gravity drain/sewer           | Dia/Height:           | 225 mm         |                        |      |
| Flow Control:       | No flow control               | Material:             | Vitrified clay |                        |      |
| Year Constructed:   | Not Specified                 | Lining Type:          | No Lining      |                        |      |
| Inspection Purpose: | Sample condition survey       | Lining Material:      | No Lining      |                        |      |
| Comments:           | None                          |                       |                |                        |      |
| Recommendations:    | None                          |                       |                |                        |      |

| Scale: 1:417                                                                       | Position [m] | Code | Observation                                             | Grade |
|------------------------------------------------------------------------------------|--------------|------|---------------------------------------------------------|-------|
| Depth: m<br>MH11                                                                   |              |      |                                                         |       |
|  | 0.00         | MH   | Start node, manhole, reference: MH11                    |       |
|                                                                                    | 0.00         | WL   | Water level, 5% of the vertical dimension               |       |
|                                                                                    | 3.50         | RFJ  | Roots, fine at joint: CIP PATCH REQ                     | 2     |
|                                                                                    | 17.42        | JN   | Junction at 9 o'clock, 100mm dia                        |       |
|                                                                                    | 17.42        | DES  | Settled deposits, fine, 5% cross-sectional area loss    | 3     |
|                                                                                    | 33.04        | JN   | Junction at 9 o'clock, 100mm dia                        |       |
|                                                                                    | 33.04        | FC   | Fracture, circumferential from 4 o'clock to 8 o'clock   | 3 / 2 |
|                                                                                    | 39.59        | JN   | Junction at 2 o'clock, 100mm dia                        |       |
|                                                                                    | 44.33        | H    | Hole in drain or sewer at 10 o'clock                    | 4     |
|                                                                                    | 45.48        | DER  | Settled deposits, coarse, 10% cross-sectional area loss | 3     |
|                                                                                    | 45.48        | RF   | Roots, fine                                             | 2     |
|                                                                                    | 48.28        | B    | Broken pipe from 1 o'clock to 6 o'clock                 | 4     |
|                                                                                    | 48.28        | SA   | Survey abandoned: DUE TO DER                            |       |



RFJ - 3.50 m



H - 44.33 m



B - 48.28 m

| Construction Features |          |          |           |           | Miscellaneous Features             |          |          |           |           |
|-----------------------|----------|----------|-----------|-----------|------------------------------------|----------|----------|-----------|-----------|
| Structural Defects    |          |          |           |           | Service & Operational Observations |          |          |           |           |
| STR No. Def           | STR Peak | STR Mean | STR Total | STR Grade | SER No. Def                        | SER Peak | SER Mean | SER Total | SER Grade |
| 3                     | 80.0     | 57.1     | 200.0     | 4.0       | 5                                  | 3.0      | 2.0      | 7.0       | 3.0       |

## Section Pictures - 02/11/2021 - MH12X

| Item No. | Inspection Direction | PLR   | Client's Job Ref | Contractor's Job Ref |
|----------|----------------------|-------|------------------|----------------------|
| 9        | 2                    | MH12X | SURVEY OPS       | 14429                |



1, 00:00:26, 3.50 m  
Roots, fine at joint, CIP PATCH REQ



2, 00:02:57, 44.33 m  
Hole in drain or sewer at 10 o'clock

## Section Pictures - 02/11/2021 - MH12X

| Item No. | Inspection Direction | PLR   | Client's Job Ref | Contractor's Job Ref |
|----------|----------------------|-------|------------------|----------------------|
| 9        | 2                    | MH12X | SURVEY OPS       | 14429                |

