**Wilberforce Way,**

**Southwater Horsham RH13 9RS**

**TECHNICAL NOTE**

# Designer's Response to Planning Condition 6

**DOCUMENT CONTROL SHEET**


**Issued by:** Burrows Graham Limited
Buckland House
Dower Mews
Berkhamsted
Herts HP4 2BL

Tel: +44 (0)1442 508402


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**Introduction**

This technical note relates to a planning application for the Erection of commercial buildings comprising flexible B2 (general industrial), B8 (storage & distribution), and E(g)(iii) (light industrial) floorspace with ancillary offices, car parking, yard space, landscape planting and other associated works.

Planning Ref: DC/22/2077 – Oakhurst Business Park, RSPCA Headquarters, Wilberforce Way, Southwater, West Sussex, RH13 9RSInformation is provided in response to LLFA comments relating to discharging planning Condition 6, dated 12th August 2024 (Ref DISC/24/0186, see relevant extract below. For full LLFA response letter refer to Appendix F.

| LLFA Comments and Designer's Response |
|---|
| 1. Supporting calculations for all rainfall return periods up to and including the 1% AEP plus appropriate climate change allowance event. This should utilise the correct parameters (FEH13 or FEH22, CV value of 1, appropriate climate change allowance and urban creep).<br>***BGL Response***<br>Refer to Appendix A for updated drainage calculations based on FEH22, Cv value of 1 and a 25% climate change. |
| 2. Consent from Southern Water for the discharge to the surface water sewer. At discharge of condition stage, the LLFA require all outfalls and discharge rates to be confirmed with the relevant authorities.<br>***BGL Response***<br>Refer to Appendix B, Southern Water were consultant as part of planning process as per their letter dated 8th December 2022, which a response was provided back to the LPA dated 23rd January 2023 and they have no objection with the proposed drainage strategy. Refer to |
| 3. Full management and maintenance plan including the responsibility of maintenance, frequency of maintenance and action of maintenance for all SuDS features on site.<br>***BGL Response***<br>Refer to Appendix C for the Drainage Maintenance Plan for all SuDs features. |
| 4. Full water quality assessment in the form of the Simple Index Approach or equivalent.<br>***BGL Response***<br>Surface water run-off from hard paved areas at risk of contamination should receive water quality treatment. Commercial yards and non-residential parking areas are considered as a medium hazard in terms of contamination. Figure 1 illustrates the pollution hazard indices for different land use classifications from The CIRIA SuDS Manual C753 (2015). |

**TABLE 26.2 Pollution hazard indices for different land use classifications**

| Land use | Pollution hazard level | Total suspended solids (TSS) | Metals | Hydro-carbons |
|---|---|---|---|---|
| Residential roofs | Very low | 0.2 | 0.2 | 0.05 |
| Other roofs (typically commercial/ industrial roofs) | Low | 0.3 | 0.2 (up to 0.8 where there is potential for metals to leach from the roof) | 0.05 |
| Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day | Low | 0.5 | 0.4 | 0.4 |
| Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways[1] | Medium | 0.7 | 0.6 | 0.7 |
| Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways[1] | High | 0.8[2] | 0.8[2] | 0.9[2] |

*Figure 1. Pollution Hazard indices for land use classification (Table 26.2 the CIRIA SuDS manual 2015)*

**TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters**

| | Mitigation indices[1] | | |
|---|---|---|---|
| **Type of SuDS component** | **TSS** | **Metals** | **Hydrocarbons** |
| Filter strip | 0.4 | 0.4 | 0.5 |
| Filter drain | 0.4[2] | 0.4 | 0.4 |
| Swale | 0.5 | 0.6 | 0.6 |
| Bioretention system | 0.8 | 0.8 | 0.8 |
| Permeable pavement | 0.7 | 0.6 | 0.7 |
| Detention basin | 0.5 | 0.5 | 0.6 |
| Pond[4] | 0.7[3] | 0.7 | 0.5 |
| Wetland | 0.8[3] | 0.8 | 0.8 |
| Proprietary treatment systems[5,6] | These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area. | | |

Notes

1 SuDS components only deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters.

2 Filter drains can remove coarse sediments, but their use for this purpose will have significant implications with respect to maintenance requirements, and this should be taken into account in the design and Maintenance Plan.

3 Ponds and wetlands can remove coarse sediments, but their use for this purpose will have significant implications with respect to the maintenance requirements and amenity value of the system. Sediment should normally be removed upstream, unless they are specifically designed to retain sediment in a separate part of the component, where it cannot easily migrate to the main body of water.

4 Where a wetland is not specifically designed to provide significantly enhanced treatment, it should be considered as having the same mitigation indices as a pond.

5 See Chapter 14 for approaches to demonstrate product performance. A British Water/Environment Agency assessment code of practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at: **http://tinyurl.com/qf7yuj7**

6 SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution where there is a requirement to retrofit treatment. SEPA (2014) also provides a flowchart with a summary of checks on suitability of a proprietary system.

*Figure 2. Indicative SuDS mitigation indices (Table 26.3 the CIRIA SuDS manual 2015*

The selection of permeable surfacing to the parking bays and filter strips along with the proprietary treatment systems in terms of the Petrol Separators to the yard areas would ensure that the SuDS mitigation component index (Figure 2) exceeds the pollution hazard index (Figure 1).
Furthermore the following will apply:

- All runoff from the car parking bays has a medium risk and will pass through permeable paving.
- In addition, all runoff from heavier duty hardstanding areas will also pass through Class 1 full retention separators.
- Surface Water Strategy, the mimicking of water quantity has been considered by reducing the offsite peak discharge rates and providing attenuation to control the runoff rates and peak volumes to the downstream network.
- In terms of Amenity and Biodiversity, - Sustainable Drainage, there are limited areas on this fully developed site to form green SuDS infrastructure to provide amenity and biodiversity areas linked to the drainage strategy. Notwithstanding, reference should be made to the landscape drawings and the Ecology & Biodiversity report which details improvements being made in relation to this provision.

5. Existing drainage on site should be outlined and confirmation of whether it is being removed or retained. Alongside this, the LLFA would also expect a CCTV survey to be submitted for review.

***BGL Response***

For existing drainage pipes will be removed upto the site boundary and all public sewer lines will be maintained. Refer to CCTV report and UG survey in Appendix E and Drainage Plan in Appendix D confirms where existing drainage will be cut back (EXMHS6 & EXMHF3 for surface and foul water respectively)

6. Finished Floor levels and Finished Ground Levels should not be TBC pending detailed assessment. At discharge of condition stage, finished floor levels should be confirmed.

***BGL Response***

The text 'TBC' has been removed.

7. There should be no features on the drainage layout drawing as TBC. Cover and Invert Levels should be confirmed at this stage. Additionally, there is no volume provided for the attenuation pond.

***BGL Response***

For every drainage element information have been shown as well as volume of the attenuation tank and pond are shown.

8. Exceedance flows should be demonstrated on the drainage layout.

***BGL Response***

Exceedance flow added onto the drainage plan. Refer to Appendix E for updated drainage plan.

# APPENDIX A – Drainage Hydraulic Calculation Output files

## Design Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FEH-22 | Minimum Velocity (m/s) | 1.00 |
| Return Period (years) | 2 | Connection Type | Level Soffits |
| Additional Flow (%) | 0 | Minimum Backdrop Height (m) | 0.200 |
| CV | 1.000 | Preferred Cover Depth (m) | 1.200 |
| Time of Entry (mins) | 4.00 | Include Intermediate Ground | ✓ |
| Maximum Time of Concentration (mins) | 30.00 | Enforce best practice design rules | ✓ |
| Maximum Rainfall (mm/hr) | 150.0 | | |

## 1 STANDARD Manhole Type

| Max Width (mm) | Diameter (mm) | Max Width (mm) | Diameter (mm) |
|---|---|---|---|
| 374 | 1200 | 749 | 1500 |
| 499 | 1350 | 900 | 1800 |

>900 Link+900 mm

| Max Depth (m) | Diameter (mm) | Max Depth (m) | Diameter (mm) |
|---|---|---|---|
| 1.500 | 1050 | 99.999 | 1350 |

## 1 STANDARD Link Type

| | | | |
|---|---|---|---|
| Shape | Circular | Auto Increment (mm) | 75 |
| Barrels | 1 | Follow Ground | x |

**Available Diameters (mm)**

| | |
|---|---|
| 100 | 150 |

## Nodes

| Name | Area (ha) | T of E (mins) | Cover Level (m) | Diameter (mm) | Depth (m) |
|---|---|---|---|---|---|
| SW01 | 0.012 | 4.00 | 66.400 | 1200 | 1.350 |
| SW02 | 0.056 | 4.00 | 66.450 | 1200 | 1.585 |
| SW03 | 0.081 | 4.00 | 66.450 | 1200 | 1.740 |
| SW04 | 0.106 | 4.00 | 66.450 | 1200 | 1.865 |
| SW05 | 0.064 | 4.00 | 66.450 | 1500 | 2.015 |
| CHANNEL | 0.340 | 4.00 | 66.200 | 1200 | 1.500 |
| SW06 | 0.065 | 4.00 | 66.480 | 1200 | 1.350 |
| SW07 | 0.065 | 4.00 | 66.480 | 1200 | 1.665 |
| TANK | | | 66.300 | 300 | 2.300 |
| SW08 | 0.030 | 4.00 | 66.500 | 1500 | 2.545 |
| SW09 | 0.050 | 4.00 | 65.150 | 1200 | 1.475 |
| SW10 | 0.166 | 4.00 | 66.050 | 1200 | 1.425 |
| SW11 | | | 65.300 | 1200 | 1.720 |
| 14 | 0.040 | 4.00 | 64.300 | 1200 | 1.050 |
| 15 | 0.234 | 4.00 | 64.970 | 1200 | 1.470 |
| SW12 | | | 65.420 | 1200 | 2.530 |
| SW13 | | | 64.900 | 1200 | 2.077 |
| SW14 | 0.185 | 4.00 | 65.200 | 1200 | 2.700 |
| SW15 | 0.185 | 4.00 | 65.200 | 1200 | 2.700 |
| POND | | | 64.000 | 1200 | 2.300 |
| SW16 | | | 64.000 | 1200 | 2.340 |
| SW17 | | | 65.300 | 1500 | 3.750 |
| EX S6 | | | 64.200 | 1200 | 2.700 |

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## Nodes

| Name | Area (ha) | T of E (mins) | Cover Level (m) | Diameter (mm) | Depth (m) |
|---|---|---|---|---|---|
| sewer | | | 63.500 | | 2.020 |

## Links

| Name | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | SW01 | SW02 | 11.000 | 0.600 | 65.050 | 64.940 | 0.110 | 100.0 | 150 | 4.18 | 54.9 |
| 1.001 | SW02 | SW03 | 16.000 | 0.600 | 64.865 | 64.785 | 0.080 | 200.0 | 225 | 4.47 | 54.9 |
| 1.002 | SW03 | SW04 | 31.000 | 0.600 | 64.710 | 64.585 | 0.125 | 248.0 | 300 | 4.99 | 54.9 |
| 1.003 | SW04 | SW05 | 19.000 | 0.600 | 64.585 | 64.510 | 0.075 | 253.3 | 300 | 5.31 | 53.7 |
| 1.004 | SW05 | TANK | 3.000 | 0.600 | 64.435 | 64.420 | 0.015 | 200.0 | 375 | 5.35 | 53.6 |
| 2.000 | CHANNEL | TANK | 8.000 | 0.600 | 64.700 | 64.409 | 0.291 | 27.5 | 300 | 4.04 | 54.9 |
| 3.000 | SW06 | SW07 | 24.000 | 0.600 | 65.130 | 64.890 | 0.240 | 100.0 | 150 | 4.40 | 54.9 |
| 3.001 | SW07 | TANK | 18.000 | 0.600 | 64.815 | 64.725 | 0.090 | 200.0 | 225 | 4.72 | 54.9 |
| 1.005 | TANK | SW08 | 9.000 | 0.600 | 64.000 | 63.955 | 0.045 | 200.0 | 225 | 5.52 | 52.9 |
| 1.006 | SW08 | SW09 | 42.000 | 0.600 | 63.955 | 63.675 | 0.280 | 150.0 | 225 | 6.17 | 50.4 |
| 1.007 | SW09 | SW11 | 14.000 | 0.600 | 63.675 | 63.580 | 0.095 | 147.4 | 225 | 6.39 | 49.7 |
| 4.000 | SW10 | SW11 | 77.000 | 0.600 | 64.625 | 63.580 | 1.045 | 73.7 | 225 | 4.84 | 54.9 |
| 1.008 | SW11 | SW17 | 57.000 | 0.600 | 63.580 | 63.295 | 0.285 | 200.0 | 300 | 7.25 | 46.8 |
| 5.000 | 14 | SW12 | 21.000 | 0.600 | 63.250 | 63.040 | 0.210 | 100.0 | 150 | 4.35 | 54.9 |
| 6.000 | 15 | SW12 | 15.000 | 0.600 | 63.500 | 63.400 | 0.100 | 150.0 | 300 | 4.20 | 54.9 |
| 5.001 | SW12 | SW13 | 10.000 | 0.600 | 62.890 | 62.823 | 0.067 | 149.3 | 300 | 4.48 | 54.9 |
| 5.002 | SW13 | SW14 | 18.000 | 0.600 | 62.823 | 62.703 | 0.120 | 150.0 | 300 | 4.71 | 54.9 |
| 5.003 | SW14 | POND | 10.000 | 0.600 | 62.500 | 62.300 | 0.200 | 50.0 | 300 | 4.79 | 54.9 |
| 7.000 | SW15 | POND | 7.000 | 0.600 | 62.500 | 62.300 | 0.200 | 35.0 | 225 | 4.05 | 54.9 |
| 5.004 | POND | SW16 | 8.000 | 0.600 | 61.700 | 61.660 | 0.040 | 200.0 | 300 | 4.91 | 54.9 |
| 5.005 | SW16 | SW17 | 32.000 | 0.600 | 61.660 | 61.550 | 0.110 | 290.9 | 300 | 5.49 | 53.0 |

| Name | Vel (m/s) | Cap (l/s) | Flow (l/s) | US Depth (m) | DS Depth (m) | Σ Area (ha) | Σ Add Inflow (l/s) |
|---|---|---|---|---|---|---|---|
| 1.000 | 1.005 | 17.8 | 2.4 | 1.200 | 1.360 | 0.012 | 0.0 |
| 1.001 | 0.921 | 36.6 | 13.5 | 1.360 | 1.440 | 0.068 | 0.0 |
| 1.002 | 0.994 | 70.2 | 29.6 | 1.440 | 1.565 | 0.149 | 0.0 |
| 1.003 | 0.983 | 69.5 | 49.5 | 1.565 | 1.640 | 0.255 | 0.0 |
| 1.004 | 1.277 | 141.1 | 61.8 | 1.640 | 1.505 | 0.319 | 0.0 |
| 2.000 | 3.010 | 212.7 | 67.5 | 1.200 | 1.591 | 0.340 | 0.0 |
| 3.000 | 1.005 | 17.8 | 12.9 | 1.200 | 1.440 | 0.065 | 0.0 |
| 3.001 | 0.921 | 36.6 | 25.8 | 1.440 | 1.350 | 0.130 | 0.0 |
| 1.005 | 0.921 | 36.6 | 150.9 | 2.075 | 2.320 | 0.789 | 0.0 |
| 1.006 | 1.065 | 42.3 | 149.3 | 2.320 | 1.250 | 0.819 | 0.0 |
| 1.007 | 1.075 | 42.7 | 156.0 | 1.250 | 1.495 | 0.869 | 0.0 |
| 4.000 | 1.525 | 60.6 | 33.0 | 1.200 | 1.495 | 0.166 | 0.0 |
| 1.008 | 1.108 | 78.3 | 175.1 | 1.420 | 1.705 | 1.035 | 0.0 |
| 5.000 | 1.005 | 17.8 | 7.9 | 0.900 | 2.230 | 0.040 | 0.0 |
| 6.000 | 1.281 | 90.6 | 46.5 | 1.170 | 1.720 | 0.234 | 0.0 |
| 5.001 | 1.284 | 90.8 | 54.4 | 2.230 | 1.777 | 0.274 | 0.0 |
| 5.002 | 1.281 | 90.6 | 54.4 | 1.777 | 2.197 | 0.274 | 0.0 |
| 5.003 | 2.228 | 157.5 | 91.1 | 2.400 | 1.400 | 0.459 | 0.0 |
| 7.000 | 2.218 | 88.2 | 36.7 | 2.475 | 1.475 | 0.185 | 0.0 |
| 5.004 | 1.108 | 78.3 | 127.9 | 2.000 | 2.040 | 0.644 | 0.0 |
| 5.005 | 0.916 | 64.8 | 123.4 | 2.040 | 3.450 | 0.644 | 0.0 |

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## Links

| Name | US Node | DS Node | Length (m) | ks (mm) / n | US IL (m) | DS IL (m) | Fall (m) | Slope (1:X) | Dia (mm) | T of C (mins) | Rain (mm/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.009 | SW17 | EX S6 | 4.000 | 0.600 | 61.550 | 61.500 | 0.050 | 80.0 | 225 | 7.29 | 46.7 |
| 1.010 | EX S6 | sewer | 10.000 | 0.600 | 61.500 | 61.480 | 0.020 | 500.0 | 225 | 7.58 | 45.8 |

| Name | Vel (m/s) | Cap (l/s) | Flow (l/s) | US Depth (m) | DS Depth (m) | Σ Area (ha) | Σ Add Inflow (l/s) |
|---|---|---|---|---|---|---|---|
| 1.009 | 1.463 | 58.2 | 283.2 | 3.525 | 2.475 | 1.679 | 0.0 |
| 1.010 | 0.578 | 23.0 | 277.9 | 2.475 | 1.795 | 1.679 | 0.0 |

## Pipeline Schedule

| Link | Length (m) | Slope (1:X) | Dia (mm) | Link Type | US CL (m) | US IL (m) | US Depth (m) | DS CL (m) | DS IL (m) | DS Depth (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 11.000 | 100.0 | 150 | 1 STANDARD | 66.400 | 65.050 | 1.200 | 66.450 | 64.940 | 1.360 |
| 1.001 | 16.000 | 200.0 | 225 | 1 STANDARD | 66.450 | 64.865 | 1.360 | 66.450 | 64.785 | 1.440 |
| 1.002 | 31.000 | 248.0 | 300 | 1 STANDARD | 66.450 | 64.710 | 1.440 | 66.450 | 64.585 | 1.565 |
| 1.003 | 19.000 | 253.3 | 300 | 1 STANDARD | 66.450 | 64.585 | 1.565 | 66.450 | 64.510 | 1.640 |
| 1.004 | 3.000 | 200.0 | 375 | 1 STANDARD | 66.450 | 64.435 | 1.640 | 66.300 | 64.420 | 1.505 |
| 2.000 | 8.000 | 27.5 | 300 | 1 STANDARD | 66.200 | 64.700 | 1.200 | 66.300 | 64.409 | 1.591 |
| 3.000 | 24.000 | 100.0 | 150 | 1 STANDARD | 66.480 | 65.130 | 1.200 | 66.480 | 64.890 | 1.440 |
| 3.001 | 18.000 | 200.0 | 225 | 1 STANDARD | 66.480 | 64.815 | 1.440 | 66.300 | 64.725 | 1.350 |
| 1.005 | 9.000 | 200.0 | 225 | 1 STANDARD | 66.300 | 64.000 | 2.075 | 66.500 | 63.955 | 2.320 |
| 1.006 | 42.000 | 150.0 | 225 | 1 STANDARD | 66.500 | 63.955 | 2.320 | 65.150 | 63.675 | 1.250 |
| 1.007 | 14.000 | 147.4 | 225 | 1 STANDARD | 65.150 | 63.675 | 1.250 | 65.300 | 63.580 | 1.495 |
| 4.000 | 77.000 | 73.7 | 225 | 1 STANDARD | 66.050 | 64.625 | 1.200 | 65.300 | 63.580 | 1.495 |
| 1.008 | 57.000 | 200.0 | 300 | 1 STANDARD | 65.300 | 63.580 | 1.420 | 65.300 | 63.295 | 1.705 |
| 5.000 | 21.000 | 100.0 | 150 | 1 STANDARD | 64.300 | 63.250 | 0.900 | 65.420 | 63.040 | 2.230 |
| 6.000 | 15.000 | 150.0 | 300 | 1 STANDARD | 64.970 | 63.500 | 1.170 | 65.420 | 63.400 | 1.720 |
| 5.001 | 10.000 | 149.3 | 300 | 1 STANDARD | 65.420 | 62.890 | 2.230 | 64.900 | 62.823 | 1.777 |
| 5.002 | 18.000 | 150.0 | 300 | 1 STANDARD | 64.900 | 62.823 | 1.777 | 65.200 | 62.703 | 2.197 |
| 5.003 | 10.000 | 50.0 | 300 | 1 STANDARD | 65.200 | 62.500 | 2.400 | 64.000 | 62.300 | 1.400 |

| Link | US Node | Dia (mm) | Node Type | MH Type | DS Node | Dia (mm) | Node Type | MH Type |
|---|---|---|---|---|---|---|---|---|
| 1.000 | SW01 | 1200 | Manhole | 1 STANDARD | SW02 | 1200 | Manhole | 1 STANDARD |
| 1.001 | SW02 | 1200 | Manhole | 1 STANDARD | SW03 | 1200 | Manhole | 1 STANDARD |
| 1.002 | SW03 | 1200 | Manhole | 1 STANDARD | SW04 | 1200 | Manhole | 1 STANDARD |
| 1.003 | SW04 | 1200 | Manhole | 1 STANDARD | SW05 | 1500 | Manhole | 1 STANDARD |
| 1.004 | SW05 | 1500 | Manhole | 1 STANDARD | TANK | 300 | Manhole | 1 STANDARD |
| 2.000 | CHANNEL | 1200 | Manhole | 1 STANDARD | TANK | 300 | Manhole | 1 STANDARD |
| 3.000 | SW06 | 1200 | Manhole | 1 STANDARD | SW07 | 1200 | Manhole | 1 STANDARD |
| 3.001 | SW07 | 1200 | Manhole | 1 STANDARD | TANK | 300 | Manhole | 1 STANDARD |
| 1.005 | TANK | 300 | Manhole | 1 STANDARD | SW08 | 1500 | Manhole | 1 STANDARD |
| 1.006 | SW08 | 1500 | Manhole | 1 STANDARD | SW09 | 1200 | Manhole | 1 STANDARD |
| 1.007 | SW09 | 1200 | Manhole | 1 STANDARD | SW11 | 1200 | Manhole | 1 STANDARD |
| 4.000 | SW10 | 1200 | Manhole | 1 STANDARD | SW11 | 1200 | Manhole | 1 STANDARD |
| 1.008 | SW11 | 1200 | Manhole | 1 STANDARD | SW17 | 1500 | Manhole | 1 STANDARD |
| 5.000 | 14 | 1200 | Manhole | 1 STANDARD | SW12 | 1200 | Manhole | 1 STANDARD |
| 6.000 | 15 | 1200 | Manhole | 1 STANDARD | SW12 | 1200 | Manhole | 1 STANDARD |
| 5.001 | SW12 | 1200 | Manhole | 1 STANDARD | SW13 | 1200 | Manhole | 1 STANDARD |
| 5.002 | SW13 | 1200 | Manhole | 1 STANDARD | SW14 | 1200 | Manhole | 1 STANDARD |
| 5.003 | SW14 | 1200 | Manhole | 1 STANDARD | POND | 1200 | Manhole | 1 STANDARD |

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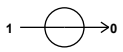
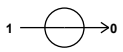
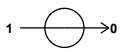
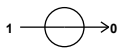
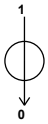
## Pipeline Schedule

| Link | Length (m) | Slope (1:X) | Dia (mm) | Link Type | US CL (m) | US IL (m) | US Depth (m) | DS CL (m) | DS IL (m) | DS Depth (m) |
|---|---|---|---|---|---|---|---|---|---|---|
| 7.000 | 7.000 | 35.0 | 225 | 1 STANDARD | 65.200 | 62.500 | 2.475 | 64.000 | 62.300 | 1.475 |
| 5.004 | 8.000 | 200.0 | 300 | 1 STANDARD | 64.000 | 61.700 | 2.000 | 64.000 | 61.660 | 2.040 |
| 5.005 | 32.000 | 290.9 | 300 | 1 STANDARD | 64.000 | 61.660 | 2.040 | 65.300 | 61.550 | 3.450 |
| 1.009 | 4.000 | 80.0 | 225 | 1 STANDARD | 65.300 | 61.550 | 3.525 | 64.200 | 61.500 | 2.475 |
| 1.010 | 10.000 | 500.0 | 225 | 1 STANDARD | 64.200 | 61.500 | 2.475 | 63.500 | 61.480 | 1.795 |

| Link | US Node | Dia (mm) | Node Type | MH Type | DS Node | Dia (mm) | Node Type | MH Type |
|---|---|---|---|---|---|---|---|---|
| 7.000 | SW15 | 1200 | Manhole | 1 STANDARD | POND | 1200 | Manhole | 1 STANDARD |
| 5.004 | POND | 1200 | Manhole | 1 STANDARD | SW16 | 1200 | Manhole | 1 STANDARD |
| 5.005 | SW16 | 1200 | Manhole | 1 STANDARD | SW17 | 1500 | Manhole | 1 STANDARD |
| 1.009 | SW17 | 1500 | Manhole | 1 STANDARD | EX S6 | 1200 | Manhole | 1 STANDARD |
| 1.010 | EX S6 | 1200 | Manhole | 1 STANDARD | sewer | | Manhole | 1 STANDARD |

