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Issue 3: 22 May 2026

DRAINAGE STATEMENT

McDonald's, Horton Road, Devizes (ST2029)



Prepared for: McDonald's Restaurants Ltd

Ref: 002_4240491_SF_DS_Devizes_Issue 3.docx

Document History

Issue	Date	Description	Prepared By	Checked By
1	04 December 25	First Issue	S Forber	H George
2	03 March 26	Updated to revised planning layout.	S Forber	H George
3	22 May 26	Updated to revised planning layout and additional SuDS features added.	S Forber	H George

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1.0 Introduction

Purpose

1.1 This Drainage Statement has been prepared by Glanville Consultants Ltd on behalf of McDonald's Restaurants Limited to support a planning application for the development of a site which is currently used as a petrol filling station, used car sales and car servicing garage. The proposed layouts for the new restaurant shown in this report are outline versions but accurately reflect the proposal from a drainage impact assessment point of view. The outline drawings exclude signage.

Site Location & Description

1.2 Devizes is a historic market town and civil parish located in the county of Wiltshire. It lies roughly centrally within Wiltshire, about 16 miles east of Bath, 11 miles northeast of Trowbridge, and 6 miles south of Calne. The proposed site is located in the northeastern part of the town and to the east of the roundabout junction between Horton Road, London Road, and the A361. The development site area itself is currently a petrol filling station, used car sales and car servicing facility with an existing access from Horton Road to the south. It is proposed that access from Horton Road will be utilised for the new restaurant. Refer to Figures 1.

Data Sources

1.2 Data used for this report is as follows:

- Topographical survey, Google Earth observations & historical mapping.
- On-line Flood Maps -. Gov
- Drainage record plans & sub scan of the site
- Phase I Geotechnical Desk Study

1.3 All the level information quoted in this report refers to the Ordnance Datum, defined as the mean sea level recorded at Newlyn in Cornwall.

Approach to SuDS

1.4 McDonald's are an advocate of sustainable development and will employ sustainable development practices wherever possible. The selection of SuDS for McDonald's sites is based on practical experience of building and maintaining thousands of similar restaurants across the United Kingdom, where many different forms of SuDS have been employed, some with greater success than others. The selection of SuDS therefore takes account of both National & Local SuDS polices, advice from LLFA's or LPA drainage engineers where this is offered, feedback from McDonald's maintenance staff, the experience of the development team and the specific conditions at the site.

1.5 McDonalds and their consultants are also constantly researching new and innovative forms of SuDS or refinements to existing SuDS designs in order to:

- Create solutions that better provide for all of the 'Four Pillars of SuDS'.
- Provide better longevity and maintenance performance for SuDS.
- Reduce carbon emissions.

2.0 Flood Risk & SuDS Planning Policy

National Flood Risk Policy

2.1 National planning policy guidance (NPPG) requires a Flood Risk Assessment for development within Zones 3 and 2, including minor development and for any development located in a critical drainage area. The proposed development is within Zone 1 and outside of any critical drainage area, therefore a Flood Risk Assessment is not required.

2.2 The proposed Restaurant use is classified as 'Less Vulnerable' and in accordance with Table 2 - Flood Risk Vulnerability and flood zone 'incompatibility', the proposed development is compatible with flood Zones 1, 2 or 3a.

2.3 The National Planning Policy Framework (NPPF) states the following in respect of SuDS:

181. When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment[63]. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;

b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;

c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;

d) any residual risk can be safely managed; and

e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

182. Applications which could affect drainage on or around the site should incorporate sustainable drainage systems to control flow rates and reduce volumes of runoff, and which are proportionate to the nature and scale of the proposal. These should provide multifunctional benefits wherever possible, through facilitating improvements in water quality and biodiversity, as well as benefits for amenity. Sustainable drainage systems provided as part of proposals for major development should:

a) take account of advice from the Lead Local Flood Authority;

b) have appropriate proposed minimum operational standards; and

c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development.

2.4 This development is not in an area at risk of flooding and therefore policy 181 does not apply. Similarly, this development has less than 1000m^2 of floor space and is on a site of less than one Hectare in size; therefore, it is not classified as 'Major Development' and therefore parts a) ,b), and c) of policy 182 do not apply.

Local SuDS Policy

2.5 Wiltshire Council, the local authority responsible for planning in Devizes, does not have a single specific "local suds policy" document, but rather incorporates Sustainable Drainage Systems (SuDS) requirements into its general planning policy documents; 'Wiltshire Core Strategy (Core Policy 67 - Flood Risk)':This document, while currently under review by the emerging Wiltshire Local Plan, states that "All new development will include measures to reduce the rate of rainwater run-off and improve rainwater infiltration to soil and ground (sustainable urban drainage) unless site or environmental conditions make these measures unsuitable

4.1.1 Solutions for Above Ground SuDS At Constrained Sites

Even for constrained sites it is almost always feasible to include some above ground SUDS into the surface water drainage network. Please see Table 1 below for solutions to typical constraints found on sites in Devon.

Constraint	Solution
There is limited space	SuDS should be considered early on in the master planning process to ensure sufficient space is set aside for above ground SuDS forming a treatment train. Integrating multi-functional SuDS for example as part of the car parking either via permeable paving or rain gardens which can be designed flexibly, can help with reducing the required land take.
The site is too steep	Swales can be designed along contours with check dams to provide attenuation and conveyance. Sustainable drainage systems designed in a staggered arrangement for example cascading basins.
The site is too flat	Manage surface water close to its source and on the surface for example permeable paving or swales
Root Protection Areas	Root barrier protection can be used to prevent damage to pipework whilst protecting the health of trees.
High groundwater	An impermeable liner such as waterproof membrane or compacted clay can be used to line above ground SuDS. In some instances, shallow SuDS can be used such as permeable paving
Health and safety concerns	Often above grounds SuDs which have a permanent body of water are seen as a health and safety concern. With appropriate design these risks can be reduced if components are visible and integrated into the local spaces. For example, the maximum slope of a bank for basins and swales should be no more than 1 in 3 and areas of deepest water should be located away from the edge.

Table 1: Solutions to Utilise SuDS on Constrained Sites

3.0 Existing Conditions and Sources of Flooding

Topography

3.1 The site is reasonably flat with a level in the northeastern corner of the site of 135.75m AOD With the fall of the site from north to South resulting in a level of around 134.00m AOD. The site itself is made-up predominantly of flexible pavement construction and concrete hardstanding areas with some gravel and grass soft landscaped areas to the perimeter.

3.2 There are no other vegetation features on the site itself such as trees or hedges but beyond the site eastern boundary there is an overgrown area of some small tress, bushes and weeds.

Geology & Ground Conditions

3.3 A Geo-Environmental Desk Study (Phase 1) was completed for the site. This provided the following information from published records. From the published records, the geology information on the area indicates that the site is directly underlain by bedrock geology of the Upper Greensands Formation. There were no available records to indicate the superficial deposits within 250 metres of the site. Due to the nature of the site, it is anticipated there will be made ground under the hard standing areas. At this stage due to the current use as a petrol filling station, car wash and car repair and servicing garage, it should be assumed that there is the potential for a high risk of contamination from fuel spillages and leaks from buried fuel tanks.

Groundwater Quality

3.4 The Upper Greensands Formation is a Principal bedrock aquifer of high vulnerability. The site is outside of any source protection zones (SPZ).

Tidal & Fluvial Flooding

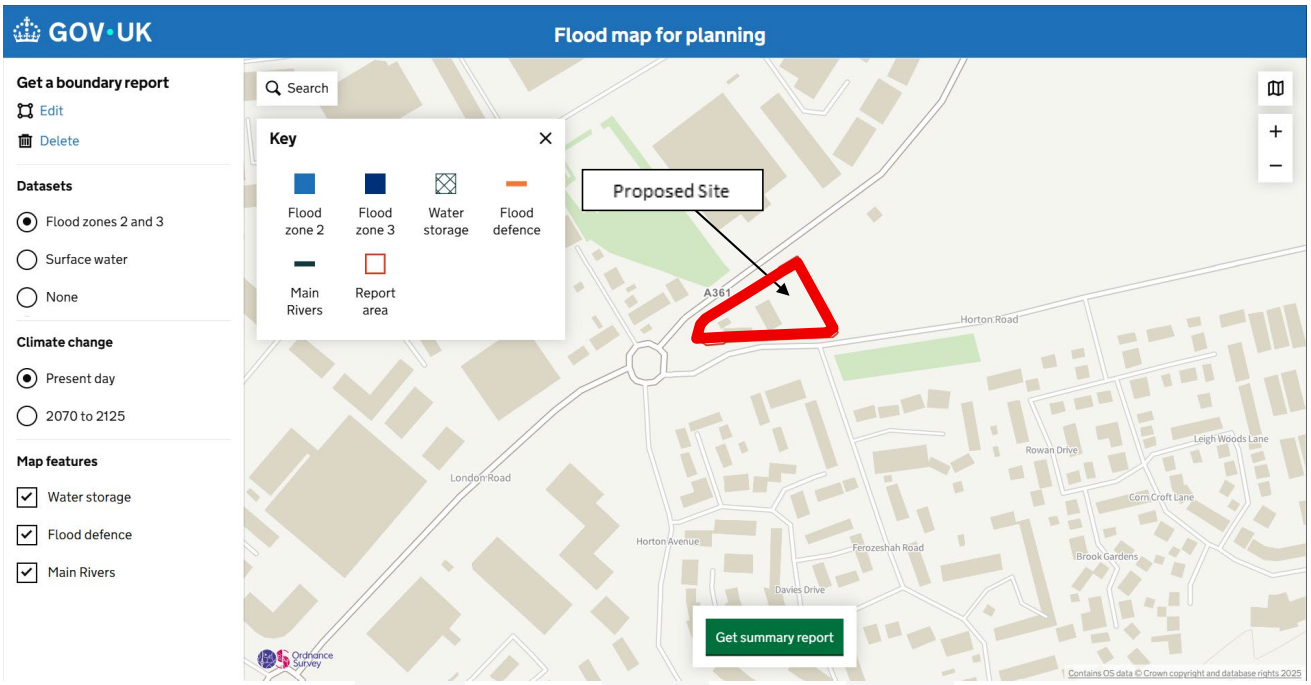
3.5 Flood Zone definitions are set out in the National Planning Policy Guidance:

- Flood Zone 1 - land assessed as having a less than 1 in 1,000 annual probabilities of river or sea flooding (<0.1%)
- Flood Zone 2 - land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year
- Flood Zone 3 - land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year

Note: Flood zones refer to the probability of river and sea flooding, ignoring defences.

3.6 Image 1 shows the site to be located in Flood Zone 1, land assessed as having less than 1:1000 annual probability of river or sea flooding.

Image 1: Gov.UK Fluvial & Tidal Flood Risk Map for Planning



Groundwater Flooding

3.7 The Phase 1 Geoenvironmental desk study indicates a 'moderate' risk of groundwater flooding.

Overland (Pluvial) Flooding

3.8 Viewing the Gov.UK flood maps for planning would show the site to have a very low risk of flooding for surface water in the 1 in 100-year likelihood (less than 1% annual chance of flooding) – refer to Image 2. There is some indication of potential surface water flooding when assessing the 1 in 1000 likelihood (less than 0.1% annual chance of flooding) – refer to Image 3.

Image 2: Gov.UK Surface Flood map for planning – up to 1 in 100-year annual likelihood.

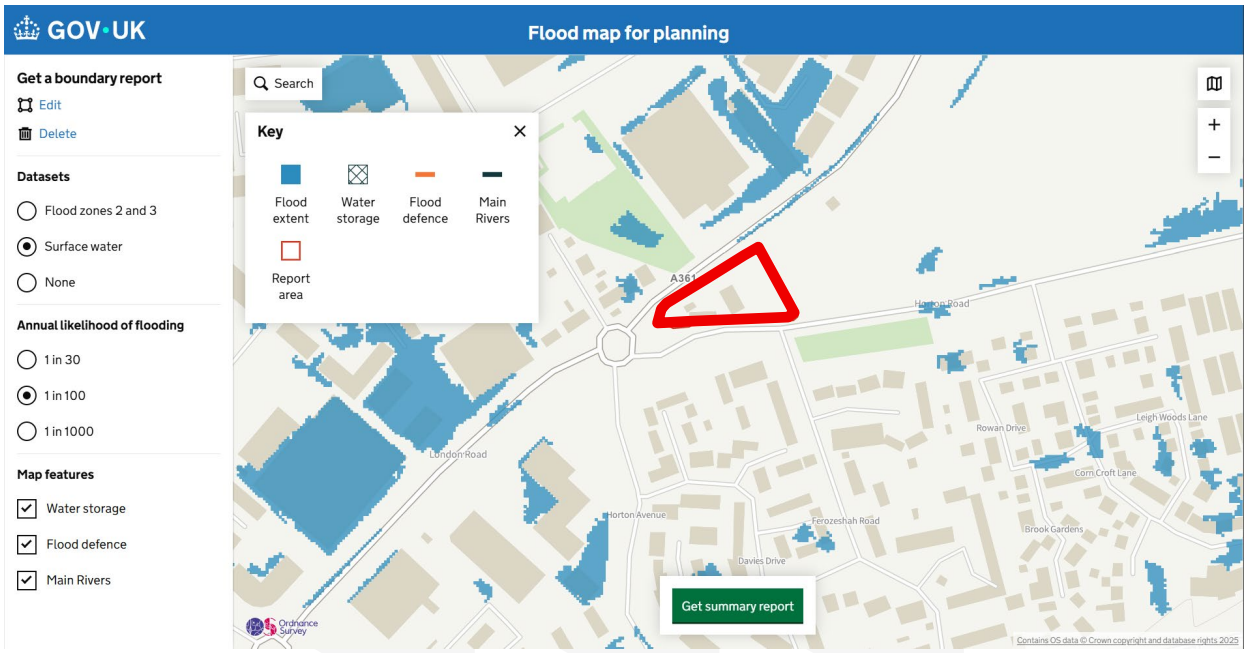
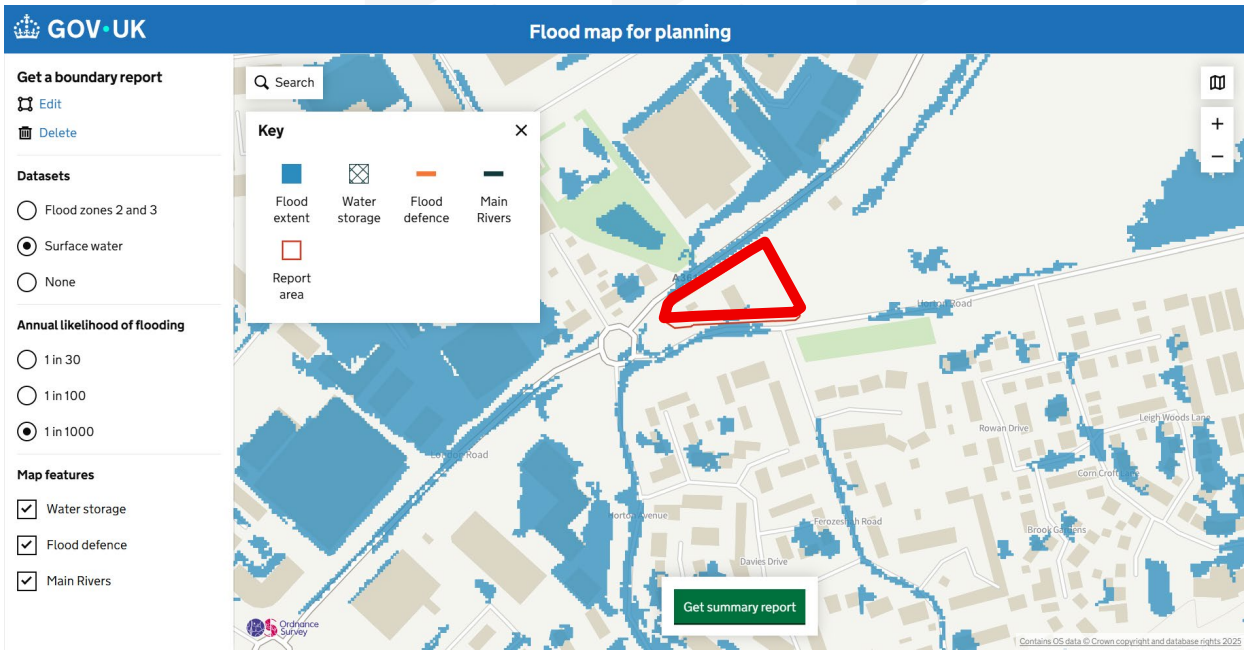


Image 3: Gov.UK Surface Flood map for planning – up to 1 in 1000-year annual likelihood.



Flooding from Reservoirs, Canals and other Artificial Sources

3.9 The Flood Warning Information Service website indicates the site to be outside the area at risk of reservoir flooding, as shown in Image 4.

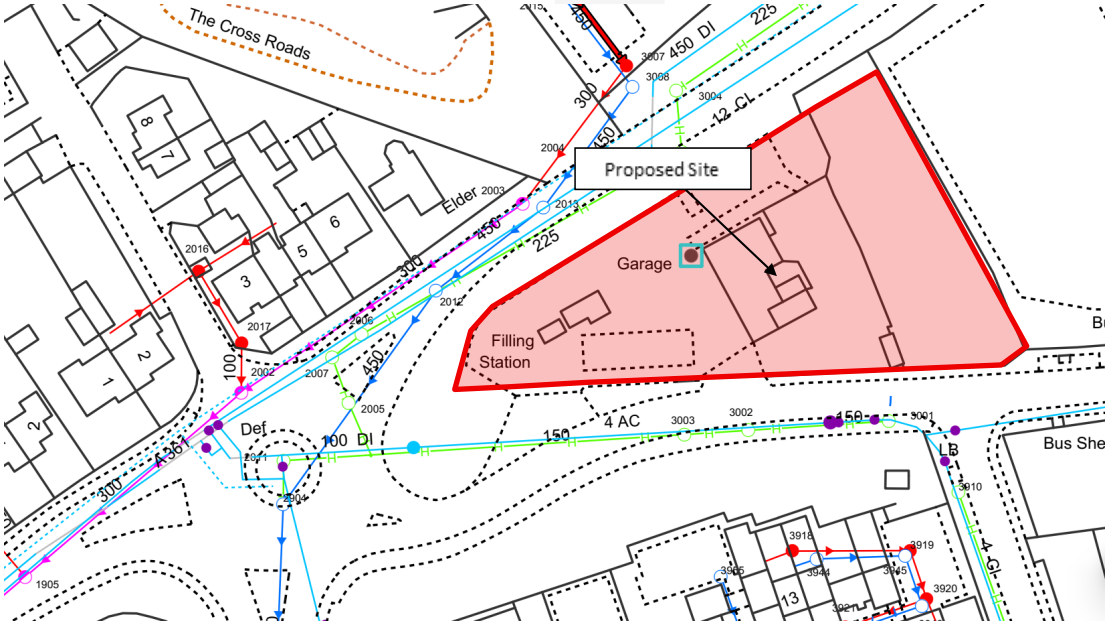


Image 4: Gov.UK Reservoir Flood Breach Extent Map

Existing Sewer Flooding

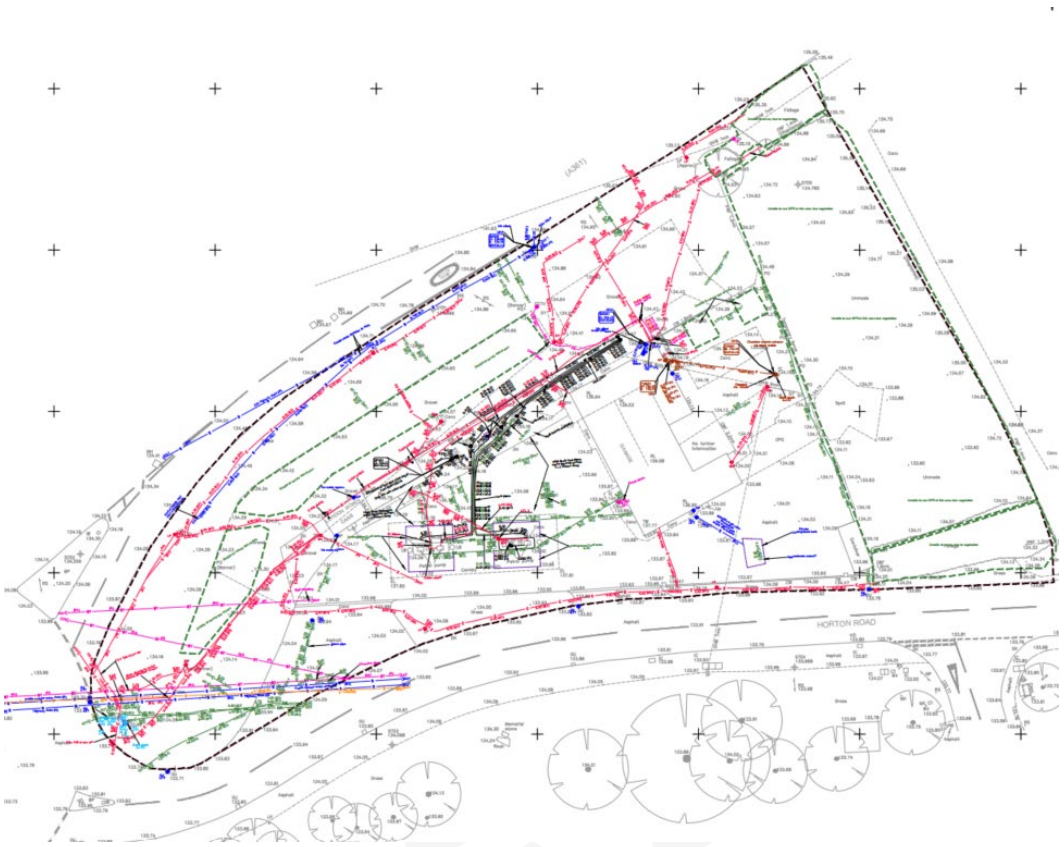
3.10 The public sewer records, Image 5, shows a foul water sewer locate to the north of the site within the A361 and a surface water sewer within the same road which then runs southwest towards the roundabout. There are no sewers recorded within the development area itself.

Image 5: Public Sewer Records Extract



3.11 The Sub-scan, Image 6 below, confirms that there are no public surface water sewers within the development area but does show some private storm drains within the site and therefore would present a low risk from surface water flooding due to the existing onsite drains.

Image 6: Sub Scan showing Site Services



4.0 Development Flood Risk

Development Proposals

4.1 The proposed development consists of a McDonald's Restaurant with associated drive-through lane and car park. The development layout can be seen in Figure 4.

Flood Risk Management

4.2 The development design includes flood risk reducing features which are listed in Table 1. The following sub sections of this chapter describe in more detail each of the potential sources of flooding and how the development design features will reduce these risks.

Table 1: Flood Risk Reducing Design Features

Possible Design Features	In this Design	Description of Feature	Flood Risk Reduction
Surface levels & FFL	Yes	Surfaces drained into the SuDS. Exceedance flow routes are checked to ensure they do not create a flood risk.	Pluvial flooding
SuDS Drainage	Yes	1:100 + climate change allowance included within drainage system.	Pluvial /drainage flooding
Flood Resilience Measures	No	Not required, buildings not expected to flood.	N/A
Flood Compensation	No	Not required, not developing in floodplain.	N/A
Flow Control Devices	Yes	Infiltration is unlikely due to made ground Flows therefore limited to public sewer.	Sewer flooding
Safe Pedestrian Escape Route	Yes	The site is dry and proposed levels designed to ensure overland surface water flow routes do not create a flood risk.	Pluvial flooding
Safe Escape Route Vehicular	Yes	The site is dry and proposed levels designed to ensure overland surface water flow routes do not create a flood risk.	Pluvial flooding
Dry parking area	Yes	Proposed levels designed to ensure overland surface water flow routes do not create a flood risk.	Pluvial flooding
Flood Plan & Warning	No	Not required, development outside floodplain.	N/A

Tidal & Fluvial Flooding

4.3 The development is outside the floodplain and therefore no design features are required to address fluvial flood risks. Hence, the risk of fluvial flooding will remain very low.

Groundwater Flooding

4.4 The site level design will ensure that in the unlikely event that any groundwater does flood at surface level, the proposed overland flow routes do not create a risk to the development. Refer to Figure 6 for more information.

Overland Surface Water Flooding (Pluvial) On Site

4.5 The proposed overland flow paths and levels are shown in Figure 6 with the existing flow path shown in Figure 2. In addition, the improved on-site drainage and raised building FFL, the site level design will ensure that any pluvial flooding is routed to avoid a risk to the development and to match existing flow routes through the site.

Overland Surface Water Flooding from the Site onto Surrounding Land

4.6 The proposed on-site drainage system will be designed to accommodate a 1 in 100 plus climate change rainfall event, without creating a flood hazard. If an exceedance event occurs (greater magnitude than 1 in 100 plus climate change storm event) then the existing overland flood routes on and off the site will not be changed by the development, so the development cannot adversely impact surrounding land, see Figures 2, 5 and 6.

Flooding from Reservoirs, Canals and other Artificial Sources

4.7 No artificial sources of flooding have been identified.

Sewer Flooding

4.8 The proposed development surface and foul water drainage layouts are shown in Figure 5. The new foul drainage infrastructure on the site will be designed in accordance with Building Regulations and therefore no significant flood risk is expected from the proposed on-site foul water drainage.

4.9 The new on-site surface water drainage is going to be designed to accommodate a 1 in 100 year plus climate change event without creating a flood hazard and therefore the risk of flooding is low.

4.10 Any flooding from existing sewers nearby will be directed away from the development through the design of exceedance routes, see Figure 6.

Flood Impacts, Mitigation and Residual Effects

4.11 Table 2 below rates the different flood risks to the development, considering the development design proposals as described in this report. Design proposals are not considered to be mitigation, but any action required in addition to the current design proposals is considered mitigation and listed in the table. We have rated the risks as none, low, medium and high based on our assessment of the facts relating to each source of flooding and the potential hazards.

Table 2: Residual Flood Risk

Type of Flood Risk	**Flood Risk Rating None Low Med High**	**Mitigation required**	**Mitigation Measure**
Tidal / Fluvial Flooding	Low	No	None
Groundwater flooding	Low	No	None
Overland SW flooding from adjacent land	Low	No	None
Overland SW flooding onto adjacent land	Low	No	None
Flooding from reservoirs	Low	No	None
Flooding from sewers	Low	Yes	Normal maintenance of drainage systems

5.0 Proposed Sustainable Drainage

Site Specific Sustainable Drainage Assessment

5.1 The Ciria SuDS Manual describes the four main categories of benefits that can be achieved by SuDS as water quantity, water quality, amenity and biodiversity: also known as the four Pillars of SuDS. The SuDS Manual Box 1.2 describes the SuDS approach to managing surface water runoff as follows & depending on the characteristics of the site, these may be used in combination and to varying degrees:

- use surface water runoff as a resource
- manage rainwater close to where it falls (at source)
- manage runoff on the surface (above ground)
- allow rainwater to soak into the ground (infiltration)
- promote evapotranspiration
- slow and store runoff to mimic natural runoff rates and volumes
- reduce contamination of runoff through pollution prevention and by controlling the runoff at source
- treat runoff to reduce the risk of urban contaminants causing environmental pollution.

5.2 Table 3 below is a version of the Ciria SuDS Manual table 1.1 'Types of SuDS Components with a comment on the suitability of each component for this site.

Table 3: SuDS Component Suitability Assessment

Component Type	Description	Suitability for this Site
Rainwater Harvesting	Rainwater collected from roof and paved surfaces in a tank. The system may include treatment elements and should include specific storage provision if it is to be used to manage runoff to a design standard.	The restaurant is of modular construction to a standard design which is not set up for rainwater recycling. Water demand is also high so any recycling would need to be accompanied by a backup water supply and a very large recycling tank, negating the environmental benefits.
Green /Blue Roofs	A planted soil layer constructed on the roof of a building to create a living surface. Water is stored in the soil layer and absorbed by vegetation. Blue roofs store water at roof level, without the use.	The restaurant is a lightweight modular construction, produced in a factory and transported to site. This form of construction has many environmental benefits but is not currently capable of supporting green or blue roofs for McDonald's.
Infiltration System	Collects & stores runoff allowing it to infiltrate into the ground. Overlying vegetation & unsaturated soils offer protection to groundwater from pollution.	Infiltration not suitable due to likely made ground and contamination from existing use as petrol filling station.
Proprietary Treatment System	These structures provide treatment of water through the removal of contaminants.	These systems are suitable for this site.
Filter Strips	Runoff from an impermeable area is allowed to flow across a grassed or otherwise densely planted area for sedimentation & filtration.	Filter strips are not suitable due to insufficient space.

Filter Drains	Runoff is temporarily stored below the surface in a trench filled with stone, providing attenuation, conveyance & treatment (via filtration).	Filter drains are proposed to run along the perimeter of some of the access road to allow runoff from the roads to filter through the stone and be collected by porous pipes below.
Swales	A vegetated channel is used to convey & treat runoff (via filtration). These can be "wet", where water will remain permanently at the base of the swale (lined), or "dry" where water is only present temporarily after rainfall events (unlined).	Shallow sales are proposed within the limited soft landscaping areas. This will collect high level runoff from part of the access roads and either recharge the topsoil or allow excess to discharge to the filter drains.
Bioretention Systems (inc. rain gardens)	A shallow landscaped depression allows runoff to pond temporarily on the surface, before filtering through vegetation and underlying soils prior to collection or infiltration. In its simplest form it is often referred to as a rain garden. Engineered soils (gravel and sand layers) and enhanced vegetation may improve treatment performance.	Certain bioretention systems are incorporated where there is sufficient space.
Rills	Formal linear drainage features in which surface water can be stored or conveyed. They can be incorporated with water features such as ponds o waterfalls where appropriate.	Unsuitable due trip/wheel hazard & high pedestrian & vehicle traffic. Unsuitable for disabled access. Channels with heal guard grating are an acceptable alternative.
Trees	Trees within a range of infiltration SuDS components improve their performance, as root growth & decomposition increase soil infiltration capacity. Alternatively, as standalone features within soil filled tree pits, tree planters or structural soils, collecting and storing runoff and providing treatment (via filtration and phytoremediation.	Trees may be suitable subject to space.
Permeable Pavements	Runoff soaks through structural paving. This can be paving blocks with gaps between solid blocks, or porous paving where water filters through the block itself. Water can be stored in the sub-base & potentially allowed to infiltrate into the ground.	Permeable paving has been used extensively by McDonald's in the past and although the daily jet washing of pavements can lead to early failure of the permeable paving, it can be considered suitable for this site in certain contained areas
Attenuation storage tanks	Below-ground spaces used to temporarily store runoff before infiltration, controlled release, or use E.g. geo-cellular or concrete tanks, oversized pipes.	These systems are suitable for this site.
Detention Basins	Runoff drains to a landscaped depression with an outlet that restricts flows, so that the basin fills & provides attenuation. Generally, basins are dry, except during & immediately following the rainfall event. If vegetated, runoff will be treated as it is conveyed & filtered across the base of the basin.	There is insufficient space for a basin.
Ponds & Wetlands	Features with a permanent pool of water can provide attenuation & treatment of runoff, where outflows are controlled & water levels vary. They can support emergent & submerged vegetation along their shoreline & in shallow, marshy zones, which enhances treatment & biodiversity.	There is insufficient space for a pond or wetland area.

Available Surface Water Discharge Options

5.3 The Geo-Environmental desk study indicates the site is anticipated to be underlain by a surface covering of topsoil or fill pavement constructions and floor slabs over made ground associated with historical developments and possible bomb strikes over naturally deposited bedrock geology of the Upper Greensand Formation. Although the Upper Greensand may be suitable for infiltration, due to the nature of the site being a past and current petrol filling station, it is most likely therefore that infiltration will not be suitable for discharge of run-off from this site. However, if planning consent is granted, a Full Intrusive Stage II Geo-Environment Investigation will be commissioned and if as a result of this investigation, it is concluded that infiltration is possible then infiltration drainage techniques will be incorporated as a modification of the drainage design proposed at this stage.

5.4 There are no watercourses near to the site which would be suitable for a storm water discharge from the site.

5.5 It is concluded that the most suitable option is therefore to continue to discharge at a controlled green field run-off rate to the existing public storm water system that serves the existing buildings via the existing private network connection located at the junction of Horton Road and the A361, subject to the correct relevant permissions and/or approvals. As many SuDS features as practical have been added up-stream of the outfall as part of the SuDS water management and treatment train.

5.6 A pre-development inquiry has been submitted to Wessex Water and the response is included in Appendix D. As noted in the previous sections and in response to Wessex Water's comments, the potential for infiltration drainage on site will be investigated when access to the site for the Phase 2 geo-environmental site investigation is possible. If it transpires that infiltration is feasible, then the base of the proposed attenuation tanks can be designed to permit infiltration. Furthermore, the surface water drainage proposals have been enhanced with additional surface level SuDS features.

Selected Sustainable Drainage Measures

5.7 The selection of SuDS techniques for this site has followed the SuDS management train concept explained in the SuDS Manual. The concept is to use drainage techniques in series to incrementally reduce pollution, flow rates and volumes. The hierarchy of techniques to be used are as follows:

- Prevention - prevent runoff & pollution e.g., rainwater re-cycling and road sweeping.
- Source Control - control runoff at or near its source e.g., local infiltration methods.
- Site Control - routing water to site controls e.g., pipes to a large detention basin.
- Regional Control - routing water from several sites to regional controls e.g., pipes to a balancing pond or wetland.

5.8 The proposed surface water drainage layout is shown in Figure 5 and includes the following features:

- Rainfall will be collected from roofs & the main car park /patio by rainwater pipes, beany kerbs, permeable paving, gullies and channels and conveyed to cellular storage via a piped network.
- Some high-level runoff from the access roads will be diverted into shallow swales to be installed within the soft landscaped areas to allow water to recharge the topsoil and allow any excess to discharge to the filter drain for additional water quality treatment.
- Some flows from the access road will be diverted to a filter drain running along the kerb edge.
- The cellular storage is used for attenuation of run-off using a flow control device downstream of the storage.
- After the flow control device, run-off will pass through a petrol interceptor, which will discharge treated run-off to a new storm water sewer which will be installed along the proposed new access road, and then discharge to an existing 450mm sewer running to the west of the site.

- Flows will be restricted in accordance with the LLFA's requirements, providing a significant reduction in peak flows entering the surface water drainage system from the existing impermeable areas.

5.9 These sustainable drainage measures have been selected for the site conditions and are suitable for the constant use and daily maintenance required for a McDonald's site. These systems are tried and tested on similar sites where permeability is poor, and the site area cannot accommodate larger open drainage features.

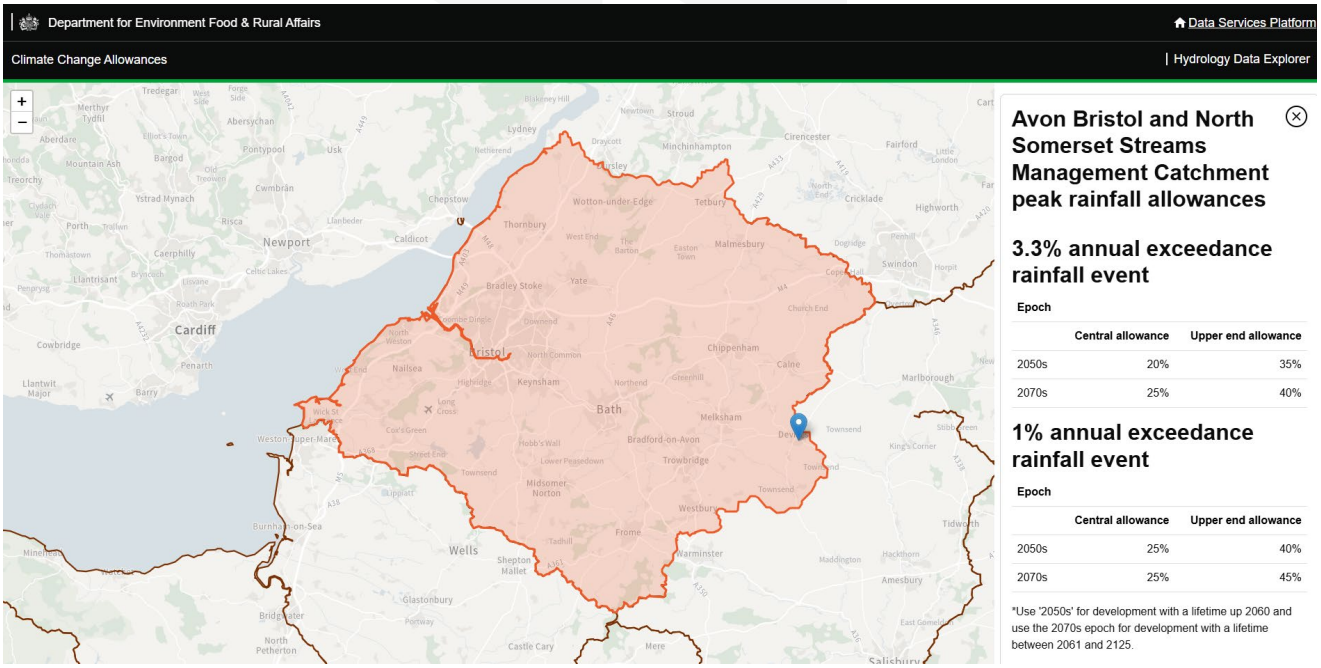
Climate Change

5.10 Climate Change allowances were updated on the 10th of May 2022. The new climate change allowances map places the site within the Avon Bristol and North Somerset Streams Management Catchments, as shown in Image 6. The design life for the proposed development is 50 years, but planning practice guidance requires non-residential development to have a minimum 75-year life for the purpose of climate change assessments which places it within 2070's epoch. For Flood Risk Assessments, the upper end allowance must be assessed and the developed designed for the 1% annual exceedance event so:

- there is no increase in flood risk elsewhere and
- the development will be safe from surface water flooding.

5.11 Development drainage should therefore be designed for no flooding in the 1:100 year plus **45%** climate change event.

Image 6: Gov.UK Climate Change Allowances



Flow Rates & Attenuation

5.12 Existing and proposed impermeable areas have been calculated and are shown in Figure 3. These areas have been used to calculate the existing and proposed discharge from the site for a range of storm events, see Table 4 for a summary of the model results and Appendix B for the full drainage calculations.

5.13 The drainage calculations are completed with industry standard software using the Flood Estimation Handbook (FEH). The proposed drainage system is designed not to flood for all events of intensity up to the 1:100 year plus climate change even and for a range of durations. Rainfall events of greater magnitude can be expected to exceed the drainage system capacity with flood water following the surface flooding exceedance routes shown in Figure 6.

5.14 'Urban Creep' is not applicable to McDonald's as most of their sites have no space for further expansion of impermeable areas and those that do will have any alterations to paving accompanied by a new planning application with additional SuDS measures if required. Urban creep allowances are normally only required for residential development where small paving alternations and extensions area more likely to be completed outside of the planning process, without complementary sustainable drainage improvements. This approach accords with the advice in the Non-Statutory Technical Standards for SuDS by LASOO (Local Authority SuDS Officer Organisation).

5.15 The site has an existing impermeable catchment area which currently discharges to the local public storm water sewer network at an uncontrolled rate. Using the standard Modified Rational Method and local rainfall data, the current peak discharge rates have been calculated. These are shown in table 4.

5.16 To improve on the current discharge rate and introduce betterment, it is proposed to restrict any peak rate flows from the new development to 0.5 l/s.

Table 4: Existing & Proposed Flows & Attenuation

Storm Event (Annual Exceedance Probability)	Existing Brownfield Run Off Rate / Greenfield (l/s)	Proposed Max. Discharge Rate	Attenuation Provided (m^3)
1 in 1 (100% AEP)	-	0.31	311.926
1 in 2 (50% AEP)	15.6	0.31	
1 in 30 (3.3% AEP)	27.9	-	
1 in 30 (3.3% AEP) plus 40%	-	0.4	
1 in 100 (1% AEP)	35.9	-	
1 in 100 (1% AEP) plus 45%	-	0.44	

Pollution Control

5.17 Ciria pollution treatment measures have been applied to ensure treatment of the surface water. The pollution control measures are designed to minimise the transmittal of any pollutants, collected by runoff flowing over hard paved areas, to the public sewers and to ground. Pre-treatment is provided with gulleys and catchpit manholes to remove silt and prolong the life of the pollution control treatment media. Pollution control measures for this site include:

- A proprietary SPEL coalesce ESR 25/C1 petrol interceptor prior to discharge to the existing storm water sewer network.
- Permeable paving
- Bio-retention strip

5.18 The suitability of the pollution control measures is quantified in accordance with CIRIA 753, pollution hazard indices. Comparing the pollution hazard indices in Table 5, for each catchment type, with the total pollution mitigation indices in Table 6, it can be seen that the suggested drainage system will be sufficient to mitigate the expected pollution from roofs and paved areas. See mitigation formula below and Appendix B for the product details.

Total SuDS Mitigation Index must be ≥ Each Catchment's Pollution Hazards Index
(For each contaminant type)
Total SuDS Mitigation Index = 1st Stage Mitigation Index + 0.5 (2nd Stage Mitigation Index)

Table 5: Pollution Hazard Indices

Catchment Type	Pollution Hazard Level	Requirements for Discharge to Groundwater	Pollution Hazard Indices		
			Suspended solids	Metals	Hydrocarbons
Restaurant Roof	low	Simple index approach	0.3	0.4	0.05
Restaurant parking	Medium	Simple index approach	0.7	0.6	0.7

Table 6: Total Pollution Mitigation Indices

Type of Pollution Mitigation (SuDS)	Pollution Mitigation Indices		
	Suspended solids	Metals	Hydrocarbons
1. SPEL Petrol interceptor with coalescer ESR 25/C1	0.8	0.6	0.9
Total treatment indices	0.8	0.6	0.9

Note: for the total calculation, the permeable paving and bio-retention strip have been ignored, as not all run-off passes through these treatment measures.

Maintenance

5.19 Refer to the separate Glanville report entitled 'Drainage Maintenance Plan'.

Foul Water (FW) Drainage Strategy

5.20 The development will connect foul water flows, via gravity, to the existing Public Sewer to the north of the site within the A361 or to the south via an existing connection from the site to Horton Road, subject to suitability, as shown in Figure 5. A pre-development inquiry has been sent to Wessex Water, who have confirmed the most suitable outfall to be the 300mm diameter public combined sewer in London Road, as shown on Figure 5.

5.21 The restaurant drainage includes an alarmed grease trap for all the kitchen waste pipework to ensure drains do not lose capacity due to grease build up and to prevent grease entering the public sewers.

6.0 Further Investigations & Approvals

6.1 The information in this report is sufficient to demonstrate the suitability of the proposed development in respect of Flood Risk and Sustainable Drainage. It is expected that planning conditions will be imposed requiring drainage proposals to be in accordance with this Drainage Statement, and that details of the on-site foul and surface water drainage designs will need to be provided prior to commencement of works.

6.2 The detailed drainage design must comply with the Building Regulations and approval will be required from a qualified Building Inspector.

6.3 An intrusive geo-environmental site investigation will be completed to assess of infiltration drainage. The surface water drainage proposals have been designed to be easily adaptable to allow infiltration if this is confirmed.

6.4 Prior to construction a formal application will need to be submitted to obtain consent for physical connections (direct or indirect) and the discharge of flows to the adopted sewer. This applies to the foul and surface water flows from this development.

6.5 Surface water must be carefully managed on site during construction to safeguard the works and neighbouring land from flooding and to ensure protection of natural water resources and ecology.

7.0 Conclusion

7.1 The development proposals have been designed after consideration of national and local planning policy and best practice guidance, in the context of the proposed use and site conditions.

7.2 Flood risks within the site have been assessed and are low. The proposed design ensures that flood risks are not increased by the development.

7.3 The development's surface water drainage strategy follows sustainable drainage guidance. Infiltration is most likely unsuitable due to previous site usage and there are no watercourses nearby, therefore runoff will discharge to an existing sewer via a new piped system within the new access road. The proposed discharge rate is restricted to 0.5 l/s maximum. The sustainable surface water drainage system is designed to accommodate a 1:100-year event plus the appropriate climate change allowance for this site without flooding.

7.4 A SuDS maintenance schedule has been provided to demonstrate adoption and maintenance proposals in a separate Glanville report entitled 'Drainage Maintenance Plan'.

7.5 The development's foul water drainage strategy utilises gravity to take effluent to the nearby existing public sewer either to the north within the A361 or to the south via an existing connection from the site to Horton Road. The design includes many access points for maintenance and an alarmed grease trap to ensure downstream sewers are protected from cooking waste / grease.

7.6 In summary, the development proposals comply with relevant standards for flood risk and sustainable drainage.

Figures



NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS, DOCUMENTS AND SPECIFICATIONS. ANY DISCREPANCIES BETWEEN INFORMATION SHOWN ON THIS AND ANY OTHER DRAWING SHALL BE REPORTED TO THE ENGINEER IMMEDIATELY.
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KEY:

APPLICATION BOUNDARY

FIGURE 1

Rev.	Description	Date	By	Chkd
P1	FIRST ISSUE	02.12.25	SWF	HBG

Glanville
Survey > Plan > Engineer

Civil Engineering | Highways Engineering | Structural Engineering | Building Surveying | Transport Planning | Geomatics

Hertfordshire | Oxfordshire | Cambridgeshire | Bristol

Client : McDonald's RESTAURANT

Project : McDONALD'S RESTAURANT DEVIZES HORTON ROAD (ST2029)

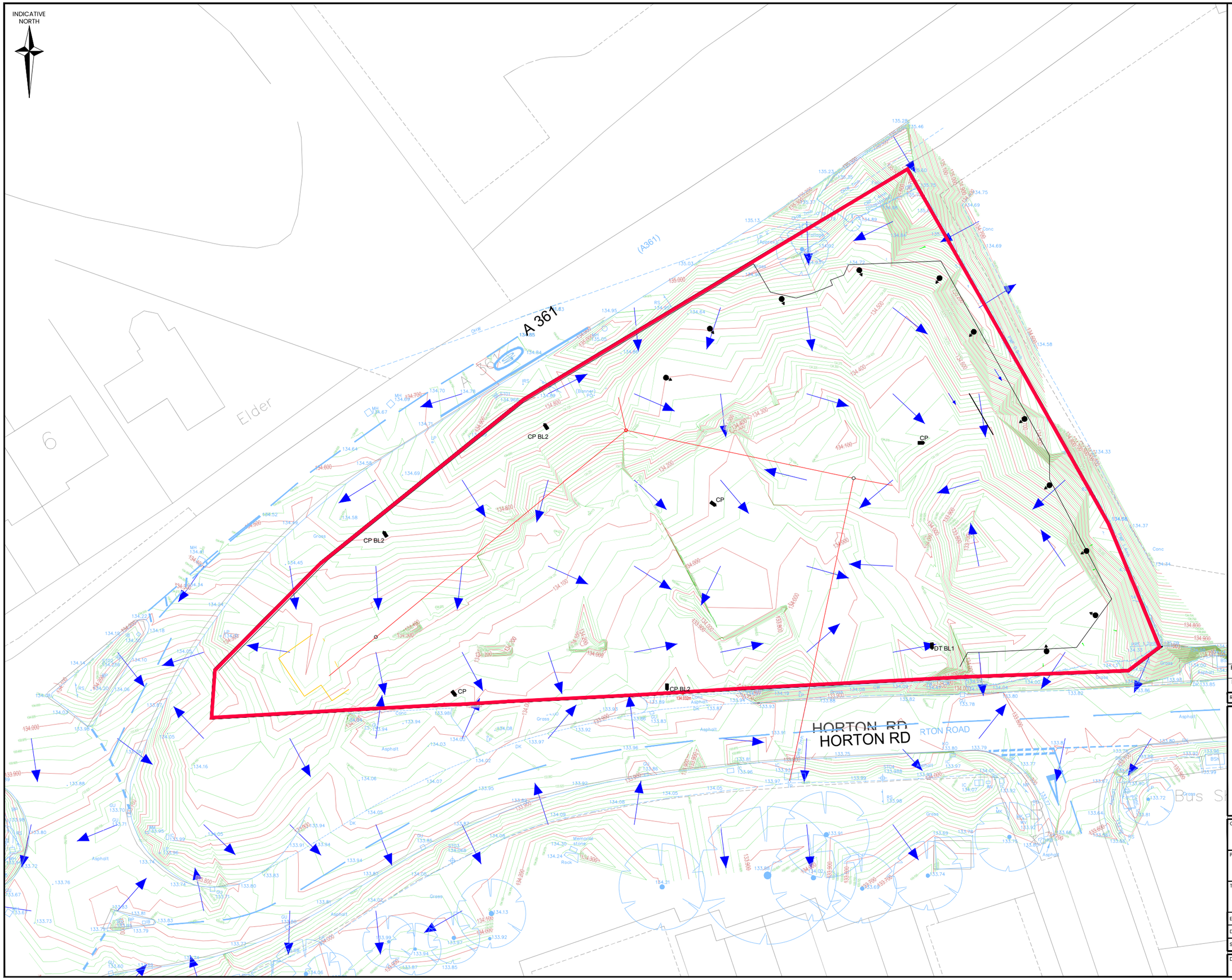
Title : SITE LOCATION PLAN

Engineer : SWF | Date : DEC 2025

Director : HBG | Scale : NTS

Status : PRELIMINARY

Drawing No. 4240491-SK03 | Rev P1



NOTES

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KEY:

- APPLICATION BOUNDARY
- TOPOGRAPHICAL SURVEY
- OS MAP (El Sub Sta)
- EXISTING OVERLAND FLOW ROUTE
- EXISTING 0.10m CONTOURS BASED ON TOPOGRAPHICAL SURVEY (54.60 / 54.50 / 54.40)

FIGURE 2

Rev.	Description	Date	By	Chkd
P2	SITE LAYOUT UPDATED.	22.05.26	SWF	HBG
P1	FIRST ISSUE	02.12.25	SWF	HBG

Glanville
Survey > Plan > Engineer
Civil Engineering | Structural Engineering | Transport Planning | Highways Engineering | Building Surveying | Geomatics
Hertfordshire | Oxfordshire | Cambridgeshire | Bristol

Client : McDonald's Restaurant

Project : McDONALD'S RESTAURANT DEVIZES HORTON ROAD (ST2029)

Title : EXISTING SITE SURVEY AND OVERLAND FLOW ROUTES

Engineer : SWF | Date : DEC 2025
Director : HBG | Scale : 1:200 @ A1
Status : PRELIMINARY

Drawing No. 4240491X-SK05 | Rev P2

INDICATIVE NORTH

HORTON RD

HORTON ROAD

A 361

Elder

McDonald's Restaurant NG50

Telegraph Pole Removed.

Drive Totem 2 12m

CP BL1

OT BL1

NOTES

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KEY:

- APPLICATION BOUNDARY
- PROPOSED SITE LAYOUT
- TOPOGRAPHICAL SURVEY
- OS MAP
- EXISTING IMPERMEABLE AREAS AREA = 1652m²
- EXISTING PERMEABLE AREAS AREA = 2167m²
- PROPOSED IMPERMEABLE AREAS AREA = 2868m²
- PROPOSED PERMEABLE AREAS AREA = 992m²

FIGURE 3

Rev.	Description	Date	By	Chkd
P3	SITE LAYOUT UPDATED.	22.05.26	SWF	HBG
P2	UPDATED IN ACCORDANCE WITH REVISED PLANNING LAYOUT.	09.01.26	SWF	HBG
P1	FIRST ISSUE	02.12.25	SWF	HBG

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Client : McDonald's RESTAURANT

Project : McDONALD'S RESTAURANT DEVIZES HORTON ROAD (ST2029)

Title : EXISTING AND PROPOSED IMPERMEABLE AREAS

Engineer : SWF | Date : DEC 2025

Director : HBG | Scale : NTS

Status : PRELIMINARY

Drawing No. 4240491-SK07 | Rev P3

INDICATIVE NORTH

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KEY:

APPLICATION BOUNDARY

TOPOGRAPHICAL SURVEY

1.1m CB boundary fence headlight screen
1.8m CB fence headlight screen
Post and rail boundary fence 1.2m high
Extg Road Sign
A 361
Goal post Height Restrictor
1No. Single Digital Screen
1No. Double Digital Screen
DOT Sign "Litter"
Telegraph Pole Removed.
CP BL2
Pedestrian guarding - see detail
2No DOT Signs 14a "Accessible parking Bay"
2No. COD & Drive Thru Canopies
Screens
DOT Sign "Look Both Ways"
Play Space E11-003
Play Panel Sign
Patio
Entrance
Cycle Locker
Corral
14b "Parked Order Bay"
14b Parked Cycle Bay Stands
DOT Sign "Pedestrians Look Right"
DOT Sign "Pedestrians Look Left"
Grill Bays
Fast Forward Lane
DT BL1
Pedestrian Access
DOT Sign "Pedestrian Crossing"
Dense planing to prevent pedestrian access and to act as headlight screen. See Landscape Architects drawings for details
HORTON RD
Shelter
Highway works, including road widening, pedestrian route and crossing improvements - All under separate agreement with L.A. and all as Highways engineers details.
New Pedestrian Crossing
New pedestrian island crossing
Driver "Lofep" 2 -12m
Double sided banner unit
2No. DOT Signs "Give Way" & "No Entry"
ARUNDEL
2No DOT Signs red limit 10mph "Pedestrians ssing"
Existing Pole Mounted Transformer
Kerb line amended as per highways consultant recommendation
Memorial stone
Rock
Elder
Gross
Asphalt
Grass
Conc

FIGURE 4

Rev.	Description	Date	By	Chkd
P3	UPDATED TO REVISED PLANNING LAYOUT.	22.05.26	SWF	HBG
P2	UPDATED IN ACCORDANCE WITH REVISED PLANNING LAYOUT.	09.01.26	SWF	HBG
P1	FIRST ISSUE	02.12.25	SWF	HBG

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Civil Engineering | Highways Engineering | Structural Engineering | Building Surveying | Transport Planning | Geomatics
Hertfordshire | Oxfordshire | Cambridgeshire | Bristol

Client : McDONALD'S RESTAURANT

Project : McDONALD'S RESTAURANT DEVIZES, HORTON ROAD SN10 2FZ (ST2029)

Title : PROPOSED SITE LAYOUT

Engineer : SWF | Date : DEC 2025

Director : HBG | Scale : 1:200 @ A1

Status : PRELIMINARY

Drawing No. 4240491-SK04 | Rev P3

INDICATIVE NORTH

DRAINAGE NOTES:

1. ALL DRAINAGE ALARM SYSTEM COVERING SPEL GREASE TRAPS AND TREATMENT UNITS MUST BE INSTALLED, CONNECTED AND COMMISSIONED SPEL PRIOR TO PRACTICAL HANDOVER OF THE STORE TO MCDONALD'S.
2. ALL DRAINAGE TO BE INSTALLED TO BUILDING REGULATIONS PART H AND/ OR SCOTTISH BUILDING REGULATIONS.
3. ALL DRAINAGE TO BS8582.
4. BUILDING INSPECTOR TO INSPECT ALL FOUL DRAINAGE INSTALLATION
5. **ALL DRAINAGE ALARM SYSTEMS COVERING GREASE TRAPS AND TREATMENT UNITS MUST BE INSTALLED, CONNECTED AND COMMISSIONED BY THE GROUNDWORK CONTRACTOR PRIOR TO PRACTICAL HANDOVER OF THE STORE TO MCDONALD'S.**

FILTER DRAIN

250MM DEEP SHALLOW ENHANCED SWALE WITH 1:4 MAX. SIDES

FILTER DRAIN TO DISCHARGE TO PERMEABLE PAVING SUB-BASE AT HIGHER LEVEL

S23 1200Ø CL 134.46 IL 133.96

FOUL OUTFALL TO CONNECT TO EXISTING PUBLIC FOUL MANHOLE

TANK OUTLET AT LOWER LEVEL

1No. Single Digital Screen

1No. Double Digital Screen

S30 1200Ø CL 134.17 IL 133.03

GREASE TRAP CL 134.15 IL 133.21

GW1 PIC 600Ø CL 134.10 IL 133.40

S32 1200Ø CL 134.21 IL 132.99

FW1 1200Ø CL 134.10 IL 132.86

FW2 1200Ø CL 134.10 IL 132.75

FW3 1200Ø CL 134.10 IL 132.69

FW4 1200Ø CL 134.12 IL 132.46

Telegraph Pole Removed.

2No. Double Digital Screens

125MM DEEP SHALLOW ENHANCED SWALE WITH 1:4 MAX. SIDES

FW5 1200Ø DISCONNECTING MANHOLE CL 134.62 IL 132.20

PERMEABLE PAVING 1
450MM VOIDED STONE SUB-BASE
EFFECTIVE STORAGE = 32.125M³

S36 1200Ø CL 134.24 IL 132.70

S33 1200Ø CL 134.11 IL 132.75

GT150 CL 134.10 IL 133.20

GW2 PIC 600Ø CL 134.15 IL 133.26

FFL 134.250

STACK LOCATIONS TBC

OUTLET FROM PERMEABLE PAVING SUB-BASE AT LOW POINT

S43 FLOW CONTROL CHAMBER 1200Ø 0.5l/s MAX. CL 134.18 IL 132.67

Drive Totem 2 12m

Double sided banner unit

2No DOT Signs "Give Way" & "No Entry"

14b Parked Order Bay

DOT BL 1

DOT BL 2

S40 1200Ø CL 134.00 IL 132.92

FILTER DRAIN

2No. DOT Signs "Speed limit 10mph" and "Pedestrians Crossing"

S41 1200Ø CL 134.18 IL 132.78

S36 1200Ø CL 134.15 IL 132.65

SPEL PETROL INTERCEPTOR CL 134.25 IL 132.66

S45 DISCONNECTING MANHOLE 1200Ø CL 134.36 IL 132.63

STORM OUTFALL TO CONNECT TO EXISTING PUBLIC STORM MANHOLE. SUBJECT TO APPROVAL.