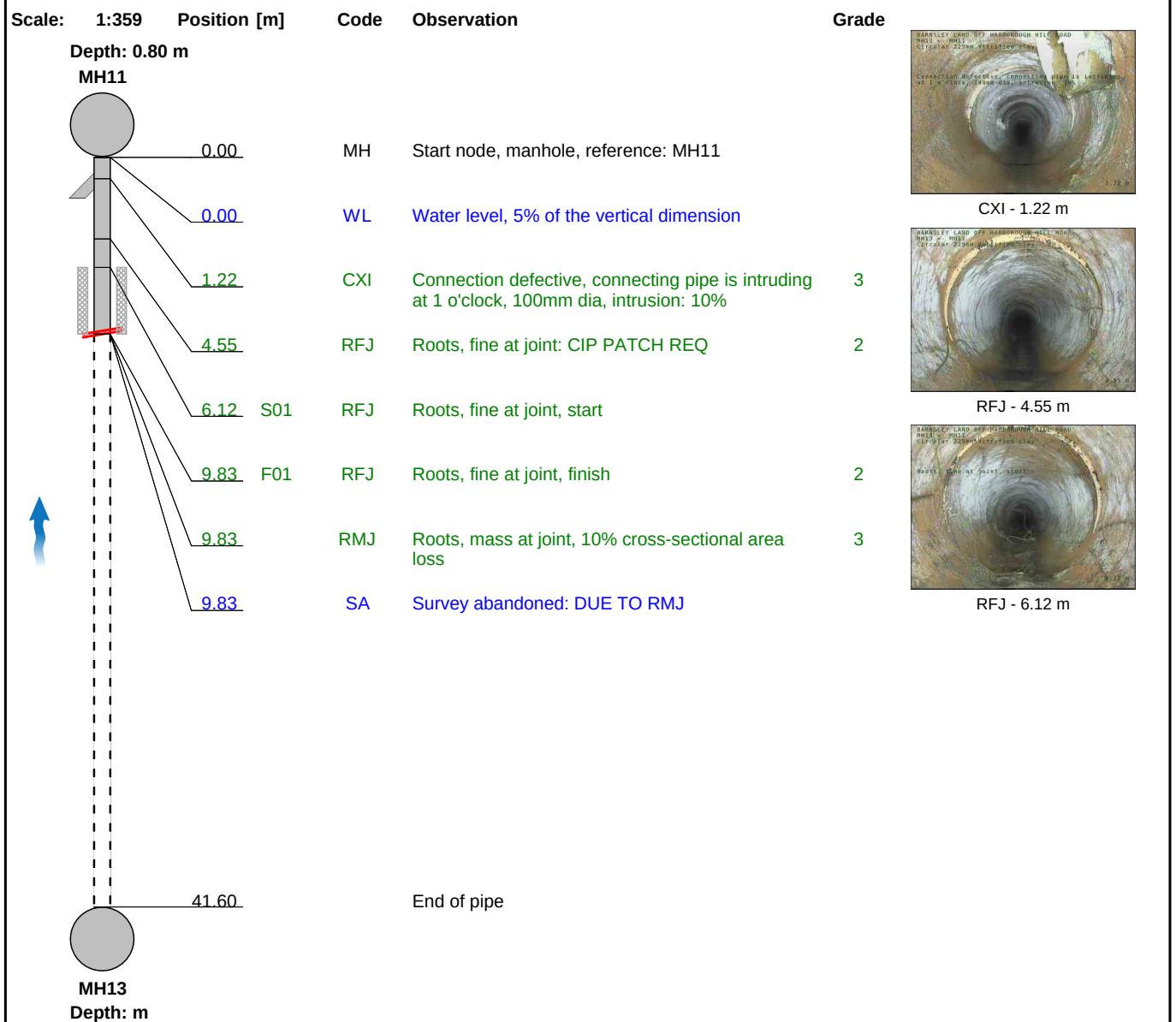


3, 00:04:43, 48.28 m  
Broken pipe from 1 o'clock to 6 o'clock

## Abandoned section inspection - 02/11/2021 - MH13X

|                |                |                    |               |                                |                            |                               |                                 |
|----------------|----------------|--------------------|---------------|--------------------------------|----------------------------|-------------------------------|---------------------------------|
| Item No.<br>10 | Insp. No.<br>1 | Date<br>02/11/21   | Time<br>12:05 | Client's Job Ref<br>SURVEY OPS | Weather<br>No Rain Or Snow | Pre Cleaned<br>No             | PLR<br>MH13X                    |
| Operator<br>PK |                | Vehicle<br>SC15NYG |               | Camera<br>Ipek Ex              | Preset Length<br>0.70 m    | Legal Status<br>Private Sewer | Alternative ID<br>Not Specified |

