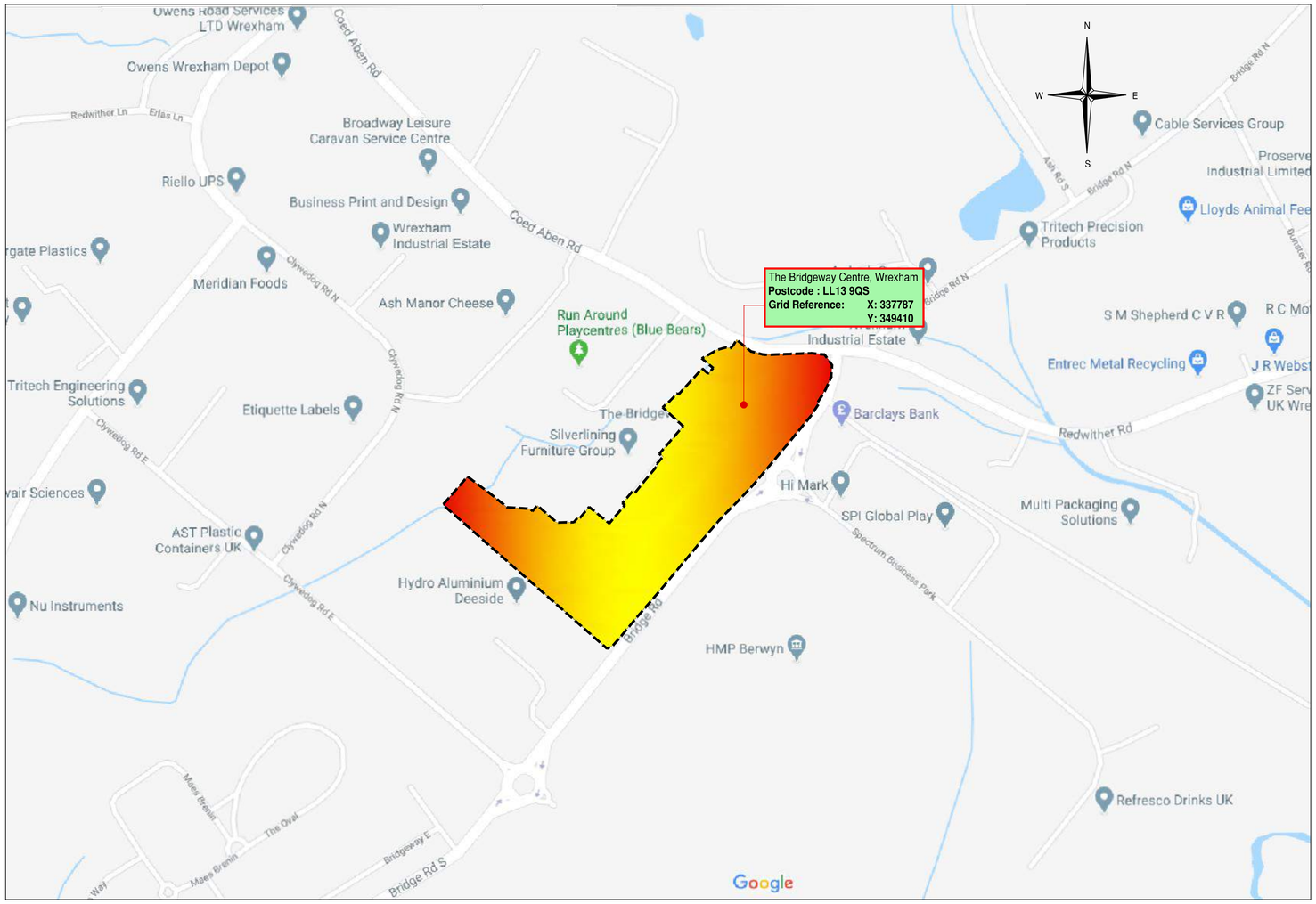
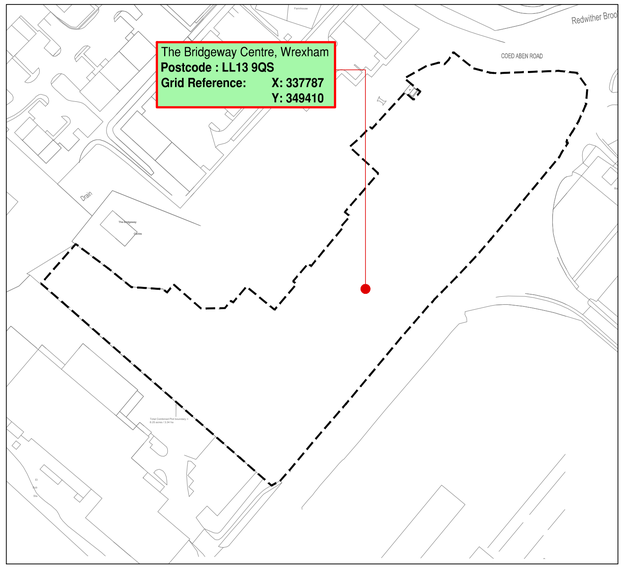
# Appendix A




Site Location Plan
(Scale 1:2500)




Site Location Plan
(Scale 1:2000)

**Safety, Health & Environmental Information:**

In addition to the hazards and risks normally associated with the types of work detailed on this drawing, please note the significant hazards identified by symbols below,

INDICATES A RESIDUAL RISK AS A WARNING

INDICATES A RESIDUAL RISK FOR INFORMATION

and described below:

**Construction/Maintenance/Cleaning/Demolition**

Refer to Drawing:

## General Notes:

1. Do not scale from this drawing.

2. All dimensions are in meters (m), all levels in metres (m) unless noted otherwise.

3. Discrepancies or omissions are to be reported to the Engineer prior to work commencing.

4. Materials and workmanship are to comply in all respects with current British Standard Specifications, Codes of Practice, and Building Regulations Approved Documents.

5. The copyright of this drawing is vested in the Engineer and must not be copied or reproduced without written consent.

6. The Contractor is to check and verify all building and site dimensions, levels and sewer invert levels at connection points before work commences.

7. This drawing is to be read in conjunction with all relevant specifications and drawings issued by the Engineer, Architect and other Specialists.

8. This drawing is based on the provided Topographical Survey

| Rev | By | Chk'd | Date | Description |
|---|---|---|---|---|
| P01 | VI | AM | 10/05/20 | Preliminary Issue |

**PRELIMINARY DRAWING**
This drawing is not to be used for construction

Client

FI REAL ESTATE MANAGEMENT


BarnsleyMarshall Limited
1 Birch Court
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Worcester
WR3 8SG

Tel: 01905 330550
Email: design@barnsleymarshall.co.uk
Web: www.barnsleymarshall.co.uk


Project

The Bridgeway Centre,
Bridgeway Road, Wrexham

Drawing

Site Location Plan

By/Chk'd VI/AM Date 10/05/20

Drawing No. BCW-BML-ERD-ZZ-DR-C-0100

Revision P01

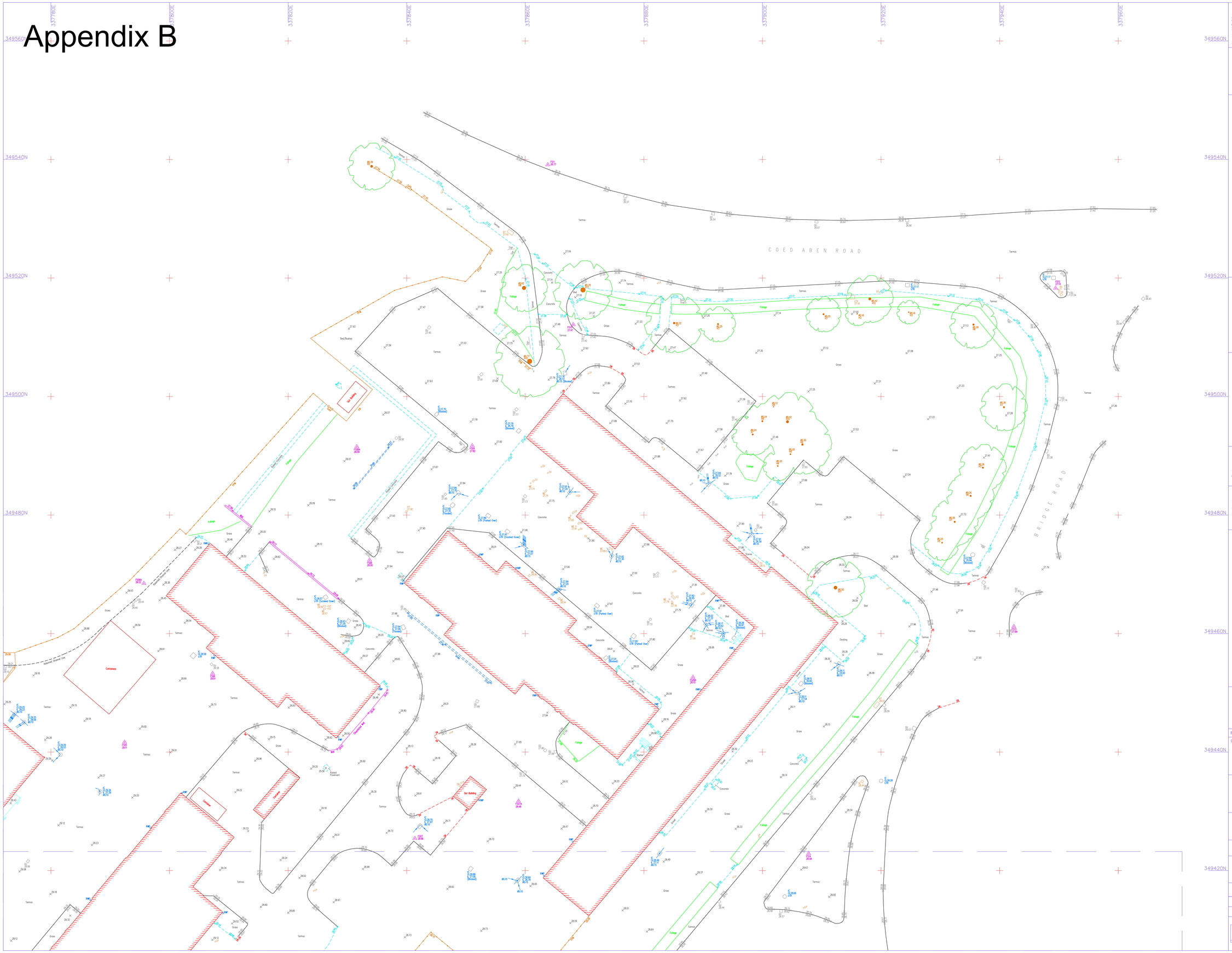
BML Job No. 1000-01

Status -

Drawing Scale at A1: As Shown

CAD Filename: C:\Users\Victoria.Azure\OneDrive-BM Server - Share\Projects\1000-01 Bridgeway Centre, Wrexham\BML Drawings\Working\CIVIL\BCW-BML-ERD-ZZ-DR-C-0100 P01 - SITE LOCATION PLAN.dwg

# Appendix B

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This survey has been produced at the survey scale (metres) with its accuracy commensurate with the indicated scale and should only be used for the original intended purposes. Any scaling should only be undertaken using a metric rule (when produced using the original data). The plotted scale may differ (for presentation purposes) from the survey scale.

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All data remains in the ownership of Formby Surveys Ltd and any discrepancies between this survey and any other information should be reported to Formby Surveys Ltd.

## Topographical Legend

(where applicable)

Building (Plan View) · Cover (Plan View) · Hedge (Plan View) · Overhead Fitting · Tree · BC/DL/M/M (Tree Canopy Spread in Metres and Indicative) · Spot Level · Survey Station · Borehole · Trial Pit · Window Sample · Dynamic Cone Penetrometer · Top of Bank · Bottom of Bank · Centre of Road · Contours (Indicative) · Photo Position (Indicative)

## Abbreviations

(where applicable)

| | | | |
|---|---|---|---|
| AB | Air Brick | IT | Intercom |
| AV | Air Valve | JTM | Junction Box |
| BB | Belisha Beacon | KL | Keep Left |
| BC | Building Canopy | LP | Lamp Post |
| BH | Borehole | LT | Lamp Post |
| BL | Bed Level | MB | Mooring Bollard |
| BM | Bench Mark | ME | Meter Manhole |
| BDY | Boundary | MH | Manhole |
| BS | Bus Stop | MK | Telephone |
| BS | BsStem (Tree) | MS | MulbsStem (Tree) |
| BST | Bus Stop | MY | Mercury Manhole |
| BT | British Telecom Manhole | NB | Nidhe Board |
| C | Crest | NFS(**) | Additional Survey Station |
| CE | Cover Eye | OT | Oil Storage Tanks |
| CCTV | Closed Circuit Television | OB | Out Building |
| CL | Ceiling Level | OS | Ordnance Survey |
| CP | Concrete Post | P | Post |
| CR | Cycle Rack | PB | Post Box |
| CTM | Cable Television Manhole | PD | Transformer Pad |
| CUL | Culvert | PI | Pipe |
| DK | Drop Kerb | PM | Parking Meter |
| DPC | Damp Proof | PM | Petrol Interceptor Manhole |
| DPC | Damp Proof Course | PP | Power Point |
| DP | Down Pipe | RE | Rodding Eye |
| DCP | Dynamic Cone Penetrometer | RS | Road Sign |
| DWB | Dog Waste Bin | RTW | Retaining Wall |
| EB | Electric Box | RWP | Rainwater Pipe |
| EL | Electricity Manhole | SDP | Stand Pipe |
| EP | Electricity Pole | SK | Soakaway |
| ER | Earthing Rod | SOF | Sniffit Level |
| FBR | Footbridge | SWMH | Storm Water Manhole |
| FCL | Fence (Chain Link) | SC | Stop Cock |
| FFL | Finished Floor Level | SJ | Stump (Tree) |
| FIR | Fence (Iron Railing) | SV | Stop Valve |
| FL | Floor Level | SVP | Soil Vent Pipe |
| FWMH | Foul Water Manhole | SW | Storm Water |
| FP | Fence Post | T | Tree (Ash, Elm, TP) |
| FPC | Fence (Post & Chain) | TBM | Temporary Benchmark |
| FPP | Fence (Post & Panel) | TCB | Telephone Call Box |
| FPR | Fence (Post & Rail) | TL | Telephone Pole |
| FPW | Fence (Post & Wire) | TS | Traffic Light |
| FSB | Fence (Safety Barrier) | TOW | Top of Wall |
| FS** | Permanent Survey Station | TP | Telegraph Pole |
| FW | Foul Water | TPT | Tidal Pit |
| FWMH | Foul Water Manhole | TY | Tree (Yew) |
| GV | Gas Valve | TSB | Traffic Signal Manhole |
| GL | Ground Level | UB | Under Beam |
| GP | Gate Post | UP | Uplight |
| GS | Gravestone | UTR | Unable To Raise |
| H | Height | VP | Valve Pit |
| H | Height | WCL | Window Cill Level |
| HY | Hydrant | WHL | Window Head Level |
| IC | Inspection Chamber | WL | Wall Level |
| IS | Information Sign | WM | Water Meter |

## Sheet Layout

Sheet 1

## Survey Control

| Station | Eastling | Northing | Level |
|---|---|---|---|
| FS01 | 337869.135 | 349365.084 | 29.01 |
| FS02 | 337840.790 | 349341.283 | 29.53 |
| FS03 | 337796.502 | 349373.043 | 29.57 |
| FS04 | 337769.363 | 349405.113 | 29.20 |
| FS05 | 337792.420 | 349441.681 | 29.12 |
| FS06 | 337807.276 | 349453.298 | 28.61 |
| FS07 | 337841.382 | 349425.451 | 28.86 |
| FS08 | 337833.738 | 349472.418 | 28.00 |
| FS09 | 337851.061 | 349497.118 | 27.82 |
| FS10 | 337868.085 | 349512.156 | 27.47 |
| FS11 | 337863.792 | 349539.125 | 26.77 |
| FS12 | 337949.434 | 349518.294 | 27.15 |
| FS13 | 337942.397 | 349461.212 | 27.99 |
| FS14 | 337907.787 | 349422.894 | 28.58 |

## Grid & Datum

Survey Grid: Local Grid ☐ Nat. Grid (OSGB36) ☑ Nat. Grid (Wgs84) ☐ Existing Grid ☐

Survey Datum: Local Datum ☐ Nat. Grid (OSGB36) ☑ Nat. Grid (Wgs84) ☐ O.S.B.M. ☐

The survey grid & level datum relate to the Ordnance Survey active GPS network (OSGB36) established via Leica SmartNET, plotted with no scale factor applied.

## General Notes

1. Tree canopies have been "trimmed" for clarity and presentation purposes.
2. All arrows on steps / ramps etc indicate an UP direction unless otherwise stated.
3. Site traffic or obstructions encountered at the time of the survey may have resulted in surface features being omitted.

| Rev | Date | Description | CAD |
|---|---|---|---|

Client

Sutcliffe

measure* manage* deliver*

**FormbySurveys**

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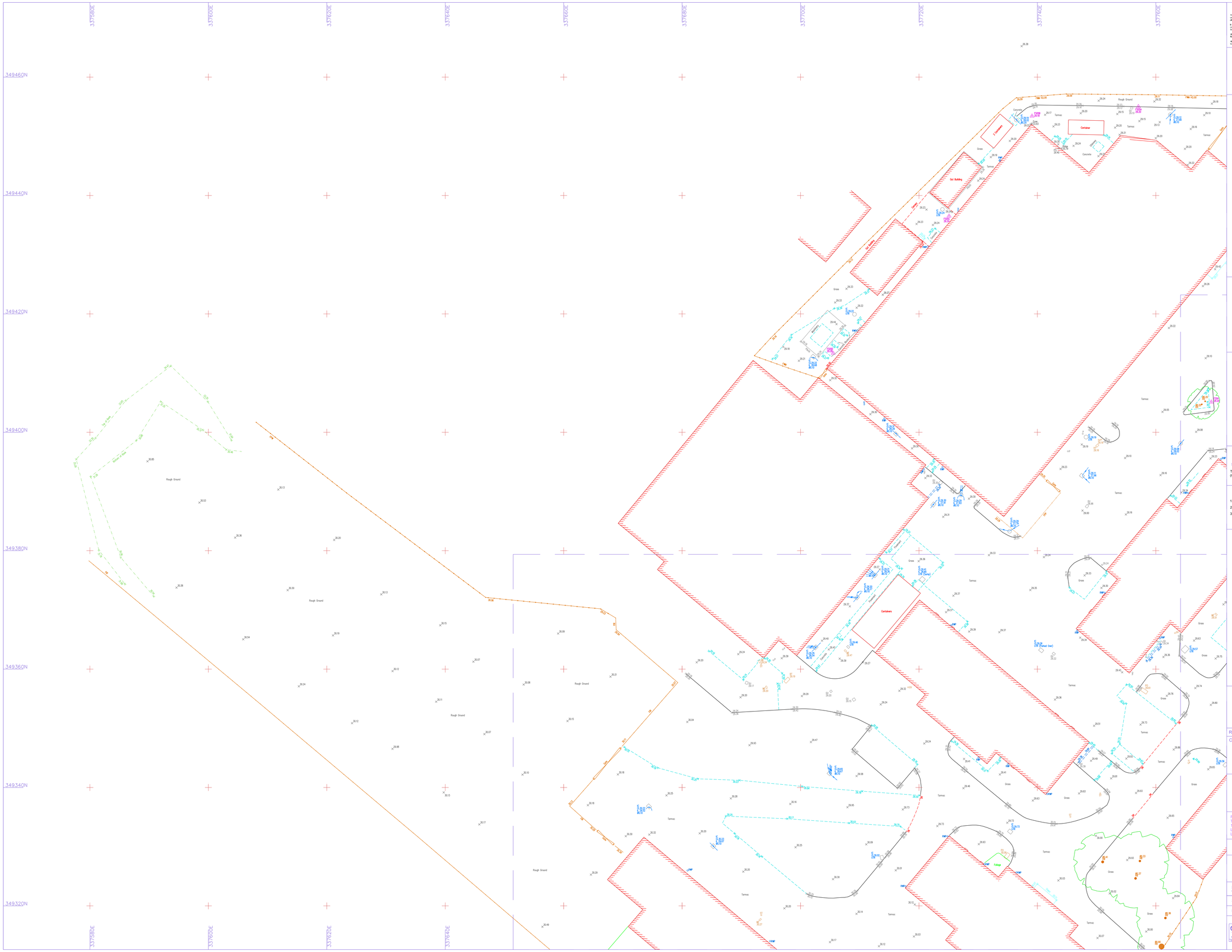
E info@formbysurveys.com
W www.formbysurveys.com

# Topographical Survey

# Bridgeway Centre, Wrexham, LL13 9QS

Plotted Scale: A0@1:200 (NB: Survey Scale - 1:200) 0.0 4.0 8.0 12.0m

| Surveyor: NT | CAD: JP/MT | Checker: NB | Rev: |
|---|---|---|---|
| Date of Issue: August 2017 | FSL Ref No: 9980_T:200:1:4 | | |

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All ground features that were visible at the time of the survey have been located; however there may have been items obscured, Rise sides and Bus direction have been estimated assessed from the surface and should be considered as approximate only.

All data remains in the ownership of Formby Surveys Ltd and any discrepancies between this survey and any other information should be reported to Formby Surveys Ltd.

## Topographical Legend

(where applicable)

Building · Tree · Survey Station · Top of Bank / Bottom of Bank · Cover · Bollard · Bench Mark (Approximate Position only) · Spot Level · Borehole · Trial Pit · Window Sample · Dynamic Cone Penetrometer · Contours · Invisible Feature · Photo Position

## Abbreviations

(where applicable)

| | | | |
|---|---|---|---|
| AB | Air Brick | IT | Intercom |
| AV | Air Valve | JTN | Junction Box |
| BB | Belisha Beacon | KL | Keep Left |
| BC | Bollard Canopy | LP | Lamp Post |
| BH | Borehole | LT | Lamp Post |
| BL | Bed Level | MB | Mooring Bollard |
| BM | Bench Mark | ME | Meter Manhole |
| BDY | Boundary | MH | Manhole |
| BS | Bus Stop | MI | Manhole |
| BS | BsStem (Tree) | MS | MulteStem (Tree) |
| BST | Bus Stop | MY | Mercury Manhole |
| BT | British Telecom Manhole | NB | Notice Board |
| C | Crest | NPS(**) | Additional Survey Station |
| CE | Cat's Eye | OB | Oil Bunkering Plate |
| CCTV | Closed Circuit Television | OB | Out Building |
| CL | Ceiling Level | OS | Ordnance Survey |
| CP | Concrete Post | P | Post |
| CR | Cycle Rack | PB | Post Box |
| CTV | Cable Television Manhole | PC | Protection Pad |
| CUL | Culvert | PI | Pipe |
| DK | Drop Kerb | PM | Parking Meter |
| DP | Down Pipe | PO | Post Office Manhole |
| DPC | Damp Proof Course | PP | Power Point |
| DT | Dump | RE | Rodding Eye |
| DCP | Dynamic Cone Penetrometer | RS | Road Sign |
| DWB | Dog Waste Bin | RTW | Retaining Wall |
| EB | Electricity Box | RWP | Rainwater Pipe |
| EL | Electricity Manhole | SDP | Stand Pipe |
| EP | Electricity Pole | SK | Soakaway |
| ER | Earthing Rod | SOF | Soffit Level |
| FBR | Footbridge | SWMH | Storm Water Manhole |
| FCL | Fence (Chain Link) | SP | Sign Post |
| FFL | Finished Floor Level | SJ | Stump (Tree) |
| FIR | Fence (Iron Railing) | SV | Stop Valve |
| FL | Floor Level | SVP | Soil Vent Pipe |
| FWMH | Foul Water Manhole | SW | Storm Water |
| FP | Flag Pole | TB | Telephone (Box, Kiosk, TP) |
| FPC | Fence (Post & Chain) | TBM | Temporary Benchmark |
| FPP | Fence (Post & Panel) | TCB | Telephone Call Box |
| FPR | Fence (Post & Rail) | TL | Telephone Cable |
| FPW | Fence (Post & Wire) | TS | Traffic Light |
| FSB | Fence (Safety Barrier) | TOW | Top of Wall |
| FS** | Permanent Survey Station | TP | Telegraph Pole |
| FW | Foul Water | TPT | Trial Pit |
| FWM | Fence (Wire Mesh) | TS | Tree Stump (Tree) |
| GV | Gas Valve | TSB | Traffic Signal Manhole |
| GL | Ground Level | UB | Under Beam |
| GP | Gate Post | UP | Upright |
| GS | Gravestone | UTR | Unable To Raise |
| H | Hedge | W | Window |
| H | Height | WCL | Window Cill Level |
| HY | Hydrant | WHL | Window Head Level |
| IC | Inspection Chamber | WL | Wall Level |
| IS | Information Sign | WM | Water Meter |

## Sheet Layout

Sheet 2

## Survey Control

| Station | Eastling | Northing | Level |
|---|---|---|---|
| FS01 | 337869.135 | 349385.084 | 29.01 |
| FS02 | 337840.790 | 349341.283 | 29.53 |
| FS03 | 337796.502 | 349373.043 | 29.57 |
| FS04 | 337769.363 | 349405.113 | 29.20 |
| FS05 | 337792.420 | 349441.681 | 29.12 |
| FS06 | 337807.276 | 349453.298 | 28.61 |
| FS07 | 337841.382 | 349425.451 | 28.86 |
| FS08 | 337833.738 | 349472.418 | 28.00 |
| FS09 | 337851.061 | 349491.718 | 27.82 |
| FS10 | 337868.085 | 349512.156 | 27.47 |
| FS11 | 337863.792 | 349539.125 | 26.77 |
| FS12 | 337949.434 | 349518.294 | 27.14 |
| FS13 | 337942.397 | 349461.212 | 27.99 |
| FS14 | 337907.787 | 349422.894 | 28.58 |

## Grid & Datum

Survey Grid: Local Grid ☐ Nat. Grid (OSGB36) ☑ Nat. Grid (Simple Fit) ☐ Existing Grid ☐

Survey Datum: Local Datum ☐ Nat. Grid (OSGB36) ☑ Nat. Grid (Mean Level) ☐ O.S.B.M. ☐

The survey grid & level datum relate to the Ordnance Survey active GPS network (OSGB36) established via Leica SmartNET, plotted with no scale factor applied.

## General Notes

1. Tree canopies have been "trimmed" for clarity and presentation purposes.
2. All arrows on steps / ramps etc indicate an UP direction unless otherwise stated.
3. Site traffic or obstructions encountered at the time of the survey may have resulted in surface features being omitted.

| Rev | Date | Description | CAD |
|---|---|---|---|

Client

Sutcliffe

measure* manage* deliver*

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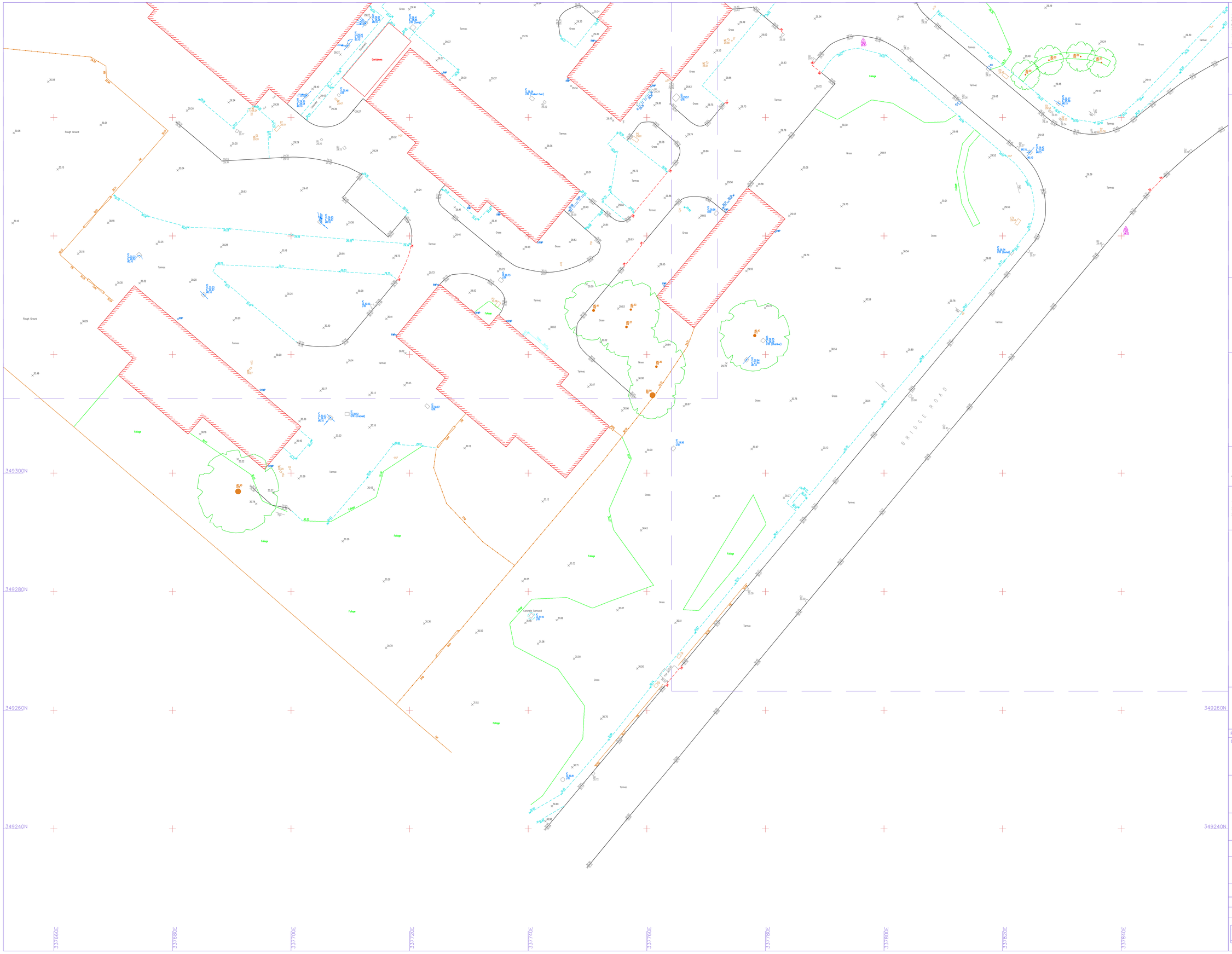
# Topographical Survey

# Bridgeway Centre, Wrexham, LL13 9QS

Plotted Scale: A0@1:200 (NB: Survey Scale: 1:200) 0.0 4.0 8.0 12.0m

| Surveyor: | NT | CAD: | JP/MT | Checker: | NB | Rev: |
|---|---|---|---|---|---|---|
| Date of Issue: | August 2017 | FSL Ref No: | 9980_T-200:2:4 | | | |

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All data remains the ownership of Formby Surveys Ltd and any discrepancies between this survey and any other information should be reported to Formby Surveys Ltd.