HORTON RD

NOTES

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KEY:

- APPLICATION BOUNDARY
- PROPOSED SITE LAYOUT
- TOPOGRAPHICAL SURVEY
- OS MAP
- 10m 150Ø 1:40 — PROPOSED SURFACE WATER DRAINAGE PIPEWORK SHOWING LENGTH, PIPE DIAMETER AND GRADE
- PROPOSED SURFACE WATER DRAINAGE PIPEWORK WITH GULLY WITH 150Ø PIPE
- PROPOSED SURFACE WATER PPIC CATCHPIT MANHOLE WITH 300mm SUMP
- ACO MONO DRAIN PDI100D U.N.O 10.0 DRAINAGE CHANNEL (BLACK)
- SPEL ESR TREATMENT UNIT WITH HARD WIRED ALARM TO MANAGER'S OFFICE
- LINED IMPERMEABLE HEAVY DUTY CELLULAR STORAGE SDS GEOlight OR SIMILAR APPROVED
- FLOW CONTROL CHAMBER
- ACO 305 KERB DRAIN - DRAINAGE KERB WITH ACCESS POINTS / OUTLETS
- 10m 150Ø 1:40 — PROPOSED FOUL WATER DRAINAGE PIPEWORK SHOWING LENGTH, PIPE DIAMETER AND GRADE
- PROPOSED BUILDING FOUL WATER DRAINAGE INSPECTION CHAMBER
- 10m 150Ø 1:40 — PROPOSED GREASE WATER DRAINAGE PIPEWORK SHOWING LENGTH, PIPE DIAMETER AND GRADE
- PROPOSED GREASE WATER DRAINAGE INSPECTION CHAMBER
- ALARMED 2000l SPEL GREASE TRAP WITH HARD WIRED ALARM TO MANAGER'S OFFICE
- 110Ø DUCTS FOR GREASE TRAP/ CABLES TO INCOMING ELECTRICS CUPBOARD (MUST BE INSTALLED, CONNECTED AND COMMISSIONED BY THE GROUNDWORK CONTRACTOR PRIOR TO PRACTICAL HANDOVER)
- PROPOSED BIO-RETENTION STRIP
- PROPOSED SHALLOW ENHANCED SWALE
- LINED PERMEABLE PAVING

FIGURE 5

Rev.	Description	Date	By	Chkd
P3	UPDATED TO REVISED PLANNING LAYOUT. SUDS FEATURES ADDED.	22.05.26	SWF	HBG
P2	UPDATED IN ACCORDANCE WITH REVISED PLANNING LAYOUT.	09.01.26	SWF	HBG
P1	FIRST ISSUE	02.12.25	SWF	HBG

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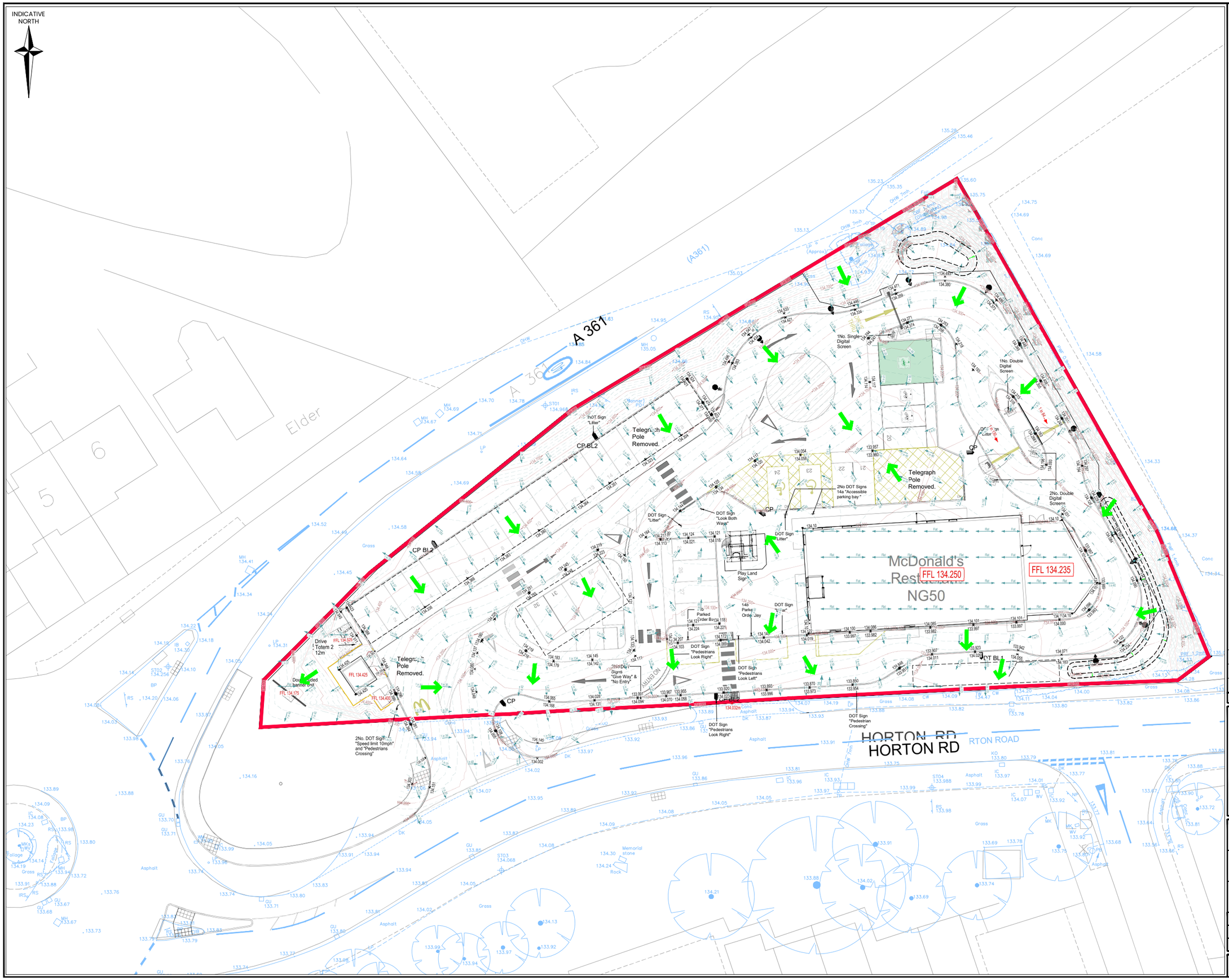
Client : McDonald's RESTAURANT

Project : McDONALD'S RESTAURANT DEVIZES HORTON ROAD (ST2029)

Title : PROPOSED DRAINAGE LAYOUT

Engineer : SWF	Date : DEC 2025
Director : HBG	Scale : 1:200 @ A1
Status : PRELIMINARY	

Drawing No. 4240491-1200 | Rev P03



NOTES

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KEY:

- APPLICATION BOUNDARY
- PROPOSED SITE LAYOUT
- TOPOGRAPHICAL SURVEY
- OS MAP
- PROPOSED MAJOR CONTOUR WITH LABELS (0.125m INTERVALS)
- PROPOSED MINOR CONTOUR WITH LABELS (0.025m INTERVALS)
- 1in80 PROPOSED SLOPE ARROW AND GRADIENT
- × 1.70m PROPOSED SPOT LEVEL
- PROPOSED EXCEEDANCE ROUTE

FIGURE 6

Rev.	Description	Date	By	Chkd
P3	UPDATED TO REVISED PLANNING LAYOUT. SUDS FEATURES ADDED.	22.05.26	SWF	HBG
P2	UPDATED IN ACCORDANCE WITH REVISED PLANNING LAYOUT.	09.01.26	SWF	HBG
P1	FIRST ISSUE	02.12.25	SWF	HBG

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Highways Engineering | Building Surveying | Geomatics
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Client : McDonald's Restaurant

Project : McDONALD'S RESTAURANT DEVIZES HORTON ROAD (ST2029)

Title : PROPOSED LEVELS LAYOUT AND EXCEEDANCE ROUTES

Engineer : SWF	Date : DEC 2025
Director : HBG	Scale : 1:200 @ A1
Status :	PRELIMINARY

Drawing No. 4240491-1100 Rev P3

Appendices

Appendix A

Geotechnical Data

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

Glanville Consultants Ltd

Phase 1 Geoenvironmental Desk Study

Horton Road
Devizes
Wiltshire
SN10 2GL

Report Reference: 25.08.007-f01
September 2025

MAIN OFFICE & LABORATORIES
Slapton Hill Barn, Blakesley Road, Slapton, Towcester, Northamptonshire. NN12 8QD
Telephone: (01327) 860060 Email: info@listersgeotechnics.co.uk

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

DOCUMENT RECORD

Report Title	Phase 1 Geoenvironmental Desk Study Report
Development	Restaurant with associated drive through and car park
Project Address	Horton Road, Devizes, Wiltshire, SN10 2GL
Project Reference	25.08.007
Client	Glanville Consultants Ltd

	Signature	**Name and Qualifications**
Prepared By:		**Benjamin Lee** **Senior Geotechnical Engineer** BSc (Hons), FGS
Checked and Approved By:		**Ian Evetts** **Managing Director** HNC, MSc, FGS, CGeol, RoGEP

For and on behalf of ListersGeo, trading name of Listers Geotechnical Consultants Ltd

Issue No	**Date**	**Status**
dr01	22nd September 2025	Draft Report
f01	30th March 2026	Final Report

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LISTERS GEO
Geotechnical and Geoenvironmental Consultants

EXECUTIVE SUMMARY

Project Reference	25.08.007
Site Location	Horton Road, Devizes, Wiltshire, SN10 2GL
OS Grid Reference	402336, 163038
Development Proposals	Demolish existing buildings to accommodate a new restaurant with associated drive through and car park.
Current Site Usage	Petrol station, vehicle repair centre, car sales forecourt and hand car wash.
Topography	The site slopes gently down to the south from around 134.9m above ordinance datum (AOD) in the north to around 134.0mAOD in the south.
Vegetation	Strip of soft landscaping extends along the eastern site boundary, which is overgrown with a variety of trees, bushes and weeds.
Published Geology	Artificial Ground: None mapped on site, but thicknesses anticipated associated with historical construction and demolition activities. Superficial geology: None recorded on or within 250m of the site Bedrock geology: Upper Greensand Formation.
Hydrology	The nearest surface water feature in the anticipated direction of hydraulic flow (south) is an unnamed drainage channel approximately 325m from the site.
Hydrogeology	Upper Greensands Formation: Principle Bedrock Aquifer of High Vulnerability.
Site History	The site comprised allotment gardens from around 1899 until circa 1976 when the existing vehicle repair and testing centre was developed, and a residential property was constructed in the east of the site. By 1995 the existing fuel filling station and car sales forecourt were constructed in the west of the site; and by 2005 the existing hand car wash was operational and the property in the east was demolished.
Unexploded Ordnance	Preliminary Unexploded Ordnance (UXO) Risk Review considered the risk to be Medium within the site boundary.
Potential Contamination Sources	Made Ground; asbestos containing building materials; vehicle repair centre, petrol station, car sales forecourt and hand car wash land uses; underground fuel storage tanks; UXO; exploded bombs; and a historical landfill.
Expected Ground Conditions	Surface covering of Topsoil or Fill (pavement constructions and floor slabs) over variable thicknesses of Made Ground above naturally deposited bedrock geology of the Upper Greensand Formation.
Potential Risks to Human Health	With regards to potential near surface soil contamination, the preliminary risk assessment identified up to a high risk for ground workers and up to moderate/low risk to the future staff, nearby residents and the general public. Intrusive investigations are considered necessary to verify the risks.
Potential Ground Gas Risks	Potential degrading hydrocarbon plume beneath the site (gases and vapours); and migrating gases from an off-site historical landfill. Ground gas monitoring considered necessary to verify the risks.
Potential Risks to Controlled Waters	The preliminary risk assessment identified a moderate risk to the underling Principal Aquifer and moderate/low risk to surface waters. Intrusive investigations are considered necessary to verify the risks.
Further Work & Recommendations	Intrusive investigation to further assess the risk and to assist with geotechnical design, ideally including: - Spread of shallow excavations to assess extent of any near surface contamination. - Machine excavated trial pits to assess trench stability, groundwater ingress and for infiltration testing. - Deeper boreholes with in-situ testing and mounting well installations. - Laboratory testing of soil and groundwater samples. - Ground gas monitoring. - Removal of underground fuel storage tanks with verification assessments. Specialist permissions may need to be obtained if intrusive investigations are undertaken with the petrol station still operational.

This executive summary should be read in conjunction with the main report.

LISTERS GEO
Geotechnical and Geoenvironmental Consultants

CONTENTS

INTRODUCTION 2
PROPOSALS 2
SITE INFORMATION AND RECONNAISSANCE 2
DESK STUDY AND BACKGROUND INFORMATION 4
PUBLISHED GEOLOGY 5
Artificial Ground 5
Superficial Deposits 5
Bedrock 5
Historical Boreholes 5
Background Soil Chemistry 5
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PHASE 1 GEOENVIRONMENTAL DESK STUDY REPORT

INTRODUCTION

A Phase 1 Geoenvironmental desk study has been undertaken for a new restaurant at Horton Road, Devizes, Wiltshire, SN10 2GL. A Site Location Plan is provided in Appendix A. The Ordnance Survey National Grid reference for the approximate centre of the site is 402336, 163038.

Instructions to undertake the investigation were received from the client, Glanville Consultants Ltd, in their letter email dated 8th August 2025.

This report describes the desk study and walkover survey carried out by ListersGeo in order to provide an evaluation of the potential ground conditions and potential for any soil, gas or groundwater contamination at the site. The report presents a preliminary human health and groundwater risk assessment based on the findings of the desk study information, and information on the potential geotechnical conditions that may be encountered.

This report has been prepared for the sole use of the client and their professional advisors. This report shall not be relied upon by third parties without the express written authority of ListersGeo. If an unauthorised third party comes into possession of this report they must not rely on it and the authors owe them no duty of care and skill.

PROPOSALS

Following the demolition of the existing buildings, it is proposed to redevelop the site to accommodate a new restaurant with an associated drive through and car park. A proposed site layout plan is provided in Appendix A.

The report is based upon the above development proposals. Should these alter significantly following issue of this report, then the contents will require re-evaluation.

SITE INFORMATION AND RECONNAISSANCE

A reconnaissance of the site and its immediate surrounds was undertaken on the 29th August 2025. A selection of site photographs is presented in Appendix A along with a plan showing the existing site layout annotated with the salient features identified.

The site consists of a triangular shaped parcel of land broadly bound by the A361 to the north, Horton Road to the south and a motorcycle learning centre to the east. With maximum dimensions of approximately 75m east-west by 50m north-south the site extends to some 0.36ha in area.

The site is currently occupied by:

- Car sales office and petrol station shop in the west.
- Car sales forecourt that extends along the northern site boundary (vehicles parked on grass and gravel surfaced verges).
- Petrol station forecourt that extends across the western section of the site (asphalt surfacing).

- Vehicle repair and testing centre in the centre of the site (concrete floor slabs).
- Hand car wash facility to the east of the vehicle repair centre (surfaced with a variety of asphalt, concrete, paving slabs and gravel).
- Strip of soft landscaping extends along the eastern site boundary, which is overgrown with a variety of trees, bushes and weeds.

With reference to the client provided Underground Utility Mapping Plan (produced by Glanville Consulting Ltd, drawing number 4240491/4201, dated May 2025), several buried services extend beneath the site, including electricity cables, communication cables, water pipes, fuel pipes, underground fuel tanks and drains (including interceptor drains). Underground fuel tanks are recorded beneath the forecourt with associated infrastructure (delivery filling points and vent pipes) extending along the northern site boundary.

The general topography of the area slopes gently down to the south towards the Kennet and Avon Canal, which is located approximately 550m away in that direction. With reference to the client provided topographical survey (produced by Glanville Consulting Ltd, drawing number 4240491/4101, dated March 2025) the site itself generally follows this trend, sloping gently down to the south from around 134.9m above ordinance datum (AOD) in the north to around 134.0mAOD in the south.

The site is currently bordered by:

Direction	**Feature**
North	A361 with a metal manufacturing company and residential housing beyond.
East	Motorcycle learning centre with overgrown grassed field beyond.
South	Horton Road with residential housing estate beyond.
West	A361 with industrial estate and residential housing beyond.

The following potential sources of contamination were identified during the reconnaissance:

- Underground fuel storage tanks and infrastructure (potential underground leaks of fuel).
- Fuel filling station land usage (potential above ground spillages of fuel).
- Vehicle repair centre land usage (use of fuel, oil and degreasing agents).
- Hand car wash land usage (cleaning agents entering the ground).
- Vehicles stored on and visiting the site (potential spills and leaks of fuel/oil).

Further assessments on the potential impact of these features on the ground beneath the site are provided in the following *Industrial Land Uses* section.

DESK STUDY AND BACKGROUND INFORMATION

A desk study review of the site and its history has been undertaken to determine the former land usage and the potential for any historically derived sources of chemical contamination, as well as provide information to aid our geotechnical assessment.

The information provided in the desk study is obtained from independent third-party sources. We have relied on this information, but no guarantee can be given for the accuracy or completeness of the third-party data used. It should be appreciated that such data is not exhaustive and is constantly being updated and reviewed in light of new information and procedures. Therefore, improved practices, technology and new information may affect our conclusions and hence this report should be referred back to us for reassessment if new data comes to light, or changes in legislation/best practise is identified prior to development. Similarly, should the development commence more than one year from publication of this report, then we recommend this report is referred back to us for reassessment.

A copy of the desk study information obtained from Groundsure is presented in Appendix C of this report. The desk study comprises a review of data compiled from multiple organisations and information sources, including:

- Ordnance Survey
- Environment Agency (EA)
- Local Authority (LA)
- Natural England
- UK Health Security Agency (UKHSA)
- Centre for Ecology & Hydrology
- Contemporary Trade Directories
- The Coal Authority
- British Geological Survey (BGS), National Geoscience Information Service
- Arup and Stantec
- Aerial Imagery
- Unexploded Ordnance (UXO) maps
- Preliminary Unexploded Ordnance Risk Review

Information from the above referenced sources has been utilised to develop a conceptual model of the site for use in the source-pathway-receptor risk assessment and geotechnical appraisal.

PUBLISHED GEOLOGY

Reference to the BGS 1:50,000 scale map, Sheet 266 (for Marlborough, dated 1974), and other published geological information on the area indicates that the site is directly underlain by Bedrock geology of the Upper Greensands Formation.

Artificial Ground

None mapped on site, but thicknesses anticipated associated with the construction of the existing buildings and infrastructure.

Areas of Landscaped Ground are mapped at surface approximately 21m north-west and 99m east of the site. The BGS maps Landscaped Ground in areas where the land surface (natural or artificial) has been extensively remodelled, but where it is impracticable or impossible to delineate separate zones of Made Ground, Worked Ground, or Disturbed Ground.

The extent of the Landscaped Ground are fairly consistent with former barracks, which is discussed further in the following *History of the Site* section.

Superficial Deposits

None recorded on or within 250m of the site.

Bedrock

The Upper Greensand Formation is generally represented by glauconitic fine-grained sandstone, weathering to sand near surface. The formation is recorded to be up to 25m thick in the area and underlain by the Gault Formation (clay and mudstone).

Historical Boreholes

The British Geological Survey holds records of exploratory holes historically put down during previous investigations.

Background Soil Chemistry

Information from the BGS is provided in the table below listing the background soil chemistry of some commonly occurring heavy metals in the Topsoil in the area:

Heavy Metal	Level in Natural Soils (mg/kg)
Arsenic	15
Cadmium	1.8
Chromium	60 to 90
Lead	100
Nickel	15 to 30

HYDROLOGY

The general topography of the site slopes down to the south towards the Kennet and Avon Canal. The anticipated direction of hydraulic flow is therefore to the south and the nearest surface water feature in this direction is an unnamed drainage channel (within a residential housing estate) located approximately 325m from the site.

The Environment Agency's Catchment Data Explorer situates the site in the Etchilhampton Water catchment. The catchment is recorded to be 'not designated artificial or heavily modified' and of generally Moderate ecological quality for the latest reported period in 2022.

There are no current surface water abstraction licenses recorded within 1000m of the site.

The desk study data indicates that the following flood risks are recorded for the site:

- River or coastal waters: no records, indicating negligible risk.
- Surface water: the highest recorded on-site risk is 0.1m to 0.3m in a 1-in-100 year return period.
- Groundwater: moderate.

These data do not constitute a site-specific Flood Risk Assessment and we recommend further enquiries to determine if such an assessment would be required to support a development application for the site.

HYDROGEOLOGY

The groundwater vulnerability and aquifer designation data are based on geological mapping provided by the BGS. Groundwater vulnerability is divided, by the EA, into High, Medium and Low ranks (as further detailed in the appended Desk Study Report). Aquifer designations are initially divided, by the EA, into Superficial and Bedrock designations. For each type there are Principal, Secondary A, Secondary B and Unproductive Strata, each with a decreasing rank of importance.

The EA records the Upper Greensands Formation as a Principle Bedrock Aquifer of High Vulnerability.

There are no current groundwater abstraction licenses recorded within 1000m of the site; and according to information provided by the EA, the site is outside of any Source Protection Zones (SPZ) for a public potable water supply.

POTENTIALLY SENSITIVE LAND USES

The site is not located in close proximity to any environmentally sensitive land uses.

HISTORY OF THE SITE

The history of the site has been assessed by reviewing historical Ordnance Survey and National Grid maps and aerial imagery of the area. This has established the following:

Time Period	Historical Site Usage	Historical Usage of the Surrounding Area
1885 to 1886	The site is undeveloped situated within a larger area of undeveloped land (possible agricultural field).	Un-named roads run parallel to the northern and southern boundaries, fairly consistent with the modern arrangement of the A361and Horton Road. Six residential properties are located some 30m west of the site; and what appears to comprise a barn is located approximately 85m south-west of the site. Beyond the above, the surrounding land generally comprises (what appear to comprise) agricultural fields.
1899 to 1938	A field boundary is recorded along the eastern site boundary and the site area as a whole is labelled as allotment gardens.	The barn to the south-west is no longer mapped.
1940 to 1960	No mapping or information available.	Research indicates that Hopton Barracks were developed on the land to the north, west and south of the site (approximately 50m away) during World War II, which were used as army barracks and a prisoner of war camp.
1961	No significant changs (mapping shows the site in use as allotment gardens).	Mapping shows the land to the north, west and south of the site as Barracks; and the land to the east of the site as a Sports Field.
1976 to 1990	A garage is mapped fairly centrally on site, fairly consistent with location of the existing vehicle repair centre. What appears to be a residential property, labelled as The Bungalow, is located in the east of the site.	A tennis court is mapped around 90m east of the site within the sports ground. A residential housing estate, depot and a scouts hall are developed on the land to the south of the site (in the location of former barracks). Tanks are recorded on land associated with a rectangular building approximately 117m and 179m south of the site.
1995	Buildings mapped in the west of the site fairly consistent with the existing car sales office and petrol station shop. Rectangular feature recorded in the west of the site fairly consistent with the existing petrol station forecourt.	Barracks to the north partially removed/demolished (roads still recorded but no buildings mapped). Area of barracks to the west redeveloped as an industrial estate, comprising a variety of depots. Residential estate to the south of the site enlarged.

Time Period	Historical Site Usage	Historical Usage of the Surrounding Area
2002	Aerial imagery from this time period shows the western and central sections of the site fairly consistent with the modern arrangement, comprising a petrol station forecourt, car sales forecourt, vehicle repair centre and hand car wash. A residential property with associated garden and driveway is located in the eastern extreme of the site.	Motorcycle training centre located on land to the east of the site. Further depots/warehouses developed on the land to the north of the site.
2005 to 2025	Residential property in the east of the site demolished; and land shown overgrown with vegetation. The site as a whole is shown consistent with the modern arrangement.	No significant changes.

UNEXPLODED ORDNANCE AND BOMB SITES

A Preliminary Unexploded Ordnance (UXO) Risk Review has been undertaken for the site by MACC International Ltd. A copy of the report is provided in Appendix C.

The report notes that *'whilst the general area suffered a low level of enemy bombing during WWII with Devizes surviving the war largely unscathed, the immediate vicinity of the site footprint underwent extensive military activity at the former Devizes Barracks'*.

The report concludes that the UXO risk is a considered to be Medium within the site footprint and recommends that a Detailed UXO Risk Assessment is conducted to more accurately define the risk levels within the site footprint.

From a contamination point the main concerns arising from UXOs are:

- Heavy metal contamination derived from the bomb's casing and detonator charge.
- Organic contamination derived from the degradation of the explosive charge.

In addition, sites where bombs originally exploded may also be of concern. From a geotechnical and safety concern UXOs create a significant danger to building works and would create delays to construction if found. Exploded bombs would have created a large crater of disturbed ground beneath the site which might necessitate the use of deep foundations.

LANDFILL AND WASTE TREATMENT SITES

Reference to records indicates that there are no current landfills and one historical landfill within 500m of the site. The historical landfill is recorded to extend within 352m east of the site, however, no details on the accepted waste type and operational dates, are provided. Given the distance and local geology in the area,

which comprises the Upper Greensand Formation (that is anticipated to be relatively permeable); it is considered possible that a viable ground gas pathway exists between the historical landfill and the site.

Reference to records indicate that are two historical and two current waste management facilities within 250m of the site, which are summarised in the table below:

Distance (m)	Direction	Name	Details/ Comments
95	NE	Wiltshire Concrete	Historical recycling centre
119	NW	Hopton Park	Historical household waste recycling centre (likely associated with the below entry)
132	NW	Devizes Household Recycling Centre	Current household, commercial and industrial waste transfer and management site.
223	W	Hopton Depot	Current special waste transfer station

Given the distances involved and nature of the facilities (recycling, management and transfer), it is considered unlikely that any of these facilities would significantly affect the site area.

RADON GAS

Desk study information indicates that the site lies within an area where less than 1% of homes exceed the action level of 200Bq/m^3 for radon gas. Therefore, in accordance with BR 211, 'Radon: guidance on protective measures for new dwellings', no radon protection measures are necessary in the construction of new buildings (without underground rooms) on this site.

ENVIRONMENTAL PERMITS, INCIDENTS AND REGISTERS

There are no records of pollution incidents, licensed discharge consents, (historical or existing) licensed industrial activities, storage of dangerous, hazardous or radioactive substances or contaminated land within 250m of the site.

A current licenced pollutant release permit (Part B) is recorded on site for the 'unloading of petrol into storage at service stations'. No further licenced pollutant release permits are recorded within 250m of the site.

INDUSTRIAL USAGE SITES

The following table summarises the historical and current industrial land uses that have been identified within 150m from the site:

Distance (m)	Direction	Feature/Activity
On site	-	Garage: vehicle repair, testing and service centre
On site	-	Car sales: second hand vehicles
On site	-	Fuel filling station
On site	-	Hand car wash
11	NW	Barracks

Distance (m)	Direction	Feature/Activity
88	NE	Concrete products
116	E	Unspecified Depot
117	S	Unspecified Tank
127	N	Business park and industrial estate
134	N	Electricity substation

The Department of the Environment (DoE) Industry Profile for 'Road vehicle fuelling, service and repair (garage and filling stations)' was consulted, which indicates that the on-site vehicle repair centre and fuel filling station, potentially use:

- Metals and their compounds, including lead, chromium, zinc, copper and vanadium.
- Acids and alkalis.
- Asbestos.
- Organic compounds, including solvents, polycyclic aromatic hydrocarbons (PAHs), fuels, hydrocarbons, anti-freeze products and detergents.

With reference to, Written evidence submitted by the Car Wash Advisory Services Limited and the Sandu Foundation (HCW0013), chemicals commonly used in vehicle washing areas include:

- Traffic film removers - made from strong alkalis such as sodium hydroxide.
- Acid wheel cleaners - made from strong acids such as phosphoric acid, hydrofluoric acid and hydrochloric acid (sometimes referred to as 'brick acid').
- Wax - complex formulations of many ingredients including cationic surfactants and a blend of oils, sometimes including silicon.
- Shampoos and foams - made from a mixture of surfactants, with a small addition of sequestrants and acid or alkali.

GEOTECHNICAL HAZARDS

The risk of naturally occurring geotechnical hazards associated with the Upper Greensands Formation mapped beneath the is recorded in the Groundsure report to be as follows:

Ground Stability Hazard	Hazard Potential Rating
Collapsible deposits	Very Low
Landslides	Very Low
Running sand	Very Low
Compressible deposits	Negligible
Ground dissolution of soluble rocks	Negligible
Shrinking and swelling clays	Negligible

Made Ground is not included in the table above. The geotechnical risks associated with such deposit should be assessed following an intrusive investigations.

Natural Cavities

Information held by Stantec UK has not identified any naturally formed dissolution features within 1km of the site.

Man-Made Cavities

The desk study resources do not provide any evidence the site and immediate surrounds have been subject to any surface (quarrying) or underground (mining) mineral extraction activities.

INITIAL CONTAMINATION CONCEPTUAL SITE MODEL

A qualitative Preliminary Risk Assessment (PRA) has been undertaken in line with the EA's online guidance Land Contamination: Risk Management (LCRM).

We understand that following the demolition of the existing buildings it is proposed to redevelop the site to accommodate a new restaurant with associated drive through and car park.

Potential sources of contamination and potential receptors have been assessed using the source-pathway-receptor principle to create a Conceptual Site Model (CSM). This takes into account the fact that a complete pathway must exist between a potential source of contamination and a potential receptor for there to be considered a risk.

POTENTIAL CONTAMINATION SOURCES

Potential Solid-, Liquid- and Vapour-phase Contamination Sources

Research indicates that the site comprised allotment gardens from around 1899 until circa 1976 when the existing vehicle repair and testing centre was developed, and a residential property was constructed in the east of the site. By 1995 the existing fuel filling station and car sales forecourt were constructed in the west of the site; and by 2005 the existing hand car wash was operational and the property in the east was demolished.

It is considered possible that the sites former and current land uses have impacted the ground beneath the site; and the following potential sources of soil or groundwater contamination have been identified:

- Made Ground associated with historical construction and demolition activities.
- Asbestos containing materials (ACMs) may have been used in the construction of the former/existing buildings (given their age).
- Contaminants associated with the on-site vehicle repair centre and fuel filling station, including metals and their compounds, solvents, PAHs, hydrocarbons (fuels, oils, lubricants), anti-freeze products and detergents.
- Leaks from underground fuel storage tanks and associated infrastructure.
- Contaminants associated with the on-site hand car wash, including alkalis, acids, oils, fuel and metals.
- Localised spillages and/or leaks of hydrocarbons (oils, fuel, lubricants) from vehicles parked and visiting the site, although likely to be minor and localised.
- Unexploded Ordnance (UXO) and/or exploded bombs.

Nearby industrial land uses include army barracks (circa 1940 to 1990), which were subsequently redeveloped as an industrial estate (depots and recycling centres). Given the distances involved and nature of the land uses, it is considered unlikely that they would have significantly impacted the ground beneath the site (in comparison the on-site potential sources of contamination).

Potential Ground Gas Contamination Sources

Two main groups of gaseous-phase contamination have been considered: the gases (including methane and carbon-dioxide) that result from organic decomposition of constituents in the ground; and Radon gas that results from the radioactive decay of thorium and uranium (found, in varying quantities, in most soils and rocks).

A degrading hydrocarbon plume may exist beneath the site (associated with the underground fuel tanks), which would have the potential to produce volatile vapours and carbon dioxide and methane gases.

The desk study resources identified a historical landfill approximately 352m east of the site. No details on the landfills accepted waste type and operational dates were available; and therefore, at this stage, be considered a potential off-site source of carbon dioxide and methane gases.

RECEPTORS

The following most sensitive receptors have been identified at the site:

Human Health – Long Term Exposure

- End users of the site - the future staff.
- Nearby residents.

Human Health – Short Term Exposure

- Construction workers (during redevelopment).
- General Public (during redevelopment).
- Maintenance Workers.

Controlled Waters and the Environment

- The Principle Bedrock Aquifer of the Upper Greensand Formation beneath the site.
- Nearest surface water feature in the anticipated direction of hydraulic flow – Unnamed drainage channel approximately 325m south of the site.

Infrastructure

- Substructures.
- Water supply pipes.

PATHWAYS

It is considered that a number of potential pathways exist between these potential sources and the above identified receptors. The viability of these pathways is discussed in the preliminary risk assessment.

Human Health

- Direct soil ingestion in areas of exposed soil.
- Inhalation of indoor and outdoor vapours, dust and fibres.
- Dermal contact with contaminated soil.

- Inhalation of soil gases or vapours migrating through permeable strata into the building.

Controlled Waters and Environmental

- Migration/leaching of contaminants through the unsaturated zone.
- Migration of contaminants through the groundwater.
- Movement of contaminants through drains or services runs.

Infrastructure

- Leachable or corrosive contaminants within the soil.
- Corrosive contaminants within the groundwater.

PRELIMINARY RISK ASSESSMENT

Based on the desk study research, the following potentially-complete pollutant linkages have been assessed and in accordance with CIRIA C552, a consequence and probability rating has been applied to each potential contamination source to create an overall risk rating. The definitions and methodology are presented in Appendix B and the results are presented in the following table:

Potential			Probability	Consequence	Risk Classification
Source	**Pathway**	**Receptor**			
Made Ground associated with historical demolition and construction activities, and possible infilled bomb craters, which may have been impacted by: - metals, solvents, hydrocarbons, PAHs, detergents, acids, alkalis and anti-freeze products associated with fuel filling station*, vehicle repair and hand car wash land uses - ACMs possibly used in the construction of former/existing buildings (*underground fuel tanks assessed as separate source)	Ingestion Dermal Contact Inhalation	Construction workers	Highly likely	Medium	High
		Future staff	Low		Moderate/Low
		Nearby residents Maintenance workers General public	Unlikely		Low
	Explanation: It is considered likely that Made Ground will be present near surface beneath the site, which may have been impacted with contaminants that pose a risk to human health. The vast majority of the site will be covered with hardstanding (floor slabs and car park surfacing) that will significantly limit the exposure routes between any impacted soils and identified receptors on completion of the development. Whilst a high-risk classification has been established for construction workers (due to the pathway potential during groundworks), exposure to this receptor can be mitigated by use of appropriate PPE, work practices and maintaining good hygiene levels.				
	Migration through unsaturated zone, groundwater, drains and/or service runs	Principal Aquifer of the Upper Greensand Formation	Likely	Medium	Moderate
		Unnamed drainage channel some 325m south of the site	Unlikely	Medium	Low
	Explanation: It is considered likely that Made Ground will be present near surface beneath the site, which may have been impacted with contaminants that pose a risk to Controlled Waters. The vast majority of the site will be surfaced with hardstanding which will significantly reduce infiltration and any leaching potential. Nevertheless, as a Principle Aquifer, the Upper Greensands Formation mapped beneath the site is a particularly sensitive receptor; and leaching / downwards migration of contamination from any impacted Made Ground soils is likely to occur in the long-term. Given the distance involved, at this stage, it is considered 'unlikely' that any near surface contamination of the Made Ground has the potential to significantly impact surface water features.				
	Direct contact	Water supply pipes	Low	Medium	Moderate/Low
	Explanation: Organic contaminants, such as polycyclic aromatic hydrocarbons, may attack plastic pipes. Utility companies often have their own local guidelines and standards that should be referenced prior to installation.				

Potential			Probability	Consequence	Risk Classification
Source	**Pathway**	**Receptor**			
Leaks from **underground fuel storage tanks** and associated infrastructure (inhalation of vapour and gases pathway assessed separately below)	Ingestion Dermal Contact Inhalation	Construction workers	Low	Medium	Moderate/Low
	Explanation: Risk phase based on underground fuel storage tanks having leaked and hydrocarbon plume extending beneath the site within the depth range of proposed groundworks. The tanks will require removal from the site as part of the proposed development (discussed further in the following section); and assessments to determine if they have leaked/impacted the ground. Should they have leaked, then, for construction workers in contact with the ground, exposure can be mitigated by use of appropriate PPE, work practices and maintaining good hygiene levels.				
	Ingestion Dermal Contact Inhalation	Future staff Maintenance workers Nearby residents	Low	Medium	Moderate/Low
	Explanation: Similar rationale to above regarding the need for the tanks to be removed and for subsequent assessments on their impact.				
	Migration through unsaturated zone, groundwater, drains and/or service runs	Principal Aquifer of the Upper Greensand Formation	Low	Severe	Moderate
		Unnamed drainage channel some 325m south of the site		Medium	Moderate/Low
	Explanation: Should the tanks have leaked, then there is the potential for a severe consequence to the underlying Principal Aquifer. Similar rationale to above regarding the need for the tanks to be removed and for subsequent assessments.				
	Direct contact	Water supply pipes	Low	Medium	Moderate/Low
	Explanation: Similar rationale to above.				
UXO and **exploded bombs**	Ingestion Dermal Contact Inhalation	Construction workers General pubic	Low	Severe	Moderate
		Future staff	Low	Medium	Moderate/Low
		Nearby residents Maintenance workers	Unlikely	Medium	Low
	Explanation: Risk phase for construction workers and general public based on short-term exposure risk due to historical UXO detonation. Risk phase for residents, maintenance workers and general public based on long-term exposure risk should UXO/ exploded bombs have leached contaminants into the soils at the site.				
	Migration through unsaturated zone, groundwater, drains and/or service runs	Principal Aquifer of the Upper Greensand Formation	Low	Medium	Moderate/Low
	Explanation: Similar risk rationale to Made Ground, based on UXO/ exploded bombs having leached contaminants into the soils at the site.				
	Direct contact	Water supply pipes	Low	Medium	Moderate/Low
	Explanation: Similar risk rationale to Made Ground, based on UXO/ exploded bombs having leached contaminants into the soils at the site.				

Potential			Probability	Consequence	Risk Classification
Source	**Pathway**	**Receptor**			
Carbon Dioxide and Methane gases - generated from potential degrading hydrocarbon plume beneath the site - migrating beneath the site form nearby historical landfill	Inhalation	Future staff Construction workers	Low	Medium	Moderate / Low
	Accumulation of gases	On-site buildings, residents and staff	Low	Severe	Moderate*
	Explanation: Intrusive investigations are considered necessary to further assess this risk from hazardous gases and vapours beneath the site; which should include ground gas monitoring, removal of the underground fuel tanks (discussed further in the following section); and assessments to determine if the tanks have leaked/impacted the ground. *Risk classification based on no mitigating design measures being implemented; potentially, in turn, resulting in the accumulation of gases in on-site building and the explosive potential associated with methane gases.				

INITIAL GEOTECHNICAL GROUND MODEL

The site is anticipated to be underlain by a surface covering of Topsoil or Fill (pavement constructions and floor slabs) over Made Ground (associated with historical developments and possible bomb strikes) above naturally deposited bedrock geology of the Upper Greensand Formation.

The Upper Greensand Formation is typically a competent founding stratum for lightly loaded traditional spread foundations; and given its typical sand- and sandstone-dominated matrix, it may offer favour infiltration rates for on-site drainage systems. However, should shallow groundwater be present beneath the site, it may be difficult to maintain dry, stable, foundation excavations (should traditional spread foundations be adopted) and reduce the efficiency and/or preclude the use of on-site drainage measures.

At this stage, therefore, the main potential geotechnical hazards for the site are considered to be,

- Variable thicknesses of Made Ground
- Shallow groundwater

Intrusive investigations are recommended to address these issues and establish any potential problems for foundations and the general development of the site, which are discussed further in the following section.

CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER WORK

The site is in use as a petrol station, vehicle repair centre, car sales forecourt and hand car wash, which are considered likely to have impacted ground beneath the site to some degree, with a variety of potential contaminants.

Several of the sources, pathways and receptors listed in the CSM are considered to have the potential to be present as complete pollutant linkages. These have the potential to cause harm to the identified human health, controlled waters and infrastructure receptors.

An intrusive investigation (Phase II Ground Investigation) is therefore considered necessary to verify any impact the sites usage has had on the underlying ground and to further assess the risks posed to the identified receptors. The intrusive investigation would ideally include:

- A spread of shallow excavations across the site to assist in assessing the extent of any impacted soils. The depth of the excavations would ideally extend through any Made Ground, or any impacted soils, into clean natural soils.
- Deeper boreholes for the installations of monitoring wells, which would ideally extend in to the groundwater table, and be used for subsequent groundwater sampling and ground gas monitoring.
- Laboratory chemical testing of soil and groundwater samples for potential contaminates identified in the CSM.

Given the sites current usage and the extent of buried services beneath the site, the investigation could be undertaken in two phases:

- Pre-demolition phase, with the exploratory locations being positioned ‘where possible’, in areas absent from buried services and maintaining access to the existing business at the site.
- Post-demolition phase, utilising the data from the initial phase to target any areas of concern/ contamination, and to target previously inaccessible areas, such as beneath the buildings, fuel pumps and in areas with high buried service density (should they be removed).

Should any pre-demolition works be undertaken, and the fuel filling station remains active, a Petrol Safety Passport (accredited by the Safety Pass Alliance) will likely be required. In addition, it may be necessary for specialist non-ignition based equipment/plant to be used.

As part of the demolition works, the underground fuel storage tanks and their associated infrastructure should be decommissioned and removed from the site by specialists. During their removal, a geo-environmental engineer should attend site to assess any impact they have had on the ground. This could involve soil sampling and testing of the soils beneath and adjacent to the tank. Should the tanks have leaked, it may be necessary for the impacted soils to be removed from the site, or for some form of in-situ remediation to be undertaken.

From a geotechnical perspective, the intrusive investigation should include provision of machine excavated trial pits to assess trench stability and the intensity of any groundwater entries. The machine excavated trial pits could also be used for infiltration testing to determine the suitability and assist in the design of any on-

site drainage measures. Density testing of the Upper Green Sands Formation, such as standard penetration tests (SPTs) should be undertaken in the boreholes to assist with foundation design and Californian Bearing Ration tests (CBRs) to assist with pavement design.

The conclusions of this report should be approved by the Local Authority as soon as possible to avoid delays to the development.

REFERENCES

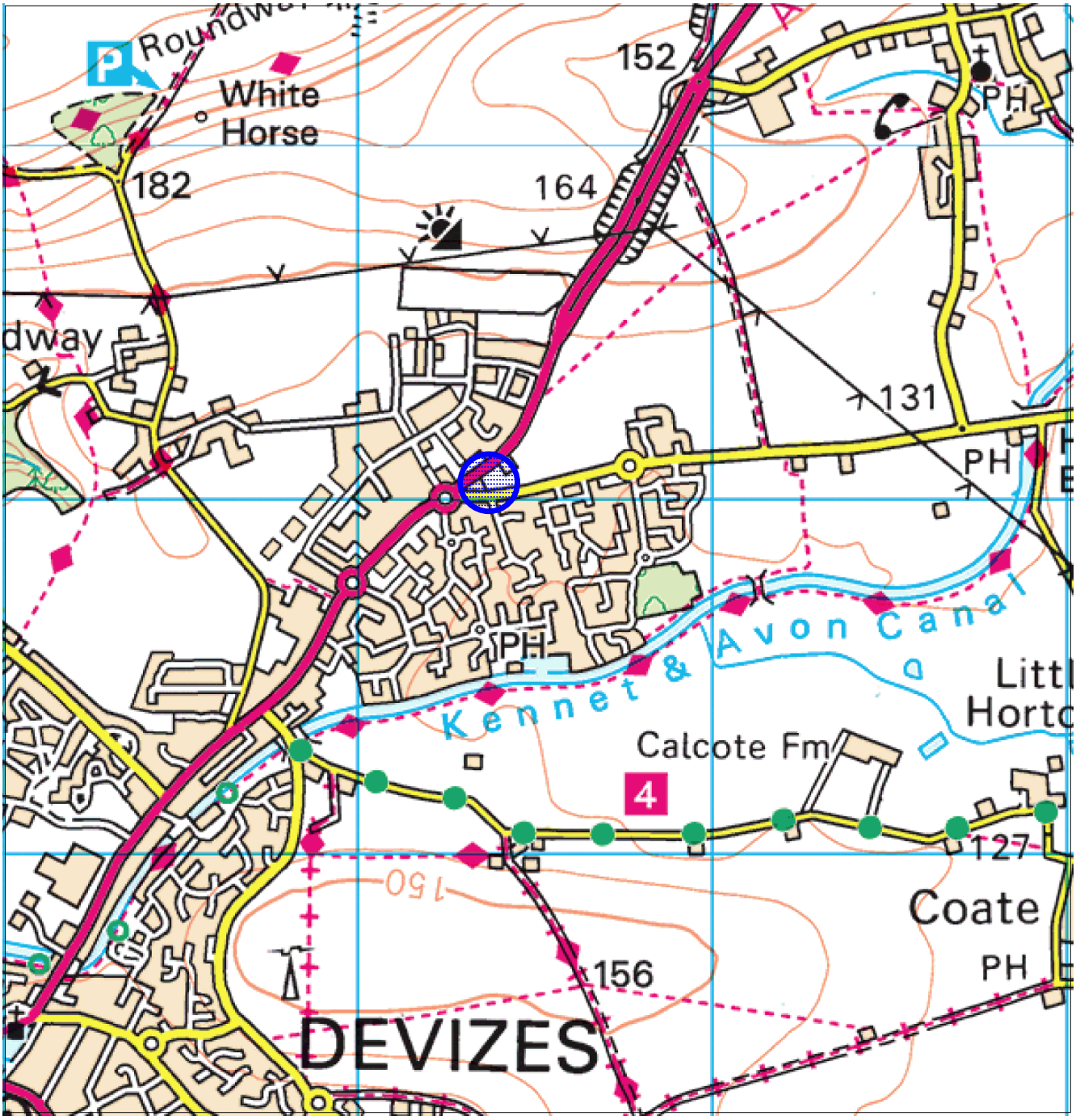
- BSI, Site Investigations: Code of Practice, BS 5930:2015+A1:2020, 2020
- BSI, Investigation of Potentially Contaminated Sites: Code of Practice, BS 10175:2011+A2:2017, 2017
- AGS, Site Investigation Asbestos Risk Assessment, AGS Interim Guidance, 2013
- CIRIA, Asbestos in soil and made ground: good practice site guide, C765, 2017
- CIRIA, Unexploded Ordnance (UXO), A Guide for the Construction Industry, C681, 2009
- BRE, Radon: Guidance on Protective Measures for New Buildings, BR 211, 2023
- BRE, Reducing Radon: Underground Rooms – Cellars and Basements, Quick Guide 7, 2015
- NHBC, NHBC Standards, Chapter 4.1 Land Quality – Managing Ground Conditions, 2024
- Environment Agency, Land contamination: risk management, 2023 https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm
- CIRIA, Contamination Land Risk Assessment – A Guide to Good Practice, C552, 2001
- BSI, Soil quality – Conceptual site models for potentially contaminated sites, BS EN ISO 21365:2020
- Environment Agency, Remedial Target Methodology, Hydrogeological Risk Assessment for Contaminated Land, 2006
- The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015
- Card G, Wilson S, Mortimer S, A Pragmatic Approach to Ground Gas Risk Assessment, CL:AIRE Research Bulletin RB17, 2012
- CIRIA, Assessing Risks Posed by Hazardous Ground Gases to Buildings, C665, 2007
- BSI, Guidance on investigations for ground gases – Permanent gases and Volatile Organic Compounds (VOCs), BS 8576:2013, 2013
- BSI, Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings, BS 8485:2015+A1:2019, 2019
- NHBC, Guidance on Evaluation of Development Proposals on Sites Where Methane and Carbon Dioxide are Present, Report 04, 2007
- CIRIA, The SuDS Manual, C753, 2015

BRE=Building Research Establishment. BSI=British Standards Institution. AGS=Association of Geotechnical and Geoenvironmental Specialists CIRIA=Construction Industry Research and Information Association. EA=Environment Agency. NHBC=National House Building Council. BGS=British Geological Survey.

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APPENDIX A
PLANS & PHOTOGRAPHS

Extract of 1:5,000 Ordnance Survey Explorer Map



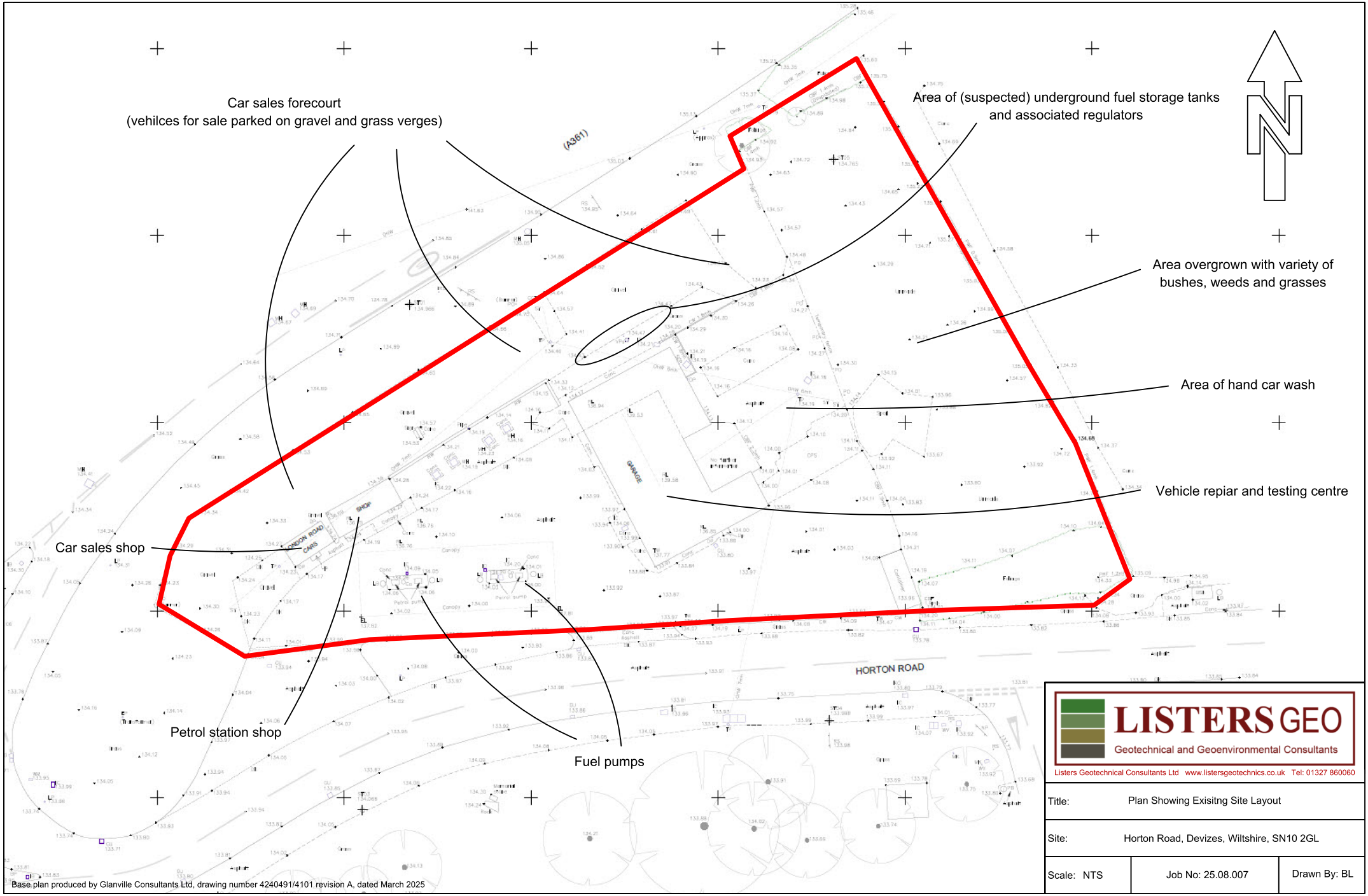
Reproduced from Ordnance Survey mapping with the permission of the Controller of His Majesty's Stationery Office. Crown Copyright reserved (Licence No: 100006010)

Approximate Site Location

LISTERS GEO
Geotechnical and Geoenvironmental Consultants
Listers Geotechnical Consultants Ltd www.listersgeotechnics.co.uk Tel: 01327 860060

Title:	Site Location Plan	
Site:	Horton Road, Devizes, Wiltshire, SN10 2GL	
Scale: NTS	Job No: 25.08.007	Drawn By: BL

N



Base plan produced by Glanville Consultants Ltd, drawing number 4240491/4101 revision A, dated March 2025

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Listers Geotechnical Consultants Ltd www.listersgeotechnics.co.uk Tel: 01327 860060

Title:	Plan Showing Exisitng Site Layout	
Site:	Horton Road, Devizes, Wiltshire, SN10 2GL	
Scale: NTS	Job No: 25.08.007	Drawn By: BL





Views along southern site boundary





View along northern site boundary





View of eastern section of the site

Site Photographs	Report: 25.08.007





Views across petrol station forecourt





Views of vehicle repair centre





Views of vehicle sales forecourt

Site Photographs	Report: 25.08.007





View of hand car wash area



Panoramic site overview from the south



Panoramic site overview from the north

Site Photographs	Report: 25.08.007

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APPENDIX B
CONTAMINATION RISK ASSESSMENT

Contaminated Land Risk Assessment – Definition of Methodology

The Contaminated Land Risk Assessment methodology followed in this report is based on Environment Agency's (EA) online guidance, Land Contamination: Risk Management (LCRM), published in June 2019. The new guidance is based upon the principles of the EA's CLR11 guidance, Model procedures for the management of land contamination, published in 2004.

The preliminary Conceptual Site Model (CSM) has been assessed using the methodology set out in CIRIA C552, Contaminated Land Risk Assessment - A Guide to Good Practice, published in 2001, as detailed below.

Risk evaluation determines the magnitude of risks present by assessing the likelihood of a particular risk being present alongside the severity of the consequence, should that event occur. The overall risk classification is a combination of the two and provides a qualitative assessment upon which to base any further work or remedial measures, where deemed necessary.

Where complete pollutant linkages are present, the probability of a contamination risk occurring at the site has been classified in accordance with the terms listed and defined in the table below.

Classification	Definition of Probability
High Likelihood	An event appears very likely in the short term and almost inevitable in the long term; or there is evidence at the receptor that harm or pollution is occurring.
Likely	It is probable that an event will occur, however, the event is not inevitable. It is possible in the short term and is likely over the long term.
Low Likelihood	Circumstances are possible under which an event could occur. However, it is uncertain that the event would occur even over a longer period and even less likely in the short term.
Unlikely	Circumstances are such that it is improbable that an event would occur even in the very long term.

The magnitude of the consequence of a contamination event occurring at this site is classified in accordance with the definitions listed in the following table. The classification of the consequence does not take into account the probability of the consequences being realised.

Classification	Definition of Consequence	Examples
Severe	Short term (acute) risk to human health likely to result in "significant harm" as defined by the Environment protection Act (1990), Part IIA. Short term risk of pollution of controlled waters. Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem, or organism forming part of such ecosystem	High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water. Explosion causing building collapse (can also equate to a short-term human health risk if buildings are occupied.).
Medium	Chronic damage to Human Health ("significant harm"). Pollution of controlled waters. A significant change in a particular ecosystem, or organism forming part of such ecosystem.	Concentrations of contaminants from site exceeding generic or site-specific screening criteria. Leaching of contaminants into a major or minor aquifer. Death of species within a designated nature reserve.
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services. Damage to sensitive buildings/structures/services or the environment	Pollution of non-classified groundwater. Damage to building rendering it unsafe to occupy. (e.g. foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by measures such as protective clothing etc). Easily reparable effects of damage to buildings, structures and services	The presence of contaminants at such concentration that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discolouration of concrete.

Once the probability and consequence of each pathway has been classified, the potential overall risk classification can be evaluated using the following matrix.

		Consequence			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**High Likelihood**	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	Likely	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low Likelihood	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

The definitions of the risk categories provided in CIRIA C552, together with actions that are likely to be necessary, are presented below.

Classification	Definition of Risk and Likely Actions Required
Very high Risk	• High probability that severe harm could arise or that severe harm is already occurring • This risk, if realised, is likely to result in a substantial liability • Urgent investigation and remediation are likely to be required
High Risk	• Harm is likely to arise • The risk, if realised, is likely to present a substantial liability • Urgent investigation is required and remediation may be necessary in the short term and likely over the longer term
Moderate Risk	• It is possible that harm could arise, however, it is unlikely that any harm would be severe and more likely it would be relatively mild • Investigation is likely to be required to clarify the risk and determine potential liability • Some remediation may be required in the longer term
Low Risk	• It is possible that harm could arise, but is likely that this harm, if realised, would be mild at worst
Very low Risk	• There is a low possibility that harm could arise • If realised, such harm is not likely to be severe

Reference:

Rudland, D J, Lancefield, R M, Mayell, P N, Contaminated land Risk Assessment. A guide to Good Practice, CIRIA Report C552, 2001.

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APPENDIX C
DESK STUDY INFORMATION

MACC International Ltd, Camilla Court, Nacton, Ipswich, Suffolk, IP10 0EU, UK

Greg Heath
Contracts Manager
Listers Geotechnics Consultants Ltd

Greg@listersgeotechnics.co.uk

Your Reference:

Our Reference: HL/9487/03

Date: 13/08/2025

Unexploded Ordnance Preliminary Risk Review
Horton Road, Devizes, Wiltshire, SN10 2GJ

MACC International Ltd (MACC) has conducted a preliminary risk review for the site footprint. The review has drawn on open source and in-house information, references have been provided where available (See Annex A).

The review has been conducted to provide Listers Geotechnics Consultants Ltd with a review of the risk which may be posed by UXO while conducting investigations on the site.

This document has been produced in the United Kingdom by MACC International Limited and has been provided solely as an aid in decision making. It is not intended to be used by any person for any purpose other than that specified. Any liability arising out of use by a third party of this document for purposes not wholly connected with the above shall be the responsibility of that party, who shall indemnify MACC International Limited against all claims, costs, damages and losses arising out of such use.

Whilst the general area suffered a low level of enemy bombing during WWII with Devizes surviving the war largely unscathed, the immediate vicinity of the site footprint underwent extensive military activity at the former Devizes Barracks. Whilst considering the history of the site and the level of post-war development, the following conclusions have been reached:

It is considered that there is a credible likelihood of encountering UXO on the plot. Consequently, the UXO risk is considered to be Medium within the site boundary.

It is recommended that a Detailed UXO Risk Assessment is conducted to more accurately define the risk levels within the site footprint. Alternatively, the stated preliminary risk level is accepted, and the following mitigation procedures are implemented:

1. All site personnel are provided with a UXO Safety Awareness Talk before intrusive works are commenced.

2. All intrusive investigations into post war un-worked ground should be supported by specialist EOD services.

I trust this document has provided you with sufficient information to meet your immediate needs, should you require anything further, please do not hesitate to contact me.