|                     |                               |                       |                |                        |         |
|---------------------|-------------------------------|-----------------------|----------------|------------------------|---------|
| Town or Village:    | Barnsley                      | Inspection Direction: | 2              | Upstream Node:         | MH13    |
| Road:               | Land Off Harborough Hill Road | Inspected Length:     | 9.83 m         | Upstream Pipe Depth:   |         |
| Location:           | Property or buildings         | Total Length:         | 41.60 m        | Downstream Node:       | MH11    |
| Surface Type:       | Asphalt Footway               | Joint Length:         |                | Downstream Pipe Depth: | 0.800 m |
| Use:                | Foul                          | Pipe Shape:           | Circular       |                        |         |
| Type of Pipe:       | Gravity drain/sewer           | Dia/Height:           | 225 mm         |                        |         |
| Flow Control:       | No flow control               | Material:             | Vitrified clay |                        |         |
| Year Constructed:   | Not Specified                 | Lining Type:          | No Lining      |                        |         |
| Inspection Purpose: | Sample condition survey       | Lining Material:      | No Lining      |                        |         |
| Comments:           | None                          |                       |                |                        |         |
| Recommendations:    | None                          |                       |                |                        |         |



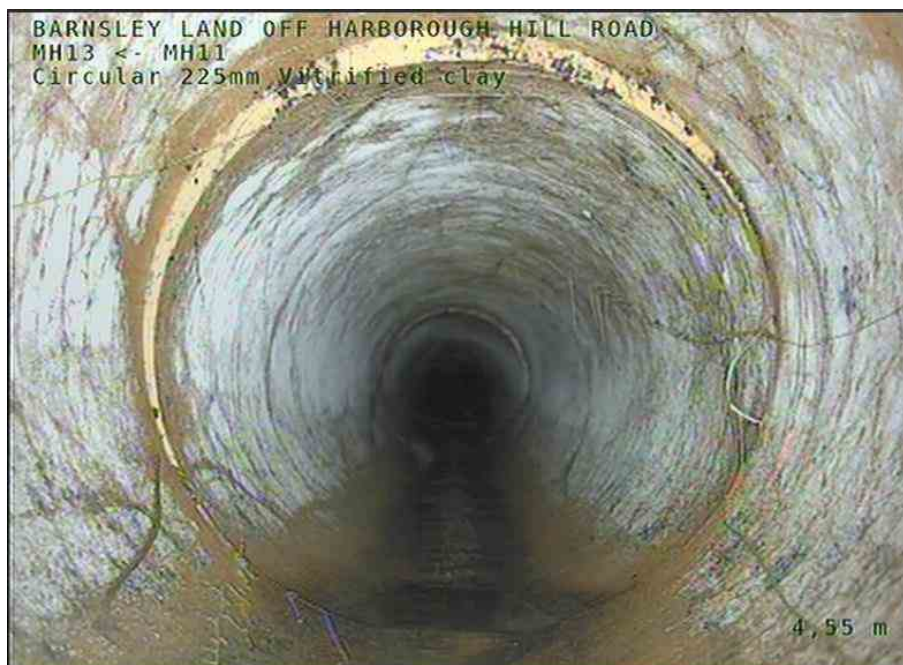
| Construction Features |          |          |           |           | Miscellaneous Features             |          |          |           |           |
|-----------------------|----------|----------|-----------|-----------|------------------------------------|----------|----------|-----------|-----------|
| Structural Defects    |          |          |           |           | Service & Operational Observations |          |          |           |           |
| STR No. Def           | STR Peak | STR Mean | STR Total | STR Grade | SER No. Def                        | SER Peak | SER Mean | SER Total | SER Grade |
| 0                     | 0.0      | 0.0      | 0.0       | 1.0       | 4                                  | 4.0      | 9.0      | 11.0      | 5.0       |

## Section Pictures - 02/11/2021 - MH13X

| Item No. | Inspection Direction | PLR   | Client's Job Ref | Contractor's Job Ref |
|----------|----------------------|-------|------------------|----------------------|
| 10       | 2                    | MH13X | SURVEY OPS       | 14429                |



1, 00:00:21, 1.22 m  
 Connection defective, connecting pipe is intruding at 1 o'clock, 100mm dia, intrusion: 10%



2, 00:00:36, 4.55 m  
 Roots, fine at joint, CIP PATCH REQ

## Section Pictures - 02/11/2021 - MH13X

| Item No. | Inspection Direction | PLR   | Client's Job Ref | Contractor's Job Ref |
|----------|----------------------|-------|------------------|----------------------|
| 10       | 2                    | MH13X | SURVEY OPS       | 14429                |

