Our Ref: 7657_RH20_Pickhurst Lane_07

Date: 20TH November 2025

RE: (DC/25/1371) Land West of Parsons Field Stables, Pickhurst Lane, Pulborough, West Sussex, RH20 1DA

This letter has been prepared in response to Lead Local Flood Authority comments dated 12.11.2025 with regards to the proposed drainage arrangements for the above site.

LLFA Comment

The site must be assessed as Greenfield and an assessment of how the site drained, prior to any development, must be provided.

Response

The site has been assessed as greenfield, with existing surface water draining via gravity to the existing watercourse located to the south of the site. Overland flow routes are shown on the proposed drainage layout shown in Appendix A, and were provided with the revision 5 of the drainage strategy report dated 21/10/2025.

LLFA Comment

HDC note that the Proposed Drainage Layout, as presented on page 21 within the Drainage Strategy report, depicts "All proposed hardstanding to be porous surface". HDC drainage note that the hardstanding has already been laid on site (as observed on Google Earth Pro). No assessment of the materials used has been provided. Evidence of what materials have been lain on site must be provided to demonstrate that the materials used are porous and infiltration is possible. Should this not be the case, the drainage strategy must be amended to include all areas of hardstanding within the catchment for the surface water drainage strategy and the resulting overland flow must be managed appropriately.

Response

All existing hardstanding material onsite is to be removed from the site and replaced with porous material.

LLFA Comment

To note, the current drainage catchment area considered is 0.0395ha whereas the total site area is 0.592ha. Should the hardstanding on site not be demonstrated to be porous/ permeable, HDC Drainage expect to see the resulting catchment area included within the calculations for the surface water drainage strategy.

Response

As stated above all existing hardstanding materials are to be removed and replaced with porous material. The impermeable area plan contained in Appendix B of this document shows the existing and proposed areas, with the proposed surfacing to be porous material.

LLFA Comment

The applicant should provide a measurement of the total site area, all pre-development permeable and impermeable areas within the red line boundary, all post-development permeable and impermeable areas within the red line boundary, with supporting catchment plans and all corresponding calculations.

Response

Pre and post-development impermeable area plans are provided within Appendix B of this document and greenfield runoff rates based on the proposed impermeable area are included within Appendix C.

LLFA Comment

A fully designed surface water management strategy should include:

- *The aim to achieve and better greenfield runoff rates and adherence to the drainage hierarchy.*
- *Rationale for SuDS selected in line with the Horsham District Planning Framework (2015) – Policy 38, and industry best practice such as The SuDS Manual (C753).*

Response

Runoff rates for pre and post development and greenfield rates are included within Appendix C of this document. A discharge rate of 1 l/s has been proposed as a practical minimum flow rate that balances and mitigates both the increased flood risk and blockage risk to the proposed drainage system.

Refer to SuDS justification document included within Appendix D of this document for rationale for SuDS selection onsite.

LLFA Comment

The method of foul and surface water disposal must be confirmed in line with the drainage hierarchy (Building Regulations Part H).

Response

Asset plans, contained in Appendix E and included in previous revision 5 of the drainage strategy report dated 21/10/2025, show that there are no public foul sewers within the vicinity of the site, following the foul drainage hierarchy set out in the drainage strategy document the proposed method has been adopted.

LLFA Comment

Where rainwater harvesting (RWH) is proposed, the appropriate sized storage unit for this system must be provided on site.

Response

Rainwater harvesting has been omitted from the site following the change in Natural England Water Neutrality policy as of October 2025.

LLFA Comment

Whilst the use of RWH is welcomed and encouraged, the operational volume within the storage unit cannot be considered a component of the total stormwater attenuation on site because there is no guarantee of water use within the property or the availability of the storage unit (system failure). Therefore, evidence is required to show the overall surface water drainage system has sufficient capacity to provide the necessary stormwater attenuation, without reliance on the RWH system.

Response

As stated above rainwater harvesting has been omitted from the site following the change in Natural England Water Neutrality policy as of October 2025.

LLFA Comment

The following flow and volume rates must be provided:

- *Existing runoff rates during a 100% Annual Exceedance Probability (AEP), 3.33% AEP, 1% AEP storm events*
- *Post development discharge rates during a 100% AEP, 3.33% AEP, 1% AEP and 1% AEP + Climate Change storm events (the 100% AEP, 3.33% AEP, 1%AEP incl. climate change have been provided in Appendix D of the Drainage Strategy, but not in the main report)*
- *Greenfield runoff rate (QBAR)*
- *Water storage capacity volumes of the proposed drainage features to attenuate the 1% AEP + Climate Change storm event.*

The runoff from the proposed development should, where possible, be restricted to the greenfield 1 in 1 year runoff rate (100% AEP) during all events up to and including the 1 in 100-year rainfall event (1% AEP) + 45% allowance for climate change. Where this is not possible, the runoff from the proposed development should restrict flows to as close as reasonably practical to the greenfield runoff rate for the site.

Response

Runoff rates for pre and post development and greenfield rates are included within Appendix C of this document. A discharge rate of 1 l/s has been proposed as a practical minimum flow rate that balances and mitigates both the increased flood risk and blockage risk to the proposed drainage system.

LLFA Comment

The surface water drainage strategy must demonstrate that the proposed SuDS attenuate all runoff from all impermeable areas (with an additional area equivalent to +10% of the area of any residential development, factored into the sum of the total impermeable areas on site, allowing for urban creep) for the 1 in 100-year rainfall event (1% AEP) + 45% allowance for climate change (upper end). Attenuation should be provided on site to ensure that:

- *The 100% AEP storm event does not generate excessive surcharging in the drainage system.*
- *The 3.33% AEP storm event is safely contained underground with no flooding.*
- *The 1% AEP + climate change storm event is safely contained within the site without risk to persons or property.*

Response

The drainage calculations have been updated for consideration for 10% urban creep and shows that no flooding occurs within all storm events, these are contained within Appendix F and was provided within the revision 5 of the drainage strategy report dated 21/10/2025. The drainage design has been updated to suit relevant information and is included within Appendix A of this document.

LLFA Comment

Where infiltration discharge methods are proposed (soakaways/swales etc…), the applicant must provide infiltration testing in accordance with BRE365, at the location and depth of the proposed devices..

Response

No infiltration has been proposed within the drainage design based on existing ground conditions.

LLFA Comment

The applicant must provide evidence of measures to prevent pollution of the receiving groundwater and/or surface water assets. Pollution control and water quality measures should be provided in accordance with the Simple Index Approach as outlined in CIRIA C753 The SuDS Manual.

Response

An evaluation of Pollution Prevention & Water Quality Management using the simple index approach was provided within section 4 of the drainage strategy report and is also included in Appendix G of this document for reference.

LLFA Comment

The applicant must provide plans which indicate the expected exceedance routes for storm events greater than the 1% AEP + climate change storm event. The Drainage Strategy must demonstrate that the surface water runoff from these events can be controlled, to confirm there is no adverse flood risk to the development or elsewhere. Evidence of appropriate management and mitigation of exceedance flows are expected within the Drainage Strategy, to demonstrate that the proposed conveyance systems have considered the risks associated to nature, people and property during the event of failure and/or exceedance.

Response

Exceedance flow paths for events greater than the 1 in 100 year + 40% climate change event have been added to the proposed drainage layout, which is included within Appendix A.

LLFA Comment

Supporting foul flow calculations, in line with Sewerage Sector Guidance and/or Building Regulations Part H, is to be provided. It should be noted that any proposed foul water system and foul water treatment unit should be in line with current legislation and best practice for the management of domestic waste, with any method for disposal justified and appropriate permits sought.

Response

Supporting foul flow calculations in accordance with British Flows and Loads can be found within Appendix H of this document. The proposed drainage design is to be in accordance with the general binding rules for small sewage discharges and therefore doesn't require an environmental permit.

LLFA Comment

Maintenance and Management Plans must be provided for both the proposed Foul and Surface Water Drainage Strategy, including access requirements, maintenance frequency and responsibility, and proprietary device manuals, for all drainage features and SuDS devices.

Response

All onsite surface water and foul drainage and SuDS features are to be maintained throughout the lifetime by the owners of the proposed development, including the proposed permeable paving. The proprietary device manuals for the proposed drainage features are included within Appendix I.

Appendices

Appendix A – Proposed Drainage Layout

Appendix B – Impermeable Area Plan

Appendix C – Greenfield Runoff Rates

Appendix D – SuDS Justification

Appendix E – Asset Mapping

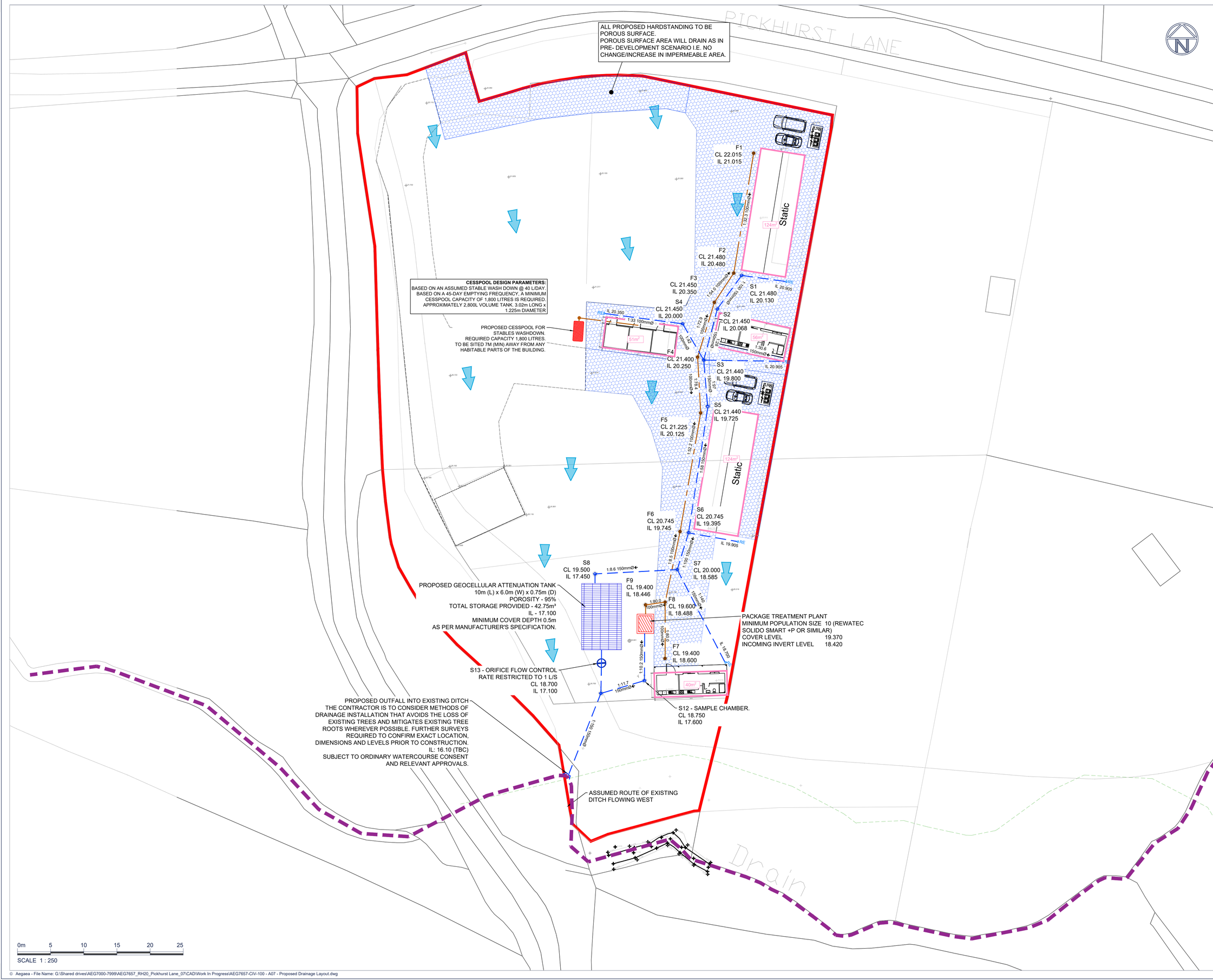
Appendix F – Drainage Calculations

Appendix G – SuDS Mitigation Indices

Appendix H – Foul Calculations

Appendix I – Proprietary Device Manuals

Appendix A - Proposed Drainage Layout



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ANY DISCREPANCIES MUST BE REPORTED IMMEDIATELY TO THE ENGINEER FOR CLARIFICATION BEFORE PROCEEDING.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
REFER TO THE RELEVANT CONSTRUCTION (DESIGN AND MANAGEMENT) DOCUMENTATION WHERE APPLICABLE.
IT IS ASSUMED THAT ALL WORKS ON THIS DRAWING WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR, WORKING WHERE APPROPRIATE TO AN APPROVED METHOD STATEMENT.

GENERAL NOTES

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4. THIS DRAWING IS SCHEMATIC FOR CLARITY ONLY, POSITIONS OF PIPE RUNS AND MANHOLES MAY VARY ON SITE DUE TO SITE CONDITIONS.
5. WHERE EXISTING OR PROPOSED TREES ARE ADJACENT TO ACCESS ROADS OR DRAINAGE, ROOT BARRIERS (TYPE TO BE APPROVED) ARE REQUIRED TO PREVENT STRUCTURAL DAMAGE.
6. ANY ANOMALY OR CONTRADICTIONS BETWEEN ANY OF THE ABOVE IS TO BE REPORTED IMMEDIATELY.
7. THE DESIGN IS TO COMPLY IN ALL ASPECTS WITH THE CURRENT BRITISH STANDARDS, BUILDING REGULATIONS AND BUILDING LEGISLATION ETC.
8. ALL PIPE SIZES, CHAMBER DEPTHS, SIZE & QUANTITY SUBJECT TO REVIEW AND DETAILED DESIGN. ALL ADOPTED PIPE WORK ROUTING AND ANY EASEMENTS SUBJECT TO FULL DESIGN REVIEW AND APPROVAL BY THE RELEVANT BODIES.
9. DRAINAGE DESIGN SUBJECT TO DETAILED LEVELS AND EXTERNAL WORKS DESIGN.
10. SUBJECT TO DETAILED DESIGN AND APPROVAL.
11. THE CONTRACTOR IS TO CONSIDER METHODS OF DRAINAGE INSTALLATION THAT AVOIDS THE LOSS OF EXISTING TREES AND MITIGATES EXISTING TREE ROOTS WHEREVER POSSIBLE. IF ALTERNATIVE/ OPTIMISED ROUTES ARE IDENTIFIED ON SITE THIS SHOULD BE REPORTED BACK TO THE ENGINEER.

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LEGEND

- SITE BOUNDARY
- PROPOSED SURFACE WATER DRAINAGE
- PROPOSED FOUL DRAINAGE
- RE — PROPOSED RODDING EYE
- PROPOSED SURFACE WATER ORIFICE PLATE
- PROPOSED POROUS SURFACE (GRAVEL SURFACING)
- PROPOSED ATTENUATION TANK
- EXISTING DITCH
- OVERLAND FLOW ROUTE
- CONTRIBUTING AREA

Rev	Date	Description	By
A07	20.11.25	ADDITIONAL INFORMATION ADDED TO DRAINAGE LAYOUT FOLLOWING LLFA COMMENTS	CM
A06	20.10.25	UPDATED IN ACCORDANCE WITH LATEST LAYOUT	DB
A05	22.08.25	UPDATED TO SUIT AMENDED SITE LAYOUT, OUTFALL ROUTE AND DITCH SURVEY UPDATED	DB
A04	01.07.25	UPDATED TO SUIT AMENDED SITE LAYOUT	CM
A03	02.05.25	UPDATED TO SUIT AMENDED SITE LAYOUT	CM
A02	24.04.25	UPDATED TO SUIT NEW SITE LAYOUT	CM
A01	09.04.25	FIRST ISSUE	CM

Client
MANORWOOD CONSTRUCTION LIMITED

Project
LAND WEST OF PARSONS FIELD STABLES, PICKHURST LANE

Title
PROPOSED DRAINAGE LAYOUT

Project No.	Drawing No.		Revision
AEG7657	CIV-100		A07
Drawn	**Checked**	**Approved**	**Date**	**Scale @ A1**
CM	DB	JM	APR 2025	1:250

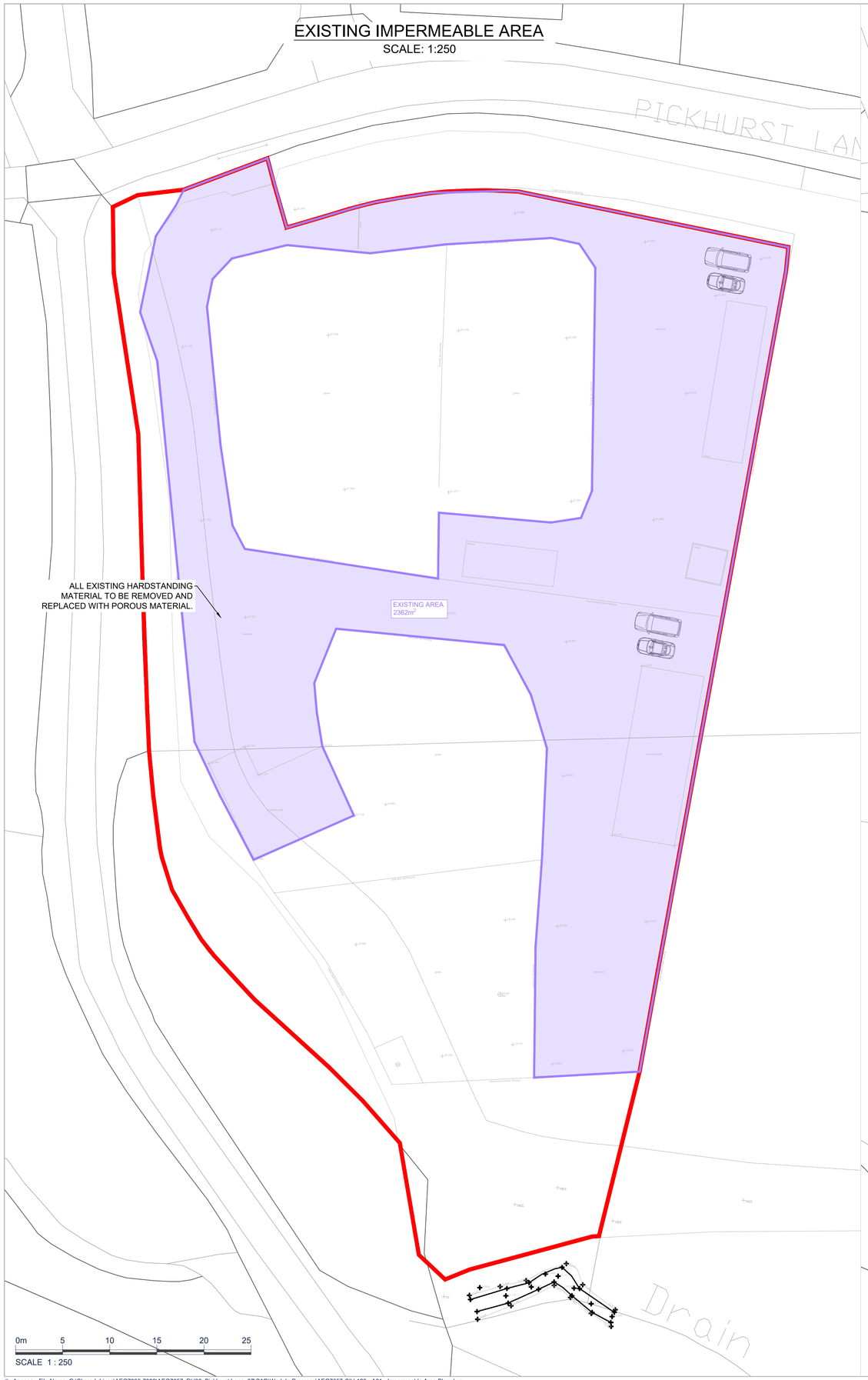
Drawing Status
PLANNING

aegaea
water, civils and environment

Appendix B - Impermeable Area Plan

EXISTING IMPERMEABLE AREA

SCALE: 1:250



PROPOSED IMPERMEABLE AREA

SCALE: 1:250

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LEGEND

- EXISTING IMPERMEABLE AREA
- PROPOSED IMPERMEABLE AREA

Rev	Date	Description	By
A01	18.11.25	FIRST ISSUE	CM

Client

MANORWOOD CONSTRUCTION LIMITED

Project

LAND WEST OF PARSONS FIELD STABLES, PICKHURST LANE

Title

IMPERMEABLE AREA PLAN

Project No.	Drawing No.	Revision
AEG7657	CIV-120	A01

Drawn	Checked	Approved	Date	Scale @ A1
CM	DB	JM	NOV 2025	1:250

Drawing Status

PLANNING

aegaea
water, civils and environment

Appendix C – Greenfield Runoff Rates

Greenfield runoff rate estimation tool

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

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

Project details

Date	18/11/2025
Calculated by	CM
Reference	Pickhurst
Model version	2.2.2

Location

Site name	Land West of Parsons Fields
Site location	Pickhurst Lane - PRE DEV

Site easting (British National Grid)	505366
Site northing (British National Grid)	120903

