HARBOURSTONE DESIGN

# DRAINAGE STATEMENT

## LAND EAST OF NORTHFIELDS LANE, WESTERGATE PO20 3UH

Residential Development

2026-C109-DS05

February 2026

Prepared on Behalf of Domusea Northfields Limited

**Harbourstone Design Limited**
Civil Engineering Consultants – harbourstonedesign.co.uk
Registered in England No: 16608131

## DOCUMENT CONTROL

**Project Name:** Land East of Northfields Lane, Westergate PO20 3UH

**Development Type:** Residential Development

**Report Type:** Drainage Statement

**Client Name:** Domusea Northfields Limited

**Document Reference:** 2026-C109-DS05

**Prepared by:** Dan Lytton

## REVISIONS:

| Issue | Date | Status | Issued by |
|---|---|---|---|
| **01** | 22/10/2025 | Initial Issue for Review | DJL |
| **02** | 26/10/2025 | Issue for Submission | DJL |
| **03** | 04/12/2025 | Revised Issue | DJL |
| **04** | 09/01/2026 | Revised Issue | DJL |
| **05** | 03/02/2026 | Revised Issue | DJL |

## DRAWINGS

**2025-C109-001** Engineering GA - Below Ground Drainage
**2025-C109-002** Engineering GA – Levels Design
**2025-C109-003** Construction Details Sht 1 of 2
**2025-C109-004** Construction Details Sht 2 of 2
**2025-C109-005** Manhole Schedule & Impermeable Areas Schedule
**2025-C109-006** Watercourse Long-Sections

## APPENDICES

**Appendix A** Greenfield Runoff Calculation
**Appendix B** Groundwater Flotation Calculations (Tank)
**Appendix C** Hydraulic Modelling Calculations
**Appendix D** Maintenance Schedule
**Appendix E** Groundwater Monitoring Results
**Appendix F** GreenBlue Urban SuDSPod Rainwater Harvesting Detail
**Appendix G** Sudsstore Controflow Universal Flow Control Detail
**Appendix H** Arun Byelaws Discharge Consent

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## FLOOD AND DRAINAGE STATEMENT

Harbourstone Design Limited is instructed by Domusea Northfields Limited to prepare a Drainage Statement to support a Discharge of Condition Application for a Residential Development at Land East of Northfields Lane, Westergate PO20 3UH. This report is for the benefit of the Client only.

The below sets out information about the drainage design for the benefit of the application.

| **Existing Site Information** | |
|---|---|
| **Location:** | Land East of Northfields Lane, Westergate PO20 3UH |
| **Area:** | 0.39 Ha. |
| **Existing Topography:** | Fairly flat, with fall towards boundary watercourses. Site levels vary from 12.05m to 12.69m AOD. |
| **Existing Site Use:** | Greenfield |
| **Proposed Development Type:** | Single residential dwelling |
| **Existing Site Greenfield Rate:** | 0.8 l/s |

| **Existing Geology** | |
|---|---|
| **Geology:** | Superficial Deposits: Head – Clay, silt, sand and gravel<br>Bedrock: London Clay Formation – Clay, silt and sand |
| **Hydrogeology:** | Superficial Drift Aquifer: 'Secondary A / Undifferentiated'<br>Bedrock Aquifer: 'Unproductive Strata'<br>- Potential for some/limited shallow infiltration, above bedrock only.<br>Groundwater Vulnerability: Low<br>- Low vulnerability to groundwater from pollutants |
| **Groundwater Depth:** | Peak winter groundwater levels at 0.7mbgl, November 2025 to January 2026.<br>ADC Comments (SB, Dec 2021, neighbouring site):<br>- "groundwater should be assumed at 0.8mbgl"<br>- "testing not necessary due to wealth of data from neighbouring sites"<br>- expectation for attenuated discharge to watercourse – recommendation for attenuated feature discharge to watercourse, and infiltration where possible (permeable liner) **N.B. comment** |

| | |
|---|---|
| | **superseded: January 2026 comments now request impermeable liner.**<br>Neighbouring Development (Taylor Wimpey, major development, north and east of site):<br>- peak groundwater levels at 0.70mbgl in 2013<br>- peak groundwater levels at 0.67mbgl in 2018 re-testing<br>Strategic Flood Risk Assessment:<br>- Groundwater affected Northfields Lane in 2014, shallow groundwater levels expected at site |
| **Other Ground Conditions:** | Neighbouring Development (Taylor Wimpey, major development, north and east of site):<br>- Clay from 0.10mbgl to full depth, minimal gravel<br>- failed tests, or very slow infiltration across site |

| **Existing Drainage** | |
|---|---|
| **Nearest Watercourse:** | East, north, and west boundaries. Watercourses flow north to south. |
| **Nearest Surface Water Sewer:** | Approx.. 200 metres to south of site |
| **Nearest Foul Sewer:** | Adjacent site, along Northfields Lane on west boundary of site. Nearest manhole 8801, recorded depth 1.40mbgl. |
| **Existing Site Drainage:** | Overland runoff to boundary watercourses |
| **Highway Drainage:** | Over-the-edge runoff to adjacent ditches, either side of private highway. |
| **Other Drainage Conditions:** | At neighbouring sites, shallow groundwater, Clay strata & failed infiltration tests, or very slow infiltration across site. Full reliance on infiltration not viable. |

| Surface Water Drainage Solution | |
|---|---|
| **Drainage Hierarchy:** | In accordance with findings & previous ADC guidance, proposal is an attenuation system with controlled discharge to boundary watercourses.<br>Rainwater harvesting tank (GreenBlue Urban SuDSPod) will provide interception drainage & attenuation at source.<br>Permeable pavement will utilise impermeable base liner, per latest ADC instruction (January 2026), given shallow groundwater levels.<br>Proposed attenuation tank will also be lined with an impermeable liner. The tank will also be designed with mitigation against groundwater flotation. |
| **Viable SuDS:** | Rainwater harvesting, permeable pavement, shallow attenuation storage tank |
| **Surface Water Storage:** | 29.9$m^3$ (0.4$m^3$ rainwater harvesting attenuation, 9.5$m^3$ attenuation tank (95% voids) & 20.0$m^3$ permeable pavement (30% voids) |
| **Surface Water Discharge:** | restricted discharge at each outfall via Controflow Universal Flow Control Chamber:<br>• Protected orifice<br>• 19mm diameter (0.7 l/s design rate, 0.8m design head)<br>• Calculated flow rates (inc. climate change):<br>  o 1-year storm: 0.9 l/s<br>  o 10-year storm: 1.0 l/s<br>  o 30-year storm: 1.0 l/s<br>  o 100-year storm: 1.2 l/s |
| **Design Standards:** | 1 in 100 year storm, 45% climate change, 10% urban creep |
| **Further Comments:** | Proposal to tier landscape northwest boundary to provide increased watercourse network capacity, as well as managed wetland for ecological benefits. |
| **Surface Water Treatment:**<br>**(Pollution Hazard Indices / Pollution Treatment Indices)** | Residential Parking: Low, TSS = 0.5, M = 0.4, H = 0.4<br>Permeable Pavement: TSS = 0.7, M = 0.6, H = 0.7 |
| **Mitigation against flood risk:** | Proposed development is raised above flood risk including with an allowance for climate change, in accordance with the approved planning application.<br>Proposals in the NW corner of the site provide further mitigation by providing an increase in watercourse capacity. |

| | |
|---|---|
| | Drainage design has included allowance for surcharged outfalls to the top of bank of the receiving ditches. |

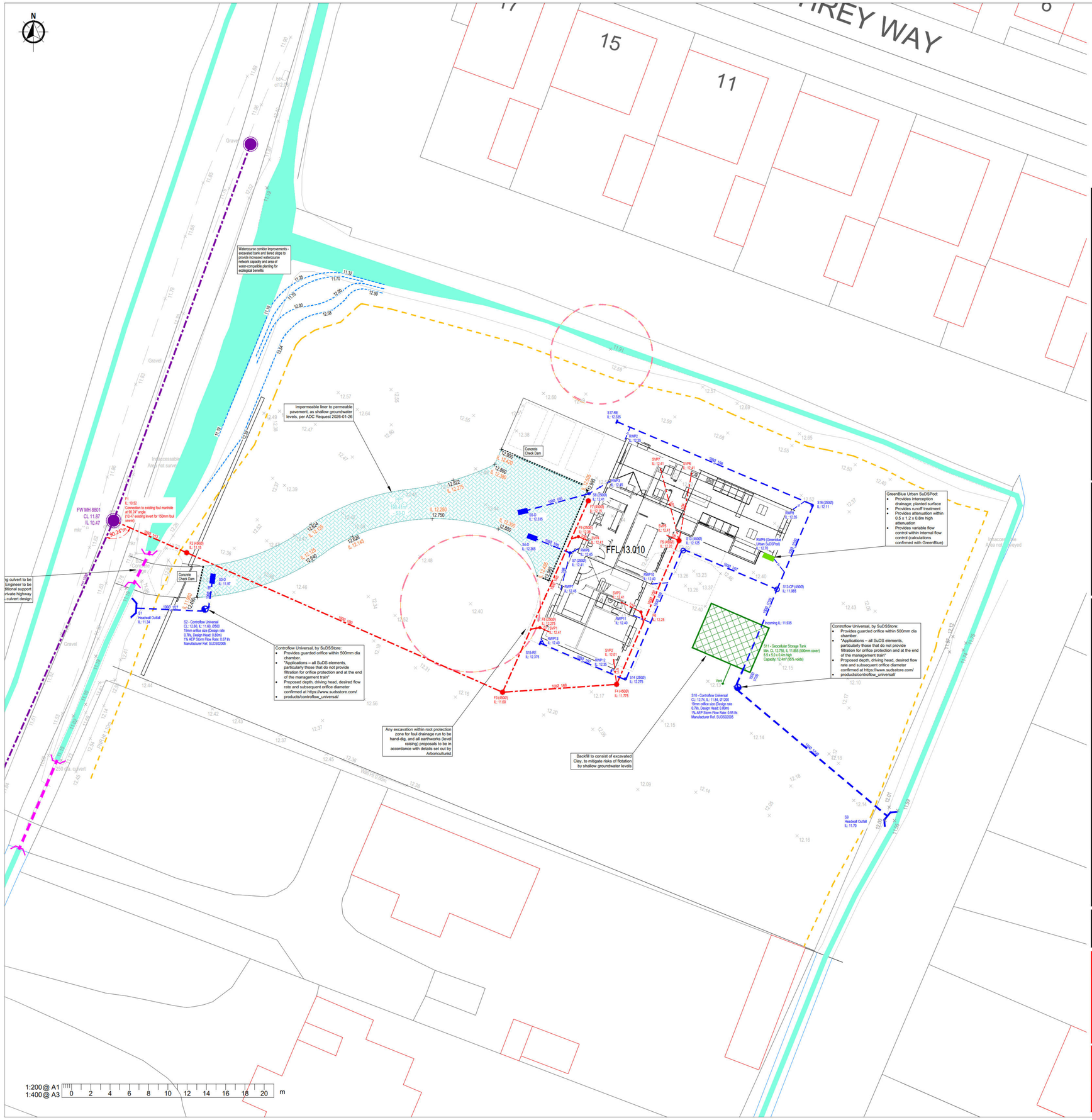
| **Foul Drainage Solution** | |
|---|---|
| **Drainage Hierarchy:** | Public foul sewer on Northfields Lane (private highway), west boundary of site |
| **Foul Proposals:** | Private foul run from proposed residential building to public sewer, by gravity |
| **Discharge:** | Discharge to public foul sewer with direct connection to existing public foul manhole. |
| **Further Comments:** | Expected peak foul discharge 0.05 l/s (in accordance with Water UK Design & Construction Guidance). |

| Adherence to ADC Drainage Comments, January 2026 | |
|---|---|
| **1.Infiltration drainage is still apparent on the construction details plan for the permeable driveway. This will need to be altered to impermeable liner.** | Allowance for infiltration from permeable pavement used, as explained, due to previous comments which requested its use by Arun Drainage team in March 2025.<br><br>Noting this request, and presumed change in policy / guidance, permeable pavement has been updated to an impermeable liner. |
| **3. Rainwater harvesting would need to be specifically designed for interception drainage. Details are not provided on the drainage layout and construction details. Please provide a design for interception drainage.** | Rainwater harvesting details have now been provided, noting the change in permeable pavement specification requirements and the change in policy that this is no longer considered interception drainage.<br><br>GreenBlue Urban SuDSPod to be utilised. Manufacturer has provided construction details and modelling information to include within hydraulic modelling.<br><br>Unit will provide interception drainage at surface and attenuation. |
| **4. The impermeable areas plan indicates a total area of 569sqm whereas the calculations include 330sqm. Please clarify the design.** | Please re-check calculations. Note that there are two separate systems and therefore the catchment areas are shown on pages 2 and 8 of the calculation sheets.<br><br>(0.005 + 0.028 + 0.004 + 0.008 + 0.006 +0.007 = 0.058 Ha.) |
| **5. The NSfS states 'Where the peak allowable discharge rate requires flow controls with orifices (or equivalent) with a diameter of less than 50mm, the flow control shall be robustly protected from blockage risks. Regardless of this, the risk of blockage for all flow controls shall be assessed and mitigated against.'**<br><br>**There are products on the market which include integral blockage protection for small diameter flow controls. Hydrobrake Optimum would not be the correct flow control device specification for achieving the lowest rate reasonably practicable.**<br><br>**5 times GFR would appear to be 0.8 l/s total for the site.**<br><br>**Upstream measures can also be incorporated to manage blockage risk.** | Design has been amended to utilise SuDSStore Controflow Universal chambers, which utilise orifice flow controls and a protection filter. The manufacturer states that:<br><br>"*Applications – all SuDS elements, particularly those that do not provide filtration for orifice protection and at the end of the management train*"<br><br>The unit is therefore appropriate, not withstanding that permeable pavement will provide primary treatment to runoff from the driveway.<br><br>Proposed runoff is now 1.2 l/s in a 100-year design storm event (and 0.9 l/s in a 1-year storm event).<br><br>Greenfield rate for the site is 0.8 l/s, as well as the Q-100 rate being 2.5 l/s.<br><br>The proposed discharge rate is therefore now approximately at existing Greenfield rate for the site, and less than the 5XGFR rate referred to (4.0 l/s). The amended design has aimed to reduce runoff rate as close to permeable pavement as possible, in accordance with the published Arun DC guidance, and it is requested that this is now considered appropriate.<br><br>If considering the GFR of only the proposed catchment area, the proposed runoff rate is now roughly or less than 5XGFR also. |

| Further Design Notes | |
|---|---|
| **Drainage Plans (inc. areas, full drainage details, specification, details, water quality):** | Detailed drainage plan provided, and accompanying construction details and flow control specification.<br>Water quality treatment is covered on the previous page. |
| **Biodiversity & Amenity Benefits:** | The proposals for an expanded bank with a softly sloped area, approximately 400mm above the watercourse invert, allows for an area to be landscaped with water compatible planting, developed into an attractive feature that provides ecological benefits – as well as increasing watercourse capacity. |
| **Arboricultural Constraints:** | Root protections are shown. No excavation is proposed within the root protection zones, other than at the edge of one area for a shallow 100mm diameter foul run, which is to be hand excavated.<br>Some minor earthworks (fill only) at a 1:3 slope will also encroach the edge of the root protection zone where returning levels to tie-in with existing levels. This is to be un-loaded landscaping only, however the Arboricultural consultant will be engaged on final earthworks design, and any mitigation, if required. |
| **Hydraulic Modelling:** | Modelling includes allowance for a surcharged outfall to the top of bank of the watercourse at the outfall point.<br>Modelling results are provided for 1yr, 10yr + 35%CC (climate change), 30yr + 35%CC, 100yr + 45%CC & 10%UC (urban creep)<br>Modelling results show no flooding up to the design event. |
| **Riparian Maintenance Responsibilities:** | 1.5m riparian maintenance buffer shown on drainage plan. |
| **Discharge Consents:** | As confirmed by Paul Cann (23/10/25), an 'Arun Drainage Byelaws Consent' still applies even where headwall does not protrude into watercourse profile (and therefore WSCC don't require a OWC for a headwall outfall).<br>Copy of consent attached. |

## DRAWINGS

| | |
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4. Any information given regarding existing underground services is given in good faith after consultation with the relevant authority, however accuracy is not certain. The main contractor is responsible for checking all information on site prior to work commencing and taking due care whilst undertaking the works.
5. All dimensions to be checked on site. All details and dimensions relating to sub-contractors work must be checked and agreed between the sub-contractor or supplier and the general contractor.
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## RESIDUAL HAZARDS

In addition to the hazards/risks normally associated with the type of work detailed on this drawing, note the following:

1. Buried services. Contractor to refer to locate existing services and undertake necessary precautions and investigation prior to excavating.
2. Excavations close to existing root protection zones. Arborculturalist to be engaged with regard to civils proposals and appropriate mitigation measures. Contractor to prepare method statement to ensure protection of existing tree roots, in accordance with root protection proposals.
3. Connection to public drainage system. Contractor to ensure drains are shut off during works and ensure operatives are familiar and competent with procedure.
4. Excavations close to existing structures. Contractor to prepare method statement to ensure stability of existing structure.
5. Working in vicinity of Waterbodies with variable surface water flows & debris. Contractor to provide method statement and ensure operatives have appropriate safeguarding equipment.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved risk assessment and method statement

## -SURFACE WATER DRAINAGE-

- Surface water disposal should be managed in view of the SuDS hierarchy, set out by Arun District Council;
  1. Re-use
  2. Infiltration
  3. Infiltration - Watercourse Hybrid
  4. Watercourse
  5. Public Surface Water Sewer(s)
- Ground investigation, infiltration testing and groundwater monitoring in the vicinity of the site shows that the site is underlain by Clay, and with groundwater levels expected to be at at least 0.8mbgl. Infiltration is therefore not considered viable, however measures will be utilised to allow shallow infiltration above peak groundwater levels, where viable.
- The rear of the proposed dwelling will be captured and attenuated within both a GreenBlue Urban SuDSPOd (a rainwater harvesting planter that provides interception drainage, attenuation and internal flow control), and a 6.5 x 5.0 x 0.4m high geocellular storage tank, with a controlled discharge to the boundary watercourse using a Controflow protected orifice chamber (19mm; max. discharge rate in a 1% AEP storm - 0.55 l/s)
- In addition, the driveway and the frontage of the proposed dwelling will be captured and attenuated within 190m² of tanked permeable pavement with a 350mm sub-base, and will drain via a diffuser unit to the boundary watercourse via a Controflow protected orifice chamber (19mm; max. discharge rate in a 1% AEP storm - 0.67 l/s).
- The controlled discharge rates will ensure that runoff is limited to as close as possible to Greenfield runoff rate (Qbar) whilst ensuring compliant 24 hour half-drain down times. The surface water drainage strategy has been designed to accommodate a 1-in-100-year storm event, inclusive of an allowance for climate change (45%) and urban creep (10%).
- Discharge to the existing watercourse will require a Land Drainage Consent to Arun District Council (under Arun Drainage Byelaws). Line & Level of the watercourse has been established to inform the application.

## -FOUL WATER STRATEGY-

- Foul water disposal should adhere to the following hierarchy;
  1. Public Sewer
  2. Private Treatment Plant
  3. Septic Tank and Drainage Field
  4. Cesspool
- There is an existing public foul sewer within 5 metres of the site, within the private highway adjacent. As a result, the proposed foul drainage will be discharged to the public sewer, with a soffit-to-soffit connection to an existing manhole.
- Connection is subject to a S106 Sewer Connection Application to Southern Water.

## -DRAINAGE KEY-

- Existing Surface Water Drain/Culvert
- Existing Surface Water Headwall
- Private (Individual) Surface Water Drainage
- Proposed Diffuser Unit
- Proposed Permeable Paving (350mm Sub-Base, permeable base liner)
- Proposed Inspection Chamber (Max 1.2m dp., or 3.0m w/ restricted access)
- Proposed Surface Water Flow Control Manhole - As detailed or otherwise agreed
- Proposed Culvert / Headwall Construction Details subject to Consent
- Rodding Point (Below Ground)
- Watercourse Maintenance Buffer (1.5m)
- SW Attenuation Tank Construction Details as Shown, based on Wavin AquaCell Manufacturer Standards
- Existing Watercourse (Confirmed / Assumed)
- Proposed Banking (Watercourse)
- Proposed Rainwater Harvesting Features
- Existing Foul Water Drain/Sewer
- Proposed Foul Water Drainage
- Inspection Chamber (Shallow) (Max 0.6m Depth) (Svp shall use main channel)
- Inspection Chamber (Max 1.2m dp., or 3.0m w/ restricted access) (Svp shall use main channel)

## -ARBORICULTURAL KEY-

- Proposed Root Protection Area (Provided by Architect)

DRAINAGE DESIGN NOTES:

ALL INTERNAL FOUL CONNECTIONS (SVPS, DCS ETC.) ARE ASSUMED TO BE Ø100mm & SET 600mm BELOW DESIGN FFL WITH MIN 1:40 INTERNAL FALLS TO INSPECTION CHAMBERS.

GROUNDWATER LEVELS INDICATED AS APPROXIMATELY 0.8mbgl. SOIL STRATA INFORMATION CONFIRMED AS CLAY. EXCAVATED CLAY TO BE USED AS BACKFILL FOR ATTENUATION TANK FOR MITIGATION AGAINST GROUNDWATER FLOTATION.

FINAL DESIGN TO BE COORDINATED WITH ARCHITECTS PLANS, STRUCTURAL DESIGN & SERVICES DESIGN.

LEVELS DESIGN NOTES:

THRESHOLD ACCESS POINTS SHOWN AS FLUSH OR WITH 150mm STEP, PER ARCHITECTS PLANS, WITH BUILDING REGULATIONS M4(1) COMPLIANT ACCESS SLOPES.

