

Causeway Coast and Glens Borough Council  
Local Planning Office  
Cloonavin  
66 Portstewart Road,  
Coleraine  
BT52 1EY

26 August 2025

**Our ref:** M01616-36

**Planning Ref** LA01/2025/0181/F - 340m South of 5 Magheraboy Road, Rasharkin

**Re:** Drainage Assessment- DfI Rivers Consultation / Policy FLD3

To whom it concerns,

McCloy Consulting provided the existing Drainage Assessment which accompanied the above referenced planning application.

This submission sets out further work undertaken to address the issues expressed by DfI Rivers in its consultation dated 4 June 2025. Rivers in consultation has expressed no concern in relation to Policies FLD1, 2, 4 and 5 of Revised PPS15. Rivers has requested clarifications in relation to Policy FLD3.

This submission is supplementary to the information in the existing Drainage Assessment.

#### **Nature of the Clarification**

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The consultation response requests that it is demonstrated that the total post-development runoff (including the greenfield run-off that is not positively drained in the development's drainage network) which discharges into the undesignated watercourse that runs along the Eastern and northern boundaries of the site, does not exceed the original greenfield run-off in order to prove that there is no increase in flood risk elsewhere as a result of the development.

The response has arisen as a result of the site being affected by a split catchment, where an area of c. 1.63Ha drains south-westerly and an area of c. 4.51Ha drains northeasterly. DfI Rivers Directorate request demonstration that flow rates to the north-easterly watercourse from the proposed site outfall do not exceed the pre-development greenfield rate of discharge from the site development area to this watercourse.

As such we attach an updated Drainage Plan and Microdrainage Calculations which demonstrate that flows draining to the north-eastern watercourse do not exceed the pre-development flow rates for the north-eastern catchment area only. The below table and figure included in Annex A offers explanation to the updated flow rates. Note that the drainage regime to undeveloped areas within the site shall not undergo changes which will affect run-off rates and the proposed access track shall remain a permeable surface, as such these areas are not considered in Table 1.

**Table 1 Catchment Analysis and Assigned Run-off Rates**

|                                            | Total Development Area | North / eastern catchment development area | Southern catchment development area |
|--------------------------------------------|------------------------|--------------------------------------------|-------------------------------------|
| Overall area being drained                 | 1.784 Ha               | 1.061Ha                                    | 0.724Ha                             |
| Allowable run-off rate (based on 10lps/Ha) | 17.8lps                | 10.6lps                                    | 7.2lps                              |
| Run-off rate applied to design             | 10.6lps                | 10.6lps                                    | -                                   |

### Summary

The 10.6lps shown on the revised Drainage Plan and associated Microdrainage Calculations has been adopted so that the total discharge from the development area post-development shall be no greater than the equivalent pre-development greenfield rate to the north-eastern catchment area.

There shall be no discharge to the southern catchment from the developed area post-development, which offers a reduction from the current scenario where a greenfield rate of run-off would apply from the area currently draining south.

### Conclusion

The information in this memorandum should allow DfI Rivers to conclude that the proposals are compliant with FLD3 as run-off to either watercourse catchment post-development does not exceed pre-development greenfield rates.

DfI Rivers has been supplied this information informally and any further concerns raised regarding the information supplied have been addressed. Please therefore arrange for DfI Rivers to be re-consulted in relation to this clarification.

Should you have any queries please do not hesitate in contacting this office.

Yours faithfully

Jill Dick

On behalf of  
**McCloy Consulting**

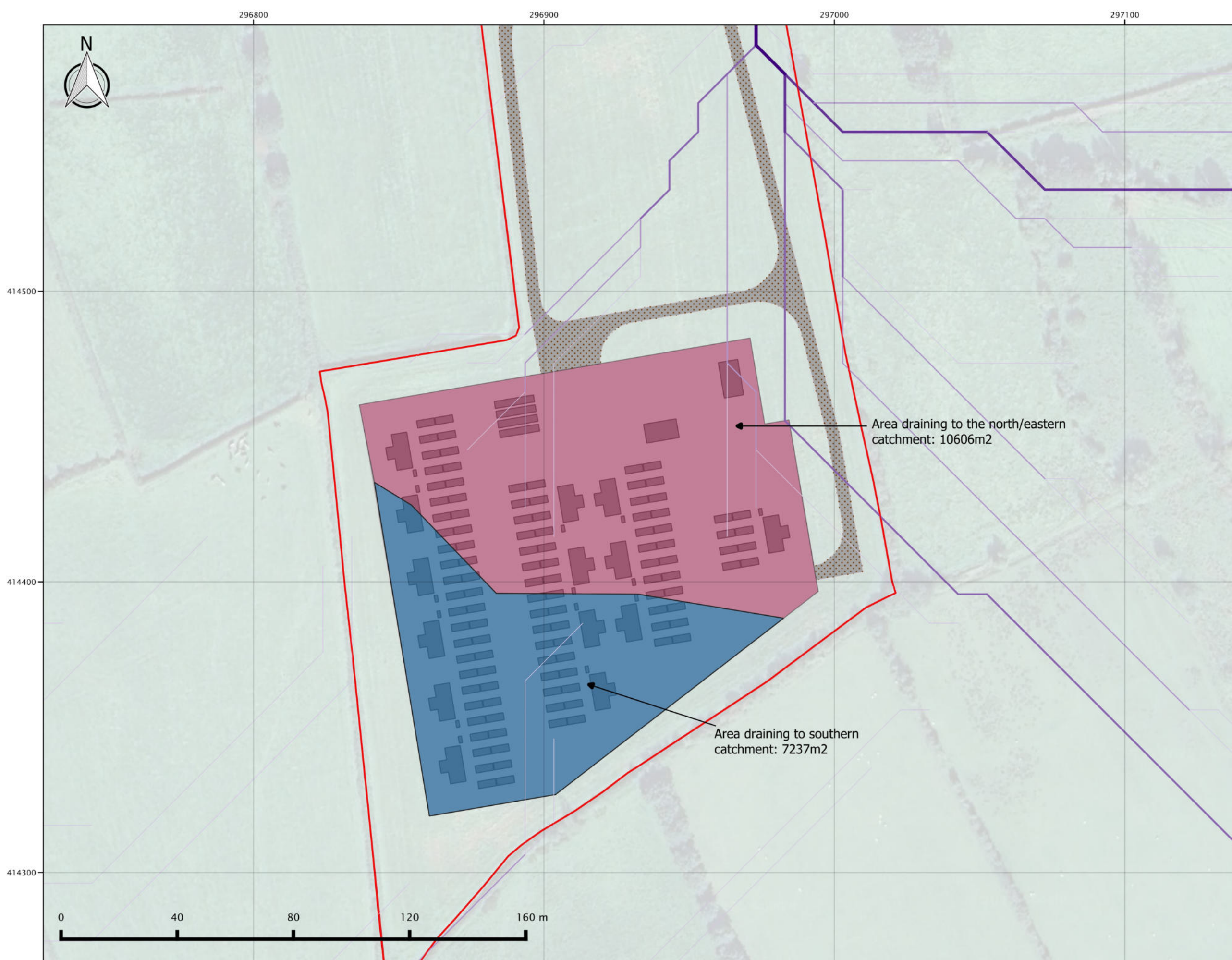
### Encs:

**ANNEX A – M01616-36 SK03 Catchment Analysis Figure**

**ANNEX B - Microdrainage Calculations**

**ANNEX C –M01616-36 DWG100-03 Revised Drainage Plan**

ANNEX A – M01616-36 SK03 Catchment Analysis Figure



- LEGEND**
- Site Boundary
  - Development area draining to southern catchment
  - Development area draining to northern catchment
  - Proposed laneway to remain permeable and draining per the existing regime

| DESCRIPTION                                 |        |          |            |
|---------------------------------------------|--------|----------|------------|
| FINVOY ROAD, RASHARKIN - CATCHMENT ANALYSIS |        |          |            |
| PROJECT / FIGURE NO.                        |        |          |            |
| M01616-36_SK03                              |        |          |            |
| DRAWN BY                                    | SCALE  | REVISION | DATE       |
| IB                                          | 1:1250 | 1        | 06/08/2025 |

## ANNEX B - Microdrainage Calculations

|                                                              |                                        |                                                                                     |
|--------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|
| McCloy Consulting Limited                                    |                                        | Page 0                                                                              |
| Mossley Mill<br>Newtownabbey<br>Co. Antrim                   | M01616-36 Storm Rev 2<br>Machaire BESS |  |
| Date 10/06/2025 16:58<br>File M01616-36 MD new layout R2.mdx | Designed by JD<br>Checked by IB        |                                                                                     |
| Innovyze                                                     | Network 2019.1                         |                                                                                     |

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Surface Network 2

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

|                                      |        |                               |       |                                       |       |
|--------------------------------------|--------|-------------------------------|-------|---------------------------------------|-------|
| Return Period (years)                | 2      | Foul Sewage (l/s/ha)          | 0.000 | Maximum Backdrop Height (m)           | 0.000 |
| M5-60 (mm)                           | 17.200 | Volumetric Runoff Coeff.      | 0.750 | Min Design Depth for Optimisation (m) | 1.200 |
| Ratio R                              | 0.288  | PIMP (%)                      | 100   | Min Vel for Auto Design only (m/s)    | 1.00  |
| Maximum Rainfall (mm/hr)             | 50     | Add Flow / Climate Change (%) | 0     | Min Slope for Optimisation (1:X)      | 500   |
| Maximum Time of Concentration (mins) | 30     | Minimum Backdrop Height (m)   | 0.000 |                                       |       |

Designed with Level Soffits

Network Design Table for Surface Network 2

« - Indicates pipe capacity < flow

| PN  | Length | Fall  | Slope | I.Area | T.E.       | Base | k    | HYD  | DIA | Section Type | Auto   |
|-----|--------|-------|-------|--------|------------|------|------|------|-----|--------------|--------|
| (m) | (m)    | (1:X) | (ha)  | (mins) | Flow (l/s) | (mm) | SECT | (mm) |     |              | Design |

Network Results Table

| PN      | Rain   | T.C. | US/IL | Σ I.Area   | Σ Base | Foul  | Add Flow | Vel   | Cap   | Flow  |
|---------|--------|------|-------|------------|--------|-------|----------|-------|-------|-------|
| (mm/hr) | (mins) | (m)  | (ha)  | Flow (l/s) | (l/s)  | (l/s) | (m/s)    | (l/s) | (l/s) | (l/s) |

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Network Design Table for Surface Network 2

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section      | Type | Auto<br>Design                                                                      |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|------|-------------------------------------------------------------------------------------|
| 1.000 | 17.343        | 0.162       | 107.1          | 0.092          | 5.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |      |  |
| 1.001 | 60.213        | 0.301       | 200.0          | 0.172          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |      |  |
| 1.002 | 60.643        | 0.303       | 200.1          | 0.183          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |      |  |
| 1.003 | 40.694        | 0.203       | 200.5          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |      |  |
| 1.004 | 31.982        | 0.364       | 87.9           | 0.000          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |      |  |
| 2.000 | 55.076        | 0.442       | 124.6          | 0.180          | 5.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |      |  |
| 2.001 | 66.702        | 0.445       | 149.9          | 0.110          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |      |  |
| 3.000 | 45.973        | 0.230       | 199.9          | 0.159          | 5.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |      |  |

### Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.000 | 50.00           | 5.17           | 82.225       | 0.092            | 0.0                  | 0.0           | 0.0               | 1.75         | 193.4        | 12.5          |
| 1.001 | 49.49           | 5.95           | 82.063       | 0.264            | 0.0                  | 0.0           | 0.0               | 1.28         | 141.1        | 35.4          |
| 1.002 | 47.00           | 6.74           | 81.762       | 0.447            | 0.0                  | 0.0           | 0.0               | 1.28         | 141.0        | 56.9          |
| 1.003 | 45.49           | 7.27           | 81.459       | 0.447            | 0.0                  | 0.0           | 0.0               | 1.28         | 140.9        | 56.9          |
| 1.004 | 44.75           | 7.55           | 81.256       | 0.447            | 0.0                  | 0.0           | 0.0               | 1.93         | 213.6        | 56.9          |
| 2.000 | 50.00           | 5.65           | 82.225       | 0.180            | 0.0                  | 0.0           | 0.0               | 1.41         | 99.5         | 24.4          |
| 2.001 | 47.66           | 6.52           | 81.783       | 0.290            | 0.0                  | 0.0           | 0.0               | 1.28         | 90.6         | 37.5          |
| 3.000 | 50.00           | 5.69           | 82.300       | 0.159            | 0.0                  | 0.0           | 0.0               | 1.11         | 78.4         | 21.5          |

