

SUDS DRAINAGE CONDITION DISCHARGE

**SEPARATE SURFACE WATER SEWER CONFIRMED;
CONNECTION APPROVAL UNDER SEC106 WITH
WATER COMPANY**

**DETAILED DESIGNS AND SPECIFICATIONS TO UPDATED APPROVED PLANNING STAGE DRAINAGE
DESIGNS**

**RETAIN LOWEST DISCHARGE RATE @ 1.0 L/S
HIGHEST SOURCE CONTROL SUDS RETAINED IN DETAILED DESIGN**

**Approved scheme Ref: 240694
Demolish existing 2 dwellings
Erect 4 dwellings**

AT

**1 & 2 Compton Close,
Wokingham, RG6 7EA**

May 2025

Ark Environmental Consultancy Ltd

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1.0 Scope

This report contains the details of a SUDS Drainage Conditions Discharged report carried out by Ark Environmental Consultancy Limited ("Ark Ltd") for 1 & 2 Compton Close, Wokingham, RG6 7EA, henceforth referred to as "the site" in this report.

This report has been prepared for V Tandon and must not be relied upon by any other party without the explicit written permission of ARK Ltd.

All parties to this report do not intend any of the terms of the Contracts (Right of Third Parties Act 1999) to apply to this report.

Please note this report does not purport to provide definitive legal advice nor can it be used to demonstrate that the site will never flood in the future.

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2.0 Introduction

The approved scheme is as per planning application "240694".

The approval is for:

"Full application for the proposed erection of 4No dwellings and 1No detached garage along with landscaping and access following demolition of the existing 2No dwellings."

3.0 Site Status and Setting for SUDS Condition Stage

3.1 Geology & Infiltration

The site is underlain by

- Bedrock: London Clay
- Superficial deposits: none

It is considered appropriate to design on a worse case of infiltration not being feasible.

It is not possible for the site to meet the 5.0m from footprint and 3.0m from site boundary easements for the location of a suitably sized soakaway.

BRE365 Testing is not required as soakaways are not feasible.

This is also policy compliant given there are existing connections to the sewer so the scheme does have a viable discharge point already proven.

We know that Wokingham promote SUDS that can support an informal amount of low order storm soakage, hence a hybrid system is considered appropriate, with the rain garden planted beds and permeable paving offering the opportunity for informally low order storm soakage. There are no lost / underground rivers documented at the site or near the site nor identifiable by the local geology mapping.

There is a viable existing connection to a separate surface water sewer as part of the existing infrastructure and manholes adjacent and within the site.

The falls of this site lend themselves to SUDS storage at the perimeter of the site to restrict flows and a resultant restricted flow to the existing manhole to the public sewer.

This covers all requirements for planning.

3.2 Separate Surface Water Sewer: Connections & Inverts

Drainage

All existing surface water is discharged 100% un-attenuated via informal infiltration for all porous areas; it is assumed all lower order storms do infiltrate informally.

All roof and hardstanding areas it is assumed discharge without any SUDS, unattenuated, directly to the sewer given existing confirmed manhole connection to sewer.

There is a connection adjacent / within the site to the sewer in Compton Close / Station Road.

There is no evidence of any existing SUDS.

An assessment of the Greenfield equivalent discharge for the site has been carried out.

This has confirmed an average discharge rate (QBAR) of a less than 0.25 l/s.

Note: We use the Greenfield not the Brownfield so as to demonstrate the worse case for sites that are too small that they cannot discharge greater than the lowest feasible restriction rate hence restriction devices are not suitable.

This low rate is due to the fact that the site is relatively very small and the geology.

A copy of the calculation output is included in Appendix B.

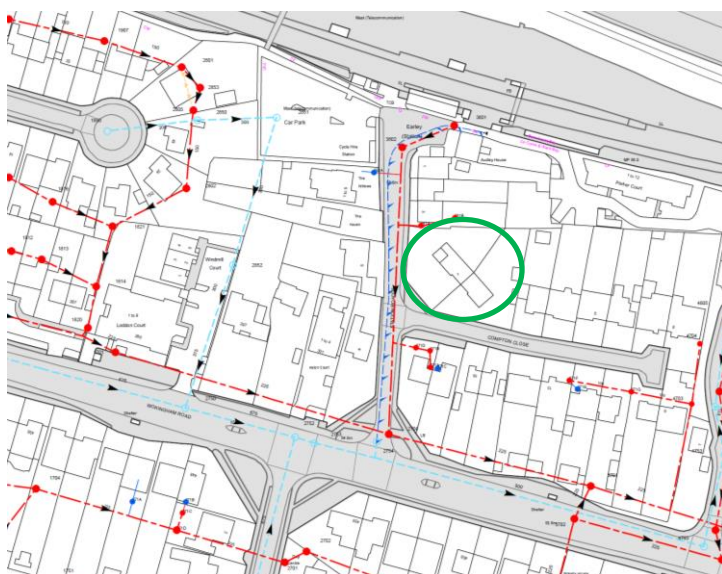
- All existing surface connections are communicated to a final manhole on site
- We will fully restrict the existing discharge to the sewer from the existing operating site as a result of the scheme, fully future proofed

Existing connection to be re-used and betterment included with SUDS: see below.

Manhole of main surface water sewer MH 2754 is 2.66metres below ground level with Cover Level of 54.52mAOD and Invert Level of 51.86mAOD.

Existing connection to surface water sewer as a separate system to be retained.

- Standard 106 Agreement with Water Company to confirm the discharge.
- SUDS can communicate all discharge to the separate surface water only final manhole on site with restriction device to restrict discharge to 1.0l/s from 100% of the formal discharge areas of the site.



Manhole Reference	Manhole Cover Level	Manhole Invert Level
271D	n/a	n/a
2801	n/a	n/a
271C	n/a	n/a
2750	55.2	52.16
271B	n/a	n/a
2802	56.46	55.07
2805	n/a	n/a
2850	56.43	54.73
2853	n/a	n/a
2852	n/a	n/a
2851	56.3	54.51
2752	54.77	51.14
2753	54.6	51.05
2754	54.52	51.86
2704	54.46	52.89
3802	55.83	53.82
371D	n/a	n/a
381A	n/a	n/a
371B	n/a	n/a

3.3 Note on Drainage Rates Building Regs Part H and BS EN 752-4

The joint DEFRA/EA R&D rainfall runoff management for developments Report-SC030219 states that

“a practicable minimum limit on the discharge rate from a flow attenuation device is often a compromise between attenuating to a satisfactorily low flow rate while keeping the risk of blockage to an acceptable level. This limit is set at 5 litres per second, using an appropriate vortex or other flow control device”.

Technology has indeed moved on and there are manufacturers providing improved flow control devices since the DEFRA/EA report was published, permitting flows lower than 5 l/sec through their devices without increasing the flood risk from blockages.

Drainage rates are a function of the size of the site, rainfall inputs, nature of the site and the likely coefficients / geology, etc. It is impossible for this site based on the function of the size to discharge close to even 2.0 l/s even in the 1in200year event. Thus, this and other very small sites (single dwelling plots usually) will have a maximum feasible discharge rate significantly lower than the lowest allowed restriction rate; this is a fact and is controlled by the official guidance. That is why a pragmatic sustainable response is required.

In accordance with Building Regs Part H, for surface water drainage, a self-cleansing velocity

of 0.7 l/sec must be maintained in all pipes and all pipes sizes are required to be of a minimum pipe size of 75mm. Thus, peak flow rates lower than 3 l/sec will fail to meet BS EN 752-4 and/or the Building Regulations Part H requirements.

The reason for the Building Regs and BS is simple: “mitigate at source” and “design out the risk” i.e. it is logical to not design modern systems with pipes / restriction devices that could be too easily blocked over time as these will cause greater risks of flooding and make any expensive and heavily engineered SUDS schemes totally pointless.

4.0 Planning Stage Approval

4.1 Approved Planning Scheme

The proposed development (Appendix A) comprises:

- Demolish existing 2 dwellings and remove impermeable areas
- Erect 4 new dwellings with integrated landscaping and SUDS
- Increase in porous / permeable areas overall
- **Maximised porous / permeable areas**
 - **Incorporating SUDS that store for the full 1in100year+40%cc discharge**
- Maximisation of highest forms of SUDS storage feasible for this very small site
- Using SUDS storage and utilising Source Control SUDS natural interception to perform the necessary reduction in peak flow rate
- Use Vortex Control device in final manhole on site to restrict to 1.0l/s maximum.

4.2 Approved Drainage Connections and Design

The existing site is functioning in terms of drainage with connections to a separate surface water and separate foul sewer in Compton Close.

There are existing manholes which are to be re-used / modified as per the minor diversion required as agreed in principle on site with Thames Water.

The connection to the existing operating surface water only sewer is appropriate given:

- a) That is the connection highest up the hierarchy available to the site
 - a. Full formal infiltration is not feasible due to the size of the site area available for a full soakaway and the bedrock / site constraints
 - b. No watercourse to connect to
 - c. A Combined and foul are lower down the hierarchy
 - i. there is no need to connect surface water to a combined or foul sewer as there is a separate surface water sewer on the site
- b) the scheme significantly reduces the rate at which the surface water will reach this sewer or the future as the scheme includes attenuation for 100% of impermeable areas including for 40% for climate change
 - a. This is appropriate flood future proofing

So it is unequivocal:

- The scheme maximises porous and permeable areas
- This provides the required source control for existing, proposed and greater than proposed impermeable areas

The SUDS designs are:

- Oversized SUDS storage below the area of patio
- Parking / driveway to also provide additional storage
- The scheme includes a granular storage system, lined (hybrid system to allow informal soakage) and with connection to a control chamber but no formal restriction is required given the very low discharge as a function of the site being very small and ability to store for 100% of the 1in100year+40%cc

This scheme will manage the discharge to the sewer using SUDS (only discharging at a restricted rate as an emergency overflow) hence there are no objections from Thames Water as the scheme has addressed the SUDS sequential approach and SUDS hierarchy and results in a betterment and reduces flood risk posed from the infrastructure to surrounding properties also by accommodating for climate change.

The separate surface water connection to a separate surface water only sewer will be retained with betterment due to the 1.0l/s restriction from the site.

A 106 Agreement with the water company will make the connection from the new scheme official. All works (eg: modified connection) to be undertaken with Thames Water and the contractor once on site.

4.3 Drainage Condition SUDS Storage Calculations

As per the approved planning stage:

We use 100% of the overestimated impermeable areas of the site plus an additional 20%, despite there being maximised porous and permeable areas.

This is 360.00m².

This is an unequivocal betterment and is LLFA compliant.

This includes for establishing Source Control SUDS for the existing pool annex to be retained.

Calculations have been prepared based on the Micro Drainage software package to assess the size of structure required, based on the following design criteria.

So for clarity:

- Design event for storage - 100 year (with climate change; see below)
- Use 60% of the site regardless of the site being only 40% impermeable
- Climate change allowance - 40%
- Calculations use the ~~2.0 l/s~~ **1.0 l/s** to derive the oversized storage calculations
- 50% reduction as standard of this overestimated impermeable drain area
- The calculation output is included within Appendix B (**updated**).
 - Oversized storage required: **50.0m³**

4.4 SUDS Condition Stage Inverts

The SUDS measures have been incorporated as part of the designs, to meet the constraints of the site and setting.