ANY EARTHWORKS WITH A SLOPE EXCEEDING 1:6 ARE TO BE REVIEWED BY A STRUCTURAL ENGINEER, WITH APPROPRIATE GUIDANCE ON IMPLICATIONS & LAND DRAINAGE PROVIDED TO CIVIL ENGINEER.

GENERAL

1. The main contractor is responsible for the design of all temporary works, and is also responsible for the safe maintenance and stability of existing buildings at all times.
2. The main contractor is responsible for dealing with all occurrences of ground water during the construction period.
3. The contractor must comply with all current legislation relating to health & safety.
4. All products specified shall be installed in strict accordance with the manufacturers recommendations and instructions. If there are discrepancies between that information and the details on any Harbourstone Design drawings, the manufacturers instructions must be used.
5. All concrete and cement mortar to be in accordance with BS8500, BSEN206 and BSEN998.
6. The contractor is responsible for managing surface water run off during construction.

DRAINAGE NOTES:

1. All drainage works to be constructed in strict accordance with specification of the Local Authority, Building Regulations, Design and Construction Guidence (published by Water UK)& BSEN.752.
2. Any existing drainage found crossing the site is to be investigated, and if found to be 'live', it should be diverted in consultation with Harbourstone Design.
3. For location and setting out of building drainage points refer to architects drawings.
4. All pipe runs near buildings to comply with the Building Regulations 2015 part H1. Where a pipe is within 1m of a foundation the trench shall be filled with class GEN3 concrete up to the lowest level of the foundation. Where the trench is further than 1m from the foundation, the trench shall be filled with class GEN3 concrete to a level below the lowest level for the foundation equal to the distance from the foundation less 150mm. In both cases the pipe shall be bedded and surrounded in 150mm thick class GEN3 concrete.
5. Where pipes, external to the structures, have a depth to soffit from ground level of less than 450mm they shall have a class GEN3 concrete encasement (150mm thick).
6. Where a pipe, under a carriageway, has a depth of cover of less than 1.2m the pipe shall be laid in a concrete bed and surround.
7. Where a pipe, under a vehicular area other than a carriageway has a depth of cover if less than 0.9m the pipe shall be protected with a concrete slab set above it.
8. In any circumstances where pipes are bedded and surrounded in concrete flexible joints should be provided. compressible boards (fibreboard or polystyrene) shall be provided at a maximum of 8m centres (coinciding with pipe joints). the boards shall be pre-cut to pipe diameter and to a height and width equal to the concrete cross section. a board thickness of 18mm for pipes up to 450mm nominal diameter and 36mm for pipes over 450mm nominal diameter.
9. All private building drainage shall be constructed in strict accordance with BS EN.752. Foul drainage beneath the floor slab shall be laid, shall be laid no flatter than 1:40. Unless otherwise specified below ground building drainage external to the building shall be 100mm diameter and shall be laid at a minimum gradient of (<1l/s = 1 in 40;>1l/s = 1 in 80) for foul drains and 1 in 80 for surface water drains.
10. All building drains shall be laid in conjunction with 'non adoptive bedding details' (class d, n or b) unless otherwise specified.
11. All pipes, bends and junction for private building drainage shall be UPVC conforming to BS4660, BSEN13598 and BSEN1401 as appropriate and shall be laid in accordance with the manufacturer's specification.
12. All pipes, bends and junction materials for adoptable drainage shall be vitrified clay, extra strength or super strength to BSEN295, with flexible joints and kitemark certified
13. All back inlet gullies to be roddable or connected to inspection chambers.
14. All gully connections other than at manholes to be 'y' junctions.
15. All road gully connections to be 150mm diameter.
16. All stub stacks to be fitted with air admittance valves where branch drain exceeds 12m except at the head of the run. Soil vent pipes located at the head of a run to terminate to fresh air.
17. No low point shall be without a method of drainage.
18. All connections to be soffit to soffit unless otherwise noted.
19. All concrete and concrete products to be in accordance with BRE 363 for sulphates.
20. The locations of all building drainage points shall be cross referenced against the architects drawings during setting out and any discrepancies reported immediately.
21. Before connections are made to existing public sewers an application under S106 must be made to relevant sewerage undertaker.
22. The precise depth and location and size of existing pipes, watercourses or manholes where connections or diversion are proposed must be confirmed and reported to the engineer before works commence on site.
23. Any existing drains to be abandoned to be decommissioned in accordance with the Building Regulations by either grubbing, infilling or sealing.
24. Should groundwater be encountered on site during construction Harbourstone Design shall be informed to determine if additional measures are required. **This includes design against flotation.**
25. The drainage system shall be fully cleansed on completion of the project using methods that ensure pollution off site does not occur.
22. Any existing land drains severed during construction shall be reinstated.

| Rev. | Amendments | Date |
|---|---|---|
| D | Revised Issue | 3/2/26 |
| C | Revised Issue | 9/1/26 |
| B | Revised Issue | 4/12/25 |
| A | Revised Issue | 4/12/25 |
| - | Original Issue | - |


HARBOURSTONE DESIGN

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Drawing Status: FOR SUBMISSION

Client: Domusea Northfields Limited

Project: Land East of Northfields Lane, Westergate PO20 3UH

Drawing Title: Engineering GA - Below Ground Drainage

| Scale | Date | Drawn By | Checked By |
|---|---|---|---|
| 1:200 | Feb '26 | DJL | CT |

Drawing No.: 2025-C109-001

Rev.: D

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## RESIDUAL HAZARDS

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1. Buried services. Contractor to refer to locate existing services and undertake necessary precautions and investigation prior to excavating.
2. Excavations close to existing root protection zones. Arborculturalist to be engaged with regard to civils proposals and appropriate mitigation measures. Contractor to prepare method statement to ensure protection of existing tree roots, in accordance with root protection proposals.
3. Connection of existing private drainage. Contractor to ensure drains are shut off during works and ensure operatives are familiar and competent with procedure.
4. Excavations close to existing structures. Contractor to prepare method statement to ensure stability of existing structure.
5. Working in vicinity of Waterbodies with variable surface water flows & debris. Contractor to provide method statement and ensure operatives have appropriate safeguarding equipment.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved risk assessment and method statement

Watercourse corridor improvements - excavated bank and tiered slope to provide increased watercourse network capacity and area of water-compatible planting for ecological benefits

Tie-in to existing levels

Tie-in to existing levels

Tie-in to existing levels

Engineer to be informed if additional support required for private highway access & culvert design

Any excavation within root protection zone for foul drainage run to be hand-dig, and all earthworks (level raising) proposals to be in accordance with details set out by Arboriculturist

Modest banking at 1:10 slope from raised earth area around proposed building (providing sufficient cover for proposed attenuation tank)

FFL 13.010

12.775m

12.533m

12.750m

12.400m

12.700m

12.200m

-LEVELS KEY-

- Ex 134.11 — Existing Spot Level
- +134.11 — Proposed Spot Level
- FFL #### — Proposed Finished Floor Level
- Level/Stepped Threshold/Access
- Proposed Contour (Primary)
- Proposed Contour (Secondary)
- Ex. / Pr. Landscape Contour (Primary)
- Ex. / Pr. Landscape Contour (Secondary)
- 1:40 — Landscape Gradient Arrow/Fall Direction
- 1:40 — Proposed Gradient Arrow/Fall Direction
- Proposed Bank Batter, and tie-in line (to existing levels)
- 2C — Raised DPC & number of courses
- Existing Watercourse

Refer to structural drawings for further information on structural slab levels.

Topographical information shown is based on site survey undertaken by others as part of site-wide development.

Contours are only as accurate as initial land survey information. Contours are approximate, and spot levels may vary slightly on site.

THRESHOLD PLATFORM SUMMARY:

L = Level Threshold

R = Ramped (Part M)

S = Stepped Approach

-ARBORICULTURAL KEY-

- Proposed Root Protection Area (Provided by Architect)

LEVELS DESIGN NOTE:

ALL FLUSH THRESHOLD ACCESS POINTS WITH 1:60 FALL FROM BUILDING, FOR MINIMUM 900mm FROM FRONT / MAIN ACCESS & FOR PATIO DISTANCE SHOWN TO SPOT LEVEL.

GENERAL

1. The main contractor is responsible for the design of all temporary works, and is also responsible for the safe maintenance and stability of existing buildings at all times.
2. The main contractor is responsible for dealing with all occurrences of ground water during the construction period.
3. The contractor must comply with all current legislation relating to health & safety.
4. All products specified shall be installed in strict accordance with the manufacturers recommendations and instructions. If there are discrepancies between that information and the details on any Harbourstone Design drawings, the manufacturers instructions must be used.
5. All concrete and cement mortar to be in accordance with BS8500, BSEN206 and BSEN998.
6. The contractor is responsible for managing surface water run off during construction.

1:200 @ A1
1:400 @ A3
0 2 4 6 8 10 12 14 16 18 20 m

| Rev. | Amendments | Date |
|---|---|---|
| A | Revised Issue | 4/12/25 |
| - | Original Issue | - |

HARBOURSTONE DESIGN


**Harbourstone Design Limited**
Civil Engineering Consultants - harbourstonedesign.co.uk
Registered in England No: 16608131


Drawing Status: FOR SUBMISSION

Client: Domusea Northfields Limited

Project: Land East of Northfields Lane, Westergate PO20 3UH

Drawing Title: Engineering GA - Levels Design

| Scale | Date | Drawn By | Checked By |
|---|---|---|---|
| 1:200 | Dec '25 | DJL | CT |

Drawing No.: 2025-C109-002

Rev.: A

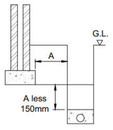
| Minimum Dimensions for Access Fittings and Inspction Chambers | | | | | | |
|---|---|---|---|---|---|---|
| Type | Min Internal Sizes | | | | Cover Sizes | |
| | Depth to invert (m) | Size of largest pipe (DN) | Length x Width (mm) | Circular (mm) | Length x Width (mm) | Circular (mm) |
| Rodding Eye | As Drain but Minimum 100mm[a] | | | | | |
| Access Fitting | 0.6 or less except where situated in a chamber | | | | | Same size as access fitting |
| Small | | | 150x100 | 150 | 150x100[a] | |
| Large | | | 225x100 | 225 | 225x100[a] | |
| Inspection Chamber | | | | | | |
| Shallow | 0.6 or less | | | 190[b] | | 190[a] |
| | 1.2 or less | | 450x450 | 450 | 450x450 | 430[a] |
| Deep | 1.2 - 3.0 | | 450x450 | 450 | Max 300x300[c] | Access restricted[c] to Max 350 |

Notes:

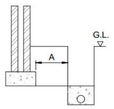
a. the clear opening may be reduced by 20mm in order to provide proper support for the cover and frame
b. Drains up to 150mm
c. A larger clear opening cover may be used in conjunction with a restricted access. the size is restricted for health a safety reasons to deter entry,

## BUILDING REGULATIONS MINIMUM DIMENSIONS FOR CHAMBERS

(Not to Scale)
This table complies with the Building Regulations 2015
Section 'H' - Drainage & Waste Disposal.



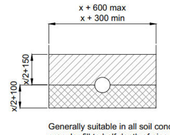

Where 'A' is 1.0m or more fill trench with concrete to this level.




Where 'A' is less than 1.0m fill trench with concrete to this level.

## DETAIL OF PIPE RUNS NEAR BUILDINGS

(Not to Scale)




Generally suitable in all soil conditions granular fill to half depth of pipe

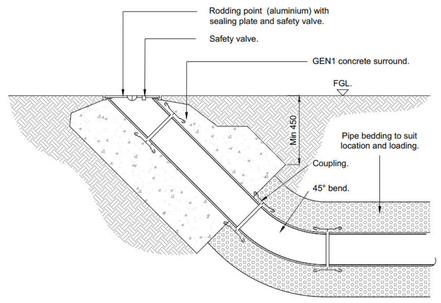
LEGEND:

- Selected fill: free from stones larger than 40mm, lumps of clay over 100mm, timber frozen material and vegetable matter.
- Granular material: should conform to BS 882:1983 table 4 or BS8301:1985 Appendix D. Compaction fraction > 0.3 for class N > 0.2 for class F and B.

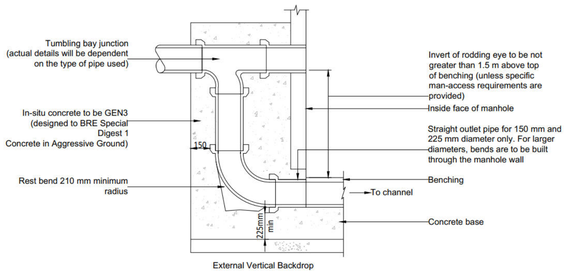
'x' - Denotes external pipe diameter.

## PIPE BEDDING DETAIL UNDER DRIVES AND GARDENS

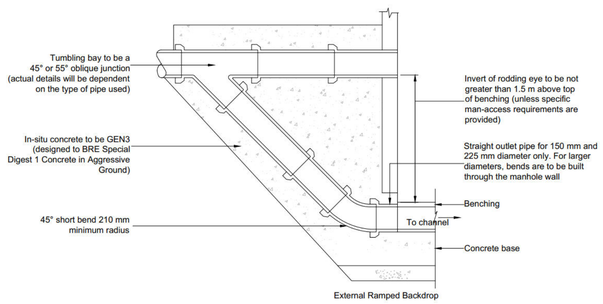
Min depth of cover 0.35m under private gardens and 0.5m under private drives




## DETAIL OF RODDING EYE

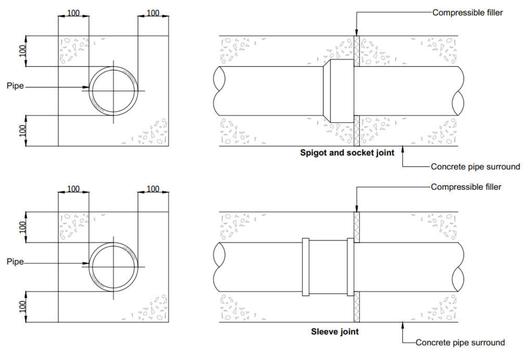



External Vertical Backdrop

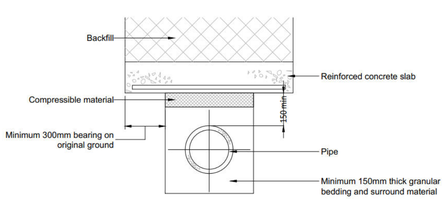



External Ramped Backdrop

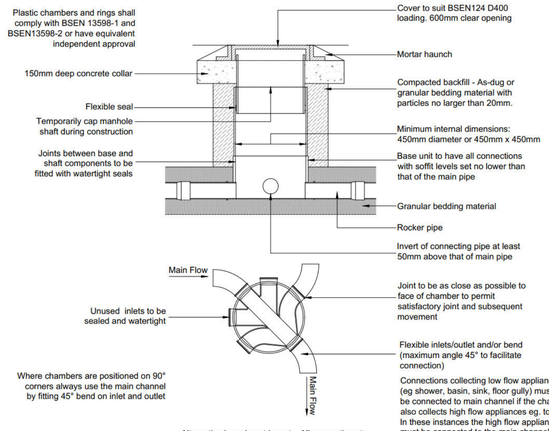
## FIGURE B16
## TYPICAL VERTICAL AND RAMPED BACKDROP DETAIL (RIGID MATERIALS)




## JOINTS FOR ENCASED PIPES



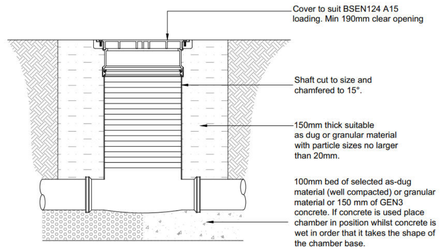

## PROTECTION OF PIPES AT SHALLOW DEPTH




Alternative base invert layouts. All connections to be minimum soffit to soffit.

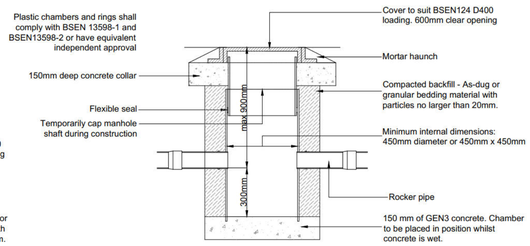
## TYPICAL ACCESS CHAMBER DETAIL - 450Ø
## (FOOTPATHS AND PRIVATE DRIVES)

1.2m MAXIMUM DEPTH TO FROM COVER TO PIPE INVERT (OR ACCESS RESTRICTED TO MAX 300 X 300 / 350Ø). LOCATED IN AREAS SUBJECT TO LIGHT VEHICLES AND FOOTPATHS



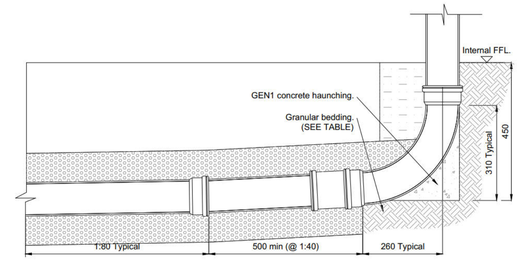

## TYPICAL SHALLOW ACCESS CHAMBER DETAIL - 250Ø

0.6m MAXIMUM DEPTH TO FROM COVER TO PIPE INVERT.



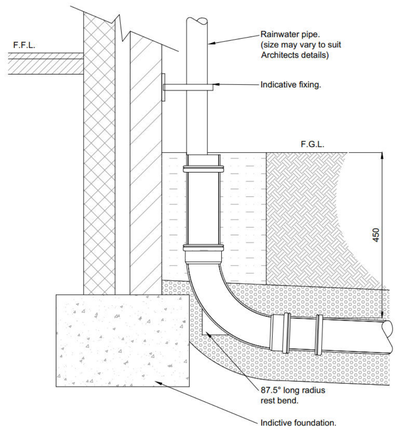

## TYPICAL CATCHTPIT DETAIL (450Ø)
## (FOOTPATHS AND PRIVATE DRIVES)

1.2m MAXIMUM DEPTH TO FROM COVER TO PIPE INVERT (OR ACCESS RESTRICTED TO MAX 300 X 300 / 350Ø). LOCATED IN AREAS SUBJECT TO LIGHT VEHICLES AND FOOTPATHS



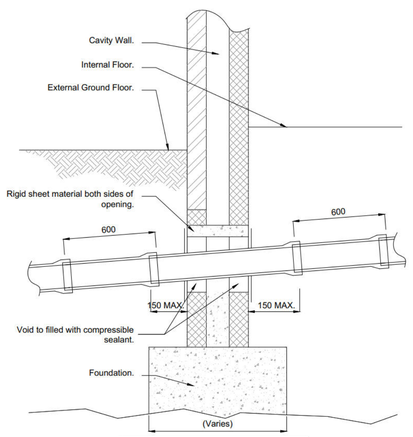

## DETAIL OF FOUL REST BEND

(Scale 1:20)




## DETAIL OF RAINWATER PIPE

(Scale 1:20)




Note:
Arched or lintelled opening to give 50mm min clearance all around the pipe. mask opening both sides with rigid sheet material to prevent overspill of fill or entry for vermin.

## TYPICAL SECTION PIPE PASSING THROUGH WALL PIPE THROUGH LINTELLED OPENING

(Scale 1:20)

### GENERAL

1. The main contractor is responsible for the design of all temporary works, and is also responsible for the safe maintenance and stability of existing buildings at all times.
2. The main contractor is responsible for dealing with all occurrences of ground water during the construction period.
3. The contractor must comply with all current legislation relating to health & safety.
4. All products specified shall be installed in strict accordance with the manufacturers recommendations and instructions. If there are discrepancies between that information and the details on any Harbourstone Design drawings, the manufacturers instructions must be used.
5. All concrete and cement mortar to be in accordance with BS8500, BSEN206 and BSEN998.
6. The contractor is responsible for managing surface water run off during construction.

### DRAINAGE NOTES:

1. All drainage works to be constructed in strict accordance with specification of the Local Authority, Building Regulations, Design and Construction Guidence (published by Water UK)& BSEN.752.
2. Any existing drainage found crossing the site is to be investigated, and if found to be 'live', it should be diverted in consultation with Harbourstone Design.
3. For location and setting out of building drainage points refer to architects drawings.
4. All pipe runs near buildings to comply with the Building Regulations 2015 part H1. Where a pipe is within 1m of a foundation the trench shall be filled with class GEN3 concrete up to the lowest level of the foundation. Where the trench is further than 1m from the foundation, the trench shall be filled with class GEN3 concrete to a level below the lowest level for the foundation equal to the distance from the foundation less 150mm. In both cases the pipe shall be bedded and surrounded in 150mm thick class GEN3 concrete.
5. Where pipes, external to the structures, have a depth to soffit from ground level of less than 450mm they shall have a class GEN3 concrete encasement (150mm thick).
6. Where a pipe, under a carriageway, has a depth of cover of less than 1.2m the pipe shall be laid in a concrete bed and surround.
7. Where a pipe, under a vehicular area other than a carriageway has a depth of cover if less than 0.9m the pipe shall be protected with a concrete slab set above it.
8. In any circumstances where pipes are bedded and surrounded in concrete flexible joints should be provided. compressible boards (fibreboard or polystyrene) shall be provided at a maximum of 8m centres (coinciding with pipe joints). the boards shall be pre-cut to pipe diameter and to a height and width equal to the concrete cross section. a board thickness of 18mm for pipes up to 450mm nominal diameter and 36mm for pipes over 450mm nominal diameter.
9. All private building drainage shall be constructed in strict accordance with BS EN.752. Foul drainage beneath the floor slab shall be laid, shall be laid no flatter than 1:40. Unless otherwise specified below ground building drainage external to the building shall be 100mm diameter and shall be laid at a minimum gradient of (<1¼ = 1 in 40/>1¼ = 1 in 80) for foul drains and 1 in 80 for surface water drains.
10. All building drains shall be laid in conjunction with 'non adoptive bedding details' (class d, n or b) unless otherwise specified.
11. All pipes, bends and junction for private building drainage shall be UPVC conforming to BS4660, BSEN13598 and BSEN1401 as appropriate and shall be laid in accordance with the manufacturer's specification.
12. All pipes, bends and junction materials for adoptable drainage shall be vitrified clay, extra strength or super strength to BSEN295, with flexible joints and kitemark certified
13. All back inlet gullies to be roddable or connected to inspection chambers.
14. All gully connections other than at manholes to be 'y' junctions.
15. All road gully connections to be 150mm diameter.
16. All stub stacks to be fitted with air admittance valves where branch drain exceeds 12m except at the head of the run. Soil vent pipes located at the head of a run to terminate to fresh air.
17. No low point shall be without a method of drainage.
18. All connections to be soffit to soffit unless otherwise noted.
19. All concrete and concrete products to be in accordance with BRE 363 for sulphates.
20. The locations of all building drainage points shall be cross referenced against the architects drawings during setting out and any discrepancies reported immediately.
21. Before connections are made to existing public sewers an application under S106 must be made to relevant sewerage undertaker.
22. The precise depth and location and size of existing pipes, watercourses or manholes where connections or diversion are proposed must be confirmed and reported to the engineer before works commence on site.
23. Any existing drains to be abandoned to be decommissioned in accordance with the Building Regulations by either grubbing, infilling or sealing.
24. Should groundwater be encountered on site during construction Harbourstone Design shall be informed to determine if additional measures are required. **This includes design against flotation.**
25. The drainage system shall be fully cleansed on completion of the project using methods that ensure pollution off site does not occur.
22. Any existing land drains severed during construction shall be reinstated.