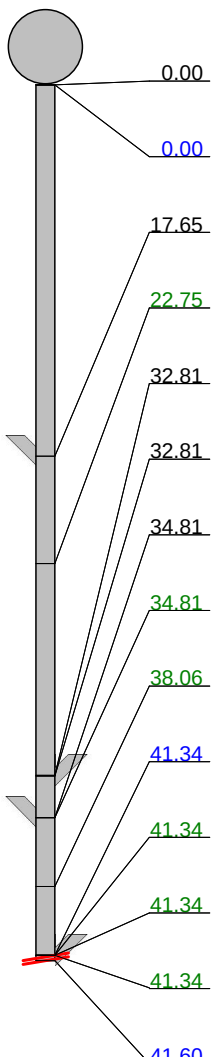


3, 00:00:44, 6.12 m  
Roots, fine at joint, start

## Abandoned section inspection - 02/11/2021 - MH13X

|                |                |                    |               |                                |                                |                               |                                 |
|----------------|----------------|--------------------|---------------|--------------------------------|--------------------------------|-------------------------------|---------------------------------|
| Item No.<br>10 | Insp. No.<br>2 | Date<br>02/11/21   | Time<br>12:50 | Client's Job Ref<br>SURVEY OPS | Weather<br>No Rain Or Snow     | Pre Cleaned<br>No             | PLR<br>MH13X                    |
| Operator<br>PK |                | Vehicle<br>SC15NYG |               | Camera<br>Ipek Ex              | Preset Length<br>Not Specified | Legal Status<br>Private Sewer | Alternative ID<br>Not Specified |

|                     |                               |                       |                |                        |         |
|---------------------|-------------------------------|-----------------------|----------------|------------------------|---------|
| Town or Village:    | Barnsley                      | Inspection Direction: | 1              | Upstream Node:         | MH13    |
| Road:               | Land Off Harborough Hill Road | Inspected Length:     | 41.60 m        | Upstream Pipe Depth:   |         |
| Location:           | Property or buildings         | Total Length:         | 41.60 m        | Downstream Node:       | MH11    |
| Surface Type:       | Asphalt Footway               | Joint Length:         |                | Downstream Pipe Depth: | 0.800 m |
| Use:                | Foul                          | Pipe Shape:           | Circular       |                        |         |
| Type of Pipe:       | Gravity drain/sewer           | Dia/Height:           | 225 mm         |                        |         |
| Flow Control:       | No flow control               | Material:             | Vitrified clay |                        |         |
| Year Constructed:   | Not Specified                 | Lining Type:          | No Lining      |                        |         |
| Inspection Purpose: | Sample condition survey       | Lining Material:      | No Lining      |                        |         |
| Comments:           | None                          |                       |                |                        |         |
| Recommendations:    | None                          |                       |                |                        |         |