Site details

Total site area (ha)	0.2362 ha

Greenfield runoff

Method

Method	IH124

IH124

	My value		Map value
SAAR (mm)	845 mm		845
How should SPR be derived?	WRAP soil type		
WRAP soil type	4		4
SPR	0.47		
QBar (IH124) (l/s)	1.4 l/s		

Growth curve factors

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

Results

Method	IH124
Flow rate 1 year (l/s)	1.2 l/s
Flow rate 2 year (l/s)	1.3 l/s
Flow rate 10 years (l/s)	2.3 l/s
Flow rate 30 years (l/s)	3.3 l/s
Flow rate 100 years (l/s)	4.5 l/s
Flow rate 200 years (l/s)	5.3 l/s

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

Disclaimer

Greenfield runoff rate estimation tool

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Project details

Date	18/11/2025
Calculated by	CM
Reference	Pickhurst
Model version	2.2.2

Location

Site name	Land West of Parsons Fields
Site location	Pickhurst Lane

Site easting (British National Grid)	505366
Site northing (British National Grid)	120903

Site details

Total site area (ha)	0.1895 ha

Greenfield runoff

Method

Method	IH124

IH124

	My value		Map value
SAAR (mm)	845 mm		845
How should SPR be derived?	WRAP soil type		
WRAP soil type	4		4
SPR	0.47		
QBar (IH124) (l/s)	1.1 l/s		

Growth curve factors

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

Results

Method	IH124
Flow rate 1 year (l/s)	1.0 l/s
Flow rate 2 year (l/s)	1.0 l/s
Flow rate 10 years (l/s)	1.8 l/s
Flow rate 30 years (l/s)	2.6 l/s
Flow rate 100 years (l/s)	3.6 l/s
Flow rate 200 years (l/s)	4.3 l/s

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

Disclaimer

Appendix D - SuDS Justification

SuDS components

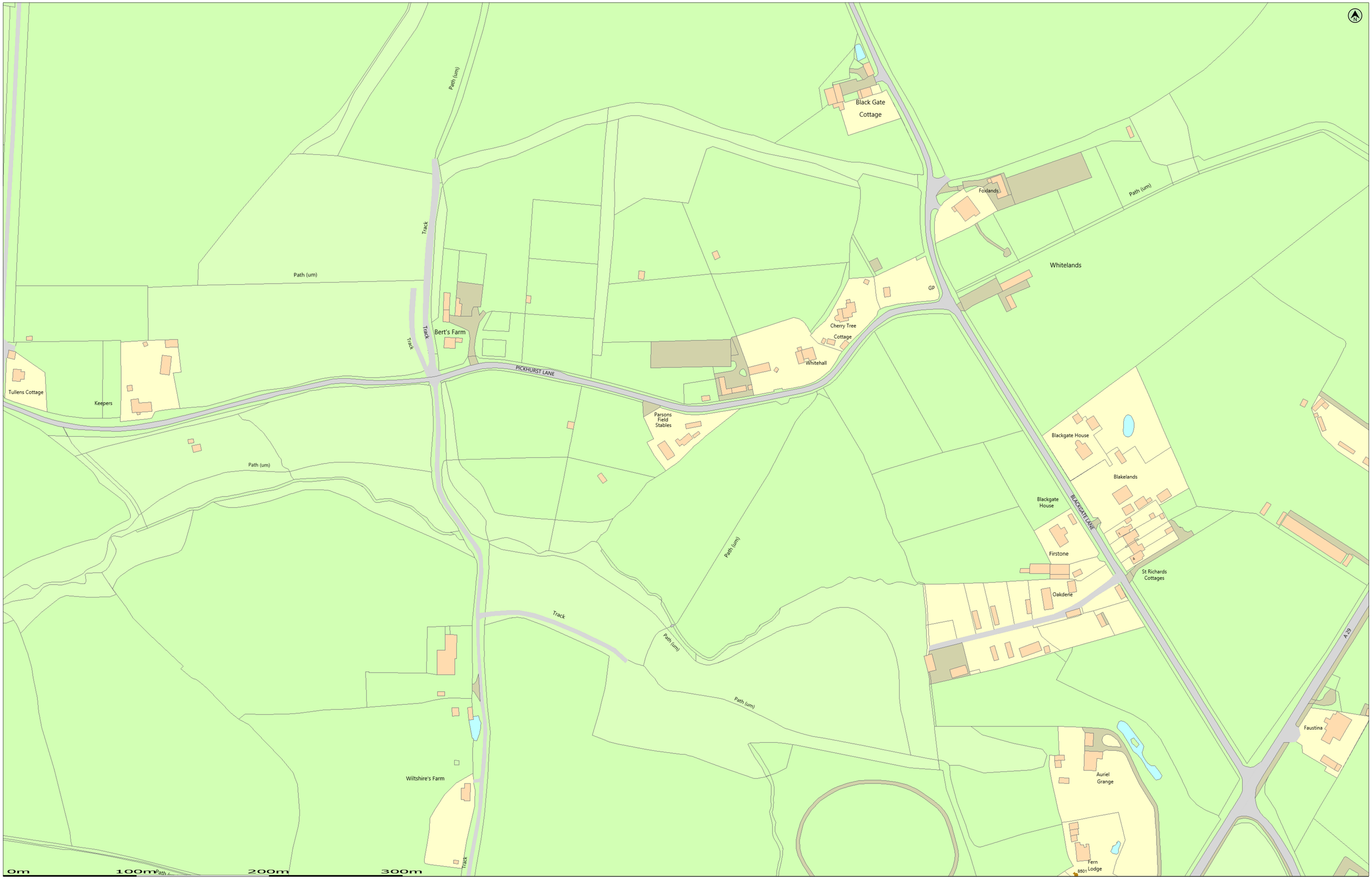
As per CIRIA (C753) SuDS Manual and Justification for Exclusion.

SuDS Component	Feature Description	Justification for Inclusion/Exclusion	Suitability
Rainwater Harvesting i.e. Water Butts	Rainwater from roofs and hard surfaces can be stored and used. Water butts are the most common means of harvesting rainwater and are primarily designed for small scale use such as in gardens.	Rainwater water butts to the base of down pipes are considered suitable for providing water for re-use. However, require overflows for storm events exceeding their capacity/when full into a positive drainage network.	✗/✓
Green Roof	Green Roofs provide ecological value, enhanced building, performance and the reduction of surface water runoff. Green roofs are designed to intercept and retain precipitation, reducing the volume of runoff and attenuating peak flows.	Green roofs are not suited to pitched roofs. Due to the nature of the development, green roofs are not viable.	✗
Infiltration Systems i.e. Soakaway	Soakaways provide attenuation, treatment and groundwater recharge and allows flows to soak into the ground, reducing runoff to watercourses and sewer networks and recharging groundwater	Not suitable for use on site. Due to the impermeable nature of the ground and high ground water, disposal of flows via infiltration drainage is not feasible.	✗
Proprietary Treatment Systems	Proprietary treatment systems i.e. manufactured products that remove pollutants from runoff, can be useful where site constraints prevent the use of other SuDS features.	Proprietary treatment systems can be used in conjunction with other methods to remove pollutants from surface water runoff. i.e. Hydro Internationals Downstream defender, Naylors, Smart Sponge etc. However, the proposed SuDS features exceed the pollution mitigation indices and therefore, proprietary treatment systems are not required.	✗/✓

SuDS Component	Feature Description	Justification for Inclusion/Exclusion	Suitability
Filter Strips/ Filter Drains	Filter strips are uniformly graded and gently sloping strips of grass/vegetation, designed to treat runoff from adjacent impermeable areas. Filter drains are shallow trenches filled with stone/ gravel that provides subsurface storage for the attenuation, conveyance and filtration of runoff.	They typically convey runoff from impermeable surfaces to secondary SuDS components. There are no feasible locations for use within the proposed development, and all proposed surfacing is to be porous.	✗
Swales	Swales are designed to convey, treat and attenuate surface water runoff and provide biodiversity benefits. They can replace conventional pipework as a means of conveying runoff; however, space constraints of some sites can make it difficult incorporating them into the design.	Open landscaped features are generally situated within landscaped corridors as part of larger developments, to facilitate conveyance to central attenuation facilities. Due to space constraints, gradients and tree root protection areas the use of swales for conveyance is unlikely to be viable.	✗
Bioretention Systems i.e. Rain gardens	Bioretention systems can reduce runoff rates and volumes and treat pollution through the use of engineered soils. They are particularly effective in delivering interception, but can also be attractive landscape features whilst providing habitats and biodiversity benefits.	Bioretention areas can be used to collect, treat and convey runoff from impermeable surfaces. Where feasible additional features can be considered during detailed design stage. Bioretention planters could be considered to the base of rainwater down pipes. However, they will require overflows into a positive drainage network when full.	✗/✓
Pervious Pavements	Pervious surfaces provide a surface suitable for pedestrian and/or vehicular traffic, while allowing rainwater to infiltrate through the surface and into underlying layers. The water can be temporarily stored before infiltration to the ground or discharged to another drainage system. Surfaces with an aggregate sub-base can provide good water quality treatment.	Permeable paving has been proposed for all areas that are to be hard paved.	✓

SuDS Component	Feature Description	Justification for Inclusion/Exclusion	Suitability
Attenuation/ Cellular Tanks	Cellular systems can be used to control and manage rainwater surface water runoff either as a soakaway or as a storage tank. The modular/ honeycomb nature of geocellular systems means that they can be tailored to suit the specific requirements on site.	Geocellular attenuation tanks are proposed to provide additional attenuation below permeable paved areas.	✓
Detention Basins	Detention basins are surface storage basins or facilities that provide flow control through attenuation of stormwater runoff. They also facilitate some settling of particulate pollutants and manage high volumes of surface water runoff.	Due to the nature of the development and space, detention basins are deemed unfeasible.	✗
Ponds & Wetlands	Ponds and Wetlands are features with a permanent pool of water that provide both attenuation and treatment of surface water runoff. They enhance treatment processes and have good amenity and biodiversity benefits.	Due to the size of the development ponds/wetlands are not feasible.	✗

Appendix E – Asset Mapping



(c) Crown copyright and database rights 2025 Ordnance Survey AC0000808122 | Date: 10/04/25 | Scale: 1:1250 | Map Centre: 505511,120885 | Data updated: 20/03/25 | Our Ref: 1740796 - 1 | Wastewater Plan A3 Powered by digiGIS

Foul Gravity Sewer
Combined Gravity Sewer
Culverted Water Course or Treated Effluent
Surface Water Gravity Sewer
Rising Main, Vacuum or Syphon
Combined Outfall
Surface Water Outfall
Foul Outfall
Surface Water Inlet
Combined Pumping Station
Surface Water Pumping Station
Foul Pumping Station
Water Treatment Works
Section 104 Area
Building Over Agreement Area
Foul Manhole
Combined Manhole
Surface Water Manhole
Side Entry Manhole, Interception Chamber, Dummy Manhole or Surface Water Soakaway

ceri@aegaea.com
Pickhurst Lane

WATER for LIFE from Southern Water.

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
8501	F	28.44	27.22	

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Appendix F - Drainage Calculations

Design Settings

Rainfall Methodology	FEH-22	Maximum Time of Concentration (mins)	30.00	Preferred Cover Depth (m)	1.200
Return Period (years)	5	Maximum Rainfall (mm/hr)	150.0	Include Intermediate Ground	✓
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00	Enforce best practice design rules	✓
CV	1.000	Connection Type	Level Soffits		
Time of Entry (mins)	5.00	Minimum Backdrop Height (m)	0.200		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.013	5.00	21.480	Manhole	600	505385.169	120899.357	1.350
2			21.450	Manhole	600	505381.512	120894.324	1.382
4	0.006	5.00	21.440	Manhole	600	505380.061	120886.887	1.640
3	0.005	5.00	21.450	Manhole	600	505376.276	120892.059	1.450
5	0.000		21.225	Manhole	600	505380.033	120879.615	1.500
6	0.013	5.00	20.745	Manhole	600	505377.174	120860.566	1.350
7	0.004	5.00	20.000	Manhole	600	505375.460	120854.999	1.415
8			19.500	Manhole	600	505366.504	120851.028	2.050
9			18.700	Manhole	1200	505366.133	120836.411	1.600
9_OUT			18.000	Manhole	1200	505362.660	120814.755	1.350

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	Link Type	T of C (mins)	Rain (mm/hr)
1.000	1	2	6.221	0.600	20.130	20.068	0.062	100.3	150	Circular	5.10	96.3
1.001	2	4	7.577	0.600	20.068	19.800	0.268	28.3	150	Circular	5.17	95.8
1.002	4	5	7.272	0.600	19.800	19.725	0.075	97.0	150	Circular	5.29	95.1
1.003	5	6	19.262	0.600	19.725	19.395	0.330	58.4	150	Circular	5.53	93.5
1.004	6	7	5.825	0.600	19.395	18.585	0.810	7.2	150	Circular	5.56	93.3
1.005	7	8	9.797	0.600	18.585	17.450	1.135	8.6	150	Circular	5.61	93.0
2.000	3	4	6.409	0.600	20.000	19.850	0.150	42.7	100	Circular	5.09	96.3
1.006	8	9	14.622	0.600	17.450	17.305	0.145	100.8	150	Circular	5.85	91.4
1.007	9	9_OUT	21.933	0.600	17.100	16.650	0.450	48.7	150	Circular	6.10	89.8

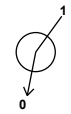
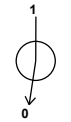
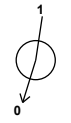
Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1	2	1.003	17.7	4.5	1.200	1.232	0.013	0.0	52	0.842
1.001	2	4	1.900	33.6	4.5	1.232	1.490	0.013	0.0	37	1.332
1.002	4	5	1.020	18.0	8.2	1.490	1.350	0.024	0.0	71	0.998
1.003	5	6	1.319	23.3	8.1	1.350	1.200	0.024	0.0	61	1.204
1.004	6	7	3.781	66.8	12.5	1.200	1.265	0.037	0.0	44	2.901
1.005	7	8	3.450	61.0	13.8	1.265	1.900	0.041	0.0	48	2.796
2.000	3	4	1.183	9.3	1.7	1.350	1.490	0.005	0.0	29	0.905
1.006	8	9	1.000	17.7	13.5	1.900	1.245	0.041	0.0	99	1.101
1.007	9	9_OUT	1.444	25.5	13.3	1.450	1.200	0.041	0.0	77	1.460

Pipeline Schedule

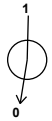
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	6.221	100.3	150	Circular	21.480	20.130	1.200	21.450	20.068	1.232
1.001	7.577	28.3	150	Circular	21.450	20.068	1.232	21.440	19.800	1.490
1.002	7.272	97.0	150	Circular	21.440	19.800	1.490	21.225	19.725	1.350
1.003	19.262	58.4	150	Circular	21.225	19.725	1.350	20.745	19.395	1.200
1.004	5.825	7.2	150	Circular	20.745	19.395	1.200	20.000	18.585	1.265
1.005	9.797	8.6	150	Circular	20.000	18.585	1.265	19.500	17.450	1.900
2.000	6.409	42.7	100	Circular	21.450	20.000	1.350	21.440	19.850	1.490
1.006	14.622	100.8	150	Circular	19.500	17.450	1.900	18.700	17.305	1.245
1.007	21.933	48.7	150	Circular	18.700	17.100	1.450	18.000	16.650	1.200

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	600	Manhole	Adoptable	2	600	Manhole	Adoptable
1.001	2	600	Manhole	Adoptable	4	600	Manhole	Adoptable
1.002	4	600	Manhole	Adoptable	5	600	Manhole	Adoptable
1.003	5	600	Manhole	Adoptable	6	600	Manhole	Adoptable
1.004	6	600	Manhole	Adoptable	7	600	Manhole	Adoptable
1.005	7	600	Manhole	Adoptable	8	600	Manhole	Adoptable
2.000	3	600	Manhole	Adoptable	4	600	Manhole	Adoptable
1.006	8	600	Manhole	Adoptable	9	1200	Manhole	Adoptable
1.007	9	1200	Manhole	Adoptable	9_OUT	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	505385.169	120899.357	21.480	1.350	600	 0	1.000	20.130	150
2	505381.512	120894.324	21.450	1.382	600	 1 0	1.000 1.001	20.068 20.068	150 150
4	505380.061	120886.887	21.440	1.640	600	 1 2 0	2.000 1.001 1.002	19.850 19.800 19.800	100 150 150
3	505376.276	120892.059	21.450	1.450	600	 0	2.000	20.000	100
5	505380.033	120879.615	21.225	1.500	600	 1 0	1.002 1.003	19.725 19.725	150 150
6	505377.174	120860.566	20.745	1.350	600	 1 0	1.003 1.004	19.395 19.395	150 150
7	505375.460	120854.999	20.000	1.415	600	 1 0	1.004 1.005	18.585 18.585	150 150
8	505366.504	120851.028	19.500	2.050	600	 1 0	1.005 1.006	17.450 17.450	150 150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections		Link	IL (m)	Dia (mm)
9	505366.133	120836.411	18.700	1.600	1200		1	1.006	17.305	150
							0	1.007	17.100	150
9_OUT	505362.660	120814.755	18.000	1.350	1200		1	1.007	16.650	150