## Topographical Legend

(where applicable)

Building; Cover; Hedge; Inspection Chamber; Tree; 30.30/MUM Mast Unknown Height, not indicated; Spot Level; *30.00; Survey Station; Borehole; Trial Pit; Window Sample; Dynamic Cone Penetrometer; Top of Bank; Bottom of Bank; Contours; 30.00; Photo Position (& numbered)

## Abbreviations

(where applicable)

| | | | |
|---|---|---|---|
| AB | Air Brick | IT | Intercom |
| AV | Air Valve | JTM | Junction Box |
| BB | Belisha Beacon | KL | Keep Left |
| BC | Bollard Concrete | LC | Level Crossing |
| BH | Borehole | LP | Lamp Post |
| BL | Bed Level | MB | Mooring Bollard |
| BM | Bench Mark | ME | Meter Manhole |
| BDY | Boundary | MH | Manhole |
| BS | Bus Stop | MI | Manhole |
| BS | BsStem (Tree) | MS | Mulbs/Stem (Tree) |
| BST | Bus Stop | MY | Mercury Manhole |
| BT | British Telecom Manhole | NB | Nidhe Board |
| C | Crest | NFS(**) | Additional Survey Station |
| CE | Centre Eye | OB | Oil Storage Tanks |
| CCTV | Closed Circuit Television | OB | Out Building |
| CL | Ceiling Level | OS | Ordnance Survey |
| CP | Concrete Post | P | Post |
| CR | Cycle Rack | PB | Post Box |
| CTM | Chorlton Television Manhole | PC | Protection Pad |
| CUL | Culvert | PI | Pipe |
| DK | Drop Kerb | PM | Parking Meter |
| DP | Down Pipe | PO | Post Office Manhole |
| DPC | Damp Proof Course | PP | Power Point |
| DT | Dump | RE | Rodding Eye |
| DCP | Dynamic Cone Penetrometer | RS | Road Sign |
| DWB | Dog Waste Bin | RTW | Retaining Wall |
| E | Eaves Level | SBP | Stand Boiler Pipe |
| EL | Electricity Manhole | SDP | Stand Pipe |
| EP | Electricity Pole | SK | Soakaway |
| ER | Earthing Rod | SOF | Sniffit Level |
| FBR | Footbridge | SWMH | Storm Water Manhole |
| FCL | Fence (Chain Link) | SP | Sign Post |
| FFL | Finished Floor Level | SJ | Stump (Tree) |
| FIR | Fence (Iron Railing) | SV | Stop Valve |
| FL | Floor Level | SVP | Soil Vent Pipe |
| FWMH | Foul Water Manhole | SW | Storm Water |
| FP | Flag Pole | TB | Trial Hole (Bore, TP) |
| FPC | Fence (Post & Chain) | TBM | Temporary Benchmark |
| FPP | Fence (Post & Panel) | TCB | Telephone Call Box |
| FPR | Fence (Post & Rail) | TL | Telephone Local |
| FPW | Fence (Post & Wire) | TS | Traffic Light |
| FSB | Fence (Safety Barrier) | TOW | Top of Wall |
| FS(**) | Permanent Survey Station | TP | Telegraph Pole |
| FW | Foul Water | TPT | Trial Pit |
| GM | Gas Manhole (Mesh) | TR | Trees (Tree) |
| GV | Gas Value | TSB | Traffic Signal Manhole |
| GL | Ground Level | UB | Under Beam |
| GP | Gate Post | UP | Uplight |
| GS | Gravestone | UTR | Unable To Raise |
| H | Hedge | W | Window |
| H | Height | WCL | Window Cill Level |
| HY | Hydrant | WHL | Window Head Level |
| IC | Inspection Chamber | WL | Wall Level |
| IB | Information Sign | WM | Water Meter |

## Sheet Layout

Sheet 3

## Survey Control

| Station | Eastling | Northing | Level |
|---|---|---|---|
| FS01 | 337869.135 | 349365.084 | 29.01 |
| FS02 | 337840.790 | 349341.283 | 29.53 |
| FS03 | 337796.502 | 349373.043 | 29.57 |
| FS04 | 337769.363 | 349405.113 | 29.20 |
| FS05 | 337792.420 | 349441.681 | 29.11 |
| FS06 | 337807.276 | 349453.298 | 28.61 |
| FS07 | 337841.382 | 349425.451 | 28.86 |
| FS08 | 337833.738 | 349472.418 | 28.00 |
| FS09 | 337851.061 | 349491.718 | 27.82 |
| FS10 | 337868.085 | 349512.156 | 27.47 |
| FS11 | 337863.792 | 349539.125 | 26.77 |
| FS12 | 337949.434 | 349518.294 | 27.15 |
| FS13 | 337942.397 | 349461.212 | 27.99 |
| FS14 | 337907.787 | 349422.894 | 28.58 |

## Grid & Datum

Survey Grid: Local Grid ☐ Nat. Grid (OSGB36) ☑ Nat. Grid (OSGB36 Pts) ☐ Existing Grid ☐

Survey Datum: Local Datum ☐ Nat. Grid (OSGB36) ☑ Nat. Grid (Mod Level) ☐ O.S.B.M. ☐

The survey grid & level datum relate to the Ordnance Survey active GPS network (OSGB36) established via Leica SmartNET, plotted with no scale factor applied.

## General Notes

1. Tree canopies have been "trimmed" for clarity and presentation purposes.
2. All arrows on steps / ramps etc indicate an UP direction unless otherwise stated.
3. Site traffic or obstructions encountered at the time of the survey may have resulted in surface features being omitted.

| Rev | Date | Description | CAD |
|---|---|---|---|

Client

Sutcliffe

measure* manage* deliver*

**FormbySurveys**

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F +44 (0)151 329 3140
E info@formbysurveys.com
W www.formbysurveys.com

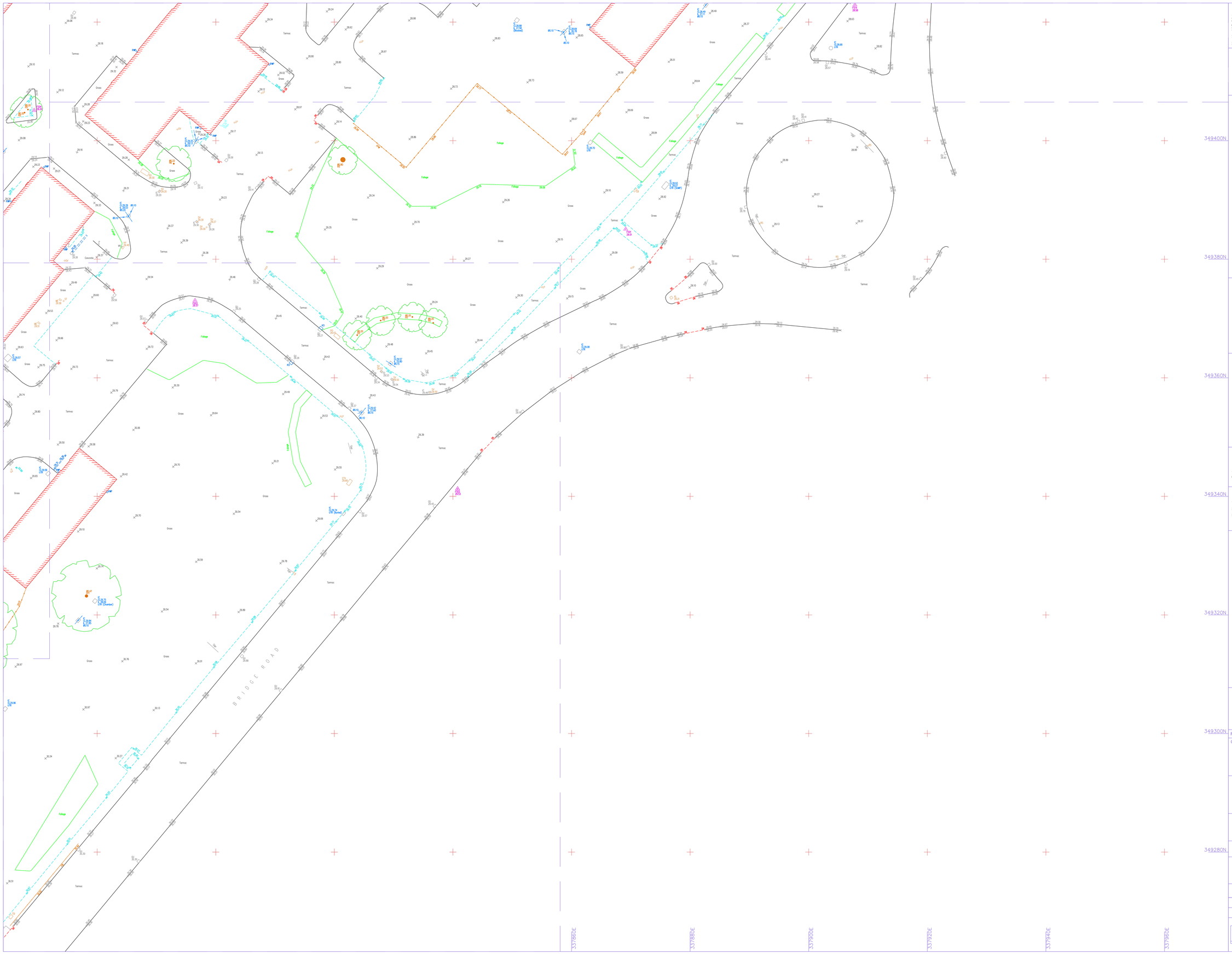
# Topographical Survey

# Bridgeway Centre, Wrexham, LL13 9QS

Plotted Scale: A0@1:200 (NB Survey Scale: 1:200) 0.0 4.0 8.0 12.0m

| Surveyor: | NT | CAD: | JP/MT | Checker: | NB | Rev: |
|---|---|---|---|---|---|---|

Date of Issue: August 2017 FSL Ref No: 9980_T:200:3:4

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All data remains the ownership of Formby Surveys Ltd and any discrepancies between this survey and any other information should be reported to Formby Surveys Ltd.

## Topographical Legend

(where applicable)

Building (Plan View) · Cover (Plan View) · Hedge (Plan View) · Inverted Tidegauge · Tree · 20.20/MUM Mature Unknown Multi Stem · Spot Level 20.00 · Survey Station · Borehole · Trial Pit · Window Sample · Dynamic Cone Penetrometer · Top of Bank · Bottom of Bank · Contours 20.00 · Photo Position (in overview)

## Abbreviations

(where applicable)

| | | | |
|---|---|---|---|
| AB | Air Brick | IT | Intercom |
| AV | Air Valve | JTM | Junction Box |
| BB | Belisha Beacon | KL | Keep Left |
| BC | Bollard Lighting Canopy | LC | Level Crossing |
| BH | Borehole | LP | Lamp Post |
| BL | Bed Level | MB | Mooring Bollard |
| BM | Bench Mark | ME | Meter Manhole |
| BDY | Boundary | MH | Manhole |
| BS | Bus Stop | MK | Marker |
| BS | Bin/Skip (Tree) | MS | Multi/Stem (Tree) |
| BST | Bus Stop | MY | Mercury Manhole |
| BT | British Telecom Manhole | NB | Notice Board |
| C | Crest | NF(S/*) | Additional Survey Station |
| CE | Cat's Eye | OB | Oil Storage Tank |
| CCTV | Closed Circuit Television | OB | Out Building |
| CL | Ceiling Level | OS | Ordnance Survey |
| CP | Concrete Post | P | Post |
| CR | Cycle Rack | PB | Post Box |
| CTV | Cable Television Manhole | PC | Pedestrian Pad |
| CUL | Culvert | PI | Pipe |
| DK | Drop Kerb | PM | Parking Meter |
| DPC | Damp Pipe | PO | Post Office Manhole |
| DPC | Damp Proof Course | PP | Power Point |
| DP | Down Pipe | RE | Rodding Eye |
| DCP | Dynamic Cone Penetrometer | RS | Road Sign |
| DWB | Dog Waste Bin | RTW | Retaining Wall |
| EB | Electric Box | RWP | Rainwater Pipe |
| EL | Electricity Manhole | SDP | Stand Pipe |
| EP | Electricity Pole | SK | Soakaway |
| ER | Earthing Rod | SOF | Soffit Level |
| FBR | Footbridge | SWMH | Storm Water Manhole |
| FCL | Fence (Chain Link) | SP | Sign Post |
| FFL | Finished Floor Level | SJ | Stump (Tree) |
| FIR | Fence (Iron Railing) | SV | Stop Valve |
| FL | Floor Level | SVP | Soil Vent Pipe |
| FWMH | Foul Water Manhole | SW | Storm Water |
| FP | Flag Pole | TB | Trial Hole (Bore, TP) |
| FPC | Fence (Post & Chain) | TBM | Temporary Benchmark |
| FPP | Fence (Post & Panel) | TCB | Telephone Call Box |
| FPR | Fence (Post & Rail) | TL | Telephone Pole |
| FPW | Fence (Post & Wire) | TS | Traffic Light |
| FSB | Fence (Safety Barrier) | TOW | Top of Wall |
| FS** | Permanent Survey Station | TP | Telegraph Pole |
| FW | Foul Water | TPT | Trial Pit |
| GM | Gas Manhole (Mesh) | TR | Tree Root (Tree) |
| GV | Gas Valve | TSB | Traffic Signal Manhole |
| GL | Ground Level | UB | Under Beam |
| GP | Gate Post | UP | Uplight |
| GS | Gravestone | UTR | Unable To Raise |
| H | Height | W | Window |
| H | Height | WCL | Window Cill Level |
| HY | Hydrant | WHL | Window Head Level |
| IC | Inspection Chamber | WL | Wall Level |
| IS | Information Sign | WM | Water Meter |

## Sheet Layout

Sheet 4

## Survey Control

| Station | Eastling | Northing | Level |
|---|---|---|---|
| FS01 | 337869.135 | 349385.084 | 29.01 |
| FS02 | 337840.790 | 349341.283 | 29.53 |
| FS03 | 337796.502 | 349373.043 | 29.57 |
| FS04 | 337769.363 | 349405.113 | 29.20 |
| FS05 | 337792.420 | 349441.681 | 29.12 |
| FS06 | 337807.276 | 349453.298 | 28.61 |
| FS07 | 337841.382 | 349425.451 | 28.86 |
| FS08 | 337833.738 | 349472.418 | 28.00 |
| FS09 | 337851.061 | 349491.718 | 27.82 |
| FS10 | 337868.085 | 349512.156 | 27.47 |
| FS11 | 337863.792 | 349539.125 | 26.77 |
| FS12 | 337949.434 | 349518.294 | 27.15 |
| FS13 | 337942.397 | 349461.212 | 27.99 |
| FS14 | 337907.787 | 349422.894 | 28.58 |

## Grid & Datum

Survey Grid: Local Grid ☐ Nat. Grid (OSGB36) ☑ Nat. Grid (Virtual RTK) ☐ Existing Grid ☐

Survey Datum: Local Datum ☐ Nat. Grid (OSGB36) ☑ Nat. Grid (Real Level) ☐ O.S.B.M. ☐

The survey grid & level datum relate to the Ordnance Survey active GPS network (OSGB36) established via Leica SmartNET, plotted with no scale factor applied.

## General Notes

1. Tree canopies have been "trimmed" for clarity and presentation purposes.
2. All arrows on steps / ramps etc indicate an UP direction unless otherwise stated.
3. Site traffic or obstructions encountered at the time of the survey may have resulted in surface features being omitted.

| Rev | Date | Description | CAD |
|---|---|---|---|

Client

Sutcliffe

measure* manage* deliver*

**FormbySurveys**

Professional Measurement Surveyors

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16-18 Johnson Street
Liverpool
L3 2BQ

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F +44 (0)151 329 3140
E info@formbysurveys.com
W www.formbysurveys.com

# Topographical Survey

# Bridgeway Centre, Wrexham, LL13 9QS

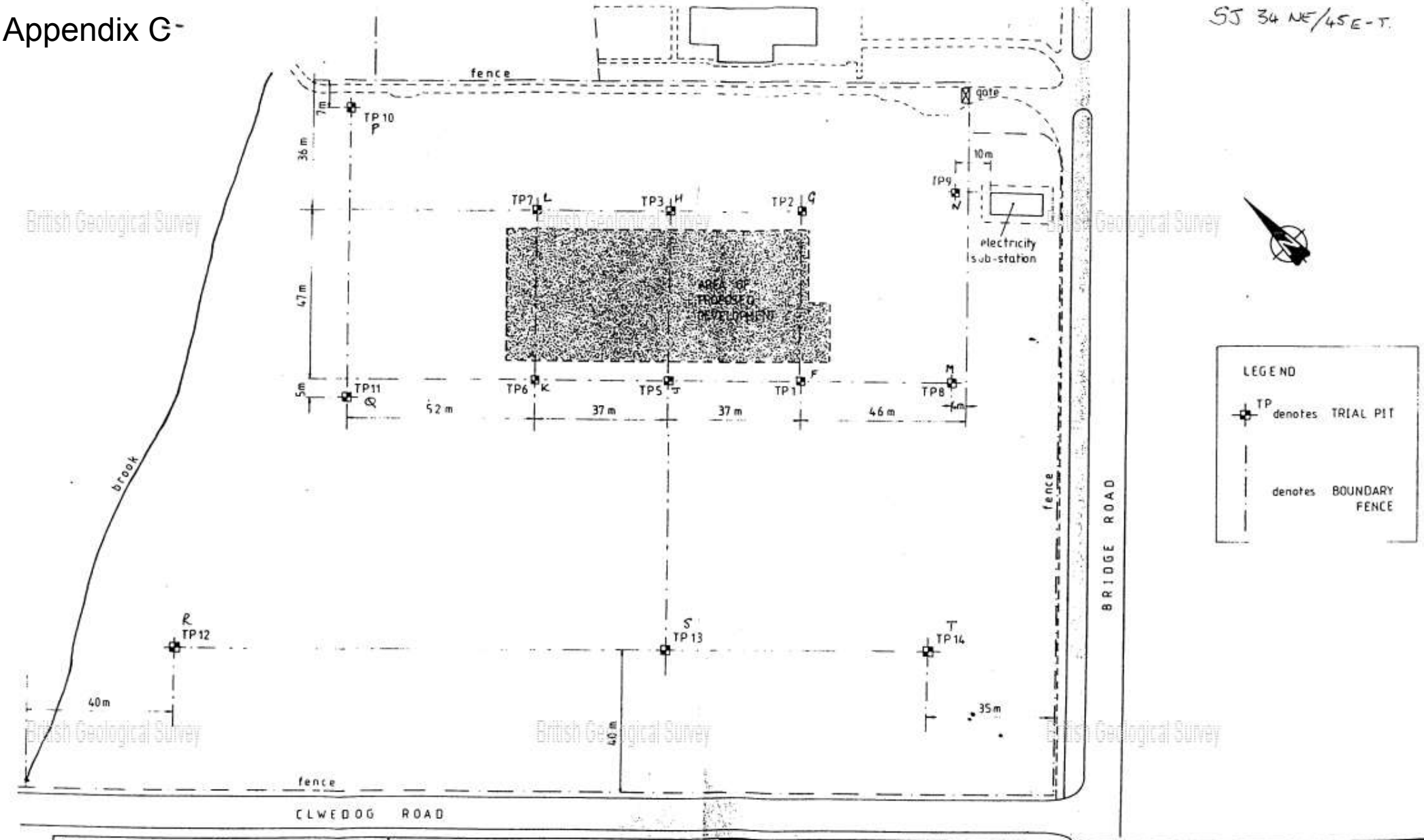
Plotted Scale: A0@1:200 (NB Survey Scale: 1:200)

0.0 4.0 8.0 12.0m

| Surveyor: NT | CAD: JP/MT | Checker: NB | Rev: |
|---|---|---|---|
| Date of Issue: August 2017 | FSL Ref No: 9980_T:200:4:4 | | |

Appendix C

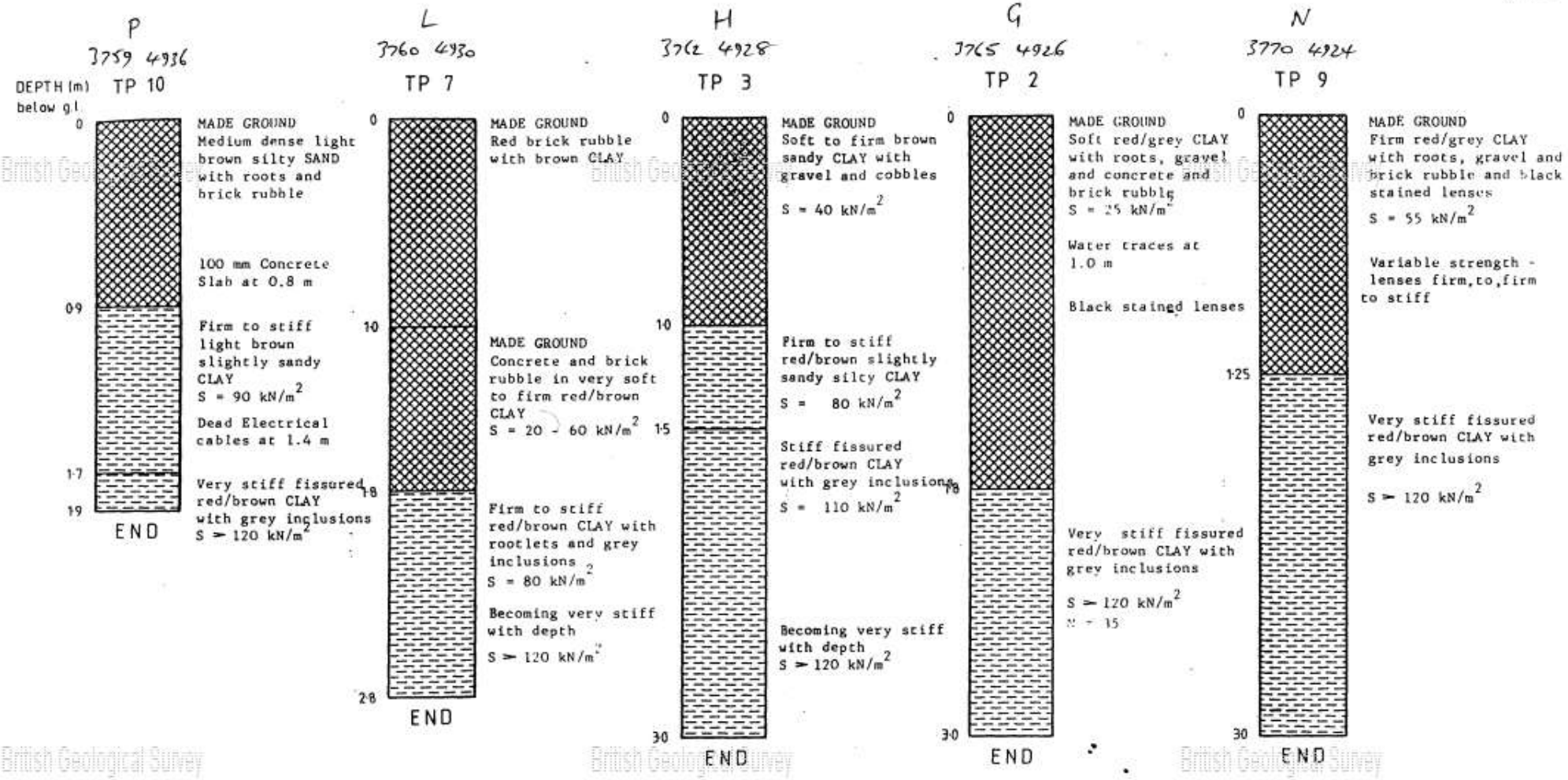
SJ 34 NE/45E-T.




| Notes | Revisions | | | Project | | | | Veryard and Partners Consulting Engineers |
|---|---|---|---|---|---|---|---|---|
| | No | Date | Details | WREXHAM ALUMINIUM INGOT PLANT | | | | ☐ Cardiff 0222 562354 |
| | | | | Title | | | | ☐ Carmarthen 0267 6977+7056 |
| | | | | SITE LAYOUT WITH TRIAL PIT POSITIONS | | | | ■ Rossett 0244 571444 |
| | | | | | | | | ☐ Coleraine 0265 51434 |
| | | | | Scale 1:1000 | Date APRIL 84 | Drawn SW | Checked | No 18081 / SI : Rev |

British Geological Survey

SJ 34 NE/45




British Geological Survey

| Notes | Revisions | | |
|---|---|---|---|
| Trial pits excavated on 6 & 9 April 1984 | No | Date | Details |
| Weather: warm and dry | | | |
| S value denotes insitu undrained shear strength as measured by hand shear vane. | | | |

Project: WREXHAM ALUMINIUM INGOT PLANT

Title: TRIAL PIT LOGS

| Scale | Date | Drawn | Checked |
|---|---|---|---|
| 1:200 | APRIL 84 | SW | |

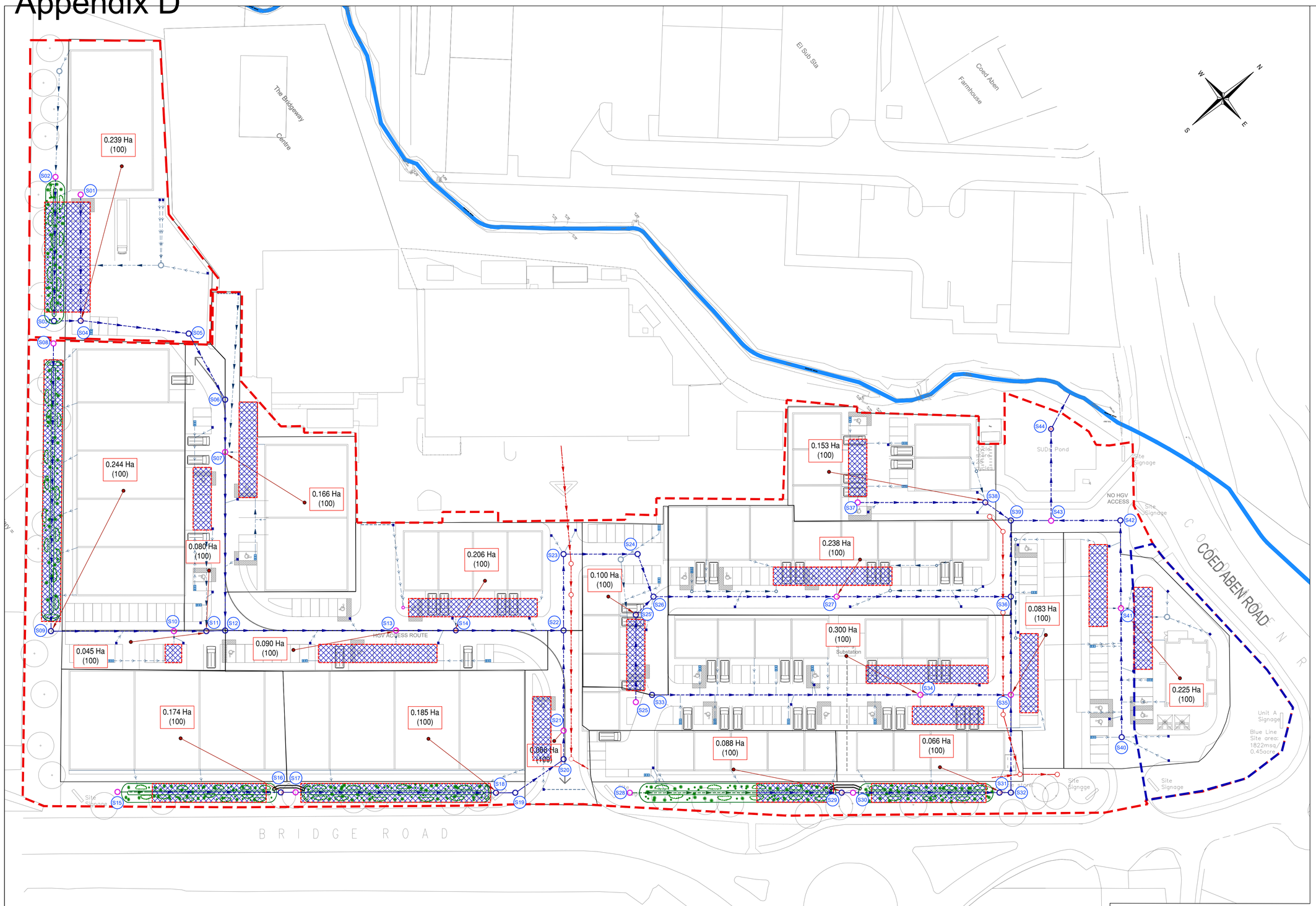
**Veryard and Partners**
Consulting Engineers

- ☐ Cardiff 0222 562354
- ☐ Carmarthen 0267 6977+7056
- ■ Rossett 0244 571444
- ☐ Coleraine 0265 51434

No. 18081 / SI/5 Rev.

AARDUE 5917/82

# Appendix D




## Safety, Health & Environmental Information:

In addition to the hazards and risks normally associated with the types of work detailed on this drawing, please note the significant hazards identified by symbols below,

⚠ INDICATES A RESIDUAL RISK AS A WARNING

ⓘ INDICATES A RESIDUAL RISK FOR INFORMATION

and described below:

## Construction/Maintenance/Cleaning/Demolition

## General Notes:

1. Do not scale from this drawing.

2. All dimensions are in meters (m), all levels in metres (m) unless noted otherwise.

3. Discrepancies or omissions are to be reported to the Engineer prior to work commencing.

4. Materials and workmanship are to comply in all respects with current British Standard Specifications, Codes of Practice, and Building Regulations Approved Documents.

5. The copyright of this drawing is vested in the Engineer and must not be copied or reproduced without written consent.

6. The Contractor is to check and verify all building and site dimensions, levels and sewer invert levels at connection points before work commences.

7. This drawing is to be read in conjunction with all relevant specifications and drawings issued by the Engineer, Architect and other Specialists.

8. Details and locations of existing services are based on the Topographical Survey and Utility Records received from Third Parties and Service Providers respectively, and should be considered indicative and approximate only. The existing services shown on drawings may not be exhaustive. The Contractor shall use Trial Pits and other approved methods to accurately locate and verify the positions and depths of all existing services before commencement of works on site.

Drainage Key

| | |
|---|---|
| DN150 SWS 1 in 100 | Proposed Surface Water Sewer |
| SWMH XX DN XXXX CL: XX.XX IL: XX.XX | Proposed Surface Water Manhole |
| SWCP XX DN XXXX CL: XX.XX IL: XX.XX | Proposed Ridgistorm Separate Catchpit |
| | Proposed DN150 RWP and Gully Connection |
| GYXX | Proposed Road Gully, refer to drawing BCW-BML-ERD-ZZ-DR-C-0501 for details. |
| H | Proposed Hydro-Brake Chamber. Refer to drawing BCW-BML-ERD-ZZ-DR-C-0501 for details. |
| | Proposed Manhole with installed Orifice Plate on one of the pipes |
| XX | Permavoid Diffuser Unit |

| Rev | By | Chk'd | Date | Description |
|---|---|---|---|---|
| P02 | VI | AM | 11/03/21 | Masterplan Amended |
| P01 | VI | AM | 15/10/20 | Preliminary Issue |

**PRELIMINARY DRAWING**
This drawing is not to be used for construction

Client

FI REAL ESTATE MANAGEMENT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Email: design@barnsleymarshall.co.uk
Web: www.barnsleymarshall.co.uk


BarnsleyMarshall

Project

The Bridgeway Centre,
Bridgeway Road, Wrexham

Drawing

Proposed Catchment Areas

By/Chk'd VI/AM Date 15/10/20

Drawing No. BCW-BML-ERD-ZZ-DR-C-0502 Revision P02

BML Job No. 1000-01 Status -

Drawing Scale at A1: 1:500

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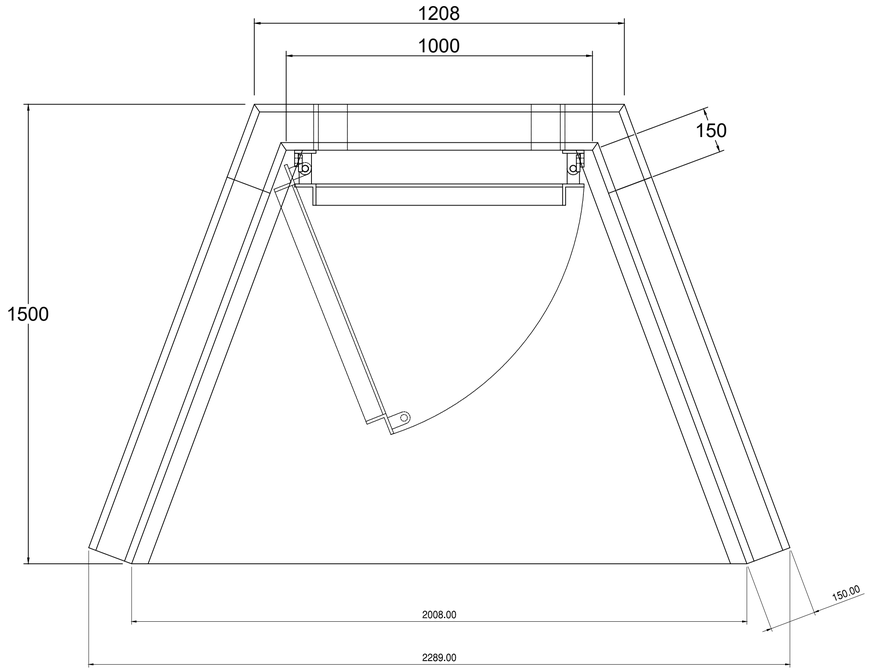
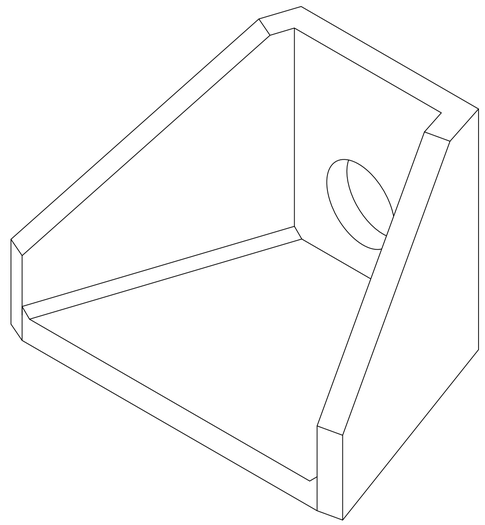
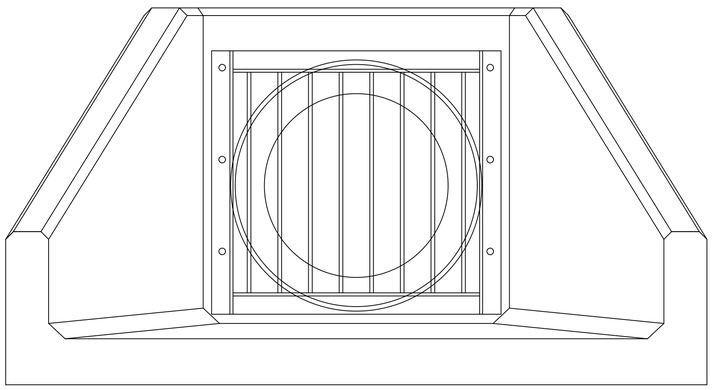
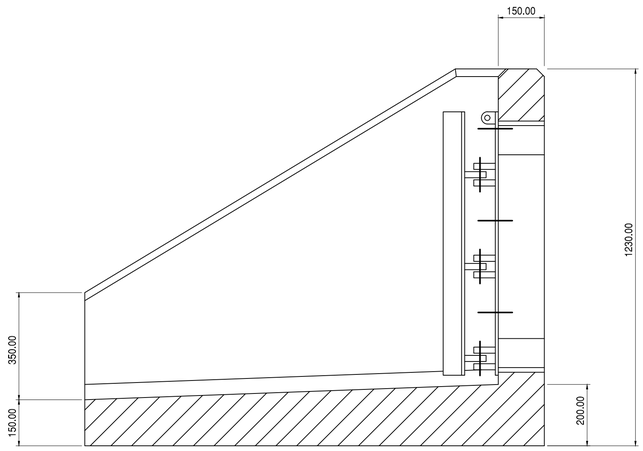
KEY:

- Hard Area for Roads, Housing and Hardstanding (Runoff Coefficient = 100%)
- Hard Area for Roads, Housing and Hardstanding (Runoff Coefficient = 100%)
- Hard Area for Roads, Housing and Hardstanding (Runoff Coefficient = 100%)
- Hard Area for Roads, Housing and Hardstanding (Runoff Coefficient = 100%)
- Hard Area for Roads, Housing and Hardstanding (Runoff Coefficient = 100%)
- 0.088 Ha (100) — 1st Row - Gross Area in Ha; 2nd Row - (PIMP)








## Headwall Outlet - Athlon SFA1 600 with Safety Grille

Scale 1:20

### Safety, Health & Environmental Information:

In addition to the hazards and risks normally associated with the types of work detailed on this drawing, please note the significant hazards identified by symbols below,

INDICATES A RESIDUAL RISK AS A WARNING

INDICATES A RESIDUAL RISK FOR INFORMATION

and described below:

### Construction/Maintenance/Cleaning/Demolition

Refer to Drawing:

### General Notes:

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| Rev | By | Chk'd | Date | Description |
|---|---|---|---|---|
| P02 | VI | AM | 11/03/21 | Drawing description amended |
| P01 | VI | AM | 15/10/20 | Preliminary Issue |

**PRELIMINARY DRAWING**
This drawing is not to be used for construction

Client

FI REAL ESTATE MANAGEMENT

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Email: design@barnsleymarshall.co.uk
Web: www.barnsleymarshall.co.uk

BarnsleyMarshall

Project

The Bridgeway Centre,
Bridgeway Road, Wrexham

Drawing

Drainage Details
Sheet 2 of 3

By/Chk'd VI/AM Date 15/10/20

Drawing No.
BCW-BML-ERD-ZZ-DR-C-0504

Revision
P02

BML Job No.
1000-01

Status
-

Drawing Scale at A1: 1:20

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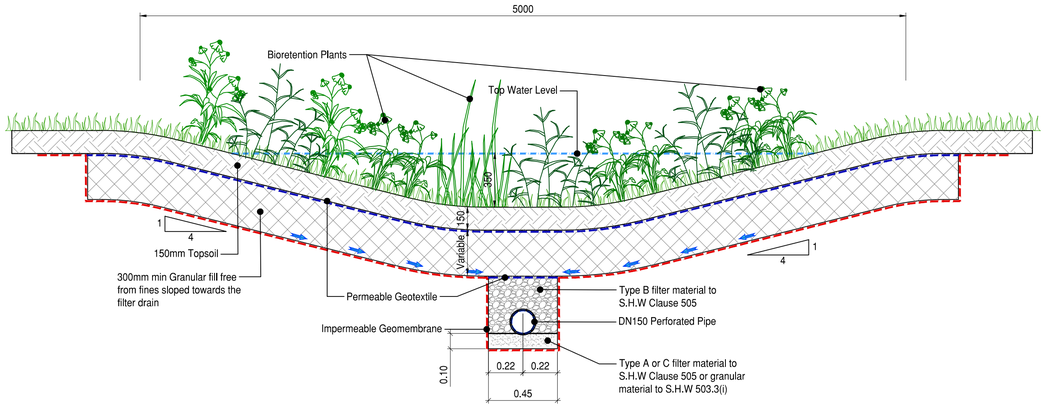
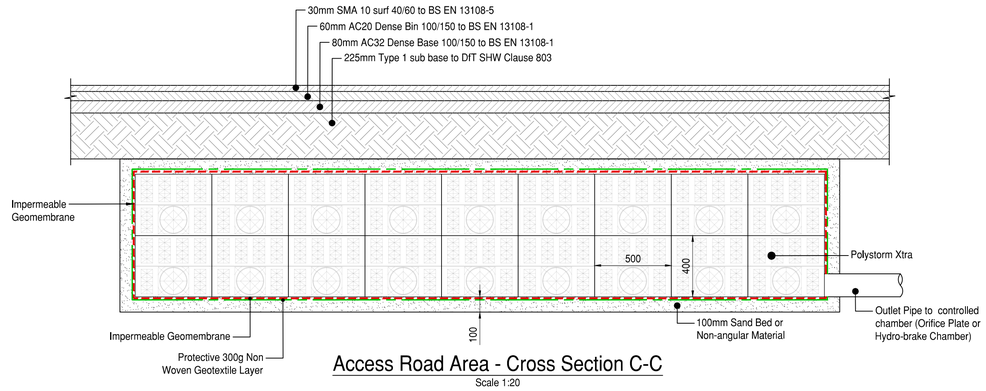


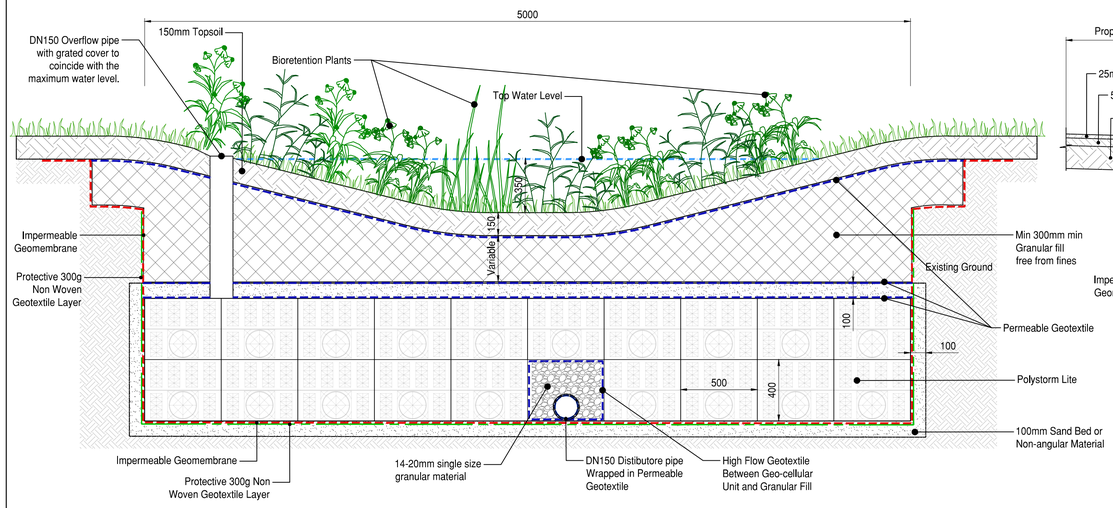

## Cascading Swale - Cross Section A-A

Scale 1:20




## Access Road Area - Cross Section C-C

Scale 1:20




## Cascading Swale - Cross Section B-B

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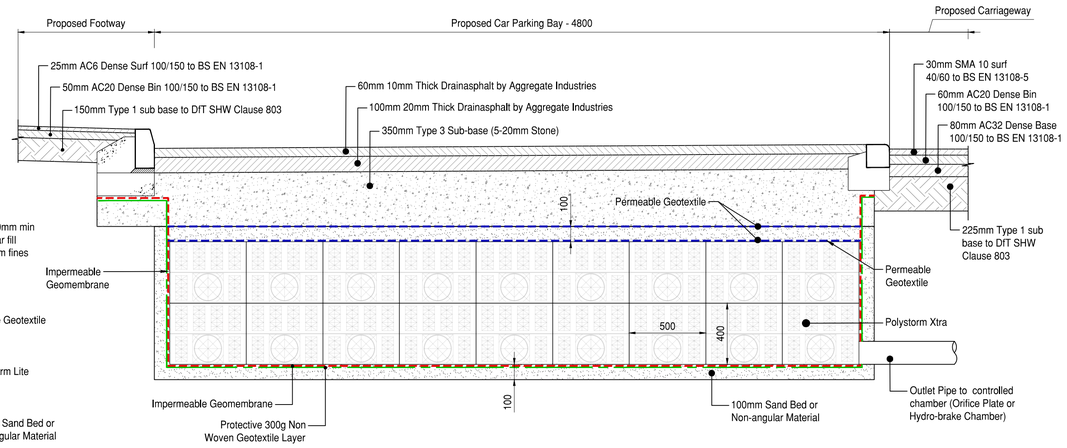
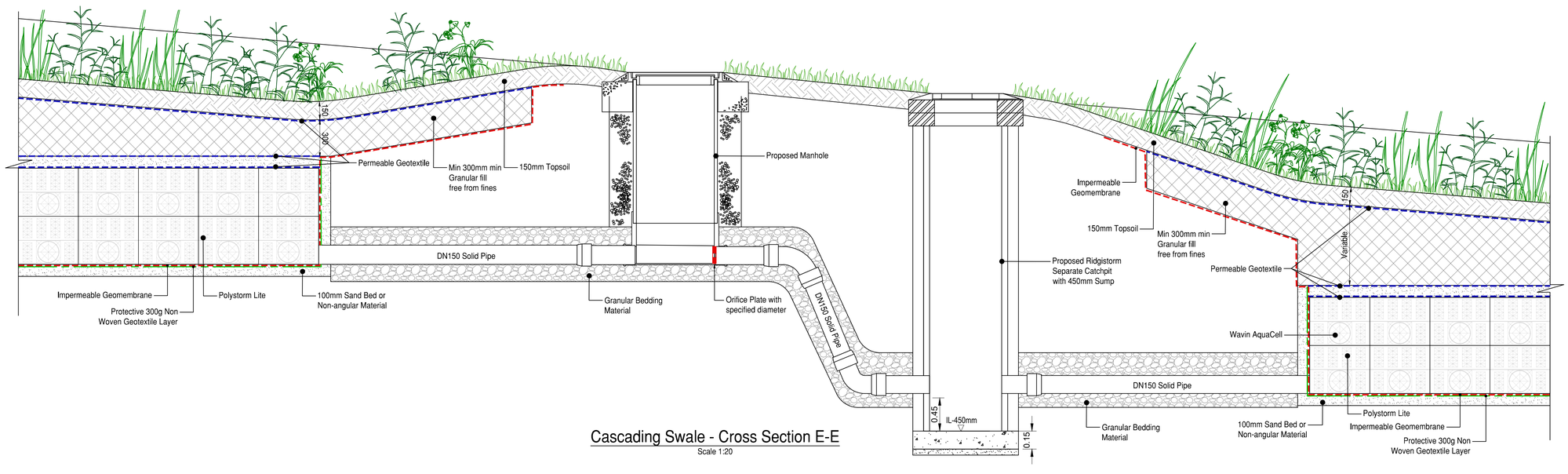



## Permeable Parking Area - Cross Section D-D

Scale 1:20




## Cascading Swale - Cross Section E-E

Scale 1:20

### Safety, Health & Environmental Information:

In addition to the hazards and risks normally associated with the types of work detailed on this drawing, please note the significant hazards identified by symbols below,

INDICATES A RESIDUAL RISK AS A WARNING

INDICATES A RESIDUAL RISK FOR INFORMATION

and described below:

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| Rev | By | Chk'd | Date | Description |
|---|---|---|---|---|
| P01 | VI | AM | 10/03/21 | Preliminary Issue |

**PRELIMINARY DRAWING**
This drawing is not to be used for construction

Client

FI REAL ESTATE MANAGEMENT


BarnsleyMarshall Limited
1 Birch Court
Blackpole East
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Tel: 01905 330550
Email: design@barnsleymarshall.co.uk
Web: www.barnsleymarshall.co.uk


Project

The Bridgeway Centre,
Bridgeway Road, Wrexham

Drawing

Drainage Details
Sheet 3 of 3

By/Chk'd VI/AM Date 10/03/21

Drawing No. BCW-BML-ERD-ZZ-DR-C-0505 Revision P01

BML Job No. 1000-01 Status -

Drawing Scale at A1: 1:20

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| Manhole Name | Cover Level (m) | MH Depth to IL (m) | Manhole Dia (mm) | Cover Loading Class | Pipe Out PN | Pipe Out Invert Level (m) | Pipe Out Diameter (mm) | Pipe In PN | Pipes In Invert Level (m) | Pipes In Diameter (mm) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S01 | 30.184 | 1.350 | 1200 | C250 | S1.000 | 28.834 | 150 | | | | Ridgistorm Separate Catchpit |
| S02 | 30.247 | 1.350 | 1200 | B125 | S2.000 | 28.897 | 150 | | | | Ridgistorm Separate Catchpit |
| S03 | 30.230 | 1.557 | 1200 | B125 | S2.001 | 28.673 | 150 | S2.000 | 28.673 | 150 | |
| S04 | 30.182 | 1.550 | 1200 | C250 | S1.001 | 28.633 Orifice 56mm | 150 | S1.000 | 28.633 | 150 | Pipe Out with Orifice Plate 56mm Dia |
| | | | | | | | | S2.001 | 28.633 | 150 | |
| S05 | 30.128 | 1.665 | 1200 | D400 | S1.002 | 28.463 | 150 | S1.001 | 28.463 | 150 | |
| S06 | 29.627 | 1.360 | 1200 | D400 | S1.003 | 28.267 | 150 | S1.002 | 28.267 | 150 | |
| S07 | 29.701 | 1.514 | 1200 | D400 | S1.004 | 28.186 Orifice 61mm | 150 | S1.003 | 28.186 | 150 | Ridgistorm Separate Catchpit; Pipe out with Orifice Plate 61mm Dia |
| S08 | 30.311 | 1.350 | 1200 | B125 | S3.000 | 28.961 | 150 | | | | Ridgistorm Separate Catchpit |
| S09 | 30.660 | 2.146 | 1200 | B125 | S3.001 | 28.515 Orifice 62mm | 150 | S3.000 | 28.515 | 150 | Pipe out with Orifice Plate 32mm Dia |
| S10 | 30.228 | 1.884 | 1200 | D400 | S3.002 | 28.344 Orifice 32mm | 150 | S3.001 | 28.344 | 150 | Ridgistorm Separate Catchpit; Pipe out with Orifice Plate32mm |
| S11 | 30.099 | 1.826 | 1200 | D400 | S3.003 | 28.273 Orifice 32mm | 150 | S3.002 | 28.273 | 150 | Pipe out with Orifice Plate 32mm Dia |
| S12 | 30.082 | 2.170 | 1200 | D400 | S1.005 | 27.911 | 150 | S1.004 | 27.911 | 150 | |
| | | | | | | | | S3.003 | 27.911 | 150 | |
| S13 | 29.673 | 2.025 | 1200 | D400 | S1.006 | 27.648 Orifice 52mm | 150 | S1.005 | 27.648 | 150 | Ridgistorm Separate Catchpit; Pipe out with Orifice Plate 52mm Dia |
| S14 | 29.745 | 2.190 | 1200 | D400 | S1.007 | 27.554 | 150 | S1.006 | 27.554 | 150 | Hydro-Brake Control Chamber |
| S15 | 30.517 | 1.350 | 1200 | B125 | S4.000 | 29.167 | 150 | | | | Ridgistorm Separate Catchpit |
| S16 | 30.371 | 1.533 | 1200 | B125 | S4.001 | 28.838 Orifice 62mm | 150 | S4.000 | 28.838 | 150 | Pipe out with Orifice Plate 32mm Dia |
| S17 | 30.259 | 1.461 | 1200 | B125 | S4.002 | 28.798 | 150 | S4.001 | 28.798 | 150 | Ridgistorm Separate Catchpit |
| S18 | 29.824 | 1.350 | 1200 | B125 | S4.003 | 28.474 Orifice Plate | 150 | S4.002 | 28.474 | 150 | Pipe out with Orifice Plate 32mm Dia |
| S19 | 29.579 | 1.348 | 1200 | B125 | S4.004 | 28.23 | 150 | S4.003 | 28.23 | 150 | |
| S20 | 29.423 | 1.349 | 1200 | D400 | S4.005 | 28.074 | 150 | S4.004 | 28.074 | 150 | |
| S21 | 29.426 | 1.397 | 1200 | D400 | S4.006 | 28.029 Orifice 32mm | 150 | S4.005 | 28.029 | 150 | Ridgistorm Separate Catchpit; Pipe out with Orifice Plate 32mm Dia |
| S22 | 29.371 | 1.990 | 1200 | D400 | S1.008 | 27.381 | 150 | S1.007 | 27.381 | 150 | |
| | | | | | | | | S4.006 | 27.381 | 150 | |
| S23 | 29.252 | 1.971 | 1200 | D400 | S1.009 | 27.28 | 150 | S1.008 | 27.28 | 150 | |
| S24 | 29.224 | 2.041 | 1200 | D400 | S1.010 | 27.184 | 150 | S1.009 | 27.184 | 150 | |
| S25 | 29.177 | 1.350 | 1200 | C250 | S5.000 | 27.827 | 150 | | | | Ridgistorm Separate Catchpit |
| S25' | 29.134 | 1.437 | 1200 | D400 | S5.001 | 27.697 Orifice 56mm | 150 | S5.000 | 27.697 | 150 | Pipe out with Orifice Plate 56mm Dia |
| S26 | 29.140 | 2.018 | 1200 | D400 | S1.011 | 27.122 | 150 | S1.010 | 27.122 | 150 | |
| | | | | | | | | S5.001 | 27.122 | 150 | |
| S27 | 28.468 | 1.629 | 1200 | D400 | S1.012 | 26.838 Orifice 74mm | 150 | S1.011 | 26.838 | 150 | Ridgistorm Separate Catchpit; Pipe out with Orifice Plate 74mm Dia |
| S28 | 29.302 | 1.350 | 1200 | B125 | S6.000 | 27.952 | 150 | | | | Ridgistorm Separate Catchpit |
| S29 | 28.638 | 1.350 | 1200 | B125 | S6.001 | 27.288 Orifice 39mm | 150 | S6.000 | 27.288 | 150 | Pipe out with Orifice Plate 39mm Dia |
| S30 | 28.580 | 1.350 | 1200 | B125 | S6.002 | 27.23 | 150 | S6.001 | 27.23 | 150 | Ridgistorm Separate Catchpit |
| S31 | 28.206 | 1.350 | 1200 | B125 | S6.003 | 26.856 Orifice 39mm | 150 | S6.002 | 26.856 | 150 | Pipe out with Orifice Plate 39mm Dia |
| S32 | 28.162 | 1.351 | 1200 | B125 | S6.004 | 26.811 | 150 | S6.003 | 26.811 | 150 | |
| S33 | 29.101 | 1.351 | 1200 | D400 | S7.000 | 27.75 | 150 | | | | |
| S34 | 28.252 | 1.350 | 1200 | D400 | S7.001 | 26.902 Orifice 52mm | 150 | S7.000 | 26.902 | 150 | Ridgistorm Separate Catchpit; Pipeout with Orifice Plate 52mm Dia |
| S35 | 27.944 | 1.349 | 1200 | D400 | S6.005 | 26.595 Orifice 90mm | 150 | S6.004 | 26.595 | 150 | Ridgistorm Separate Catchpit; Pipe in with Orifice Plate 52mm Dia; Pipe out with Orifice Plate 90mm Dia |
| | | | | | | | | S7.001 | 26.595 | 150 | |
| S36 | 27.823 | 1.380 | 1200 | D400 | S1.013 | 26.444 | 150 | S1.012 | 26.444 | 150 | |
| | | | | | | | | S6.005 | 26.444 | 150 | |
| S37 | 28.580 | 1.350 | 1200 | D400 | S8.000 | 27.23 | 150 | | | | Ridgistorm Separate Catchpit |
| S38 | 27.882 | 1.350 | 1200 | D400 | S8.001 | 26.532 Orifice 74mm | 150 | S8.000 | 26.532 | 150 | Pipe out with Orifice Plate 74mm Dia |
| S39 | 27.838 | 1.512 | 1200 | D400 | S1.014 | 26.326 | 150 | S1.013 | 26.326 | 150 | |
| | | | | | | | | S8.001 | 26.326 | 150 | |
| S40 | 28.053 | 1.350 | 1200 | D400 | S9.000 | 26.702 | 150 | | | | |
| S41 | 27.628 | 1.350 | 1200 | D400 | S9.001 | 26.278 Orifice 52mm | 150 | S9.000 | 26.278 | 150 | Ridgistorm Separate Catchpit; Pipe out with Orifice Plate 52mm Dia |
| S42 | 27.444 | 1.354 | 1200 | D400 | S9.002 | 26.09 | 150 | S9.001 | 26.09 | 150 | |
| S43 | 27.768 | 1.784 | 1200 | D400 | S1.015 | 25.983 | 150 | S1.014 | 25.983 | 150 | Ridgistorm Separate Catchpit |
| | | | | | | | | S9.002 | 25.983 | 150 | |
| S44 | 27.656 | 1.739 | 1200 | C250 | S1.016 | 25.917 | 225 | S1.015 | 25.917 | 150 | Complex Control Chamber Hydro-Brake 1 MDSHE-0176 -1450-0700-1450 Hydro-Brake 2 MDSHE-0229-2600-0500-2600 |

| Attenuation Tank Number | Plan Area (m2) | Depth (m) | Gross Volume (m3) | Effective Volume (m3) | Type of control |
|---|---|---|---|---|---|
| 1 | 350.00 | 0.40 | 140.00 | 133.00 | Orifice Plate 56mm Dia |
| 2 | 120.00 | 0.80 | 96.00 | 91.20 | Orifice Plate 61mm Dia |
| 3 | 315.70 | 0.80 | 252.00 | 240.00 | Orifice Plate 40mm Dia |
| 4 | 18.40 | 0.80 | 14.70 | 14.00 | Orifice Plate 32mm Dia |
| 5 | 78.90 | 0.80 | 63.20 | 60.00 | Orifice Plate 32mm Dia |
| 6 | 150.00 | 0.80 | 120.00 | 114.00 | Orifice Plate 52mm Dia |
| 7 | 157.90 | 1.20 | 189.50 | 180.00 | Hydro-Brake MD-SCL-0145-1200-1200-1200 |
| 8 | 150.00 | 0.80 | 115.80 | 110.00 | Orifice Plate 32mm Dia |
| 9 | 144.70 | 0.80 | 200.00 | 190.00 | Orifice Plate 32mm Dia |
| 10 | 80.00 | 0.80 | 64.00 | 60.80 | Orifice Plate 32mm Dia |
| 11 | 90.00 | 0.40 | 36.00 | 34.20 | Orifice Plate 56mm Dia |
| 12 | 150.00 | 0.80 | 120.00 | 114.00 | Orifice Plate 74mm Dia |
| 13 | 100.00 | 0.40 | 40.00 | 38.00 | Orifice Plate 39mm Dia |
| 14 | 150.00 | 0.40 | 60.00 | 57.00 | Orifice Plate 39mm Dia |
| 15 | 237.00 | 0.80 | 189.50 | 180.00 | Orifice Plate 52mm Dia |
| 16 | 92.10 | 0.80 | 73.70 | 70.00 | Orifice Plate 90mm Dia |
| 17 | 72.30 | 0.80 | 57.80 | 54.90 | Orifice Plate 74mm Dia |
| 18 | 164.50 | 0.80 | 131.60 | 125.00 | Orifice Plate 52mm Dia |

## Safety, Health & Environmental Information:

In addition to the hazards and risks normally associated with the types of work detailed on this drawing, please note the significant hazards identified by symbols below,

INDICATES A RESIDUAL RISK AS A WARNING

INDICATES A RESIDUAL RISK FOR INFORMATION

and described below:

## Construction/Maintenance/Cleaning/Demolition

## General Notes:

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7. This drawing is to be read in conjunction with all relevant specifications and drawings issued by the Engineer, Architect and other Specialists.

8. Details and locations of existing services are based on the Topographical Survey and Utility Records received from Third Parties and Service Providers respectively, and should be considered indicative and approximate only. The existing services shown on drawings may not be exhaustive. The Contractor shall use Trial Pits and other approved methods to accurately locate and verify the positions and depths of all existing services before commencement of works on site.

| Rev | By | Chk'd | Date | Description |
|---|---|---|---|---|
| P01 | VI | AM | 11/03/21 | Preliminary Issue |

PRELIMINARY DRAWING
This drawing is not to be used for construction

Client

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Web: www.barnsleymarshall.co.uk

BarnsleyMarshall

Project

The Bridgeway Centre,
Bridgeway Road, Wrexham

Drawing

Proposed Surface Water
Manhole Schedule

By/Chk'd VI/AM Date 11/03/21

Drawing No. BCW-BML-ERD-ZZ-DR-C-0506

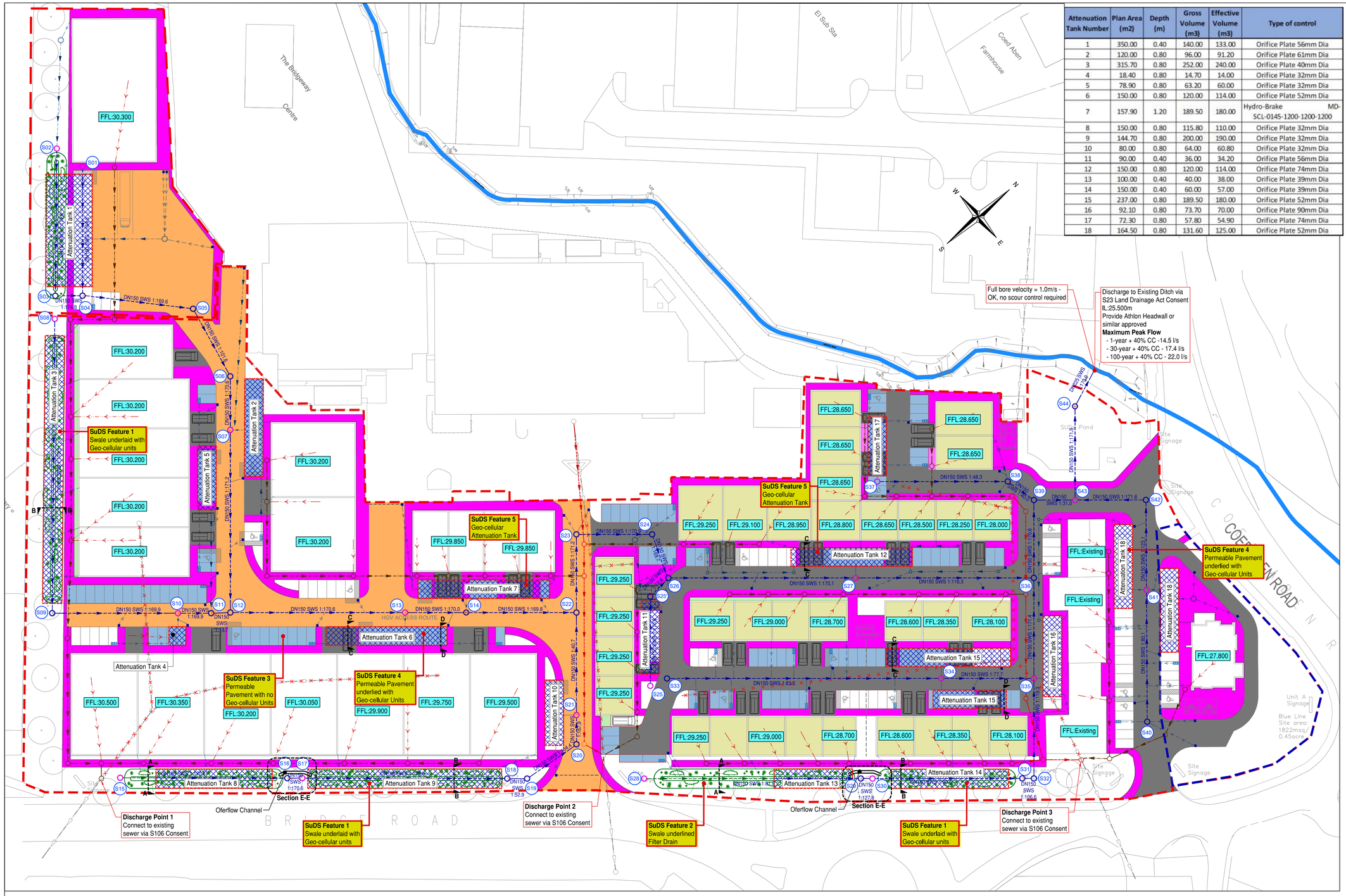
Revision P01

BML Job No. 1000-01

Status -

Drawing Scale at A1: 1:20

CAD Filename: C:\Users\Valerie.Azurel\Onedrive\BM Server - Shared\Projects\1000-01 Bridgeway Centre, Wrexham\BML Drawings\Working\CIVIL\SCH-BML-ERD-CZ-DR-C-0506 P01 - PRICPOSED SW MANHOLE SCHEDULE.dwg




| Attenuation Tank Number | Plan Area (m2) | Depth (m) | Gross Volume (m3) | Effective Volume (m3) | Type of control |
|---|---|---|---|---|---|
| 1 | 350.00 | 0.40 | 140.00 | 133.00 | Orifice Plate 56mm Dia |
| 2 | 120.00 | 0.80 | 96.00 | 91.20 | Orifice Plate 61mm Dia |
| 3 | 315.70 | 0.80 | 252.00 | 240.00 | Orifice Plate 40mm Dia |
| 4 | 18.40 | 0.80 | 14.70 | 14.00 | Orifice Plate 32mm Dia |
| 5 | 78.90 | 0.80 | 63.20 | 60.00 | Orifice Plate 32mm Dia |
| 6 | 150.00 | 0.80 | 120.00 | 114.00 | Orifice Plate 52mm Dia |
| 7 | 157.90 | 1.20 | 189.50 | 180.00 | Hydro-Brake MD-SCL-0145-1200-1200-1200 |
| 8 | 150.00 | 0.80 | 115.80 | 110.00 | Orifice Plate 32mm Dia |
| 9 | 144.70 | 0.80 | 200.00 | 190.00 | Orifice Plate 32mm Dia |
| 10 | 80.00 | 0.80 | 64.00 | 60.80 | Orifice Plate 32mm Dia |
| 11 | 90.00 | 0.40 | 36.00 | 34.20 | Orifice Plate 56mm Dia |
| 12 | 150.00 | 0.80 | 120.00 | 114.00 | Orifice Plate 74mm Dia |
| 13 | 100.00 | 0.40 | 40.00 | 38.00 | Orifice Plate 39mm Dia |
| 14 | 150.00 | 0.40 | 60.00 | 57.00 | Orifice Plate 39mm Dia |
| 15 | 237.00 | 0.80 | 189.50 | 180.00 | Orifice Plate 52mm Dia |
| 16 | 92.10 | 0.80 | 73.70 | 70.00 | Orifice Plate 90mm Dia |
| 17 | 72.30 | 0.80 | 57.80 | 54.90 | Orifice Plate 74mm Dia |
| 18 | 164.50 | 0.80 | 131.60 | 125.00 | Orifice Plate 52mm Dia |

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## Notes:

1. For Surface Water Manhole Schedule and Attenuation Tanks Schedule refer to drawing BCW-BML-ERD-ZZ-DR-C-0506

2. For cross-sections A-A, B-B, C-C, D-D and E-E refer to drawing number BCW-BML-ERD-ZZ-DR-C-0505

| Rev | By | Chk'd | Date | Description |
|---|---|---|---|---|
| P02 | VI | AM | 11/03/21 | Surface Water Peak Flow reduced to Greenfield rate |
| P01 | VI | AM | 13/10/20 | Preliminary Issue |

**PRELIMINARY DRAWING**
This drawing is not to be used for construction

Client

FI REAL ESTATE MANAGEMENT


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Blackpole East
Worcester
WR3 8SG

Tel: 01905 330550
Email: design@barnsleymarshall.co.uk
Web: www.barnsleymarshall.co.uk


Project

The Bridgeway Centre,
Bridgeway Road, Wrexham

Drawing

Combined Drainage Layout

By/Chk'd VI/AM Date 13/10/20

Drawing No. BCW-BML-ERD-ZZ-DR-C-0500

Revision P02

BML Job No. 1000-01

Status -

Drawing Scale at A1: 1:500

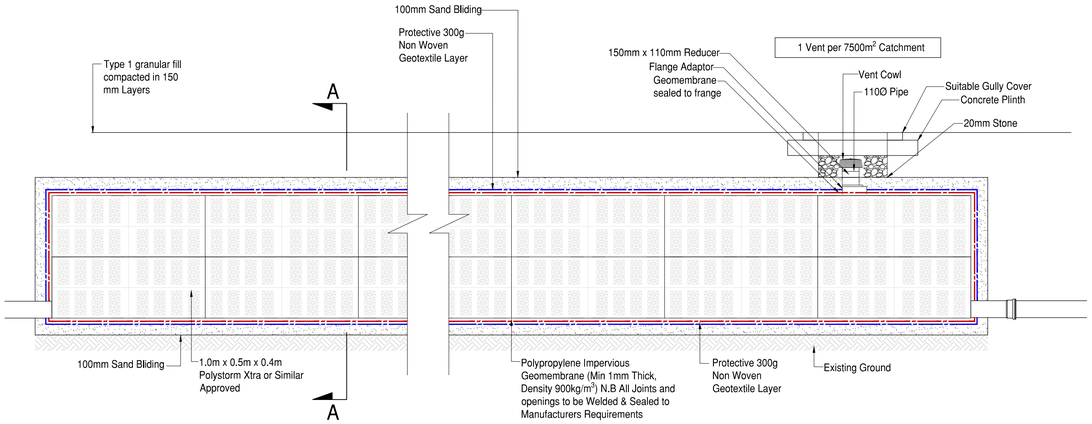
CAD Filename: C:\Users\Victoria.Ayres\Christians\BM Server - SharedProjects\1000-01 Bridgeway Centre, Wrexham\BML Drawings\Working\CIVIL\BCW-BML-ERD-ZZ-DR-C-0500 P02 - COMBINED DRAINAGE LAYOUT.dwg