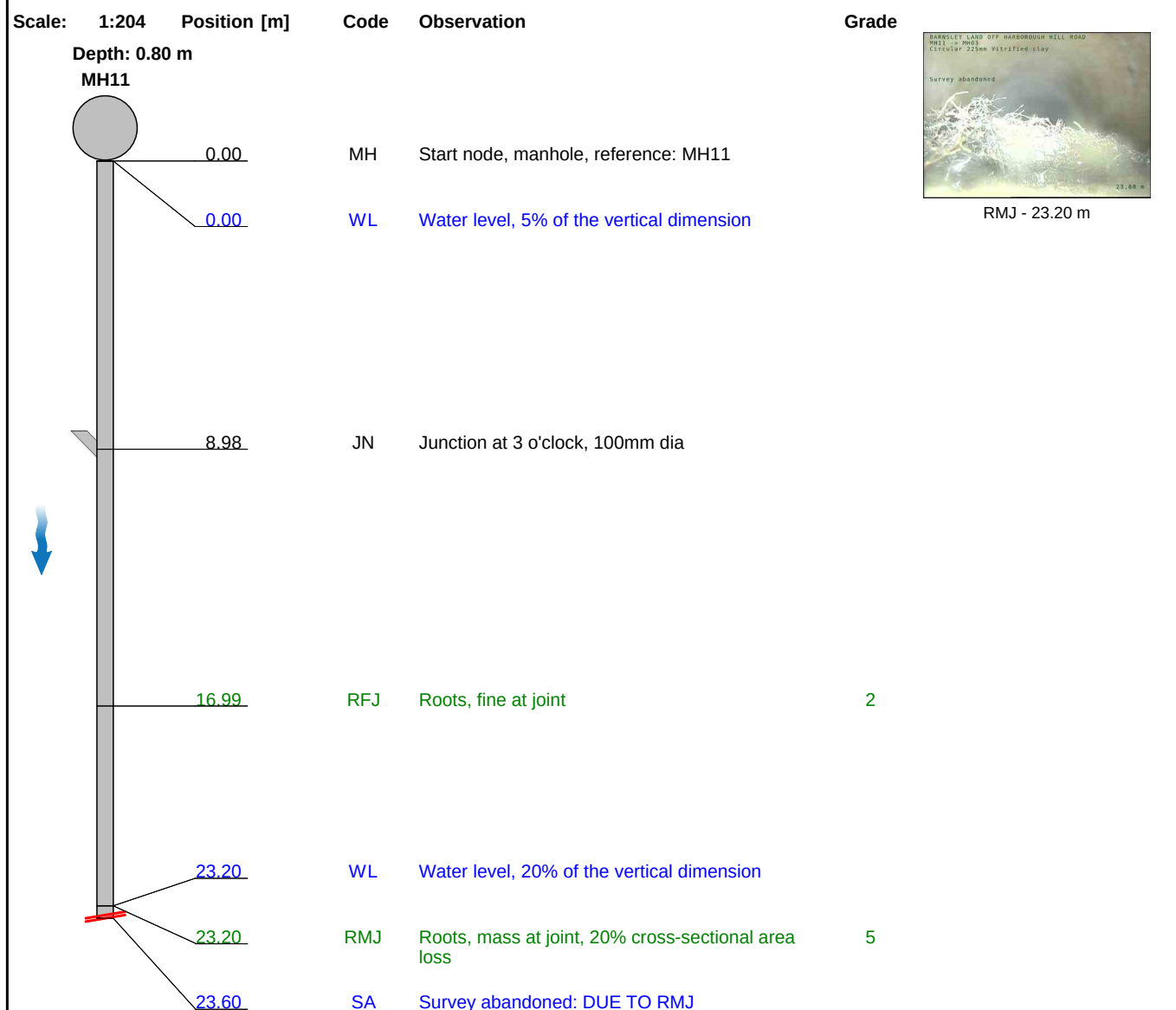
| Scale: 1:359                                                                       | Position [m] | Code                                                                                        | Observation | Grade |
|------------------------------------------------------------------------------------|--------------|---------------------------------------------------------------------------------------------|-------------|-------|
| Depth: m<br>MH13                                                                   |              |                                                                                             |             |       |
|  |              |                                                                                             |             |       |
| 0.00                                                                               | MH           | Start node, manhole, reference: MH13                                                        |             |       |
| 0.00                                                                               | WL           | Water level, 5% of the vertical dimension: 3                                                |             |       |
| 17.65                                                                              | JN           | Junction at 3 o'clock, 100mm dia                                                            |             |       |
| 22.75                                                                              | RFJ          | Roots, fine at joint                                                                        | 2           |       |
| 32.81                                                                              | JN           | Junction at 9 o'clock, 100mm dia                                                            |             |       |
| 32.81                                                                              | SC           | Pipe size changes, new size(s), 225mm high                                                  |             |       |
| 34.81                                                                              | JN           | Junction at 3 o'clock, 100mm dia                                                            |             |       |
| 34.81                                                                              | RFJ          | Roots, fine at joint                                                                        | 2           |       |
| 38.06                                                                              | RFJ          | Roots, fine at joint                                                                        | 2           |       |
| 41.34                                                                              | WL           | Water level, 30% of the vertical dimension                                                  |             |       |
| 41.34                                                                              | DER          | Settled deposits, coarse, 20% cross-sectional area loss                                     | 4           |       |
| 41.34                                                                              | RMJ          | Roots, mass at joint, 20% cross-sectional area loss                                         | 5           |       |
| 41.34                                                                              | CXI          | Connection defective, connecting pipe is intruding at 10 o'clock, 100mm dia, intrusion: 10% | 3           |       |
| 41.60                                                                              | SA           | Survey abandoned: DUE TO DER RM                                                             |             |       |

| Construction Features |          |          |           |           | Miscellaneous Features             |          |          |           |           |
|-----------------------|----------|----------|-----------|-----------|------------------------------------|----------|----------|-----------|-----------|
| Structural Defects    |          |          |           |           | Service & Operational Observations |          |          |           |           |
| STR No. Def           | STR Peak | STR Mean | STR Total | STR Grade | SER No. Def                        | SER Peak | SER Mean | SER Total | SER Grade |
| 0                     | 0.0      | 0.0      | 0.0       | 1.0       | 6                                  | 17.0     | 0.5      | 20.0      | 5.0       |