Simulation Settings

Rainfall Methodology	FEH-22	Winter CV	1.000	Drain Down Time (mins)	240	Check Discharge Rate(s)	x
Rainfall Events	Singular	Analysis Speed	Detailed	Additional Storage (m³/ha)	0.0	Check Discharge Volume	x
Summer CV	1.000	Skip Steady State	x	Starting Level (m)			

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440	2160

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	10	0	100	0	10	0
30	0	10	0	100	45	10	0

Node 9 Online Orifice Control

Flap Valve	x	Invert Level (m)	17.100	Design Flow (l/s)	1.0	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Depth (m)	1.700	Diameter (m)	0.025		

Node 9 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	17.100
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	60.0	60.0	0.750	60.0	80.6	0.751	0.0	80.6

Other (defaults)

Entry Loss (manhole)	0.250	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.250	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Results for 1 year +10% A Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	20.164	0.034	1.8	0.0097	0.0000	OK
15 minute summer	2	10	20.091	0.023	1.8	0.0066	0.0000	OK
15 minute summer	4	11	19.846	0.046	3.3	0.0129	0.0000	OK
15 minute summer	3	11	20.019	0.019	0.7	0.0054	0.0000	OK
15 minute summer	5	11	19.766	0.041	3.3	0.0115	0.0000	OK
15 minute summer	6	11	19.424	0.029	5.0	0.0081	0.0000	OK
15 minute summer	7	11	18.615	0.030	5.5	0.0086	0.0000	OK
15 minute summer	8	11	17.509	0.059	5.5	0.0168	0.0000	OK
360 minute summer	9	240	17.208	0.108	1.8	6.2678	0.0000	OK
360 minute summer	9_OUT	248	16.663	0.013	0.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	1.8	0.752	0.100	0.0148	
15 minute summer	2	1.001	4	1.8	0.579	0.052	0.0236	
15 minute summer	4	1.002	5	3.3	0.784	0.181	0.0303	
15 minute summer	3	2.000	4	0.7	0.685	0.075	0.0065	
15 minute summer	5	1.003	6	3.3	1.068	0.140	0.0594	
15 minute summer	6	1.004	7	5.0	2.042	0.074	0.0142	
15 minute summer	7	1.005	8	5.5	1.259	0.090	0.0443	
15 minute summer	8	1.006	9	5.5	0.864	0.309	0.0923	
360 minute summer	9	1.007	9_OUT	0.4	0.533	0.016	0.0165	8.5

Results for 30 year +10% A Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	20.204	0.074	7.7	0.0211	0.0000	OK
15 minute summer	2	10	20.117	0.049	7.6	0.0137	0.0000	OK
15 minute summer	4	10	19.909	0.109	14.1	0.0308	0.0000	OK
15 minute summer	3	10	20.039	0.039	3.0	0.0111	0.0000	OK
15 minute summer	5	11	19.816	0.091	13.9	0.0257	0.0000	OK
15 minute summer	6	10	19.459	0.064	21.4	0.0180	0.0000	OK
15 minute summer	7	10	18.650	0.065	23.7	0.0184	0.0000	OK
15 minute summer	8	11	17.741	0.291	23.7	0.0825	0.0000	SURCHARGED
360 minute summer	9	272	17.444	0.344	5.2	20.0163	0.0000	SURCHARGED
360 minute summer	9_OUT	272	16.668	0.018	0.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	7.6	1.126	0.431	0.0424	
15 minute summer	2	1.001	4	7.6	0.813	0.226	0.0705	
15 minute summer	4	1.002	5	13.9	1.120	0.771	0.0901	
15 minute summer	3	2.000	4	3.0	0.893	0.320	0.0245	
15 minute summer	5	1.003	6	13.9	1.524	0.597	0.1758	
15 minute summer	6	1.004	7	21.3	2.960	0.319	0.0420	
15 minute summer	7	1.005	8	23.7	1.655	0.388	0.1220	
15 minute summer	8	1.006	9	23.4	1.329	1.323	0.2516	
360 minute summer	9	1.007	9_OUT	0.7	0.640	0.029	0.0256	19.2

Results for 100 year +10% A Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	20.215	0.085	9.6	0.0240	0.0000	OK
15 minute summer	2	10	20.123	0.055	9.5	0.0155	0.0000	OK
15 minute summer	4	10	19.931	0.131	17.6	0.0372	0.0000	OK
15 minute summer	3	10	20.044	0.044	3.7	0.0126	0.0000	OK
15 minute summer	5	11	19.831	0.106	17.4	0.0300	0.0000	OK
15 minute summer	6	10	19.468	0.073	26.7	0.0206	0.0000	OK
15 minute summer	7	11	18.664	0.079	29.7	0.0223	0.0000	OK
15 minute summer	8	11	17.921	0.471	29.5	0.1334	0.0000	SURCHARGED
240 minute winter	9	232	17.527	0.427	5.7	24.8308	0.0000	SURCHARGED
240 minute winter	9_OUT	232	16.669	0.019	0.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	9.5	1.193	0.539	0.0499	
15 minute summer	2	1.001	4	9.5	0.839	0.283	0.0839	
15 minute summer	4	1.002	5	17.4	1.165	0.962	0.1074	
15 minute summer	3	2.000	4	3.7	0.860	0.398	0.0326	
15 minute summer	5	1.003	6	17.4	1.594	0.745	0.2089	
15 minute summer	6	1.004	7	26.7	3.051	0.399	0.0517	
15 minute summer	7	1.005	8	29.5	1.935	0.484	0.1323	
15 minute summer	8	1.006	9	29.1	1.655	1.648	0.2548	
240 minute winter	9	1.007	9_OUT	0.8	0.662	0.033	0.0276	17.9

Results for 100 year +45% CC +10% A Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	20.238	0.108	14.0	0.0305	0.0000	OK
15 minute summer	2	11	20.150	0.082	13.9	0.0232	0.0000	OK
15 minute summer	4	11	20.095	0.295	24.3	0.0833	0.0000	SURCHARGED
15 minute summer	3	11	20.143	0.143	5.4	0.0404	0.0000	SURCHARGED
15 minute summer	5	12	19.924	0.199	23.7	0.0562	0.0000	SURCHARGED
15 minute summer	6	11	19.482	0.087	36.5	0.0245	0.0000	OK
15 minute summer	7	12	18.874	0.289	41.3	0.0819	0.0000	SURCHARGED
15 minute summer	8	12	18.266	0.816	38.5	0.2310	0.0000	SURCHARGED
240 minute winter	9	236	17.744	0.644	8.2	37.4536	0.0000	SURCHARGED
240 minute winter	9_OUT	236	16.671	0.021	1.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	1	1.000	2	13.9	1.286	0.784	0.0719	
15 minute summer	2	1.001	4	13.5	0.903	0.403	0.1041	
15 minute summer	4	1.002	5	23.7	1.345	1.313	0.1280	
15 minute summer	3	2.000	4	5.1	0.868	0.553	0.0501	
15 minute summer	5	1.003	6	22.9	1.592	0.981	0.2711	
15 minute summer	6	1.004	7	37.0	3.066	0.554	0.0820	
15 minute summer	7	1.005	8	38.5	2.208	0.631	0.1725	
15 minute summer	8	1.006	9	38.3	2.178	2.168	0.2548	
240 minute winter	9	1.007	9_OUT	1.0	0.705	0.040	0.0320	22.5

Appendix G - SuDS Mitigation Indices

Pollution Prevention & Water Quality Management

SuDS Mitigation Indices

1.1. Chapter 26 of the CIRIA C753 The SuDS Manual, provides design advice to meet water quality standards by adopting the SuDS train treatment mechanism and thereby reduce the risk of pollution by evaluating potential pollution hazards at the outset.

1.2. The proposed site layout provides the opportunity to introduce SuDS into the scheme to reduce potential contaminant risk further.

1.3. Runoff from individual property driveways, residential car parks and low traffic roads are generally viewed as low risk (as per Table 26.2 of C753), shown in the tables below.

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Individual property driveways, residential car parks and low traffic roads	Low	0.5	0.4	0.4

Pollutant Hazard Indices

	Mitigation Indices				Indices for Calculation		
	TSS	Metals	Hydrocarbons		TSS	Metals	Hydrocarbons
Permeable Paving	0.7	0.6	0.7	100%	0.7	0.6	0.7
Total Mitigation Indices score					0.7	0.6	0.7
Sufficiency of Pollution Mitigation Indices					Sufficient (No additional mitigation required)		

SuDS Mitigation Indices

1.4. The mitigation indices offered by the proposed SuDS features exceed the hazard indices from roof areas and therefore provides adequate mitigation. It is therefore considered that the proposed SuDS features on site are appropriate and acceptable in terms of water quality.

Appendix H - Foul Calculations

Foul Drainage Strategy

1.1. It is proposed that a sewage treatment plant is installed to serve the static caravans within the proposed development.

1.2. The below shows the estimated foul drainage loads arising from the proposed development based on an assumed minimum population of 10.

1.3. Based on British Flows and Loads = 150 litres per person per day.

1.4. Therefore, 10 x 150 = 1,500 litres per day

1.5. The proposed package treatment plant has been sized to support the above loadings.

1.6. It is proposed that a cesspool is to be installed to serve the stable washdown, based on a rate of 40l/day.

1.7. A cesspool with minimum capacity of 1,800 litres is required to serve the proposed stable washdown based on a 45-day design emptying frequency.

Appendix I - Proprietary Device Manuals

PREMIER TECH

INSTALLATION & SERVICING GUIDE

REWATEC™

Solido Smart +P

Installation & Servicing Guide

Rewatec™ Solido SMART +P, 3000L to 9900L

Phosphorus Removal Wastewater Treatment Plant

BS EN 12566-3.

Manual Version OM0033 Rev 3

(DOKK5110F)

Created On: 21 Sept 2022

Installers: To Safeguard Warranty Please Ensure You Are Using The Latest Installation Manual

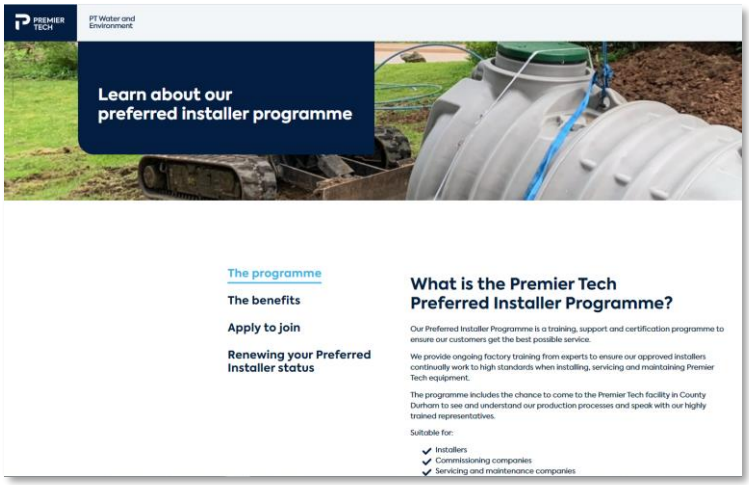
⚠ **This manual is designed for use by experienced sewage treatment tank installers & service providers. If you are not a professional installer you can obtain training from Premier Tech. (see below)**

- Premier Tech are proud to warrant the workmanship and components of the tank for the time period shown in this manual.
- Installers, commissioning agents and service providers must ensure they adhere to the installation guidelines and allow for site specific environmental conditions.

Premier Tech Water & Environment provide full training for installers and servicing agents.

For more information see:

https://www.premiertechaqua.com/en-gb/preferred-installer-programme



PREMIER TECH
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PT-WaterEnvironment.co.uk

Installation & Commissioning Checklist

Property Owners Name:

Property Address:

City: County: Postcode: Tel:

Installation Agents Name:

Installation Agents Address:

City: County: Postcode: Tel:

Date Installation Carried Out:

TANK MODEL:

TANK SERIAL NUMBER:

This document constitutes guidance only – it is the responsibility of the installing agent to ensure the wastewater treatment plant is installed correctly, fully functional & operating as intended. For assistance please contact Premier Tech Water & Environment 0191 587 8650 / sales.ptwe.uk@premiertech.com

- ☐ 1 Health & Safety

Hyperlinked Document

- ☐ 2 Rewatec Solido Smart Overview
- ☐ 3 Tank Handling
- ☐ 4 Offloading Inspection
- ☐ 5 Assessing Ground Conditions
- ☐ 6 Locating Tank & Hole Excavation
- ☐ 7 Backfilling
- ☐ 8 Connections & Assembly Pumped & Gravity Versions
- ☐ 9 Control Panel Guide
- ☐ 10 Start-Up & Commissioning Procedure

- ☐ Servicing & Maintenance Guide
- ☐ Sludge Removal

Health & Safety

The Solido SMART +P should be installed by qualified personnel only.

You must read these warnings carefully before installing or using the equipment. Should the equipment be transferred to a new owner, always ensure that all relevant documents are supplied.

Observe all hazard labels and take appropriate action to avoid exposure to the risks indicated.

Take care to maintain correct posture, particularly when lifting. Use appropriate lifting equipment when necessary.

- Only experienced contractors should carry out installation, following the guidelines.
- The unit should have a Pre-Service Agreement Inspection by a competent engineer.
- A qualified electrician should carry out electrical work.
- Covers must be kept locked.
- Observe all hazard labels and take appropriate action to avoid exposure to the risks indicated.

Clothing

- We recommend the use of a dust mask and gloves when cutting components.
- Any person carrying out maintenance on the equipment should wear suitable protective clothing, including gloves.

Working Area

- Ensure that the working area is adequately lit.
- Ensure that you are familiar with safe working areas and accesses.
- Use only the designated access walkways. Do not walk on the cover or deep well safety mesh(es).
- Ensure proper footing and balance at all times.
- Avoid any sharp edges.

Desludging

- Desludging should be carried out by a licensed waste disposal contractor holding the relevant permits to transport and dispose of sewage sludge.
- The contractor must refer to the desludge instructions in the Operating Handbook, a copy of the instructions is fastened under the covers.

Maintenance and Inspection Procedures

- Should you wish to inspect the operation of the equipment, please observe all necessary precautions, including those listed below, which apply to maintenance procedures.
- The power supply to the equipment must be isolated at the control panel(s) before lifting the covers.
- If the equipment has to run with the covers off , all care must be taken to avoid contact with moving parts and electrical components or conductors.
- Drive guards must be replaced and secured if removed during maintenance.
- Once power has been isolated, the control panel must be kept locked shut to avoid accidental re-connection whilst work or inspection is being carried out.

Electrical Components

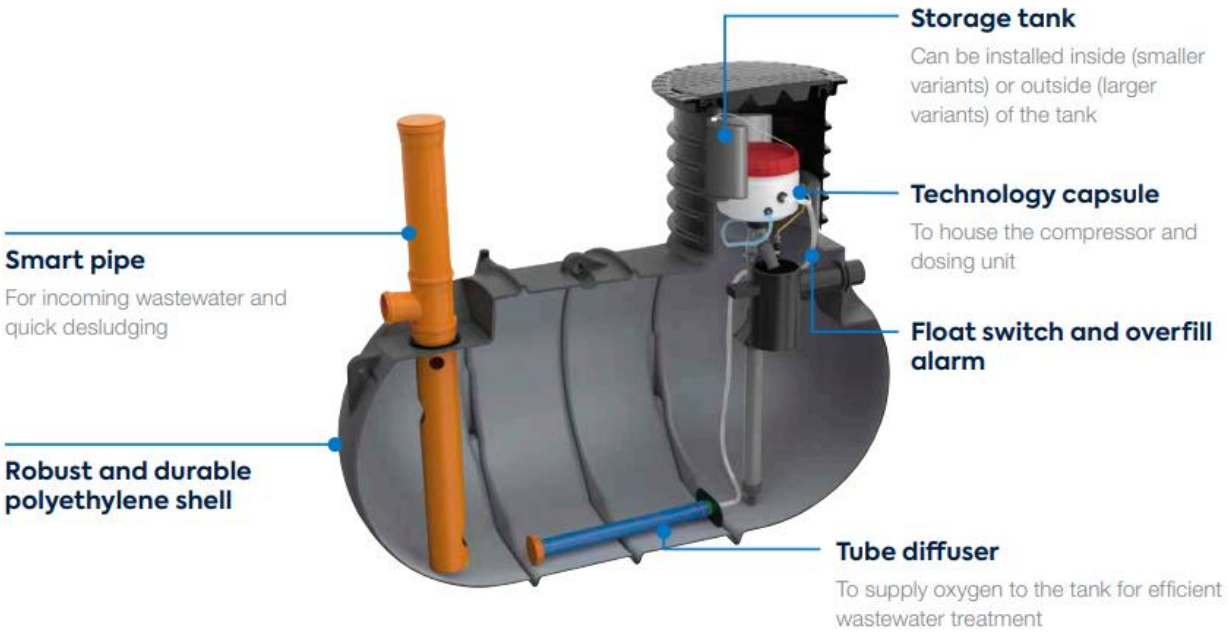
- The electrical components must be connected, started up, and opened only by qualified authorised personnel. The power cord must be protected with a 30 mA residual-current circuit breaker.
- The technology capsule must be opened ONLY by a specialist company and ONLY when the power is switched off.

Warning: irritating / corrosive
Irritating to eyes and skin.

- The plant contains chemical agents, please avoid contact and wear suitable protective equipment.
- When handling, use only containers and fittings made of inert plastic.
- Disturbances in the treatment capacity of the plant is not expected when the chemical is in contact with the plant's mixed liquor.

Disclaimer: This document constitutes installation and inspection guidance only – it is the responsibility of the installation company to ensure the wastewater treatment plant is fully functional & operating as intended.

Rewatec Solido SMART +P Overview



TECHNICAL SPECIFICATIONS (REWATEC SOLIDO SMART +P)

PE	Chamber	Outlet	Length (mm)	Width (mm)	Height min-max (mm)
6	Single	Gravity/pump	2,420	1,420	2,470-2,570*
9	Single	Gravity/pump	2,420	1,700	2,750-2,850*
12	Single	Gravity/pump	2,400	2,010	2,625-3,035*
15	Single	Gravity/pump	2,765	2,310	2,915-3,350*
25	Single	Gravity/pump	3,400	2,310	2,915-3,350*
An external polyethylene pump station is required for the pump outlet.					