A1

1. This drawing is to be read in conjunction with any other information, drawings and specification issued by Principle Designer, Architect and the Harbourstone Design package for this project. Any discrepancies found are to be reported immediately to the Engineer.
2. Harbourstone Design accepts no responsibility for inaccuracies in data provided by third parties such as topographic surveys or Ordnance Survey mapping.
3. Do not scale, work to figured dimensions only. All dimensions are in millimeters unless noted otherwise and all levels are in metres from the topographic survey datum.
4. Any information given regarding existing underground services is given in good faith after consultation with the relevant authority, however accuracy is not certain. The main contractor is responsible for checking all information on site prior to work commencing and taking due care whilst undertaking the works.
5. All dimensions to be checked on site. All details and dimensions relating to sub-contractors work must be checked and agreed between the sub-contractor or supplier and the general contractor.
6. The electronic information from this drawing can not be guaranteed as dimensionally drawn exact. Figured dimensions must be used for setting out and detailing. Harbourstone Design logos and company information must be removed from copies if information is re-used.
7. Where used, this map is based on or reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the controller of His Majesty's Stationary Office (c) Crown Copyright. Harbourstone Design accept no liability for any inaccuracies with the data.

## RESIDUAL HAZARDS

In addition to the hazards/risks normally associated with the type of work detailed on this drawing, note the following:

1. Buried services. Contractor to refer to locate existing services and undertake necessary precautions and investigation prior to excavating.
2. Excavations close to existing root protection zones. Arborculturalist to be engaged with regard to civils proposals and appropriate mitigation measures. Contractor to prepare method statement to ensure protection of existing tree roots, in accordance with root protection proposals.
3. Connection of existing private drainage. Contractor to ensure drains are shut off during works and ensure operatives are familiar and competent with procedure.
4. Excavations close to existing structures. Contractor to prepare method statement to ensure stability of existing structure.
5. Working in vicinity of Waterbodies with variable surface water flows & debris. Contractor to provide method statement and ensure operatives have appropriate safeguarding equipment.

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved risk assessment and method statement

| Rev. | | |
|---|---|---|
| - | Original Issue | - |
| Rev. | Amendments | Date |

HARBOURSTONE DESIGN


**Harbourstone Design Limited**
Civil Engineering Consultants - harbourstonedesign.co.uk
Registered in England No: 16608131


Drawing Status: FOR SUBMISSION

Client: Domusea Northfields Limited

Project: Land East of Northfields Lane, Westergate PO20 3UH

Drawing Title: Construction Details Sht 1 of 2

| Scale | Date | Drawn By | Checked By |
|---|---|---|---|
| As Shown | Oct' 2025 | DJL | - |

Drawing No.: 2025-C109-003 Rev.: -

## FLOW CONTROL CHAMBER S2

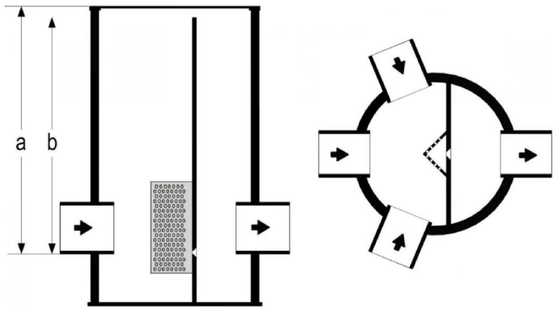
**SCHEDULE**

COVER LEVEL: 12.600
INVERT LEVEL: 11.600
DESIGN FLOW RATE: 0.7 l/s
DESIGN HEAD: 0.80 m
CALCULATED FLOW RATE (1% AEP STORM): 0.67 L/S
FLOW CONTROL UNIT: SUDSSTORE CONTROFLOW UNIVERSAL
UNIT REFERENCE: SUDS02005
MANHOLE DIMENSIONS: 500 mm

## FLOW CONTROL CHAMBER S10

**SCHEDULE**

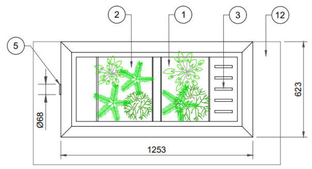
COVER LEVEL: 12.740
INVERT LEVEL: 11.840
DESIGN FLOW RATE: 0.7 l/s
DESIGN HEAD: 0.80 m
CALCULATED FLOW RATE (1% AEP STORM): 0.55 L/S
FLOW CONTROL UNIT: SUDSSTORE CONTROFLOW UNIVERSAL
UNIT REFERENCE: SUDS02005
MANHOLE DIMENSIONS: 500 mm



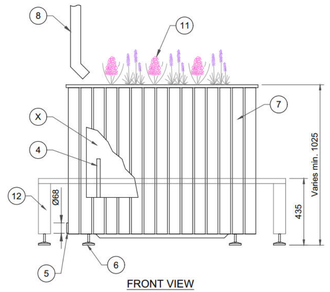



## CONTROFLOW UNIVERSAL EXAMPLE SECTION

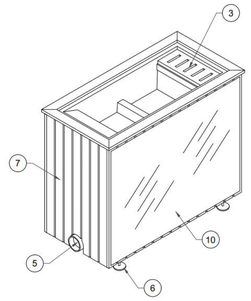
FURTHER DETAIL SHOWN IN APPENDICES



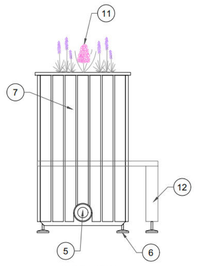

PLAN VIEW



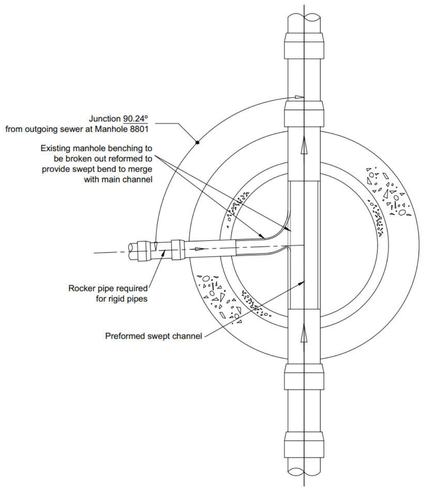

FRONT VIEW




ISOMETRIC VIEW




SIDE VIEW




Sectional Plan

Rigid pipes built into manhole should have a flexible joint as close as feasible to the external face of the structure and the length of the next rocker pipe should be as shown.

| Nominal diameter (mm) | Maximum effective length (m) |
|---|---|
| 150 - 600 | 0.6 |
| 601 - 750 | 1.00 |
| over 750 | 1.25 |

All pipes entering the bottom of the manhole to have soffits level.

## ARRANGEMENT OF PIPE JUNCTION WITHIN MANHOLE 8801

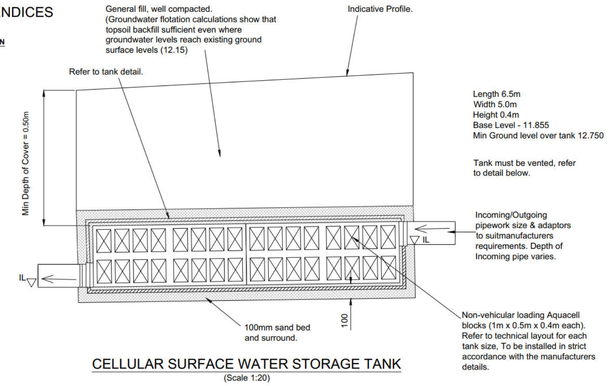
## GREENBLUE URBAN SUDSPOD EXAMPLE SECTION

FURTHER DETAIL SHOWN IN APPENDICES

**PACKAGE INCLUDES THE FOLLOWING GREENBLUE URBAN PRODUCTS PER TREE:**

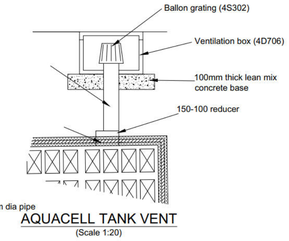
1. GROWING MEDIUM
2. ANTI-SCOUR SLATE MULCH
3. DEBRIS FILTER BLOCK AND SILT TRAP
4. PATENTED FLOW CONTROL MECHANISM
5. 68MM OUTLET CONNECTION
6. LEVELING FEET
7. OPTIONAL CLADDING KIT
8. ADDITIONAL ITEMS
9. DOWNPIPE FITTING
10. PROMOTIONAL / EDUCATIONAL BRANDED INFORMATION
11. PLANT PACK
12. OPTIONAL BENCH

X. CUT-OUT



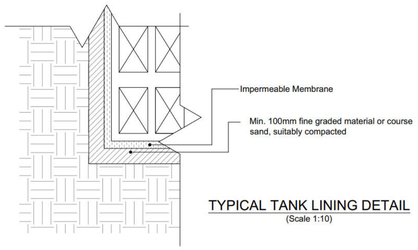

## CELLULAR SURFACE WATER STORAGE TANK

(Scale 1:20)



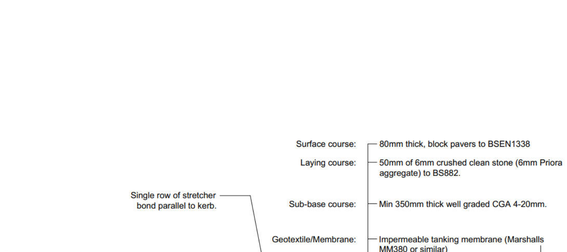

## AQUACELL TANK VENT

(Scale 1:20)




## TYPICAL TANK LINING DETAIL

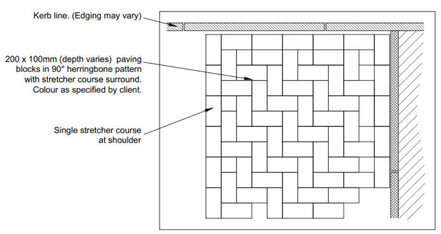
(Scale 1:10)




NOTE:
Porous paving system to be installed in strict accordance with the manufacturers recommendation and instructions.

## PERMEABLE DRIVEWAY BLOCK PAVING CONSTRUCTION DETAIL

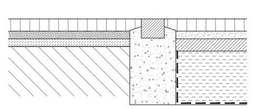
(PERMEABLE PAVERS-TANKED)
(Scale 1:20)




Blocks laid in accordance with BS 6717.

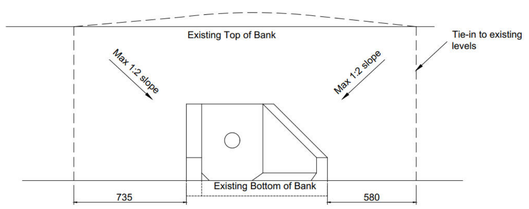
## BLOCK PAVING ARRANGEMENT PLAN

(Scale 1:20)

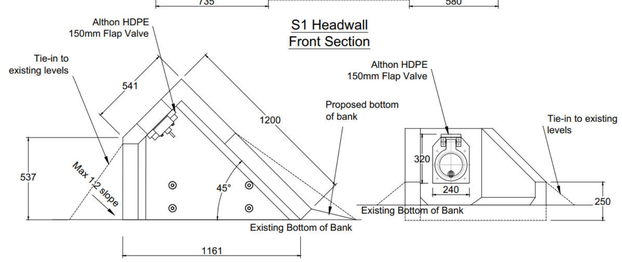


## CONCRETE CHECK DAM DETAIL

(Scale 1:20)



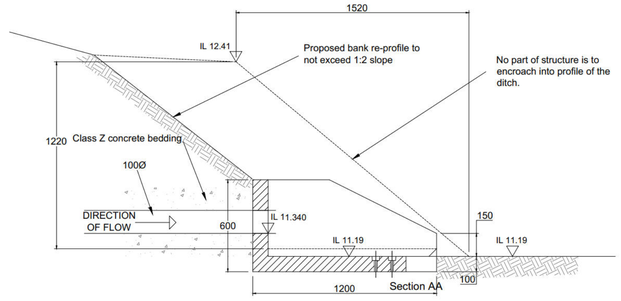

## S1 Headwall Front Section



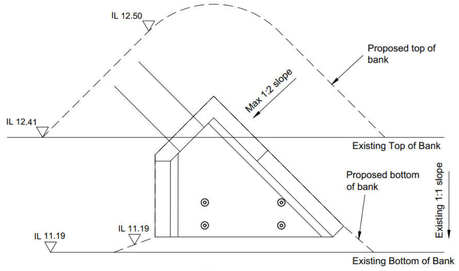

## S9 Headwall Top Section



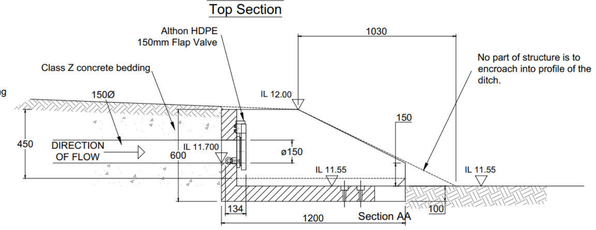

## S9 Headwall Front Section




## S1 Headwall
## Athlon Pre-cast AH4C LH Angled Headwall
## Scale 1:20




## S1 Headwall
## Top Section




## S9 Headwall
## Athlon Pre-cast AH4C LH Angled Headwall
## Scale 1:20

GENERAL

1. The main contractor is responsible for the design of all temporary works, and is also responsible for the safe maintenance and stability of existing buildings at all times.
2. The main contractor is responsible for dealing with all occurrences of ground water during the construction period.
3. The contractor must comply with all current legislation relating to health & safety.
4. All products specified shall be installed in strict accordance with the manufacturers recommendations and instructions. If there are discrepancies between that information and the details on any Harbourstone Design drawings, the manufacturers instructions must be used.
5. All concrete and cement mortar to be in accordance with BS8500, BSEN206 and BSEN998.
6. The contractor is responsible for managing surface water run off during construction.

DRAINAGE NOTES:

1. All drainage works to be constructed in strict accordance with specification of the Local Authority, Building Regulations, Design and Construction Guidence (published by Water UK)& BSEN.752.
2. Any existing drainage found crossing the site is to be investigated, and if found to be 'live', it should be diverted in consultation with Harbourstone Design.
3. For location and setting out of building drainage points refer to architects drawings.
4. All pipe runs near buildings to comply with the Building Regulations 2015 part H1. Where a pipe is within 1m of a foundation the trench shall be filled with class GEN3 concrete up to the lowest level of the foundation. Where the trench is further than 1m from the foundation, the trench shall be filled with class GEN3 concrete to a level below the lowest level for the foundation equal to the distance from the foundation less 150mm. In both cases the pipe shall be bedded and surrounded in 150mm thick class GEN3 concrete.
5. Where pipes, external to the structures, have a depth to soffit from ground level of less than 450mm they shall have a class GEN3 concrete encasement (150mm thick).
6. Where a pipe, under a carriageway, has a depth of cover of less than 1.2m the pipe shall be laid in a concrete bed and surround.
7. Where a pipe, under a vehicular area other than a carriageway has a depth of cover if less than 0.9m the pipe shall be protected with a concrete slab set above it.
8. In any circumstances where pipes are bedded and surrounded in concrete flexible joints should be provided. compressible boards (fibreboard or polystyrene) shall be provided at a maximum of 8m centres (coinciding with pipe joints). the boards shall be pre-cut to pipe diameter and to a height and width equal to the concrete cross section. a board thickness of 18mm for pipes up to 450mm nominal diameter and 36mm for pipes over 450mm nominal diameter.
9. All private building drainage shall be constructed in strict accordance with BS EN.752. Foul drainage beneath the floor slab shall be laid, shall be laid no flatter than 1:40. Unless otherwise specified below ground building drainage external to the building shall be 100mm diameter and shall be laid at a minimum gradient of (<1l/s = 1 in 40/>1l/s = 1 in 80) for foul drains and 1 in 80 for surface water drains.
10. All building drains shall be laid in conjunction with 'non adoptive bedding details' (class d, n or b) unless otherwise specified.
11. All pipes, bends and junction for private building drainage shall be UPVC conforming to BS4660, BSEN13598 and BSEN1401 as appropriate and shall be laid in accordance with the manufacturer's specification.
12. All pipes, bends and junction materials for adoptable drainage shall be vitrified clay, extra strength or super strength to BSEN295, with flexible joints and kitemark certified
13. All back inlet gullies to be roddable or connected to inspection chambers.
14. All gully connections other than at manholes to be 'y' junctions.
15. All road gully connections to be 150mm diameter.
16. All stub stacks to be fitted with air admittance valves where branch drain exceeds 12m except at the head of the run. Soil vent pipes located at the head of a run to terminate to fresh air.
17. No low point shall be without a method of drainage.
18. All connections to be soffit to soffit unless otherwise noted.
19. All concrete and concrete products to be in accordance with BRE 363 for sulphates.
20. The locations of all building drainage points shall be cross referenced against the architects drawings during setting out and any discrepancies reported immediately.
21. Before connections are made to existing public sewers an application under S106 must be made to relevant sewerage undertaker.
22. The precise depth and location and size of existing pipes, watercourses or manholes where connections or diversion are proposed must be confirmed and reported to the engineer before works commence on site.
23. Any existing drains to be abandoned to be decommissioned in accordance with the Building Regulations by either grubbing, infilling or sealing.
24. Should groundwater be encountered on site during construction Harbourstone Design shall be informed to determine if additional measures are required. **This includes design against flotation.**
25. The drainage system shall be fully cleansed on completion of the project using methods that ensure pollution off site does not occur.
22. Any existing land drains severed during construction shall be reinstated.