## Manhole Schedule

| Node | Easting (m) | Northing (m) | CL (m) | Depth (m) | Dia (mm) | Connections | Link | IL (m) | Dia (mm) |
|---|---|---|---|---|---|---|---|---|---|
| SW01 | -27.750 | 618.750 | 66.400 | 1.350 | 1200 |  | 0 | 1.000 | 65.050 | 150 |
| SW02 | -16.750 | 618.750 | 66.450 | 1.585 | 1200 |  | 1<br>0 | 1.000<br>1.001 | 64.940<br>64.865 | 150<br>225 |
| SW03 | -0.750 | 618.750 | 66.450 | 1.740 | 1200 |  | 1<br>0 | 1.001<br>1.002 | 64.785<br>64.710 | 225<br>300 |
| SW04 | 30.250 | 618.750 | 66.450 | 1.865 | 1200 |  | 1<br>0 | 1.002<br>1.003 | 64.585<br>64.585 | 300<br>300 |
| SW05 | 49.250 | 618.750 | 66.450 | 2.015 | 1500 |  | 1<br>0 | 1.003<br>1.004 | 64.510<br>64.435 | 300<br>375 |
| CHANNEL | 52.250 | 626.750 | 66.200 | 1.500 | 1200 |  | 0 | 2.000 | 64.700 | 300 |
| SW06 | 52.250 | 660.750 | 66.480 | 1.350 | 1200 |  | 0 | 3.000 | 65.130 | 150 |
| SW07 | 52.250 | 636.750 | 66.480 | 1.665 | 1200 |  | 1<br>0 | 3.000<br>3.001 | 64.890<br>64.815 | 150<br>225 |

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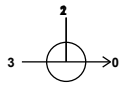
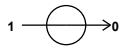
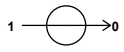
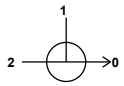
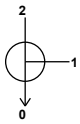
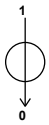
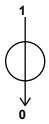
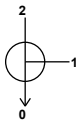
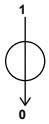
## Manhole Schedule

| Node | Easting (m) | Northing (m) | CL (m) | Depth (m) | Dia (mm) | Connections | Link | IL (m) | Dia (mm) |
|---|---|---|---|---|---|---|---|---|---|
| TANK | 52.250 | 618.750 | 66.300 | 2.300 | 300 |  | 1 | 3.001 | 64.725 | 225 |
| | | | | | | | 2 | 2.000 | 64.409 | 300 |
| | | | | | | | 3 | 1.004 | 64.420 | 375 |
| | | | | | | | 0 | 1.005 | 64.000 | 225 |
| SW08 | 61.250 | 618.750 | 66.500 | 2.545 | 1500 |  | 1 | 1.005 | 63.955 | 225 |
| | | | | | | | 0 | 1.006 | 63.955 | 225 |
| SW09 | 103.250 | 618.750 | 65.150 | 1.475 | 1200 |  | 1 | 1.006 | 63.675 | 225 |
| | | | | | | | 0 | 1.007 | 63.675 | 225 |
| SW10 | 117.250 | 695.750 | 66.050 | 1.425 | 1200 |  | 0 | 4.000 | 64.625 | 225 |
| SW11 | 117.250 | 618.750 | 65.300 | 1.720 | 1200 |  | 1 | 4.000 | 63.580 | 225 |
| | | | | | | | 2 | 1.007 | 63.580 | 225 |
| | | | | | | | 0 | 1.008 | 63.580 | 300 |
| 14 | 174.250 | 717.750 | 64.300 | 1.050 | 1200 |  | 0 | 5.000 | 63.250 | 150 |
| 15 | 189.250 | 696.750 | 64.970 | 1.470 | 1200 |  | 0 | 6.000 | 63.500 | 300 |
| SW12 | 174.250 | 696.750 | 65.420 | 2.530 | 1200 |  | 1 | 6.000 | 63.400 | 300 |
| | | | | | | | 2 | 5.000 | 63.040 | 150 |
| | | | | | | | 0 | 5.001 | 62.890 | 300 |
| SW13 | 174.250 | 686.750 | 64.900 | 2.077 | 1200 |  | 1 | 5.001 | 62.823 | 300 |
| | | | | | | | 0 | 5.002 | 62.823 | 300 |
| SW14 | 174.250 | 668.750 | 65.200 | 2.700 | 1200 |  | 1 | 5.002 | 62.703 | 300 |
| | | | | | | | 0 | 5.003 | 62.500 | 300 |
| SW15 | 181.250 | 658.750 | 65.200 | 2.700 | 1200 |  | 0 | 7.000 | 62.500 | 225 |
| POND | 174.250 | 658.750 | 64.000 | 2.300 | 1200 |  | 1 | 7.000 | 62.300 | 225 |
| | | | | | | | 2 | 5.003 | 62.300 | 300 |
| | | | | | | | 0 | 5.004 | 61.700 | 300 |
| SW16 | 174.250 | 650.750 | 64.000 | 2.340 | 1200 |  | 1 | 5.004 | 61.660 | 300 |
| | | | | | | | 0 | 5.005 | 61.660 | 300 |

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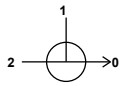
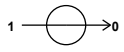
## Manhole Schedule

| Node | Easting (m) | Northing (m) | CL (m) | Depth (m) | Dia (mm) | Connections | Link | IL (m) | Dia (mm) |
|---|---|---|---|---|---|---|---|---|---|
| SW17 | 174.250 | 618.750 | 65.300 | 3.750 | 1500 |  | 1 | 5.005 | 61.550 | 300 |
| | | | | | | | 2 | 1.008 | 63.295 | 300 |
| | | | | | | | 0 | 1.009 | 61.550 | 225 |
| EX S6 | 178.250 | 618.750 | 64.200 | 2.700 | 1200 |  | 1 | 1.009 | 61.500 | 225 |
| | | | | | | | 0 | 1.010 | 61.500 | 225 |
| sewer | 188.250 | 618.750 | 63.500 | 2.020 | |  | 1 | 1.010 | 61.480 | 225 |

## Simulation Settings

| | | | | | |
|---|---|---|---|---|---|
| Rainfall Methodology | FEH-22 | Analysis Speed | Normal | Additional Storage (m³/ha) | 20.0 |
| Summer CV | 1.000 | Skip Steady State | x | Check Discharge Rate(s) | x |
| Winter CV | 1.000 | Drain Down Time (mins) | 240 | Check Discharge Volume | x |

### Storm Durations

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

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|---|---|---|---|
| 2 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 |
| 100 | 25 | 0 | 0 |

## Node SW08 Online Hydro-Brake® Control

| | | | |
|---|---|---|---|
| Flap Valve | x | Objective | (HE) Minimise upstream storage |
| Replaces Downstream Link | x | Sump Available | ✓ |
| Invert Level (m) | 63.955 | Product Number | CTL-SHE-0127-1000-2300-1000 |
| Design Depth (m) | 2.300 | Min Outlet Diameter (m) | 0.150 |
| Design Flow (l/s) | 10.0 | Min Node Diameter (mm) | 1500 |

## Node SW12 Online Orifice Control

| | | | | | |
|---|---|---|---|---|---|
| Flap Valve | x | Design Depth (m) | 1.500 | Discharge Coefficient | 0.600 |
| Replaces Downstream Link | x | Design Flow (l/s) | 7.0 | | |
| Invert Level (m) | 62.890 | Diameter (m) | 0.050 | | |

## Node SW17 Online Hydro-Brake® Control

| | | | |
|---|---|---|---|
| Flap Valve | x | Objective | (HE) Minimise upstream storage |
| Replaces Downstream Link | x | Sump Available | ✓ |
| Invert Level (m) | 61.550 | Product Number | CTL-SHE-0132-1100-2350-1100 |
| Design Depth (m) | 2.350 | Min Outlet Diameter (m) | 0.150 |
| Design Flow (l/s) | 11.0 | Min Node Diameter (mm) | 1500 |

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## Node SW10 Carpark Storage Structure

| | | | | | |
|---|---|---|---|---|---|
| Base Inf Coefficient (m/hr) | 0.00000 | Invert Level (m) | 65.700 | Slope (1:X) | 500.0 |
| Side Inf Coefficient (m/hr) | 0.00000 | Time to half empty (mins) | 4 | Depth (m) | 0.250 |
| Safety Factor | 2.0 | Width (m) | 7.000 | Inf Depth (m) | |
| Porosity | 0.30 | Length (m) | 70.000 | | |

## Node POND Depth/Area Storage Structure

| | | | | | |
|---|---|---|---|---|---|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0 | Invert Level (m) | 61.700 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity | 1.00 | Time to half empty (mins) | |

| Depth (m) | Area (m²) | Inf Area (m²) | Depth (m) | Area (m²) | Inf Area (m²) | Depth (m) | Area (m²) | Inf Area (m²) | Depth (m) | Area (m²) | Inf Area (m²) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.000 | 42.0 | 0.0 | 0.800 | 182.0 | 0.0 | 1.600 | 360.0 | 0.0 | 2.400 | 577.0 | 0.0 |
| 0.400 | 106.0 | 0.0 | 1.200 | 270.0 | 0.0 | 2.000 | 465.0 | 0.0 | | | |

## Node TANK Depth/Area Storage Structure

| | | | | | |
|---|---|---|---|---|---|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0 | Invert Level (m) | 64.000 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity | 0.95 | Time to half empty (mins) | |

| Depth (m) | Area (m²) | Inf Area (m²) | Depth (m) | Area (m²) | Inf Area (m²) | Depth (m) | Area (m²) | Inf Area (m²) |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 420.0 | 0.0 | 1.200 | 420.0 | 0.0 | 1.201 | 0.0 | 0.0 |

## Node SW12 Depth/Area Storage Structure

| | | | | | |
|---|---|---|---|---|---|
| Base Inf Coefficient (m/hr) | 0.00000 | Safety Factor | 2.0 | Invert Level (m) | 62.890 |
| Side Inf Coefficient (m/hr) | 0.00000 | Porosity | 0.95 | Time to half empty (mins) | |

| Depth (m) | Area (m²) | Inf Area (m²) | Depth (m) | Area (m²) | Inf Area (m²) | Depth (m) | Area (m²) | Inf Area (m²) |
|---|---|---|---|---|---|---|---|---|
| 0.000 | 200.0 | 0.0 | 0.800 | 200.0 | 0.0 | 0.801 | 0.0 | 0.0 |

## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) | Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|---|---|---|
| 2 year 15 minute summer | 111.666 | 31.598 | 2 year 600 minute winter | 7.638 | 3.058 |
| 2 year 15 minute winter | 78.362 | 31.598 | 2 year 720 minute summer | 9.953 | 2.668 |
| 2 year 30 minute summer | 72.946 | 20.641 | 2 year 720 minute winter | 6.689 | 2.668 |
| 2 year 30 minute winter | 51.190 | 20.641 | 2 year 960 minute summer | 8.158 | 2.148 |
| 2 year 60 minute summer | 49.568 | 13.099 | 2 year 960 minute winter | 5.404 | 2.148 |
| 2 year 60 minute winter | 32.932 | 13.099 | 2 year 1440 minute summer | 5.925 | 1.588 |
| 2 year 120 minute summer | 34.463 | 9.108 | 2 year 1440 minute winter | 3.982 | 1.588 |
| 2 year 120 minute winter | 22.896 | 9.108 | 30 year 15 minute summer | 290.647 | 82.243 |
| 2 year 180 minute summer | 27.641 | 7.113 | 30 year 15 minute winter | 203.963 | 82.243 |
| 2 year 180 minute winter | 17.967 | 7.113 | 30 year 30 minute summer | 193.399 | 54.725 |
| 2 year 240 minute summer | 22.300 | 5.893 | 30 year 30 minute winter | 135.719 | 54.725 |
| 2 year 240 minute winter | 14.815 | 5.893 | 30 year 60 minute summer | 131.316 | 34.703 |
| 2 year 360 minute summer | 17.275 | 4.445 | 30 year 60 minute winter | 87.243 | 34.703 |
| 2 year 360 minute winter | 11.229 | 4.445 | 30 year 120 minute summer | 79.501 | 21.010 |
| 2 year 480 minute summer | 13.648 | 3.607 | 30 year 120 minute winter | 52.818 | 21.010 |
| 2 year 480 minute winter | 9.068 | 3.607 | 30 year 180 minute summer | 60.241 | 15.502 |
| 2 year 600 minute summer | 11.178 | 3.058 | 30 year 180 minute winter | 39.158 | 15.502 |

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## Rainfall

| Event | Peak Intensity (mm/hr) | Average Intensity (mm/hr) |
|---|---|---|
| 30 year 240 minute summer | 47.058 | 12.436 |
| 30 year 240 minute winter | 31.264 | 12.436 |
| 30 year 360 minute summer | 35.178 | 9.053 |
| 30 year 360 minute winter | 22.867 | 9.053 |
| 30 year 480 minute summer | 27.252 | 7.202 |
| 30 year 480 minute winter | 18.106 | 7.202 |
| 30 year 600 minute summer | 22.025 | 6.024 |
| 30 year 600 minute winter | 15.049 | 6.024 |
| 30 year 720 minute summer | 19.418 | 5.204 |
| 30 year 720 minute winter | 13.050 | 5.204 |
| 30 year 960 minute summer | 15.683 | 4.130 |
| 30 year 960 minute winter | 10.389 | 4.130 |
| 30 year 1440 minute summer | 11.151 | 2.989 |
| 30 year 1440 minute winter | 7.494 | 2.989 |
| 100 year +25% CC 15 minute summer | 457.708 | 129.515 |
| 100 year +25% CC 15 minute winter | 321.198 | 129.515 |
| 100 year +25% CC 30 minute summer | 306.784 | 86.809 |
| 100 year +25% CC 30 minute winter | 215.287 | 86.809 |
| 100 year +25% CC 60 minute summer | 210.503 | 55.630 |
| 100 year +25% CC 60 minute winter | 139.853 | 55.630 |
| 100 year +25% CC 120 minute summer | 124.878 | 33.002 |
| 100 year +25% CC 120 minute winter | 82.966 | 33.002 |
| 100 year +25% CC 180 minute summer | 94.015 | 24.193 |
| 100 year +25% CC 180 minute winter | 61.112 | 24.193 |
| 100 year +25% CC 240 minute summer | 73.268 | 19.363 |
| 100 year +25% CC 240 minute winter | 48.677 | 19.363 |
| 100 year +25% CC 360 minute summer | 54.755 | 14.090 |
| 100 year +25% CC 360 minute winter | 35.592 | 14.090 |
| 100 year +25% CC 480 minute summer | 42.540 | 11.242 |
| 100 year +25% CC 480 minute winter | 28.263 | 11.242 |
| 100 year +25% CC 600 minute summer | 34.488 | 9.433 |
| 100 year +25% CC 600 minute winter | 23.565 | 9.433 |
| 100 year +25% CC 720 minute summer | 30.493 | 8.172 |
| 100 year +25% CC 720 minute winter | 20.493 | 8.172 |
| 100 year +25% CC 960 minute summer | 24.732 | 6.513 |
| 100 year +25% CC 960 minute winter | 16.383 | 6.513 |
| 100 year +25% CC 1440 minute summer | 17.682 | 4.739 |
| 100 year +25% CC 1440 minute winter | 11.884 | 4.739 |

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**Results for 2 year Critical Storm Duration. Lowest mass balance: 99.87%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute summer | SW01 | 10 | 65.088 | 0.038 | 2.4 | 0.0502 | 0.0000 | OK |
| 15 minute summer | SW02 | 10 | 64.965 | 0.100 | 13.8 | 0.1841 | 0.0000 | OK |
| 15 minute summer | SW03 | 10 | 64.847 | 0.137 | 30.2 | 0.2824 | 0.0000 | OK |
| 15 minute summer | SW04 | 10 | 64.786 | 0.201 | 51.5 | 0.4556 | 0.0000 | OK |
| 15 minute summer | SW05 | 10 | 64.635 | 0.200 | 63.1 | 0.4809 | 0.0000 | OK |
| 15 minute summer | CHANNEL | 10 | 64.838 | 0.138 | 68.9 | 0.7808 | 0.0000 | OK |
| 15 minute summer | SW06 | 10 | 65.230 | 0.100 | 13.2 | 0.2097 | 0.0000 | OK |
| 15 minute summer | SW07 | 10 | 64.964 | 0.149 | 26.3 | 0.2857 | 0.0000 | OK |
| 360 minute summer | TANK | 248 | 64.321 | 0.321 | 37.4 | 128.1869 | 0.0000 | SURCHARGED |
| 360 minute summer | SW08 | 248 | 64.318 | 0.363 | 8.5 | 0.7267 | 0.0000 | SURCHARGED |
| 15 minute summer | SW09 | 10 | 63.758 | 0.083 | 12.9 | 0.1501 | 0.0000 | OK |
| 15 minute summer | SW10 | 10 | 64.744 | 0.119 | 33.7 | 0.4103 | 0.0000 | OK |
| 15 minute summer | SW11 | 11 | 63.743 | 0.163 | 46.1 | 0.1841 | 0.0000 | OK |
| 15 minute summer | 14 | 10 | 63.323 | 0.073 | 8.1 | 0.1389 | 0.0000 | OK |
| 15 minute summer | 15 | 10 | 63.667 | 0.167 | 47.4 | 0.7214 | 0.0000 | OK |
| 360 minute summer | SW12 | 256 | 63.137 | 0.247 | 13.0 | 47.2294 | 0.0000 | OK |
| 360 minute summer | SW13 | 256 | 62.857 | 0.034 | 2.4 | 0.0386 | 0.0000 | OK |
| 600 minute summer | SW14 | 630 | 62.784 | 0.284 | 7.7 | 0.7101 | 0.0000 | OK |
| 600 minute summer | SW15 | 630 | 62.784 | 0.284 | 5.7 | 0.7093 | 0.0000 | SURCHARGED |
| 600 minute summer | POND | 630 | 62.783 | 1.083 | 17.4 | 148.8419 | 0.0000 | SURCHARGED |
| 720 minute summer | SW16 | 720 | 62.782 | 1.122 | 8.3 | 1.2685 | 0.0000 | SURCHARGED |
| 720 minute summer | SW17 | 720 | 62.805 | 1.255 | 13.6 | 2.2170 | 0.0000 | SURCHARGED |
| 240 minute summer | EX S6 | 124 | 61.603 | 0.103 | 10.1 | 0.1160 | 0.0000 | OK |
| 60 minute summer | sewer | 38 | 61.562 | 0.082 | 10.1 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute summer | SW01 | 1.000 | SW02 | 2.4 | 0.690 | 0.135 | 0.0382 | |
| 15 minute summer | SW02 | 1.001 | SW03 | 13.8 | 0.837 | 0.376 | 0.2633 | |
| 15 minute summer | SW03 | 1.002 | SW04 | 30.0 | 0.735 | 0.428 | 1.2625 | |
| 15 minute summer | SW04 | 1.003 | SW05 | 50.1 | 1.086 | 0.721 | 0.8776 | |
| 15 minute summer | SW05 | 1.004 | TANK | 62.6 | 1.149 | 0.444 | 0.1636 | |
| 15 minute summer | CHANNEL | 2.000 | TANK | 68.9 | 2.426 | 0.324 | 0.2273 | |
| 15 minute summer | SW06 | 3.000 | SW07 | 13.1 | 1.077 | 0.738 | 0.2919 | |
| 15 minute summer | SW07 | 3.001 | TANK | 26.1 | 0.988 | 0.713 | 0.4751 | |
| 360 minute summer | TANK | 1.005 | SW08 | 8.2 | 0.207 | 0.225 | 0.3579 | |
| 360 minute summer | SW08 | 1.006 | SW09 | 8.5 | 0.800 | 0.200 | 0.4550 | |
| 15 minute summer | SW09 | 1.007 | SW11 | 12.6 | 0.748 | 0.294 | 0.3072 | |
| 15 minute summer | SW10 | 4.000 | SW11 | 33.5 | 1.409 | 0.553 | 1.9438 | |
| 15 minute summer | SW11 | 1.008 | SW17 | 43.1 | 1.131 | 0.551 | 2.1731 | |
| 15 minute summer | 14 | 5.000 | SW12 | 8.1 | 0.964 | 0.454 | 0.1755 | |
| 15 minute summer | 15 | 6.000 | SW12 | 47.4 | 1.244 | 0.524 | 0.5716 | |
| 360 minute summer | SW12 | 5.001 | SW13 | 2.4 | 0.544 | 0.027 | 0.0443 | |
| 360 minute summer | SW13 | 5.002 | SW14 | 2.4 | 0.555 | 0.027 | 0.0781 | |
| 600 minute summer | SW14 | 5.003 | POND | 7.7 | 1.132 | 0.049 | 0.6971 | |
| 600 minute summer | SW15 | 7.000 | POND | 5.7 | 1.210 | 0.065 | 0.2784 | |
| 600 minute summer | POND | 5.004 | SW16 | 7.7 | 0.439 | 0.098 | 0.5634 | |
| 720 minute summer | SW16 | 5.005 | SW17 | 8.4 | 0.119 | 0.129 | 2.2534 | |
| 720 minute summer | SW17 | 1.009 | EX S6 | 10.1 | 0.683 | 0.173 | 0.0591 | |
| 240 minute summer | EX S6 | 1.010 | sewer | 10.1 | 0.658 | 0.439 | 0.1534 | 242.2 |

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**Results for 30 year Critical Storm Duration. Lowest mass balance: 99.87%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute summer | SW01 | 11 | 65.373 | 0.323 | 7.6 | 0.4230 | 0.0000 | SURCHARGED |
| 15 minute summer | SW02 | 11 | 65.349 | 0.484 | 32.6 | 0.8894 | 0.0000 | SURCHARGED |
| 15 minute summer | SW03 | 10 | 65.274 | 0.564 | 72.0 | 1.1623 | 0.0000 | SURCHARGED |
| 15 minute summer | SW04 | 10 | 65.119 | 0.534 | 125.6 | 1.2113 | 0.0000 | SURCHARGED |
| 15 minute summer | SW05 | 10 | 64.804 | 0.369 | 156.2 | 0.8859 | 0.0000 | OK |
| 15 minute summer | CHANNEL | 10 | 65.027 | 0.327 | 179.3 | 1.8526 | 0.0000 | SURCHARGED |
| 15 minute summer | SW06 | 11 | 65.982 | 0.852 | 34.3 | 1.7842 | 0.0000 | SURCHARGED |
| 15 minute summer | SW07 | 10 | 65.220 | 0.405 | 61.7 | 0.7738 | 0.0000 | SURCHARGED |
| 240 minute winter | TANK | 228 | 64.773 | 0.773 | 68.4 | 308.4999 | 0.0000 | SURCHARGED |
| 240 minute winter | SW08 | 228 | 64.769 | 0.814 | 9.3 | 1.6313 | 0.0000 | SURCHARGED |
| 15 minute summer | SW09 | 11 | 64.025 | 0.350 | 33.5 | 0.6330 | 0.0000 | SURCHARGED |
| 15 minute summer | SW10 | 11 | 65.602 | 0.977 | 87.6 | 3.3821 | 0.0000 | SURCHARGED |
| 15 minute summer | SW11 | 11 | 63.976 | 0.396 | 98.4 | 0.4480 | 0.0000 | SURCHARGED |
| 360 minute winter | 14 | 352 | 63.453 | 0.203 | 2.5 | 0.3837 | 0.0000 | SURCHARGED |
| 15 minute summer | 15 | 10 | 63.933 | 0.433 | 123.5 | 1.8684 | 0.0000 | SURCHARGED |
| 360 minute winter | SW12 | 352 | 63.453 | 0.563 | 17.4 | 107.5383 | 0.0000 | SURCHARGED |
| 960 minute winter | SW13 | 960 | 63.432 | 0.609 | 3.0 | 0.6886 | 0.0000 | SURCHARGED |
| 960 minute winter | SW14 | 960 | 63.432 | 0.932 | 10.6 | 2.3305 | 0.0000 | SURCHARGED |
| 960 minute winter | SW15 | 960 | 63.432 | 0.932 | 5.3 | 2.3305 | 0.0000 | SURCHARGED |
| 960 minute winter | POND | 960 | 63.432 | 1.732 | 20.3 | 355.2958 | 0.0000 | SURCHARGED |
| 960 minute winter | SW16 | 960 | 63.432 | 1.772 | 6.8 | 2.0039 | 0.0000 | SURCHARGED |
| 960 minute winter | SW17 | 960 | 63.432 | 1.882 | 15.0 | 3.3251 | 0.0000 | SURCHARGED |
| 60 minute winter | EX S6 | 26 | 61.603 | 0.103 | 10.1 | 0.1160 | 0.0000 | OK |
| 120 minute summer | sewer | 52 | 61.562 | 0.082 | 10.1 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute summer | SW01 | 1.000 | SW02 | 9.7 | 0.706 | 0.546 | 0.1937 | |
| 15 minute summer | SW02 | 1.001 | SW03 | 34.0 | 0.918 | 0.928 | 0.6363 | |
| 15 minute summer | SW03 | 1.002 | SW04 | 72.4 | 1.028 | 1.031 | 2.1830 | |
| 15 minute summer | SW04 | 1.003 | SW05 | 122.4 | 1.739 | 1.762 | 1.3346 | |
| 15 minute summer | SW05 | 1.004 | TANK | 154.5 | 1.507 | 1.095 | 0.3018 | |
| 15 minute summer | CHANNEL | 2.000 | TANK | 176.4 | 2.861 | 0.829 | 0.4877 | |
| 15 minute summer | SW06 | 3.000 | SW07 | 29.3 | 1.666 | 1.652 | 0.4225 | |
| 15 minute summer | SW07 | 3.001 | TANK | 60.0 | 1.511 | 1.640 | 0.6938 | |
| 240 minute winter | TANK | 1.005 | SW08 | 9.0 | 0.226 | 0.246 | 0.3579 | |
| 240 minute winter | SW08 | 1.006 | SW09 | 9.0 | 0.825 | 0.214 | 0.5236 | |
| 15 minute summer | SW09 | 1.007 | SW11 | 27.7 | 0.832 | 0.647 | 0.5568 | |
| 15 minute summer | SW10 | 4.000 | SW11 | 71.9 | 1.808 | 1.186 | 3.0624 | |
| 15 minute summer | SW11 | 1.008 | SW17 | 95.3 | 1.379 | 1.217 | 3.7286 | |
| 360 minute winter | 14 | 5.000 | SW12 | 2.5 | 0.631 | 0.141 | 0.3697 | |
| 15 minute summer | 15 | 6.000 | SW12 | 123.2 | 1.752 | 1.360 | 1.0243 | |
| 360 minute winter | SW12 | 5.001 | SW13 | 3.2 | 0.592 | 0.036 | 0.7042 | |
| 960 minute winter | SW13 | 5.002 | SW14 | 2.9 | 0.570 | 0.032 | 1.2675 | |
| 960 minute winter | SW14 | 5.003 | POND | 9.8 | 1.065 | 0.062 | 0.7042 | |
| 960 minute winter | SW15 | 7.000 | POND | 5.6 | 1.112 | 0.064 | 0.2784 | |
| 960 minute winter | POND | 5.004 | SW16 | -6.7 | 0.441 | -0.086 | 0.5634 | |
| 960 minute winter | SW16 | 5.005 | SW17 | -6.8 | 0.126 | -0.105 | 2.2534 | |
| 960 minute winter | SW17 | 1.009 | EX S6 | 10.1 | 0.684 | 0.173 | 0.0591 | |
| 60 minute winter | EX S6 | 1.010 | sewer | 10.1 | 0.658 | 0.439 | 0.1534 | 151.4 |