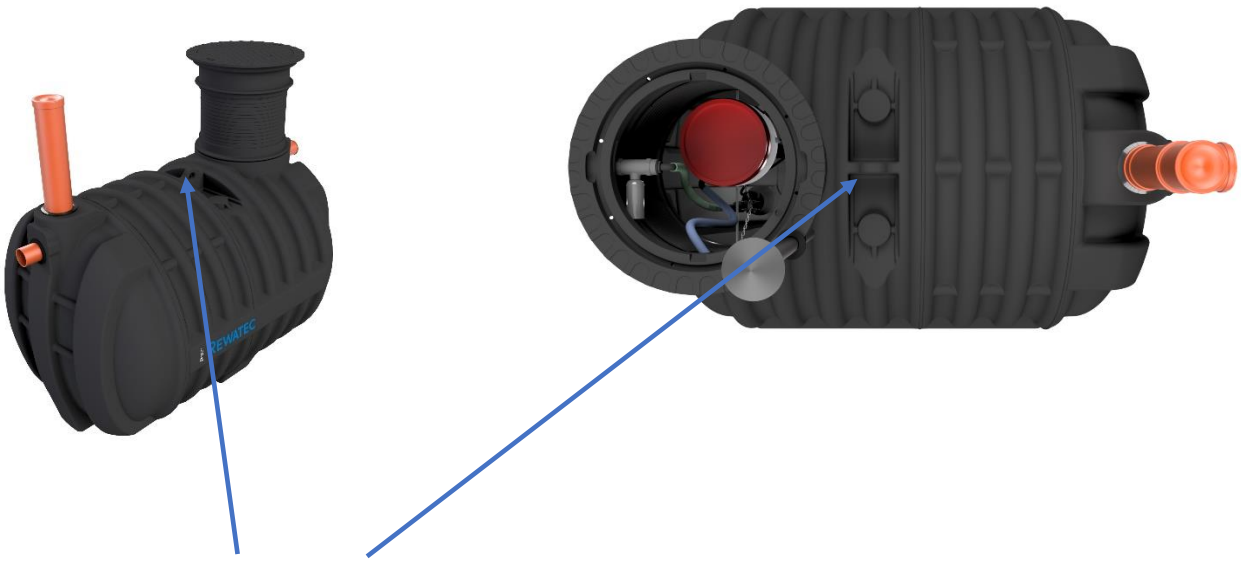
*Minimum height is as standard, maximum height corresponds to the maximum manway extension

25 YEAR WARRANTY

Shell Warranty – 25 Years*
Technology & Pump Warranty – 3 Years*
Design Life – 50 Years*

*Only when regular servicing schedule adhered to.

Tank Handling



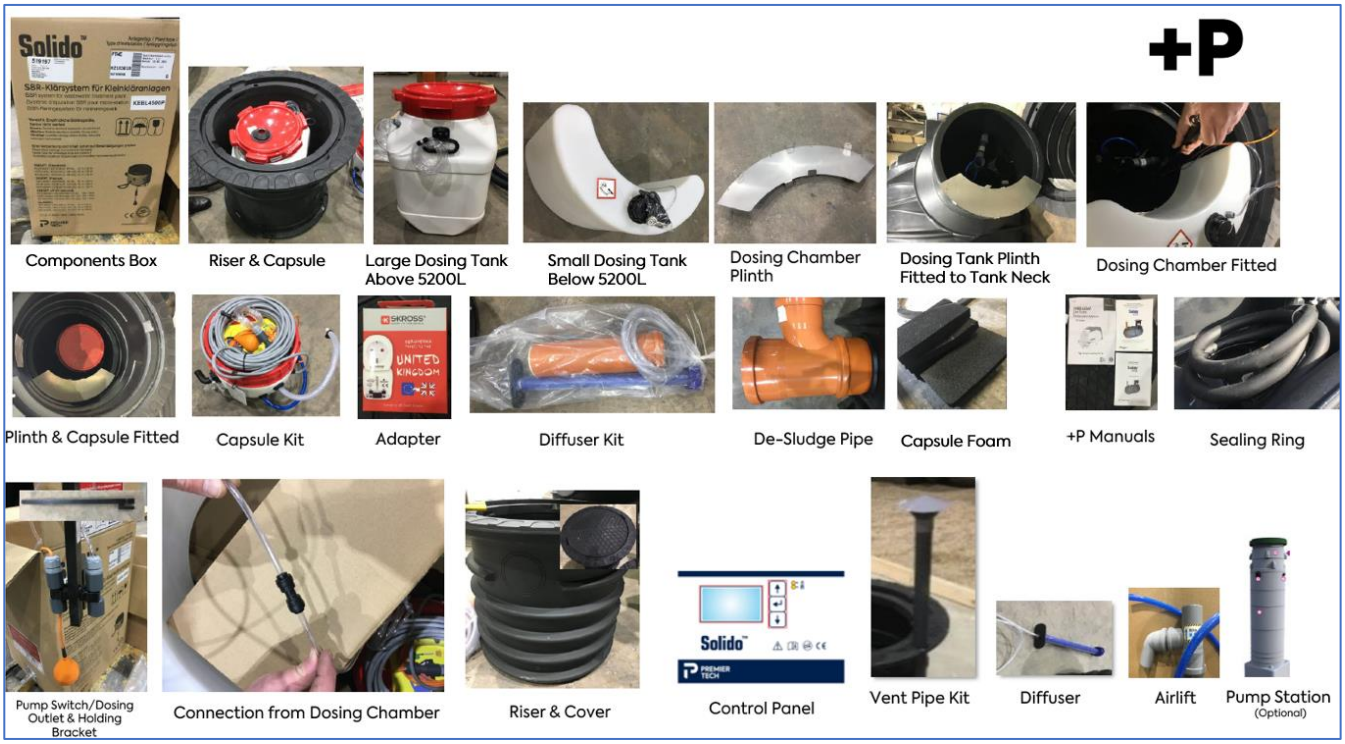
- ☐ Use lifting point only.
- ☐ Connect a webbed sling to the lifting point. (Do NOT use any other item such as rope or chain)
- ☐ Lift using a suitable mechanical device such as a crane or digger.
- ☐ Take care not to damage the tank

Images for representation only

Offloading Inspection

- ☐ Check tank for signs of transit damage.
- ☐ Ensure below items are present

Solido +P Components



Inside Capsule

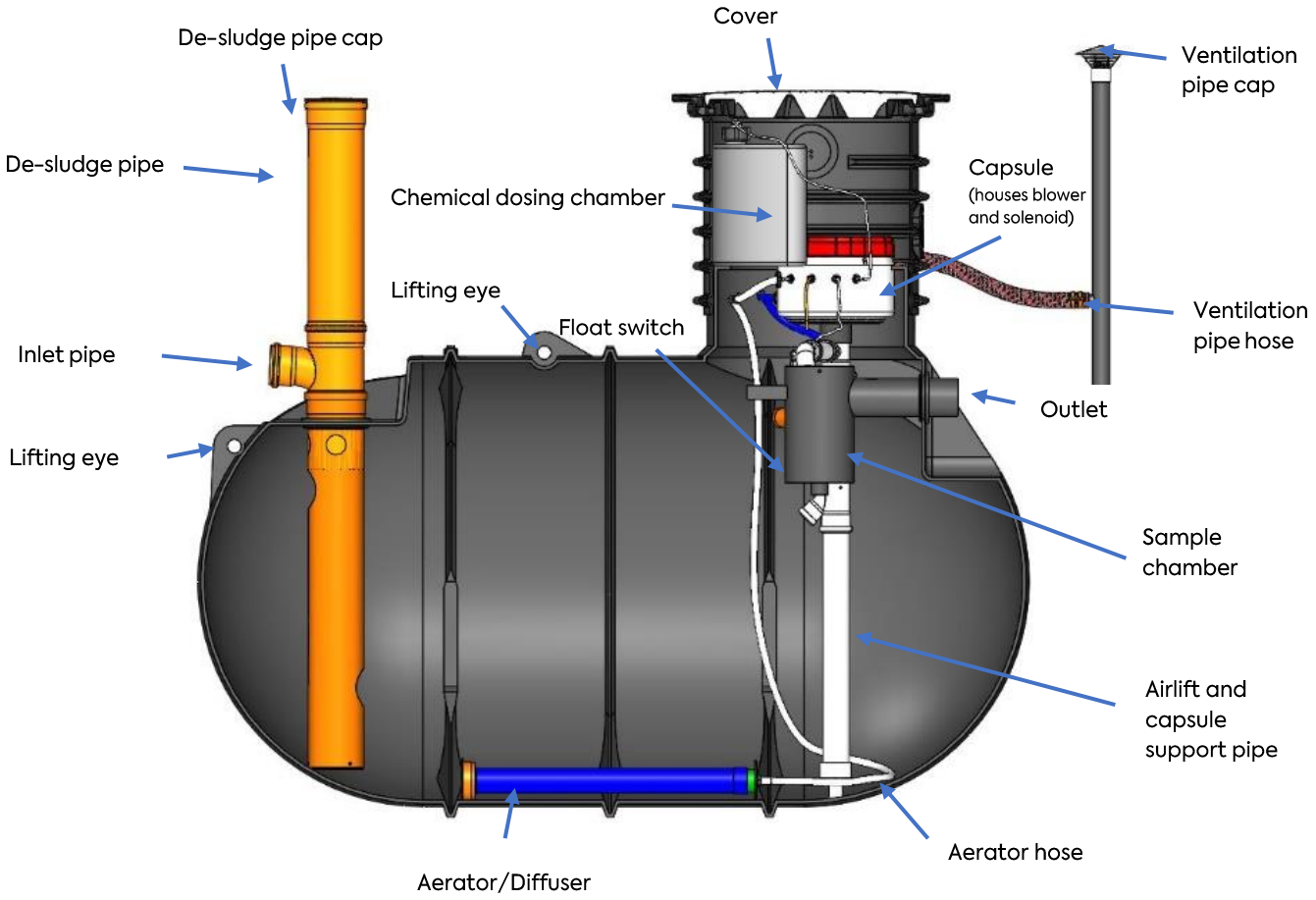
Dosing Pump

Blower

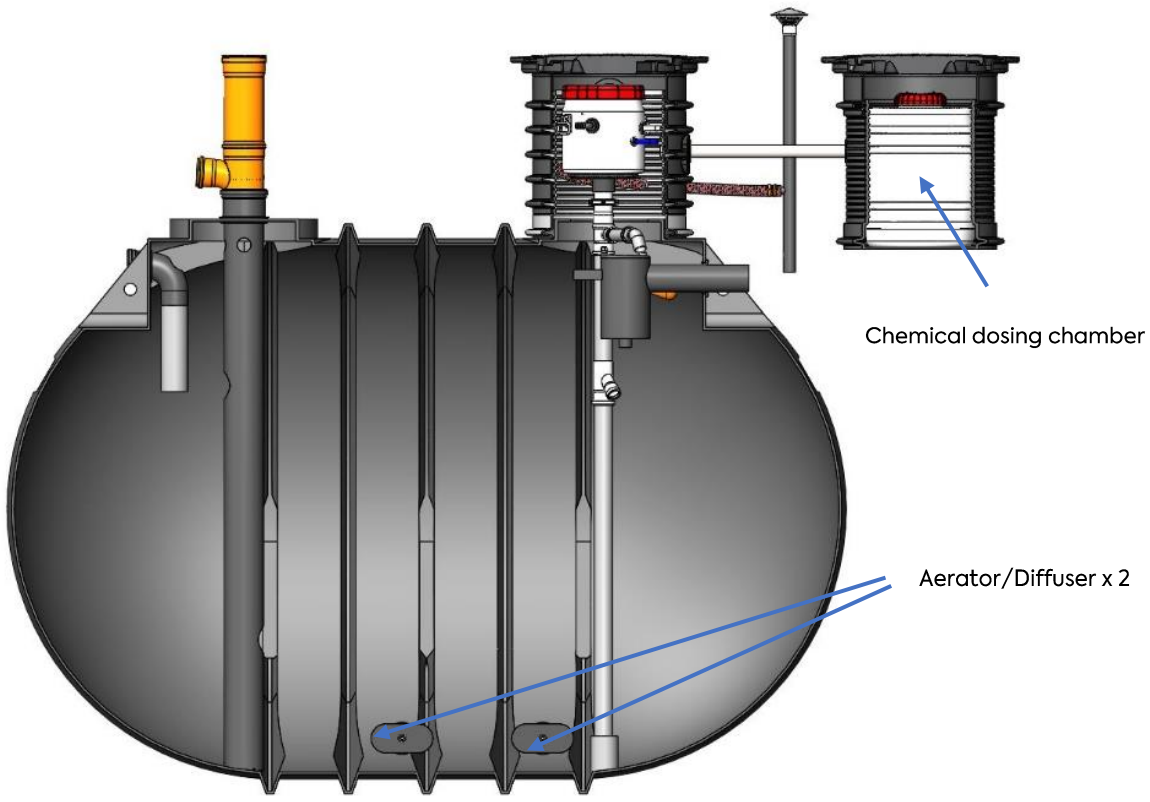
Dosing Hose

Optional externally located pump station

4500 and 5200L Tanks come with Internal Dosing Chamber



7600 and 9900L Tanks come with External Dosing Chamber



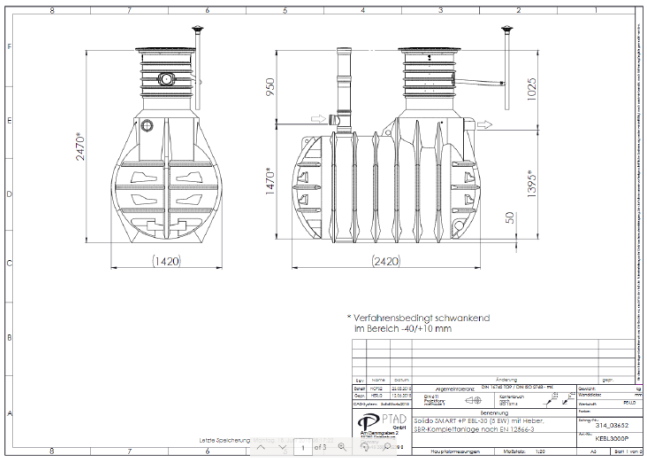
How It Works

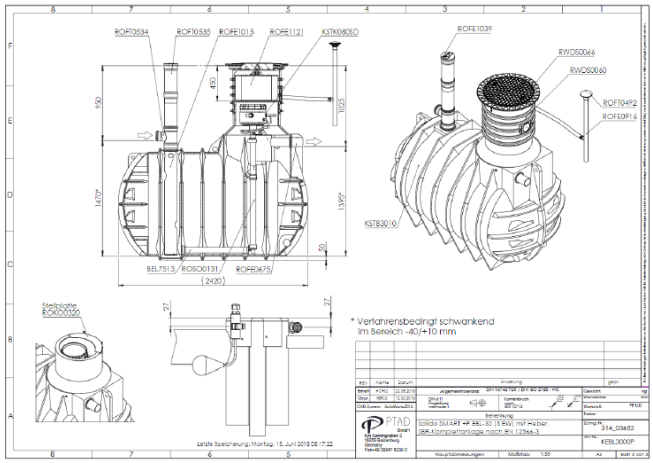
A chemical precipitant is dosed directly to the mixed liquor to reduce the phosphate concentration that accumulated in the incoming wastewater. Dosing is time-controlled using a timer and a peristaltic pump> the dose takes place at the end of the aeration cycle for optimal results.

The overall annual recommended dosage (pre-set) is approx. 5 litres per the nominally connected resident (PE).

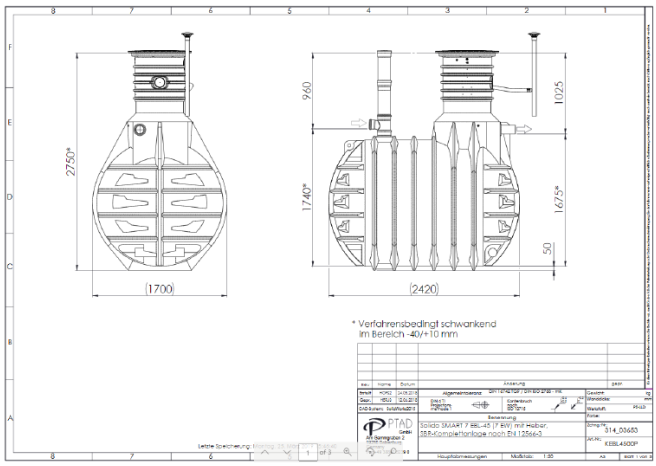
Dimension Drawings

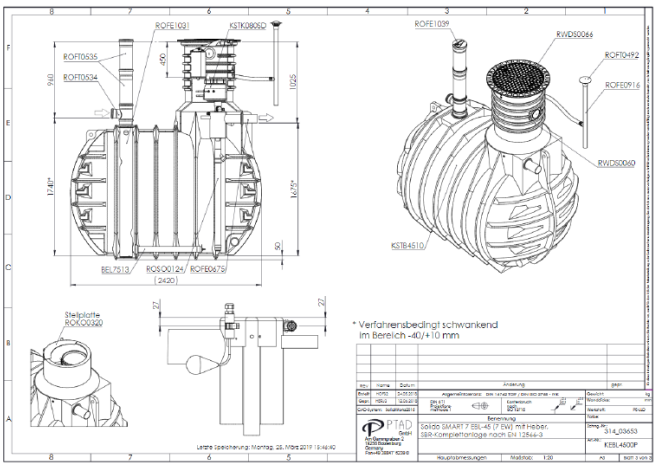
Solido Smart +P Gravity 3000L (KEBL3000P / 394275)



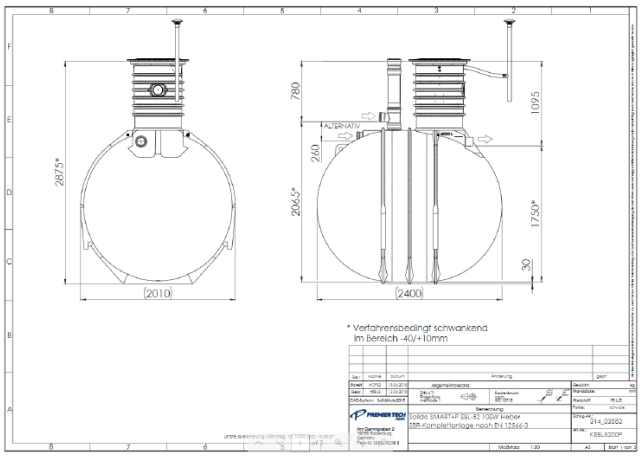


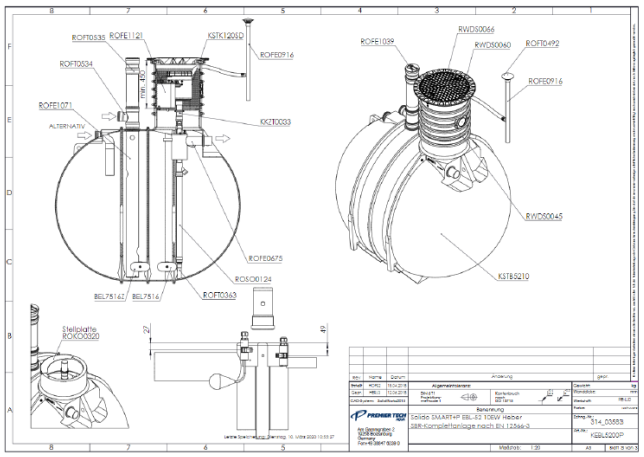
Solido Smart +P Gravity 4500L (KEBL4500P / 394276)