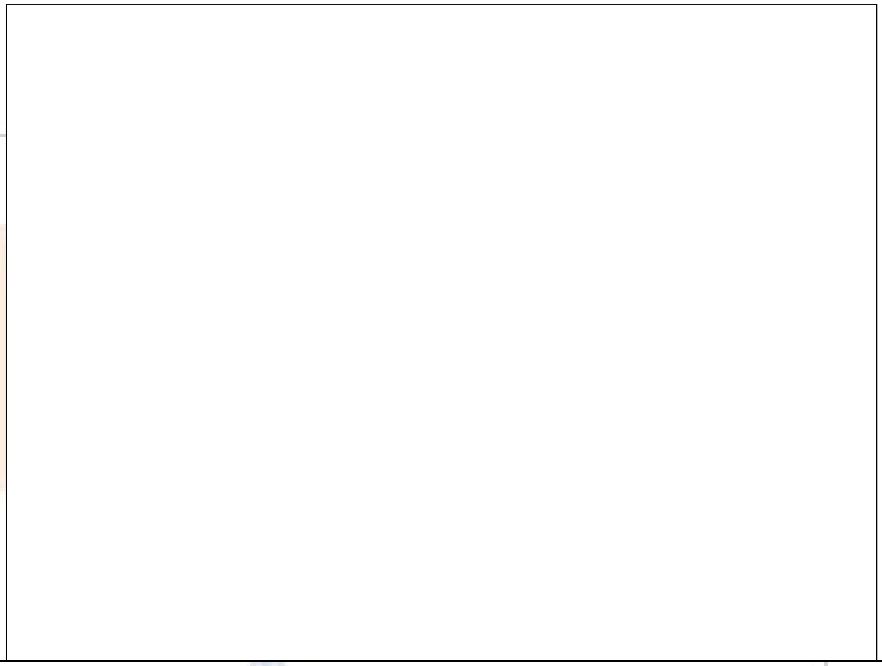
Yours Sincerely

Hannah Lees
Research Manager

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E-mail: macc@macc-eod.com Web: www.macc-eod.com
Registered in England: No. 3014471

Annex ‘A’ to
Document HL/9487/03
Dated 13/08/2025

Unexploded Ordnance Preliminary Risk Review

Site Location	**Site Address:** Horton Road, Devizes, Wiltshire, SN10 2GJ **Grid Reference:** 402325,163036 
Scope of Intended works	Preliminary review of the risk that may be posed by UXO to geotechnical investigations.
History	**Wartime Use:** The site footprint was undeveloped land during WWII. **Post War Development:** Areas of the site footprint have undergone post-war development through construction of the existing commercial premises.
Wartime History	**Enemy Bombing:** The general area suffered a low level of enemy bombing during WWII with Devizes surviving the war largely unscathed. No records were found to confirm a bomb strike within the site footprint or immediate surrounding area. The nearest recorded bombing incident occurred approximately 4.9km south-west of the site at Silver Street, Potterne in April 1942. **Anti-Aircraft Guns:** No guns were recorded to have been positioned on site. A Heavy Anti-Aircraft Battery was positioned approximately 3.8km to the south-east. **Military Use:** There was an extensive wartime military presence within the immediate vicinity of the site footprint. Le Marchant Barracks was established approximately 500m south-west of the site in 1878 and stationed thousands of British and American troops during WWII. Large military structures were located adjacent to the northeast of the site during this period. Part of the Barracks were repurposed as a Prisoner of War Camp, approximately 130m southeast of the site footprint, in September 1944.
Unexploded Ordnance (UXO) Finds	No reports were found to confirm a UXO find within the site footprint.

Groundsure LOCATION INTELLIGENCE

Enviro+Geo Insight

HORTON ROAD, DEVIZES, WILTSHIRE, SN10 2GJ

Order Details

Date: 22/08/2025

Your ref: 25.08.007

Our Ref: GS-7KO-HDA-CLZ-C6O

Site Details

Location: 402336 163038

Area: 0.36 ha

Authority: Wiltshire Council ↗



Summary of findings p. 2 >

Aerial image p. 9 >

OS MasterMap site plan p.14 >

Insight User Guide ↗

Contact us with any questions at:
info@groundsure.com ↗
01273 257 755

Certified B Corporation

Summary of findings

Page	Section	Past land use >	On site	0-50m	50-250m	250-500m	500-2000m
15 >	1.1 >	Historical industrial land uses >	0	1	4	11	-
16 >	1.2 >	Historical tanks >	0	0	5	11	-
17 >	1.3 >	Historical energy features >	0	0	5	9	-
18	1.4	Historical petrol stations	0	0	0	0	-
18 >	1.5 >	Historical garages >	3	0	0	0	-
19	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped >	On site	0-50m	50-250m	250-500m	500-2000m
20 >	2.1 >	Historical industrial land uses >	0	3	8	22	-
22 >	2.2 >	Historical tanks >	0	0	7	21	-
23 >	2.3 >	Historical energy features >	0	0	13	20	-
25	2.4	Historical petrol stations	0	0	0	0	-
25 >	2.5 >	Historical garages >	6	0	0	0	-
Page	Section	Waste and landfill >	On site	0-50m	50-250m	250-500m	500-2000m
26	3.1	Active or recent landfill	0	0	0	0	-
26	3.2	Historical landfill (BGS records)	0	0	0	0	-
27	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
27 >	3.4 >	Historical landfill (EA/NRW records) >	0	0	0	1	-
27 >	3.5 >	Historical waste sites >	0	0	2	2	-
29 >	3.6 >	Licensed waste sites >	0	0	9	6	-
33 >	3.7 >	Waste exemptions >	0	0	13	26	-
Page	Section	Current industrial land use >	On site	0-50m	50-250m	250-500m	500-2000m
37 >	4.1 >	Recent industrial land uses >	3	0	28	-	-
40	4.2	National Geographic Database (NGD) - Current or recent tanks	0	0	0	-	-
40 >	4.3 >	Current or recent petrol stations >	0	1	0	0	-
40	4.4	Electricity cables	0	0	0	0	-
40	4.5	Gas pipelines	0	0	0	0	-

40	4.6	Sites determined as Contaminated Land	0	0	0	0	-
41 >	4.7 >	Control of Major Accident Hazards (COMAH) >	0	1	0	0	-
41	4.8	Regulated explosive sites	0	0	0	0	-
41	4.9	Hazardous substance storage/usage	0	0	0	0	-
41	4.10	Historical licensed industrial activities (IPC)	0	0	0	0	-
42	4.11	Licensed industrial activities (Part A(1))	0	0	0	0	-
42 >	4.12 >	Licensed pollutant release (Part A(2)/B) >	1	0	0	5	-
43	4.13	Radioactive Substance Authorisations	0	0	0	0	-
43	4.14	Licensed Discharges to controlled waters	0	0	0	0	-
43	4.15	Pollutant release to surface waters (Red List)	0	0	0	0	-
43	4.16	Pollutant release to public sewer	0	0	0	0	-
43	4.17	List 1 Dangerous Substances	0	0	0	0	-
44	4.18	List 2 Dangerous Substances	0	0	0	0	-
44	4.19	Pollution Incidents (EA/NRW)	0	0	0	0	-
44	4.20	Pollution inventory substances	0	0	0	0	-
44	4.21	Pollution inventory waste transfers	0	0	0	0	-
44	4.22	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
45	5.1	Superficial aquifer	None (within 500m)				
46 >	5.2 >	Bedrock aquifer >	Identified (within 500m)				
47 >	5.3 >	Groundwater vulnerability >	Identified (within 50m)				
48	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
48	5.5	Groundwater vulnerability- local information	None (within 0m)				
49 >	5.6 >	Groundwater abstractions >	0	0	0	0	6
51 >	5.7 >	Surface water abstractions >	0	0	0	0	1
51 >	5.8 >	Potable abstractions >	0	0	0	0	2
52	5.9	Source Protection Zones	0	0	0	0	-
52	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology >	On site	0-50m	50-250m	250-500m	500-2000m

53	6.1	Water Network (OS MasterMap)	0	0	0	-	-
53	6.2	Surface water features	0	0	0	-	-
54 >	6.3 >	WFD Surface water body catchments >	1	-	-	-	-
54 >	6.4 >	WFD Surface water bodies >	0	0	0	-	-
55 >	6.5 >	WFD Groundwater bodies >	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
56	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
56	7.2	Historical Flood Events	0	0	0	-	-
56	7.3	Flood Defences	0	0	0	-	-
57	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
57	7.5	Flood Storage Areas	0	0	0	-	-
58	7.6	Flood Zone 2	None (within 50m)				
58	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding >					
59 >	8.1 >	Surface water flooding >	1 in 30 year, 0.3m - 1.0m (within 50m)				
Page	Section	Groundwater flooding >					
61 >	9.1 >	Groundwater flooding >	Moderate (within 50m)				
Page	Section	Environmental designations >	On site	0-50m	50-250m	250-500m	500-2000m
62 >	10.1 >	Sites of Special Scientific Interest (SSSI) >	0	0	0	0	1
63	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
63	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
63	10.4	Special Protection Areas (SPA)	0	0	0	0	0
63	10.5	National Nature Reserves (NNR)	0	0	0	0	0
64	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
64	10.7	Designated Ancient Woodland	0	0	0	0	0
64	10.8	Biosphere Reserves	0	0	0	0	0
64	10.9	Forest Parks	0	0	0	0	0
65	10.10	Marine Conservation Zones	0	0	0	0	0
65	10.11	Green Belt	0	0	0	0	0

65	10.12	Proposed Ramsar sites	0	0	0	0	0
65	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
65	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
66	10.15	Nitrate Sensitive Areas	0	0	0	0	0
66 >	10.16 >	Nitrate Vulnerable Zones >	1	0	0	0	4
67 >	10.17 >	SSSI Impact Risk Zones >	1	-	-	-	-
68 >	10.18 >	SSSI Units >	0	0	0	0	1
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
69	11.1	World Heritage Sites	0	0	0	-	-
69	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
69	11.3	National Parks	0	0	0	-	-
69	11.4	Listed Buildings	0	0	0	-	-
70	11.5	Conservation Areas	0	0	0	-	-
70	11.6	Scheduled Ancient Monuments	0	0	0	-	-
70	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations >	On site	0-50m	50-250m	250-500m	500-2000m
71 >	12.1 >	Agricultural Land Classification >	Urban (within 250m)				
72	12.2	Open Access Land	0	0	0	-	-
72	12.3	Tree Felling Licences	0	0	0	-	-
72	12.4	Environmental Stewardship Schemes	0	0	0	-	-
72	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations >	On site	0-50m	50-250m	250-500m	500-2000m
73	13.1	Priority Habitat Inventory	0	0	0	-	-
73	13.2	Habitat Networks	0	0	0	-	-
74 >	13.3 >	Open Mosaic Habitat >	0	0	1	-	-
74	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale >	On site	0-50m	50-250m	250-500m	500-2000m
75 >	14.1 >	10k Availability >	Identified (within 500m)				
76 >	14.2 >	Artificial and made ground (10k) >	0	0	0	1	-

77 >	14.3 >	Superficial geology (10k) >	0	0	0	1	-
78	14.4	Landslip (10k)	0	0	0	0	-
79	14.5	Bedrock geology (10k)	0	0	0	0	-
79	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale >	On site	0-50m	50-250m	250-500m	500-2000m
80 >	15.1 >	50k Availability >	Identified (within 500m)				
81 >	15.2 >	Artificial and made ground (50k) >	0	1	1	1	-
82 >	15.3 >	Artificial ground permeability (50k) >	0	1	-	-	-
83 >	15.4 >	Superficial geology (50k) >	0	0	0	3	-
84	15.5	Superficial permeability (50k)	None (within 50m)				
84	15.6	Landslip (50k)	0	0	0	0	-
84	15.7	Landslip permeability (50k)	None (within 50m)				
85 >	15.8 >	Bedrock geology (50k) >	1	0	0	1	-
86 >	15.9 >	Bedrock permeability (50k) >	Identified (within 50m)				
86	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
87	16.1	BGS Boreholes	0	0	0	-	-
Page	Section	Natural ground subsidence >					
88 >	17.1 >	Shrink swell clays >	Very low (within 50m)				
89 >	17.2 >	Running sands >	Very low (within 50m)				
91 >	17.3 >	Compressible deposits >	Negligible (within 50m)				
92 >	17.4 >	Collapsible deposits >	Very low (within 50m)				
93 >	17.5 >	Landslides >	Very low (within 50m)				
94 >	17.6 >	Ground dissolution of soluble rocks >	Negligible (within 50m)				
Page	Section	Mining and ground workings >	On site	0-50m	50-250m	250-500m	500-2000m
96	18.1	BritPits	0	0	0	0	-
97	18.2	Surface ground workings	0	0	0	-	-
97	18.3	Underground workings	0	0	0	0	0
97	18.4	Underground mining extents	0	0	0	0	-

97	18.5	Historical Mineral Planning Areas	0	0	0	0	-
97 >	18.6 >	Non-coal mining >	0	0	0	1	1
98	18.7	JPB mining areas	None (within 0m)				
98	18.8	The Coal Authority non-coal mining	0	0	0	0	-
98	18.9	Researched mining	0	0	0	0	-
99	18.10	Mining record office plans	0	0	0	0	-
99	18.11	BGS mine plans	0	0	0	0	-
99	18.12	Coal mining	None (within 0m)				
99	18.13	Brine areas	None (within 0m)				
99	18.14	Gypsum areas	None (within 0m)				
100	18.15	Tin mining	None (within 0m)				
100	18.16	Clay mining	None (within 0m)				
Page	Section	Ground cavities and sinkholes	On site	0-50m	50-250m	250-500m	500-2000m
101	19.1	Natural cavities	0	0	0	0	-
101	19.2	Mining cavities	0	0	0	0	0
101	19.3	Reported recent incidents	0	0	0	0	-
101	19.4	Historical incidents	0	0	0	0	-
Page	Section	Radon >					
103 >	20.1 >	Radon >	Less than 1% (within 0m)				
Page	Section	Soil chemistry >	On site	0-50m	50-250m	250-500m	500-2000m
105 >	21.1 >	BGS Estimated Background Soil Chemistry >	1	1	-	-	-
105	21.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
105	21.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
106	22.1	Underground railways (London)	0	0	0	-	-
106	22.2	Underground railways (Non-London)	0	0	0	-	-
106	22.3	Railway tunnels	0	0	0	-	-
106	22.4	Historical railway and tunnel features	0	0	0	-	-
106	22.5	Royal Mail tunnels	0	0	0	-	-

107	22.6	Historical railways	0	0	0	-	-
107	22.7	Railways	0	0	0	-	-
107	22.8	Crossrail 2	0	0	0	0	-
107	22.9	HS2	0	0	0	0	-

Recent aerial photograph



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Capture Date: 28/05/2023

Site Area: 0.36ha

Recent site history - 2020 aerial photograph



Capture Date: 12/05/2020

Site Area: 0.36ha

Recent site history - 2014 aerial photograph



Aerial photography supplied by Getmapping PLC. © Copyright Getmapping PLC 2025. All Rights Reserved.

Capture Date: 09/09/2014

Site Area: 0.36ha

Recent site history - 2006 aerial photograph



Capture Date: 08/06/2006

Site Area: 0.36ha

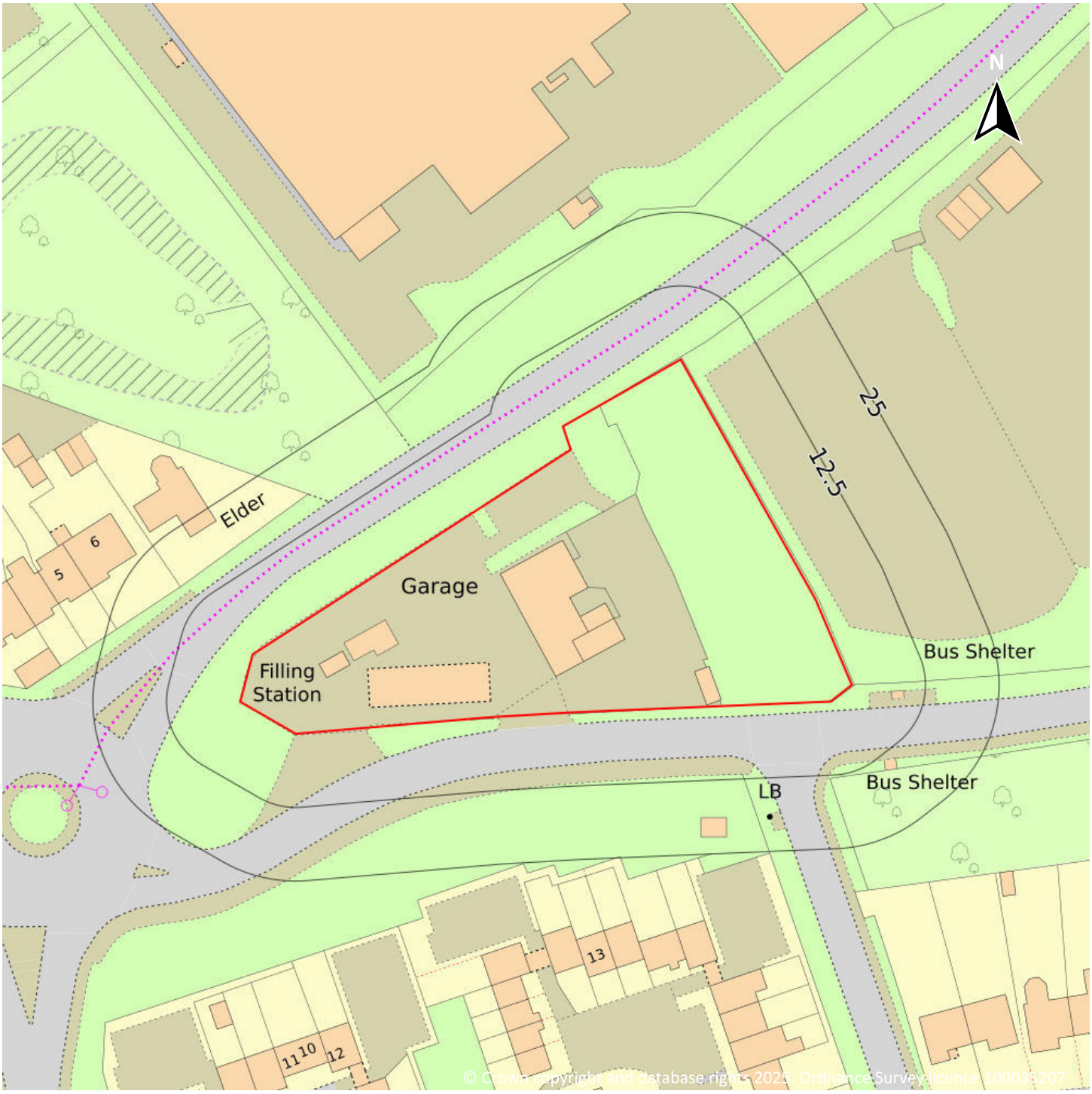
Recent site history - 1999 aerial photograph



Capture Date: 15/11/1999

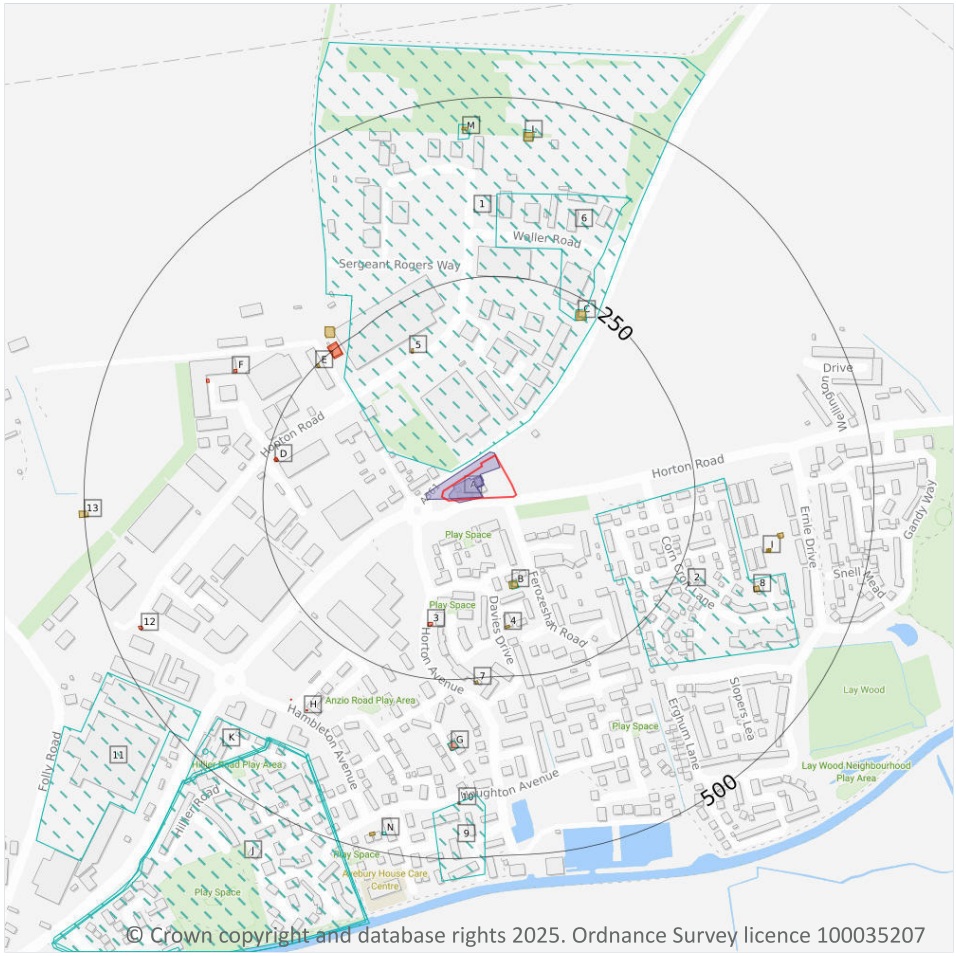
Site Area: 0.36ha

OS MasterMap site plan



Site Area: 0.36ha

1 Past land use



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

Historical garages

1.1 Historical industrial land uses

Records within 500m	16

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 15 >**

ID	Location	Land use	Dates present	Group ID
1	11m NW	Barracks	1961 - 1990	1999171

ID	Location	Land use	Dates present	Group ID
2	116m E	Unspecified Depot	1981 - 1990	1946144
B	117m S	Unspecified Tank	1981 - 1990	1924562
6	219m NE	Barracks	1981 - 1990	1933242
C	219m NE	Unspecified Tank	1981 - 1990	1930124
G	336m S	Electric Substation	1981 - 1990	1964515
J	405m SW	Barracks	1885	1945759
J	405m SW	Barracks	1899 - 1938	1959905
J	410m SW	Barracks	1961 - 1990	1915293
9	414m S	Rifle Range	1981 - 1990	1958077
K	417m SW	Hospital	1885	1890082
L	442m N	Unspecified Tank	1981 - 1990	1968098
M	444m N	Unspecified Tanks	1981 - 1990	1921710
11	452m SW	Unspecified Depot	1981 - 1990	1960753
N	471m S	Septic Tank	1922 - 1938	1990619
K	482m SW	Chimney	1981 - 1990	1940058

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m **16**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 15 >**

ID	Location	Land use	Dates present	Group ID
B	117m S	Unspecified Tank	1976 - 1990	334495
4	179m S	Unspecified Tank	1976 - 1990	329656
5	181m NW	Unspecified Tank	1976	323671

ID	Location	Land use	Dates present	Group ID
C	220m NE	Unspecified Tank	1976	325434
E	245m NW	Unspecified Tank	1976	325436
7	254m S	Unspecified Tank	1976	325433
E	263m NW	Unspecified Tank	1976 - 1990	328991
8	356m E	Unspecified Tank	1976	324952
I	358m E	Unspecified Tank	1990 - 1992	344169
I	360m E	Unspecified Tank	1995 - 1996	334410
I	360m E	Unspecified Tank	1976	340253
I	369m E	Unspecified Tank	1976 - 1996	337882
L	441m N	Unspecified Tank	1976	325435
M	456m N	Tanks	1976	318249
N	474m S	Septic Tank	1924	320081
13	495m W	Unspecified Tank	1970	320162

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	**14**

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 15 >**

ID	Location	Land use	Dates present	Group ID
3	172m S	Electricity Substation	1990 - 1996	216927
D	234m W	Electricity Substation	1999	224005
D	235m W	Electricity Substation	1988 - 1990	223328
E	237m NW	Electricity Substation	1976	229209
E	239m NW	Electricity Substation	1988 - 1990	224224

ID	Location	Land use	Dates present	Group ID
F	333m NW	Electricity Substation	1995	208785
G	336m S	Electricity Substation	1976 - 1996	227119
H	352m SW	Electricity Substation	1995	216214
H	352m SW	Electricity Substation	1996	221235
H	352m SW	Electricity Substation	1996	224414
H	352m SW	Gas Governor	1995 - 1996	234463
F	361m NW	Electricity Substation	1995	208784
10	421m S	Electricity Substation	1995 - 1996	228907
12	456m SW	Electricity Substation	1989 - 1995	221885

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	3

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 15 >**

ID	Location	Land use	Dates present	Group ID
A	**On site**	**Garage**	**1999**	**68193**
A	**On site**	**Garage**	**1976**	**71193**

ID	Location	Land use	Dates present	Group ID
A	**On site**	**Garage**	**1988 - 1990**	**72340**

This data is sourced from Ordnance Survey / Groundsure.

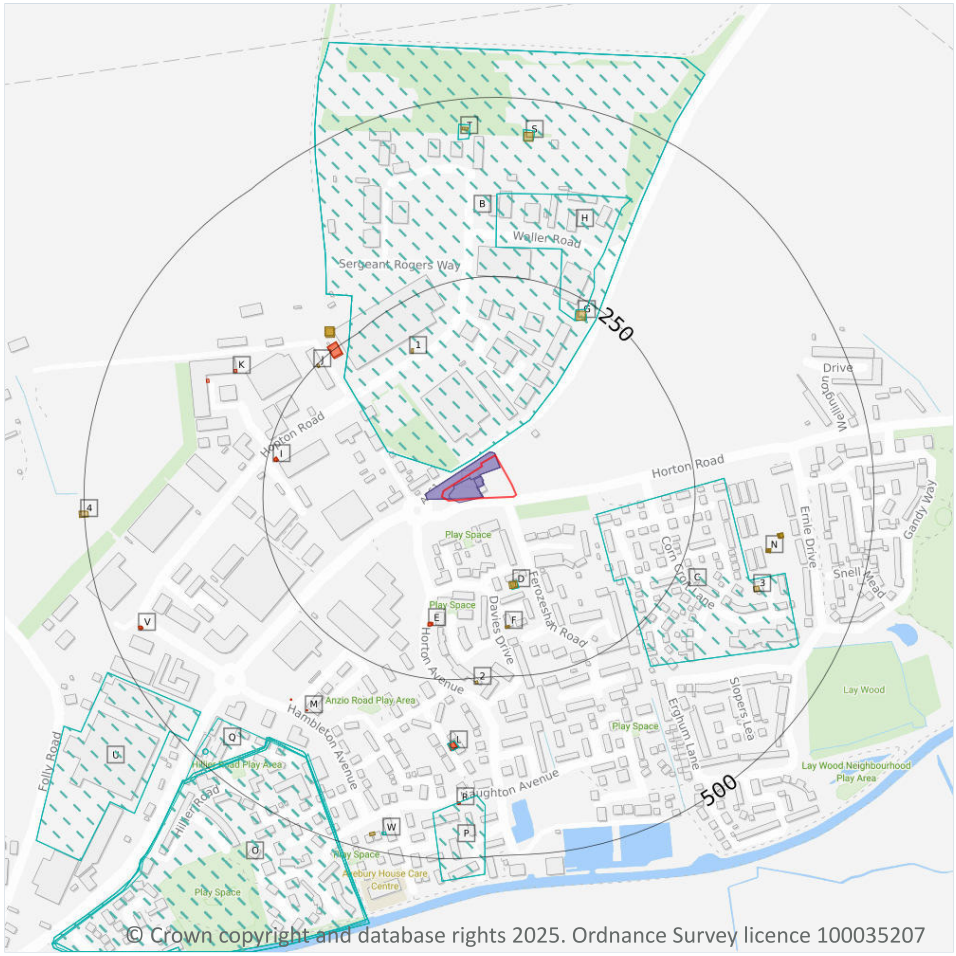
1.6 Historical military land

Records within 500m	**0**

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped



2.1 Historical industrial land uses

Records within 500m	33

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 20 >**

ID	Location	Land Use	Date	Group ID
B	11m NW	Barracks	1990	1999171
B	11m NW	Barracks	1961	1999171
B	11m NW	Barracks	1981	1999171

ID	Location	Land Use	Date	Group ID
C	116m E	Unspecified Depot	1990	1946144
C	116m E	Unspecified Depot	1981	1946144
D	117m S	Unspecified Tank	1990	1924562
D	117m S	Unspecified Tank	1981	1924562
G	219m NE	Unspecified Tank	1990	1930124
G	219m NE	Unspecified Tank	1981	1930124
H	219m NE	Barracks	1990	1933242
H	219m NE	Barracks	1981	1933242
L	336m S	Electric Substation	1990	1964515
L	336m S	Electric Substation	1981	1964515
O	405m SW	Barracks	1885	1945759
O	405m SW	Barracks	1938	1959905
O	405m SW	Barracks	1922	1959905
O	405m SW	Barracks	1899	1959905
O	410m SW	Barracks	1990	1915293
O	410m SW	Barracks	1961	1915293
O	410m SW	Barracks	1981	1915293
P	414m S	Rifle Range	1990	1958077
P	414m S	Rifle Range	1981	1958077
Q	417m SW	Hospital	1885	1890082
S	442m N	Unspecified Tank	1990	1968098
S	442m N	Unspecified Tank	1981	1968098
T	444m N	Unspecified Tanks	1990	1921710
T	444m N	Unspecified Tanks	1981	1921710
U	452m SW	Unspecified Depot	1990	1960753
U	452m SW	Unspecified Depot	1981	1960753
W	471m S	Septic Tank	1938	1990619
W	471m S	Septic Tank	1922	1990619

ID	Location	Land Use	Date	Group ID
Q	482m SW	Chimney	1990	1940058
Q	482m SW	Chimney	1981	1940058

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**28**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 20 >**

ID	Location	Land Use	Date	Group ID
D	117m S	Unspecified Tank	1976	334495
D	118m S	Unspecified Tank	1990	334495
F	179m S	Unspecified Tank	1976	329656
F	179m S	Unspecified Tank	1990	329656
1	181m NW	Unspecified Tank	1976	323671
G	220m NE	Unspecified Tank	1976	325434
J	245m NW	Unspecified Tank	1976	325436
2	254m S	Unspecified Tank	1976	325433
J	263m NW	Unspecified Tank	1976	328991
J	266m NW	Unspecified Tank	1988	328991
J	266m NW	Unspecified Tank	1990	328991
3	356m E	Unspecified Tank	1976	324952
N	358m E	Unspecified Tank	1990	344169
N	358m E	Unspecified Tank	1992	344169
N	360m E	Unspecified Tank	1996	334410
N	360m E	Unspecified Tank	1996	334410
N	360m E	Unspecified Tank	1995	334410
N	360m E	Unspecified Tank	1976	340253

ID	Location	Land Use	Date	Group ID
N	369m E	Unspecified Tank	1990	337882
N	369m E	Unspecified Tank	1992	337882
N	371m E	Unspecified Tank	1996	337882
N	371m E	Unspecified Tank	1996	337882
N	371m E	Unspecified Tank	1995	337882
N	371m E	Unspecified Tank	1976	337882
S	441m N	Unspecified Tank	1976	325435
T	456m N	Tanks	1976	318249
W	474m S	Septic Tank	1924	320081
4	495m W	Unspecified Tank	1970	320162

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	**33**

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 20 >**

ID	Location	Land Use	Date	Group ID
E	172m S	Electricity Substation	1996	216927
E	172m S	Electricity Substation	1996	216927
E	172m S	Electricity Substation	1995	216927
E	173m S	Electricity Substation	1990	216927
E	173m S	Electricity Substation	1992	216927
I	234m W	Electricity Substation	1999	224005
I	235m W	Electricity Substation	1988	223328
I	235m W	Electricity Substation	1988	223328
I	235m W	Electricity Substation	1990	223328
I	235m W	Electricity Substation	1990	223328

ID	Location	Land Use	Date	Group ID
J	237m NW	Electricity Substation	1976	229209
J	239m NW	Electricity Substation	1988	224224
J	239m NW	Electricity Substation	1990	224224
K	333m NW	Electricity Substation	1995	208785
L	336m S	Electricity Substation	1996	227119
L	336m S	Electricity Substation	1996	227119
L	336m S	Electricity Substation	1995	227119
L	336m S	Electricity Substation	1976	227119
L	336m S	Electricity Substation	1990	227119
L	336m S	Electricity Substation	1992	227119
M	352m SW	Electricity Substation	1996	224414
M	352m SW	Electricity Substation	1996	221235
M	352m SW	Electricity Substation	1995	216214
M	352m SW	Gas Governor	1996	234463
M	352m SW	Gas Governor	1996	234463
M	352m SW	Gas Governor	1995	234463
K	361m NW	Electricity Substation	1995	208784
R	421m S	Electricity Substation	1996	228907
R	421m S	Electricity Substation	1996	228907
R	421m S	Electricity Substation	1995	228907
V	456m SW	Electricity Substation	1995	221885
V	457m SW	Electricity Substation	1989	221885
V	457m SW	Electricity Substation	1990	221885

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m	6

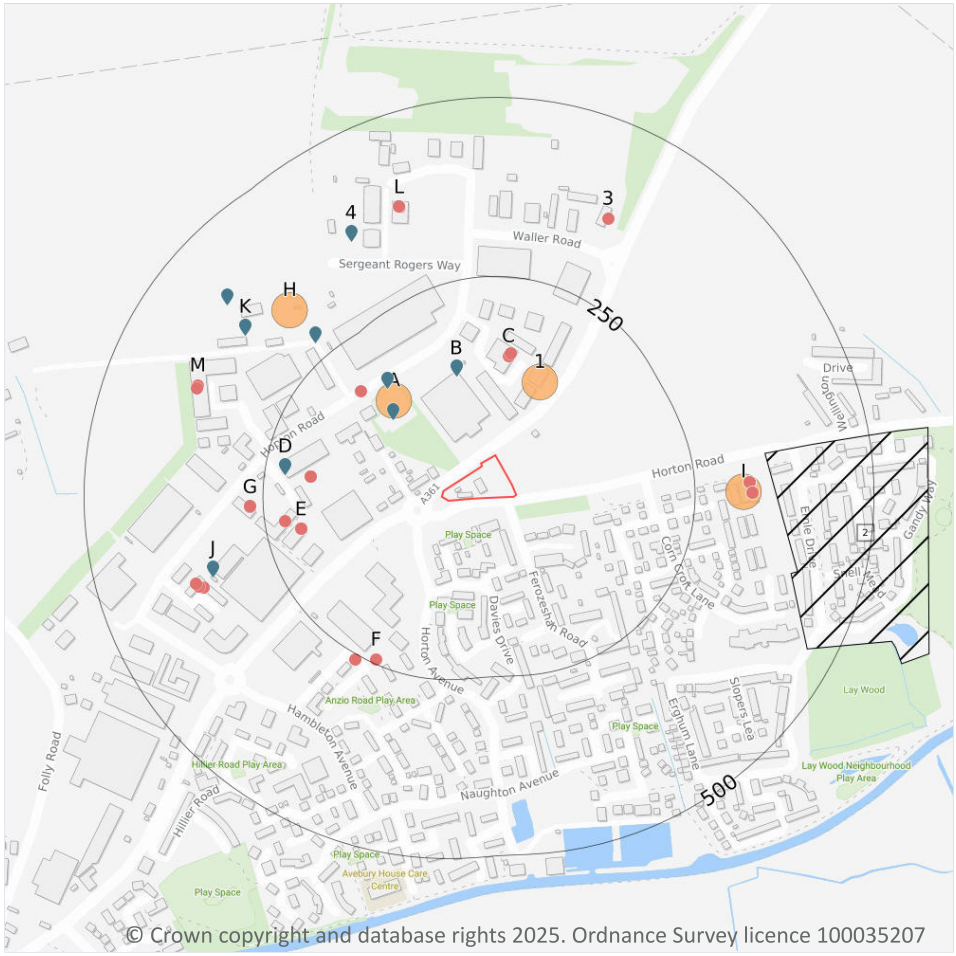
Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 20 >**

ID	Location	Land Use	Date	Group ID
A	**On site**	**Garage**	**1988**	**72340**
A	**On site**	**Garage**	**1988**	**72340**
A	**On site**	**Garage**	**1990**	**72340**
A	**On site**	**Garage**	**1990**	**72340**
A	**On site**	**Garage**	**1999**	**68193**
A	**On site**	**Garage**	**1976**	**71193**

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



3.1 Active or recent landfill

Records within 500m	0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	1

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

Features are displayed on the Waste and landfill map on **page 26 >**

ID	Location	Details		
2	352m E	Site Address: Sand Ground, Horton Road, Devizes Licence Holder Address: Northgate Street, Devizes	Waste Licence: - Site Reference: - Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: - Licence Surrender: -	Operator: - Licence Holder: Gaiger Brothers First Recorded - Last Recorded: -

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	4

Waste site records derived from Local Authority planning records and high detail historical mapping.

Features are displayed on the Waste and landfill map on **page 26 >**

ID	Location	Address	Further Details	Date
1	95m NE	Site Address: Wiltshire Concrete, Hopton Road, Hopton Park Industrial Estate, Devizes, Wiltshire, SN10 2EY	Type of Site: Recycling Capability Planning application reference: 19/04446/FUL Description: Scheme comprises consolidation of planning permissions ref k/59904 and 15/08324/ful to include provision of additional recycling capability. Data source: Historic Planning Application Data Type: Point	08/05/2019

ID	Location	Address	Further Details	Date
A	119m NW	Site Address: Hopton Park Industrial Estate, Hopton Park Industrial Estate, London Road, DEVIZES, Wiltshire, SN10 2HB	Type of Site: Household Waste Recycling Centre Planning application reference: K/043765 Description: Scheme comprises provision of a household waste recycling centre consisting of a fenced compound of 3,600 sqm with a small site office, 2 compactors and skips. Construction - brick walls; concrete paving, fencing site works. An application (ref: K/0435) for Detailed Planning permission was granted by Kennet D.C. Detailed plans have been granted. We have been informed that this contract is currently on hold, due to planning issues over the access road. Data source: Historic Planning Application Data Type: Point	15/03/2004
I	293m E	Site Address: County Council Depot, Horton Road, DEVIZES, Wiltshire, SN10 2J	Type of Site: Household Recycling Centre Planning application reference: 37116 Description: Scheme comprises provision of a household waste recycling centre consisting of a fenced compound with a small site office, 2 compactors and skips. Construction - brick walls; concrete paving, fencing site works. An application (ref: 37116) for Detailedlanning permission was granted by Kennet D.C. Please note the addition of Fencing contractors J V strong. Work has commenced on site. Data source: Historic Planning Application Data Type: Point	15/03/2004
H	307m NW	Site Address: Wiltshire Concrete, Hopton Park Industrial Estate, Hopton Road, DEVIZES, Wiltshire, SN10 2EY	Type of Site: Recycling Facility Planning application reference: K/59904/WCC Description: Scheme comprises change of use of a vehicle parking and storage area and adjoining farm storage for development and operation of a recycling facility within an established industrial yard on the edge of hopton park industrial estate. An application (ref: K/59904/WCC) for detailed planning permission was submitted to Kennet D.C. Data source: Historic Planning Application Data Type: Point	01/09/2009

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	15

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

Features are displayed on the Waste and landfill map on **page 26 >**

ID	Location	Details		
A	132m NW	Site Name: Devizes Household Recycling Centre Site Address: Hopton Industrial Estate, London Road, Devizes, Wiltshire, SN10 2EU Correspondence Address: -	Type of Site: Household Waste Amenity Site Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: 660064 EPR reference: EA/EPR/FB3505MN Operator: Fcc Waste Services (Uk) Limited Waste Management licence No: 23709 Annual Tonnage: 24995	Issue Date: 13/02/2004 Effective Date: 13/02/2004 Modified: 13/02/2004 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued
B	133m NW	Site Name: Devizes Household Recycling Centre Site Address: Hopton Park, Devizes, Wiltshire Correspondence Address: -	Type of Site: Household, Commercial & Industrial Waste T Stn Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HIL010 EPR reference: GP3193FT/A001 Operator: Hills Minerals & Waste Ltd Waste Management licence No: 23709 Annual Tonnage: 24995	Issue Date: 13/02/2004 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued
B	133m NW	Site Name: Devizes Household Recycling Centre Site Address: Hopton Park, Devizes, Wiltshire Correspondence Address: Land And Minerals Management Ltd, Roundhouse Cottages, Bridge Street, Frome, Somerset, BA11 1BE	Type of Site: Household, Commercial & Industrial Waste T Stn Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HIL010 EPR reference: - Operator: Hill Minerals & Waste Ltd Waste Management licence No: 23709 Annual Tonnage: 24995	Issue Date: 13/02/2004 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued

ID	Location	Details		
B	133m NW	Site Name: Devizes Household Recycling Centre Site Address: Hopton Park, Devizes, Wiltshire Correspondence Address: Hills Minerals And Waste Limited, Ailesbury Court, High Street, Marlborough, Wiltshire, SN8 1AA	Type of Site: Household, Commercial & Industrial Waste T Stn Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HIL010 EPR reference: - Operator: Hills Minerals And Waste Limited Waste Management licence No: 23709 Annual Tonnage: 24995	Issue Date: 13/02/2004 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued
B	133m NW	Site Name: Devizes Household Recycling Centre Site Address: Hopton Park, Devizes, Wiltshire, SN10 2EU Correspondence Address: -	Type of Site: Household Waste Amenity Site Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HIL010 EPR reference: EA/EPR/GP3193FT/A001 Operator: Hills Minerals & Waste Ltd Waste Management licence No: 23709 Annual Tonnage: 24995	Issue Date: 13/02/2004 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued
A	173m NW	Site Name: Devizes Household Recycling Centre Site Address: Hopton Ind Est, Hopton Road, Devizes, Wiltshire, SN10 2EU Correspondence Address: -	Type of Site: Household Waste Amenity Site Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: HIL010 EPR reference: EA/EPR/GP3193FT/V003 Operator: Hills Waste Solutions Ltd Waste Management licence No: 23709 Annual Tonnage: 24995	Issue Date: 13/02/2004 Effective Date: - Modified: 16/07/2014 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified

ID	Location	Details		
A	173m NW	Site Name: Devizes Household Recycling Centre Site Address: Hopton Industrial Estate, London Road, Devizes, Wiltshire, SN10 2EU Correspondence Address: -	Type of Site: Household Waste Amenity Site Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: FCC002 EPR reference: EA/EPR/FB3505MN/T001 Operator: F C C Waste Services (U K) Limited Waste Management licence No: 23709 Annual Tonnage: 24995	Issue Date: 13/02/2004 Effective Date: 05/10/2017 Modified: 16/07/2014 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred
D	223m W	Site Name: Hopton Depot Site Address: London Road, Hopton Ind Est, Devizes, Wiltshire, SN10 2EH Correspondence Address: -	Type of Site: Special Waste Transfer Station Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: KEN004 EPR reference: EA/EPR/SP3393FB/S002 Operator: Kennet District Council Waste Management licence No: 23633 Annual Tonnage: 50000	Issue Date: 19/09/1994 Effective Date: - Modified: - Surrendered Date: Jun 15 2004 12:00AM Expiry Date: - Cancelled Date: - Status: Surrendered
D	223m W	Site Name: Hopton Depot Site Address: London Road, Hopton Ind Est, Devizes, Wiltshire, SN10 2EH Correspondence Address: -	Type of Site: Special Waste Transfer Station Size: >= 25000 tonnes 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: 656868 EPR reference: EA/EPR/SP3393FB Operator: Kennet District Council Waste Management licence No: 23633 Annual Tonnage: 50000	Issue Date: 19/09/1994 Effective Date: 19/09/1994 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Surrendered
H	283m NW	Site Name: Wiltshire Concrete Site Address: Land/premises At, Hopton Road, Hopton Park Ind Est, Devizes, Wiltshire, SN10 2EY Correspondence Address: -	Type of Site: Transfer Station taking Non-Biodegradable Wastes Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: 646307 EPR reference: EA/EPR/LP3597EU Operator: Wiltshire Heavy Building Materials Limited Waste Management licence No: 100457 Annual Tonnage: 0	Issue Date: 24/12/2009 Effective Date: 24/12/2009 Modified: - Surrendered Date: 24/12/2009 Expiry Date: - Cancelled Date: - Status: Surrendered

ID	Location	Details		
J	336m W	Site Name: Kennet District Council W T S Site Address: Kennet House, Sergeant Rogers Way, Hopton In Park, Devizes, Wiltshire, SN10 2ET Correspondence Address: -	Type of Site: Household, Commercial & Industrial Waste T Stn Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: KEN005 EPR reference: EA/EPR/KP3593FY/A001 Operator: Kennet District Council Waste Management licence No: 23714 Annual Tonnage: 5000	Issue Date: 22/09/2003 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued
K	360m NW	Site Name: Wiltshire Concrete Site Address: Hopton Park Industrial Estate, Hopton Road, Devizes, Wiltshire, SN10 2EY Correspondence Address: -	Type of Site: 75kte HCI Waste TS + treatment Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: WIL422 EPR reference: EA/EPR/EB3200MY/A001 Operator: Wiltshire Heavy Building Materials Limited Waste Management licence No: 403314 Annual Tonnage: 74999	Issue Date: 09/09/2016 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued
K	360m NW	Site Name: Wiltshire Concrete Site Address: Hopton Park Industrial Estate, Hopton Road, Hopton Park Industrial Es, Devizes, Wiltshire, SN10 2EY Correspondence Address: -	Type of Site: - Size: >= 25000 tonnes 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: 627341 EPR reference: EA/EPR/EB3200MY Operator: Wiltshire Heavy Building Materials Limited Waste Management licence No: 403314 Annual Tonnage: 74999	Issue Date: 09/09/2016 Effective Date: 09/09/2016 Modified: 12/06/2024 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued
4	370m NW	Site Name: Kennet House Depot Site Address: Kennet House, Sergeant Rogers Way, Hopton Industrial Estate, Devizes, Wiltshire, SN10 2ET Correspondence Address: -	Type of Site: Special Waste Transfer Station Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: 649943 EPR reference: EA/EPR/KP3593FY Operator: Wiltshire Council Waste Management licence No: 23714 Annual Tonnage: 4999	Issue Date: 22/09/2003 Effective Date: 22/09/2003 Modified: 22/09/2003 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued

ID	Location	Details		
K	406m NW	Site Name: Wiltshire Concrete Site Address: Wiltshire Concrete, Hopton Road, Hopton Park Ind Est, Devizes, Wiltshire, SN10 2EY Correspondence Address: -	Type of Site: Physical Treatment Facility Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: 647091 EPR reference: EA/EPR/HB3501XR Operator: Wiltshire Heavy Building Materials Limited Waste Management licence No: 406302 Annual Tonnage: 0	Issue Date: 10/10/2019 Effective Date: 10/10/2019 Modified: 12/06/2024 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m **39**

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 26 >**

ID	Location	Site	Reference	Category	Sub-Category	Description
C	140m N	Prolight Design Unit B4 Beacon Business Centre Devizes Wiltshire Sn10 2ey	EPR/CF0709BW/A001	Treating waste exemption	Non-agricultural waste only	Crushing waste fluorescent tubes
C	143m N	Prolight Design Ltd Beacon Buisness Centre Devizes Sn102ey	EPR/UE5182JM/A001	Treating waste exemption	Non-agricultural waste only	Crushing waste fluorescent tubes
A	181m NW	Unit 6b (5) Hopton Industrial Estate London Road Devizes Wiltshire Sn10 2eu	EA/EPR/VP3686FE/A001	Treating waste exemption	Non-agricultural waste only	Repair or refurbishment of WEEE
D	186m W	Hopton Depot Hopton Park Industrial Estate Devizes Wiltshire Sn10 2eu	EPR/YF0704MV/A001	Storing waste exemption	Non-agricultural waste only	Storage of waste in a secure place
D	186m W	Hopton Depot Hopton Park Industrial Estate Devizes Wiltshire Sn10 2eu	EPR/YF0704MV/A001	Using waste exemption	Non-agricultural waste only	Use of waste in construction
D	186m W	Hopton Depot Hopton Park Industrial Estate Devizes Wiltshire Sn10 2eu	EPR/YF0704MV/A001	Treating waste exemption	Non-agricultural waste only	Sorting mixed waste

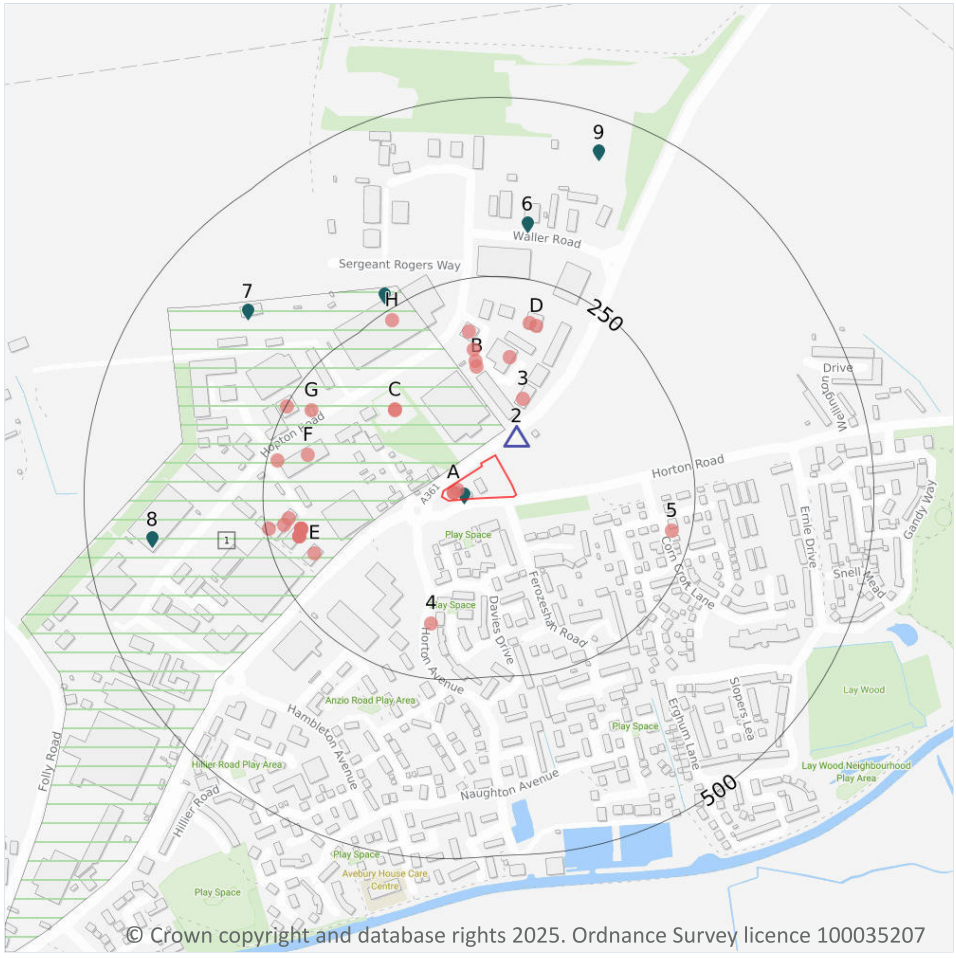
ID	Location	Site	Reference	Category	Sub-Category	Description
D	186m W	Hopton Depot Hopton Park Industrial Estate Devizes Wiltshire Sn10 2eu	EPR/YF0704MV/A001	Treating waste exemption	Non-agricultural waste only	Manual treatment of waste
D	186m W	Hopton Depot Hopton Park Industrial Estate Devizes Wiltshire Sn10 2eu	EPR/YF0704MV/A001	Treating waste exemption	Non-agricultural waste only	Screening and blending of waste
E	202m W	Kew Electrical Unit 6b2, Hopton Industrial Estate, Devizes, Wiltshire, Sn10 2eu	WEX254068	Storing waste exemption	Not on a farm	Storage of waste in a secure place
E	202m W	Household Recycling Centre, Hopton Industrial Estate, London Road, Devizes, Sn10 2eu	WEX273221	Storing waste exemption	Not on a farm	Storage of waste in a secure place
E	202m W	Kew Electrical Unit 6b2, Hopton Industrial Estate, Devizes, Wiltshire, Sn10 2eu	WEX382121	Storing waste exemption	Not on a farm	Storage of waste in a secure place
E	223m W	Unit 6b (5) Hopton Industrial Estate, London Road, Devizes, Wiltshire, Sn10 2eu	EA/EPR/VP3844NR/A001	Treating waste exemption	Non-agricultural waste only	Repair or refurbishment of WEEE
F	244m SW	-	WEX104207	Using waste exemption	Not on a farm	Use of waste in construction
F	258m SW	-	WEX115923	Using waste exemption	Not on a farm	Use of waste in construction
G	268m W	Kew Electrical Unit 6b2, Hopton Industrial Estate, Devizes, Wiltshire, Sn10 2eu	WEX113194	Storing waste exemption	Not on a farm	Storage of waste in a secure place
G	268m W	Household Recycling Centre, Hopton Industrial Estate, London Road, Devizes, Sn10 2eu	WEX132364	Storing waste exemption	Not on a farm	Storage of waste in a secure place
G	269m W	6 Hopton Road Devizes Wiltshire Sn10 2eu	EPR/ZF0007SE/A001	Storing waste exemption	Non-agricultural waste only	Storage of waste in a secure place
I	326m E	Ringway Highways Depot Horton Road Wiltshire Sn10 2jj	EPR/NH0917DF/A001	Storing waste exemption	Non-agricultural waste only	Storage of waste in secure containers

ID	Location	Site	Reference	Category	Sub-Category	Description
I	326m E	Ringway Highways Depot Horton Road Wiltshire Sn10 2jj	EPR/NH0917DF/A001	Storing waste exemption	Non-agricultural waste only	Storage of waste in a secure place
I	326m E	Ringway Highways Depot Horton Road Wiltshire Sn10 2jj	EPR/NH0917DF/A001	Using waste exemption	Non-agricultural waste only	Use of waste in construction
I	326m E	Ringway Highways Depot Horton Road Wiltshire Sn10 2jj	EPR/NH0917DF/A001	Using waste exemption	Non-agricultural waste only	Use of waste for a specified purpose
I	330m E	Horton Road, Devizes, Sn10 2jj	WEX257187	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
I	330m E	C/o Tonic Construction, Laywood, Horton Road, Devizes, Sn10 2jj	WEX298385	Using waste exemption	Not on a farm	Use of waste in construction
I	330m E	Horton Road, Devizes, Sn10 2jj	WEX384874	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
J	357m W	J&l Perry Transport Ltd, White Horse Business Centre, Hopton Road, Devizes, Sn10 2hj	WEX165117	Using waste exemption	Not on a farm	Use of waste in construction
J	357m W	J&l Perry Transport Ltd, White Horse Business Centre, Hopton Road, Devizes, Sn10 2hj	WEX165117	Storing waste exemption	Not on a farm	Storage of waste in a secure place
J	363m W	Headlights (Lighting) Ltd Unit 6 Hopton Industrial Estate Wiltshire Sn10 2hj	EPR/WE5657DW/A001	Storing waste exemption	Non-agricultural waste only	Storage of waste in secure containers
J	365m W	White Horse Business Centre, Unit 6, Hopton Road, Devizes, Sn10 2hj	WEX044538	Storing waste exemption	Not on a farm	Storage of waste in secure containers
3	366m NE	-	WEX254010	Treating waste exemption	Not on a farm	Sorting and de-naturing of controlled drugs for disposal
L	372m N	Kennet House Sergeant Rogers Way Devizes Wiltshire Sn10 2et	EPR/SF0406WA/A001	Storing waste exemption	Non-agricultural waste only	Storage of waste in a secure place
L	372m N	Kennet House Sergeant Rogers Way Devizes Wiltshire Sn10 2et	EPR/SF0406WA/A001	Storing waste exemption	Non-agricultural waste only	Storage of waste in secure containers
L	372m N	Kennet House Sergeant Rogers Way Devizes Wiltshire Sn10 2et	EPR/SF0406WA/A001	Using waste exemption	Non-agricultural waste only	Use of waste for a specified purpose

ID	Location	Site	Reference	Category	Sub-Category	Description
L	372m N	Kennet House Sergeant Rogers Way Devizes Wiltshire Sn10 2et	EPR/SF0406WA/A001	Using waste exemption	Non-agricultural waste only	Use of waste in construction
L	373m N	Devizes Highways Depot Seargent Rogers Way Devizes Wiltshire Sn10 2et	EPR/FH0717DQ/A001	Storing waste exemption	Non-agricultural waste only	Storage of waste in secure containers
L	373m N	Devizes Highways Depot Seargent Rogers Way Devizes Wiltshire Sn10 2et	EPR/FH0717DQ/A001	Storing waste exemption	Non-agricultural waste only	Storage of waste in a secure place
L	373m N	Devizes Highways Depot Seargent Rogers Way Devizes Wiltshire Sn10 2et	EPR/FH0717DQ/A001	Using waste exemption	Non-agricultural waste only	Use of waste in construction
L	373m N	Devizes Highways Depot Seargent Rogers Way Devizes Wiltshire Sn10 2et	EPR/FH0717DQ/A001	Using waste exemption	Non-agricultural waste only	Use of waste for a specified purpose
M	374m NW	Unit 6b (5) Hopton Industrial Estate, London Road, Devizes, Sn10 2eu	EA/EPR/VP3947ZE/A001	Treating waste exemption	Not on a farm	Repair or refurbishment of WEEE
M	374m NW	Kennet Furniture Refurbiz Ltd Unit 6, Hopton Road, Devizes, Sn10 2eu	EXP/TP3646YM	Treating waste exemption	Not on a farm	Repair or refurbishment of WEEE

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



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4.1 Recent industrial land uses

Records within 250m	31

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 37 >**

ID	Location	Company	Address	Activity	Category
A	**On site**	**London Road Car Sales**	**Cannings Hill Garage, Horton Road, Devizes, Wiltshire, SN10 2JG**	**Secondhand Vehicles**	**Motoring**
A	**On site**	**Cannings Hill Garage**	**Cannings Hill Garage, Horton Road, Devizes, Wiltshire, SN10 2JG**	**Vehicle Repair, Testing and Servicing**	**Repair and Servicing**

ID	Location	Company	Address	Activity	Category
A	**On site**	**Cannings Hill Garage**	**Horton Road, Devizes, Wiltshire, SN10 2JG**	**Petrol and Fuel Stations**	**Road and Rail**
3	88m NE	Wiltshire Concrete	Unit C4 to C5 Unit D Beacon Business Centre, Hopton Road, Devizes, Wiltshire, SN10 2EY	Concrete Products	Industrial Products
B	127m N	Beacon Business Centre	Wiltshire, SN10	Business Parks and Industrial Estates	Industrial Features
C	132m NW	FCC Environmen t	Hopton Road, Devizes, Wiltshire, SN10 2EU	Recycling, Reclamation and Disposal	Recycling Services
C	133m NW	Recycling Centre	Wiltshire, SN10	Recycling Centres	Infrastructure and Facilities
B	134m N	Electricity Sub Station	Wiltshire, SN10	Electrical Features	Infrastructure and Facilities
B	139m N	Prolight Design	Unit B/4 Beacon Business Centre, Hopton Road, Devizes, Wiltshire, SN10 2EY	Lampshades and Lighting	Consumer Products
B	151m N	Electricity Sub Station	Wiltshire, SN10	Electrical Features	Infrastructure and Facilities
4	173m S	Electricity Sub Station	Wiltshire, SN10	Electrical Features	Infrastructure and Facilities
B	176m N	T Y M Seals & Gaskets Ltd	Unit A Beacon Business Centre, Hopton Road, Devizes, Wiltshire, SN10 2EY	Seals, Tapes, Taps and Valves	Industrial Products
D	189m N	The Glass Radiator Company	7 Devizes Trade Centre, Hopton Road, Devizes, Wiltshire, SN10 2EH	Industrial Repairs and Servicing	Repair and Servicing
D	191m N	Eyedot	5 Devizes Trade Centre, Hopton Road, Devizes, Wiltshire, SN10 2EH	Electrical and Electronic Engineers	Engineering Services
E	195m SW	Kennet Print	8, Hopton Road, Devizes, Wiltshire, SN10 2EU	Published Goods	Industrial Products
F	196m W	Grist Environmen tal	Gaiger Bros Limited, Hopton Road, Devizes, Wiltshire, SN10 2EU	Vehicle Breakdown and Recovery Services	Personal, Consumer and Other Services
E	202m W	Hayden's Bakeries Ltd	1, Hopton Road, Devizes, Wiltshire, SN10 2EU	Catering and Non Specific Food Products	Foodstuffs
E	202m W	South West Forklifts Ltd	1, Hopton Road, Devizes, Wiltshire, SN10 2EU	Lifting and Handling Equipment	Industrial Products
E	202m W	N C A B Group Ltd	1, Hopton Road, Devizes, Wiltshire, SN10 2EU	Electrical Components	Industrial Products

ID	Location	Company	Address	Activity	Category
E	202m W	Devizes Christmas Trees	1, Hopton Road, Devizes, Wiltshire, SN10 2EU	Medals, Trophies, Ceremonial and Religious Goods	Consumer Products
E	207m W	etyres	2-3, Hopton Road, Devizes, Wiltshire, SN10 2EU	Vehicle Parts and Accessories	Motoring
E	207m W	Protyre Devizes	2-3, Hopton Road, Devizes, Wiltshire, SN10 2EU	Vehicle Repair, Testing and Servicing	Repair and Servicing
E	207m W	Bathwick Mots Car Servicing & Tyres in Devizes	2-3, Hopton Road, Devizes, Wiltshire, SN10 2EU	Vehicle Repair, Testing and Servicing	Repair and Servicing
E	216m W	Kennet Sign & Display	Unit 7 Hopton Court, Hopton Road, Devizes, Wiltshire, SN10 2EU	Signs	Industrial Products
G	216m NW	Hams Transport Ltd	Hopton Road, Devizes, Wiltshire, SN10 2EU	Distribution and Haulage	Transport, Storage and Delivery
5	223m E	Electricity Sub Station	Wiltshire, SN10	Electrical Features	Infrastructure and Facilities
E	224m W	Easterton Joinery Ltd	Unit 6 Hopton Court, Hopton Road, Devizes, Wiltshire, SN10 2EU	General Construction Supplies	Industrial Products
F	236m W	Electricity Sub Station	Wiltshire, SN10	Electrical Features	Infrastructure and Facilities
H	236m NW	Cross Manufacturing	Hopton Road, Devizes, Wiltshire, SN10 2EU	Precision Engineers	Engineering Services
E	245m W	Kinch Fuels	Unit 5b Hopton Court, Hopton Road, Devizes, Wiltshire, SN10 2EU	Fuel Distributors and Suppliers	Household, Office, Leisure and Garden
G	249m NW	R M S Refrigeration Maintenance & Sales Ltd	Hopton Road, Devizes, Wiltshire, SN10 2EU	Electrical Equipment Repair and Servicing	Repair and Servicing

This data is sourced from Ordnance Survey.

