



**BRIAN CLANCY HIGBY PARTNERSHIP**  
CHARTERED STRUCTURAL & CIVIL ENGINEERS

## **DRAINAGE STRATEGY**

for

### **INDUSTRIAL UNIT EXTENSION**

to

**HOLCHEM LABORATORIES**

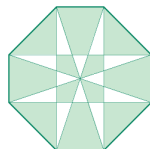
**KERSIA UK**

**GATEWAY HOUSE**

**PILSWORTH INDUSTRIAL ESTATE**

**BURY BL9 8RD**

***Revision A***



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## **BOREHOLE LOGS**

## **1.0 INTRODUCTION**

- 1.1** It is proposed to extend an existing industrial facility, with a trapezoidal shaped extension, to suit the topography of the site, continuing the ridges and valleys of the existing multi bay roof, albeit one bay width narrower.
- 1.2** The building is to have a small extension to the existing surface car park, adjacent to the east elevation of the building, and adjacent to the west elevation there is to be a resurfacing of the existing stone side access road, to a new turning head adjacent to the south west corner of the existing building, for access into the new extension, adjacent to which there is to be a bunded tank farm.
- 1.3** This report is intended to provide supporting information for the consent of planning permission.

## **2.0 DESCRIPTION OF DEVELOPMENT/ EXISTING DRAINAGE**

- 2.1** There is currently an existing industrial facility of an approximate area of approximately 7550 m<sup>2</sup>, constructed as a three bay portal framed building, with a hard standing at the front (northern end) of the building.
- 2.2** The surface water drainage from the building discharges into two different existing surface water drains:
- the western third discharges into an existing 600mm diameter drain, which runs parallel with the western elevation of the building and accepts surface water from buildings to the North of the site, discharging out to the south of the site.
  - The eastern two thirds of the building discharges into an existing 300mm diameter drain, which discharges from the site out in a south easterly direction off the site. The surface car park, at the south east end of the site discharges at an attenuated flow rate into the existing 300mm diameter drain.

### **3.0 SURFACE WATER DRAINAGE STRATEGY**

- 3.1 The proposed extension, trapezoidal in shape to suit the topography of the site, which falls from the proposed tapering south elevation, down towards the south, to Aviation Road, behind. The area of the proposed extension is approximately 3800 m<sup>2</sup>. Given the topography of the site, traditional rainwater pipes along the new south elevation is not achievable.
- 3.2 It is proposed to have a syphonic collection system within the building, discharging the roof water out to the 300mm diameter existing drain, discharging out to the south east corner of the site, attenuated as required to limit the additional flow rate into the system to greenfield run-off rate from the extension area.
- 3.3 The access road/ hard standing on the west elevation of the building will be connected to the existing surface water drain which discharges out to the south west of the site, attenuated to suit greenfield run off rates. The tank farm is to be bunded and will not be connected to the surface water drainage system.
- 3.4 The site is located in a flood zone 1.
- 3.5 The flows from the new impermeable area are to be restricted to greenfield run off rate, up to the 3.33% annual probability (1 in 30 year event). Climate change will be taken into account by increasing the rainfall intensity by 45%.

### **4.0 SUSTAINABLE DRAINAGE DISCUSSION**

- 4.1 The Technical Guidance for the National Planning Policy Framework requires that a development exceeding 0.4Ha requires that the management of the surface water runoff utilises Sustainable Urban Drainage (SUDS) and considers the hierarchy of provision which are as follows:
- Infiltration to ground – soakaways and permeable surfacing
  - Discharge to local watercourse
  - Discharge to surface water drain
  - Discharge to sewer
- 4.2 The first option to be considered for surface water disposal for all proposed development must be infiltration into the ground. The ground conditions for the proposed development consist of a minimum of 4m of made ground, deemed unsuitable for infiltration.
- 4.3 There are no local water courses within the site or adjacent. Therefore, discharge to a water course is not an option.
- 4.4 In order to prevent an increase in flood risk to adjacent land and downstream of the site it will be necessary to restrict the surface water discharge from the development to the equivalent QBAR Greenfield runoff rate from the site (mean annual greenfield peak flow).

**4.5** The Draft National Standards for Sustainable drainage systems covers the whole range of sustainable approaches to surface water drainage management including:

- Source control measures including rainwater recycling and drainage.
- Infiltration devices to allow water to soak into ground, that can include individual soakaways and communal facilities.
- Filter strips and swales, which are vegetated features that hold and drain water downhill mimicking natural drainage patterns.
- Filter drains and porous pavements to allow rainwater and runoff to infiltrate into permeable material below ground and provide storage if needed.
- Basins and ponds to hold excess water after rain and allow controlled discharge that avoids flooding, and
- Underground storage to hold excess water after rain and allow controlled discharge that avoids flooding.

**4.6** These SUDS solutions are considered below with reference to their suitability for the proposed development.

| SUDS Group           | Technique                        | Likely to be suitable? | Notes                                                                                                                                                             |
|----------------------|----------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Source Control       | Rainwater Harvesting             | No                     | Would not feasibly accommodate the full increase of volume of runoff created by the proposed development                                                          |
| Infiltration Device  | Permeable Paving                 | No                     | The ground sub strate is not suitable for limited infiltration                                                                                                    |
|                      | Infiltration trenches and basins | No                     | Could be used to slow the movement of water down but not as an effective means of dealing with runoff and the ground sub strate is not suitable for infiltration. |
| Filtration           | Soakaways                        | No                     | The ground sub strate is not suitable for limited infiltration                                                                                                    |
|                      | Open swales                      | No                     | Insufficient space to accommodate pond. Hazardous to site users.                                                                                                  |
|                      | Filter Strips                    | No                     | Insufficient space to accommodate pond. Hazardous to site users.                                                                                                  |
| Retention/ Detention | Basin/ponds                      | No                     | Insufficient space to accommodate pond.                                                                                                                           |
| Underground Storage  | Culverts/Tanks/ Oversized Pipes  | Yes                    | Suitable for controlling discharge to watercourse or sewer via a piped outfall.<br>No land take required to accommodate.                                          |

## **5.0 PROPOSED DRAINAGE STRATEGY – SURFACE WATER**

- 5.1** It is proposed that surface water drainage from the proposed development will be discharged into the existing surface water sewers via new hydrobrake and attenuation systems to accommodate all design storms up to 1 in 100 year storms, plus 45% Climate Change factor, restricting the increase in flow rate to greenfield run off rate, utilising storm water storage crates located under the car parking/ turning head areas of the new extension.
- 5.2** Above and beyond the Interception Storage requirements there are the more intense storms to consider. Attenuation will be required within the system to accommodate the volume of surface water created by restricting the outfall rates.
- 5.3** The drainage on site will remain private and be maintained and managed by the owners of the site.

## **6.0 PROPOSED DRAINAGE STRATEGY – FOUL WATER**

- 6.1** The current foul drainage from the site discharges into a public foul sewer at the North East corner of the site. Any additional foul drainage from the new extension will be connected into this existing foul system.

## **7.0 CONCLUSIONS**

- 7.1** Runoff from the proposed extension will be restricted to existing greenfield runoff rates with an outfall into the existing surface water drains. Storage up to and including the 1 in 100 years plus climatic change event (45%) will be provided within the boundary of the site, the attenuation will be in the form of attenuation crates.
- 7.2** Foul drainage will be discharged to the foul sewer.
- 7.3** The strategy outlined above shows the viable sustainable drainage solution is achievable within the constraints of the site.



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Director

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                            |                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Black Seal Ltd                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                            | Page 1                                                                              |
| Cuddington<br>Cheshire<br>CW8 2FH                                                                                                                                                                                                                                                                                                                                                                                                                                | Holchem<br>Pilsworth Ind. Estate<br>Greenfield Run-off LHS |  |
| Date 11/10/2023<br>File                                                                                                                                                                                                                                                                                                                                                                                                                                          | Designed by BCH<br>Checked by PH                           |                                                                                     |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                            | Source Control 2020.1.3                                                             |
| <p style="text-align: center;"><u>ICP SUDS Mean Annual Flood</u></p> <p style="text-align: center;">Input</p> <p>Return Period (years) 100                      Soil 0.450<br/> Area (ha) 0.233                      Urban 0.650<br/> SAAR (mm) 1090 Region Number Region 10</p> <p style="text-align: center;"><b>Results l/s</b></p> <p>QBAR Rural 1.7<br/> QBAR Urban 3.7</p> <p>Q100 years 6.0</p> <p>Q1 year 3.2<br/> Q30 years 5.4<br/> Q100 years 6.0</p> |                                                            |                                                                                     |
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|                                             |                                           |                                                                                     |
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|                                             |                                           | Page 1                                                                              |
|                                             | Pilsworth<br>Left Hand Side<br>SW Network |  |
| Date 24/10/2023<br>File SW LHS 24-10-23.MDX | Designed by BCH<br>Checked by PH          |                                                                                     |
| XP Solutions                                | Network 2020.1.3                          |                                                                                     |

### STORM SEWER DESIGN by the Modified Rational Method

#### Design Criteria for SW LHS 24-10-23.SWS

Pipe Sizes SW RHS 24-10-23 Manhole Sizes SW RHS 24-10-23

|                                        |        |                                       |       |
|----------------------------------------|--------|---------------------------------------|-------|
| FSR Rainfall Model - England and Wales |        |                                       |       |
| Return Period (years)                  | 2      | PIMP (%)                              | 100   |
| M5-60 (mm)                             | 19.000 | Add Flow / Climate Change (%)         | 0     |
| Ratio R                                | 0.308  | Minimum Backdrop Height (m)           | 0.200 |
| Maximum Rainfall (mm/hr)               | 0      | Maximum Backdrop Height (m)           | 0.000 |
| Maximum Time of Concentration (mins)   | 30     | Min Design Depth for Optimisation (m) | 1.200 |
| Foul Sewage (l/s/ha)                   | 0.000  | Min Vel for Auto Design only (m/s)    | 0.75  |
| Volumetric Runoff Coeff.               | 0.750  | Min Slope for Optimisation (1:X)      | 500   |

Designed with Level Soffits

#### Time Area Diagram for SW LHS 24-10-23.SWS

| Time<br>(mins) | Area<br>(ha) | Time<br>(mins) | Area<br>(ha) |
|----------------|--------------|----------------|--------------|
| 0-4            | 0.158        | 4-8            | 0.075        |

Total Area Contributing (ha) = 0.233

Total Pipe Volume (m³) = 31.617

#### Network Design Table for SW LHS 24-10-23.SWS

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section Type | Auto<br>Design                                                                        |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|---------------------------------------------------------------------------------------|
| 1.000 | 83.899        | 0.210       | 399.5          | 0.000          | 5.00           | 0.0                | 0.600     | o           | 600         | Pipe/Conduit |  |
| 1.001 | 9.524         | 0.024       | 396.8          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 600         | Pipe/Conduit |  |
| 2.000 | 55.984        | 0.500       | 112.0          | 0.147          | 5.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |  |
| 2.001 | 11.791        | 0.150       | 78.6           | 0.050          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |  |
| 2.002 | 4.914         | 0.500       | 9.8            | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |  |

#### Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.000 | 0.00            | 6.15           | 87.080       | 0.000            | 0.0                  | 0.0           | 0.0               | 1.21         | 342.7        | 0.0           |
| 1.001 | 0.00            | 6.28           | 86.870       | 0.000            | 0.0                  | 0.0           | 0.0               | 1.22         | 343.9        | 0.0           |
| 2.000 | 0.00            | 5.76           | 89.675       | 0.147            | 0.0                  | 0.0           | 0.0               | 1.23         | 49.1         | 0.0           |
| 2.001 | 0.00            | 5.89           | 89.175       | 0.197            | 0.0                  | 0.0           | 0.0               | 1.48         | 58.7         | 0.0           |
| 2.002 | 0.00            | 5.91           | 89.025       | 0.197            | 0.0                  | 0.0           | 0.0               | 4.20         | 166.9        | 0.0           |



|                                             |  |                                           |                                                                                     |
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|                                             |  |                                           | Page 3                                                                              |
|                                             |  | Pilsworth<br>Left Hand Side<br>SW Network |  |
| Date 24/10/2023<br>File SW LHS 24-10-23.MDX |  | Designed by BCH<br>Checked by PH          |                                                                                     |
| XP Solutions                                |  | Network 2020.1.3                          |                                                                                     |

Manhole Schedules for SW LHS 24-10-23.SWS

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam., L*W (mm) | PN    | Pipe Out Invert Level (m) | Diameter (mm) | PN    | Pipes In Invert Level (m) | Diameter (mm) | Backdrop (mm) |
|---------|-----------|--------------|---------------|--------------------|-------|---------------------------|---------------|-------|---------------------------|---------------|---------------|
| 11      | 89.600    | 2.520        | Open Manhole  | 1500               | 1.000 | 87.080                    | 600           |       |                           |               |               |
| 12      | 90.670    | 3.800        | Open Manhole  | 1500               | 1.001 | 86.870                    | 600           | 1.000 | 86.870                    | 600           |               |
| 13      | 90.500    | 0.825        | Open Manhole  | 1200               | 2.000 | 89.675                    | 225           |       |                           |               |               |
| 14      | 90.800    | 1.625        | Open Manhole  | 1200               | 2.001 | 89.175                    | 225           | 2.000 | 89.175                    | 225           |               |
| 15      | 90.650    | 1.625        | Open Manhole  | 1200               | 2.002 | 89.025                    | 225           | 2.001 | 89.025                    | 225           |               |
| 16      | 90.650    | 2.100        | Open Manhole  | 1200               | 3.000 | 88.550                    | 225           |       |                           |               |               |
| 17      | 90.600    | 2.075        | Open Manhole  | 1500               | 2.003 | 88.525                    | 150           | 2.002 | 88.525                    | 225           |               |
|         |           |              |               |                    |       |                           |               | 3.000 | 88.525                    | 225           |               |
| 18      | 90.600    | 2.225        | Open Manhole  | 1200               | 2.004 | 88.375                    | 150           | 2.003 | 88.375                    | 150           |               |
| 19      | 90.450    | 3.604        | Open Manhole  | 1500               | 1.002 | 86.846                    | 600           | 1.001 | 86.846                    | 600           |               |
|         |           |              |               |                    |       |                           |               | 2.004 | 88.325                    | 150           |               |
| 20      | 90.100    | 3.271        | Open Manhole  | 0                  |       | OUTFALL                   |               | 1.002 | 86.829                    | 600           | 1029          |

| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North) |
|---------|---------------------|----------------------|--------------------------|---------------------------|----------------|----------------|
| 11      | 381929.830          | 408719.144           | 381929.830               | 408719.144                | Required       |                |
| 12      | 381918.828          | 408635.970           | 381918.828               | 408635.970                | Required       |                |
| 13      | 381930.927          | 408704.960           | 381930.927               | 408704.960                | Required       |                |
| 14      | 381921.995          | 408649.693           | 381921.995               | 408649.693                | Required       |                |
| 15      | 381919.958          | 408638.080           | 381919.958               | 408638.080                | Required       |                |
| 16      | 381925.679          | 408628.305           | 381925.679               | 408628.305                | Required       |                |
| 17      | 381920.369          | 408633.183           | 381920.369               | 408633.183                | Required       |                |
| 18      | 381919.751          | 408629.231           | 381919.751               | 408629.231                | Required       |                |





|                                             |                                           |                                                                                     |
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|                                             | Pilsworth<br>Left Hand Side<br>SW Network |  |
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| XP Solutions                                | Network 2020.1.3                          |                                                                                     |

# PIPELINE SCHEDULES for SW LHS 24-10-23.SWS

## Upstream Manhole

| PN    | Hyd<br>Sect | Diam<br>(mm) | MH<br>Name | C.Level<br>(m) | I.Level<br>(m) | D.Depth<br>(m) | MH<br>Connection | MH DIAM., L*W<br>(mm) |
|-------|-------------|--------------|------------|----------------|----------------|----------------|------------------|-----------------------|
| 1.000 | o           | 600          | 11         | 89.600         | 87.080         | 1.920          | Open Manhole     | 1500                  |
| 1.001 | o           | 600          | 12         | 90.670         | 86.870         | 3.200          | Open Manhole     | 1500                  |
| 2.000 | o           | 225          | 13         | 90.500         | 89.675         | 0.600          | Open Manhole     | 1200                  |
| 2.001 | o           | 225          | 14         | 90.800         | 89.175         | 1.400          | Open Manhole     | 1200                  |
| 2.002 | o           | 225          | 15         | 90.650         | 89.025         | 1.400          | Open Manhole     | 1200                  |
| 3.000 | o           | 225          | 16         | 90.650         | 88.550         | 1.875          | Open Manhole     | 1200                  |
| 2.003 | o           | 150          | 17         | 90.600         | 88.525         | 1.925          | Open Manhole     | 1500                  |
| 2.004 | o           | 150          | 18         | 90.600         | 88.375         | 2.075          | Open Manhole     | 1200                  |
| 1.002 | o           | 600          | 19         | 90.450         | 86.846         | 3.004          | Open Manhole     | 1500                  |

## Downstream Manhole

| PN    | Length<br>(m) | Slope<br>(1:X) | MH<br>Name | C.Level<br>(m) | I.Level<br>(m) | D.Depth<br>(m) | MH<br>Connection | MH DIAM., L*W<br>(mm) |
|-------|---------------|----------------|------------|----------------|----------------|----------------|------------------|-----------------------|
| 1.000 | 83.899        | 399.5          | 12         | 90.670         | 86.870         | 3.200          | Open Manhole     | 1500                  |
| 1.001 | 9.524         | 396.8          | 19         | 90.450         | 86.846         | 3.004          | Open Manhole     | 1500                  |
| 2.000 | 55.984        | 112.0          | 14         | 90.800         | 89.175         | 1.400          | Open Manhole     | 1200                  |
| 2.001 | 11.791        | 78.6           | 15         | 90.650         | 89.025         | 1.400          | Open Manhole     | 1200                  |
| 2.002 | 4.914         | 9.8            | 17         | 90.600         | 88.525         | 1.850          | Open Manhole     | 1500                  |
| 3.000 | 7.211         | 288.4          | 17         | 90.600         | 88.525         | 1.850          | Open Manhole     | 1500                  |
| 2.003 | 4.000         | 26.7           | 18         | 90.600         | 88.375         | 2.075          | Open Manhole     | 1200                  |
| 2.004 | 3.381         | 67.6           | 19         | 90.450         | 88.325         | 1.975          | Open Manhole     | 1500                  |
| 1.002 | 6.702         | 394.2          | 20         | 90.100         | 86.829         | 2.671          | Open Manhole     | 0                     |