## Abandoned section inspection - 02/11/2021 - MH11X

| Item No. | Insp. No. | Date     | Time  | Client's Job Ref | Weather         | Pre Cleaned   | PLR            |
|----------|-----------|----------|-------|------------------|-----------------|---------------|----------------|
| 11       | 1         | 02/11/21 | 12:12 | SURVEY OPS       | No Rain Or Snow | No            | MH11X          |
| Operator |           | Vehicle  |       | Camera           | Preset Length   | Legal Status  | Alternative ID |
| PK       |           | SC15NYG  |       | Ipek Ex          | 0.70 m          | Private Sewer | Not Specified  |

|                            |                               |                              |         |                               |                |
|----------------------------|-------------------------------|------------------------------|---------|-------------------------------|----------------|
| <b>Town or Village:</b>    | Barnsley                      | <b>Inspection Direction:</b> | 1       | <b>Upstream Node:</b>         | MH11           |
| <b>Road:</b>               | Land Off Harborough Hill Road | <b>Inspected Length:</b>     | 23.60 m | <b>Upstream Pipe Depth:</b>   | 0.800 m        |
| <b>Location:</b>           | Property or buildings         | <b>Total Length:</b>         | 23.60 m | <b>Downstream Node:</b>       | MH03           |
| <b>Surface Type:</b>       | Asphalt Footway               | <b>Joint Length:</b>         |         | <b>Downstream Pipe Depth:</b> | 3.600 m        |
| <b>Use:</b>                | Surface water                 |                              |         | <b>Pipe Shape:</b>            | Circular       |
| <b>Type of Pipe:</b>       | Gravity drain/sewer           |                              |         | <b>Dia/Height:</b>            | 225 mm         |
| <b>Flow Control:</b>       | No flow control               |                              |         | <b>Material:</b>              | Vitrified clay |
| <b>Year Constructed:</b>   | Not Specified                 |                              |         | <b>Lining Type:</b>           | No Lining      |
| <b>Inspection Purpose:</b> | Sample condition survey       |                              |         | <b>Lining Material:</b>       | No Lining      |
| <b>Comments:</b>           | None                          |                              |         |                               |                |
| <b>Recommendations:</b>    | None                          |                              |         |                               |                |



| Construction Features |          |          |           |           | Miscellaneous Features             |          |          |           |           |
|-----------------------|----------|----------|-----------|-----------|------------------------------------|----------|----------|-----------|-----------|
| Structural Defects    |          |          |           |           | Service & Operational Observations |          |          |           |           |
| STR No. Def           | STR Peak | STR Mean | STR Total | STR Grade | SER No. Def                        | SER Peak | SER Mean | SER Total | SER Grade |
| 0                     | 0.0      | 0.0      | 0.0       | 1.0       | 2                                  | 10.0     | 0.5      | 11.0      | 5.0       |

## Section Pictures - 02/11/2021 - MH11X

| Item No. | Inspection Direction | PLR   | Client's Job Ref | Contractor's Job Ref |
|----------|----------------------|-------|------------------|----------------------|
| 11       | 1                    | MH11X | SURVEY OPS       | 14429                |