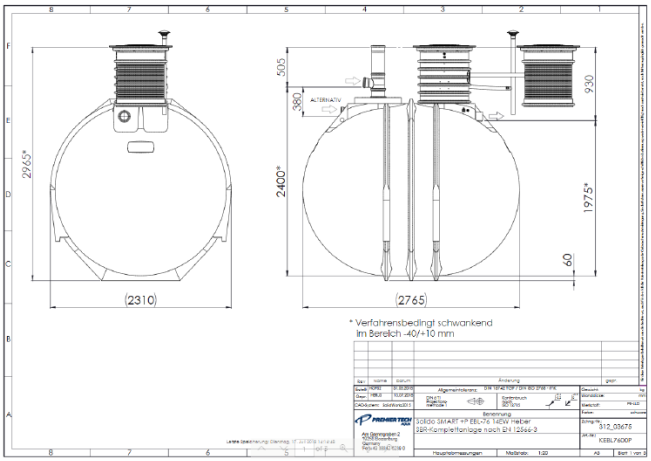


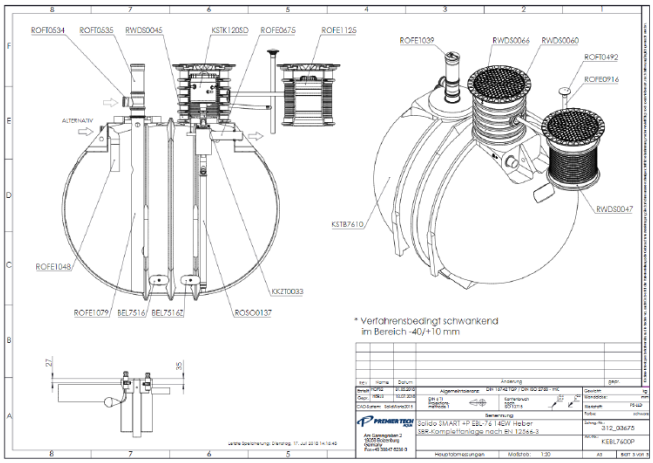
Solido Smart +P Gravity 5200L (KEBL5200P / 394277)



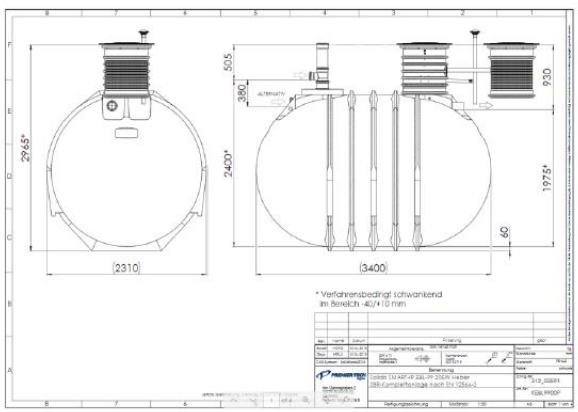


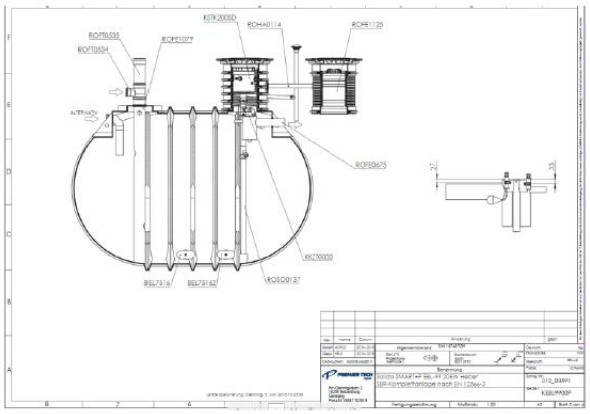
Solido Smart +P Gravity 7600L (KEBL7600P / 394278)





Solido Smart +P Gravity 9900L (KEBL9900P / 394279)





Assessing Ground Conditions

Ground conditions dictate whether the tank should be installed in pea gravel or concrete. A high-water table requires concrete installation, a low water table requires pea gravel installation.

Incorrect assessment of ground conditions can negatively impact the installation. Please ensure you read the below information.

Changing weather patterns in the UK mean that regions or areas that may have been relatively dry, may now be subjected to heavy and sporadic rainfall events.

Signs of a High-Water Table

- ☐ Low permeability in soil (i.e., high clay content)
- ☐ Visible water table during excavation of the hole
- ☐ Naturally wet area
- ☐ Low lying or flat land
- ☐ Installation in a natural depression of the land
- ☐ Areas of low drainage or standing water
- ☐ Areas where water could congregate even if the land is currently dry

Signs of a Low-Water Table

- ☐ Absence of water during excavation
- ☐ When installing on a hilltop or hillside location
- ☐ Dry excavation even during wet weather
- ☐ High permeability soil

Installation in Periodic High-Water Table Conditions

If the ground water table could be above the turret (shoulder of the tank) height of the tank for a short period of time (defined as hours rather than days) a watertight connection between the tank and shaft system should be installed using a factory-provided welded joint (if considered necessary).

In such conditions, installation in concrete is recommended.

Installation in High-Water Table Conditions

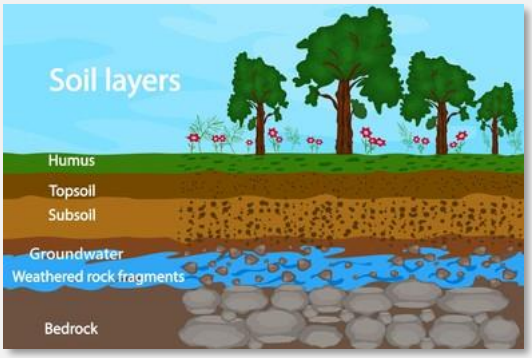
If the water table is at risk of being higher than the turret (shoulder) of the tank for a prolonged period (defined as days rather than hours) installation in concrete is recommended.

Hillside Situations

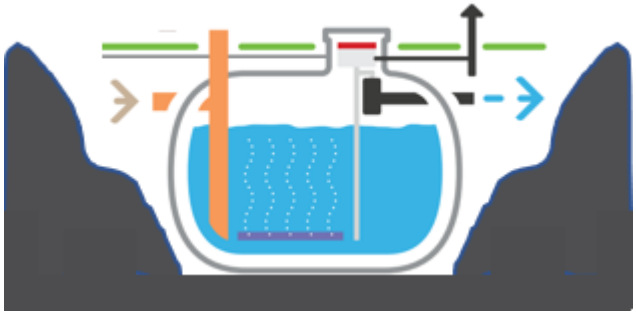
If the soil of the area is subjected to movement the tank will be need to be secured with a supporting structure (e.g., a wall).

Installation in Permanently Low-Water Table Conditions

The water table below the turret (shoulder of the tank). Where the water table is below the turret of the tank, installation in pea gravel is recommended.



Backfilling

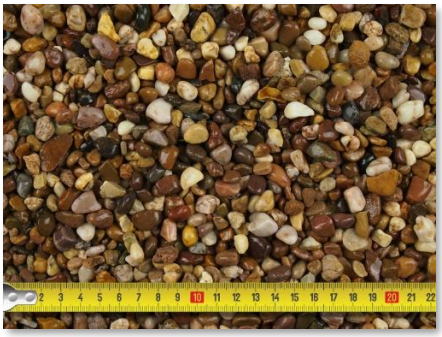


After ensuring the tank is correctly positioned and perfectly flat in a bed of gravel.

- Fill the tank with water up to approximately 300mm then backfill to the same height with pea gravel or concrete depending upon your ground water conditions. (SEE BELOW FOR DETAILS ON WHEN TO USE PEA GRAVEL OR CONCRETE)
- Add 300mm more water then backfill again to approximately the same level as the water.
- Repeat this process until tank is completely backfilled with water up to the level of the pump and pea gravel until the body of the tank is completely covered.
- Above this level, top-soil or excavated material can be used.

Failure to do this creates uneven interior/exterior loads and could damage the tank shell.

Low Water Table – Pea Gravel



Use pea gravel when installing in low water-table conditions.

The filling material around the tank must be compactable, permeable, and free of sharp objects. Round Gravel - Grain size between 5-16 mm. (alternatively 12-16 mm or 8-12 mm).

Soil, clay or "filler sand" **do not** meet these criteria.

The backfill material should reach at least of 250mm between the tank and the edge of the excavated hole.

High Water Table - Concrete

Use concrete when installing in high water-table conditions.

Ensure the tank is correctly positioned and perfectly flat in a bed of concrete. Use a spirit level to achieve this.

The thickness of the concrete should be at least 250mm between the tank and the excavated hole.

Fill the tank with 300mm of water, then backfill to the same height with concrete and repeat until the body of the tank is completely covered.

Failure to do this creates uneven interior/exterior loads and could damage the tank shell.

Locating the Tank & Hole Excavation

If you are in any doubt about any aspect of the installation, please contact Premier Tech.

Tank Positioning Next to Buildings

The excavation hole must be located a suitable distance away from buildings (Please check Building Regulations Part H).

For tanks that are required to be located on driveways or where traffic is expected to pass a steel cover and a strengthened manway is required. Available from Premier Tech as an option.

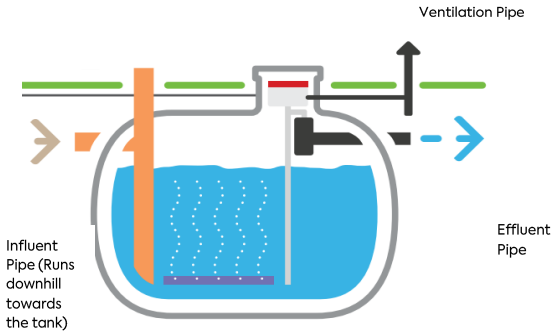
- Ensure there are no sub-surface obstacles such as pipes, cables or tree roots.
- Ensure depth is sufficient for the tank to be located plus there is sufficient space for surface top-soil.
- Ensure the space between the tank and the edges of the excavated hole are at least 250mm.
- Ensure the tank height and positioning is such that the influent pipe runs downwards towards the tank from the property and the effluent discharge pipe runs in the desired direction towards the discharge point.
- Place a layer of gravel on the base of the excavated hole.
- Ensure the tank is perfectly flat in the ground using a spirit level.

- The soil coverage required above the tank (standard max. 1,50 meter, depend also on the traffic loads). The soil coverage should not be more than 1.2m from the top of the tank (1.5 from the IL), otherwise maintenance of the sewage treatment systems cannot not be carried out.

1. Positioning the Tank.

Ensure the tank height and positioning is such that the influent pipe runs downwards towards the tank from the property and the effluent discharge pipe runs in the desired direction towards the discharge point.

Ensure the discharge point will not be liable to flooding.



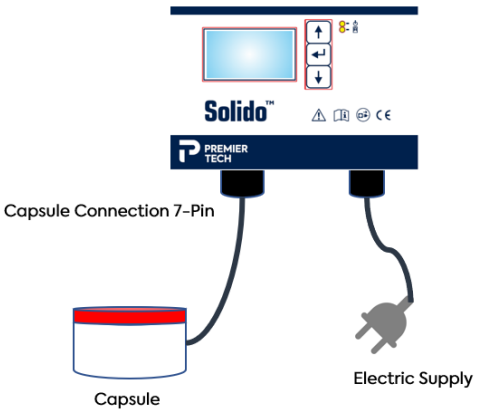
2. The Tank Turret

Can be cut down on-site <u>if necessary,</u> to achieve the appropriate tank depth for the install. Use the horizontal mould lines to assist with this.

Tool Required: Angle grinder/circular saw or similar.

3. Locate the Control Unit

The control unit should be located up to a maximum of 30m from the tank. Either indoors or inside an optional control panel kiosk. The control panel should <u>not</u> be positioned in direct sunlight or where weather can reach it. Ensure the electricity supply is reliable. If it is not, use a UPS generator or similar.

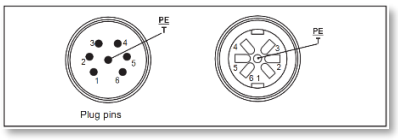


4. Lay the Control Panel Cable

Pull the control cable of the capsule through a duct and route it to the chosen location of the control panel.

Control Panel Cable

- Attach a wire to the end of the cable so that the cable can be pulled out of the conduit.
- Ensure the cable duct is positioned in a suitable location (ie Away from standing water, grass cutting equipment, traffic etc)
- Never disassemble the cable plug.
- Protect the plug from moisture.



View of 7-Pin Socket
For Tank Connection

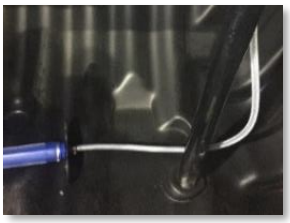
Ensure a suitable cable duct is used.

5. Installing The Capsule & Components

Connect the pre-fitted hose on the grey lifter pipe located inside the tank (narrow blue hose) to the narrow blue hose coming out of the capsule.

Connect the clear braided hose attached to the diffuser's hose to the clear braided hose coming out of the capsule.

Place diffuser on the tank floor (centralised)



Connect the ventilation hose (connected to the ventilation pipe) to the black elbow joint attached to the side of the capsule.

Carefully place the technology capsule onto the top of the grey pipe (airlift) inside the tank so that the capsule is positioned securely.

Loosely bundle the hoses using a cable tie and place them around the capsule.

Lock the orange float switch in place on the pre-assembled retaining clip for the sampling pot in the tank.

Ensure hose pipe is clipped into manway using clip provided. This provides support for the hose. Use bolts and washers to achieve this.

Fit the capsule cable into the control panel.

If an extended electrical cable is required, ensure the connection is covered with heat shrink.

Image for Demonstration Purposes Only – Connect Hoses In-Situ

Fit the dosing hose to the pump inside the capsule

Dosing hose, PE, 4x6mm, transparent
for precipitants with

Dosing element (pressure side, pre-assembled on the technology capsule)

Suction side Pressure side

6. Positioning Chemical Dosing Tank 4500L and 5200L Only

Tank for precipitant, approx. 21 liters, with a pre-assembled dosing hose, suction filter with weight (suction side)

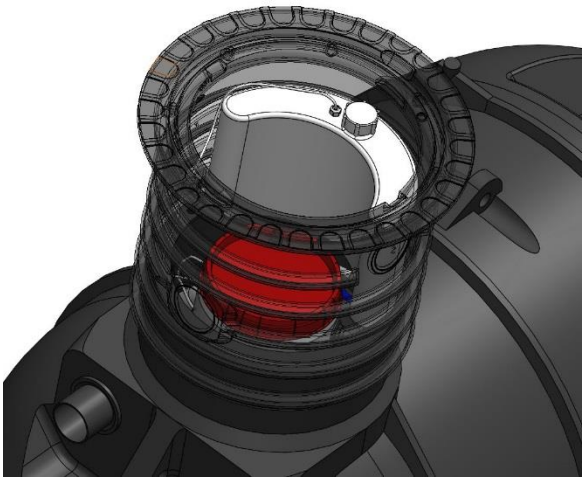
Storage tank positioning plate (base), screws, nuts and washers included

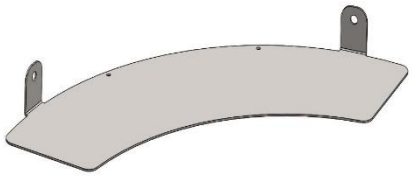
For systems with a VS60 shaft, insert the mounting plate with the tabs facing down between the edge of the container and the shaft.

Fix with screws if necessary.

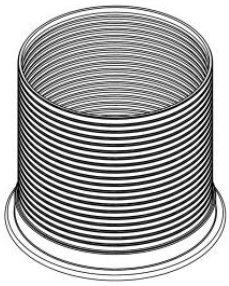
For systems with an intermediate ring, fix the setting plate to the intermediate ring with the screws (tabs pointing upwards).

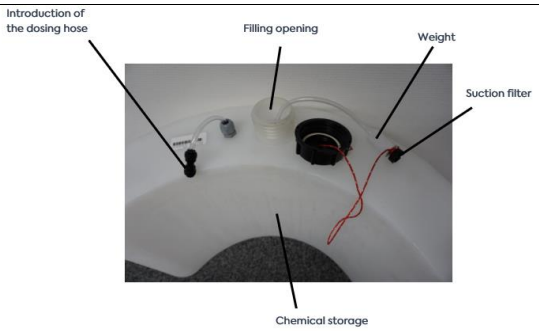
If necessary, fix it to the container with screws.





Affix plate to manway



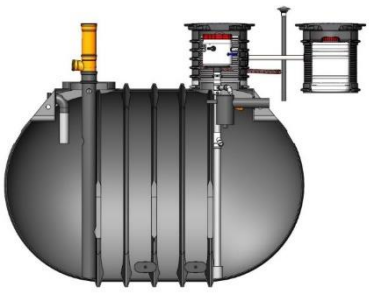


Only by specialist company:
Fill the precipitant tank.

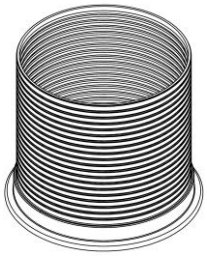
Observe hazard warnings

Place the precipitant tank on the setting plate and secure it with the belt loops and the carabiner to the eye bolt in the shaft.

7. Positioning Chemical Dosing Tank 7600L and 9900L Only



Precipitant tank, approx. 66 litres, with pre-assembled dosing hose, suction filter with weight (suction side)



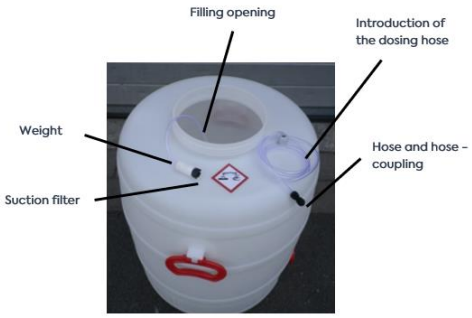
Level in the precipitant tank:
10cm corresponds to approx. 13-14L

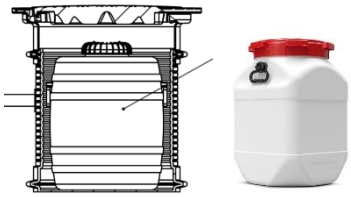
The tank is to be positioned in a covered encasement next to the main-tank (encasement provided)

Only by specialist company:

Fill the precipitant tank.

Observe hazard warnings



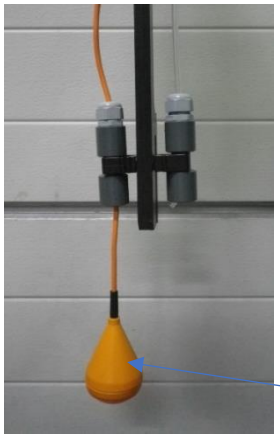


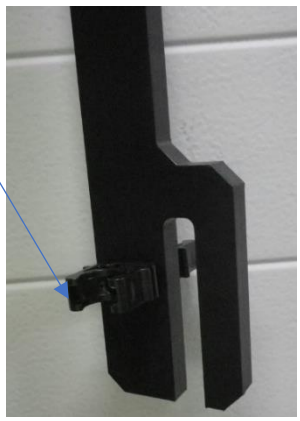
8. Removable holder for overfill alarm SWS and dosing element Length 97 cm

Click the dosing element and the overfill detector into the retaining clips on the removable receptacle.

Use the left side for the float switch (high level alarm)

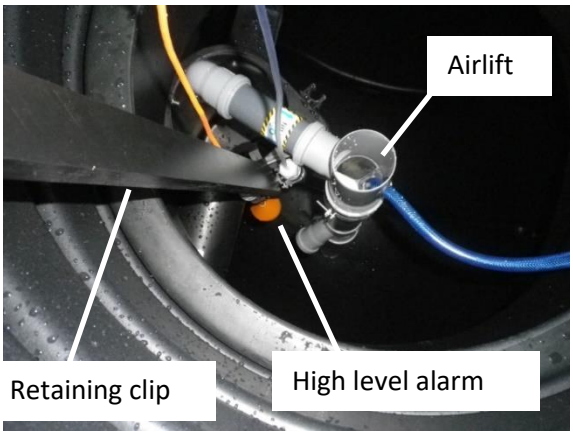
Dosing element on this side





Float switch on the other side

Place the removable receptacle with the dosing element and overfill indicator on the edge of the sampling pot.