Drainage Key

| | |
|---|---|
| DN150 SWS 1 in 100 | Proposed Surface Water Sewer |
| SWMH XX DN XXXX CL: XX.XX IL: XX.XX | Proposed Surface Water Manhole |
| SWCP XX DN XXXX CL: XX.XX IL: XX.XX | Proposed Ridgistorm Separate Catchpit |
| | Proposed DN150 RWP and Gully Connection |
| GYXX | Proposed Road Gully, refer to drawing BCW-BML-ERD-ZZ-DR-C-0501 for details. |
| | Proposed Hydro-Brake Chamber. Refer to drawing BCW-BML-ERD-ZZ-DR-C-0501 for details. |
| | Proposed Manhole with installed Orifice Plate on one of the pipes |

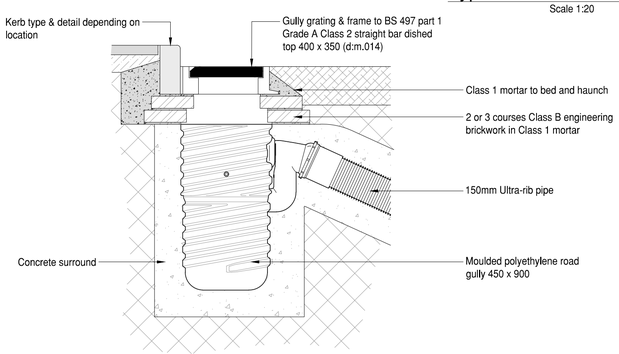
| | |
|---|---|
| XX | Permavoid Diffuser Unit |
| DN150 FWS 1 in 100 | Proposed Foul Water Sewer |
| FWMH XX DN XXXX CL: XX.XX IL: XX.XX | Proposed Foul Water Manhole |
| WW COMB | Existing WW Combined Sewer |
| WW COMB | Existing WW Combined Sewer to be removed |
| DN150 COMB 1:80 | Diverted WW Combined Sewer |
| | Site Boundary |
| FFL:29.500 | Assumed Finished Floor Level |

| | |
|---|---|
| | Proposed Asphalt Access Road |
| | Proposed Asphalt Access Road suitable for HGV |
| | Proposed Permeable Paving |
| | Proposed Asphalt Footpath |
| | Existing and Proposed Green Areas |
| | Proposed Building |



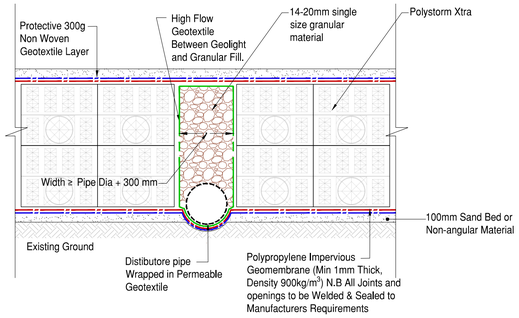

## Typical Cellular Storage Tank

Scale 1:20

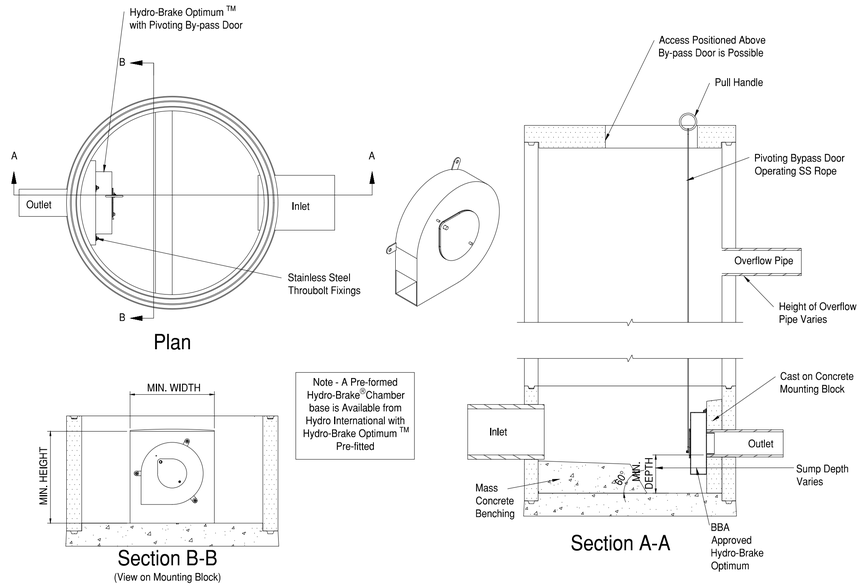



## Gully Detail

NTS




## Section A-A




Note - A Pre-formed Hydro-Brake® Chamber base is Available from Hydro International with Hydro-Brake Optimum ™ Pre-fitted

## Plan

## Section B-B

(View on Mounting Block)

## Section A-A

## Typical Hydrobrake Chamber Detail With Overflow Pipe

Scale 1:20

### Safety, Health & Environmental Information:

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INDICATES A RESIDUAL RISK AS A WARNING

INDICATES A RESIDUAL RISK FOR INFORMATION

and described below:

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Refer to Drawing:

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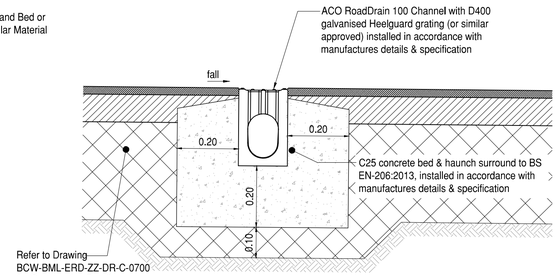
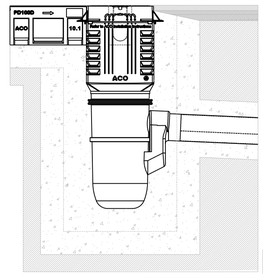
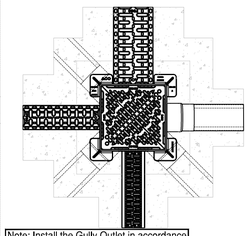



## ACO RoadDrain Detail

NTS

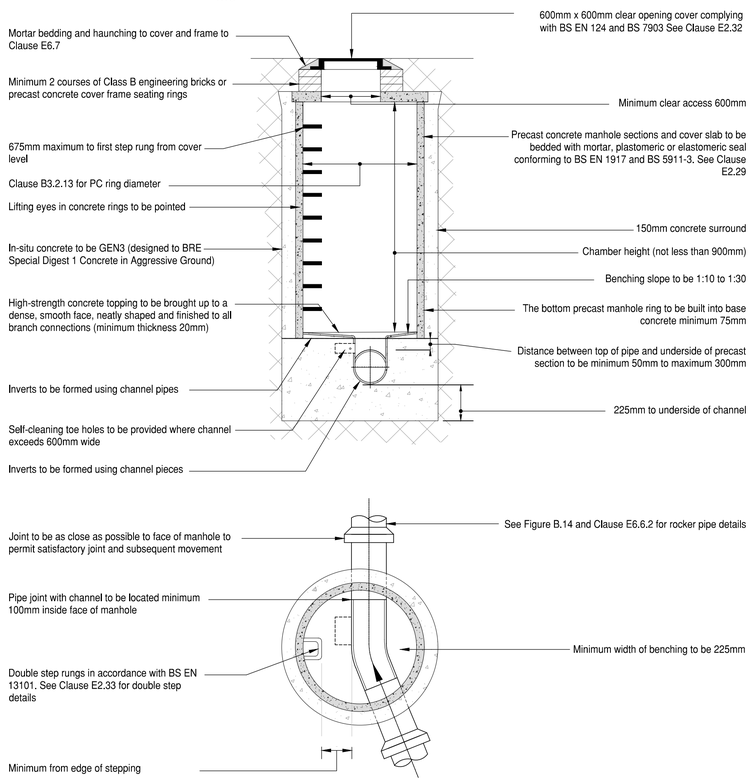




Note: Install the Gully Outlet in accordance with manufactures requirements. Use ACO Gully Outlet or similar approved.

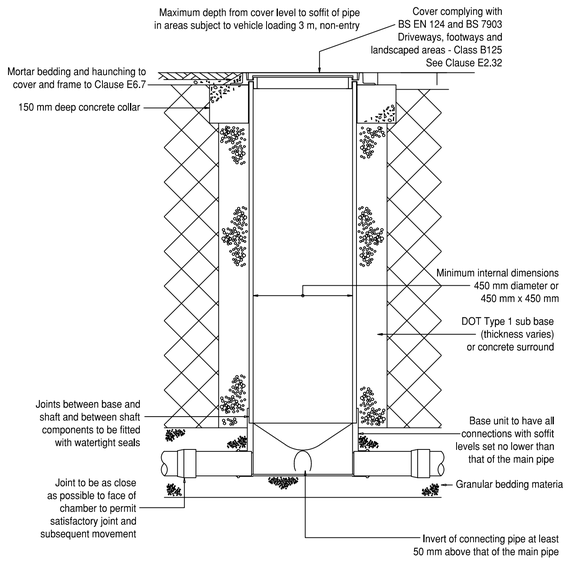
## ACO Gully Outlet Details

NTS



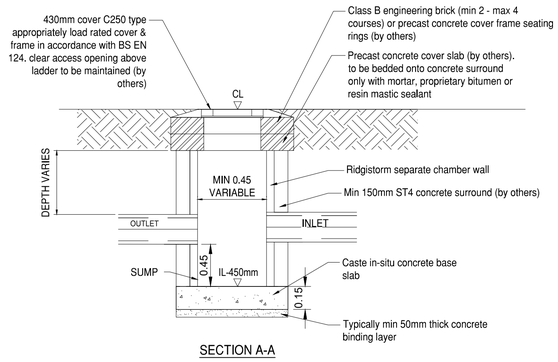

## Typical Manhole Detail (Max depth from cover to soffit of pipe 3.0m)

Scale 1:20

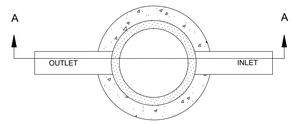



## Typical Inspection Chamber Detail (Flexible Material Detail)

NTS




SECTION A-A




PLAN

## Rigistorm Separate Catchpit

NTS

| Rev | By | Chk'd | Date | Description |
|---|---|---|---|---|
| P02 | VI | AM | 11/03/21 | Details Amended |
| P01 | VI | AM | 15/10/20 | Preliminary Issue |

**PRELIMINARY DRAWING**

This drawing is not to be used for construction

Client

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Web: www.barnsleymarshall.co.uk


BarnsleyMarshall

Project

The Bridgeway Centre, Bridgeway Road, Wrexham

Drawing

Drainage Details Sheet 1 of 3

By/Chk'd VI/AM Date 15/10/20

Drawing No. BCW-BML-ERD-ZZ-DR-C-0501

Revision P02

BML Job No. 1000-01

Status -

Drawing Scale at A1: As Shown

CAD Filename: C:\Users\Valerie.Azaral\Christiana-BM Server - Share\Project\1000-01 Bridgeway Centre, Wrexham\BML Drawings\Working\DRG\BCW-BML-ERD-ZZ-DR-C-0501-P02 - DRAINAGE DETAILS 1 OF 3.dwg

Appendix E

# PEAK FOUL FLOW CALCULATION PROCEDURE

***(used by UK water companies)***

## *BRIDGEWAY CENTRE - DISCHARGE POINT 4*

***NOTE: PLEASE ENTER DATA IN YELLOW CELLS ONLY***

**DOMESTIC PREMISES**
**(houses, apartments, flats, etc)**

| | |
|---|---|
| 1) Assume a Dry Weather Flow (DWF) of 225 litres/person/day | 0.0026042 |
| 2) Assume 3 people/dwelling (houses, apartments, flats, etc) | 3 |
| 3) Enter number of dwellings (houses, apartments, flats, etc) | 0 |
| DOMESTIC PEAK FLOW, **l/s** | **0** |

***NOTE: PLEASE ENTER DATA IN YELLOW CELLS ONLY***

**COMMERCIAL PREMISES**
**(restaurants, shops, offices, gym, etc)**

| | |
|---|---|
| 1) Assume a Dry Weather Flow (DWF) of 300 litres/100m2/day | 0.0000347 |
| 3) Enter the total area of commerical space (restaurants, shops, gym, , etc) | 1486 |
| COMMMERCIAL PEAK FLOW, **l/s** | **0.10319444** |

| | |
|---|---|
| **TOTAL PEAK FOUL FLOW, l/s** | **0.10** |

# PEAK FOUL FLOW CALCULATION PROCEDURE

***(used by UK water companies)***

## *BRIDGEWAY CENTRE - DISCHARGE POINT 5*

***NOTE: PLEASE ENTER DATA IN YELLOW CELLS ONLY***

**DOMESTIC PREMISES**
**(houses, apartments, flats, etc)**

| | |
|---|---|
| 1) Assume a Dry Weather Flow (DWF) of 225 litres/person/day | 0.0026042 |
| 2) Assume 3 people/dwelling (houses, apartments, flats, etc) | 3 |
| 3) Enter number of dwellings (houses, apartments, flats, etc) | 0 |
| DOMESTIC PEAK FLOW, **l/s** | **0** |

***NOTE: PLEASE ENTER DATA IN YELLOW CELLS ONLY***

**COMMERCIAL PREMISES**
**(restaurants, shops, offices, gym, etc)**

| | |
|---|---|
| 1) Assume a Dry Weather Flow (DWF) of 300 litres/100m2/day | 0.0000347 |
| 3) Enter the total area of commerical space (restaurants, shops, gym, , etc) | 1480 |
| COMMMERCIAL PEAK FLOW, **l/s** | **0.10277778** |

| | |
|---|---|
| **TOTAL PEAK FOUL FLOW, l/s** | **0.10** |

# PEAK FOUL FLOW CALCULATION PROCEDURE

***(used by UK water companies)***

## *BRIDGEWAY CENTRE - DISCHARGE POINT 6*

***NOTE: PLEASE ENTER DATA IN YELLOW CELLS ONLY***

**DOMESTIC PREMISES**
**(houses, apartments, flats, etc)**

| | |
|---|---|
| 1) Assume a Dry Weather Flow (DWF) of 225 litres/person/day | 0.0026042 |
| 2) Assume 3 people/dwelling (houses, apartments, flats, etc) | 3 |
| 3) Enter number of dwellings (houses, apartments, flats, etc) | 0 |
| DOMESTIC PEAK FLOW, **l/s** | **0** |

***NOTE: PLEASE ENTER DATA IN YELLOW CELLS ONLY***

**COMMERCIAL PREMISES**
**(restaurants, shops, offices, gym, etc)**

| | |
|---|---|
| 1) Assume a Dry Weather Flow (DWF) of 300 litres/100m2/day | 0.0000347 |
| 3) Enter the total area of commerical space (restaurants, shops, gym, , etc) | 2079 |
| COMMMERCIAL PEAK FLOW, **l/s** | **0.144375** |

| | |
|---|---|
| **TOTAL PEAK FOUL FLOW, l/s** | **0.14** |

# PEAK FOUL FLOW CALCULATION PROCEDURE

***(used by UK water companies)***

## *BRIDGEWAY CENTRE - DISCHARGE POINT 7*

***NOTE: PLEASE ENTER DATA IN YELLOW CELLS ONLY***

**DOMESTIC PREMISES**
**(houses, apartments, flats, etc)**

| | |
|---|---|
| 1) Assume a Dry Weather Flow (DWF) of 225 litres/person/day | 0.0026042 |
| 2) Assume 3 people/dwelling (houses, apartments, flats, etc) | 3 |
| 3) Enter number of dwellings (houses, apartments, flats, etc) | 0 |
| DOMESTIC PEAK FLOW, **l/s** | **0** |

***NOTE: PLEASE ENTER DATA IN YELLOW CELLS ONLY***

**COMMERCIAL PREMISES**
**(restaurants, shops, offices, gym, etc)**

| | |
|---|---|
| 1) Assume a Dry Weather Flow (DWF) of 300 litres/100m2/day | 0.0000347 |
| 3) Enter the total area of commerical space (restaurants, shops, gym, , etc) | 674 |
| COMMMERCIAL PEAK FLOW, **l/s** | **0.04680556** |

| | |
|---|---|
| **TOTAL PEAK FOUL FLOW, l/s** | **0.05** |

# PEAK FOUL FLOW CALCULATION PROCEDURE

***(used by UK water companies)***

## *BRIDGEWAY CENTRE - DISCHARGE POINT 8*

***NOTE: PLEASE ENTER DATA IN YELLOW CELLS ONLY***

**DOMESTIC PREMISES**
**(houses, apartments, flats, etc)**

| | |
|---|---|
| 1) Assume a Dry Weather Flow (DWF) of 225 litres/person/day | 0.0026042 |
| 2) Assume 3 people/dwelling (houses, apartments, flats, etc) | 3 |
| 3) Enter number of dwellings (houses, apartments, flats, etc) | 0 |
| DOMESTIC PEAK FLOW, **l/s** | **0** |

***NOTE: PLEASE ENTER DATA IN YELLOW CELLS ONLY***

**COMMERCIAL PREMISES**
**(restaurants, shops, offices, gym, etc)**

| | |
|---|---|
| 1) Assume a Dry Weather Flow (DWF) of 300 litres/100m2/day | 0.0000347 |
| 3) Enter the total area of commerical space (restaurants, shops, gym, , etc) | 181 |
| COMMMERCIAL PEAK FLOW, **l/s** | **0.01256944** |

| | |
|---|---|
| **TOTAL PEAK FOUL FLOW, l/s** | **0.01** |

## ICP SUDS Mean Annual Flood

Input

| | | | |
|---|---|---|---|
| Return Period (years) | 100 | Soil | 0.450 |
| Area (ha) | 3.350 | Urban | 0.000 |
| SAAR (mm) | 810 | Region Number | Region 4 |

| **Results** | **l/s** |
|---|---|
| QBAR Rural | 17.5 |
| QBAR Urban | 17.5 |
| Q100 years | 44.9 |
| Q1 year | 14.5 |
| Q30 years | 34.2 |
| Q100 years | 44.9 |

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## STORM SEWER DESIGN by the Modified Rational Method

### Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

| | | | |
|---|---|---|---|
| Return Period (years) | 2 | PIMP (%) | 100 |
| M5-60 (mm) | 18.000 | Add Flow / Climate Change (%) | 40 |
| Ratio R | 0.325 | Minimum Backdrop Height (m) | 4.000 |
| Maximum Rainfall (mm/hr) | 250 | Maximum Backdrop Height (m) | 4.000 |
| 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) | 0.76 |
| Volumetric Runoff Coeff. | 0.750 | Min Slope for Optimisation (1:X) | 500 |

Designed with Level Soffits

### Time Area Diagram for Storm

| Time (mins) | Area (ha) | Time (mins) | Area (ha) | Time (mins) | Area (ha) | Time (mins) | Area (ha) |
|---|---|---|---|---|---|---|---|
| 0-4 | 0.710 | 4-8 | 1.320 | 8-12 | 0.717 | 12-16 | 0.003 |

Total Area Contributing (ha) = 2.750

Total Pipe Volume (m³) = 20.620

### Network Design Table for Storm

« - Indicates pipe capacity < flow

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | 33.240 | 0.202 | 164.8 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S2.000 | 38.235 | 0.224 | 170.6 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S2.001 | 7.049 | 0.040 | 174.8 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |

### Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | 53.85 | 5.71 | 28.834 | 0.000 | 0.0 | 0.0 | 0.0 | 0.78 | 13.8 | 0.0 |
| S2.000 | 53.38 | 5.83 | 28.897 | 0.000 | 0.0 | 0.0 | 0.0 | 0.77 | 13.5 | 0.0 |
| S2.001 | 52.79 | 5.99 | 28.673 | 0.000 | 0.0 | 0.0 | 0.0 | 0.76 | 13.4 | 0.0 |

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## Network Design Table for Storm

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S1.001 | 28.777 | 0.170 | 169.6 | 0.239 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.002 | 19.865 | 0.196 | 101.6 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.003 | 13.831 | 0.081 | 170.6 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.004 | 47.053 | 0.275 | 171.2 | 0.166 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S3.000 | 76.078 | 0.446 | 170.5 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S3.001 | 29.005 | 0.171 | 169.9 | 0.244 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S3.002 | 11.998 | 0.071 | 169.9 | 0.045 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S3.003 | 4.969 | 0.362 | 13.7 | 0.080 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.005 | 45.002 | 0.264 | 170.6 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.006 | 15.817 | 0.093 | 170.0 | 0.090 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.007 | 29.411 | 0.173 | 169.8 | 0.206 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S4.000 | 56.129 | 0.329 | 170.6 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S4.001 | 6.861 | 0.040 | 170.6 | 0.174 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S4.002 | 40.586 | 0.324 | 125.5 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S4.003 | 12.907 | 0.244 | 52.9 | 0.185 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S4.004 | 16.340 | 0.157 | 104.4 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S4.005 | 7.516 | 0.045 | 167.9 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S4.006 | 26.403 | 0.648 | 40.7 | 0.068 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |

## Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.001 | 50.58 | 6.61 | 28.633 | 0.239 | 0.0 | 0.0 | 13.1 | 0.77 | 13.6« | 45.9 |
| S1.002 | 49.49 | 6.94 | 28.463 | 0.239 | 0.0 | 0.0 | 13.1 | 1.00 | 17.6« | 45.9 |
| S1.003 | 48.55 | 7.24 | 28.267 | 0.239 | 0.0 | 0.0 | 13.1 | 0.77 | 13.5« | 45.9 |
| S1.004 | 45.65 | 8.27 | 28.186 | 0.405 | 0.0 | 0.0 | 20.0 | 0.77 | 13.5« | 70.2 |
| S3.000 | 50.44 | 6.65 | 28.961 | 0.000 | 0.0 | 0.0 | 0.0 | 0.77 | 13.5 | 0.0 |
| S3.001 | 48.43 | 7.28 | 28.515 | 0.244 | 0.0 | 0.0 | 12.8 | 0.77 | 13.6« | 44.8 |
| S3.002 | 47.66 | 7.54 | 28.344 | 0.290 | 0.0 | 0.0 | 14.9 | 0.77 | 13.6« | 52.3 |
| S3.003 | 47.57 | 7.57 | 28.273 | 0.369 | 0.0 | 0.0 | 19.0 | 2.73 | 48.3« | 66.6 |
| S1.005 | 43.25 | 9.25 | 27.911 | 0.775 | 0.0 | 0.0 | 36.3 | 0.77 | 13.5« | 127.0 |
| S1.006 | 42.47 | 9.59 | 27.648 | 0.865 | 0.0 | 0.0 | 39.8 | 0.77 | 13.6« | 139.3 |
| S1.007 | 41.12 | 10.23 | 27.554 | 1.071 | 0.0 | 0.0 | 47.7 | 0.77 | 13.6« | 166.9 |
| S4.000 | 51.94 | 6.22 | 29.167 | 0.000 | 0.0 | 0.0 | 0.0 | 0.77 | 13.5 | 0.0 |
| S4.001 | 51.41 | 6.37 | 28.838 | 0.174 | 0.0 | 0.0 | 9.7 | 0.77 | 13.5« | 33.9 |
| S4.002 | 48.92 | 7.13 | 28.798 | 0.174 | 0.0 | 0.0 | 9.7 | 0.90 | 15.8« | 33.9 |
| S4.003 | 48.44 | 7.28 | 28.474 | 0.359 | 0.0 | 0.0 | 18.8 | 1.39 | 24.5« | 65.9 |
| S4.004 | 47.62 | 7.56 | 28.230 | 0.359 | 0.0 | 0.0 | 18.8 | 0.98 | 17.4« | 65.9 |
| S4.005 | 47.15 | 7.72 | 28.074 | 0.359 | 0.0 | 0.0 | 18.8 | 0.77 | 13.7« | 65.9 |
| S4.006 | 46.38 | 8.00 | 28.029 | 0.427 | 0.0 | 0.0 | 21.5 | 1.58 | 27.9« | 75.1 |

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## Network Design Table for Storm

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S1.008 | 17.251 | 0.101 | 171.2 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S1.009 | 16.529 | 0.097 | 170.9 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S1.010 | 10.398 | 0.061 | 169.7 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S5.000 | 22.237 | 0.130 | 170.6 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S5.001 | 7.273 | 0.575 | 12.6 | 0.100 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S1.011 | 48.297 | 0.284 | 170.1 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S1.012 | 45.920 | 0.395 | 116.3 | 0.238 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S6.000 | 54.321 | 0.663 | 81.9 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S6.001 | 7.499 | 0.059 | 127.8 | 0.088 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S6.002 | 33.866 | 0.374 | 90.6 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S6.003 | 4.782 | 0.045 | 106.6 | 0.066 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S6.004 | 25.796 | 0.216 | 119.3 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S7.000 | 70.752 | 0.848 | 83.5 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S7.001 | 23.862 | 0.307 | 77.7 | 0.300 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S6.005 | 25.924 | 0.151 | 171.4 | 0.083 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S1.013 | 20.047 | 0.118 | 170.6 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |

## Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.008 | 40.37 | 10.60 | 27.381 | 1.498 | 0.0 | 0.0 | 65.5 | 0.77 | 13.5« | 229.2 |
| S1.009 | 39.68 | 10.96 | 27.280 | 1.498 | 0.0 | 0.0 | 65.5 | 0.77 | 13.5« | 229.2 |
| S1.010 | 39.26 | 11.19 | 27.184 | 1.498 | 0.0 | 0.0 | 65.5 | 0.77 | 13.6« | 229.2 |
| S5.000 | 54.76 | 5.48 | 27.827 | 0.000 | 0.0 | 0.0 | 0.0 | 0.77 | 13.5 | 0.0 |
| S5.001 | 54.58 | 5.53 | 27.697 | 0.100 | 0.0 | 0.0 | 5.9 | 2.85 | 50.3 | 20.6 |
| S1.011 | 37.46 | 12.24 | 27.122 | 1.597 | 0.0 | 0.0 | 65.5 | 0.77 | 13.6« | 229.2 |
| S1.012 | 36.17 | 13.06 | 26.838 | 1.836 | 0.0 | 0.0 | 71.9 | 0.93 | 16.5« | 251.8 |
| S6.000 | 53.45 | 5.81 | 27.952 | 0.000 | 0.0 | 0.0 | 0.0 | 1.11 | 19.6 | 0.0 |
| S6.001 | 52.91 | 5.96 | 27.288 | 0.088 | 0.0 | 0.0 | 5.0 | 0.89 | 15.7« | 17.6 |
| S6.002 | 50.99 | 6.49 | 27.230 | 0.088 | 0.0 | 0.0 | 5.0 | 1.06 | 18.7 | 17.6 |
| S6.003 | 50.71 | 6.57 | 26.856 | 0.154 | 0.0 | 0.0 | 8.5 | 0.97 | 17.2« | 29.6 |
| S6.004 | 49.19 | 7.04 | 26.811 | 0.154 | 0.0 | 0.0 | 8.5 | 0.92 | 16.2« | 29.6 |
| S7.000 | 52.48 | 6.07 | 27.750 | 0.000 | 0.0 | 0.0 | 0.0 | 1.10 | 19.5 | 0.0 |
| S7.001 | 51.24 | 6.42 | 26.902 | 0.300 | 0.0 | 0.0 | 16.6 | 1.14 | 20.2« | 58.2 |
| S6.005 | 47.48 | 7.60 | 26.595 | 0.536 | 0.0 | 0.0 | 27.6 | 0.76 | 13.5« | 96.5 |
| S1.013 | 35.54 | 13.50 | 26.444 | 2.372 | 0.0 | 0.0 | 91.3 | 0.77 | 13.5« | 319.6 |

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## Network Design Table for Storm

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S8.000 | 33.673 | 0.698 | 48.3 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S8.001 | 8.247 | 0.206 | 40.0 | 0.153 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.014 | 10.617 | 0.343 | 31.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S9.000 | 33.990 | 0.424 | 80.1 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S9.001 | 23.160 | 0.188 | 123.1 | 0.225 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S9.002 | 18.274 | 0.107 | 171.6 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.015 | 11.447 | 0.067 | 171.9 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.016 | 11.389 | 0.067 | 170.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |

## Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| S8.000 | 55.16 | 5.39 | 27.230 | 0.000 | 0.0 | 0.0 | 0.0 | 1.45 | 25.7 | 0.0 |
| S8.001 | 54.80 | 5.47 | 26.532 | 0.153 | 0.0 | 0.0 | 9.1 | 1.60 | 28.2« | 31.8 |
| S1.014 | 35.41 | 13.59 | 26.326 | 2.525 | 0.0 | 0.0 | 96.8 | 1.82 | 32.1« | 339.0 |
| S9.000 | 54.67 | 5.50 | 26.702 | 0.000 | 0.0 | 0.0 | 0.0 | 1.12 | 19.9 | 0.0 |
| S9.001 | 53.00 | 5.93 | 26.278 | 0.225 | 0.0 | 0.0 | 12.9 | 0.90 | 16.0« | 45.2 |
| S9.002 | 51.55 | 6.33 | 26.090 | 0.225 | 0.0 | 0.0 | 12.9 | 0.76 | 13.5« | 45.2 |
| S1.015 | 35.06 | 13.84 | 25.983 | 2.750 | 0.0 | 0.0 | 104.5 | 0.76 | 13.5« | 365.6 |
| S1.016 | 34.81 | 14.03 | 25.917 | 2.750 | 0.0 | 0.0 | 104.5 | 1.00 | 39.8« | 365.6 |

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## Manhole Schedules for Storm

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam.,L*W (mm) | Pipe Out PN | Pipe Out Invert Level (m) | Pipe Out Diameter (mm) | Pipes In PN | Pipes In Invert Level (m) | Pipes In Diameter (mm) | Backdrop (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S1 | 30.184 | 1.350 | Open Manhole | 1200 | S1.000 | 28.834 | 150 | | | | |
| S2 | 30.247 | 1.350 | Open Manhole | 1200 | S2.000 | 28.897 | 150 | | | | |
| S3 | 30.230 | 1.557 | Open Manhole | 1200 | S2.001 | 28.673 | 150 | S2.000 | 28.673 | 150 | |
| S4 | 30.182 | 1.550 | Open Manhole | 1200 | S1.001 | 28.633 | 150 | S1.000 | 28.633 | 150 | |
| | | | | | | | | S2.001 | 28.633 | 150 | |
| S5 | 30.128 | 1.665 | Open Manhole | 1200 | S1.002 | 28.463 | 150 | S1.001 | 28.463 | 150 | |
| S6 | 29.627 | 1.360 | Open Manhole | 1200 | S1.003 | 28.267 | 150 | S1.002 | 28.267 | 150 | |
| S7 | 29.701 | 1.514 | Open Manhole | 1200 | S1.004 | 28.186 | 150 | S1.003 | 28.186 | 150 | |
| S8 | 30.311 | 1.350 | Open Manhole | 1200 | S3.000 | 28.961 | 150 | | | | |
| S9 | 30.660 | 2.146 | Open Manhole | 1200 | S3.001 | 28.515 | 150 | S3.000 | 28.515 | 150 | |
| S10 | 30.228 | 1.884 | Open Manhole | 1200 | S3.002 | 28.344 | 150 | S3.001 | 28.344 | 150 | |
| S11 | 30.099 | 1.826 | Open Manhole | 1200 | S3.003 | 28.273 | 150 | S3.002 | 28.273 | 150 | |
| S12 | 30.082 | 2.170 | Open Manhole | 1200 | S1.005 | 27.911 | 150 | S1.004 | 27.911 | 150 | |
| | | | | | | | | S3.003 | 27.911 | 150 | |
| S13 | 29.673 | 2.025 | Open Manhole | 1200 | S1.006 | 27.648 | 150 | S1.005 | 27.648 | 150 | |
| S14 | 29.745 | 2.190 | Open Manhole | 1200 | S1.007 | 27.554 | 150 | S1.006 | 27.554 | 150 | |
| S15 | 30.517 | 1.350 | Open Manhole | 1200 | S4.000 | 29.167 | 150 | | | | |
| S16 | 30.371 | 1.533 | Open Manhole | 1200 | S4.001 | 28.838 | 150 | S4.000 | 28.838 | 150 | |
| S17 | 30.259 | 1.461 | Open Manhole | 1200 | S4.002 | 28.798 | 150 | S4.001 | 28.798 | 150 | |
| S18 | 29.824 | 1.350 | Open Manhole | 1200 | S4.003 | 28.474 | 150 | S4.002 | 28.474 | 150 | |
| S19 | 29.579 | 1.348 | Open Manhole | 1200 | S4.004 | 28.230 | 150 | S4.003 | 28.230 | 150 | |
| S20 | 29.423 | 1.349 | Open Manhole | 1200 | S4.005 | 28.074 | 150 | S4.004 | 28.074 | 150 | |
| S21 | 29.426 | 1.397 | Open Manhole | 1200 | S4.006 | 28.029 | 150 | S4.005 | 28.029 | 150 | |
| S22 | 29.371 | 1.990 | Open Manhole | 1200 | S1.008 | 27.381 | 150 | S1.007 | 27.381 | 150 | |
| | | | | | | | | S4.006 | 27.381 | 150 | |
| S23 | 29.252 | 1.971 | Open Manhole | 1200 | S1.009 | 27.280 | 150 | S1.008 | 27.280 | 150 | |
| S24 | 29.224 | 2.041 | Open Manhole | 1200 | S1.010 | 27.184 | 150 | S1.009 | 27.184 | 150 | |
| S25 | 29.177 | 1.350 | Open Manhole | 1200 | S5.000 | 27.827 | 150 | | | | |
| S25 | 29.134 | 1.437 | Open Manhole | 1200 | S5.001 | 27.697 | 150 | S5.000 | 27.697 | 150 | |
| S26 | 29.140 | 2.018 | Open Manhole | 1200 | S1.011 | 27.122 | 150 | S1.010 | 27.122 | 150 | |
| | | | | | | | | S5.001 | 27.122 | 150 | |
| S27 | 28.468 | 1.629 | Open Manhole | 1200 | S1.012 | 26.838 | 150 | S1.011 | 26.838 | 150 | |
| S28 | 29.302 | 1.350 | Open Manhole | 1200 | S6.000 | 27.952 | 150 | | | | |
| S29 | 28.638 | 1.350 | Open Manhole | 1200 | S6.001 | 27.288 | 150 | S6.000 | 27.288 | 150 | |
| S30 | 28.580 | 1.350 | Open Manhole | 1200 | S6.002 | 27.230 | 150 | S6.001 | 27.230 | 150 | |
| S31 | 28.206 | 1.350 | Open Manhole | 1200 | S6.003 | 26.856 | 150 | S6.002 | 26.856 | 150 | |
| S32 | 28.162 | 1.351 | Open Manhole | 1200 | S6.004 | 26.811 | 150 | S6.003 | 26.811 | 150 | |
| S33 | 29.101 | 1.351 | Open Manhole | 1200 | S7.000 | 27.750 | 150 | | | | |