Network Design Table for Surface Network 2

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section      | Type | Auto<br>Design                                                                      |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|------|-------------------------------------------------------------------------------------|
| 3.001 | 43.191        | 0.216       | 200.0          | 0.115          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |      |  |
| 2.002 | 29.514        | 0.371       | 79.6           | 0.063          | 0.00           | 0.0                | 0.600     | o           | 300         | Pipe/Conduit |      |  |
| 4.000 | 58.075        | 0.387       | 150.1          | 0.116          | 5.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |      |  |
| 1.005 | 17.277        | 0.115       | 150.2          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |      |  |
| 1.006 | 54.534        | 0.365       | 149.4          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |      |  |
| 1.007 | 27.505        | 1.890       | 14.6           | 0.000          | 0.00           | 0.0                | 0.600     | o           | 375         | Pipe/Conduit |      |  |
| 1.008 | 4.461         | 0.030       | 148.7          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |      |  |

### Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 3.001 | 48.22           | 6.34           | 82.070       | 0.274            | 0.0                  | 0.0           | 0.0               | 1.11         | 78.3         | 35.8          |
| 2.002 | 46.83           | 6.80           | 81.338       | 0.627            | 0.0                  | 0.0           | 0.0               | 1.76         | 124.7        | 79.5          |
| 4.000 | 49.63           | 5.91           | 82.200       | 0.116            | 0.0                  | 0.0           | 0.0               | 1.07         | 42.3         | 15.6          |
| 1.005 | 44.25           | 7.74           | 80.892       | 1.190            | 0.0                  | 0.0           | 0.0               | 1.48         | 163.0        | 142.7         |
| 1.006 | 42.76           | 8.36           | 80.777       | 1.190            | 0.0                  | 0.0           | 0.0               | 1.48         | 163.5        | 142.7         |
| 1.007 | 42.53           | 8.45           | 80.714       | 1.190            | 0.0                  | 0.0           | 0.0               | 4.77         | 526.9        | 142.7         |
| 1.008 | 42.37           | 8.52           | 79.650       | 1.190            | 0.0                  | 0.0           | 0.0               | 1.07         | 42.5         | 142.7         |

|                                                              |                                        |                                                                                     |
|--------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|
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| Mossley Mill<br>Newtownabbey<br>Co. Antrim                   | M01616-36 Storm Rev 2<br>Machaire BESS |  |
| Date 10/06/2025 16:58<br>File M01616-36 MD new layout R2.mdx | Designed by JD<br>Checked by IB        |                                                                                     |
| Innovyze                                                     | Network 2019.1                         |                                                                                     |

Network Design Table for Surface Network 2

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Section Type | Auto<br>Design                                                                      |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|--------------|-------------------------------------------------------------------------------------|
| 1.009 | 29.443        | 0.196       | 150.2          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         | Pipe/Conduit |  |

### Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | Σ I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.009 | 41.35           | 8.99           | 79.620       | 1.190            | 0.0                  | 0.0           | 0.0               | 1.06         | 42.3         | 142.7         |

## Manhole Schedules for Surface Network 2

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam.,L*W (mm) | Pipe Out<br>Invert Level (m) Diameter (mm) |        |     | Pipes In<br>Invert Level (m) Diameter (mm) |        |     | Backdrop (mm) |
|---------|-----------|--------------|---------------|-------------------|--------------------------------------------|--------|-----|--------------------------------------------|--------|-----|---------------|
| S1      | 83.250    | 1.025        | Open Manhole  | 1800              | 1.000                                      | 82.225 | 375 |                                            |        |     |               |
| S2      | 83.250    | 1.187        | Open Manhole  | 1800              | 1.001                                      | 82.063 | 375 | 1.000                                      | 82.063 | 375 |               |
| S3      | 83.250    | 1.488        | Open Manhole  | 1800              | 1.002                                      | 81.762 | 375 | 1.001                                      | 81.762 | 375 |               |
| S4      | 83.250    | 1.791        | Open Manhole  | 1800              | 1.003                                      | 81.459 | 375 | 1.002                                      | 81.459 | 375 |               |
| S5      | 82.730    | 1.474        | Open Manhole  | 1800              | 1.004                                      | 81.256 | 375 | 1.003                                      | 81.256 | 375 |               |
| S6      | 83.250    | 1.025        | Open Manhole  | 1800              | 2.000                                      | 82.225 | 300 |                                            |        |     |               |
| S7      | 83.250    | 1.467        | Open Manhole  | 1800              | 2.001                                      | 81.783 | 300 | 2.000                                      | 81.783 | 300 |               |
| S8      | 83.250    | 0.950        | Open Manhole  | 1800              | 3.000                                      | 82.300 | 300 |                                            |        |     |               |
| S9      | 83.250    | 1.180        | Open Manhole  | 1800              | 3.001                                      | 82.070 | 300 | 3.000                                      | 82.070 | 300 |               |
| S10     | 83.250    | 1.912        | Open Manhole  | 1800              | 2.002                                      | 81.338 | 300 | 2.001                                      | 81.338 | 300 |               |
|         |           |              |               |                   |                                            |        |     | 3.001                                      | 81.854 | 300 | 516           |
| S11     | 83.250    | 1.050        | Open Manhole  | 1500              | 4.000                                      | 82.200 | 225 |                                            |        |     |               |
| S12     | 83.000    | 2.108        | Open Manhole  | 1800              | 1.005                                      | 80.892 | 375 | 1.004                                      | 80.892 | 375 |               |
|         |           |              |               |                   |                                            |        |     | 2.002                                      | 80.967 | 300 |               |
|         |           |              |               |                   |                                            |        |     | 4.000                                      | 81.813 | 225 | 771           |
| S13     | 83.250    | 2.473        | Open Manhole  | 1800              | 1.006                                      | 80.777 | 375 | 1.005                                      | 80.777 | 375 |               |
| S14     | 83.250    | 2.838        | Open Manhole  | 1800              | 1.007                                      | 80.714 | 375 | 1.006                                      | 80.412 | 375 |               |
| S15     | 80.596    | 1.772        | Open Manhole  | 1500              | 1.008                                      | 79.650 | 225 | 1.007                                      | 78.824 | 375 |               |
| S16     | 80.550    | 0.930        | Open Manhole  | 1500              | 1.009                                      | 79.620 | 225 | 1.008                                      | 79.620 | 225 |               |

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## Manhole Schedules for Surface Network 2

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam. ,L*W (mm) | Pipe Out Invert Level (m) | Pipe Out Diameter (mm) | Pipes In Invert Level (m) | Pipes In Diameter (mm) | Backdrop (mm) |
|---------|-----------|--------------|---------------|--------------------|---------------------------|------------------------|---------------------------|------------------------|---------------|
| S17     | 80.000    | 0.576        | Open Manhole  | 0                  | OUTFALL                   |                        | 1.009                     | 79.424                 | 225           |

| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North)                                                                        |
|---------|---------------------|----------------------|--------------------------|---------------------------|----------------|---------------------------------------------------------------------------------------|
| S1      | 296862.775          | 414322.451           | 296862.775               | 414322.451                | Required       |    |
| S2      | 296859.894          | 414339.554           | 296859.894               | 414339.554                | Required       |    |
| S3      | 296849.618          | 414398.883           | 296849.618               | 414398.883                | Required       |  |
| S4      | 296839.437          | 414458.666           | 296839.437               | 414458.666                | Required       |  |
| S5      | 296879.570          | 414465.396           | 296879.570               | 414465.396                | Required       |  |