9. Positioning Manway onto Turret

Position rubber seal onto turret - make sure the rubber ring is well-positioned in the groove of the manway. No major force is required if the rubber seal is positioned correctly into the groove

Position manway onto turret and press down until seal is created and manway is level

10. Drilling Manway Holes & Fitting Pipes/Cables

Tool Required: Circular cutter drill bits

○ **Ventilation pipe hose**

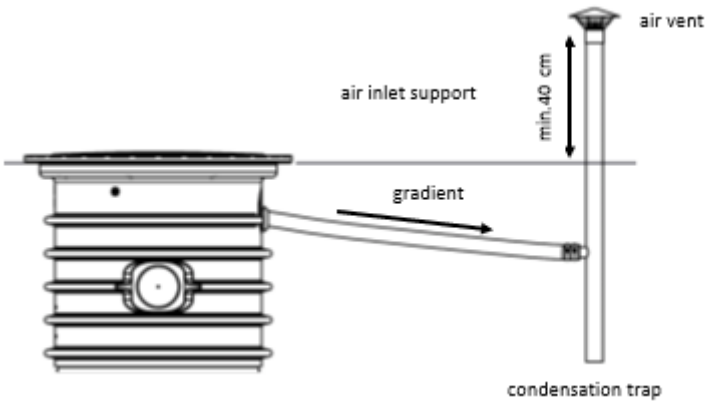
Ensure there is a water-tight seal between the ventilation hose and the manway.

○ **Electrical cable from capsule**

NOTE – Ensure holes drilled into the turret for pipes and cabling are completely water- tight. If you have any questions regarding how to do this please contact premier tech.

NOTE - To ensure air hose pipes do not kink, cut down hose lengths where required. For example, if you have excess pipe from the pump to the pump hose outlet, cut the hose down in size to prevent kinking.

11. Ventilation Pipe Installation



12. Optional Pumped Version (externally located)

Suspend the pump onto the threaded metal rods using the hooks located on the chain.

Attach the chain hooks into the turret as below. Position the hooks so they are easily accessible as high up in the turret as the chain length allows.

In the case that the effluent has to reach to a static head that the airlift cannot support, the product would have to be supported by our small-footprint pump station.

The pump station is made of polyethylene and is of a 500mm diameter. The pump (Top2 Vortex) is able to deliver the effluent volume and is enabled by an integrated float switch. The pipework is made of PVC and is of 1 '' cable gland outlet (threaded, DN25) and a 32mm of pump connection inlet.

The function of the pump is only regulated by the float and no timers is included.

See pictures below with the corresponding legends.

From left to right: Overall view of the pump station; top lid of the pump station with the corresponding extension(s); view of the TOP Vortex pump with the integrated float switch




From left to right: Detail of the float switch; pipework connection (outlet); generic plan view showing the position of the pump; top of the pump station showing the outlet pipe outside the vessel

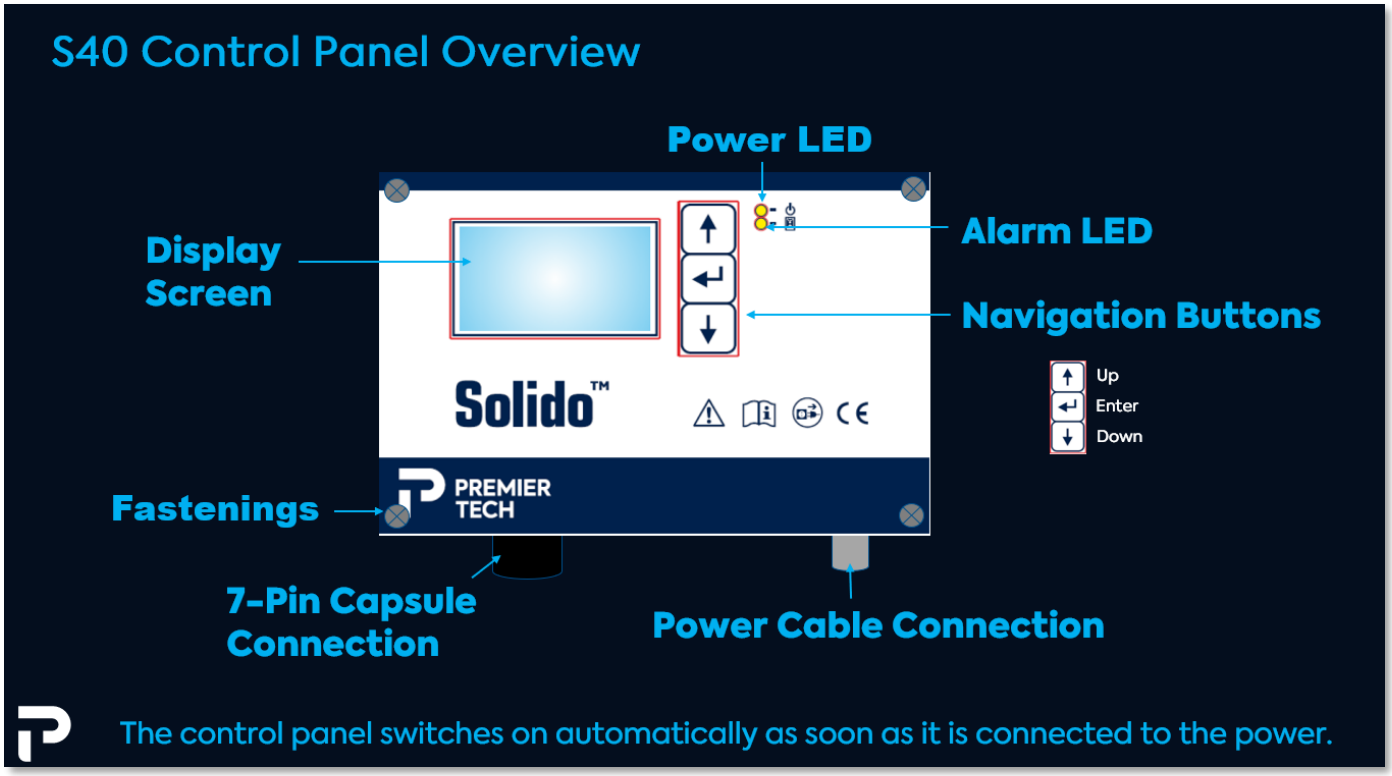
13. Check the Complete Installation

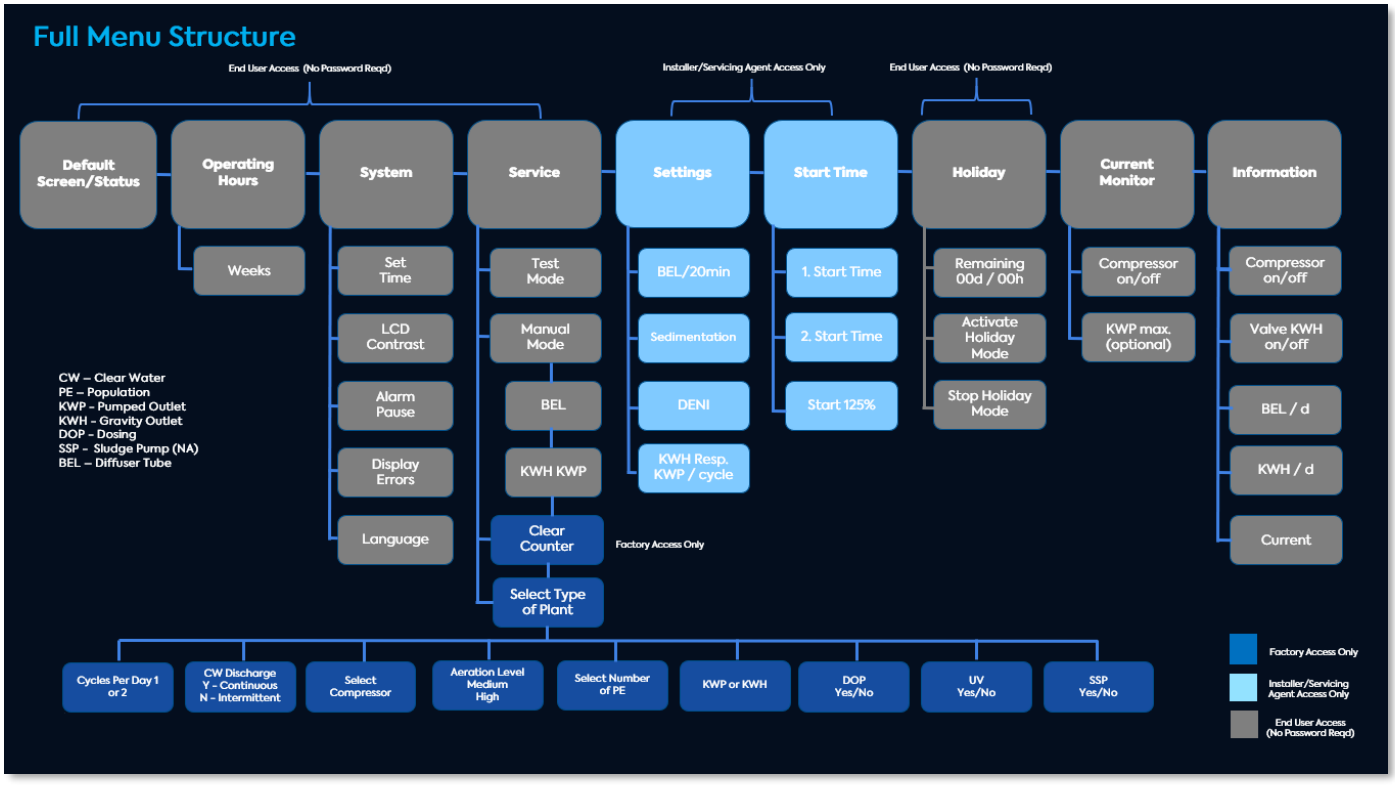
Check the full installation:

- Tank location
- Ground conditions including inlet/outlet pipes
- Backfill is stable
- Control panel location is accessible
- Connections all completed
- Electric supply is reliable

14. Perform Start-Up

Once everything is connected, switch on the panel and configure the plant. Perform a test run to assess the electro-mechanical components.





Control Panel Password

The control panel requires a code to access the system. This is a safety feature to discourage access by end users. Contact Premier Tech for the password.

The initial setup code is 7682 (First-time use only)

+44 (0) 191 587 8650
sales.ptwe.uk@premiertech.com
PT-WaterEnvironment.co.uk

First Start Up (1/3)

Up
Enter
Down

- On first start up panel shows **'Sprache Deutsch'**
- Press down to English – Press Enter.
- Set date and time using up down and enter.
- Enter Password **7682** using down and enter.
- Screen shows **Solido Smart Yes** press enter.
- Screen shows **Cycles Per Day 2** press enter.

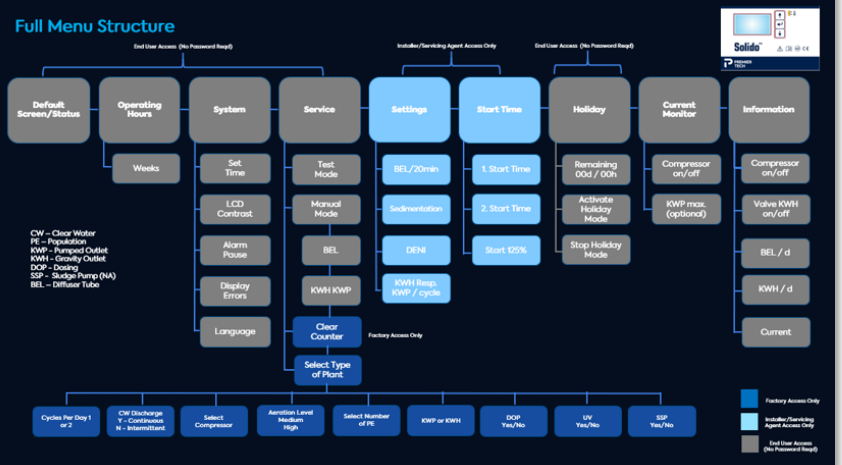
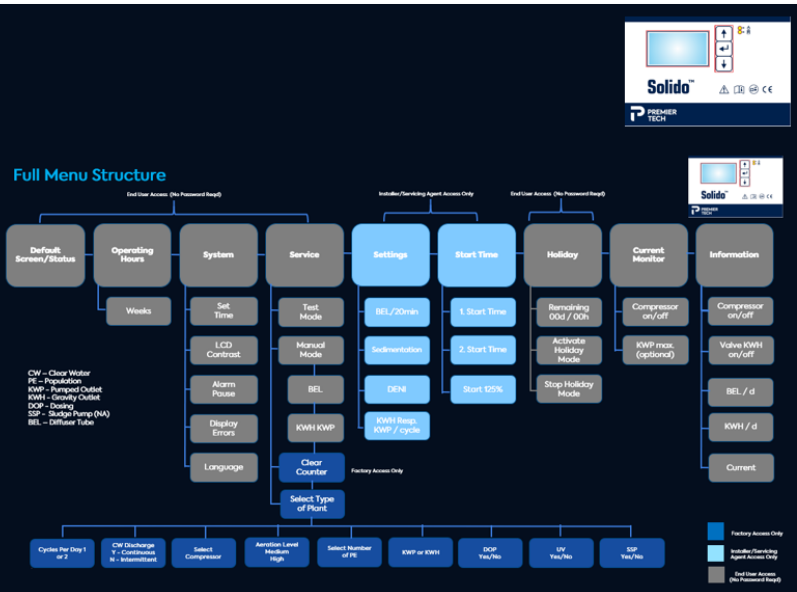


Abb.	Meaning
KKA	Wastewater treatment plant
SBR	Sequencing batch reactor
BEL	Tube diffuser
KWH	Clearwater lifter
SWS	Float switch
DOP	Dosing for Phosphorus Removal

First Start Up (2/3)

Up
Enter
Down

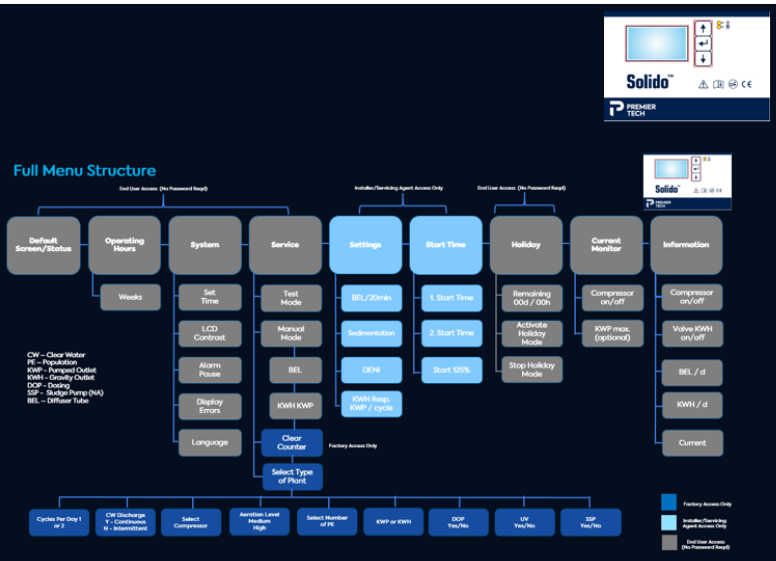
- Screen shows **Continuous CW Discharge Yes** press enter (press NO only if you have a downstream process, i.e. slow infiltration bed, Ecoflo, reed bed or similar)
- Screen shows **Select Compressor select correct option for your compressor type** press enter.
- Screen shows **Solido Smart C** press enter.
- Screen shows **Number of PE** – using up and down select the number of persons in the property. Press enter.
- Screen shows **KWP – Press enter for pumped outlet tanks. For gravity outlet tanks, press down it will show 'No', press enter.**
- **Where a pumped outlet tank is being installed – determine the distance from the tank to the effluent discharge. If the install requires pumped outlet more than 25m then access KWP and increase pumping time to 20 minutes.**



First Start Up (3/3)

Up
Enter
Down

- **Test mode will begin Do Not press any key if you want to run in test mode.**
- **It takes a few minutes to run the test mode depending upon the specification of tank.**
- If the system runs without showing errors and does not alarm, then press the Enter Button.
- Screen shows **'Were inputs Ok'** press down till Yes then press Enter. The system will start. (If No is entered the system will reboot to initial settings then reconfigure from the start).
- If you want to temporarily silence the alarm press the Enter once. If you press the Enter again the alarm will reset but will continue until fault is rectified.



In some models, during setup, extra options may appear (depending on manufacturing date)

Aeration: Medium / High (press high)

DOP: Yes / No (Only press yes if installing a +P Phosphorus removal tank)

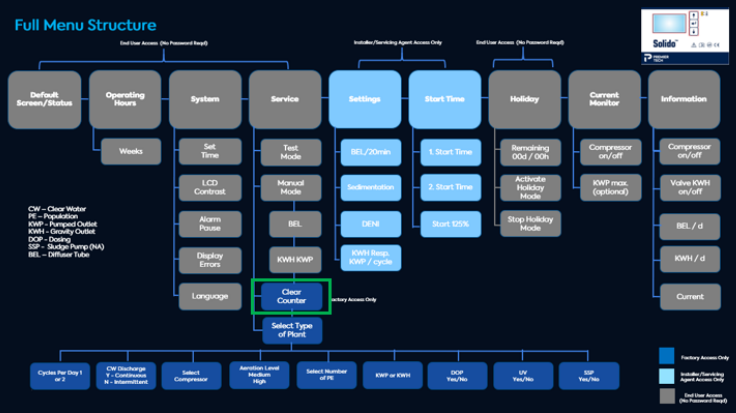
UV: Yes / No (press No)

SSP: Yes / No (press No)

Rebooting to Factory Settings

Up
Enter
Down

- Navigate to 'Clear Counter'
- Press Enter
- Contact Premier Tech for password and Enter
- Press Down until on the Start Time screen.
- Press Enter
- On Start Time screen press Down until on Reset – press Enter
- It will show Are You Sure press Down till shows Yes – press Enter
- System will reboot to factory settings.



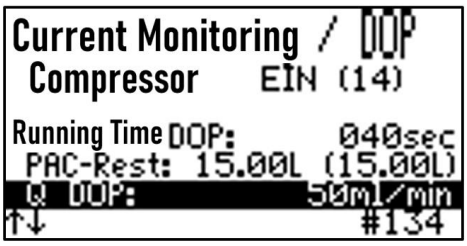
Changing The Set Volume Flow Of The Dosing Pump

Note:
- **Standard setting 42 ml / min (default during dosing)**
- **If a deviating value is determined during maintenance, *please enter this in the control.***

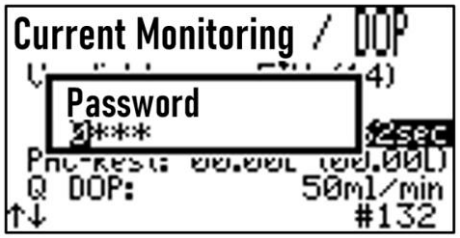
Volume flow of the pump

Standard value (pre-assigned) for SEKO PE-3:
42 ml / min

Note: if the distance between the precipitant tank and the pump is greater, an % increase in liters is necessary to compnsate for the losses.