The highest forms of SUDS have been prioritized as per the LLFA guidance and SUDS Hierarchy.

The scheme has been designed in accordance with the drainage officer's strict requirements.

We have used industry best practice, our 21 years experience, together with the lessons learned and the same approach as per many similar and more complex UK wide schemes.

Inverts

The SUDS storage areas have been kept deliberately at the surface / as high as is feasible.

- The lowest SUDS storage would be 0.6m depth of geocellular + additional up to 300mm maximum for laying course and the paving slabs / extra depths to allow for the falls of connections within the site

- This means a maximum depth of c. 0.90m and at the closest point to the discharge point
- The sewer invert is (based on other asset plans) c. 1.20m below ground level at the lowest hence the fall is more than sufficient to permit gravity drainage from the final manhole on site
- This is fully compliant at this stage.

[Note: the areas used in the SUDS may not match exactly the areas used for any Landscaping or Net Gain calculations because the SUDS have to take into account the construction make-up and specification requirements which restricts the areas truly available to SUDS.]

4.5 SUDS Conditions Specifications: SUDS Hierarchy Compliant

Formal SUDS Type	Source Control	Dimensions	Storage Volume
Rain Garden / Planter Storage: Easily accessible at all times for maintenance	Yes & Natural Interception	Fed directly by RWP / diverter 2.40m ² in total With an average voided height / depth of planter bed integrated of 0.4m = 0.96m ³	0.96m ³
Plots 1-3 New porous and permeable front parking / garden areas with lined geocellular storage (Note: given sewer connection is very deep, it is possible for the geocellular to be deeper in fewer locations, which can be optimized during detailed design)	Yes & Natural Interception	104m ² total area that can have geocellular storage Use 0.6m depth cellular storage cells = 62.4m ³ Assume 95% void ratio = 59.28m ³	59.28m ³
Plot 4 New permeable front parking / garden areas with lined geocellular storage	Yes & Natural Interception	Area of 24.5m ² Use shallower 0.3m depth of geocellular due to distance from final manhole = 7.35m ³ Assume 95% void ratio = 6.98m ³	6.98m ³
		Total	67.22m³ Greater than the already oversized 50.0m³ required
Additional (but not required to meet the volume of storage requirements) New permeable rear patio areas with lined geocellular storage (Note: given sewer connection is very deep, it is possible for the geocellular to be deeper in fewer locations, which can be optimized during detailed design)	Yes & Natural Interception	Total of c. 32.5m ² Use 0.8m depth cellular Subtotal = 26.00m ³ Assume 95% void ratio = 24.70m ³	24.70m ³

The indicative SUDS layout plans (Appendix C) and elevations below shows locations for the SUDS structures and demonstrates the specification dimensions are achievable.

This is a scaled drawing from the architects so the dimensions of all SUDS used in the table above are verified by the drawing.

Connections of SUDS online subject to approval of the water company.

4.6 For probity: Sedum / Blue / Green Roofs

The scheme has necessarily pitched roofs hence standard porous roofs are not feasible.

It has been considered that given the SUDS can attain the required volume of storage, incorporating further changes to the roof area would increase the weight at height and increase the embodied carbon without a commensurate sustainability betterment from the SUDS.

The small areas of porch flat roof are not suitable for sedum roof areas to make a significant contribution to SUDS.

Any additional area or depth of green or blue roof will provide interception and contribute to the restriction and storage on site of surface water; it does not need to be quantified at this stage as the scheme can accommodate other more sustainable forms project-wise of SUDS and this has been demonstrated at planning by this report.

4.7 Pipe Sizes / Manholes / Pipe Runs

These are shown on the SUDS drainage layout in Appendix C.

All pipes are to Building Regulation requirements and the responsibility of the contractor.

The falls all work for the inverts shown to enable gravity drainage to the final manhole with existing connection to the sewer.

As stated:

Surface Water pipes: 110mm diameter
Main communication pipes: 1in 100 fall (Building regs and contractor to conform on site)
Minor branches of RWP to storage adjacent = can be 1 in 50 fall
Pipes: choice of exact specification to be by contractor / Building Regs and British Standards requirements

4.8 Maintenance

With respect to maintenance, the proposed SUDS techniques should be maintained in accordance with the appropriate regimes set out within the SUDS manual and will be the responsibility of the owner / management company.

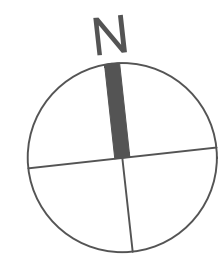
- The specifications have been deliberately chosen to be low maintenance, resilient and easy to access inspect & clean.

A SUDS maintenance schedule is included within Appendix D.

APPENDIX A

- KEY**
- GRASS
 - POROUS BLOCK PAVERS
 - PAVING
 - MIXED PLANTED BORDERS RHS PLANTS FOR POLINATORS
 - MIXED NATIVE HEDGEROW - EXISTING
 - MIXED NATIVE HEDGEROW - PROPOSED
 - 1.2M HIGH POST AND WIRE FENCE

- FEATHERED OR MULTISTEM DECIDUOUS TREES
- SEMI MATURE CLEAR STEM TREES
- EXISTING RETAINED TREES
- RPA



landscape connection

Turret House, The Avenue, Amersham, Bucks. HP7 0AB
01494 729991 www.landscapeconnection.co.uk

CLIENT C/O ARCHDEZINE REVISIONS

SITE 1-2 COMPTON CLOSE
EARLEY

DRAWING LANDSCAPE STRATEGY

DATE 29-5-24

DRWG NR LC-2947-02

SCALE 1:100 @ A1

ISSUE PLANNING



Search address supplied 1
Compton Close
Earley
Reading
RG6 7EA

Your reference 1/2 Compton Close Earley

Our reference ALS/ALS Standard/2025_5154166

Search date 24 April 2025

Keeping you up-to-date

We have a new website and email address

Website URL: thameswater.co.uk/propertysearches

Email address: property.searches@thameswater.co.uk

Please do get in contact with us if you have any questions.



Thames Water Utilities Ltd
Property Searches,
Clearwater Court, Vastern Road, Reading RG1 8DB



property.searches@thameswater.co.uk
thameswater.co.uk/propertysearches



0800 009 4540

Search address supplied: 1, Compton Close, Earley, Reading, RG6 7EA

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This search provides maps showing the position and size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0800 009 4540, or use the contact details below:

Thames Water Utilities Ltd
Property Searches
Clearwater Court
Vastern Road
Reading
RG1 8DB

Email: property.searches@thameswater.co.uk

Web: thameswater.co.uk/propertysearches

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority. Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners. The public sewer map relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus. The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an 'as constructed' record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies. For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and pressure test to be carried out for a fee.



For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. You can do this by emailing customer.feedback@thameswater.co.uk with the email subject header 'Enquiry – TWOSA', along with details of the request.

If you have any questions regarding sewer connections, budget estimates, diversions or building over issues please direct them to our service desk which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

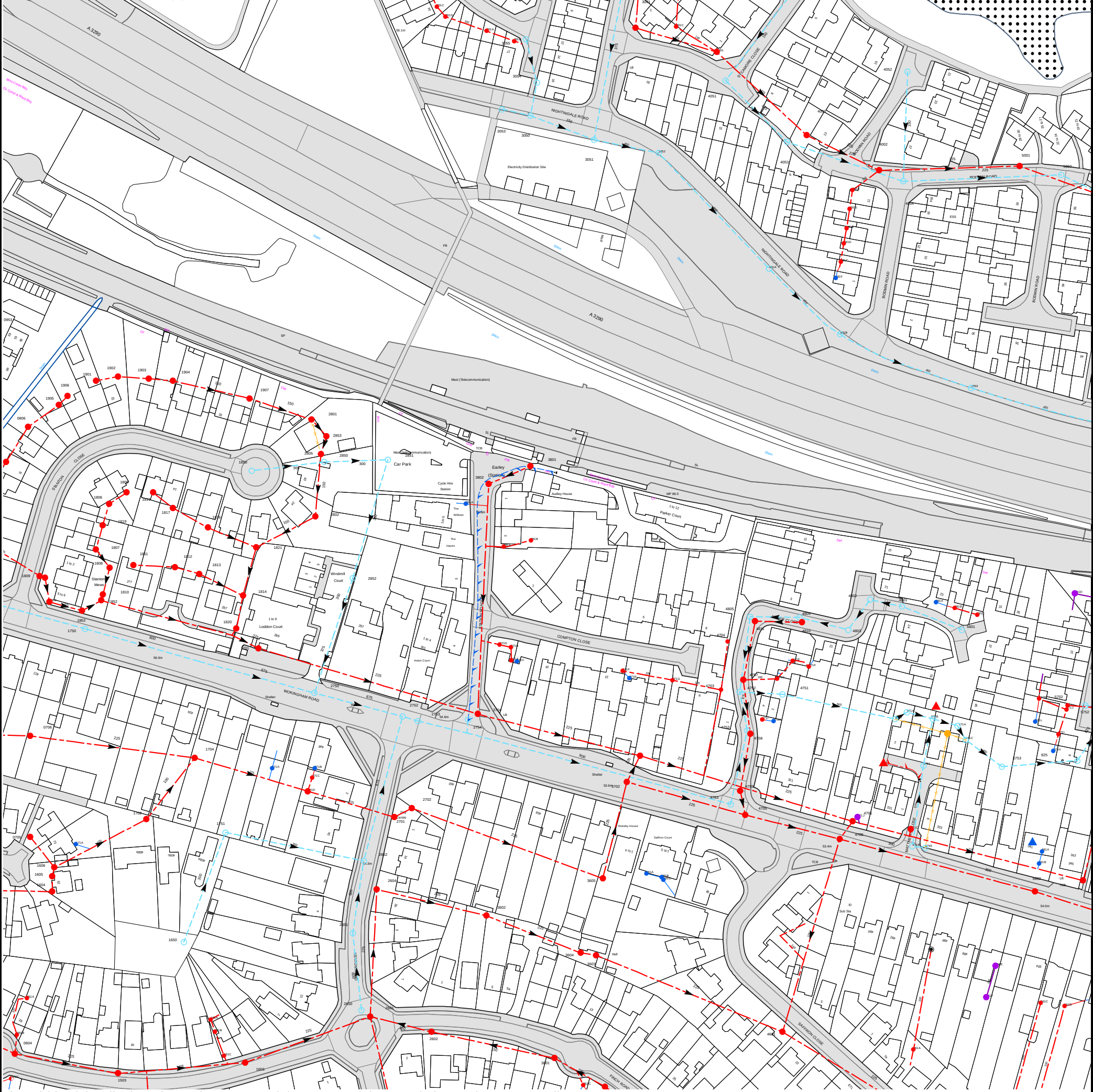
Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Clean Water queries