4.2 National Geographic Database (NGD) - Current or recent tanks

Records within 250m	0

Current or recent tanks identified from the Ordnance Survey NGD.

This data is sourced from Ordnance Survey.

4.3 Current or recent petrol stations

Records within 500m	1

Open, closed, under development and obsolete petrol stations.

Features are displayed on the Current industrial land use map on **page 37 >**

ID	Location	Company	Address	LPG	Status
2	39m NE	MURCO	Horton Road, London Road, Devizes, Wiltshire, SN10 2JG	No	Open

This data is sourced from Experian.

4.4 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.5 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.6 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.7 Control of Major Accident Hazards (COMAH)

Records within 500m	1

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

Features are displayed on the Current industrial land use map on **page 37 >**

ID	Location	Company	Address	Operational status	Tier
1	19m NW	Wiltshire Transport Training Ltd	Wiltshire Transport Training Ltd, Hopton Industrial Estate, London Road, Devizes, SN10 2EX	Historical NIHHS Site	-

This data is sourced from the Health and Safety Executive.

4.8 Regulated explosive sites

Records within 500m	0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.9 Hazardous substance storage/usage

Records within 500m	0

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.10 Historical licensed industrial activities (IPC)

Records within 500m	0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed industrial activities (Part A(1))

Records within 500m	0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.12 Licensed pollutant release (Part A(2)/B)

Records within 500m	6

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 37 >**

ID	Location	Address	Details	
A	**On site**	**Cannings Hill Garage, London Road, Devizes, SN10 2JG**	**Process: Unloading of Petrol into Storage at Service Stations Status: Current Permit Permit Type: Part B**	**Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified**
H	270m NW	Taarup-kidd Farm Machinery	Process: Coating Processes Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
6	325m N	Cebal Printal	Process: Coating Processes Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
7	371m NW	Wiltshire Concrete, Hopton Industrial Estate, Devizes, SN10 2EY	Process: Use of Bulk Cement Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
8	410m W	Smallbone and Co Ltd, Hopton Industrial Estate, Devizes, SN10 2EU	Process: Coating Processes; Timber Manufacture Status: Current Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified
9	446m N	Tamura Hinchley	Process: Coating Processes Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcements Notified Date of enforcement: No Enforcements Notified Comment: No Enforcements Notified

This data is sourced from Local Authority records.

4.13 Radioactive Substance Authorisations

Records within 500m	0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Licensed Discharges to controlled waters

Records within 500m	0

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to surface waters (Red List)

Records within 500m	0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 1 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 List 2 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution Incidents (EA/NRW)

Records within 500m	0

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.20 Pollution inventory substances

Records within 500m	0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.21 Pollution inventory waste transfers

Records within 500m	0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.22 Pollution inventory radioactive waste

Records within 500m	0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer

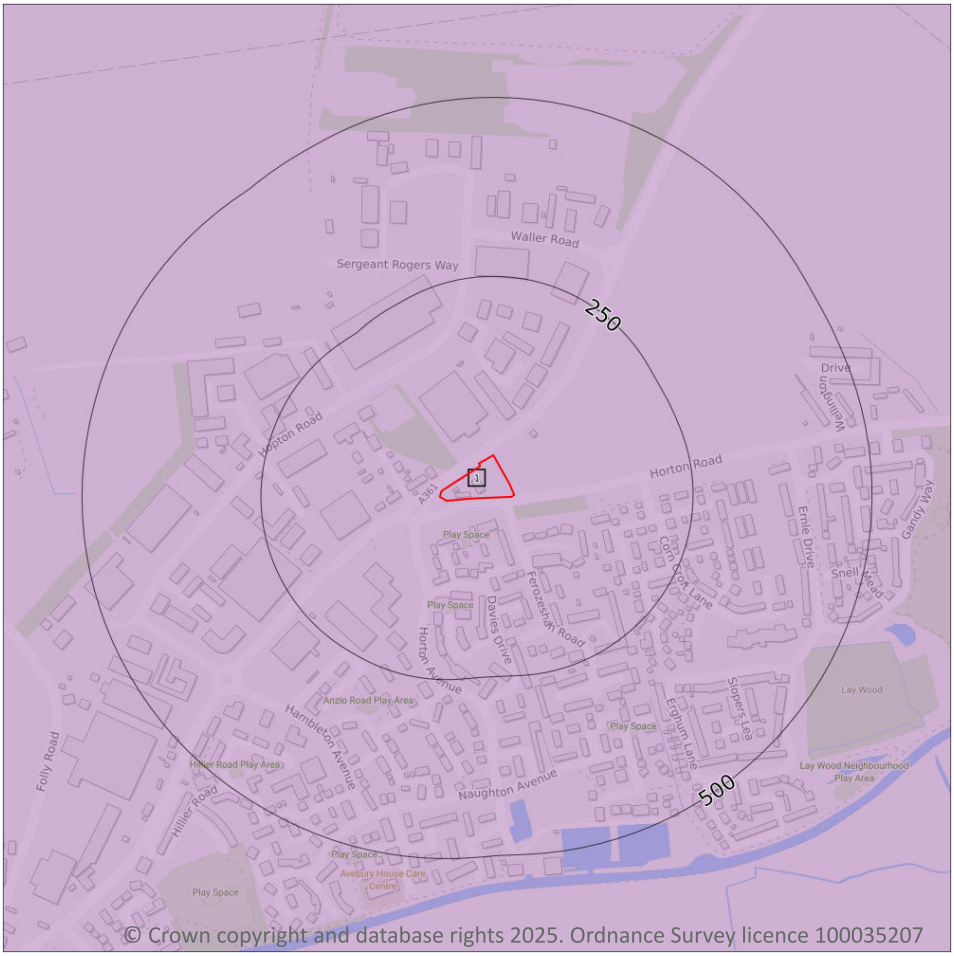
5.1 Superficial aquifer

Records within 500m	0

Aquifer status of groundwater held within superficial geology.

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive

5.2 Bedrock aquifer

Records within 500m	1

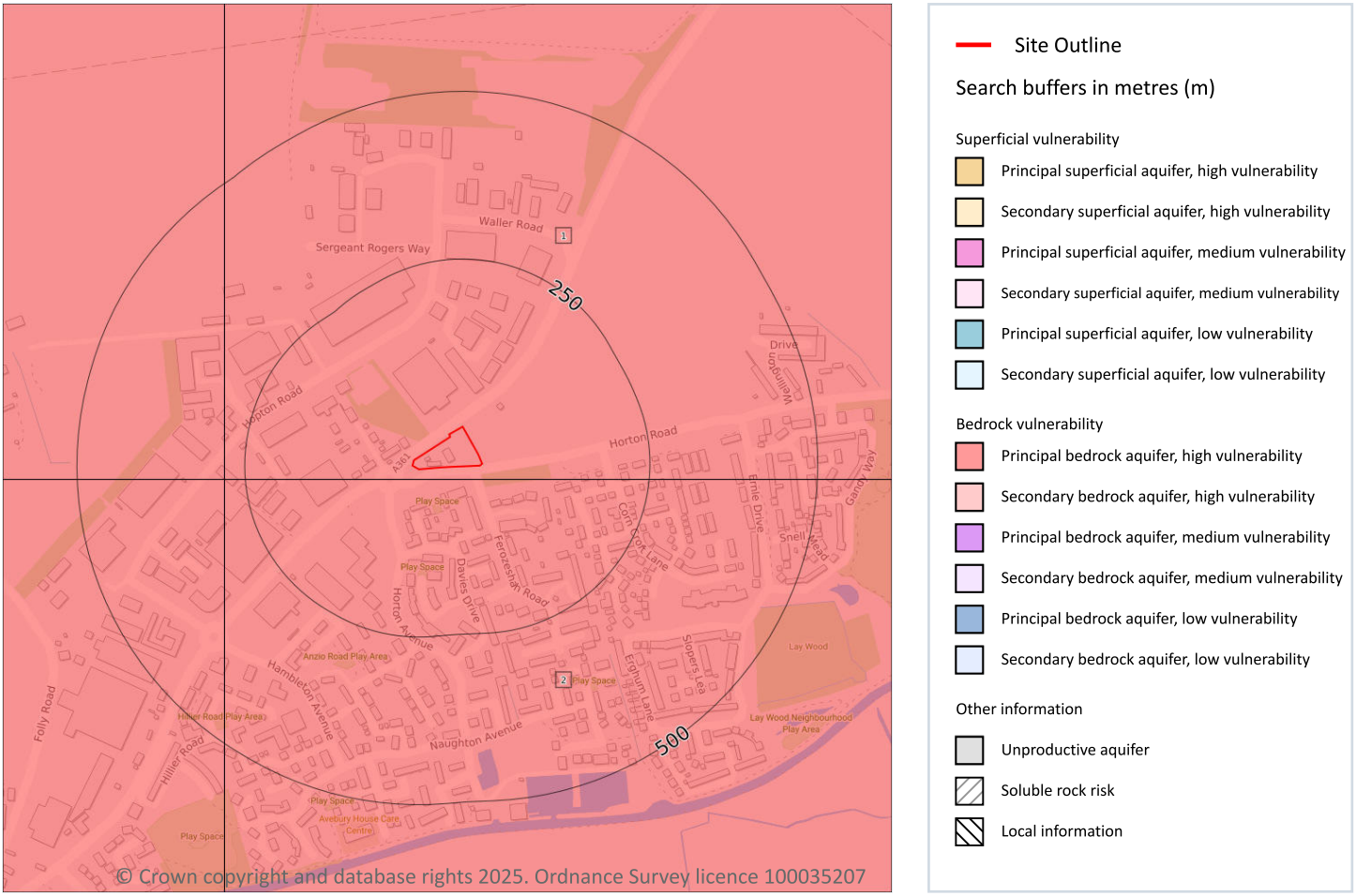
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 46 >**

ID	Location	Designation	Description
1	On site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



5.3 Groundwater vulnerability

Records within 50m	2

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 47 >**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	**On site**	**Summary Classification: Principal bedrock aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, No Superficial Aquifer**	**Leaching class: High Infiltration value: >70% Dilution value: 300-550mm/year**	**Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: <90% Recharge potential: No Data**	**Vulnerability: High Aquifer type: Principal Flow mechanism: Well connected fractures**
2	15m S	Summary Classification: Principal bedrock aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, No Superficial Aquifer	Leaching class: Intermediate Infiltration value: >70% Dilution value: 300-550mm/year	Vulnerability: - Aquifer type: - Thickness: <3m Patchiness value: <90% Recharge potential: No Data	Vulnerability: High Aquifer type: Principal Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	**0**

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

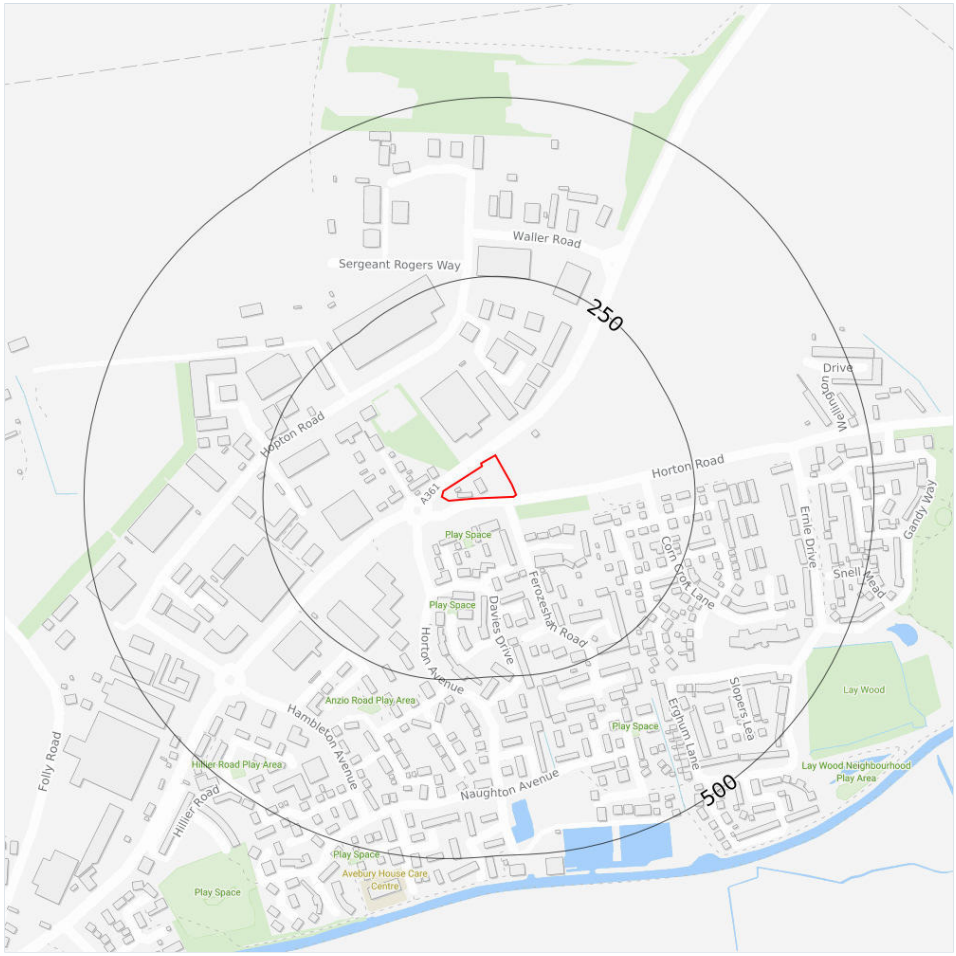
5.5 Groundwater vulnerability- local information

Records on site	**0**

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk ↗.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



Appendix B

Drainage Calculations

Network Details

Manhole Schedule

Manhole	Catchment Area (ha)	Size (mm)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
S1	0.002	100	Type E	134.468	134.365	0.003	402360.854	163062.473
S2	0.001	100	Type E	134.480	134.363	0.016	402359.877	163064.213
S5	0.001	100	Type E	134.488	134.360	0.028	402357.505	163066.263
S6	0.001	---	Type E	134.600	134.357	0.142	402356.611	163069.088
S10	0.000	---	Type E	134.600	134.350	0.150	402349.532	163070.137
S11	0.002	100	Type E	134.468	134.011	0.307	402348.006	163066.025
S13	0.000	100	Type E	134.440	134.000	0.290	402343.215	163064.106
S14	0.000	100	Type E	134.449	133.995	0.304	402340.771	163063.617
S15	0.000	100	Type E	134.490	133.989	0.351	402337.720	163063.617
S16	0.000	100	Type E	134.537	133.981	0.406	402333.990	163062.938
S18	0.000	100	Type E	134.548	133.975	0.422	402331.439	163061.377
S20	0.000	100	Type E	134.510	133.969	0.391	402329.210	163058.933
S22	0.000	150	Type E	134.479	133.964	0.365	402328.144	163056.932
S23	0.000	0x0	Type C	134.458	133.958	0.350	402326.603	163054.329
S24-TANK-4	0.000	150	Type E	134.388	133.020	1.218	402311.292	163043.481
S26	0.000	1350	Type C	134.321	133.159	1.012	402349.559	163060.736
S27-TANK-1	0.000	1350	Type C	134.054	133.116	0.789	402350.046	163047.682
S29	0.083	0x0	Type C	134.164	133.030	0.909	402357.036	163043.247
S30	0.000	1350	Type C	134.099	133.025	0.849	402350.379	163042.885
S31	0.000	150	Type E	134.033	133.010	0.798	402332.269	163041.903
S32	0.049	0x0	Type B	134.207	132.990	0.992	402326.850	163041.143
S33	0.023	0x0	Type B	134.140	132.746	1.169	402316.199	163034.215
S34	0.000	225	Type E	134.169	132.734	1.210	402314.613	163033.125
S35-TANK-2	0.000	150	Type E	134.237	132.701	1.311	402304.799	163027.177
S36	0.000	0x0	Type C	134.241	132.697	1.319	402303.827	163026.541
S37	0.012	---	Type E	134.092	133.990	0.002	402368.168	163021.870
S38	0.000	150	Type E	134.118	133.045	0.848	402366.683	163021.892
S39-TANK-3	0.000	150	Type E	134.000	132.993	0.782	402349.701	163021.094
S40	0.084	0x0	Type C	134.000	132.975	0.800	402347.179	163020.097
S41	0.007	0x0	Type B	134.177	132.781	1.171	402305.532	163017.844
S42	0.024	150	Type E	134.335	132.984	1.201	402293.140	163029.114
S43-CC	0.000	1200	Type C	134.185	132.673	1.362	402297.593	163025.011
S44	0.000	0x0	Type C	134.155	132.650	1.280	402295.131	163018.592
S45	0.000	0x0	Type B	134.385	132.630	1.605	402289.588	163016.486
Unknown-1	0.000	0	Unknown	134.700	132.650	1.600	402300.674	163061.454
2013	0.000	1350	Type B	134.687	132.530	1.707	402294.809	163051.715
2012	0.000	1350	Type B	134.406	132.200	1.756	402272.706	163033.333
2904	0.000	1350	Type B	133.728	131.028	2.250	402245.557	162994.877
Unknown-2	0.000	0	Unknown	133.450	130.820	2.180	402244.027	162973.226

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	S1	134.365	S2	134.363	Circ	100	1.996	1000	0.600	0.003	0.016
1.001	S2	134.363	S5	134.360	Circ	100	3.135	1000	0.600	0.016	0.028
1.002	S5	134.360	S6	134.357	Circ	100	2.963	1000	0.600	0.028	0.142
1.003	S6	134.357	S10	134.350	Circ	100	7.157	1000	0.600	0.142	0.150
1.004	S10	134.350	S11	134.011	Circ	150	4.386	13	0.600	0.100	0.307
1.005	S11	134.011	S13	134.000	Circ	150	5.161	476	0.600	0.307	0.290
1.006	S13	134.000	S14	133.995	Circ	150	2.492	500	0.600	0.290	0.304
1.007	S14	133.995	S15	133.989	Circ	150	3.051	500	0.600	0.304	0.351
1.008	S15	133.989	S16	133.981	Circ	150	3.792	500	0.600	0.351	0.406
1.009	S16	133.981	S18	133.975	Circ	150	2.991	500	0.600	0.406	0.422
1.010	S18	133.975	S20	133.969	Circ	150	3.307	500	0.600	0.422	0.391
1.011	S20	133.969	S22	133.964	Circ	150	2.267	500	0.600	0.391	0.365
1.012	S22	133.964	S23	133.958	Circ	150	3.025	500	0.600	0.365	0.350
1.013	S23	133.958	S24-TANK-4	133.896	Circ	150	18.764	300	0.600	0.350	0.342
1.014	S24-TANK-4	133.020	S33	132.821	Circ	150	10.485	53	0.600	1.218	1.169
2.000	S26	133.159	S27-TANK-1	133.116	Circ	150	13.063	299	0.600	1.012	0.789
2.001	S27-TANK-1	133.116	S30	133.100	Circ	150	4.808	303	0.600	0.789	0.849
3.000	S29	133.030	S30	133.025	Circ	225	6.666	1240	0.600	0.909	0.849

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)
2.002	S30	133.025	S31	133.010	Circ	225	18.137	1240	0.600	0.849	0.798
2.003	S31	133.010	S32	132.990	Circ	225	5.472	274	0.600	0.798	0.992
2.004	S32	132.990	S33	132.746	Circ	225	12.706	52	0.600	0.992	1.169
1.015	S33	132.746	S34	132.734	Circ	225	1.925	160	0.600	1.169	1.210
1.016	S34	132.734	S35-TANK-2	132.701	Circ	225	11.476	342	0.600	1.210	1.311
1.017	S35-TANK-2	132.701	S36	132.697	Circ	225	1.162	302	0.600	1.311	1.319
1.018	S36	132.697	S43-CC	132.673	Circ	225	6.419	269	0.600	1.319	1.287
4.000	S37	133.990	S38	133.973	Circ	100	1.485	89	0.600	0.002	0.045
4.001	S38	133.045	S39-TANK-3	132.993	Circ	225	17.000	327	0.600	0.848	0.782
4.002	S39-TANK-3	132.993	S40	132.975	Circ	225	2.712	150	0.600	0.782	0.800
4.003	S40	132.975	S41	132.781	Circ	225	41.708	215	0.600	0.800	1.171
4.004	S41	132.781	S43-CC	132.673	Circ	225	10.696	99	0.600	1.171	1.287
5.000	S42	132.984	S43-CC	132.673	Circ	150	6.056	19	0.600	1.201	1.362
1.019	S43-CC	132.673	S44	132.650	Circ	225	6.874	300	0.600	1.287	1.280
1.020	S44	132.650	S45	132.630	Circ	225	5.929	295	0.600	1.280	1.530
1.021	S45	132.630	2904	131.328	Circ	150	49.048	38	0.600	1.605	2.250
6.000	Unknown-1	132.650	2013	132.530	Circ	450	11.368	95	0.600	1.600	1.707
6.001	2013	132.530	2012	132.200	Circ	450	28.748	87	0.600	1.707	1.756
6.002	2012	132.200	2904	131.028	Circ	450	47.074	40	0.600	1.756	2.250
1.022	2904	131.028	Unknown-2	130.820	Circ	450	21.705	104	0.600	2.250	2.180

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)
Permeable Paving1	S42	42.833	134.335	133.605	0.00000000	2.00	402322.638	163052.057

Outfall Details

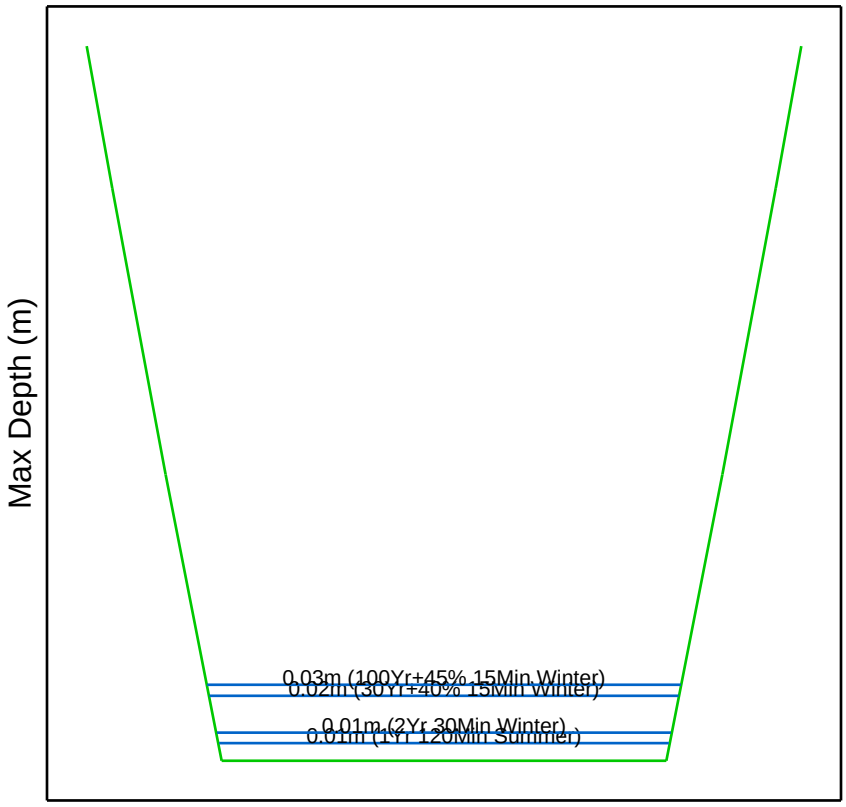
Outfall Manhole Unknown-2 : Free Discharge

Flow Control Details

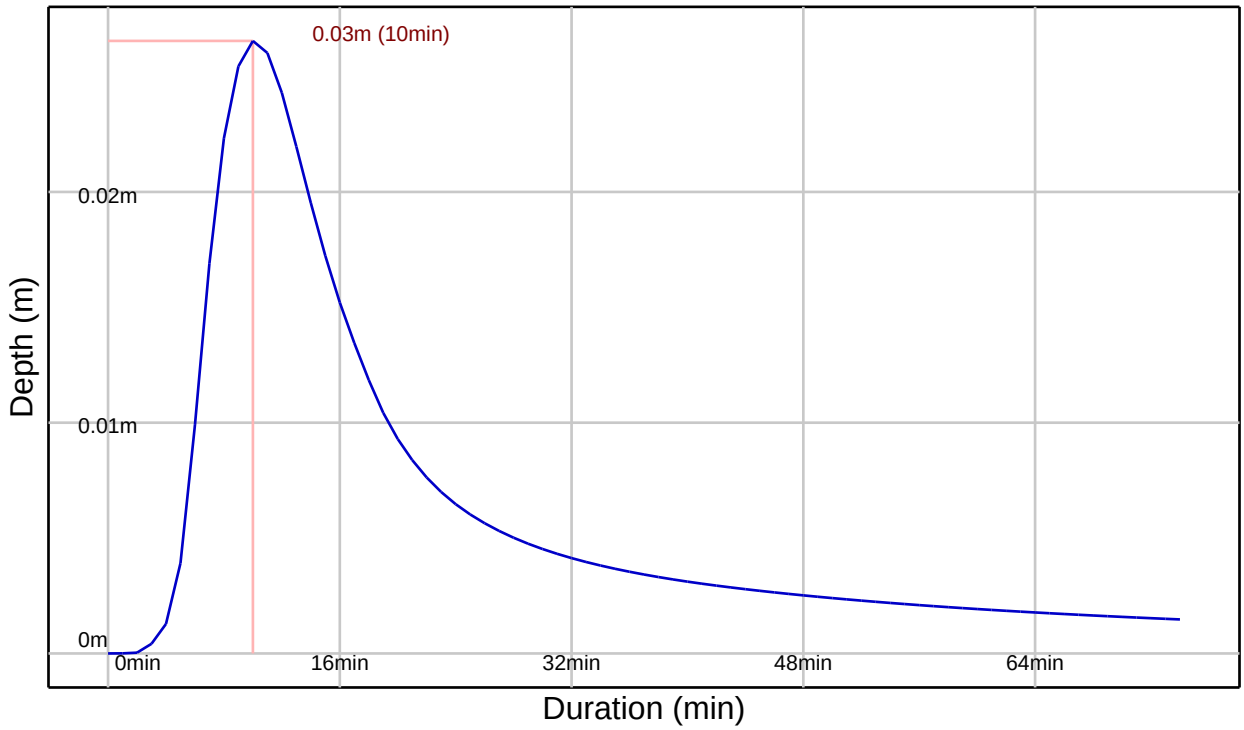
Pond Structure at Manhole S10

Pond Invert (m)	Max Depth (m)	Volume To Water Level (m3)	Water Level (m)	Freeboard (m)	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
134.350	0.250	2.672	134.500	0.100	0.00000000	0.00000000	2.00

Pond Depth/Area Diagram at S10



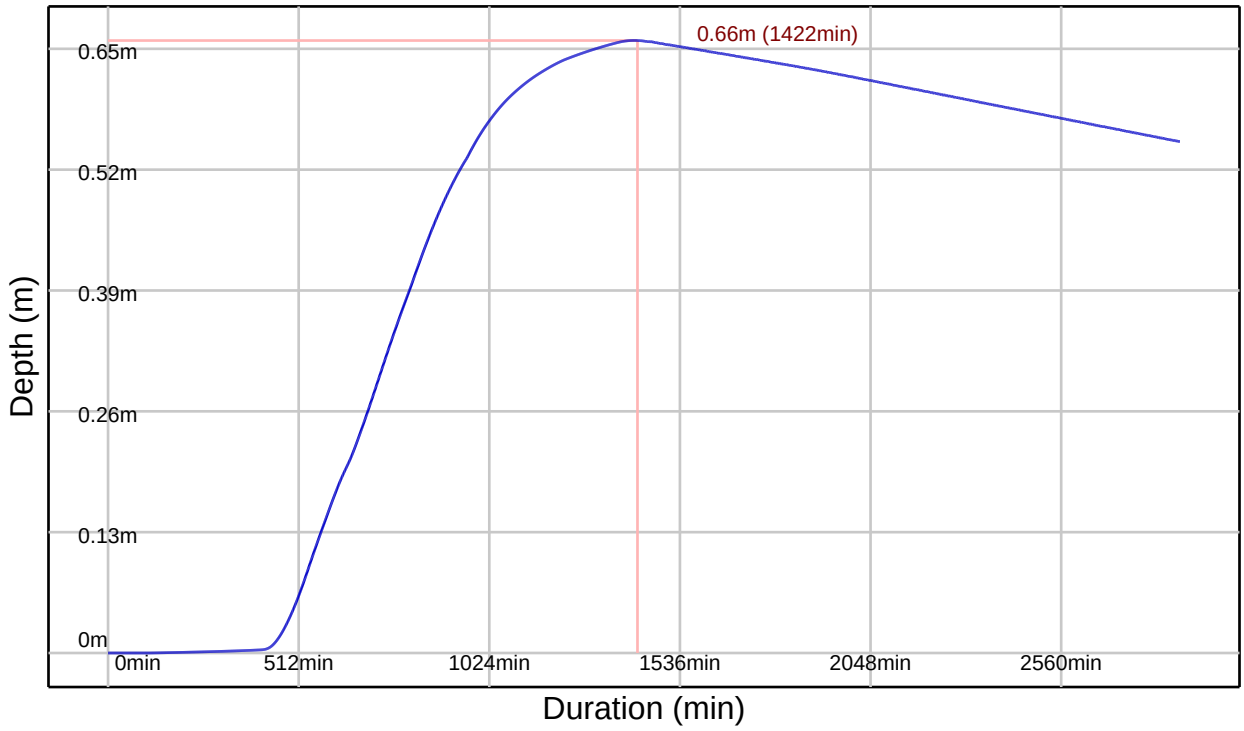
Swale 1 at S10 (100Yr+45% 15Min Winter)



Tank Structure at Manhole S24-TANK-4

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
132.980	0.800	95.00	237.976	226.077	180.862	0.00000000	0.00000000	2.00

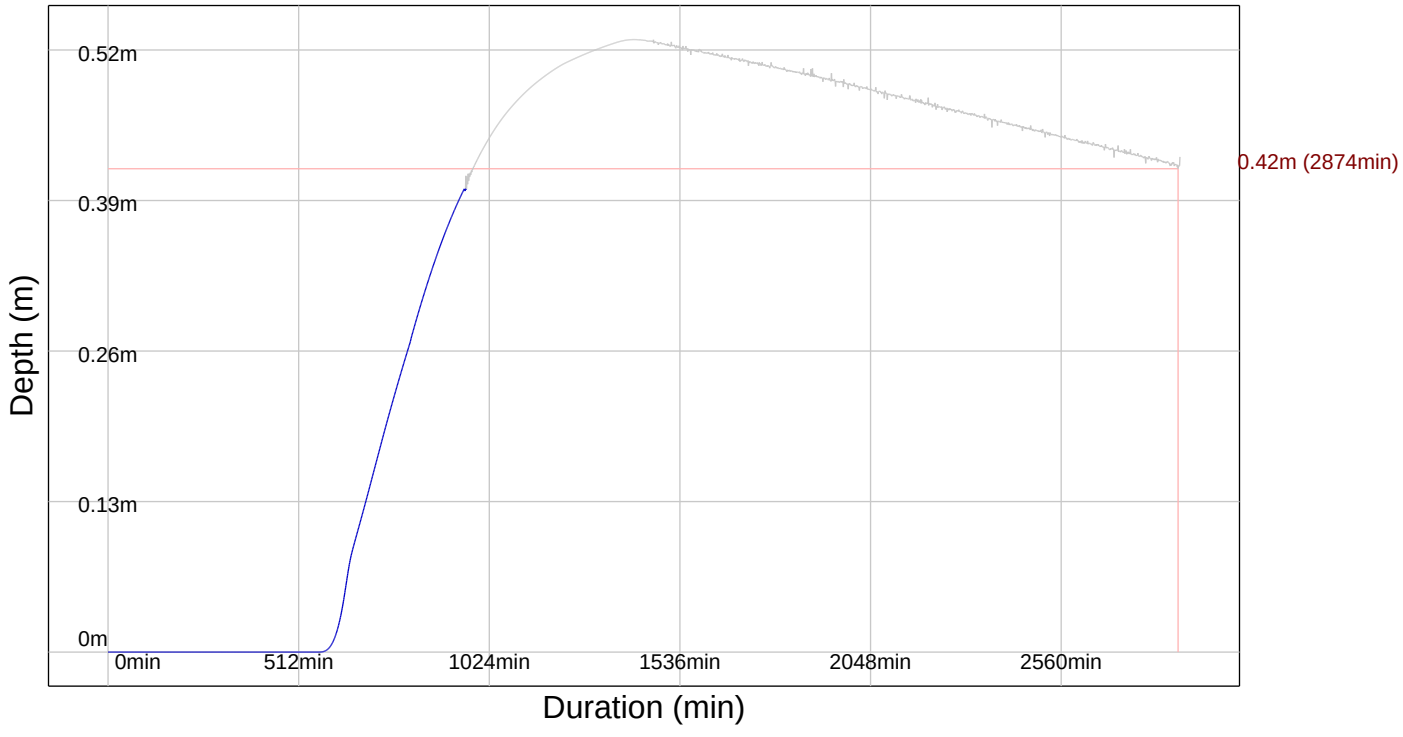
Tank 3 at S24-TANK-4 (100Yr+45% 1440Min Winter)



Tank Structure at Manhole S27-TANK-1

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
133.110	0.400	95.00	77.947	74.049	29.620	0.00000000	0.00000000	2.00

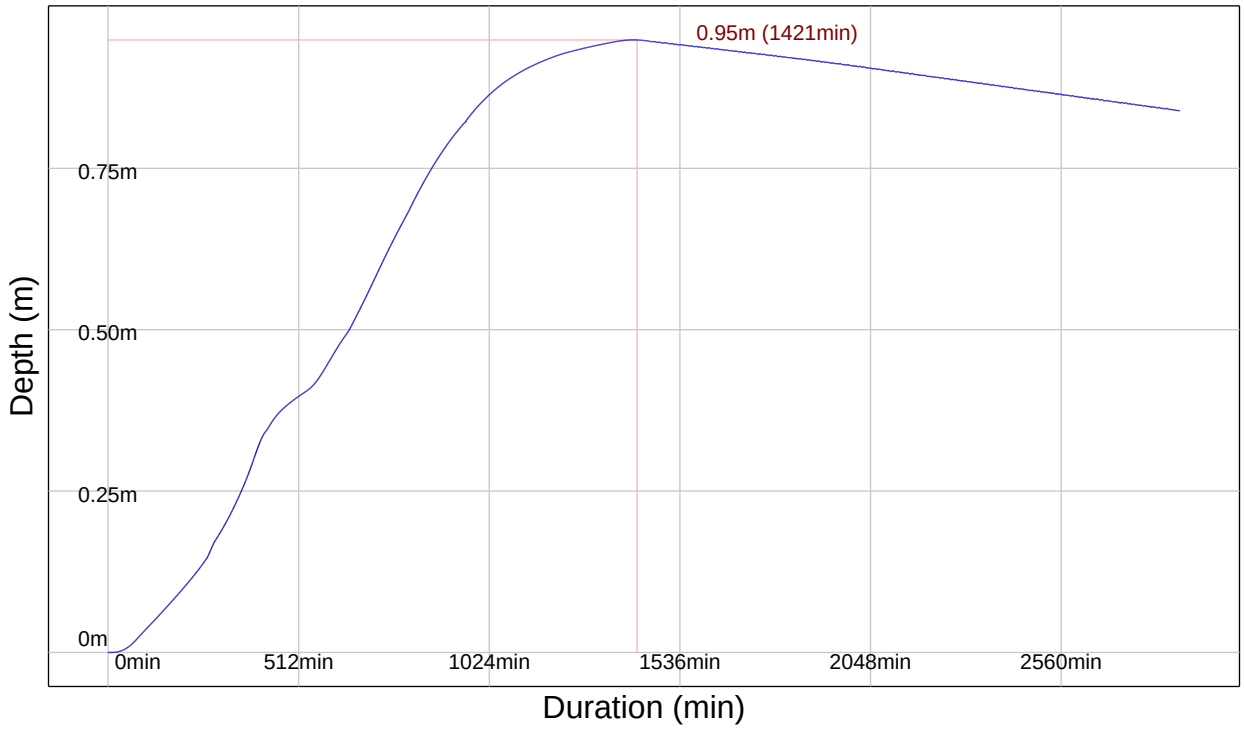
Tank 1 at S27-TANK-1 (100Yr+45% 1440Min Winter)



Tank Structure at Manhole S35-TANK-2

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
132.690	1.200	95.00	74.819	71.078	85.294	0.00000000	0.00000000	2.00

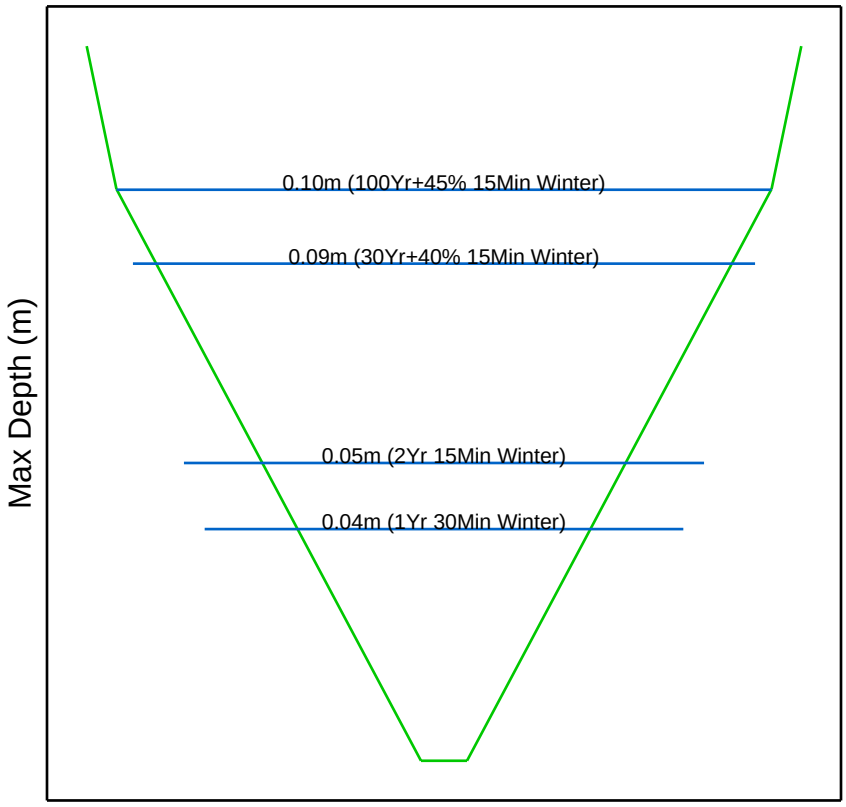
Tank 2 at S35-TANK-2 (100Yr+45% 1440Min Winter)



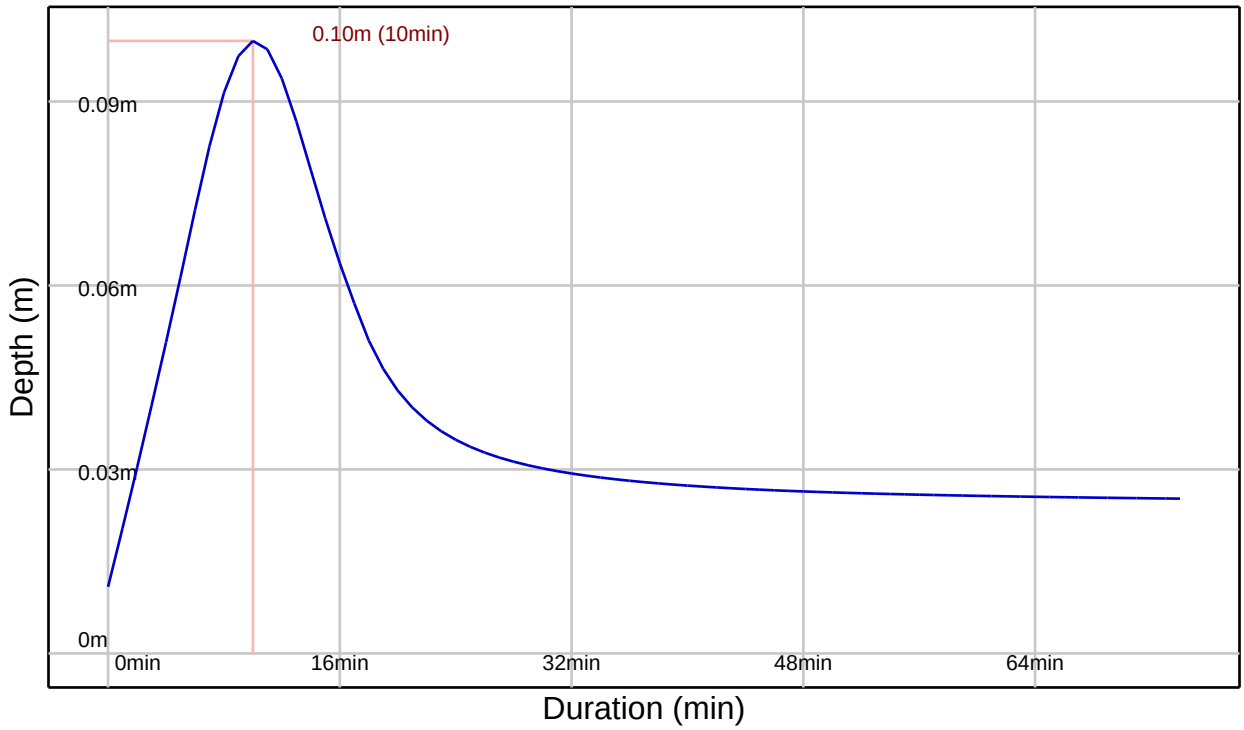
Pond Structure at Manhole S37

Pond Invert (m)	Max Depth (m)	Volume To Water Level (m3)	Water Level (m)	Freeboard (m)	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
133.967	0.125	2.059	134.092	0.000	0.00000000	0.00000000	2.00

Pond Depth/Area Diagram at S37



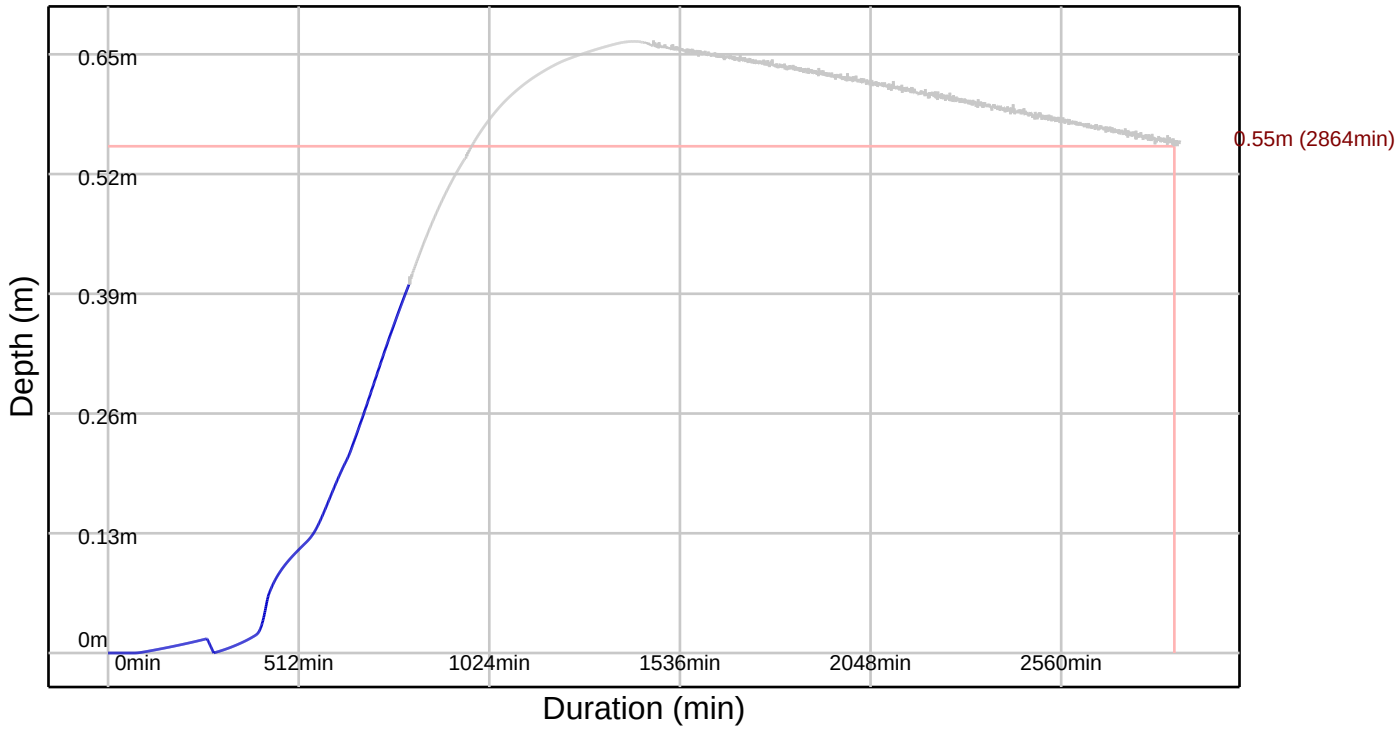
Swale 2 at S37 (100Yr+45% 15Min Winter)



Tank Structure at Manhole S39-TANK-3

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
132.975	0.400	95.00	42.500	40.375	16.150	0.00000000	0.00000000	2.00

Tank 3 at S39-TANK-3 (100Yr+45% 1440Min Winter)

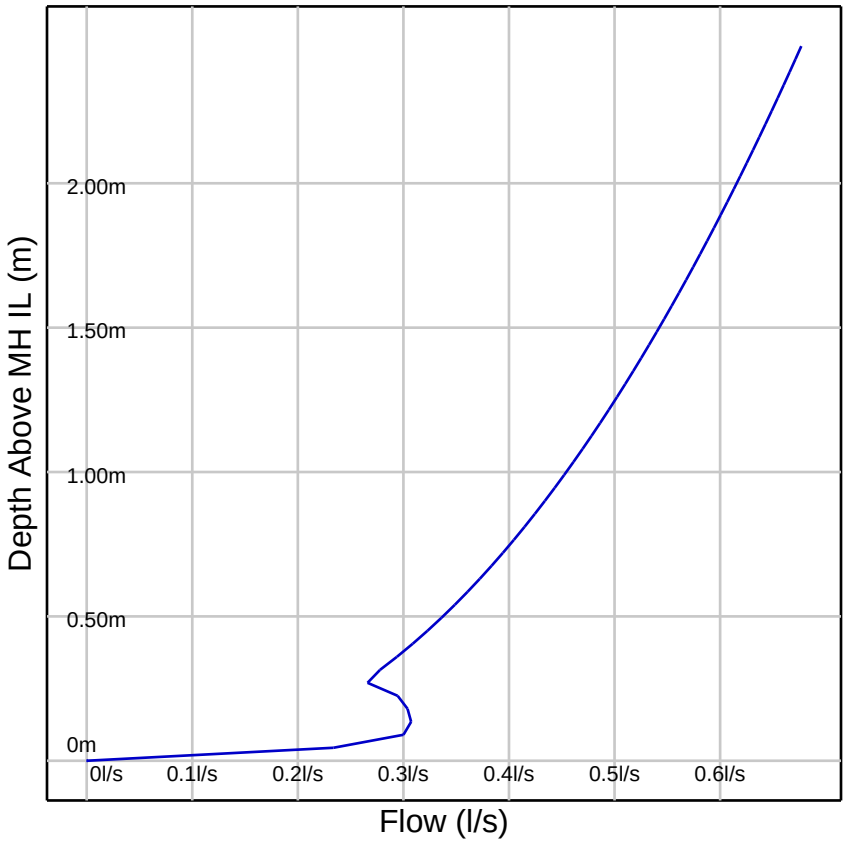


Controls within Manhole S43-CC

Hydro-Brake® Optimum Control

Model Ref	Design Depth (m)	Design Flow (l/s)	Invert Offset (m)	FF Head (m)	FF Flow (l/s)	KF Head (m)	KF Flow (l/s)
SHE-0031-5000-1250-5000	1.250	0.500	0.000	0.134	0.307	0.273	0.262

Hydro-Brake® Optimum Control from S43-CC to S44



Simulation Settings

FEH2022 (point): Filename=FEH_Point_Descriptors_402289_163019_v5_1_0.xml

Summer (Cv min: 0.75, max: 1.00), Winter (Cv min: 0.84, max: 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%), (2, +0%), (30, +40%), (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	12.859	0.00	1.30	30Yr+40% 15Min Summer	108.532	0.00	2.06
1Yr 15Min Summer	12.859	0.00	1.30	30Yr+40% 15Min Winter	108.532	0.00	2.10
1Yr 30Min Winter	8.387	0.00	1.13	30Yr+40% 30Min Summer	70.683	0.00	2.12
1Yr 30Min Summer	8.387	0.00	1.18	30Yr+40% 30Min Winter	70.683	0.00	2.15
1Yr 60Min Winter	5.221	0.00	0.95	30Yr+40% 60Min Summer	43.887	0.00	2.10
1Yr 60Min Summer	5.221	0.00	1.02	30Yr+40% 60Min Winter	43.887	0.00	2.10
1Yr 120Min Summer	4.442	0.00	0.54	30Yr+40% 120Min Summer	26.861	0.00	2.04
1Yr 120Min Winter	4.442	0.00	0.53	30Yr+40% 120Min Winter	26.861	0.00	2.13
1Yr 180Min Summer	3.891	0.00	0.53	30Yr+40% 180Min Summer	20.052	0.00	2.07
1Yr 180Min Winter	3.891	0.00	0.80	30Yr+40% 180Min Winter	20.052	0.00	2.20
1Yr 240Min Summer	3.306	0.00	0.63	30Yr+40% 240Min Summer	16.195	0.00	2.08
1Yr 240Min Winter	3.306	0.00	2.82	30Yr+40% 240Min Winter	16.195	0.00	2.24
1Yr 360Min Summer	2.632	0.00	1.98	30Yr+40% 360Min Summer	11.946	0.00	2.12
1Yr 360Min Winter	2.632	0.00	1.37	30Yr+40% 360Min Winter	11.946	0.00	2.27
1Yr 480Min Summer	2.223	0.00	2.03	30Yr+40% 480Min Summer	9.600	0.00	2.10
1Yr 480Min Winter	2.223	0.00	1.42	30Yr+40% 480Min Winter	9.600	0.00	2.27
1Yr 600Min Summer	1.924	0.00	1.82	30Yr+40% 600Min Summer	8.071	0.00	2.07
1Yr 600Min Winter	1.924	0.00	1.25	30Yr+40% 600Min Winter	8.071	0.00	2.23
1Yr 720Min Winter	1.698	0.00	1.04	30Yr+40% 720Min Summer	6.985	0.00	2.04
1Yr 720Min Summer	1.698	0.00	1.24	30Yr+40% 720Min Winter	6.985	0.00	2.29
1Yr 960Min Summer	1.391	0.00	0.39	30Yr+40% 960Min Summer	5.554	0.00	1.93
1Yr 960Min Winter	1.391	0.00	1.07	30Yr+40% 960Min Winter	5.554	0.00	2.21
1Yr 1440Min Summer	1.044	0.00	0.55	30Yr+40% 1440Min Summer	3.996	0.00	1.70
1Yr 1440Min Winter	1.044	0.00	0.98	30Yr+40% 1440Min Winter	3.996	0.00	1.93
2Yr 15Min Summer	28.534	0.00	0.90	100Yr+45% 15Min Summer	143.803	0.00	2.05
2Yr 15Min Winter	28.534	0.00	0.88	100Yr+45% 15Min Winter	143.803	0.00	2.07
2Yr 30Min Summer	18.400	0.00	0.80	100Yr+45% 30Min Summer	94.311	0.00	2.02
2Yr 30Min Winter	18.400	0.00	0.85	100Yr+45% 30Min Winter	94.311	0.00	2.07
2Yr 60Min Summer	11.433	0.00	1.03	100Yr+45% 60Min Summer	58.976	0.00	2.15
2Yr 60Min Winter	11.433	0.00	1.39	100Yr+45% 60Min Winter	58.976	0.00	2.41
2Yr 120Min Winter	8.117	0.00	2.08	100Yr+45% 120Min Summer	35.361	0.00	2.33
2Yr 120Min Summer	8.117	0.00	2.37	100Yr+45% 120Min Winter	35.361	0.00	2.48
2Yr 180Min Summer	6.539	0.00	2.06	100Yr+45% 180Min Summer	26.156	0.00	2.41
2Yr 180Min Winter	6.539	0.00	1.75	100Yr+45% 180Min Winter	26.156	0.00	2.55
2Yr 240Min Summer	5.403	0.00	1.53	100Yr+45% 240Min Summer	21.144	0.00	2.45
2Yr 240Min Winter	5.403	0.00	1.74	100Yr+45% 240Min Winter	21.144	0.00	2.61
2Yr 360Min Summer	4.143	0.00	1.55	100Yr+45% 360Min Summer	15.631	0.00	2.50
2Yr 360Min Winter	4.143	0.00	1.68	100Yr+45% 360Min Winter	15.631	0.00	2.63
2Yr 480Min Summer	3.410	0.00	1.48	100Yr+45% 480Min Summer	12.600	0.00	2.48
2Yr 480Min Winter	3.410	0.00	1.61	100Yr+45% 480Min Winter	12.600	0.00	2.63
2Yr 600Min Winter	2.900	0.00	1.52	100Yr+45% 600Min Summer	10.637	0.00	2.46
2Yr 600Min Summer	2.900	0.00	1.38	100Yr+45% 600Min Winter	10.637	0.00	2.69
2Yr 720Min Summer	2.527	0.00	1.28	100Yr+45% 720Min Summer	9.244	0.00	2.43
2Yr 720Min Winter	2.527	0.00	1.43	100Yr+45% 720Min Winter	9.244	0.00	2.59
2Yr 960Min Summer	2.038	0.00	1.06	100Yr+45% 960Min Summer	7.390	0.00	2.35
2Yr 960Min Winter	2.038	0.00	1.24	100Yr+45% 960Min Winter	7.390	0.00	2.52
2Yr 1440Min Summer	1.499	0.00	1.01	100Yr+45% 1440Min Winter	5.336	0.00	2.39
2Yr 1440Min Winter	1.499	0.00	0.86	100Yr+45% 1440Min Summer	5.336	0.00	2.30