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## Manhole Schedules for Storm

| 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) | Backd (mm |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S34 | 28.252 | 1.350 | Open Manhole | 1200 | S7.001 | 26.902 | 150 | S7.000 | 26.902 | 150 | |
| S35 | 27.944 | 1.349 | Open Manhole | 1200 | S6.005 | 26.595 | 150 | S6.004 | 26.595 | 150 | |
| | | | | | | | | S7.001 | 26.595 | 150 | |
| S36 | 27.823 | 1.380 | Open Manhole | 1200 | S1.013 | 26.444 | 150 | S1.012 | 26.444 | 150 | |
| | | | | | | | | S6.005 | 26.444 | 150 | |
| S37 | 28.580 | 1.350 | Open Manhole | 1200 | S8.000 | 27.230 | 150 | | | | |
| S38 | 27.882 | 1.350 | Open Manhole | 1200 | S8.001 | 26.532 | 150 | S8.000 | 26.532 | 150 | |
| S39 | 27.838 | 1.512 | Open Manhole | 1200 | S1.014 | 26.326 | 150 | S1.013 | 26.326 | 150 | |
| | | | | | | | | S8.001 | 26.326 | 150 | |
| S40 | 28.053 | 1.350 | Open Manhole | 1200 | S9.000 | 26.702 | 150 | | | | |
| S41 | 27.628 | 1.350 | Open Manhole | 1200 | S9.001 | 26.278 | 150 | S9.000 | 26.278 | 150 | |
| S42 | 27.444 | 1.354 | Open Manhole | 1200 | S9.002 | 26.090 | 150 | S9.001 | 26.090 | 150 | |
| S43 | 27.768 | 1.784 | Open Manhole | 1200 | S1.015 | 25.983 | 150 | S1.014 | 25.983 | 150 | |
| | | | | | | | | S9.002 | 25.983 | 150 | |
| S44 | 27.656 | 1.739 | Open Manhole | 1200 | S1.016 | 25.917 | 225 | S1.015 | 25.917 | 150 | |
| SHWtoDitch | 27.513 | 1.663 | Open Manhole | 0 | | OUTFALL | | S1.016 | 25.850 | 225 | |

| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North) |
|---|---|---|---|---|---|---|
| S1 | 337626.867 | 349357.492 | 337626.867 | 349357.492 | Required | |
| S2 | 337618.933 | 349355.603 | 337618.933 | 349355.603 | Required | |
| S3 | 337647.832 | 349330.568 | 337647.832 | 349330.568 | Required | |
| S4 | 337652.265 | 349336.049 | 337652.265 | 349336.049 | Required | |
| S5 | 337673.330 | 349355.655 | 337673.330 | 349355.655 | Required | |
| S6 | 337692.805 | 349351.737 | 337692.805 | 349351.737 | Required | |
| S7 | 337703.371 | 349342.813 | 337703.371 | 349342.813 | Required | |

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## Manhole Schedules for Storm

| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North) |
|---|---|---|---|---|---|---|
| S8 | 337652.320 | 349327.048 | 337652.320 | 349327.048 | Required | |
| S9 | 337709.854 | 349277.271 | 337709.854 | 349277.271 | Required | |
| S10 | 337728.562 | 349299.437 | 337728.562 | 349299.437 | Required | |
| S11 | 337736.293 | 349308.612 | 337736.293 | 349308.612 | Required | |
| S12 | 337739.371 | 349312.514 | 337739.371 | 349312.514 | Required | |
| S13 | 337768.385 | 349346.914 | 337768.385 | 349346.914 | Required | |
| S14 | 337778.581 | 349359.006 | 337778.581 | 349359.006 | Required | |
| S15 | 337746.124 | 349254.518 | 337746.124 | 349254.518 | Required | |
| S16 | 337782.482 | 349297.280 | 337782.482 | 349297.280 | Required | |
| S17 | 337786.925 | 349302.507 | 337786.925 | 349302.507 | Required | |
| S18 | 337813.149 | 349333.484 | 337813.149 | 349333.484 | Required | |
| S19 | 337821.408 | 349343.403 | 337821.408 | 349343.403 | Required | |
| S20 | 337823.462 | 349359.612 | 337823.462 | 349359.612 | Required | |
| S21 | 337817.723 | 349364.465 | 337817.723 | 349364.465 | Required | |
| S22 | 337797.542 | 349381.489 | 337797.542 | 349381.489 | Required | |

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## Manhole Schedules for Storm

| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North) |
|---|---|---|---|---|---|---|
| S23 | 337784.338 | 349392.590 | 337784.338 | 349392.590 | Required | |
| S24 | 337794.984 | 349405.234 | 337794.984 | 349405.234 | Required | |
| S25 | 337823.621 | 349383.115 | 337823.621 | 349383.115 | Required | |
| S25 | 337806.617 | 349397.445 | 337806.617 | 349397.445 | Required | |
| S26 | 337805.364 | 349404.609 | 337805.364 | 349404.609 | Required | |
| S27 | 337836.487 | 349441.541 | 337836.487 | 349441.541 | Required | |
| S28 | 337840.677 | 349366.701 | 337840.677 | 349366.701 | Required | |
| S29 | 337875.876 | 349408.076 | 337875.876 | 349408.076 | Required | |
| S30 | 337880.876 | 349413.665 | 337880.876 | 349413.665 | Required | |
| S31 | 337902.519 | 349439.712 | 337902.519 | 349439.712 | Required | |
| S32 | 337905.633 | 349443.341 | 337905.633 | 349443.341 | Required | |
| S33 | 337824.906 | 349387.632 | 337824.906 | 349387.632 | Required | |
| S34 | 337870.515 | 349441.720 | 337870.515 | 349441.720 | Required | |
| S35 | 337885.903 | 349459.959 | 337885.903 | 349459.959 | Required | |
| S36 | 337866.074 | 349476.659 | 337866.074 | 349476.659 | Required | |

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## Manhole Schedules for Storm

| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North) |
|---|---|---|---|---|---|---|
| S37 | 337821.054 | 349461.796 | 337821.054 | 349461.796 | Required | |
| S38 | 337842.759 | 349487.539 | 337842.759 | 349487.539 | Required | |
| S39 | 337850.749 | 349489.583 | 337850.749 | 349489.583 | Required | |
| S40 | 337913.260 | 349475.113 | 337913.260 | 349475.113 | Required | |
| S41 | 337887.149 | 349496.873 | 337887.149 | 349496.873 | Required | |
| S42 | 337869.349 | 349511.690 | 337869.349 | 349511.690 | Required | |
| S43 | 337857.626 | 349497.672 | 337857.626 | 349497.672 | Required | |
| S44 | 337849.061 | 349505.266 | 337849.061 | 349505.266 | Required | |
| SHWtoDitch | 337840.474 | 349512.748 | | | No Entry | |

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## PIPELINE SCHEDULES for Storm

### 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) |
|---|---|---|---|---|---|---|---|---|
| S1.000 | o | 150 | S1 | 30.184 | 28.834 | 1.200 | Open Manhole | 1200 |
| S2.000 | o | 150 | S2 | 30.247 | 28.897 | 1.200 | Open Manhole | 1200 |
| S2.001 | o | 150 | S3 | 30.230 | 28.673 | 1.407 | Open Manhole | 1200 |
| S1.001 | o | 150 | S4 | 30.182 | 28.633 | 1.400 | Open Manhole | 1200 |
| S1.002 | o | 150 | S5 | 30.128 | 28.463 | 1.515 | Open Manhole | 1200 |
| S1.003 | o | 150 | S6 | 29.627 | 28.267 | 1.210 | Open Manhole | 1200 |
| S1.004 | o | 150 | S7 | 29.701 | 28.186 | 1.364 | Open Manhole | 1200 |
| S3.000 | o | 150 | S8 | 30.311 | 28.961 | 1.200 | Open Manhole | 1200 |
| S3.001 | o | 150 | S9 | 30.660 | 28.515 | 1.996 | Open Manhole | 1200 |
| S3.002 | o | 150 | S10 | 30.228 | 28.344 | 1.734 | Open Manhole | 1200 |
| S3.003 | o | 150 | S11 | 30.099 | 28.273 | 1.676 | Open Manhole | 1200 |
| S1.005 | o | 150 | S12 | 30.082 | 27.911 | 2.020 | Open Manhole | 1200 |
| S1.006 | o | 150 | S13 | 29.673 | 27.648 | 1.875 | Open Manhole | 1200 |
| S1.007 | o | 150 | S14 | 29.745 | 27.554 | 2.040 | Open Manhole | 1200 |
| S4.000 | o | 150 | S15 | 30.517 | 29.167 | 1.200 | Open Manhole | 1200 |
| S4.001 | o | 150 | S16 | 30.371 | 28.838 | 1.383 | 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) |
|---|---|---|---|---|---|---|---|---|
| S1.000 | 33.240 | 164.8 | S4 | 30.182 | 28.633 | 1.400 | Open Manhole | 1200 |
| S2.000 | 38.235 | 170.6 | S3 | 30.230 | 28.673 | 1.407 | Open Manhole | 1200 |
| S2.001 | 7.049 | 174.8 | S4 | 30.182 | 28.633 | 1.400 | Open Manhole | 1200 |
| S1.001 | 28.777 | 169.6 | S5 | 30.128 | 28.463 | 1.515 | Open Manhole | 1200 |
| S1.002 | 19.865 | 101.6 | S6 | 29.627 | 28.267 | 1.210 | Open Manhole | 1200 |
| S1.003 | 13.831 | 170.6 | S7 | 29.701 | 28.186 | 1.364 | Open Manhole | 1200 |
| S1.004 | 47.053 | 171.2 | S12 | 30.082 | 27.911 | 2.020 | Open Manhole | 1200 |
| S3.000 | 76.078 | 170.5 | S9 | 30.660 | 28.515 | 1.996 | Open Manhole | 1200 |
| S3.001 | 29.005 | 169.9 | S10 | 30.228 | 28.344 | 1.734 | Open Manhole | 1200 |
| S3.002 | 11.998 | 169.9 | S11 | 30.099 | 28.273 | 1.676 | Open Manhole | 1200 |
| S3.003 | 4.969 | 13.7 | S12 | 30.082 | 27.911 | 2.020 | Open Manhole | 1200 |
| S1.005 | 45.002 | 170.6 | S13 | 29.673 | 27.648 | 1.875 | Open Manhole | 1200 |
| S1.006 | 15.817 | 170.0 | S14 | 29.745 | 27.554 | 2.040 | Open Manhole | 1200 |
| S1.007 | 29.411 | 169.8 | S22 | 29.371 | 27.381 | 1.840 | Open Manhole | 1200 |
| S4.000 | 56.129 | 170.6 | S16 | 30.371 | 28.838 | 1.383 | Open Manhole | 1200 |
| S4.001 | 6.861 | 170.6 | S17 | 30.259 | 28.798 | 1.311 | Open Manhole | 1200 |

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## PIPELINE SCHEDULES for Storm

### 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) |
|---|---|---|---|---|---|---|---|---|
| S4.002 | o | 150 | S17 | 30.259 | 28.798 | 1.311 | Open Manhole | 1200 |
| S4.003 | o | 150 | S18 | 29.824 | 28.474 | 1.200 | Open Manhole | 1200 |
| S4.004 | o | 150 | S19 | 29.579 | 28.230 | 1.198 | Open Manhole | 1200 |
| S4.005 | o | 150 | S20 | 29.423 | 28.074 | 1.199 | Open Manhole | 1200 |
| S4.006 | o | 150 | S21 | 29.426 | 28.029 | 1.247 | Open Manhole | 1200 |
| S1.008 | o | 150 | S22 | 29.371 | 27.381 | 1.840 | Open Manhole | 1200 |
| S1.009 | o | 150 | S23 | 29.252 | 27.280 | 1.821 | Open Manhole | 1200 |
| S1.010 | o | 150 | S24 | 29.224 | 27.184 | 1.891 | Open Manhole | 1200 |
| S5.000 | o | 150 | S25 | 29.177 | 27.827 | 1.200 | Open Manhole | 1200 |
| S5.001 | o | 150 | S25 | 29.134 | 27.697 | 1.287 | Open Manhole | 1200 |
| S1.011 | o | 150 | S26 | 29.140 | 27.122 | 1.867 | Open Manhole | 1200 |
| S1.012 | o | 150 | S27 | 28.468 | 26.838 | 1.479 | Open Manhole | 1200 |
| S6.000 | o | 150 | S28 | 29.302 | 27.952 | 1.200 | Open Manhole | 1200 |
| S6.001 | o | 150 | S29 | 28.638 | 27.288 | 1.200 | Open Manhole | 1200 |
| S6.002 | o | 150 | S30 | 28.580 | 27.230 | 1.200 | Open Manhole | 1200 |
| S6.003 | o | 150 | S31 | 28.206 | 26.856 | 1.200 | Open Manhole | 1200 |
| S6.004 | o | 150 | S32 | 28.162 | 26.811 | 1.201 | 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) |
|---|---|---|---|---|---|---|---|---|
| S4.002 | 40.586 | 125.5 | S18 | 29.824 | 28.474 | 1.200 | Open Manhole | 1200 |
| S4.003 | 12.907 | 52.9 | S19 | 29.579 | 28.230 | 1.198 | Open Manhole | 1200 |
| S4.004 | 16.340 | 104.4 | S20 | 29.423 | 28.074 | 1.199 | Open Manhole | 1200 |
| S4.005 | 7.516 | 167.9 | S21 | 29.426 | 28.029 | 1.247 | Open Manhole | 1200 |
| S4.006 | 26.403 | 40.7 | S22 | 29.371 | 27.381 | 1.840 | Open Manhole | 1200 |
| S1.008 | 17.251 | 171.2 | S23 | 29.252 | 27.280 | 1.821 | Open Manhole | 1200 |
| S1.009 | 16.529 | 170.9 | S24 | 29.224 | 27.184 | 1.891 | Open Manhole | 1200 |
| S1.010 | 10.398 | 169.7 | S26 | 29.140 | 27.122 | 1.867 | Open Manhole | 1200 |
| S5.000 | 22.237 | 170.6 | S25 | 29.134 | 27.697 | 1.287 | Open Manhole | 1200 |
| S5.001 | 7.273 | 12.6 | S26 | 29.140 | 27.122 | 1.868 | Open Manhole | 1200 |
| S1.011 | 48.297 | 170.1 | S27 | 28.468 | 26.838 | 1.479 | Open Manhole | 1200 |
| S1.012 | 45.920 | 116.3 | S36 | 27.823 | 26.444 | 1.230 | Open Manhole | 1200 |
| S6.000 | 54.321 | 81.9 | S29 | 28.638 | 27.288 | 1.200 | Open Manhole | 1200 |
| S6.001 | 7.499 | 127.8 | S30 | 28.580 | 27.230 | 1.200 | Open Manhole | 1200 |
| S6.002 | 33.866 | 90.6 | S31 | 28.206 | 26.856 | 1.200 | Open Manhole | 1200 |
| S6.003 | 4.782 | 106.6 | S32 | 28.162 | 26.811 | 1.201 | Open Manhole | 1200 |
| S6.004 | 25.796 | 119.3 | S35 | 27.944 | 26.595 | 1.199 | Open Manhole | 1200 |

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## PIPELINE SCHEDULES for Storm

### 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) |
|---|---|---|---|---|---|---|---|---|
| S7.000 | o | 150 | S33 | 29.101 | 27.750 | 1.201 | Open Manhole | 1200 |
| S7.001 | o | 150 | S34 | 28.252 | 26.902 | 1.200 | Open Manhole | 1200 |
| S6.005 | o | 150 | S35 | 27.944 | 26.595 | 1.199 | Open Manhole | 1200 |
| S1.013 | o | 150 | S36 | 27.823 | 26.444 | 1.230 | Open Manhole | 1200 |
| S8.000 | o | 150 | S37 | 28.580 | 27.230 | 1.200 | Open Manhole | 1200 |
| S8.001 | o | 150 | S38 | 27.882 | 26.532 | 1.200 | Open Manhole | 1200 |
| S1.014 | o | 150 | S39 | 27.838 | 26.326 | 1.362 | Open Manhole | 1200 |
| S9.000 | o | 150 | S40 | 28.053 | 26.702 | 1.200 | Open Manhole | 1200 |
| S9.001 | o | 150 | S41 | 27.628 | 26.278 | 1.200 | Open Manhole | 1200 |
| S9.002 | o | 150 | S42 | 27.444 | 26.090 | 1.204 | Open Manhole | 1200 |
| S1.015 | o | 150 | S43 | 27.768 | 25.983 | 1.634 | Open Manhole | 1200 |
| S1.016 | o | 225 | S44 | 27.656 | 25.917 | 1.514 | 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) |
|---|---|---|---|---|---|---|---|---|
| S7.000 | 70.752 | 83.5 | S34 | 28.252 | 26.902 | 1.200 | Open Manhole | 1200 |
| S7.001 | 23.862 | 77.7 | S35 | 27.944 | 26.595 | 1.199 | Open Manhole | 1200 |
| S6.005 | 25.924 | 171.4 | S36 | 27.823 | 26.444 | 1.230 | Open Manhole | 1200 |
| S1.013 | 20.047 | 170.6 | S39 | 27.838 | 26.326 | 1.362 | Open Manhole | 1200 |
| S8.000 | 33.673 | 48.3 | S38 | 27.882 | 26.532 | 1.200 | Open Manhole | 1200 |
| S8.001 | 8.247 | 40.0 | S39 | 27.838 | 26.326 | 1.362 | Open Manhole | 1200 |
| S1.014 | 10.617 | 31.0 | S43 | 27.768 | 25.983 | 1.634 | Open Manhole | 1200 |
| S9.000 | 33.990 | 80.1 | S41 | 27.628 | 26.278 | 1.200 | Open Manhole | 1200 |
| S9.001 | 23.160 | 123.1 | S42 | 27.444 | 26.090 | 1.204 | Open Manhole | 1200 |
| S9.002 | 18.274 | 171.6 | S43 | 27.768 | 25.983 | 1.634 | Open Manhole | 1200 |
| S1.015 | 11.447 | 171.9 | S44 | 27.656 | 25.917 | 1.589 | Open Manhole | 1200 |
| S1.016 | 11.389 | 170.0 | SHWtoDitch | 27.513 | 25.850 | 1.438 | Open Manhole | 0 |

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## Setting Out Information - True Coordinates (Storm)

| PN | USMH Name | Dia/Len (mm) | Width (mm) | US Easting (m) | US Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Layout (North) |
|---|---|---|---|---|---|---|---|---|
| S1.000 | S1 | 1200 | | 337626.867 | 349357.492 | 337626.867 | 349357.492 | |
| S2.000 | S2 | 1200 | | 337618.933 | 349355.603 | 337618.933 | 349355.603 | |
| S2.001 | S3 | 1200 | | 337647.832 | 349330.568 | 337647.832 | 349330.568 | |
| S1.001 | S4 | 1200 | | 337652.265 | 349336.049 | 337652.265 | 349336.049 | |
| S1.002 | S5 | 1200 | | 337673.330 | 349355.655 | 337673.330 | 349355.655 | |
| S1.003 | S6 | 1200 | | 337692.805 | 349351.737 | 337692.805 | 349351.737 | |
| S1.004 | S7 | 1200 | | 337703.371 | 349342.813 | 337703.371 | 349342.813 | |
| S3.000 | S8 | 1200 | | 337652.320 | 349327.048 | 337652.320 | 349327.048 | |
| S3.001 | S9 | 1200 | | 337709.854 | 349277.271 | 337709.854 | 349277.271 | |
| S3.002 | S10 | 1200 | | 337728.562 | 349299.437 | 337728.562 | 349299.437 | |
| S3.003 | S11 | 1200 | | 337736.293 | 349308.612 | 337736.293 | 349308.612 | |
| S1.005 | S12 | 1200 | | 337739.371 | 349312.514 | 337739.371 | 349312.514 | |
| S1.006 | S13 | 1200 | | 337768.385 | 349346.914 | 337768.385 | 349346.914 | |
| S1.007 | S14 | 1200 | | 337778.581 | 349359.006 | 337778.581 | 349359.006 | |
| S4.000 | S15 | 1200 | | 337746.124 | 349254.518 | 337746.124 | 349254.518 | |
| S4.001 | S16 | 1200 | | 337782.482 | 349297.280 | 337782.482 | 349297.280 | |

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## Setting Out Information - True Coordinates (Storm)

| PN | USMH Name | Dia/Len (mm) | Width (mm) | US Easting (m) | US Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Layout (North) |
|---|---|---|---|---|---|---|---|---|
| S4.002 | S17 | 1200 | | 337786.925 | 349302.507 | 337786.925 | 349302.507 | |
| S4.003 | S18 | 1200 | | 337813.149 | 349333.484 | 337813.149 | 349333.484 | |
| S4.004 | S19 | 1200 | | 337821.408 | 349343.403 | 337821.408 | 349343.403 | |
| S4.005 | S20 | 1200 | | 337823.462 | 349359.612 | 337823.462 | 349359.612 | |
| S4.006 | S21 | 1200 | | 337817.723 | 349364.465 | 337817.723 | 349364.465 | |
| S1.008 | S22 | 1200 | | 337797.542 | 349381.489 | 337797.542 | 349381.489 | |
| S1.009 | S23 | 1200 | | 337784.338 | 349392.590 | 337784.338 | 349392.590 | |
| S1.010 | S24 | 1200 | | 337794.984 | 349405.234 | 337794.984 | 349405.234 | |
| S5.000 | S25 | 1200 | | 337823.621 | 349383.115 | 337823.621 | 349383.115 | |
| S5.001 | S25 | 1200 | | 337806.617 | 349397.445 | 337806.617 | 349397.445 | |
| S1.011 | S26 | 1200 | | 337805.364 | 349404.609 | 337805.364 | 349404.609 | |
| S1.012 | S27 | 1200 | | 337836.487 | 349441.541 | 337836.487 | 349441.541 | |
| S6.000 | S28 | 1200 | | 337840.677 | 349366.701 | 337840.677 | 349366.701 | |
| S6.001 | S29 | 1200 | | 337875.876 | 349408.076 | 337875.876 | 349408.076 | |
| S6.002 | S30 | 1200 | | 337880.876 | 349413.665 | 337880.876 | 349413.665 | |
| S6.003 | S31 | 1200 | | 337902.519 | 349439.712 | 337902.519 | 349439.712 | |

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## Setting Out Information - True Coordinates (Storm)

| PN | USMH Name | Dia/Len (mm) | Width (mm) | US Easting (m) | US Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Layout (North) |
|---|---|---|---|---|---|---|---|---|
| S6.004 | S32 | 1200 | | 337905.633 | 349443.341 | 337905.633 | 349443.341 | |
| S7.000 | S33 | 1200 | | 337824.906 | 349387.632 | 337824.906 | 349387.632 | |
| S7.001 | S34 | 1200 | | 337870.515 | 349441.720 | 337870.515 | 349441.720 | |
| S6.005 | S35 | 1200 | | 337885.903 | 349459.959 | 337885.903 | 349459.959 | |
| S1.013 | S36 | 1200 | | 337866.074 | 349476.659 | 337866.074 | 349476.659 | |
| S8.000 | S37 | 1200 | | 337821.054 | 349461.796 | 337821.054 | 349461.796 | |
| S8.001 | S38 | 1200 | | 337842.759 | 349487.539 | 337842.759 | 349487.539 | |
| S1.014 | S39 | 1200 | | 337850.749 | 349489.583 | 337850.749 | 349489.583 | |
| S9.000 | S40 | 1200 | | 337913.260 | 349475.113 | 337913.260 | 349475.113 | |
| S9.001 | S41 | 1200 | | 337887.149 | 349496.873 | 337887.149 | 349496.873 | |
| S9.002 | S42 | 1200 | | 337869.349 | 349511.690 | 337869.349 | 349511.690 | |
| S1.015 | S43 | 1200 | | 337857.626 | 349497.672 | 337857.626 | 349497.672 | |
| S1.016 | S44 | 1200 | | 337849.061 | 349505.266 | 337849.061 | 349505.266 | |

| PN | DSMH Name | Dia/Len (mm) | Width (mm) | DS Easting (m) | DS Northing (m) | Layout (North) |
|---|---|---|---|---|---|---|
| S1.016 | SHWtoDitch | 0 | | 337840.474 | 349512.748 | |

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## Area Summary for Storm

| Pipe Number | PIMP Type | PIMP Name | PIMP (%) | Gross Area (ha) | Imp. Area (ha) | Pipe Total (ha) |
|---|---|---|---|---|---|---|
| 1.000 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 2.000 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 2.001 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.001 | User | - | 100 | 0.239 | 0.239 | 0.239 |
| 1.002 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.003 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.004 | User | - | 100 | 0.166 | 0.166 | 0.166 |
| 3.000 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 3.001 | User | - | 100 | 0.244 | 0.244 | 0.244 |
| 3.002 | User | - | 100 | 0.045 | 0.045 | 0.045 |
| 3.003 | User | - | 100 | 0.080 | 0.080 | 0.080 |
| 1.005 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.006 | User | - | 100 | 0.090 | 0.090 | 0.090 |
| 1.007 | User | - | 100 | 0.206 | 0.206 | 0.206 |
| 4.000 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 4.001 | User | - | 100 | 0.174 | 0.174 | 0.174 |
| 4.002 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 4.003 | User | - | 100 | 0.185 | 0.185 | 0.185 |
| 4.004 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 4.005 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 4.006 | User | - | 100 | 0.068 | 0.068 | 0.068 |
| 1.008 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.009 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.010 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 5.000 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 5.001 | User | - | 100 | 0.100 | 0.100 | 0.100 |
| 1.011 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.012 | User | - | 100 | 0.238 | 0.238 | 0.238 |
| 6.000 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 6.001 | User | - | 100 | 0.088 | 0.088 | 0.088 |
| 6.002 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 6.003 | User | - | 100 | 0.066 | 0.066 | 0.066 |
| 6.004 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 7.000 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 7.001 | User | - | 100 | 0.300 | 0.300 | 0.300 |
| 6.005 | User | - | 100 | 0.083 | 0.083 | 0.083 |
| 1.013 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 8.000 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 8.001 | User | - | 100 | 0.153 | 0.153 | 0.153 |
| 1.014 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 9.000 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 9.001 | User | - | 100 | 0.225 | 0.225 | 0.225 |
| 9.002 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.015 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.016 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| | | | | Total | Total | Total |
| | | | | 2.750 | 2.750 | 2.750 |

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## Free Flowing Outfall Details for Storm

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D,L (mm) | W (mm) |
|---|---|---|---|---|---|---|
| S1.016 | SHWtoDitch | 27.513 | 25.850 | 25.500 | 0 | 0 |

## Simulation Criteria for Storm

| | | | |
|---|---|---|---|
| Volumetric Runoff Coeff | 0.750 | Additional Flow - % of Total Flow | 0.000 |
| Areal Reduction Factor | 1.000 | MADD Factor * 10m³/ha Storage | 0.000 |
| 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 | 18 |
| Number of Online Controls | 19 | Number of Time/Area Diagrams | 0 |
| Number of Offline Controls | 0 | Number of Real Time Controls | 0 |

## Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Profile Type | Summer |
| Return Period (years) | 2 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 18.000 | Storm Duration (mins) | 30 |
| Ratio R | 0.325 | | |

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## Online Controls for Storm

### Orifice Manhole: S4, DS/PN: S1.001, Volume (m³): 2.4

Diameter (m) 0.056 Discharge Coefficient 0.600 Invert Level (m) 28.633

### Orifice Manhole: S7, DS/PN: S1.004, Volume (m³): 1.9

Diameter (m) 0.061 Discharge Coefficient 0.600 Invert Level (m) 28.186

### Orifice Manhole: S9, DS/PN: S3.001, Volume (m³): 3.7

Diameter (m) 0.040 Discharge Coefficient 0.600 Invert Level (m) 28.515

### Orifice Manhole: S10, DS/PN: S3.002, Volume (m³): 2.6

Diameter (m) 0.032 Discharge Coefficient 0.600 Invert Level (m) 28.344

### Orifice Manhole: S11, DS/PN: S3.003, Volume (m³): 2.3

Diameter (m) 0.032 Discharge Coefficient 0.600 Invert Level (m) 28.273

### Orifice Manhole: S13, DS/PN: S1.006, Volume (m³): 3.1

Diameter (m) 0.052 Discharge Coefficient 0.600 Invert Level (m) 27.648

### Hydro-Brake® Optimum Manhole: S14, DS/PN: S1.007, Volume (m³): 2.7

| | |
|---|---|
| Unit Reference | MD-SCL-0145-1200-1200-1200 |
| Design Head (m) | 1.200 |
| Design Flow (l/s) | 12.0 |
| Flush-Flo™ | Calculated |
| Objective | Minimise blockage risk |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 145 |
| Invert Level (m) | 27.554 |
| Minimum Outlet Pipe Diameter (mm) | 225 |
| Suggested Manhole Diameter (mm) | 1200 |

| **Control Points** | **Head (m)** | **Flow (l/s)** |
|---|---|---|
| Design Point (Calculated) | 1.200 | 12.0 |
| Flush-Flo™ | 0.276 | 12.0 |
| Kick-Flo® | 0.694 | 9.3 |
| Mean Flow over Head Range | - | 10.1 |

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

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Hydro-Brake® Optimum Manhole: S14, DS/PN: S1.007, Volume (m³): 2.7

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|---|---|---|---|---|---|---|---|
| 0.100 | 5.8 | 1.200 | 12.0 | 3.000 | 18.5 | 7.000 | 27.7 |
| 0.200 | 11.8 | 1.400 | 12.9 | 3.500 | 19.9 | 7.500 | 28.7 |
| 0.300 | 12.0 | 1.600 | 13.7 | 4.000 | 21.2 | 8.000 | 29.6 |
| 0.400 | 11.7 | 1.800 | 14.5 | 4.500 | 22.4 | 8.500 | 30.5 |
| 0.500 | 11.2 | 2.000 | 15.3 | 5.000 | 23.6 | 9.000 | 31.3 |
| 0.600 | 10.6 | 2.200 | 16.0 | 5.500 | 24.7 | 9.500 | 32.1 |
| 0.800 | 9.9 | 2.400 | 16.6 | 6.000 | 25.8 | | |
| 1.000 | 11.0 | 2.600 | 17.3 | 6.500 | 26.8 | | |