## Free Flowing Outfall Details for SW LHS 24-10-23.SWS

| Outfall<br>Pipe Number | Outfall<br>Name | C. Level<br>(m) | I. Level<br>(m) | Min<br>I. Level<br>(m) | D,L<br>(mm) | W<br>(mm) |
|------------------------|-----------------|-----------------|-----------------|------------------------|-------------|-----------|
| 1.002                  | 20              | 90.100          | 86.829          | 0.000                  | 0           | 0         |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                           |                                                                                     |                         |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------|-------------------------|-------|-----------------------------------|-------|------------------------|-------|-------------------------------|-------|------------------|---|--------------------|-------|----------------------|---|-------------------------------------|-------|---------------------------------|-------|-----------------|----|-------------------------------|-------|------------------------|---|----------------|-----|--------------|--------|-----------------------|---|-------------|-------|--------|-------------------|-------------|-------|------------|--------|-----------------------|----|---------|-------|--|--|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                           | Page 6                                                                              |                         |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Pilsworth<br>Left Hand Side<br>SW Network |  |                         |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Date 24/10/2023<br>File SW LHS 24-10-23.MDX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Designed by BCH<br>Checked by PH          |                                                                                     |                         |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Network 2020.1.3                          |                                                                                     |                         |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| <p><u>Simulation Criteria for SW LHS 24-10-23.SWS</u></p> <table><tr><td>Volumetric Runoff Coeff</td><td>0.750</td><td>Additional Flow - % of Total Flow</td><td>0.000</td></tr><tr><td>Areal Reduction Factor</td><td>1.000</td><td>MADD Factor * 10m³/ha Storage</td><td>2.000</td></tr><tr><td>Hot Start (mins)</td><td>0</td><td>Inlet Coeffiecient</td><td>0.800</td></tr><tr><td>Hot Start Level (mm)</td><td>0</td><td>Flow per Person per Day (l/per/day)</td><td>0.000</td></tr><tr><td>Manhole Headloss Coeff (Global)</td><td>0.500</td><td>Run Time (mins)</td><td>60</td></tr><tr><td>Foul Sewage per hectare (l/s)</td><td>0.000</td><td>Output Interval (mins)</td><td>1</td></tr></table> <p>Number of Input Hydrographs 0    Number of Storage Structures 1<br/>Number of Online Controls 1    Number of Time/Area Diagrams 0<br/>Number of Offline Controls 0    Number of Real Time Controls 0</p> <p><u>Synthetic Rainfall Details</u></p> <table><tr><td>Rainfall Model</td><td>FSR</td><td>Profile Type</td><td>Summer</td></tr><tr><td>Return Period (years)</td><td>2</td><td>Cv (Summer)</td><td>0.750</td></tr><tr><td>Region</td><td>England and Wales</td><td>Cv (Winter)</td><td>0.840</td></tr><tr><td>M5-60 (mm)</td><td>19.000</td><td>Storm Duration (mins)</td><td>30</td></tr><tr><td>Ratio R</td><td>0.308</td><td></td><td></td></tr></table> |                                           |                                                                                     | Volumetric Runoff Coeff | 0.750 | Additional Flow - % of Total Flow | 0.000 | Areal Reduction Factor | 1.000 | MADD Factor * 10m³/ha Storage | 2.000 | Hot Start (mins) | 0 | Inlet Coeffiecient | 0.800 | Hot Start Level (mm) | 0 | Flow per Person per Day (l/per/day) | 0.000 | Manhole Headloss Coeff (Global) | 0.500 | Run Time (mins) | 60 | Foul Sewage per hectare (l/s) | 0.000 | Output Interval (mins) | 1 | Rainfall Model | FSR | Profile Type | Summer | Return Period (years) | 2 | Cv (Summer) | 0.750 | Region | England and Wales | Cv (Winter) | 0.840 | M5-60 (mm) | 19.000 | Storm Duration (mins) | 30 | Ratio R | 0.308 |  |  |
| Volumetric Runoff Coeff                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.750                                     | Additional Flow - % of Total Flow                                                   | 0.000                   |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Areal Reduction Factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1.000                                     | MADD Factor * 10m³/ha Storage                                                       | 2.000                   |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Hot Start (mins)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0                                         | Inlet Coeffiecient                                                                  | 0.800                   |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Hot Start Level (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0                                         | Flow per Person per Day (l/per/day)                                                 | 0.000                   |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Manhole Headloss Coeff (Global)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.500                                     | Run Time (mins)                                                                     | 60                      |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Foul Sewage per hectare (l/s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.000                                     | Output Interval (mins)                                                              | 1                       |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Rainfall Model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | FSR                                       | Profile Type                                                                        | Summer                  |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2                                         | Cv (Summer)                                                                         | 0.750                   |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Region                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | England and Wales                         | Cv (Winter)                                                                         | 0.840                   |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| M5-60 (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 19.000                                    | Storm Duration (mins)                                                               | 30                      |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Ratio R                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0.308                                     |                                                                                     |                         |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| ©1982-2020 Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                           |                                                                                     |                         |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |

|                                             |                                           |                                                                                     |
|---------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------|
|                                             |                                           | Page 7                                                                              |
|                                             | Pilsworth<br>Left Hand Side<br>SW Network |  |
| Date 24/10/2023<br>File SW LHS 24-10-23.MDX | Designed by BCH<br>Checked by PH          |                                                                                     |
| XP Solutions                                | Network 2020.1.3                          |                                                                                     |

Online Controls for SW LHS 24-10-23.SWS

Hydro-Brake® Optimum Manhole: 17, DS/PN: 2.003, Volume (m³): 4.0

|                                   |                            |
|-----------------------------------|----------------------------|
| Unit Reference                    | MD-SHE-0088-3700-1200-3700 |
| Design Head (m)                   | 1.200                      |
| Design Flow (l/s)                 | 3.7                        |
| Flush-Flo™                        | Calculated                 |
| Objective                         | Minimise upstream storage  |
| Application                       | Surface                    |
| Sump Available                    | Yes                        |
| Diameter (mm)                     | 88                         |
| Invert Level (m)                  | 88.525                     |
| Minimum Outlet Pipe Diameter (mm) | 150                        |
| Suggested Manhole Diameter (mm)   | 1200                       |

| Control Points            | Head (m) | Flow (l/s) |
|---------------------------|----------|------------|
| Design Point (Calculated) | 1.200    | 3.7        |
| Flush-Flo™                | 0.361    | 3.7        |
| Kick-Flo®                 | 0.743    | 3.0        |
| Mean Flow over Head Range | -        | 3.2        |

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| 0.100     | 2.7        | 1.200     | 3.7        | 3.000     | 5.7        | 7.000     | 8.4        |
| 0.200     | 3.5        | 1.400     | 4.0        | 3.500     | 6.1        | 7.500     | 8.7        |
| 0.300     | 3.7        | 1.600     | 4.2        | 4.000     | 6.5        | 8.000     | 9.0        |
| 0.400     | 3.7        | 1.800     | 4.5        | 4.500     | 6.9        | 8.500     | 9.3        |
| 0.500     | 3.6        | 2.000     | 4.7        | 5.000     | 7.2        | 9.000     | 9.5        |
| 0.600     | 3.5        | 2.200     | 4.9        | 5.500     | 7.5        | 9.500     | 9.8        |
| 0.800     | 3.1        | 2.400     | 5.1        | 6.000     | 7.9        |           |            |
| 1.000     | 3.4        | 2.600     | 5.3        | 6.500     | 8.2        |           |            |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                           | Page 8                                                                              |           |           |                |           |           |                |       |      |      |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------|-----------|-----------|----------------|-----------|-----------|----------------|-------|------|------|-------|-----|-------|-------|------|-------|-------|-----|-------|-------|------|-------|-------|-----|-------|-------|------|-------|-------|-----|-------|-------|------|-------|-------|-----|-------|-------|------|-------|-------|-----|-------|-------|------|-------|-------|-----|-------|-------|------|-------|-------|-----|-------|-------|------|-------|-------|-----|-------|-------|------|-------|-------|-----|-------|-------|------|-------|-------|-----|-------|-------|------|-------|-------|-----|-------|-------|------|-------|-------|-----|-------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Pilsworth<br>Left Hand Side<br>SW Network |  |           |           |                |           |           |                |       |      |      |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |
| Date 24/10/2023<br>File SW LHS 24-10-23.MDX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Designed by BCH<br>Checked by PH          |                                                                                     |           |           |                |           |           |                |       |      |      |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Network 2020.1.3                          |                                                                                     |           |           |                |           |           |                |       |      |      |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |
| <p><u>Storage Structures for SW LHS 24-10-23.SWS</u></p> <p><u>Cellular Storage Manhole: 16, DS/PN: 3.000</u></p> <p>Invert Level (m) 88.550 Safety Factor 2.0<br/>Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95<br/>Infiltration Coefficient Side (m/hr) 0.00000</p> <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>99.0</td><td>99.0</td><td>1.300</td><td>0.0</td><td>148.7</td></tr><tr><td>0.100</td><td>99.0</td><td>103.0</td><td>1.400</td><td>0.0</td><td>148.7</td></tr><tr><td>0.200</td><td>99.0</td><td>107.0</td><td>1.500</td><td>0.0</td><td>148.7</td></tr><tr><td>0.300</td><td>99.0</td><td>110.9</td><td>1.600</td><td>0.0</td><td>148.7</td></tr><tr><td>0.400</td><td>99.0</td><td>114.9</td><td>1.700</td><td>0.0</td><td>148.7</td></tr><tr><td>0.500</td><td>99.0</td><td>118.9</td><td>1.800</td><td>0.0</td><td>148.7</td></tr><tr><td>0.600</td><td>99.0</td><td>122.9</td><td>1.900</td><td>0.0</td><td>148.7</td></tr><tr><td>0.700</td><td>99.0</td><td>126.9</td><td>2.000</td><td>0.0</td><td>148.7</td></tr><tr><td>0.800</td><td>99.0</td><td>130.8</td><td>2.100</td><td>0.0</td><td>148.7</td></tr><tr><td>0.900</td><td>99.0</td><td>134.8</td><td>2.200</td><td>0.0</td><td>148.7</td></tr><tr><td>1.000</td><td>99.0</td><td>138.8</td><td>2.300</td><td>0.0</td><td>148.7</td></tr><tr><td>1.100</td><td>99.0</td><td>142.8</td><td>2.400</td><td>0.0</td><td>148.7</td></tr><tr><td>1.200</td><td>99.0</td><td>146.8</td><td>2.500</td><td>0.0</td><td>148.7</td></tr></table> |                                           |                                                                                     | Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) | 0.000 | 99.0 | 99.0 | 1.300 | 0.0 | 148.7 | 0.100 | 99.0 | 103.0 | 1.400 | 0.0 | 148.7 | 0.200 | 99.0 | 107.0 | 1.500 | 0.0 | 148.7 | 0.300 | 99.0 | 110.9 | 1.600 | 0.0 | 148.7 | 0.400 | 99.0 | 114.9 | 1.700 | 0.0 | 148.7 | 0.500 | 99.0 | 118.9 | 1.800 | 0.0 | 148.7 | 0.600 | 99.0 | 122.9 | 1.900 | 0.0 | 148.7 | 0.700 | 99.0 | 126.9 | 2.000 | 0.0 | 148.7 | 0.800 | 99.0 | 130.8 | 2.100 | 0.0 | 148.7 | 0.900 | 99.0 | 134.8 | 2.200 | 0.0 | 148.7 | 1.000 | 99.0 | 138.8 | 2.300 | 0.0 | 148.7 | 1.100 | 99.0 | 142.8 | 2.400 | 0.0 | 148.7 | 1.200 | 99.0 | 146.8 | 2.500 | 0.0 | 148.7 |
| Depth (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Area (m²)                                 | Inf. Area (m²)                                                                      | Depth (m) | Area (m²) | Inf. Area (m²) |           |           |                |       |      |      |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |
| 0.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 99.0                                      | 99.0                                                                                | 1.300     | 0.0       | 148.7          |           |           |                |       |      |      |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |
| 0.100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 99.0                                      | 103.0                                                                               | 1.400     | 0.0       | 148.7          |           |           |                |       |      |      |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |
| 0.200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 99.0                                      | 107.0                                                                               | 1.500     | 0.0       | 148.7          |           |           |                |       |      |      |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |
| 0.300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 99.0                                      | 110.9                                                                               | 1.600     | 0.0       | 148.7          |           |           |                |       |      |      |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |
| 0.400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 99.0                                      | 114.9                                                                               | 1.700     | 0.0       | 148.7          |           |           |                |       |      |      |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |
| 0.500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 99.0                                      | 118.9                                                                               | 1.800     | 0.0       | 148.7          |           |           |                |       |      |      |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |
| 0.600                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 99.0                                      | 122.9                                                                               | 1.900     | 0.0       | 148.7          |           |           |                |       |      |      |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |
| 0.700                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 99.0                                      | 126.9                                                                               | 2.000     | 0.0       | 148.7          |           |           |                |       |      |      |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |
| 0.800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 99.0                                      | 130.8                                                                               | 2.100     | 0.0       | 148.7          |           |           |                |       |      |      |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |
| 0.900                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 99.0                                      | 134.8                                                                               | 2.200     | 0.0       | 148.7          |           |           |                |       |      |      |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |
| 1.000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 99.0                                      | 138.8                                                                               | 2.300     | 0.0       | 148.7          |           |           |                |       |      |      |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |
| 1.100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 99.0                                      | 142.8                                                                               | 2.400     | 0.0       | 148.7          |           |           |                |       |      |      |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |
| 1.200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 99.0                                      | 146.8                                                                               | 2.500     | 0.0       | 148.7          |           |           |                |       |      |      |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |
| ©1982-2020 Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                           |                                                                                     |           |           |                |           |           |                |       |      |      |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |       |      |       |       |     |       |

|                |
|----------------|
| Pilsworth      |
| Left Hand Side |
| SW Network     |



|      |                     |
|------|---------------------|
| Date | 24/10/2023          |
| File | SW LHS 24-10-23.MDX |

|                 |
|-----------------|
| Designed by BCH |
| Checked by PH   |

XP Solutions

Network 2020.1.3

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW LHS 24-10-23.SWS

## Simulation Criteria

|                                 |       |                                     |       |
|---------------------------------|-------|-------------------------------------|-------|
| Areal Reduction Factor          | 1.000 | Additional Flow - % of Total Flow   | 0.000 |
| Hot Start (mins)                | 0     | MADD Factor * 10m³/ha Storage       | 2.000 |
| Hot Start Level (mm)            | 0     | Inlet Coeffiecient                  | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s)   | 0.000 |                                     |       |

|                             |   |                              |   |
|-----------------------------|---|------------------------------|---|
| Number of Input Hydrographs | 0 | Number of Storage Structures | 1 |
| Number of Online Controls   | 1 | Number of Time/Area Diagrams | 0 |
| Number of Offline Controls  | 0 | Number of Real Time Controls | 0 |

### Synthetic Rainfall Details

|                |                   |             |       |
|----------------|-------------------|-------------|-------|
| Rainfall Model | FSR               | Ratio R     | 0.305 |
| Region         | England and Wales | Cv (Summer) | 0.750 |
| M5-60 (mm)     | 19.000            | Cv (Winter) | 0.840 |

|                                    |                                 |
|------------------------------------|---------------------------------|
| Margin for Flood Risk Warning (mm) | 450.0                           |
| Analysis Timestep                  | 2.5 Second Increment (Extended) |
| DTS Status                         | ON                              |
| DVD Status                         | ON                              |
| Inertia Status                     | OFF                             |

|                          |                                                    |
|--------------------------|----------------------------------------------------|
| Profile(s)               | Summer and Winter                                  |
| Duration(s) (mins)       | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960 |
| Return Period(s) (years) | 100                                                |
| Climate Change (%)       | 45                                                 |

WARNING: Half Drain Time has not been calculated as the structure is too full.

|       |       |       |        |        |         |           |           |           |          | Water  |
|-------|-------|-------|--------|--------|---------|-----------|-----------|-----------|----------|--------|
|       | US/MH |       |        | Return | Climate | First (X) | First (Y) | First (Z) | Overflow | Level  |
| PN    | Name  | Storm | Period | Change |         | Surcharge | Flood     | Overflow  | Act.     | (m)    |
| 1.000 | 11    | 15    | Summer | 100    | +45%    |           |           |           |          | 87.080 |
| 1.001 | 12    | 240   | Winter | 100    | +45%    |           |           |           |          | 86.906 |
| 2.000 | 13    | 15    | Winter | 100    | +45%    | 100/15    | Summer    |           |          | 90.498 |
| 2.001 | 14    | 30    | Winter | 100    | +45%    | 100/15    | Summer    |           |          | 89.764 |
| 2.002 | 15    | 240   | Winter | 100    | +45%    | 100/15    | Summer    |           |          | 89.778 |
| 3.000 | 16    | 240   | Winter | 100    | +45%    | 100/15    | Summer    |           |          | 89.751 |
| 2.003 | 17    | 240   | Winter | 100    | +45%    | 100/15    | Summer    |           |          | 89.778 |
| 2.004 | 18    | 240   | Winter | 100    | +45%    |           |           |           |          | 88.428 |
| 1.002 | 19    | 360   | Winter | 100    | +45%    |           |           |           |          | 86.907 |

|                                             |  |                                           |                                                                                     |
|---------------------------------------------|--|-------------------------------------------|-------------------------------------------------------------------------------------|
|                                             |  |                                           | Page 10                                                                             |
|                                             |  | Pilsworth<br>Left Hand Side<br>SW Network |  |
| Date 24/10/2023<br>File SW LHS 24-10-23.MDX |  | Designed by BCH<br>Checked by PH          |                                                                                     |
| XP Solutions                                |  | Network 2020.1.3                          |                                                                                     |