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
S1	15 min Winter	11	134.384	0.019	0.078		OK
S2	15 min Winter	11	134.383	0.020	0.120		OK
S5	15 min Winter	11	134.382	0.022	0.169		OK
S6	15 min Winter	11	134.380	0.022	0.211		OK
S10	120 min Summer	68	134.356	0.006	0.159		OK
S11	120 min Summer	67	134.027	0.016	0.201		OK
S13	120 min Summer	68	134.017	0.017	0.200		OK
S14	120 min Summer	69	134.012	0.016	0.199		OK
S15	120 min Summer	69	134.005	0.016	0.199		OK
S16	120 min Summer	70	133.998	0.016	0.198		OK
S18	180 min Summer	101	133.992	0.016	0.197		OK
S20	180 min Summer	102	133.985	0.016	0.197		OK
S22	180 min Summer	103	133.981	0.016	0.196		OK
S23	180 min Summer	104	133.973	0.015	0.196		OK
S24-TANK-4	1440 min Winter	1245	133.027	0.047	0.008		OK
S26	15 min Winter	0	133.159	0.000	0.000		OK
S27-TANK-1	15 min Winter	0	133.110	0.000	0.000		OK
S29	15 min Winter	8	133.112	0.082	4.947		OK
S30	15 min Winter	9	133.106	0.081	4.690		OK
S31	1440 min Summer	1306	133.070	0.060	0.716		OK
S32	600 min Winter	783	133.068	0.078	0.667		OK
S33	720 min Winter	892	133.066	0.320	5.248		Surcharged
S34	720 min Winter	892	133.066	0.332	5.194		Surcharged
S35-TANK-2	720 min Winter	764	133.066	0.376	4.492		Surcharged
S36	720 min Winter	764	133.066	0.369	3.348		Surcharged
S37	30 min Winter	19	134.007	0.041	0.412		OK
S38	600 min Winter	659	133.066	0.021	0.000		OK
S39-TANK-3	720 min Winter	895	133.066	0.091	0.126		OK
S40	720 min Winter	894	133.066	0.091	1.654		OK
S41	720 min Winter	893	133.066	0.285	2.685		Surcharged
S42	720 min Winter	893	133.066	0.081	0.008		OK
S43-CC	720 min Winter	893	133.066	0.393	2.953		Surcharged
S44	1440 min Winter	611	132.666	0.016	0.307		OK
S45	1440 min Winter	2531	132.641	0.011	0.307		OK
Unknown-1	15 min Winter	0	132.650	0.000	0.000		OK
2013	15 min Winter	0	132.530	0.000	0.000		OK
2012	15 min Winter	0	132.200	0.000	0.000		OK
2904	1440 min Winter	2531	131.039	0.011	0.307		OK
Unknown-2	1440 min Winter	2531	130.828	0.008	0.307		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	S1	S2	0.019	0.137	0.098	0.053	OK
1.001	15 min Winter	11	S2	S5	0.021	0.125	0.124	0.067	OK
1.002	15 min Winter	11	S5	S6	0.022	0.138	0.172	0.094	OK
1.003	30 min Winter	20	S6	S10	0.013	0.378	0.213	0.116	OK
1.004	120 min Summer	68	S10	S11	0.011	0.267	0.159	0.003	OK
1.005	120 min Summer	68	S11	S13	0.016	0.192	0.201	0.025	OK
1.006	120 min Summer	68	S13	S14	0.017	0.189	0.200	0.026	OK
1.007	120 min Summer	69	S14	S15	0.016	0.189	0.199	0.026	OK
1.008	120 min Summer	70	S15	S16	0.016	0.189	0.198	0.025	OK
1.009	120 min Summer	71	S16	S18	0.016	0.188	0.198	0.025	OK
1.010	180 min Summer	102	S18	S20	0.016	0.188	0.197	0.025	OK
1.011	180 min Summer	102	S20	S22	0.016	0.187	0.197	0.025	OK
1.012	180 min Summer	103	S22	S23	0.016	0.199	0.196	0.025	OK
1.013	180 min Summer	104	S23	S24-TANK-4	0.014	0.244	0.196	0.019	OK
1.014	480 min Summer	403	S24-TANK-4	S33	0.108	0.732	9.977	0.407	OK

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
2.000	15 min Winter	0	S26	S27-TANK-1	0.000	0.000	0.000	0.000	OK
2.001	15 min Winter	9	S27-TANK-1	S30	0.003	0.000	0.000	0.000	OK
3.000	15 min Winter	8	S29	S30	0.081	0.392	4.890	0.340	OK
2.002	15 min Winter	9	S30	S31	0.070	0.458	4.784	0.333	OK
2.003	720 min Winter	892	S31	S32	0.067	0.388	1.014	0.033	OK
2.004	600 min Winter	1042	S32	S33	0.151	0.456	2.829	0.039	OK
1.015	720 min Summer	751	S33	S34	0.225	0.400	11.375	0.277	OK
1.016	960 min Winter	572	S34	S35-TANK-2	0.225	0.282	11.208	0.403	OK
1.017	1440 min Winter	2217	S35-TANK-2	S36	0.225	0.247	8.650	0.292	OK
1.018	720 min Winter	889	S36	S43-CC	0.225	0.093	3.703	0.118	OK
4.000	30 min Winter	19	S37	S38	0.017	0.473	0.420	0.065	OK
4.001	720 min Winter	895	S38	S39-TANK-3	0.047	0.196	0.122	0.004	OK
4.002	720 min Winter	895	S39-TANK-3	S40	0.082	0.300	2.478	0.059	OK
4.003	720 min Winter	894	S40	S41	0.158	0.460	2.706	0.077	OK
4.004	720 min Winter	769	S41	S43-CC	0.225	0.219	2.808	0.054	OK
5.000	720 min Winter	893	S42	S43-CC	0.116	0.028	0.350	0.009	OK
1.019	720 min Winter	308	S43-CC	S44	0.016	0.249	0.307	0.010	OK
1.020	1440 min Winter	2530	S44	S45	0.013	0.320	0.307	0.010	OK
1.021	1440 min Winter	2531	S45	2904	0.011	0.541	0.307	0.011	OK
6.000	15 min Winter	0	Unknown-1	2013	0.000	0.000	0.000	0.000	OK
6.001	15 min Winter	0	2013	2012	0.000	0.000	0.000	0.000	OK
6.002	1440 min Winter	2531	2012	2904	0.006	0.000	0.000	0.000	OK
1.022	1440 min Winter	2531	2904	Unknown-2	0.009	0.390	0.307	0.001	OK

Permeable Paving Storage

Permeable Paving	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Surface Runoff (m3)	Status
Permeable Paving1	480 min Summer	276	133.622	0.017	0.316			OK

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

2yr+0%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	15 min Winter	10	134.398	0.033	0.235		OK
S2	15 min Winter	10	134.397	0.034	0.354		OK
S5	15 min Winter	10	134.395	0.035	0.500		OK
S6	15 min Winter	10	134.391	0.034	0.623		OK
S10	30 min Winter	21	134.360	0.010	0.419		OK
S11	30 min Winter	20	134.037	0.026	0.536		OK
S13	30 min Winter	21	134.027	0.027	0.528		OK
S14	30 min Winter	22	134.022	0.027	0.513		OK
S15	30 min Winter	22	134.015	0.026	0.518		OK
S16	30 min Winter	23	134.008	0.026	0.507		OK
S18	30 min Winter	23	134.002	0.026	0.509		OK
S20	30 min Winter	24	133.995	0.026	0.498		OK
S22	30 min Winter	25	133.990	0.025	0.485		OK
S23	30 min Winter	25	133.981	0.023	0.488		OK
S24-TANK-4	1440 min Winter	1368	133.095	0.115	0.009		OK
S26	15 min Summer	0	133.159	0.000	0.000		OK
S27-TANK-1	15 min Winter	12	133.111	0.001	0.000		OK
S29	15 min Winter	8	133.151	0.121	10.979		OK
S30	15 min Winter	8	133.142	0.117	10.902		OK
S31	15 min Winter	9	133.095	0.085	10.167		OK
S32	1440 min Winter	1371	133.095	0.105	0.133		OK
S33	1440 min Winter	1462	133.097	0.350	0.287		Surcharged
S34	1440 min Winter	1456	133.095	0.361	0.000		Surcharged
S35-TANK-2	1440 min Winter	1372	133.095	0.405	0.164		Surcharged
S36	1440 min Winter	1362	133.095	0.398	0.058		Surcharged
S37	15 min Winter	10	134.019	0.052	1.280		OK
S38	1440 min Winter	1360	133.095	0.050	0.013		OK
S39-TANK-3	1440 min Winter	1361	133.095	0.120	0.014		OK
S40	1440 min Winter	1341	133.095	0.120	0.094		OK
S41	1440 min Winter	1347	133.095	0.314	0.107		Surcharged
S42	1440 min Winter	1416	133.095	0.111	0.030		OK
S43-CC	1440 min Winter	1406	133.095	0.422	0.374		Surcharged
S44	1440 min Winter	1347	132.666	0.016	0.309		OK
S45	1440 min Winter	1348	132.641	0.011	0.309		OK
Unknown-1	15 min Summer	0	132.650	0.000	0.000		OK
2013	15 min Summer	0	132.530	0.000	0.000		OK
2012	15 min Summer	0	132.200	0.000	0.000		OK
2904	1440 min Winter	1348	131.039	0.011	0.309		OK
Unknown-2	1440 min Winter	1374	130.828	0.008	0.309		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	10	S1	S2	0.033	0.153	0.242	0.132	OK
1.001	15 min Winter	10	S2	S5	0.035	0.150	0.360	0.196	OK
1.002	15 min Winter	10	S5	S6	0.035	0.211	0.507	0.276	OK
1.003	15 min Winter	11	S6	S10	0.021	0.550	0.637	0.346	OK
1.004	30 min Winter	21	S10	S11	0.018	0.358	0.430	0.009	OK
1.005	30 min Winter	21	S11	S13	0.027	0.254	0.531	0.066	OK
1.006	30 min Winter	21	S13	S14	0.027	0.250	0.527	0.068	OK
1.007	30 min Winter	22	S14	S15	0.026	0.250	0.520	0.067	OK
1.008	30 min Winter	22	S15	S16	0.026	0.271	0.517	0.066	OK
1.009	30 min Winter	23	S16	S18	0.026	0.313	0.509	0.065	OK
1.010	30 min Winter	24	S18	S20	0.026	0.336	0.505	0.065	OK
1.011	30 min Winter	24	S20	S22	0.025	0.366	0.496	0.064	OK
1.012	30 min Winter	25	S22	S23	0.024	0.361	0.488	0.063	OK
1.013	30 min Winter	26	S23	S24-TANK-4	0.021	0.319	0.480	0.047	OK
1.014	1440 min Winter	1368	S24-TANK-4	S33	0.112	0.717	9.726	0.397	OK
2.000	15 min Summer	0	S26	S27-TANK-1	0.000	0.000	0.000	0.000	OK
2.001	15 min Winter	8	S27-TANK-1	S30	0.030	0.000	0.000	0.000	OK
3.000	15 min Winter	8	S29	S30	0.119	0.510	10.902	0.758	OK
2.002	15 min Winter	8	S30	S31	0.101	0.591	10.175	0.708	OK

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
2.003	1440 min Winter	1371	S31	S32	0.095	0.367	1.342	0.043	OK
2.004	1440 min Winter	1371	S32	S33	0.165	0.387	3.158	0.044	OK
1.015	360 min Summer	188	S33	S34	0.225	0.486	11.349	0.277	OK
1.016	120 min Summer	101	S34	S35-TANK-2	0.225	0.451	10.460	0.376	OK
1.017	180 min Summer	307	S35-TANK-2	S36	0.225	0.093	3.702	0.125	OK
1.018	180 min Summer	307	S36	S43-CC	0.225	0.092	3.661	0.116	OK
4.000	15 min Winter	10	S37	S38	0.029	0.638	1.183	0.185	OK
4.001	1440 min Winter	1361	S38	S39-TANK-3	0.076	0.196	0.112	0.004	OK
4.002	1440 min Winter	1512	S39-TANK-3	S40	0.111	0.301	0.713	0.017	OK
4.003	1440 min Winter	1341	S40	S41	0.172	0.325	1.182	0.034	OK
4.004	120 min Summer	90	S41	S43-CC	0.225	0.429	4.674	0.090	OK
5.000	1440 min Winter	1819	S42	S43-CC	0.130	0.030	0.461	0.011	OK
1.019	1440 min Winter	1347	S43-CC	S44	0.016	0.249	0.309	0.010	OK
1.020	1440 min Winter	1347	S44	S45	0.013	0.321	0.309	0.010	OK
1.021	1440 min Winter	1348	S45	2904	0.011	0.542	0.309	0.011	OK
6.000	15 min Summer	0	Unknown-1	2013	0.000	0.000	0.000	0.000	OK
6.001	15 min Summer	0	2013	2012	0.000	0.000	0.000	0.000	OK
6.002	1440 min Winter	1348	2012	2904	0.006	0.000	0.000	0.000	OK
1.022	1440 min Winter	1374	2904	Unknown-2	0.009	0.390	0.309	0.001	OK

Permeable Paving Storage

Permeable Paving	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Surface Runoff (m3)	Status
Permeable Paving1	240 min Summer	144	133.632	0.026	0.624			OK

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

30yr+40%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	15 min Winter	9	134.438	0.073	1.075		OK
S2	15 min Winter	9	134.437	0.074	1.586		OK
S5	15 min Winter	9	134.433	0.073	2.226		OK
S6	15 min Winter	9	134.424	0.067	2.752		OK
S10	15 min Winter	10	134.373	0.023	2.631		OK
S11	15 min Winter	10	134.079	0.068	3.200		OK
S13	15 min Winter	11	134.070	0.070	3.027		OK
S14	15 min Winter	11	134.064	0.068	3.044		OK
S15	15 min Winter	11	134.056	0.067	3.041		OK
S16	15 min Winter	12	134.048	0.066	2.845		OK
S18	15 min Winter	12	134.041	0.065	2.875		OK
S20	15 min Winter	12	134.032	0.064	2.888		OK
S22	15 min Winter	12	134.025	0.060	2.881		OK
S23	15 min Winter	13	134.013	0.055	2.744		OK
S24-TANK-4	1440 min Winter	1410	133.425	0.445	0.020		Surcharged
S26	1440 min Winter	1411	133.426	0.266	0.007		Surcharged
S27-TANK-1	1440 min Winter	1415	133.425	0.315	0.003		Surcharged
S29	1440 min Winter	1406	133.425	0.395	0.112		Surcharged
S30	1440 min Winter	1408	133.425	0.401	0.130		Surcharged
S31	1440 min Winter	1406	133.425	0.415	0.103		Surcharged
S32	1440 min Winter	1406	133.425	0.435	0.166		Surcharged
S33	1440 min Winter	1463	133.431	0.684	0.070		Surcharged
S34	1440 min Winter	1465	133.427	0.693	0.000		Surcharged
S35-TANK-2	1440 min Winter	1413	133.425	0.735	0.212		Surcharged
S36	1440 min Winter	1464	133.429	0.733	0.000		Surcharged
S37	15 min Winter	10	134.053	0.087	4.863		OK
S38	1440 min Winter	1463	133.427	0.382	0.002		Surcharged
S39-TANK-3	1440 min Winter	1463	133.426	0.451	0.103		Surcharged
S40	1440 min Winter	1463	133.426	0.451	0.173		Surcharged
S41	1440 min Winter	1412	133.425	0.645	0.120		Surcharged
S42	1440 min Winter	1476	133.425	0.441	0.127		Surcharged
S43-CC	1440 min Winter	1412	133.425	0.752	0.400		Surcharged
S44	1440 min Winter	1413	132.668	0.018	0.398		OK
S45	1440 min Winter	1414	132.642	0.012	0.398		OK
Unknown-1	15 min Summer	0	132.650	0.000	0.000		OK
2013	15 min Summer	0	132.530	0.000	0.000		OK
2012	15 min Summer	0	132.200	0.000	0.000		OK
2904	1440 min Winter	1415	131.040	0.012	0.398		OK
Unknown-2	1440 min Winter	1415	130.830	0.010	0.398		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	9	S1	S2	0.073	0.176	1.075	0.584	OK
1.001	15 min Winter	9	S2	S5	0.074	0.256	1.585	0.861	OK
1.002	15 min Winter	9	S5	S6	0.070	0.378	2.225	1.209	OK
1.003	15 min Winter	9	S6	S10	0.044	0.828	2.755	1.497	OK
1.004	15 min Winter	10	S10	S11	0.046	0.549	2.486	0.050	OK
1.005	15 min Winter	11	S11	S13	0.069	0.412	3.153	0.394	OK
1.006	15 min Winter	11	S13	S14	0.069	0.409	3.072	0.394	OK
1.007	15 min Winter	11	S14	S15	0.068	0.409	3.041	0.390	OK
1.008	15 min Winter	11	S15	S16	0.067	0.415	3.015	0.387	OK
1.009	15 min Winter	12	S16	S18	0.066	0.470	2.961	0.380	OK
1.010	15 min Winter	12	S18	S20	0.064	0.535	2.888	0.370	OK
1.011	15 min Winter	12	S20	S22	0.062	0.489	2.881	0.369	OK
1.012	15 min Winter	12	S22	S23	0.057	0.629	2.859	0.367	OK
1.013	15 min Winter	13	S23	S24-TANK-4	0.051	0.529	2.814	0.278	OK
1.014	1440 min Winter	1461	S24-TANK-4	S33	0.150	0.073	1.296	0.053	Surcharged
2.000	1440 min Winter	2039	S26	S27-TANK-1	0.150	0.011	0.188	0.018	Surcharged
2.001	960 min Winter	1068	S27-TANK-1	S30	0.150	0.057	1.002	0.099	Surcharged
3.000	15 min Winter	8	S29	S30	0.225	1.038	41.263	2.870	OK
2.002	120 min Winter	77	S30	S31	0.225	0.588	10.375	0.722	OK

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
2.003	60 min Winter	37	S31	S32	0.225	0.905	15.820	0.507	OK
2.004	30 min Summer	17	S32	S33	0.225	1.163	43.088	0.597	OK
1.015	15 min Winter	8	S33	S34	0.225	1.376	54.730	1.335	OK
1.016	15 min Winter	8	S34	S35-TANK-2	0.225	1.377	53.740	1.932	OK
1.017	1440 min Winter	2155	S35-TANK-2	S36	0.225	0.102	4.071	0.137	OK
1.018	1440 min Summer	2202	S36	S43-CC	0.225	0.068	2.711	0.086	OK
4.000	15 min Winter	10	S37	S38	0.063	0.923	4.850	0.757	OK
4.001	120 min Winter	71	S38	S39-TANK-3	0.225	0.336	1.725	0.061	OK
4.002	60 min Winter	47	S39-TANK-3	S40	0.225	0.093	3.683	0.087	OK
4.003	30 min Winter	21	S40	S41	0.225	0.967	20.997	0.596	OK
4.004	15 min Winter	9	S41	S43-CC	0.225	0.811	26.484	0.508	OK
5.000	60 min Summer	44	S42	S43-CC	0.150	0.195	3.440	0.085	Surcharged
1.019	1440 min Winter	1413	S43-CC	S44	0.018	0.270	0.398	0.013	OK
1.020	1440 min Winter	1414	S44	S45	0.015	0.345	0.398	0.013	OK
1.021	1440 min Winter	1414	S45	2904	0.012	0.586	0.398	0.014	OK
6.000	15 min Summer	0	Unknown-1	2013	0.000	0.000	0.000	0.000	OK
6.001	15 min Summer	0	2013	2012	0.000	0.000	0.000	0.000	OK
6.002	1440 min Winter	1415	2012	2904	0.006	0.000	0.000	0.000	OK
1.022	1440 min Winter	1415	2904	Unknown-2	0.011	0.391	0.398	0.001	OK

Permeable Paving Storage

Permeable Paving	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Surface Runoff (m3)	Status
Permeable Paving1	60 min Summer	44	133.686	0.081	2.722			OK

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

100yr+45%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	15 min Winter	9	134.453	0.088	1.424		OK
S2	15 min Winter	9	134.452	0.088	2.101		OK
S5	15 min Winter	9	134.447	0.087	2.951		OK
S6	15 min Winter	9	134.436	0.079	3.647		OK
S10	15 min Winter	10	134.377	0.027	3.485		OK
S11	15 min Winter	10	134.095	0.084	4.375		OK
S13	15 min Winter	11	134.084	0.084	4.062		OK
S14	15 min Winter	11	134.078	0.083	4.104		OK
S15	15 min Winter	11	134.071	0.082	4.125		OK
S16	15 min Winter	11	134.062	0.081	4.125		OK
S18	15 min Winter	11	134.054	0.079	4.101		OK
S20	15 min Winter	12	134.045	0.076	3.910		OK
S22	15 min Winter	12	134.037	0.073	3.942		OK
S23	15 min Winter	12	134.024	0.066	3.960		OK
S24-TANK-4	1440 min Winter	1413	133.639	0.659	0.025		Surcharged
S26	1440 min Winter	1413	133.639	0.480	0.000		Surcharged
S27-TANK-1	1440 min Winter	1413	133.639	0.529	0.009		Surcharged
S29	1440 min Winter	1410	133.639	0.609	0.132		Surcharged
S30	1440 min Winter	1410	133.639	0.614	0.140		Surcharged
S31	1440 min Winter	1410	133.639	0.629	0.135		Surcharged
S32	1440 min Winter	1410	133.639	0.649	0.208		Surcharged
S33	1440 min Winter	1491	133.644	0.897	0.490		Surcharged
S34	1440 min Winter	1471	133.640	0.906	0.000		Surcharged
S35-TANK-2	1440 min Winter	1414	133.639	0.949	0.246		Surcharged
S36	1440 min Winter	1470	133.641	0.944	0.000		Surcharged
S37	15 min Winter	10	134.066	0.100	6.445		OK
S38	1440 min Winter	1414	133.639	0.594	0.023		Surcharged
S39-TANK-3	1440 min Winter	1465	133.640	0.665	0.687		Surcharged
S40	1440 min Winter	1414	133.639	0.664	0.139		Surcharged
S41	1440 min Winter	1414	133.639	0.858	0.148		Surcharged
S42	1440 min Winter	1414	133.639	0.655	0.008		Surcharged
S43-CC	1440 min Winter	1414	133.639	0.966	0.445		Surcharged
S44	1440 min Winter	1414	132.669	0.019	0.444		OK
S45	1440 min Winter	1415	132.643	0.013	0.444		OK
Unknown-1	15 min Summer	0	132.650	0.000	0.000		OK
2013	15 min Summer	0	132.530	0.000	0.000		OK
2012	15 min Summer	0	132.200	0.000	0.000		OK
2904	1440 min Winter	1416	131.041	0.013	0.444		OK
Unknown-2	1440 min Winter	1416	130.831	0.011	0.444		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	9	S1	S2	0.088	0.195	1.424	0.774	OK
1.001	15 min Winter	9	S2	S5	0.088	0.288	2.100	1.141	OK
1.002	15 min Winter	9	S5	S6	0.083	0.424	2.950	1.603	OK
1.003	15 min Winter	9	S6	S10	0.052	0.885	3.649	1.983	OK
1.004	15 min Winter	10	S10	S11	0.055	0.582	3.428	0.069	OK
1.005	15 min Winter	10	S11	S13	0.084	0.443	4.340	0.542	OK
1.006	15 min Winter	11	S13	S14	0.084	0.441	4.272	0.548	OK
1.007	15 min Winter	11	S14	S15	0.083	0.443	4.184	0.536	OK
1.008	15 min Winter	11	S15	S16	0.081	0.448	4.125	0.529	OK
1.009	15 min Winter	11	S16	S18	0.080	0.460	4.101	0.526	OK
1.010	15 min Winter	12	S18	S20	0.077	0.490	4.056	0.520	OK
1.011	15 min Winter	12	S20	S22	0.074	0.618	3.989	0.511	OK
1.012	15 min Winter	12	S22	S23	0.069	0.581	3.960	0.508	OK
1.013	15 min Winter	12	S23	S24-TANK-4	0.061	0.582	3.966	0.391	OK
1.014	1440 min Summer	678	S24-TANK-4	S33	0.150	0.720	9.786	0.399	Surcharged
2.000	1440 min Summer	1188	S26	S27-TANK-1	0.150	0.031	0.545	0.054	Surcharged
2.001	60 min Winter	63	S27-TANK-1	S30	0.150	0.277	4.889	0.485	Surcharged
3.000	15 min Winter	8	S29	S30	0.225	1.365	54.271	3.775	OK
2.002	15 min Winter	7	S30	S31	0.225	0.746	27.915	1.942	OK

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
2.003	15 min Winter	7	S31	S32	0.225	0.891	26.037	0.835	OK
2.004	15 min Winter	8	S32	S33	0.225	1.372	54.558	0.756	OK
1.015	15 min Winter	7	S33	S34	0.225	1.501	59.685	1.456	OK
1.016	15 min Winter	8	S34	S35-TANK-2	0.225	1.497	58.930	2.118	OK
1.017	1440 min Winter	2463	S35-TANK-2	S36	0.225	0.104	4.136	0.140	OK
1.018	960 min Summer	1500	S36	S43-CC	0.225	0.064	2.534	0.081	OK
4.000	15 min Winter	10	S37	S38	0.076	0.960	6.180	0.964	OK
4.001	30 min Winter	19	S38	S39-TANK-3	0.225	0.447	4.697	0.165	OK
4.002	30 min Winter	32	S39-TANK-3	S40	0.225	0.139	5.526	0.131	OK
4.003	15 min Winter	11	S40	S41	0.225	1.080	31.144	0.883	OK
4.004	15 min Winter	8	S41	S43-CC	0.225	0.864	33.153	0.636	OK
5.000	60 min Summer	45	S42	S43-CC	0.150	0.275	4.862	0.120	Surcharged
1.019	1440 min Winter	1414	S43-CC	S44	0.019	0.279	0.444	0.015	OK
1.020	1440 min Winter	1415	S44	S45	0.016	0.358	0.444	0.015	OK
1.021	1440 min Winter	1415	S45	2904	0.013	0.606	0.444	0.015	OK
6.000	15 min Summer	0	Unknown-1	2013	0.000	0.000	0.000	0.000	OK
6.001	15 min Summer	0	2013	2012	0.000	0.000	0.000	0.000	OK
6.002	1440 min Winter	1416	2012	2904	0.006	0.000	0.000	0.000	OK
1.022	1440 min Winter	1416	2904	Unknown-2	0.012	0.391	0.444	0.001	OK

Permeable Paving Storage

Permeable Paving	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Surface Runoff (m3)	Status
Permeable Paving1	60 min Summer	45	133.709	0.104	4.890			OK

Appendix C

Product Details

ACO Water Management:
Civils + Infrastructure

Uniclass JR12/JR23 L731	
CI/SfB (52.7)	







Surface Water Flow Control Systems

ACO Q-Brake Vortex and ACO Q-Plate

Introduction to the ACO Group

Throughout the world ACO branded drainage and surface water management systems are recognised for their innovative design, high quality manufacture, environmental excellence and industry leading performance.

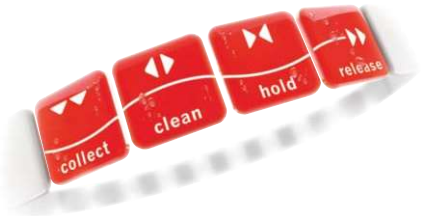
Today the ACO Group has a research and production base that reaches across four continents. This unmatched resource pioneers the development of solutions that are tailored to individual applications, meeting the need for high performance, sustainable products that deliver optimum value throughout their operational life.



ACO Technologies plc

ACO operates as ACO Technologies plc in the United Kingdom. Founded over 25 years ago, the company has grown quickly on a reputation for design innovation and customer service.

There are 2 core divisions, ACO Water Management and ACO Building Drainage, that serve every sector of the construction industry, providing solutions for applications as diverse as rail, highways, airports, landscaping, retail, distribution centres and environmentally sensitive projects.



To help architects, designers and contractors meet the legal requirements that now tightly control the way surface water is managed, ACO has created its unique 'Surface Water Management Cycle' – Collect, Clean, Hold, Release – the four core processes now required for the complete and sustainable management of surface water drainage.



The ACO group / www.aco.com

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Introduction to ACO's surface water control systems	4
Benefits of using a surface water control system	6
ACO Q-Brake Vortex features overview	8
ACO Q-Brake Vortex specification and design process	10
ACO Q-Brake Vortex Installation detail	11
Operation and maintenance recommendations	12
Introduction to ACO Q Plate	14

Introduction to ACO's Surface Water Flow Control Systems

ACO's range of flow control systems are designed to regulate storm water flow before it discharges into the watercourse or sewer networks. ACO Q-Brake Vortex flow controls and ACO Q-Plate orifice plates are capable of regulating any flow for surface water applications and can be used in conjunction with retention and attenuation systems, such as ACO StormBrixx, as an integrated sustainable urban drainage (SuDS) scheme.

What is ACO Q-Brake Vortex?

ACO Q-Brake Vortex is a horizontal vortex flow control designed to regulate storm water flows from 1-100 litres per second. Manufactured from grade 304 stainless steel, each ACO Q-Brake Vortex is individually configured to suit specific performance criteria.

The design of a vortex flow control is based on the fluid mechanics principle of the forced vortex, which permits flow regulation without any moving parts.

ACO Q-Brake Vortex utilises the upstream head and discharge to generate a 'vortex' within the structure of the unit. The water is then released at a pre-determined controlled rate preventing downstream flooding.

Unlike more conventional methods, ACO Q-Brake Vortex is less prone to blockage, and permits higher flow at a lower head of water, as a vortex control allows an outlet 4-6 times larger in cross sectional area to be used.

ACO Q-Brake Vortex can form part of the design of any integrated drainage scheme for a wide range of infrastructure, industrial and other SuDS applications.

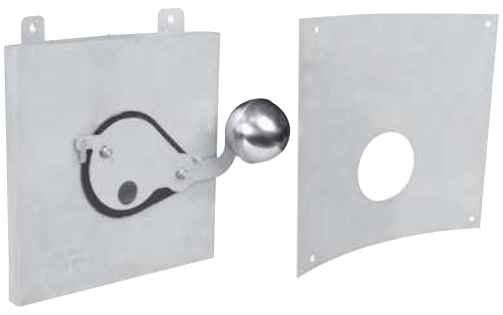


What is ACO Q-Plate?

ACO Q-Plate orifice plates are designed for use where an ACO Q-Brake vortex is not the most effective solution.

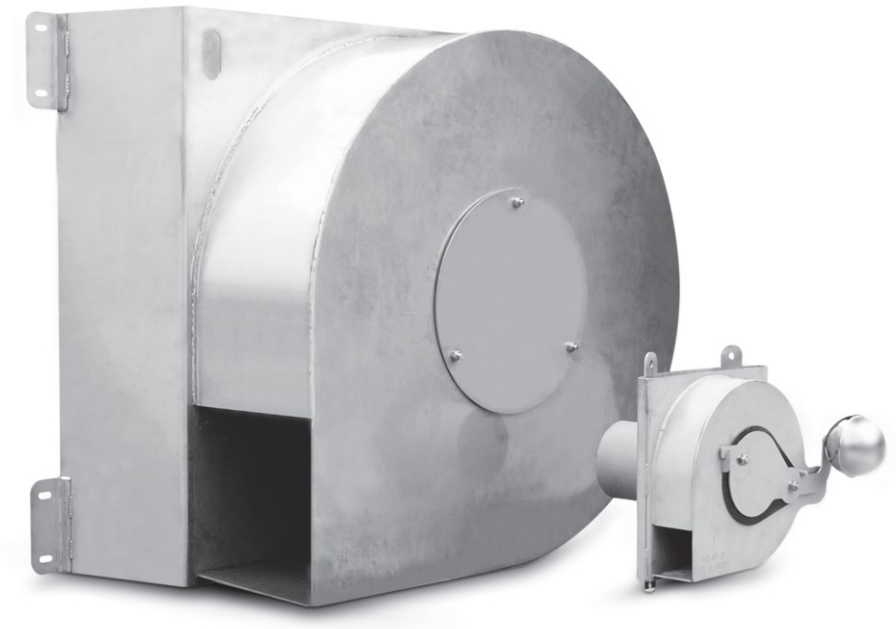
To suit application requirements, the range is available with or without remote bypass and drain down and is designed to match a variety on manhole configurations.

Information regarding the specification of ACO Q –Plates can be found on page 14.



ACO Q-Plates with and without draindown

Why choose ACO Q-Brake Vortex?



- **Planning and connection**

  ACO Q-Brake Vortex addresses the planning and connection requirements set out in the Floods and Water Management Act. Where a discharge restriction is in place, ACO Q-Brake Vortex regulates the surface water flow to the specified rate.

- **Tailored performance**

  Each ACO Q-Brake Vortex is tailored to the specific performance requirements of the application providing optimum efficiency within the system.

- **Optimum hydraulic efficiency**

  The mechanism employed within ACO Q-Brake Vortex provides superior hydraulic performance in comparison to traditional flow control systems.

- **Water Authority Approval**

  ACO Q-Brake Vortex has been approved for use by a number of water authorities including Severn Trent, Anglian and Scottish Water.

- **Proven performance**

  ACO Q-Brake Vortex is UK manufactured and has been independently laboratory tested to verified discharge rates.

- **Simplified access and maintenance**

  ACO Q-Brake Vortex has large clear openings making it less prone to blockage. The absence of any loose parts also reduces maintenance requirements.

  The patented bypass door and emergency drain down facility allows ACO Q-Brake Vortex to be remotely accessed from the surface to allow the upstream system to be independently drained, completely bypassing the inlet. Building Regulations 2000 Section H discourages direct man access to sewer manholes.

- **Reduces total installed cost**

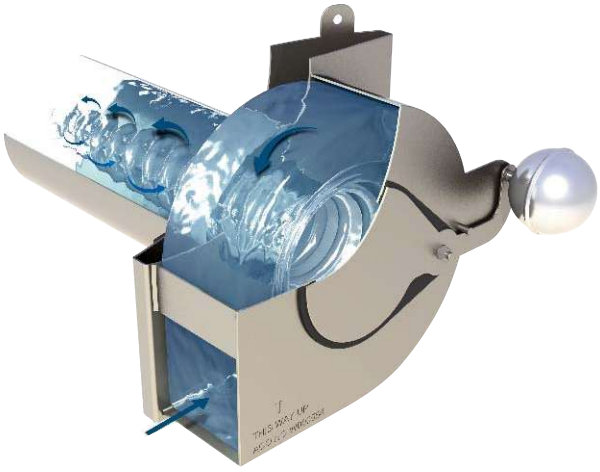
  ACO Q-Brake Vortex allows more flow at lower heads, reducing the need for on-site storage volume requirements lowering installation costs.

- **Ease of installation**

  Each ACO Q-Brake Vortex unit is custom built to suit the profile of the chamber. Radius fixing options remove the need for additional benching - simplifying installation and reducing cost.

- **WinDes**

  ACO Q-Brake Vortex can be sized and modelled on the latest version of the design software and can be incorporated into the overall hydraulic drainage design.



Benefits of using a surface water flow control system

Storage and the controlled release of clean water into the natural environment is an important aspect of managing surface water in the SuDS approach. The Floods and Water Management Act now gives overall responsibility to the local regulatory body to impose, where appropriate, the discharge rate of a surface water flow control system.

ACO's range of flow control systems can be used in conjunction with ACO's award-winning attenuation and infiltration system, ACO StormBrixx, to provide a fully integrated storm water control system meeting the requirements of the regulations.

This diagram simulates how the ACO StormBrixx system is used to provide storm water attenuation, whilst the ACO Q-Brake Vortex is used to regulate the rate of discharge from the development into the watercourse or sewer network.

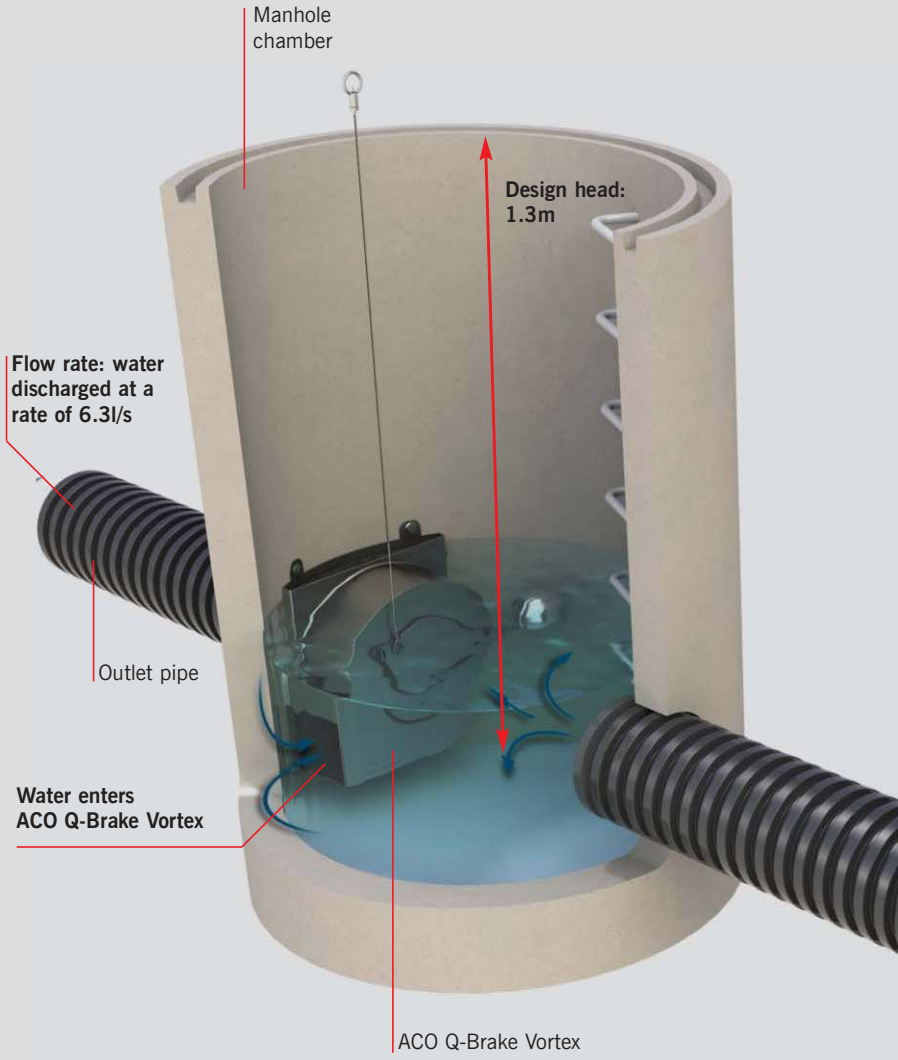
Compared to the use of traditional flow control systems, the combination of ACO StormBrixx and ACO Q-Brake Vortex can reduce the need for additional upstream storage lowering overall installation and maintenance costs.

This benefit is best demonstrated in the example opposite. The conclusion of the example means that upstream storage can be reduced by 11m^3 compared to using a traditional flow control system.

For more information on ACO's award winning attenuation and infiltration system, ACO StormBrixx, please go to www.stormbrixx.co.uk.

Example:

There is a project in Bedford, England with a catchment area of 13,000m^2. The project has design criteria of a 1 in 30 year storm and the runoff from the site must not exceed 6.3l/s at a design head of 1.3m.

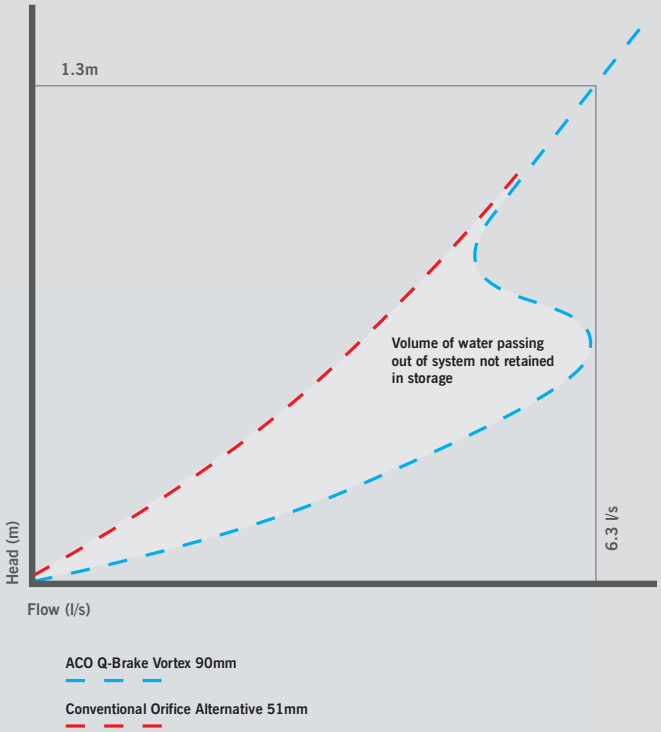


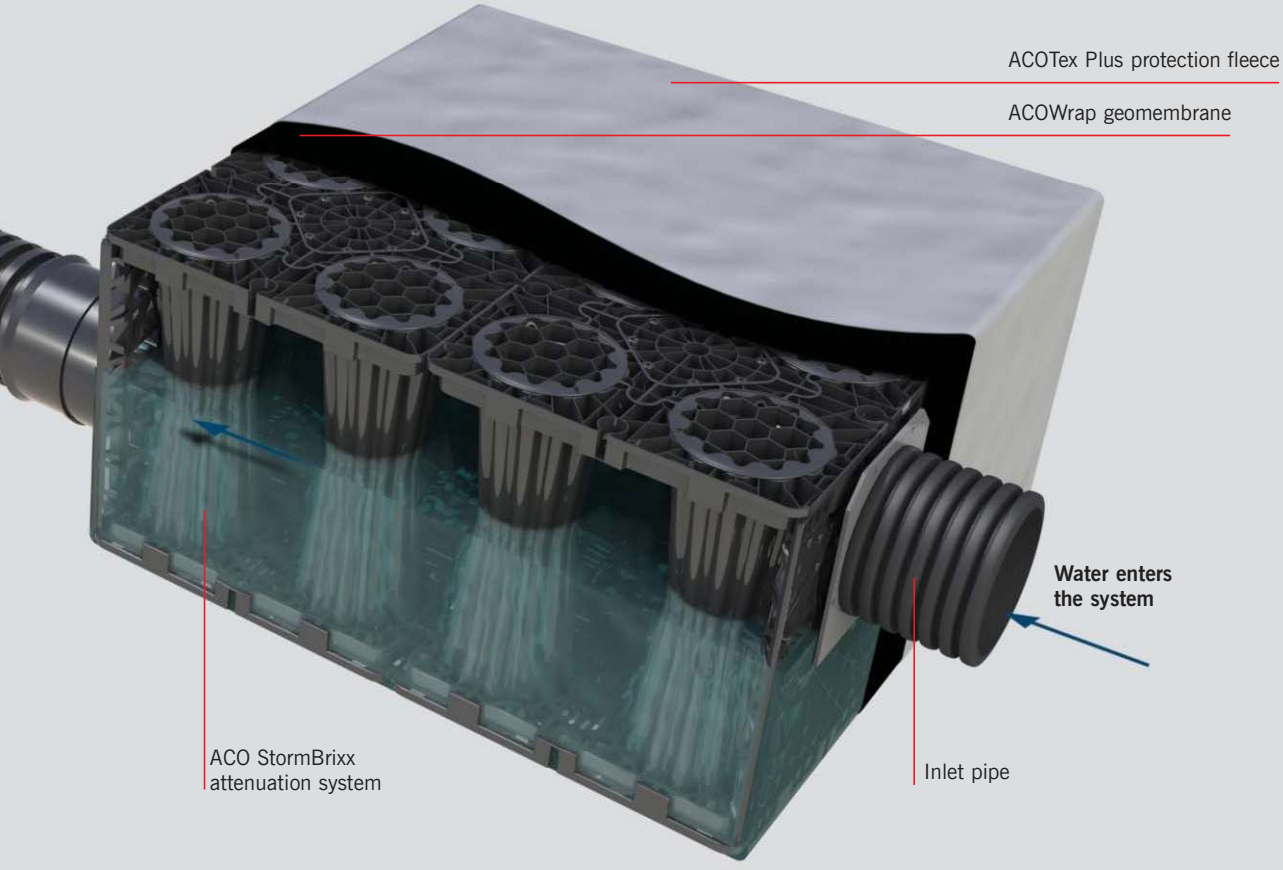
Results:

Using MicroDrainage® software, ACO has compared the upstream storage requirements using ACO Q-Brake Vortex and a traditional orifice plate. The results are summarised below:

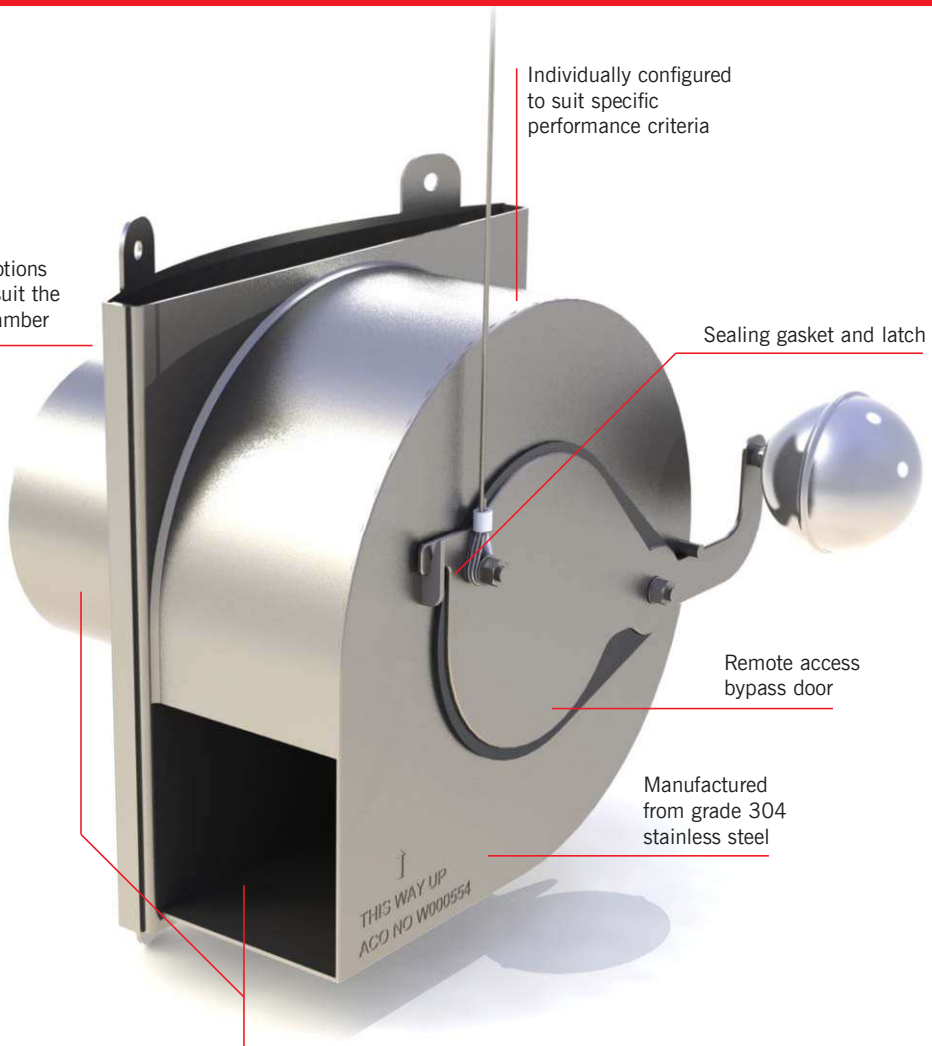
- ACO Q-Brake Vortex required Ø90mm. Upstream attenuation required 402m³.
- Orifice plate size required Ø 51mm. Upstream attenuation required 413m³. ACO Q-Brake Vortex reduces upstream attenuation by 11m³ whilst having an orifice over three times the area of the traditional orifice plate and making ACO Q-Brake Vortex more efficient and far less prone to blockage.

Discharge characteristics



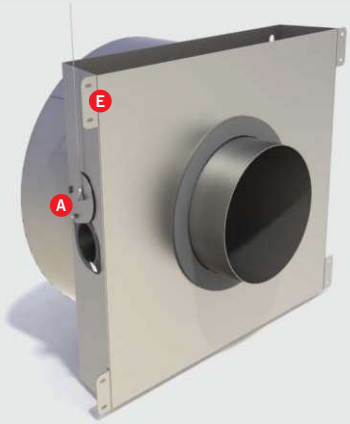


ACO Q-BRAKE FLOW CONTROL FEATURES OVERVIEW



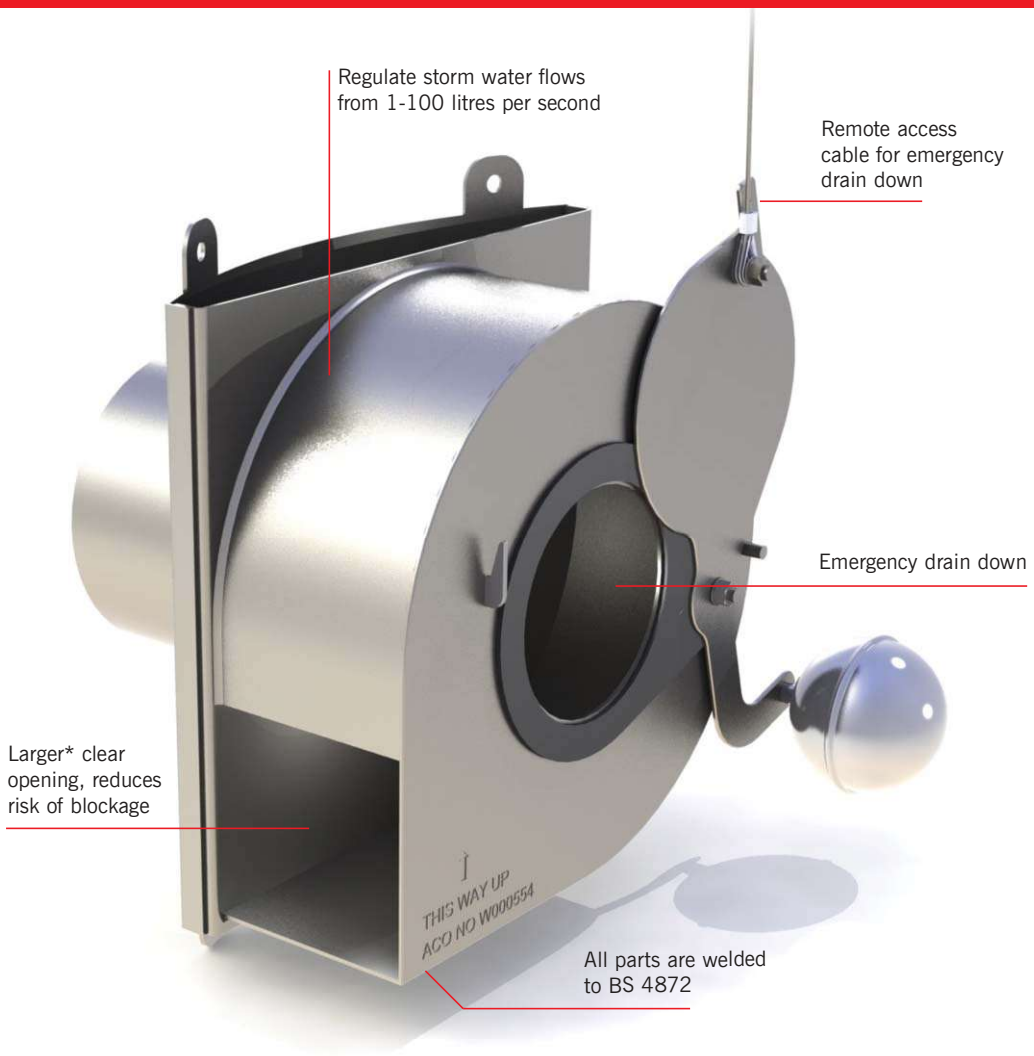
Additional and varying features for ACO Q-Brake Vortex >40l/s

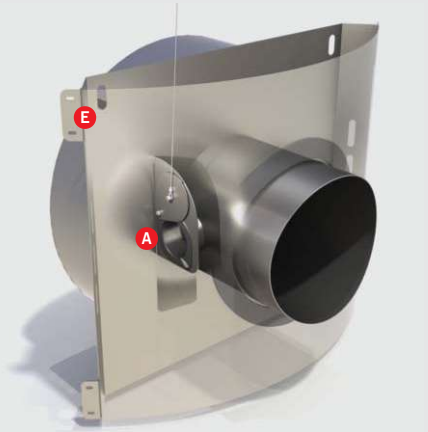
- **A** Remote access bypass door and emergency draindown. Located in a different position to ACO Q-Brake Vortex units <40l/s
- **B** Removable maintenance cover
- **C** Side vents to aid draindown on units with radius fixing
- **D** Lifting eyes
- **E** Fixing locators



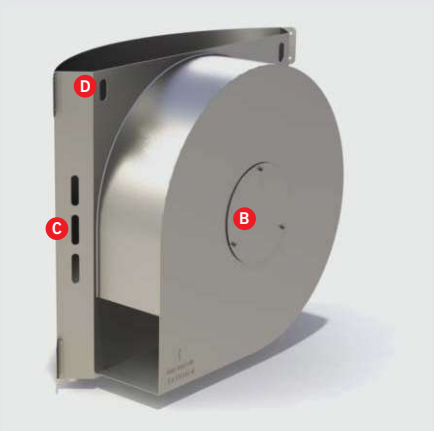
Square manhole fixing (rear)

***Larger than traditional orifice plates**





Radius manhole fixing (rear)



Radius manhole fixing (front)

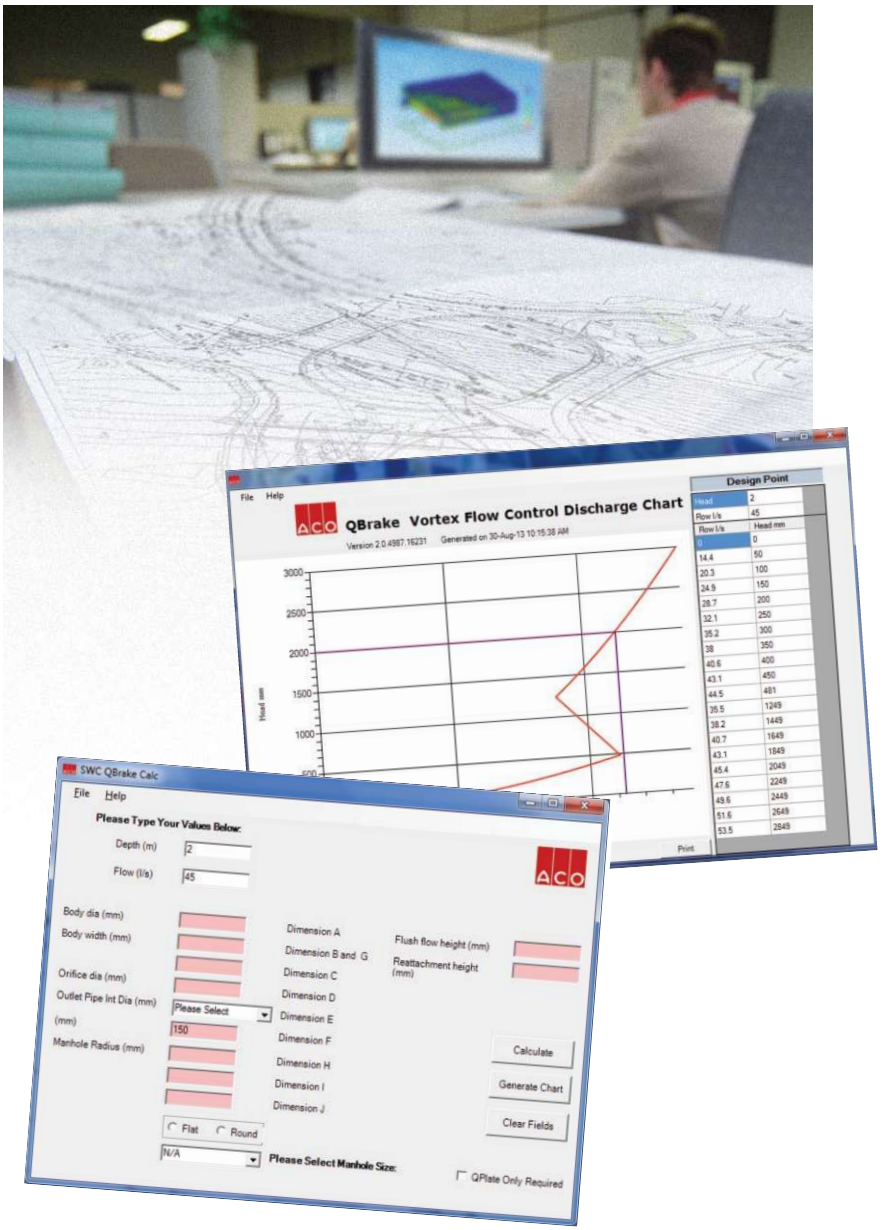
ACO Q-Brake Vortex specification and design process

Manufactured from grade 304 stainless steel, each ACO Q-Brake Vortex is individually configured to suit specific performance criteria. Our engineers will use industry standard drainage software and hydraulic design calculations to ensure the system is correctly sized for any project requirement.

In order to complete this process and deliver the product options available, please provide the ACO engineers with the following information:

- The proposed design flow – maximum allowable discharge
- The proposed design head – invert of outlet pipe to top water level
- The proposed outlet pipe diameter
- The proposed type and size of outlet manhole

Before production can commerce, ALL of the above information must be verified on ACO's Contract Review Document issued at the time of order placement.



Finished product

From this information ACO will size and design the ACO Q-Brake Vortex to meet the design criteria and to suit the proposed surface water application.

ACO will supply:

- Head discharge table & graph
- ACO Q-Brake Vortex installation details
- Information for manhole sizing

ACO Water Management Design Services Team

ACO has embraced the concept of 'value engineering' – a totally new approach to on-site construction that saves both time and money. ACO will review any design to minimise the total scheme and life cost of a proposal.

By utilising ACO's portfolio of products, it is often possible to remove the need for conventional underground drainage.

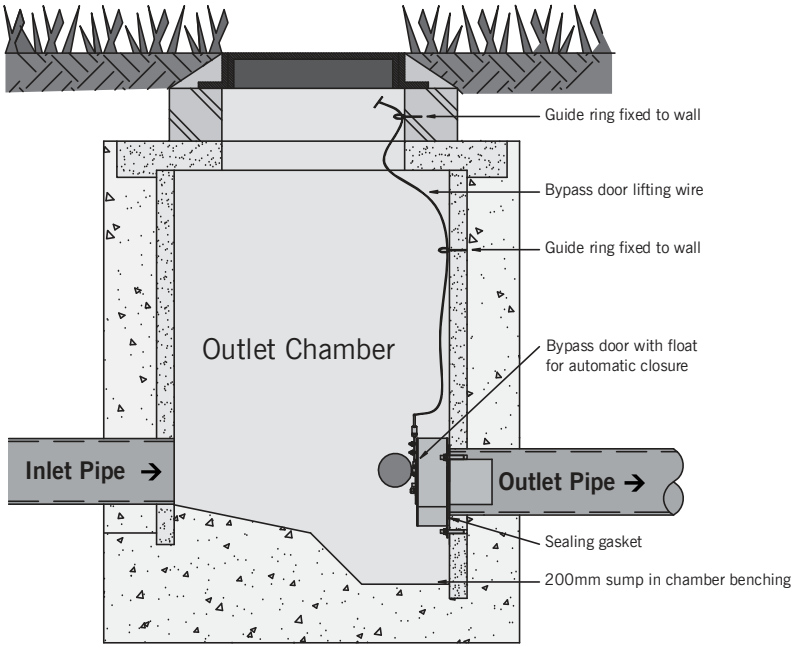
ACO Water Management Design Services Team

Tel: 01462 816666
Email: technical@aco.co.uk

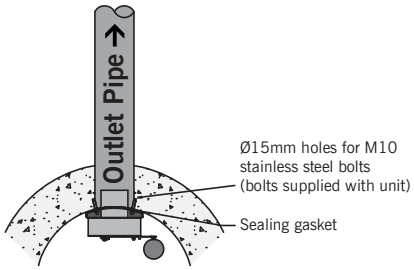
Micro Drainage Modelling
ACO Q-Brake Vortex can be sized and modelled on the latest version of Micro Drainage.