Orifice Manhole: S16, DS/PN: S4.001, Volume (m³): 2.7

Diameter (m) 0.032 Discharge Coefficient 0.600 Invert Level (m) 28.838

Orifice Manhole: S18, DS/PN: S4.003, Volume (m³): 2.2

Diameter (m) 0.032 Discharge Coefficient 0.600 Invert Level (m) 28.474

Orifice Manhole: S21, DS/PN: S4.006, Volume (m³): 1.7

Diameter (m) 0.032 Discharge Coefficient 0.600 Invert Level (m) 28.029

Orifice Manhole: S25, DS/PN: S5.001, Volume (m³): 2.0

Diameter (m) 0.056 Discharge Coefficient 0.600 Invert Level (m) 27.697

Orifice Manhole: S27, DS/PN: S1.012, Volume (m³): 2.7

Diameter (m) 0.074 Discharge Coefficient 0.600 Invert Level (m) 26.838

Orifice Manhole: S29, DS/PN: S6.001, Volume (m³): 2.5

Diameter (m) 0.039 Discharge Coefficient 0.600 Invert Level (m) 27.288

Orifice Manhole: S31, DS/PN: S6.003, Volume (m³): 2.1

Diameter (m) 0.039 Discharge Coefficient 0.600 Invert Level (m) 26.856

Orifice Manhole: S34, DS/PN: S7.001, Volume (m³): 2.8

Diameter (m) 0.052 Discharge Coefficient 0.600 Invert Level (m) 26.902

Orifice Manhole: S35, DS/PN: S6.005, Volume (m³): 2.4

Diameter (m) 0.090 Discharge Coefficient 0.600 Invert Level (m) 26.595

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Orifice Manhole: S38, DS/PN: S8.001, Volume (m³): 2.1

Diameter (m) 0.074 Discharge Coefficient 0.600 Invert Level (m) 26.532

Orifice Manhole: S41, DS/PN: S9.001, Volume (m³): 2.1

Diameter (m) 0.052 Discharge Coefficient 0.600 Invert Level (m) 26.278

Complex Manhole: S44, DS/PN: S1.016, Volume (m³): 2.1

Hydro-Brake® Optimum

| | |
|---|---|
| Unit Reference | MD-SHE-0176-1450-0700-1450 |
| Design Head (m) | 0.700 |
| Design Flow (l/s) | 14.5 |
| Flush-Flo™ | Calculated |
| Objective | Minimise upstream storage |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 176 |
| Invert Level (m) | 25.917 |
| Minimum Outlet Pipe Diameter (mm) | 225 |
| Suggested Manhole Diameter (mm) | 1200 |

| Control Points | Head (m) | Flow (l/s) |
|---|---|---|
| Design Point (Calculated) | 0.700 | 14.5 |
| Flush-Flo™ | 0.276 | 14.5 |
| Kick-Flo® | 0.531 | 12.7 |
| Mean Flow over Head Range | - | 11.9 |

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 | 6.2 | 1.200 | 18.7 | 3.000 | 29.0 | 7.000 | 43.7 |
| 0.200 | 14.2 | 1.400 | 20.2 | 3.500 | 31.3 | 7.500 | 45.0 |
| 0.300 | 14.5 | 1.600 | 21.5 | 4.000 | 33.4 | 8.000 | 46.5 |
| 0.400 | 14.1 | 1.800 | 22.7 | 4.500 | 35.3 | 8.500 | 47.9 |
| 0.500 | 13.3 | 2.000 | 23.9 | 5.000 | 37.2 | 9.000 | 49.4 |
| 0.600 | 13.5 | 2.200 | 25.0 | 5.500 | 38.9 | 9.500 | 50.7 |
| 0.800 | 15.4 | 2.400 | 26.1 | 6.000 | 40.6 | | |
| 1.000 | 17.2 | 2.600 | 27.1 | 6.500 | 42.2 | | |

Hydro-Brake® Optimum

| | |
|---|---|
| Unit Reference | MD-SHE-0229-2600-0500-2600 |
| Design Head (m) | 0.500 |
| Design Flow (l/s) | 26.0 |

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## Hydro-Brake® Optimum

| | |
|---|---|
| Flush-Flo™ | Calculated |
| Objective | Minimise upstream storage |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 229 |
| Invert Level (m) | 26.617 |
| Minimum Outlet Pipe Diameter (mm) | 300 |
| Suggested Manhole Diameter (mm) | 1200 |

| **Control Points** | **Head (m)** | **Flow (l/s)** |
|---|---|---|
| Design Point (Calculated) | 0.500 | 26.0 |
| Flush-Flo™ | 0.310 | 26.0 |
| Kick-Flo® | 0.443 | 24.5 |
| Mean Flow over Head Range | - | 18.9 |

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 | 7.6 | 1.200 | 39.6 | 3.000 | 61.6 | 7.000 | 92.7 |
| 0.200 | 22.9 | 1.400 | 42.6 | 3.500 | 66.4 | 7.500 | 96.1 |
| 0.300 | 26.0 | 1.600 | 45.4 | 4.000 | 70.9 | 8.000 | 99.2 |
| 0.400 | 25.3 | 1.800 | 48.1 | 4.500 | 75.1 | 8.500 | 102.3 |
| 0.500 | 26.0 | 2.000 | 50.6 | 5.000 | 79.0 | 9.000 | 105.4 |
| 0.600 | 28.4 | 2.200 | 53.0 | 5.500 | 82.0 | 9.500 | 108.3 |
| 0.800 | 32.6 | 2.400 | 55.3 | 6.000 | 85.7 | | |
| 1.000 | 36.2 | 2.600 | 57.5 | 6.500 | 89.3 | | |

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## Storage Structures for Storm

### Cellular Storage Manhole: S4, DS/PN: S1.001

Invert Level (m) 28.633 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 350.0 | 0.0 | 0.401 | 0.0 | 0.0 |
| 0.400 | 350.0 | 0.0 | | | |

### Cellular Storage Manhole: S7, DS/PN: S1.004

Invert Level (m) 28.186 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 120.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 120.0 | 0.0 | | | |

### Cellular Storage Manhole: S9, DS/PN: S3.001

Invert Level (m) 28.515 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 345.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 345.0 | 0.0 | | | |

### Cellular Storage Manhole: S10, DS/PN: S3.002

Invert Level (m) 28.344 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 18.4 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 18.4 | 0.0 | | | |

### Cellular Storage Manhole: S11, DS/PN: S3.003

Invert Level (m) 28.273 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

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## Cellular Storage Manhole: S11, DS/PN: S3.003

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 78.9 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 78.9 | 0.0 | | | |

## Cellular Storage Manhole: S13, DS/PN: S1.006

Invert Level (m) 27.648 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 150.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 150.0 | 0.0 | | | |

## Cellular Storage Manhole: S14, DS/PN: S1.007

Invert Level (m) 27.554 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 240.0 | 0.0 | 1.201 | 0.0 | 0.0 |
| 1.200 | 240.0 | 0.0 | | | |

## Cellular Storage Manhole: S16, DS/PN: S4.001

Invert Level (m) 28.838 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 150.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 150.0 | 0.0 | | | |

## Cellular Storage Manhole: S18, DS/PN: S4.003

Invert Level (m) 28.474 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 250.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 250.0 | 0.0 | | | |

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## Cellular Storage Manhole: S21, DS/PN: S4.006

Invert Level (m) 28.029 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 80.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 80.0 | 0.0 | | | |

## Cellular Storage Manhole: S25, DS/PN: S5.001

Invert Level (m) 27.697 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 90.0 | 0.0 | 0.401 | 0.0 | 0.0 |
| 0.400 | 90.0 | 0.0 | | | |

## Cellular Storage Manhole: S27, DS/PN: S1.012

Invert Level (m) 26.838 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 150.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 150.0 | 0.0 | | | |

## Cellular Storage Manhole: S29, DS/PN: S6.001

Invert Level (m) 27.288 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 100.0 | 0.0 | 0.401 | 0.0 | 0.0 |
| 0.400 | 100.0 | 0.0 | | | |

## Cellular Storage Manhole: S31, DS/PN: S6.003

Invert Level (m) 26.856 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 150.0 | 0.0 | 0.400 | 150.0 | 0.0 |

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## Cellular Storage Manhole: S31, DS/PN: S6.003

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.401 | 0.0 | 0.0 | | | |

## Cellular Storage Manhole: S34, DS/PN: S7.001

Invert Level (m) 26.902 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 300.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 300.0 | 0.0 | | | |

## Cellular Storage Manhole: S35, DS/PN: S6.005

Invert Level (m) 26.595 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 100.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 100.0 | 0.0 | | | |

## Cellular Storage Manhole: S38, DS/PN: S8.001

Invert Level (m) 26.532 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 72.3 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 72.3 | 0.0 | | | |

## Cellular Storage Manhole: S41, DS/PN: S9.001

Invert Level (m) 26.278 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 164.5 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 164.5 | 0.0 | | | |

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## 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

### Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
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 18
Number of Online Controls 19 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 0.323
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 150.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 40, 40, 40

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. |
|---|---|---|---|---|---|---|---|---|
| S1.000 | S1 | 15 Summer | 1 | +40% | 100/180 Winter | | | |
| S2.000 | S2 | 15 Summer | 1 | +40% | 100/360 Winter | | | |
| S2.001 | S3 | 480 Winter | 1 | +40% | 30/60 Summer | | | |
| S1.001 | S4 | 480 Winter | 1 | +40% | 30/30 Summer | | | |
| S1.002 | S5 | 480 Winter | 1 | +40% | 30/60 Winter | | | |
| S1.003 | S6 | 480 Winter | 1 | +40% | 1/480 Winter | | | |
| S1.004 | S7 | 480 Winter | 1 | +40% | 1/60 Winter | | | |
| S3.000 | S8 | 15 Summer | 1 | +40% | 100/600 Winter | | | |
| S3.001 | S9 | 2160 Winter | 1 | +40% | 1/240 Winter | | | |
| S3.002 | S10 | 1440 Winter | 1 | +40% | 1/15 Winter | | | |
| S3.003 | S11 | 1440 Winter | 1 | +40% | 1/120 Summer | | | |
| S1.005 | S12 | 1440 Winter | 1 | +40% | 1/600 Winter | | | |
| S1.006 | S13 | 1440 Winter | 1 | +40% | 1/120 Summer | | | |
| S1.007 | S14 | 240 Winter | 1 | +40% | 30/30 Summer | | | |
| S4.000 | S15 | 15 Summer | 1 | +40% | 30/180 Winter | | | |
| S4.001 | S16 | 720 Winter | 1 | +40% | 1/120 Summer | | | |
| S4.002 | S17 | 720 Winter | 1 | +40% | 30/480 Winter | | | |

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## 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Half Drain Time (mins) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S1 | 28.834 | -0.150 | 0.000 | 0.00 | | | 0.0 | OK |
| S2.000 | S2 | 28.897 | -0.150 | 0.000 | 0.00 | | | 0.0 | OK |
| S2.001 | S3 | 28.757 | -0.066 | 0.000 | 0.00 | | | 0.0 | OK |
| S1.001 | S4 | 28.757 | -0.026 | 0.000 | 0.16 | | 299 | 2.0 | OK |
| S1.002 | S5 | 28.498 | -0.115 | 0.000 | 0.12 | | | 2.0 | OK |
| S1.003 | S6 | 28.418 | 0.001 | 0.000 | 0.16 | | | 2.0 | SURCHARGED |
| S1.004 | S7 | 28.410 | 0.073 | 0.000 | 0.26 | | 268 | 3.4 | SURCHARGED |
| S3.000 | S8 | 28.961 | -0.150 | 0.000 | 0.00 | | | 0.0 | OK |
| S3.001 | S9 | 28.727 | 0.063 | 0.000 | 0.05 | | 1162 | 0.7 | SURCHARGED |
| S3.002 | S10 | 28.670 | 0.176 | 0.000 | 0.06 | | 1658 | 0.8 | SURCHARGED |
| S3.003 | S11 | 28.543 | 0.120 | 0.000 | 0.03 | | 1444 | 1.1 | SURCHARGED |
| S1.005 | S12 | 28.119 | 0.058 | 0.000 | 0.31 | | | 4.1 | SURCHARGED |
| S1.006 | S13 | 28.091 | 0.293 | 0.000 | 0.29 | | 551 | 3.6 | SURCHARGED |
| S1.007 | S14 | 27.658 | -0.047 | 0.000 | 0.46 | | | 6.1 | OK |
| S4.000 | S15 | 29.167 | -0.150 | 0.000 | 0.00 | | | 0.0 | OK |
| S4.001 | S16 | 29.070 | 0.082 | 0.000 | 0.09 | | 456 | 1.0 | SURCHARGED |
| S4.002 | S17 | 28.823 | -0.125 | 0.000 | 0.06 | | | 1.0 | OK |

| PN | US/MH Name | Level Exceeded |
|---|---|---|
| S1.000 | S1 | |
| S2.000 | S2 | |
| S2.001 | S3 | |
| S1.001 | S4 | |
| S1.002 | S5 | |
| S1.003 | S6 | |
| S1.004 | S7 | |
| S3.000 | S8 | |
| S3.001 | S9 | |
| S3.002 | S10 | |
| S3.003 | S11 | |
| S1.005 | S12 | |
| S1.006 | S13 | |
| S1.007 | S14 | |
| S4.000 | S15 | |
| S4.001 | S16 | |
| S4.002 | S17 | |

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## 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. |
|---|---|---|---|---|---|---|---|---|
| S4.003 | S18 | 2880 Winter | 1 | +40% | 1/180 Winter | | | |
| S4.004 | S19 | 2880 Winter | 1 | +40% | 30/120 Winter | | | |
| S4.005 | S20 | 2880 Winter | 1 | +40% | 1/360 Winter | | | |
| S4.006 | S21 | 2880 Winter | 1 | +40% | 1/180 Summer | | | |
| S1.008 | S22 | 720 Winter | 1 | +40% | 30/30 Summer | | | |
| S1.009 | S23 | 720 Winter | 1 | +40% | 1/360 Winter | | | |
| S1.010 | S24 | 720 Winter | 1 | +40% | 1/240 Winter | | | |
| S5.000 | S25 | 15 Summer | 1 | +40% | 30/60 Winter | | | |
| S5.001 | S25 | 180 Winter | 1 | +40% | 30/15 Summer | | | |
| S1.011 | S26 | 720 Winter | 1 | +40% | 1/180 Winter | | | |
| S1.012 | S27 | 960 Winter | 1 | +40% | 1/30 Summer | | | |
| S6.000 | S28 | 15 Summer | 1 | +40% | | | | |
| S6.001 | S29 | 360 Winter | 1 | +40% | 30/15 Winter | | | |
| S6.002 | S30 | 360 Winter | 1 | +40% | 100/240 Winter | | | |
| S6.003 | S31 | 960 Winter | 1 | +40% | 30/60 Summer | | | |
| S6.004 | S32 | 960 Winter | 1 | +40% | 30/120 Summer | | | |
| S7.000 | S33 | 15 Summer | 1 | +40% | | | | |
| S7.001 | S34 | 600 Winter | 1 | +40% | 1/120 Winter | | | |
| S6.005 | S35 | 480 Winter | 1 | +40% | 1/480 Winter | | | |
| S1.013 | S36 | 480 Winter | 1 | +40% | 1/120 Winter | | | |
| S8.000 | S37 | 15 Summer | 1 | +40% | | | | |
| S8.001 | S38 | 120 Winter | 1 | +40% | 1/30 Winter | | | |
| S1.014 | S39 | 360 Winter | 1 | +40% | 1/120 Winter | | | |
| S9.000 | S40 | 15 Summer | 1 | +40% | 30/180 Winter | | | |
| S9.001 | S41 | 480 Winter | 1 | +40% | 1/60 Winter | 100/480 Winter | | |
| S9.002 | S42 | 480 Winter | 1 | +40% | 1/60 Winter | | | |
| S1.015 | S43 | 480 Winter | 1 | +40% | 1/30 Winter | | | |
| S1.016 | S44 | 480 Winter | 1 | +40% | 1/60 Winter | | | |

| PN | US/MH Name | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Half Drain Time (mins) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|---|---|---|---|
| S4.003 | S18 | 28.767 | 0.143 | 0.000 | 0.05 | | 1222 | 1.1 | SURCHARGED |
| S4.004 | S19 | 28.374 | -0.006 | 0.000 | 0.07 | | | 1.1 | OK |
| S4.005 | S20 | 28.369 | 0.145 | 0.000 | 0.10 | | | 1.1 | SURCHARGED |
| S4.006 | S21 | 28.366 | 0.187 | 0.000 | 0.05 | | 1429 | 1.2 | SURCHARGED |
| S1.008 | S22 | 27.493 | -0.039 | 0.000 | 0.51 | | | 6.4 | OK |
| S1.009 | S23 | 27.466 | 0.036 | 0.000 | 0.51 | | | 6.4 | SURCHARGED |
| S1.010 | S24 | 27.440 | 0.106 | 0.000 | 0.52 | | | 6.3 | SURCHARGED |
| S5.000 | S25 | 27.827 | -0.150 | 0.000 | 0.00 | | | 0.0 | OK |
| S5.001 | S25 | 27.821 | -0.026 | 0.000 | 0.05 | | 88 | 2.0 | OK |
| S1.011 | S26 | 27.419 | 0.147 | 0.000 | 0.59 | | | 7.8 | SURCHARGED |
| S1.012 | S27 | 27.346 | 0.357 | 0.000 | 0.49 | | 544 | 7.8 | SURCHARGED |
| S6.000 | S28 | 27.952 | -0.150 | 0.000 | 0.00 | | | 0.0 | OK |
| S6.001 | S29 | 27.416 | -0.023 | 0.000 | 0.08 | | 179 | 1.0 | OK |
| S6.002 | S30 | 27.253 | -0.127 | 0.000 | 0.06 | | | 1.0 | OK |

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Half Drain Time (mins) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|---|---|---|---|
| S6.003 | S31 | 26.993 | -0.013 | 0.000 | 0.08 | | 389 | 1.1 | OK |
| S6.004 | S32 | 26.837 | -0.124 | 0.000 | 0.07 | | | 1.1 | OK |
| S7.000 | S33 | 27.750 | -0.150 | 0.000 | 0.00 | | | 0.0 | OK |
| S7.001 | S34 | 27.087 | 0.034 | 0.000 | 0.12 | | 336 | 2.2 | SURCHARGED |
| S6.005 | S35 | 26.747 | 0.002 | 0.000 | 0.37 | | 321 | 4.8 | SURCHARGED |
| S1.013 | S36 | 26.670 | 0.076 | 0.000 | 0.91 | | | 11.5 | SURCHARGED |
| S8.000 | S37 | 27.230 | -0.150 | 0.000 | 0.00 | | | 0.0 | OK |
| S8.001 | S38 | 26.719 | 0.036 | 0.000 | 0.18 | | 51 | 4.4 | SURCHARGED |
| S1.014 | S39 | 26.582 | 0.106 | 0.000 | 0.47 | | | 13.6 | SURCHARGED |
| S9.000 | S40 | 26.702 | -0.150 | 0.000 | 0.00 | | | 0.0 | OK |
| S9.001 | S41 | 26.554 | 0.126 | 0.000 | 0.17 | | 232 | 2.6 | SURCHARGED |
| S9.002 | S42 | 26.518 | 0.279 | 0.000 | 0.28 | | | 3.5 | SURCHARGED |
| S1.015 | S43 | 26.516 | 0.383 | 0.000 | 1.20 | | | 14.7 | SURCHARGED |
| S1.016 | S44 | 26.442 | 0.300 | 0.000 | 0.43 | | | 14.5 | SURCHARGED |

| PN | US/MH Name | Level Exceeded |
|---|---|---|
| S4.003 | S18 | |
| S4.004 | S19 | |
| S4.005 | S20 | |
| S4.006 | S21 | |
| S1.008 | S22 | |
| S1.009 | S23 | |
| S1.010 | S24 | |
| S5.000 | S25 | |
| S5.001 | S25 | |
| S1.011 | S26 | |
| S1.012 | S27 | |
| S6.000 | S28 | |
| S6.001 | S29 | |
| S6.002 | S30 | |
| S6.003 | S31 | |
| S6.004 | S32 | |
| S7.000 | S33 | |
| S7.001 | S34 | |
| S6.005 | S35 | |
| S1.013 | S36 | |
| S8.000 | S37 | |
| S8.001 | S38 | |
| S1.014 | S39 | |
| S9.000 | S40 | |
| S9.001 | S41 | 3 |
| S9.002 | S42 | |
| S1.015 | S43 | |
| S1.016 | S44 | |

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## 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

### Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
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 18
Number of Online Controls 19 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 0.323
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 150.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 40, 40, 40

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

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. |
|---|---|---|---|---|---|---|---|---|
| S1.000 | S1 | 480 Winter | 30 | +40% | 100/180 Winter | | | |
| S2.000 | S2 | 480 Winter | 30 | +40% | 100/360 Winter | | | |
| S2.001 | S3 | 480 Winter | 30 | +40% | 30/60 Summer | | | |
| S1.001 | S4 | 480 Winter | 30 | +40% | 30/30 Summer | | | |
| S1.002 | S5 | 960 Winter | 30 | +40% | 30/60 Winter | | | |
| S1.003 | S6 | 960 Winter | 30 | +40% | 1/480 Winter | | | |
| S1.004 | S7 | 960 Winter | 30 | +40% | 1/60 Winter | | | |
| S3.000 | S8 | 2160 Winter | 30 | +40% | 100/600 Winter | | | |
| S3.001 | S9 | 2160 Winter | 30 | +40% | 1/240 Winter | | | |
| S3.002 | S10 | 1440 Winter | 30 | +40% | 1/15 Winter | | | |
| S3.003 | S11 | 1440 Winter | 30 | +40% | 1/120 Summer | | | |
| S1.005 | S12 | 960 Winter | 30 | +40% | 1/600 Winter | | | |
| S1.006 | S13 | 960 Winter | 30 | +40% | 1/120 Summer | | | |
| S1.007 | S14 | 960 Winter | 30 | +40% | 30/30 Summer | | | |

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Half Drain Time (mins) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S1 | 28.924 | -0.060 | 0.000 | 0.00 | | | 0.0 | OK |
| S2.000 | S2 | 28.924 | -0.123 | 0.000 | 0.00 | | | 0.0 | OK |
| S2.001 | S3 | 28.924 | 0.101 | 0.000 | 0.00 | | | 0.0 | SURCHARGED |
| S1.001 | S4 | 28.924 | 0.142 | 0.000 | 0.23 | | 405 | 3.0 | SURCHARGED |
| S1.002 | S5 | 28.790 | 0.177 | 0.000 | 0.18 | | | 2.9 | SURCHARGED |
| S1.003 | S6 | 28.781 | 0.364 | 0.000 | 0.23 | | | 2.9 | SURCHARGED |
| S1.004 | S7 | 28.773 | 0.437 | 0.000 | 0.36 | | 654 | 4.8 | SURCHARGED |
| S3.000 | S8 | 29.040 | -0.071 | 0.000 | 0.00 | | | 0.0 | OK |
| S3.001 | S9 | 29.040 | 0.375 | 0.000 | 0.07 | | 1728 | 0.9 | SURCHARGED |
| S3.002 | S10 | 28.981 | 0.487 | 0.000 | 0.08 | | | 1.0 | SURCHARGED |
| S3.003 | S11 | 28.848 | 0.424 | 0.000 | 0.04 | | 1452 | 1.4 | SURCHARGED |
| S1.005 | S12 | 28.632 | 0.571 | 0.000 | 0.45 | | | 6.0 | SURCHARGED |
| S1.006 | S13 | 28.601 | 0.804 | 0.000 | 0.35 | | | 4.4 | SURCHARGED |
| S1.007 | S14 | 28.035 | 0.331 | 0.000 | 0.52 | | 589 | 6.8 | SURCHARGED |

| PN | US/MH Name | Level Exceeded |
|---|---|---|
| S1.000 | S1 | |
| S2.000 | S2 | |
| S2.001 | S3 | |
| S1.001 | S4 | |
| S1.002 | S5 | |
| S1.003 | S6 | |
| S1.004 | S7 | |
| S3.000 | S8 | |
| S3.001 | S9 | |
| S3.002 | S10 | |
| S3.003 | S11 | |
| S1.005 | S12 | |
| S1.006 | S13 | |
| S1.007 | S14 | |

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## 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. |
|---|---|---|---|---|---|---|---|---|
| S4.000 | S15 | 720 Winter | 30 | +40% | 30/180 Winter | | | |
| S4.001 | S16 | 720 Winter | 30 | +40% | 1/120 Summer | | | |
| S4.002 | S17 | 2160 Winter | 30 | +40% | 30/480 Winter | | | |
| S4.003 | S18 | 2160 Winter | 30 | +40% | 1/180 Winter | | | |
| S4.004 | S19 | 2880 Winter | 30 | +40% | 30/120 Winter | | | |
| S4.005 | S20 | 2880 Winter | 30 | +40% | 1/360 Winter | | | |
| S4.006 | S21 | 2880 Winter | 30 | +40% | 1/180 Summer | | | |
| S1.008 | S22 | 960 Winter | 30 | +40% | 30/30 Summer | | | |
| S1.009 | S23 | 960 Winter | 30 | +40% | 1/360 Winter | | | |
| S1.010 | S24 | 360 Winter | 30 | +40% | 1/240 Winter | | | |
| S5.000 | S25 | 180 Winter | 30 | +40% | 30/60 Winter | | | |
| S5.001 | S25 | 180 Winter | 30 | +40% | 30/15 Summer | | | |
| S1.011 | S26 | 360 Winter | 30 | +40% | 1/180 Winter | | | |
| S1.012 | S27 | 480 Winter | 30 | +40% | 1/30 Summer | | | |
| S6.000 | S28 | 15 Summer | 30 | +40% | | | | |
| S6.001 | S29 | 240 Winter | 30 | +40% | 30/15 Winter | | | |
| S6.002 | S30 | 720 Winter | 30 | +40% | 100/240 Winter | | | |
| S6.003 | S31 | 720 Winter | 30 | +40% | 30/60 Summer | | | |
| S6.004 | S32 | 720 Winter | 30 | +40% | 30/120 Summer | | | |
| S7.000 | S33 | 15 Summer | 30 | +40% | | | | |
| S7.001 | S34 | 600 Winter | 30 | +40% | 1/120 Winter | | | |
| S6.005 | S35 | 720 Winter | 30 | +40% | 1/480 Winter | | | |
| S1.013 | S36 | 720 Winter | 30 | +40% | 1/120 Winter | | | |
| S8.000 | S37 | 15 Summer | 30 | +40% | | | | |
| S8.001 | S38 | 120 Winter | 30 | +40% | 1/30 Winter | | | |
| S1.014 | S39 | 600 Winter | 30 | +40% | 1/120 Winter | | | |
| S9.000 | S40 | 720 Winter | 30 | +40% | 30/180 Winter | | | |
| S9.001 | S41 | 720 Winter | 30 | +40% | 1/60 Winter | 100/480 Winter | | |
| S9.002 | S42 | 600 Winter | 30 | +40% | 1/60 Winter | | | |
| S1.015 | S43 | 600 Winter | 30 | +40% | 1/30 Winter | | | |
| S1.016 | S44 | 600 Winter | 30 | +40% | 1/60 Winter | | | |

| PN | US/MH Name | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Half Drain Time (mins) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|---|---|---|---|
| S4.000 | S15 | 29.390 | 0.073 | 0.000 | 0.00 | | | 0.0 | SURCHARGED |
| S4.001 | S16 | 29.390 | 0.402 | 0.000 | 0.12 | | 764 | 1.4 | SURCHARGED |
| S4.002 | S17 | 29.091 | 0.143 | 0.000 | 0.08 | | | 1.2 | SURCHARGED |
| S4.003 | S18 | 29.084 | 0.460 | 0.000 | 0.06 | | 1714 | 1.4 | SURCHARGED |
| S4.004 | S19 | 28.648 | 0.267 | 0.000 | 0.09 | | | 1.4 | SURCHARGED |
| S4.005 | S20 | 28.642 | 0.418 | 0.000 | 0.12 | | | 1.4 | SURCHARGED |
| S4.006 | S21 | 28.638 | 0.459 | 0.000 | 0.06 | | 2680 | 1.6 | SURCHARGED |
| S1.008 | S22 | 27.926 | 0.395 | 0.000 | 0.60 | | | 7.6 | SURCHARGED |
| S1.009 | S23 | 27.901 | 0.470 | 0.000 | 0.61 | | | 7.6 | SURCHARGED |
| S1.010 | S24 | 27.888 | 0.555 | 0.000 | 0.64 | | | 7.7 | SURCHARGED |
| S5.000 | S25 | 28.007 | 0.030 | 0.000 | 0.00 | | | 0.0 | SURCHARGED |

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## 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Half Drain Time (mins) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|---|---|---|---|
| S5.001 | S25 | 28.007 | 0.160 | 0.000 | 0.08 | | 112 | 3.6 | SURCHARGED |
| S1.011 | S26 | 27.887 | 0.615 | 0.000 | 0.75 | | | 9.9 | SURCHARGED |
| S1.012 | S27 | 27.872 | 0.884 | 0.000 | 0.62 | | | 9.9 | SURCHARGED |
| S6.000 | S28 | 27.952 | -0.150 | 0.000 | 0.00 | | | 0.0 | OK |
| S6.001 | S29 | 27.601 | 0.162 | 0.000 | 0.13 | | 216 | 1.7 | SURCHARGED |
| S6.002 | S30 | 27.318 | -0.062 | 0.000 | 0.09 | | | 1.6 | OK |
| S6.003 | S31 | 27.311 | 0.305 | 0.000 | 0.11 | | 619 | 1.4 | SURCHARGED |
| S6.004 | S32 | 27.125 | 0.164 | 0.000 | 0.09 | | | 1.4 | SURCHARGED |
| S7.000 | S33 | 27.750 | -0.150 | 0.000 | 0.00 | | | 0.0 | OK |
| S7.001 | S34 | 27.352 | 0.300 | 0.000 | 0.16 | | 524 | 3.1 | SURCHARGED |
| S6.005 | S35 | 27.120 | 0.375 | 0.000 | 0.38 | | 773 | 4.9 | SURCHARGED |
| S1.013 | S36 | 27.031 | 0.438 | 0.000 | 1.06 | | | 13.5 | SURCHARGED |
| S8.000 | S37 | 27.230 | -0.150 | 0.000 | 0.00 | | | 0.0 | OK |
| S8.001 | S38 | 27.065 | 0.383 | 0.000 | 0.26 | | | 6.3 | SURCHARGED |
| S1.014 | S39 | 26.908 | 0.432 | 0.000 | 0.54 | | | 15.6 | SURCHARGED |
| S9.000 | S40 | 26.945 | 0.093 | 0.000 | 0.00 | | | 0.0 | SURCHARGED |
| S9.001 | S41 | 26.945 | 0.517 | 0.000 | 0.14 | | | 2.2 | SURCHARGED |
| S9.002 | S42 | 26.816 | 0.577 | 0.000 | 0.16 | | | 2.0 | SURCHARGED |
| S1.015 | S43 | 26.808 | 0.674 | 0.000 | 1.43 | | | 17.4 | SURCHARGED |
| S1.016 | S44 | 26.671 | 0.529 | 0.000 | 0.52 | | | 17.4 | SURCHARGED |

| PN | US/MH Name | Level Exceeded |
|---|---|---|
| S4.000 | S15 | |
| S4.001 | S16 | |
| S4.002 | S17 | |
| S4.003 | S18 | |
| S4.004 | S19 | |
| S4.005 | S20 | |
| S4.006 | S21 | |
| S1.008 | S22 | |
| S1.009 | S23 | |
| S1.010 | S24 | |
| S5.000 | S25 | |
| S5.001 | S25 | |
| S1.011 | S26 | |
| S1.012 | S27 | |
| S6.000 | S28 | |
| S6.001 | S29 | |
| S6.002 | S30 | |
| S6.003 | S31 | |
| S6.004 | S32 | |
| S7.000 | S33 | |
| S7.001 | S34 | |
| S6.005 | S35 | |

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Level Exceeded |
|---|---|---|
| S1.013 | S36 | |
| S8.000 | S37 | |
| S8.001 | S38 | |
| S1.014 | S39 | |
| S9.000 | S40 | |
| S9.001 | S41 | 3 |
| S9.002 | S42 | |
| S1.015 | S43 | |
| S1.016 | S44 | |

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## 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

### Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 0.000
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 18
Number of Online Controls 19 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 0.323
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 150.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status OFF
DVD Status ON
Inertia Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 40, 40, 40

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

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. |
|---|---|---|---|---|---|---|---|---|
| S1.000 | S1 | 600 Winter | 100 | +40% | 100/180 Winter | | | |
| S2.000 | S2 | 600 Winter | 100 | +40% | 100/360 Winter | | | |
| S2.001 | S3 | 600 Winter | 100 | +40% | 30/60 Summer | | | |
| S1.001 | S4 | 600 Winter | 100 | +40% | 30/30 Summer | | | |
| S1.002 | S5 | 600 Winter | 100 | +40% | 30/60 Winter | | | |
| S1.003 | S6 | 600 Winter | 100 | +40% | 1/480 Winter | | | |
| S1.004 | S7 | 600 Winter | 100 | +40% | 1/60 Winter | | | |
| S3.000 | S8 | 2160 Winter | 100 | +40% | 100/600 Winter | | | |
| S3.001 | S9 | 2160 Winter | 100 | +40% | 1/240 Winter | | | |
| S3.002 | S10 | 960 Winter | 100 | +40% | 1/15 Winter | | | |
| S3.003 | S11 | 720 Winter | 100 | +40% | 1/120 Summer | | | |
| S1.005 | S12 | 720 Winter | 100 | +40% | 1/600 Winter | | | |
| S1.006 | S13 | 720 Winter | 100 | +40% | 1/120 Summer | | | |
| S1.007 | S14 | 960 Winter | 100 | +40% | 30/30 Summer | | | |