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW LHS 24-10-23.SWS

| PN    | US/MH<br>Name | Surcharged   |                | Flooded |        | Flow /<br>Cap. | Overflow<br>(l/s) | Half Drain<br>Time<br>(mins) | Pipe<br>Flow<br>(l/s) | Status     | Level<br>Exceeded |
|-------|---------------|--------------|----------------|---------|--------|----------------|-------------------|------------------------------|-----------------------|------------|-------------------|
|       |               | Depth<br>(m) | Volume<br>(m³) | Flow    | Volume |                |                   |                              |                       |            |                   |
| 1.000 | 11            | -0.600       | 0.000          | 0.00    |        |                |                   |                              | 0.0                   | OK         |                   |
| 1.001 | 12            | -0.564       | 0.000          | 0.00    |        |                |                   |                              | 0.0                   | OK         |                   |
| 2.000 | 13            | 0.598        | 0.000          | 1.25    |        |                |                   |                              | 59.3                  | FLOOD RISK |                   |
| 2.001 | 14            | 0.364        | 0.000          | 1.41    |        |                |                   |                              | 70.5                  | SURCHARGED |                   |
| 2.002 | 15            | 0.528        | 0.000          | 0.24    |        |                |                   |                              | 24.2                  | SURCHARGED |                   |
| 3.000 | 16            | 0.976        | 0.000          | 0.23    |        |                |                   |                              | 5.5                   | SURCHARGED |                   |
| 2.003 | 17            | 1.103        | 0.000          | 0.15    |        |                |                   |                              | 3.7                   | SURCHARGED |                   |
| 2.004 | 18            | -0.097       | 0.000          | 0.27    |        |                |                   |                              | 3.7                   | OK         |                   |
| 1.002 | 19            | -0.539       | 0.000          | 0.02    |        |                |                   |                              | 3.7                   | OK         |                   |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                        |                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                        | Page 1                                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Holchem<br>Pilsworth Ind. Estate<br>Greenfield Run-off |  |
| Date 11/10/2023<br>File                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Designed by BCH<br>Checked by PH                       |                                                                                     |
| XP Solutions Source Control 2020.1.3                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                        |                                                                                     |
| <p style="text-align: center;"><u>ICP SUDS Mean Annual Flood</u></p> <p style="text-align: center;">Input</p> <p> Return Period (years) 100                      Soil 0.450<br/> Area (ha) 0.430                      Urban 0.000<br/> SAAR (mm) 1080 Region Number Region 10 </p> <p style="text-align: center;"><b>Results l/s</b></p> <p> QBAR Rural 3.1<br/> QBAR Urban 3.1<br/> <br/> Q100 years 6.5<br/> <br/> Q1 year 2.7<br/> Q30 years 5.3<br/> Q100 years 6.5 </p> |                                                        |                                                                                     |
| <p style="text-align: center;">©1982-2020 Innovyze</p>                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                        |                                                                                     |

|                                             |                                            |                                                                                     |
|---------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
|                                             |                                            | Page 1                                                                              |
|                                             | Pilsworth<br>Right Hand Side<br>SW Network |  |
| Date 24/10/2023<br>File SW RHS 24-10-23.MDX | Designed by BCH<br>Checked by PH           |                                                                                     |
| XP Solutions                                | Network 2020.1.3                           |                                                                                     |

### STORM SEWER DESIGN by the Modified Rational Method

#### Design Criteria for SW RHS 24-10-23.SWS

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

|                                      |        |                                       |       |
|--------------------------------------|--------|---------------------------------------|-------|
| Return Period (years)                | 2      | PIMP (%)                              | 100   |
| M5-60 (mm)                           | 19.000 | Add Flow / Climate Change (%)         | 0     |
| Ratio R                              | 0.308  | Minimum Backdrop Height (m)           | 0.200 |
| Maximum Rainfall (mm/hr)             | 0      | Maximum Backdrop Height (m)           | 0.000 |
| Maximum Time of Concentration (mins) | 30     | Min Design Depth for Optimisation (m) | 1.200 |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Vel for Auto Design only (m/s)    | 0.75  |
| Volumetric Runoff Coeff.             | 0.750  | Min Slope for Optimisation (1:X)      | 500   |

Designed with Level Soffits

#### Time Area Diagram for SW RHS 24-10-23.SWS

| Time<br>(mins) | Area<br>(ha) | Time<br>(mins) | Area<br>(ha) |
|----------------|--------------|----------------|--------------|
| 0-4            | 0.408        | 4-8            | 0.180        |

Total Area Contributing (ha) = 0.588

Total Pipe Volume (m³) = 5.187

#### Network Design Table for SW RHS 24-10-23.SWS

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section Type | Auto<br>Design                                                                        |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|---------------------------------------------------------------------------------------|
| 1.000 | 20.872        | 0.815       | 25.6           | 0.083          | 5.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |  |
| 1.001 | 15.100        | 0.530       | 28.5           | 0.042          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 2.000 | 9.421         | 0.025       | 376.8          | 0.000          | 5.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 3.000 | 11.153        | 0.050       | 223.1          | 0.398          | 5.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 3.001 | 8.102         | 0.050       | 162.0          | 0.033          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |

#### Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.000 | 0.00            | 5.13           | 90.760       | 0.083            | 0.0                  | 0.0           | 0.0               | 2.60         | 103.2        | 0.0           |
| 1.001 | 0.00            | 5.22           | 89.870       | 0.125            | 0.0                  | 0.0           | 0.0               | 2.96         | 209.0        | 0.0           |
| 2.000 | 0.00            | 5.20           | 89.365       | 0.000            | 0.0                  | 0.0           | 0.0               | 0.80         | 56.8         | 0.0           |
| 3.000 | 0.00            | 5.18           | 88.950       | 0.398            | 0.0                  | 0.0           | 0.0               | 1.05         | 74.1         | 0.0           |
| 3.001 | 0.00            | 5.29           | 88.900       | 0.431            | 0.0                  | 0.0           | 0.0               | 1.23         | 87.1         | 0.0           |

|                                             |                                            |                                                                                     |
|---------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
|                                             |                                            | Page 2                                                                              |
|                                             | Pilsworth<br>Right Hand Side<br>SW Network |  |
| Date 24/10/2023<br>File SW RHS 24-10-23.MDX | Designed by BCH<br>Checked by PH           |                                                                                     |
| XP Solutions                                | Network 2020.1.3                           |                                                                                     |

Network Design Table for SW RHS 24-10-23.SWS

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section Type | Auto<br>Design                                                                      |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|-------------------------------------------------------------------------------------|
| 3.002 | 5.126         | 0.050       | 102.5          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |
| 1.002 | 4.005         | 0.100       | 40.1           | 0.032          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| 1.003 | 13.345        | 0.100       | 133.5          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 150         | Pipe/Conduit |  |
| 1.004 | 8.406         | 0.050       | 168.1          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |  |

Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 3.002 | 0.00            | 5.34           | 88.850       | 0.431            | 0.0                  | 0.0           | 0.0               | 1.55         | 109.8        | 0.0           |
| 1.002 | 0.00            | 5.38           | 88.800       | 0.588            | 0.0                  | 0.0           | 0.0               | 1.60         | 28.2         | 0.0           |
| 1.003 | 0.00            | 5.64           | 88.700       | 0.588            | 0.0                  | 0.0           | 0.0               | 0.87         | 15.3         | 0.0           |
| 1.004 | 0.00            | 5.76           | 88.450       | 0.588            | 0.0                  | 0.0           | 0.0               | 1.21         | 85.5         | 0.0           |

|                                             |  |                                            |                                                                                     |
|---------------------------------------------|--|--------------------------------------------|-------------------------------------------------------------------------------------|
|                                             |  |                                            | Page 3                                                                              |
|                                             |  | Pilsworth<br>Right Hand Side<br>SW Network |  |
| Date 24/10/2023<br>File SW RHS 24-10-23.MDX |  | Designed by BCH<br>Checked by PH           |                                                                                     |
| XP Solutions                                |  | Network 2020.1.3                           |                                                                                     |

Manhole Schedules for SW RHS 24-10-23.SWS

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam., L*W (mm) | PN    | Pipe Out Invert Level (m) | Diameter (mm) | PN    | Pipes In Invert Level (m) | Diameter (mm) | Backdrop (mm) |
|---------|-----------|--------------|---------------|--------------------|-------|---------------------------|---------------|-------|---------------------------|---------------|---------------|
| 1       | 92.980    | 2.220        | Open Manhole  | 1200               | 1.000 | 90.760                    | 225           |       |                           |               |               |
| 2       | 92.070    | 2.200        | Open Manhole  | 1200               | 1.001 | 89.870                    | 300           | 1.000 | 89.945                    | 225           |               |
| 3       | 91.450    | 2.085        | Open Manhole  | 1200               | 2.000 | 89.365                    | 300           |       |                           |               |               |
| 4       | 90.700    | 1.750        | Open Manhole  | 1200               | 3.000 | 88.950                    | 300           |       |                           |               |               |
| 5       | 91.100    | 2.200        | Open Manhole  | 1200               | 3.001 | 88.900                    | 300           | 3.000 | 88.900                    | 300           |               |
| 6       | 91.250    | 2.400        | Open Manhole  | 1200               | 3.002 | 88.850                    | 300           | 3.001 | 88.850                    | 300           |               |
| 7       | 91.340    | 2.540        | Open Manhole  | 1500               | 1.002 | 88.800                    | 150           | 1.001 | 89.340                    | 300           | 690           |
|         |           |              |               |                    |       |                           |               | 2.000 | 89.340                    | 300           | 690           |
|         |           |              |               |                    |       |                           |               | 3.002 | 88.800                    | 300           |               |
| 8       | 91.200    | 2.500        | Open Manhole  | 1200               | 1.003 | 88.700                    | 150           | 1.002 | 88.700                    | 150           |               |
| 9       | 91.320    | 2.870        | Open Manhole  | 1200               | 1.004 | 88.450                    | 300           | 1.003 | 88.600                    | 150           |               |
| 10      | 94.040    | 5.640        | Open Manhole  | 1200               |       | OUTFALL                   |               | 1.004 | 88.400                    | 300           |               |

| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North)                                                                        |
|---------|---------------------|----------------------|--------------------------|---------------------------|----------------|---------------------------------------------------------------------------------------|
| 1       | 382025.554          | 408571.850           | 382025.554               | 408571.850                | Required       |  |
| 2       | 382018.582          | 408591.523           | 382018.582               | 408591.523                | Required       |  |
| 3       | 382026.102          | 408598.651           | 382026.102               | 408598.651                | Required       |  |
| 4       | 382006.031          | 408597.461           | 382006.031               | 408597.461                | Required       |  |
| 5       | 382007.753          | 408608.480           | 382007.753               | 408608.480                | Required       |  |
| 6       | 382015.758          | 408607.229           | 382015.758               | 408607.229                | Required       |  |
| 7       | 382020.825          | 408606.455           | 382020.825               | 408606.455                | Required       |  |
| 8       | 382021.490          | 408610.404           | 382021.490               | 408610.404                | Required       |  |

|  |                                            |
|--|--------------------------------------------|
|  | Pilsworth<br>Right Hand Side<br>SW Network |
|--|--------------------------------------------|



Date 24/10/2023

|                 |
|-----------------|
| Designed by BCH |
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File SW RHS 24-10-23.MDX

Checked by PH

XP Solutions

Network 2020.1.3

### Manhole Schedules for SW RHS 24-10-23.SWS

| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North)                                                                      |
|---------|---------------------|----------------------|--------------------------|---------------------------|----------------|-------------------------------------------------------------------------------------|
| 9       | 382033.802          | 408605.255           | 382033.802               | 408605.255                | Required       |  |
| 10      | 382037.943          | 408597.940           |                          |                           | No Entry       |  |

|                                             |                                            |                                                                                     |
|---------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
|                                             |                                            | Page 5                                                                              |
|                                             | Pilsworth<br>Right Hand Side<br>SW Network |  |
| Date 24/10/2023<br>File SW RHS 24-10-23.MDX | Designed by BCH<br>Checked by PH           |                                                                                     |
| XP Solutions                                | Network 2020.1.3                           |                                                                                     |

### PIPELINE SCHEDULES for SW RHS 24-10-23.SWS

#### Upstream Manhole

| PN    | Hyd Sect | Diam (mm) | MH Name | C.Level (m) | I.Level (m) | D.Depth (m) | MH Connection | MH DIAM., L*W (mm) |
|-------|----------|-----------|---------|-------------|-------------|-------------|---------------|--------------------|
| 1.000 | o        | 225       | 1       | 92.980      | 90.760      | 1.995       | Open Manhole  | 1200               |
| 1.001 | o        | 300       | 2       | 92.070      | 89.870      | 1.900       | Open Manhole  | 1200               |
| 2.000 | o        | 300       | 3       | 91.450      | 89.365      | 1.785       | Open Manhole  | 1200               |
| 3.000 | o        | 300       | 4       | 90.700      | 88.950      | 1.450       | Open Manhole  | 1200               |
| 3.001 | o        | 300       | 5       | 91.100      | 88.900      | 1.900       | Open Manhole  | 1200               |
| 3.002 | o        | 300       | 6       | 91.250      | 88.850      | 2.100       | Open Manhole  | 1200               |
| 1.002 | o        | 150       | 7       | 91.340      | 88.800      | 2.390       | Open Manhole  | 1500               |
| 1.003 | o        | 150       | 8       | 91.200      | 88.700      | 2.350       | Open Manhole  | 1200               |
| 1.004 | o        | 300       | 9       | 91.320      | 88.450      | 2.570       | Open Manhole  | 1200               |

#### Downstream Manhole

| PN    | Length (m) | Slope (1:X) | MH Name | C.Level (m) | I.Level (m) | D.Depth (m) | MH Connection | MH DIAM., L*W (mm) |
|-------|------------|-------------|---------|-------------|-------------|-------------|---------------|--------------------|
| 1.000 | 20.872     | 25.6        | 2       | 92.070      | 89.945      | 1.900       | Open Manhole  | 1200               |
| 1.001 | 15.100     | 28.5        | 7       | 91.340      | 89.340      | 1.700       | Open Manhole  | 1500               |
| 2.000 | 9.421      | 376.8       | 7       | 91.340      | 89.340      | 1.700       | Open Manhole  | 1500               |
| 3.000 | 11.153     | 223.1       | 5       | 91.100      | 88.900      | 1.900       | Open Manhole  | 1200               |
| 3.001 | 8.102      | 162.0       | 6       | 91.250      | 88.850      | 2.100       | Open Manhole  | 1200               |
| 3.002 | 5.126      | 102.5       | 7       | 91.340      | 88.800      | 2.240       | Open Manhole  | 1500               |
| 1.002 | 4.005      | 40.1        | 8       | 91.200      | 88.700      | 2.350       | Open Manhole  | 1200               |
| 1.003 | 13.345     | 133.5       | 9       | 91.320      | 88.600      | 2.570       | Open Manhole  | 1200               |
| 1.004 | 8.406      | 168.1       | 10      | 94.040      | 88.400      | 5.340       | Open Manhole  | 1200               |