Micro Drainage
an XP Solutions company

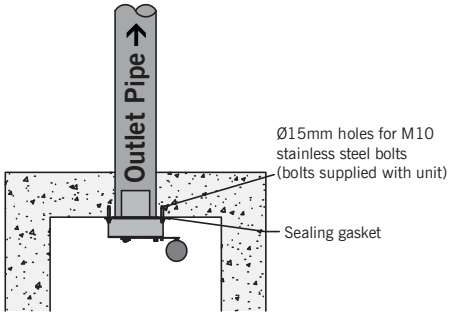
Installation detail



Fixing installation detail for round manhole chambers



Fixing installation detail for flat sided manhole chambers



Guide to installing ACO Q-Brake Vortex flow control regulator

Step 1:

Construct the chamber that is to house the ACO Q-Brake Vortex flow control. Note that if the chamber has a curved wall (e.g. a concrete ring manhole), the diameter of the chamber should be specified on the order and Contract Review Document for the ACO Q-Brake Vortex flow control unit.

Step 2:

The base of the chamber must be at a level 200mm below the bottom of the ACO Q-Brake Vortex flow control. When the chamber base is benched, there must be a 200mm deep sump below the bottom of the unit as shown on the sketch.

Step 3:

Offer the ACO Q-Brake Vortex flow control unit up to the outlet pipe using the lifting eyes where appropriate. Ensure the unit is upright (arrow pointing vertically up). Mark the position of the fixing holes on the chamber wall. Remove the unit and drill fixing holes to suit the M10 bolts supplied with the unit. (Note bolts are Rawlbolt R-XPT-S stainless steel M10 bolts requiring a hole 15mm diameter).

Step 4:

Place bolts into the drilled holes. Locate the ACO Q-Brake Vortex flow control onto the bolts (again check it is upright). Ensure that the gasket is flat against the wall. Fit the nuts and tighten them to pull the unit against the gasket and seal it against the wall.

Step 5:

Fix the two wire guide rings (supplied) to the chamber wall, one approx mid height and one just under the access cover. Thread the bypass door lifting wire through the rings. Adjust the length of the wire by fixing the handle in the correct position and cut to length if necessary.

An electronic version of the ACO Q-Brake Vortex installation detail is available to download from the ACO website.
Visit www.aco.co.uk.

Operation and maintenance recommendations

Commissioning the product

Before the product is commissioned, the chamber containing the ACO Q-Brake Vortex should be inspected in line with normal practice. Any debris or silt should be removed. Any visible fixing bolts should be checked.

If an internal blockage is suspected, the control can be inspected internally and cleaned out by opening the inspection bypass door on the upstream end. The bypass door must be returned to the closed position before the control becomes operational or bolted shut.

Frequency of inspection / maintenance

Inspections should be carried out at frequent and regular intervals (approximately every 3-6 months). The frequency will depend upon the location and the environment, and should be based on local knowledge. Action is only required in the event of a blockage or suspected blockage.

Maintenance plan

ACO Q-Brake Vortex flow controls require no routine maintenance although inspections should be carried out at regular intervals (See frequency of inspection / maintenance section).

Manual handling

ACO Q-Brake Vortex flow controls should be handled in accordance with current legislation and regulations:

- The Health and Safety at Work Act 1974
- The Management of Health and Safety at Work Regulations 1999
- The Manual Handling Operations Regulations 1992

Service life

ACO Q-Brake Vortex flow controls have no moving parts to wear or fail. Manufactured from grade 304 stainless steel plate they will resist scour, degradation and chemical attack. The unit is designed to easily outlast the drainage system in which it is installed.

COSHH

ACO Q-Brake Vortex flow controls are manufactured from grade 304 stainless steel. This material is not regarded as hazardous to health and demonstrates no chemical hazard when used for the stated applications.

MODEL SPECIFICATION CLAUSE

The vortex flow control device shall be supplied by ACO Technologies plc; all materials and components within the scope of this system shall be obtained from this manufacturer.

All units shall be manufactured from grade 304 stainless steel incorporating rear mounted remote access bypass and emergency drain down door complete with stainless steel cable and fixings.

ACO Q-Brake Vortex is a vortex flow control device designed to suit a design head of #mm and design flow of # litres per second.

Insert information as appropriate

NBS Specification

ACO Q-Brake Vortex should be specified in section R12. Assistance in completing this clause can be found in the ACO Water Management entry in NBS Plus, or please contact the ACO Water Management Design Services Team.

Note: A specification in NBS format is available to download from www.thenbs.com or www.aco.co.uk

RECYCLED CONTENT

ACO Technologies aims to incorporate as much recycled material or waste material as is practicable in its manufactured products.

Typically steel products contain between 25% and 33% recycled content by weight. Therefore the total recycled content of the ACO Brake Vortex will contain be at minimum approximately 25% by weight recycled material.

ACO Q-Brake Vortex is intended for a long life with low maintenance, to reduce the need to recycle, but when eventually the product is no longer needed, much of its content can be readily recycled with a very low risk of pollution to the environment.



Product Testing

Through ACO's continual product development and refinement programme has led to an enhanced range of ACO Q-Brake Vortex flow controls. The range has been independently tested and complex software written to ensure that the best possible characteristics and curves are achieved to help reduce upstream storage requirements and installation costs.

What is ACO Q-Plate?

ACO Q-Plate orifice plates are designed for use where an ACO Q-Brake vortex is not the most effective solution. To suit application requirements, the range is available with or without remote bypass and drain down and is designed to match a variety of manhole configurations. A neoprene sealing gasket and fixing holes are featured on each unit.



ACO Q-Plate with remote draindown and bypass recommended for all orifice apertures less than 100mm



ACO Q-Plate

ACO Q-Plate Bypass features

- Manufactured from 304 stainless steel
- Orifice aperture up to 150mm
- Sealing pipe gasket
- Emergency drain-down and access cable
- Bypass door (with improved seal) and latch
- Flat or curved radius to suit manhole diameter
- Manhole fixings

ACO Q-Plate features

- Manufactured from 304 stainless steel
- Four fixing positions
- Pipe sealing gasket
- Manhole fixings
- Flat or curved radius to suit manhole diameter

ACO Q-Plate Specification and design process

To suit project requirements, two options of ACO Q-plate are available:

ACO Q-Plate Bypass
< 100mm orifice with remote drain-down and bypass (also available up to 150mm)

ACO Q-Plate
>100mm orifice without remote drain-down and bypass

In order to complete this process and deliver the product options available, please provide the ACO engineers with the following information:

- The proposed design flow – maximum allowable discharge
- The proposed design head – invert of outlet pipe to top water level
- The proposed outlet pipe diameter
- The proposed type and size of outlet manhole

Before production can commerce, ALL of the above information must be verified on ACO's Contract Review Document issued at the time of order placement.

Finished product

From this information ACO will size and design the ACO Q-Plate to meet the design criteria and to suit the prosed surface water application.

ACO will supply:

- Head discharge table & graph
- ACO Q-Plate installation details
- Information for manhole sizing

Guide to installing an ACO Q-Plate

Step 1:

Construct the chamber that is to house the ACO Q-Plate orifice control. Note that if the chamber has a curved wall (e.g. a concrete ring manhole), the diameter of the chamber should be specified on the order and Contract Review Document for the ACO Q-Plate Orifice control unit.

Step 2:

There should be a small sump under the outlet to ensure the orifice control does not easily block, ideally there should be upstream sediment and debris traps. When the chamber base is benched, there should be a minimum 200mm deep sump below the bottom of the unit as shown on the sketch.

Step 3:

Offer the ACO Q-Plate orifice control unit up to the outlet pipe. Ensure the unit is upright (arrow pointing vertically up) and that the orifice is correctly positioned at the invert of the outlet pipe.

Check there is a good seal between the orifice plate and the outlet pipe. Mark the position of the fixing holes on the chamber wall. Remove the unit and drill fixing holes to suit the bolts supplied with the unit.

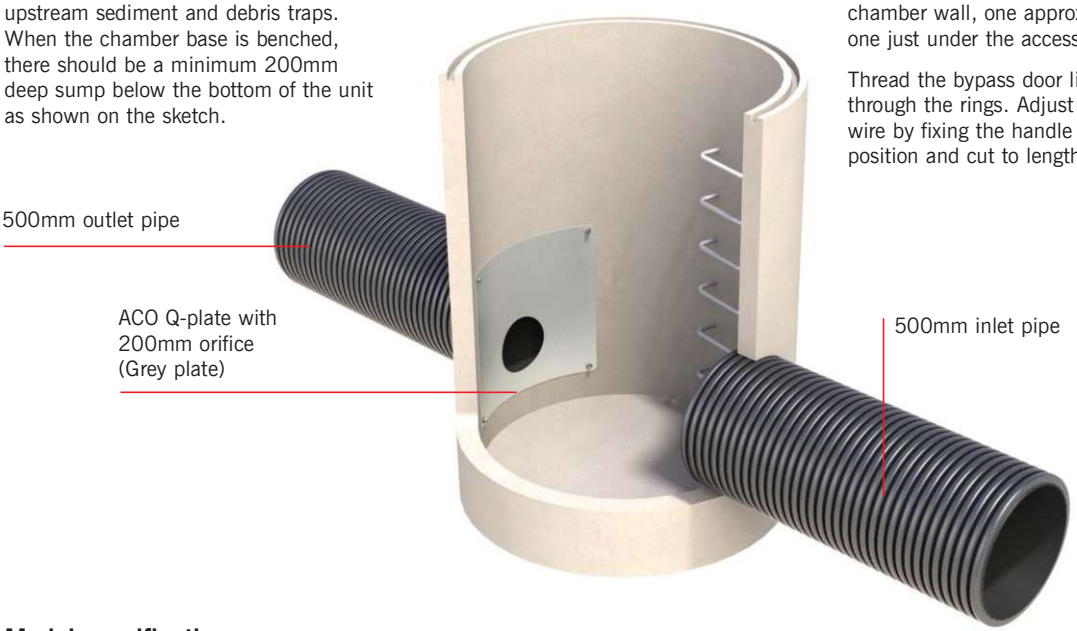
Step 4:

Place bolts into the drilled holes. Locate the ACO Q-Plate orifice control onto the bolts (again check it is correctly aligned). Ensure that the gasket is flat against the wall. Fit the nuts and tighten them to pull the unit against the gasket and seal it against the wall.

Step 5:

If you have been supplied the Q-Plate with the drain down and bypass door fix the two wire guide rings (supplied) to the chamber wall, one approx mid height and one just under the access cover.

Thread the bypass door lifting wire through the rings. Adjust the length of the wire by fixing the handle in the correct position and cut to length if necessary.



Model specification

ACO Q-Plate orifice control *with remote drain down and bypass (delete as appropriate), ##mm orifice designed to suit a pipe outlet size of ###mm, a design head of ## mm and design flow of # litres per second.

ACO Technologies plc

- ACO Water Management
  Civils + Infrastructure
  Urban + Landscape
- ACO Building Drainage
- ACO Sport
- ACO Wildlife

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The ACO Group: A strong family you can depend on.

ISO 9001
FM 13502

ISO 14001
EMS 538781

OHSAS 18001
OHS 524145

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Printed on material approved by the Forest Stewardship Council (FSC) who provide a means of assuring that products come from responsibly managed forest.

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BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
03/4018
Product Sheet 3

INTESIO ATTENUATION AND INFILTRATION SYSTEMS

AQUACELL PLUS ATTENUATION AND INFILTRATION SYSTEM

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to the AquaCell Plus Attenuation and Infiltration System, which can be used either for sub-surface water storage or as a soakaway to manage run-off from impermeable surfaces.



AGRÉMENT CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.

KEY FACTORS ASSESSED

System design — data is provided in the Certificate to assist in the design of a stormwater management system (see section 5).

Structural performance — the system has adequate strength and stiffness to resist long- and short-term loads when used in accordance with this Certificate (see section 6).

Durability — the system will have a service life in excess of 50 years when installed in accordance with this Certificate (see section 11).

The BBA has awarded this Agrément Certificate to the company named above for the system described herein. The system has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 9 June 2010

Brian Chamberlain
Head of Approvals — Engineering

Greg Cooper
Chief Executive

Certificate amended on 22 July 2010 to clarify annotation in Figure 5.

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

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Regulations

In the opinion of the BBA, the Aquacell Plus Attenuation and Infiltration System, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:



The Building Regulations 2000 (as amended) (England and Wales)

Requirement:	H3(3)	Rainwater drainage
Comment:		The units can be used in a construction to meet this Requirement. See sections 5.1 to 5.10 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The system is acceptable. See section 11 and the *Installation* part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The use of the system satisfies the requirements of this Regulation. See sections 10.1 to 10.6, 11 and the *Installation* part of this Certificate.
Regulation:	9	Building standards – construction
Standard:	3.6(a)	Surface water drainage
Comment:		The units can be used in a construction to satisfy this Standard, with reference to clauses 3.6.1[(1)(2)] to 3.6.5[(1)(2)]. See sections 5.1 to 5.10 of this Certificate.

(1) Technical Handbook (Domestic).
(2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2000 (as amended)

Regulation:	B2	Fitness of materials and workmanship
Comment:		The system is acceptable. See section 11 and the *Installation* part of this Certificate.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The system is acceptable. See sections 10.1 to 10.6 of this Certificate.
Regulation:	N5	Rain-water drainage
Comment:		The system can be used in a construction to satisfy this Regulation. See sections 5.1 to 5.10 of this Certificate.

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See sections: 2 *Delivery and site handling* (2.3) and 13 *Installation — Procedure* of this Certificate.

Non-regulatory Information

NHBC Standards 2008

In the opinion of the BBA, the use of the AquaCell Plus Attenuation and Infiltration System, in relation to this Certificate, is not subject to the requirements of these standards.

General

This Certificate relates to the AquaCell Plus Attenuation and Infiltration System, consisting of polypropylene units, shear connectors and clips.

The system assembles to form an underground structure which can be used either for sub-surface water storage or as a soakaway to manage run-off from impermeable surfaces.

This Certificate does not cover the collection or disposal of the surface water. Information relating to this can be obtained from the Certificate holder.

1 Description

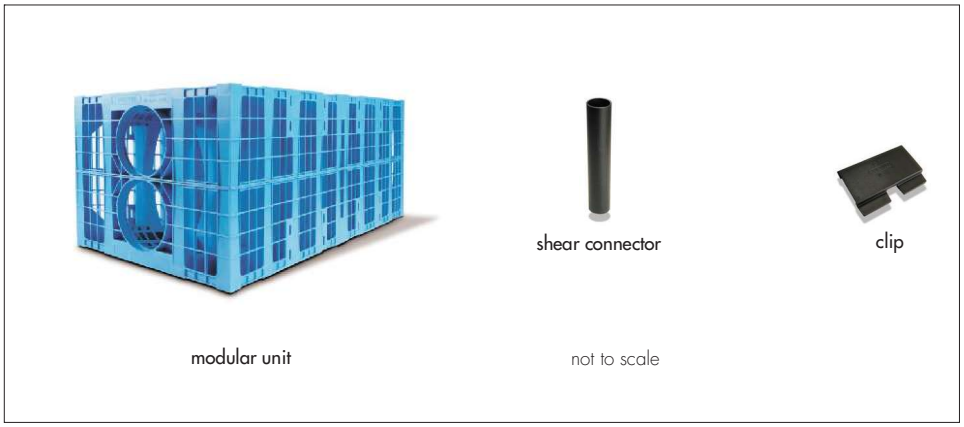
1.1 The AquaCell Plus Attenuation and Infiltration System consists of individual, light blue polypropylene modular units (see Table 1), light blue polypropylene end caps, black polypropylene shear connectors and black polypropylene clips (see Figure 1).

Table 1 Characteristics of modular unit

Element (Unit)	Value
Dimensions (nominal) (l x w x h) (mm)	1000 x 500 x 400
Volume (nominal) (m^3)	0.20
Storage volume (nominal) (m^3)	0.19
Porosity (void ratio) (%)	95
Ultimate compressive strength at yield ($kN \cdot m^{-2}$) – vertical loading on top face – lateral loading on side face	 650 85
Short-term deflection (mm per $kN \cdot m^{-2}$)(1) – vertical loading on side face – lateral loading on side face	 1 per 74 1 per 9
Estimated long-term deflection(2) (Ln)(3) (mm)	0.4755

(1) Applied load.
(2) At up to 20 years at 20°C at 232 $kN \cdot m^{-2}$ load.
(3) Time in hours.

Figure 1 Components



1.2 The system manages stormwater run-off from impermeable surfaces by:

- infiltration, ie as a soakaway to infiltrate water back into the ground
- attenuation, ie as temporary storage for excess flows and to control outflow to streams and rivers
- a combination of the above methods.

1.3 The polypropylene modular units incorporate a central, open channel which facilitates inspection of the structure by camera, provided a suitable inspection chamber is installed at the end of the channel . They also have pre-formed sockets which enable direct coupling with 160 mm diameter pipework or 150 mm pipework via an adaptor. Connection can also be made at points other than to the pre-formed socket to suitable 150 mm pipework using a flange adaptor. Adaptors and connecting pipework for use with this system are outside the scope of this Certificate.

1.4 Each assembly is wrapped in either a permeable geotextile when used for infiltration or an impermeable geomembrane when used for attenuation. Geotextiles and geomembranes for use with the system are outside the scope of this Certificate. Information on their required specification may be obtained from the Certificate holder.

1.5 Adequate venting must be provided to the structure using an air vent. One 110 mm diameter air vent is required per 7500 m^2 of impermeable catchment area to be drained. Air vent connections and pipework for use with this system are outside the scope of this Certificate.

2 Delivery and site handling

2.1 The system is supplied to site in packs of 15 units, secured with straps with plastic feet attached to the underside to enable placing and movement by a fork-lift. Each pack of units carries a label bearing the Aquacell type, part number, operator's initials, individual pallet sequential number and date of manufacture.

2.2 Each unit is supplied with two shear connectors and three clips.

2.3 The packs of the units should be carefully placed on level ground and should not be stacked on site. Loose individual modules should not be stored more than two units high.

2.4 The units contain an inhibitor to resist the effects of ultraviolet light for up to six months. However, prolonged exposure to direct sunlight should be avoided.

2.5 Units should not be stored near fuel bowsers, fuel tanks or areas where solvents may be kept.

2.6 The units are resistant to damage that could occur with normal handling. They should be stored away from the possibility of impacts by vehicles and other construction plant.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Aquacell Plus Attenuation and Infiltration System.

Design Considerations

3 General

3.1 The AquaCell Plus Attenuation and Infiltration System design must be in accordance with the Certificate holder's *Stormwater Solutions — Design Manual*. Guidance on the application of sustainable drainage systems (SUDS) for new developments, such as the AquaCell Plus Attenuation and Infiltration System, can also be found in the Communities and Local Government Planning Policy Statement PPS25 *Development and Flood Risk* and *The SUDS Manual C697* published by the Construction Industry Research and Information Association (CIRIA).

3.2 The system can be used for the control of stormwater run-off from impermeable surfaces in three main ways:

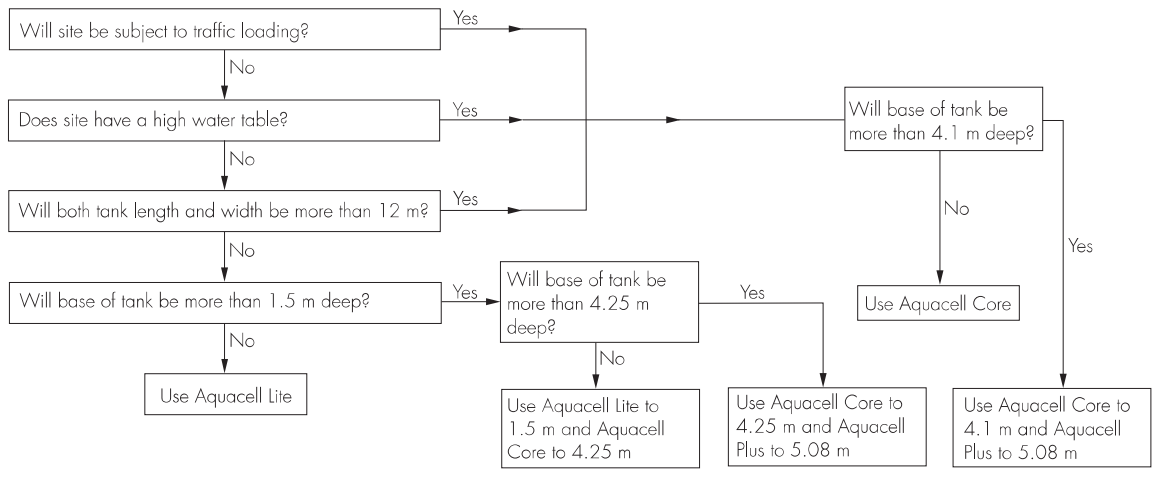
- Infiltration — water is collected in the units during rainfall and allowed to drain away by soaking into the surrounding ground over a period of time
- Attenuation — water is collected in the units during rainfall and released at a reduced flow rate through a flow control device into an appropriate outfall. This reduces peak flows in the watercourse, thereby minimising the risk of flooding
- Combined — a combination of the above two systems.

3.3 Design of the appropriate system (see Figure 2 and Table 2) for a specific project must always be preceded by a detailed audit of the proposed site to establish:

- existing factors and considerations applicable to the site
- predicted factors relating to the site's use following the planned development, and the parameters within which the installation is required to function
- the type of function of application suggested by this audit.

3.4 Once the project criteria have been established from the site audit, there are two main parts to the design procedure: hydraulic design and structural design.

Figure 2 Aquacell unit selection flowchart[1][2]



(1) This Certificate covers Aquacell Core units only — the validity of Certificates covering other Aquacell units can be checked on the BBA website: www.bbacerts.co.uk.

(2) Maximum burial depths assume ideal soil conditions and should be verified by site investigations (see section 6 of this Certificate for information relating to structural design). Maximum burial depths for a variety of soil types are given in Table 9.

Table 2 Design information checklist

Description	Information source
A Existing factors	
Topography	Site survey or inspection
Area of catchment[1]	Site survey
Hydrology of catchment	Site inspection and observations
Soil type[1]	Site investigation
Structural properties of soil – CBR, stiffness	Site investigation and laboratory testing
Infiltration potential of soil	Site investigation
Contamination[1]	Site investigation and desk research
Details of receiving water, watercourse/ aquifer	Environment Agency, Scottish Environment Protection Agency or water and sewerage company
Environmental sensitivity of site	Environment Agency, Scottish Environment Protection Agency or water and sewerage company
Groundwater vulnerability and source protection status	Environment Agency, Scottish Environment Protection Agency or water and sewerage company
B Predicted factors	
Development type and land use	Proposed development plans
Traffic loads	Proposed development plans
Rainfall data[1]	Meteorological Office or Wallingford procedure
Discharge design criteria	
– quantity	Environment Agency, Scottish Environment Protection Agency or water and sewerage company
– quality	Environment Agency, Scottish Environment
Health and safety	Protection Agency or water and sewerage company All affected parties.
C Planned function	
Infiltration	Conclusions from **A** and **B** audit/review
Attenuation	Conclusions from **A** and **B** audit/review.

(1) For individual house soakaways, only the items referenced for this footnote are required.

4 Practicability of installation

The system is designed to be installed by a competent general builder or contractor with experience of this type of system.

5 System design

Infiltration

Calculation principles



5.1 There are two approaches, either of which may be adopted, ie the Construction Industry Research and Information Association (CIRIA) Report 156 *Infiltration Drainage — Manual of Good Practice* or BRE Digest 365 *Soakaway Design*.

5.2 A simplified approximate approach can be used on a very small site (ie a single-house development) where detailed site infiltration rate information may not be required nor available (see Table 3). From Approved Document H of the England and Wales Building Regulations, for areas up to 25 m^2, a storage volume equal to the area to be drained multiplied by 10 mm may be used. Beyond this size, design should be carried out in accordance with BS EN 752 : 2008 or BRE Digest 365. It is suggested in BS EN 752 : 2008 that a storage volume equal to 20 mm multiplied by the area to be drained may be used. In Scotland, guidance for the design of single-house soakaways is given in Mandatory Standard 3.6, clause 3.6.5[1].

(1) Technical Handbook (Domestic).

Table 3 Design parameters for single-house roof soakaway

Number of units	Storage volume (m^3)	Maximum area to be drained (m^2)
1	0.19	19[1]
2	0.38	25[1]
3	0.57	28.5[2]
4	0.76	38[2]
5	0.95	47.5[2]
10	1.90	95[2]

(1) In accordance with Approved Document H.
(2) In accordance with BS EN 752 : 2008, clause NA 4.4.8.

5.3 When the BRE or CIRIA approach is used, the design volumes and areas for trench or cuboid type installations can be found in Tables 4 and 5.

Table 4 Volumetric data per linear metre for a one-unit (0.5 mm) wide trench configuration

Number of units high	Volume (m^3)	Side area (m^2)	Base area (m^2)
1	0.19	0.8	0.5
2	0.38	1.6	0.5
3	0.57	2.4	0.5

Table 5 Volumetric data for 3D usage two units high

No of units long (1 m side)	2 wide (0.5 m side)			4 wide (0.5 m side)			8 wide (0.5 m side)		
	Vol (m^3)	Side (m^2)	Base (m^2)	Vol (m^3)	Side (m^2)	Base (m^2)	Vol (m^3)	Side (m^2)	Base (m^2)
1	0.76	3.20	1.00	1.52	4.80	2.00	3.04	8.00	4.00
2	1.52	4.80	2.00	3.04	6.40	4.00	6.08	9.60	8.00
4	3.04	8.00	4.00	6.08	9.60	8.00	12.16	12.80	16.00
8	6.08	14.40	8.00	12.16	16.00	16.00	24.32	19.20	32.00
10	7.60	17.60	10.00	15.20	19.20	20.00	30.40	22.40	40.00
100	76.00	161.60	100.00	152.00	163.20	200.00	304.00	166.40	400.00

5.4 For calculations, the size and volume of the units are given in Table 1. The total areas of the base and sides are required as water is absorbed through the geotextile soil interface. Storage volume is 95% of the total volume. As an example, using Table 4, for a typical linear trench 40 m long and two units deep, the volume is 0.38 by 40 = 15.2 m^3 and the side area 1.6 by 40 = 64 m^2.

Attenuation

Calculation principles

5.5 The anticipated run-off volume (A) from the site must be estimated. The most commonly used method for evaluating storm rainfall events in the UK is the Wallingford Procedure by which the total rainfall level of storms over defined time periods ranging from five minutes up to 48 hours are assessed. The depth of water (mm) found can be multiplied by the catchment area to assess the size of attenuation systems and is normally based upon a two-hour storm of a return period appropriate for the catchment. The allowable discharge rate from the site to an appropriate outfall is established but will normally be set by the Environment Agency or Planning Authorities. The outflow volume (B) to be discharged at this rate over the two-hour period is calculated and subtracted from the run-off volume (A – B). This defines the excess volume (C) to be stored in AquaCell Plus units constructed as an underground tank. The number of AquaCell Plus units needed to contain this excess is calculated on the basis that the storage volume is equal to 95% of the total volume of the tank.

Connection

5.6 Connection is made to AquaCell Plus units using a pre-formed socket and adaptor or a flange adaptor. These items are outside the scope of this Certificate. Information can be found in the Certificate holder's *Stormwater Solutions — Design Manual*.

5.7 It is recommended that all connections into storage applications (using a geomembrane) are made using a flange adaptor. Adhesive or double-sided tape should be used between the geomembrane and flange adaptor to ensure a watertight seal.

Manifold design

5.8 The capacity of this input pipe is limited and may be insufficient for the anticipated flow load. Therefore, the flow load may be split between a number of 150 mm diameter flow pipes or other connection arrangements used (see Figure 3). The maximum areas that can be drained according to the number of input pipes provided is given in Table 6. The calculations are based on:

- paved surfaces — two-year, three- to five-minute event
- eaves drained roofs — one-year, two-minute event
- internal gutters — 500-year, two-minute event.

Figure 3 Typical inlet connection designs

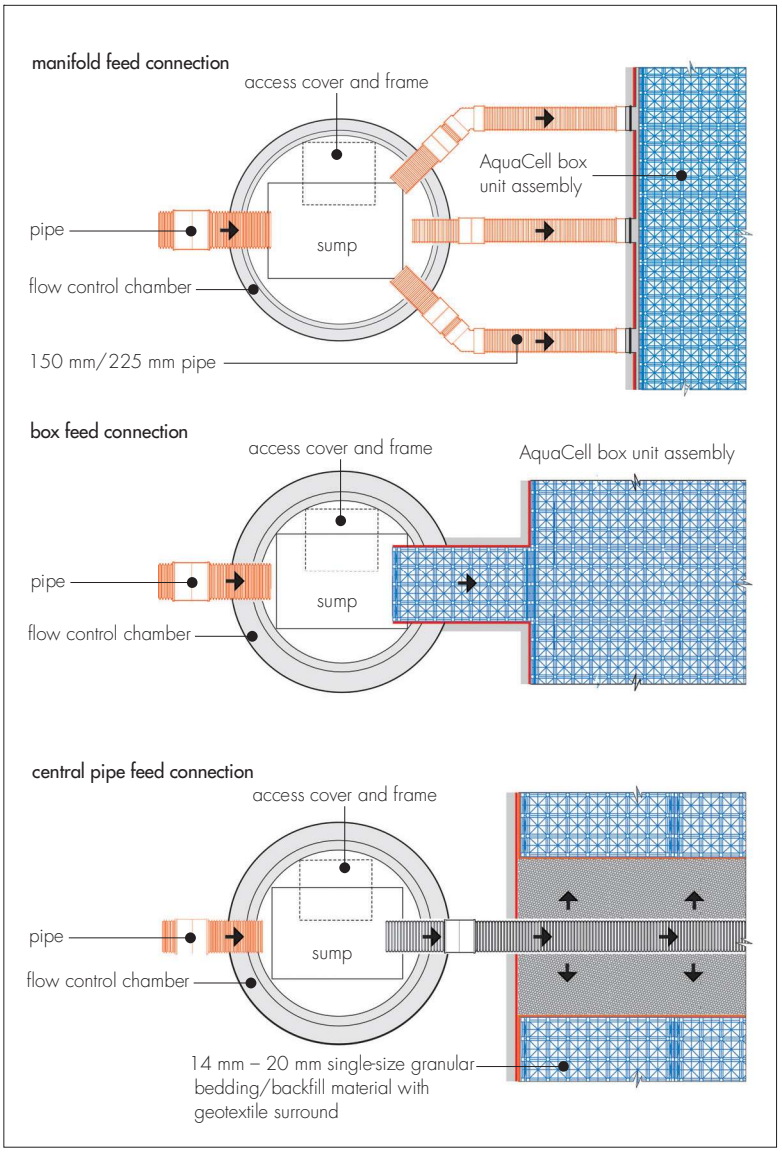


Table 6 Multiple manifolds

Surface type	Drainage area (m^2)					
	Number of inlet pipes					
	1	2	3	4	5	6
Paved area	1110	2220	3330	4440	5550	6660
Roof area(1)	841	1682	2523	3364	4205	5046
Roof area(2)	210	420	630	840	1050	1260

(1) Roofs drained by eaves gutters, close to the attenuation site (within 25 m).

(2) Roofs drained by internal gutters, close to the attenuation site (within 25 m) (especially siphonic roof drainage).

Flow control

5.9 The outflow from the tank must be controlled to comply with the discharge rate consent of the site. There are four main methods to achieve outflow control, ie orifice plate, Garastor, vortex control or small pipe. Comparative features and benefits of these various flow control devices should be considered prior to selection. These devices are outside the scope of this Certificate.

Outflow positioning and head calculations

5.10 The invert level of the outflow pipe should be flush with, or lower than, the bottom of the lowest unit to allow the tank to drain. As the tank fills, a depth of water develops on the upstream side of the outflow control. For a tank with two layers of AquaCell Plus units, this depth is 0.8 m when the units are full, creating a driving head to push the flow through the control device. For design purposes, the head used in calculations is taken as that at the centre line of the outflow device.

6 Structural performance

6.1 AquaCell Plus units can be placed under a wide variety of landscaped or lightly-trafficked areas. Design procedures for heavily-trafficked applications are outside the scope of this Certificate. If the proposed application is in areas subject to high-intensity traffic, commercial vehicles or other heavy loads, the advice of the Certificate holder should be sought.

6.2 The short-term ultimate compressive strength at yield for the AquaCell Plus units, as derived from independent test data, is 650 $kN \cdot m^{-2}$ for vertical loading on the top face and 85 $kN \cdot m^{-2}$ for lateral loading on the side face. A partial safety factor for materials (f_m) of 2.75 for ultimate limit state and 1.5 for serviceability limit state should be applied to these values for a design life of 20 years. The short- and long-term deflections are given in Table 1.

6.3 Creep tests indicate that the long-term deflection may be estimated from the following expression. This is valid for loads up to 232 $kN \cdot m^{-2}$ for durations of up to 20 years at 20°C. In locations where settlement is not a concern, designs of up to 50 years can be considered:

deflection (mm) = 0.4755Ln (time in hours) + 2.0477

6.4 For a small-scale application such as soakaways for individual house roof drainage, the AquaCell Plus system is typically located below a garden a minimum of 5 m from the building (see Table 7). In this case there are no traffic loads.

Table 7 Design criteria for use of AquaCell Plus system as soakaway for individual house

Criterion	Value
Maximum depth to base of units(1) (m)	3.55
Minimum depth of cover required over units to prevent accidental damage (m)	0.50

(1) Assumes a minimum value for the angle of shearing resistance of the surrounding soil of 29°. This should be confirmed from the results of the site investigation. Groundwater must be at least one metre below base of units.

6.5 AquaCell Plus units used for large-scale storage or infiltration must be designed to carry all loads that will be applied, including dead and imposed loads. Design parameters and estimated loads should be used to determine the maximum depth of installation and the maximum and minimum cover depths.

6.6 The criteria provided in Tables 8 and 9 can be used to design the AquaCell Plus units for installation below lightly- and non-trafficked areas. These design tables are only applicable in temperate climate conditions such as those in the UK. The partial safety factors for loads that have been applied are given in Table 10. Partial safety factors for materials (f_m) of 2.75 for ultimate limit state and 1.5 for serviceability limit state have been applied. The AquaCell Plus system can be used for areas where greater loads are anticipated but these applications are outside the scope of this Certificate and specific advice should be sought from the Certificate holder.

Table 8 Maximum installation depths (to base of units)

ϕ(1)(2)	Maximum depth of installation (to base of unit) (m)		
	Non-trafficked area	Trafficked area	
		Cars(3)	HGV
24	2.96	2.65	2.35
26	3.18	2.88	2.57
28	3.42	3.12	2.82
30	3.69	3.39	3.08
32	3.98	3.68	3.38
34	4.31	4.01	3.71
36	4.68	4.38	4.07
38	5.08	4.78	4.48

(1) Loosening of dense sand or softening of clay by water can occur during installation. The designer should allow for any such likely effects when choosing an appropriate value of ϕ.

(2) The design is very sensitive to small changes in the assumed value of ϕ, therefore, it should be confirmed by a chartered geotechnical engineer. In clay soils, it may be possible to utilise cohesion in some cases.

(3) Applicable for car parks or similar areas trafficked only be slow moving vehicles. Assumptions made are:
- ground surface is horizontal
- shear planes or other weaknesses are not present within the structure of the soil.

Table 9 Minimum cover depths over top of AquaCell Plus units(1)

Design load case	Minimum cover depth(1) (m)
DIN 3/3 loading (cars up to 3000 kg GVW)	0.50
DIN 9/9 loading (vehicles up to 9000 kg GVW)	0.75
DIN 60/30 loading (vehicles up to 60000 kg GVW)	1.10(2)

(1) The minimum cover depths have been assessed using the characteristic parameters for the AquaCell Plus and the guidance in CIRIA Report C680.

(2) This is less than the limiting value in CIRIA C680, but is acceptable based on the calculations.

Table 10 Partial safety factors for loads used for design

Description	Symbol	Ultimate limit state	Serviceability limit state
Vertical dead load	f_{dl}	1.40	1.00
Earth pressure (horizontal) dead load	f_{ep}	1.40	1.00
Imposed live load	f_{ll}	1.60	1.00

6.7 For lightly-loaded applications, the bearing capacity of the underlying soils, typically, should not be exceeded by the AquaCell Plus System. Therefore, settlement of the underlying soils should be negligible. On weak or compressible soils, the bearing capacity and settlement characteristics should be confirmed by a geotechnical engineer.

6.8 Care should be taken when the AquaCell Plus system is used for infiltration below trafficked areas and close to structures. It is important to ensure that the infiltrating water will not soften the soils or cause loss of fines and settlement.

6.9 When the units are wrapped in an impermeable geomembrane and placed below the groundwater table, flotation may occur. To prevent this, the weight of the soil over the top of the units must be greater than the uplift force caused by the unit's buoyancy in the water. This can be achieved with most types of fill if the depth of cover fill is equal to, or greater than, the depth of penetration of the units below groundwater level.

7 Geotextiles and geomembranes

7.1 In infiltration applications, the geotextile wrapped around the AquaCell Plus system prevents soil entering the units and stops the soil which surrounds the unit becoming clogged with silt present in run-off. In attenuation/storage applications, the geotextile serves to protect the geomembrane.

7.2 The selection of an appropriate geotextile for a specific AquaCell Plus infiltration installation should be considered carefully, with particular reference to the surrounding soil properties and required performance. Points to consider are:

- the pore size should be designed and specified to assist infiltration and prevent migration of fine soil particles
- the permeability and breakthrough head should not limit the flow of water in the system, and should be similar to or greater than the surrounding materials
- the material must be able to resist the punching stresses caused by loading on sharp points of contact
- its strength should be sufficient to resist the imposed forces (eg from traffic).

7.3 The geotextile should be selected according to specific site conditions. However, typically, a 300 g non-woven material will be suitable for most situations. Specialist advice should be sought if surrounding soil characteristics exhibit a high degree of fines/low infiltration capacity and/or there is risk of damage from ground contaminants.

7.4 In attenuation/storage applications where infiltration is not possible or permitted, an impermeable geomembrane is wrapped around the AquaCell Plus system to prevent release of attenuated/stored water into surrounding ground and to prevent inflow of pollutants from contaminated subsoil into the storage reservoir.

7.5 The specification and selection of the impermeable geomembrane must be correct for the installation envisaged, to ensure it performs to the level required. It is essential that the specified material:

- withstands the rigours of installation
- resists puncture
- resists multi-axial elongation stress and strains associated with settlement
- resists environmental stress cracking
- resists damage from ground contaminants
- remains intact for the full design life.

7.6 Geomembranes less than 1 mm thick are unlikely to meet these criteria[1], and are not recommended for use with the AquaCell Plus system[2]. A specification for a typical polypropylene geomembrane is shown in Table 11.

(1) Except in shallow, domestic installations.

(2) Further details can be obtained from the Certificate holder.

Table 11 Typical specification for a polypropylene geomembrane

Property	Value	Test method
Thickness ± 10% (mm)	1.0	ASTM D 751
Density (minimum) ($g \cdot cm^{-3}$)	0.9	ASTM D 792
Tensile stress at break (min) ($N \cdot mm^{-2}$)	18	ASTM D 638
Elongation at break (%)	>700	ASTM D 638
Puncture resistance (min) (N)	150	FTMS 101C, Method 2065
Tear resistance (min) (N)	60	ASTM D 1004
Dimensional stability (max) (% change)	±2.0	ASTM D 1204, 1 h at 100°C
Stress crack resistance (%)	100	ASTM D 5397
Volatile loss, 5% loss (max)	0.2	ASTM D 1203
Ozone resistance	No cracks	ASTM D 1149
Carbon black content (%)	2 to 3	ASTM D 1603
Moisture vapour ($g \cdot m^{-2} \cdot day^{-1}$)	<0.1	ASTM E 96
Friction angle (non-woven geotextile)	21°	Shear box
Methane permeability ($g \cdot m^{-2} \cdot day^{-1} \cdot atm^{-1}$)	0.11	European Standard
Methane transmission rate ($m^3 \cdot m^{-2} \cdot s^{-1}$ atm^{-1})	0.8×10^{-9}	BRE
Permeability coefficient	1.8×10^{-12}	
Application temperature (°C)	>4	

7.7 To ensure total impermeability, joints between adjacent sheets of impermeable geomembranes should be sealed correctly using proprietary welding techniques. The integrity of joints should be demonstrated by non-destructive testing[1].

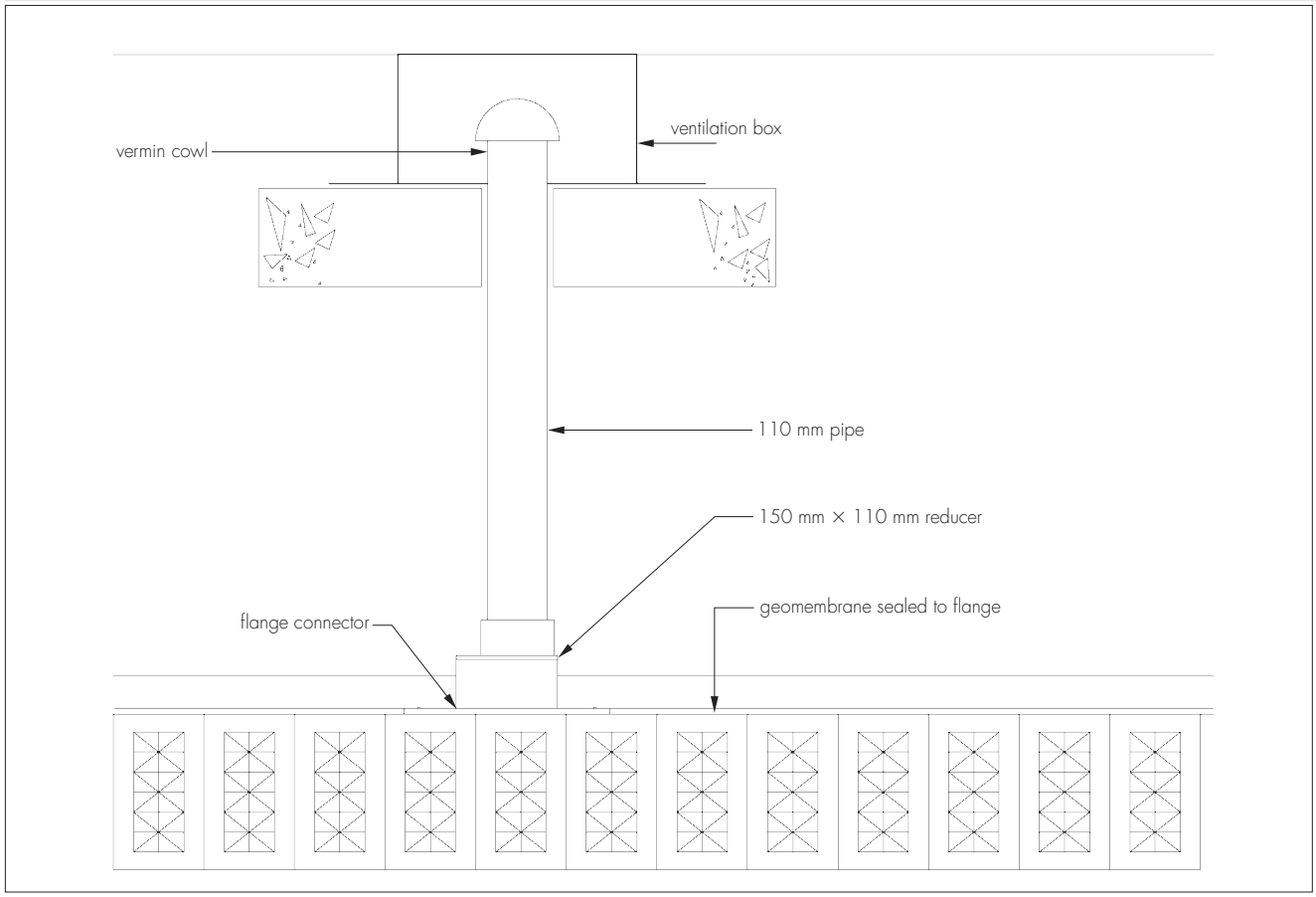
(1) Advice on seam testing is given in CIRIA SP124 *Barriers, liners and cover systems for containment and control of land contamination*.

8 Venting

8.1 Adequate venting must be provided to the AquaCell Plus structure. One 110 mm diameter air vent is required per 7500 m^2 of impermeable catchment area to be drained (see Figure 4).

8.2 Typical air vent connectors and pipework can be seen in the Certificate holder's *Intesio Stormwater Solutions – Design Manual*. It is recommended that all air vent installations in attenuation/storage applications (using an impermeable geomembrane) are made using a flange adaptor. Adhesive or double-sided tape should be used between the geomembrane and flange adaptor to ensure a watertight seal.

Figure 4 Typical air vent system



9 Resistance to chemicals

9.1 An assessment by the BBA indicates that the components of the system are suitable for use in contact with the chemicals likely to be found in rainwater.

9.2 An assessment of the suitability for use of AquaCell Plus units on brownfield sites should be made only after a suitable site investigation to determine the possibility for chemical attack. Particular care must be taken where acids and organic solvents are present at high concentrations. Further information can be obtained from the Certificate holder.

10 Maintenance

10.1 The customer is responsible for maintenance. Recommendations for maintenance of SUDS systems are given in CIRIA C697.

10.2 For soakaways to individual houses, the only necessary maintenance is to keep gullies clear of debris such as leaves.

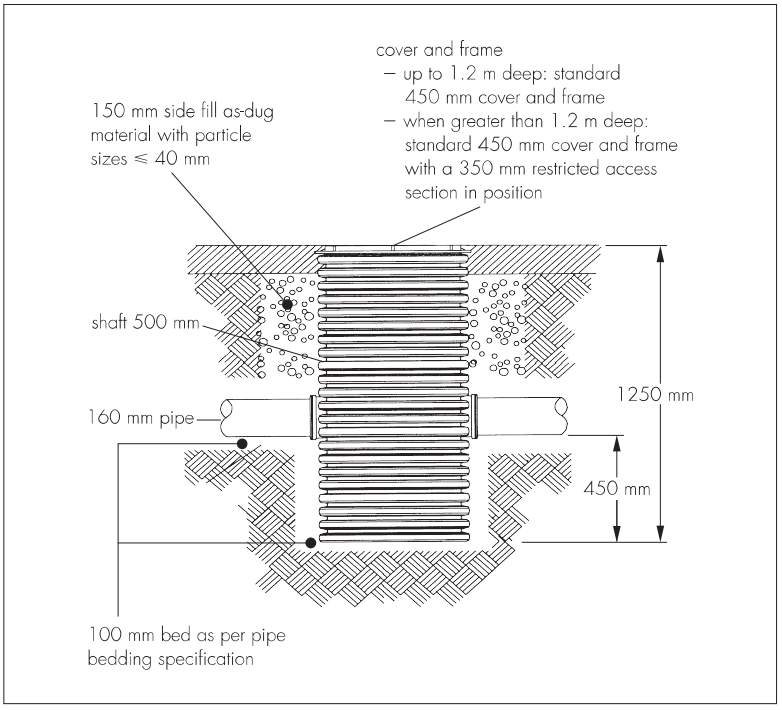
10.3 For large installations or where the receiving waters are environmentally sensitive, a system of regular inspections should be established to prevent the accumulation of silt in the system which, if allowed to develop, would reduce effectiveness. They should also be inspected after every major storm event. It is recommended that a minimum of three inspection tunnels are included, positioned at the inlet or centre line of the tank and at the edges of the structure.

10.4 It is recommended that a silt trap is incorporated into the pipework at the inlet to the tank (see Figure 5). There must be a maintenance plan that ensures regular cleaning of the trap to ensure correct performance. Silt traps for use with this system are outside the scope of this Certificate.

10.5 For all flow control devices it is sensible to incorporate access (via a manhole or similar) to the location of the pipe entry, orifice or vortex control. This will enable easy removal of any blockage. The orifice itself may be protected by a debris screen.

10.6 Paved surface areas above an installation should be inspected at the same time to ensure the units continue to provide the required structural support.

Figure 5 Typical silt trap



11 Durability

The structural properties of polypropylene used in the components of the system will deteriorate with time and should be taken into account at the design stage by the application of suitable safety factors. In the opinion of the BBA, the AquaCell Plus Attenuation and Infiltration System, when used in accordance with this Certificate, will have a life in excess of 50 years.

Installation

12 General

The system should be installed in accordance with the Certificate holder's *Stormwater Solutions — Design Manual*.

13 Procedure

13.1 The hole or trench is excavated to the required depth, dimensions and levels. It must be ensured that the plan area is sufficient to allow plant access around sides to compact backfill material (300 mm minimum). The base must be smooth and level without sharp drops or humps. Slopes must be cut to a safe angle or adequately supported and safe access must be provided to allow personnel to enter the excavation.

13.2 The base must be inspected for soft spots in the formation – any present must be excavated and replaced with compacted granular fill material.

13.3 A 100 mm thick, bedding layer of coarse sand is laid on the base and sides of the excavation. If required in attenuation systems, a layer of geotextile is laid to protect the impermeable geomembrane.

13.4 The impermeable geomembrane (or geotextile, if in an infiltration system) is laid over the sand bedding layer and up the sides of the excavation. The impermeable geomembrane is inspected for damage and all welds are tested as required. Joints between adjacent sheets of impermeable membrane should be sealed correctly using proprietary techniques with a minimum lap of 50 mm. Jointing with tape is not recommended as the system then becomes reliant on the mechanical properties of the tape to maintain its integrity.

13.5 The AquaCell Plus units are installed in accordance with the installation schedule for correct orientation. Wherever possible, continuous vertical joints should be avoided. The units are arranged so that pre-formed sockets are in the correct alignment for inlet and outlet pipes. For single-layer applications, Wavin clips are used and, for multi-layers, Wavin clips and shear connectors are used. Units at the end of the structure should be fitted with end caps unless positioned in a row that will be used for inspection.

13.6 The geotextile or impermeable geomembrane encapsulation to base, sides and top of installation, including protective geotextile (if required to protect the geomembrane) is completed. Impermeable geomembranes should be welded with double seams. All welds should be tested as required and the membrane inspected for damage.

13.7 Drainage connections are made to the installation using proprietary adaptors. Pre-formed socket positions for pipe connections must be located at the correct position for receiving pipework. Alternatively, flange adaptors are used attached to AquaCell Plus units with adhesive tape and self-tapping screws (flange adaptors cannot be used at the invert of AquaCell Plus units into the pre-formed socket). It is recommended that all connections and air vent installations, in attenuation/storage applications, are made with a flange adaptor, using adhesive or double-sided tape to form a seal. Alternatively, drainage connections are sealed into a pre-formed socket using proprietary seals approved by the geomembrane manufacturer.

13.8 The installation is backfilled with Type 1 or 2 sub-base or Class 6P (side fill only) selected granular material in accordance with the *Manual of Contract Documents for Highway Works* (MCHW), Volume 1. The backfill is compacted in 150 mm thick layers.

13.9 A coarse sand protection layer, 100 mm thick, should be placed over the top of the units that have been wrapped. Backfilling is continued with:

- trafficked areas (eg car parks) — Type 1 or 2 sub-base material compacted in 150 mm layers in accordance with the MCHW, Volume 1. Compaction plant over the top of the system must not exceed 2300 kg per metre width
- landscaped and non-trafficked areas — selected as-dug material, with size of pieces less than 75 mm, compacted to 90% maximum dry density. Compaction plant over the top of the system must not exceed 2300 kg per metre width.

13.10 Pavement construction or landscaping over the AquaCell Plus system is completed.

Technical Investigations

14 Tests

Tests were carried out on the system to determine:

- long- and short-term resistance to loading
- performance and durability of geosynthetics
- volumetric capacity and discharge rate.

15 Investigations

15.1 The manufacturing process was examined, including the method adopted for quality control, and details obtained on the quality and composition of the material used.

15.2 An assessment of the system was made in relation to material properties and design procedures.

15.3 A site visit was made to assess the practicability and ease of installation and connection.

Bibliography

BS EN 752 : 2008 *Drain and sewer systems outside buildings*

ASTM D 638 : 2002 *Test Method for Tensile Properties of Plastics*

ASTM D 751 : 2000 *Standard Test Methods for Coated Fabrics*

ASTM D 792 : 2000 *Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement*

ASTM D 1004 : 1994 *Standard Test Method for Initial Tear Resistance of Plastic Film and Sheeting*

ASTM D 1149 : 1999 *Standard Test Method for Rubber Deterioration — Surface Ozone Cracking in a Chamber*

ASTM D 1203 : 1994 *Standard Test Methods for Volatile Loss From Plastics Using Activated Carbon Methods*

ASTM D 1204 : 1994 *Standard Test Methods for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperatures*

ASTM D 1603 : 2001 *Test Method for Carbon Black in Olefin Plastics*

ASTM D 5397 : 1999 *Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test*

ASTM E 96 : 2000 *Standard Test Methods for Water Vapor Transmission of Materials*

Manual of Contract Documents for Highway Works, Volume 1 *Specification for Highway Works,* August 1998 (as amended)

16 Conditions

16.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English law.

16.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

16.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

16.4 In granting this Certificate, the BBA is not responsible for:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

16.5 Any information relating to the manufacture, supply, installation, use and maintenance of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used and maintained. It does not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the manufacture, supply, installation, use and maintenance of this product/system.

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SECTION

3

SPEL Fuel/Oil Separators - Overview

For the removal of hydrocarbons, silt and soluble metals as sediment bound

Introduction, Testing & Compliance with BS EN 858-1:2002 & Performance	**3.1 - 3.2**
Where are Separators Needed?	**3.3**
How to Select & Specify	**3.4**
SPEL Puraceptor® Class 1 Full Retention Separators – Single & Two Chamber	**3.5**
SPEL Stormceptor® Class 1 By-Pass Separators	**3.6**
SPEL Coalescer Guide Rail Systems	**3.7**
How to Specify - *Type, Sizing, Model, Connections (size and orientation) and Tank Specification re. Tank Invert Depth and Water Table and Options for Alarm and SPEL Econoskim® System*	**3.8**
SPEL Automatic Alarm/Monitoring Systems	**3.9 - 3.19**
Automatic Closure Device	**3.20**
Maintenance	**3.21 - 3.24**


INDIAN AIR FORCE




39 38 37 36 35 34 33 32 31 30 29 28 27 26 25



It is a known fact the planet's atmosphere and climate have been changing for decades, and hydrocarbons are one of the main culprits. Spillages of oil and fuel from industrial sites, filling stations and the emissions from automotive leaks can have a cumulative effect that can damage the environment in devastating ways.

Highway surface runoff discharges contain pollutants that have accumulated on the carriageway, particularly following periods of dry weather.

These pollutants can then be transported via the surface water drainage system to discharge to ground or receiving watercourses.

Previous studies have demonstrated that highway runoff affects the quality of waters and sediments. Increased concentrations of metals, hydrocarbons and anions are associated with changes in the structure and functioning of biological communities.

Spills and leaks from fuel handling facilities using containers, tanks, drums, intermediate bulk containers (IBCs) and mobile containers called 'bowsers', can course serious pollution incidents.

The common saying is 'prevention is better than cure'. To fit a SPEL Separator to capture fuel, oil and silt prior to SuDS attenuation schemes is far better than hoping for the best and then have to instigate remedial work. All have a responsibility to cater for any possible pollution incidents.

- General Guidance by the Environment Agency regarding fuel/oil separators
- They are typically needed for any site with a risk of oil contamination, such as:
- Car parks larger than 800m2 in area or for 50 or more car parking spaces
- Smaller car parks discharging to a sensitive environment, such as a marsh that has been designated as a nature reserve
- Vehicle maintenance areas
- Roads
- Refuelling facilities

The type and class of separator needed will depend on the activity and where the discharge is directed to.

Fuel/oil separators do not work if there is detergent in the water, e.g. from car washing (see Section 6).

Testing and independent accreditation

The highly successful and well known SPEL fuel/oil/silt Separators are the result of extensive testing by H R Wallingford, the hydraulics research testing station, for hydrocarbon removal performance against the stringent European Standard BS EN 858 -1:2002. The tests required the hydrocarbons introduced into the separator at 5ml/litre to be reduced to a maximum of 5mg/litre in the outlet.

H R Wallingford started the testing in 1999.The SPEL Stormceptor® by-pass class 1 by-pass separator was the first to be accredited under the standard in the UK.



Hydrocarbon removal performance

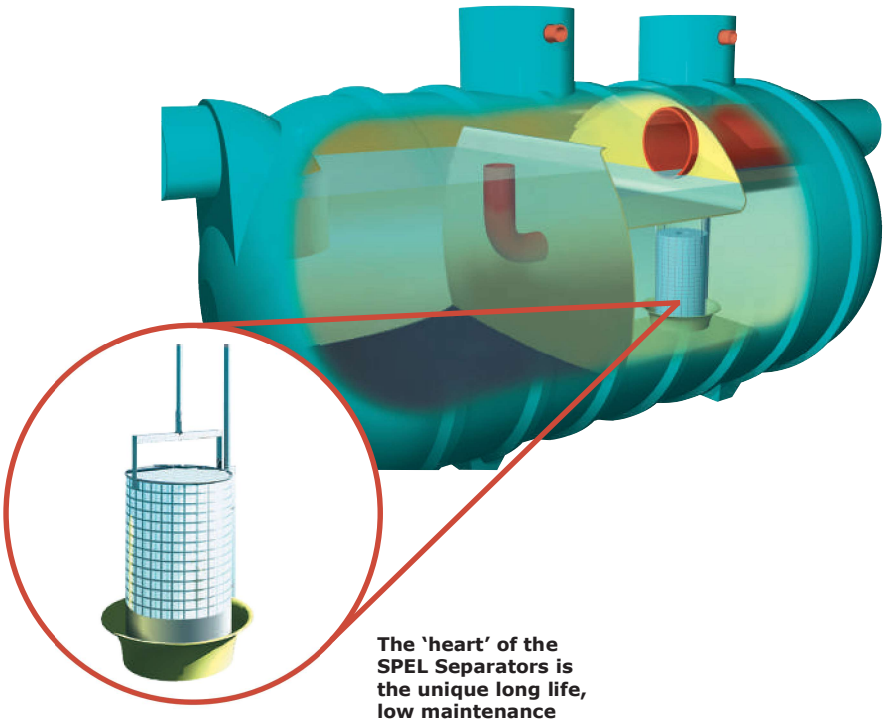
All models performed well within the European Standard with an average of 0.64mg/l.

Since then the SPEL Stormceptor® Class 1 by-pass and the Puraceptor® Class 1 full retention Separators have advanced in performance and construction as a result of technological advances in design and manufacture.

The 'heart' of the SPEL Separators is the unique long life, low maintenance coalescer unit/s which 'polishes' the final effluent AFTER 90% hydrocarbon and silt have been separated out.

Coalescer units comprise a stainless steel holder with a robust and efficient high volume reticulated foam insert. The coalescing process brings the smaller globules of oil into larger and buoyant forms to separate by gravity. The high volume foam safeguards against blockages due to silt and ensures a long life between servicing.

The coalescer inserts are easy to clean with normal pressure water and rarely require replacing.



The 'heart' of the SPEL Separators is the unique long life, low maintenance coalescer unit/s

3.2 Introduction

25 Year Warranty (life expectancy of over 50 years)

Manufacture

The full range of models is manufactured in glass reinforced plastics using the latest computerised equipment to ensure consistent quality. The shells are chop-hoop filament wound (see Section 2), the end domes using a specialised computer controlled machine and the components sprayed up by an eight axial robotic machine.

Quality control procedures ensure each serial numbered tank is tested and inspected to the strict quality parameters required.