Should you require any advice concerning clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 475330,171840
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map (2024) with the Sanction of the controller of H.M. Stationery Office, License no. AC0000849556 Crown Copyright Reserved.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
571H	n/a	n/a
571I	n/a	n/a
571J	n/a	n/a
3052	55.44	52.32
4053	56.12	53.68
3051	55.77	52.56
4003	n/a	n/a
4051	55.62	53.97
4052	55.03	53.84
4001	55.58	52.08
3001	56.04	52.32
301C	n/a	n/a
201C	n/a	n/a
201D	n/a	n/a
301A	n/a	n/a
3053	55.92	54.8
301B	n/a	n/a
3055	55.46	54.53
3050	55.96	54.45
3054	55.76	54.51
571K	n/a	n/a
5801	n/a	n/a
581C	n/a	n/a
581B	n/a	n/a
581E	n/a	n/a
581D	n/a	n/a
5953	n/a	n/a
5050	n/a	n/a
5001	55.93	51.58
0805	n/a	n/a
0806	57.51	56.46
0706	n/a	n/a
1809	57.24	54.85
081A	57.15	54.75
1854	57	54.65
1905	n/a	n/a
1906	n/a	n/a
1853	56.75	54.45
1750	56.59	53.66
1807	56.86	55.67
1901	n/a	n/a
5761	52.02	50.522
471H	n/a	n/a
471I	n/a	n/a
4767	51.96	50.195
571B	51.7	50.184
471A	52.06	50.191
4751	53.63	50.54
471G	n/a	n/a
471F	n/a	n/a
471E	n/a	n/a
4803	n/a	n/a
4810	n/a	n/a
4811	n/a	n/a
4804	n/a	n/a
4801	n/a	n/a
581A	n/a	n/a
4802	n/a	n/a
491B	n/a	n/a
491F	n/a	n/a
491A	n/a	n/a
491C	n/a	n/a
491D	n/a	n/a
491E	n/a	n/a
491G	n/a	n/a
401A	n/a	n/a
4054	55.11	52.52
4002	56.06	51.79
1852	56.6	54.33
1819	n/a	n/a
1810	56.63	55.12
1806	57.13	56.04
1808	56.69	55.42
1902	57.33	56.43
1805	57.09	56.24
1811	56.24	55.44
1903	57.25	56.38
1815	n/a	n/a
1904	57.25	56.3
1817	n/a	n/a
1812	56.37	55.06
1704	n/a	n/a
1813	56.07	54.97
1816	n/a	n/a
1820	55.72	54.34
1814	55.97	54.52
1907	56.96	55.82
1850	56.71	55.05
1821	56.44	54.79
1701	55.55	53.86
271A	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
271D	n/a	n/a
2801	n/a	n/a
271C	n/a	n/a
2750	55.2	52.16
271B	n/a	n/a
2802	56.46	55.07
2805	n/a	n/a
2850	56.43	54.73
2853	n/a	n/a
2852	n/a	n/a
2851	56.3	54.51
2752	54.77	51.14
2753	54.6	51.05
2754	54.52	51.86
2704	54.46	52.89
3802	55.83	53.82
371D	n/a	n/a
381A	n/a	n/a
371B	n/a	n/a
371A	n/a	n/a
371C	n/a	n/a
3801	55.99	54.03
381B	n/a	n/a
3702	53.61	52.12
3701	53.98	52.04
4703	n/a	n/a
4704	n/a	n/a
4763	53.2	50.73
4752	n/a	n/a
4759	n/a	n/a
4757	n/a	n/a
4753	n/a	n/a
4805	n/a	n/a
4758	n/a	n/a
5703	51.2	50.15
1604	56.21	55.42
1605	56.35	55.4
1606	56.45	55.3
0705	56.64	55.6
571A	51.73	50.177
571C	51.93	50.172
561F	n/a	n/a
561E	n/a	n/a
5753	n/a	n/a
5602	53.83	51.21
571L	n/a	n/a
561B	n/a	n/a
561C	n/a	n/a
561A	n/a	n/a
561D	n/a	n/a
5702	51.78	50.23
5750	51.6	49.79
5601	53.44	51.23
5752	51.21	50.26
461A	n/a	n/a
4601	54.73	50.89
3603	53.73	50.98
3604	53.86	51.36
3602	53.65	51.72
361C	n/a	n/a
3605	53.27	52.32
361B	n/a	n/a
361A	n/a	n/a
5755	53.43	51.93
471B	53.14	50.595
4706	53.29	51.44
471C	52.91	51.822
4701	52.74	51.69
471J	n/a	n/a
4705	53.23	51.78
1503	55.52	54.32
1603	55	53.71
161C	n/a	n/a
2602	54.62	53.47
161B	n/a	n/a
161A	n/a	n/a
2601	54.46	53.08
2650	54.45	52.75
1650	55.17	53.96
2651	54.2	52.49
2604	54.25	52.3
2652	54.23	52.02
171A	n/a	n/a
1751	n/a	n/a
1702	55.5	54.45
2701	54.51	52.81
2702	54.29	52.69
3505	55.17	54.38
351C	n/a	n/a
3601	54.93	54.06
0604	56.11	54.79
061B	n/a	n/a
061A	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
051G	n/a	n/a
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.		



Asset Location Search - Sewer Key

Public Sewer Types (Operated and maintained by Thames Water)

	Foul Sewer: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.
	Surface Water Sewer: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.
	Combined Sewer: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.
	Storm Sewer
	Sludge Sewer
	Foul Trunk Sewer
	Surface Trunk Sewer
	Combined Trunk Sewer
	Foul Rising Main
	Surface Water Rising Main
	Combined Rising Main
	Vacuum
	Thames Water Proposed
	Vent Pipe
	Gallery

Other Sewer Types (Not operated and maintained by Thames Water)

	Sewer
	Culverted Watercourse
	Proposed
	Decommissioned Sewer
	Content of this drainage network is currently unknown
	Ownership of this drainage network is currently unknown

Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plan are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate the direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

	Air Valve		Meter
	Dam Chase		Vent
	Fitting		

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

	Ancillary		Drop Pipe
	Control Valve		Well

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol. Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

	Inlet		Outfall
	Undefined End		

Other Symbols

Symbols used on maps which do not fall under other general categories.

	Change of Characteristic Indicator		Public / Private Pumping Station
	Invert Level		Summit

Areas

Lines denoting areas of underground surveys, etc.

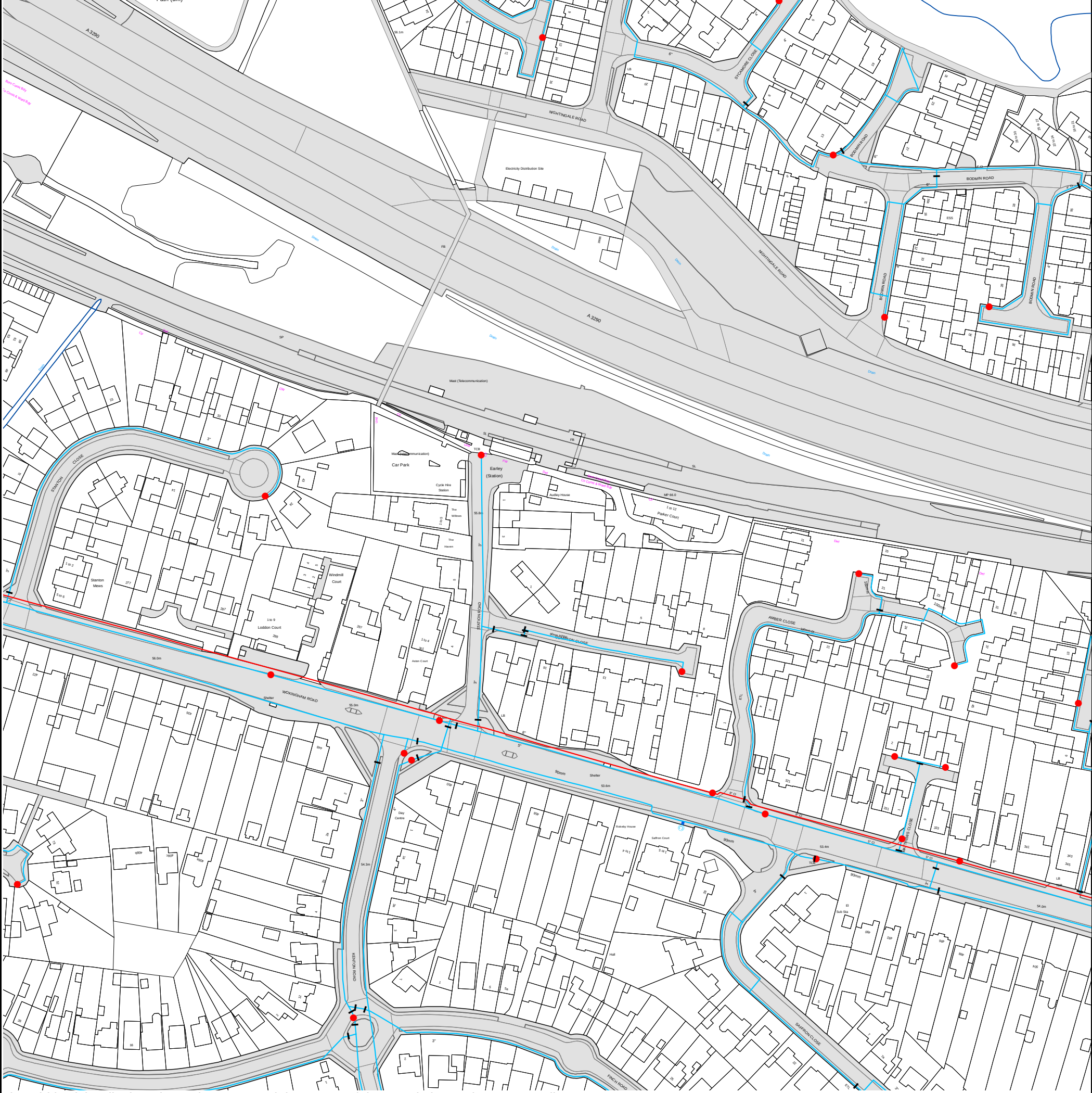
	Agreement
	Chamber
	Operational Site

Ducts or Crossings

	Casement	Ducts may contain high voltage cables. Please check with Thames Water.
	Conduit Bridge	
	Subway	
	Tunnel	

5) 'na' or '0' on a manhole indicates that data is unavailable.

6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimeters. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology, please contact Property Searches on 0800 009 4540.



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 475330, 171840.
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.
Based on the Ordnance Survey Map (2024) with the Sanction of the controller of H.M. Stationery Office, License no. AC0000849556 Crown Copyright Reserved.



Asset Location Search - Water Key

Water Pipes (Operated & Maintained by Thames Water)

- 4"** **Distribution Main:** The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.
- 16"** **Trunk Main:** A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.
- 3" SUPPLY** **Supply Main:** A supply main indicates that the water main is used as a supply for a single property or group of properties.
- 3" FIRE** **Fire Main:** Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.
- 3" METERED** **Metered Pipe:** A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.
- Transmission Tunnel:** A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.
- Proposed Main:** A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger
- Casement:** Ducts may contain high voltage cables. Please check with Thames Water.

Other Water Pipes (Not Operated or Maintained by Thames Water)

- Other Water Company Main:** Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.
- Private Main:** Indicates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

APPENDIX B

Calculated by:

George Locke

Site name:

1&2 Compton RG6 7EA

Site location:

1&2 Compton RG6 7EA

Site Details

Latitude:

51.44035° N

Longitude:

0.91766° W

Reference:

1380702305

Date:

Feb 14 2024 16:06

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.