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Half Drain Time (mins) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S1 | 29.417 | 0.433 | 0.000 | 0.02 | | | 0.3 | SURCHARGED |
| S2.000 | S2 | 29.417 | 0.370 | 0.000 | 0.02 | | | 0.3 | SURCHARGED |
| S2.001 | S3 | 29.417 | 0.594 | 0.000 | 0.06 | | | 0.7 | SURCHARGED |
| S1.001 | S4 | 29.417 | 0.634 | 0.000 | 0.25 | | 627 | 3.2 | SURCHARGED |
| S1.002 | S5 | 29.299 | 0.687 | 0.000 | 0.19 | | | 3.2 | SURCHARGED |
| S1.003 | S6 | 29.289 | 0.872 | 0.000 | 0.25 | | | 3.2 | SURCHARGED |
| S1.004 | S7 | 29.280 | 0.944 | 0.000 | 0.40 | | | 5.3 | SURCHARGED |
| S3.000 | S8 | 29.231 | 0.120 | 0.000 | 0.00 | | | 0.0 | SURCHARGED |
| S3.001 | S9 | 29.231 | 0.566 | 0.000 | 0.08 | | 2149 | 1.0 | SURCHARGED |
| S3.002 | S10 | 29.187 | 0.693 | 0.000 | 0.08 | | | 1.0 | SURCHARGED |
| S3.003 | S11 | 29.179 | 0.755 | 0.000 | 0.04 | | | 1.6 | SURCHARGED |
| S1.005 | S12 | 29.063 | 1.002 | 0.000 | 0.49 | | | 6.5 | SURCHARGED |
| S1.006 | S13 | 29.030 | 1.232 | 0.000 | 0.38 | | | 4.7 | SURCHARGED |
| S1.007 | S14 | 28.323 | 0.619 | 0.000 | 0.53 | | 684 | 6.8 | SURCHARGED |

| PN | US/MH Name | Level Exceeded |
|---|---|---|
| S1.000 | S1 | |
| S2.000 | S2 | |
| S2.001 | S3 | |
| S1.001 | S4 | |
| S1.002 | S5 | |
| S1.003 | S6 | |
| S1.004 | S7 | |
| S3.000 | S8 | |
| S3.001 | S9 | |
| S3.002 | S10 | |
| S3.003 | S11 | |
| S1.005 | S12 | |
| S1.006 | S13 | |
| S1.007 | S14 | |

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## 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. |
|---|---|---|---|---|---|---|---|---|
| S4.000 | S15 | 720 Winter | 100 | +40% | 30/180 Winter | | | |
| S4.001 | S16 | 720 Winter | 100 | +40% | 1/120 Summer | | | |
| S4.002 | S17 | 2160 Winter | 100 | +40% | 30/480 Winter | | | |
| S4.003 | S18 | 2160 Winter | 100 | +40% | 1/180 Winter | | | |
| S4.004 | S19 | 1440 Winter | 100 | +40% | 30/120 Winter | | | |
| S4.005 | S20 | 1440 Winter | 100 | +40% | 1/360 Winter | | | |
| S4.006 | S21 | 1440 Winter | 100 | +40% | 1/180 Summer | | | |
| S1.008 | S22 | 720 Winter | 100 | +40% | 30/30 Summer | | | |
| S1.009 | S23 | 240 Winter | 100 | +40% | 1/360 Winter | | | |
| S1.010 | S24 | 240 Winter | 100 | +40% | 1/240 Winter | | | |
| S5.000 | S25 | 240 Winter | 100 | +40% | 30/60 Winter | | | |
| S5.001 | S25 | 240 Winter | 100 | +40% | 30/15 Summer | | | |
| S1.011 | S26 | 240 Winter | 100 | +40% | 1/180 Winter | | | |
| S1.012 | S27 | 180 Winter | 100 | +40% | 1/30 Summer | | | |
| S6.000 | S28 | 240 Winter | 100 | +40% | | | | |
| S6.001 | S29 | 240 Winter | 100 | +40% | 30/15 Winter | | | |
| S6.002 | S30 | 600 Winter | 100 | +40% | 100/240 Winter | | | |
| S6.003 | S31 | 600 Winter | 100 | +40% | 30/60 Summer | | | |
| S6.004 | S32 | 720 Winter | 100 | +40% | 30/120 Summer | | | |
| S7.000 | S33 | 15 Summer | 100 | +40% | | | | |
| S7.001 | S34 | 600 Winter | 100 | +40% | 1/120 Winter | | | |
| S6.005 | S35 | 720 Winter | 100 | +40% | 1/480 Winter | | | |
| S1.013 | S36 | 600 Winter | 100 | +40% | 1/120 Winter | | | |
| S8.000 | S37 | 180 Winter | 100 | +40% | | | | |
| S8.001 | S38 | 180 Winter | 100 | +40% | 1/30 Winter | | | |
| S1.014 | S39 | 600 Winter | 100 | +40% | 1/120 Winter | | | |
| S9.000 | S40 | 600 Winter | 100 | +40% | 30/180 Winter | | | |
| S9.001 | S41 | 600 Winter | 100 | +40% | 1/60 Winter | 100/480 Winter | | |
| S9.002 | S42 | 600 Winter | 100 | +40% | 1/60 Winter | | | |
| S1.015 | S43 | 600 Winter | 100 | +40% | 1/30 Winter | | | |
| S1.016 | S44 | 600 Winter | 100 | +40% | 1/60 Winter | | | |

| PN | US/MH Name | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Half Drain Time (mins) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|---|---|---|---|
| S4.000 | S15 | 29.585 | 0.267 | 0.000 | 0.00 | | | 0.0 | SURCHARGED |
| S4.001 | S16 | 29.585 | 0.596 | 0.000 | 0.13 | | | 1.5 | SURCHARGED |
| S4.002 | S17 | 29.270 | 0.322 | 0.000 | 0.08 | | | 1.2 | SURCHARGED |
| S4.003 | S18 | 29.263 | 0.638 | 0.000 | 0.07 | | 1985 | 1.5 | SURCHARGED |
| S4.004 | S19 | 28.788 | 0.407 | 0.000 | 0.09 | | | 1.5 | SURCHARGED |
| S4.005 | S20 | 28.782 | 0.558 | 0.000 | 0.13 | | | 1.5 | SURCHARGED |
| S4.006 | S21 | 28.777 | 0.598 | 0.000 | 0.07 | | | 1.8 | SURCHARGED |
| S1.008 | S22 | 28.201 | 0.669 | 0.000 | 0.66 | | | 8.3 | SURCHARGED |
| S1.009 | S23 | 28.253 | 0.823 | 0.000 | 0.67 | | | 8.4 | SURCHARGED |
| S1.010 | S24 | 28.322 | 0.989 | 0.000 | 0.65 | | | 7.9 | SURCHARGED |
| S5.000 | S25 | 29.003 | 1.026 | 0.000 | 0.05 | | | 0.6 | SURCHARGED |

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## 100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Half Drain Time (mins) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|---|---|---|---|
| S5.001 | S25 | 29.003 | 1.156 | 0.000 | 0.12 | | 243 | 5.3 | FLOOD RISK |
| S1.011 | S26 | 28.380 | 1.108 | 0.000 | 0.76 | | | 10.1 | SURCHARGED |
| S1.012 | S27 | 28.443 | 1.454 | 0.000 | 0.77 | | | 12.3 | FLOOD RISK |
| S6.000 | S28 | 28.061 | -0.041 | 0.000 | 0.01 | | | 0.2 | OK |
| S6.001 | S29 | 28.061 | 0.623 | 0.000 | 0.20 | | 286 | 2.8 | SURCHARGED |
| S6.002 | S30 | 27.770 | 0.390 | 0.000 | 0.11 | | | 1.9 | SURCHARGED |
| S6.003 | S31 | 27.762 | 0.756 | 0.000 | 0.16 | | | 2.1 | SURCHARGED |
| S6.004 | S32 | 27.322 | 0.361 | 0.000 | 0.13 | | | 2.0 | SURCHARGED |
| S7.000 | S33 | 27.750 | -0.150 | 0.000 | 0.00 | | | 0.0 | OK |
| S7.001 | S34 | 27.525 | 0.473 | 0.000 | 0.17 | | 561 | 3.2 | SURCHARGED |
| S6.005 | S35 | 27.311 | 0.566 | 0.000 | 0.43 | | 840 | 5.6 | SURCHARGED |
| S1.013 | S36 | 27.195 | 0.602 | 0.000 | 1.19 | | | 15.2 | SURCHARGED |
| S8.000 | S37 | 27.275 | -0.105 | 0.000 | 0.00 | | | 0.0 | OK |
| S8.001 | S38 | 27.275 | 0.593 | 0.000 | 0.25 | | 181 | 6.3 | SURCHARGED |
| S1.014 | S39 | 27.052 | 0.576 | 0.000 | 0.62 | | | 17.9 | SURCHARGED |
| S9.000 | S40 | 27.629 | 0.777 | 0.000 | 0.02 | | | 0.3 | SURCHARGED |
| S9.001 | S41 | 27.629 | 1.201 | 0.603 | 0.31 | | | 4.6 | FLOOD |
| S9.002 | S42 | 26.948 | 0.708 | 0.000 | 0.37 | | | 4.6 | SURCHARGED |
| S1.015 | S43 | 26.927 | 0.794 | 0.000 | 1.81 | | | 22.0 | SURCHARGED |
| S1.016 | S44 | 26.710 | 0.568 | 0.000 | 0.65 | | | 22.0 | SURCHARGED |

| PN | US/MH Name | Level Exceeded |
|---|---|---|
| S4.000 | S15 | |
| S4.001 | S16 | |
| S4.002 | S17 | |
| S4.003 | S18 | |
| S4.004 | S19 | |
| S4.005 | S20 | |
| S4.006 | S21 | |
| S1.008 | S22 | |
| S1.009 | S23 | |
| S1.010 | S24 | |
| S5.000 | S25 | |
| S5.001 | S25 | |
| S1.011 | S26 | |
| S1.012 | S27 | |
| S6.000 | S28 | |
| S6.001 | S29 | |
| S6.002 | S30 | |
| S6.003 | S31 | |
| S6.004 | S32 | |
| S7.000 | S33 | |
| S7.001 | S34 | |
| S6.005 | S35 | |

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Level Exceeded |
|---|---|---|
| S1.013 | S36 | |
| S8.000 | S37 | |
| S8.001 | S38 | |
| S1.014 | S39 | |
| S9.000 | S40 | |
| S9.001 | S41 | 3 |
| S9.002 | S42 | |
| S1.015 | S43 | |
| S1.016 | S44 | |

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# PEAK FOUL FLOW CALCULATION PROCEDURE

***(used by UK water companies)***

## *BRIDGEWAY CENTRE - DISCHARGE POINT 1*

***NOTE: PLEASE ENTER DATA IN YELLOW CELLS ONLY***

**DOMESTIC PREMISES**
**(houses, apartments, flats, etc)**

| | |
|---|---|
| 1) Assume a Dry Weather Flow (DWF) of 225 litres/person/day | 0.0026042 |
| 2) Assume 3 people/dwelling (houses, apartments, flats, etc) | 3 |
| 3) Enter number of dwellings (houses, apartments, flats, etc) | 0 |
| DOMESTIC PEAK FLOW, **l/s** | **0** |

***NOTE: PLEASE ENTER DATA IN YELLOW CELLS ONLY***

**COMMERCIAL PREMISES**
**(restaurants, shops, offices, gym, etc)**

| | |
|---|---|
| 1) Assume a Dry Weather Flow (DWF) of 300 litres/100m2/day | 0.0000347 |
| 3) Enter the total area of commerical space (restaurants, shops, gym, , etc) | 3593 |
| COMMMERCIAL PEAK FLOW, **l/s** | **0.24951389** |

| | |
|---|---|
| **TOTAL PEAK FOUL FLOW, l/s** | **0.25** |

# PEAK FOUL FLOW CALCULATION PROCEDURE

***(used by UK water companies)***

## *BRIDGEWAY CENTRE - DISCHARGE POINT 2*

***NOTE: PLEASE ENTER DATA IN YELLOW CELLS ONLY***

**DOMESTIC PREMISES**
**(houses, apartments, flats, etc)**

| | |
|---|---|
| 1) Assume a Dry Weather Flow (DWF) of 225 litres/person/day | 0.0026042 |
| 2) Assume 3 people/dwelling (houses, apartments, flats, etc) | 3 |
| 3) Enter number of dwellings (houses, apartments, flats, etc) | 0 |
| DOMESTIC PEAK FLOW, **l/s** | **0** |

***NOTE: PLEASE ENTER DATA IN YELLOW CELLS ONLY***

**COMMERCIAL PREMISES**
**(restaurants, shops, offices, gym, etc)**

| | |
|---|---|
| 1) Assume a Dry Weather Flow (DWF) of 300 litres/100m2/day | 0.0000347 |
| 3) Enter the total area of commerical space (restaurants, shops, gym, , etc) | 1261 |
| COMMMERCIAL PEAK FLOW, **l/s** | **0.08756944** |

| | |
|---|---|
| **TOTAL PEAK FOUL FLOW, l/s** | **0.09** |

# PEAK FOUL FLOW CALCULATION PROCEDURE

***(used by UK water companies)***

## *BRIDGEWAY CENTRE - DISCHARGE POINT 3*

***NOTE: PLEASE ENTER DATA IN YELLOW CELLS ONLY***

**DOMESTIC PREMISES**
**(houses, apartments, flats, etc)**

| | |
|---|---|
| 1) Assume a Dry Weather Flow (DWF) of 225 litres/person/day | 0.0026042 |
| 2) Assume 3 people/dwelling (houses, apartments, flats, etc) | 3 |
| 3) Enter number of dwellings (houses, apartments, flats, etc) | 0 |
| DOMESTIC PEAK FLOW, **l/s** | **0** |

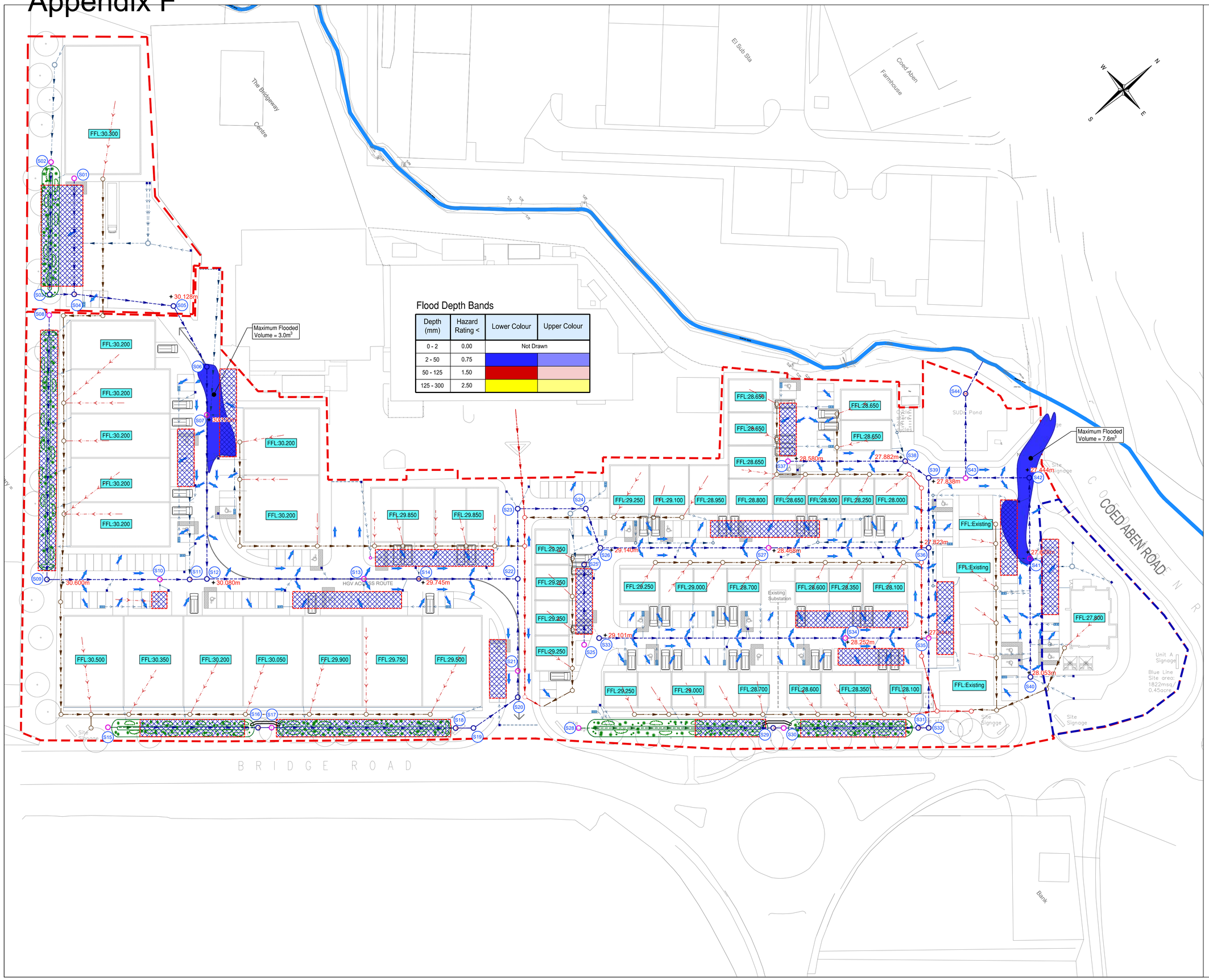
***NOTE: PLEASE ENTER DATA IN YELLOW CELLS ONLY***

**COMMERCIAL PREMISES**
**(restaurants, shops, offices, gym, etc)**

| | |
|---|---|
| 1) Assume a Dry Weather Flow (DWF) of 300 litres/100m2/day | 0.0000347 |
| 3) Enter the total area of commerical space (restaurants, shops, gym, , etc) | 799 |
| COMMMERCIAL PEAK FLOW, **l/s** | **0.05548611** |

| | |
|---|---|
| **TOTAL PEAK FOUL FLOW, l/s** | **0.06** |

# Appendix F




## Safety, Health & Environmental Information:

In addition to the hazards and risks normally associated with the types of work detailed on this drawing, please note the significant hazards identified by symbols below,

INDICATES A RESIDUAL RISK AS A WARNING

INDICATES A RESIDUAL RISK FOR INFORMATION

and described below:

## Construction/Maintenance/Cleaning/Demolition

002 Underground High Voltage Electricity Cable

Refer to drawing LGL-BML-ERD-ZZ-DR-C-0100

## General Notes:

1. Do not scale from this drawing.

2. All dimensions are in meters (m), all levels in metres (m) unless noted otherwise.

3. Discrepancies or omissions are to be reported to the Engineer prior to work commencing.

4. Materials and workmanship are to comply in all respects with current British Standard Specifications, Codes of Practice, and Building Regulations Approved Documents.

5. The copyright of this drawing is vested in the Engineer and must not be copied or reproduced without written consent.

6. The Contractor is to check and verify all building and site dimensions, levels and sewer invert levels at connection points before work commences.

7. This drawing is to be read in conjunction with all relevant specifications and drawings issued by the Engineer, Architect and other Specialists.

8. Details and locations of existing services are based on the Topographical Survey and Utility Records received from Third Parties and Service Providers respectively, and should be considered indicative and approximate only. The existing services shown on drawings may not be exhaustive. The Contractor shall use Trial Pits and other approved methods to accurately locate and verify the positions and depths of all existing services before commencement of works on site.

Drainage Key

| | |
|---|---|
| DN150 SWS 1 in 100 | Proposed Surface Water Sewer |
| SWMH XX<br>DN XXXX<br>CL: XX.XX<br>IL: XX.XX | Proposed Surface Water Manhole |
| SWCP XX<br>DN XXXX<br>CL: XX.XX<br>IL: XX.XX | Proposed Ridgistorm Separate Catchpit |
| | Proposed DN150 RWP and Gully Connection |
| GYXX ■ | Proposed Road Gully, refer to drawing BCW-BML-ERD-ZZ-DR-C-0501 for details. |
| | Proposed Hydro-Brake Chamber. Refer to drawing BCW-BML-ERD-ZZ-DR-C-0501 for details. |
| | Proposed Manhole with installed Orifice Plate on one of the pipes |
| | Permavoid Diffuser Unit |

| Rev | By | Chk'd | Date | Description |
|---|---|---|---|---|
| P02 | VI | AM | 11/03/21 | Masterplan Amended |
| P01 | VI | AM | 18/10/20 | Preliminary Issue |

**PRELIMINARY DRAWING**
This drawing is not to be used for construction

Client

FI REAL ESTATE MANAGEMENT


BarnsleyMarshall Limited
1 Birch Court
Blackpole East
Worcester
WR3 8SG

Tel: 01905 330550
Email: design@barnsleymarshall.co.uk
Web: www.barnsleymarshall.co.uk


BarnsleyMarshall

Project

The Bridgeway Centre,
Bridgeway Road, Wrexham

Drawing

FloodFlow Analysis
125-Year + 40% CC
600min Winter Storm Event

By/Chk'd VI/AM Date 18/10/20

Drawing No. BCW-BML-ERD-ZZ-DR-C-0503

Revision P02

BML Job No. 1000-01

Status -

Drawing Scale at A1: 1:500

CAD Filename: C:\Users\Valerie.Ayres\Downloads\BM Server - (Farm)\Projects\1000-01 Bridgeway Centre, Wrexham\BML Drawings\Working\0503\BCW-BML-ERD-ZZ-DR-C-0503 - FLOODFLOW ANALYSIS 180 YEAR WINTER STORM EVENT.dwg

Appendix F

| Barnsley Marshall | | Page 1 |
|---|---|---|
| 1 Birch Court<br>Blackpole East<br>Worcester, WR3 8SG | | |
| Date 12/03/2021 12:35<br>File SW Drainage - 22.0 lps ... | Designed by Alex<br>Checked by | |
| Innovyze | Network 2020.1 | |

## STORM SEWER DESIGN by the Modified Rational Method

### Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

| | | | |
|---|---|---|---|
| Return Period (years) | 2 | PIMP (%) | 100 |
| M5-60 (mm) | 18.000 | Add Flow / Climate Change (%) | 40 |
| Ratio R | 0.325 | Minimum Backdrop Height (m) | 4.000 |
| Maximum Rainfall (mm/hr) | 250 | Maximum Backdrop Height (m) | 4.000 |
| 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) | 0.76 |
| Volumetric Runoff Coeff. | 0.750 | Min Slope for Optimisation (1:X) | 500 |

Designed with Level Soffits

### Time Area Diagram for Storm

| Time (mins) | Area (ha) | Time (mins) | Area (ha) | Time (mins) | Area (ha) | Time (mins) | Area (ha) |
|---|---|---|---|---|---|---|---|
| 0-4 | 0.710 | 4-8 | 1.320 | 8-12 | 0.717 | 12-16 | 0.003 |

Total Area Contributing (ha) = 2.750

Total Pipe Volume (m³) = 20.620

### Network Design Table for Storm

« - Indicates pipe capacity < flow

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | 33.240 | 0.202 | 164.8 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S2.000 | 38.235 | 0.224 | 170.6 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S2.001 | 7.049 | 0.040 | 174.8 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |

### Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.000 | 53.85 | 5.71 | 28.834 | 0.000 | 0.0 | 0.0 | 0.0 | 0.78 | 13.8 | 0.0 |
| S2.000 | 53.38 | 5.83 | 28.897 | 0.000 | 0.0 | 0.0 | 0.0 | 0.77 | 13.5 | 0.0 |
| S2.001 | 52.79 | 5.99 | 28.673 | 0.000 | 0.0 | 0.0 | 0.0 | 0.76 | 13.4 | 0.0 |

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## Network Design Table for Storm

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S1.001 | 28.777 | 0.170 | 169.6 | 0.239 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.002 | 19.865 | 0.196 | 101.6 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.003 | 13.831 | 0.081 | 170.6 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.004 | 47.053 | 0.275 | 171.2 | 0.166 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S3.000 | 76.078 | 0.446 | 170.5 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S3.001 | 29.005 | 0.171 | 169.9 | 0.244 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S3.002 | 11.998 | 0.071 | 169.9 | 0.045 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S3.003 | 4.969 | 0.362 | 13.7 | 0.080 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.005 | 45.002 | 0.264 | 170.6 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.006 | 15.817 | 0.093 | 170.0 | 0.090 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.007 | 29.411 | 0.173 | 169.8 | 0.206 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S4.000 | 56.129 | 0.329 | 170.6 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S4.001 | 6.861 | 0.040 | 170.6 | 0.174 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S4.002 | 40.586 | 0.324 | 125.5 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S4.003 | 12.907 | 0.244 | 52.9 | 0.185 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S4.004 | 16.340 | 0.157 | 104.4 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S4.005 | 7.516 | 0.045 | 167.9 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S4.006 | 26.403 | 0.648 | 40.7 | 0.068 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |

## Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.001 | 50.58 | 6.61 | 28.633 | 0.239 | 0.0 | 0.0 | 13.1 | 0.77 | 13.6« | 45.9 |
| S1.002 | 49.49 | 6.94 | 28.463 | 0.239 | 0.0 | 0.0 | 13.1 | 1.00 | 17.6« | 45.9 |
| S1.003 | 48.55 | 7.24 | 28.267 | 0.239 | 0.0 | 0.0 | 13.1 | 0.77 | 13.5« | 45.9 |
| S1.004 | 45.65 | 8.27 | 28.186 | 0.405 | 0.0 | 0.0 | 20.0 | 0.77 | 13.5« | 70.2 |
| S3.000 | 50.44 | 6.65 | 28.961 | 0.000 | 0.0 | 0.0 | 0.0 | 0.77 | 13.5 | 0.0 |
| S3.001 | 48.43 | 7.28 | 28.515 | 0.244 | 0.0 | 0.0 | 12.8 | 0.77 | 13.6« | 44.8 |
| S3.002 | 47.66 | 7.54 | 28.344 | 0.290 | 0.0 | 0.0 | 14.9 | 0.77 | 13.6« | 52.3 |
| S3.003 | 47.57 | 7.57 | 28.273 | 0.369 | 0.0 | 0.0 | 19.0 | 2.73 | 48.3« | 66.6 |
| S1.005 | 43.25 | 9.25 | 27.911 | 0.775 | 0.0 | 0.0 | 36.3 | 0.77 | 13.5« | 127.0 |
| S1.006 | 42.47 | 9.59 | 27.648 | 0.865 | 0.0 | 0.0 | 39.8 | 0.77 | 13.6« | 139.3 |
| S1.007 | 41.12 | 10.23 | 27.554 | 1.071 | 0.0 | 0.0 | 47.7 | 0.77 | 13.6« | 166.9 |
| S4.000 | 51.94 | 6.22 | 29.167 | 0.000 | 0.0 | 0.0 | 0.0 | 0.77 | 13.5 | 0.0 |
| S4.001 | 51.41 | 6.37 | 28.838 | 0.174 | 0.0 | 0.0 | 9.7 | 0.77 | 13.5« | 33.9 |
| S4.002 | 48.92 | 7.13 | 28.798 | 0.174 | 0.0 | 0.0 | 9.7 | 0.90 | 15.8« | 33.9 |
| S4.003 | 48.44 | 7.28 | 28.474 | 0.359 | 0.0 | 0.0 | 18.8 | 1.39 | 24.5« | 65.9 |
| S4.004 | 47.62 | 7.56 | 28.230 | 0.359 | 0.0 | 0.0 | 18.8 | 0.98 | 17.4« | 65.9 |
| S4.005 | 47.15 | 7.72 | 28.074 | 0.359 | 0.0 | 0.0 | 18.8 | 0.77 | 13.7« | 65.9 |
| S4.006 | 46.38 | 8.00 | 28.029 | 0.427 | 0.0 | 0.0 | 21.5 | 1.58 | 27.9« | 75.1 |

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## Network Design Table for Storm

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S1.008 | 17.251 | 0.101 | 171.2 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S1.009 | 16.529 | 0.097 | 170.9 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S1.010 | 10.398 | 0.061 | 169.7 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S5.000 | 22.237 | 0.130 | 170.6 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S5.001 | 7.273 | 0.575 | 12.6 | 0.100 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S1.011 | 48.297 | 0.284 | 170.1 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S1.012 | 45.920 | 0.395 | 116.3 | 0.238 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S6.000 | 54.321 | 0.663 | 81.9 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S6.001 | 7.499 | 0.059 | 127.8 | 0.088 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S6.002 | 33.866 | 0.374 | 90.6 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S6.003 | 4.782 | 0.045 | 106.6 | 0.066 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S6.004 | 25.796 | 0.216 | 119.3 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S7.000 | 70.752 | 0.848 | 83.5 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S7.001 | 23.862 | 0.307 | 77.7 | 0.300 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S6.005 | 25.924 | 0.151 | 171.4 | 0.083 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |
| S1.013 | 20.047 | 0.118 | 170.6 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | 🔒 |

## Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| S1.008 | 40.37 | 10.60 | 27.381 | 1.498 | 0.0 | 0.0 | 65.5 | 0.77 | 13.5« | 229.2 |
| S1.009 | 39.68 | 10.96 | 27.280 | 1.498 | 0.0 | 0.0 | 65.5 | 0.77 | 13.5« | 229.2 |
| S1.010 | 39.26 | 11.19 | 27.184 | 1.498 | 0.0 | 0.0 | 65.5 | 0.77 | 13.6« | 229.2 |
| S5.000 | 54.76 | 5.48 | 27.827 | 0.000 | 0.0 | 0.0 | 0.0 | 0.77 | 13.5 | 0.0 |
| S5.001 | 54.58 | 5.53 | 27.697 | 0.100 | 0.0 | 0.0 | 5.9 | 2.85 | 50.3 | 20.6 |
| S1.011 | 37.46 | 12.24 | 27.122 | 1.597 | 0.0 | 0.0 | 65.5 | 0.77 | 13.6« | 229.2 |
| S1.012 | 36.17 | 13.06 | 26.838 | 1.836 | 0.0 | 0.0 | 71.9 | 0.93 | 16.5« | 251.8 |
| S6.000 | 53.45 | 5.81 | 27.952 | 0.000 | 0.0 | 0.0 | 0.0 | 1.11 | 19.6 | 0.0 |
| S6.001 | 52.91 | 5.96 | 27.288 | 0.088 | 0.0 | 0.0 | 5.0 | 0.89 | 15.7« | 17.6 |
| S6.002 | 50.99 | 6.49 | 27.230 | 0.088 | 0.0 | 0.0 | 5.0 | 1.06 | 18.7 | 17.6 |
| S6.003 | 50.71 | 6.57 | 26.856 | 0.154 | 0.0 | 0.0 | 8.5 | 0.97 | 17.2« | 29.6 |
| S6.004 | 49.19 | 7.04 | 26.811 | 0.154 | 0.0 | 0.0 | 8.5 | 0.92 | 16.2« | 29.6 |
| S7.000 | 52.48 | 6.07 | 27.750 | 0.000 | 0.0 | 0.0 | 0.0 | 1.10 | 19.5 | 0.0 |
| S7.001 | 51.24 | 6.42 | 26.902 | 0.300 | 0.0 | 0.0 | 16.6 | 1.14 | 20.2« | 58.2 |
| S6.005 | 47.48 | 7.60 | 26.595 | 0.536 | 0.0 | 0.0 | 27.6 | 0.76 | 13.5« | 96.5 |
| S1.013 | 35.54 | 13.50 | 26.444 | 2.372 | 0.0 | 0.0 | 91.3 | 0.77 | 13.5« | 319.6 |

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## Network Design Table for Storm

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S8.000 | 33.673 | 0.698 | 48.3 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S8.001 | 8.247 | 0.206 | 40.0 | 0.153 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.014 | 10.617 | 0.343 | 31.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S9.000 | 33.990 | 0.424 | 80.1 | 0.000 | 5.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S9.001 | 23.160 | 0.188 | 123.1 | 0.225 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S9.002 | 18.274 | 0.107 | 171.6 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.015 | 11.447 | 0.067 | 171.9 | 0.000 | 0.00 | 0.0 | 0.600 | o | 150 | Pipe/Conduit | |
| S1.016 | 11.389 | 0.067 | 170.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |

## Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| S8.000 | 55.16 | 5.39 | 27.230 | 0.000 | 0.0 | 0.0 | 0.0 | 1.45 | 25.7 | 0.0 |
| S8.001 | 54.80 | 5.47 | 26.532 | 0.153 | 0.0 | 0.0 | 9.1 | 1.60 | 28.2« | 31.8 |
| S1.014 | 35.41 | 13.59 | 26.326 | 2.525 | 0.0 | 0.0 | 96.8 | 1.82 | 32.1« | 339.0 |
| S9.000 | 54.67 | 5.50 | 26.702 | 0.000 | 0.0 | 0.0 | 0.0 | 1.12 | 19.9 | 0.0 |
| S9.001 | 53.00 | 5.93 | 26.278 | 0.225 | 0.0 | 0.0 | 12.9 | 0.90 | 16.0« | 45.2 |
| S9.002 | 51.55 | 6.33 | 26.090 | 0.225 | 0.0 | 0.0 | 12.9 | 0.76 | 13.5« | 45.2 |
| S1.015 | 35.06 | 13.84 | 25.983 | 2.750 | 0.0 | 0.0 | 104.5 | 0.76 | 13.5« | 365.6 |
| S1.016 | 34.81 | 14.03 | 25.917 | 2.750 | 0.0 | 0.0 | 104.5 | 1.00 | 39.8« | 365.6 |