### Free Flowing Outfall Details for SW RHS 24-10-23.SWS

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D,L (mm) | W (mm) |
|---------------------|--------------|--------------|--------------|------------------|----------|--------|
| 1.004               | 10           | 94.040       | 88.400       | 0.000            | 1200     | 0      |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                            |                                                                                     |                         |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|-------------------------|-------|-----------------------------------|-------|------------------------|-------|-------------------------------|-------|------------------|---|--------------------|-------|----------------------|---|-------------------------------------|-------|---------------------------------|-------|-----------------|----|-------------------------------|-------|------------------------|---|--|--|--|--|-----------------------------|---|------------------------------|---|---------------------------|---|------------------------------|---|----------------------------|---|------------------------------|---|----------------|-----|--------------|--------|-----------------------|---|-------------|-------|--------|-------------------|-------------|-------|------------|--------|-----------------------|----|---------|-------|--|--|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                            | Page 6                                                                              |                         |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Pilsworth<br>Right Hand Side<br>SW Network |  |                         |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Date 24/10/2023<br>File SW RHS 24-10-23.MDX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Designed by BCH<br>Checked by PH           |                                                                                     |                         |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| XP Solutions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Network 2020.1.3                           |                                                                                     |                         |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| <p><u>Simulation Criteria for SW RHS 24-10-23.SWS</u></p> <table><tr><td>Volumetric Runoff Coeff</td><td>0.750</td><td>Additional Flow - % of Total Flow</td><td>0.000</td></tr><tr><td>Areal Reduction Factor</td><td>1.000</td><td>MADD Factor * 10m³/ha Storage</td><td>2.000</td></tr><tr><td>Hot Start (mins)</td><td>0</td><td>Inlet Coeffiecient</td><td>0.800</td></tr><tr><td>Hot Start Level (mm)</td><td>0</td><td>Flow per Person per Day (l/per/day)</td><td>0.000</td></tr><tr><td>Manhole Headloss Coeff (Global)</td><td>0.500</td><td>Run Time (mins)</td><td>60</td></tr><tr><td>Foul Sewage per hectare (l/s)</td><td>0.000</td><td>Output Interval (mins)</td><td>1</td></tr><tr><td colspan="4"> </td></tr><tr><td>Number of Input Hydrographs</td><td>0</td><td>Number of Storage Structures</td><td>2</td></tr><tr><td>Number of Online Controls</td><td>1</td><td>Number of Time/Area Diagrams</td><td>0</td></tr><tr><td>Number of Offline Controls</td><td>0</td><td>Number of Real Time Controls</td><td>0</td></tr></table> <p><u>Synthetic Rainfall Details</u></p> <table><tr><td>Rainfall Model</td><td>FSR</td><td>Profile Type</td><td>Summer</td></tr><tr><td>Return Period (years)</td><td>2</td><td>Cv (Summer)</td><td>0.750</td></tr><tr><td>Region</td><td>England and Wales</td><td>Cv (Winter)</td><td>0.840</td></tr><tr><td>M5-60 (mm)</td><td>19.000</td><td>Storm Duration (mins)</td><td>30</td></tr><tr><td>Ratio R</td><td>0.308</td><td></td><td></td></tr></table> |                                            |                                                                                     | Volumetric Runoff Coeff | 0.750 | Additional Flow - % of Total Flow | 0.000 | Areal Reduction Factor | 1.000 | MADD Factor * 10m³/ha Storage | 2.000 | Hot Start (mins) | 0 | Inlet Coeffiecient | 0.800 | Hot Start Level (mm) | 0 | Flow per Person per Day (l/per/day) | 0.000 | Manhole Headloss Coeff (Global) | 0.500 | Run Time (mins) | 60 | Foul Sewage per hectare (l/s) | 0.000 | Output Interval (mins) | 1 |  |  |  |  | Number of Input Hydrographs | 0 | Number of Storage Structures | 2 | Number of Online Controls | 1 | Number of Time/Area Diagrams | 0 | Number of Offline Controls | 0 | Number of Real Time Controls | 0 | Rainfall Model | FSR | Profile Type | Summer | Return Period (years) | 2 | Cv (Summer) | 0.750 | Region | England and Wales | Cv (Winter) | 0.840 | M5-60 (mm) | 19.000 | Storm Duration (mins) | 30 | Ratio R | 0.308 |  |  |
| Volumetric Runoff Coeff                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.750                                      | Additional Flow - % of Total Flow                                                   | 0.000                   |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Areal Reduction Factor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1.000                                      | MADD Factor * 10m³/ha Storage                                                       | 2.000                   |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Hot Start (mins)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0                                          | Inlet Coeffiecient                                                                  | 0.800                   |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Hot Start Level (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0                                          | Flow per Person per Day (l/per/day)                                                 | 0.000                   |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Manhole Headloss Coeff (Global)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.500                                      | Run Time (mins)                                                                     | 60                      |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Foul Sewage per hectare (l/s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.000                                      | Output Interval (mins)                                                              | 1                       |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                            |                                                                                     |                         |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Number of Input Hydrographs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0                                          | Number of Storage Structures                                                        | 2                       |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Number of Online Controls                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1                                          | Number of Time/Area Diagrams                                                        | 0                       |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Number of Offline Controls                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0                                          | Number of Real Time Controls                                                        | 0                       |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Rainfall Model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | FSR                                        | Profile Type                                                                        | Summer                  |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Return Period (years)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2                                          | Cv (Summer)                                                                         | 0.750                   |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Region                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | England and Wales                          | Cv (Winter)                                                                         | 0.840                   |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| M5-60 (mm)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 19.000                                     | Storm Duration (mins)                                                               | 30                      |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
| Ratio R                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.308                                      |                                                                                     |                         |       |                                   |       |                        |       |                               |       |                  |   |                    |       |                      |   |                                     |       |                                 |       |                 |    |                               |       |                        |   |  |  |  |  |                             |   |                              |   |                           |   |                              |   |                            |   |                              |   |                |     |              |        |                       |   |             |       |        |                   |             |       |            |        |                       |    |         |       |  |  |
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|                                             |                                            |                                                                                     |
|---------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
|                                             |                                            | Page 7                                                                              |
|                                             | Pilsworth<br>Right Hand Side<br>SW Network |  |
| Date 24/10/2023<br>File SW RHS 24-10-23.MDX | Designed by BCH<br>Checked by PH           |                                                                                     |
| XP Solutions                                | Network 2020.1.3                           |                                                                                     |

### Online Controls for SW RHS 24-10-23.SWS

Hydro-Brake® Optimum Manhole: 7, DS/PN: 1.002, Volume (m<sup>3</sup>): 6.3

|                                   |                            |
|-----------------------------------|----------------------------|
| Unit Reference                    | MD-SHE-0115-7000-1600-7000 |
| Design Head (m)                   | 1.600                      |
| Design Flow (l/s)                 | 7.0                        |
| Flush-Flo™                        | Calculated                 |
| Objective                         | Minimise upstream storage  |
| Application                       | Surface                    |
| Sump Available                    | Yes                        |
| Diameter (mm)                     | 115                        |
| Invert Level (m)                  | 88.800                     |
| Minimum Outlet Pipe Diameter (mm) | 150                        |
| Suggested Manhole Diameter (mm)   | 1200                       |

| Control Points            | Head (m) | Flow (l/s) |
|---------------------------|----------|------------|
| Design Point (Calculated) | 1.600    | 7.0        |
| Flush-Flo™                | 0.476    | 7.0        |
| Kick-Flo®                 | 0.977    | 5.6        |
| Mean Flow over Head Range | -        | 6.1        |

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| 0.100     | 4.0        | 1.200     | 6.1        | 3.000     | 9.4        | 7.000     | 14.1       |
| 0.200     | 6.2        | 1.400     | 6.6        | 3.500     | 10.1       | 7.500     | 14.5       |
| 0.300     | 6.7        | 1.600     | 7.0        | 4.000     | 10.8       | 8.000     | 15.0       |
| 0.400     | 6.9        | 1.800     | 7.4        | 4.500     | 11.4       | 8.500     | 15.4       |
| 0.500     | 7.0        | 2.000     | 7.8        | 5.000     | 12.0       | 9.000     | 15.9       |
| 0.600     | 6.9        | 2.200     | 8.1        | 5.500     | 12.5       | 9.500     | 16.3       |
| 0.800     | 6.5        | 2.400     | 8.5        | 6.000     | 13.1       |           |            |
| 1.000     | 5.6        | 2.600     | 8.8        | 6.500     | 13.6       |           |            |

|                                             |                                            |                                                                                     |
|---------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
|                                             |                                            | Page 8                                                                              |
|                                             | Pilsworth<br>Right Hand Side<br>SW Network |  |
| Date 24/10/2023<br>File SW RHS 24-10-23.MDX | Designed by BCH<br>Checked by PH           |                                                                                     |
| XP Solutions                                | Network 2020.1.3                           |                                                                                     |

### Storage Structures for SW RHS 24-10-23.SWS

#### Cellular Storage Manhole: 3, DS/PN: 2.000

Invert Level (m) 89.365 Safety Factor 2.0  
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95  
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000     | 120.0                  | 120.0                       | 1.300     | 0.0                    | 157.2                       |
| 0.100     | 120.0                  | 124.4                       | 1.400     | 0.0                    | 157.2                       |
| 0.200     | 120.0                  | 128.8                       | 1.500     | 0.0                    | 157.2                       |
| 0.300     | 120.0                  | 133.1                       | 1.600     | 0.0                    | 157.2                       |
| 0.400     | 120.0                  | 137.5                       | 1.700     | 0.0                    | 157.2                       |
| 0.500     | 120.0                  | 141.9                       | 1.800     | 0.0                    | 157.2                       |
| 0.600     | 120.0                  | 146.3                       | 1.900     | 0.0                    | 157.2                       |
| 0.700     | 120.0                  | 150.7                       | 2.000     | 0.0                    | 157.2                       |
| 0.800     | 120.0                  | 155.1                       | 2.100     | 0.0                    | 157.2                       |
| 0.900     | 0.0                    | 157.2                       | 2.200     | 0.0                    | 157.2                       |
| 1.000     | 0.0                    | 157.2                       | 2.300     | 0.0                    | 157.2                       |
| 1.100     | 0.0                    | 157.2                       | 2.400     | 0.0                    | 157.2                       |
| 1.200     | 0.0                    | 157.2                       | 2.500     | 0.0                    | 157.2                       |

#### Cellular Storage Manhole: 5, DS/PN: 3.001

Invert Level (m) 88.900 Safety Factor 2.0  
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95  
Infiltration Coefficient Side (m/hr) 0.00000

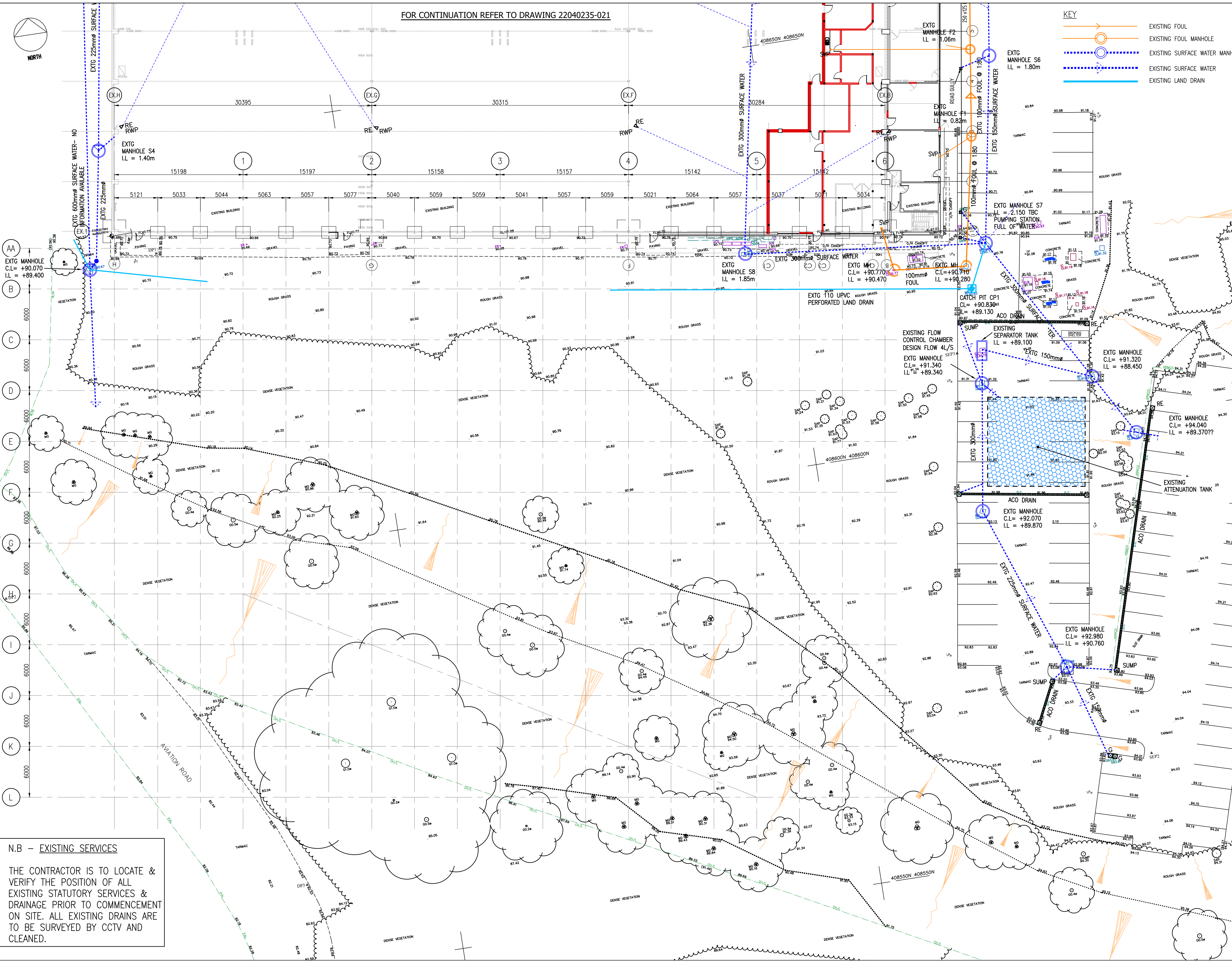
| Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) | Depth (m) | Area (m <sup>2</sup> ) | Inf. Area (m <sup>2</sup> ) |
|-----------|------------------------|-----------------------------|-----------|------------------------|-----------------------------|
| 0.000     | 225.0                  | 225.0                       | 1.300     | 0.0                    | 300.0                       |
| 0.100     | 225.0                  | 231.0                       | 1.400     | 0.0                    | 300.0                       |
| 0.200     | 225.0                  | 237.0                       | 1.500     | 0.0                    | 300.0                       |
| 0.300     | 225.0                  | 243.0                       | 1.600     | 0.0                    | 300.0                       |
| 0.400     | 225.0                  | 249.0                       | 1.700     | 0.0                    | 300.0                       |
| 0.500     | 225.0                  | 255.0                       | 1.800     | 0.0                    | 300.0                       |
| 0.600     | 225.0                  | 261.0                       | 1.900     | 0.0                    | 300.0                       |
| 0.700     | 225.0                  | 267.0                       | 2.000     | 0.0                    | 300.0                       |
| 0.800     | 225.0                  | 273.0                       | 2.100     | 0.0                    | 300.0                       |
| 0.900     | 225.0                  | 279.0                       | 2.200     | 0.0                    | 300.0                       |
| 1.000     | 225.0                  | 285.0                       | 2.300     | 0.0                    | 300.0                       |
| 1.100     | 225.0                  | 291.0                       | 2.400     | 0.0                    | 300.0                       |
| 1.200     | 225.0                  | 297.0                       | 2.500     | 0.0                    | 300.0                       |



|                                             |                                            |                                                                                     |
|---------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
|                                             |                                            | Page 10                                                                             |
|                                             | Pilsworth<br>Right Hand Side<br>SW Network |  |
| Date 24/10/2023<br>File SW RHS 24-10-23.MDX | Designed by BCH<br>Checked by PH           |                                                                                     |
| XP Solutions                                | Network 2020.1.3                           |                                                                                     |

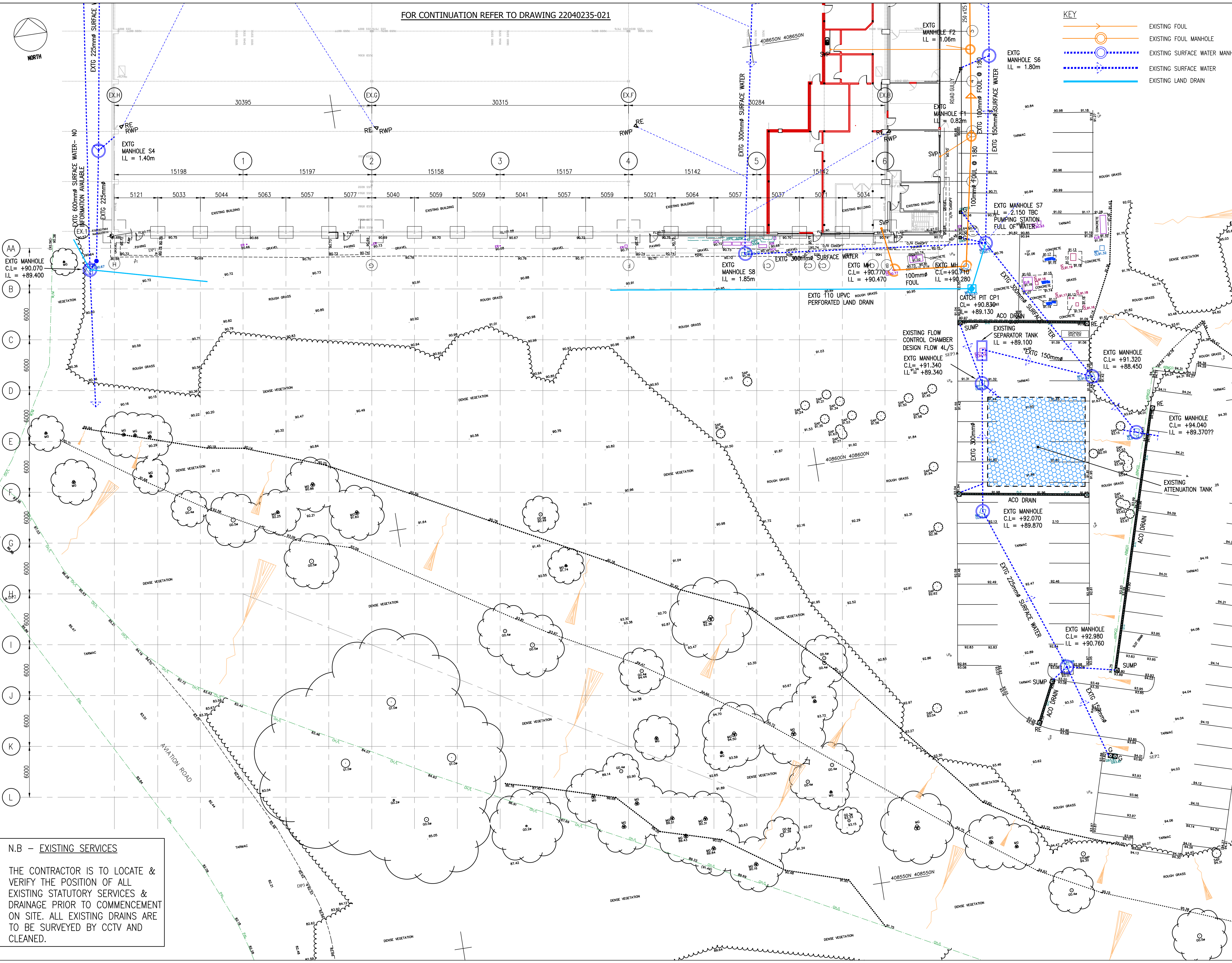
100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for SW RHS 24-10-23.SWS

| PN    | US/MH<br>Name | Surcharged   |                | Flooded |        | Flow /<br>Cap. | Overflow<br>(l/s) | Half Drain<br>Time<br>(mins) | Pipe<br>Flow<br>(l/s) | Status     | Level<br>Exceeded |
|-------|---------------|--------------|----------------|---------|--------|----------------|-------------------|------------------------------|-----------------------|------------|-------------------|
|       |               | Depth<br>(m) | Volume<br>(m³) | Flow    | Volume |                |                   |                              |                       |            |                   |
| 1.000 | 1             | -0.113       | 0.000          | 0.49    |        |                |                   |                              | 46.0                  | OK         |                   |
| 1.001 | 2             | -0.084       | 0.000          | 0.07    |        |                |                   |                              | 11.8                  | OK         |                   |
| 2.000 | 3             | 0.414        | 0.000          | 0.09    |        |                |                   | 354                          | 3.4                   | SURCHARGED |                   |
| 3.000 | 4             | 0.837        | 0.000          | 0.62    |        |                |                   |                              | 36.6                  | SURCHARGED |                   |
| 3.001 | 5             | 0.884        | 0.000          | 0.35    |        |                |                   |                              | 21.2                  | SURCHARGED |                   |
| 3.002 | 6             | 0.938        | 0.000          | 0.34    |        |                |                   |                              | 20.9                  | SURCHARGED |                   |
| 1.002 | 7             | 1.137        | 0.000          | 0.35    |        |                |                   |                              | 7.0                   | SURCHARGED |                   |
| 1.003 | 8             | -0.075       | 0.000          | 0.50    |        |                |                   |                              | 7.0                   | OK         |                   |
| 1.004 | 9             | -0.233       | 0.000          | 0.11    |        |                |                   |                              | 7.0                   | OK         |                   |



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**KEY**

- EXISTING FOUL
- EXISTING FOUL MANHOLE
- EXISTING SURFACE WATER MANHOLE
- EXISTING SURFACE WATER
- EXISTING LAND DRAIN

This scale bar is for microfilming purposes only.