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):

0.135

Methodology

Q_{BAR} estimation method:

Calculate from SPR and SAAR

SPR estimation method:

Calculate from SOIL type

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

Soil characteristics

	Default	Edited
SOIL type:	2	2
HOST class:	N/A	N/A
SPR/SPRHOST:	0.3	0.3

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

Hydrological characteristics

	Default	Edited
SAAR (mm):	644	644
Hydrological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
-------------------------	---------	--------

Q_{BAR} (l/s):	0.22	0.22
1 in 1 year (l/s):	0.19	0.19
1 in 30 years (l/s):	0.51	0.51
1 in 100 year (l/s):	0.71	0.71
1 in 200 years (l/s):	0.83	0.83

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at 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 www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of 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, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Calculated by:	George Locke
Site name:	1&2 Compton RG6 7EA
Site location:	1&2 Compton RG6 7EA

This is an estimation of the storage volume requirements that are needed 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). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site Details

Latitude:	51.44036° N
Longitude:	0.91767° W
Reference:	1269940134
Date:	Feb 14 2024 16:10

Site characteristics

Total site area (ha):	0.135
Significant public open space (ha):	0
Area positively drained (ha):	0.135
Impermeable area (ha):	0.081
Percentage of drained area that is impermeable (%):	60
Impervious area drained via infiltration (ha):	0
Return period for infiltration system design (year):	10
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	10
Compliance factor for rainwater harvesting system (%):	66
Net site area for storage volume design (ha):	0.14
Net impermeable area for storage volume design (ha):	0.09
Pervious area contribution to runoff (%):	30

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other flow rates will have been reduced accordingly.

Methodology

esti	IH124
Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	2	2
SPR:	0.3	0.3

Hydrological characteristics

	Default	Edited
Rainfall 100 yrs 6 hrs:	--	55
Rainfall 100 yrs 12 hrs:	--	74.97
FEH / FSR conversion factor	1.19	1.19
SAAR (mm):	644	644
M5-60 Rainfall Depth (mm):	17	17
'r' Ratio M5-60/M5-2 day:	0.4	0.4
Hydrological region:	6	6
Growth curve factor 1 year	0.85	0.85
Growth curve factor 10 year	1.62	1.62
Growth curve factor 30 year	2.3	2.3

Design criteria

Climate change allowance factor:	1.4	Growth curve factor 100 years:	3.19	3.19
Urban creep allowance factor:	1.1	Q_{BAR} for total site area (l/s):	0.22	0.22
Volume control approach:	Use long term storage	Q_{BAR} for net site area (l/s):	0.22	0.22
Interception rainfall depth (mm):	5			
Minimum flow rate (l/s):	1.0			

Site discharge rates	Default	Edited	Estimated storage volumes	Default	Edited
1 in 1 year (l/s):	1	1	Attenuation storage 1/100 years (m³):	50	50
1 in 30 years (l/s):	1	1	Long term storage 1/100 years (m³):	0	0
1 in 100 year (l/s):	1	1	Total storage 1/100 years (m³):	50	50

This report was produced using the storage estimation tool developed by HRWallingford and available at 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 <http://uksuds.com/terms-and-conditions.htm>. The outputs from this tool have been used to estimate storage volume requirements. 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, CEH, Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

APPENDIX C

Landscape Scheme for context: demonstrate SUDS are integrated with biodiversity scheme



Formal SUDS Type	Source Control	Dimensions	Storage Volume
Rain Garden / Planter Storage: Easily accessible at all times for maintenance	Yes & Natural Interception	Fed directly by RWP / diverter 2.40m2 in total With an average voided height / depth of planter bed integrated of 0.4m = 0.96m3	0.96m3
Plots 1-3 New porous and permeable front parking / garden areas with lined geocellular storage (Note: given sewer connection is very deep, it is possible for the geocellular to be deeper in fewer locations, which can be optimized during detailed design)	Yes & Natural Interception	104m2 total area that can have geocellular storage Use 0.6m depth cellular storage cells = 62.4m3 Assume 95% void ratio = 59.28m3	59.28m3
Plot 4 New permeable front parking / garden areas with lined geocellular storage	Yes & Natural Interception	Area of 24.5m2 Use shallower 0.3m depth of geocellular due to distance from final manhole = 7.35m3 Assume 95% void ratio = 6.98m3	6.98m3
		Total	67.22m3 Greater than the already oversized 50.0m3 required
Additional (but not required to meet the volume of storage requirements) New permeable rear patio areas with lined geocellular storage (Note: given sewer connection is very deep, it is possible for the geocellular to be deeper in fewer locations, which can be optimized during detailed design)	Yes & Natural Interception	Total of c. 32.5m2 Use 0.8m depth cellular Subtotal = 26.00m3 Assume 95% void ratio = 24.70m3	24.70m3

Shallower geocellular given required fall to final manhole

Surface Water pipes: 110mm diameter

Main communication pipes: 1in 100 fall (Building regs and contractor to conform on site)

Minor branches of RWP to storage adjacent = can be 1 in 50 fall

Pipes: choice of exact specification to be by contractor / Building Regs and British Standards requirements

Final Manhole SW10 includes:

Vortex Control Discharge Rate Restriction Device to 1.0l/s

SUDS Connection Chains:

Plot 4: RWP to Geocellular and Planter and then to SW01 then SW10 final manhole

Plots 1-3 : Direct from RWP to planter storage / granular then to SW06-SW08 and then SW09 then SW10 final manhole

Rear Patio: drain to garden and overflow to SW02-SW05 thence to SW09 then SW10 final manhole

Dotted Blue Areas

Geocellular storage areas

Blue Solid Areas

Rain Garden Planters with void storage

Red Outline Blue Filled Box

Existing final manhole connected to surface water sewer for re-use subject to TW requirements at detailed design

Dashed Blue Line

Indicative pipe layout: subject to detailed design / other utilities but not required at this stage of planning as it would be abortive work

Green boxes

Permeable paving patio areas with granular storage (offline and not required to meet the required volume storage; discharge low order storm to garden; overflow connection to surface water network)

MANHOLE TYPES

A: PC MANHOLE UNITS TO BS 5911 PART 200 KITE MARKED

B: POLYPROPYLENE INSPECTION CHAMBER-450 dia

POLYPROPYLENE INSPECTION CHAMBERS TO BE MANUFACTURED BY HEPWORTH OR SIMILAR APPROVED

All downpipes and gulleys to be roddable

Surface Water Drainage				
Manhole No.	Invert (Metres bgl)	Type	Cover Size	Internal
SW01	0.6	B	450	450
SW02	0.4	B	450	450
SW03	0.4	B	450	450
SW04	0.4	B	450	450
SW05	0.4	B	450	450
SW06	0.75	B	450	450
SW07	0.77	B	450	450
SW08	0.78	B	450	450
SW09	0.8	B	450	450
SW10	0.85 - 0.9	A	600x600	1200

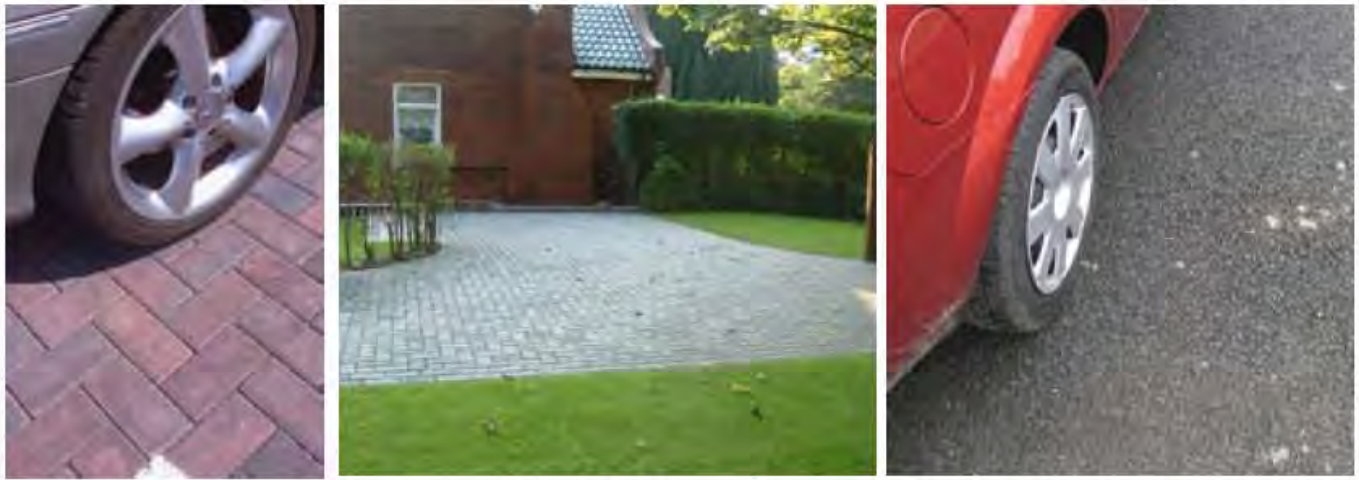
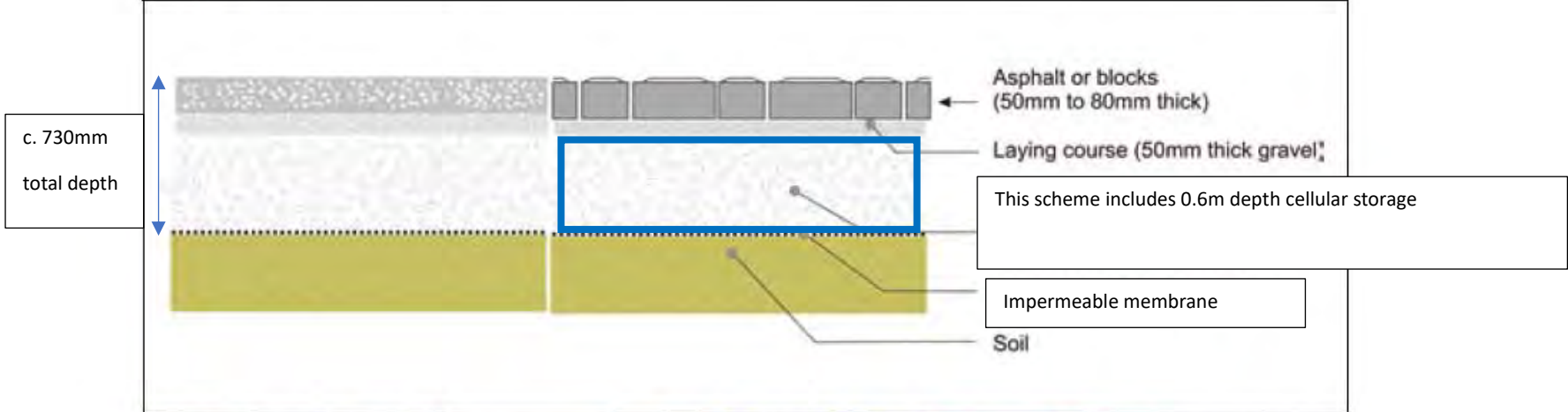
Plots 1-3