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| Checked by IB  |



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## Manhole Schedules for Surface Network 2

| MH Name | Manhole Easting (m) | Manhole Northing (m) | Intersection Easting (m) | Intersection Northing (m) | Manhole Access | Layout (North)                                                                        |
|---------|---------------------|----------------------|--------------------------|---------------------------|----------------|---------------------------------------------------------------------------------------|
| S6      | 296991.324          | 414398.022           | 296991.324               | 414398.022                | Required       |    |
| S7      | 296981.850          | 414452.277           | 296981.850               | 414452.277                | Required       |    |
| S8      | 296929.978          | 414352.942           | 296929.978               | 414352.942                | Required       |    |
| S9      | 296923.066          | 414398.392           | 296923.066               | 414398.392                | Required       |    |
| S10     | 296916.105          | 414441.019           | 296916.105               | 414441.019                | Required       |    |
| S11     | 296968.422          | 414480.047           | 296968.422               | 414480.047                | Required       |  |
| S12     | 296911.201          | 414470.123           | 296911.201               | 414470.123                | Required       |  |
| S13     | 296908.717          | 414487.220           | 296908.717               | 414487.220                | Required       |  |

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## Manhole Schedules for Surface Network 2

| MH<br>Name | Manhole<br>Easting<br>(m) | Manhole<br>Northing<br>(m) | Intersection<br>Easting<br>(m) | Intersection<br>Northing<br>(m) | Manhole<br>Access | Layout<br>(North)                                                                   |
|------------|---------------------------|----------------------------|--------------------------------|---------------------------------|-------------------|-------------------------------------------------------------------------------------|
| S14        | 296962.504                | 414496.216                 | 296962.504                     | 414496.216                      | Required          |  |
| S15        | 296958.293                | 414523.397                 | 296958.293                     | 414523.397                      | Required          |                                                                                     |