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**Results for 100 year +25% CC Critical Storm Duration. Lowest mass balance: 99.87%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute summer | SW01 | 11 | 66.273 | 1.223 | 18.5 | 1.6003 | 0.0000 | FLOOD RISK |
| 15 minute summer | SW02 | 11 | 66.230 | 1.365 | 50.2 | 2.5088 | 0.0000 | FLOOD RISK |
| 480 minute summer | SW03 | 344 | 66.208 | 1.498 | 17.6 | 3.0881 | 0.0000 | FLOOD RISK |
| 480 minute summer | SW04 | 344 | 66.204 | 1.619 | 30.1 | 3.6722 | 0.0000 | FLOOD RISK |
| 480 minute summer | SW05 | 344 | 66.202 | 1.767 | 37.1 | 4.2441 | 0.0000 | FLOOD RISK |
| 360 minute winter | CHANNEL | 280 | 66.200 | 1.500 | 33.6 | 8.4960 | 21.6089 | FLOOD |
| 15 minute summer | SW06 | 10 | 66.480 | 1.350 | 54.0 | 2.8269 | 1.9872 | FLOOD |
| 480 minute summer | SW07 | 344 | 66.204 | 1.389 | 15.4 | 2.6555 | 0.0000 | FLOOD RISK |
| 480 minute summer | TANK | 344 | 66.202 | 2.202 | 91.3 | 479.1558 | 0.0000 | FLOOD RISK |
| 240 minute winter | SW08 | 208 | 66.197 | 2.242 | 10.6 | 4.4915 | 0.0000 | SURCHARGED |
| 15 minute summer | SW09 | 11 | 64.253 | 0.578 | 45.4 | 1.0451 | 0.0000 | SURCHARGED |
| 15 minute summer | SW10 | 12 | 65.833 | 1.208 | 137.9 | 13.4095 | 0.0000 | FLOOD RISK |
| 30 minute summer | SW11 | 19 | 64.145 | 0.565 | 113.0 | 0.6393 | 0.0000 | SURCHARGED |
| 360 minute winter | 14 | 240 | 64.300 | 1.050 | 7.4 | 1.9877 | 15.6201 | FLOOD |
| 240 minute winter | 15 | 168 | 64.347 | 0.847 | 31.6 | 3.6559 | 0.0000 | SURCHARGED |
| 240 minute winter | SW12 | 168 | 64.346 | 1.456 | 36.7 | 153.7417 | 0.0000 | SURCHARGED |
| 1440 minute winter | SW13 | 1410 | 63.929 | 1.106 | 4.1 | 1.2508 | 0.0000 | SURCHARGED |
| 1440 minute winter | SW14 | 1410 | 63.929 | 1.429 | 12.0 | 3.5737 | 0.0000 | SURCHARGED |
| 1440 minute winter | SW15 | 1410 | 63.929 | 1.429 | 6.1 | 3.5737 | 0.0000 | SURCHARGED |
| 1440 minute winter | POND | 1410 | 63.929 | 2.229 | 21.1 | 584.8890 | 0.0000 | FLOOD RISK |
| 1440 minute winter | SW16 | 1410 | 63.929 | 2.269 | 7.2 | 2.5661 | 0.0000 | FLOOD RISK |
| 1440 minute winter | SW17 | 1410 | 63.929 | 2.379 | 16.2 | 4.2033 | 0.0000 | SURCHARGED |
| 1440 minute winter | EX S6 | 1410 | 61.607 | 0.107 | 10.9 | 0.1209 | 0.0000 | OK |
| 1440 minute winter | sewer | 1410 | 61.565 | 0.085 | 10.9 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute summer | SW01 | 1.000 | SW02 | 15.4 | 0.873 | 0.866 | 0.1937 | |
| 15 minute summer | SW02 | 1.001 | SW03 | 52.8 | 1.329 | 1.444 | 0.6363 | |
| 480 minute summer | SW03 | 1.002 | SW04 | 17.6 | 0.634 | 0.251 | 2.1830 | |
| 480 minute summer | SW04 | 1.003 | SW05 | 29.5 | 0.901 | 0.425 | 1.3380 | |
| 480 minute summer | SW05 | 1.004 | TANK | 36.0 | 0.929 | 0.255 | 0.3309 | |
| 360 minute winter | CHANNEL | 2.000 | TANK | 33.6 | 1.970 | 0.158 | 0.5634 | |
| 15 minute summer | SW06 | 3.000 | SW07 | 35.2 | 2.000 | 1.983 | 0.4225 | |
| 480 minute summer | SW07 | 3.001 | TANK | 15.4 | 0.863 | 0.421 | 0.7159 | |
| 480 minute summer | TANK | 1.005 | SW08 | 9.4 | 0.237 | 0.258 | 0.3579 | |
| 240 minute winter | SW08 | 1.006 | SW09 | 9.7 | 0.834 | 0.230 | 0.5682 | |
| 15 minute summer | SW09 | 1.007 | SW11 | 38.8 | 0.976 | 0.908 | 0.5568 | |
| 15 minute summer | SW10 | 4.000 | SW11 | 75.1 | 1.888 | 1.238 | 3.0624 | |
| 30 minute summer | SW11 | 1.008 | SW17 | 111.6 | 1.593 | 1.425 | 3.8371 | |
| 360 minute winter | 14 | 5.000 | SW12 | -5.5 | 0.630 | -0.308 | 0.3697 | |
| 240 minute winter | 15 | 6.000 | SW12 | 31.6 | 1.128 | 0.349 | 1.0563 | |
| 240 minute winter | SW12 | 5.001 | SW13 | 4.9 | 0.592 | 0.053 | 0.7042 | |
| 1440 minute winter | SW13 | 5.002 | SW14 | 4.1 | 0.560 | 0.045 | 1.2675 | |
| 1440 minute winter | SW14 | 5.003 | POND | 8.1 | 1.001 | 0.052 | 0.7042 | |
| 1440 minute winter | SW15 | 7.000 | POND | 6.0 | 1.021 | 0.067 | 0.2784 | |
| 1440 minute winter | POND | 5.004 | SW16 | -7.1 | 0.450 | -0.090 | 0.5634 | |
| 1440 minute winter | SW16 | 5.005 | SW17 | -7.2 | 0.129 | -0.110 | 2.2534 | |
| 1440 minute winter | SW17 | 1.009 | EX S6 | 10.9 | 0.695 | 0.187 | 0.0628 | |
| 1440 minute winter | EX S6 | 1.010 | sewer | 10.9 | 0.674 | 0.474 | 0.1619 | 920.6 |

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# APPENDIX B – Southern Water Correspondence

from Southern Water

Directorate of Planning
Horsham District Council
Parkside
Chart Way
Horsham
West Sussex
RH12 1RL

Your ref
DC/22/2077

Our ref
DSA000018122

Date
08/12/2022

Contact
[redacted]

Dear Sir/Madam,

**Proposal:** Demolition of existing building and the erection of 3no buildings to provide flexible industrial and storage and distribution floorspace (Use Class B2/B8) and ancillary office floorspace, with associated hard and soft landscaping, car and cycle parking, supporting infrastructure and retention of existing attenuation pond.
**Site:** DC/22/2077: - RSPCA Headquarters, Oakhurst Business Park, Wilberforce Way, Southwater, RH13 9RS.

Thank you for your letter dated 17/11/2022.

The attached plan shows that the proposed development will lie over an existing public foul sewer, which will not be acceptable to Southern Water. The exact position of the public apparatus must be determined on site by the applicant before the layout of the proposed development is finalised.

It might be possible to divert the 150 mm public foul sewer, so long as this would result in no unacceptable loss of hydraulic capacity, and the work was carried out at the developer's expense to the satisfaction of Southern Water under the relevant statutory provisions.

- The 150 mm public foul sewer requires a clearance of 3 metres on either side of the gravity sewer to protect it from construction works and to allow for future access for maintenance.

- No development or tree planting should be carried out within 3 metres of the external edge of the public gravity sewer without consent from Southern Water.

- No new soakaways should be located within 5 metres of a public sewer.

- All existing infrastructure should be protected during the course of construction works.

Please refer to: southernwater.co.uk/media/3011/stand-off-distances.pdf



Southern Water Services Ltd, Registered Office: Southern House, Yeoman Road, Worthing, West Sussex, BN13 3NX Registered in England No. 2366670

Alternatively, the applicant may wish to amend the site layout, or combine a diversion with amendment of the site layout.

It is possible that a sewer now deemed to be public could be crossing the development site. Therefore, should any sewer be found during construction works, an investigation of the sewer will be required to ascertain its ownership before any further works commence on site.

In order to protect drainage apparatus, Southern Water requests that if consent is granted, a condition is attached to the planning permission; for example, the developer must advise the local authority (in consultation with Southern Water) of the measures which will be undertaken to divert the public sewers, prior to the commencement of the development.

Our initial investigations indicate that Southern Water can provide foul sewage disposal to service the proposed development. Southern Water requires a formal application for a connection to the public foul sewer to be made by the applicant or developer.

To make an application visit Southern Water's Get Connected service: developerservices.southernwater.co.uk and please read our New Connections Charging Arrangements documents which are available on our website via the following link: southernwater.co.uk/developing-building/connection-charging-arrangements

Southern Water has undertaken a desktop study of the impact of the proposed development on the existing public surface water network. The results of this assessment indicate that with a connection at the “practical point of connection”, as defined in the New Connections Services implemented from 1st April 2018, there is an increased risk of flooding if the proposed surface water run off rates are to be discharged at proposed connection points. southernwater.co.uk/connection-charging-arrangements

Alternatively, if this is a brownfield site redevelopment, the developer can discharge surface water flow no greater than existing levels if proven to already be connected and it is ensured that there is no overall increase in flows into the surface water system. The developer will be required to provide a topographical site survey and/or a CCTV survey with the connection application showing the existing connection points, pipe sizes, gradients and calculations confirming the proposed surface water flow will be no greater than the existing contributing flows.

We request that should this application receive planning approval, the following condition is attached to the consent: Construction of the development shall not commence until details of the proposed means of surface water run off disposal in accordance with Part H3 of Building Regulations hierarchy as well as acceptable discharge points, rates and volumes have been agreed by the Lead Flood Authority, in consultation with Southern Water.

The supporting documents make reference to drainage using Sustainable Drainage Systems (SuDS).

Under certain circumstances SuDS will be adopted by Southern Water should this be requested by the developer. Where SuDS form part of a continuous sewer system, and are not an isolated end of pipe SuDS component, adoption will be considered if such systems comply with the latest Design and Construction Guidance (Appendix C) and CIRIA guidance available here:

water.org.uk/sewerage-sector-guidance-approved-documents/

ciria.org/Memberships/The_SuDS_Manual_C753_Chapters.aspx

Where SuDS rely upon facilities which are not adoptable by sewerage undertakers the applicant will need to ensure that arrangements exist for the long-term maintenance of the SuDS facilities. It is critical that the effectiveness of these systems is maintained in perpetuity. Good management will avoid flooding from the proposed surface water system, which may result in the inundation of the foul sewerage system.

Thus, where a SuDS scheme is to be implemented, the drainage details submitted to the Local Planning Authority should:

- Specify the responsibilities of each party for the implementation of the SuDS scheme.

- Specify a timetable for implementation.

- Provide a management and maintenance plan for the lifetime of the development.

This should include the arrangements for adoption by any public authority or statutory undertaker and any other arrangements to secure the operation of the scheme throughout its lifetime.

Land uses such as general hard standing that may be subject to oil/petrol spillages should be drained by means of appropriate oil trap gullies or petrol/oil interceptors.

Southern Water has noted that the applicant has submitted a Water Neutrality report which we understand the Local Planning Authority will be working in conjunction with Natural England on reviewing the developers proposals. We would not comment on the developers proposals directly, however if the LPA have any specific questions, they can be forwarded to us for a direct response.

We request that should this planning application receive planning approval, the following informative is attached to the consent: Construction of the development shall not commence until details of the proposed means of foul sewerage and surface water disposal have been submitted to, and approved in writing by, the Local Planning Authority in consultation with Southern Water.

This initial assessment does not prejudice any future assessment or commit to any adoption agreements under Section 104 of the Water Industry Act 1991. Please note that non-compliance with the Design and Construction Guidance will preclude future adoption of the foul and surface water sewerage network on site. The design of drainage should ensure that no groundwater or land drainage is to enter public sewers.

Our investigations indicate that Southern Water can facilitate water supply to service the proposed development. Southern Water requires a formal application for a connection to the water supply to be made by the applicant or developer.

To make an application visit developerservices.southernwater.co.uk and please read our New Connections Services Charging Arrangements documents which are available to read on our website via the following link: southernwater.co.uk/developing-building/connection-charging-arrangements

[redacted]

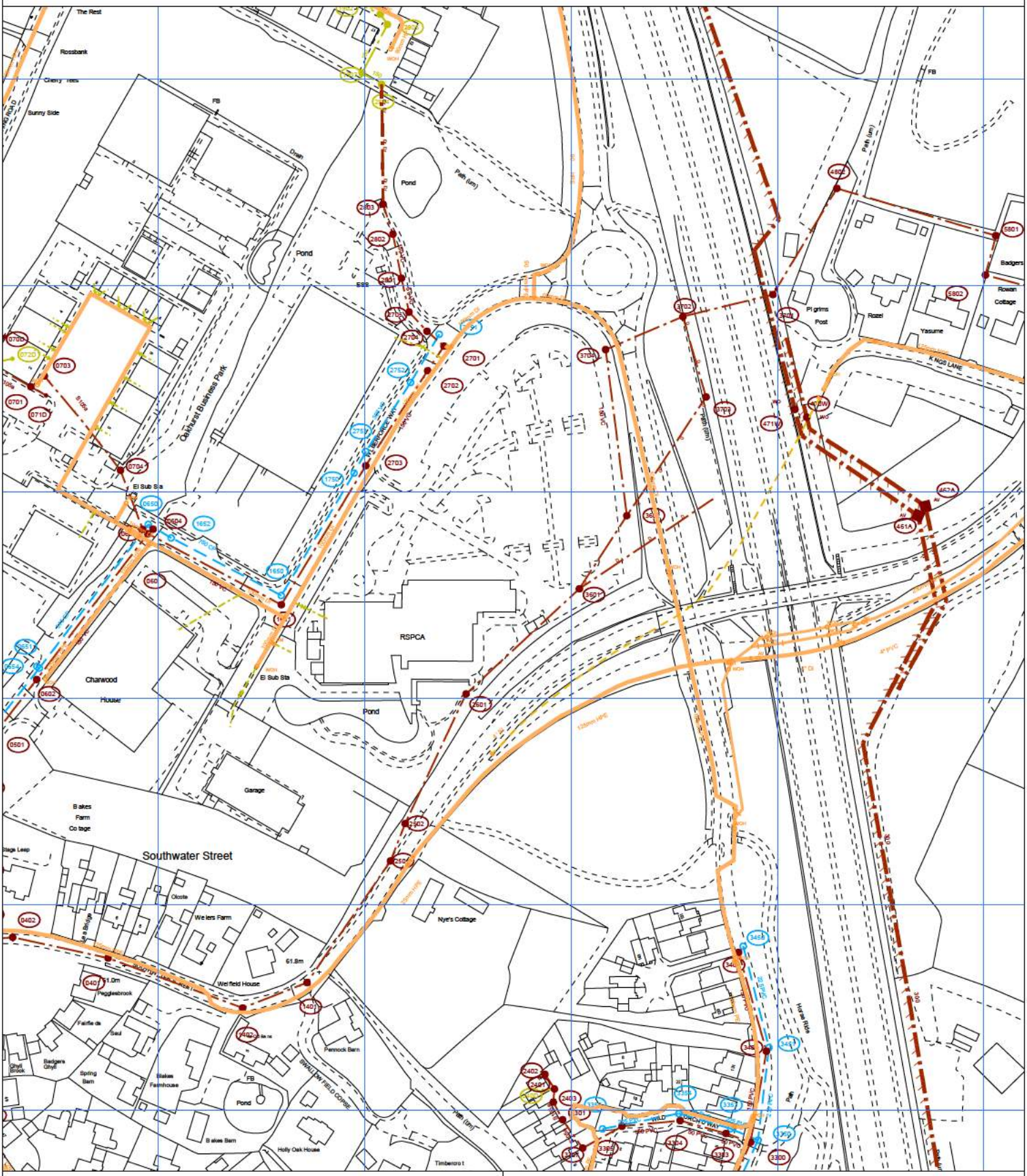
[redacted] SouthernWaterPlanning@southernwater.co.uk

Yours faithfully,

Future Growth Planning Team
**Business Channels**

southernwater.co.uk/developing-building/planning-your-development

# SOUTHERN WATER




The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy The actual positions should be determined on site

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Southern Water

| | | | |
|---|---|---|---|
| O.S. REF: TQ1627NW | Scale: 1:2500 | Printed By: BoregoS | Date: 7-12-2022 |
| Screen Print | | Southern Water MapGuide Browser | |
| WARNING: BAC pipes are constructed of Bonded Asbestos Cement | | Requested By: | |
| WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement | | | |

[redacted]

**From:** Becky Hartley [redacted]
**Sent:** 23 January 2023 11:57
**To:** jason.hawkes@horsham.gov.uk
**Cc:** James Guthrie
**Subject:** Wilberforce House - Southern Water Response
**Attachments:** 21191-BGL-XX-XX-DR-C-00250_P3 Drainage Strategy Plan.pdf; Southern Water Sewer Map - Small Map.pdf; 071466 Wilberforce House Horsham Drainage Report.pdf; Southerm Water Sewer Investigation Ref 8002158839 28.10.2022.pdf; Correspondance with West Sussex CC RE 750 pipe culvert 15.09.2022.pdf

Dear Jason,

Following Southern Water consultation response dated 8th December 2022 (Ref DSA000018122), we respond as follows (in red) to the main comments raised:

SW Comment - The attached plan shows that the proposed development will lie over an existing public foul sewer, which will not be acceptable to Southern Water. The exact position of the public apparatus must be determined on site by the applicant before the layout of the proposed development is finalised.

Response – Utilities Survey CCTV Drainage survey (Ref 071466 dated August/October 2022) was completed to confirm the location and condition of the existing 150mm diameter Foul Water Southern Water sewer located along the northern and eastern boundary of the site. This survey confirmed that the double run shown on the sewer record, is not present and that 1No upstream pipe is located at MH3601. The route of the upstream was traced to buried MH3602 and location is shown on the marked-up plan appended to the report, along with details of MH3601 in the manhole schedule. This information has been used to determine the position of the new development relative to the existing sewer and proposed building is not located over the sewer.

Southern Water also attended site on 12th and 14th September 2022 to survey the drain and they concurred with the findings of the CCTV drainage report – See attached Southern Water letter dated 28.10.2023 Ref 8002158839

We do note that a corner of one of the proposed units is located approx. 1500m from this 150mm diameter FW sewer. We are intending to enter into a Build Over agreement and discussions are being had with the Developer Services Team

SW Comment - It might be possible to divert the 150 mm public foul sewer, so long as this would result in no unacceptable loss of hydraulic capacity, and the work was carried out at the developer's expense to the satisfaction of Southern Water under the relevant statutory provisions.

Response – Given only one corner of one of the proposed units is close to the sewer, with remaining development being kept a minimum of 3000mm away to impact or impede access to the sewer, we do not believe a diversion is required so long as we enter into a build over for this localised encroachment. Proposed foundation solution is traditional and levels are not changing significantly in this area to undermine the sewer in anyway

SW Comment - The 150 mm public foul sewer requires a clearance of 3 metres on either side of the gravity sewer to protect it from construction works and to allow for future access for maintenance.

Response – As noted above, the intention is to apply for a build over where corner of one of the proposed units will encroach into the 3m easement

SW Comment - No development or tree planting should be carried out within 3 metres of the external edge of the public gravity sewer without consent from Southern Water.

Response – Noted. Development is being constructed adjacent to existing landscape strip which the sewer currently runs under

SW Comment - No new soakaways should be located within 5 metres of a public sewer.

Response – Soakaways are not being proposed for this development given the underlying ground conditions

SW Comment - All existing infrastructure should be protected during the course of construction works

Response – Noted and the Development Contractors will be made aware of this prior to start on site.

SW Comment - It is possible that a sewer now deemed to be public could be crossing the development site. Therefore, should any sewer be found during construction works, an investigation of the sewer will be required to ascertain its ownership before any further works commence on site.

Response – The attached Utilities Survey CCTV Drainage survey also confirmed the presence of an existing 750mm piped culvert, which following discussion with WSCC is confirmed to be riparian owner, see attached email correspondence dated concluding on 15th September 2022.

SW Comment - If this is a brownfield site redevelopment, the developer can discharge surface water flow no greater than existing levels if proven to already be connected and it is ensured that there is no overall increase in flows into the surface water system. The developer will be required to provide a topographical site survey and/or a CCTV survey with the connection application showing the existing connection points, pipe sizes, gradients and calculations confirming the proposed surface water flow will be no greater than the existing contributing flows

Response – Proposed development is looking to reuse existing SW and FW connections that served the former site which has been confirm via the Utilities Survey CCTV Drainage survey, attached. SW discharge from this former brownfield site is being restricted to greenfield rate of 11l/s as detailed in the FRA and Drainage Strategy Report dated October 2022 (Ref: 21191-BGL-XX-XX-RP-D-0001) issued as part of the original planning submission.

SW Comment - Where SuDS rely upon facilities which are not adoptable by sewerage undertakers the applicant will need to ensure that arrangements exist for the long-term maintenance of the SuDS facilities. It is critical that the effectiveness of these systems is maintained in perpetuity. Good management will avoid flooding from the proposed surface water system, which may result in the inundation of the foul sewerage system

Response – A Drainage Maintenance Plan has been included in Appendix G of the FRA and Drainage Strategy Report dated October 2022 (Ref: 21191-BGL-XX-XX-RP-D-0001) issued as part of the original planning submission.

Please do not hesitate to contact me if you require any further information or clarification.

Thank you
Becky

# APPENDIX C – Drainage Maintenance Plan

**WILBERFORCE WAY, SOUTHWATER, HORSHAM**

**TECHNICAL NOTE**

**DRAINAGE MAINTENANCE PLAN**

**DOCUMENT CONTROL SHEET**

**Issued by:** Burrows Graham Limited
Buckland House,
Dower Mews,
Berkhamsted, Herts
HP4 2BL

Tel: 01442 508402

**Client:** Legal & General

**Project:** Wilberforce Way

**Document No:** 21191-BGL-XX-XX-TN-X-0001-V1

**Title:** Technical Note – Drainage Management & Maintenance Plan

**Status:** Preliminary

**Date:** 14/10/22

**Prepared By:** PG

**Checked By:** RM

**Document Revision Record**

| Version Number | Date | Revision Details |
|---|---|---|
| 1 | 14/10/2022 | First Issue |
| | | |
| | | |

Burrows Graham Limited has prepared this report in accordance with the instructions of the above-named Client for their sole and specific use. Any third parties who may use the information contained herein do so at their own risk.

# 1 INTRODUCTION

This document has been prepared to provide a maintenance methodology to the surface water drainage elements proposed for this development. If any discrepancies from manufactures guidance are encountered, the proprietary system guidance should be adopted, refer to enclosed Appendices.

The surface water drainage works are composed of the following:

- Linear drainage channels, connecting pipe network, manholes & inspection chambers
- Permeable paving
- Geocellular attenuation tanks.
- Attenuation Pond
- Oil separators

Refer to drawing 21191-BGL-XX-X-DR-C-0250 for the Proposed Drainage Layout.

Any man-entry into the system and silt removal should be carried out by trained personnel with adequate personal protective equipment. Approved safety procedures must be followed in accordance with the Health and Safety Act.