Permeable Paving for Parking / Porous Area SUDS Cross Sections

This is to demonstrate this is an EA approved permeable make-up
Please see below for the site specific detailed Cross Sections

Hard permeable and porous surfaces

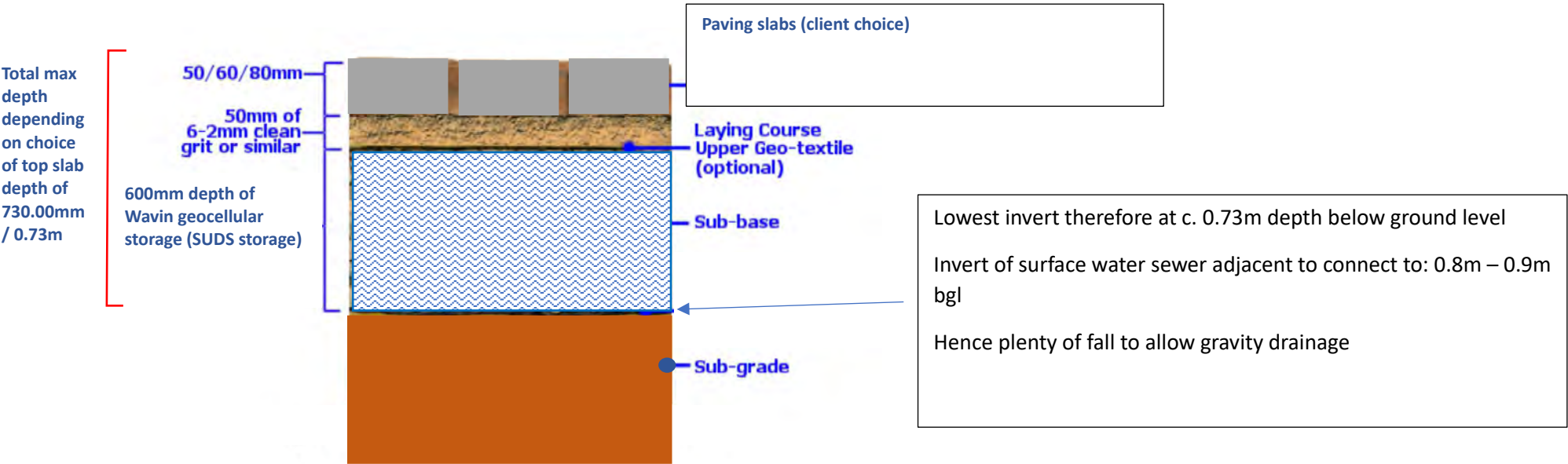
Hard surfacing which allows water to soak into it can be built with porous asphalt, porous concrete blocks, concrete or clay block permeable paving. The material has open voids across the surface of the material or around the edges of blocks that allow water to soak in. The surface is constructed over a permeable sub-base. Systems are available from a variety of manufacturers. Sources of further information are provided in Section 6.



Pros	Cons
Hard and durable with a very long service life if correctly constructed	Can be more expensive than other options
Require the least amount of maintenance	Require knowledgeable contractor to construct correctly (especially porous asphalt which should be provided and laid by a specialist company)
Wide variety of shapes and colours available for concrete blocks	

Permeable Patio

Detailed Cross Section



Plot 4

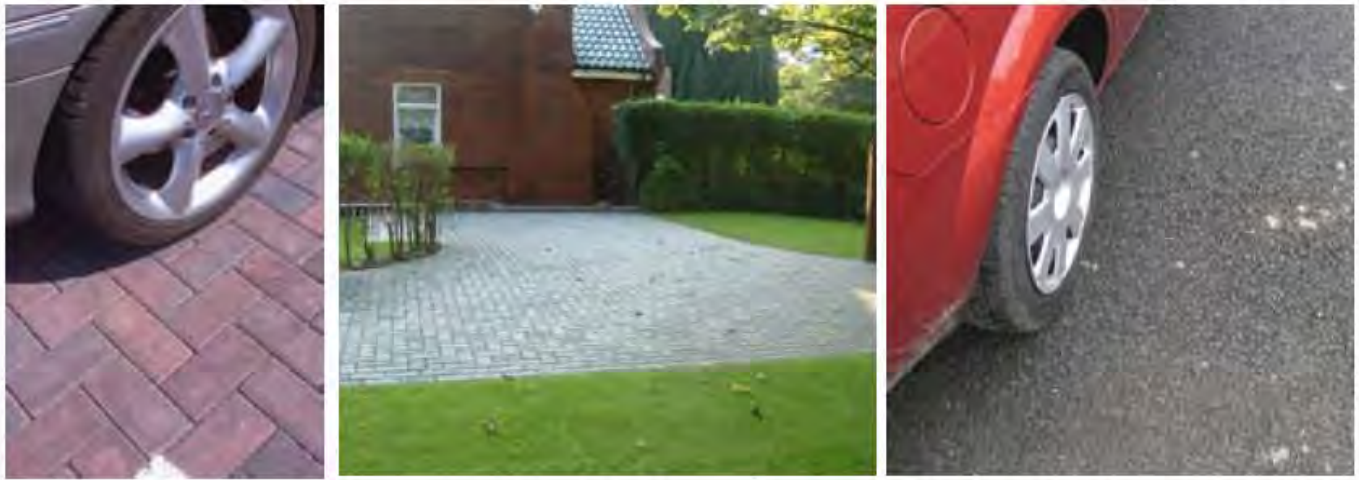
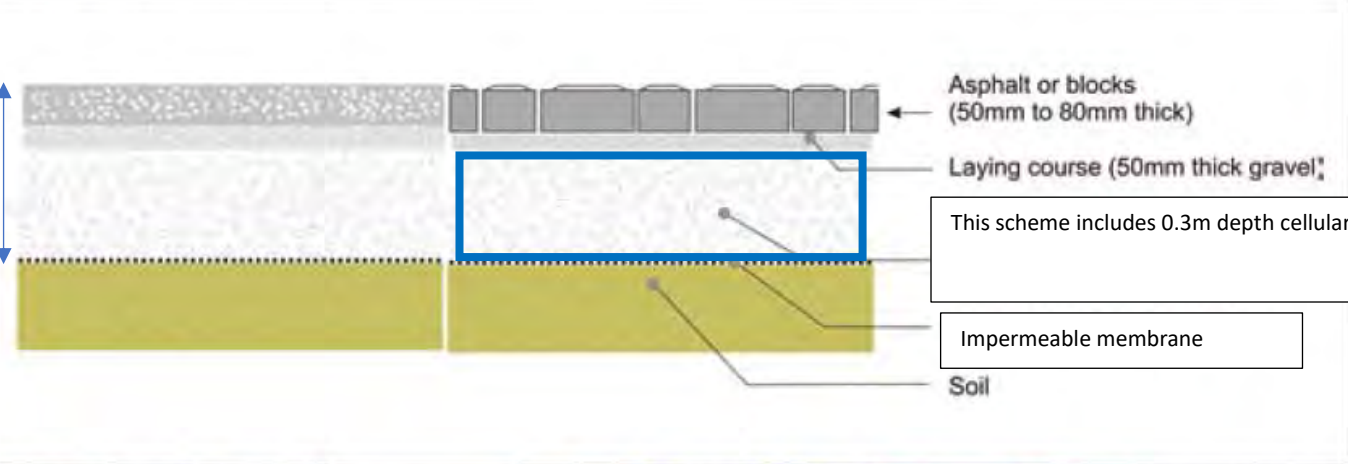
Permeable Paving for Parking / Porous Area SUDS Cross Sections

This is to demonstrate this is an EA approved permeable make-up

Please see below for the site specific detailed Cross Sections

Hard permeable and porous surfaces

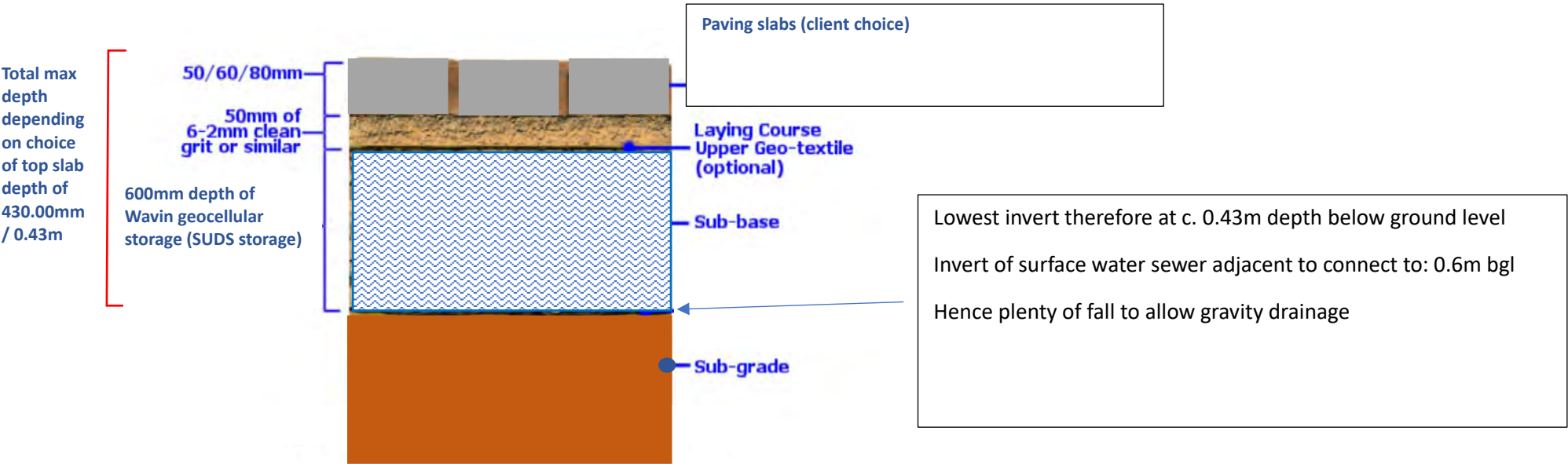
Hard surfacing which allows water to soak into it can be built with porous asphalt, porous concrete blocks, concrete or clay block permeable paving. The material has open voids across the surface of the material or around the edges of blocks that allow water to soak in. The surface is constructed over a permeable sub-base. Systems are available from a variety of manufacturers. Sources of further information are provided in Section 6.