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## Area Summary for Storm

| Pipe Number | PIMP Type | PIMP Name | PIMP (%) | Gross Area (ha) | Imp. Area (ha) | Pipe Total (ha) |
|---|---|---|---|---|---|---|
| 1.000 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 2.000 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 2.001 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.001 | User | - | 100 | 0.239 | 0.239 | 0.239 |
| 1.002 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.003 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.004 | User | - | 100 | 0.166 | 0.166 | 0.166 |
| 3.000 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 3.001 | User | - | 100 | 0.244 | 0.244 | 0.244 |
| 3.002 | User | - | 100 | 0.045 | 0.045 | 0.045 |
| 3.003 | User | - | 100 | 0.080 | 0.080 | 0.080 |
| 1.005 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.006 | User | - | 100 | 0.090 | 0.090 | 0.090 |
| 1.007 | User | - | 100 | 0.206 | 0.206 | 0.206 |
| 4.000 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 4.001 | User | - | 100 | 0.174 | 0.174 | 0.174 |
| 4.002 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 4.003 | User | - | 100 | 0.185 | 0.185 | 0.185 |
| 4.004 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 4.005 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 4.006 | User | - | 100 | 0.068 | 0.068 | 0.068 |
| 1.008 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.009 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.010 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 5.000 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 5.001 | User | - | 100 | 0.100 | 0.100 | 0.100 |
| 1.011 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.012 | User | - | 100 | 0.238 | 0.238 | 0.238 |
| 6.000 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 6.001 | User | - | 100 | 0.088 | 0.088 | 0.088 |
| 6.002 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 6.003 | User | - | 100 | 0.066 | 0.066 | 0.066 |
| 6.004 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 7.000 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 7.001 | User | - | 100 | 0.300 | 0.300 | 0.300 |
| 6.005 | User | - | 100 | 0.083 | 0.083 | 0.083 |
| 1.013 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 8.000 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 8.001 | User | - | 100 | 0.153 | 0.153 | 0.153 |
| 1.014 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 9.000 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 9.001 | User | - | 100 | 0.225 | 0.225 | 0.225 |
| 9.002 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.015 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| 1.016 | - | - | 100 | 0.000 | 0.000 | 0.000 |
| | | | | Total | Total | Total |
| | | | | 2.750 | 2.750 | 2.750 |

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## Free Flowing Outfall Details for Storm

| Outfall Pipe Number | Outfall Name | C. Level (m) | I. Level (m) | Min I. Level (m) | D,L (mm) | W (mm) |
|---|---|---|---|---|---|---|
| S1.016 | SHWtoDitch | 27.513 | 25.850 | 25.500 | 0 | 0 |

## Simulation Criteria for Storm

| | | | |
|---|---|---|---|
| Volumetric Runoff Coeff | 0.840 | Additional Flow - % of Total Flow | 40.000 |
| Areal Reduction Factor | 1.000 | MADD Factor * 10m³/ha Storage | 0.000 |
| 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) | 1200 |
| Foul Sewage per hectare (l/s) | 0.000 | Output Interval (mins) | 10 |

| | | | |
|---|---|---|---|
| Number of Input Hydrographs | 0 | Number of Storage Structures | 18 |
| Number of Online Controls | 19 | Number of Time/Area Diagrams | 0 |
| Number of Offline Controls | 0 | Number of Real Time Controls | 0 |

## Synthetic Rainfall Details

| | | | |
|---|---|---|---|
| Rainfall Model | FSR | Profile Type | Winter |
| Return Period (years) | 125 | Cv (Summer) | 0.750 |
| Region | England and Wales | Cv (Winter) | 0.840 |
| M5-60 (mm) | 18.000 | Storm Duration (mins) | 600 |
| Ratio R | 0.325 | | |

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## Online Controls for Storm

### Orifice Manhole: S4, DS/PN: S1.001, Volume (m³): 2.4

Diameter (m) 0.056 Discharge Coefficient 0.600 Invert Level (m) 28.633

### Orifice Manhole: S7, DS/PN: S1.004, Volume (m³): 1.9

Diameter (m) 0.061 Discharge Coefficient 0.600 Invert Level (m) 28.186

### Orifice Manhole: S9, DS/PN: S3.001, Volume (m³): 3.7

Diameter (m) 0.040 Discharge Coefficient 0.600 Invert Level (m) 28.515

### Orifice Manhole: S10, DS/PN: S3.002, Volume (m³): 2.6

Diameter (m) 0.032 Discharge Coefficient 0.600 Invert Level (m) 28.344

### Orifice Manhole: S11, DS/PN: S3.003, Volume (m³): 2.3

Diameter (m) 0.032 Discharge Coefficient 0.600 Invert Level (m) 28.273

### Orifice Manhole: S13, DS/PN: S1.006, Volume (m³): 3.1

Diameter (m) 0.052 Discharge Coefficient 0.600 Invert Level (m) 27.648

### Hydro-Brake® Optimum Manhole: S14, DS/PN: S1.007, Volume (m³): 2.7

| | |
|---|---|
| Unit Reference | MD-SCL-0145-1200-1200-1200 |
| Design Head (m) | 1.200 |
| Design Flow (l/s) | 12.0 |
| Flush-Flo™ | Calculated |
| Objective | Minimise blockage risk |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 145 |
| Invert Level (m) | 27.554 |
| Minimum Outlet Pipe Diameter (mm) | 225 |
| Suggested Manhole Diameter (mm) | 1200 |

| **Control Points** | **Head (m)** | **Flow (l/s)** |
|---|---|---|
| Design Point (Calculated) | 1.200 | 12.0 |
| Flush-Flo™ | 0.276 | 12.0 |
| Kick-Flo® | 0.694 | 9.3 |
| Mean Flow over Head Range | - | 10.1 |

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

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Hydro-Brake® Optimum Manhole: S14, DS/PN: S1.007, Volume (m³): 2.7

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|---|---|---|---|---|---|---|---|
| 0.100 | 5.8 | 1.200 | 12.0 | 3.000 | 18.5 | 7.000 | 27.7 |
| 0.200 | 11.8 | 1.400 | 12.9 | 3.500 | 19.9 | 7.500 | 28.7 |
| 0.300 | 12.0 | 1.600 | 13.7 | 4.000 | 21.2 | 8.000 | 29.6 |
| 0.400 | 11.7 | 1.800 | 14.5 | 4.500 | 22.4 | 8.500 | 30.5 |
| 0.500 | 11.2 | 2.000 | 15.3 | 5.000 | 23.6 | 9.000 | 31.3 |
| 0.600 | 10.6 | 2.200 | 16.0 | 5.500 | 24.7 | 9.500 | 32.1 |
| 0.800 | 9.9 | 2.400 | 16.6 | 6.000 | 25.8 | | |
| 1.000 | 11.0 | 2.600 | 17.3 | 6.500 | 26.8 | | |

Orifice Manhole: S16, DS/PN: S4.001, Volume (m³): 2.7

Diameter (m) 0.032 Discharge Coefficient 0.600 Invert Level (m) 28.838

Orifice Manhole: S18, DS/PN: S4.003, Volume (m³): 2.2

Diameter (m) 0.032 Discharge Coefficient 0.600 Invert Level (m) 28.474

Orifice Manhole: S21, DS/PN: S4.006, Volume (m³): 1.7

Diameter (m) 0.032 Discharge Coefficient 0.600 Invert Level (m) 28.029

Orifice Manhole: S25, DS/PN: S5.001, Volume (m³): 2.0

Diameter (m) 0.056 Discharge Coefficient 0.600 Invert Level (m) 27.697

Orifice Manhole: S27, DS/PN: S1.012, Volume (m³): 2.7

Diameter (m) 0.074 Discharge Coefficient 0.600 Invert Level (m) 26.838

Orifice Manhole: S29, DS/PN: S6.001, Volume (m³): 2.5

Diameter (m) 0.039 Discharge Coefficient 0.600 Invert Level (m) 27.288

Orifice Manhole: S31, DS/PN: S6.003, Volume (m³): 2.1

Diameter (m) 0.039 Discharge Coefficient 0.600 Invert Level (m) 26.856

Orifice Manhole: S34, DS/PN: S7.001, Volume (m³): 2.8

Diameter (m) 0.052 Discharge Coefficient 0.600 Invert Level (m) 26.902

Orifice Manhole: S35, DS/PN: S6.005, Volume (m³): 2.4

Diameter (m) 0.090 Discharge Coefficient 0.600 Invert Level (m) 26.595

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Orifice Manhole: S38, DS/PN: S8.001, Volume (m³): 2.1

Diameter (m) 0.074 Discharge Coefficient 0.600 Invert Level (m) 26.532

Orifice Manhole: S41, DS/PN: S9.001, Volume (m³): 2.1

Diameter (m) 0.052 Discharge Coefficient 0.600 Invert Level (m) 26.278

Complex Manhole: S44, DS/PN: S1.016, Volume (m³): 2.1

Hydro-Brake® Optimum

| | |
|---|---|
| Unit Reference | MD-SHE-0176-1450-0700-1450 |
| Design Head (m) | 0.700 |
| Design Flow (l/s) | 14.5 |
| Flush-Flo™ | Calculated |
| Objective | Minimise upstream storage |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 176 |
| Invert Level (m) | 25.917 |
| Minimum Outlet Pipe Diameter (mm) | 225 |
| Suggested Manhole Diameter (mm) | 1200 |

| Control Points | Head (m) | Flow (l/s) |
|---|---|---|
| Design Point (Calculated) | 0.700 | 14.5 |
| Flush-Flo™ | 0.276 | 14.5 |
| Kick-Flo® | 0.531 | 12.7 |
| Mean Flow over Head Range | - | 11.9 |

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 | 6.2 | 1.200 | 18.7 | 3.000 | 29.0 | 7.000 | 43.7 |
| 0.200 | 14.2 | 1.400 | 20.2 | 3.500 | 31.3 | 7.500 | 45.0 |
| 0.300 | 14.5 | 1.600 | 21.5 | 4.000 | 33.4 | 8.000 | 46.5 |
| 0.400 | 14.1 | 1.800 | 22.7 | 4.500 | 35.3 | 8.500 | 47.9 |
| 0.500 | 13.3 | 2.000 | 23.9 | 5.000 | 37.2 | 9.000 | 49.4 |
| 0.600 | 13.5 | 2.200 | 25.0 | 5.500 | 38.9 | 9.500 | 50.7 |
| 0.800 | 15.4 | 2.400 | 26.1 | 6.000 | 40.6 | | |
| 1.000 | 17.2 | 2.600 | 27.1 | 6.500 | 42.2 | | |

Hydro-Brake® Optimum

| | |
|---|---|
| Unit Reference | MD-SHE-0229-2600-0500-2600 |
| Design Head (m) | 0.500 |
| Design Flow (l/s) | 26.0 |

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## Hydro-Brake® Optimum

| | |
|---|---|
| Flush-Flo™ | Calculated |
| Objective | Minimise upstream storage |
| Application | Surface |
| Sump Available | Yes |
| Diameter (mm) | 229 |
| Invert Level (m) | 26.617 |
| Minimum Outlet Pipe Diameter (mm) | 300 |
| Suggested Manhole Diameter (mm) | 1200 |

| **Control Points** | **Head (m)** | **Flow (l/s)** |
|---|---|---|
| Design Point (Calculated) | 0.500 | 26.0 |
| Flush-Flo™ | 0.310 | 26.0 |
| Kick-Flo® | 0.443 | 24.5 |
| Mean Flow over Head Range | - | 18.9 |

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 | 7.6 | 1.200 | 39.6 | 3.000 | 61.6 | 7.000 | 92.7 |
| 0.200 | 22.9 | 1.400 | 42.6 | 3.500 | 66.4 | 7.500 | 96.1 |
| 0.300 | 26.0 | 1.600 | 45.4 | 4.000 | 70.9 | 8.000 | 99.2 |
| 0.400 | 25.3 | 1.800 | 48.1 | 4.500 | 75.1 | 8.500 | 102.3 |
| 0.500 | 26.0 | 2.000 | 50.6 | 5.000 | 79.0 | 9.000 | 105.4 |
| 0.600 | 28.4 | 2.200 | 53.0 | 5.500 | 82.0 | 9.500 | 108.3 |
| 0.800 | 32.6 | 2.400 | 55.3 | 6.000 | 85.7 | | |
| 1.000 | 36.2 | 2.600 | 57.5 | 6.500 | 89.3 | | |

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## Storage Structures for Storm

### Cellular Storage Manhole: S4, DS/PN: S1.001

Invert Level (m) 28.633 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 350.0 | 0.0 | 0.401 | 0.0 | 0.0 |
| 0.400 | 350.0 | 0.0 | | | |

### Cellular Storage Manhole: S7, DS/PN: S1.004

Invert Level (m) 28.186 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 120.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 120.0 | 0.0 | | | |

### Cellular Storage Manhole: S9, DS/PN: S3.001

Invert Level (m) 28.515 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 345.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 345.0 | 0.0 | | | |

### Cellular Storage Manhole: S10, DS/PN: S3.002

Invert Level (m) 28.344 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 18.4 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 18.4 | 0.0 | | | |

### Cellular Storage Manhole: S11, DS/PN: S3.003

Invert Level (m) 28.273 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

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## Cellular Storage Manhole: S11, DS/PN: S3.003

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 78.9 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 78.9 | 0.0 | | | |

## Cellular Storage Manhole: S13, DS/PN: S1.006

Invert Level (m) 27.648 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 150.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 150.0 | 0.0 | | | |

## Cellular Storage Manhole: S14, DS/PN: S1.007

Invert Level (m) 27.554 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 240.0 | 0.0 | 1.201 | 0.0 | 0.0 |
| 1.200 | 240.0 | 0.0 | | | |

## Cellular Storage Manhole: S16, DS/PN: S4.001

Invert Level (m) 28.838 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 150.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 150.0 | 0.0 | | | |

## Cellular Storage Manhole: S18, DS/PN: S4.003

Invert Level (m) 28.474 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 250.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 250.0 | 0.0 | | | |

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Cellular Storage Manhole: S21, DS/PN: S4.006

Invert Level (m) 28.029 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 80.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 80.0 | 0.0 | | | |

Cellular Storage Manhole: S25, DS/PN: S5.001

Invert Level (m) 27.697 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 90.0 | 0.0 | 0.401 | 0.0 | 0.0 |
| 0.400 | 90.0 | 0.0 | | | |

Cellular Storage Manhole: S27, DS/PN: S1.012

Invert Level (m) 26.838 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 150.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 150.0 | 0.0 | | | |

Cellular Storage Manhole: S29, DS/PN: S6.001

Invert Level (m) 27.288 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 100.0 | 0.0 | 0.401 | 0.0 | 0.0 |
| 0.400 | 100.0 | 0.0 | | | |

Cellular Storage Manhole: S31, DS/PN: S6.003

Invert Level (m) 26.856 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 150.0 | 0.0 | 0.400 | 150.0 | 0.0 |

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## Cellular Storage Manhole: S31, DS/PN: S6.003

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.401 | 0.0 | 0.0 | | | |

## Cellular Storage Manhole: S34, DS/PN: S7.001

Invert Level (m) 26.902 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 300.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 300.0 | 0.0 | | | |

## Cellular Storage Manhole: S35, DS/PN: S6.005

Invert Level (m) 26.595 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 100.0 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 100.0 | 0.0 | | | |

## Cellular Storage Manhole: S38, DS/PN: S8.001

Invert Level (m) 26.532 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 72.3 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 72.3 | 0.0 | | | |

## Cellular Storage Manhole: S41, DS/PN: S9.001

Invert Level (m) 26.278 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

| Depth (m) | Area (m²) | Inf. Area (m²) | Depth (m) | Area (m²) | Inf. Area (m²) |
|---|---|---|---|---|---|
| 0.000 | 164.5 | 0.0 | 0.801 | 0.0 | 0.0 |
| 0.800 | 164.5 | 0.0 | | | |

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## Summary of Results for 600 minute 125 year Winter (Storm)

Margin for Flood Risk Warning (mm) 150.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

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

| PN | US/MH Name | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Half Drain Time (mins) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|---|---|---|---|
| S1.000 | S1 | 29.859 | 0.875 | 0.000 | 0.03 | | | 0.4 | SURCHARGED |
| S2.000 | S2 | 29.859 | 0.812 | 0.000 | 0.03 | | | 0.4 | SURCHARGED |
| S2.001 | S3 | 29.859 | 1.036 | 0.000 | 0.07 | | | 0.8 | SURCHARGED |
| S1.001 | S4 | 29.859 | 1.076 | 0.000 | 0.37 | | | 4.8 | SURCHARGED |
| S1.002 | S5 | 29.639 | 1.026 | 0.000 | 0.29 | | | 4.8 | SURCHARGED |
| S1.003 | S6 | 29.624 | 1.207 | 3.038 | 0.38 | | | 4.7 | FLOOD |
| S1.004 | S7 | 29.615 | 1.279 | 0.000 | 0.41 | | | 5.3 | FLOOD RISK |
| S3.000 | S8 | 29.184 | 0.073 | 0.000 | 0.00 | | | 0.0 | SURCHARGED |
| S3.001 | S9 | 29.184 | 0.519 | 0.000 | 0.06 | | | 0.8 | SURCHARGED |
| S3.002 | S10 | 29.268 | 0.774 | 0.000 | 0.08 | | | 0.9 | SURCHARGED |
| S3.003 | S11 | 29.360 | 0.937 | 0.000 | 0.04 | | | 1.6 | SURCHARGED |
| S1.005 | S12 | 29.313 | 1.251 | 0.000 | 0.51 | | | 6.7 | SURCHARGED |
| S1.006 | S13 | 29.277 | 1.479 | 0.000 | 0.43 | | | 5.4 | SURCHARGED |
| S1.007 | S14 | 28.398 | 0.693 | 0.000 | 0.56 | | | 7.3 | SURCHARGED |
| S4.000 | S15 | 29.624 | 0.307 | 0.000 | 0.00 | | | 0.0 | SURCHARGED |
| S4.001 | S16 | 29.624 | 0.636 | 0.000 | 0.13 | | | 1.5 | SURCHARGED |
| S4.002 | S17 | 29.170 | 0.222 | 0.000 | 0.10 | | | 1.5 | SURCHARGED |
| S4.003 | S18 | 29.160 | 0.535 | 0.000 | 0.07 | | | 1.5 | SURCHARGED |
| S4.004 | S19 | 28.758 | 0.377 | 0.000 | 0.09 | | | 1.5 | SURCHARGED |
| S4.005 | S20 | 28.752 | 0.528 | 0.000 | 0.13 | | | 1.5 | SURCHARGED |
| S4.006 | S21 | 28.748 | 0.569 | 0.000 | 0.07 | | | 1.7 | SURCHARGED |
| S1.008 | S22 | 28.278 | 0.746 | 0.000 | 0.70 | | | 8.9 | SURCHARGED |
| S1.009 | S23 | 28.248 | 0.817 | 0.000 | 0.71 | | | 8.9 | SURCHARGED |
| S1.010 | S24 | 28.259 | 0.925 | 0.000 | 0.73 | | | 8.9 | SURCHARGED |
| S5.000 | S25 | 28.685 | 0.708 | 0.000 | 0.01 | | | 0.2 | SURCHARGED |
| S5.001 | S25 | 28.687 | 0.840 | 0.000 | 0.10 | | 620 | 4.2 | SURCHARGED |
| S1.011 | S26 | 28.281 | 1.009 | 0.000 | 0.71 | | | 9.3 | SURCHARGED |
| S1.012 | S27 | 28.276 | 1.288 | 0.000 | 0.69 | | | 11.1 | SURCHARGED |
| S6.000 | S28 | 28.349 | 0.248 | 0.000 | 0.01 | | | 0.1 | SURCHARGED |
| S6.001 | S29 | 28.350 | 0.911 | 0.000 | 0.17 | | 410 | 2.3 | SURCHARGED |
| S6.002 | S30 | 28.104 | 0.724 | 0.000 | 0.13 | | | 2.3 | SURCHARGED |
| S6.003 | S31 | 28.094 | 1.088 | 0.000 | 0.21 | | | 2.7 | FLOOD RISK |
| S6.004 | S32 | 27.377 | 0.416 | 0.000 | 0.18 | | | 2.7 | SURCHARGED |
| S7.000 | S33 | 27.750 | -0.150 | 0.000 | 0.00 | | | 0.0 | OK |
| S7.001 | S34 | 27.565 | 0.513 | 0.000 | 0.16 | | 590 | 3.1 | SURCHARGED |
| S6.005 | S35 | 27.364 | 0.619 | 0.000 | 0.46 | | | 6.0 | SURCHARGED |
| S1.013 | S36 | 27.236 | 0.642 | 0.000 | 1.23 | | | 15.7 | SURCHARGED |
| S8.000 | S37 | 27.230 | -0.150 | 0.000 | 0.00 | | | 0.0 | OK |
| S8.001 | S38 | 27.202 | 0.520 | 0.000 | 0.18 | | 490 | 4.5 | SURCHARGED |
| S1.014 | S39 | 27.081 | 0.605 | 0.000 | 0.64 | | | 18.5 | SURCHARGED |
| S9.000 | S40 | 27.628 | 0.776 | 0.000 | 0.01 | | | 0.2 | SURCHARGED |
| S9.001 | S41 | 27.628 | 1.200 | 7.576 | 0.29 | | | 4.4 | FLOOD |

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Summary of Results for 600 minute 125 year Winter (Storm)

| PN | US/MH Name | Water Level (m) | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) | Half Drain Time (mins) | Pipe Flow (l/s) | Status |
|---|---|---|---|---|---|---|---|---|---|
| S9.002 | S42 | 26.963 | 0.723 | 0.000 | 0.35 | | | 4.4 | SURCHARGED |
| S1.015 | S43 | 26.943 | 0.810 | 0.000 | 1.86 | | | 22.6 | SURCHARGED |
| S1.016 | S44 | 26.714 | 0.572 | 0.000 | 0.67 | | | 22.6 | SURCHARGED |

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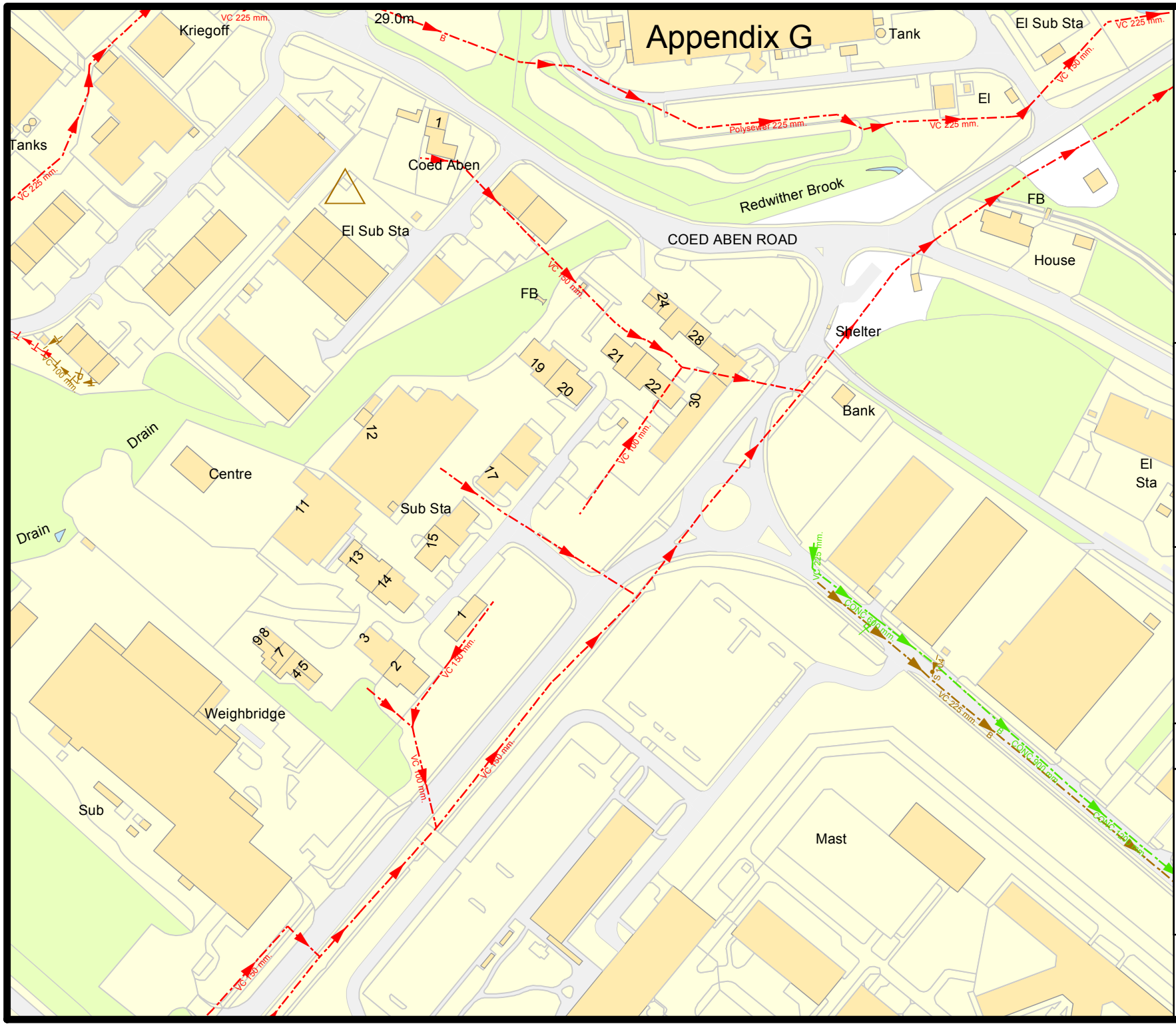
# Appendix G




Dŵr Cymru
Welsh Water

Sewer Plan PPA0005208

**LEGEND(Representative of most common features)**

**Notes:**

Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases pipe material (other than Asbestos Cement or Pitch Fibre) may be found to be asbestos cement (AC) or Pitch Fibre (PF) . It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation

Dŵr Cymru Cyfyngedig ('the Company') gives this information as to the position of its underground apparatus by way of general guidance only and on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the company's apparatus. The onus of locating apparatus before carrying out any excavations rests entirely on you. The information which is supplied by the Company, is done so in accordance with statutory requirements of sections 198 and 199 of the Water Industry Act 1991 which is based upon the best Information available and, in particular, but without prejudice to the generality of the foregoing, it should be noted that the records that are available to the Company may not disclose the existence of a water main, service pipe, sewer, lateral drain or disposal main and any associated apparatus laid before 1 September 1989, or, if they do, the particulars thereof including their position underground may not be accurate. It must be understood that the furnishing of this information is entirely without prejudice to the provision of the New Roads and Street Works Act 1991 and the Company's right to be compensated for any damage to its apparatus.

Service pipes are not generally shown but their presence should be anticipated.

**EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.**

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| | |
|---|---|
| Map Ref: | 337835,349389 |
| Map scale: | 1:2500 |
| Printed by: | Walmsley Natalie |
| Printed on: | 15 Oct 2020 |

Dŵr Cymru
Welsh Water

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Ms Emily Armstrong
FI Real Estate Management
Canal Mill
Botany Brow Chorley
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PR6 9AF

**Date: 15/10/2020**
**Our Ref: PPA0005208**

Dear Ms Armstrong,

**Site Address: Wrexham**
**Development: Redevelopment of the site to provide 48 commercial/industrial/warehousing units**

I refer to your pre-planning enquiry received relating to the above site, seeking our views on the capacity of our network of assets and infrastructure to accommodate your proposed development. Having reviewed the details submitted I can provide the following comments which should be taken into account within any future planning application for the development.

**APPRAISAL**

Firstly, we note that the proposal relates to the redevelopment of the site to provide 48 commercial/industrial/warehousing units. We also note there will be a total of 120 staff as a result of the proposal. We acknowledge that the site is located within the development boundary of Wrexham Industrial Estate in the Unitary Development Plan and located within allocated employment area in the Deposit Local Development Plan (LDP). We offer the following comments as part of our appraisal of this development.

**Public Sewerage Network**

The proposed development site is located in the immediate vicinity of a separate sewerage system, comprising combined, foul and surface water public sewers, which drains to Five Fords Wastewater Treatment Works (WwTW) via Wrexham Industrial Estate Sewerage Pumping Station (SPS).

This site is crossed by a public sewers with their approximate position being marked on the attached Statutory Public Sewer Record. In accordance with the Water Industry Act 1991, Dwr Cymru Welsh Water requires access to its apparatus at all times in order to carry out maintenance and repairs. However, having regard to the site location plan, it appears the proposed development would be situated within the protection zone of the public sewers measured 3 metres either side of the centreline. Our strong recommendation is that your site layout is amended to take into account the location of the assets

crossing the site and should be referred to in any master-planning exercises or site layout plans submitted as part of any subsequent planning application. Alternatively, it may be possible to divert the sewers if the developer applies under Section 185 of the Water Industry Act and we request that they contact us to discuss and consider possible solutions.

In the first instance, it is recommended that the developer carry out a survey to ascertain the location of the sewers and establish their relationship to the proposed development. Further information regarding Asset Protection is provided in the attached Advice & Guidance note.

You are also advised that some public sewers and lateral drains may not be recorded on our maps of public sewers because they were originally privately owned and were transferred into public ownership by nature of the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011. The presence of such assets may affect the proposal. In order to assist you may contact Dwr Cymru Welsh Water on 0800 085 3968 to establish the location and status of the apparatus in and around your site. Please be mindful that under the Water Industry Act 1991 Dwr Cymru Welsh Water has rights of access to its apparatus at all times.

**Surface Water Drainage**

As of 7th January 2019, this proposed development is subject to Schedule 3 of the Flood and Water Management Act 2010. The development therefore requires approval of Sustainable Drainage Systems (SuDS) features, in accordance with the 'Statutory standards for sustainable drainage systems – designing, constructing, operating and maintaining surface water drainage systems'. As highlighted in these standards, the developer is required to explore and fully exhaust all surface water drainage options in accordance with a hierarchy which states that discharge to a combined sewer shall only be made as a last resort. Disposal should be made through the hierarchical approach, preferring infiltration and, where infiltration is not possible, disposal to a surface water drainage body in liaison with the Land Drainage Authority and/or Natural Resources Wales.

It is therefore recommended that the developer consult with Wrexham County Borough Council, as the determining SuDS Approval Body (SAB), in relation to their proposals for SuDS features. Please note, DCWW is a statutory consultee to the SAB application process and will provide comments to any SuDS proposals by response to SAB consultation. Please refer to further detailed advice relating to surface water management included in our attached Advice & Guidance note.

Please be advised that due to capacity constraints with the combined public sewerage network, under no circumstances would we allow surface water from the proposed development to discharged into the combined sewer.

In addition, please note that no highway or land drainage run-off will be permitted to discharge directly or indirectly into the public sewerage system.

## Foul Water Drainage – Sewerage Network

We have considered the impact of foul flows generated by the proposed development and concluded that domestic flows can be accommodated within the public sewerage system. We advise that the flows should be connected to an existing manhole chamber on the combined sewer at or downstream of manhole SJ37497201 located in Bridge Road.

Should a planning application be submitted for this development we will seek to control these points of communication via appropriate planning conditions and therefore recommend that any drainage layout or strategy submitted as part of your application takes this into account. However, should you wish for an alternative connection point to be considered please provide further information to us in the form of a drainage strategy, preferably in advance of a planning application being submitted.

You may need to apply to Dwr Cymru Welsh Water for any connection to the public sewer under Section 106 of the Water industry Act 1991. However, if the connection to the public sewer network is either via a lateral drain (i.e. a drain which extends beyond the connecting property boundary) or via a new sewer (i.e. serves more than one property), it is now a mandatory requirement to first enter into a Section 104 Adoption Agreement (Water Industry Act 1991). The design of the sewers and lateral drains must also conform to the Welsh Ministers Standards for Foul Sewers and Lateral Drains, and conform with the publication "Sewers for Adoption"- 7th Edition. Further information can be obtained via the Developer Services pages of www.dwrcymru.com.

If the development will give rise to a new discharge (or alter an existing discharge) of trade effluent, directly or indirectly to the public sewerage system, then a Discharge Consent under Section 118 of the Water Industry Act 1991 is required from Dwr Cymru / Welsh Water. Please note that the issuing of a Discharge Consent is independent of the planning process and a consent may be refused although planning permission is granted

## SEWAGE TREATMENT

No problems are envisaged with the Waste Water Treatment Works for the treatment of domestic discharges from this site. Should any trade effluent be generated by the development a separate trade effluent consent will be required.

I trust the above information is helpful and will assist you in forming water and drainage strategies that should accompany any future planning application. I also attach copies of our water and sewer extract plans for the area, and a copy of our Planning Guidance Note which provides further information on our approach to the planning process, making connections to our systems and ensuring any existing public assets or infrastructure located within new development sites are protected.

Please note that our response is based on the information provided in your enquiry and should the information change we reserve the right to make a new representation. Should you have any queries or wish to discuss any aspect of our response please do not hesitate to contact our dedicated team of planning officers, either on 0800 917 2652 or via email at **developer.services@dwrcymru.com**

Please quote our reference number in all communications and correspondence.

Yours faithfully,

**Owain George**
**Planning Liaison Manager**
**Developer Services**

***<u>Please Note</u> that demands upon the water and sewerage systems change continually; consequently the information given above should be regarded as reliable for a maximum period of 12 months from the date of this letter.***