This drainage system's maintenance will be the responsibility of the project developer or by an appointed maintenance company, and as such an appropriated maintenance regime should be implemented.

Long-term management practices include monthly sweeping of external paved areas. The sweeping program will remove sand and contaminants directly from paved surfaces before they become mobilised during storm events and transported to the drainage system.

During the winter months, drainage features such as gullies and channels should be cleared of ice, snow, debris or litter

Sediment/material removal should be undertaken in consultation with the environmental regulator to confirm appropriate protocols; especially where run-off is taken from potentially contaminated areas such as the filter drains and the upstream/downstream chambers

# 2 MAINTENANCE STRATEGY

## 2.1 INSPECTION, MANHOLE AND CATCHPIT CHAMBERS

Access points have been located at the head of each run, at a change in direction and at a change of pipe size in accordance with Building Regulations Part H.

The appropriate health and safety equipment must be used when accessing manholes. Confined space certificates must be held by any personnel entering a manhole and the appropriate permits should be obtained from the Maintenance Manager prior to any access.

## 2.2 PIPES

Pipes are proprietary products, and the materials can vary across the site and as such where used the manufacture's recommendations should be followed. Regardless of the product used, the pipes will be fully compliant with the Burrows Graham drainage specification.

Pipes are intended to be the main conveyance across the development and where oversized they form the attenuation volume required by the limitation of the discharge rate. They are intended to be dry except for during rainfall events. These have been designed to be self-cleaning where possible for smaller diameter pipes, and for larger diameters the risk is reduced due to the overall pipe size.

Access for maintenance is provided through access chambers and manholes.

Regular inspection and maintenance are important to identify areas which may have been obstructed / clogged and may not be drainage correctly thus exposing the development to a greater level of flood risk.

## 2.3 CHANNELS & GULLIES

Channels and gullies should be inspected and cleaned in accordance with the manufacturer's details. Channel units can be cleaned through the use of a high-pressure hose; this can be fed into the channel system through access units strategically placed along the channel run. The throat section of channel units should be kept clear at all times to ensure uninterrupted flow of surface water into the drainage channel and any debris within the throat should be removed.

Locking bolts should be replaced and sufficiently tightened, taking care that the bolt heads do not stand above the top surface of the cover or grate. If covers are allowed to move within their frame, this may cause damage to the frame or seating

| Maintenance schedule | Required action | Typical frequency |
|---|---|---|
| Regular Maintenance | Remove manhole and chamber covers to sewers and flow control on network– inspect to ensure water is flowing freely and that the water flow route is unobstructed.<br><br>Remove debris and silt as required. | Half Yearly<br><br>Undertake one of these inspections after leaf fall in autumn |
| Occasional Maintenance | None required | |
| Remedial Actions | Re-line or replace pipework if unable to clear blockages by jetting. | As required |
| Monitoring | Inspect chambers for build-up of silt and debris | Half yearly |

**Table 1 – Operation & maintenance requirements for pipe network, manholes & inspection chambers, drainage channels & gullies.**

## 2.4 GEOCELLULAR ATTENUATION TANKS

Geocellular tanks are modular storage systems made with plastic units. These units can be assembled to achieved re required volume and usually on multiple layers. Generally, the units have 95% of voids content and are used to create an efficient below ground structure to store surface water.

The geocellular units and geotextile are proprietary products and therefore manufacturer's recommendations should also be taken into consideration.

Access for maintenance should be provided by an access shaft located on the tank and from the manhole chambers downstream of the tank.

Regular inspection and maintenance are important for the effective operation of attenuation tanks as designed. As the feature is buried, a regular inspection regime is very important to ensure the correction functionality of the surface water drainage network.

| Maintenance schedule | Required action | Typical frequency |
|---|---|---|
| Regular Maintenance | Inspect and identify any areas that are not operating correctly. If required, take remedial action. | Monthly for 3 months, then annually. |
| | Remove debris form the catchment surface (where it may cause risks to performance). | Monthly. |
| | For systems where rainfall infiltrates into the tank from above, check surface of filter for blockages by sediment, algae or other matter; remove and replace surface infiltration medium as required. | Annually. |
| | Remove sediments from pre-treatment structures and/or internal forebays. | Annually, or as required. |
| Remedial Actions | Repair/rehabilitate inlets, outlets, overflows and vents. | As required. |
| Monitoring | Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed. | Annually |
| | Survey inside of tank for sediment build-up and remove if necessary. | Every 5 years or as required. |

**Table 2 – Operation & maintenance requirements for attenuation storage tanks - Based on CIRIA SuDS Manual 2015**

## 2.5 POROUS PAVED AREA AND GRANULAR FILTER STRIPS

Permeable surfacing enables any water landing on the surface to infiltrate directly to ground at source, thus acting close to a permeable surface.

Regular inspection and maintenance are important for the effective operation of the permeable surfacing to allow it to work efficiently through it s design life.

| Maintenance schedule | Required action | Typical frequency |
|---|---|---|
| Regular Maintenance | Brushing and vacuuming (standard cosmetic sweep over whole surface) | Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surfaces from adjacent impermeable areas as this is most likely to collect the most sediment. |
| Occasional Maintenance | Stabilise and mow contributing and adjacent areas. | As required |
| | Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying | As required – once per year on less frequently used pavements. |
| Remedial Actions | Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the surface. | As required |
| | Remedial works to any depressions, rutting and cracked considered detrimental to the structural performance or a hazard to users, and replace lost jointing material | As required |
| | Rehabilitation of surface and upper substructure by remedial sweeping. | Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging) |
| Monitoring | Inspect for evidence of poor operation and/or weed growth<br>-if required, take remedial action | Three-monthly, 48 hours after large storms in the first six months |
| | Inspect silt accumulation rates and establish appropriate brushing frequencies. | Annually |
| | Monitor inspection chambers | Annually |

**Table 3 – Operation & Maintenance requirements for Porous Paved Area – CIRIA SuDS Manual 2015**

## 2.6 PROPRIETARY SURFACE WATER TREATMENT SYSTEMS

These are manufactured products to provide a treatment to the surface water by removing specific pollutant, such as petrol interceptors.

Table 4 sets out the recommended maintenance actions and frequency. Manufacture guidance / recommendations should always be used when available.

| Maintenance schedule | Required action | Typical frequency |
|---|---|---|
| Regular Maintenance | Remove litter and debris and inspect for sediment, oil and grease accumulation. | Monthly for 3 months, then annually. |
| | Change the filter media. | As recommended by manufacturer. |
| | Remove sediment, oil grease and floatables. | As necessary – indicated by system inspections or immediately following significant spill. |
| Remedial Actions | Replace malfunctioning parts or structures. | As required. |
| Monitoring | Inspect for evidence of poor operation. | Biannually |
| | Inspect filter media and establish appropriate replacement frequencies. | Biannually |
| | Inspect sediment accumulation rates and establish removal frequencies. | Monthly during first half year of operation, then every six months. |

**Table 4 – Operation & maintenance requirements for proprietary surface water treatment systems - CIRIA SuDS Manual 2015**

## 2.7 PONDS AND WETLANDS

Ponds and wetlands are features with a permanent pool of water that provide both attenuation and treatment of surface water runoff. They can support emergent and submerged aquatic vegetation along their shoreline and in shallow, marshy (wetland) zones, which helps enhance treatment processes and has amenity and biodiversity benefits. Attenuation storage is provided above the permanent pool and wetland areas. A flow control system at the outfall controls the rates of discharge for a range of water levels, causing the pond volume to fill during storm events. Runoff from each rainfall event is detained and treated in the pool. The volume of the pool influences the effectiveness of the feature in settling out particulate pollutants, with larger volumes providing longer periods of time for sedimentation to occur, and greater opportunities for biodegradation and biological uptake mechanisms.

Well-designed and maintained permanent water bodies can offer important aesthetic, amenity and wildlife benefits to development sites. Ponds can be designed as natural features with shallow, grassed side slopes or can be hard landscaped features that complement the character of dense urban environments.

| Maintenance schedule | Required action | Typical frequency |
|---|---|---|
| Regular Maintenance | Remove litter and debris. | Monthly (or as required) |
| | Cut the grass — public areas. | Monthly (during growing season) |
| | Cut the meadow grass. | Half yearly (spring, before nesting season, and autumn) |
| | Inspect marginal and bankside vegetation and remove nuisance plants (for first 3 years) | Monthly (at start, then as nuisance plants required). |
| | Inspect inlets, outlets, banksides, structures, pipework etc for evidence of blockage and/or physical damage. | Monthly |
| | Inspect water body for signs of poor water quality. | Monthly (May — October) |
| | Check any mechanical devices, e.g. penstocks. | Half yearly |
| | Hand cut submerged and emergent aquatic plants (at minimum of 0.1 m above pond base; include max 25% of pond surface). | Annually |
| | Remove 25% of bank vegetation from water's edge to a minimum of 1 m above water level. | Annually |
| | Tidy all dead growth (scrub clearance) before start of growing season (Note: tree maintenance is usually part of overall landscape management contract). | Annually |
| | Remove sediment from any forebay. | Every 1—5 years, or as required |
| | Remove sediment and planting from one quadrant of the main body of ponds without sediment forebays. | Every 5 years, or as required |
| Remedial Actions | Repair erosion or other damage | As required |
| | Replant, where necessary | As required |
| | Aerate pond when signs of eutrophication are detected | As required |
| | Realign riprap or repair other damage | As required |
| | Repair / rehabilitate inlets, outlets and overflows. | As required |
| Monitoring | Inspect for evidence of poor operation. | Biannually |
| | Remove sediment from the main body of big ponds when pool volume is reduced by 20% | With effective pre-treatment, this will only be required rarely, e.g. every 25—50 years |

**Table 5 – Operation & maintenance requirements for Ponds & Wetlands - CIRIA SuDS Manual 2015**

# APPENDIX D – CCTV Report & UG Survey



**CCTV SURVEYS**



**HIGH PRESSURE JETTING**



**MAN ENTRY SURVEYS**



**RELINING & REPAIRS**



**PILING SURVEYS**



**CHIMNEY SURVEYS**

DrainSafe
Approved Drainage Contractors

National Association N.A.D.C. Drainage Contractors

UTILITY SURVEYS LTD.

**5 SUFFOLK ROAD**
**MALDON**
**ESSEX**
**CM9 6AX**
Telephone: 07971 910370

# CCTV REPORT

| | |
|---|---|
| **CLIENT** | BURROWS GRAHAM |
| **LOCATION** | WILBERFORCE HOUSE<br>WILBERFORCE WAY<br>HORSHAM<br>RH13 9RS |
| **DATE** | 30 / 31 AUGUST 2022 & 17 OCTOBER 2022 |
| **REF** | 071466 |

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2. CONTACT INFORMATION……3
3. UTILITY SURVEYS LTD CONTACT DETAILS……..3
4. SITE DESCRIPTION……...4
5. SURVEY BRIEF……...…5
6. SURVEY TECHNIQUES……7
7. INDIVIDUAL INSPECTION REPORT……...8

**REGISTER OF APPENDICES**

A. MANHOLE INSPECTION REPORT
B. COPIES OF SITE HAND WRITTEN DAILY RECORD SHEETS
C. ANNOTATED SITE DRAWINGS

## GENERAL INFORMATION

Utility Surveys Ltd have been appointed by Burrows Graham to undertake a Sewer Condition Survey at the location identified. This survey commenced on 30 August 2022.

## CONTACT INFORMATION

| | |
|---|---|
| **SITE ADDRESS:**<br>**WILBERFORCE HOUSE**<br>**WILBERFORCE WAY**<br>**HORSHAM**<br>**RH13 9RS** | **SITE CONTACT: N/A**<br><br>**CONTACT NO:**<br><br>**EMAIL:** |
| **CLIENT DETAILS:**<br>**BURROWS GRAHAM**<br>**BUCKLAND HOUSE**<br>**DOWER MEWS**<br>**BERKHAMSTED**<br>**HP4 2BL** | **CONTACT: ROQUE MENEZES**<br><br>[redacted]<br><br>**EMAIL:**<br>[redacted] |

## UTILITY SURVEYS LTD CONTACT DETAILS

| | |
|---|---|
| **OFFICE** | **SIMON GARDINER**<br>[redacted]<br>[redacted] |
| **RIG MANAGER** | **SIMON GARDINER** |

## SITE DESCRIPTION

### Site Description

COMMERCIAL DEVELOPMENT SITE

### Site Boundaries

CLEARLY DEFINED ON SUPPLIED DRAWINGS

## SURVEY BRIEF

### Sewer Condition Inspection Survey

The Purpose of the Sewer Condition Inspection Survey was to establish the location and extent of foul and/ or surface water drainage systems and to document their condition prior to any further works.

- A full condition survey can only be produced if precleansing / jetting is carried out in conjunction with the CCTV survey.

- If precleansing is not carried out at the time of the survey further faults and conditional defects may be present but not recorded in this report.

In addition Utility Surveys Ltd have;

- Attempted to investigate all agreed areas, although if not all could be fully accessed (see Daily Record Sheet).

- Produced a report to establish the location and extent of foul and surface water drainage systems and to document their condition prior to any further works.

- Provided the basic information from which a remediation or management plan can be instigated.

- Highlighted the requirement for urgent action to repair or remediation works to the surveyed drainage system.

- Incorporated in the results any additional manholes/ drainage found, which may have been buried, obscured or not identified in the original scope of works.

## Agreed Restrictions and Exclusions

This report is based upon a Sewer Condition Inspection Survey of an unfamiliar site.

During the course of the survey all reasonable efforts were made to identify and access all Manholes and foul/ surface drainage/ outfall, throughout the site.

Some installations/ areas may not have been inspected due to access and or safety reasons (e.g. Wet Wells, Large Unventilated Tanks, Traffic Management Situations). Unless an accepted safe system of work has been devised.

Access may not have been gained to several areas of the site due to conditions outside the control of the client or contractor, any such areas have been documented within this report (see Daily Record Sheet).

Any diagrams/ CAD drawings in the report are not to be scaled and are illustrative only to indicate approximate locations.

Manhole covers will not be lifted if:

a) There is a danger of damaging surrounding flooring or finishes.

b) They are covered, i.e. under fitted carpets, flooring, tiling or paving etc.

c) Under fittings, fixtures, fencing, equipment etc.

Buried manholes will be located, if possible, position marked. If instructed, excavated in soft ground only up to a depth of 350mm with temporary reinstatement.

No allowance has been made for any precleansing unless stated in the quotation.

Full and free access to all areas affected is to be arranged by the instructing party.

## SURVEY TECHNIQUES

The areas set out within the survey brief underwent inspection for a Sewer Condition Inspection Survey each area within the agreed scope of works was surveyed for location extent and condition of foul and/ or surface water drainage systems and CCTV footage gathered for confirmation. Every reasonable effort was made to investigate all aspects of the drainage system. Additional photographs were taken where relevant to the inspection.

There were no deviations from the agreed scope of works.

This Sewer Condition Inspection Survey was carried out in accordance with the Utility Surveys Ltd documented 'in-house' procedure 820 'Code of Working Practice' based on National Sewerage Association guidance.
The Sewer Condition Inspection Survey Report states information recorded at the time of survey only, based on visual and CCTV assessment in accordance with sewer classification codings issued by WRC, incorporating the following inspection criteria:

CONDITION of pipe work
LOCATION of pipe work
EXTENT of the pipe work

A defect grade description has been provided for the identification of defective pipe work.

Changes to any of the above criteria shall necessitate the need for reassessment

These gradings and the reports can be used to form the basis of a planned preventative maintenance programme. This can be the subject of further discussions with our technical support team.

# Drainage Report

Prepared For

**BURROWS GRAHAM**
**BUCKLAND HOUSE**
**DOWER MEWS**
**BERKHAMSTED**
**HP4 2BL**

Site

**RSPCA**
**WILBERFORCE HOUSE**
**WILBERFORCE WAY**
**HORSHAM**
**RH13 9RS**

**UTILITY SURVEYS LIMITED**
**Surveyor: Simon Gardiner**

[redacted]

Total Defects for Project




Total DRB Grades for Project



## 071466 Wilberforce House Horsham - CCTV Survey Report : 30/08/22

| | |
|---|---|
| Name : | UTILITY SURVEYS LIMITED |
| Contact : | SIMON GARDINER |
| Location : | 5 SUFFOLK ROAD |
| Town : | MALDON |
| Region : | ESSEX |
| Postcode : | CM9 6AX |
| Email : | [redacted] |
| Contact Number : | |
| Surveyor : | Simon Gardiner |
| Valid Certification No : | L1103 |

**Client Information**

| | |
|---|---|
| Name : | BURROWS GRAHAM |
| Contact : | ROQUE MENEZES |
| Location : | BUCKLAND HOUSE |
| Town : | DOWER MEWS |
| Region : | BERKHAMSTED |
| Postcode : | HP4 2BL |
| Tel : | [redacted] |
| Mobile : | |
| Email : | |
| Fax : | |

**Site Information**

| | |
|---|---|
| Name : | RSPCA |
| Contact : | |
| Location : | WILBERFORCE HOUSE |
| Town : | WILBERFORCE WAY |
| Region : | HORSHAM |
| Postcode : | RH13 9RS |
| Tel : | |
| Mobile : | |
| Email : | |
| Fax : | |

Total Defects for Project

| | | | | |
|---|---|---|---|---|
| 1 | 0 | 44 | 2 | 0 |

Total DRB Grades for Project

| | | |
|---|---|---|
| 5 | 13 | 2 |

# Report interpretation.

## Overview:

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

Grade A: Drain is serviceable no recommendations required

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

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

## Observations:

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

Severity 1 to 2: These defects may require remedial monitoring

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

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

## General:

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

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

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

## Overview

| | | |
|---|---|---|
| **Section:** 1<br>**From: 3601**<br>**To: 3602** | Grade B | **DRB Grade: B**<br>**Pipe Size: 150**<br>**Material: Vitrified Clay (i.e. all clayware)**<br>**Use: Foul** |
| **Section:** 2<br>**From: 3601**<br>**To: 2601** | Grade B | **DRB Grade: B**<br>**Pipe Size: 150**<br>**Material: Vitrified Clay (i.e. all clayware)**<br>**Use: Foul** |
| **Section:** 3<br>**From: S1**<br>**To: PI1** | Grade A | **DRB Grade: A**<br>**Pipe Size: 400**<br>**Material: Vitrified Clay (i.e. all clayware)**<br>**Use: Surface Water** |
| **Section:** 4<br>**From: S1**<br>**To: S2** | Grade A | **DRB Grade: A**<br>**Pipe Size: 400**<br>**Material: Vitrified Clay (i.e. all clayware)**<br>**Use: Surface Water** |
| **Section:** 5<br>**From: S3**<br>**To: OUTFALL 1** | Grade B | **DRB Grade: B**<br>**Pipe Size: 225**<br>**Material: Vitrified Clay (i.e. all clayware)**<br>**Use: Surface Water** |
| **Section:** 6<br>**From: S4**<br>**To: POND OUTFALL** | Grade B | **DRB Grade: B**<br>**Pipe Size: 400**<br>**Material: Vitrified Clay (i.e. all clayware)**<br>**Use: Surface Water** |
| **Section:** 7<br>**From: S5**<br>**To: S4** | Grade C | **DRB Grade: C**<br>**Pipe Size: 225**<br>**Material: Vitrified Clay (i.e. all clayware)**<br>**Use: Surface Water** |
| **Section:** 8<br>**From: S5**<br>**To: S6** | Grade B | **DRB Grade: B**<br>**Pipe Size: 225**<br>**Material: Vitrified Clay (i.e. all clayware)**<br>**Use: Surface Water** |

Total Defects for Project

1 0 44 2 0

Total DRB Grades for Project

5 13 2

| | | |
|---|---|---|
| **Section:** 9<br><br>**From: S7**<br>**To: OUTFALL 2** | Grade A | **DRB Grade: A**<br>**Pipe Size: 225**<br>**Material: Vitrified Clay (i.e. all clayware)**<br>**Use: Surface Water** |
| **Section:** 10<br><br>**From: F2**<br>**To: F1** | Grade A | **DRB Grade: A**<br>**Pipe Size: 150**<br>**Material: Vitrified Clay (i.e. all clayware)**<br>**Use: Foul** |
| **Section:** 11<br><br>**From: F2**<br>**To: F3** | Grade B | **DRB Grade: B**<br>**Pipe Size: 150**<br>**Material: Vitrified Clay (i.e. all clayware)**<br>**Use: Foul** |
| **Section:** 12<br><br>**From: 1601**<br>**To: F3** | Grade B | **DRB Grade: B**<br>**Pipe Size: 150**<br>**Material: Vitrified Clay (i.e. all clayware)**<br>**Use: Foul** |
| **Section:** 13<br><br>**From: 2502**<br>**To: 2601** | Grade B | **DRB Grade: B**<br>**Pipe Size: 150**<br>**Material: Vitrified Clay (i.e. all clayware)**<br>**Use: Foul** |
| **Section:** 14<br><br>**From: S8**<br>**To: S9** | Grade B | **DRB Grade: B**<br>**Pipe Size: 750**<br>**Material: Concrete**<br>**Use: Surface Water** |
| **Section:** 15<br><br>**From: 3704**<br>**To: 3602** | Grade B | **DRB Grade: B**<br>**Pipe Size: 150**<br>**Material: Vitrified Clay (i.e. all clayware)**<br>**Use: Foul** |
| **Section:** 16<br><br>**From: S8**<br>**To: S11** | Grade A | **DRB Grade: A**<br>**Pipe Size: 375**<br>**Material: Concrete**<br>**Use: Surface Water** |
| **Section:** 17<br><br>**From: S6**<br>**To: 1650** | Grade B | **DRB Grade: B**<br>**Pipe Size: 225**<br>**Material: Vitrified Clay (i.e. all clayware)**<br>**Use: Surface Water** |

Total Defects for Project

1 | 0 | 44 | 2 | 0

Total DRB Grades for Project

5 | 13 | 2

| | | |
|---|---|---|
| **Section:** 18<br><br>**From: 3601**<br>**To: 3602** | Grade C | **DRB Grade: C**<br>**Pipe Size: 150**<br>**Material: Vitrified Clay (i.e. all clayware)**<br>**Use: Foul** |
| **Section:** 19<br><br>**From: 3602**<br>**To: 3704** | Grade B | **DRB Grade: B**<br>**Pipe Size: 150**<br>**Material: Vitrified Clay (i.e. all clayware)**<br>**Use: Foul** |
| **Section:** 20<br><br>**From: 2502**<br>**To: 2601** | Grade B | **DRB Grade: B**<br>**Pipe Size: 150**<br>**Material: Vitrified Clay (i.e. all clayware)**<br>**Use: Foul** |

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY — Section 1

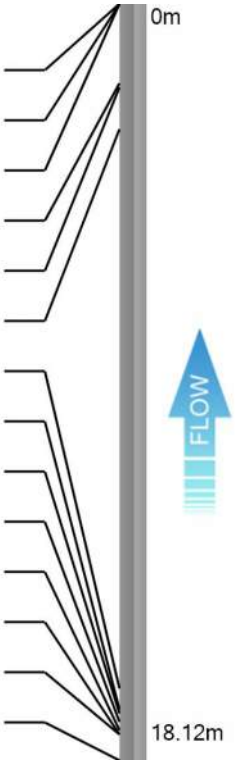
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 30/08/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | 3601 | Finish Node Ref: | 3602 | Direction: | U | Height/Dia: | 150 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | F | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | VC | Cleaned | N |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 18.12 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 5% | | | 0:00:00 |
| 00.00m | DEG | S1 Attached deposits, grease 07-05 5% | S1 | | 0:00:00 |
| 01.90m | DER | Settled deposits coarse 10% | | | 0:00:29 |
| 02.00m | WL | Water level 10% | | | 0:00:29 |
| 03.00m | WL | Water level 5% | | | 0:00:41 |
| 16.40m | WL | Water level 10% | | | 0:02:30 |
| 16.90m | WL | Water level 20% | | | 0:02:33 |
| 17.00m | JDM | Joint displaced medium | | 0_8 | 0:02:34 |
| 17.20m | WL | Water level 30% | | | 0:02:36 |
| 17.40m | WL | Water level 40% | | | 0:02:37 |
| 17.50m | DEG | F1 Attached deposits, grease 07-05 5% | F1 | | 0:00:00 |
| 17.50m | CUW | Loss of vision, camera under water | | 0_11 | 0:02:37 |
| 18.12m | SA | Survey abandoned | | | |




Total Defects for section

| 0 | 0 | 4 | 0 | 0 |
|---|---|---|---|---|

DRB Grade for Section

B

## Descriptive Report with Remarks and Observation Images

**Section 1**

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole 3601 | |
| 00.00m | 0:00:00 | WL | Water level: 5% Height/Diameter | |
| 00.00m | 0:00:00 | S1 DEG | Attached deposits, grease 0m - 17.5m from 07 o'clock to 05 o'clock: 5% Cross sectional area loss - Severity 3 | |
| 01.90m | 0:00:29 | DER | Settled deposits coarse: 10% Cross sectional area loss - Severity 3 | |
| 02.00m | 0:00:29 | WL | Water level: 10% Height/Diameter | |
| 03.00m | 0:00:41 | WL | Water level: 5% Height/Diameter | |
| 16.40m | 0:02:30 | WL | Water level: 10% Height/Diameter | |
| 16.90m | 0:02:33 | WL | Water level: 20% Height/Diameter | |
| 17.00m | 0:02:34 | JDM | Joint displaced medium - Severity 3 | Image Provided - Ref: 0_8  |
| 17.20m | 0:02:36 | WL | Water level: 30% Height/Diameter | |
| 17.40m | 0:02:37 | WL | Water level: 40% Height/Diameter | |
| 17.50m | 0:00:00 | F1 DEG | Attached deposits, grease Defect End from 07 o'clock to 05 o'clock: 5% Cross sectional area loss - Severity 3 | |