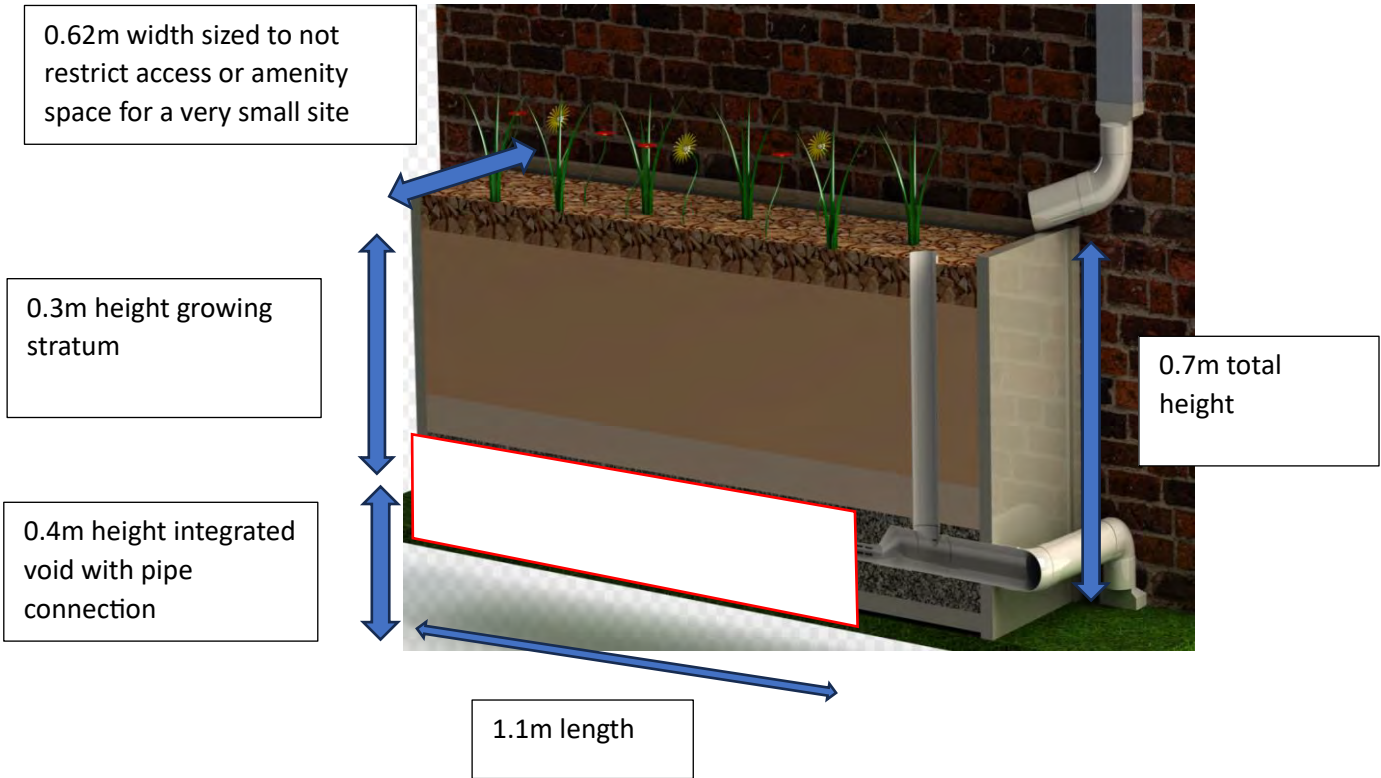
Pros	Cons
Hard and durable with a very long service life if correctly constructed	Can be more expensive than other options
Require the least amount of maintenance	Require knowledgeable contractor to construct correctly (especially porous asphalt which should be provided and laid by a specialist company)
Wide variety of shapes and colours available for concrete blocks	

Permeable Patio

Detailed Cross Section

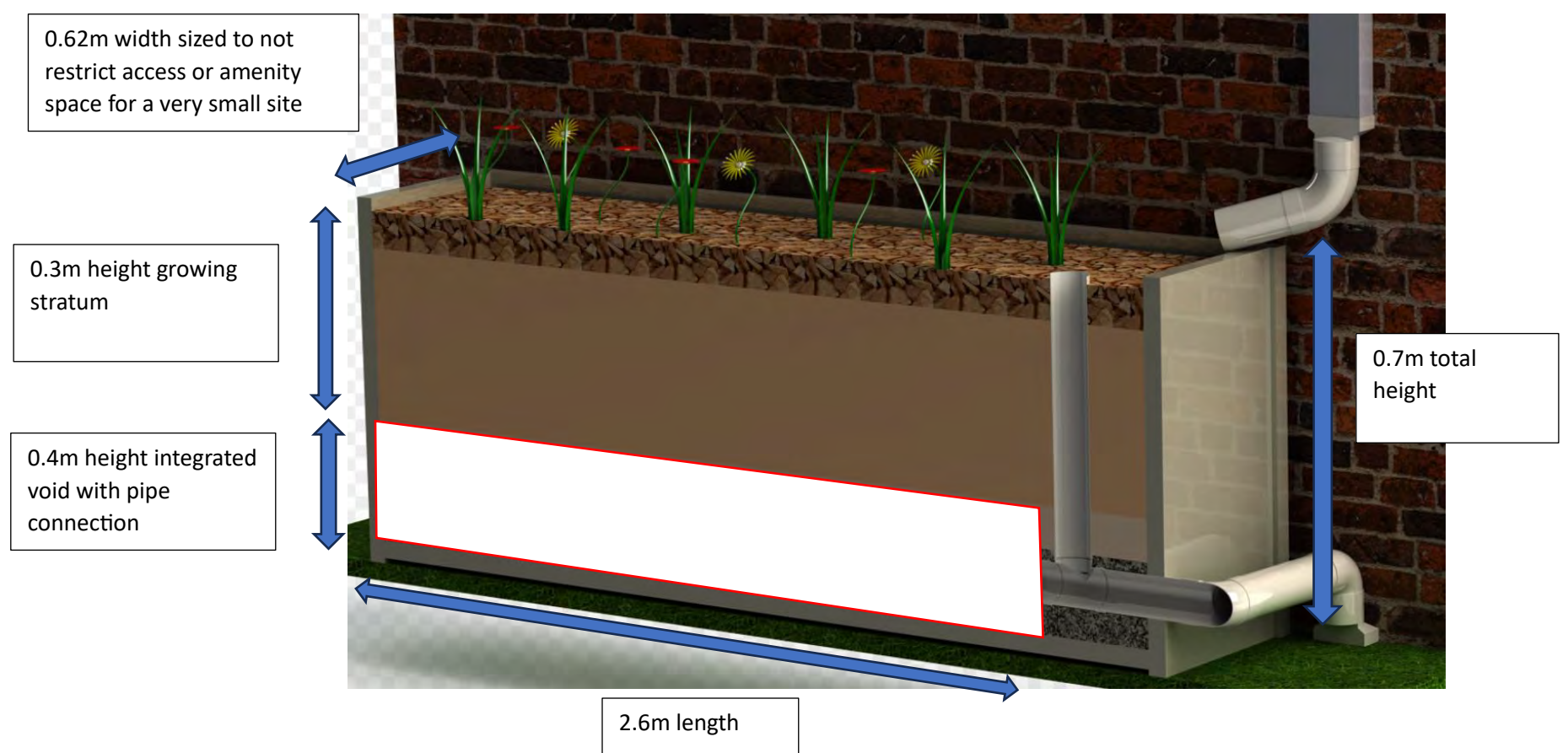


Planters Cross Section: Front Plots 1-3



Planters Cross Section: Plot 4

Rear: 2 number combined: a) 2.5m and b) 1.1 both by 0.62m = (2.232m²) with 0.4m void height of storage = 0.89m³



This is to demonstrate there are suitable specifications off the shelf.

Please see below for the site specific detailed Cross Sections

110mm Plain Bottle Gully (Roddable)



Our Price: £8.50
(Exc. 20% VAT)
(£10.20 Inc. VAT)
Earn 8 Loyalty Point
Model: GWPTE330



Example Inspection chamber / catch pit: fully roddable

110mm Plain Bottle Gully (Roddable)

Rear RWP can also use Diverters to Rainwater Butts

Specification to be chosen by client / contractor to integrate with cycle storage area



Example Planters and Mechanisms for Connection

There are many off the shelf versions; client aesthetic requirements can confirm the exact specification; it is not necessary to commit to a type or design.

Hydro-Brake® Optimum

Reduce Storage Needs

Product Summary

The Hydro-Brake® Optimum Vortex Flow Control is a versatile, self-activating device with a unique geometry designed to harness the energy of vortex flow.

The Hydro-Brake® Optimum is used to maximize savings on new construction projects by minimizing stormwater detention volumes. Also an economical retrofit solution, the Hydro-Brake® Optimum can be installed in over-discharging ponds and catch basins to restrict the outflow without requiring the construction of additional detention volumes.

With large openings that guard against blockages and an installation base upwards of 25,000 units, the Hydro-Brake® is a trusted and proven solution used to reduce the rate of stormwater runoff.

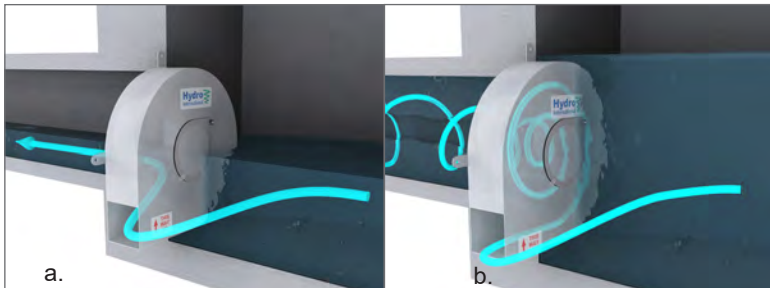


Fig.1 The Hydro-Brake® operates like (a) a large orifice under low flow conditions, and (b) a small orifice under higher flow / higher head conditions when a vortex air core forms within the device and throttles the flow.

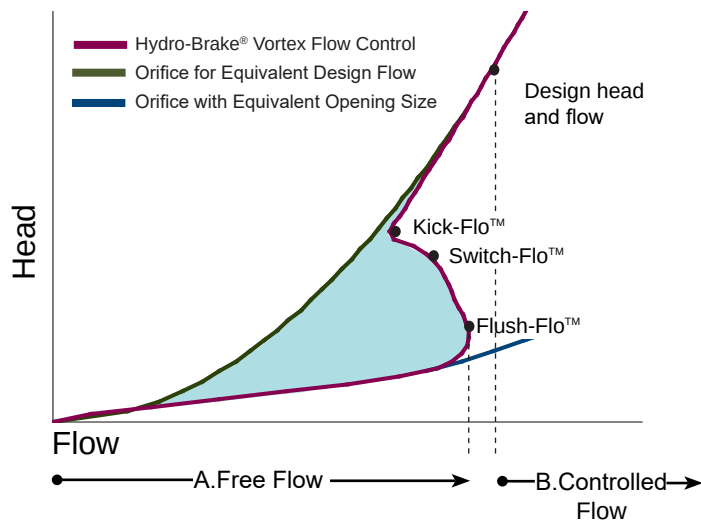


Fig.2 The characteristic of the Hydro-Brake® vs. an equivalent orifice.

The Hydro-Brake® Vortex Flow Control optimizes flow control to allow for higher discharge rates at lower heads than conventional flow control options. The head/discharge curves shown below illustrate the behavior of a Hydro-Brake® Vortex Flow Control compared to an orifice (Fig.2).

How it Works

Reduce Storage Volumes by 40%



The Hydro-Brake® Optimum operates on simple fluid hydraulics. Flow enters the volute tangentially through the inlet. Under low flow conditions, the Hydro-Brake® Optimum acts as a large orifice and water passes directly from the inlet to the outlet (Fig.1a).