0 10 20 30 40 50 60 70

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Figured dimensions to be used in preference to scale.

**GENERAL DRAINAGE NOTES**

ALL NEW MANHOLES TO BE TO AS PER DETAIL DRAWING.

ALL NEW PIPEWORK TO BE WAVIN OSMADRAIN OR WAVIN ULTRARIB UPVC PIPEWORK UNLESS OTHERWISE NOTED.

ALL PIPEWORK AT COVER LEVELS LESS THAN 900MM IN TRAFFICKED AREAS 400MM IN OTHER AREAS SHOULD BE ENCASED IN CONCRETE (CLASS 2 BEDDING)

ALL OTHER PIPEWORK TO BE IN CLASS 5 BEDDING

PIPEWORK PASSING THROUGH BUILDING WALLS SHOULD BE FITTED WITH ROCKER PIPES AS PER STANDARD DETAIL

ALL EXTERNAL MANHOLE COVERS TO BE TO EN124:1994 TRAFFICKED AREAS - GRADE D400 OTHER AREAS - GRADE A14

ALL PIPEWORK TO BE 100% PIPEWORK AT MINIMUM 180 FALL FW AND 1:100 SW UNLESS NOTED OTHERWISE

ALL NEW MANHOLES 450P PPIC UNLESS NOTED OTHERWISE

ALL RWP LOCATIONS AND NUMBERS TO BE CONFIRMED FROM ARCHITECTS DRAWINGS. ALL RWP'S TO ENTER SYSTEM VIA TRAPPED GULLY WITH GRATE TO ALLOW OVERFLOW IN EXTREME EVENT

EXACT SVP AND GULLY LOCATIONS TO BE CONFIRMED FROM ARCHITECTS DRAWINGS

GENERAL CONTRACTOR RESPONSIBLE FOR DESIGN AND CONSTRUCTION OF ALL TEMPORARY WORKS, PROPPING AND SHEETING

THE CONDITION OF ALL EXISTING SEWERS IS TO BE VERIFIED ON SITE BY CCTV SURVEY, PRIOR TO THE COMMENCEMENT OF ANY WORK ON SITE. THE LOCATION & INVERT LEVELS OF ALL EXISTING MANHOLES ARE TO BE CONFIRMED, PRIOR TO ANY EXCAVATION WORK STARTING.

ALL WORK IS TO COMPLY WITH THE REQUIREMENTS OF 'BS EN 752:2008' & 'SEWERS FOR ADOPTION - 6TH EDITION-2006

**CDM NOTES.**

ALL THE WORKS IS TO BE CARRIED OUT IN ACCORDANCE WITH THE CONTRACTORS HEALTH & SAFETY PLAN & 'CONSTRUCTION DESIGN & MANAGEMENT (CDM) REGULATIONS - 2015

SHORING TO EXCAVATIONS OVER 1.2M DEEP REQUIREMENTS. POTENTIAL FOR EXCAVATION COLLAPSE. WORK IN CONFINED SPACES PRECAUTIONS NECESSARY. MECHANICAL & MANUAL HANDLING PRECAUTIONS NECESSARY.

BURIED SERVICES EXIST ON & OFF SITE. REFER TO STATUTORY SERVICES INFORMATION.

GUARDING OF EXCAVATIONS TO PREVENT SITE STAFF, VEHICLES & MATERIALS FALLING INTO EXCAVATIONS & TO PREVENT OUT OF HOURS UNAUTHORISED ACCESS. ALL SITE PERSONNEL ARE TO HAVE THE NECESSARY QUALIFICATIONS TO PROVE THEIR COMPETANCE FOR WORKING ON THIS PROJECT.

WORKING WITH HAZARDOUS CEMENTITIOUS PRODUCTS. PREVENTION FOR FALLS FROM HEIGHT

| Rev | Date     | By                             | Check | Rev | Date | By | Check |
|-----|----------|--------------------------------|-------|-----|------|----|-------|
| P1  | 28.09.23 | PRELIMINARY ISSUE FOR COMMENTS | IS    | PH  |      |    |       |

Client: **KERSIA**

Project Title: **EXTENSION TO EXISTING FACTORY, PILSWORTH INDUSTRIAL ESTATE, BURY**

Dwg Title: **EXISTING DRAINAGE SCHEME - SHEET 1**

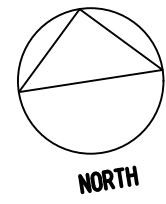
Dwg No.: 22040235-020

Revision: P1

Scale: 1:200

Drawn By / Date: @ A1

IS AUG 2023



# KEY

- EXISTING FOUL
- EXISTING FOUL MANHOLE
- EXISTING SURFACE WATER MANHOLE
- EXISTING SURFACE WATER
- EXISTING LAND DRAIN

This scale bar is for microfilming purposes only.

0 10 20 30 40 50 60 70  
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Figured dimensions to be used in preference to scale.

## GENERAL DRAINAGE NOTES

ALL NEW MANHOLES TO BE TO AS PER DETAIL DRAWING.

ALL NEW PIPEWORK TO BE WOVEN OSMADRAIN OR WOVEN ULTRARIB UPVC PIPEWORK UNLESS OTHERWISE NOTED.

ALL PIPEWORK AT COVER LEVELS LESS THAN 900MM IN TRAFFICKED AREAS 400MM IN OTHER AREAS SHOULD BE ENCASED IN CONCRETE (CLASS 2 BEDDING)

ALL OTHER PIPEWORK TO BE IN CLASS 5 BEDDING

PIPEWORK PASSING THROUGH BUILDING WALLS SHOULD BE FITTED WITH ROCKER PIPES AS PER STANDARD DETAIL

ALL EXTERNAL MANHOLE COVERS TO BE TO EN124/1994 TRAFFICKED AREAS - GRADE D400 OTHER AREAS - GRADE A14

ALL PIPEWORK TO BE 100% PIPEWORK AT MINIMUM 180 FALL FW AND 1100 SW UNLESS NOTED OTHERWISE.

ALL NEW MANHOLES 1500 PPIC UNLESS NOTED OTHERWISE

ALL RWP LOCATIONS AND NUMBERS TO BE CONFIRMED FROM ARCHITECTS DRAWINGS. ALL RWP'S TO ENTER SYSTEM VIA TRAPPED GULLY WITH GRATE TO ALLOW OVERFLOW IN EXTREME EVENT

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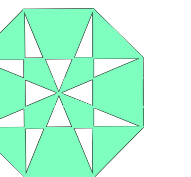
BURIED SERVICES EXIST ON & OFF SITE. REFER TO STATUTORY SERVICES INFORMATION. GUARDING OF EXCAVATIONS TO PREVENT SITE STAFF, VEHICLES & MATERIALS FALLING INTO EXCAVATIONS & TO PREVENT OUT OF HOURS UNAUTHORISED ACCESS. ALL SITE PERSONNEL ARE TO HAVE THE NECESSARY QUALIFICATIONS TO PROVE THEIR COMPETENCE FOR WORKING ON THIS PROJECT. WORKING WITH HAZARDOUS CEMENTITIOUS PRODUCTS. PREVENTION FOR FALLS FROM HEIGHT

## N.B - EXISTING SERVICES

THE CONTRACTOR IS TO LOCATE & VERIFY THE POSITION OF ALL EXISTING STATUTORY SERVICES & DRAINAGE PRIOR TO COMMENCEMENT ON SITE. ALL EXISTING DRAINS ARE TO BE SURVEYED BY CCTV AND CLEANED.

FOR CONTINUATION REFER TO DRAWING 22040235-020

|     |          |                                |                 |
|-----|----------|--------------------------------|-----------------|
|     |          |                                |                 |
| P1  | 28.09.23 | PRELIMINARY ISSUE FOR COMMENTS | IS PH           |
| Rev | Date     |                                | Rev. by CHG. by |



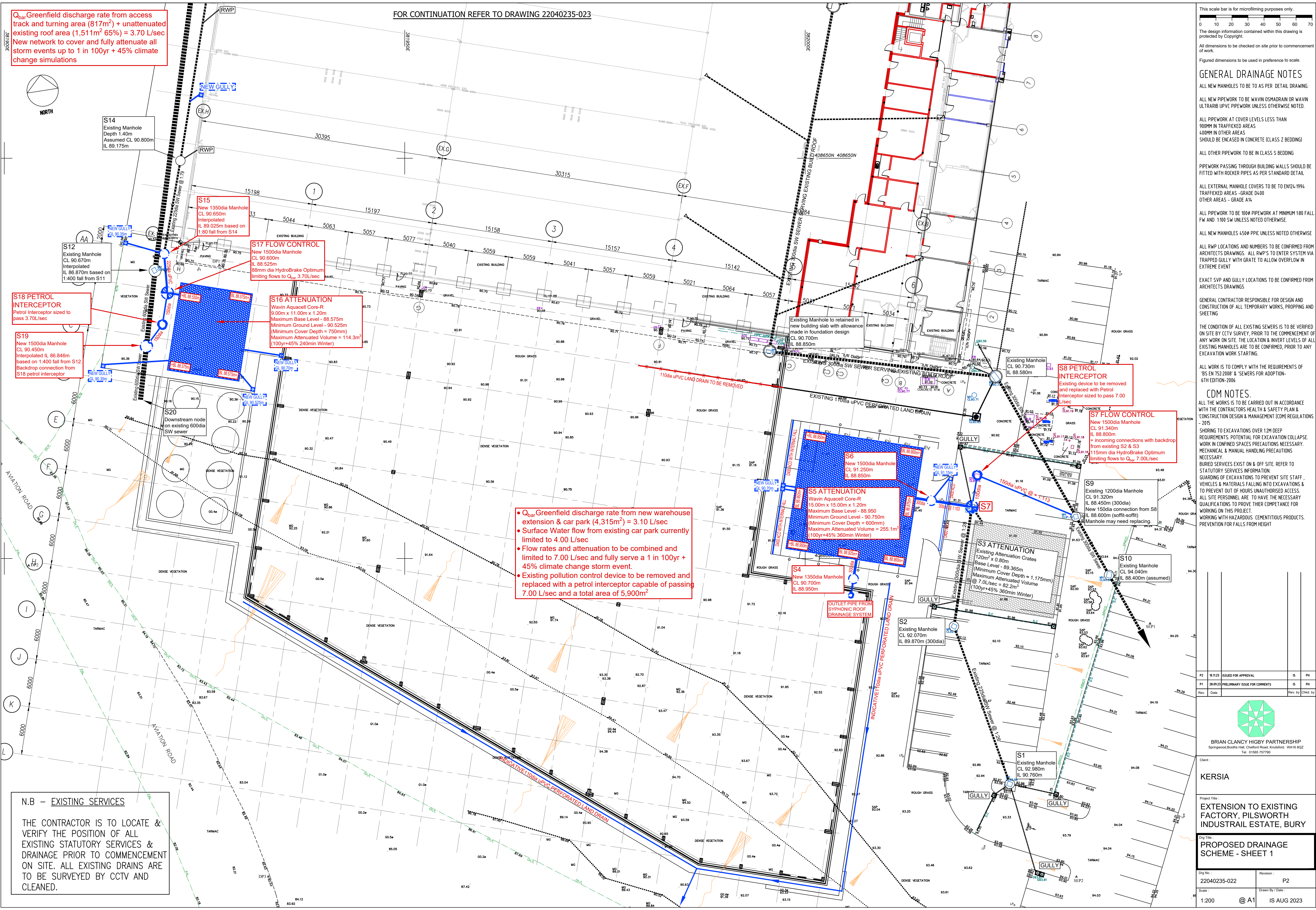
BRIAN CLANCY HIGBY PARTNERSHIP  
Springwood Borehole Hall, Chelwood Road, Knebworth, WATFORD, Herts. SG9 6JZ  
Tel: 01955 757790

Client:  
**KERSIA**

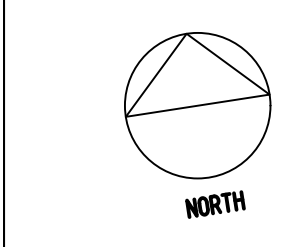
Project Title:  
**EXTENSION TO EXISTING FACTORY, PILSWORTH INDUSTRIAL ESTATE, BURY**

Drawn By:  
**EXISTING DRAINAGE SCHEME - SHEET 2**

|                           |                                      |
|---------------------------|--------------------------------------|
| Drawn By:<br>22040235-021 | Revision:<br>P1                      |
| Scale:<br>1:250           | Drawn By / Date:<br>@ A1 IS AUG 2023 |



$Q_{bar}$  Greenfield discharge rate from access track and turning area (817m<sup>2</sup>) + unattenuated existing roof area (1,511m<sup>2</sup> 65%) = 3.70 L/sec  
New network to cover and fully attenuate all storm events up to 1 in 100yr + 45% climate change simulations



FOR CONTINUATION REFER TO DRAWING 22040235-023

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### GENERAL DRAINAGE NOTES

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ALL NEW MANHOLES 450P PPIC UNLESS NOTED OTHERWISE

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### CDM NOTES.

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WORKING WITH HAZARDOUS CEMENTITIOUS PRODUCTS. PREVENTION FOR FALLS FROM HEIGHT

|     |          |                                |    |          |
|-----|----------|--------------------------------|----|----------|
| P2  | 16.11.23 | ISSUED FOR APPROVAL            | IS | PH       |
| P1  | 28.09.23 | PRELIMINARY ISSUE FOR COMMENTS | IS | PH       |
| Rev | Date     | Rev                            | by | CHK'd by |

BRIAN CLANCY HIGBY PARTNERSHIP  
Springwood Bloorha Hall, Chelwood Road, Knebworth, Herts SG5 2JZ  
Tel: 01585 757790

Client:

**KERSIA**

Project Title:

**EXTENSION TO EXISTING FACTORY, PILSWORTH INDUSTRIAL ESTATE, BURY**

Dwg Title:

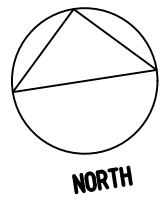
**PROPOSED DRAINAGE SCHEME - SHEET 1**

|         |              |                  |                  |
|---------|--------------|------------------|------------------|
| Dwg No: | 22040235-022 | Revision:        | P2               |
| Scale:  | 1:200        | Drawn By / Date: | @ A1 IS AUG 2023 |

**N.B - EXISTING SERVICES**

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•  $Q_{bar}$  Greenfield discharge rate from new warehouse extension & car park (4,315m<sup>2</sup>) = 3.10 L/sec  
• Surface Water flow from existing car park currently limited to 4.00 L/sec  
• Flow rates and attenuation to be combined and limited to 7.00 L/sec and fully serve a 1 in 100yr + 45% climate change storm event.  
• Existing pollution control device to be removed and replaced with a petrol interceptor capable of passing 7.00 L/sec and a total area of 5,900m<sup>2</sup>



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0 10 20 30 40 50 60 70  
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ALL PIPEWORK TO BE 100Ø PIPEWORK AT MINIMUM 180 FALL FW AND 1:100 SW UNLESS NOTED OTHERWISE.