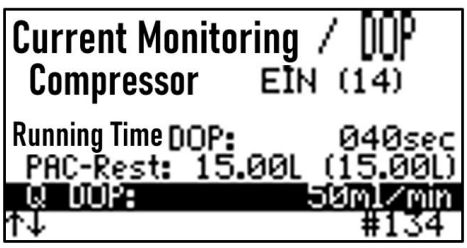
Press the middle button again and then enter the service password.



Enter the desired value,
confirm with the middle button.

Adjustable max. 80ml / min

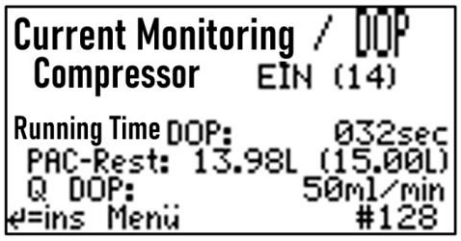
The new value is saved.



Changing The Running Time Of The Dosing Pump

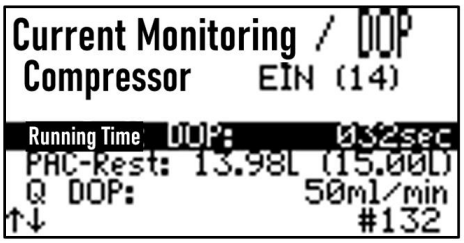
To optimize the cleaning performance of the system, it may be necessary to adjust the running time of the dosing pump (as part of maintenance).

Go to the menu item
Current monitoring / DOP

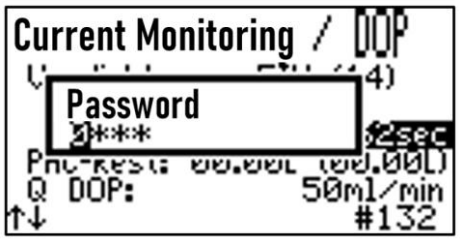


And scroll to the line, Term DOP

This is the running time of the dosing pump
in sec per cycle



Press the middle button again and then enter
the service password.



Enter the desired value,
confirm with the middle button.

Adjustable: 0-240s

1. Start-Up & Commissioning Procedure

1. Is the control unit located no more than 30 m from the treatment plant and protected from rain and sun? ☐

2. Is a 230 V power supply plug with a 30 mA residual-current circuit breaker available? Is the protective earth conductor functioning? ☐

3. Is the treatment tank installed according to the installation manual? ☐

4. Is the sludge removal pipe installed in accordance with the installation instructions including extension and cap? ☐

5. Are the seals from the shaft assembly set for the air supply hose and cable conduit set in place? Is the cable holder installed? For pumped version, is the outlet installed? ☐

6. Is the hose pulled into the shaft up to the red marking? (Standard hose length 3m, extension up to 10m possible, max. 300mm deep into the ground) ☐

7. Is the diffuser pipe installed in the centre of and horizontally on the tank floor? ☐

8. Are the lifters filled with water to prevent them from being lifted? (Not applicable to pumped version) ☐

9. Check the inlet pipe from the house is connected and the outlet pipe is connected to the downstream pipework. ☐

10. Make sure ventilation is sufficient as described in this manual ☐

11. A wire is attached to the end of the cable so that the cable can be pulled out of the conduit in future if required. ☐

12. Fill the tank with clean water up to the level of the pump. ☐

13. Ensure the pump is hanging both on the threaded stainless-steel rods as well as on the chain hooks positioned in the turret. ☐

Servicing Guide for Professionals

Servicing & Maintenance

Ensuring the sewage treatment plant is regularly maintained is necessary to ensure the operational efficiency of the tank and to limit the possibility of any faults occurring.

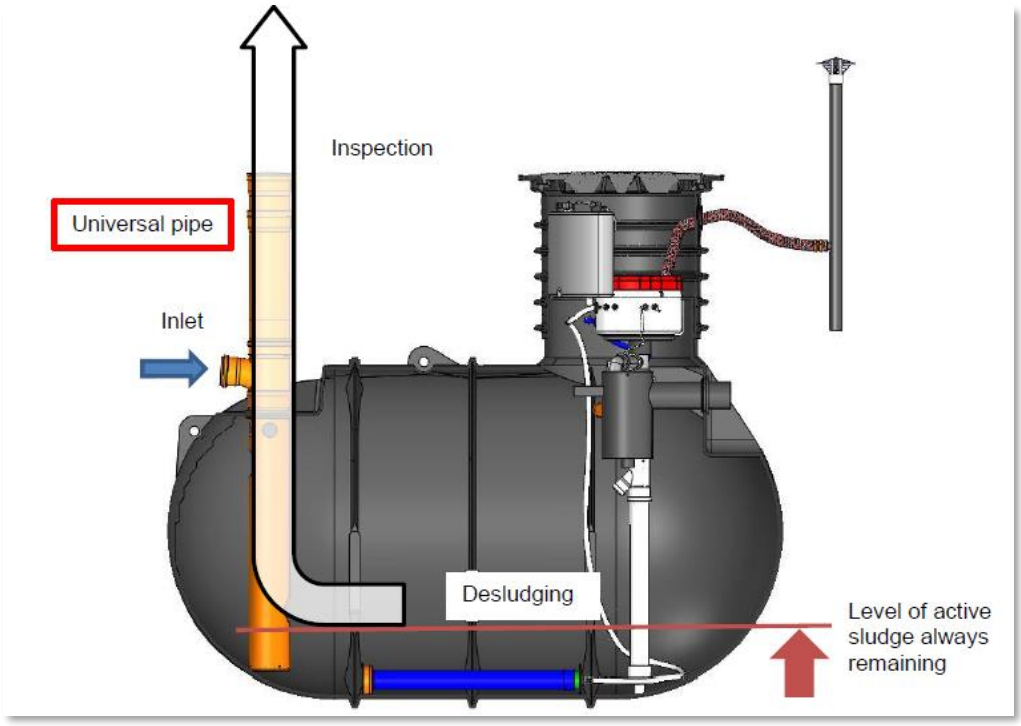
■ Servicing

This should be conducted by a professional wastewater treatment servicing agent as a matter of course at least once a year. Failure to do this could impact the performance of the wastewater treatment plant and void the warranty.

De-Sludging

The design of the de-sludge pipe ensures that at 10% of the volume of contents will stay inside the tank. This is required to ensure ongoing biological operation.

De-Sludge using the de-sludge pipe only



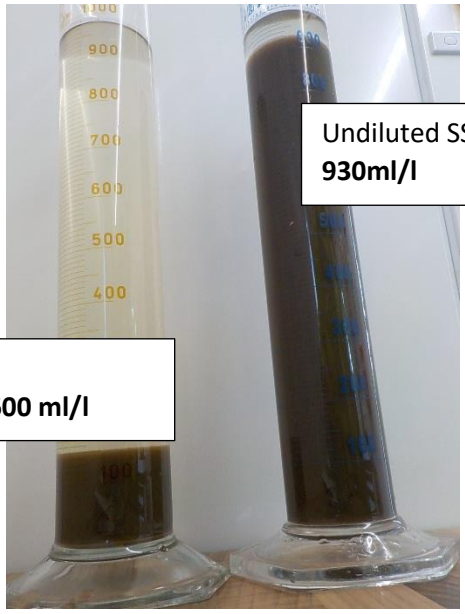
- Desludging is required if the sludge level reaches 70% of the max. permitted.
- If the sludge volume fraction is lower than that, then an annual desludging is the maximum acceptable period for solids' accumulation.
- Your service provider should carry out this test by using two volumetric cylinders, one empty and one half full of water.
- You must check whether the functions of the calmed inlet, aeration devices, and clearwater lifter are impacted by damaging substances (i.e fats, rugs, inert solids). Substances that are damaging to functions should be removed each time that maintenance is performed.
- During desludging, you must ensure that airlift and aeration devices are not damaged, the plant is not in the middle of the sedimentation phase whenever possible, and that at least 10% of the sludge quantity remains in the container (inlet pipe has a corresponding opening to allow for the specific volume).

Assessing Activated Sludge Volume In The Reactor (SSV30)

- measure **water level** in the reactor (**after aeration, ideally around 11.30 am**
- aerate reactor per manual mode for 2min when tank is full, evaluate mixing
- take **250 ml sample of mixed activated sludge** and fill into 1000 ml cylinder
- fill up with **750 ml of clearwater** from sample pot to reach "1+3 dilution"
- allow **settlement for 30min**
- **multiply resulting sludge level by factor 4** to get **SSV30 in ml/l**
- take **picture** and save it as part of maintenance report

Why dilute 1+3?

Example after 30min sedimentation:



The result of **600ml/l** is much closer to the real conditions in the tank.

9.3.Evaluation of Sludge Level SSV90norm and Desludging

For proper evaluation of $SSV90_{norm}$ sludge level calculate according to this formula:

$$SSV90_{norm} = 0,95 \times SSV30 \times HR / HRmax$$

$SSV90_{norm}$	true sludge level in reactor after 90min of sedimentation normalized / standardized to HRmax
0,95	factor for conversion of SSV30 to SSV90 (30 resp.90 min sedimentation)
SSV30:	measurement of sludge level in reactor in 1+3 dilution after 30min sedimentation at current water level HR during service
HR:	current water level at service
HRmax:	max. reg. water level at full hydraulic load (see table below)

Desludging is required when **$SSV90_{norm}$ = 700 ml/l**

EXAMPLE

- Type: EM2-35 (tank type)
- HR at service: 1,16 m
- HRmax according to table: 1,28 m
- level in cylinder (30min): 130 ml (1+3)
  (250ml sample+750ml clearwater)
- SSV30 = 520 ml/l *(4x130)*
- $SSV90_{norm}$
  = 0,95 x 520 x (1,16 / 1,28) ml/l
  = 448 ml/l

➔ **$SSV90_{norm}$ = 448 ml/l**
➔ **around 2/3 of total sludge storage volume capacity is currently filled**

Table of max.regular water level at full hydraulic load HRmax:

Plant type	**PE**	**HRmax**	Height tank bottom to edge of manhole as refernce for on-site measurement
EBL-26	5 PE	**0,92 m**	1,57 m
EBL-30	5 PE	**1,12 m**	1,96 m
EBL-45	8 PE	**1,35 m**	2,24 m
EBL-52	10 PE	**1,54 m**	2,21 m
EBL-76	15 PE	**1,68 m**	2,28 m
EBL-99	20 PE	**1,81 m**	2,28 m
EBL-76X2	30 PE	**1,71 m**	2,28 m
EBL-99X2	40 PE	**1,81 m**	2,28 m
EBL-99X3	50 PE	**1,85 m**	2,28 m

Special Notes On Maintenance Of The Dosing Mechanism

This paragraph highlights the maintenance needs for the dosing equipment. This work is to be carried out by an experience service company only that knows the hazards from handling corrosive chemicals.

Precipitants

Warning: irritating / corrosive, Irritating to eyes and skin.

Avoid contact and wear suitable protective equipment.

Use only containers and fittings made of plastic.

There is no expected hazard when the chemical agent is dispensed into the mixed liquor.

Tools Required (Only By Professional Service Company)

- A dipstick made of plastic to be used for the measurement of the level in the precipitant tank
- Funnel and hose to be used for the refill of the precipitant tank

Suction Filter In The Precipitant Tank (only by professional service company)

Check the suction filter in the precipitant tank for deposits or blockages. Clean if necessary.

Level of Precipitant (only by professional service company)

As part of maintenance, the actual fill level in the precipitant tank must be compared with the "theoretical" fill level displayed on the control (PAC rest).

Fill level (large canister): 10cm corresponds to approx. 13–14L

In the event of significant deviations, the cause must be clarified (see likely scenarios below)

Possible causes:	**Inspect:**
The flow rate of the pump is not set correctly.	Measure the volume flow of the pump and adjust the settings on the control if necessary
Blockage at the dosing hose or dosing pump	Check the pump, hose and suction filter and clean if necessary.
Malfunction of the dosing pump	Check the pump.

Filling The Precipitant Tank

Danger:
Observe the safety instructions for handling the precipitant, see Appendix

Polyaluminium hydroxide chloride PAC is used as a precipitant.

Container: canister 60L
See data sheets in the appendix
Annual consumption for an average single-family house: approx. 15 liters
After the precipitant tank has been filled, the new filling volume must be entered on the control.

Dosing Pump

The pump hose inside the housing must be replaced once a year as part of the maintenance.

- Replacement hose: Persitalik hose, material: Santoprene



Please make sure that the plastic cover clicks back into place correctly!

Notes For Plants With Pumped Outlet (option)

- The pump is positioned on the bottom of the tank; make sure that the integrated float moves freely and the length is short so it can easily reach to a vertical position.
- Consider 1 '' cable gland outlet (threaded, DN25) and a 32mm of pump connection inlet

Important Information on Control With DOP

- The metering pump is not monitored for current (no alarm if the pump fails)
- When vacation mode is activated, the dosing pump is inactive

Alarm Relay (for an external signaller)

The control unit has an alarm relay, whereby contacts 11 and 12 of the relay can be connected to an external signalling device (e.g. warning light). Ensure that the external device has a separate power supply so that a power failure in the control unit can also be signalled. When an alarm sounds or there is a power failure, contacts 11 and 12 are connected to one another. Finally (to be performed by a qualified electrician only), the pre-punched opening on the housing is opened and the cable is expertly led through with a PG gland.

Service & Maintenance (specialist companies only)

Replacing the fuse:

If the **control fuse is released**, it should only be replaced by **a microfuse of the following type: T 4.0 A, 250 V, H** (time-delay glass tube microfuse 4.0 A; 5 x 20 mm with a high breaking capacity (opaque) according to EN 60127-2/III.

Changing the battery: Battery maintenance is not required; however, if the alarm duration begins to decrease or the alarm **Accu**, we recommend replacing the accumulators with new ones (type NiMH AA, capacity 1800 to 2100 mAh).

Only rechargeable accumulators (batteries) are permitted; never use normal batteries.

Technical Data And Environmental Conditions For The Control Unit

Technical Data

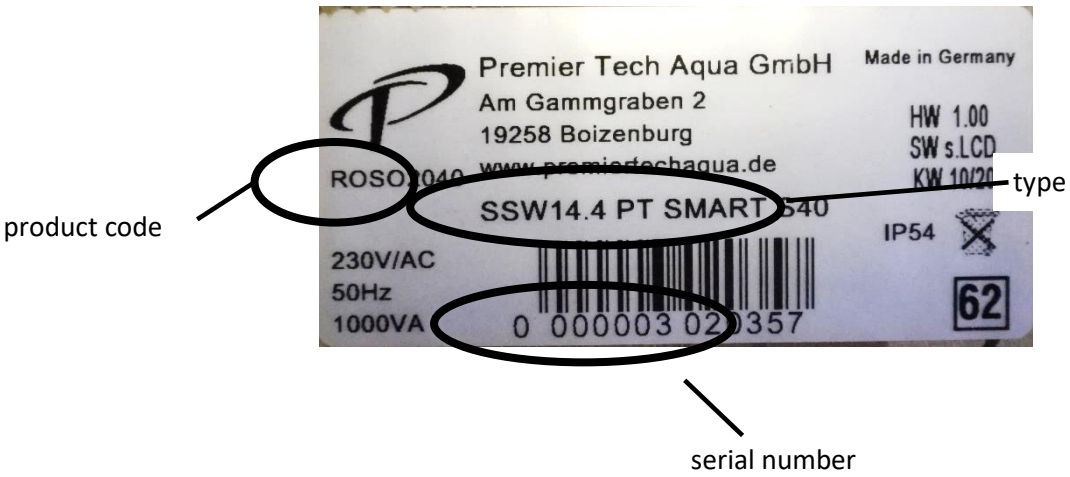
Housing material:	Polycarbonate for wall mounting
Dimensions:	200 x 120 x 60 mm
Type of protection:	IP54
Supply voltage:	230 V AC, 50 Hz
Control:	Time-controlled using real time clock
Inputs:	1 float switch input
Outputs:	4 relay outputs
Alarm output:	1 alarm relay
Interface:	Internal RS232 interface
Current measurement:	Available Power failure monitoring
Connection technology:	1 x 7-pin flange socket (binder)
Mains voltage via shock-proof plug:	3 x 1.0 mm^2, 1.5 m long
Microfuses:	2x T 4.0 A, 250 V, H (time-delay glass tube microfuse) 4.0 A; 5 x 20 mm with a high breaking capacity, opaque, as a joint fuse for all outputs (L/N)
Sound level:	Max. 57 dB(A) when the acoustic alarm is sounding at a distance of 1 m

Environmental conditions for control unit

Permitted ambient temperatures:

Operating temperature:	Unit function: −20°C to +55°C
Storage temperature:	−25°C to +60°C
Air pressure:	During operation and during storage, 80 kPa to 106 kPa
Relative humidity:	max. 95% rH (condensing) permitted
Ice formation:	Not permitted

Type Plate Control Unit



Technical Data For Solido SMART Technology Capsule

Outer dimensions of technology capsule:	D = 340 mm, H = 252 mm (High capsule: H = 352 mm)
Material:	HD-PE
Approval:	UN / 1H2 / X 38 / S
Protection class:	IPX6
Relative humidity:	max. 95% rH (condensing) permitted
Sound level:	max. 36 dB(A) at a height of 1.50 m directly above the cover of the Solido SMART +P (with XP-60)
Solenoid valves:	1 x 3/2-way solenoid valves, DN 13, 1/2" female thread, IP65

Installed compressor:

HIBLOW membrane compressor models	XP-80
Operating pressure (mbar)	147
Applicable pressure range (mbar)	60-270
Air feed rate at operating pressure (l/min)	80
Max. apparent output of technology capsule (S) (VA)	205
Weight (kg)	4.3
Dimensions (mm x mm x mm)	208 x 132 x 186
Protection class	IP45

In the higher capsule:

HIBLOW membrane compressor models	HP-120	HP-200
Operating pressure (mbar)	177	200
Applicable pressure range (mbar)	30 to 300	30 to 300
Air feed rate at operating pressure (l/min)	120	200
Max. apparent output of technology capsule (S) (VA)	285	510
Weight (kg)	8.5	9.0
Dimensions (mm x mm x mm)	256 x 200 x 222	256 x 200 x 222
Protection class	IP45	IP45

Dosing Pump Information

Dosing pump PE – 3

Catalogue number: PP0003A1000_A

Technical specifications

Housing protection of the pump	IP 65
Flow max (l/hr)	3.0
Pressure (bar)	0.1
Suction distance (m)	1.5
Hose connection	Nut 4x6mm
Power supply	230 VAC
Power requirement (W)	3.5
Electrical supply (mA)	100
Scope of delivery	Includes standard assembly kit
Dimensions (mm)	103 x 82 x 92 (H x W x D)
Standards	72/23EEC (19/02/1973) 89/336EEC (from 03/05/1989) EN60336-1

Final effluent pump (optional)

The pump used is TOP vortex (model. 2)

See details for model 2

MODEL	POWER (P2)		Q	m³/h	0	1.2	2.4	3.6	4.8	6.0	7.2	8.4	9.6	10.8
Single-phase	kW	HP		l/min	0	20	40	60	80	100	120	140	160	180
TOP 2 - VORTEX	0.37	0.50	H	metres	7	6.5	6	5.4	4.8	4.2	3.5	2.9	2.2	1.5
TOP 3 - VORTEX	0.55	0.75			8.5	8	7.4	6.8	6.1	5.5	4.7	4	3.2	2.5

Q = Flow rate **H** = Total manometric head

Tolerance of characteristic curves in compliance with EN ISO 9906 Grade 3B.