As flow increases and reaches the Flush-Flo™ point, high peripheral velocities initiate the throttling action. As head increases, the valve approaches the Switch-Flo™ and Kick-Flo™ points and an air-filled core starts to form in the volute. As head continues to increase, the air core fully stabilizes and the valve discharge is throttled to that of a smaller orifice (Fig.1b).

Benefits

- » Reduced stormwater storage volumes by up to 40%
- » Up to 50% savings in project storage costs
- » Self-activating with no moving parts or power requirements
- » Available in wall-mounted or floor-mounted geometries
- » Area of opening is 3-6 times larger than the equivalent orifice
- » Virtually maintenance free
- » Proven performance with over 25,000 installations worldwide



Stormwater Solutions

→ hydro-int.com/hydro-brake

Sizing & Design

Three series of Hydro-Brake® Optimum Vortex Flow Controls are available to suit various applications and design constraints. Refer to the Hydro-Brake® Optimum Design Chart for typical sizing guidelines.

Series	S Series	V Series	C Series
Typical Geometry			
Models	SH STH SXH SMH SMXH	SV SXV SMV	C CX CH
Typical Applications	- Flow control at the inlet of the storm drain system - Outlet flow control for stormwater detention systems	- Erosion control & energy dissipation - Roof runoff control for "Blue Roof" detention schemes	- Outlet flow control for flood dams and levees - Outlet flow control for stormwater detention systems
Typical Mount Style	Wall Mount	Downspout/Roof Mount Floor Mount Pipe Mount	Floor Mount
Typical Diameter Range*	2 - 16 in (5 - 41 cm)	2 - 16 in (5 - 41 cm)	3 - 20 in (7.5 - 51 cm)
Typical Flow Range**	0.05 - 5.6 cfs (1 - 157 L/s)	0.05 - 6.0 cfs (1 - 174 L/s)	0.18 - 14.3 cfs (5.3 - 405 L/s)

*Listed diameter ranges are typical guidelines only. Hydro-Brake® Optimum Vortex Flow Controls can be manufactured to any specified diameter up to 6'.

**Flow ranges listed are for 4' - 6.5' of head.

Contact Hydro International for site-specific sizing and design requirements.

Optional Design Accessories

Pivoting Bypass Door



For maintenance access to the outlet pipe.

Curved Backplate



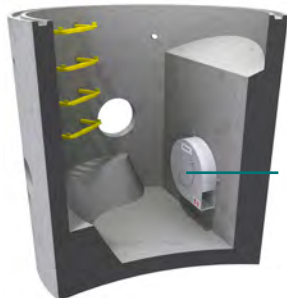
To allow for flush-mounting to the wall of a round manhole.

Vortex Suppressor Pipe

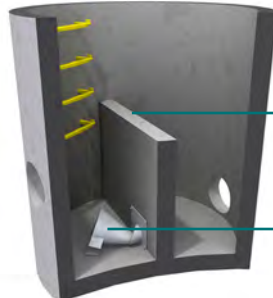


To eliminate air core for emergency bypass.

Typical Chamber Configurations



Wall Mounted
SXH Model for
Catch Basin
Inlet Control



Large Storm
Bypass Weir

Floor Mounted
CH Model for
Small Storm
Flow Control



Pipe Mounted
SXV Model for
Energy & Velocity
Dissipation



📍 Hydro International, 94 Hutchins Drive, Portland, ME 04102

☎ Tel: (207) 756-6200

✉ Email: stormwaterinquiry@hydro-int.com

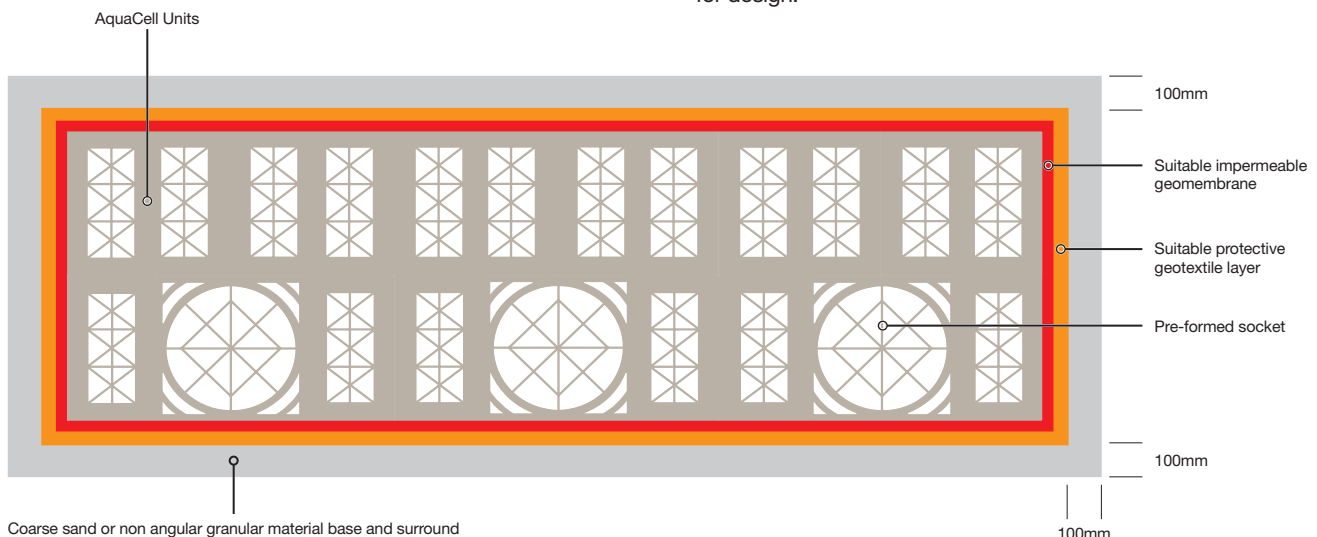
🌐 Web: www.hydro-int.com/hydro-brake

Typical Storage Tank Installation Method

Typical installation procedure

1. Excavate the trench to the required depth ensuring that the plan area is slightly greater than that of the AquaCell units.
2. Lay 100mm bed of coarse sand, level and compact.
3. Lay the geotextile over the base and up the sides of the trench.
4. Lay the geomembrane on top of the geotextile over the base and up the sides of the trench.
5. Lay the AquaCell units parallel with each other. In multiple layer applications, wherever possible, continuous vertical joints should be avoided. AquaCell units can be laid in a 'brick bonded' formation (i.e. to overlap the joints below) – see page 18. For single layer applications use the AquaCell Clips and for multi layers use the AquaCell Clips and the AquaCell Shear Connectors (vertical rods).
6. Wrap the geomembrane around the AquaCell structure and seal to manufacturers recommendations.*
7. If side connections into the AquaCell units is required, (other than the preformed socket), use the appropriate Flange Adaptor (6LB104 or 6LB106). Fix the flange adaptor to the unit using self-tapping screws. Drill a hole through the Flange Adaptor and connect the pipework. (6LB106 should not be used with AquaCell Eco).
8. In order to prevent silt from entering the tank, clogging inlet pipework and reducing storage capacity, it is recommended that the Domestic Silt Trap (6LB300) or the standard Silt Trap (6LB600) is installed prior to the inlet pipework – see page 22 for installation guidelines.
9. Wrap and overlap the geotextile covering the entire AquaCell structure, to protect the geomembrane.
10. Lay 100mm of coarse sand between the trench walls and the AquaCell units and compact.
11. Lay 100mm bed of coarse sand over the geotextile and compact. Backfill with suitable material. .

NB: A storage tank must be vented, and it is recommended that one vent pipe, 110mm in diameter is provided per 7,500 square metres of impermeable catchment area on a site, see page 22 for design.



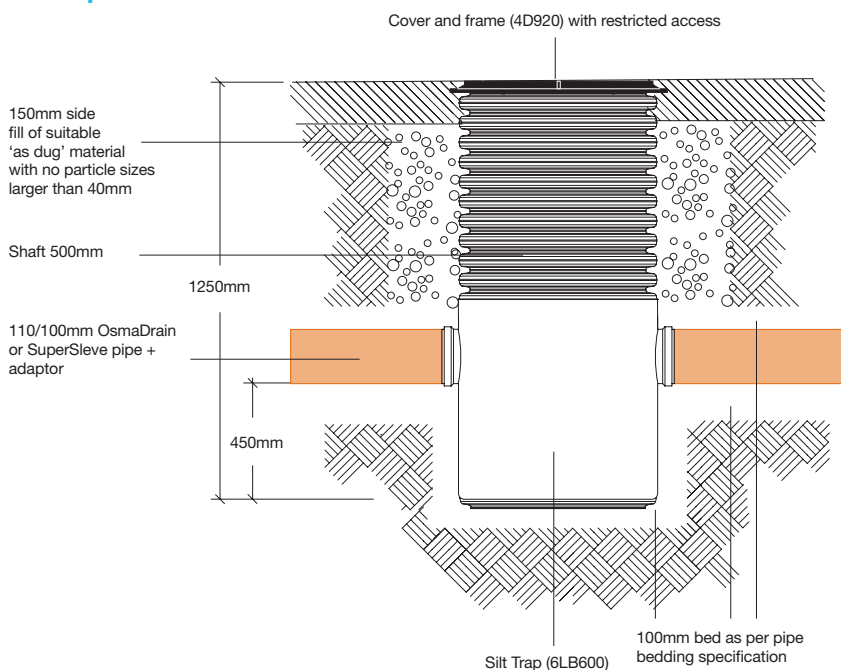
Example shows the use of AquaCell Prime. However, a storage tank can also be installed as shown using any of the other versions of AquaCell units (Eco, Core or Plus) as appropriate.