**A1**

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| Rev. | Amendments | Date |
|---|---|---|
| C | Revised Issue | 3/2/26 |
| B | Revised Issue | 9/1/26 |
| A | Revised Issue | 4/12/25 |
| - | Original Issue | - |


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Registered in England No: 16608131


Drawing Status: FOR SUBMISSION

Client: Domusea Northfields Limited

Project: Land East of Northfields Lane, Westergate PO20 3UH

Drawing Title: Construction Details Sht 2 of 2

| Scale | Date | Drawn By | Checked By |
|---|---|---|---|
| As Shown | Feb '26 | DJL | - |

Drawing No.: 2025-C109-004

Rev.: C




IMPERMEABLE AREAS PLAN @ 1:200

A1

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## RESIDUAL HAZARDS

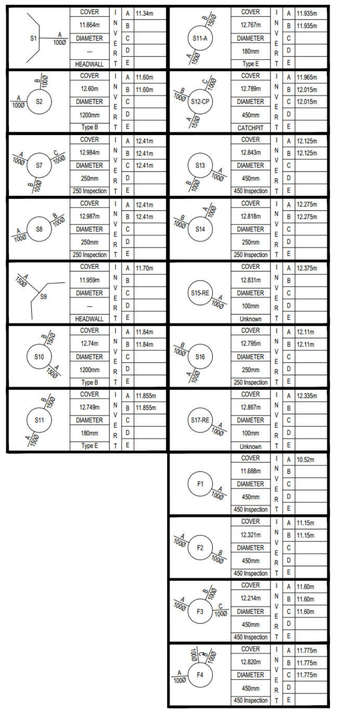
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PHASE: 0 (PRIVATE)

| MH No. | MANHOLE DIMENSION (mm) | MANHOLE TYPE | COVER TYPE | COVER LEVEL (m) | INVERT LEVEL (m) | DEPTH TO SOFFIT (m) | EASTING (m) | NORTHING (m) |
|---|---|---|---|---|---|---|---|---|
| S1 | --- | HEADWALL | | 11.864 | 11.340 | 0.424 | 493893.257 | 105829.242 |
| S2 | 1200Ø | Type B | | 12.600 | 11.600 | 0.900 | 493900.404 | 105829.137 |
| S7 | 250Ø | 250 Inspection | B125 | 12.984 | 12.410 | 0.474 | 493938.295 | 105834.969 |
| S8 | 250Ø | 250 Inspection | | 12.987 | 12.410 | 0.477 | 493940.264 | 105841.120 |
| S9 | --- | HEADWALL | | 11.959 | 11.700 | 0.109 | 493971.227 | 105807.662 |
| S10 | 1200Ø | Type B | | 12.740 | 11.840 | 0.750 | 493955.659 | 105821.522 |
| S11 | 180Ø | Type E | | 12.749 | 11.855 | 0.744 | 493956.309 | 105823.016 |
| S13 | 450Ø | 450 Inspection | | 12.843 | 12.125 | 0.618 | 493949.970 | 105835.377 |
| S14 | 250Ø | 250 Inspection | | 12.818 | 12.275 | 0.443 | 493944.061 | 105821.794 |
| S16 | 250Ø | 250 Inspection | | 12.795 | 12.110 | 0.585 | 493963.532 | 105839.943 |
| S11-A | 180Ø | Type E | | 12.767 | 11.935 | 0.682 | 493958.260 | 105827.621 |
| S12-CP | 450Ø | CATCHPIT | | 12.789 | 11.965 | 0.674 | 493959.775 | 105831.185 |
| S15-RE | 100Ø | Unknown | B125 | 12.831 | 12.375 | 0.356 | 493935.189 | 105825.624 |
| S17-RE | 100Ø | Unknown | | 12.867 | 12.335 | 0.432 | 493943.146 | 105848.588 |
| S3-D | 1000x500 | Type E | B125 | 12.444 | 11.970 | 0.374 | 493900.648 | 105832.028 |
| S4-D | 1000x500 | Type E | B125 | 12.929 | 12.365 | 0.464 | 493934.354 | 105836.587 |
| S5-D | 1000x500 | Type E | B125 | 12.906 | 12.335 | 0.471 | 493933.388 | 105839.264 |
| F1 | 450Ø | 450 Inspection | | 11.688 | 10.520 | 1.068 | 493890.908 | 105838.324 |
| F2 | 450Ø | 450 Inspection | | 12.321 | 11.150 | 1.071 | 493898.494 | 105834.997 |
| F3 | 450Ø | 450 Inspection | | 12.214 | 11.600 | 0.514 | 493931.282 | 105820.516 |
| F4 | 450Ø | 450 Inspection | | 12.820 | 11.775 | 0.945 | 493943.120 | 105821.332 |
| F5 | 450Ø | 450 Inspection | | 12.855 | 12.200 | 0.555 | 493949.602 | 105836.250 |
| F6 | 250Ø | 250 Inspection | | 12.852 | 12.250 | 0.502 | 493945.648 | 105828.842 |
| F7 | 450Ø | 450 Inspection | B125 | 12.986 | 12.150 | 0.736 | 493940.185 | 105840.377 |
| F8 | 250Ø | 250 Inspection | B125 | 12.860 | 12.275 | 0.485 | 493935.163 | 105827.220 |
| F9 | 250Ø | 250 Inspection | B125 | 12.988 | 12.380 | 0.508 | 493939.155 | 105836.662 |




| Manhole No. | Pipe No. | Adoptable IMP | Adoptable UC | Private IMP | Private UC | Total IMP + UC |
|---|---|---|---|---|---|---|
| RWP13 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| RWP12 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| RWP8 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| RWP10 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| RWP11 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| RWP9 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| RWP2 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| RWP3 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| S15-RE | 1.000 | 0.000 | 0.000 | 35.111 | 3.511 | 38.622 |
| PS1 | 1.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| S8 | 1.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| S14 | 1.001 | 0.000 | 0.000 | 69.151 | 6.915 | 76.066 |
| S5-D | 1.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| S13 | 1.002 | 0.000 | 0.000 | 59.953 | 5.995 | 65.948 |
| S3-D | 1.003 | 0.000 | 0.000 | 317.474 | 12.706 | 330.180 |
| S12-CP | 1.003 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| S2 | 1.004 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| S11-A | 1.004 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| S11 | 1.005 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| S10 | 1.006 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| RWP7 | 2.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| S17-RE | 2.000 | 0.000 | 0.000 | 53.475 | 5.347 | 58.822 |
| S7 | 2.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| S16 | 2.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| S4-D | 2.002 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| RWP6 | 3.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Totals: | | 0.000 | 0.000 | 535.163 | 34.475 | 569.638 |

| Rev. | Amendments | Date |
|---|---|---|
| A | Revised Issue | 4/12/25 |
| - | Original Issue | - |


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Drawing Status: FOR SUBMISSION

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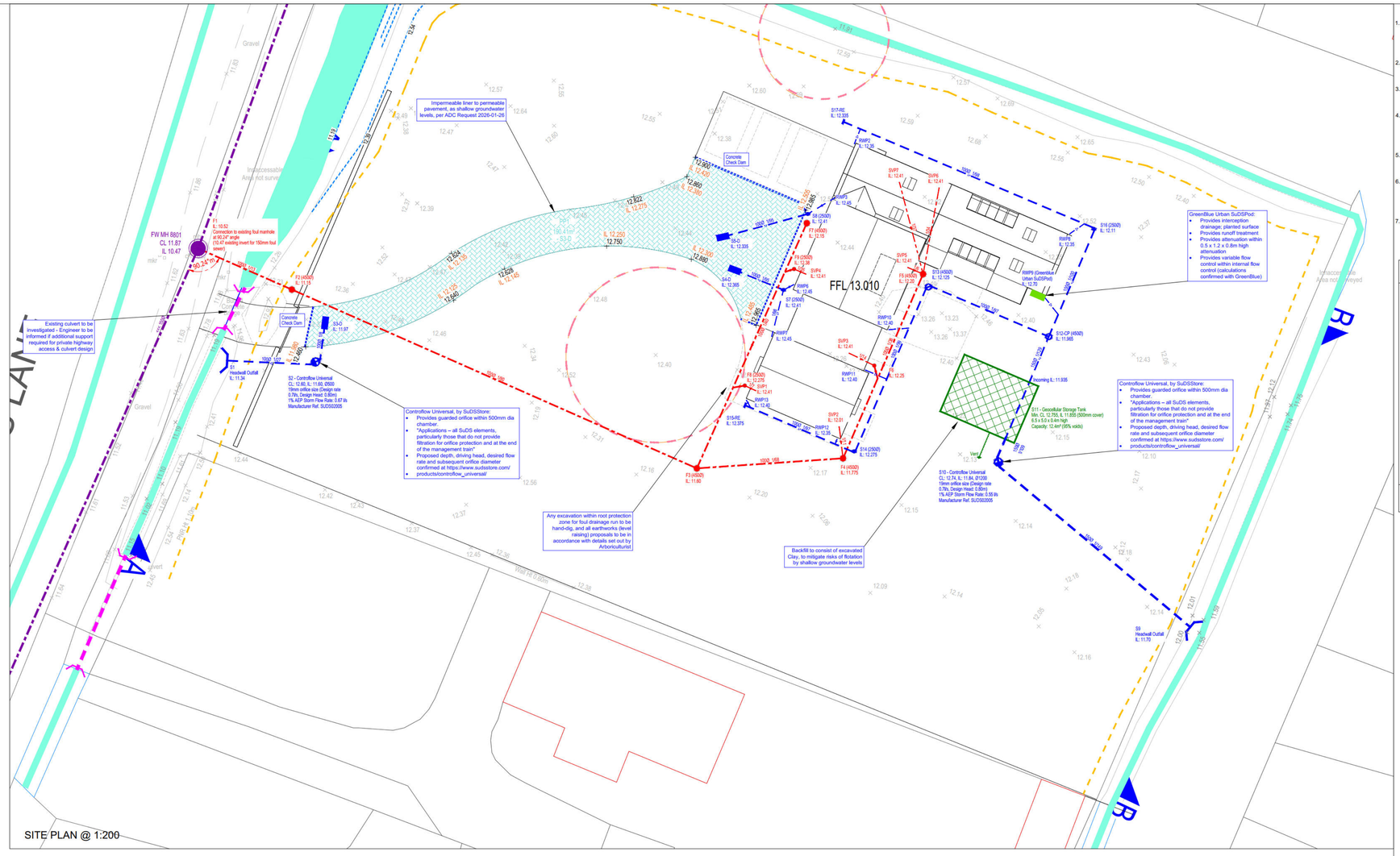
Project: Land East of Northfields Lane, Westergate PO20 3UH

Drawing Title: Manhole & Impermeable Areas Schedules

| Scale | Date | Drawn By | Checked By |
|---|---|---|---|
| As Shown | Dec '25 | DJL | - |

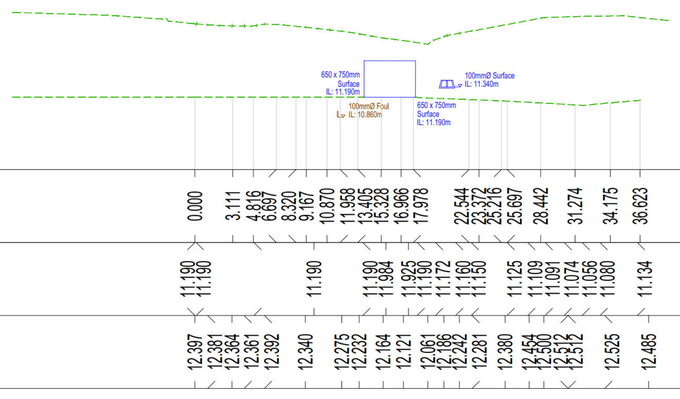
Drawing No.: 2025-C109-005

Rev.: A




# A-A

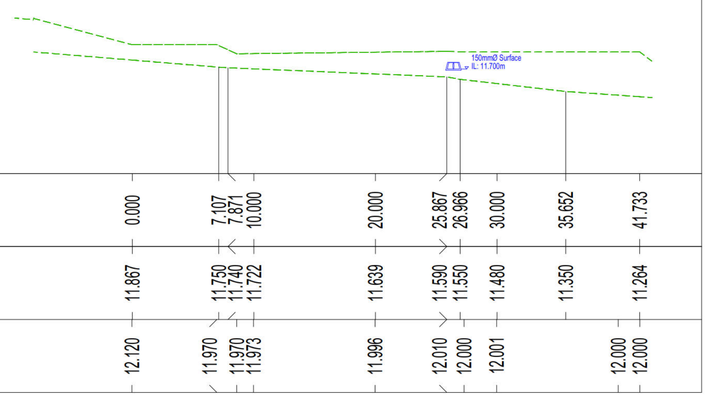
Vertical Exaggeration: 5
Datum: 10.000M AOD




| | |
|---|---|
| EXISTING CHAINAGE (m) | 0.000 3.111 4.816 6.697 8.320 9.167 10.870 11.958 13.405 15.328 16.966 17.978 22.544 23.372 25.216 25.697 28.442 31.274 34.175 36.623 |
| Watercourse Invert Levels (m) | 11.190 11.190 11.190 11.190 11.984 11.925 11.190 11.172 11.160 11.150 11.125 11.109 11.091 11.074 11.056 11.080 11.134 |
| Top of Bank Levels (m) | 12.397 12.381 12.364 12.361 12.392 12.340 12.275 12.232 12.164 12.121 12.061 12.196 12.242 12.281 12.380 12.454 12.500 12.512 12.512 12.525 12.485 |

# B-B

Vertical Exaggeration: 5
Datum: 10.000M AOD




| | |
|---|---|
| EXISTING CHAINAGE (m) | 0.000 7.107 7.871 10.000 20.000 25.867 26.966 30.000 35.652 41.733 |
| Watercourse Invert Levels (m) | 11.867 11.750 11.740 11.722 11.639 11.590 11.550 11.480 11.350 11.264 |
| Top of Bank Levels (m) | 12.120 11.970 11.970 11.973 11.996 12.010 12.000 12.001 12.000 12.000 |

**A1**

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| Rev. | Amendments | Date |
|---|---|---|
| C | Revised Issue | 3/2/26 |
| B | Revised Issue | 9/1/26 |
| A | Revised Issue | 4/12/25 |
| - | Original Issue | - |

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Registered in England No: 16608131


Drawing Status: FOR SUBMISSION

Client: Domusea Northfields Limited

Project: Land East of Northfields Lane, Westergate PO20 3UH

Drawing Title: Watercourse Long Sections

| Scale | Date | Drawn By | Checked By |
|---|---|---|---|
| As Shown | Feb '26 | DJL | CT |

Drawing No.: 2025-C109-006

Rev.: C

# APPENDICES

## Appendix A Greenfield Runoff Calculation

# Greenfield runoff rate estimation tool

www.uksuds.com | Greenfield runoff rate estimation tool (https://www.uksuds.com/)

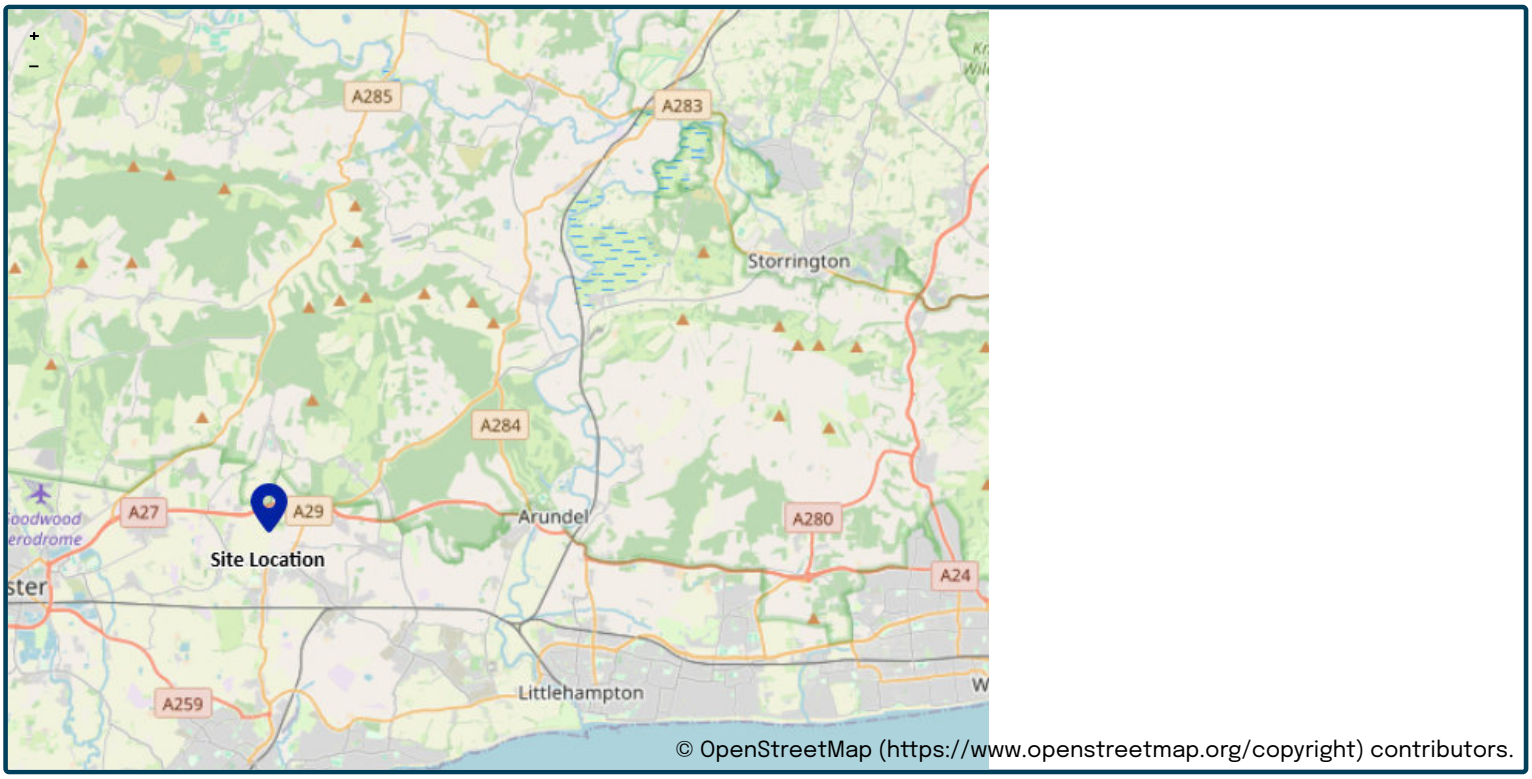
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

## Project details

| | |
|---|---|
| Date | 02/02/2026 |
| Calculated by | DL |
| Reference | C109 |
| Model version | 2.2.2 |

## Location

| | |
|---|---|
| Site name | Northfields |
| Site location | Westergate |




| | |
|---|---|
| Site easting (British National Grid) | 493930 |
| Site northing (British National Grid) | 105843 |

## Site details

| | |
|---|---|
| Total site area (ha) | 0.39 ha |

# Greenfield runoff

## Method

| | |
|---|---|
| Method | IH124 |

## IH124

| | My value | | Map value |
|---|---|---|---|
| SAAR (mm) | 760 mm | | 760 |
| How should SPR be derived? | WRAP soil type | | |
| WRAP soil type | 2 | | 2 |
| SPR | 0.3 | | |
| QBar (IH124) (l/s) | 0.8 l/s | | |

## Growth curve factors

| | My value | | Map value |
|---|---|---|---|
| Hydrological region | 7 | | 7 |
| 1 year growth factor | 0.85 | | |
| 2 year growth factor | 0.88 | | |
| 10 year growth factor | 1.62 | | |
| 30 year growth factor | 2.3 | | |
| 100 year growth factor | 3.19 | | |
| 200 year growth factor | 3.74 | | |

## Results

| | |
|---|---|
| Method | IH124 |
| Flow rate 1 year (l/s) | 0.7 l/s |
| Flow rate 2 year (l/s) | 0.7 l/s |
| Flow rate 10 years (l/s) | 1.3 l/s |
| Flow rate 30 years (l/s) | 1.8 l/s |
| Flow rate 100 years (l/s) | 2.5 l/s |
| Flow rate 200 years (l/s) | 2.9 l/s |

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

### Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.2) developed by HR Wallingford and available at uksuds.com (https://www.uksuds.com/). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (https://www.uksuds.com/terms-conditions). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

**Appendix B** Groundwater Flotation Calculations (Tank)

HARBOURSTONE DESIGN

**Project No:** C109
**Project Name:** Land East of Northfields Lane
**Sheet No:** 1 Node / System

## GEOCELLULAR STORAGE TANK HYDROSTATIC UPLIFT ANALYSIS FOR SOFT GROUND

Level Data:

| | | |
|---|---|---|
| Ground Level = | 12.75 | m |
| Depth to Groundwater = | 0.6 | m |
| Invert of Tank = | 11.855 | m |
| Top Level of Tank = | **12.255** | **m** |
| Depth of Penetration in groundwater = | 0.30 | m |
| **Hydrostatic Uplift** | **2.95** | **kN/m²** |
| Factor of Safety = | 1.2 | |
| **Min' downward force required =** | **3.54** | **kN/m²** |

| | | |
|---|---|---|
| Height of Tank = | 400 | mm |
| (Existing ground level) **TOTAL =** | **400** | **mm** |

Thickness of surfacing above Tank:

| | | |
|---|---|---|
| Soil = | 400 | mm |
| Clay = | 0 | mm |
| **TOTAL =** | **400** | **mm** |

(Minus sand bedding surround from total surfacing above tank)

Densities:

| | | |
|---|---|---|
| Top Soil = | 15.7 | kN/m³ |
| Clay = | 22 | kN/m³ |

| | | |
|---|---|---|
| Weight of Topsoil = | 6.28 | kN/m² |
| Weight of Clay = | 0.00 | kN/m² |

**Downward force of layers over liner=** **6.28** **kN/m²**

**Make-up over TANK OK**

# Appendix C Hydraulic Modelling Calculations

## Simulation Settings

FEH2022 (point): Filename=FEH_Point_Descriptors_493934_105827_v5_1_0.xml

Summer (Cv: 1.00), Winter (Cv: 1.00)

Global Time of Entry: 5.0 mins

Durations (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Periods (yrs) + Climate Change: (1, +0%), (10, +35%), (30, +35%), (100, +45%)