Technical specifications

Feature	Details
Pump body	Technopolymer
Suction filter	
Suction plate	
Diffuser	
impeller	Technopolymer Vortex type
Motorcasing	Stainless steel AISI 304
Motorcasing plate	Stainless steel AISI 431
Motor shaft	
Electrical motor	Single phase
Capacitor	10uF – 450VL (220V) 16uF – 250 VL (110-127 V)
Electrical motor	220V 60Hz
insulation	Class F
Protection	IP X8
Cable	5.0m H07 RNF power cable with Schuko plug
Hose connection	32 mm (with ring nut)

Generic MSDS for PAC

Chemical agent – properties

Agent name: Polyaluminium Chloride (PAC) solution

- Al_3^+: 9.2 ±0.4 % (3.4 ±0.15 mol/kg)
- Al_2O_3: 17.4 ±0.6%
- pH (at 20°C): <2.0
- colour: Yellow (-ish)

Component	CAS-No	Weight (%)
PAC	1327-41-9	25-35%
Water	7732-18-5	65-75%

Hazard Identification

Classification – OSHA regulatory status

This chemical is considered hazardous by the 2012 OOSHA hazard Communication Standard (29 CFR 1910 1200)

Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2
Corrosive to metals	Category 1

Prüfinstitut für Abwassertechnik GmbH

PERFORMANCE RESULTS

Premier Tech Aqua GmbH
Am Gammgraben 2, 19258 Boizenburg, Germany

EN 12566-3, Annex B
Small wastewater treatment systems for up to 50 PT

Small wastewater treatment system SMART + P Millenium 4m³
One chamber SBR system with phosphorus precipitation

Test report PIA2017-300B22

Nominal organic daily load	0.20 kg BOD_5/d	
Nominal hydraulic daily load	0.6 m³/d	
Material	Polyethylene	
Treatment efficiency (nominal sequences)	COD	95.5 %
	BOD_5	98.7 %
	N_{tot}	74.6 %
	NH_4-N*	99.1 %
	P_{tot}	90.0 %
	SS	95.5 %
Electrical consumption	0.56 kWh/d	

**determined for temperatures ≥ 12°C in the bioreactor*

Performance tested by:

PIA – Prüfinstitut für Abwassertechnik GmbH
(PIA GmbH)
Hergenrather Weg 30
52074 Aachen, Germany

This document replaces neither the declaration of performance nor the CE marking

Notified Body No. 1739

Certified according to ISO 9001:2008

DAkkS Deutsche Akkreditierungsstelle D-PL-17712-01-00

Prüfinstitut für Abwassertechnik GmbH
geprüft - tested - testé

Elmar Lancé February 2018

PREMIER TECH

INSTALLATION & SERVICING GUIDE

REWATEC™

Solido Smart +P

PREMIER TECH

015711
Shallow Dig Cess Pools & Silage
Installation & Maintenance Guidelines

Kingspan Water & Energy Service Contact Numbers:

UK: 0333 240 6868

NI: 028 3836 4600

ROI: 0818 543 500

Enclosed Documents

DS1214	**Guernsey Shallow Dig Cess Pools (5700, 7150 & 9150 Litres)**
DS1219	**Shallow Dig Cess Pools (2800, 3800, 4800, 5700, 7150 & 9150 Litres)**
DS1220	**Shallow Dig Silage Tanks (2800, 3800, 4800, 5700, 7150 & 9150 Litres)**
DS1336	**Shallow Dig Cess Pools (2800, 3800, 4800, 5700, 7150 & 9150 Litres) - Norway**

Issue	Description	Date
05	ECR189 / ECN1626 – Remove Tank Feet	September 2022
04	ECN - 1621	September 2022

HEALTH & SAFETY

These warnings are provided in the interest of safety. You must read them carefully before installing or using the equipment.

It is important that this document is retained with the equipment for future reference. Should the equipment be transferred to a new owner, always ensure that all relevant documents are supplied in order that the new owner can be acquainted with the functioning of the equipment and the relevant warnings.

Installation should only be carried out by a suitably experienced contractor, following these guidelines.

We recommend the use of a dust mask and gloves when cutting GRP components.

Electrical work should be carried out by a qualified electrician.

Contaminated surface water can contain substances harmful to human health. Any person carrying out maintenance on the equipment should wear suitable protective clothing, including gloves. Good hygiene practice should also be observed.

Access covers should be selected with reference to the location of the unit and traffic loads to be accommodated. These are not (normally) part of the unit's supply.

When covers are removed precautions must be taken against personnel falling into the unit.

Should you wish to inspect the operation of the equipment, please observe all necessary precautions, including those listed below, which apply to maintenance procedures.

Ensure that you are familiar with the safe working areas and accesses. Ensure that the working area is adequately lit.

Take care to maintain correct posture, particularly when lifting. Use appropriate lifting equipment when necessary. Keep proper footing and balance at all times. Avoid any sharp edges.

MAINTENANCE

The correct ongoing maintenance is essential for the proper operation of the equipment. Operators who rely on high level alarms to prompt them to empty the unit run the risk of polluting, should the alarm not work, hence the ongoing maintenance of the alarm systems is fundamental if pollution incidents are to be avoided.

The removal of sludge and liquid from the unit should be carried out by a contractor holding the relevant permits to transport and dispose of such waste. The contractor should refer to the guidelines in this document.

CONTENTS

1.0 Introduction

1.1 Kingspan shallow installation tanks are designed to be installed in areas where shallow dig depths are required due to minimal invert levels or difficult ground conditions. Typically, in areas where granite rock strata are close to the surface.

1.2 The tanks have either one or two manhole shafts for ease of emptying (please check your order),

1.3 Consult your local authority as the installation may require Planning and Building Control approval. In the UK, you will need to be aware of publication DETR 3/99 (Welsh office 10/99) “Planning requirement in respect to use of non mains sewerage incorporating tanks in new development and building regulations H2”. In Ireland, circular letter SP/03 for the protection of groundwater. These documents require detailed site assessments.

1.4 The tanks are covered within the UK by H2 Building regulations 2000. A building inspector may wish to examine the site before, during or after tank installation and may require site of percolation test results.

1.5 In Ireland, Building regulations 1997, Technical guidance document H details the regulations.

1.6 Tanks shall be of adequate capacity, impermeable to liquids and adequately ventilated.

1.7 Tanks should be so sited and constructed that they are not prejudicial to the health of any person, will not contaminate any watercourse, underground water or water supply. They must have adequate means of access for maintenance and emptying.

1.8 Buildings which utilise such tanks should have a notice affixed within the building. This notice should advise the estimated emptying frequency and the need to use a licensed waste disposal contractor. The owner is legally responsible for ensuring that the system does not cause pollution, a health hazard or a nuisance.

1.9 These guidelines represent Best Practice for the installation of the above units. Many years of specialist experience has led to the successful installation of thousands of units it must be noted, however, that these Guidelines are necessarily of a general nature. It is the responsibility of others to verify that they are appropriate for the specific ground conditions and in-service loads of each installation. Similarly, a qualified specialist (e.g. Civil engineering consultant) must verify any information or advice given by employees or agents of the company regarding the design of an installation.

2.0 Handling & Storage

2.1 Care must be taken to ensure that units are not damaged during delivery and handling on site.

2.2 The design requirements of our products will frequently mean that the centre of gravity of the unit is “offset”. Care must therefore be taken to ensure that the unit is stable when lifting. Rainwater may also collect inside units, particularly if they have been stored on site prior to installation, adding weight and increasing instability. Check units before lifting and pump out any excess water.

2.3 When lifting units, use webbing slings of a suitable specification. DO NOT USE CHAINS.

2.4 A suitable spreader bar should be used to ensure that units are stable and that loads are evenly distributed during lifting. When lifting units, a spreader bar should be used where the slings would otherwise be at an angle > 30 degrees to the vertical.

2.5 Lifting equipment should be selected by considering the unit weight, length and the distance of lift required on site.

2.6 We accept no responsibility for the selection of lifting equipment.

2.7 Whenever units are stored or moved on site, ensure that the storage location is free of rock, debris and any sharp objects, which may damage the unit. The units must be placed on ground, which is flat and level to evenly support the base of the unit. Do not roll units. The unit has two stability feet at its base.

3.0 Site Planning

The following points should be considered before installation of the equipment:

3.1 The installation should have Planning and Building Control approval. See DETR 3/99 Planning requirement in respect to use of none-mains sewerage in new development and building regulations H2.

3.2 Position the unit at the maximum distance from habitation. Distances in excess of 15m are usually the minimum acceptable to the planners, but this varies depending on your local authority. The installation must be sited so as not to be prejudicial to health, nor to contaminate water supplies.

3.3 See BS EN 752-4 Drain & sewer systems outside Buildings.

3.4 Consider placing inspection points in the drain line before the units.

3.5 Tanks and treatment systems installed in series should be set with appropriate falls between them. Allow a minimum of 50mm, if not more. Connecting pipework should never run uphill.

3.6 Consider venting of the unit. Comply with local regulations. Larger tanks serving multiple properties should have a vent fitted to the neck to enable localized high-level venting.

3.7 Uncontaminated run off such as roof and surface water should be excluded from the unit to avoid over frequent filling. Separate drains must be provided for surface water which must NOT enter the unit.

3.8 Our tanks are structurally tested in accordance with EN 12566-1, which specifies structural stability testing for both wet and dry sites using granular backfill 3-8mm. However, in GB it would be typical for tanks to be installed in concrete due to rising water table, and it can generally be assumed that buoyancy prevention of concrete backfill is more advantageous than the granular backfill materials used in testing.

3.9 Ground conditions and water table level should be assessed. If the water table will be above the base of the unit at any time of the year, adequate concrete backfill must be provided to avoid flotation. In poorly draining ground, consideration should also be given to the likelihood of flotation due to surface water collecting in the backfill, and an appropriate installation method devised to avoid this.

3.10 Do not install the unit deeper than necessary. The maximum invert depth of the unit is shown on the relevant equipment drawing.

3.11 Sample/Inspection chambers may be required.

3.12 Adequate access to the unit must be provided for routine maintenance. Vehicles should not be permitted within a distance equal to the depth of the unit, unless suitable structural protection is provided to the installation.

3.13 There must be at least 1 meter of clear, level ground all around the access covers to allow for routine maintenance.

3.14 Provide electrical supply for alarm system. (If required)

3.15 Installation should only be carried out by suitably qualified and experienced contractors in accordance with current Health and Safety Regulations. Electrical work should be carried out by a qualified electrician, working to the latest edition of IEE.

3.16 Manhole covers and frames should suit the duty for the intended location.

4.0 Installation – General

4.1 When units are installed in unstable ground conditions where movement of the surrounding material and/or unit may occur, the connecting pipework should be designed to minimize the risk of damage from differential movement of the unit(s) and/or surrounding material.

4.2 The excavation must be deep enough to provide bedding and cover depth as determined by the type of surface pavement and loading. Asphalt and concrete pads should extend a minimum of 300mm horizontally beyond the unit in all directions.

4.3 In situations where the excavation will not maintain a vertical wall, it will be necessary to shore up the side walls of the excavation with suitable trench sheets and bracing systems to maintain a vertical wall from the bottom to the top of the excavation. DO NOT completely remove the shoring system until the backfilling is complete, but before the concrete fully hardens.

4.4 In areas where the water table is above the bottom of the excavation and/or the excavation is liable to flood, the excavation should be dewatered using suitable pumping equipment and this should continue until the installation is complete.

4.5 During installation care must be taken to ensure that the body of any unit is uniformly supported so that point loads through the unit are avoided.

4.6 The concrete Specification is a general specification. It is not a site-specific installation design.

GENERAL CONCRETE SPECIFICATION IN ACCORDANCE WITH BS EN 206-1 (BS 8500-1)		
TYPE OF MIX		(DC) DESIGN
PERMITTED TYPE OF CEMENT		BS 12 (OPC): BS 12 (RHPC): BS 4027 (SRPC)
PERMITTED TYPE OF AGGREGATE (coarse & fine)		BS 882
NOMINAL MAXIMUM SIZE OF AGGREGATE		20 mm
GRADES:	C25 /30 C25 /30 C16 /20	REINFORCED & ABOVE GROUND WITH HOLDING DOWN BOLTS REINFORCED (EG. FOR HIGH WATER TABLE) UNREINFORCED (NORMAL CONDITIONS)
MINIMUM CEMENT CONTENT	C30 C20	270 - 280 Kg/M^3 220 - 230 Kg/M^3
SLUMP CLASS		S1 (25mm)
RATE OF SAMPLING		READY MIX CONCRETE SHOULD BE SUPPLIED COMPLETE WITH APPROPRIATE DELIVERY TICKET IN ACCORDANCE WITH BS EN 12350-1
NOTE: STANDARD MIXES SHOULD NOT BE USED WHERE SULPHATES OR OTHER AGGRESSIVE CHEMICALS EXIST IN GROUND WATER		

5.0 Unit Installation

5.1 Excavate a hole of sufficient length and width to accommodate the tank and a minimum 150mm concrete surround and to a depth that allows for the burial depth of the unit plus concrete base slab of 300mm.

5.2 Construct a suitable concrete base slab appropriate to site conditions. Ensure that the slab is flat and level.

5.3 When the concrete base slab has set enough to support the installed load, install a 75mm deep level bed of C20 grade concrete. This will provide support for the tank and allow the tank to be levelled up when installed. Lower the unit onto the slab using suitable webbing slings and lifting equipment. The selection of lifting equipment is the responsibility of the installer considering unit weight, length, height and distance of lift.

5.4 Pour no more than 300mm depth of clean water into the unit, avoiding shock loads. DO NOT OVERFILL, the unit is not designed to hold water whilst unsupported.

5.5 Place concrete backfill to approximately 300mm depth under and to the sides of the tank ensuring good compaction to remove voids. Concrete backfill must be manually compacted; we DO NOT recommend the use of vibrating lances. Allow initial concrete set to occur before proceeding. Ensure concrete fills the voids underneath the tank and feet.

5.6 Continue adding concrete backfill, simultaneously keeping the internal water level no more than 300mm above the backfill level at all times, until the backfill is just below the underside of the Inlet drain, giving sufficient room to connect the inlet pipework.

5.7 Connect inlet drains and vent pipes when safe access to the backfill can be gained.

5.8 The inlet (110mmDia) should be extended to ground level.

5.9 The maximum recommended inlet invert is 1500mm.

5.10 Continue backfilling with concrete over the tank body to the required level. Build up a shell of concrete, minimum 150mm thick, around the access shaft(s), inlet pipe and alarm access tube (as applicable). Temporarily strut the access shaft to avoid distortion.

5.11 Do not install in trafficked areas unless a suitable top slab has been designed and constructed. The top slab should bear on a suitable foundation to prevent superimposed loads being transmitted to the unit and access shafts. Loads applied to covers and frames must bear on the top slab, not the access shaft.

5.12 Trafficked Areas, the tank should be installed at a suitable distance from any trafficked areas to prevent superimposed loading by vehicles.

5.13 The unit should be filled with clean water up to the invert level of the inlet pipe.

5.14 Leave until the concrete is fully cured. Tanks are now ready for use. Do not empty the tank until the concrete backfill has cured to an adequate strength (typically 1 - 2 days minimum).

5.15 Concrete back fill is recommended for backfilling the unit, but pea shingle or sand may be used on dry sites with relevant holding down strapping into the concrete base.

6.0 Operation

6.1 The unit should be filled with clean water up to the invert level of the inlet pipe.

6.2 Tanks are sized according to a population equivalent formula. Users should be aware that their waste enters a tank so that they can dispose of their waste considerately. Not everything is suitable for disposal into the tank, for example oils, fats and grease, medications should not be disposed of. We can provide User leaflets with more information for individual householders on request.

6.3 In addition, properties should display a notice within the building see section on notices.

7.0 Maintenance

7.1 Tanks accumulate & store solids and must be emptied periodically. The period between emptying depends upon the population served by the tank or, the amount of use to which the tank is put. Generally, the period is at least 6 months, however, tanks which are over utilized may require more frequent emptying.

7.2 All sludge should be removed when the unit is emptied. Solids should not be allowed to accumulate in more than half the tank.

7.3 The waste should be removed under the terms of The Waste Management Code of Practice. The Code imposes a duty of care on the waste producer to ensure that the cleansing contractor is registered with the Environment Agency and that the final disposal of the waste is to a licensed facility. Owners have a responsibility to use licensed waste contractors.

7.4 Covers should be replaced.

7.5 Our site engineers are available to carry out inspection, service and maintenance visits. We recommend regular maintenance contracts for units with complex operational or electrical requirements. A service to supervise tank emptying is also available. Contact details are provided on the cover sheet.

8.0 Warranty

Taken from ‘Kingspan’s Terms & Conditions of Sale’

The company will replace or, at its option, properly repair without charge any goods which are found to be defective and which cause failure in normal circumstances of use within a period of twelve months from the date of delivery.

This warranty is conditional upon:

(a) the Buyer notifying the Company of any claim within Seven days of the failure becoming discernible.
(b) the Company being allowed a reasonable opportunity to inspect the goods so as to confirm that they are defective.
(c) the goods not having been modified, mishandled or misused and being used strictly in accordance with any relevant instructions issued by the Company.

The Company’s liability under this Clause is limited to the repair or replacement of the defective goods, and does not cover costs of transport, installation or associated site costs, if applicable.

The Company’s liability to replace or repair the goods is in lieu of and excludes all other warranties and conditions, and in particular (but without limitation) the Company shall have no liability of any kind for consequential loss or damage.

For any further advice, please contact the Warranty department on 0844 225 2785

A Warranty Form is included in this package, to register your unit for Warranty. Please complete ALL sections of the Form and return it at your earliest convenience.

Also within this package are Notices, describing the necessary maintenance of the plant in use. This should be fixed within the building.

NOTICES:

CESS POOL/SILAGE TANK

KINGSPAN CESSPOOL/SILAGE

The foul drainage from this property is served by a Cesspool/Silage Tank.

The system should be emptied when full by a licensed contractor and inspected fortnightly for overflow.

THE OWNER OF THE PROPERTY IS LEGALLY RESPONSIBLE FOR ENSURING

THAT THE SYSTEM DOES NOT CAUSE POLLUTION, A HEALTH HAZARD OR A

NUISANCE.

We recommend that a separate log is kept of all service visits, the log should detail the date and any action taken, e.g., Emptying volume and frequency.

This notice should be fixed by the owner within the building alerting current and future owners to the maintenance requirement.

(Building regulation H2 (1.57)

Please contact Kingspan Water & Energy Services on +44 (0) 844 846 0500 to arrange a maintenance service or to request replacement operating instructions.