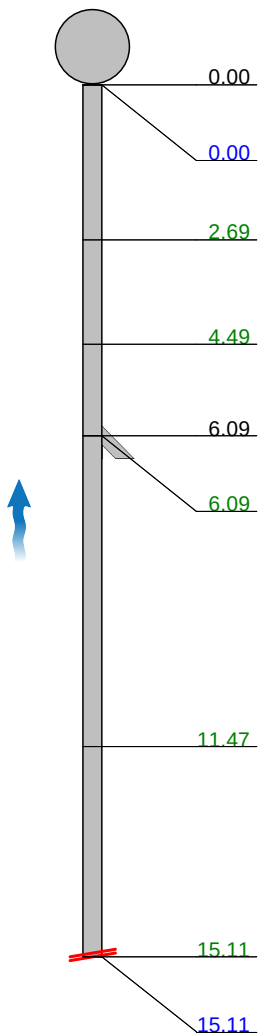


1, 00:01:32, 23.20 m  
Roots, mass at joint, 20% cross-sectional area loss

## Abandoned section inspection - 02/11/2021 - MH13AX

|                |                |                    |               |                                |                            |                               |                                 |
|----------------|----------------|--------------------|---------------|--------------------------------|----------------------------|-------------------------------|---------------------------------|
| Item No.<br>12 | Insp. No.<br>1 | Date<br>02/11/21   | Time<br>13:02 | Client's Job Ref<br>SURVEY OPS | Weather<br>No Rain Or Snow | Pre Cleaned<br>No             | PLR<br>MH13AX                   |
| Operator<br>PK |                | Vehicle<br>SC15NYG |               | Camera<br>Ipek Ex              | Preset Length<br>0.60 m    | Legal Status<br>Private Sewer | Alternative ID<br>Not Specified |

|                     |                               |                       |                |                        |         |
|---------------------|-------------------------------|-----------------------|----------------|------------------------|---------|
| Town or Village:    | Barnsley                      | Inspection Direction: | 2              | Upstream Node:         | MH13A   |
| Road:               | Land Off Harborough Hill Road | Inspected Length:     | 15.11 m        | Upstream Pipe Depth:   | 0.000 m |
| Location:           | Property or buildings         | Total Length:         | 15.11 m        | Downstream Node:       | MH13    |
| Surface Type:       | Asphalt Footway               | Joint Length:         |                | Downstream Pipe Depth: |         |
| Use:                | Surface water                 | Pipe Shape:           | Circular       |                        |         |
| Type of Pipe:       | Gravity drain/sewer           | Dia/Height:           | 150 mm         |                        |         |
| Flow Control:       | No flow control               | Material:             | Vitrified clay |                        |         |
| Year Constructed:   | Not Specified                 | Lining Type:          | No Lining      |                        |         |
| Inspection Purpose: | Sample condition survey       | Lining Material:      | No Lining      |                        |         |
| Comments:           | None                          |                       |                |                        |         |
| Recommendations:    | None                          |                       |                |                        |         |

| Scale: 1:131                                                                       | Position [m] | Code                                                                                       | Observation | Grade |
|------------------------------------------------------------------------------------|--------------|--------------------------------------------------------------------------------------------|-------------|-------|
| Depth: m<br>MH13                                                                   |              |                                                                                            |             |       |
|  |              |                                                                                            |             |       |
| 0.00                                                                               | MH           | Start node, manhole, reference: MH13                                                       |             |       |
| 0.00                                                                               | WL           | Water level, 5% of the vertical dimension                                                  |             |       |
| 2.69                                                                               | LR           | Line deviates right                                                                        |             |       |
| 4.49                                                                               | DES          | Settled deposits, fine, 30% cross-sectional area loss                                      | 4           |       |
| 6.09                                                                               | JN           | Junction at 9 o'clock, 100mm dia                                                           |             |       |
| 6.09                                                                               | DER          | Settled deposits, coarse, 20% cross-sectional area loss                                    | 4           |       |
| 11.47                                                                              | DES          | Settled deposits, fine, 10% cross-sectional area loss                                      | 3           |       |
| 15.11                                                                              | DEE          | Attached deposits, encrustation from 5 o'clock to 7 o'clock, 10% cross-sectional area loss | 3           |       |
| 15.11                                                                              | SA           | Survey abandoned: DUE TO DEE                                                               |             |       |

| Construction Features |          |          |           |           | Miscellaneous Features             |          |          |           |           |
|-----------------------|----------|----------|-----------|-----------|------------------------------------|----------|----------|-----------|-----------|
| Structural Defects    |          |          |           |           | Service & Operational Observations |          |          |           |           |
| STR No. Def           | STR Peak | STR Mean | STR Total | STR Grade | SER No. Def                        | SER Peak | SER Mean | SER Total | SER Grade |
| 0                     | 0.0      | 0.0      | 0.0       | 1.0       | 4                                  | 5.0      | 0.9      | 14.0      | 4.0       |