ALL NEW MANHOLES 450Ø PPIC UNLESS NOTED OTHERWISE

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$Q_{bar}$  Greenfield discharge rate from access track and turning area (817m<sup>2</sup>) + unattenuated existing roof area (1,511m<sup>2</sup> 65%) = 3.70 L/sec  
New network to cover and fully attenuate all storm events up to 1 in 100yr + 45% climate change simulations

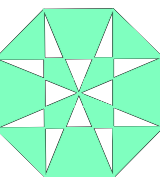
S14  
Existing Manhole  
Depth 1.40m  
Assumed CL 90.800m  
IL 89.175m

S11  
Existing Manhole  
Depth 2.52m  
Assumed CL 89.600m  
IL 87.080m

S13  
Existing Rodding Eye  
Assumed Depth 0.60m  
Assumed CL 90.500m  
IL 89.675m

FOR CONTINUATION REFER TO DRAWING 22040235-022

|     |          |                                |     |    |
|-----|----------|--------------------------------|-----|----|
|     |          |                                |     |    |
| P1  | 28.09.23 | PRELIMINARY ISSUE FOR COMMENTS | IS  | PH |
| Rev | Date     |                                | Rev | by |



BRIAN CLANCY HIGBY PARTNERSHIP  
Springwood Borehole Hall, Chelford Road, Knebworth, WATFOLDE  
Tel: 01585 757790

Client :

KERSIA

Project Title :

EXTENSION TO EXISTING  
FACTORY, PILSWORTH  
INDUSTRIAL ESTATE, BURY

Dwg Title :

PROPOSED DRAINAGE  
SCHEME - SHEET 2

Dwg No. :

22040235-023

Revision :

P1

Scale :

1:250 @ A1

Drawn By / Date :

IS AUG 2023

| SURFACE WATER NETWORK - Left (South West) Hand Side of Building |               |               |           |             |                  |                       |         |                    |         |         |        |
|-----------------------------------------------------------------|---------------|---------------|-----------|-------------|------------------|-----------------------|---------|--------------------|---------|---------|--------|
| Pipe Code                                                       | Diameter (mm) | Gradient (1:) | Pipe Type | Pipe Length | Upstream Manhole |                       |         | Downstream Manhole |         |         |        |
|                                                                 |               |               |           |             | Number           | Invert                | Cover   | Number             | Invert  | Cover   |        |
| 1.000                                                           | 600           | 400*          | EXISTING  | 83.899      | S11              | 87.080*               | 89.600* | S12                | 86.870* | 90.670* | 92.070 |
| 1.001                                                           | 600           | 397*          | EXISTING  | 9.523       | S12              | 86.870*               | 90.670* | S19                | 86.846* | 90.450* |        |
| 1.002                                                           | 600           | 394*          | EXISTING  | 6.702       | S19              | 86.846*               | 90.450* | S20                | 86.829* | 90.100* |        |
| 2.000                                                           | 225           | 112*          | EXISTING  | 55.984      | S13              | 89.675*               | 90.500* | S14                | 89.175* | 90.800* |        |
| 2.001                                                           | 225           | 79*           | EXISTING  | 11.791      | S14              | 89.175*               | 90.800* | S15                | 89.025* | 90.650  |        |
| 2.002                                                           | 225           | 10            | uPVC      | 4.914       | S15              | 89.025                | 90.650  | S17                | 88.525  | 90.600  |        |
| 2.003                                                           | 150           | 27            | uPVC      | 4.000       | S17              | 88.525                | 90.600  | S18                | 88.375  | 90.600  |        |
| 2.004                                                           | 150           | 68            | uPVC      | 3.380       | S18              | 88.375                | 90.600  | S19                | 88.325  | 90.450  |        |
| 3.000                                                           | 225           | 288           | uPVC      | 7.211       | S16              | 88.550                | 90.650  | S17                | 88.525  | 90.600  |        |
| * ASSUMED GRADIENTS                                             |               |               |           |             |                  | * INTERPOLATED LEVELS |         |                    |         |         |        |

| Manhole Number              | Cover Level     | Connections | Pipe |         |                  | Manhole Size                                                                                                                                                                                                                                                                                       | Types                                                                                                                                                               |            |                    |                   |
|-----------------------------|-----------------|-------------|------|---------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------|-------------------|
| Coordinates                 | Depth To Soffit |             | Code | Inverts | Diams            |                                                                                                                                                                                                                                                                                                    | Manhole                                                                                                                                                             | Cover      |                    |                   |
| S11<br>EXISTING MANHOLE     | 89.600*         |             |      |         |                  | EXISTING                                                                                                                                                                                                                                                                                           |                                                                                                                                                                     |            |                    |                   |
| E. 381929.830               | 1.920*          |             |      |         |                  |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                     |            |                    |                   |
| N. 408719.144               |                 |             | 0    | 1.000   | 87.080*          |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                     |            | 600                |                   |
| S12<br>EXISTING MANHOLE     | 90.670*         |             | 1    | 1.000   | 86.870*          | 600                                                                                                                                                                                                                                                                                                | EXISTING                                                                                                                                                            |            |                    |                   |
| E. 381918.828               | 3.200*          |             |      |         |                  |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                     |            |                    |                   |
| N. 408635.970               |                 |             | 0    | 1.001   | 86.870*          | 600                                                                                                                                                                                                                                                                                                |                                                                                                                                                                     |            |                    |                   |
| S13<br>EXISTING RODDING EYE | 90.500*         |             |      |         |                  | EXISTING                                                                                                                                                                                                                                                                                           |                                                                                                                                                                     |            |                    |                   |
| E. 381930.927               | 0.600*          |             |      |         |                  |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                     |            |                    |                   |
| N. 408704.960               |                 |             | 0    | 2.000   | 89.675*          |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                     |            | 225                |                   |
| S14<br>EXISTING MANHOLE     | 90.800*         |             | 1    | 2.000   | 89.175*          | 225                                                                                                                                                                                                                                                                                                | EXISTING                                                                                                                                                            |            |                    |                   |
| E. 381921.995               | 1.400           |             |      |         |                  |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                     |            |                    |                   |
| N. 408649.693               |                 |             | 0    | 2.001   | 89.175*          | 225                                                                                                                                                                                                                                                                                                |                                                                                                                                                                     |            |                    |                   |
| S15<br>NEW MANHOLE          | 90.650          |             | 1    | 2.001   | 89.025* EXISTING | 225                                                                                                                                                                                                                                                                                                | 1350                                                                                                                                                                | DCG Type C | D400<br>1220 x 665 |                   |
| E. 381919.958               | 1.400*          |             |      |         |                  |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                     |            |                    |                   |
| N. 408638.080               |                 |             | 0    | 2.002   | 89.025*          | 225                                                                                                                                                                                                                                                                                                |                                                                                                                                                                     |            |                    |                   |
| S16<br>ATTENUATION          | 90.650          |             |      |         |                  | Wavin Aquacell Core-R<br>9.00m x 11.00m x 1.20m<br>Maximum Base Level - 88.575m<br>Minimum Ground Level 90.525m<br>(Minimum Cover Depth = 750mm)<br>Max. Attenuated Volume = 114.3m³<br>(100yr+45% 240min Winter)<br>A minimum of 2 maintenance access points is required to the attenuation cells |                                                                                                                                                                     |            |                    |                   |
| E. 381925.679               | 1.875           |             |      |         |                  |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                     |            |                    |                   |
| N. 408628.305               |                 |             | 0    | 3.000   | 88.550           |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                     |            | 225                |                   |
| S17<br>FLOW CONTROL         | 90.600          |             | 1    | 3.000   | 88.525           | 225                                                                                                                                                                                                                                                                                                | HYDROBRAKE OPTIMUM FLOW CONTROL BY HYDRO INT.<br>88mm DIAMETER<br>MAX FLOW 3.7L/sec - HEAD 1.20m                                                                    | 1500       | DCG Type B         | D400<br>600 x 600 |
| E. 381920.368               | 1.850           |             | 2    | 2.002   | 88.525           | 225                                                                                                                                                                                                                                                                                                |                                                                                                                                                                     |            |                    |                   |
| N. 408633.183               | +400mm SUMP     |             | 0    | 2.003   | 88.525           | 150                                                                                                                                                                                                                                                                                                |                                                                                                                                                                     |            |                    |                   |
| S18<br>POLLUTION CONTROL    | 90.600          |             | 1    | 2.003   | 88.375 #         | 150                                                                                                                                                                                                                                                                                                | S18 PETROL INTERCEPTOR<br>Petrol Interceptor sized to pass 3.70L/sec<br><br># Invert level and fall across interceptor to be determined.<br>100mm drop allowed for. |            |                    |                   |
| E. 381919.751               | 2.000           |             |      |         |                  |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                     |            |                    |                   |
| N. 408629.231               |                 |             | 0    | 2.004   | 88.375 #         | 150                                                                                                                                                                                                                                                                                                |                                                                                                                                                                     |            |                    |                   |
| S19<br>NEW MANHOLE          | 90.450          |             | 1    | 2.004   | 88.325 BACK DROP | 150                                                                                                                                                                                                                                                                                                | 1500                                                                                                                                                                | DCG Type A | D400<br>600 x 600  |                   |
| E. 381917.749               | 3.004*          |             | 2    | 1.001   | 86.846* EXISTING | 600                                                                                                                                                                                                                                                                                                |                                                                                                                                                                     |            |                    |                   |
| N. 408626.508               |                 |             | 0    | 1.002   | EXISTING 86.846* | 600                                                                                                                                                                                                                                                                                                |                                                                                                                                                                     |            |                    |                   |
| S20<br>SW NODE              | 90.100          |             | 1    | 1.002   | 86.829*          | 600                                                                                                                                                                                                                                                                                                | EXISTING                                                                                                                                                            |            |                    |                   |
| E. 381917.008               | 2.671*          |             |      |         |                  |                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                     |            |                    |                   |
| N. 408619.847               |                 |             | 0    | 1.002   | 86.829*          | 600                                                                                                                                                                                                                                                                                                |                                                                                                                                                                     |            |                    |                   |

## S17 FLOW CONTROL

**Technical Specification**

| Control Point  | Head (m) | Flow (l/s) |
|----------------|----------|------------|
| Primary Design | 1.200    | 3.700      |
| Flush-Flo™     | 0.361    | 3.696      |
| Kick-Flo™      | 0.743    | 2.967      |
| Mean Flow      |          | 3.246      |

Hydro-Brake Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting bypass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet
- Indicative Weight: 10 kg

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

**DESIGN ADVICE**

The headflow characteristics of this SHE-0088-3700-1200-3700 Hydro-Brake Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full headflow characteristic curve. The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

|          |                  |                                                |
|----------|------------------|------------------------------------------------|
| DATE     | 24/10/2023 15:14 | SHE-0088-3700-1200-3700<br>Hydro-Brake Optimum |
| SITE     | Pilsworth        |                                                |
| DESIGNER | BCH              |                                                |
| REF      | LHS              |                                                |

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## S7 FLOW CONTROL

**Technical Specification**

| Control Point  | Head (m) | Flow (l/s) |
|----------------|----------|------------|
| Primary Design | 1.600    | 7.000      |
| Flush-Flo™     | 0.476    | 6.980      |
| Kick-Flo™      | 0.977    | 5.558      |
| Mean Flow      |          | 6.128      |

Hydro-Brake Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting bypass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet
- Indicative Weight: 20 kg

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

**DESIGN ADVICE**

The headflow characteristics of this SHE-0115-7000-1600-7000 Hydro-Brake Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full headflow characteristic curve. The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

|          |                  |                                                |
|----------|------------------|------------------------------------------------|
| DATE     | 24/10/2023 15:38 | SHE-0115-7000-1600-7000<br>Hydro-Brake Optimum |
| SITE     | Pilsworth        |                                                |
| DESIGNER | BCH              |                                                |
| REF      | RHS              |                                                |

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| SURFACE WATER NETWORK - Right (South East) Hand Side of Building |               |               |           |             |        |                         |        |                    |         |        |  |
|------------------------------------------------------------------|---------------|---------------|-----------|-------------|--------|-------------------------|--------|--------------------|---------|--------|--|
| Pipe Code                                                        | Diameter (mm) | Gradient (1:) | Pipe Type | Pipe Length | Number | Upstream Manhole Invert | Cover  | Downstream Manhole |         |        |  |
|                                                                  |               |               |           |             |        |                         |        | Number             | Invert  | Cover  |  |
| 1.000                                                            | 225           | 26            | EXISTING  | 20.872      | S1     | 90.760                  | 92.980 | S2                 | 89.945  | 92.070 |  |
| 1.001                                                            | 300           | 28            | EXISTING  | 15.100      | S2     | 89.870                  | 92.070 | S7                 | 89.340* | 91.340 |  |
| 1.002                                                            | 150           | 40            | uPVC      | 4.005       | S7     | 88.800                  | 91.340 | S8                 | 88.700  | 91.200 |  |
| 1.003                                                            | 150           | 133           | uPVC      | 13.345      | S8     | 88.700                  | 91.200 | S9                 | 88.600  | 91.320 |  |
| 1.004                                                            | 300           | 168           | EXISTING  | 8.406       | S9     | 88.450                  | 91.320 | S10                | 88.400* | 94.040 |  |
| 2.000                                                            | 300           | 377           | EXISTING  | 9.421       | S3     | 89.365                  | 91.450 | S7                 | 89.340* | 91.340 |  |
| 3.000                                                            | 300           | 223           | uPVC      | 11.153      | S4     | 88.950                  | 90.700 | S5                 | 88.900  | 91.100 |  |
| 3.001                                                            | 300           | 162           | uPVC      | 8.102       | S5     | 88.900                  | 91.100 | S6                 | 88.850  | 91.250 |  |
| 3.002                                                            | 300           | 103           | uPVC      | 5.126       | S6     | 88.850                  | 91.250 | S7                 | 88.800  | 91.340 |  |
| * ASSUMED LEVELS                                                 |               |               |           |             |        |                         |        |                    |         |        |  |

| Manhole Number             | Cover Level     | Connections | Pipe |         |          | Manhole Size | Types                                                                                                                                                                                                                                                                                               |                                      |
|----------------------------|-----------------|-------------|------|---------|----------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
|                            | Depth To Soffit |             | Code | Inverts | Diams    |              | Manhole                                                                                                                                                                                                                                                                                             | Cover                                |
| S1<br>EXISTING MANHOLE     | 92.980          |             |      |         |          |              | EXISTING                                                                                                                                                                                                                                                                                            |                                      |
| E. 382025.554              | 1.995           |             |      |         |          |              |                                                                                                                                                                                                                                                                                                     |                                      |
| N. 408571.850              |                 |             | 0    | 1.000   | 90.760   | 225          |                                                                                                                                                                                                                                                                                                     |                                      |
| S2<br>EXISTING MANHOLE     | 92.070          |             | 1    | 1.000   | 89.945   | 225          | EXISTING                                                                                                                                                                                                                                                                                            |                                      |
| E. 382018.582              | 1.900           |             |      |         |          |              |                                                                                                                                                                                                                                                                                                     |                                      |
| N. 408591.523              |                 |             | 0    | 1.001   | 89.870   | 300          |                                                                                                                                                                                                                                                                                                     |                                      |
| S3<br>EXISTING ATTENUATION | 91.450          |             |      |         |          |              | S3 ATTENUATION<br>Existing Attenuation Crates<br>120m² x 0.80m<br>Base Level - 89.365m<br>(Minimum Cover Depth = 1,175mm)<br>Maximum Attenuated Volume @ 7.0L/sec = 82.2m³<br>(100yr+45% 360min Winter)                                                                                             |                                      |
| E. 382026.102              | 1.785           |             |      |         |          |              |                                                                                                                                                                                                                                                                                                     |                                      |
| N. 408598.651              |                 |             | 0    | 2.000   | 89.365   | 300          |                                                                                                                                                                                                                                                                                                     |                                      |
| S4<br>NEW MANHOLE          | 90.700          |             |      |         |          |              | 1350                                                                                                                                                                                                                                                                                                | DCG Type C<br><br>D400<br>1220 x 665 |
| E. 382006.031              | 1.450           |             |      |         |          |              |                                                                                                                                                                                                                                                                                                     |                                      |
| N. 408597.461              |                 |             | 0    | 3.000   | 88.950   | 300          |                                                                                                                                                                                                                                                                                                     |                                      |
| S5<br>ATTENUATION          | 91.100          |             | 1    | 3.000   | 88.900   | 300          | Wavin Aquacell Core-R<br>15.00m x 15.00m x 1.20m<br>Maximum Base Level - 88.950<br>Minimum Ground Level - 90.750m<br>(Minimum Cover Depth = 600mm)<br>Max Attenuated Volume = 255.1m³<br>(100yr+45% 360min Winter)<br>A minimum of 2 maintenance access points is required to the attenuation cells |                                      |
| E. 382007.753              | 1.900           |             |      |         |          |              |                                                                                                                                                                                                                                                                                                     |                                      |
| N. 408608.480              |                 |             | 0    | 3.001   | 88.900   | 300          |                                                                                                                                                                                                                                                                                                     |                                      |
| S6<br>NEW MANHOLE          | 91.250          |             | 1    | 3.001   | 88.850   | 300          | 1500                                                                                                                                                                                                                                                                                                | DCG Type B<br><br>D400<br>600 x 600  |
| E. 382015.758              | 2.100           |             |      |         |          |              |                                                                                                                                                                                                                                                                                                     |                                      |
| N. 408607.229              |                 |             | 0    | 3.002   | 88.850   | 300          |                                                                                                                                                                                                                                                                                                     |                                      |
| S7<br>FLOW CONTROL         | 91.340          |             | 1    | 3.002   | 88.800   | 300          | HYDROBRAKE OPTIMUM FLOW CONTROL BY HYDRO INT.<br>115mm DIAMETER<br>MAX FLOW 7.0L/sec - HEAD 1.60m                                                                                                                                                                                                   |                                      |
| E. 382020.825              | 2.390           |             | 2    | 1.001   | 89.340*  | 300          | 1500                                                                                                                                                                                                                                                                                                | DCG Type B<br><br>D400<br>600 x 600  |
| N. 408606.455              |                 |             | 3    | 2.000   | 89.340*  | 300          |                                                                                                                                                                                                                                                                                                     |                                      |
|                            | +450mm SUMP     |             | 0    | 1.002   | 88.800   | 150          |                                                                                                                                                                                                                                                                                                     |                                      |
| S8<br>POLLUTION CONTROL    | 91.200          |             | 1    | 1.002   | 88.700 # | 150          | S8 PETROL INTERCEPTOR<br>Existing pollution control device to be removed.<br>New Petrol Interceptor sized to pass 7.00L/sec<br><br># Invert level and fall across interceptor to be determined.<br>100mm drop allowed for.                                                                          |                                      |
| E. 382021.490              | 2.350           |             |      |         |          |              |                                                                                                                                                                                                                                                                                                     |                                      |
| N. 408610.404              |                 |             | 0    | 1.003   | 88.700 # | 150          |                                                                                                                                                                                                                                                                                                     |                                      |
| S9<br>EXISTING MANHOLE     | 91.320          |             | 1    | 1.003   | 88.600   | 150          | EXISTING                                                                                                                                                                                                                                                                                            |                                      |
| E. 382033.802              | 2.570           |             |      |         |          |              |                                                                                                                                                                                                                                                                                                     |                                      |
| N. 408605.255              |                 |             | 0    | 1.004   | 88.450   | 300          |                                                                                                                                                                                                                                                                                                     |                                      |
| S10<br>EXISTING MANHOLE    | 94.040          |             | 1    | 1.004   | 88.400*  | 300          | EXISTING                                                                                                                                                                                                                                                                                            |                                      |
| E. 382037.943              | 5.340           |             |      |         |          |              |                                                                                                                                                                                                                                                                                                     |                                      |
| N. 408597.940              |                 |             | 0    |         | 88.400*  | 300          |                                                                                                                                                                                                                                                                                                     |                                      |

This scale bar is for microfilming purposes only.