Total Defects for section

0 0 4 0 0

DRB Grade for Section

B

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 17.50m | 0:02:37 | CUW | Loss of vision, camera under water | Image Provided - Ref: 0_11  |
| 18.12m | | SA | Survey abandoned CAMERA UNDERWATER | |

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY — Section 2

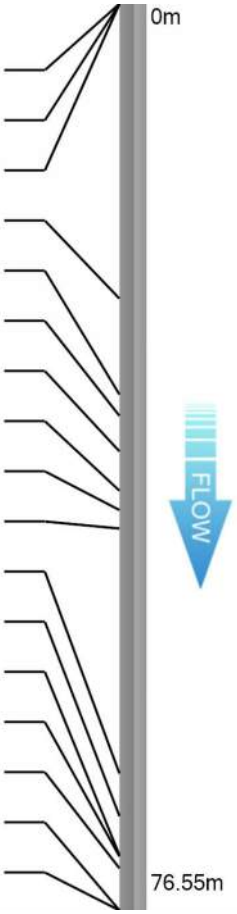
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 30/08/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | 3601 | Finish Node Ref: | 2601 | Direction: | D | Height/Dia: | 150 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | F | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | VC | Cleaned | N |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 76.55 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 5% | | | 0:00:00 |
| 00.00m | DEG | S1 Attached deposits, grease 07-05 5% | S1 | | 0:00:00 |
| 24.90m | RJ | Roots at joint | | | 0:02:38 |
| 33.00m | RJ | Roots at joint | | | 0:03:37 |
| 34.80m | RJ | Roots at joint | | 1_5 | 0:03:48 |
| 37.80m | RJ | Roots at joint | | 1_6 | 0:04:10 |
| 41.12m | RJ | Roots at joint | | 1_7 | 0:04:33 |
| 42.75m | RJ | Roots at joint | | | 0:05:49 |
| 44.31m | RJ | Roots at joint | | | 0:05:56 |
| 65.00m | WL | Water level 10% | | | 0:08:45 |
| 68.60m | RJ | Roots at joint | | | 0:08:47 |
| 71.90m | RJ | Roots at joint | | 1_12 | 0:09:08 |
| 72.00m | WL | Water level 20% | | | 0:09:17 |
| 73.00m | WL | Water level 30% | | | 0:10:01 |
| 76.55m | DEG | F1 Attached deposits, grease 07-05 5% | F1 | | 0:00:00 |
| 76.55m | MHF | Finish node type, manhole | | | |




Total Defects for section

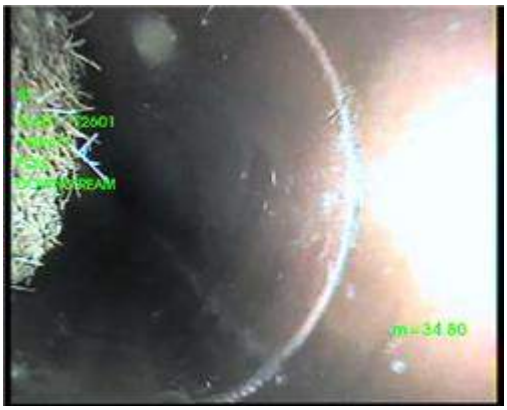
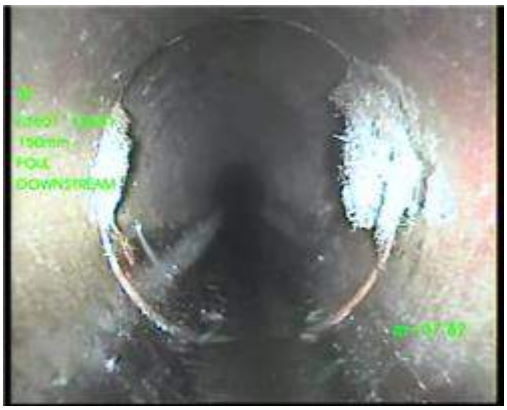
| 0 | 0 | 11 | 0 | 0 |
|---|---|---|---|---|

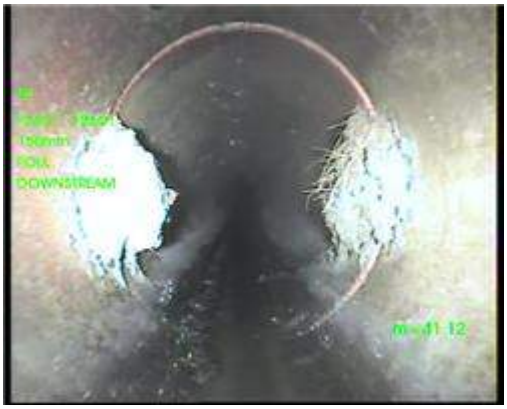
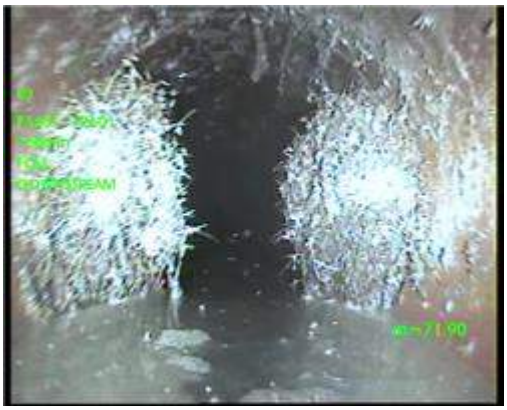
DRB Grade for Section

B

## Descriptive Report with Remarks and Observation Images

Section 2

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole 3601 | |
| 00.00m | 0:00:00 | WL | Water level: 5% Height/Diameter | |
| 00.00m | 0:00:00 | S1 DEG | Attached deposits, grease 0m - 76.55m from 07 o'clock to 05 o'clock: 5% Cross sectional area loss - Severity 3 | |
| 24.90m | 0:02:38 | RJ | Roots at joint - Severity 3 FINE ROOTS AT JOINT | |
| 33.00m | 0:03:37 | RJ | Roots at joint - Severity 3 FINE ROOTS AT JOINT | |
| 34.80m | 0:03:48 | RJ | Roots at joint - Severity 3 MASS ROOTS AT JOINT 30% | Image Provided - Ref: 1_5  |
| 37.80m | 0:04:10 | RJ | Roots at joint - Severity 3 MASS ROOTS AT JOINT | Image Provided - Ref: 1_6  |

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 41.12m | 0:04:33 | RJ | Roots at joint - Severity 3<br>MASS ROOTS AT JOINT | Image Provided - Ref: 1_7  |
| 42.75m | 0:05:49 | RJ | Roots at joint - Severity 3<br>MASS ROOTS AT JOINT | |
| 44.31m | 0:05:56 | RJ | Roots at joint - Severity 3<br>MASS ROOTS AT JOINT | |
| 65.00m | 0:08:45 | WL | Water level: 10%<br>Height/Diameter | |
| 68.60m | 0:08:47 | RJ | Roots at joint - Severity 3<br>MASS ROOTS AT JOINT | |
| 71.90m | 0:09:08 | RJ | Roots at joint - Severity 3<br>MASS ROOTS AT JOINT | Image Provided - Ref: 1_12  |
| 72.00m | 0:09:17 | WL | Water level: 20%<br>Height/Diameter | |
| 73.00m | 0:10:01 | WL | Water level: 30%<br>Height/Diameter | |
| 76.55m | 0:00:00 | F1 DEG | Attached deposits, grease Defect End from 07 o'clock to 05 o'clock: 5% Cross sectional area loss - Severity 3 | |
| 76.55m | | MHF | Finish node type, manhole 2601 | |

Total Defects for section

0 0 11 0 0

DRB Grade for Section

B

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY

**Section 3**

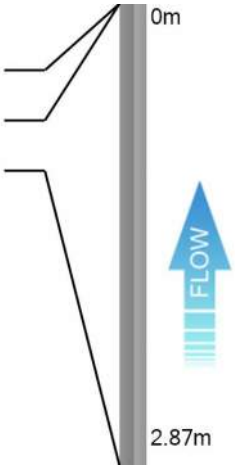
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 30/08/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | S1 | Finish Node Ref: | PI1 | Direction: | U | Height/Dia: | 400 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | S | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | VC | Cleaned | N |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 2.87 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 0% | | | 0:00:00 |
| 02.87m | MHF | Finish node type, manhole | | | |




Total Defects for section

0 0 0 0 0

DRB Grade for Section

A

## Descriptive Report with Remarks and Observation Images

**Section 3**

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole<br>S1 | |
| 00.00m | 0:00:00 | WL | Water level: 0%<br>Height/Diameter | |
| 02.87m | | MHF | Finish node type, manhole<br>PI1 | |

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY — Section 4

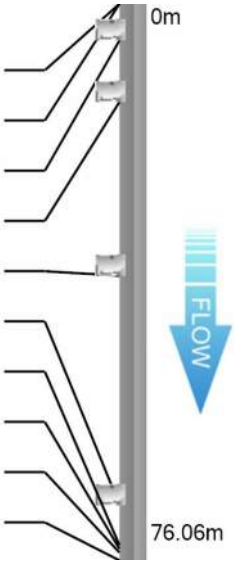
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 30/08/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | S1 | Finish Node Ref: | S2 | Direction: | D | Height/Dia: | 400 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | S | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | VC | Cleaned | N |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 76.06 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 5% | | | 0:00:00 |
| 05.00m | JN | Junction 02 : 100mm Diameter | | | 0:00:20 |
| 13.40m | JN | Junction 03 : 100mm Diameter | | | 0:00:46 |
| 37.16m | JN | Junction 03 : 100mm Diameter | | | 0:01:55 |
| 68.47m | JN | Junction 03 : 100mm Diameter | | | 0:04:25 |
| 74.00m | WL | Water level 10% | | | 0:04:50 |
| 74.50m | WL | Water level 20% | | | 0:04:52 |
| 75.00m | WL | Water level 30% | | 3_8 | 0:04:59 |
| 76.06m | MHF | Finish node type, manhole | | | |




Total Defects for section

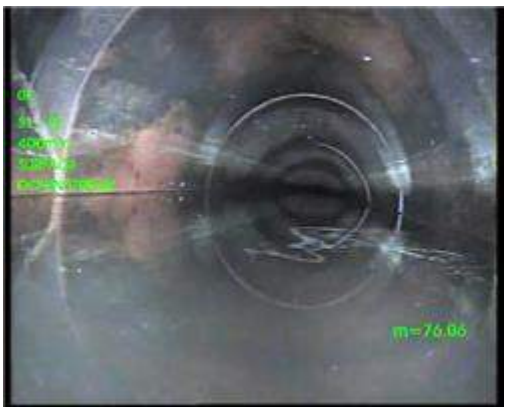
0 0 0 0 0

DRB Grade for Section

A

## Descriptive Report with Remarks and Observation Images

**Section 4**

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole S1 | |
| 00.00m | 0:00:00 | WL | Water level: 5% Height/Diameter | |
| 05.00m | 0:00:20 | JN | Junction at 02 o'clock: 100mm Diameter | |
| 13.40m | 0:00:46 | JN | Junction at 03 o'clock: 100mm Diameter | |
| 37.16m | 0:01:55 | JN | Junction at 03 o'clock: 100mm Diameter | |
| 68.47m | 0:04:25 | JN | Junction at 03 o'clock: 100mm Diameter | |
| 74.00m | 0:04:50 | WL | Water level: 10% Height/Diameter | |
| 74.50m | 0:04:52 | WL | Water level: 20% Height/Diameter | |
| 75.00m | 0:04:59 | WL | Water level: 30% Height/Diameter | Image Provided - Ref: 3_8  |
| 76.06m | | MHF | Finish node type, manhole S2 | |

Total Defects for section

0 0 0 0 0

DRB Grade for Section

A

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY

## Section 5

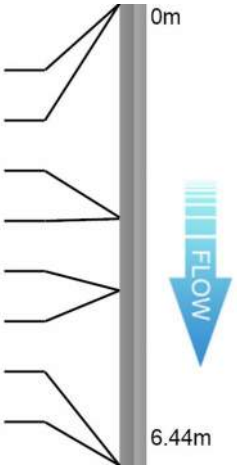
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 30/08/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | S3 | Finish Node Ref: | OUTFALL 1 | Direction: | D | Height/Dia: | 225 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | S | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | VC | Cleaned | N |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 6.44 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 0% | | | 0:00:00 |
| 02.98m | JDM | Joint displaced medium | | 4_2 | 0:00:25 |
| 03.00m | LDF | Line of drain/sewer deviates down [full] | | | 0:00:27 |
| 04.00m | CUW | S1 Loss of vision, camera under water | S1 | | 0:00:55 |
| 04.00m | LUF | Line of drain/sewer deviates up [full] | | | 0:00:55 |
| 06.44m | CUW | F1 Loss of vision, camera under water | F1 | | 0:00:55 |
| 06.44m | SA | Survey abandoned | | | |




Total Defects for section

| 0 | 0 | 1 | 0 | 0 |
|---|---|---|---|---|

DRB Grade for Section

B

## Descriptive Report with Remarks and Observation Images — Section 5

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole S3 | |
| 00.00m | 0:00:00 | WL | Water level: 0% Height/Diameter | |
| 02.98m | 0:00:25 | JDM | Joint displaced medium - Severity 3 | Image Provided - Ref: 4_2  |
| 03.00m | 0:00:27 | LDF | Line of drain/sewer deviates down [full] | |
| 04.00m | 0:00:55 | S1 CUW | Loss of vision, camera under water 4m - 6.44m | |
| 04.00m | 0:00:55 | LUF | Line of drain/sewer deviates up [full] | |
| 06.44m | 0:00:55 | F1 CUW | Loss of vision, camera under water Defect End | |
| 06.44m | | SA | Survey abandoned CAMERA UNDERWATER | |

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY — Section 6

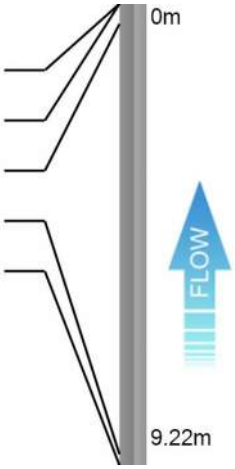
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 30/08/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | S4 | Finish Node Ref: | POND OUTFALL | Direction: | U | Height/Dia: | 400 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | S | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | VC | Cleaned | N |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 9.22 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 0% | | | 0:00:00 |
| 00.40m | DES | S1 Settled deposits fine 10% | S1 | | 0:00:00 |
| 09.00m | DES | F1 Settled deposits fine 10% | F1 | | 0:00:00 |
| 09.22m | OFF | Finish node type, outfall | | | |




Total Defects for section

| 0 | 0 | 2 | 0 | 0 |
|---|---|---|---|---|

DRB Grade for Section

B

## Descriptive Report with Remarks and Observation Images — Section 6

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole S4 | |
| 00.00m | 0:00:00 | WL | Water level: 0% Height/Diameter | |
| 00.40m | 0:00:00 | S1 DES | Settled deposits fine 0.4m - 9m: 10% Cross sectional area loss - Severity 3 | |
| 09.00m | 0:00:00 | F1 DES | Settled deposits fine Defect End: 10% Cross sectional area loss - Severity 3 | |
| 09.22m | | OFF | Finish node type, outfall POND OUTFALL | |

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY

## Section 7

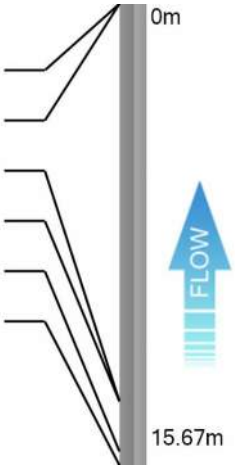
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 30/08/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | S5 | Finish Node Ref: | S4 | Direction: | U | Height/Dia: | 225 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | S | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | VC | Cleaned | N |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 15.67 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 0% | | | 0:00:00 |
| 13.50m | JDL | Joint displaced large | | 6_2 | 0:01:25 |
| 13.50m | MC | Material of drain/sewer changes | | | 0:01:30 |
| 15.20m | LUF | Line of drain/sewer deviates up [full] | | | 0:01:43 |
| 15.67m | MHF | Finish node type, manhole | | | |




Total Defects for section

0 0 0 1 0

DRB Grade for Section

C

## Descriptive Report with Remarks and Observation Images

Section 7

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole S5 | |
| 00.00m | 0:00:00 | WL | Water level: 0% Height/Diameter | |
| 13.50m | 0:01:25 | JDL | Joint displaced large - Severity 4 | Image Provided - Ref: 6_2  |
| 13.50m | 0:01:30 | MCCI | Material of pipe changes to Cast Iron | |
| 15.20m | 0:01:43 | LUF | Line of drain/sewer deviates up [full] | |
| 15.67m | | MHF | Finish node type, manhole S4 | |

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY — Section 8

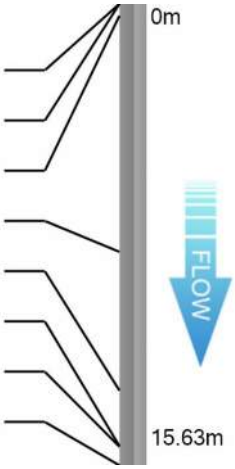
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 30/08/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | S5 | Finish Node Ref: | S6 | Direction: | D | Height/Dia: | 225 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | S | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | VC | Cleaned | N |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 15.63 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 0% | | | 0:00:00 |
| 00.40m | DEE | S1 Attached deposits, encrustation 04-08 5% | S1 | | 0:01:02 |
| 08.40m | DEE | F1 Attached deposits, encrustation 04-08 5% | F1 | | 0:01:02 |
| 13.10m | LDF | Line of drain/sewer deviates down [full] | | | 0:01:31 |
| 14.98m | LUF | Line of drain/sewer deviates up [full] | | | 0:01:46 |
| 15.00m | CUW | Loss of vision, camera under water | | | 0:02:15 |
| 15.63m | SA | Survey abandoned | | | |




Total Defects for section

| 0 | 0 | 2 | 0 | 0 |
|---|---|---|---|---|

DRB Grade for Section

B

## Descriptive Report with Remarks and Observation Images — Section 8

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole S5 | |
| 00.00m | 0:00:00 | WL | Water level: 0% Height/Diameter | |
| 00.40m | 0:01:02 | S1 DEE | Attached deposits, encrustation 0.4m - 8.4m from 04 o'clock to 08 o'clock: 5% Cross sectional area loss - Severity 3 | |
| 08.40m | 0:01:02 | F1 DEE | Attached deposits, encrustation Defect End from 04 o'clock to 08 o'clock: 5% Cross sectional area loss - Severity 3 | |
| 13.10m | 0:01:31 | LDF | Line of drain/sewer deviates down [full] | |
| 14.98m | 0:01:46 | LUF | Line of drain/sewer deviates up [full] | |
| 15.00m | 0:02:15 | CUW | Loss of vision, camera under water | |
| 15.63m | | SA | Survey abandoned CAMERA UNDERWATER | |

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY — Section 9

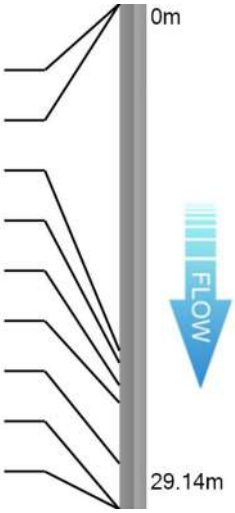
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 30/08/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | S7 | Finish Node Ref: | OUTFALL 2 | Direction: | D | Height/Dia: | 225 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | S | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | VC | Cleaned | N |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 29.14 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 5% | | | 0:00:00 |
| 20.00m | WL | Water level 10% | | | 0:02:01 |
| 20.70m | WL | Water level 20% | | | 0:02:07 |
| 22.00m | WL | Water level 30% | | | 0:02:25 |
| 23.00m | CUW | Loss of vision, camera under water | | | 0:02:31 |
| 26.50m | CUW | S1 Loss of vision, camera under water | S1 | | 0:03:00 |
| 29.14m | CUW | F1 Loss of vision, camera under water | F1 | | 0:03:00 |
| 29.14m | OFF | Finish node type, outfall | | | |




Total Defects for section

0 0 0 0 0

DRB Grade for Section

A

## Descriptive Report with Remarks and Observation Images — Section 9

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole S7 | |
| 00.00m | 0:00:00 | WL | Water level: 5% Height/Diameter | |
| 20.00m | 0:02:01 | WL | Water level: 10% Height/Diameter | |
| 20.70m | 0:02:07 | WL | Water level: 20% Height/Diameter | |
| 22.00m | 0:02:25 | WL | Water level: 30% Height/Diameter | |
| 23.00m | 0:02:31 | CUW | Loss of vision, camera under water | |
| 26.50m | 0:03:00 | S1 CUW | Loss of vision, camera under water 26.5m - 29.14m | |
| 29.14m | 0:03:00 | F1 CUW | Loss of vision, camera under water Defect End | |
| 29.14m | | OFF | Finish node type, outfall OUTFALL 2 | |

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY — Section 10

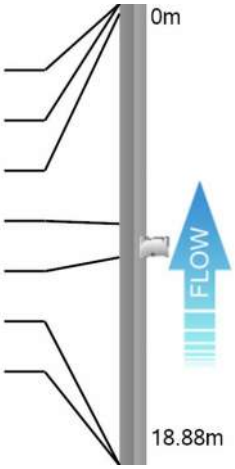
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 31/08/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | F2 | Finish Node Ref: | F1 | Direction: | U | Height/Dia: | 150 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | F | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | VC | Cleaned | N |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 18.88 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 10% | | | 0:00:00 |
| 00.40m | REM | S1 General remark | S1 | | 0:00:00 |
| 09.00m | WL | Water level 5% | | | 0:01:12 |
| 10.37m | JN | Junction 10 : 100mm Diameter | | | 0:01:20 |
| 18.88m | REM | F1 General remark | F1 | | 0:00:00 |
| 18.88m | MHF | Finish node type, manhole | | | |




Total Defects for section

0 0 0 0 0

DRB Grade for Section

A

## Descriptive Report with Remarks and Observation Images — Section 10

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole F2 | |
| 00.00m | 0:00:00 | WL | Water level: 10% Height/Diameter | |
| 00.40m | 0:00:00 | S1 REM | General remark 0.4m - 18.88m STAINING TO PIPE SURFACE | |
| 09.00m | 0:01:12 | WL | Water level: 5% Height/Diameter | |
| 10.37m | 0:01:20 | JN | Junction at 10 o'clock: 100mm Diameter | |
| 18.88m | 0:00:00 | F1 REM | General remark Defect End STAINING TO PIPE SURFACE | |
| 18.88m | | MHF | Finish node type, manhole F1 | |

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY — Section 11

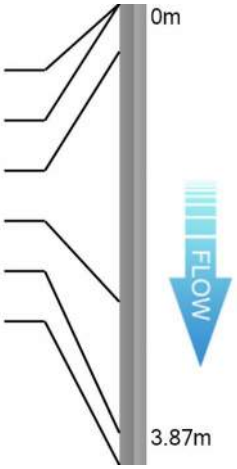
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 31/08/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | F2 | Finish Node Ref: | F3 | Direction: | D | Height/Dia: | 150 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | F | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | VC | Cleaned | N |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 3.87 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 5% | | | 0:00:00 |
| 00.40m | REM | S1 General remark | S1 | | 0:00:33 |
| 02.50m | JDM | Joint displaced medium | | | 0:00:20 |
| 03.60m | REM | F1 General remark | F1 | | 0:00:33 |
| 03.87m | MHF | Finish node type, manhole | | | |




Total Defects for section

0 | 0 | 1 | 0 | 0

DRB Grade for Section

B

## Descriptive Report with Remarks and Observation Images — Section 11

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole F2 | |
| 00.00m | 0:00:00 | WL | Water level: 5% Height/Diameter | |
| 00.40m | 0:00:33 | S1 REM | General remark 0.4m - 3.6m STAINING TO PIPE SURFACE | |
| 02.50m | 0:00:20 | JDM | Joint displaced medium - Severity 3 | |
| 03.60m | 0:00:33 | F1 REM | General remark Defect End STAINING TO PIPE SURFACE | |
| 03.87m | | MHF | Finish node type, manhole F3 | |

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY — Section 12

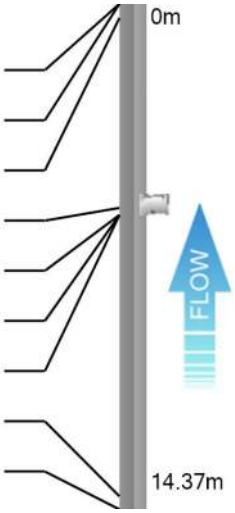
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 31/08/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | 1601 | Finish Node Ref: | F3 | Direction: | U | Height/Dia: | 150 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | F | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | VC | Cleaned | N |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 14.37 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 5% | | | 0:00:00 |
| 00.40m | REM | S1 General remark | S1 | | 0:00:00 |
| 05.80m | DEG | Attached deposits, grease 07-11 5% | | | 0:00:41 |
| 06.00m | REM | F1 General remark | F1 | | 0:00:00 |
| 06.00m | JN | Junction 10 : 100mm Diameter | | | 0:00:43 |
| 06.00m | DEG | S2 Attached deposits, grease 05-07 5% | S2 | | 0:00:00 |
| 14.00m | DEG | F2 Attached deposits, grease 05-07 5% | F2 | | 0:00:00 |
| 14.37m | MHF | Finish node type, manhole | | | |