Manhole Flood Risk Freeboard: 0.300m

## Simulated Rainfall Events

| Storm | Average Intensity (mm/hr) | Runoff Continuity % | Flow Continuity % | Storm | Average Intensity (mm/hr) | Runoff Continuity % | Flow Continuity % |
|---|---|---|---|---|---|---|---|
| 1Yr 15Min Winter | 15.653 | 0.00 | 0.00 | 30Yr+35% 15Min Summer | 110.177 | 0.00 | 2.75 |
| 1Yr 15Min Summer | 15.653 | 0.00 | 0.00 | 30Yr+35% 15Min Winter | 110.177 | 0.00 | 2.77 |
| 1Yr 30Min Winter | 10.370 | 0.00 | 0.00 | 30Yr+35% 30Min Summer | 73.477 | 0.00 | 2.36 |
| 1Yr 30Min Summer | 10.370 | 0.00 | 0.00 | 30Yr+35% 30Min Winter | 73.477 | 0.00 | 2.36 |
| 1Yr 60Min Winter | 6.643 | 0.00 | 0.00 | 30Yr+35% 60Min Summer | 46.696 | 0.00 | 1.77 |
| 1Yr 60Min Summer | 6.643 | 0.00 | 0.00 | 30Yr+35% 60Min Winter | 46.696 | 0.00 | 1.76 |
| 1Yr 120Min Summer | 5.343 | 0.00 | 0.00 | 30Yr+35% 120Min Summer | 28.564 | 0.00 | 1.17 |
| 1Yr 120Min Winter | 5.343 | 0.00 | 0.00 | 30Yr+35% 120Min Winter | 28.564 | 0.00 | 1.17 |
| 1Yr 180Min Summer | 4.504 | 0.00 | 0.00 | 30Yr+35% 180Min Summer | 21.155 | 0.00 | 0.00 |
| 1Yr 180Min Winter | 4.504 | 0.00 | 0.00 | 30Yr+35% 180Min Winter | 21.155 | 0.00 | 0.00 |
| 1Yr 240Min Summer | 3.726 | 0.00 | 0.00 | 30Yr+35% 240Min Summer | 16.967 | 0.00 | 0.00 |
| 1Yr 240Min Winter | 3.726 | 0.00 | 0.00 | 30Yr+35% 240Min Winter | 16.967 | 0.00 | 0.00 |
| 1Yr 360Min Summer | 2.902 | 0.00 | 0.00 | 30Yr+35% 360Min Summer | 12.320 | 0.00 | 0.00 |
| 1Yr 360Min Winter | 2.902 | 0.00 | 0.00 | 30Yr+35% 360Min Winter | 12.320 | 0.00 | 0.00 |
| 1Yr 480Min Summer | 2.418 | 0.00 | 0.00 | 30Yr+35% 480Min Summer | 9.778 | 0.00 | 0.00 |
| 1Yr 480Min Winter | 2.418 | 0.00 | 0.00 | 30Yr+35% 480Min Winter | 9.778 | 0.00 | 0.00 |
| 1Yr 600Min Summer | 2.065 | 0.00 | 0.00 | 30Yr+35% 600Min Summer | 8.147 | 0.00 | 0.00 |
| 1Yr 600Min Winter | 2.065 | 0.00 | 0.00 | 30Yr+35% 600Min Winter | 8.147 | 0.00 | 0.00 |
| 1Yr 720Min Winter | 1.802 | 0.00 | 0.00 | 30Yr+35% 720Min Summer | 7.002 | 0.00 | 0.00 |
| 1Yr 720Min Summer | 1.802 | 0.00 | 0.00 | 30Yr+35% 720Min Winter | 7.002 | 0.00 | 0.00 |
| 1Yr 960Min Summer | 1.455 | 0.00 | 0.00 | 30Yr+35% 960Min Summer | 5.511 | 0.00 | 0.00 |
| 1Yr 960Min Winter | 1.455 | 0.00 | 0.00 | 30Yr+35% 960Min Winter | 5.511 | 0.00 | 0.00 |
| 1Yr 1440Min Summer | 1.096 | 0.00 | 0.00 | 30Yr+35% 1440Min Summer | 3.944 | 0.00 | 0.00 |
| 1Yr 1440Min Winter | 1.096 | 0.00 | 0.00 | 30Yr+35% 1440Min Winter | 3.944 | 0.00 | 0.00 |
| 10Yr+35% 15Min Summer | 85.192 | 0.00 | 3.31 | 100Yr+45% 15Min Summer | 148.603 | 0.00 | 2.69 |
| 10Yr+35% 15Min Winter | 85.192 | 0.00 | 3.35 | 100Yr+45% 15Min Winter | 148.603 | 0.00 | 2.68 |
| 10Yr+35% 30Min Summer | 56.204 | 0.00 | 2.58 | 100Yr+45% 30Min Summer | 99.595 | 0.00 | 2.46 |
| 10Yr+35% 30Min Winter | 56.204 | 0.00 | 2.58 | 100Yr+45% 30Min Winter | 99.595 | 0.00 | 2.46 |
| 10Yr+35% 60Min Summer | 35.559 | 0.00 | 1.94 | 100Yr+45% 60Min Summer | 63.976 | 0.00 | 1.99 |
| 10Yr+35% 60Min Winter | 35.559 | 0.00 | 1.94 | 100Yr+45% 60Min Winter | 63.976 | 0.00 | 1.99 |
| 10Yr+35% 120Min Winter | 22.362 | 0.00 | 0.26 | 100Yr+45% 120Min Summer | 38.349 | 0.00 | 1.23 |
| 10Yr+35% 120Min Summer | 22.362 | 0.00 | 0.30 | 100Yr+45% 120Min Winter | 38.349 | 0.00 | 1.23 |
| 10Yr+35% 180Min Summer | 16.811 | 0.00 | 0.00 | 100Yr+45% 180Min Summer | 28.108 | 0.00 | 0.62 |
| 10Yr+35% 180Min Winter | 16.811 | 0.00 | 0.00 | 100Yr+45% 180Min Winter | 28.108 | 0.00 | 0.57 |
| 10Yr+35% 240Min Summer | 13.540 | 0.00 | 0.00 | 100Yr+45% 240Min Summer | 22.587 | 0.00 | -0.25 |
| 10Yr+35% 240Min Winter | 13.540 | 0.00 | 0.00 | 100Yr+45% 240Min Winter | 22.587 | 0.00 | -0.38 |
| 10Yr+35% 360Min Summer | 9.904 | 0.00 | 0.00 | 100Yr+45% 360Min Summer | 16.413 | 0.00 | 0.00 |
| 10Yr+35% 360Min Winter | 9.904 | 0.00 | 0.00 | 100Yr+45% 360Min Winter | 16.413 | 0.00 | -0.17 |
| 10Yr+35% 480Min Summer | 7.896 | 0.00 | 0.00 | 100Yr+45% 480Min Summer | 13.030 | 0.00 | 0.00 |
| 10Yr+35% 480Min Winter | 7.896 | 0.00 | 0.00 | 100Yr+45% 480Min Winter | 13.030 | 0.00 | 0.00 |
| 10Yr+35% 600Min Winter | 6.592 | 0.00 | 0.00 | 100Yr+45% 600Min Summer | 10.871 | 0.00 | 0.00 |
| 10Yr+35% 600Min Summer | 6.592 | 0.00 | 0.00 | 100Yr+45% 600Min Winter | 10.871 | 0.00 | 0.00 |
| 10Yr+35% 720Min Summer | 5.672 | 0.00 | 0.00 | 100Yr+45% 720Min Summer | 9.359 | 0.00 | 0.00 |
| 10Yr+35% 720Min Winter | 5.672 | 0.00 | 0.00 | 100Yr+45% 720Min Winter | 9.359 | 0.00 | 0.00 |
| 10Yr+35% 960Min Summer | 4.477 | 0.00 | 0.00 | 100Yr+45% 960Min Summer | 7.377 | 0.00 | 0.00 |
| 10Yr+35% 960Min Winter | 4.477 | 0.00 | 0.00 | 100Yr+45% 960Min Winter | 7.377 | 0.00 | 0.00 |
| 10Yr+35% 1440Min Summer | 3.220 | 0.00 | 0.00 | 100Yr+45% 1440Min Winter | 5.271 | 0.00 | 0.00 |
| 10Yr+35% 1440Min Winter | 3.220 | 0.00 | 0.00 | 100Yr+45% 1440Min Summer | 5.271 | 0.00 | 0.00 |

# Network Details

## Manhole Schedule

| Manhole | Catchment Area (ha) | Size (mm) | Type | CL (m) | IL (m) | Depth To Soffit (m) | Easting (m) | Northing (m) |
|---|---|---|---|---|---|---|---|---|
| RWP3 | 0.005 | 180 | Type E | 13.010 | 12.450 | 0.460 | 493942.452 | 105842.423 |
| S8 | 0.000 | 250 | 250 Inspection | 12.987 | 12.410 | 0.477 | 493940.264 | 105841.120 |
| S5-D | 0.000 | 1000x500 | Type E | 12.906 | 12.335 | 0.471 | 493933.388 | 105839.264 |
| RWP7 | 0.000 | 180 | Type E | 12.979 | 12.450 | 0.429 | 493937.339 | 105831.186 |
| RWP6 | 0.000 | 180 | Type E | 12.993 | 12.450 | 0.443 | 493939.153 | 105835.405 |
| S7 | 0.000 | 250 | 250 Inspection | 12.984 | 12.410 | 0.474 | 493938.295 | 105834.969 |
| S4-D | 0.000 | 1000x500 | Type E | 12.929 | 12.365 | 0.464 | 493934.354 | 105836.587 |
| S3-D | 0.028 | 1000x500 | Type E | 12.444 | 11.970 | 0.374 | 493900.648 | 105832.028 |
| S2 | 0.000 | 500 | Unknown | 12.600 | 11.600 | 0.900 | 493900.404 | 105829.137 |
| S1 | 0.000 | --- | Type E | 11.864 | 11.340 | 0.424 | 493893.257 | 105829.242 |

## Pipe Schedule

| Pipe Number | US Manhole | US IL (m) | DS Manhole | DS IL (m) | Shape | Dimension (mm) | Length (m) | Gradient (1:x) | Roughness (mm) | US Depth To Soffit (m) | DS Depth To Soffit (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | RWP3 | 12.450 | S8 | 12.410 | Circ | 100 | 2.547 | 64 | 0.600 | 0.460 | 0.477 |
| 1.001 | S8 | 12.410 | S5-D | 12.335 | Circ | 100 | 7.122 | 95 | 0.600 | 0.477 | 0.471 |
| 1.002 | S5-D | 12.335 | S3-D | 11.970 | Circ | 100 | 33.530 | 92 | 0.600 | 0.471 | 0.374 |
| 2.000 | RWP7 | 12.450 | S7 | 12.410 | Circ | 100 | 3.902 | 98 | 0.600 | 0.429 | 0.474 |
| 3.000 | RWP6 | 12.450 | S7 | 12.410 | Circ | 100 | 0.963 | 24 | 0.600 | 0.443 | 0.474 |
| 2.001 | S7 | 12.410 | S4-D | 12.365 | Circ | 100 | 4.260 | 95 | 0.600 | 0.474 | 0.464 |
| 2.002 | S4-D | 12.365 | S3-D | 11.970 | Circ | 100 | 34.013 | 86 | 0.600 | 0.464 | 0.374 |
| 1.003 | S3-D | 11.970 | S2 | 11.600 | Circ | 100 | 2.901 | 8 | 0.600 | 0.374 | 0.900 |
| 1.004 | S2 | 11.600 | S1 | 11.340 | Circ | 100 | 7.148 | 27 | 0.600 | 0.900 | 0.424 |

## Permeable Paving Schedule

| Permeable Paving | Assigned Manhole | Effective Storage Volume (m3) | CL (m) | IL (m) | Storage Infil Rate (m/hr) | Safety Factor | Easting (m) | Northing (m) |
|---|---|---|---|---|---|---|---|---|
| PP1 | S3-D | 19.993 | 12.444 | 11.964 | 0.00000000 | 2.00 | 493934.807 | 105839.708 |

# Outfall Details

## Outfall Manhole S1 : Surcharged (Constant Level)

### Surcharged Constant

| Water Elevation (m) | Water Depth (m) |
|---|---|
| 11.560 | 0.220 |

# Flow Control Details

## Controls within Manhole S2

## Orifice Control

| Invert Offset (m) | Orifice Diameter (m) | Discharge Coeff |
|---|---|---|
| 0.000 | 0.019 | 0.600 |

# Simulation Results

Return Period (yrs) + Climate Change (%):

1yr+0%

## Manholes

| Manhole | Critical Storm | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Flood (m3) | Status |
|---|---|---|---|---|---|---|---|
| RWP3 | 15 min Summer | 8 | 12.466 | 0.016 | 0.437 | | OK |
| S8 | 15 min Summer | 9 | 12.427 | 0.017 | 0.425 | | OK |
| S5-D | 15 min Summer | 10 | 12.354 | 0.019 | 0.397 | | OK |
| RWP7 | 15 min Winter | 0 | 12.450 | 0.000 | 0.000 | | OK |
| RWP6 | 15 min Winter | 0 | 12.450 | 0.000 | 0.000 | | OK |
| S7 | 15 min Winter | 0 | 12.410 | 0.000 | 0.000 | | OK |
| S4-D | 15 min Winter | 0 | 12.365 | 0.000 | 0.000 | | OK |
| S3-D | 360 min Summer | 216 | 11.991 | 0.021 | 0.419 | | OK |
| S2 | 360 min Summer | 215 | 11.998 | 0.398 | 0.354 | | Surcharged |
| S1 | 15 min Winter | 0 | 11.560 | 0.220 | 0.000 | | Outfall |

## Conduits

| Pipe No. | Critical Storm | Peak (mins) | US Manhole | DS Manhole | Flow Depth (m) | Max Velocity (m/s) | Max Flow (l/s) | Flow / Capacity | Status |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 15 min Summer | 8 | RWP3 | S8 | 0.017 | 0.496 | 0.428 | 0.057 | OK |
| 1.001 | 15 min Summer | 9 | S8 | S5-D | 0.018 | 0.460 | 0.430 | 0.070 | OK |
| 1.002 | 360 min Summer | 216 | S5-D | S3-D | 0.014 | 0.388 | 0.148 | 0.024 | OK |
| 2.000 | 15 min Winter | 0 | RWP7 | S7 | 0.000 | 0.000 | 0.000 | 0.000 | OK |
| 3.000 | 15 min Winter | 0 | RWP6 | S7 | 0.000 | 0.000 | 0.000 | 0.000 | OK |
| 2.001 | 15 min Winter | 0 | S7 | S4-D | 0.000 | 0.000 | 0.000 | 0.000 | OK |
| 2.002 | 360 min Summer | 216 | S4-D | S3-D | 0.011 | 0.000 | 0.000 | 0.000 | OK |
| 1.003 | 360 min Summer | 226 | S3-D | S2 | 0.061 | 0.334 | 1.606 | 0.074 | OK |
| 1.004 | 360 min Summer | 220 | S2 | S1 | 0.057 | 0.101 | 0.465 | 0.040 | OK |

## Permeable Paving Storage

| Permeable Paving | Critical Storm | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Flood (m3) | Surface Runoff (m3) | Status |
|---|---|---|---|---|---|---|---|---|
| PP1 | 360 min Summer | 215 | 11.995 | 0.032 | 0.406 | | | OK |

Return Period (yrs) + Climate Change (%):

10yr+35%

## Manholes

| Manhole | Critical Storm | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Flood (m3) | Status |
|---|---|---|---|---|---|---|---|
| RWP3 | 15 min Summer | 8 | 12.491 | 0.041 | 2.374 | | OK |
| S8 | 15 min Summer | 8 | 12.453 | 0.043 | 2.353 | | OK |
| S5-D | 15 min Summer | 9 | 12.382 | 0.047 | 2.317 | | OK |
| RWP7 | 15 min Summer | 0 | 12.450 | 0.000 | 0.000 | | OK |
| RWP6 | 15 min Summer | 0 | 12.450 | 0.000 | 0.000 | | OK |
| S7 | 15 min Summer | 0 | 12.410 | 0.000 | 0.000 | | OK |
| S4-D | 15 min Summer | 0 | 12.365 | 0.000 | 0.000 | | OK |
| S3-D | 240 min Winter | 200 | 12.152 | 0.182 | 0.552 | | Flood Risk |
| S2 | 240 min Winter | 200 | 12.152 | 0.552 | 0.552 | | Surcharged |
| S1 | 15 min Summer | 0 | 11.560 | 0.220 | 0.000 | | Outfall |

## Conduits

| Pipe No. | Critical Storm | Peak (mins) | US Manhole | DS Manhole | Flow Depth (m) | Max Velocity (m/s) | Max Flow (l/s) | Flow / Capacity | Status |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 15 min Summer | 8 | RWP3 | S8 | 0.042 | 0.761 | 2.353 | 0.310 | OK |
| 1.001 | 15 min Summer | 9 | S8 | S5-D | 0.045 | 0.693 | 2.330 | 0.377 | OK |
| 1.002 | 120 min Summer | 68 | S5-D | S3-D | 0.062 | 0.611 | 1.081 | 0.172 | OK |
| 2.000 | 15 min Summer | 0 | RWP7 | S7 | 0.000 | 0.000 | 0.000 | 0.000 | OK |
| 3.000 | 15 min Summer | 0 | RWP6 | S7 | 0.000 | 0.000 | 0.000 | 0.000 | OK |
| 2.001 | 15 min Summer | 0 | S7 | S4-D | 0.000 | 0.000 | 0.000 | 0.000 | OK |
| 2.002 | 30 min Summer | 28 | S4-D | S3-D | 0.050 | 0.000 | 0.000 | 0.000 | OK |
| 1.003 | 60 min Summer | 40 | S3-D | S2 | 0.100 | 0.881 | 2.625 | 0.120 | Surcharged |
| 1.004 | 240 min Winter | 200 | S2 | S1 | 0.057 | 0.119 | 0.552 | 0.048 | OK |

## Permeable Paving Storage

| Permeable Paving | Critical Storm | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Flood (m3) | Surface Runoff (m3) | Status |
|---|---|---|---|---|---|---|---|---|
| PP1 | 240 min Winter | 200 | 12.153 | 0.189 | 0.472 | | | OK |

Return Period (yrs) + Climate Change (%):

30yr+35%

## Manholes

| Manhole | Critical Storm | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Flood (m3) | Status |
|---|---|---|---|---|---|---|---|
| RWP3 | 15 min Summer | 8 | 12.497 | 0.047 | 3.070 | | OK |
| S8 | 15 min Summer | 8 | 12.460 | 0.050 | 3.044 | | OK |
| S5-D | 15 min Summer | 9 | 12.389 | 0.054 | 2.992 | | OK |
| RWP7 | 15 min Summer | 0 | 12.450 | 0.000 | 0.000 | | OK |
| RWP6 | 15 min Summer | 0 | 12.450 | 0.000 | 0.000 | | OK |
| S7 | 15 min Summer | 0 | 12.410 | 0.000 | 0.000 | | OK |
| S4-D | 15 min Summer | 0 | 12.365 | 0.000 | 0.000 | | OK |
| S3-D | 240 min Winter | 214 | 12.216 | 0.246 | 0.584 | | Flood Risk |
| S2 | 240 min Winter | 214 | 12.216 | 0.616 | 0.584 | | Surcharged |
| S1 | 15 min Summer | 0 | 11.560 | 0.220 | 0.000 | | Outfall |

## Conduits

| Pipe No. | Critical Storm | Peak (mins) | US Manhole | DS Manhole | Flow Depth (m) | Max Velocity (m/s) | Max Flow (l/s) | Flow / Capacity | Status |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 15 min Summer | 8 | RWP3 | S8 | 0.049 | 0.803 | 3.044 | 0.402 | OK |
| 1.001 | 15 min Summer | 9 | S8 | S5-D | 0.052 | 0.738 | 3.015 | 0.487 | OK |
| 1.002 | 120 min Summer | 63 | S5-D | S3-D | 0.065 | 0.589 | 1.381 | 0.220 | OK |
| 2.000 | 15 min Summer | 0 | RWP7 | S7 | 0.000 | 0.000 | 0.000 | 0.000 | OK |
| 3.000 | 15 min Summer | 0 | RWP6 | S7 | 0.000 | 0.000 | 0.000 | 0.000 | OK |
| 2.001 | 15 min Summer | 0 | S7 | S4-D | 0.000 | 0.000 | 0.000 | 0.000 | OK |
| 2.002 | 15 min Summer | 18 | S4-D | S3-D | 0.050 | 0.000 | 0.000 | 0.000 | OK |
| 1.003 | 30 min Summer | 22 | S3-D | S2 | 0.100 | 1.071 | 2.655 | 0.122 | Surcharged |
| 1.004 | 240 min Winter | 214 | S2 | S1 | 0.058 | 0.125 | 0.584 | 0.050 | OK |

## Permeable Paving Storage

| Permeable Paving | Critical Storm | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Flood (m3) | Surface Runoff (m3) | Status |
|---|---|---|---|---|---|---|---|---|
| PP1 | 240 min Winter | 214 | 12.217 | 0.253 | 0.486 | | | OK |

Return Period (yrs) + Climate Change (%):

100yr+45%

## Manholes

| Manhole | Critical Storm | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Flood (m3) | Status |
|---|---|---|---|---|---|---|---|
| RWP3 | 15 min Summer | 8 | 12.508 | 0.058 | 4.142 | | OK |
| S8 | 15 min Summer | 8 | 12.470 | 0.060 | 4.105 | | OK |
| S5-D | 240 min Winter | 225 | 12.410 | 0.075 | 0.095 | | OK |
| RWP7 | 15 min Summer | 0 | 12.450 | 0.000 | 0.000 | | OK |
| RWP6 | 15 min Summer | 0 | 12.450 | 0.000 | 0.000 | | OK |
| S7 | 240 min Winter | 224 | 12.410 | 0.000 | 0.000 | | OK |
| S4-D | 240 min Winter | 223 | 12.410 | 0.045 | 0.000 | | OK |
| S3-D | 240 min Winter | 224 | 12.410 | 0.440 | 0.670 | | Flood Risk |
| S2 | 240 min Winter | 224 | 12.410 | 0.810 | 0.671 | | Flood Risk |
| S1 | 15 min Summer | 0 | 11.560 | 0.220 | 0.000 | | Outfall |

## Conduits

| Pipe No. | Critical Storm | Peak (mins) | US Manhole | DS Manhole | Flow Depth (m) | Max Velocity (m/s) | Max Flow (l/s) | Flow / Capacity | Status |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 15 min Summer | 8 | RWP3 | S8 | 0.059 | 0.849 | 4.105 | 0.542 | OK |
| 1.001 | 15 min Summer | 8 | S8 | S5-D | 0.062 | 0.803 | 4.064 | 0.657 | OK |
| 1.002 | 240 min Winter | 225 | S5-D | S3-D | 0.088 | 0.459 | 0.739 | 0.117 | OK |
| 2.000 | 240 min Winter | 224 | RWP7 | S7 | 0.000 | 0.000 | 0.000 | 0.000 | OK |
| 3.000 | 240 min Winter | 224 | RWP6 | S7 | 0.000 | 0.000 | 0.000 | 0.000 | OK |
| 2.001 | 240 min Winter | 224 | S7 | S4-D | 0.023 | 0.000 | 0.000 | 0.000 | OK |
| 2.002 | 240 min Winter | 243 | S4-D | S3-D | 0.073 | 0.024 | 0.113 | 0.017 | OK |
| 1.003 | 15 min Winter | 15 | S3-D | S2 | 0.100 | 1.248 | 3.046 | 0.140 | Surcharged |
| 1.004 | 240 min Winter | 224 | S2 | S1 | 0.058 | 0.142 | 0.671 | 0.058 | OK |