0 10 20 30 40 50 60 70  
The design information contained within this drawing is protected by Copyright.

All dimensions to be checked on site prior to commencement of work.

Figured dimensions to be used in preference to scale.

## GENERAL DRAINAGE NOTES

ALL NEW MANHOLES TO BE TO AS PER DETAIL DRAWING.

ALL NEW PIPEWORK TO BE WAVIN OSMDRAIN OR WAVIN ULTRARIB UPVC PIPEWORK UNLESS OTHERWISE NOTED.

ALL PIPEWORK AT COVER LEVELS LESS THAN 900MM IN TRAFFICKED AREAS  
400MM IN OTHER AREAS  
SHOULD BE ENCASED IN CONCRETE (CLASS 2 BEDDING)

ALL OTHER PIPEWORK TO BE IN CLASS 5 BEDDING

PIPEWORK PASSING THROUGH BUILDING WALLS SHOULD BE FITTED WITH ROCKER PIPES AS PER STANDARD DETAIL

ALL EXTERNAL MANHOLE COVERS TO BE TO EN124:1994 TRAFFICKED AREAS - GRADE D400  
OTHER AREAS - GRADE A14

ALL PIPEWORK TO BE 100Ø PIPEWORK AT MINIMUM 180 FALL FW AND 1:100 SW UNLESS NOTED OTHERWISE.

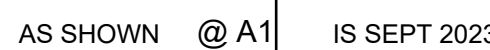
ALL NEW MANHOLES 450Ø PPIC UNLESS NOTED OTHERWISE

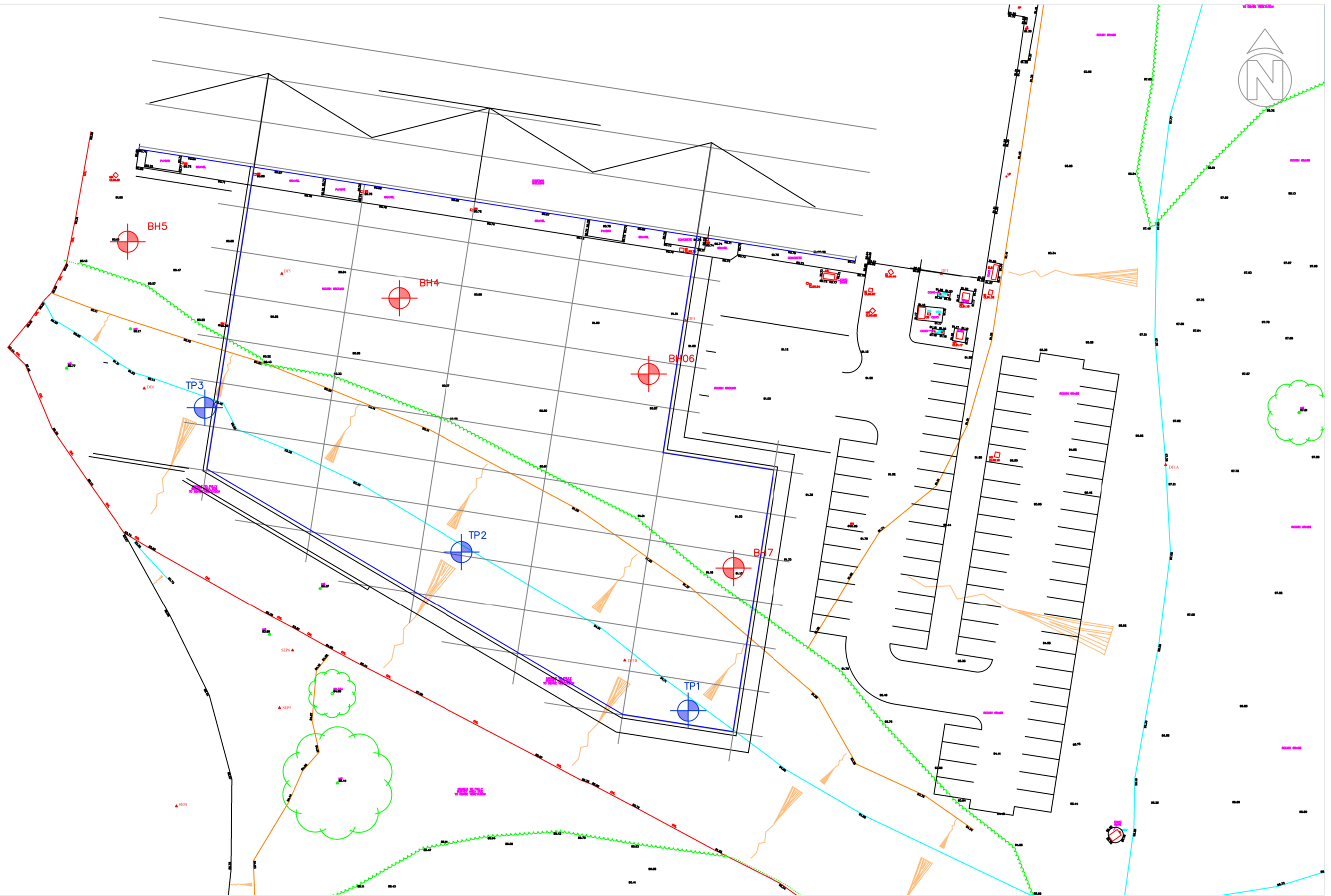
ALL RWP LOCATIONS AND NUMBERS TO BE CONFIRMED FROM ARCHITECTS DRAWINGS. ALL RWP'S TO ENTER SYSTEM VIA TRAPPED GULLY WITH GRATE TO ALLOW OVERFLOW IN EXTREME EVENT

EXACT SWP AND GULLY LOCATIONS TO BE CONFIRMED FROM ARCHITECTS DRAWINGS

GENERAL CONTRACTOR RESPONSIBLE FOR DESIGN AND CONSTRUCTION OF ALL TEMPORARY WORKS, PROPPING AND SHEETING

THE CONDITION OF ALL EXISTING SEWERS IS TO BE VERIFIED ON SITE BY CCTV SURVEY, PRIOR TO THE COMMENCEMENT OF ANY WORK ON SITE. THE LOCATION & INVERT LEVELS OF ALL EXISTING MANHOLES ARE TO BE CONFIRMED,





GROUNDTECH  
CONSULTING



CLIENT

BRIAN CLANCY HIGBY PARTNERSHIP LTD

PROJECT TITLE

HOLCHEM

PLAN TITLE

EXPLORATORY HOLE LOCATION PLAN

DATE

JUNE 2022

SCALE

NTS

PLAN NUMBER

GRO-22216-DRAFT

|      |         |      |
|------|---------|------|
|      |         |      |
|      |         |      |
|      |         |      |
| Rev. | Details | Date |

Status

Preliminary

Draft

Issued

For Comment

Approved

Notes

-  Approximate position of cable percussion boreholes
-  Approximate position of hand dug trial holes





GROUNDTECH  
CONSULTING

# Borehole Log

Borehole No.

**BH4**

Sheet 1 of 2

Project Name: HOLCHEM

Project No.  
22216

Co-ords: -

Hole Type  
CP

Location: BURY

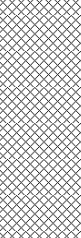
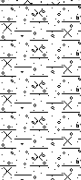
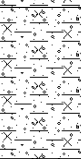
Level:

Scale  
1:50

Client: BRIAN CLANCY HIGBY PARTNERSHIP

Dates: 15/06/2022 - 16/06/2022

Logged By  
JOD

| Well                                                                               | Water Strikes                                                                       | Samples and In Situ Testing |      |                    | Depth (m) | Level (m) | Legend                                                                              | Stratum Description                                                                                                       |    |
|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-----------------------------|------|--------------------|-----------|-----------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|----|
|                                                                                    |                                                                                     | Depth (m)                   | Type | Results            |           |           |                                                                                     |                                                                                                                           |    |
|  |  | 0.50                        | D    |                    | 0.50      |           |    | MADE GROUND: Sandy sandstone cobbles. Sand is fine to coarse.                                                             |    |
|                                                                                    |                                                                                     | 0.50                        | ES   |                    | 0.70      |           |    | MADE GROUND: Firm brown sandy silty clay. Sand is fine to coarse.                                                         |    |
|                                                                                    |                                                                                     | 1.00                        | D    |                    |           |           |    | MADE GROUND: Firm dark brown clayey slightly gravelly sand. Sand is coarse. Gravels are rounded to subrounded and coarse. | 1  |
|                                                                                    |                                                                                     | 1.20                        |      | N=23 (1,2/5,7,4,7) |           |           |                                                                                     |                                                                                                                           |    |
|                                                                                    |                                                                                     | 1.50                        | ES   |                    |           |           |                                                                                     |                                                                                                                           |    |
|                                                                                    |                                                                                     | 2.00                        |      | N=11 (1,2/2,3,2,4) |           |           |                                                                                     |                                                                                                                           | 2  |
|                                                                                    |                                                                                     | 2.60                        | D    |                    | 2.50      |           |    | Firm brown sandy gravelly CLAY. Sand is fine to coarse. Gravels are subrounded to rounded and fine.                       |    |
|                                                                                    |                                                                                     | 3.00                        | ES   |                    |           |           |                                                                                     |                                                                                                                           | 3  |
|                                                                                    |                                                                                     | 3.00                        |      | N=11 (1,1/2,2,3,4) |           |           |                                                                                     |                                                                                                                           |    |
|                                                                                    |                                                                                     | 3.00 - 3.45                 | B    |                    |           |           |                                                                                     |                                                                                                                           |    |
|                                                                                    |                                                                                     | 4.00                        |      | N=13 (1,2/3,3,3,4) |           |           |                                                                                     |                                                                                                                           | 4  |
|                                                                                    |                                                                                     | 5.00                        |      | N=17 (2,3/4,4,4,5) | 5.10      |           |                                                                                     |                                                                                                                           | 5  |
|                                                                                    |                                                                                     | 5.00 - 5.45                 | B    |                    |           |           |  | Grey brown silty gravelly SAND. Sand is fine to coarse. Gravels are rounded to subrounded and fine.                       |    |
|                                                                                    |                                                                                     | 6.00 - 6.45                 | U    |                    |           |           |                                                                                     |                                                                                                                           | 6  |
|                                                                                    |                                                                                     | 6.50                        | D    |                    | 6.40      |           |  | Grey silty gravelly SAND. Sand is fine to coarse. Gravels are rounded to subrounded and fine.                             |    |
|                                                                                    |                                                                                     | 7.00                        |      | N=18 (1,3/4,4,4,6) |           |           |                                                                                     |                                                                                                                           | 7  |
|                                                                                    |                                                                                     | 7.00 - 7.45                 | B    |                    |           |           |                                                                                     |                                                                                                                           |    |
|                                                                                    |                                                                                     |                             |      |                    | 7.80      |           |  | Firm dark brown sandy silty gravelly CLAY. Sand is fine. Gravels are subrounded to rounded and fine.                      | 8  |
|                                                                                    |                                                                                     | 8.50 - 8.95                 | U    |                    |           |           |                                                                                     |                                                                                                                           |    |
|                                                                                    |                                                                                     | 9.00                        | D    |                    | 9.00      |           |  | Firm dark brown sandy silty slightly gravelly CLAY. Sand is fine. Gravels are subrounded to rounded and firm              | 9  |
|                                                                                    |                                                                                     | 10.00 - 10.45               | B    |                    | 10.00     |           |                                                                                     |                                                                                                                           | 10 |

Continued on next sheet

## Remarks

1. Location scanned for utilities. 2. Hand dug inspection pit to 1.3m bgl. 3. Groundwater encountered at 7m and 8m bgl. 4. Standpipe installed to 3m, 1m plain, 2m slotted. 5. Backfilled with gravels, bentonite and postcrete around the cap.





GROUNDTECH  
CONSULTING

# Borehole Log

Borehole No.

**BH4**

Sheet 2 of 2

Project Name: HOLCHEM

Project No.  
22216

Co-ords: -

Hole Type  
CP

Location: BURY

Level:

Scale  
1:50

Client: BRIAN CLANCY HIGBY PARTNERSHIP

Dates: 15/06/2022 - 16/06/2022

Logged By  
JOD

| Well | Water Strikes | Samples and In Situ Testing |      |                           | Depth (m) | Level (m) | Legend | Stratum Description                                                                                                                                       |    |
|------|---------------|-----------------------------|------|---------------------------|-----------|-----------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----|
|      |               | Depth (m)                   | Type | Results                   |           |           |        |                                                                                                                                                           |    |
|      |               | 11.50 - 11.95               | U    |                           |           |           |        | Soft to firm brown silty CLAY.                                                                                                                            | 11 |
|      |               |                             |      |                           |           |           |        |                                                                                                                                                           | 12 |
|      |               | 13.00<br>13.00 - 13.45      | B    | N=17 (2,3/3,4,4,6)        | 13.00     |           |        | Firm brown silty CLAY.                                                                                                                                    | 13 |
|      |               |                             |      |                           | 14.00     |           |        |                                                                                                                                                           | 14 |
|      |               | 14.50                       |      | N=26 (3,3/4,5,7,10)       |           |           |        | Fine brown clayey silty SAND. Sand is fine to coarse.                                                                                                     | 15 |
|      |               |                             |      |                           | 15.10     |           |        |                                                                                                                                                           | 16 |
|      |               | 15.50 - 15.95               | B    |                           | 15.70     |           |        | Fine brown sandy GRAVELS. Sand is fine to coarse. Gravels are rounded to subrounded, fine to coarse. Mixed lithologies some siltstone and sandstone.      | 17 |
|      |               |                             |      |                           |           |           |        | Firm brown sandy gravelly CLAY. Sand is fine. Gravels are rounded and fine.                                                                               | 18 |
|      |               | 17.00<br>17.00 - 17.45      | B    | N=36 (4,5/5,7,10,14)      | 17.00     |           |        | Firm brown sandy gravelly CLAY. Sand is fine. Gravels are rounded to subrounded, fine to coarse. Mixed lithologies some siltstone and sandstone.          | 19 |
|      |               |                             |      |                           |           |           |        |                                                                                                                                                           | 20 |
|      |               | 18.50                       |      | N=50<br>(4,5/10,14,16,10) | 18.50     |           |        | Firm to stiff brown sandy gravelly CLAY. Sand is fine to coarse. Gravels are subrounded to rounded and coarse. Mixed lithologies siltstone and sandstone. | 20 |
|      |               | 19.50                       |      | N=43<br>(5,4/6,10,10,17)  |           |           |        |                                                                                                                                                           |    |
|      |               |                             |      |                           | 20.00     |           |        | End of borehole at 20.00 m                                                                                                                                |    |

## Remarks

1. Location scanned for utilities. 2. Hand dug inspection pit to 1.3m bgl. 3. Groundwater encountered at 7m and 8m bgl. 4. Standpipe installed to 3m, 1m plain, 2m slotted. 5. Backfilled with gravels, bentonite and postcrete around the cap.





GROUNDTECH  
CONSULTING

# Borehole Log

Borehole No.