Total Defects for section

| 0 | 0 | 3 | 0 | 0 |
|---|---|---|---|---|

DRB Grade for Section

B

## Descriptive Report with Remarks and Observation Images — Section 12

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole 1601 | |
| 00.00m | 0:00:00 | WL | Water level: 5% Height/Diameter | |
| 00.40m | 0:00:00 | S1 REM | General remark 0.4m - 6m STAINING TO PIPE SURFACE | |
| 05.80m | 0:00:41 | DEG | Attached deposits, grease from 07 o'clock to 11 o'clock: 5% Cross sectional area loss - Severity 3 | |
| 06.00m | 0:00:00 | F1 REM | General remark Defect End STAINING TO PIPE SURFACE | |
| 06.00m | 0:00:43 | JN | Junction at 10 o'clock: 100mm Diameter | |
| 06.00m | 0:00:00 | S2 DEG | Attached deposits, grease 6m - 14m from 05 o'clock to 07 o'clock: 5% Cross sectional area loss - Severity 3 | |
| 14.00m | 0:00:00 | F2 DEG | Attached deposits, grease Defect End from 05 o'clock to 07 o'clock: 5% Cross sectional area loss - Severity 3 | |
| 14.37m | | MHF | Finish node type, manhole F3 | |

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY — Section 13

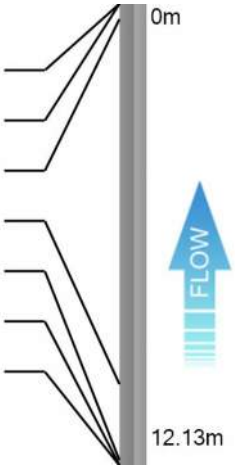
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 31/08/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | 2502 | Finish Node Ref: | 2601 | Direction: | U | Height/Dia: | 150 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | F | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | VC | Cleaned | N |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 12.13 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 5% | | | 0:00:00 |
| 00.40m | DEG | S1 Attached deposits, grease 07-05 5% | S1 | | 0:00:22 |
| 10.00m | RJ | Roots at joint | | | 0:00:55 |
| 12.00m | RJ | Roots at joint | | 12_4 | 0:01:05 |
| 12.13m | DEG | F1 Attached deposits, grease 07-05 5% | F1 | | 0:00:22 |
| 12.13m | SA | Survey abandoned | | | |




Total Defects for section

0 | 0 | 4 | 0 | 0

DRB Grade for Section

B

## Descriptive Report with Remarks and Observation Images — Section 13

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole 2502 | |
| 00.00m | 0:00:00 | WL | Water level: 5% Height/Diameter | |
| 00.40m | 0:00:22 | S1 DEG | Attached deposits, grease 0.4m - 12.13m from 07 o'clock to 05 o'clock: 5% Cross sectional area loss - Severity 3 | |
| 10.00m | 0:00:55 | RJ | Roots at joint - Severity 3 MASS ROOTS AT JOINT | |
| 12.00m | 0:01:05 | RJ | Roots at joint - Severity 3 MASS ROOTS AT JOINT 50% | Image Provided - Ref: 12_4  |
| 12.13m | 0:00:22 | F1 DEG | Attached deposits, grease Defect End from 07 o'clock to 05 o'clock: 5% Cross sectional area loss - Severity 3 | |
| 12.13m | | SA | Survey abandoned MASS ROOTS | |

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY — Section 14

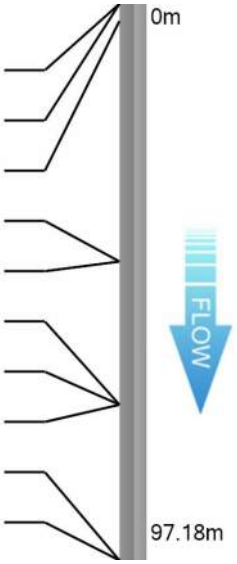
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 31/08/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | S8 | Finish Node Ref: | S9 | Direction: | D | Height/Dia: | 750 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | S | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | CO | Cleaned | N |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 97.18 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 5% | | | 0:00:00 |
| 03.00m | DER | Settled deposits coarse 10% | | | 0:00:03 |
| 45.00m | WL | Water level 10% | | | 0:02:15 |
| 45.00m | DES | S1 Settled deposits fine 10% | S1 | | 0:02:15 |
| 70.00m | DES | F1 Settled deposits fine 10% | F1 | | 0:02:15 |
| 70.00m | WL | Water level 20% | | | 0:03:59 |
| 70.00m | DES | S2 Settled deposits fine 20% | S2 | | 0:03:59 |
| 97.18m | DES | F2 Settled deposits fine 20% | F2 | | 0:03:59 |
| 97.18m | MHF | Finish node type, manhole | | | |




Total Defects for section

| | | | | |
|---|---|---|---|---|
| 0 | 0 | 5 | 0 | 0 |

DRB Grade for Section

B

## Descriptive Report with Remarks and Observation Images

Section 14

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole S8 | |
| 00.00m | 0:00:00 | WL | Water level: 5% Height/Diameter | |
| 03.00m | 0:00:03 | DER | Settled deposits coarse: 10% Cross sectional area loss - Severity 3 | |
| 45.00m | 0:02:15 | WL | Water level: 10% Height/Diameter | |
| 45.00m | 0:02:15 | S1 DES | Settled deposits fine 45m - 70m: 10% Cross sectional area loss - Severity 3 | |
| 70.00m | 0:02:15 | F1 DES | Settled deposits fine Defect End: 10% Cross sectional area loss - Severity 3 | |
| 70.00m | 0:03:59 | WL | Water level: 20% Height/Diameter | |
| 70.00m | 0:03:59 | S2 DES | Settled deposits fine 70m - 97.18m: 20% Cross sectional area loss - Severity 3 | |
| 97.18m | 0:03:59 | F2 DES | Settled deposits fine Defect End: 20% Cross sectional area loss - Severity 3 | |
| 97.18m | | MHF | Finish node type, manhole S9 | |

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY — Section 15

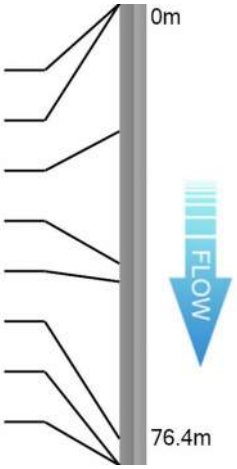
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 17/10/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | 3704 | Finish Node Ref: | 3602 | Direction: | D | Height/Dia: | 150 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | F | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | VC | Cleaned | N |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 76.4 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 10% | | | 0:00:00 |
| 21.10m | JDM | Joint displaced medium | | | 0:02:27 |
| 43.00m | WL | Water level 20% | | | 0:05:43 |
| 46.00m | WL | Water level 10% | | | 0:06:01 |
| 72.00m | DEG | S1 Attached deposits, grease 07-05 5% | S1 | | 0:10:32 |
| 76.40m | DEG | F1 Attached deposits, grease 07-05 5% | F1 | | 0:10:32 |
| 76.40m | SA | Survey abandoned | | | |




Total Defects for section

| 0 | 0 | 3 | 0 | 0 |
|---|---|---|---|---|

DRB Grade for Section

B

## Descriptive Report with Remarks and Observation Images — Section 15

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole 3704 | |
| 00.00m | 0:00:00 | WL | Water level: 10% Height/Diameter | |
| 21.10m | 0:02:27 | JDM | Joint displaced medium - Severity 3 | |
| 43.00m | 0:05:43 | WL | Water level: 20% Height/Diameter | |
| 46.00m | 0:06:01 | WL | Water level: 10% Height/Diameter | |
| 72.00m | 0:10:32 | S1 DEG | Attached deposits, grease 72m - 76.4m from 07 o'clock to 05 o'clock: 5% Cross sectional area loss - Severity 3 | |
| 76.40m | 0:10:32 | F1 DEG | Attached deposits, grease Defect End from 07 o'clock to 05 o'clock: 5% Cross sectional area loss - Severity 3 | |
| 76.40m | | SA | Survey abandoned END OF ROD | |

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY — Section 16

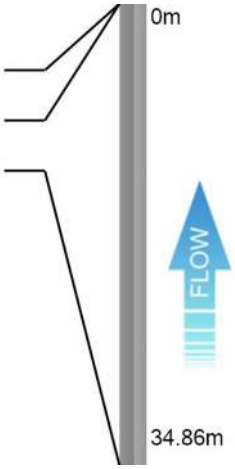
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 17/10/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | S8 | Finish Node Ref: | S11 | Direction: | U | Height/Dia: | 375 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | S | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | CO | Cleaned | N |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 34.86 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 10% | | | 0:00:00 |
| 34.86m | MHF | Finish node type, manhole | | | |




Total Defects for section

0 0 0 0 0

DRB Grade for Section

A

## Descriptive Report with Remarks and Observation Images — Section 16

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole S8 | |
| 00.00m | 0:00:00 | WL | Water level: 10% Height/Diameter | |
| 34.86m | | MHF | Finish node type, manhole S11 | |

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY — Section 17

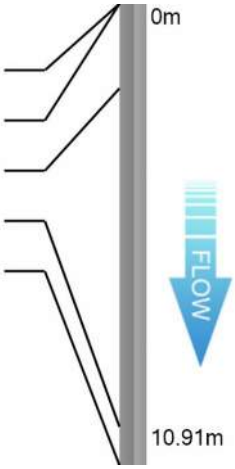
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 17/10/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | S6 | Finish Node Ref: | 1650 | Direction: | D | Height/Dia: | 225 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | S | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | VC | Cleaned | N |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 10.91 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 5% | | | 0:00:00 |
| 02.00m | CC | Crack, circumferential 07-05 | | | 0:00:29 |
| 10.00m | JDM | Joint displaced medium | | | 0:02:43 |
| 10.91m | MHF | Finish node type, manhole | | | |




Total Defects for section

| 1 | 0 | 1 | 0 | 0 |
|---|---|---|---|---|

DRB Grade for Section

B

## Descriptive Report with Remarks and Observation Images

Section 17

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole S6 | |
| 00.00m | 0:00:00 | WL | Water level: 5% Height/Diameter | |
| 02.00m | 0:00:29 | CC | Crack, circumferential from 07 o'clock to 05 o'clock - Severity 1 | |
| 10.00m | 0:02:43 | JDM | Joint displaced medium - Severity 3 | |
| 10.91m | | MHF | Finish node type, manhole 1650 | |

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY — Section 18

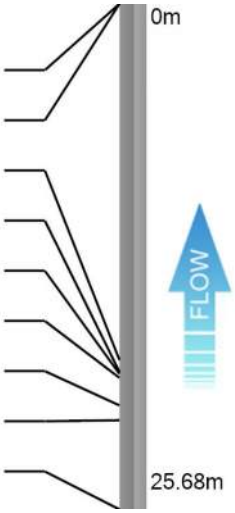
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 17/10/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | 3601 | Finish Node Ref: | 3602 | Direction: | U | Height/Dia: | 150 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | F | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | VC | Cleaned | Y |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 25.68 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 5% | | | 0:00:00 |
| 18.10m | JDL | Joint displaced large | | 17_2 | 0:02:05 |
| 18.70m | FC | Fracture circumferential 07-05 | | 17_3 | 0:02:18 |
| 18.80m | WL | Water level 10% | | | 0:02:18 |
| 19.00m | WL | Water level 20% | | 17_5 | 0:02:26 |
| 20.40m | JDM | Joint displaced medium | | | 0:02:39 |
| 21.15m | RJ | Roots at joint | | 17_7 | 0:02:45 |
| 25.68m | MHF | Finish node type, manhole | | | |



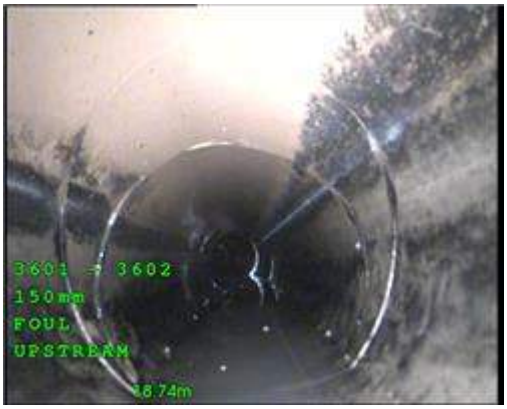

Total Defects for section

| 0 | 0 | 3 | 1 | 0 |
|---|---|---|---|---|

DRB Grade for Section

C

## Descriptive Report with Remarks and Observation Images — Section 18

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole 3601 | |
| 00.00m | 0:00:00 | WL | Water level: 5% Height/Diameter | |
| 18.10m | 0:02:05 | JDL | Joint displaced large - Severity 4 | Image Provided - Ref: 17_2   |
| 18.70m | 0:02:18 | FC | Fracture circumferential from 07 o'clock to 05 o'clock - Severity 3 | Image Provided - Ref: 17_3   |
| 18.80m | 0:02:18 | WL | Water level: 10% Height/Diameter | |
| 19.00m | 0:02:26 | WL | Water level: 20% Height/Diameter | Image Provided - Ref: 17_5   |

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 20.40m | 0:02:39 | JDM | Joint displaced medium - Severity 3 | |
| 21.15m | 0:02:45 | RJ | Roots at joint - Severity 3<br>FINE ROOTS AT JOINT | Image Provided - Ref: 17_7  |
| 25.68m | | MHF | Finish node type, manhole 3602 | |

Total Defects for section

0 0 3 1 0

DRB Grade for Section

C

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY — Section 19

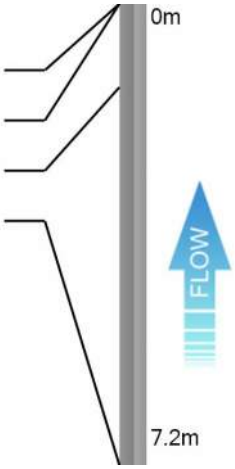
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 17/10/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | 3602 | Finish Node Ref: | 3704 | Direction: | U | Height/Dia: | 150 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | F | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | VC | Cleaned | Y |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 7.2 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 10% | | | 0:00:00 |
| 01.30m | DES | Settled deposits fine 10% | | | 0:00:29 |
| 07.20m | SA | Survey abandoned | | | |




Total Defects for section

| 0 | 0 | 1 | 0 | 0 |
|---|---|---|---|---|

DRB Grade for Section

B

## Descriptive Report with Remarks and Observation Images

**Section 19**

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole 3602 | |
| 00.00m | 0:00:00 | WL | Water level: 10% Height/Diameter | |
| 01.30m | 0:00:29 | DES | Settled deposits fine: 10% Cross sectional area loss - Severity 3 | |
| 07.20m | | SA | Survey abandoned PAST POINT REACHED FROM OTHER END | |

## Site: WILBERFORCE HOUSE, WILBERFORCE WAY — Section 20

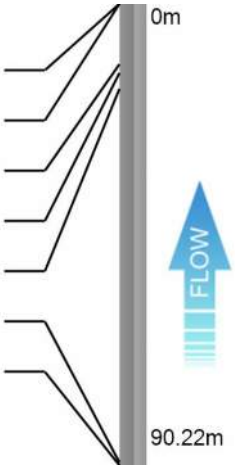
| Client: | Location (Street Name): | City/Town/Village | Cust Job Ref. | Surveyors Name: | Date: |
|---|---|---|---|---|---|
| BURROWS GRAHAM | WILBERFORCE HOUSE | WILBERFORCE WAY | | Simon Gardiner | 17/10/2022 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Start Node Ref: | 2502 | Finish Node Ref: | 2601 | Direction: | U | Height/Dia: | 150 |
| Start Node Depth: | 0.00 | Finish Node Depth: | 0.00 | Use: | F | Shape: | C |
| Start Node Coordinate: | | Finish Node Coordinate: | | Material: | VC | Cleaned | Y |

| Node Type | Cover Condition | Benching Condition | 1/2 Channel Condition | Node Condition Remarks |
|---|---|---|---|---|
| MH | | | | |

| Drain Type | Lining Type | Lining Mat. | Year Const. | Weather | Flow Cont. | Length | General Remarks |
|---|---|---|---|---|---|---|---|
| A | | | | D | N | 90.22 | |

| Position | Code | Description | CD | Pic | Video Ref |
|---|---|---|---|---|---|
| 00.00m | MH | Start node type, manhole | | | |
| 00.00m | WL | Water level 5% | | | 0:00:00 |
| 11.80m | RJ | Roots at joint | | 19_2 | 0:01:01 |
| 13.50m | JDM | Joint displaced medium | | | 0:01:10 |
| 16.60m | REM | General remark | | 19_4 | 0:01:23 |
| 89.67m | RJ | Roots at joint | | 19_5 | 0:07:55 |
| 90.22m | MHF | Finish node type, manhole | | | |



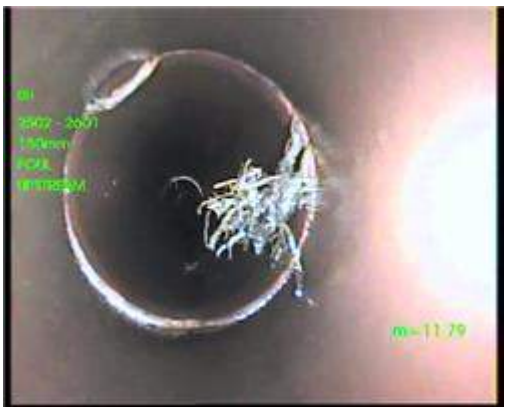
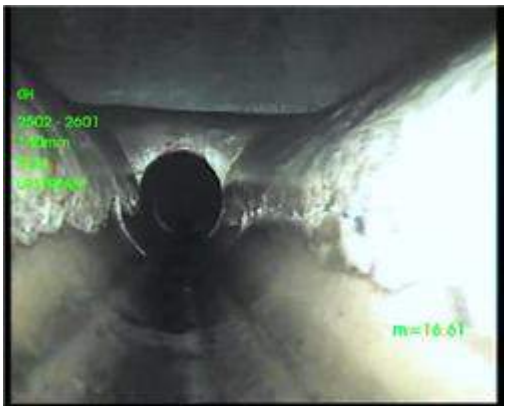
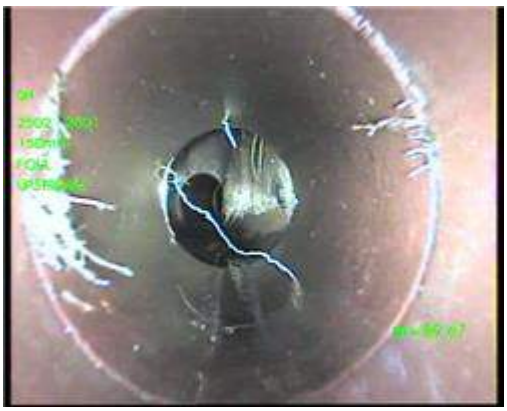

Total Defects for section

| 0 | 0 | 3 | 0 | 0 |
|---|---|---|---|---|

DRB Grade for Section

B

## Descriptive Report with Remarks and Observation Images — Section 20

| Pos | Video Ref | Code | Description | Image |
|---|---|---|---|---|
| 00.00m | | MH | Start node type, manhole 2502 | |
| 00.00m | 0:00:00 | WL | Water level: 5% Height/Diameter | |
| 11.80m | 0:01:01 | RJ | Roots at joint - Severity 3 ROOTS AT JOINT | Image Provided - Ref: 19_2  |
| 13.50m | 0:01:10 | JDM | Joint displaced medium - Severity 3 | |
| 16.60m | 0:01:23 | REM | General remark BURIED UNPLOTTED MANHOLE | Image Provided - Ref: 19_4  |
| 89.67m | 0:07:55 | RJ | Roots at joint - Severity 3 ROOTS AT JOINT | Image Provided - Ref: 19_5  |
| 90.22m | | MHF | Finish node type, manhole 2601 | |

Total Defects for section

| 0 | 0 | 3 | 0 | 0 |
|---|---|---|---|---|

DRB Grade for Section

B

Total Defects for section




DRB Grade for Section



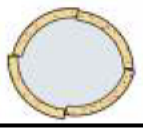
**A guide to defects and other observations in drainage systems**

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

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

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

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

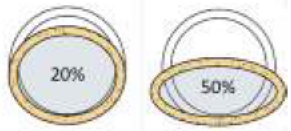
| Code | Observation | Description | Attributes | |
|---|---|---|---|---|
| **B** | Broken | Pieces pipe have visibly moved | Defined by clock references. Associated with deformity in rigid pipe |  |
| **CC CL CM CR** | Cracks | Cracks are break lines that are not visibly open | Defined by clock reference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

Total Defects for section

| 0 | 0 | 3 | 0 | 0 |
|---|---|---|---|---|

DRB Grade for Section

B

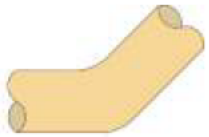
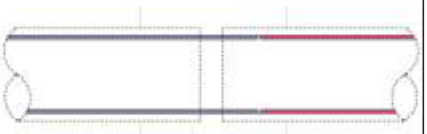
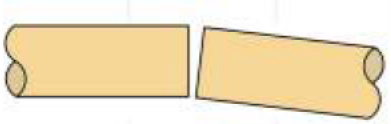
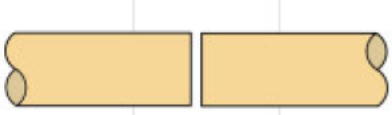
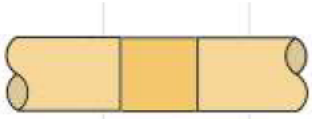
| | | | | |
|---|---|---|---|---|
| **CX(I)** | Defective Connection (Intruding) | Defective by intrusion or damage due to factors including: cracks, fractures, obstruction, position etc | Described by clock reference position and diameter (+ % intrusion) |  |
| **CU** | Loss of Vision | Lens of camera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

Total Defects for section

| | | | | |
|---|---|---|---|---|
| 0 | 0 | 3 | 0 | 0 |

DRB Grade for Section

B

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

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

**REGISTER OF APPENDICES**

A. MANHOLE INSPECTION REPORT

B. COPIES OF SITE HAND WRITTEN DAILY RECORD SHEETS

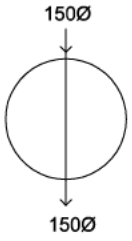
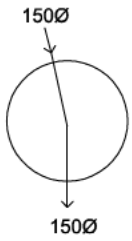
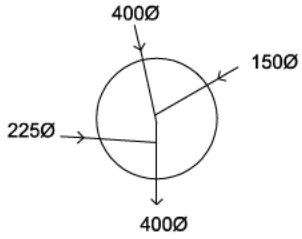
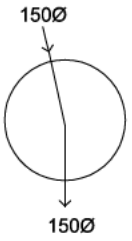
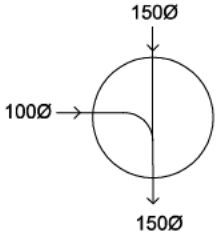
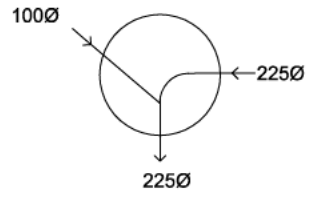
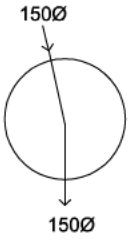
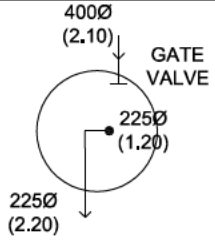
C. ANNOTATED SITE DRAWINGS

# UTILITY SURVEYS LTD

5 SUFFOLK ROAD
MALDON
ESSEX
CM9 6AX

LOCATION: WILBERFORCE HOUSE WILBERFORCE WAY HORSHAM JOB REF: 071466

CLIENT: BURROWS GRAHAM DATE: 30/08/2022

| | | | |
|---|---|---|---|
| MH No. 3601<br>DEPTH. 2.74<br>COVER. SH<br>CONSTRUCTION. Co Rlng<br>REMARKS. |  | MH No. F2<br>DEPTH. 2.22<br>COVER. SH<br>CONSTRUCTION. Co Rlng<br>REMARKS. |  |
| MH No. 3602<br>DEPTH.<br>COVER.<br>CONSTRUCTION.<br>REMARKS. | BURIED IN VEGETATION | MH No. F3<br>DEPTH.<br>COVER.<br>CONSTRUCTION.<br>REMARKS. | BURIED IN VEGETATION |
| MH No. 2601<br>DEPTH.<br>COVER.<br>CONSTRUCTION.<br>REMARKS. | BURIED IN VEGETATION | MH No. S1<br>DEPTH. 1.26<br>COVER. SH<br>CONSTRUCTION. Co Rlng<br>REMARKS. |  |
| MH No. 2502<br>DEPTH. 1.41<br>COVER. SH<br>CONSTRUCTION. Co Rlng<br>REMARKS. |  | MH No. S2<br>DEPTH.<br>COVER.<br>CONSTRUCTION.<br>REMARKS. | BURIED IN VEGETATION |
| MH No. 1601<br>DEPTH. 2.08<br>COVER. SH<br>CONSTRUCTION. Co Rlng<br>REMARKS. |  | MH No. S3<br>DEPTH. 1.40<br>COVER. SH<br>CONSTRUCTION. Co Rlng<br>REMARKS. |  |
| MH No. F1<br>DEPTH 1.70<br>COVER. SH<br>CONSTRUCTION. Co Rlng<br>REMARKS. |  | MH No. S4<br>DEPTH. 2.70<br>COVER. SH<br>CONSTRUCTION. Co Rlng<br>REMARKS. |  |

KEY:

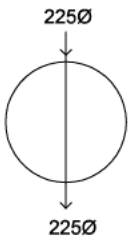
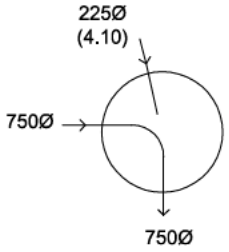
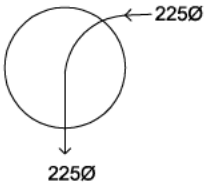
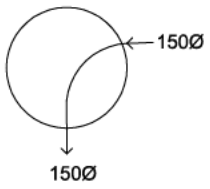
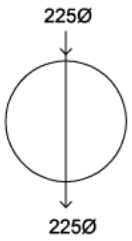
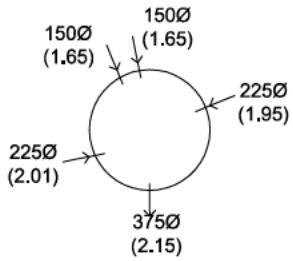
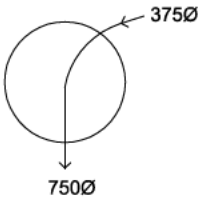
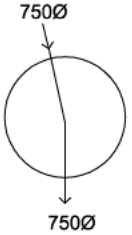
| | | |
|---|---|---|
| C - Circular | L - Light Duty | Co - Concrete |
| S - Square | M - Medium Duty | Br - Brick |
| T - Triangular | H - Heavy Duty | R - Rectangular |

# UTILITY SURVEYS LTD

5 SUFFOLK ROAD
MALDON
ESSEX
CM9 6AX

LOCATION: WILBERFORCE HOUSE WILBERFORCE WAY HORSHAM JOB REF: 071466

CLIENT: BURROWS GRAHAM DATE: 30/08/2022 & 17/10/2022

| | | | |
|---|---|---|---|
| MH No. S5<br>DEPTH. 2.35<br>COVER. SH<br>CONSTRUCTION. Co Ring<br>REMARKS. |  | MH No. 1650<br>DEPTH. 4.51<br>COVER. SH<br>CONSTRUCTION. Co Ring<br>REMARKS. |  |
| MH No. S6<br>DEPTH. 4.14<br>COVER. RM<br>CONSTRUCTION. Co Ring<br>REMARKS. |  | MH No. 3704<br>DEPTH. 2.85<br>COVER. SCH<br>CONSTRUCTION. Co Ring<br>REMARKS. |  |
| MH No. S7<br>DEPTH. 0.80<br>COVER. SH<br>CONSTRUCTION. Co Ring<br>REMARKS. |  | MH No. S11<br>DEPTH. 2.46<br>COVER. SCH<br>CONSTRUCTION. Co Ring<br>REMARKS. |  |
| MH No. S8<br>DEPTH. 6.00<br>COVER. CH<br>CONSTRUCTION. Co Ring<br>REMARKS. |  | | |
| MH No. S9<br>DEPTH.<br>COVER.<br>CONSTRUCTION.<br>REMARKS. | BURIED IN<br>VEGETATION | | |
| MH No. S10<br>DEPTH 3.66<br>COVER. CH<br>CONSTRUCTION. Co Ring<br>REMARKS.<br>SURCHARGED, PIPES 90<br>% FULL OF WATER |  | | |

KEY:

| | | |
|---|---|---|
| C - Circular | L - Light Duty | Co - Concrete |
| S - Square | M - Medium Duty | Br - Brick |
| T - Triangular | H - Heavy Duty | R - Rectangular |

# CCTV Sewer Survey – Daily Record Sheet

| | |
|---|---|
| Date | 30/08/2022 |
| Job No | 071466 |
| Client | BURROWS GRAHAM |
| Site Address | WILBERFORCE HOUSE<br>WILBERFORCE WAY<br>HORSHAM RH13 9RS |
| Rig Manager | S. GARDINER |
| Operative | M. CAMPBELL |

UTILITY SURVEYS LTD.
5 Suffolk Road
Maldon
Essex
CM9 6AX
[redacted]

| Manhole Start | Manhole Finish | Sewer dia. | Recorded Metreage | Survey Abandoned | Remarks |
|---|---|---|---|---|---|
| 3601 | 3602 | 150 | 18-12 | ✓ | F UNDERWATER |
| 3601 | 2601 | 150 | 76-55 | | |
| S1 | PI 1 | 400 | 2-87 | | |
| S1 | S2 | 400 | 76-06 | | |
| S3 | OUTFALL 1 | 225 | 6-44 | ✓ | UNDERWATER |
| S4 | POND OUTFALL | 400 | 9-22 | | |
| S5 | S4 | 225 | 15-67 | | |
| S5 | S6 | 225 | 15-63 | ✓ | UNDERWATER |
| S7 | OUTFALL 2 | 225 | 29-14 | | |
| | | | | | |
| | | | | | |
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| | | | | | |
| | | | | | |
| | | | | | |
| | | TOTAL | | | |

Standing Time

Meterage check X

Length OK

Reason for standing time

Remarks S5 - 1650 AUDIBLE TRACE
S6 BURIED IN VEGETATION

3602 BURIED IN VEGETATION
2601 BURIED IN VEGETATION

Checked

# CCTV Sewer Survey – Daily Record Sheet

| | |
|---|---|
| Date | 31/08/2022 |
| Job No | 071466 |
| Client | BURROWS GRAHAM |
| Site Address | WILBERFORCE HOUSE<br>WILBERFORCE WAY<br>HORSHAM RH13 9RS |
| Rig Manager | S. GARDINER |
| Operative | M. CAMPBELL |


UTILITY SURVEYS LTD.
5 Suffolk Road
Maldon
Essex
CM9 6AX
[redacted]


| Manhole Start | Manhole Finish | Sewer dia. | Recorded Metreage | Survey Abandoned | Remarks |
|---|---|---|---|---|---|
| F2 | F1 | 150 | 18-86 | | |
| F2 | F3 | 150 | 3-87 | | |
| 1601 | F3 | 150 | 14-37 | | |
| 2502 | 2601 | 150 | 12-13 | — | MASS ROOTS |
| S8 | S9 | 750 | 97-18 | | |
| | | | | | |
| | | | | | |
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| | | | | | |
| | | | | | |
| | | | | | |
| | | TOTAL | | | |

Standing Time | Meterage check X | Length OK

Reason for standing time

Remarks

F3 BURIED IN VEGETATION
S9 BURIED IN VEGETATION
S10 AUDIBLE TRACE TO S8

Checked

# CCTV Sewer Survey – Daily Record Sheet

| | | | |
|---|---|---|---|
| Date | 17/10/2022 | Job No | 071A66-2 |
| Client | BURROOS GRAHAM | | |
| Site Address | WILBERFORCE HOUSE | | |
| | WILBERFORCE WAY | | |
| | HORSHAM RH13 9RS | | |
| Rig Manager | S. GARDINER | Operative | M. CAMPBELL |
| | | | |

UTILITY SURVEYS LTD.
5 Suffolk Road
Maldon
Essex
CM9 6AX
[redacted]

| Manhole Start | Manhole Finish | Sewer dia. | Recorded Metreage | Survey Abandoned | Remarks |
|---|---|---|---|---|---|
| 3704 | 3602 | 150 | 76 | | |
| S8 | S11 | 375 | 3.486 | | |
| S6 | 1650 | 225 | 10-91 | | |
| S10 | S9 | 750 | — | — | UNDERWATER |
| 3601 | 3602 | 150 | 25-68 | | |
| 3602 | 3704 | 150 | 7-2 | | PAST POINT REACHED FROM 3704 |
| 2502 | 2601 | 150 | 90-22 | | |
| | | | | | |
| | | | | | |
| | | | | | |
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| | | | | | |
| | | | | | |
| | | | | | |
| | | TOTAL | | | |

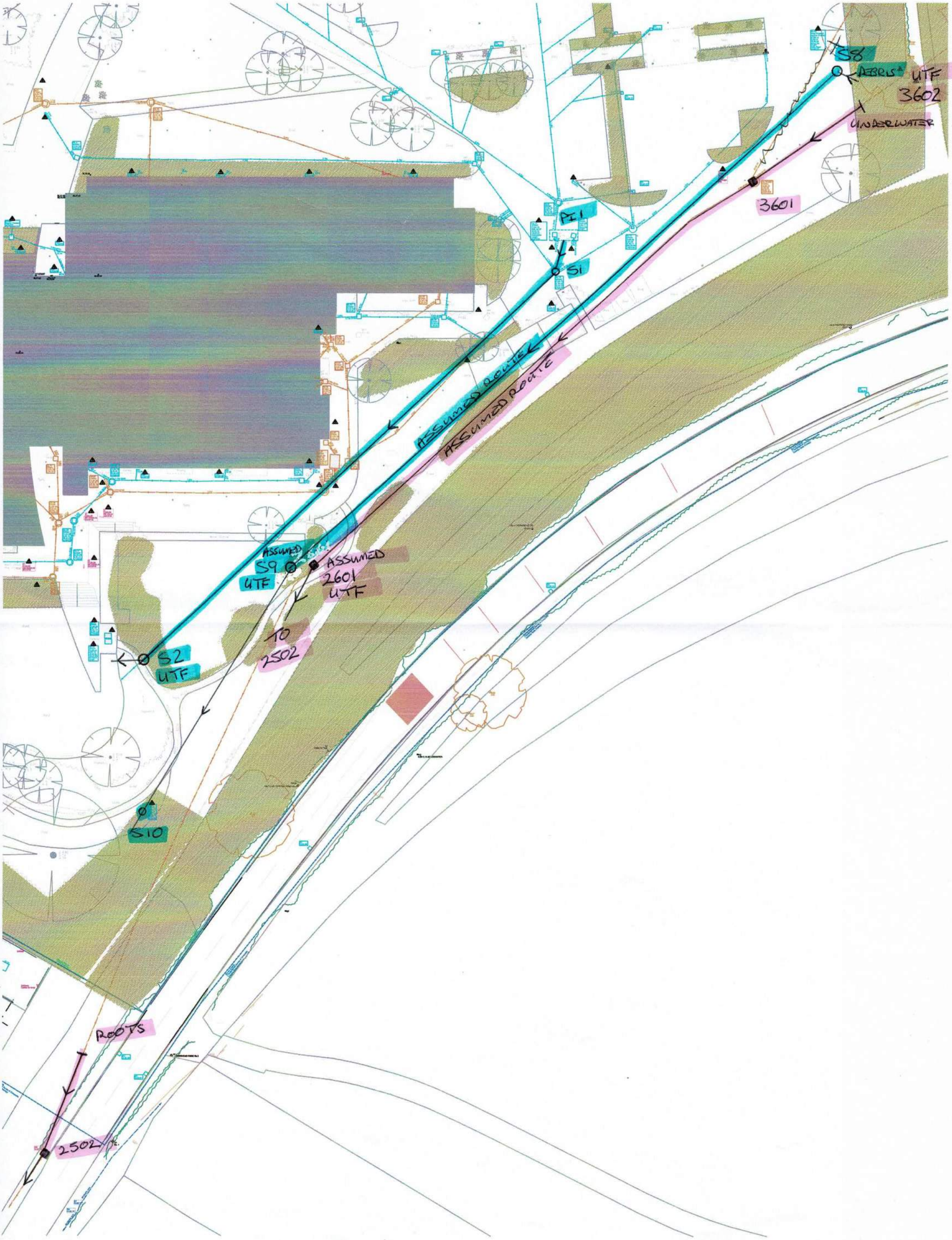
Standing Time | Meterage check: X | Length: OK

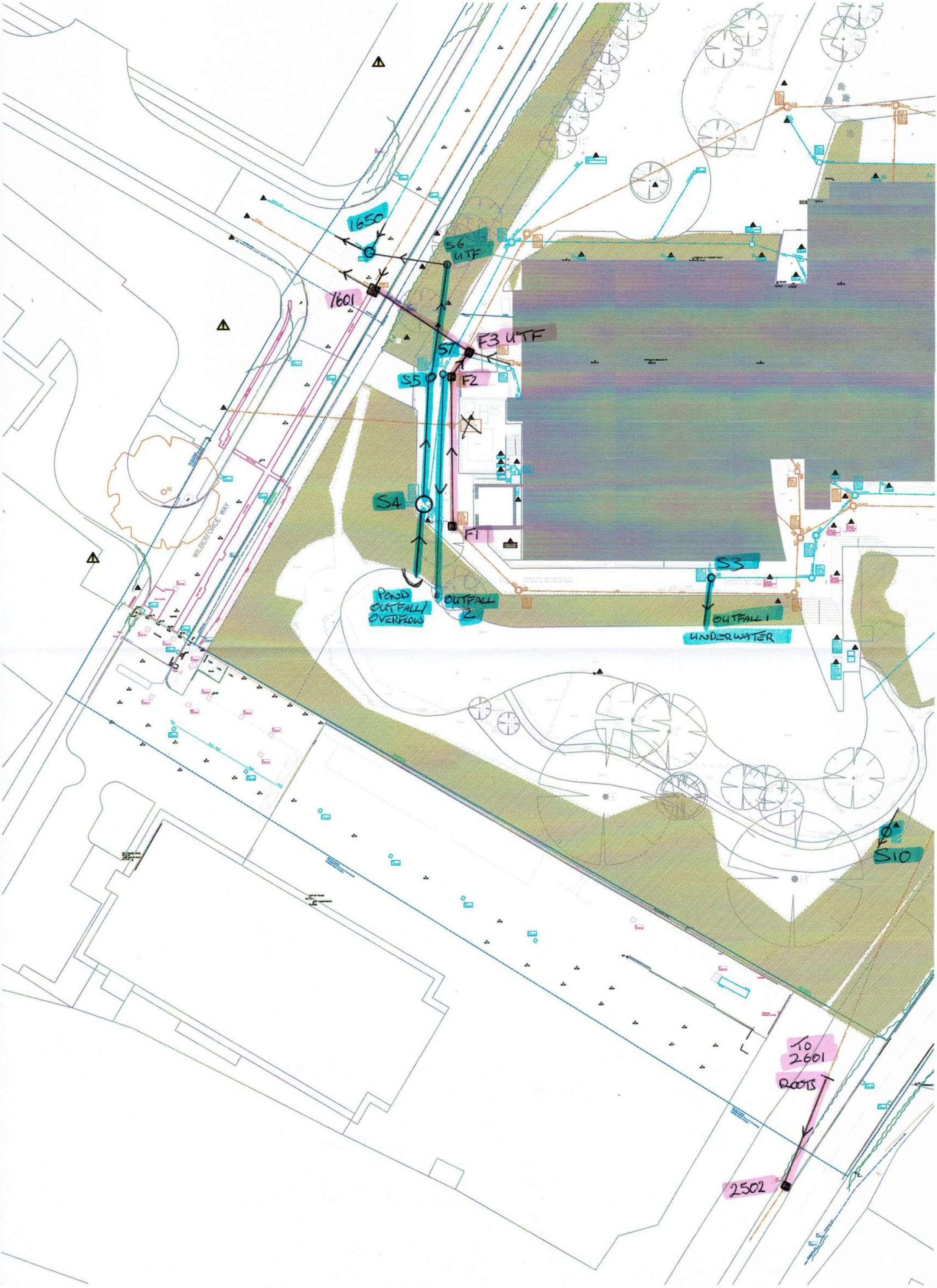
Reason for standing time

Remarks

S10-S9 600MM DEPTH OF WATER S10 DOWN 700MM DEPTH OF WATER

Special Instructions; Site Contact – [redacted]


S8
DEBRIS
UTF
3602
UNDERWATER
3601
P1
S1
ASSUMED ROUTE
ASSUMED ROUTE
ASSUMED
S9
UTF
ASSUMED
2601
UTF
TO
2502
S2
UTF
S10
ROOTS
2502


1650
S6
4TF
1601
F3 4TF
S7
S5
F2
F1
S4
S3
POND
OUTFALL/
OVERFLOW
OUTFALL
2
OUTFALL 1
UNDERWATER
S10
TO
2601
ROOTS
2502
WILBERFORCE WAY

2ND VISIT
17/10/2022

3704

11.00M

S6

8.50M

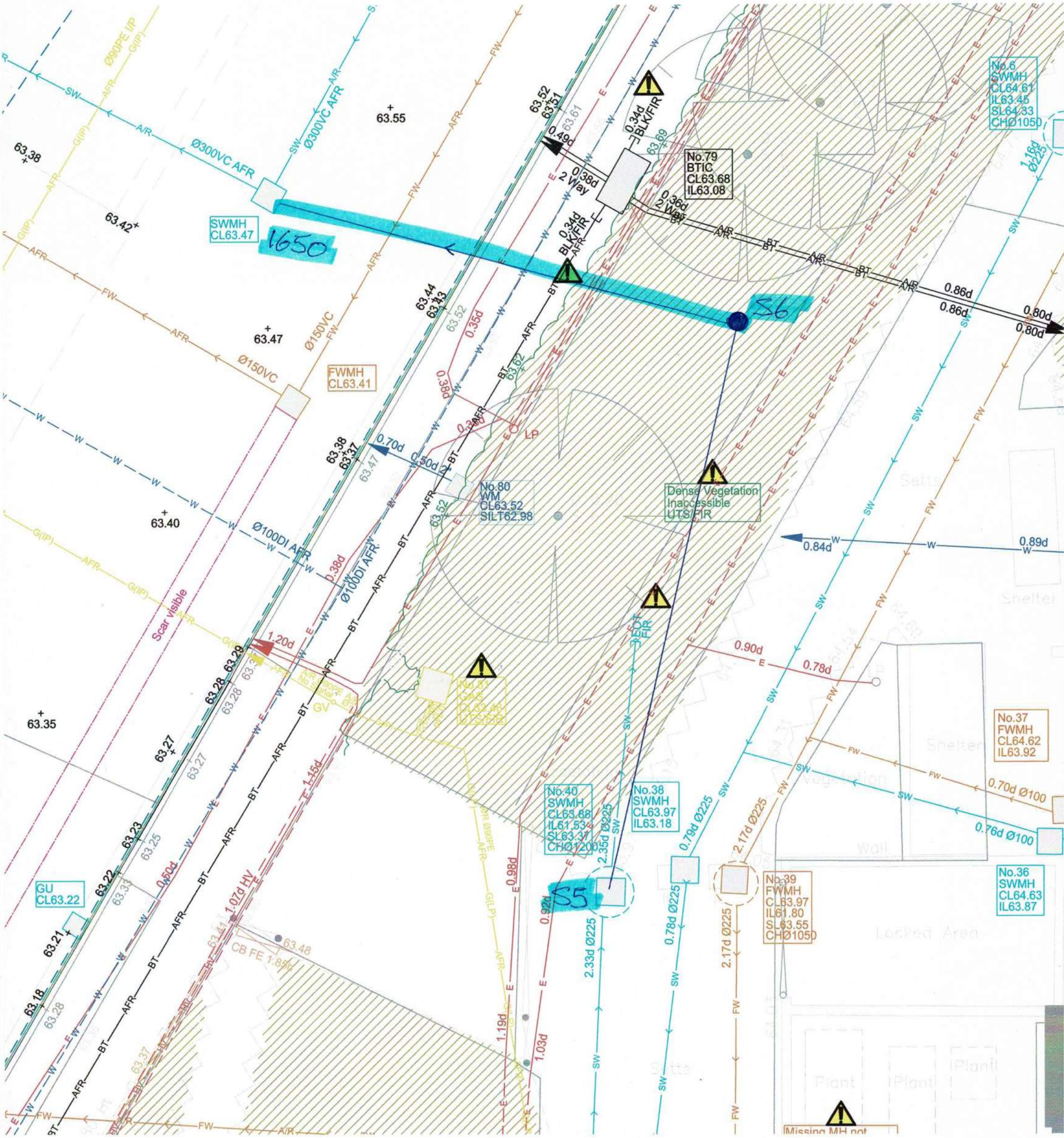
13.00M

3602
BURIED

3601

S11

2ND VISIT
17/10/2022



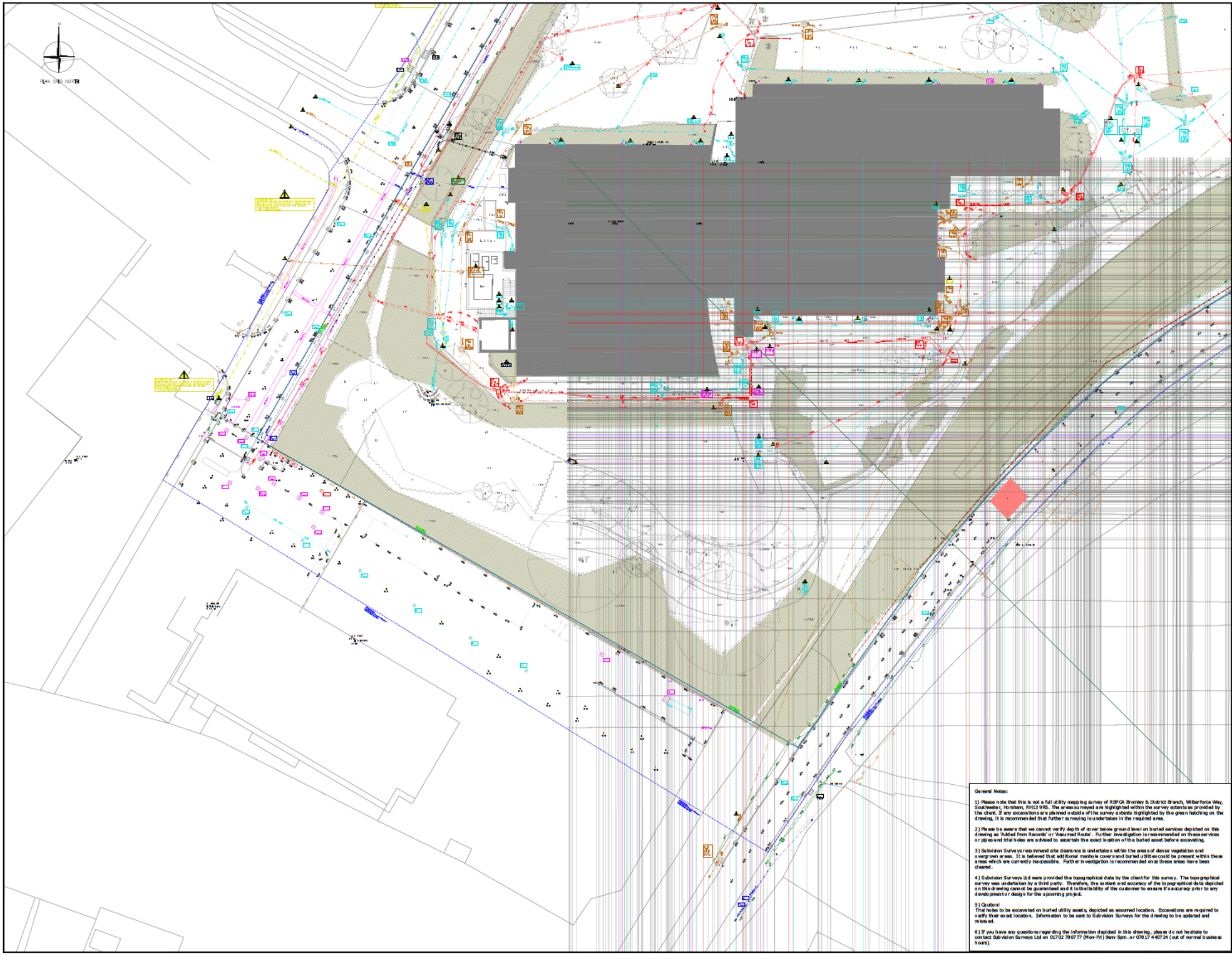
2601
BURIED

S10 Y
SURCHARGED

2ND VISIT
17/10/2022

BURIED
MH

2502




SS-BRG-003 | 1

SUBVISION SURVEYS

SURVEY LEGEND

LEGEND & ABBREVIATIONS

SUBVISION SURVEYS LTD-Disclaimer note 2022

Whilst every effort has been taken in the preparation of this drawing, the original land marks/apparatus configuration may have been altered since the survey/drawing was produced. The user shall make further enquiries and investigations to satisfy himself as to the accuracy of this drawing and position of the apparatus. The exact positions of the apparatus should be verified by the use of suitable detection devices and safe digging practices in accordance with HSG47, further advice on the location of apparatus should be recommended by the owner. No representation is made by Subvision Surveys Ltd, its agents or servants as to the accuracy, completeness, and sufficiency or otherwise of this drawing and the positions of the apparatus. All apparatus shall be treated as live unless proved otherwise by the owner. It is the users responsibility to ensure that the information on the location of apparatus is provided to all persons (either direct labour or contractors) working in proximity to the apparatus.
In all cases please call the 811 Dial before you dig service to mark their own plant before any site works commence 0800 917 0999.
Recorded depth information represents the centre of the utility in question unless this data is obtained via Ground Penetrating Radar (GPR) methods. If this is the case the depth represents the distance between the ground and the top of the utility. All measurements and levels are taken in metres and pipe diameter information is taken in millimetres. All drainage/sewer depth information is measured from the invert.

SITE LOCATION

LEVELLING NOTES

Burrows Graham

RSPCA Bromley & District Branch,
Wilberforce Way, Southwater, Horsham, RH13 9RS

2D GPR Utility Mapping and 3D Full Topographical Survey

Burrows Graham

| Scale | Drawn by | Sheet size |
|---|---|---|
| 1:200 | CH | A0 |
| Surveyed by: JJ | Checked by: MC | Approved by: JH | Date: JULY 2022 |

General Notes:

1) Please note that this is not a full utility mapping survey of RSPCA Bromley & District Branch, Wilberforce Way, Southwater, Horsham, RH13 9RS. The areas surveyed are highlighted within the survey extents as provided by the client. If any excavations are planned outside of the survey extents highlighted by the green hatching on the drawing, it is recommended that further surveying is undertaken in the required area.