|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                        |                                                                                     |                           |                  |                            |                  |                   |                  |                   |                  |                   |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
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| McCloy Consulting Limited                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                        | Page 12                                                                             |                           |                  |                            |                  |                   |                  |                   |                  |                   |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
| Mossley Mill<br>Newtownabbey<br>Co. Antrim                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | M01616-36 Storm Rev 2<br>Machaire BESS |  |                           |                  |                            |                  |                   |                  |                   |                  |                   |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
| Date 10/06/2025 16:58<br>File M01616-36 MD new layout R2.mdx                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Designed by JD<br>Checked by IB        |                                                                                     |                           |                  |                            |                  |                   |                  |                   |                  |                   |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
| Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Network 2019.1                         |                                                                                     |                           |                  |                            |                  |                   |                  |                   |                  |                   |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
| <p style="text-align: center;"><u>Online Controls for Surface Network 2</u></p> <p style="text-align: center;"><u>Hydro-Brake® Optimum Manhole: S16, DS/PN: 1.009, Volume (m³): 1.8</u></p> <table><tr><td>Unit Reference</td><td>MD-SHE-0151-1060-0900-1060</td><td>Sump Available</td><td>Yes</td></tr><tr><td>Design Head (m)</td><td>0.900</td><td>Diameter (mm)</td><td>151</td></tr><tr><td>Design Flow (l/s)</td><td>10.6</td><td>Invert Level (m)</td><td>79.620</td></tr><tr><td>Flush-Flo™</td><td>Calculated</td><td>Minimum Outlet Pipe Diameter (mm)</td><td>225</td></tr><tr><td>Objective</td><td>Minimise upstream storage</td><td>Suggested Manhole Diameter (mm)</td><td>1200</td></tr><tr><td>Application</td><td>Surface</td><td></td><td></td></tr></table> <table><tr><td><b>Control Points</b></td><td><b>Head (m)</b></td><td><b>Flow (l/s)</b></td><td><b>Control Points</b></td><td><b>Head (m)</b></td><td><b>Flow (l/s)</b></td></tr><tr><td>Design Point (Calculated)</td><td>0.900</td><td>10.6</td><td>Kick-Flo®</td><td>0.628</td><td>8.9</td></tr><tr><td>Flush-Flo™</td><td>0.285</td><td>10.6</td><td>Mean Flow over Head Range</td><td>-</td><td>9.0</td></tr></table> <p>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</p> <table><tr><td><b>Depth (m)</b></td><td><b>Flow (l/s)</b></td><td><b>Depth (m)</b></td><td><b>Flow (l/s)</b></td><td><b>Depth (m)</b></td><td><b>Flow (l/s)</b></td><td><b>Depth (m)</b></td><td><b>Flow (l/s)</b></td><td><b>Depth (m)</b></td><td><b>Flow (l/s)</b></td><td><b>Depth (m)</b></td><td><b>Flow (l/s)</b></td></tr><tr><td>0.100</td><td>5.4</td><td>0.600</td><td>9.4</td><td>1.600</td><td>13.9</td><td>2.600</td><td>17.5</td><td>5.000</td><td>23.9</td><td>7.500</td><td>29.1</td></tr><tr><td>0.200</td><td>10.4</td><td>0.800</td><td>10.0</td><td>1.800</td><td>14.7</td><td>3.000</td><td>18.7</td><td>5.500</td><td>25.1</td><td>8.000</td><td>30.0</td></tr><tr><td>0.300</td><td>10.6</td><td>1.000</td><td>11.1</td><td>2.000</td><td>15.4</td><td>3.500</td><td>20.2</td><td>6.000</td><td>26.1</td><td>8.500</td><td>30.9</td></tr><tr><td>0.400</td><td>10.4</td><td>1.200</td><td>12.1</td><td>2.200</td><td>16.2</td><td>4.000</td><td>21.5</td><td>6.500</td><td>27.2</td><td>9.000</td><td>31.8</td></tr><tr><td>0.500</td><td>10.1</td><td>1.400</td><td>13.0</td><td>2.400</td><td>16.9</td><td>4.500</td><td>22.8</td><td>7.000</td><td>28.2</td><td>9.500</td><td>32.5</td></tr></table> |                                        |                                                                                     |                           | Unit Reference   | MD-SHE-0151-1060-0900-1060 | Sump Available   | Yes               | Design Head (m)  | 0.900             | Diameter (mm)    | 151               | Design Flow (l/s) | 10.6 | Invert Level (m) | 79.620 | Flush-Flo™ | Calculated | Minimum Outlet Pipe Diameter (mm) | 225 | Objective | Minimise upstream storage | Suggested Manhole Diameter (mm) | 1200 | Application | Surface |  |  | <b>Control Points</b> | <b>Head (m)</b> | <b>Flow (l/s)</b> | <b>Control Points</b> | <b>Head (m)</b> | <b>Flow (l/s)</b> | Design Point (Calculated) | 0.900 | 10.6 | Kick-Flo® | 0.628 | 8.9 | Flush-Flo™ | 0.285 | 10.6 | Mean Flow over Head Range | - | 9.0 | <b>Depth (m)</b> | <b>Flow (l/s)</b> | <b>Depth (m)</b> | <b>Flow (l/s)</b> | <b>Depth (m)</b> | <b>Flow (l/s)</b> | <b>Depth (m)</b> | <b>Flow (l/s)</b> | <b>Depth (m)</b> | <b>Flow (l/s)</b> | <b>Depth (m)</b> | <b>Flow (l/s)</b> | 0.100 | 5.4 | 0.600 | 9.4 | 1.600 | 13.9 | 2.600 | 17.5 | 5.000 | 23.9 | 7.500 | 29.1 | 0.200 | 10.4 | 0.800 | 10.0 | 1.800 | 14.7 | 3.000 | 18.7 | 5.500 | 25.1 | 8.000 | 30.0 | 0.300 | 10.6 | 1.000 | 11.1 | 2.000 | 15.4 | 3.500 | 20.2 | 6.000 | 26.1 | 8.500 | 30.9 | 0.400 | 10.4 | 1.200 | 12.1 | 2.200 | 16.2 | 4.000 | 21.5 | 6.500 | 27.2 | 9.000 | 31.8 | 0.500 | 10.1 | 1.400 | 13.0 | 2.400 | 16.9 | 4.500 | 22.8 | 7.000 | 28.2 | 9.500 | 32.5 |
| Unit Reference                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | MD-SHE-0151-1060-0900-1060             | Sump Available                                                                      | Yes                       |                  |                            |                  |                   |                  |                   |                  |                   |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
| Design Head (m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.900                                  | Diameter (mm)                                                                       | 151                       |                  |                            |                  |                   |                  |                   |                  |                   |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
| Design Flow (l/s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 10.6                                   | Invert Level (m)                                                                    | 79.620                    |                  |                            |                  |                   |                  |                   |                  |                   |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
| Flush-Flo™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Calculated                             | Minimum Outlet Pipe Diameter (mm)                                                   | 225                       |                  |                            |                  |                   |                  |                   |                  |                   |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
| Objective                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Minimise upstream storage              | Suggested Manhole Diameter (mm)                                                     | 1200                      |                  |                            |                  |                   |                  |                   |                  |                   |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
| Application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Surface                                |                                                                                     |                           |                  |                            |                  |                   |                  |                   |                  |                   |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
| <b>Control Points</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>Head (m)</b>                        | <b>Flow (l/s)</b>                                                                   | <b>Control Points</b>     | <b>Head (m)</b>  | <b>Flow (l/s)</b>          |                  |                   |                  |                   |                  |                   |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
| Design Point (Calculated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0.900                                  | 10.6                                                                                | Kick-Flo®                 | 0.628            | 8.9                        |                  |                   |                  |                   |                  |                   |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
| Flush-Flo™                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.285                                  | 10.6                                                                                | Mean Flow over Head Range | -                | 9.0                        |                  |                   |                  |                   |                  |                   |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
| <b>Depth (m)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Flow (l/s)</b>                      | <b>Depth (m)</b>                                                                    | <b>Flow (l/s)</b>         | <b>Depth (m)</b> | <b>Flow (l/s)</b>          | <b>Depth (m)</b> | <b>Flow (l/s)</b> | <b>Depth (m)</b> | <b>Flow (l/s)</b> | <b>Depth (m)</b> | <b>Flow (l/s)</b> |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
| 0.100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 5.4                                    | 0.600                                                                               | 9.4                       | 1.600            | 13.9                       | 2.600            | 17.5              | 5.000            | 23.9              | 7.500            | 29.1              |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
| 0.200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 10.4                                   | 0.800                                                                               | 10.0                      | 1.800            | 14.7                       | 3.000            | 18.7              | 5.500            | 25.1              | 8.000            | 30.0              |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
| 0.300                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 10.6                                   | 1.000                                                                               | 11.1                      | 2.000            | 15.4                       | 3.500            | 20.2              | 6.000            | 26.1              | 8.500            | 30.9              |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
| 0.400                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 10.4                                   | 1.200                                                                               | 12.1                      | 2.200            | 16.2                       | 4.000            | 21.5              | 6.500            | 27.2              | 9.000            | 31.8              |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
| 0.500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 10.1                                   | 1.400                                                                               | 13.0                      | 2.400            | 16.9                       | 4.500            | 22.8              | 7.000            | 28.2              | 9.500            | 32.5              |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |
| ©1982-2019 Innovyze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                        |                                                                                     |                           |                  |                            |                  |                   |                  |                   |                  |                   |                   |      |                  |        |            |            |                                   |     |           |                           |                                 |      |             |         |  |  |                       |                 |                   |                       |                 |                   |                           |       |      |           |       |     |            |       |      |                           |   |     |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |                  |                   |       |     |       |     |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |       |      |

| McCloy Consulting Limited                                                                                                                                                                                                                                                                                                                                                                         |                                        | Page 13                                                                             |           |           |           |           |       |       |       |       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|-------|-------|-------|-------|
| Mossley Mill<br>Newtownabbey<br>Co. Antrim                                                                                                                                                                                                                                                                                                                                                        | M01616-36 Storm Rev 2<br>Machaire BESS |  |           |           |           |           |       |       |       |       |
| Date 10/06/2025 16:58<br>File M01616-36 MD new layout R2.mdx                                                                                                                                                                                                                                                                                                                                      | Designed by JD<br>Checked by IB        |                                                                                     |           |           |           |           |       |       |       |       |
| Innovyze                                                                                                                                                                                                                                                                                                                                                                                          | Network 2019.1                         |                                                                                     |           |           |           |           |       |       |       |       |
|                                                                                                                                                                                                                                                                                                                                                                                                   |                                        |                                                                                     |           |           |           |           |       |       |       |       |
| <p style="text-align: center;"><u>Storage Structures for Surface Network 2</u></p> <p style="text-align: center;"><u>Tank or Pond Manhole: S15, DS/PN: 1.008</u></p> <p style="text-align: center;">Invert Level (m) 79.650</p> <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr><tr><td>0.000</td><td>470.0</td><td>0.946</td><td>730.0</td></tr></table> |                                        |                                                                                     | Depth (m) | Area (m²) | Depth (m) | Area (m²) | 0.000 | 470.0 | 0.946 | 730.0 |
| Depth (m)                                                                                                                                                                                                                                                                                                                                                                                         | Area (m²)                              | Depth (m)                                                                           | Area (m²) |           |           |           |       |       |       |       |
| 0.000                                                                                                                                                                                                                                                                                                                                                                                             | 470.0                                  | 0.946                                                                               | 730.0     |           |           |           |       |       |       |       |
| <p style="text-align: center;">©1982-2019 Innovyze</p>                                                                                                                                                                                                                                                                                                                                            |                                        |                                                                                     |           |           |           |           |       |       |       |       |