The design and construction

The SPEL Separators are designed to meet the requirements of underground tanks with a generous safety factor and meet the external load requirements depending on the burial depth and water table level as detailed in Section 3 with tables for each tank series. The quality shells have a chemical resistant inner lining suitable for aviation fuels with a smooth moulded finish to ensure easy desludging and cleaning.

Tests 'in the field' in other countries

SPEL being used globally has allowed us to obtain 'in the field' performance data in other countries for total suspended solids (TSS) with 75% removal and the reduction in soluble metals e.g. zinc, lead, copper, nickel, cadmium, arsenic and mercury.



CERTIFICATE

LIGHT LIQUID SEPARATOR TEST PERFORMANCE CERTIFICATE

Separator make and model number: SPEL STORMCEPTOR 320CUSC NSR20

Test date: 21 June 2006

Designated/nominal flow rate, Q_n (litres/second): 20 litres/s

Net capacity of separator (excluding any allowance for silt storage), V_n (litres): 3859 litres

Total duration of test (minutes): 20 min

Running-in period (≥ 15 minutes): 15 min

Sampling period (minutes): 5 minutes common to all tests

Oil flow rate (based on 0.5% of water flowrate, litres/second): 0.1 litres/s

Temperature of oil (°C): 17.6

Temperature of water (°C): 18.1

Temperature of air (°C): 18.0

Analysis of samples by IR spectroscopy carried out by: Intertek Caleb Brett Testing Services*

Date of results: 26/06/06

Sample	Oil concentration (mg/l)**
1	0.5
2	0.4
3	0.6
4	0.3
5	0.1
Resulting average:	0.4

Name Date

For and behalf of HR Wallingford Limited

* NAMAS accredited laboratory

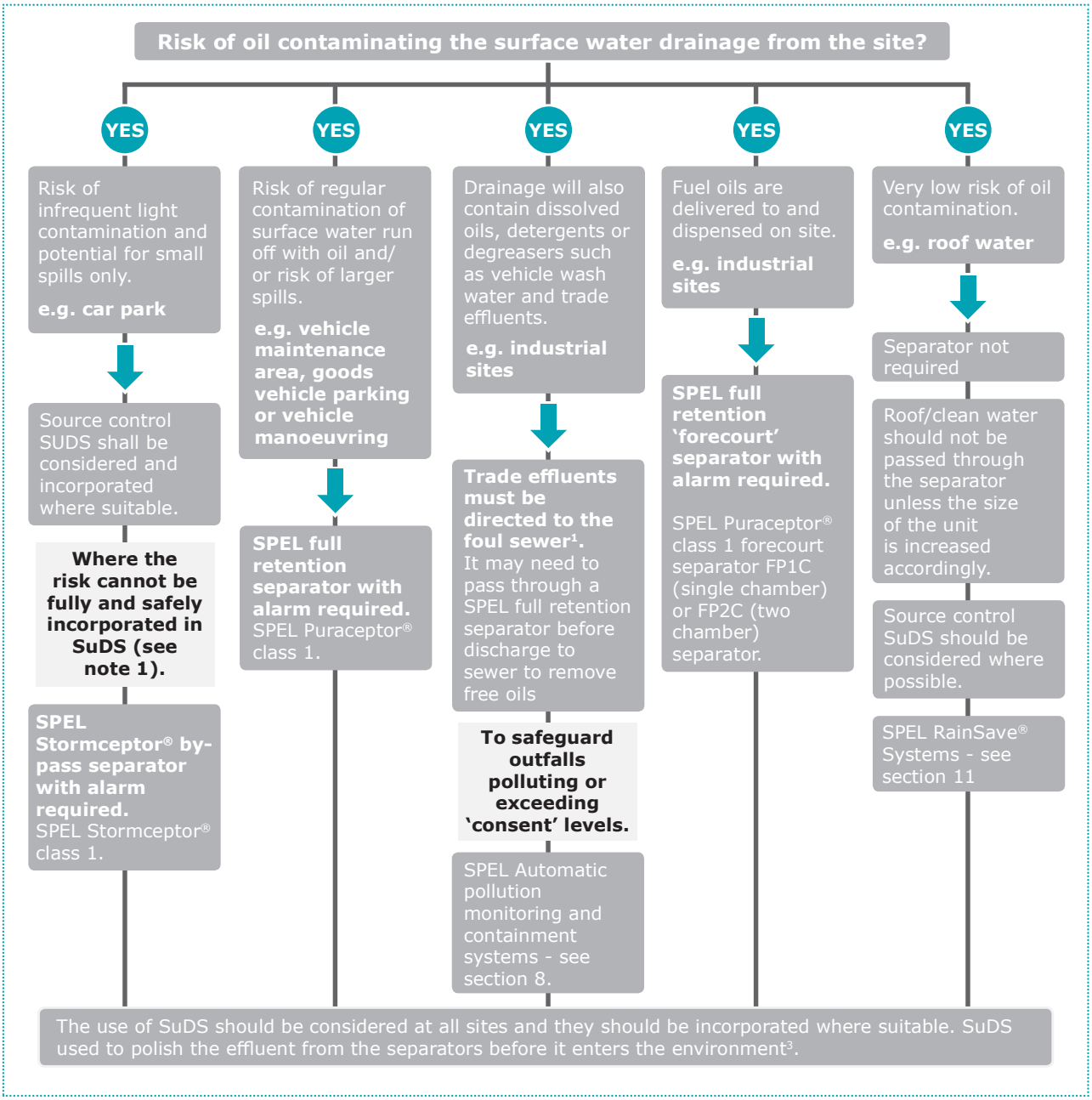
** Value of baseline concentration deducted

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Where are separators needed?

Surface water can be contaminated by oil and other contaminants depending on the site use. Sites with this risk need to have measures in place to prevent polluting the environment. These sites include:-

- Car parks typically larger than 800m2 or for 50 or more car parking spaces
- Smaller car parks discharging to a sensitive environment
- Areas where goods vehicles are parked or manoeuvred
- Vehicle maintenance areas
- Roads
- Industrial sites where fuel and oil are stored or handled
- Refuelling facilities
- Any other site with a risk of contamination



Selecting the appropriate type of SPEL Separator

This flow chart is to aid selection of the most suitable and appropriate type of SPEL Separator for use in surface water drainage systems that discharge to rivers and soakaways. However, the appropriate provision on any site will require detailed consideration of the local circumstance and risk factors including:

- The discharge point of your proposed separator.
- The environmental sensitivity of your location.
- Activities on your site.

Notes to accompany the flowchart

[1] You must seek prior permission from your local sewer provider before you decide which separator to install and before you make any discharge.

[2] Drainage from higher risk areas such as vehicle maintenance yards and goods vehicle parking areas should be connected to foul sewer in preference to surface water.

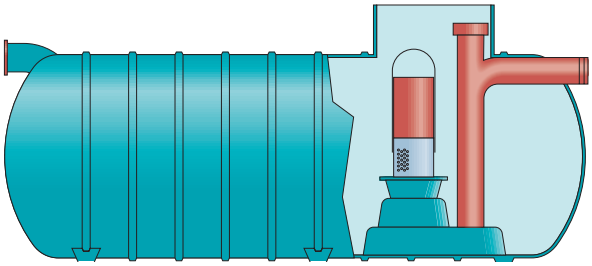
[3] A separator may be one of the devices used in the SuDS scheme.

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SPEL Puraceptor® separators have been designed and tested to meet the stringent European Standard BS EN 858-1 for installations for separator of light liquids where the maximum hydrocarbon concentration in the outlet does not exceed 5mg/l. Suitable for discharging into a surface water drain. For further details see section 5.

The 'heart' of SPEL Separators is the unique long life, low maintenance coalesce unit which 'polishes' the final effluent AFTER 90% hydrocarbons of SPEL

SINGLE CHAMBER MODELS



Typical sites

- Medium to high risk oil/fuel storage and handling areas.
- Filling stations (SPEL Puraceptor® forecourt separator FP1C).
- Commercial vehicle/plant maintenance yards and heavily contaminated industrial areas.

Features

Good access to all parts for desludging.

Sampling point incorporated into outlet.

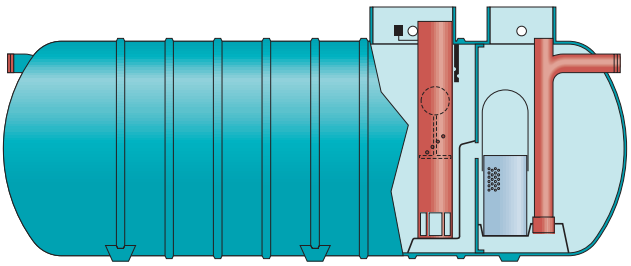
Stainless steel/plastic or copper ball automatic closure device. (ACD).

Robust stainless steel coalescer unit with long life foam insertion and lifting handle. These strong stainless steel units incorporate robust high volume reticulated foam inserts. The inserts efficiently coalesce the finer globules of hydrocarbons for gravity separation and due to their large volume, last for long periods before requiring cleaning.

Cleaning is then a simple operation using normal pressure water. The inserts can be reused again and again, rarely requiring replacement.

One access shaft for desludging tank and servicing of ACD and coalescer unit.

TWO CHAMBER MODELS



Typical sites

High risk oil/fuel storage and handling areas, filling stations (SPEL Puraceptor® forecourt separator FP2C), heavily contaminated industrial areas, commercial vehicle/plant maintenance yards, power stations and sub-stations.

Two chamber models provide protection to the coalescer foam inserts from silt and heavy fuel/oil contamination resulting in less frequent maintenance and easier cleaning of the coalescer foam inserts.

Features

Good access to all parts for desludging.

Coalescer unit/s incorporated into second chamber.

Stainless steel, plastic or copper ball automatic closure device (ACD).

Two access shafts for generous access to the desludging tank and servicing of the ACD and coalescer units.

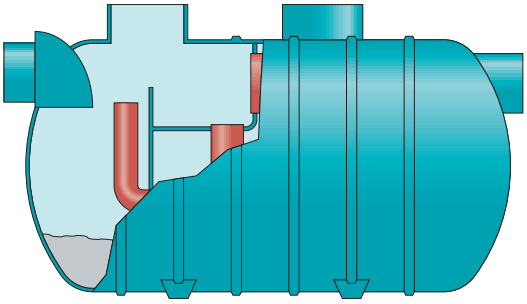
Sampling point incorporated into outlet.

Robust stainless steel coalescer unit with long life, high volume foam insert and lifting handle. These strong stainless steel units incorporate robust high volume reticulated foam inserts. The inserts efficiently coalesce the finer globules of hydrocarbons for gravity separation and due to their large volume, last for long periods before requiring cleaning. Cleaning is then a simple operation using normal pressure water. The inserts can be reused again and again, rarely requiring replacement.

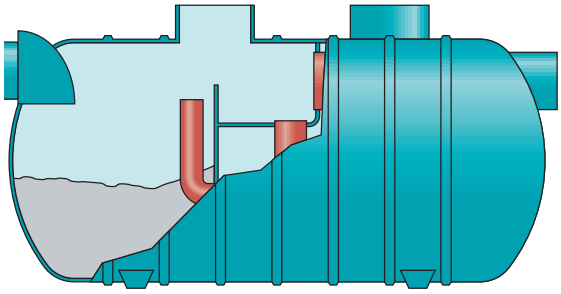
- Sized for working capacity PLUS fuel/oil and silt containment, ensuring optimum performance between maintenance periods.
- Designed for a long life span of high performance with low maintenance.

3.6 SPEL Separators Stormceptor® By-Pass Seperator

By-Pass Separator with Minimum Silt Capacity



By-Pass Separator with Silt Capacity BS EN 858



SPEL Stormceptors® are the most widely used separators where it is acceptable to treat the first flush and normal flows up to 6.5mm/hr rainfall. This covers approximately 99% of all rainfall events in the UK. Any excess rainfall is by-passed without treatment.

Class 1 separators, which are designed to achieve a concentration of less than 5mg/l of oil under standard test conditions, should be used when the separator is required to remove very small oil droplets, such as those arising from car park run-off.

These are used when it is considered an acceptable risk not to provide full treatment for high flows, for example, where the risk of a large spillage and heavy rainfall occurring at the same time is small. They are especially suitable for situations where the main requirement is to trap spillages.

The SPEL Stormceptor® is the first by-pass separator certified to BS EN 858-1.
For further details see section 4.

Typical sites and range

200/300 series the popular range of Stormceptors® for small to medium parking areas associated with smaller supermarkets and industrial estates.

400 series large capacity Stormceptors® for supermarkets, hypermarkets and large vehicle parking areas, industrial complexes, docks, airport aprons etc.

500/600 series the largest Stormceptor® range, for catchment areas from eight hectares upward to in excess of 30 hectares. Details are supplied against specific schemes.

Features

- Good access to all parts for desludging.
- Large and fully accessible primary chamber for silt capacity and its removal.
- Outlet junction chamber-approved sampling point.
- Dip pipe inlet for minimum turbulence and to prevent inflammable vapours passing upstream in drainage system.
- Most models can provide a choice of nine different inlet/outlet orientations to suit site drainage lay-out (check before specifying). See section 4.
- Coalescer unit/s incorporated within the main separation chamber provide an efficient coalescing separation process to reduce the hydrocarbon content in the outlet to 5mg/litre or less. These strong stainless steel units incorporate robust high volume reticulated foam inserts. Cleaning is then a simple operation using normal pressure water. The inserts can be reused again and rarely require replacement.
- Handle and/or lifting retaining cables with security fixing provided with each coalescer unit (see optional extra systems). See 3.4.
- Designed for high performance and low maintenance over a long life span.

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SPEL coalescer unit guide rails

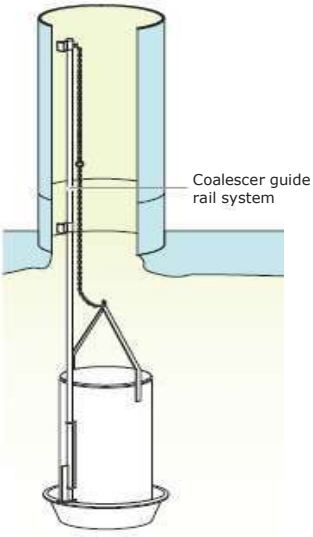
Normal servicing of the smaller SPEL Separators frequently requires emptying the unit completely providing access for the coalescer units to be taken out, cleaned and returned and guided accurately to their seating positions. However larger SPEL Separators may only require the hydrocarbon pollutants and silt to be removed.

In order to limit the servicing to sucking off the fuel/oil from the top and the silt from the bottom guide rails are required to ensure coalescer units are replaced into their correct positions.

The system is robust, manufactured throughout in stainless steel and the action positive, leaving no doubt the coalescer unit is located properly.

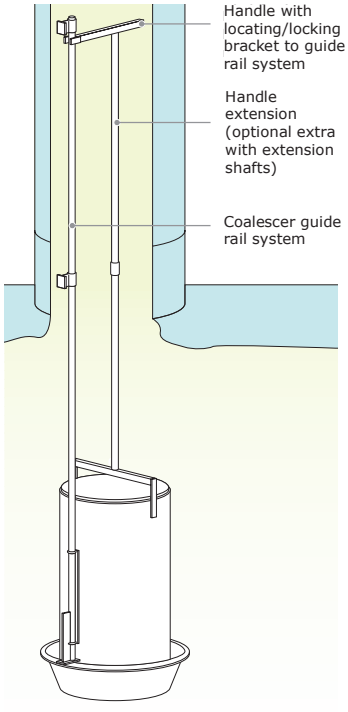
Brackets fixed to the top and bottom of the coalescer unit simply engage the stainless steel guide rail fixed to the top of the stub access shaft. The coalescer is then lowered in the normal way, being guided at the correct angle into the conical base unit which locates the coalescer unit into its final position.

Extension guide rails can be incorporated into SPEL extension shafts to suit (preferably when ordered with the separator).



SPEL coalescer unit guide rail system

SPEL coalescer unit lifting/locating/locking system for positive location and security locking



SPEL coalescer unit guide rail system/lifting, locating and locking system

SPEL coalescer units lowered into the separator with the SPEL guide rail system are easily guided into the base unit's conical moulding to automatically seat correctly.

However, when the separator is full of water, debris or sludge accumulated over a period, this could prevent the coalescer unit from re-seating correctly after servicing.

The coalescer unit lifting/locating/locking system provides assurance the coalescer unit is seated correctly and can be locked into position to prevent tampering.

The system is particularly suitable in SPEL Separator + Econoskim® systems where the total contents of the separator are not emptied on servicing.



The system comprises a robust stainless steel lifting and lowering handle that locates on the guide rail system. When the coalescer unit is correctly located in the conical seating in the separator, the handle will align with guide rail top bracket ie. the handles slotted holes with the top bracket clip locking groove, see diagram.

When aligned the stainless steel clip can be located through the slots and lock into position on the top bracket.

The stainless steel lifting handle can be extended to suit deep tank inverts and provide easy access for lifting manually or with the SPEL tripod and hoist.

3.8 How to Specify SPEL Separators

Type and model

Follow these steps to specify your requirements

Determine the type of separator – full retention or by-pass – see chart 3.4.

Specify whether silt capacity is required integrally or separately upstream of the separator.

Against the catchment area within which your requirements fall, the SPEL Separator nominal size can be ascertained or

To meet projected 'climate change' requirements – e.g. return storm frequency and percentage for climate change.

Optional extras available:

SPEL automatic alarm/monitoring system (section 3).

Extension shafts (see 2.13).

SPEL coalescer unit guide rail system (see 3.7).

SPEL mechanical anchoring system (see 13.11 – 13.12).

SPEL Econoskim® light liquid skimming and separate containment system (section 7).

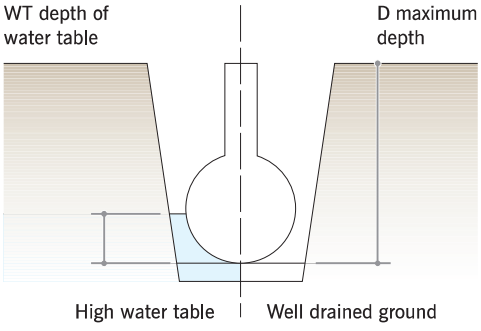
SPEL automatic alarm/monitoring system (section 3).

Tank specification

SPEL Separators are available in four specifications to suit invert depths and ground water conditions. Standard, Heavy, Extra Heavy and Special, see tables alongside.

Concrete surround

Standard tanks		
Series	**WT(m)**	**D(m)**
100/200/300	1.0	4.0
400	1.3	5.0
500	1.9	5.7
600	2.4	6.2



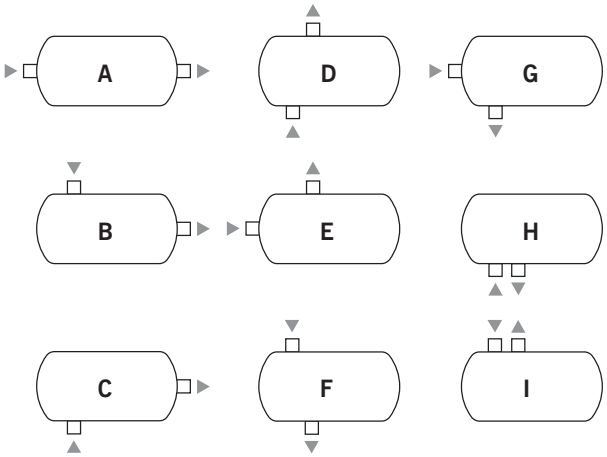
For detailed tables – see section 13.4 & 13.5

Connections

110,160,225 mm diameter mm PVCu/Quantum
Inlets are socket and outlets are spigots.

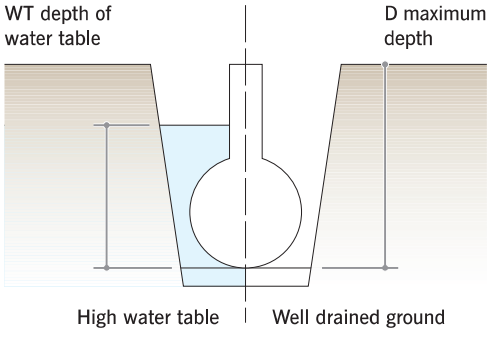
300 mm diameter and larger
Inlet and outlets are spigots and can be connected to the site pipework using Flex-Seal, Band-Seal or similar flexible couplings.

Inlet/outlet pipe connection orientation A-I
(see options below).



For extra heavy and special specification range and pea gravel surround refer to section 13 or contact technical sales.

Heavy tanks		
Series	**WT(m)**	**D(m)**
100/200/	2.0	6.0
300	2.8	5.6
400	3.5	6.0
500	4.5	7.25
600	4.7	7.3



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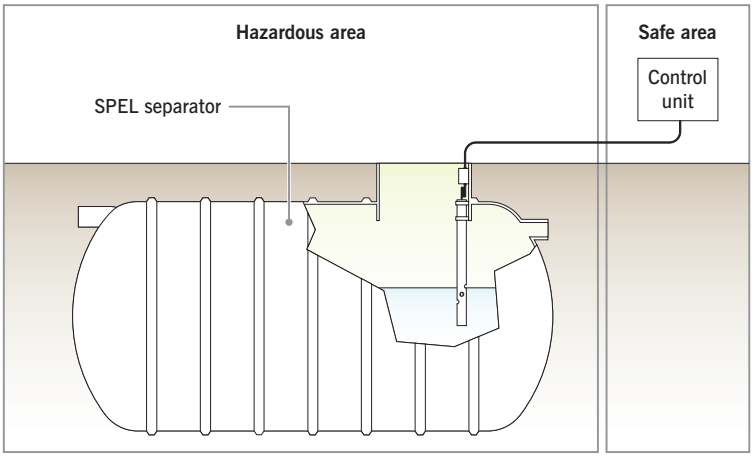
Installation, operation and maintenance instructions

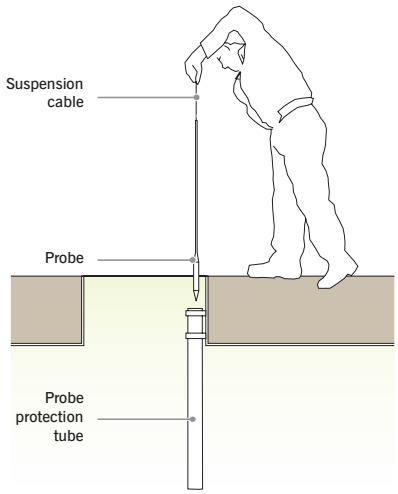
SPEL Automatic Alarm/Monitoring Systems – Overview

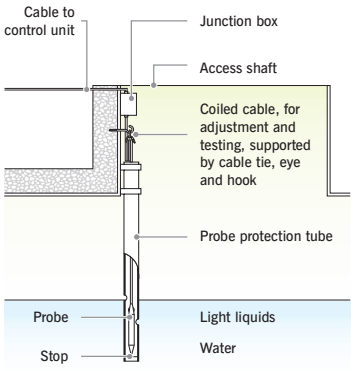
The SPEL automatic alarm/monitoring systems provide visual and audible warning when the level of the oil in the SPEL Separator reaches 90% of the storage volume under static liquid level conditions.

The systems comprise a conductive 'fail safe' probe mounted in the main separation chamber which senses when the designed volume of light liquids has accumulated and sends a signal to the electronic control unit activating a red 'empty now' warning light and an audible alarm.

Cabinets







Maintenance

When the separator is maintained, lift the probe out of the probe protection tube, check it operates the alarm (see under Ref. 3.18) and at the same time wipe oil and contaminants from the probe to prevent a fake alarm after re-inserting.

It is a legal requirement in the UK to kit and oil alarm/monitor construction. Product regulation trading standards. It is less expensive to fix appropriate tube during construction.

Operation

The probe is freely suspended in the probe protection tube in the separator at the correct level. When the oil-layer or depth of hydrocarbons reaches the predetermined level, the top of the probe will be immersed in the oil, breaking the circuit and activating the alarm. It is a 'fail-safe' system providing complete assurance that it is operative. If a fault occurs it will be signalled immediately.

Installation

Control unit (general positioning)

The control unit has been designed to be located indoors and outdoors, within a non-hazardous area. It should be wall mounted and positioned such that the LED display and push switches on the front panel can be readily seen and accessed. The unit can be secured to the wall using the four mounting holes provided. Included within the control is an intrinsically safe circuit (approved according to ATEX Directive 94/9/EC), to which the probe unit is connected.

Inserting probe on site

All that is required on site is to undertake the electrical installation in accordance with the instructions provided. Fix the plated hook provided in the position indicated and lower the probe into the probe protection tube until it locates onto the stop at the base. Coil excess cable and secure with the nylon cable-tie provided. The cable-tie eyelet is then hooked onto the hook to maintain the probe in the vertical position just touching the stop.

The probe protection tube is factory fitted and positioned to ensure the probe activates the alarm when the light liquids retained reach 90% of the storage volume the SPEL Separator is designed for.

3.10 SPEL Automatic Oil Alarm/Monitoring System Model ALARM-DY14400

Ideal for new build sites or where mains supply is readily available, making installation efficient and cost effective. The unit has an audible alarm and mute button. there is provision for a remote low power beacon.

Alarm warnings allow you time to take corrective action ensuring the safe and economic operation of separators preventing oil passing through the separator and polluting watercourses which may result in expensive fines and clean up costs.

Benefits

The alarm system and sensors guarantee an increased level of safety and requires simple installation for bespoke monitoring of oil and petrol separators.

Warn of excessive oil level

Tells you when a separator needs emptying

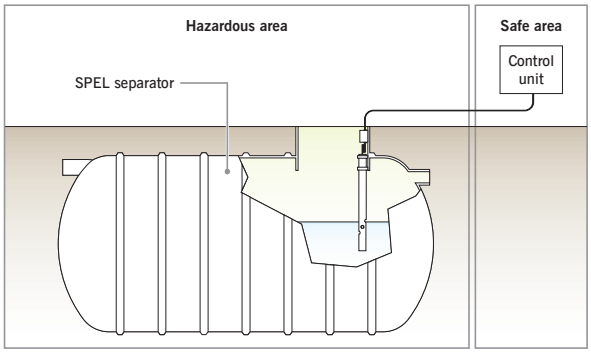
Reduces waste management costs

Designed to comply with EN858-1 and 2

Can be fitted to interceptors from all manufacturers

Reduces interceptor servicing costs

Ensures safe and economic operation of interceptors



Specifications

- Mains powered: 230VAC
- IP65 ABS Enclosure: 180 x 130 x 60mm
- Output: Remote Beacon Only (11volt. 100m Amax
- Alarm: Audible (local)
- Probe Range: 200 metres max. (dependent on cable style)
- ATEX approved: Baseefa 13ATEX0172
- Specific Marking of Explosion Protection: Ex II (1) G [Ex ia Ga] IIB (-20°C ≤ Ta ≤ 50°C)
- ATEX Directive Marking: Ex II (1) G
- Notified Body: Baseefa 1180 Buxton UK

Compatible probe types:

- High Oil



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Oil separator alarm device

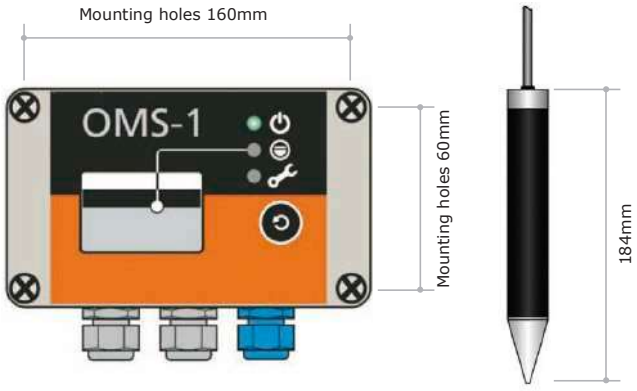
The SPEL OMS-1 alarm device is specially designed for oil separators. It indicates when it is time to empty the oil separator and thus prevents harmful hydrocarbon emissions to the sewer system.

SPEL OMS-1 control unit and SPEL OMS sensor



Accessories: Cable joint

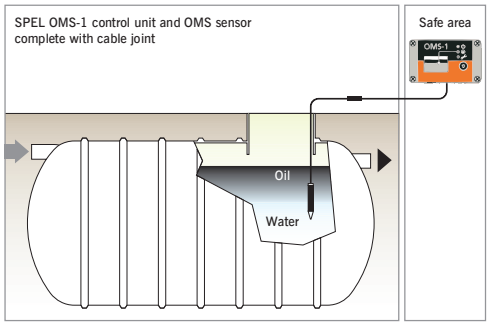
Control unit	SPEL OMS-1
Dimensions:	175 mm x 75 mm x 35 mm (L x H x D)
Material:	Polycarbonate
Enclosure:	IP65
Operation temperature:	-30 °C...+50 °C
Supply voltage:	230 VAC ± 10 %, 50/60 Hz The device is not equipped with a mains switch.
Power consumption:	1 VA
Sensors:	OMS sensor
Relay outputs:	Potential-free relay output 250 V, 5 A, 100 VA Operational delay 10 sec. Relay de-energize at trigger point
Electrical safety:	IEC/EN 61010-1, Class II ⧈, CAT II
Insulation level sensor/mains supply voltage:	375 V (IEC/EN 60079-11)
EMC:	EC/EN 61000-6-3 (Emission) IEC/EN 61000-6-1 (Immunity)
Ex-classification: **Special conditions** **ATEX** **IECEx**	⟨Ex⟩ II (1) G [Ex ia] IIB (Ta = -30 °C...+50 °C) VTT 12 ATEX 003X IECEx VTT 12.0001X
Electrical parameters:	U_o = 6,6 V I_o = 20,2 mA P_o = 33,3 mW
Manufacturing year: Please see the serial number on the type plate	xxx x xxxxx xx YY x Where YY = manufacturing year (e.g. 12 – 2012)



Mounting holes diameter ø 4.5mm Enclosure depth 35mm

Sensor	SPEL OMS
Principle of operation:	Measurement of conductivity
Material:	PVC, AISI 316
Enclosure:	IP68
Temperature:	Operation: 0 °C...+60 °C Safety: -30 °C...+60 °C
Cable:	Oil-proof cable 2 x 0,75 mm², standard length 5 m. Other lengths optional. The max. length of the fixed cable is 15 m. Can be extended up to 100 m.
EMC:	IEC/EN 61000-6-3 (Emission) IEC/EN 61000-6-1 (Immunity)
Ex-classification:	⟨Ex⟩II 1 G Ex ia IIA T6 Ga According to IEC/EN 60079-11 simple apparatus.
Manufacturing year: Please see the serial number on the type plate	x xxx x xxxxx xx YY x Where YY = manufacturing year (e.g. 12 – 2012)

Application



3.12 IdOil® Sensors

idOil sensors are an integral part of the idOil oil separator alarm system and they are to be used with the idOil control units. All idOil sensors are digital and polarity free.

	idOil-LIQ	idOil-OIL	idOil-SLU
Measurement principle	Vibration	Conductive	Ultrasonic
Mounting	Suspension		
Wetted parts	PVC, aluminium, PA, CR, Viton	PVC, AISI 316, PA, CR, NBR	PP, AISI 316, PA, CR, Silicon
Weight incl. 5m cable	240g	395g	530g
IP classification	IP68		
Ambient temperature	-30°c...+60°C		-25°c...+60°C
Supply voltage	12 V DC		
Fixed cable	Length 5m, 2 x 0.75 mm² PUR unshielded		
EMC	IEC/EN 61000-6-2 Emission IEC/EM 61000-6-3 Immunity		
ATEX	VTT 17 ATEX 005X	VTT 17 ATEX 004X	VTT 17 ATEX 006X
IECEx	IECEx VTT 17.0003X	IECEx VTT 17.0002X	IECEx VTT 17.0004X
Ex-classification	Ⓔ II 1 G Ex ia IIb T5 Ga	Ⓔ II 1 G Ex ia IIA T5 Ga	Ⓔ II 1 G Ex ia IIB T5 Ga
Exi Interface Values	U_i=16 V, I_i=80 mA, P_i=400 mW	U_i=16V, I_i=80 mA, P_i=400 mW	U_i=16V, I_i=80 mA, P_i=400mW
Max values in IIB	C_i ≤ 5.2 nF, L_i ≤ 1,6 mH	C_i ≤ 5.2 nF, L_i ≤ 1.6 mH	C_i ≤ 4.0 nF, L_i ≤ 1.6 mH



idOil-LiQ high liquid level sensor

Indicates when the liquid level in the oil separator rises excessively e.g. in an outlet blockage situation.



idOil-OIL oil sensor

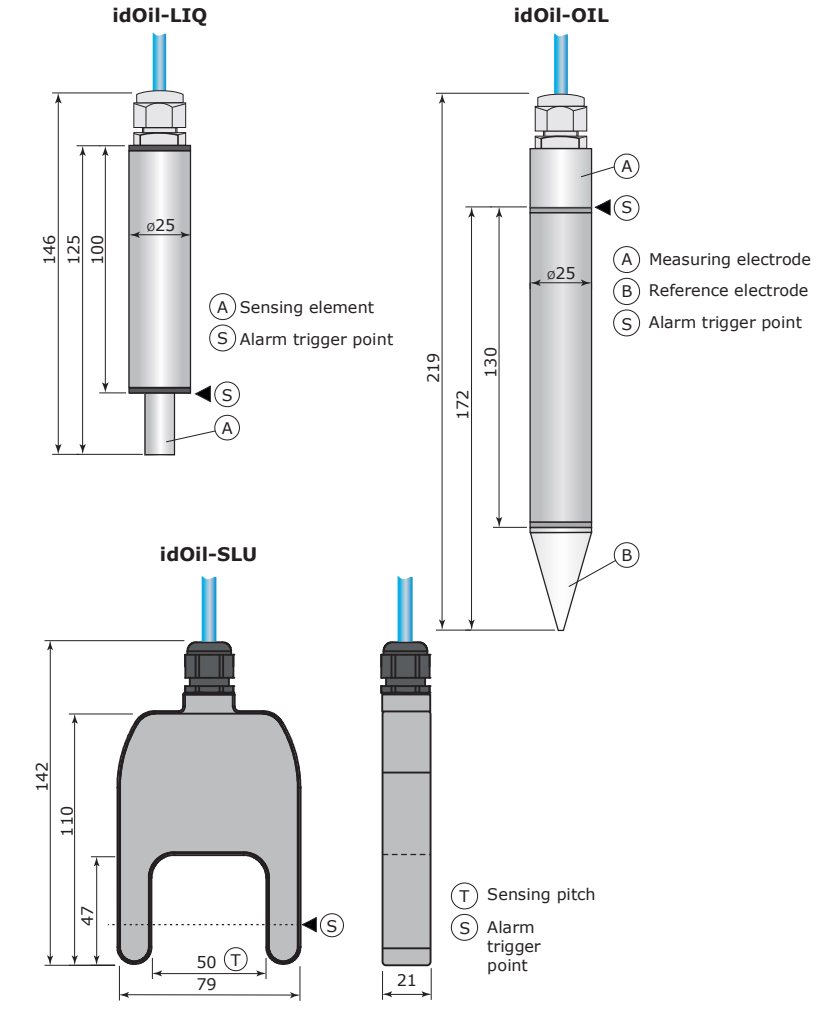
Detects oil and indicates when the separator's oil storage is full.



idOil-SLU sludge sensor

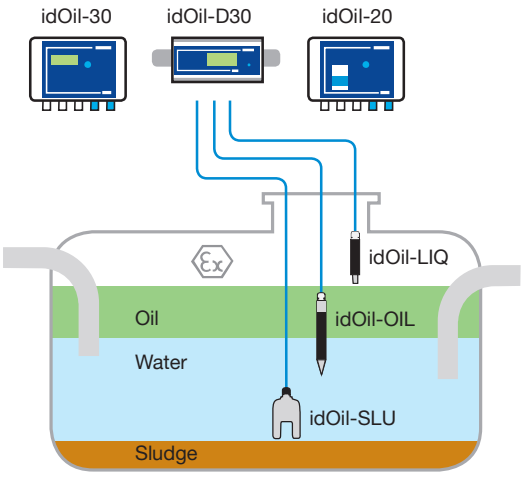
Monitors the sludge layer in the oil separator and indicates when the sludge layer has reached its maximum level.

Dimensions (mm)



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Application



Cable connectors

Cable connectors are used for cable extension between the sensors and the control unit. They are oil resistant, IP68 and suitable for ATEX Zone 0. Simple apparatus according to IEC/EN 60079-11.



LCJ1-1
Cable connector for one sensor



LCJ1-2
Cable connector for two sensors



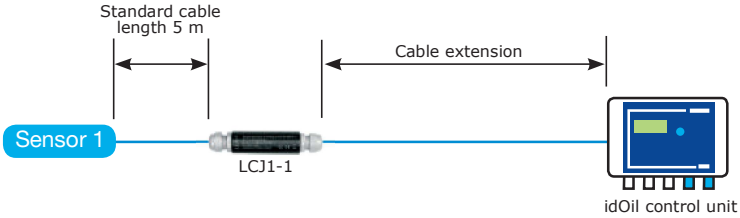
LCJ1-3
Cable connector for three sensors

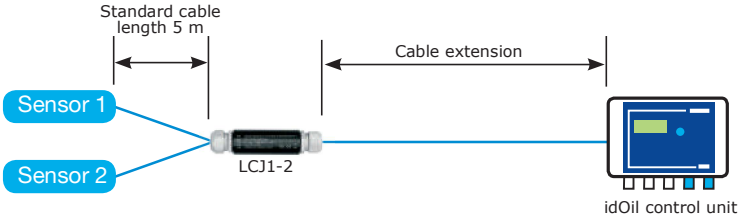
Sensor cable extension with installation

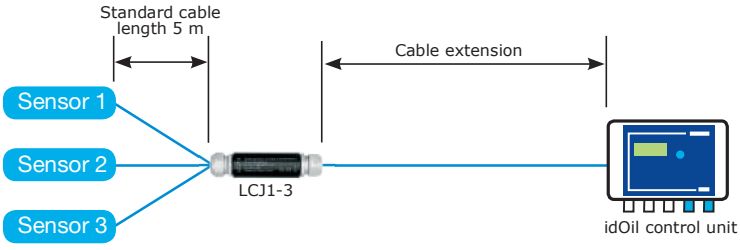
Sensor cable extension with Labkotec cable connector
LCJ1-1 for one sensor
LCJ1-2 for two sensors
LCJ1-3 for three sensors

Extension cable example
Twisted pair cable, 2 x 0.75 mm²

Extension cable diameter
LCJ1-1: Ø 4mm...9mm
LCJ1-2 and LCJ1-3: Ø 5mm...10mm
Max. extension cable resistance 68 Ohms.







3.14 IdOil®-20 Oil Separator Alarm Control Unit



Fulfils requirements of EN 858-1&2 standards

The idOil-20 is an easy to use oil separator alarm control unit that offers all necessary basic features. It can be equipped with up to three different types of idOil sensors that are identified automatically with a one-touch commissioning feature.

- High liquid level alarm, when the liquid level in the oil separator rises excessively e.g. in an outlet blockage situation.
- Oil layer thickness alarm, when the oil separator's full capacity for oil or petrol has been reached.
- Sludge layer thickness alarm, when the sludge layer in the bottom of the separator has reached its maximum level.
- Separator leakage alarm, when the liquid level drops unexpectedly.

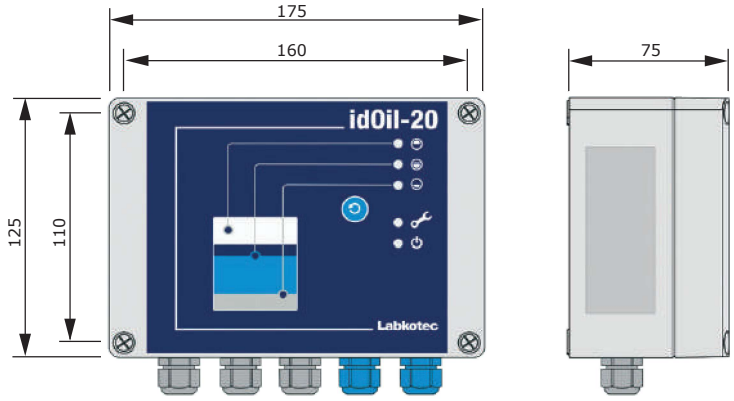
In these situations, an integrated alarm buzzer will sound, the display will show the alarm information and the relay(s) will switch.

Features

- Multi supply voltage
- Sensor combination with up to three different idOil sensors
- Polarity-free sensor connection
- Automatic sensor and sensor type detection
- Quick one-touch commissioning
- LED lights for alarms, sensor fault and power
- Buzzer for alarm indication
- Two potential free relay outputs. One for alarms and one for faults

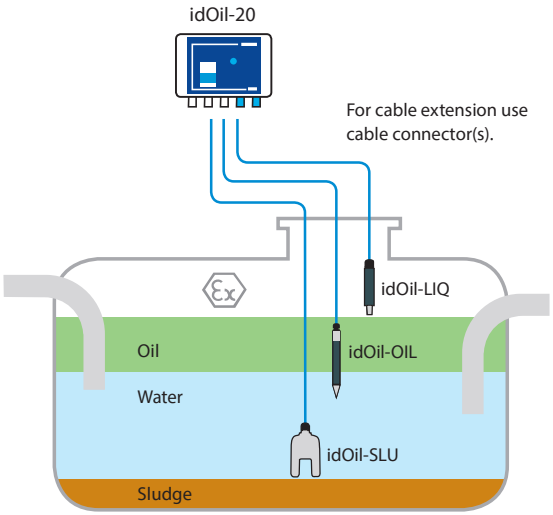
Mounting	Wall mounting
Enclosure material	Polycarbonate
Weight	750g
IP classification	IP65
LED Lights	For alarms, sensor fault and power
Ambient temperature	-30°C...+60°C
Supply voltage	100-240 V AC, 50/60 Hz
Supply power fuse	Max. 10 A
Power consumption	Max. 8 VA
Relay outputs	5 A, 250 V AC/30 V DC, 100 VA potential free changeover contracts, 2 pcs
EMC	IEC/EN 61000-6-2 IEC/EN 61000-6-3
Electrical safety	Class I, CAT II IEC/EN 61010-1, UL 61010-1 CAN/CSA-C 22.2 NO. 61010-1-12
Ex-classification	⟨Ex⟩ II (1) G [Ex ia Ga] IIB
ATEX **IECEx**	VTT 16 ATEX 018X IECEx VTT 16.0005X
Exi interface values	U_o - 14.5 v, I_o = 78 mA, P_o - 367 mW, R = 243 Ω
Max values in IIB	C_o = 4.0 µF, L_o = 16.7 mH
Compatible sensors	idOil-LIQ high liquid level sensor idOil-OIL oil sensor idOil-SLU sludge sensor
Accessories	LCJ1-1 cable connector for one sensor LCJ-1 cable connector for two sensors LCJ1-3 cable connector for three sensors LMS-SAS5 mounting set for one sensor

Dimensions (mm)

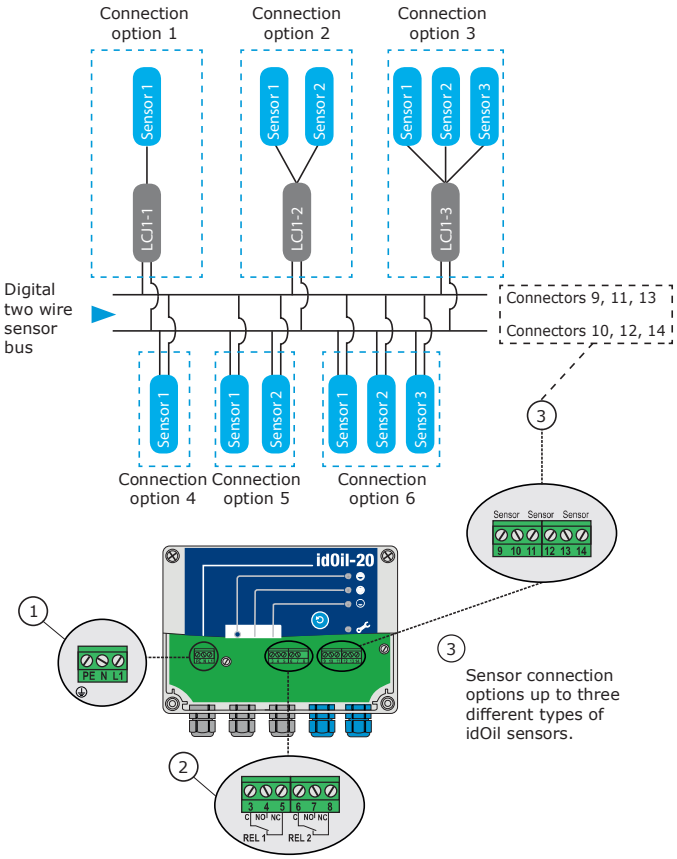


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Application



Installation



Cable connectors

Cable connectors are used for cable extension between the sensors and the control unit. They are oil resistant, IP68 and suitable for ATEX Zone 0. Simple apparatus according to IEC/EN 60079-11.



LCJ1-1
Cable connector for one sensor



LCJ1-2
Cable connector for two sensors



LCJ1-3
Cable connector for three sensors

(1) Supply voltage 100-240 V AC
PE = Ground conductor
N = Neutral conductor
L1 = Phase conductor

(2) Supply voltage 100-240 V AC
Relay 1
3 = Common pole
4 = Opening pole when alarm
5 = Closing pole when alarm
Relay 2
6 = Common pole
7 = Opening pole when alarm
8 = Closing pole when alarm

(3) Sensor connectors
9 = Sensor 1 connection 1
10 = Sensor 1 connection 2
11 = Sensor 2 connection 1
12 = Sensor 2 connection 2
13 = Sensor 3 connection 1
14 = Sensor 3 connection 2

3.16 IdOil®-30 Oil Separator Alarm Control Unit



Fulfils requirements of EN 858-1&2 standards

idOil-30 is a control unit for oil separator alarm systems. It can be equipped with up to three types of idOil sensors. With the idOil-30 and applicable Labkotec sensors following alarms can be monitored:

- High liquid level alarm, when the liquid level in the oil separator rises excessively e.g. in an outlet blockage situation.
- Oil layer thickness alarm, when the oil separator's full capacity for oil or petrol has been reached.
- Sludge layer thickness alarm, when the sludge layer in the bottom of the separator has reached its maximum level.
- Separator leakage alarm, when the liquid level drops unexpectedly.

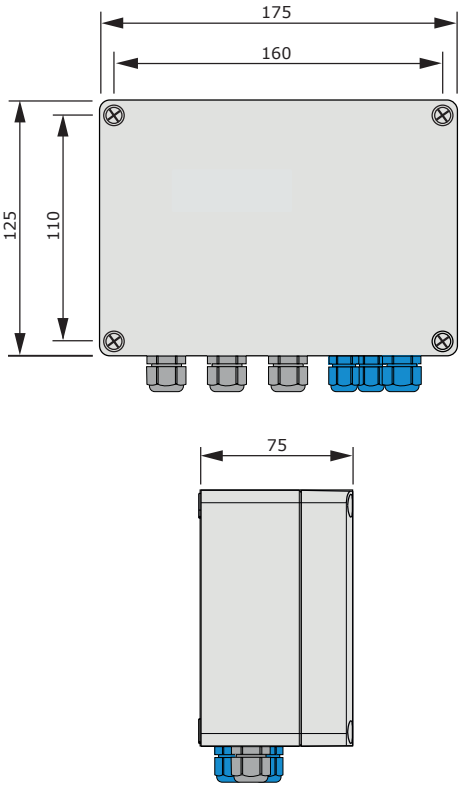
In these situations, an integrated alarm buzzer will sound, the display will show the alarm information and the relay(s) will switch. idOil-30 can be connected locally to laptop/tablet/smartphone via WLAN to access the inbuilt browser user interface for further configurations and settings.

Features

- Multi supply voltage
- Selectable sensor combination with up to three sensors
- Polarity-free sensor connection
- Automatic sensor and sensor type detection
- Quick one touch commissioning
- Display for system status and alarm information
- Two fully configurable potential free relay outputs
- Alarm log
- Service and maintenance diary
- WLAN connection locally between control unit and laptop/tablet smartphone to access the built in browser user interface for settings and configuration

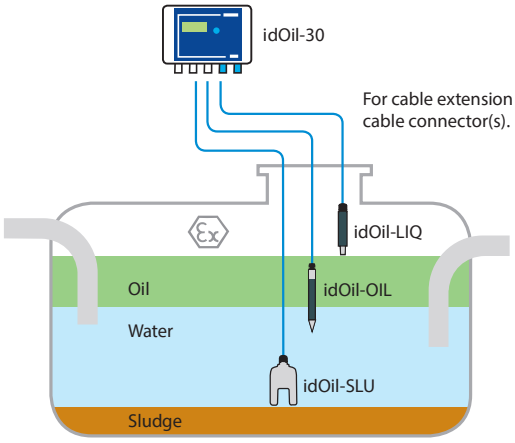
Mounting	Wall mounting
Enclosure material	Polycarbonate
Weight	780g
IP classification	IP65
Display	4 line monochrome LCD
Ambient temperature	-30°C...+60°C
Supply voltage	100-240V AC, 50/60 Hz
Supply power fuse	Max. 10 A
Power consumption	Max. 12 VA
Relay outputs	5 A, 250 V AC/30 V DC, 100 VA potential free changeover contacts, 2 pcs
EMC	IEC/EN 61000-6-2 IEC/EN 61000-6-3
Electrical safety	Class 1, CAT II IEC/EN 61010-1, UL 61010-1 CAN/CSA-C 22.2 NO. 61010-1-12
Ex-classification	⟨Ex⟩ II (1) G [Ex is Ga] IIB
ATEX **IECEx**	VTT 16 ATEX 018X IECEx VTT 16.0005X
Exi interface values	U_o = 14.5 V, I_o = 78mA, P_o = 367 mW, R = 243 Ω
Max values in IIB	C_o = 4.0 µF, L_o = 16.7 mH
Compatible sensors	idOil-LIQ high liquid level sensor idOil-OIL oil sensor idOil-SLU sludge sensor
Accessories	LCJ1-1 cable connector for one sensor LCJ1-2 cable connector for two sensors LCJ1-3 cable connector for three sensors LMS-SAS5 mounting set for one sensor

Dimensions (mm)

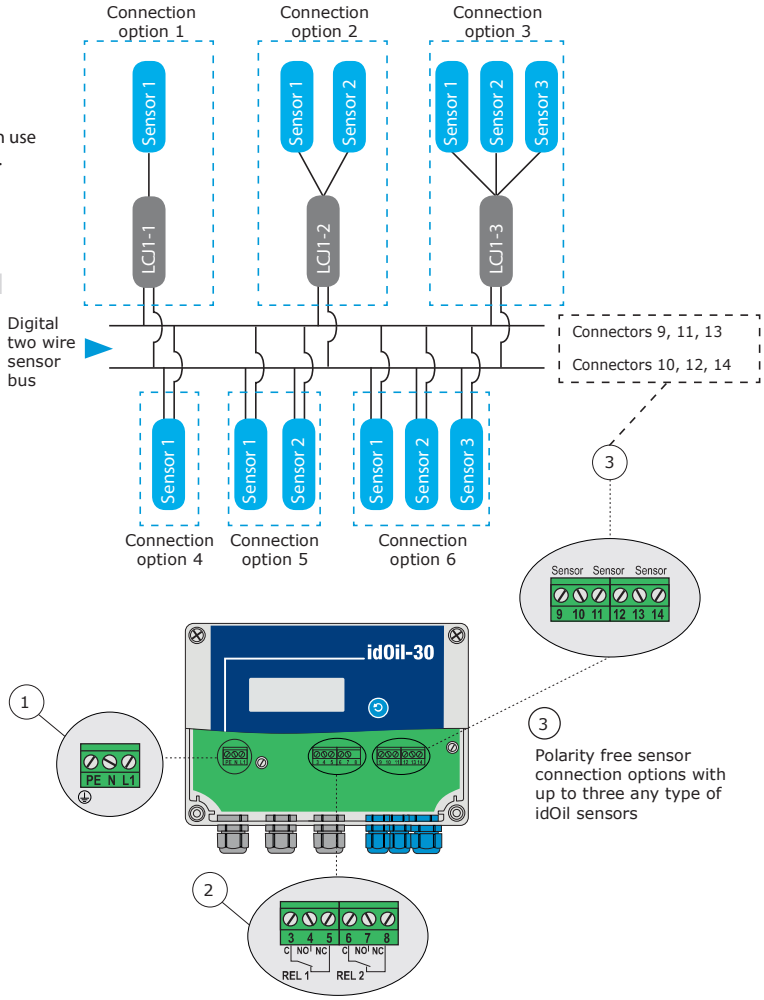


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Application



Installation



3 Polarity free sensor connection options with up to three any type of idOil sensors

Settings, configurations and information via browser user interface



- System status view with current alarms
- Date and time settings
- Language selection
- Alarms log, downloadable
- Inspection settings
- Write inspection notes
- Inspection diary, downloadable
- Customer data input for display
- Alarm settings
- Sensor identification and naming
- Relay configuration
- Software update

Cable connectors



LCJ1-1
Cable connector for one sensor



LCJ1-2
Cable connector for two sensors



LCJ1-3
Cable connector for three sensors

1 Supply voltage 100-240 V AC
PE = Ground conductor
N = Neutral conductor
L1 = Phase conductor

2 Supply voltage 100-240 V AC
Relay 1
3 = Common pole
4 = Opening pole when alarm
5 = Closing pole when alarm
Relay 2
6 = Common pole
7 = Opening pole when alarm
8 = Closing pole when alarm

3 Sensor connectors
9 = Sensor 1 connection 1
10 = Sensor 1 connection 2
11 = Sensor 2 connection 1
12 = Sensor 2 connection 2
13 = Sensor 3 connection 1
14 = Sensor 3 connection 2

3.18 IdOil®-D30 Oil Separator Alarm Control Unit



Fulfils requirements of EN 858-1&2 standards

idOil-D30 is a control unit for oil separator alarm systems. It can be equipped with up to three types of idOil sensors. With the idOil-D30 and applicable Labkotec sensors following alarms can be monitored:

- High liquid level alarm, when the liquid level in the oil separator rises excessively e.g. in an outlet blockage situation.
- Oil layer thickness alarm, when the oil separator's full capacity for oil or petrol has been reached.
- Sludge layer thickness alarm, when the sludge layer in the bottom of the separator has reached its maximum level.
- Separator leakage alarm, when the liquid level drops unexpectedly.

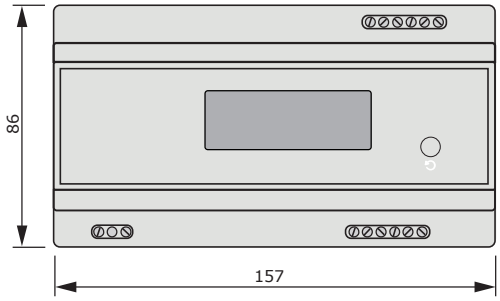
In these situations, an integrated alarm buzzer will sound, the display will show the alarm information and the relay(s) will switch. idOil-D30 can be connected locally to laptop/tablet/smartphone via WLAN to access the inbuilt browser user interface for further configurations and settings.

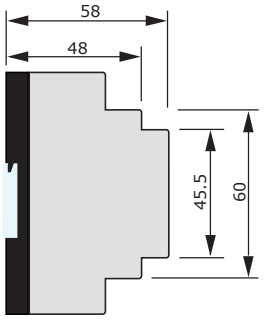
Features

- Multi supply voltage
- Selectable sensor combination with up to three sensors
- Polarity-free sensor connection
- Automatic sensor and sensor type detection
- Quick one touch commissioning
- Display for system status and alarm information
- Two fully configurable potential free relay outputs
- Alarm log
- Service and maintenance diary
- WLAN connection locally between control unit and laptop/tablet/ smartphone to access the built in browser user interface for settings and configuration

Mounting	M36 DIN rail mounting
Enclosure material	Lexan 940 (top), Noryl VO 1550 (base)
Weight	380g
IP classification	IP20
Display	4 line monochrome LCD
Ambient temperature	-30°C...+60°C
Supply voltage	100-240V AC, 50/60 Hz
Supply power fuse	Max. 10 A
Power consumption	Max. 12 VA
Relay outputs	5 A, 250 V AC/30 V DC, 100 VA potential free changeover contacts, 2 pcs
EMC	IEC/EN 61000-6-2 IEC/EN 61000-6-3
Electrical safety	Class 1, CAT II IEC/EN 61010-1, UL 61010-1 CAN/CSA-C 22.2 NO. 61010-1-12
Ex-classification	⟨Ex⟩ II (1) G [Ex is Ga] IIB
ATEX **IECEx**	VTT 16 ATEX 018X IECEx VTT 16.0005X
Exi interface values	U_o = 14.5 V, I_o = 78mA, P_o = 367 mW, R = 243 Ω
Max values in IIB	C_o = 4.0 µF, L_o = 16.7 mH
Compatible sensors	idOil-LIQ high liquid level sensor idOil-OIL oil sensor idOil-SLU sludge sensor
Accessories	LCJ1-1 cable connector for one sensor LCJ1-2 cable connector for two sensors LCJ1-3 cable connector for three sensors

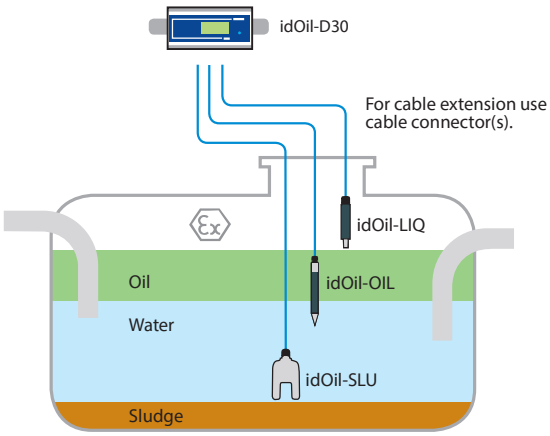
Dimensions (mm)



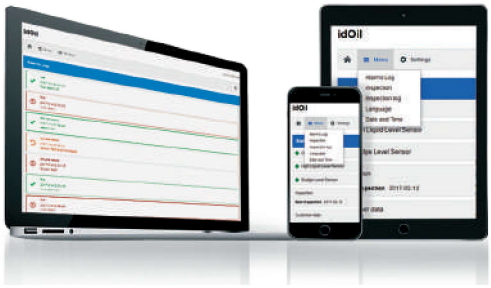


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Application



Settings, configurations and information via browser user interface



- System status view with current alarms
- Date and time settings
- Language selection
- Alarms log, downloadable
- Inspection settings
- Write inspection notes
- Inspection diary, downloadable
- Customer data input for display
- Alarm settings
- Sensor identification and naming
- Relay configuration

Cable connectors



LCJ1-1
Cable connector for one sensor

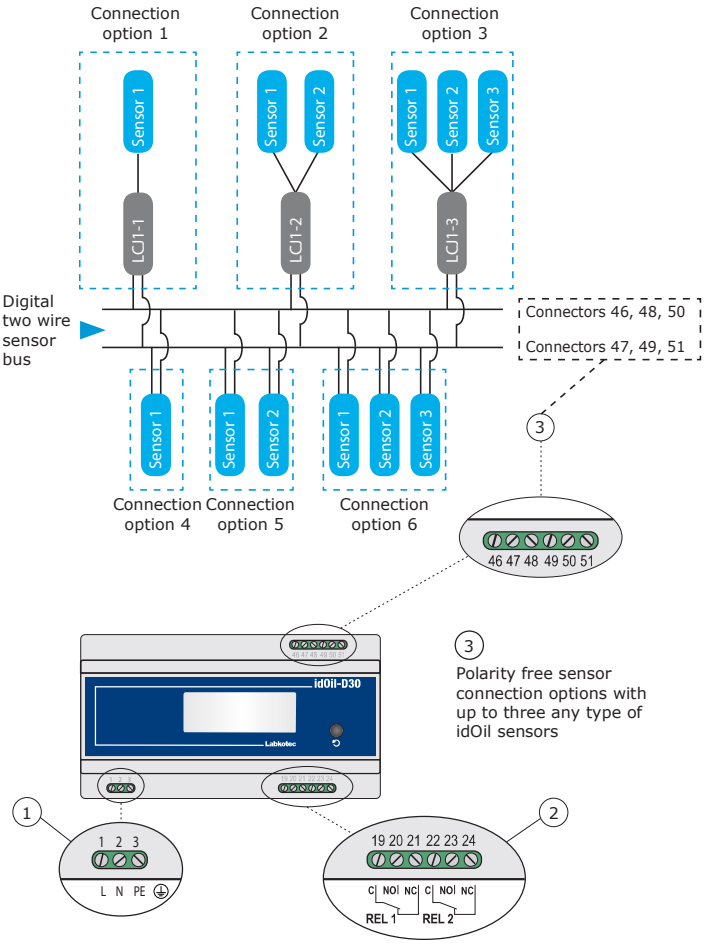


LCJ1-2
Cable connector for two sensors



LCJ1-3
Cable connector for three sensors

Installation



3 Polarity free sensor connection options with up to three any type of idOil sensors

1 Supply voltage 100-240 V AC
1 = L, phase conductor
2 = N, neutral conductor
3 = PE, ground conductor

2 Relay output
Relay 1
19 = Common pole
20 = Opening pole when alarm
21 = Closing pole when alarm
Relay 2
22 = Common pole
23 = Opening pole when alarm
24 = Closing pole when alarm

3 Sensor connectors
46 = Sensor 1 connection 1
47 = Sensor 1 connection 2
48 = Sensor 2 connection 1
49 = Sensor 2 connection 2
50 = Sensor 3 connection 1
51 = Sensor 3 connection 2

3.20 IdOil® Solar Oil Separator Alarm



idOil Solar with beacon light



idOil Solar

idOil Solar oil separator alarm

The idOil Solar is a solar powered oil separator alarm for off-grid areas. It can be equipped with a beacon light and/or 3G modem.