## Abandoned section inspection - 02/11/2021 - MH13BX

|                |                |                    |               |                                |                            |                               |                                 |
|----------------|----------------|--------------------|---------------|--------------------------------|----------------------------|-------------------------------|---------------------------------|
| Item No.<br>13 | Insp. No.<br>1 | Date<br>02/11/21   | Time<br>13:13 | Client's Job Ref<br>SURVEY OPS | Weather<br>No Rain Or Snow | Pre Cleaned<br>No             | PLR<br>MH13BX                   |
| Operator<br>PK |                | Vehicle<br>SC15NYG |               | Camera<br>Ipek Ex              | Preset Length<br>0.60 m    | Legal Status<br>Private Sewer | Alternative ID<br>Not Specified |

|                     |                               |                       |                |                        |         |
|---------------------|-------------------------------|-----------------------|----------------|------------------------|---------|
| Town or Village:    | Barnsley                      | Inspection Direction: | 2              | Upstream Node:         | MH13B   |
| Road:               | Land Off Harborough Hill Road | Inspected Length:     | 27.54 m        | Upstream Pipe Depth:   | 0.000 m |
| Location:           | Property or buildings         | Total Length:         | 27.53 m        | Downstream Node:       | MH13    |
| Surface Type:       | Asphalt Footway               | Joint Length:         |                | Downstream Pipe Depth: |         |
| Use:                | Surface water                 | Pipe Shape:           | Circular       |                        |         |
| Type of Pipe:       | Gravity drain/sewer           | Dia/Height:           | 150 mm         |                        |         |
| Flow Control:       | No flow control               | Material:             | Vitrified clay |                        |         |
| Year Constructed:   | Not Specified                 | Lining Type:          | No Lining      |                        |         |
| Inspection Purpose: | Sample condition survey       | Lining Material:      | No Lining      |                        |         |
| Comments:           | None                          |                       |                |                        |         |
| Recommendations:    | None                          |                       |                |                        |         |

| Scale: 1:238  | Position [m] | Code | Observation                                                       | Grade |
|---------------|--------------|------|-------------------------------------------------------------------|-------|
| Depth: m      |              |      |                                                                   |       |
| MH13          | 0.00         | MH   | Start node, manhole, reference: MH13                              |       |
|               | 0.00         | WL   | Water level, 5% of the vertical dimension                         |       |
|               | 3.31         | DER  | Settled deposits, coarse, 10% cross-sectional area loss           | 3     |
|               | 7.82         | JN   | Junction at 3 o'clock, 100mm dia                                  |       |
|               | 10.53        | RFJ  | Roots, fine at joint                                              | 2     |
|               | 10.53        | CN   | Connection other than junction at 10 o'clock, 100mm dia           |       |
|               | 13.21        | JN   | Junction at 3 o'clock, 100mm dia                                  |       |
|               | 13.21        | RF   | Roots, fine                                                       | 2     |
|               | 19.94        | JN   | Junction at 3 o'clock, 100mm dia                                  |       |
|               | 19.94        | RF   | Roots, fine                                                       | 2     |
|               | 23.06        | S01  | DES Settled deposits, fine, 10% cross-sectional area loss, start  |       |
|               | 23.06        | RF   | Roots, fine                                                       | 2     |
|               | 26.74        | JN   | Junction at 3 o'clock, 150mm dia                                  |       |
|               | 27.29        | F01  | DES Settled deposits, fine, 10% cross-sectional area loss, finish | 3     |
| MH13B         | 27.53        | SA   | Survey abandoned: DUE TO DES                                      |       |
| Depth: 0.00 m |              |      |                                                                   |       |

| Construction Features |          |          |           |           | Miscellaneous Features             |          |          |           |           |
|-----------------------|----------|----------|-----------|-----------|------------------------------------|----------|----------|-----------|-----------|
| Structural Defects    |          |          |           |           | Service & Operational Observations |          |          |           |           |
| STR No. Def           | STR Peak | STR Mean | STR Total | STR Grade | SER No. Def                        | SER Peak | SER Mean | SER Total | SER Grade |
| 0                     | 0.0      | 0.0      | 0.0       | 1.0       | 6                                  | 3.0      | 0.6      | 16.0      | 3.0       |

## Disclaimer and FOW Recommendations

### Disclaimer

Underground Surveys disclaims all responsibility and liability (including without limitation, liability in negligence) for all expenses, losses, damages and cost you might incur as a result of the information being inaccurate or incomplete in anyway and for any reason. The accuracy of the location of the pipe may be adversely affected due to ground conditions, materials within the ground and overhead utilities. The list is by no means exhausted.

### FOW Recommendations

We have identified remedial works from carrying out our CCTV drainage survey at your site, each of our recommendations has been detailed against each section survey, if you would like a quotation for Underground Surveys to carry out the remedial works that we have identified, please contact our office to discuss further on 01925 444664 or email AmyD@undergroundsveys.co.uk