## Permeable Paving Storage

| Permeable Paving | Critical Storm | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Flood (m3) | Surface Runoff (m3) | Status |
|---|---|---|---|---|---|---|---|---|
| PP1 | 240 min Winter | 224 | 12.411 | 0.447 | 0.579 | | | Flood Risk |

# Network Details

## Manhole Schedule

| Manhole | Catchment Area (ha) | Size (mm) | Type | CL (m) | IL (m) | Depth To Soffit (m) | Easting (m) | Northing (m) |
|---|---|---|---|---|---|---|---|---|
| S15-RE | 0.004 | 100 | Unknown | 12.831 | 12.375 | 0.356 | 493935.189 | 105825.624 |
| S14 | 0.008 | 250 | 250 Inspection | 12.818 | 12.275 | 0.443 | 493944.061 | 105821.794 |
| S13 | 0.000 | 450 | 450 Inspection | 12.843 | 12.125 | 0.618 | 493949.970 | 105835.377 |
| RWP2 | 0.000 | 180 | Type E | 12.860 | 12.350 | 0.410 | 493944.029 | 105846.791 |
| S17-RE | 0.000 | 100 | Unknown | 12.796 | 12.330 | 0.366 | 493944.349 | 105848.078 |
| RWP8 | 0.006 | 180 | Type E | 12.856 | 12.350 | 0.406 | 493961.506 | 105839.530 |
| S16 | 0.000 | 250 | 250 Inspection | 12.795 | 12.110 | 0.585 | 493963.532 | 105839.943 |
| RWP9 | 0.007 | 180 | Type E | 12.900 | 12.060 | 0.740 | 493959.085 | 105833.639 |
| S12-CP | 0.000 | 450 | 450 Inspection | 12.827 | 11.965 | 0.712 | 493959.775 | 105831.185 |
| S11-A | 0.000 | 180 | Type E | 12.767 | 11.935 | 0.682 | 493958.260 | 105827.621 |
| S11 | 0.000 | 180 | Type E | 12.749 | 11.855 | 0.744 | 493956.309 | 105823.016 |
| S10 | 0.000 | 500 | Unknown | 12.740 | 11.840 | 0.750 | 493955.659 | 105821.522 |
| S9 | 0.000 | --- | Type E | 11.959 | 11.700 | 0.109 | 493971.227 | 105807.662 |

## Pipe Schedule

| Pipe Number | US Manhole | US IL (m) | DS Manhole | DS IL (m) | Shape | Dimension (mm) | Length (m) | Gradient (1:x) | Roughness (mm) | US Depth To Soffit (m) | DS Depth To Soffit (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | S15-RE | 12.375 | S14 | 12.275 | Circ | 100 | 9.663 | 97 | 0.600 | 0.356 | 0.443 |
| 1.001 | S14 | 12.275 | S13 | 12.125 | Circ | 100 | 14.813 | 99 | 0.600 | 0.443 | 0.618 |
| 1.002 | S13 | 12.125 | S12-CP | 12.015 | Circ | 100 | 10.663 | 97 | 0.600 | 0.618 | 0.712 |
| 2.000 | RWP2 | 12.350 | S17-RE | 12.330 | Circ | 100 | 1.327 | 66 | 0.600 | 0.410 | 0.366 |
| 2.001 | S17-RE | 12.330 | S16 | 12.110 | Circ | 100 | 20.837 | 95 | 0.600 | 0.366 | 0.585 |
| 3.000 | RWP8 | 12.350 | S16 | 12.119 | Circ | 100 | 2.067 | 9 | 0.600 | 0.406 | 0.576 |
| 2.002 | S16 | 12.110 | S12-CP | 12.015 | Circ | 100 | 9.529 | 100 | 0.600 | 0.585 | 0.712 |
| 4.000 | RWP9 | 12.060 | S12-CP | 12.034 | Circ | 100 | 2.549 | 100 | 0.600 | 0.740 | 0.693 |
| 1.003 | S12-CP | 11.965 | S11-A | 11.935 | Circ | 150 | 3.873 | 129 | 0.600 | 0.712 | 0.682 |
| 1.004 | S11-A | 11.935 | S11 | 11.855 | Circ | 150 | 5.002 | 63 | 0.600 | 0.682 | 0.744 |
| 1.005 | S11 | 11.855 | S10 | 11.840 | Circ | 150 | 1.629 | 109 | 0.600 | 0.744 | 0.750 |
| 1.006 | S10 | 11.840 | S9 | 11.700 | Circ | 150 | 20.844 | 149 | 0.600 | 0.750 | 0.109 |

# Outfall Details

## Outfall Manhole S9 : Surcharged (Constant Level)

### Surcharged Constant

| Water Elevation (m) | Water Depth (m) |
|---|---|
| 12.000 | 0.300 |

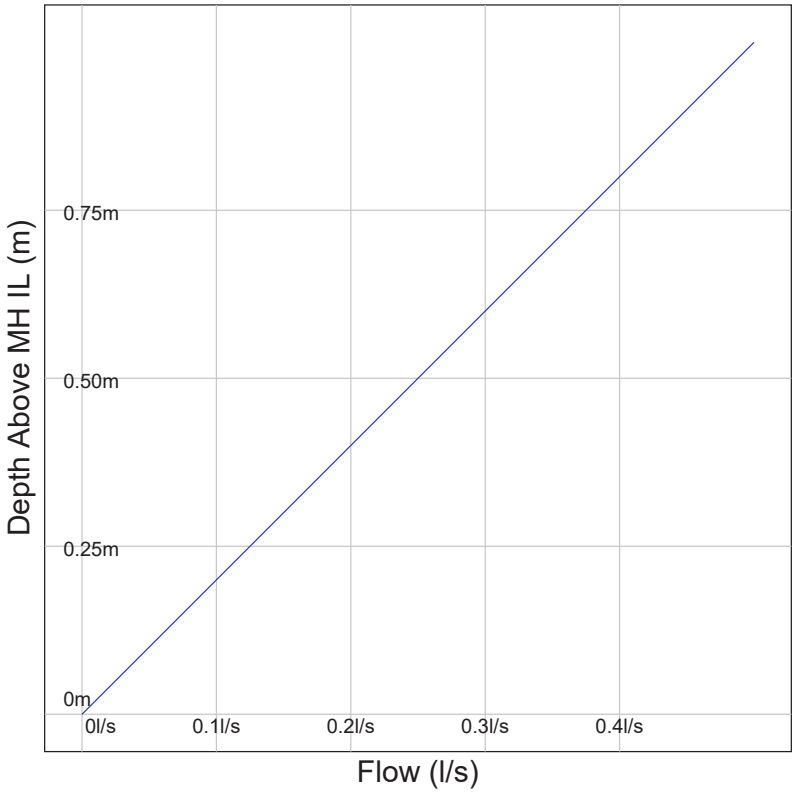
# Flow Control Details

## Controls within Manhole RWP9

### Depth/Flow Control

| Depth Above Manhole Invert (m) | Flow (l/s) |
|---|---|
| 0.000 | 0.000 |
| 1.000 | 0.500 |

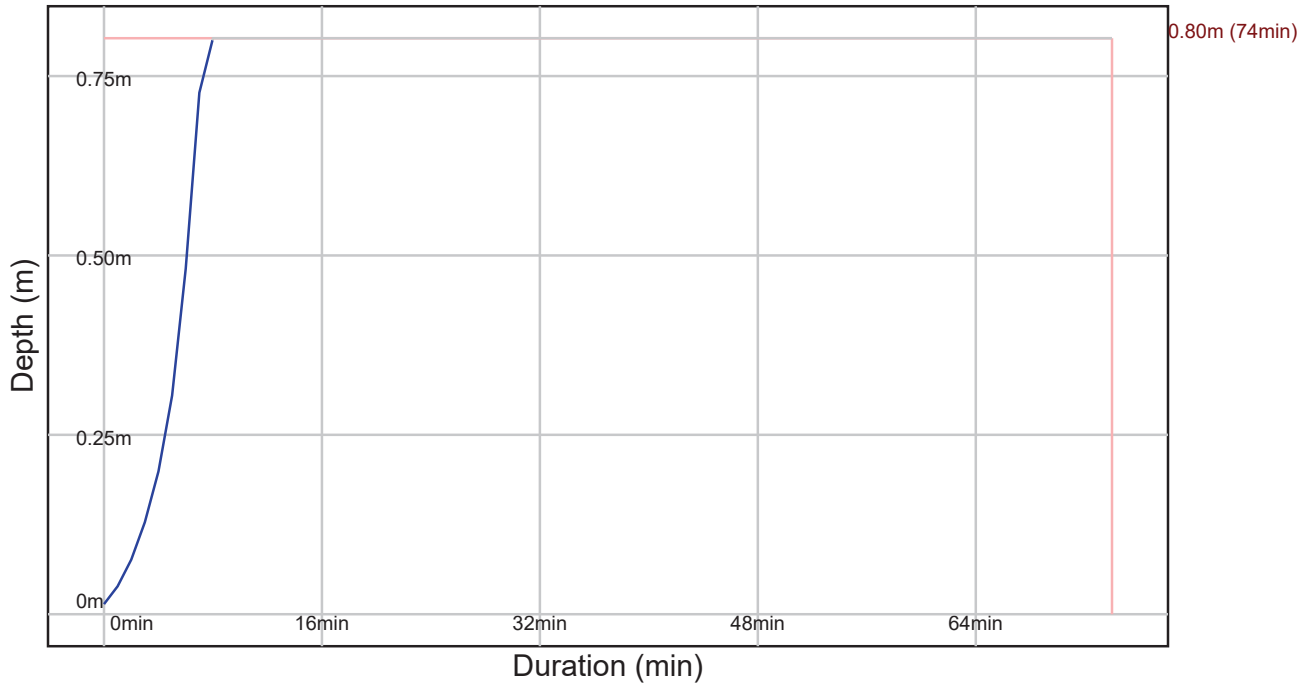
### Depth/Flow Control from RWP9 to S12-CP




## Tank Structure at Manhole RWP9

| Tank Invert (m) | Tank Height (m) | Porosity Ratio (%) | Area (m2) | Effective Area (m2) Area x Porosity Ratio | Max Storage (m3) Effective Area x Height | Infil Base (m/hr) | Infil Side (m/hr) | Safety Factor |
|---|---|---|---|---|---|---|---|---|
| 12.060 | 0.800 | 85.00 | 0.603 | 0.512 | 0.410 | 0.00000000 | 0.00000000 | 2.00 |

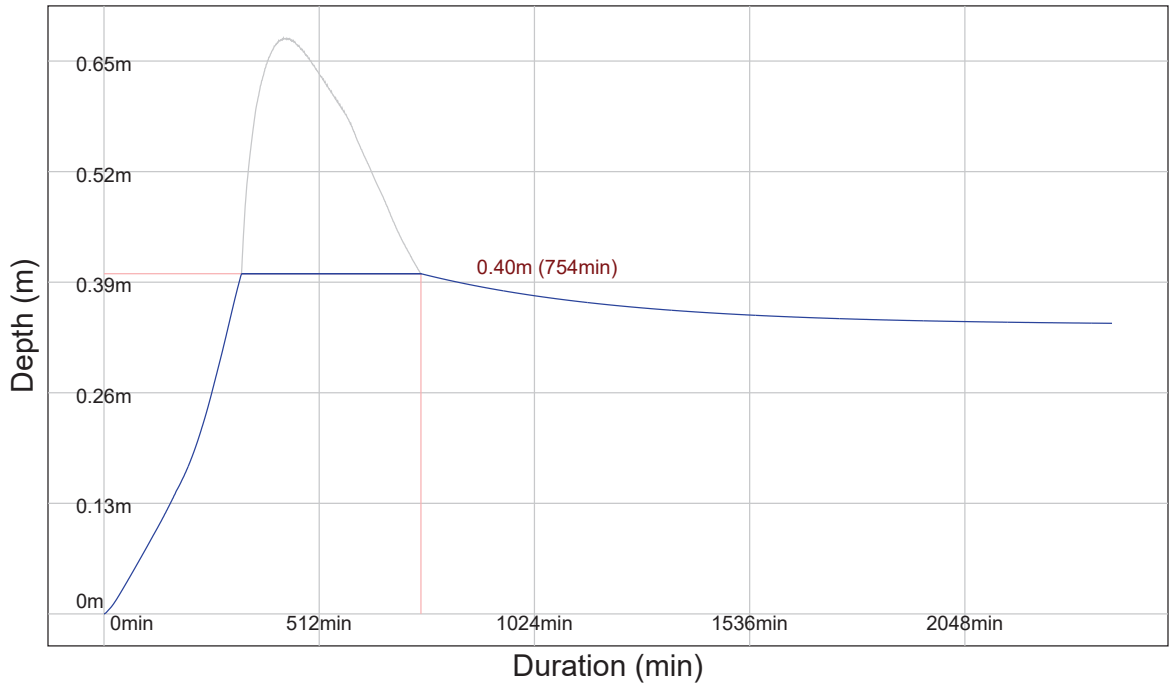
## Tank 2 at RWP9 (100Yr+45% 15Min Summer)




## Tank Structure at Manhole S11

| Tank Invert (m) | Tank Height (m) | Porosity Ratio (%) | Area (m2) | Effective Area (m2) Area x Porosity Ratio | Max Storage (m3) Effective Area x Height | Infil Base (m/hr) | Infil Side (m/hr) | Safety Factor |
|---|---|---|---|---|---|---|---|---|
| 11.855 | 0.400 | 95.00 | 32.515 | 30.890 | 12.356 | 0.00000000 | 0.00000000 | 1.00 |

## Tank 1 at S11 (100Yr+45% 600Min Winter)




## Controls within Manhole S10

## Orifice Control

| Invert Offset (m) | Orifice Diameter (m) | Discharge Coeff |
|---|---|---|
| 0.000 | 0.019 | 0.600 |

# Simulation Results

Return Period (yrs) + Climate Change (%):

1yr+0%

## Manholes

| Manhole | Critical Storm | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Flood (m3) | Status |
|---|---|---|---|---|---|---|---|
| S15-RE | 15 min Summer | 8 | 12.391 | 0.016 | 0.358 | | OK |
| S14 | 15 min Summer | 8 | 12.303 | 0.028 | 1.052 | | OK |
| S13 | 15 min Summer | 9 | 12.153 | 0.028 | 1.034 | | OK |
| RWP2 | 15 min Winter | 0 | 12.350 | 0.000 | 0.000 | | OK |
| S17-RE | 15 min Winter | 0 | 12.330 | 0.000 | 0.000 | | OK |
| RWP8 | 15 min Summer | 8 | 12.361 | 0.011 | 0.545 | | OK |
| S16 | 15 min Summer | 9 | 12.130 | 0.020 | 0.527 | | OK |
| RWP9 | 180 min Summer | 106 | 12.374 | 0.314 | 0.154 | | Surcharged |
| S12-CP | 960 min Summer | 584 | 12.048 | 0.083 | 0.165 | | OK |
| S11-A | 960 min Summer | 584 | 12.048 | 0.113 | 0.165 | | OK |
| S11 | 960 min Summer | 584 | 12.048 | 0.193 | 0.165 | | Surcharged |
| S10 | 960 min Summer | 584 | 12.048 | 0.208 | 0.165 | | Surcharged |
| S9 | 15 min Winter | 0 | 12.000 | 0.300 | 0.425 | | Outfall |

## Conduits

| Pipe No. | Critical Storm | Peak (mins) | US Manhole | DS Manhole | Flow Depth (m) | Max Velocity (m/s) | Max Flow (l/s) | Flow / Capacity | Status |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 15 min Summer | 8 | S15-RE | S14 | 0.022 | 0.273 | 0.348 | 0.057 | OK |
| 1.001 | 15 min Summer | 9 | S14 | S13 | 0.028 | 0.586 | 1.039 | 0.171 | OK |
| 1.002 | 15 min Summer | 9 | S13 | S12-CP | 0.028 | 0.589 | 1.041 | 0.170 | OK |
| 2.000 | 15 min Winter | 0 | RWP2 | S17-RE | 0.000 | 0.000 | 0.000 | 0.000 | OK |
| 2.001 | 15 min Summer | 9 | S17-RE | S16 | 0.010 | 0.000 | 0.000 | 0.000 | OK |
| 3.000 | 15 min Summer | 8 | RWP8 | S16 | 0.011 | 1.123 | 0.542 | 0.027 | OK |
| 2.002 | 15 min Summer | 9 | S16 | S12-CP | 0.020 | 0.480 | 0.534 | 0.089 | OK |
| 4.000 | 180 min Summer | 107 | RWP9 | S12-CP | 0.011 | 0.340 | 0.151 | 0.025 | OK |
| 1.003 | 960 min Summer | 584 | S12-CP | S11-A | 0.098 | 0.214 | 0.353 | 0.023 | OK |
| 1.004 | 960 min Summer | 584 | S11-A | S11 | 0.131 | 0.063 | 0.344 | 0.015 | OK |
| 1.005 | 960 min Summer | 572 | S11 | S10 | 0.150 | 0.009 | 0.165 | 0.010 | Surcharged |
| 1.006 | 15 min Summer | 1 | S10 | S9 | 0.150 | 0.024 | 0.425 | 0.029 | Surcharged |

Return Period (yrs) + Climate Change (%):

10yr+35%

## Manholes

| Manhole | Critical Storm | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Flood (m3) | Status |
|---|---|---|---|---|---|---|---|
| S15-RE | 15 min Summer | 8 | 12.413 | 0.038 | 1.947 | | OK |
| S14 | 15 min Summer | 8 | 12.353 | 0.078 | 5.764 | | OK |
| S13 | 480 min Summer | 480 | 12.240 | 0.115 | 0.053 | | Surcharged |
| RWP2 | 15 min Summer | 0 | 12.350 | 0.000 | 0.000 | | OK |
| S17-RE | 15 min Summer | 0 | 12.330 | 0.000 | 0.000 | | OK |
| RWP8 | 15 min Summer | 8 | 12.375 | 0.025 | 2.965 | | OK |
| S16 | 480 min Summer | 481 | 12.240 | 0.130 | 0.016 | | Surcharged |
| RWP9 | 30 min Summer | 17 | 12.862 | 0.802 | 2.667 | | Surcharged |
| S12-CP | 480 min Summer | 481 | 12.240 | 0.275 | 0.366 | | Surcharged |
| S11-A | 480 min Summer | 481 | 12.240 | 0.305 | 0.366 | | Surcharged |
| S11 | 480 min Summer | 481 | 12.240 | 0.385 | 0.367 | | Surcharged |
| S10 | 480 min Summer | 481 | 12.240 | 0.400 | 0.369 | | Surcharged |
| S9 | 15 min Summer | 0 | 12.000 | 0.300 | 1.907 | | Outfall |

## Conduits

| Pipe No. | Critical Storm | Peak (mins) | US Manhole | DS Manhole | Flow Depth (m) | Max Velocity (m/s) | Max Flow (l/s) | Flow / Capacity | Status |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 15 min Summer | 8 | S15-RE | S14 | 0.058 | 0.406 | 1.929 | 0.315 | OK |
| 1.001 | 15 min Summer | 8 | S14 | S13 | 0.078 | 0.872 | 5.700 | 0.940 | OK |
| 1.002 | 480 min Summer | 380 | S13 | S12-CP | 0.100 | 0.496 | 0.986 | 0.161 | Surcharged |
| 2.000 | 15 min Summer | 0 | RWP2 | S17-RE | 0.000 | 0.000 | 0.000 | 0.000 | OK |
| 2.001 | 360 min Summer | 301 | S17-RE | S16 | 0.050 | 0.000 | 0.000 | 0.000 | OK |
| 3.000 | 480 min Summer | 356 | RWP8 | S16 | 0.052 | 1.114 | 0.506 | 0.025 | OK |
| 2.002 | 480 min Summer | 330 | S16 | S12-CP | 0.100 | 0.398 | 0.506 | 0.084 | Surcharged |
| 4.000 | 240 min Summer | 172 | RWP9 | S12-CP | 0.100 | 0.447 | 0.406 | 0.067 | Surcharged |
| 1.003 | 60 min Winter | 237 | S12-CP | S11-A | 0.150 | 0.877 | 4.530 | 0.291 | Surcharged |
| 1.004 | 60 min Winter | 103 | S11-A | S11 | 0.150 | 0.848 | 4.527 | 0.201 | Surcharged |
| 1.005 | 480 min Summer | 477 | S11 | S10 | 0.150 | 0.021 | 0.371 | 0.022 | Surcharged |
| 1.006 | 30 min Summer | 1 | S10 | S9 | 0.150 | 0.028 | 0.491 | 0.034 | Surcharged |

Return Period (yrs) + Climate Change (%):

30yr+35%

## Manholes

| Manhole | Critical Storm | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Flood (m3) | Status |
|---|---|---|---|---|---|---|---|
| S15-RE | 15 min Summer | 9 | 12.430 | 0.055 | 2.411 | | OK |
| S14 | 15 min Summer | 9 | 12.419 | 0.144 | 6.944 | | Surcharged |
| S13 | 720 min Summer | 525 | 12.353 | 0.228 | 0.128 | | Surcharged |
| RWP2 | 720 min Summer | 525 | 12.353 | 0.003 | 0.000 | | OK |
| S17-RE | 720 min Summer | 525 | 12.353 | 0.023 | 0.000 | | OK |
| RWP8 | 15 min Summer | 8 | 12.379 | 0.029 | 3.835 | | OK |
| S16 | 720 min Summer | 524 | 12.353 | 0.243 | 0.066 | | Surcharged |
| RWP9 | 15 min Summer | 9 | 12.862 | 0.802 | 4.117 | | Surcharged |
| S12-CP | 720 min Summer | 524 | 12.353 | 0.388 | 0.448 | | Surcharged |
| S11-A | 720 min Summer | 524 | 12.353 | 0.418 | 0.448 | | Surcharged |
| S11 | 720 min Summer | 524 | 12.353 | 0.498 | 0.448 | | Surcharged |
| S10 | 720 min Summer | 524 | 12.353 | 0.513 | 0.448 | | Surcharged |
| S9 | 15 min Summer | 0 | 12.000 | 0.300 | 0.450 | | Outfall |