**For large scale, deep installations a 1mm thick geomembrane is recommended and joints should be sealed using proprietary welding techniques. For further details contact Wavin Technical Design.*

Installation AquaCell Units

Silt Trap and Air Vent Termination

Silt Trap

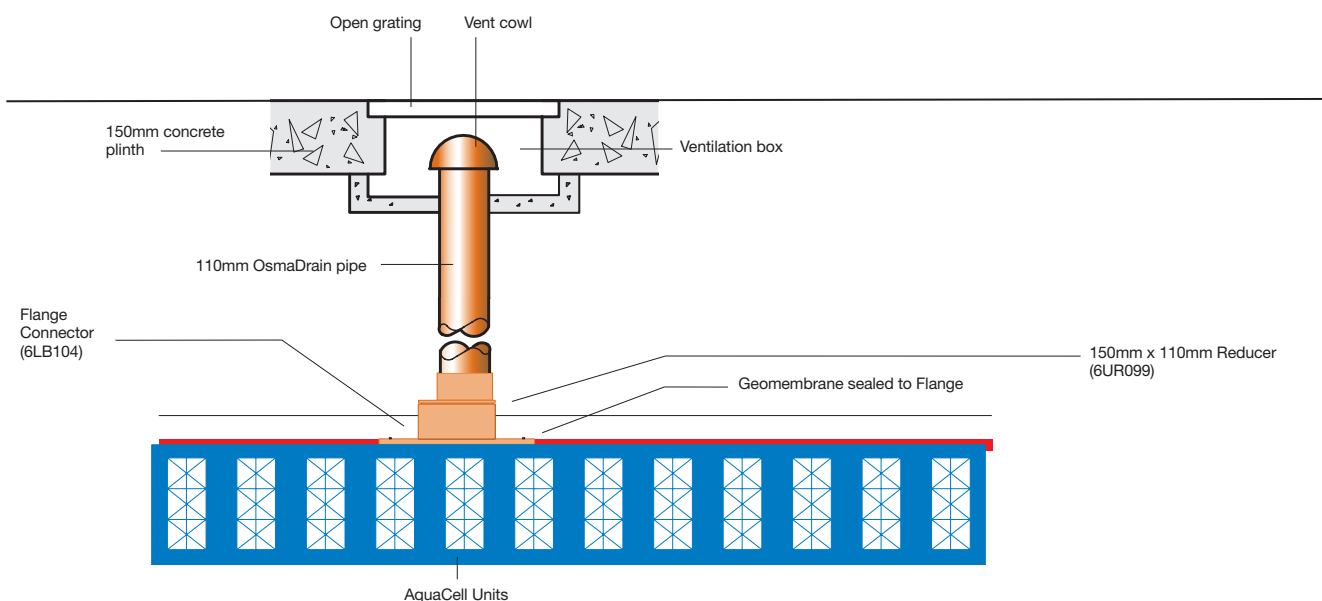


Typical installation procedure

1. Place the Silt Trap (6LB600) on a minimum of 100mm bed as per pipe bedding specification. Ensure that the trap is as close to the AquaCell unit as possible and in a suitable position to allow pipework connection.
2. Connect the relevant pipework in accordance with standard pipe installation guidelines.
3. Surround the sides of the Silt Trap with 150mm of 'as dug' material, with no particle sizes larger than 40mm.
4. Fit relevant cover and frame.

NOTE: When surrounded by a concrete plinth (150mm x 150mm) the 4D920 Cover and Frame can be used in situations with a loading of up to 50kN (5 tonne).

Typical Air Vent design



NOTE: It is recommended that all connections and air vent installations in storage applications (using geomembrane) are made using a Flange Adaptor.

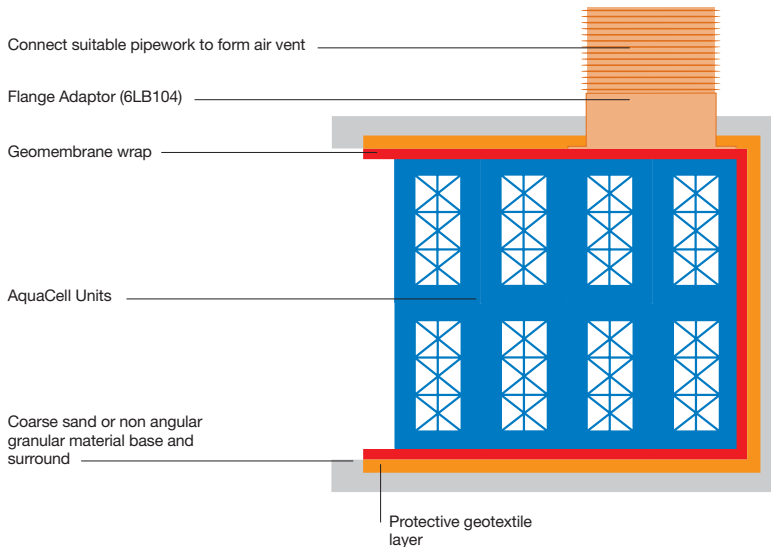
Adhesive or double sided tape should be used between the geomembrane and the flange plate to ensure a watertight seal.

NOTE: It is recommended that one vent pipe, 110mm in diameter, is provided per 7,500 square meters of impermeable catchment area on a site. Please contact Wavin Technical Design for further details.

Typical Details AquaCell Units

Top Connection for Air Vent

Connect into the top of the AquaCell unit, using Flange Adaptor.

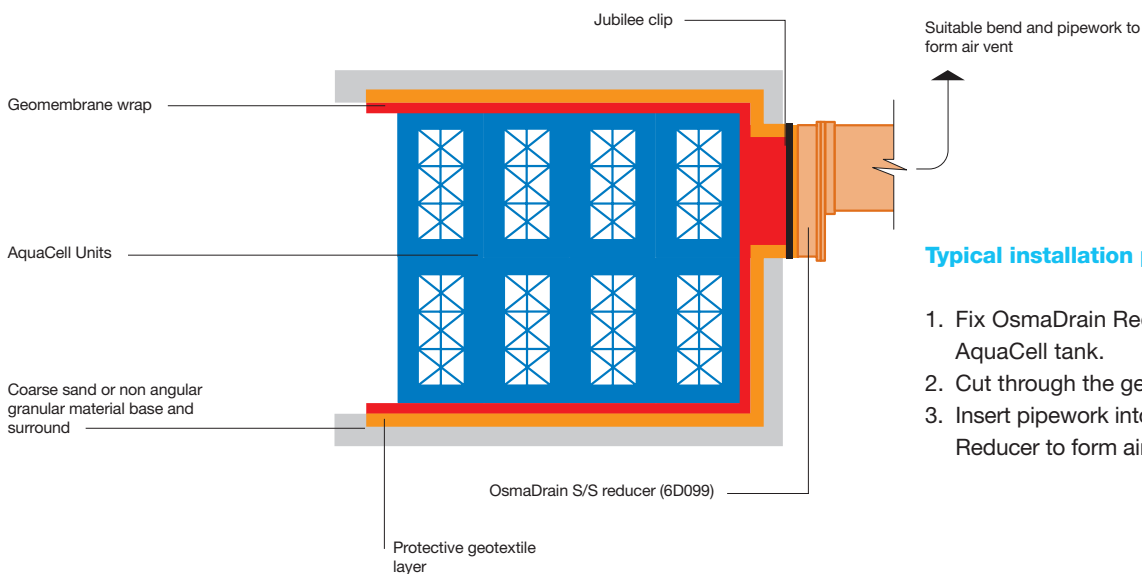


Typical installation procedure

1. Fix Flange Adaptor to the AquaCell unit with self tapping screws.
2. Cut through the geomembrane.
3. Insert pipework into Flange Adaptor to form air vent.

Side Connection for Air Vent

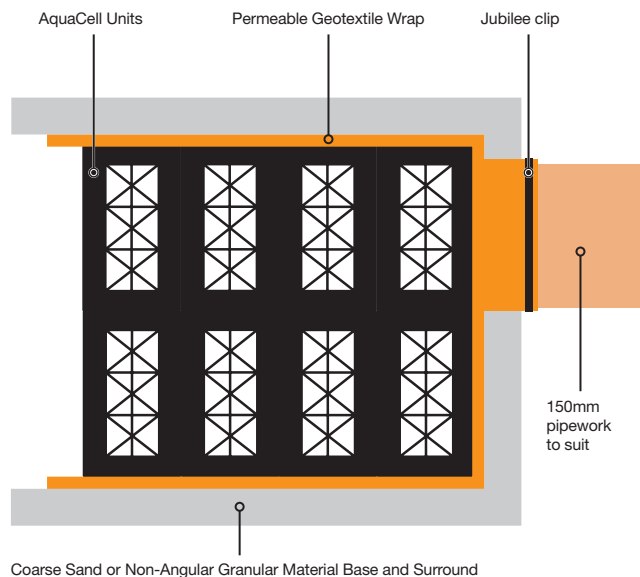
Connect into the side of the AquaCell tank unit using standard Reducer.



Typical installation procedure

1. Fix OsmaDrain Reducer to the AquaCell tank.
2. Cut through the geomembrane.
3. Insert pipework into OsmaDrain Reducer to form air vent.

Typical Details AquaCell Units

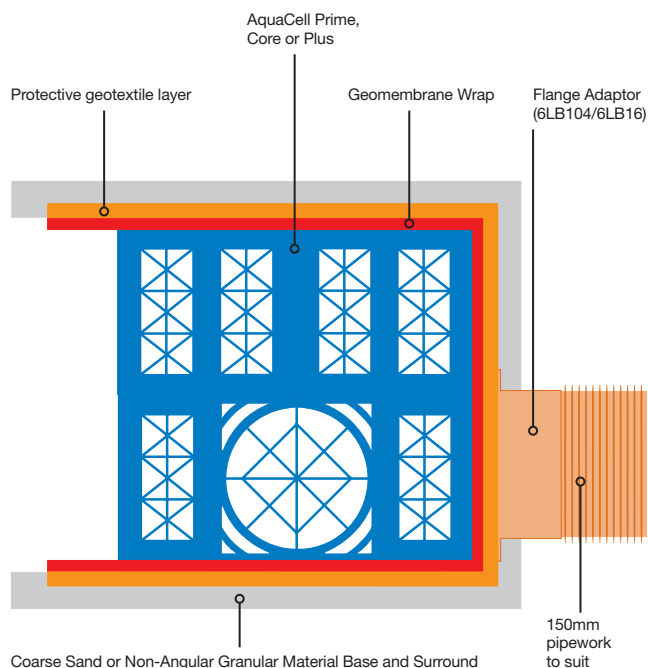


Connections to AquaCell Units

Connection for soakaway application using either the pre-formed socket (as shown below) or standard adaptors into pre-formed socket*.

*NOTE: For pipework other than 160mm OsmaDrain, these adaptors can be used to connect to the following:

- ⓘ 6TW141: TwinWall S/S Adaptor connects to 150mm TwinWall
- ⓘ 6D099: OsmaDrain Adaptor connects to 110mm OsmaDrain
- ⓘ 4D916: OsmaDrain PE Adaptor connects to 160mm OsmaDrain
- ⓘ 6UR141: UltraRib S/S Adaptor connects to 150mm UltraRib
- ⓘ 6D129: OsmaDrain S/S Adaptor connects to 150mm SuperSleeve clay. (Use an appropriate reducer, as required, e.g. 6D099)



Connection for storage application using Flange Adaptor at points other than pre-formed socket, (for AquaCell Prime, Core or Plus).

Installation procedure

1. Fix Flange Adaptor to the AquaCell unit with self tapping screws.
2. Cut through the geomembrane.
3. Insert pipework into Flange Adaptor.

*NOTE: AquaCell Eco is not suitable for side connection using a Flange Adaptor.

APPENDIX D

SUDS Maintenance Schedule

Installation	Maintenance Required	Frequency	Responsibility
Granular Attenuation: rear pation	No maintenance required	No maintenance required	No maintenance required
Permeable Paving / Rain Garden / Diverter (incl. associated distribution pipework and inspection chambers) Non return valve on granular storage IC	Inspection, debris removal and jetting Diverter to be maintained as per Manufacturer Guidance	Typically, inspection is recommended annually or after a severe or significant storm event, with any jetting/cleaning being carried out as necessary.	Estate/Building Management Company
Cellular storage under front parking Wavin specification (or similar) Restriction device as required	Inspection, debris removal and jetting Cellular to be maintained as per Manufacturer Guidance	Typically, inspection is recommended annually or after a severe or significant storm event, with any jetting/cleaning being carried out as necessary.	Typically, inspection is recommended annually or after a severe or significant storm event, with any jetting/cleaning being carried out as necessary.