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| McCloy Consulting Limited                                    |                                        | Page 16                                                                             |
| Mossley Mill<br>Newtownabbey<br>Co. Antrim                   | M01616-36 Storm Rev 2<br>Machaire BESS |  |
| Date 10/06/2025 16:58<br>File M01616-36 MD new layout R2.mdx | Designed by JD<br>Checked by IB        |                                                                                     |
| Innovyze                                                     | Network 2019.1                         |                                                                                     |

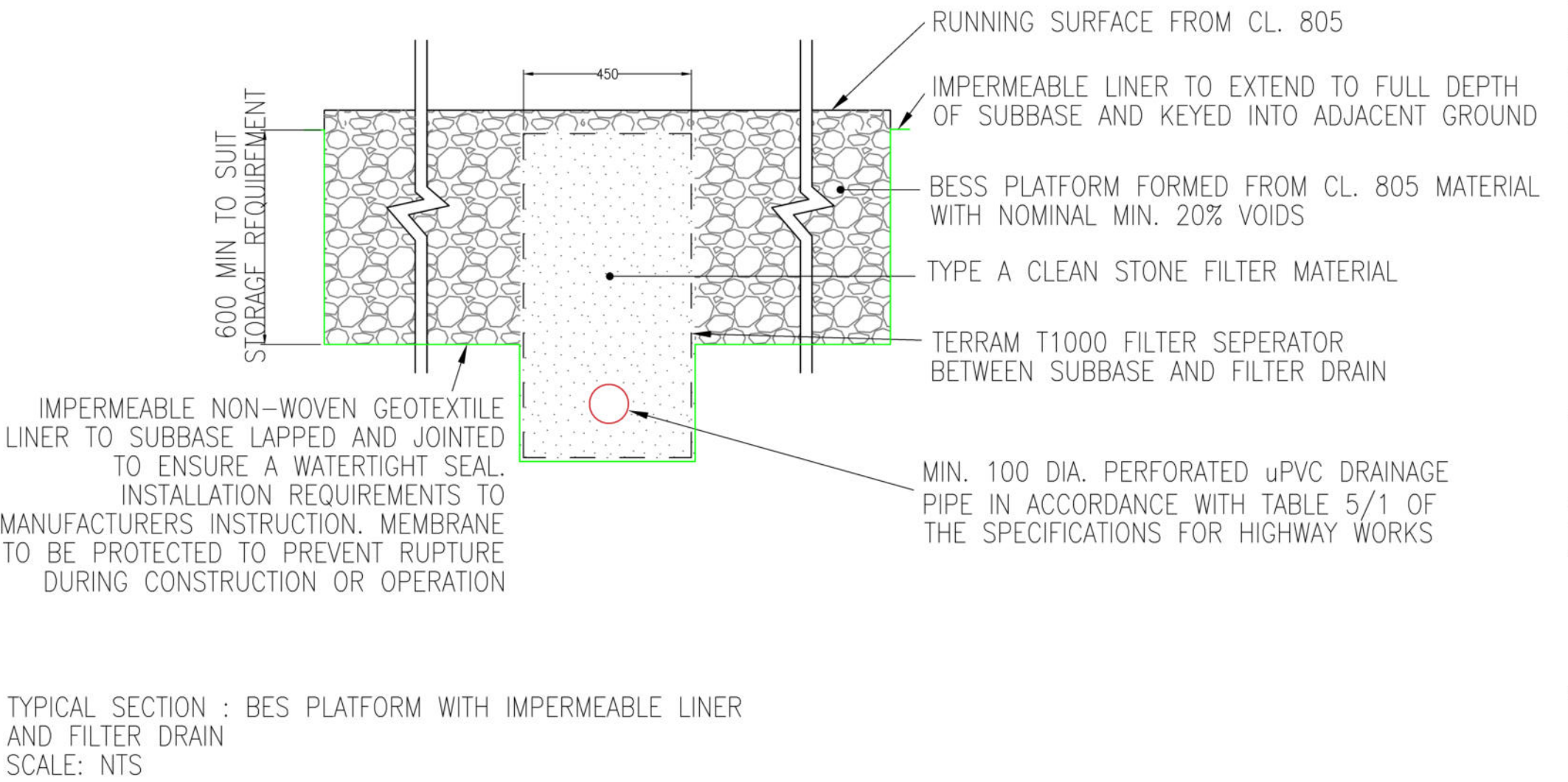
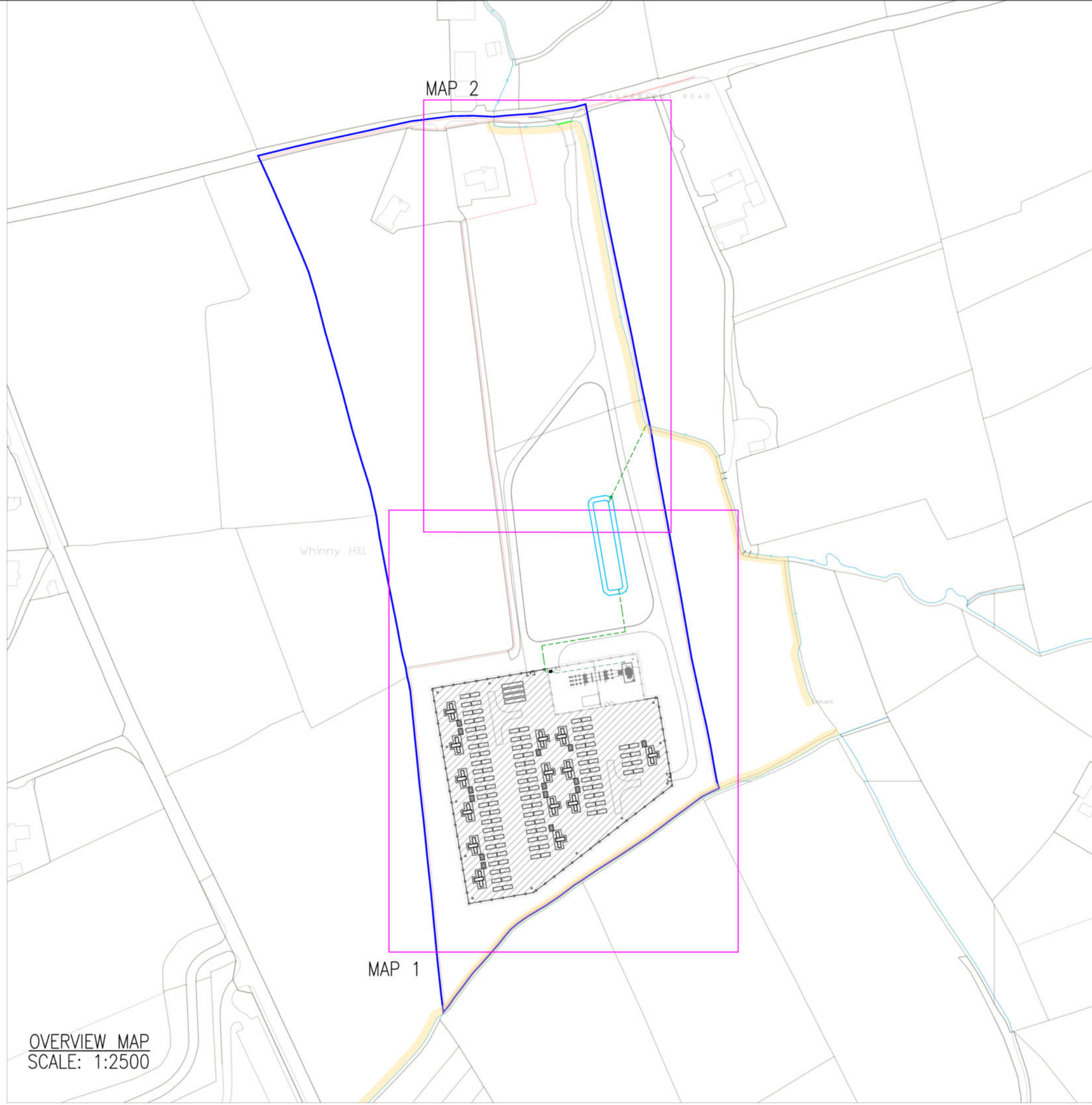
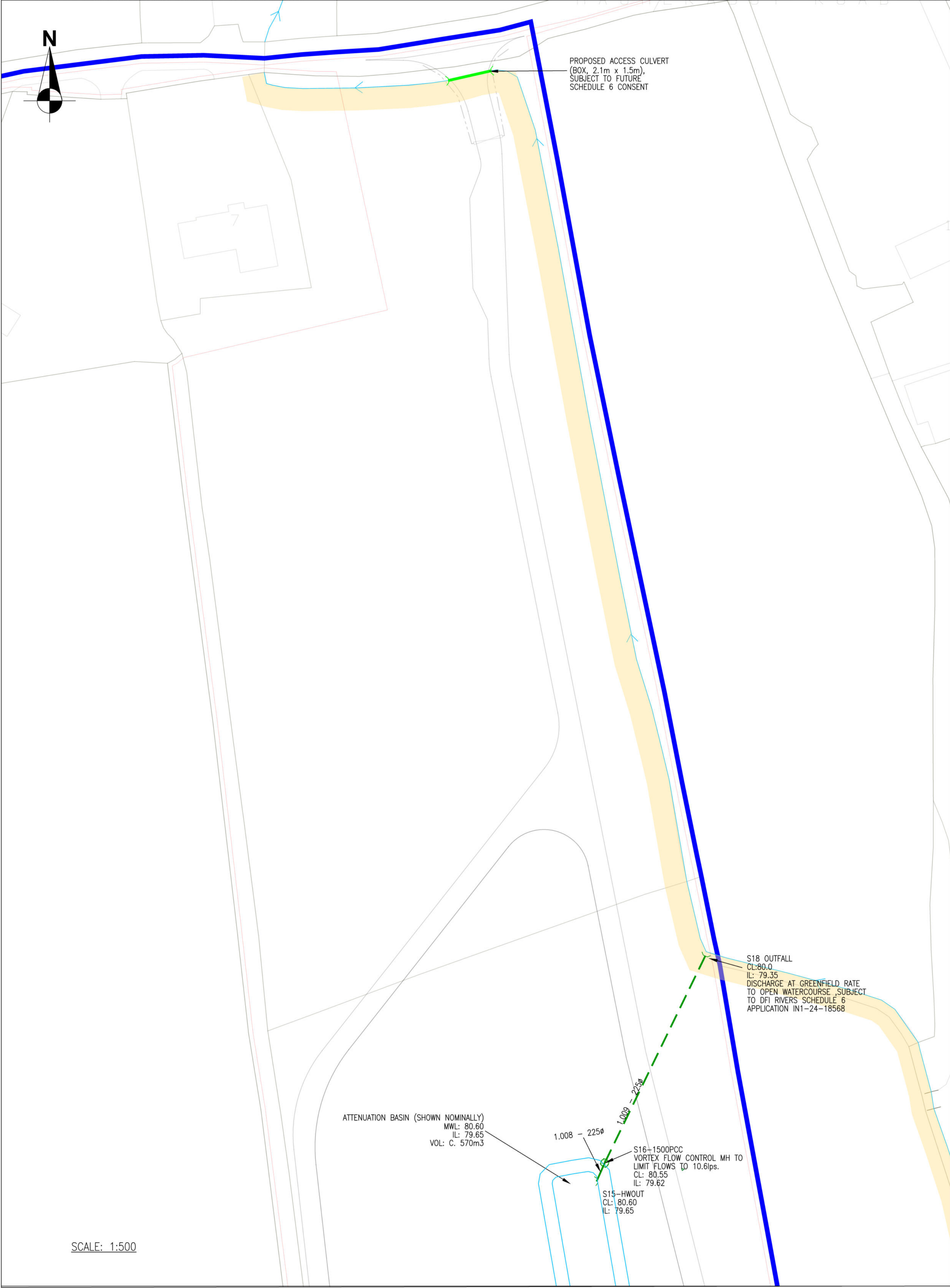
### Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2