## Conduits

| Pipe No. | Critical Storm | Peak (mins) | US Manhole | DS Manhole | Flow Depth (m) | Max Velocity (m/s) | Max Flow (l/s) | Flow / Capacity | Status |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 15 min Summer | 9 | S15-RE | S14 | 0.078 | 0.412 | 2.496 | 0.407 | OK |
| 1.001 | 15 min Summer | 9 | S14 | S13 | 0.100 | 0.884 | 6.894 | 1.137 | Surcharged |
| 1.002 | 360 min Summer | 229 | S13 | S12-CP | 0.100 | 0.564 | 1.532 | 0.250 | Surcharged |
| 2.000 | 720 min Summer | 552 | RWP2 | S17-RE | 0.013 | 0.006 | 0.003 | 0.000 | OK |
| 2.001 | 720 min Summer | 624 | S17-RE | S16 | 0.062 | 0.001 | 0.006 | 0.001 | OK |
| 3.000 | 480 min Summer | 279 | RWP8 | S16 | 0.054 | 1.128 | 0.632 | 0.031 | OK |
| 2.002 | 240 min Summer | 171 | S16 | S12-CP | 0.100 | 0.535 | 1.072 | 0.178 | Surcharged |
| 4.000 | 240 min Winter | 144 | RWP9 | S12-CP | 0.100 | 0.447 | 0.399 | 0.066 | Surcharged |
| 1.003 | 60 min Winter | 58 | S12-CP | S11-A | 0.150 | 0.939 | 5.794 | 0.372 | Surcharged |
| 1.004 | 30 min Winter | 102 | S11-A | S11 | 0.150 | 1.089 | 8.477 | 0.377 | Surcharged |
| 1.005 | 600 min Summer | 609 | S11 | S10 | 0.150 | 0.032 | 0.568 | 0.033 | Surcharged |
| 1.006 | 720 min Summer | 524 | S10 | S9 | 0.150 | 0.025 | 0.448 | 0.031 | Surcharged |

Return Period (yrs) + Climate Change (%):

100yr+45%

## Manholes

| Manhole | Critical Storm | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Flood (m3) | Status |
|---|---|---|---|---|---|---|---|
| S15-RE | 15 min Summer | 10 | 12.588 | 0.213 | 2.703 | | Flood Risk |
| S14 | 15 min Summer | 10 | 12.566 | 0.291 | 8.057 | | Flood Risk |
| S13 | 600 min Winter | 433 | 12.532 | 0.407 | 0.256 | | Surcharged |
| RWP2 | 600 min Winter | 434 | 12.532 | 0.182 | 0.001 | | Surcharged |
| S17-RE | 600 min Winter | 432 | 12.532 | 0.202 | 0.027 | | Flood Risk |
| RWP8 | 600 min Winter | 433 | 12.532 | 0.182 | 0.147 | | Surcharged |
| S16 | 600 min Winter | 432 | 12.532 | 0.422 | 0.151 | | Flood Risk |
| RWP9 | 15 min Summer | 8 | 12.863 | 0.803 | 5.799 | | Surcharged |
| S12-CP | 600 min Winter | 434 | 12.532 | 0.567 | 0.545 | | Flood Risk |
| S11-A | 600 min Winter | 436 | 12.532 | 0.597 | 0.491 | | Flood Risk |
| S11 | 600 min Winter | 427 | 12.532 | 0.677 | 0.481 | | Surcharged |
| S10 | 600 min Winter | 433 | 12.532 | 0.692 | 0.399 | | Flood Risk |
| S9 | 15 min Summer | 0 | 12.000 | 0.300 | 0.509 | | Outfall |

## Conduits

| Pipe No. | Critical Storm | Peak (mins) | US Manhole | DS Manhole | Flow Depth (m) | Max Velocity (m/s) | Max Flow (l/s) | Flow / Capacity | Status |
|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 15 min Winter | 11 | S15-RE | S14 | 0.100 | 0.407 | 2.759 | 0.450 | Surcharged |
| 1.001 | 15 min Winter | 9 | S14 | S13 | 0.100 | 0.979 | 7.692 | 1.268 | Surcharged |
| 1.002 | 180 min Summer | 108 | S13 | S12-CP | 0.100 | 0.742 | 3.414 | 0.558 | Surcharged |
| 2.000 | 360 min Winter | 416 | RWP2 | S17-RE | 0.100 | 0.027 | 0.071 | 0.010 | Surcharged |
| 2.001 | 360 min Winter | 416 | S17-RE | S16 | 0.100 | 0.023 | 0.156 | 0.025 | Surcharged |
| 3.000 | 480 min Summer | 285 | RWP8 | S16 | 0.100 | 1.131 | 1.099 | 0.054 | Surcharged |
| 2.002 | 180 min Summer | 105 | S16 | S12-CP | 0.100 | 0.594 | 1.752 | 0.291 | Surcharged |
| 4.000 | 240 min Summer | 209 | RWP9 | S12-CP | 0.100 | 0.445 | 0.426 | 0.071 | Surcharged |
| 1.003 | 30 min Winter | 29 | S12-CP | S11-A | 0.150 | 0.961 | 10.693 | 0.687 | Surcharged |
| 1.004 | 30 min Winter | 22 | S11-A | S11 | 0.150 | 1.154 | 10.694 | 0.476 | Surcharged |
| 1.005 | 600 min Winter | 327 | S11 | S10 | 0.150 | 0.074 | 1.301 | 0.076 | Surcharged |
| 1.006 | 600 min Winter | 435 | S10 | S9 | 0.150 | 0.031 | 0.550 | 0.038 | Surcharged |

## Appendix D Maintenance Schedule

HARBOURSTONE DESIGN

# MANAGEMENT & MAINTENANCE SCHEDULE

## LAND EAST OF NORTHFIELDS LANE, WESTERGATE PO20 3UH

Residential Development

2025-C109-MMS01

October 2025

Prepared on Behalf of Domusea Northfields Limited

# 1 MAINTENANCE

## 1.1 General Maintenance

1.1.1 In accordance with National Standards for SuDS (Standard 7), a Maintenance Plan, within an Operation and Maintenance Manual, is required to ensure that the proposed drainage system can be maintained safely. Chapter 32 of the SuDS Manual details good practice for operation and maintenance activities, and the below sets out the basis of measures to be incorporated in a detailed management plan as part of the detailed drainage design.

1.1.2 Maintenance of private features serving only one residential dwelling are the responsibility of the resident.

1.1.3 A maintenance regime should include tasks to be taken at regular intervals to keep the system in good working order (see SuDS Manual Table 32.1). General measures should include:

| Drainage System feature | Proposed maintenance / remedial works | Required frequency of works |
|---|---|---|
| **Inlet, Outfall** | Inspection, vegetation clearance and additional clearing/cleansing of potential outfall blockages | At least once a year |
| | Desilting | Year 1, Year 3, then every 5 years |
| **Catch pits, gully sumps and drains, flap valves** | Inspection and additional cleansing as required. | Every 6 months |
| | Desilting | Year 1, Year 3, then every 5 years |
| **Pipework** | Jetting to clear blockages | As required |

1.1.4 Chapters 11-23 of the CIRIA SuDS Manual set out specific maintenance for differing SuDS features, and this is detailed below for the proposed SuDS features.

## 1.2 Permeable Pavements & Diffuser Units

1.2.1 The areas of permeable paving are designed to allow surface water run-off to percolate through the joints in the block paving surface course and into the sub-base below. This provides a volume of attenuated storage (as it is proposed that the permeable paving will be tanked in view of site constraints) before collected run-off is discharged, at a control rate, to the receiving outfall(s).

1.2.2 As part of the permeable paving system, diffuser units are used to discharge surface water run-off from roof areas into the sub-base, as well as conveying runoff to the outfall from the permeable paving. These diffuser units are small heavy-duty cellular units which allow more efficient discharge of surface water into the sub-base base of the permeable paved areas.

1.2.3 The areas of permeable paving will require additional maintenance measures to ensure they operate as designed. Failure in carrying out this maintenance, could increase the risk of flooding. The additional measures are as follows:

| Drainage System feature | Proposed maintenance / remedial works | Required frequency of works |
|---|---|---|
| **Permeable Pavement** | Surface sweeping to reduce silt and debris accumulation. | Every 8 to 12 weeks |
| | Replace broken slabs/blocks | As required |
| | Removal / management of weed growth | At least once a year |
| | Silt removal from permeable surfaces, possibly involving raking out of joints, redressing, removal and remedial works. | As required / to be specified by manufacturer |
| **Diffuser units** | Inspection and additional cleansing as required. | Annual |
| | Desilting. | Year 1, Year 3, then every 5 years |

## 1.3 Flow Control Chambers

1.3.1 A flow control chamber (such as a HydroBrake) or device is self-activating, relying on upstream hydraulic head to generate an air-filled vortex within the centre of the casing. Once the vortex is initiated water drains down through a small opening in the back of the device at the designed restricted flow rate.

1.3.2 The flow control device includes a bypass valve for use should it become blocked. A valve is situated in the front of the unit which is operated from the surface by a release cable situated just under the chamber cover. The valve also proved access of rodding of the downstream pipework.

1.3.3 The flow control chamber will require the following maintenance:

- The sump within the flow control chamber should be monitored for build-up of silts and should be emptied as a minimum on the same regime as specified for catchpits previously within this document.
- The drain down door located on the centre of the unit will require inspection, greasing and opening annually, to ensure it is operating as intended.

1.3.4 The flap valve chamber will require the following maintenance:

- The catchpit chamber should be monitored for build-up of silts and should be emptied as a minimum on the same regime as specified for catchpits previously within this document.
- The hinged door located on the mounted concrete block will require inspection, greasing and opening annually, to ensure it is operating as intended.

| Drainage System feature | Proposed maintenance / remedial works | Required frequency of works |
|---|---|---|
| **Flow Control Chambers** | Clean out chamber/sump | Monthly for first 3 months then twice annually |
| | Inspect flow control unit and remove debris | |

### 1.4 Attenuation Storage Tanks

| Drainage System feature | Proposed maintenance / remedial works | Required frequency of works |
|---|---|---|
| **Upstream & Downstream catchpit chambers** | Clean out chamber/sump. | Twice annually for the first 2 years of operation then annually |
| **Inlets & Outlets** | Inspection, vegetation clearance and additional clearing/cleansing of potential outfall blockages. | Annually and after large storms |
| **Geocellular Units** | Inspect and identify any areas that are not operating correctly. If required, take remedial action. | Post-construction, monthly for 3 months, then annually |
| | Remove debris from the catchment surface (where it may cause risks to performance). | Monthly |
| | For systems where rainfall infiltrates into the tank from above, check the surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary. | Monthly, or as required |

### 1.5 On-site & Boundary Ditches/Watercourses

1.5.1 The purpose of these features primarily is to convey water and provide an element of storage. It is the responsibility of the legal riparian for ensuring all ditches/watercourses are free flowing.

1.5.2 The inspection frequency and maintenance requirements are illustrated in the table below and may be affected by other seasonal ecology constraints i.e. bird nesting.

| Maintenance | Required Action | Required frequency of works |
|---|---|---|
| **Regular Maintenance** | Remove litter/debris | Monthly, or as required |
| | Cut grass – may be to suit design parameters | Monthly, or as required |
| | Manage and/or cut back vegetation | Monthly, or as required |
| | Inspect inlets/outlets (i.e. culvert at upstream and downstream headwalls) | Monthly |
| | Inspect base for silt and remove as required | Twice annually |
| **Occasional Maintenance** | Reseed areas of poor grass coverage and/or vegetation growth | As required |
| **Remedial Actions** | Repair erosion or other damage | As required |
| | Remove silt from base | As required |
| | Re-level uneven surfaces to existing/design surface profile | As required |
| | Remove and dispose of oils, petrols and/or other pollutants and dispose to licenced tip as required | As required |

## 1.6 Remedial Maintenance

1.6.1 As well as the frequencies set out in the above tables, inspections should be undertaken after significant storm events to establish any remedial maintenance may be required, as there may be damage to the drainage system that could cause adverse impacts in a future storm event if not identified.

## 1.7 Accidental Spillages

1.7.1 In the event of a serious spillage, either by volume or of unknown or toxic compounds, the spillage should be isolated with the use of soil, turf or fabric with outlet pipes from chambers downstream of the spillage blocked with a bung/bungs.

1.7.2 Minor spillages of fuels and oils from motor vehicles will be dealt with by the permachannel, filter gully & catchpits collecting the hydrocarbons.

1.7.3 In the event of a spillage, the responsibility lies with the private resident to clear up any spillage before it enters the drainage network. The primary method of dealing with any spillage of hydrocarbons should be using sand (or equivalent) to soak up the leak and mitigate pollution migration. Any contaminated waste shall be disposed of by a licensed contractor, & SmartSponge replacement (inserted within filter gully) should be made in accordance with the manufacturer's instructions.

1.7.4 The Environment Agency should then be contacted immediately on their incident hotline; 0800 807060.

## 1.8 Construction & Operation (Maintenance) Considerations

1.8.1 In addition to the regular, occasional and remedial maintenance measures set out above, the following considerations are to be taken:

i. The Construction Management Plan needs to include management of surface water runoff during construction to prevent pollution. In addition, it is recommended that construction phasing ensures SuDs are completed prior to the construction of buildings and hardstanding areas where possible to provide treatment during construction. These features will need a complete inspection upon completion with necessary remedial maintenance taken.

ii. Any future changes to the proposed development will need assessment by the designer to determine impacts on and/or changes required to the proposed drainage system.

# Appendix E Groundwater Monitoring Results

| Site Name: | Northfields | |
|---|---|---|
| Item<br>**GROUNDWATER MONITORING RESULTS** | Project No.:<br>C109 | |
| Taken by:<br>AT/ER | | |

HARBOURSTONE DESIGN

| | **Total Depth** | 2.0m | **Cover Level** | 12.20m AOD |
|---|---|---|---|---|
| **Location** | **centre-east of site, adjacent earth mound** | | | |

| **Date** | **Water Depth (mbgl)** | **Notes** |
|---|---|---|
| **25/10/2025** | 1.50 | Ditches dry |
| **05/11/2025** | 1.20 | Ditches dry |
| **25/11/2025** | 1.00 | Following heavy rainfall - 50mm ditch depth |
| **01/12/2025** | 1.00 | Following heavy rainfall - 1000mm ditch depth |
| **15/12/2025** | 0.70 | 30mm water in ditch |
| **19/12/2025** | 0.70 | 200mm water in ditch |
| **06/01/2026** | 0.80 | 150mm water in ditch |
| | | |
| | | |
| | | |
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## Appendix F GreenBlue Urban SuDSPod Rainwater Harvesting Detail

# SuDSPod™

## On plot attenuation



**Overview**

Discover GreenBlue Urban's cost effective, cutting-edge solution that addresses a myriad of challenges associated with stormwater management, ranging from reducing peak flow rates from roofs, complex SuDS designs to reducing CSO spills.

SuDSPod offers a versatile and innovative on plot attenuation approach that benefits new developments, and can be seamlessly retrofitted to private, public housing and service buildings.

The patented design is the next generation of a traditional drain-down vessel, delivering industry leading attenuation performance, providing in some cases up to five times its own storage volume.

With a focus on simplicity, effectiveness, and adaptability, SuDSPod delivers on all four pillars of SuDS as set in the CIRIA SuDS Manual Guidance and is poised to transform the landscape of drainage systems.

**Features**

Contribution towards reduction of CSO spills through intelligent on-plot attenuation.
Potential sewer upgrade avoidance through highly effective peak flow attenuation.
Maximise land values through reduction of downstream retention pond/tank size.

**Benefits**

Suits most downpipes.
Fast and simple install.
Failsafe design.
Homeowner-friendly maintenance.
Attractive cladding options.
Positive ecological impact.

T: [redacted]
[redacted]
W: greenblue.com

GreenBlue URBAN
Creating healthier urban spaces in harmony with nature

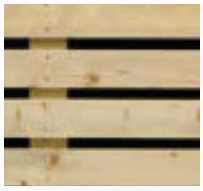
| | Code | Description |
|---|---|---|
| **Product Code** | SUDSPOD12X5A | SuDSPod On-plot attenuation raised planter 1200mm x 500mm with tanlised timber slat cladding. |
| | SUDSPOD12X5B | SuDSPod On-plot attenuation raised planter 1200mm x 500mm with tanlised timber slat cladding - colour/finish to be specified by customer. |
| | SUDSPOD12X5C | SuDSPod On-plot attenuation raised planter 1200mm x 500mm without cladding. |

**Additional Information**

- Intended to manage 30-year return period storm for a 50sqm roof subject to location.
- Accurate modelled data currently in development.
- Live trial projects for long term testing currently in development – please enquire if you have a project you feel would be suitable to undertake a trial installation in partnership with GreenBlue Urban.

**Material** 100% recycled polyethylene

**Cladding Options**



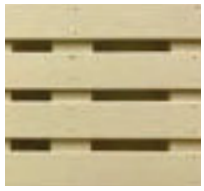
**Standard**



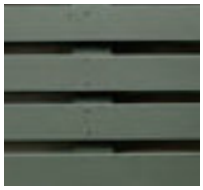
**Rustic Oak (stained)**



**Weathered Grey (Paint)**



**Birch Wood (Paint)**



**Green (Paint)**



**Black (Paint)**

**Accessories** Levelling support frame available.

**Maintenance** No maintenance required

T: +[redacted]
[redacted]
W: greenblue.com

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**NEW FEATURE**

**New cladding style**
SuDSPod now comes with vertical cladding, available in a range of stained and painted finishes.

**NEW FEATURE**

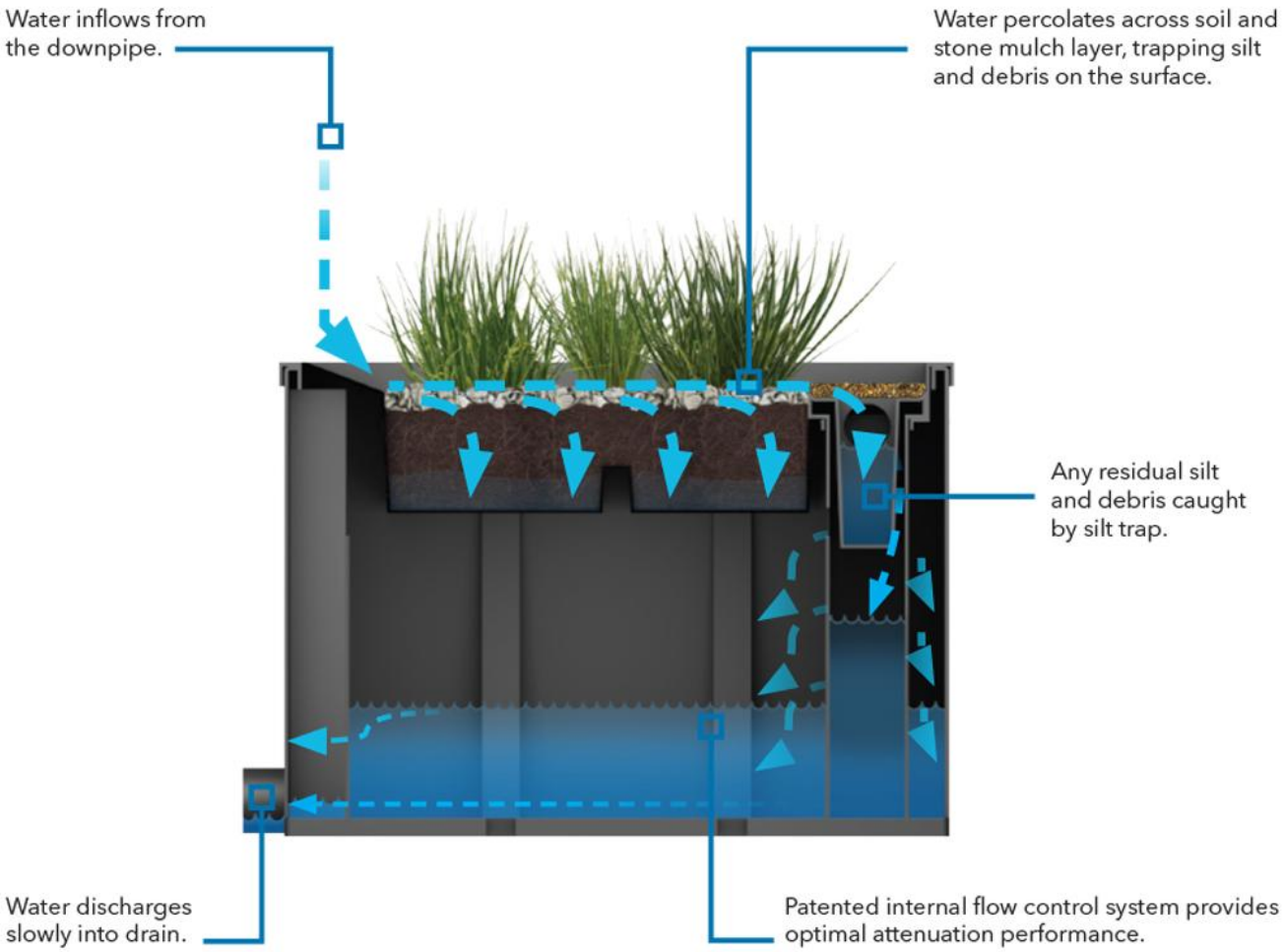
**Water storage for reuse**
SuDSPod's unique patented internal chamber is now capable of storing water for reuse.