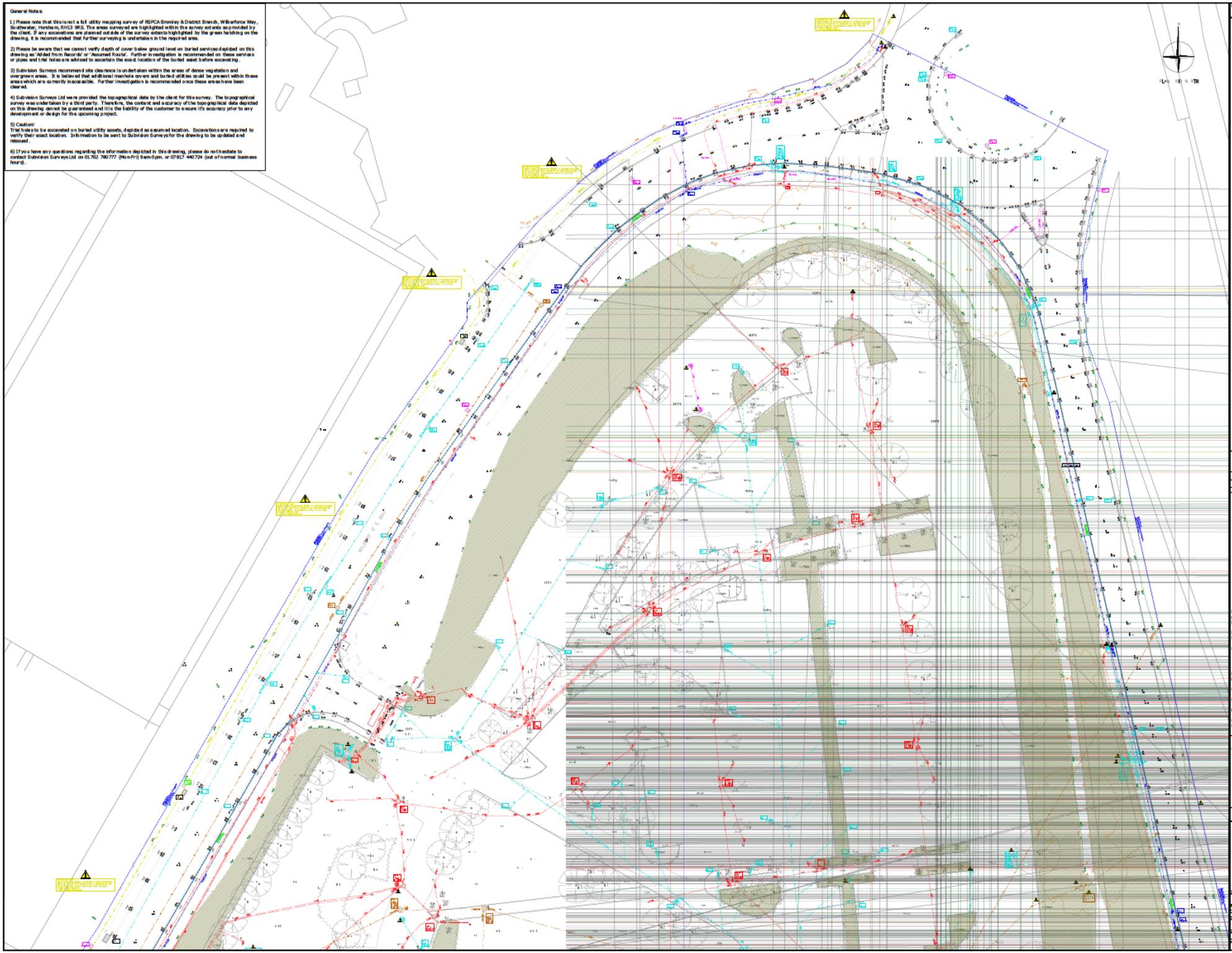
2) Please be aware that we can not verify depth of cover below ground level on buried services depicted on this drawing as 'Added from Records' or 'Assumed Route'. Further investigation is recommended on these services or pipes and trial holes are advised to ascertain the exact location of the buried asset before excavating.

3) Subvision Surveys recommend site clearance is undertaken within the areas of dense vegetation and overgrown areas. It is believed that additional manhole covers and buried utilities could be present within these areas which are currently inaccessible. Further investigation is recommended once these areas have been cleared.

4) Subvision Surveys Ltd were provided the topographical data by the client for this survey. The topographical survey was undertaken by a third party. Therefore, the content and accuracy of the topographical data depicted on this drawing cannot be guaranteed and it is the liability of the customer to ensure it's accuracy prior to any development or design for the upcoming project.

5) Caution!
Trial holes to be excavated on buried utility assets, depicted as assumed location. Excavations are required to verify their exact location. Information to be sent to Subvision Surveys for the drawing to be updated and reissued.

6) If you have any questions regarding the information depicted in this drawing, please do not hesitate to contact Subvision Surveys Ltd on 01702 780777 (Mon-Fri) 9am-5pm. or 07817 440724 (out of normal business hours).



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SS-BRG-003 | Rev: 1

SUBVISION SURVEYS

Mayflow House
Unit 4
Fairfield Ave
Essex, SS9 5UG
Tel: 0845 257 0077

**SURVEY LEGEND**

GENERAL

FENCE TYPES

PAS 128 LEGEND

| QUALITY LEVELS | LOCATION ACCURACY HORIZONTAL | LOCATION ACCURACY VERTICAL | SUPPORTING DATA |
|---|---|---|---|
| QL"A" | Usually ± | Usually ± | A Utility as given A which is assigned to it a plot but has a distance data also and to those how shown as an assume it has to (CAT), or a false or those was also ( VP'S). |
| QL"B" | ±300m or | Usually ± plus or to the depth measure were of possible). | Position but location only a if the a Utility if attached to as a of it a gas physical tactile types and c. |
| QL"C" | ±300m or of ±300 if ± of ±300 if detector d dept in scheme & geo tot. | ±400 of see ordert depth. | Position but location physical location of the utility data cited by one of the gas physical tactile types and. |
| QL"D" | ±300m or or ±100 if detector d dept in scheme & geo tot. | ±400 of see ordert depth. | Position tot and vertical location of the utility data cited by multiple gas physical tactile types. |

Existing | Top | Bottom | Caution! | Hedge | Gate | Fence | Building | Path | Parking

**LEGEND & ABBREVIATIONS**

SUBVISION SURVEYS LTD-Disclaimer note 2022

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**SITE LOCATION**




**LEVELLING NOTES**

All levels & OS Co-ords are to be read on: OS grid Rise & Fall (GNSS)

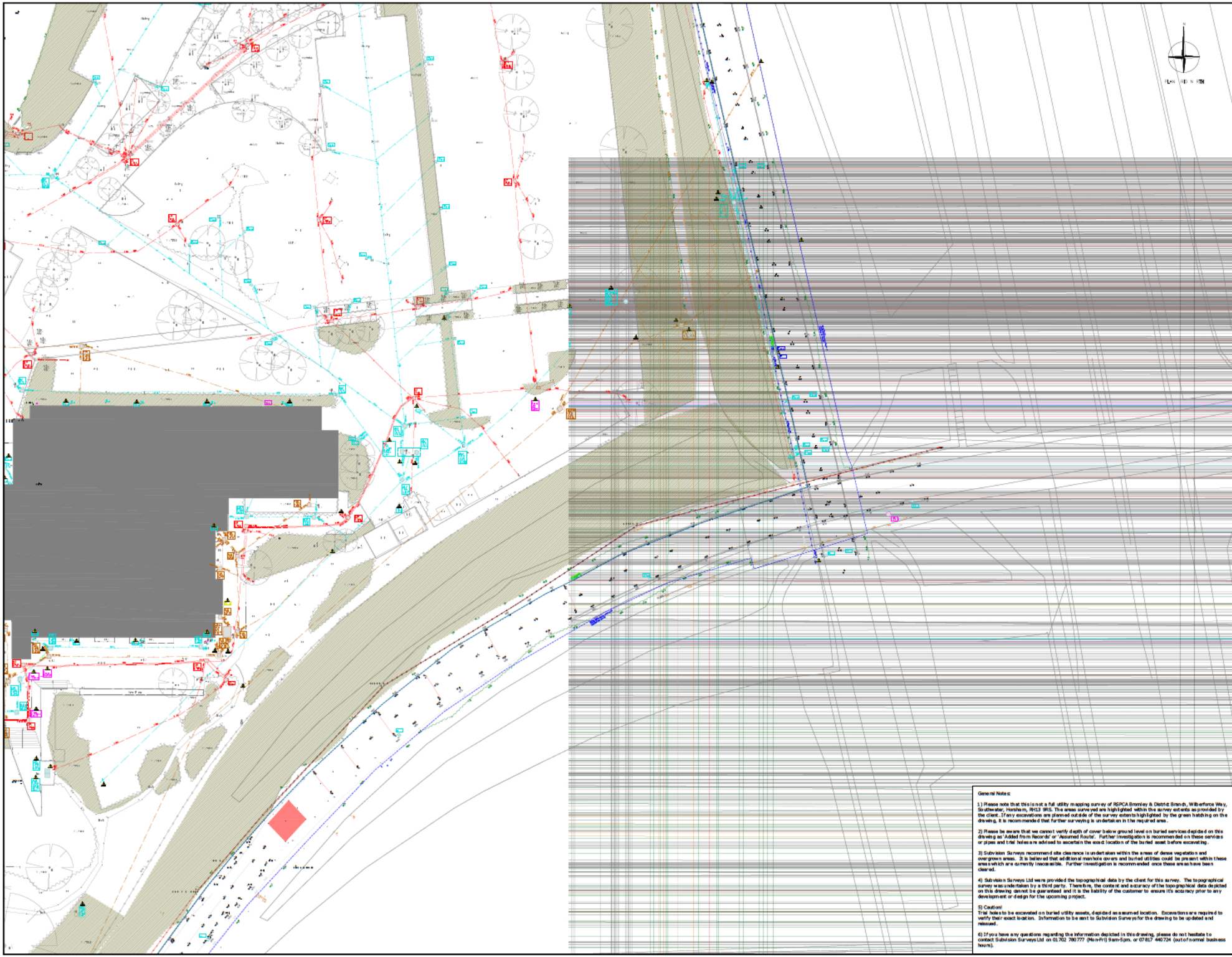
Burrows Graham

RSPCA Bromley & District Branch,
Willberforce Way, Southwater, Horsham, RH13 9RS

2D GPR Utility Mapping and 3D Full Topographical Survey

Burrows Graham

| Scale: | Checked: | Sheet size: |
|---|---|---|
| 1:200 | CH | A0 |
| Surveyed: JJ | Checked: KC | Approved: JH | Date: JULY 2022 |



SS-BRG-003 | 1

SUBVISION SURVEYS

Mayflow House
Telegraph Hill
Purdeys
Essex, SS8 0AG
Tel: 0845 337 0077

## SURVEY LEGEND

GENERAL

FENCE TYPES

PAS 128 LEGEND

| QUALITY LEVELS | LOCATION ACCURACY HORIZONTAL | LOCATION ACCURACY VERTICAL | SUPPORTING DATA |
|---|---|---|---|
| QL-D | Unutilities or | Unutilities or | A Utility on green Exhibit is mapped as D & shall be from a drawing or data sheet prior to them been physically on site. Assume it may be of QL-C or better if there are multiple lines on it. |
| QL-C | ±500mm or | Unutilities or plus or to the depth measure were at surface. | Position fall location only a if this a Utility if attached to or is of it a geo physical techn square used. |
| QL-B | ±250mm or if ±500 if it detects object & can to scheme & geo tol. | ±100 of was surface depth. | Position fall and vertical location of the utility data sheet by multiple geo physical techn square. |
| QL-A | ±150mm or ±100 if it detects object & can to scheme & geo tol. | ±100 of was surface depth. | Position fall and vertical location of the utility data sheet by multiple geo physical techn square. |

Bending | Top | Caution! | For their knowledge it is a requirement of the utility

Hedge | Kerb

Gate | Parking

Fence

## LEGEND & ABBREVIATIONS

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## SITE LOCATION




LEVELLING NOTES

All levels & OCDs visible above ground are to mod cor. OS grid files of by GNSS

Burrows Graham

Project title: RSPCA Bromley & District Branch, Wilberforce Way, Southwater, Horsham, RH13 9RS

Survey type: 2D GPR Utility Mapping and 3D Full Topographical Survey

Client: Burrows Graham

| Scale | Surveyed by | Checked by | Drawn by | Sheet size |
|---|---|---|---|---|
| 1:200 | JJ | KC | CH | A0 |
| | | | Approved by: JH | Date: JULY 2022 |

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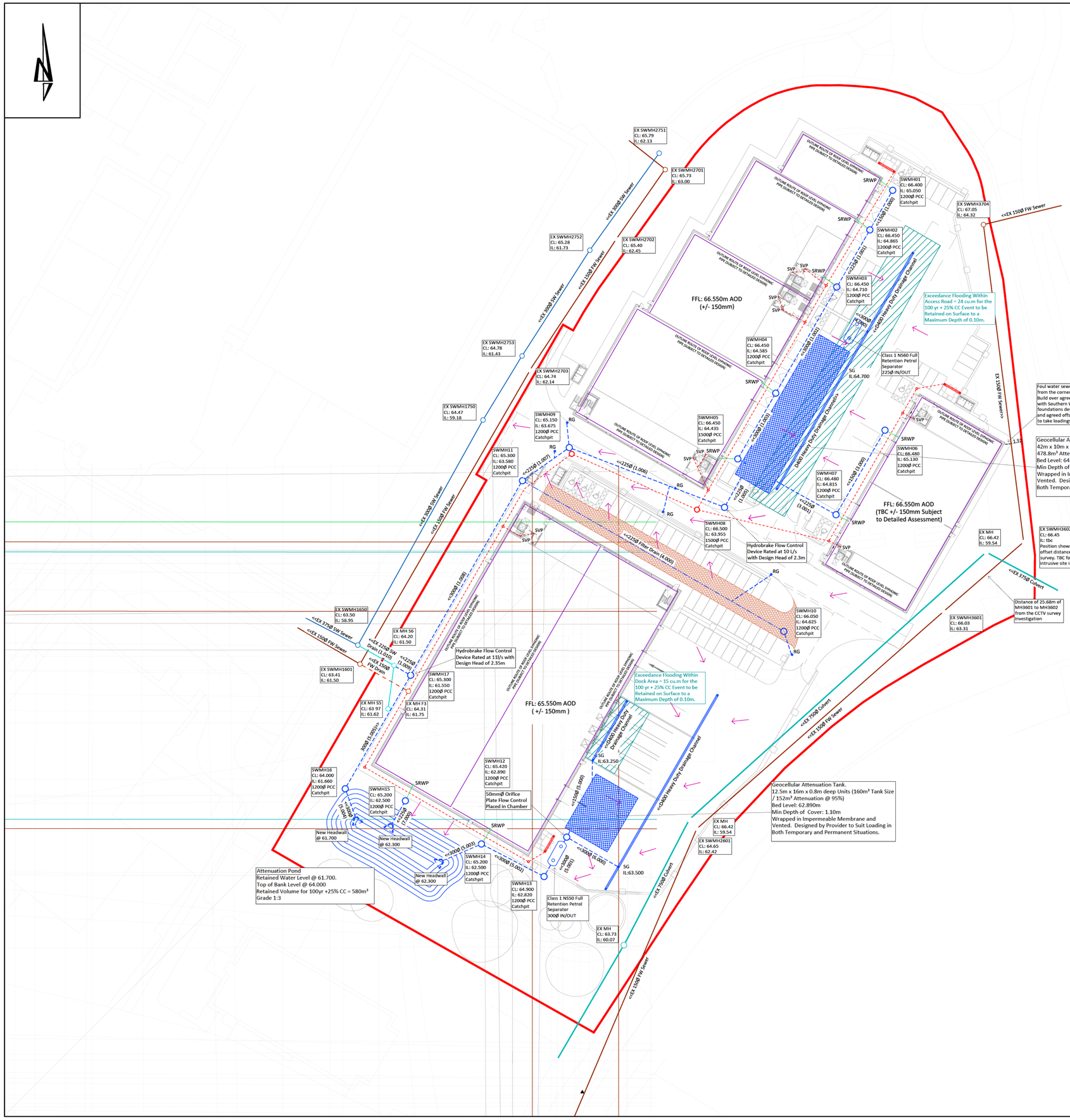
# APPENDIX E – Drainage Plan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CL: 65.79
IL: 62.13
EX SWMH2701
CL: 65.73
IL: 63.00
EX SWMH2752
CL: 65.28
IL: 61.73
EX SWMH2702
CL: 65.40
IL: 62.45
EX SWMH2753
CL: 64.78
IL: 61.43
EX SWMH2703
CL: 64.74
IL: 62.14
EX SWMH1750
CL: 64.47
IL: 59.18
EX SWMH1650
CL: 63.50
IL: 58.95
EX SWMH1601
CL: 63.41
IL: 61.50
EX MH S6
CL: 64.20
IL: 61.50
EX MH S5
CL: 63 97
IL: 61.62
EX MH F3
CL: 64.31
IL: 61.75
<<EX 300Ø SW Sewer
<<EX 150Ø FW Sewer
<<EX 375Ø SW Sewer
<<EX 225Ø SW Drain (1.010)
<<EX 150Ø FW Drain
<225Ø (1.010)
300Ø (5.000)>>
FFL: 66.550m AOD
(+/- 150mm)
FFL: 66.550m AOD
(TBC +/- 150mm Subject
to Detailed Assessment)
FFL: 65.550m AOD
( +/- 150mm )
OUTLINE ROUTE OF ROOF LEVEL SYPHONIC PIPE SUBJECT TO DETAILED DESIGN
SWMH01
CL: 66.400
IL: 65.050
1200Ø PCC
Catchpit
SWMH02
CL: 66.450
IL: 64.865
1200Ø PCC
Catchpit
SWMH03
CL: 66.450
IL: 64.710
1200Ø PCC
Catchpit
SWMH04
CL: 66.450
IL: 64.585
1200Ø PCC
Catchpit
SWMH05
CL: 66.450
IL: 64.435
1500Ø PCC
Catchpit
SWMH06
CL: 66.480
IL: 65.130
1200Ø PCC
Catchpit
SWMH07
CL: 66.480
IL: 64.815
1200Ø PCC
Catchpit
SWMH08
CL: 66.500
IL: 63.955
1500Ø PCC
Catchpit
SWMH09
CL: 65.150
IL: 63.675
1200Ø PCC
Catchpit
SWMH10
CL: 66.050
IL: 64.625
1200Ø PCC
Catchpit
SWMH11
CL: 65.300
IL: 63.580
1200Ø PCC
Catchpit
SWMH12
CL: 65.420
IL: 62.890
1200Ø PCC
Catchpit
SWMH13
CL: 64.900
IL: 62.820
1200Ø PCC
Catchpit
SWMH14
CL: 65.200
IL: 62.500
1200Ø PCC
Catchpit
SWMH15
CL: 65.200
IL: 62.500
1200Ø PCC
Catchpit
SWMH16
CL: 64.000
IL: 61.660
1200Ø PCC
Catchpit
SWMH17
CL: 65.300
IL: 61.550
1200Ø PCC
Catchpit
EX SWMH3704
CL: 67.05
IL: 64.32
EX SWMH3602
CL: 66.45
IL: tbc
Position shown based on offset distances from CCTV survey. TBC following further intrusive site investigations
EX SWMH3601
CL: 66.03
IL: 63.31
EX SWMH2601
CL: 64.65
IL: 62.42
EX MH
CL: 66.42
IL: 59.54
EX MH
CL: 63.73
IL: 60.07
<<EX 150Ø FW Sewer>>
<<EX 375Ø Culvert
<<EX 750Ø Culvert
<<EX 1500 FW Sewer
<<EX 1500Ø FW Sewer
Distance of 25.68m of MH3601 to MH3602 from the CCTV survey investigation
Foul water sewer identified to be 1.57m from the corner of the proposed building. Build over agreement to be entered into with Southern Water. Traditional foundations designed to provide a suitable and agreed offset distance from sewer and to take loadings beneath sewer.
1.57
Geocellular Attenuation Tank.
42m x 10m x 1.2m deep Units (504m³ Tank Size / 478.8m³ Attenuation @ 95%)
Bed Level: 64.000m
Min Depth of Cover: 1.10m
Wrapped in Impermeable Membrane and Vented. Designed by Provider to Suit Loading in Both Temporary and Permanent Situations.
Exceedance Flooding Within Access Road = 24 cu.m for the 100 yr + 25% CC Event to be Retained on Surface to a Maximum Depth of 0.10m.
Exceedance Flooding Within Dock Area = 15 cu.m for the 100 yr + 25% CC Event to be Retained on Surface to a Maximum Depth of 0.10m.
Class 1 NS60 Full Retention Petrol Separator 225Ø IN/OUT
Class 1 NS50 Full Retention Petrol Separator 300Ø IN/OUT
Hydrobrake Flow Control Device Rated at 10 l/s with Design Head of 2.3m
Hydrobrake Flow Control Device Rated at 11l/s with Design Head of 2.35m
50mmØ Orifice Plate Flow Control Placed in Chamber
Attenuation Pond
Retained Water Level @ 61.700.
Top of Bank Level @ 64.000
Retained Volume for 100yr +25% CC = 580m³
Grade 1:3
Geocellular Attenuation Tank.
12.5m x 16m x 0.8m deep Units (160m³ Tank Size / 152m³ Attenuation @ 95%)
Bed Level: 62.890m
Min Depth of Cover: 1.10m
Wrapped in Impermeable Membrane and Vented. Designed by Provider to Suit Loading in Both Temporary and Permanent Situations.
New Headwall @ 61.700
New Headwall @ 62.300
New Headwall @ 62.300
<<225Ø (1.007)
<<225Ø (1.006)
<<225Ø (3.001)
<<225Ø (1.000)
<<225Ø (1.000)
<<225Ø (1.000

# APPENDIX F – LLFA Letter Relating to Discharge of Planning Condition 6

Ground Floor
Northleigh
County Hall
Chichester
West Sussex
PO19 1RH

**Lead Local Flood Authority**

Jason Hawkes
Development Control
Horsham District Council
Parkside
Chart Way
Horsham
RH14 1RL

Date 12 August 2024

Dear Jason,

RE: **DISC/24/0186 – Oakhurst Business Park, RSPCA Headquarters, Wilberforce Way, Southwater, West Sussex, RH13 9RS**

Thank you for your consultation on the above site, received on 26 July 2024. We have reviewed the application as submitted and wish to make the following comments.

This application is for the discharge of conditions 3 (CEMP), 6 (Surface and Foul Water) and 7 (Phasing) to approved application DC/22/2077.

The LLFA have reviewed the documents submitted in relation to Condition 6, as it relates to drainage. For reference, Condition 6 is worded as follows:

*No development shall commence for any phase or unit until a drainage strategy detailing the proposed means of foul and surface water disposal has been submitted to and approved in writing by the Local Planning Authority. The development shall be carried out in accordance with the approved scheme.*

The Drainage Strategy submitted is not sufficient for the recommended discharge of Condition 6. The appendices are not included in the document (Site Masterplan, Topographical Survey, BGL Drawings, Hydraulic Calculations, Southern Water Response and SuDS Proforma). Additionally, the finished floor levels and drainage features are marked are not final on the drainage layout.

As such, we are **unable to recommend the discharge of Condition 6**.

**Reason**

To prevent flooding in accordance with National Planning Policy Framework paragraph 173, 175 and 180 by ensuring the satisfactory management of local flood risk, surface water flow paths, storage and disposal of surface water from the site in a range of rainfall

events and ensuring the SuDS proposed operates as designed for the lifetime of the development.

We would consider reviewing our response if the following information is provided.

1. Supporting calculations for all rainfall return periods up to and including the 1% AEP plus appropriate climate change allowance event. This should utilise the correct parameters (FEH13 or FEH22, CV value of 1, appropriate climate change allowance and urban creep).

2. Consent from Southern Water for the discharge to the surface water sewer. At discharge of condition stage, the LLFA require all outfalls and discharge rates to be confirmed with the relevant authorities.

3. Full management and maintenance plan including the responsibility of maintenance, frequency of maintenance and action of maintenance for all SuDS features on site.

4. Full water quality assessment in the form of the Simple Index Approach or equivalent.

5. Existing drainage on site should be outlined and confirmation of whether it is being removed or retained. Alongside this, the LLFA would also expect a CCTV survey to be submitted for review.

6. Finished Floor levels and Finished Ground Levels should not be TBC pending detailed assessment. At discharge of condition stage, finished floor levels should be confirmed.

7. There should be no features on the drainage layout drawing as TBC. Cover and Invert Levels should be confirmed at this stage. Additionally, there is no volume provided for the attenuation pond.

8. Exceedance flows should be demonstrated on the drainage layout.

Please note if the LPA decide to grant planning permission, we wish to be notified for our records should there be any subsequent surface water flooding that we may be required to investigate as a result of the new development.

Yours sincerely

**Flood Risk Management Team**

**Annex**

The following documents have been reviewed, which have been submitted to support the application;

- Flood Risk Assessment and Drainage Strategy Report for the proposed development at Oakhurst Business Park, prepared by Burrows Graham, October 2022, REF 21191-BGL-XX-XX-RP-D-0001 V1.
- Drainage Strategy Plan for the proposed development at Oakhurst Business Park, prepared by Burrows Graham, October 2022, REF 21191-BGL-XX-XX-DR-C-0250 P01.