|       |       |            |        |        |               |           |           |           | Water    | Surcharged | Flooded |        |        | Pipe     |       |
|-------|-------|------------|--------|--------|---------------|-----------|-----------|-----------|----------|------------|---------|--------|--------|----------|-------|
|       | US/MH |            |        | Return | Climate       | First (X) | First (Y) | First (Z) | Overflow | Level      | Depth   | Volume | Flow / | Overflow | Flow  |
| PN    | Name  | Storm      | Period | Change | Surcharge     |           | Flood     | Overflow  | Act.     | (m)        | (m)     | (m³)   | Cap.   | (l/s)    | (l/s) |
| 1.001 | S2    | 15 Winter  | 100    | +20%   | 100/15 Summer |           |           |           |          | 82.751     | 0.313   | 0.000  | 0.73   |          | 96.8  |
| 1.002 | S3    | 15 Winter  | 100    | +20%   | 100/15 Summer |           |           |           |          | 82.637     | 0.500   | 0.000  | 0.99   |          | 130.4 |
| 1.003 | S4    | 15 Winter  | 100    | +20%   | 100/15 Summer |           |           |           |          | 82.532     | 0.698   | 0.000  | 0.77   |          | 99.3  |
| 1.004 | S5    | 15 Winter  | 100    | +20%   | 100/15 Summer |           |           |           |          | 82.426     | 0.795   | 0.000  | 0.57   |          | 109.0 |
| 2.000 | S6    | 15 Winter  | 100    | +20%   | 100/15 Summer |           |           |           |          | 83.027     | 0.502   | 0.000  | 0.66   |          | 62.0  |
| 2.001 | S7    | 15 Winter  | 100    | +20%   | 100/15 Summer |           |           |           |          | 82.908     | 0.825   | 0.000  | 0.80   |          | 69.2  |
| 3.000 | S8    | 15 Winter  | 100    | +20%   | 100/15 Summer |           |           |           |          | 82.931     | 0.331   | 0.000  | 0.72   |          | 53.1  |
| 3.001 | S9    | 15 Winter  | 100    | +20%   | 100/15 Summer |           |           |           |          | 82.837     | 0.467   | 0.000  | 1.10   |          | 80.1  |
| 2.002 | S10   | 15 Winter  | 100    | +20%   | 100/15 Summer |           |           |           |          | 82.722     | 1.084   | 0.000  | 1.23   |          | 139.2 |
| 4.000 | S11   | 15 Winter  | 100    | +20%   | 100/15 Summer |           |           |           |          | 82.478     | 0.053   | 0.000  | 1.05   |          | 42.8  |
| 1.005 | S12   | 15 Winter  | 100    | +20%   | 100/15 Summer |           |           |           |          | 82.266     | 0.999   | 0.000  | 1.86   |          | 246.6 |
| 1.006 | S13   | 15 Winter  | 100    | +20%   | 100/15 Summer |           |           |           |          | 81.868     | 0.716   | 0.000  | 1.60   |          | 243.5 |
| 1.007 | S14   | 15 Winter  | 100    | +20%   |               |           |           |           |          | 80.909     | -0.180  | 0.000  | 0.53   |          | 244.3 |
| 1.008 | S15   | 480 Winter | 100    | +20%   | 100/15 Summer |           |           |           |          | 80.530     | 0.655   | 0.000  | 0.40   |          | 11.9  |
| 1.009 | S16   | 480 Winter | 100    | +20%   | 100/15 Summer |           |           |           |          | 80.531     | 0.686   | 0.000  | 0.27   |          | 10.6  |

|       | US/MH |            | Level    |
|-------|-------|------------|----------|
| PN    | Name  | Status     | Exceeded |
| 1.001 | S2    | SURCHARGED |          |
| 1.002 | S3    | SURCHARGED |          |
| 1.003 | S4    | SURCHARGED |          |
| 1.004 | S5    | SURCHARGED |          |

|                                                                                    |                                        |  |                                                                                     |
|------------------------------------------------------------------------------------|----------------------------------------|--|-------------------------------------------------------------------------------------|
| McCloy Consulting Limited                                                          |                                        |  | Page 17                                                                             |
| Mossley Mill<br>Newtownabbey<br>Co. Antrim                                         | M01616-36 Storm Rev 2<br>Machaire BESS |  |  |
| Date 10/06/2025 16:58<br>File M01616-36 MD new layout R2.mdx                       | Designed by JD<br>Checked by IB        |  |                                                                                     |
| Innovyze                                                                           | Network 2019.1                         |  |                                                                                     |
| <u>Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 2</u> |                                        |  |                                                                                     |
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ANNEX C –M01616-36 DWG101-04 Revised Drainage Plan



NOTES

GENERAL

1. THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION PURPOSES.
2. THIS DRAWING SHALL BE REVIEWED IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL DRAWINGS.
3. THIS DRAWING IS NOT TO BE SCALED FROM.
4. THE CONTRACTOR IS TO LIAISE WITH ALL STATUTORY UNDERTAKERS IN REGARD TO LOCATING ALL EXISTING SERVICES WITHIN AND ADJACENT TO THE SITE OF THE WORK

LEGEND

- SITE BOUNDARY
- LAND OWNERSHIP BOUNDARY
- CARRIER PIPE
- FILTER DRAIN
- CULVERT TO ACCESS
- WATERCOURSE (OPEN)
- 5m MAINTENANCE BUFFER

| ISSUE | DRN | APP | DATE       | NOTES / DESCRIPTION            |
|-------|-----|-----|------------|--------------------------------|
| 4     | JD  | DKS | 26/08/2025 | AMENDMENT TO SUIT DFI COMMENTS |
| 3     | JD  | DKS | 11/06/2025 | AMENDMENT TO SUIT DFI COMMENTS |
| 2     | IB  | JD  | 27/02/25   | MINOR AMENDMENT                |
| 1     | IB  | DKS | 25/02/25   | FOR REVIEW                     |

STATUS FOR REVIEW

**McCloy Consulting**

T: 028 9084 8894  
F: 028 9084 1525  
E: info@mcclayconsulting.com  
W: www.mcclayconsulting.com

Mossley Mill, Lower Ground (West)  
Carmoney Road North  
Newtownabbey  
Co. Antrim, BT36 5QA

PROPOSED BATTERY ENERGY STORAGE SYSTEM, MAGHERABOY RD

CLIENT **res**

DRAWING TITLE  
PROPOSED DRAINAGE LAYOUT  
GENERAL ARRANGEMENT  
2 OF 2

| SCALE       | AS SHOWN   | ORIGINAL SIZE | A1      |
|-------------|------------|---------------|---------|
| DRAWN       | IB         | CHECKED       | DKS     |
| PROJECT NO. | M01616-36  | DRAWING NO.   | DWG_101 |
| DATE        | 11/06/2025 | ISSUE NO.     | 4       |