In an alert situation, the beacon light will flash and/or an alarm message will be sent to the user's mobile phone. The idOil Solar control unit has the same features as the idOil-30.



Enclosure material	Polycarbonate
Weight	8000g
IP classification	IP43 with two ventilation devices
Ambient temperature	-30 °C...+60 °C
Supply voltage	11-17 V DC
Compatible sensors	idOil-LIQ, idOil-OIL, idOil-SLU
Relay outputs	5 A, 30 V DC, 100 VA potential free, 2 pcs
EMC	IEC/EN 61000-6-2 IEC/EN 61000-6-3
Electrical safety	Class III, IEC/EN 61010-1, UL 61010-1 CAN/CSA-C 22.2 NO. 61010-1-12
Overvoltage category	
ATEX	VTT 16 ATEX 018X
IECEx	IECEx VTT 16.0005X
Ex-classification	⟨Ex⟩ II (1) G [Ex ia Ga] IIB

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The purpose of the automatic closure device (ACD) is to close the separator off automatically when the maximum storage capacity of light liquid is attained.

The ACD is to ensure that in the event of a major spillage, pollutants do not pass into the drainage system; it should not be regarded as a substitute for an automatic alarm/monitoring system.

Prior to installation

Prior to installation the ACD retaining tube should be covered with polythene to prevent ingress of concrete etc., which would fall onto the ACD and upset its calibration.

Operation and maintenance

If the tank should fill with light liquid the ACD, which is calibrated for a specific gravity of 0.85, will automatically fall and close off the SPEL Puraceptor®.

Normally routine maintenance would include removing light liquid intercepted within the Puraceptor®. If a SPEL automatic alarm/monitoring system is incorporated, it will automatically indicate when the Puraceptor® should be emptied. Only in an emergency will the Puraceptor® fill to its maximum and operate the ACD.

In such an event the Puraceptor® should be completely sucked out and the ACD lifted out (see Maintenance Procedure – Ref: 5.5).

SPEL Puraceptor® class 1 separators two chamber models and full retention class 2 separators

Commissioning

After the tank has been installed, leave the water in.

1. Remove the ACD from the packing box, taking care not to cause damage.
2. Remove the retaining cap from the top of the retaining tube in the separator.
3. Insert the ACD into the retaining tube using the lifting eye provided, ensuring it floats correctly with the float just visible above the water level.
4. Replace the retaining cap. This is to safeguard against the removal of the float by unauthorised persons or rising above the tube under abnormal conditions.

Note: If the tank's invert depth exceeds 1m it is advisable to remove the retaining cap prior to installation and only replace after inserting the ACD, if it is possible to do so from ground level.

SPEL Puraceptor® class 1 separators single chamber models

Models P004/1C to P050/1CSC.

Commissioning

After the tank has been installed, leave the water in.

1. Remove the ACD from the packing box, taking care not to cause damage.
2. Remove the retaining cap from the top of the retaining tube in the separator.
3. Insert the ACD into the retaining tube using the lifting eye provided. Allow it to sink to the bottom. The stainless steel retaining plate should seat on the base flange and the ACD attain its operating position as shown in the open position.
4. Replace the retaining cap. This is to safeguard against the removal of the float by unauthorised persons or rising above the tube under abnormal conditions.

Note: If the tank's invert depth exceeds 1m it is advisable to remove the retaining cap prior to installation and only replace after inserting the ACD, if it is possible to do so from ground level.

Larger Models

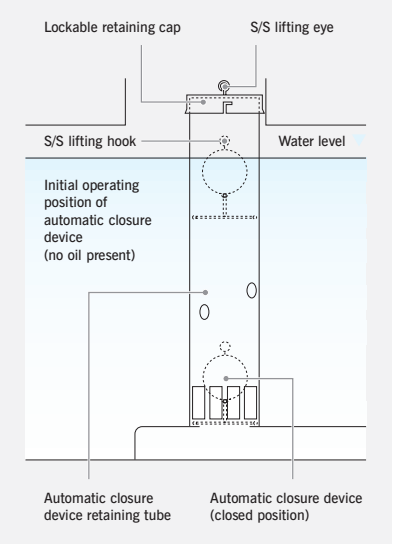
Where the ACD is already positioned in the unit, proceed as follows:

1. Before putting any water in the tank, lift rope attached to ACD up to the next knot and hang it from the rope hook. This is now in the 'operating position'.
2. As soon as the water level in the tank is above the ACD, the rope must be removed altogether and the rope hook must be unbolted. Do not leave the rope hook attached to the shaft. Ensure the ACD automatically remains in the 'operating position'.
3. Tape up or fill the hole(s) in the shaft where the rope hook was attached to prevent any backfill seeping into the shaft.

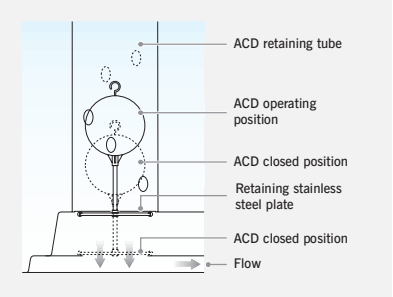
Maintenance

Dependent upon site conditions it is advisable to remove the ACD periodically taking care not to raise it too quickly and damage the plastic/copper float. Clean from debris/silt to prevent premature closing. Check the seating in the base unit is free of debris/silt that could prevent proper closing in an emergency.

Automatic closure device Type F (Floating) SPEL Puraceptor® class 1 separators (two chamber) & full retention class 2 separators.



Automatic closure device Type R (Retained) SPEL Puraceptor® class 1 separator (single chamber).

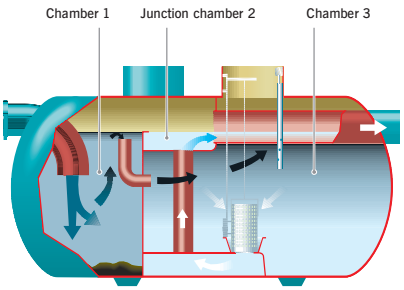


Maintenance

The SPEL Stormceptor® by-pass separator is a well proven high quality factory made unit, designed and tested in accordance with the European Standard BS EN 858-1 and meets the requirements of the Environment Agency and the Construction Products Regulations.

SPEL Stormceptors® are designed for long term performance and with SPEL high volume coalescer units, low maintenance.

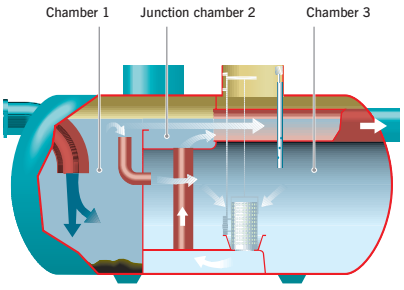
SPEL Stormceptor® by-pass separators are manufactured in class 1 and class 2 models and with or without silt capacity in accordance with BS EN 858-1. The range of models is listed in section 4 or on the SPEL Stormceptor® selection chart – available on request.



Flows according to nominal size (NSB)

The polluted surface water first enters the primary chamber where silt settles out and is retained. The fuel, oil and other pollutants lighter than water, rise to the surface and are efficiently skimmed off and transferred to the separation chamber.

In normal conditions all the flow is through the separation chamber, where the quiescent conditions allow the pollutants to separate out efficiently. Water from the cleanest zone in the separation chamber flows through a coalescer unit, to remove smaller globules of oil, up to the junction chamber and thence to the outlet



Storm flows above NSB

During a storm the level in the primary chamber rises and the stormwater passes over the weir into the junction chamber and to the outlet.

The design keeps the turbulence within the separation chamber to a minimum which avoids disturbing the contaminants retained.

Maintenance requirements

The SPEL automatic alarm/monitoring system will automatically warn you when the SPEL Stormceptor® requires emptying of light liquids, however, silt will accumulate and require removing at intervals depending on the site conditions.

We recommend the SPEL Stormceptor® is checked at 3, 6, or 12 monthly intervals to determine the depth of silt in the primary chamber.

Where a SPEL automatic alarm/monitoring system is not fitted, the SPEL Stormceptor® should be checked at 3, 6, 12 monthly intervals, depending upon site conditions, to determine the depth of retained pollutants. When the depth of light liquids retained has reached the predetermined design level in accordance with the European Standard BS EN 858-1, or if excessive silt has accumulated, it should be emptied.

When emptying ensure both chambers (primary - chamber 1 and separation - chamber 3) are emptied equally to prevent unequal pressure on the internal partition.

Chamber 1

The inlet connects directly into chamber 1 - the primary chamber where silt etc. is deposited and light liquids are skimmed off to be transferred to the main separation chamber, chamber 3.

Maintenance requires the removal of accumulated silt etc., checking the skim pipe is not blocked and removing floating debris.

Chamber 2

This is the junction chamber where the clean water passing out of the main separation chamber and the storm flow over the weir from the primary chamber meet and pass to the outlet. This chamber is an approved sampling point if samples are required for analysis. As it is mainly clean water passing though the chamber, maintenance is confined to checking the weir plate is free of debris.

Chamber 3

The main separation chamber is where the light liquids are retained and in the case of class 1 Stormceptors®, where the coalescer units are incorporated.

If coalescer units are incorporated, these should be removed and cleaned in accordance with the requirements set out in Data Sheet ref. 3.23 steps 1 to 5.

Retained light liquids should be removed from the top and any sediment from the bottom. Small Stormceptor® by-pass separators generally need to be completely emptied.

SPEL automatic alarm/monitoring system

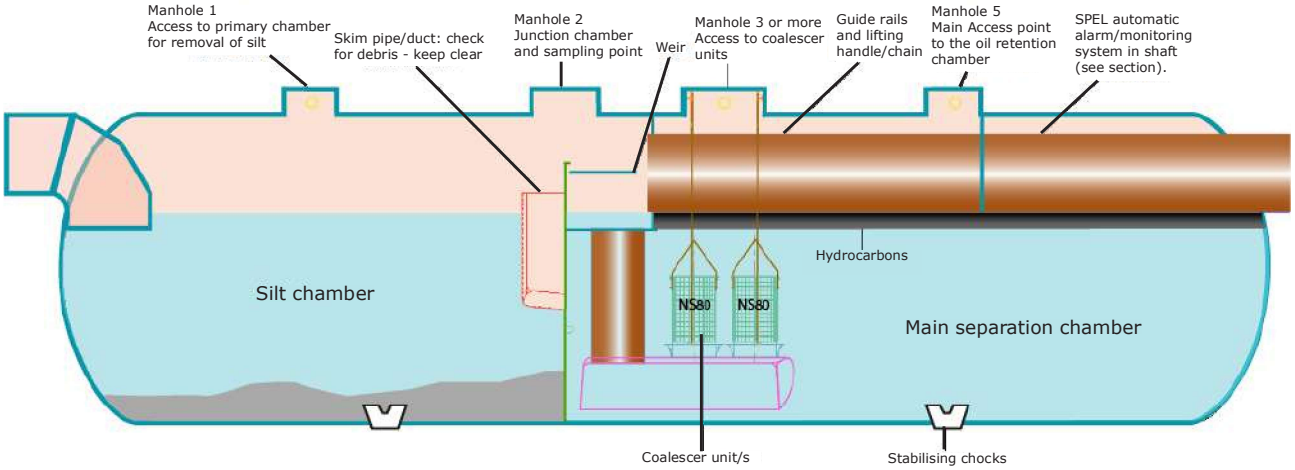
If a SPEL automatic alarm/monitoring system is fitted this will automatically signal when the Stormceptor® requires light liquids to be removed. If this system is fitted see 3.10 – 3.19.

When emptying take care not to damage or shift the probe protection tube situated in the access shaft of chamber 3.

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Maintenance Access

SPEL Stormceptor® class 1 by-pass separators 400, 500 & 600 Series



A wide range of SPEL Stormceptor® class 1 by-pass separators is available incorporating coalescer unit/s for small to large catchment areas.

When emptying ensure both chambers (primary – chamber 1 and separation – chamber 3) are emptied equally to prevent unequal pressure on the internal partition.

Manhole access 1

This is the access to the primary chamber for removal of silt, the inspection of the skim pipe and clearing of any floating debris.

Manhole access 2

This provides access to the junction chamber which is suitable as a sampling point for the final discharge.

Manhole access 3 & 4 (larger models)

These provide access for the inspection, the removal and reinsertion of the coalescer units and the removal of hydrocarbons and silt.

The SPEL automatic alarm/monitoring system probe is generally situated at the base of this access shaft (see section on alarms).

Maintenance

SPEL Puraceptor® class 1 separators

The SPEL Puraceptor® class 1 separator is available in single chamber or two chamber models.

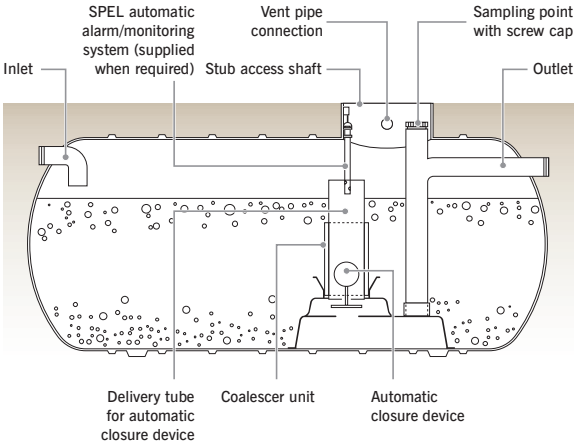
Single chamber models (Figure 1)

These incorporate a coalescer unit and an automatic closure device type 'R'. For maintenance see 3.20.

Two chamber models (Figure 2)

The maintenance procedure for the SPEL Puraceptor® class 1 two chamber models is detailed on sheet 3.20.

Figure 1



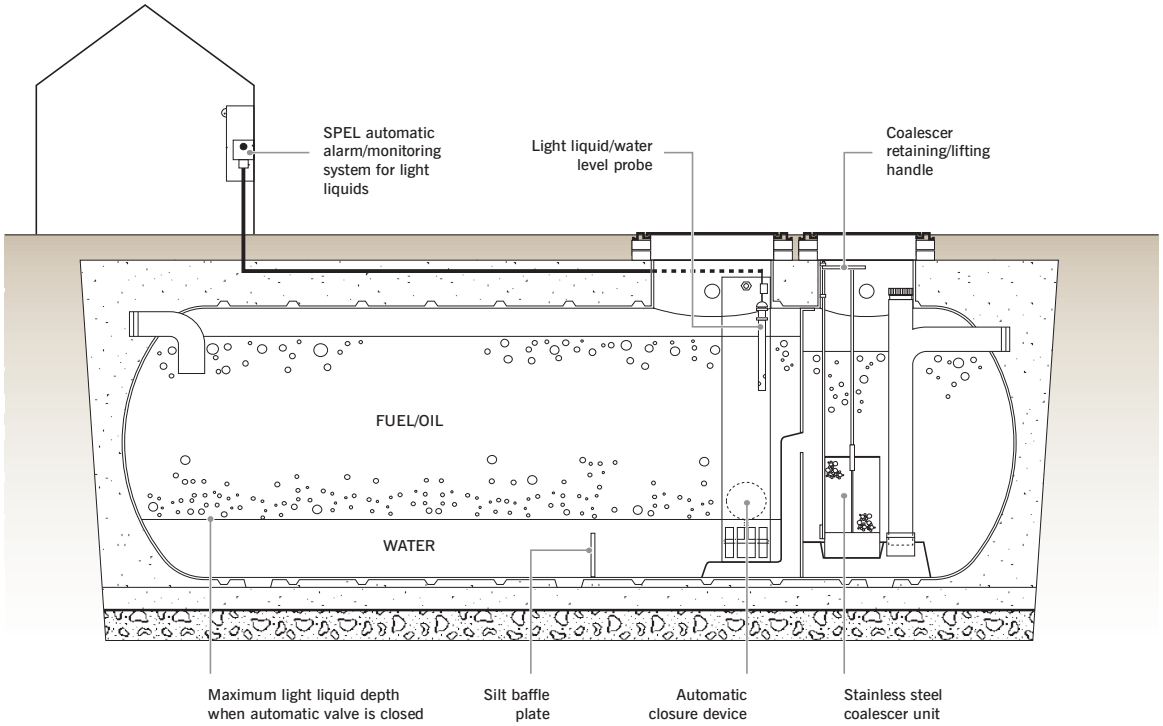
Maintenance requirements

The SPEL automatic alarm/monitoring system will automatically warn you when the SPEL Separator requires emptying of light liquids. See ref. 3.10 – 3.19. However, silt will accumulate and require removing at intervals depending on the site conditions.

We recommend the SPEL Separator is checked at 3, 6 or 12 monthly intervals to determine the depth of silt in the primary chamber.

Separators must be provided with a remote device to provide visual and audible warning when the level of oil reaches 90 per cent of the oil storage volume (V) under static liquid level conditions. This automatic warning device indicates that the separator is in need of immediate emptying for it to continue to work effectively.

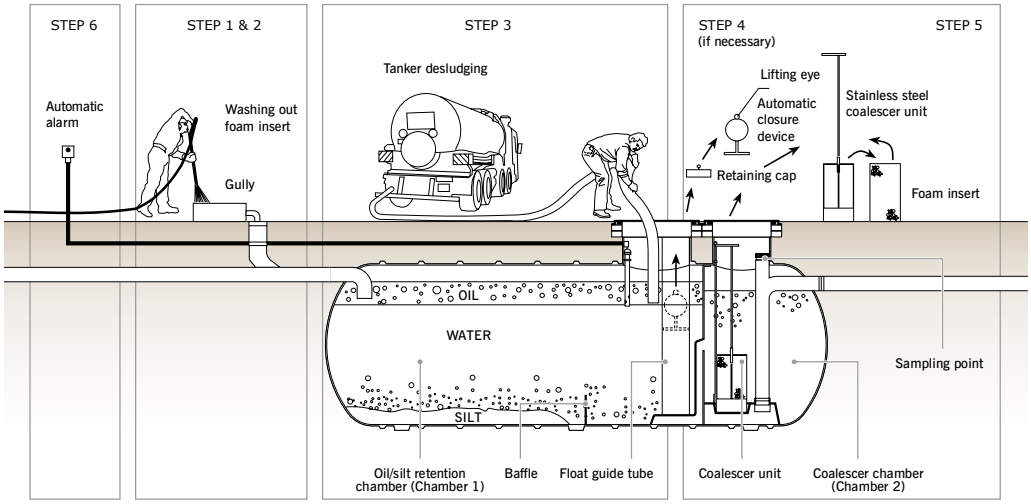
Figure 2



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Maintenance

SPEL Puraceptor® separator - two chamber model



Step 1: Coalescer unit

Use the lifting handle or unclip the retaining clip for the wire rope and lift the coalescer unit out of the tank and place ahead of the Puraceptor®.

Step 2: Cleaning foam insert

Remove foam insert and wash with normal water pressure ensuring the dirty water runs into the Puraceptor®.

Step 3: Sucking out oil/fuel and silt

Suck off the retained oil from both chambers of the Puraceptor® and then the silt deposited on the bottom, leaving sufficient water to ensure the ACD remains floating.

Step 4: Sucking out complete contents (if necessary)

If the quantity of pollutants exceeds recommended levels, the complete contents of the Puraceptor® may need to be removed.

After sucking out completely, remove the ACD in the ACD retaining tube by first removing the retaining cap (this is to safeguard against the removal of the float by unauthorised persons).

Then, by means of a pole with a hook, lift out the ACD using the lifting eye on the float. Check the seating at the base of the retaining tube is free of debris/silt that could prevent the ACD closing off in an emergency.

Step 5: Re-insert coalescer unit and ACD

Re-insert the foam insert into the stainless steel coalescer unit and re-insert the coalescer unit into the Puraceptor®. Re-clip the wire rope or location pin as provided with the SPEL lifting/locating/locking system (see 3.7).

Partially fill the Puraceptor® with clean water to ensure the ACD when re-inserted remains floating. Check the ACD is not damaged and the closure plate is clean. Re-insert the ACD.

Finally check the ACD is floating and the retaining cap has been replaced to safeguard against its removal by unauthorised persons, unless depth of tank precludes doing so from ground level.

ACD closes off in emergency due to oil spill

If the ACD closes off, the oil/fuel spill needs to be removed by a suction tanker. With a single chamber model, the complete contents will need to be removed in order to release the ACD. With the two chamber models, insert the suction hose into the first chamber (oil/silt retention chamber) and then the head in the second chamber will normally provide a back pressure and automatically release the ACD.

Precaution: never try to pull the ACD off its seating by force.

Step 6: SPEL automatic alarm /monitoring system

The SPEL automatic alarm/monitoring system probe should be lifted out of the probe protection tube, wiped clean and re-inserted. The system should now be reset according to instructions.
See 3.10 – 3.19.

Maintenance procedure

The SPEL automatic alarm/monitoring system will automatically warn you when the Puraceptor® requires emptying. See 3.10 – 3.19. Where a SPEL automatic alarm/monitoring system is not fitted, SPEL Puraceptors® should be checked at three, six or twelve-monthly intervals depending on site conditions, to determine the depth of retained pollutants and silt in both chambers and the correct operating of the ACD (automatic closure device). When the depth of the oil/fuel retained has reached the predetermined design level, in accordance with BS EN 858-1, it should be emptied.

Important Note: When emptying, ensure both chambers are emptied equally starting with the oil retention chamber and then the coalescer chamber and back again until empty.

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19.9.2014
D15622Be

GA-1

Grease Separator Alarm Device

Installation and Operating Instructions



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SYMBOLS


Warning / Attention


Device is protected by double or reinforced insulation

1 GENERAL

GA-1 is an alarm device for monitoring the thickness of the grease layer accumulating in a grease separator.

The system consists of GA-1 control unit, GA-SG1 sensor and a cable joint.

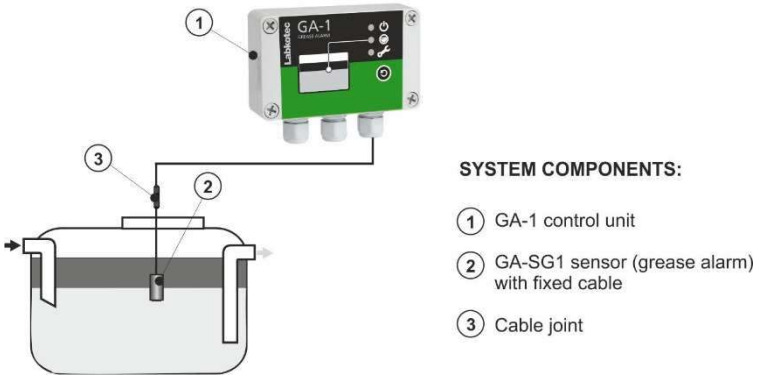


Figure 1. Grease separator supervision with GA-1 alarm device

GA-SG1 sensor is installed into the grease separator and it supervises thickness of grease layer.

The LED indicators, push button and interfaces of the GA-1 control unit are described in figure 2.

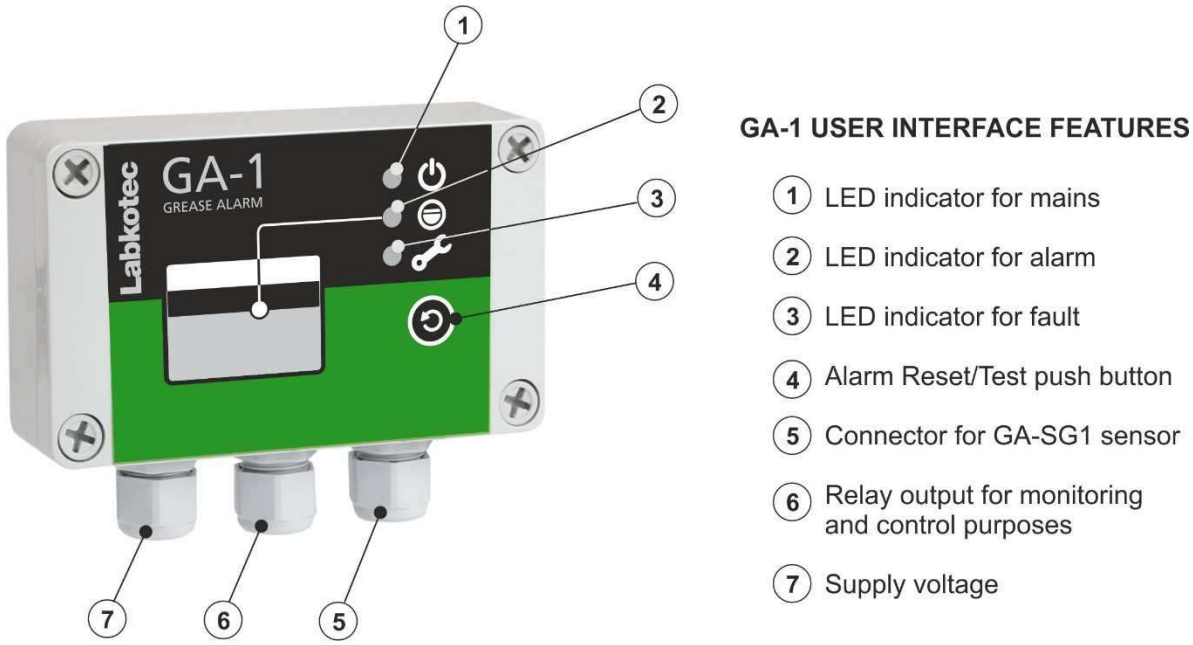


Figure 2. GA-1 control unit – features

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2 INSTALLATION

2.1 GA-1 control unit

GA-1 control unit can be wall-mounted. The mounting holes are located in the base plate of the enclosure, beneath the mounting holes of the front cover.

The cover of the enclosure must be tightened so, that the edges touch the base frame. Only then does the push button function properly and the enclosure is tight.

Before installation, please read the safety instructions in chapter 6!

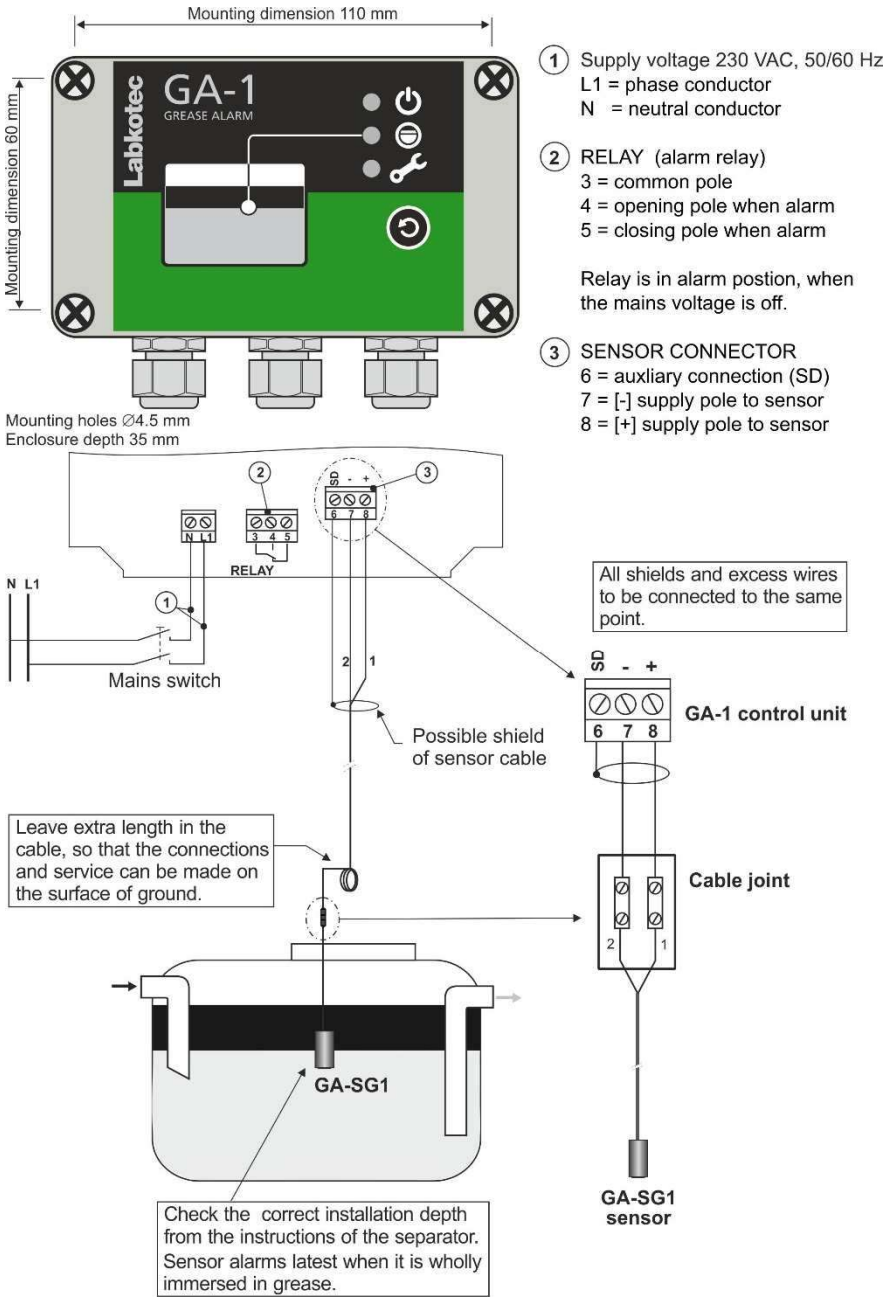


Figure 3. GA-1 alarm device installation.

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2.2 GA-SG1 sensor

GA-SG1 sensor should be installed as described in figure 3.

The sensor gives an alarm latest when it is wholly immersed in grease.

Please check the correct installation depth also from the instructions of the grease separator.

2.3 Installation Accessories

The delivery includes a cable joint (figure 4), fixing accessories (figure 5) for installation of the control unit and the sensor. In figure 6 is an installation example of cable with suspension hook.

Connections of the sensor cable inside the cable joint are explained in figure 3. If shielded cable is used cable shields and possible excess wires need to be connected to the same point in galvanic contact.

IP rating of the cable joint is IP68. Make sure, that the cable joint is closed properly.



Figure 4 Cable joint

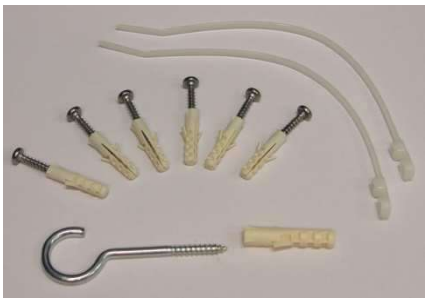


Figure 5. Fixing accessories



Figure 6. Cable installation example

3 OPERATION

The operation of the alarm device should be checked always after the installation. Also check the operation always when emptying the separator or at least once every six months.

Functionality test

1. Immerse the sensor into water. The device should be in normal mode.
2. Lift the sensor up in air or grease. A grease alarm should be generated (see chapter 3.1 for more detailed description).
3. Clean up the sensor.
4. Immerse the sensor back into water. The alarm should go off after a delay of 10 sec.

A more detailed description of the operation is provided in chapter 3.1.
If the operation is not as described here, check connections and cabling. If necessary contact a representative of the manufacturer.

3.1 Modes of operation

Normal mode – no alarms

Sensor is totally immersed in water.

Mains LED indicator is on.
Other LED indicators are off.
Relay is energized.

Grease alarm

Sensor is immersed in grease. (the sensor gives an alarm latest when it is wholly immersed in grease).

Mains LED indicator is on.
Grease Alarm LED indicator is on.
Buzzer on after 10 sec delay.
Relay de-energize after 10 sec delay.
(Note. The same alarm takes place when GA-SG1 sensor is in the air.)

After removal of an alarm, the Grease Alarm LED indicator and buzzer will be off, and relay will be energized after 10 sec delay.

Fault alarm

Sensor cable break, short circuit or a broken sensor.

Mains LED indicator is on.
Sensor circuit Fault LED indicator is on after 10 sec delay.
Buzzer is on after 10 sec delay.
The relay de-energize after 10 sec delay.

Reset of an alarm

When pressing the Reset/Test push button.

Buzzer will go off.
Relay and LED indicator will not change their position until the alarm or fault situation is removed.
If the buzzer is not reset, it goes off automatically after three days.

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TEST FUNCTION

Test function provides an artificial alarm, which can be used to test the function of the GA-1 alarm device and the function of other equipment, which are connected to GA-1 via its relay.



Attention! Before pressing the Reset/Test button, make sure that the change of relay status does not cause hazards elsewhere!

Normal situation	*When pressing the Reset/Test push button:* *Grease Alarm and Fault LED indicators are immediately on.* *Buzzer is immediately on.* *Relay de-energize after 2 sec of continuous pressing.* *When the Reset/Test push button is released:* *LED indicators and buzzer go immediately off.* *Relay energize immediately.*
Alarm on	*When pressing the Reset/Test push button for the first time:* *Buzzer will go off.* *When pressing the Reset/Test push button after that:* *Fault LED indicator is immediately on.* *Grease Alarm LED indicator remains on.* *Buzzer remains on. If it has been reset earlier, it will return to be on.* *When the Reset/Test push button is released:* *The device returns right away to the preceding status.*
Fault alarm on	*When pressing the Reset/Test push button:* *The device does not react to the test at all.*

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4 TROUBLE-SHOOTING

Problem:	***No alarm when sensor in grease or air, or the alarm will not go off***
Possible reason:	*Sensor is dirty.*
To do:	*1. Clean-up the sensor and check the operation again.*

The following operations must be performed only by a qualified electrician!

Problem:	***MAINS LED indicator is off***
Possible reason:	*Device doesn't get supply voltage.*
To do:	*1. Check that power separation switch is not switched off.* *2. Measure the voltage between poles N and L1. It should be 230 VAC + 10 %.*

Problem:	***FAULT LED indicator is on***
Possible reason:	*Current in sensor circuit too low (cable break or out of connector) or too high (cable in short circuit). The sensor might also be broken.*
To do:	*1. Make sure, that the sensor cable has been connected correctly to the GA-1 control unit.* *2. Measure the voltage separately between the poles 7 and 8. The voltages should be between 7,0 - 8,5 V. Note! The voltage alternates between the sensor connectors in 1 second intervals.* *3. Measure sensor current when the sensor is in the air or in grease. The measured current should be 7,0 – 8,5 mA.* *4. Measure current when the sensor is in the water. Measured current should be 2,5 – 3,5 mA*

If the problem can not be solved with the above instructions, please contact Labkotec Oy's service.

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5 REPAIR AND SERVICE

The sensor should be cleaned and the operation should also be tested when emptying or maintaining the grease separator or at least once every six months. The easiest way to check the operation is to lift the sensor up in the air and to put it back to the separator. The operation is described in chapter 3.

For cleaning, a mild detergent (e.g. washing-up liquid) and a scrubbing brush can be used.

In case of queries, please contact Labkotec Oy's service:

service@labkotec.fi.

6 SAFETY INSTRUCTIONS



The device does not include a mains switch. A two pole mains switch (250 VAC 1 A), which isolates both lines (L1, N) must be installed in the main power supply lines in the vicinity of the unit. This switch facilitates maintenance and service operations and it has to be marked to identify the unit.



If opening of housing's cover is needed, only a qualified electrician is allowed to install or to maintain the device.



If the device is used against the manufacturer's instructions, the protection provided by the device may be damaged.



The device is not allowed to install in hazardous areas.

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7 TECHNICAL DATA

GA-1 control unit	
Dimensions	125 mm x 75 mm x 35 mm (L x H x D)
Weight	250 g Package 0,8 kg (control unit + sensor + cable joint)
Enclosure	IP 65, material polycarbonate Cable glands adjustment range is 6 – 10mm
Operation temperature	-30 ºC…+50 ºC
Supply voltage	230 VAC ± 10 %, 50/60 Hz The device is not equipped with a mains switch
Power consumption	5 VA
Sensors	GA-SG1 sensor
Relay output	Potential-free relay output 250 V, 5 A Operational delay 10 sec. Relay de-energize at trigger point.
Electrical safety	IEC/EN 61010-1, Class II ⧈, CAT II
EMC Emission Immunity	 IEC/EN 61000-6-3 IEC/EN 61000-6-1
Manufacturing year: Please see the serial number on the type plate	xxx x xxxxx xx **YY** x where YY = manufacturing year (e.g. 14 = 2014)

GA-SG1 sensor	
Principle of operation	Capacitive
Material	POM, PUR, AISI 316
Weight	350 g (sensor + fixed cable)
IP-classification	IP68
Operation temperature	0 ºC…+90 ºC
Cable	Fixed cable 2 x 0.75 mm^2. Standard length 5 m, other lengths optional. The max. length of the fixed cable is 15 m, can be extended. Maximum cable loop resistance is 75 Ω.
EMC Emission Immunity	 IEC/EN 61000-6-3 IEC/EN 61000-6-1
Manufacturing year: Please see the serial number from the bottom of sensor	GAxxxxx**YY** where YY = manufacturing year (e.g. 14 = 2014)

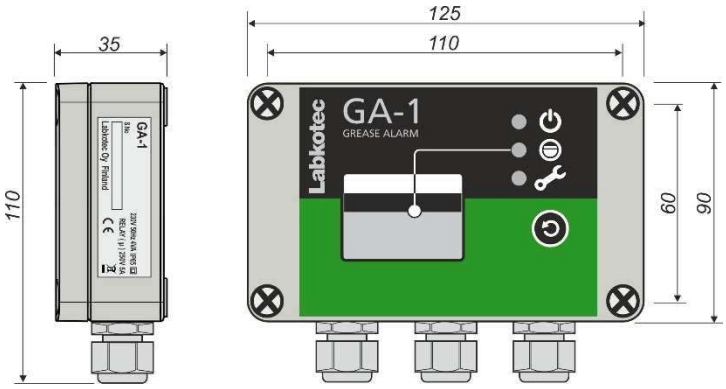


Figure 7. GA-1 control unit

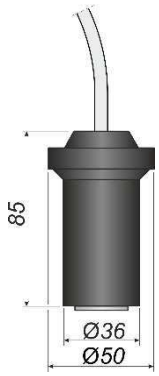
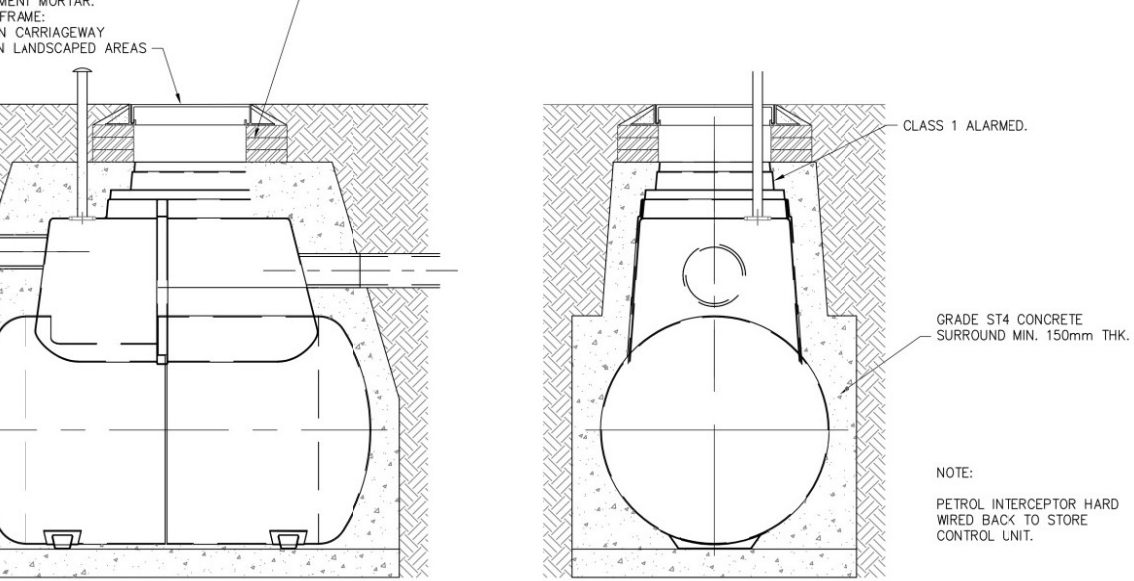


Figure 8. GA-SG1 sensor

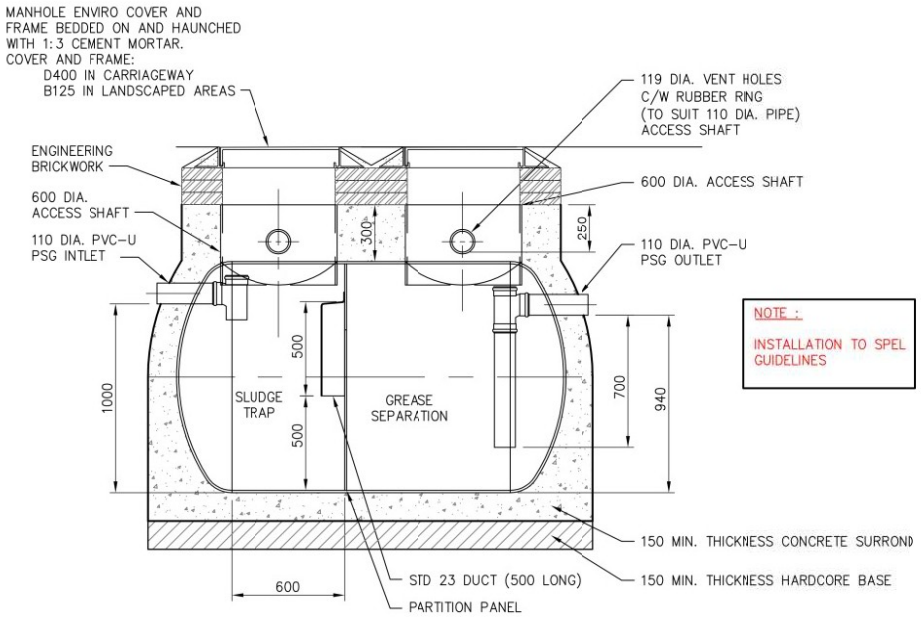
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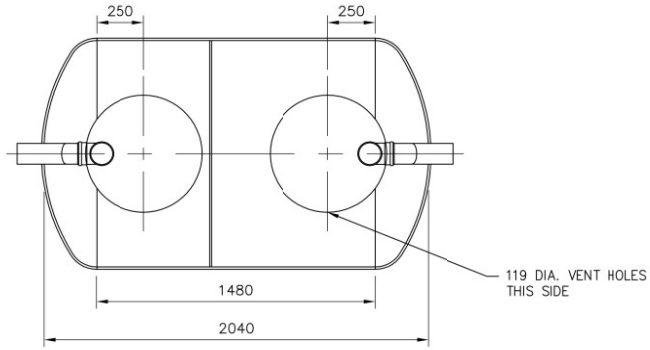


SPEL 206 C1 PETROL INTERCEPTOR (OR SIMILAR APPROVED). CONCRETE SURROUND

Scale 1:20



SECTION



PLAN

2000L SPEL GREASE INTERCEPTOR WITH TELEMETRY ALARM

SCALE 1:20

Labkotec
INDUTRADE GROUP

L15624_e
F15625_e

Declaration of Conformity

This declaration certifies that the below mentioned apparatus conforms to the essential requirements of the EMC directive 2004/108/EY and Low-Voltage directive (LVD) 2006/95/EC.

Description of the apparatus:	Measuring and control unit with sensor
Type:	GA-1 Grease Alarm control unit with GA-SG1 sensor GA-2 Grease Alarm control unit with two GA-SG1 sensors
Manufacturer:	Labkotec Oy Myllyhaantie 6 FI-33960 Pirkkala FINLAND

The construction of the appliance is in accordance with the following standards:

EMC:	
EN 61000-6-1 (2007)	Electromagnetic compatibility, Generic standards – Immunity for residential, commercial and light-industrial environments.
EN 61000-6-3 (2007) +A1 (2011)	Electromagnetic compatibility, Generic standards – Emission standard for residential, commercial and light-industrial environments.
EN 61000-3-2 (2006) +A1+A2 (2009)	Electromagnetic compatibility, Product family standard: Harmonic current emissions.
EN 61000-3-3 (2008)	Electromagnetic compatibility, Product family standard: Voltage changes, fluctuations and flicker sensation.
LVD:	
EN 61010-1 (2010)	Safety requirements for electrical equipment for measurement, control and laboratory use. Part 1: General requirements.

This product is CE-marked since 2013.

Signature

The authorized signatory to this declaration, on behalf of the manufacturer, and the Responsible Person based within the EU, is identified below.

Pirkkala 20.5.2013

Ari Tolonen
CEO
Labkotec Oy

SPEL Grease/Fat Separators

Introduction

Grease separators are used to remove fat and grease from waste water. This is often essential to eliminate incidents of drain blockages caused by the waste from catering establishments. The operation of septic tanks, pumps, and sewage treatment systems will also be improved by removing the fat and grease from the effluent.

Siting and Installing the Tank

The tank should not be installed near a road or driveway, where it could be subjected to high external loads, unless the installation is designed to withstand such loadings so they are not transferred to the tank shell.

Where the tank is to emptied using a tanker, it should be sited within 30m of a vehicle access provided that the invert level of the septic tank is no more than 3m below the level of the vehicle access. This distance may need to be reduced where the depth to the invert of the tank is more than 3m. There should also be a clear route for the hose such that the tank can be emptied and cleaned without the contents being taken through a dwelling or place of work.

Adequate ventilation of the tank and the inlet pipework must be provided to prevent the accumulation of fermentation gases.

For full installation instructions concerning tank specification handling and burial please consider our supplied installation guidelines, Sec4.

Operation

Please refer to a supplied drawing. Contaminated water flows into the tank through the inlet pipe. Heavy deposits will settle on the bottom of the chamber and light contaminants will mostly float on top of the water. Cleaner water flows through to the second chamber where water is allowed to pass out of the tank taken from the cleanest part of the chamber.

Maintenance

Grease, sludge and other fatty effluents remain in the tank until removed by a specialist cleansing or waste disposal contractor. The tank must be emptied periodically of retained grease, sludge and other fatty effluents. Other than this action SPEL Grease separators are essentially maintenance free, however, it is not possible to predict site specific maintenance requirements. SPEL tank shells usually carry a 25-year warranty.

© SPEL Products, Lancaster Road, Shrewsbury, Shropshire. SY1 3NQ. Tel: +44 (0)1743 445200

Alarm Options
SPEL can provide a range of alarms to suit your needs.

Access
SPEL Grease separators have good access to both chambers for period emptying of retained grease, sludge and similar fatty effluents. Access is made in each case through a circular access shaft of 600mm diameter at the crown of the chamber.

Emptying Period
Periods between emptying will have to be determined depending on site conditions but normally at least twice a year.

Emptying Procedure
Typically the contents of the chambers will be sucked out by a specialist cleansing or waste disposal contractor. Both light and heavy deposits should be removed at this time. A Large hose is usually lowered down into the chamber through the access shaft. As the contents are sucked out care should be taken to ensure that both chambers contents are reduced equally. If one chamber is allowed to contain too great a quantity of fluid in comparison with the other chamber damage to the dividing baffle wall may result. Following removal the tank should be re-charged with clean water. The removed contents should be disposed of by the specialist contractor.

The contents of this document are supplied for general guidance only. SPEL Products can accept no liability for harmful incidents that arise as a result of the contents of this document. It is not possible for SPEL Products to predict site specific operational or maintenance requirements.

Vortex Flow Control

Operation & Maintenance Instructions

Item: Crown Radial Type Vortex Flow Control Unit

Operation
The Vortex Flow Control unit is a surface water regulator. It is entirely self activating and requires no manual intervention

Maintenance
The unit requires no routine maintenance
In the event of a blockage, it can be removed after the system has been drained down by pulling on the lifting cable located at the access

Inspection
The chamber containing the unit should be inspected in line with normal practice. Any debris or silt should be removed
Any visible fixing bolts should be checked. If an internal blockage is suspected
the vortex unit can be removed and inspected internally through the inlet or outlet hole
The unit must be replaced and securely fitted before the unit becomes operational

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Ascot
SL5 7ET
Tel 01344 886996
Fax 01344 885986

Appendix D

Wessex Water Correspndence

Response to: Developer e-mail: Viktor Nemeth <VNemeth@glanvillegroup.com>				
Planning Ref:		Our Ref: SU06SW/ 400	Our Email:	planning.liaison@wessexwater.co.uk
Proposal:	Drive Through			
Location:	Devizes, HortonRd SN10 2JG		DATE	26.11.2025

Thank you for your pre-development enquiry. Extracts from our records showing the approximate location of our apparatus within the vicinity of the site are attached.

We have reviewed documents submitted in support of the enquiry. We have following comments to make:

Foul Drainage

Foul Sewerage – Point of Discharge

Wessex Water will accommodate domestic type foul flows in the public foul sewer with connections made on a size for size basis, Developers fund the cost of connecting to the nearest 'size for size' sewer and Wessex Water will manage the sewer network to accommodate foul flows from granted development. We fund this through our infrastructure charging arrangements.

The nearest suitable size for size point of discharge is the 300mm dia Public Combined Sewer in London Road.

The point of connection to the public foul network is by application and agreement and Wessex Water will accommodate domestic type foul flows in the public foul sewer with connections made on a 'size for size' basis, Developers fund the cost of connecting to the nearest 'size for size' foul sewer and Wessex Water will manage the foul sewer network to accommodate foul flows from granted development. We fund this through our infrastructure charging arrangements.

Separated systems of drainage are required: Wessex Water will not accept surface water or land drainage flows to the public foul sewer and treatment works, either directly or indirectly.

Surface Water Drainage (rainwater falling onto, and running off, impermeable surfaces)

Surface water must be disposed of via the SuDS Hierarchy which is subject to Building Regulations and NPPF.

No surface water runoff, land drainage or ground water will be accepted into a public sewer that carries sewerage, either directly or indirectly.

The National Planning Policy Framework (NPPF) mandates that Sustainable Drainage Systems (SuDS) must be incorporated into new developments to manage surface water runoff, mitigate flood risks, and provide additional benefits, including enhanced water quality and green spaces.

In line with the drainage hierarchy outlined in Approved Document H of the Building Regulations, Planning Practice Guidance, and the necessity to address water scarcity, all surface water runoff should aim to be discharged as high up the following hierarchy as feasible:

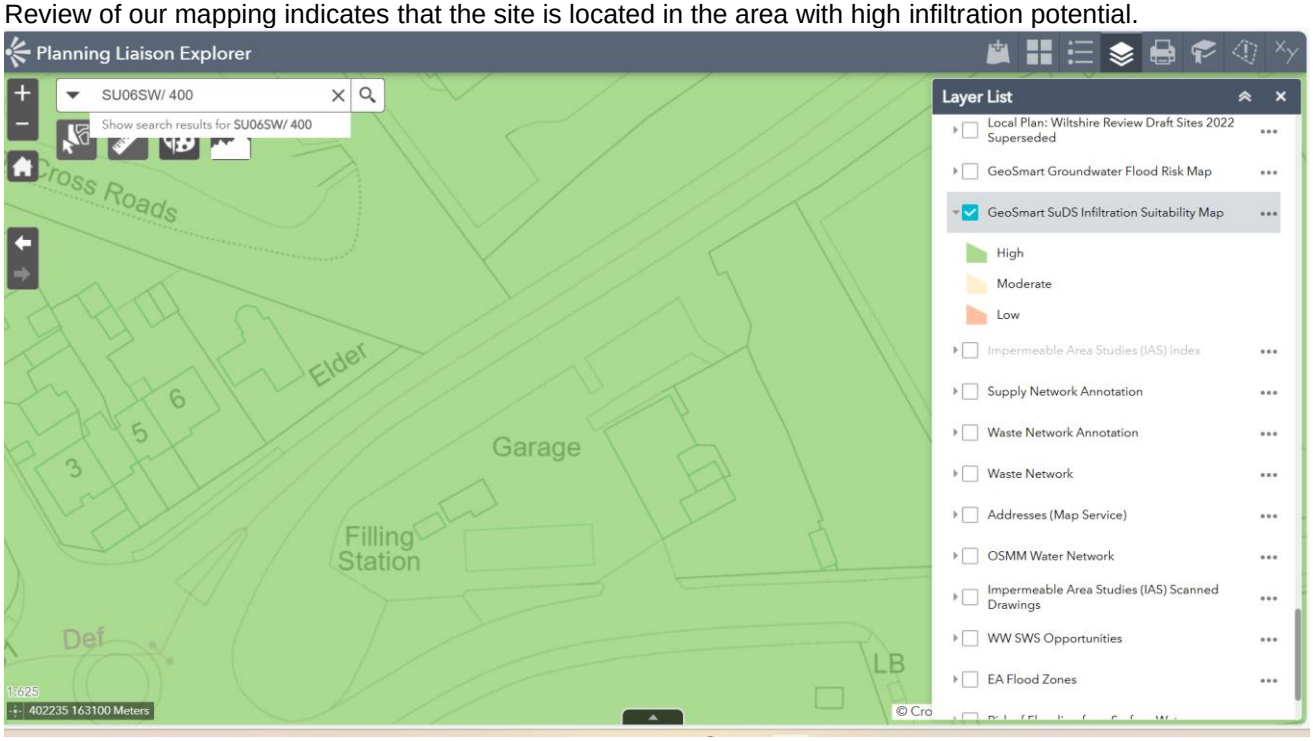
- Rainwater reuse through harvesting or greywater recycling
- An adequate soakaway or other infiltration system
- A hybrid solution involving infiltration and discharge to a surface water body
- Discharge directly to a surface water body (e.g., an ordinary watercourse)
- Discharge to a surface water sewer, highway drain, or other drainage system

Wessex Water statement on surface water discharge can be accessed via the following link: :
https://developerservices.wessexwater.co.uk/media/m4rjrfmg/wwds-dev063p-rainwater-drainage-policy.pdf

Review of the submitted information in support of this application indicates that it is proposed to discharge 3l/s into the public surface water sewer. This is **not acceptable** for following reasons:

- no compliance with Surface Water Discharge Hierarchy
- There is no evidence of water reuse or soakaway testing
- The 3l/s is not acceptable – this rate seems extremely high for such a small site

Review of our mapping indicates that the site is located in the area with high infiltration potential.



No drainage strategy has been submitted in support of this application.

Adoption

Wessex Water can adopt SuDS features as part of a surface water sewer network, SuDS schemes will be required to have full S104 technical approval and full planning approval before construction work begins. All drainage design requirements for the site (discharge rates, attenuation, climate change etc.) must be agreed, in consultation with the Local Planning Authority / Lead Local Flood Authority, prior to the submission of a formal S104 application. Adoption is by agreement with Wessex Water. More detailed information and guidance for adoptable standards can be found on our Developer Services Web Pages Sector guidance on sewerage and water adoption agreements (wessexwater.co.uk)

Water Supply

Wessex Water will provide a point of connection for new water mains to be laid into the development site, either through a Section 41 agreement or a self-lay arrangement.

There is 4" (in Horton Road) and 450mm (in London Road) distribution in the vicinity of the site from which a suitable point of connection could be made.

Developers may connect to our water network on a size for size basis at their cost and Wessex Water will undertake any network reinforcement that may be required to accommodate granted development, this is funded through our infrastructure charging arrangements.

Upon grant of planning Wessex Water will undertake a modelling exercise to determine the impact on our network and manage any necessary improvements.

For more details and guidance for applying to connect to our networks please see our website: https://www.wessexwater.co.uk/services/building-and-developing/building-multiple-properties-or-largedevelopments

New Appointments and Variations (NAVs)

The NAV Market enables developers to choose their water or sewerage undertaker for a specific geographic area. For developers wishing to consider an alternative supplier or seeking further information, a full list of

appointees and further guidance can be found on the Developing a new site (wessexwater.co.uk) and Ofwat website.

If you are making a NAV enquiry, there is a Wessex Water dedicated wholesale team that deal with NAV enquiries. Full details are on our website including guidance notes, our policy and contact details https://developerservices.wessexwater.co.uk/new-appointments-and-variations

I trust that you will find the mapping and initial comments of use.

Note: These comments are based upon known circumstances prevailing at the time of writing. A review of the contents of this email is required where 18 months or more have elapsed since issue or in the light of significant changes likely to impact upon the response (e.g. changes in development numbers or phasing). Please email review requests to planning.liaison@wessexwater.co.uk

Hertfordshire | Oxfordshire | Cambridgeshire | Bristol

postbox@glanvillegroup.com | www.glanvillegroup.com

Glanville
Survey > Plan > Engineer

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