**NEW FEATURE**

**In built levelling system**
SuDSPod's comes with an in built levelling system that allows for fast installation and adaptability to suit all sites.

## How SuDSPod works



## Appendix G Sudsstore Controflow Universal Flow Control Detail

## Contents:


| Product Code | Description | Page |
|---|---|---|
| SUDS01001 | Controflow Micro | 3 |
| SUDS01101 | Controflow Domestic | 7 |
| SUDS02005 | Controflow Universal | 9 |
| SUDS02008 | Controflow Housing | 13 |
| SUDS03001 | Controflow Commercial | 15 |
| SUDS08001 | Controflow SuDS Basket | 17 |


## Controflow Product Selector:

| | Application | Product Code | Description | Comments |
|---|---|---|---|---|
| Flow Control Chambers | Permeable Pavement Level Invert | SUDS01001 | Controflow Micro | For shallow applications only, max 600mm cover to invert |
| | | SUDS02005 | Controflow Universal | Max depth 1.2m |
| | Permeable Pavement Stepped Invert | SUDS02008 | Controflow Housing | Typically Housing, 110mm Ø pipe connections |
| | | SUDS03001 | Controflow Commercial | Typically Commercial, 160mm Ø pipe connections |
| | Swale | SUDS02005 | Controflow Universal | Max depth 1.2m |
| | Skeletank On-Plot Attenuation Tanks | SUDS01101 | Controflow Domestic | Prescribed flow rate of 0.2 l/s |
| | Plastic Crate On-Plot Attenuation Tanks | SUDS01101 | Controflow Domestic | If overall depth of tank < 900mm, prescribed flow rate of 0.2 l/s |
| | | SUDS02005 | Controflow Universal | Max depth 1.2m |
| | General Drainage / Site Outfall | SUDS02005 | Controflow Universal | Max depth 1.2m |

| | | | |
|---|---|---|---|
| Swale | Swale Inlet / Outlet | SUDS08001 | Stainless Steel Mesh Basket and Pipe Guard |

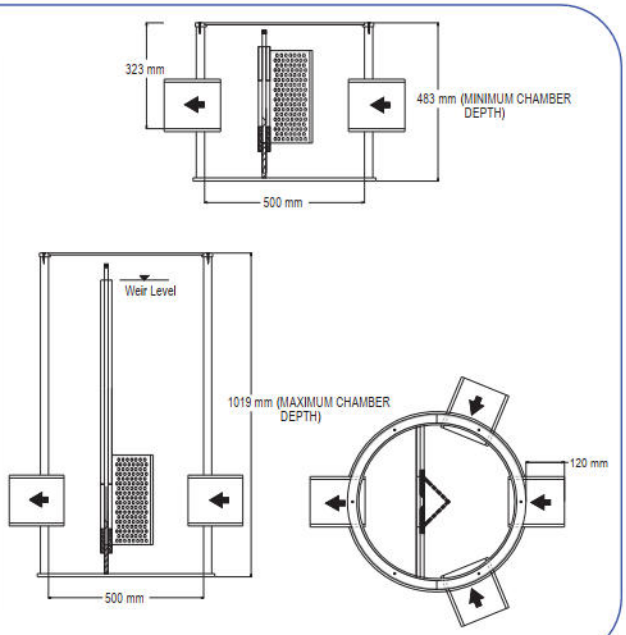
# Controflow Universal

SUDS02005

## Description

A flexible universal flow control chamber, with level inverts, suitable for any SuDS technique. The slide-out centre plate acts as an overflow weir and contains a circular orifice (to specified diameter), protected by an upstream filter guard. The slide-out centre plate can be temporarily removed to gain access to rod the connections, during regular maintenance services. The Controflow 500 Series Universal Level Invert is available with either 160mm or 110mm diameter connection stubs which offer a flexible layout and is available in depths ranging from 483mm to 925mm. An optional foul air trap is available when connected to the combined sewer. Chambers are supplied with a temporary protective site cover (permanent cover and frame available upon request).






## Packaging Details

| Element | Value | Unit |
|---|---|---|
| Packaging unit dimension | 773 x 773 x 1032 (LxWxD) | mm |
| Packing unit weight | TBC | kg |
| Number of units per pallet | 8 | nr |
| Pallet dimensions | 1200 x 1200 x 150 (LxWxD) | mm |
| Pallet weight | TBC | kg |

*packaging dimensions based on maximum chamber depth

## Specification

| Element | Value | Unit |
|---|---|---|
| Maximum depth of chamber | 1019 | mm |
| Minimum depth of chamber | 483 | mm |
| Overall width | 753 | mm |
| Spigot O.D ⌀ | 160 or 110 | mm |
| Orifice type | Fixed plate | |
| Unit weight | TBC | kg |
| Material | HDPE | |

## Information Check List
(required prior to order being processed)

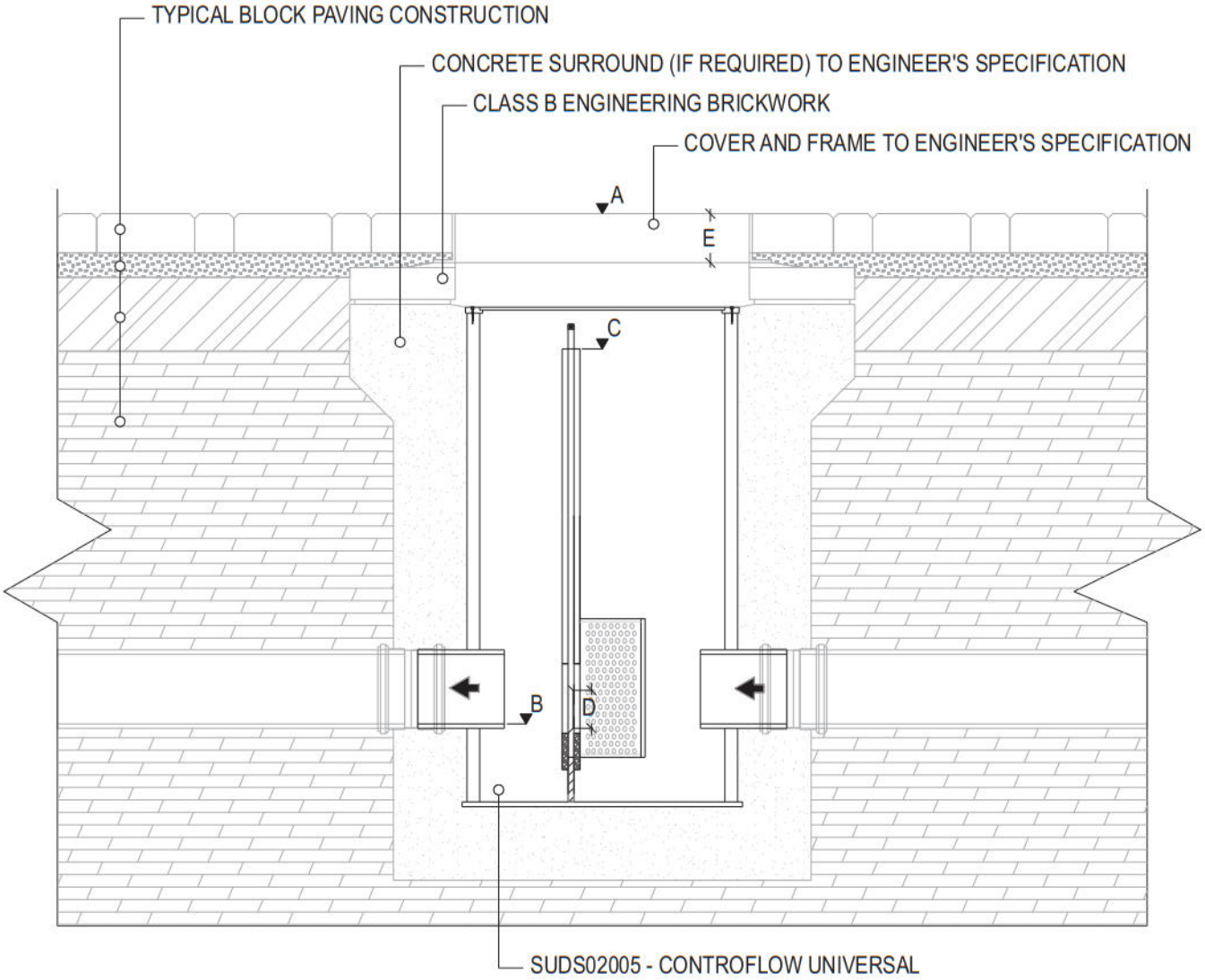
| Element | Value | Unit |
|---|---|---|
| Cover level | | m (A.O.D) |
| Pipe invert level | | m (A.O.D) |
| Weir Level | | m (A.O.D) |
| Orifice diameter | | mm |
| Depth of cover and frame to be used | | mm |
| Spigot Diameter | | mm |
| Number of inlet spigots | | nr. |

A.O.D - Above Ordinance Datum

# Controflow Universal - Level Invert Protected Orifice

SUDS02005

## General Application

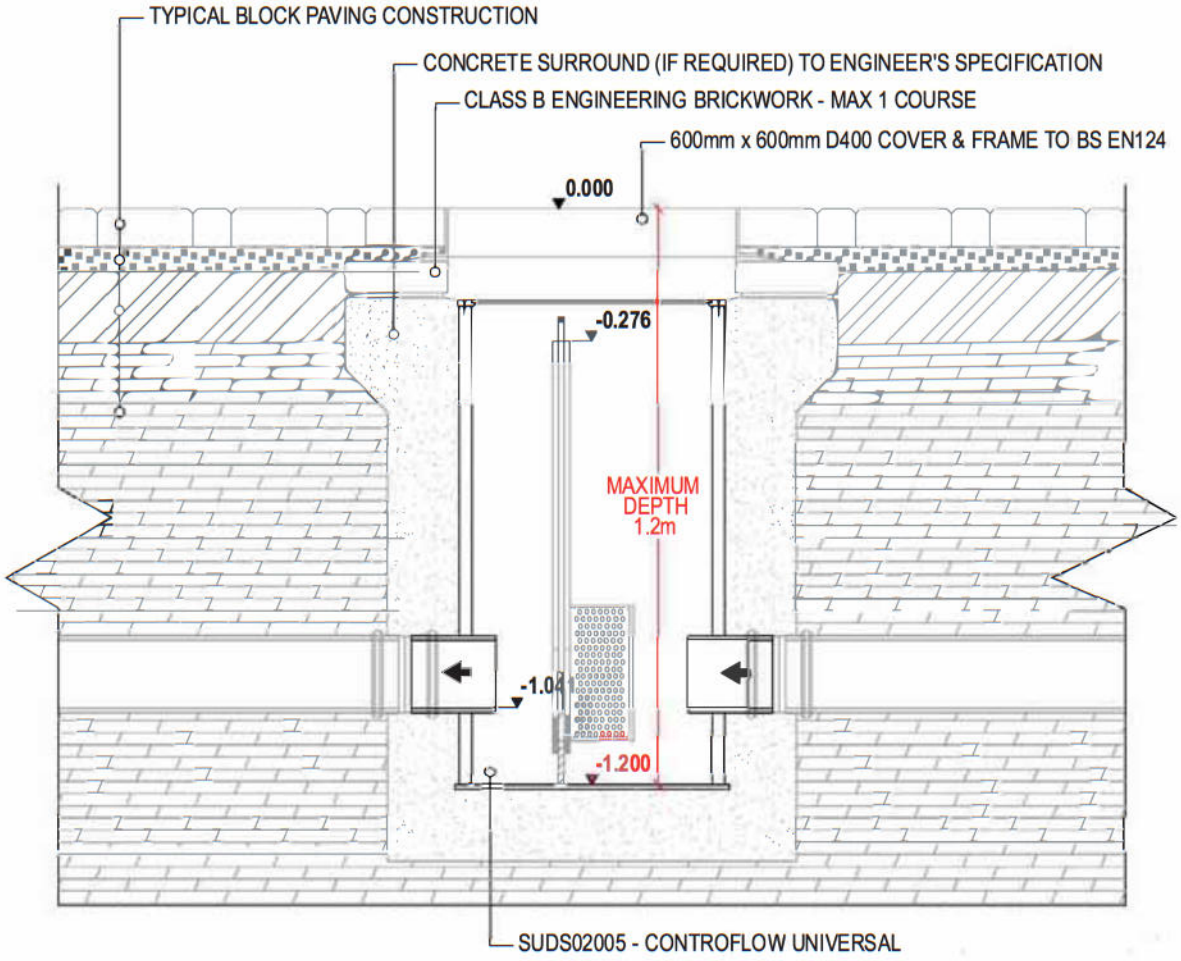



A - COVER LEVEL (m AOD)
B - PIPE INVERT LEVEL (m AOD)
C - WEIR LEVEL (m AOD)
D - ORIFICE DIAMETER (mm)
E - DEPTH OF COVER AND FRAME TO BE USED (mm)

# Controflow Universal - Level Invert Protected Orifice

SUDS02005

## Maximum Depth Application

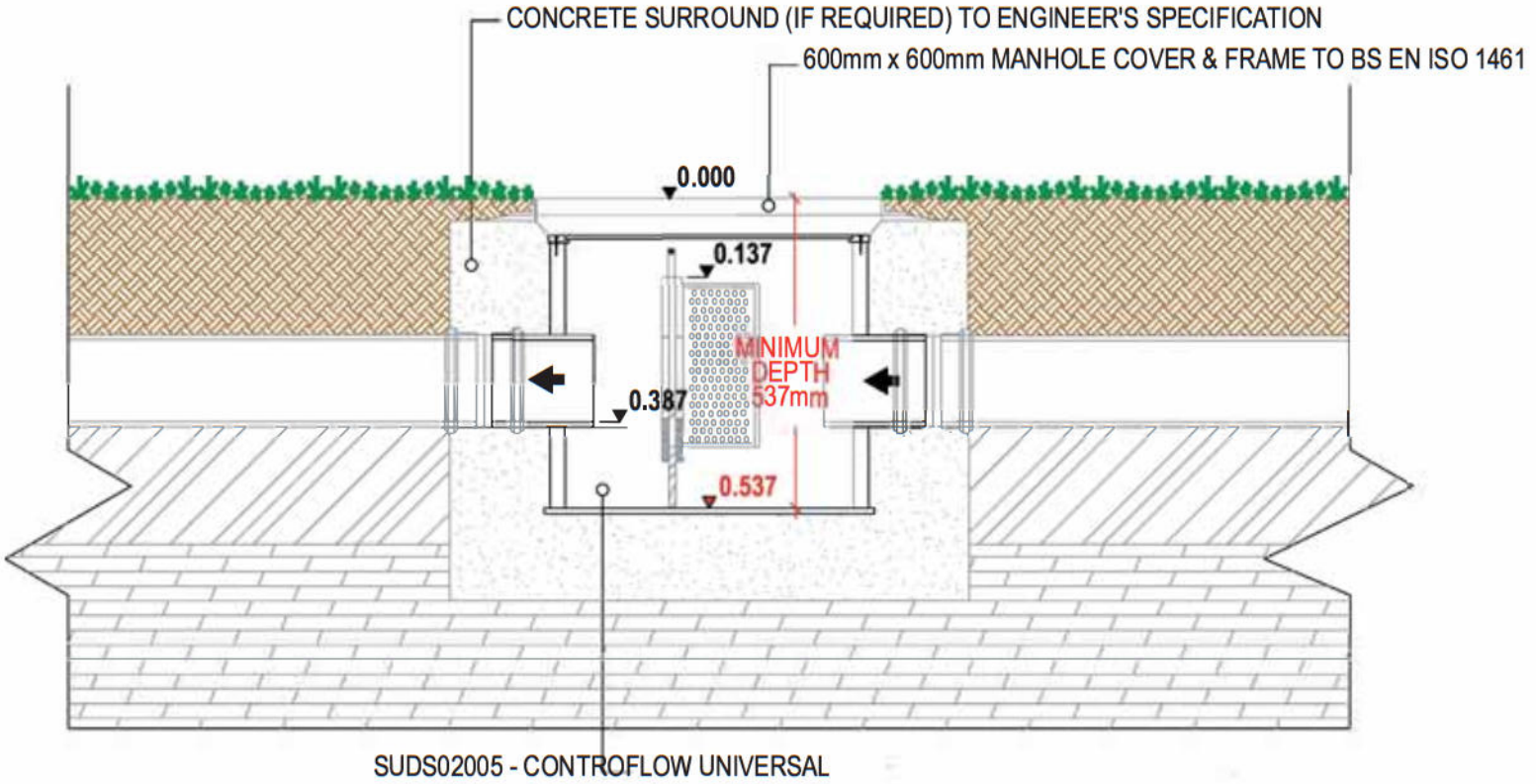



**NOTE: IN ACCORDANCE WITH BUILDING REGULATIONS H1, CLEARANCE OF BLOCKAGES, TABLE 11. SHOULD THE DEPTH OF THE CHAMBER FROM INVERT LEVEL, TO THE TOP OF THE SPECIFIED COVER EXCEED 1.2 METRES, A RESTRICTED ACCESS COVER NO GREATER THAN 350mm MUST BE USED FOR HEALTH AND SAFETY REASONS TO DETER ENTRY.**

# Controflow Universal - Level Invert Protected Orifice

SUDS02005

## Minimum Depth Application




**NOTE: IN ACCORDANCE WITH BUILDING REGULATIONS H1, CLEARANCE OF BLOCKAGES, TABLE 11.**

**SHOULD THE DEPTH OF THE CHAMBER FROM INVERT LEVEL, TO THE**

**TOP OF THE SPECIFIED COVER EXCEED 1.2 METRES, A RESTRICTED ACCESS**

**COVER NO GREATER THAN 350mm MUST BE USED FOR HEALTH AND SAFETY REASONS TO DETER ENTRY.**

**Appendix H** Arun Byelaws Discharge Consent

Arun District Council
Arun Civic Centre
Maltravers Road
Littlehampton
West Sussex
BN17 5LF

Tel: 01903 737819

12th January 2026

Mr D Lytton
Harbourstone Design Limited
87 Redwing Road
Clanfield
Waterlooville PO8 0LX

Please ask for:

Paul Cann
Engineering Services
37819
e-mail: paul.cann@arun.gov.uk

Your Ref:

Our Ref: LDB/ARU/2026/001

Dear Dan

**Arun District Council Land Drainage Byelaws 2004**
**Land Drainage Works at Development East of Northfields Lane, Aldingbourne**

Thank you for your application for consent to undertake works under our Land Drainage Byelaws.

I confirm that your proposals for the permanent / ~~temporary~~* works are acceptable. I enclose consent number LDB/ARU/2026/001 giving approval to the proposals.

Please notify this authority no less than seven days before commencement and upon completion of the works via one of the methods of contact above, quoting the above consent number for reference. Please note that inspections will be carried out as deemed necessary.

The applicant must provide photographs of the works during construction and on completion, and forward digital copies to this office. **Please note the 'Conditions' attached to this approval.**

Yours sincerely

Mr Paul Cann
Principal Drainage Engineer

# Land Drainage Byelaws Consent

## Arun District Council Land Drainage Byelaws 2004

**Name:**

**Domusea Northfields Limited**

**Consent applying to:**

**Land East of Northfields Lane, Aldingbourne**

**Connections to watercourse**

**Consent Number LDB/ARU/2026/001**

**Effective from**
**12th January 2026**

# Land Drainage Byelaws 2004

Control of works affecting ordinary watercourses

Consent number LDB/ARU/2026/001

**To:** Domusea Northfields Limited

**Arun District Council in exercise of its powers under our Land Drainage Byelaws 2004 and subject to the conditions attached, hereby grants its consent in relation to the works or operations described in this Consent.**

Watercourse: Not named

Location: Land east of Northfields Lane and north of The Haven

Map reference: SU 93895 05835 & 93968 05805

Description of works: Connection to watercourse on western boundary via 100mm diameter pipe and headwall & connection to watercourse on eastern boundary via 150mm diameter pipe, flap valve and headwall.

Drg no's. 24005 01 Rev A, 2025-C109-001 Rev B, 2025-C109-004 Rev B, 2025-C109-006 Rev A

In supporting documentation;

Arun District Council does not accept any responsibility for the design and construction of the works referred hereto and any liability for any loss or damage which may arise out of their design, construction, maintenance or use.

**This Consent shall come into effect on 12th January 2026**

Signed on behalf of Arun District Council

**Mr Paul Cann**
**Principal Drainage Engineer**

Date of signing

12th January 2026

# Conditions

This consent is granted with the following conditions:

**General**

N/A

**Timing**

Works to be completed within 3 years of the date of this consent or else the consent will be deemed to have expired. This period can be extended upon written agreement.

**Temporary Works**

Method statements for associated construction and/or temporary works to be submitted and approved before commencing works.

**Site Specific**

No part of headwalls to encroach into the ditch profile.

Banks to be suitably profiled to suit the prefabricated headwalls.

**Other Information**

This Consent does not remove from the applicant the necessity to obtain other licences, consents, approvals or permissions (including planning permission) which may be required in law or in order to comply with any duties or responsibilities for conservation or protection of the environment.

It is the applicants responsibility to ensure that he obtains the consent / permission of any owners and occupiers affected by the works.

This Consent does not confer any rights of entry or rights over property.

Works should be arranged to ensure there is no increase in flood risk to third parties.

Arun District Council does not accept any responsibility for the design and construction of the works that are the subject of this Consent and any liability for any loss or damage which may arise out of their design, construction, maintenance or use.

The works must be undertaken in accordance with the approved plans, drawings, calculations, specifications and other relevant documents.

All reasonable precautions must be taken during the undertaking of the works so as not to obstruct, impede or interfere with the flow of water in, into or out of the watercourse and not to damage the banks or bed or any drainage works without the approval of the Arun District Council.




Harbourstone Design Limited
Civil Engineering Consultants – harbourstonedesign.co.uk
Registered in England No: 16608131