**BH5**

Sheet 1 of 2

Project Name: HOLCHEM

Project No.  
22216

Co-ords: -

Hole Type  
CP

Location: BURY

Level:

Scale  
1:50

Client: BRIAN CLANCY HIGBY PARTNERSHIP

Dates: 14/06/2022 - 15/06/2022

Logged By  
JOD

| Well | Water Strikes | Samples and In Situ Testing |      |                    | Depth (m) | Level (m) | Legend | Stratum Description                                                                                                        |    |
|------|---------------|-----------------------------|------|--------------------|-----------|-----------|--------|----------------------------------------------------------------------------------------------------------------------------|----|
|      |               | Depth (m)                   | Type | Results            |           |           |        |                                                                                                                            |    |
|      |               | 0.00 - 0.70                 | B    |                    | 0.30      |           |        | MADE GROUND: Brown clayey sandy topsoil. Sand is fine.                                                                     |    |
|      |               | 0.50                        | ES   |                    | 0.70      |           |        | MADE GROUND: Brown clayey sandy sandstone cobbles. Sand is fine to coarse.                                                 |    |
|      |               | 1.20                        | D    | N=12 (2,1/3,2,3,4) |           |           |        | MADE GROUND: Firm brown silty sandy clay. Sand is fine.                                                                    | 1  |
|      |               | 1.20                        |      |                    |           |           |        |                                                                                                                            |    |
|      |               | 1.20 - 1.65                 | B    |                    |           |           |        |                                                                                                                            |    |
|      |               | 2.00                        | ES   | N=6 (1,1/2,1,2,1)  |           |           |        |                                                                                                                            | 2  |
|      |               | 2.00                        |      |                    |           |           |        |                                                                                                                            |    |
|      |               | 2.00 - 2.45                 | B    |                    |           |           |        |                                                                                                                            |    |
|      |               | 3.00                        | ES   | N=15 (2,2/3,4,4,4) |           |           |        |                                                                                                                            | 3  |
|      |               | 3.00                        |      |                    |           |           |        |                                                                                                                            |    |
|      |               | 3.00 - 3.45                 | B    |                    |           |           |        |                                                                                                                            |    |
|      |               | 4.00                        | ES   | N=14 (2,3/3,3,4,4) |           |           |        |                                                                                                                            | 4  |
|      |               | 4.00 - 4.45                 | U    |                    |           |           |        |                                                                                                                            |    |
|      |               | 4.50                        | D    |                    |           |           |        |                                                                                                                            |    |
|      |               | 5.00                        |      |                    |           |           |        |                                                                                                                            |    |
|      |               | 5.00 - 5.45                 | B    |                    | 5.00      |           |        | Firm to stiff brown occasionally gravelly CLAY. Gravels are subangular to subrounded, fine to coarse.                      | 5  |
|      |               | 6.00                        |      | N=10 (1,2/2,2,3,3) |           |           |        | Firm brown silty CLAY.                                                                                                     | 6  |
|      |               | 6.00 - 6.45                 | B    |                    | 5.70      |           |        |                                                                                                                            |    |
|      |               | 7.00                        |      | N=10 (1,1/1,2,3,4) |           |           |        |                                                                                                                            | 7  |
|      |               | 7.50 - 7.95                 | B    |                    | 7.50      |           |        |                                                                                                                            |    |
|      |               | 8.70                        |      |                    |           |           |        | Firm to stiff brown sandy Clay. Sand is fine.                                                                              | 9  |
|      |               | 9.00                        |      | N=17 (3,3/3,4,4,6) |           |           |        |                                                                                                                            |    |
|      |               | 9.00 - 9.45                 | B    |                    | 9.00      |           |        | Stiff brown sandy CLAY. Sand is fine.                                                                                      |    |
|      |               | 9.45                        |      |                    |           |           |        |                                                                                                                            |    |
|      |               |                             |      |                    |           |           |        | Firm brown gravelly CLAY with sandy bands. Sand is fine. Gravels rounded to subrounded, fine to coarse. Mixed lithologies. | 10 |

Continued on next sheet

## Remarks

1. Location scanned for utilities. 2. Hand dug inspection pit to 1.3m bgl. 3. Groundwater encountered at 12m bgl. 4. Standpipe installed to 7m, 3m plain, 4m slotted. 5. Backfilled with gravels, bentonite and postcrete around the cap.





GROUNDTECH  
CONSULTING

# Borehole Log

Borehole No.

**BH5**

Sheet 2 of 2

Project Name: HOLCHEM

Project No.  
22216

Co-ords: -

Hole Type  
CP

Location: BURY

Level:

Scale  
1:50

Client: BRIAN CLANCY HIGBY PARTNERSHIP

Dates: 14/06/2022 - 15/06/2022

Logged By  
JOD

| Well | Water Strikes | Samples and In Situ Testing |      |                     | Depth (m) | Level (m) | Legend | Stratum Description                                                                                                                           |    |
|------|---------------|-----------------------------|------|---------------------|-----------|-----------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------|----|
|      |               | Depth (m)                   | Type | Results             |           |           |        |                                                                                                                                               |    |
|      |               | 10.50<br>10.50 - 10.95      | B    | N=17 (3,3/4,4,4,5)  | 10.20     |           |        | Silty sandy GRAVELS and COBBLES. Sand is fine. Gravels are rounded to subrounded, fine to coarse. Mixed lithologies sandstone and siltstone.  | 11 |
|      |               | 12.00<br>12.00 - 12.45      | B    | N=22 (2,2/3,4,5,10) | 12.00     |           |        | Brown sandy GRAVELS. Sand is fine to coarse. Gravels are rounded to subrounded, fine to coarse. Mixed lithologies of siltstone and sandstone. | 12 |
|      |               | 13.50<br>13.50 - 13.95      | B    | N=25 (4,4/5,5,7,8)  |           |           |        |                                                                                                                                               | 13 |
|      |               | 15.00                       |      | N=28 (4,4/5,7,8,8)  | 15.00     |           |        | End of borehole at 15.00 m                                                                                                                    | 14 |
|      |               |                             |      |                     |           |           |        |                                                                                                                                               | 15 |
|      |               |                             |      |                     |           |           |        |                                                                                                                                               | 16 |
|      |               |                             |      |                     |           |           |        |                                                                                                                                               | 17 |
|      |               |                             |      |                     |           |           |        |                                                                                                                                               | 18 |
|      |               |                             |      |                     |           |           |        |                                                                                                                                               | 19 |
|      |               |                             |      |                     |           |           |        |                                                                                                                                               | 20 |

## Remarks

1. Location scanned for utilities. 2. Hand dug inspection pit to 1.3m bgl. 3. Groundwater encountered at 12m bgl. 4. Standpipe installed to 7m, 3m plain, 4m slotted. 5. Backfilled with gravels, bentonite and postcrete around the cap.





GROUNDTECH  
CONSULTING

# Borehole Log

Borehole No.

**BH6**

Sheet 1 of 2

Project Name: HOLCHEM

Project No.  
22216

Co-ords: -

Hole Type  
CP

Location: BURY

Level:

Scale  
1:50

Client: BRIAN CLANCY HIGBY PARTNERSHIP

Dates: 17/06/2022 - 20/06/2022

Logged By  
JOD

| Well | Water Strikes | Samples and In Situ Testing |      |                    | Depth (m) | Level (m) | Legend | Stratum Description                                                                                                                                                                       |    |
|------|---------------|-----------------------------|------|--------------------|-----------|-----------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
|      |               | Depth (m)                   | Type | Results            |           |           |        |                                                                                                                                                                                           |    |
|      |               | 0.50                        | D    |                    | 0.50      |           |        | MADE GROUND: Dark brown slightly sandy topsoil. Sand is fine.                                                                                                                             |    |
|      |               | 0.50                        | ES   |                    |           |           |        | MADE GROUND: Clayey gravelly sand. Sand is coarse. Gravels are subrounded to subangular, and coarse. Mixed lithologies.                                                                   |    |
|      |               | 1.00                        | D    |                    | 1.00      |           |        | MADE GROUND: Clayey gravelly sand with occasional cobbles. Sand is coarse. Gravels are rounded to subrounded, and coarse. Mixed lithologies including sandstone and some brick fragments. | 1  |
|      |               | 1.20                        |      | N=10 (1,2/3,2,2,3) |           |           |        |                                                                                                                                                                                           |    |
|      |               | 1.50                        | ES   |                    |           |           |        |                                                                                                                                                                                           |    |
|      |               | 2.00                        |      | N=9 (1,1/2,1,3,3)  |           |           |        |                                                                                                                                                                                           | 2  |
|      |               | 2.20                        | ES   |                    |           |           |        |                                                                                                                                                                                           |    |
|      |               | 3.00                        |      | N=15 (2,2/2,4,4,5) |           |           |        |                                                                                                                                                                                           | 3  |
|      |               | 3.00 - 3.45                 | B    |                    | 3.30      |           |        |                                                                                                                                                                                           |    |
|      |               | 4.00                        |      | N=13 (2,3/2,3,4,4) |           |           |        |                                                                                                                                                                                           | 4  |
|      |               | 4.00 - 4.45                 | B    |                    |           |           |        |                                                                                                                                                                                           |    |
|      |               | 5.00                        |      | N=16 (2,2/3,4,4,5) | 5.00      |           |        |                                                                                                                                                                                           | 5  |
|      |               | 5.00 - 5.45                 | B    |                    |           |           |        |                                                                                                                                                                                           |    |
|      |               | 6.50                        |      | N=13 (2,3/2,4,3,4) | 6.50      |           |        |                                                                                                                                                                                           | 6  |
|      |               |                             |      |                    |           |           |        |                                                                                                                                                                                           |    |
|      |               | 8.00                        |      | N=9 (1,2/1,3,2,3)  |           |           |        |                                                                                                                                                                                           | 8  |
|      |               | 8.00 - 8.45                 | B    |                    |           |           |        |                                                                                                                                                                                           |    |
|      |               | 8.50 - 8.70                 | B    |                    | 8.50      |           |        |                                                                                                                                                                                           |    |
|      |               |                             |      |                    | 8.70      |           |        | Firm to stiff, clayey PEAT. Fragments of wood and vegetation.                                                                                                                             |    |
|      |               | 9.00 - 9.45                 | U    |                    |           |           |        | Firm to stiff brown sandy CLAY. Sand is fine.                                                                                                                                             | 9  |
|      |               | 9.50                        | D    |                    | 9.50      |           |        | Stiff mottled brown grey CLAY.                                                                                                                                                            |    |
|      |               |                             |      |                    |           |           |        |                                                                                                                                                                                           | 10 |

Continued on next sheet

## Remarks

1. Location scanned for utilities. 2. Hand dug inspection pit to 1.3m bgl. 3. Groundwater encountered at 12m and 14.5m bgl. 4. Backfilled with arisings.





GROUNDTECH  
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# Borehole Log

Borehole No.

**BH6**

Sheet 2 of 2

Project Name: HOLCHEM

Project No.  
22216

Co-ords: -

Hole Type  
CP

Location: BURY

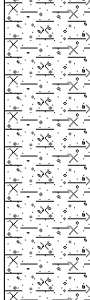
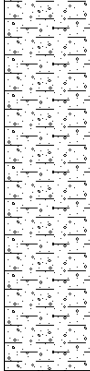
Level:

Scale  
1:50

Client: BRIAN CLANCY HIGBY PARTNERSHIP

Dates: 17/06/2022 - 20/06/2022

Logged By  
JOD

| Well                                                                               | Water Strikes | Samples and In Situ Testing |      |                    | Depth (m)                                                                         | Level (m)                  | Legend                                                                             | Stratum Description                                                                                           |    |
|------------------------------------------------------------------------------------|---------------|-----------------------------|------|--------------------|-----------------------------------------------------------------------------------|----------------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|----|
|                                                                                    |               | Depth (m)                   | Type | Results            |                                                                                   |                            |                                                                                    |                                                                                                               |    |
|  |               | 10.50<br>10.50 - 10.95      | B    | N=21 (3,5/4,4,5,8) | 10.50                                                                             |                            |   | Stiff brown sandy gravelly silty CLAY. Sand is fine to coarse. Gravels are rounded to subrounded, and coarse. | 11 |
|                                                                                    |               | 12.00                       | U    |                    |  |                            | 12                                                                                 |                                                                                                               |    |
|                                                                                    |               | 12.50                       | D    |                    | 12.50                                                                             |                            |  | Firm brown sandy gravelly CLAY. Sand is fine to coarse. Gravels are subrounded to subangular, and coarse.     | 13 |
|                                                                                    |               | 13.50<br>13.50 - 13.95      | B    | N=17 (3,4/4,4,4,5) |                                                                                   |                            |                                                                                    | 14                                                                                                            |    |
|                                                                                    |               | 14.50                       |      | N=21 (3,4/4,5,6,6) |                                                                                   |                            |                                                                                    | 15                                                                                                            |    |
|                                                                                    |               |                             |      | 15.00              |                                                                                   | End of borehole at 15.00 m |                                                                                    | 15                                                                                                            |    |
|                                                                                    |               |                             |      |                    |                                                                                   |                            |                                                                                    |                                                                                                               | 16 |
|                                                                                    |               |                             |      |                    |                                                                                   |                            |                                                                                    |                                                                                                               | 17 |
|                                                                                    |               |                             |      |                    |                                                                                   |                            |                                                                                    |                                                                                                               | 18 |
|                                                                                    |               |                             |      |                    |                                                                                   |                            |                                                                                    |                                                                                                               | 19 |
|                                                                                    |               |                             |      |                    |                                                                                   |                            |                                                                                    |                                                                                                               | 20 |

**Remarks**

1. Location scanned for utilities. 2. Hand dug inspection pit to 1.3m bgl. 3. Groundwater encountered at 12m and 14.5m bgl. 4. Backfilled with arisings.





GROUNDTECH  
CONSULTING

# Borehole Log

Borehole No.

**BH7**

Sheet 1 of 2

Project Name: HOLCHEM

Project No.  
22216

Co-ords: -

Hole Type  
CP

Location: BURY

Level:

Scale  
1:50

Client: BRIAN CLANCY HIGBY PARTNERSHIP

Dates: 13/06/2022 - 14/06/2022

Logged By  
JOD

| Well | Water Strikes | Samples and In Situ Testing |      |                    | Depth (m) | Level (m) | Legend | Stratum Description                                                                                                                                                |    |
|------|---------------|-----------------------------|------|--------------------|-----------|-----------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
|      |               | Depth (m)                   | Type | Results            |           |           |        |                                                                                                                                                                    |    |
|      |               | 0.25                        |      |                    | 0.25      |           |        | MADE GROUND: Dark brown slightly sandy topsoil.                                                                                                                    |    |
|      |               | 0.50                        | D    |                    | 0.50      |           |        | MADE GROUND: Firm brown sandy gravelly Clay. Sand is fine. Gravels are rounded to subrounded and fine.                                                             |    |
|      |               | 0.50                        | ES   |                    |           |           |        |                                                                                                                                                                    |    |
|      |               | 1.00                        | D    |                    | 1.00      |           |        | MADE GROUND: Firm stiff dark brown sandy gravelly clay. Sand is fine. Gravel are subrounded to rounded, and fine. Mixed lithologies sandstone and brick fragments. | 1  |
|      |               | 1.20                        |      | N=6 (1,2/1,2,1,2)  |           |           |        |                                                                                                                                                                    |    |
|      |               | 1.50                        | ES   |                    | 1.40      |           |        | MADE GROUND: Firm stiff dark brown sandy gravelly clay. Sand is fine. Gravel are subrounded to rounded, fine to coarse. Mixed lithologies sandstone.               |    |
|      |               | 2.00                        |      | N=9 (1,2/2,1,2,4)  |           |           |        | MADE GROUND: Firm dark brown sandy gravelly clay. Sand is fine to coarse. Gravels are subangular to subrounded and coarse                                          | 2  |
|      |               | 3.00                        | D    |                    |           |           |        |                                                                                                                                                                    |    |
|      |               | 3.00                        |      | N=11 (2,2/2,3,3,3) |           |           |        |                                                                                                                                                                    | 3  |
|      |               | 4.00                        |      | N=7 (1,1/1,2,2,2)  | 4.00      |           |        | Clayey gravelly SAND. Sand is coarse. Gravels are subrounded to subangular and coarse. Mixed lithologies some granite.                                             | 4  |
|      |               | 4.50                        | D    |                    |           |           |        |                                                                                                                                                                    |    |
|      |               | 5.00                        |      | N=15 (2,3/3,4,4,4) |           |           |        |                                                                                                                                                                    | 5  |
|      |               | 5.30                        | ES   |                    |           |           |        |                                                                                                                                                                    | 6  |
|      |               | 6.50                        |      | N=4 (1,0/0,1,1,2)  | 6.50      |           |        | Firm to stiff brown sandy CLAY. Sand is fine.                                                                                                                      | 7  |
|      |               | 8.00                        |      | N=17 (2,3/4,4,4,5) | 8.00      |           |        | Brown silty gravelly SAND. Sand is fine. Gravels are subrounded and fine, of mixed lithologies.                                                                    | 8  |
|      |               |                             |      |                    |           |           |        |                                                                                                                                                                    | 9  |
|      |               | 10.00                       | D    |                    |           |           |        |                                                                                                                                                                    | 10 |
|      |               |                             |      |                    |           |           |        | Continued on next sheet                                                                                                                                            |    |

## Remarks

1. Location scanned for utilities. 2. Hand dug inspection pit to 1.3m bgl. 3. Groundwater encountered at 10m and 12.5m bgl. 4. Standpipe installed to 3m, 1m plain, 2m slotted. 5. Backfilled with gravels, bentonite and postcrete around the cap.





GROUNDTECH  
CONSULTING

# Borehole Log

Borehole No.

**BH7**

Sheet 2 of 2

Project Name: HOLCHEM

Project No.  
22216

Co-ords: -

Hole Type  
CP

Location: BURY

Level:

Scale  
1:50

Client: BRIAN CLANCY HIGBY PARTNERSHIP

Dates: 13/06/2022 - 14/06/2022

Logged By  
JOD

| Well | Water Strikes | Samples and In Situ Testing |      |                    | Depth (m) | Level (m) | Legend | Stratum Description                                                                                                                                          |    |
|------|---------------|-----------------------------|------|--------------------|-----------|-----------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
|      |               | Depth (m)                   | Type | Results            |           |           |        |                                                                                                                                                              |    |
|      |               | 11.00                       |      | N=15 (2,2/4,3,3,5) | 10.50     |           |        | Firm to stiff brown sandy gravelly CLAY. Sand is fine. Gravels are subrounded to subangular and fine. Mixed lithologies of siltstone, sandstone and granite. | 11 |
|      |               |                             |      |                    |           |           |        |                                                                                                                                                              | 12 |
|      |               | 13.00                       | D    |                    | 12.50     |           |        | Firm mottled grey brown silty CLAY.                                                                                                                          | 13 |
|      |               | 14.00                       |      | N=16 (2,3/3,4,4,5) |           |           |        |                                                                                                                                                              | 14 |
|      |               | 14.50                       |      | N=18 (2,3/4,4,5,5) |           |           |        |                                                                                                                                                              | 15 |
|      |               |                             |      |                    | 15.00     |           |        | End of borehole at 15.00 m                                                                                                                                   | 15 |
|      |               |                             |      |                    |           |           |        |                                                                                                                                                              | 16 |
|      |               |                             |      |                    |           |           |        |                                                                                                                                                              | 17 |
|      |               |                             |      |                    |           |           |        |                                                                                                                                                              | 18 |
|      |               |                             |      |                    |           |           |        |                                                                                                                                                              | 19 |
|      |               |                             |      |                    |           |           |        |                                                                                                                                                              | 20 |

## Remarks

1. Location scanned for utilities. 2. Hand dug inspection pit to 1.3m bgl. 3. Groundwater encountered at 10m and 12.5m bgl. 4. Standpipe installed to 3m, 1m plain, 2m slotted. 5. Backfilled with gravels, bentonite and postcrete around the cap.

