Strata Homes Limited

Construction Surface Water Management Plan: Main Avenue, Cowersley, Huddersfield.

302826 R01 (01)

RSK GEOSCIENCES

DECEMBER 2025

RSK GENERAL NOTES

Project No.: 302826

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Client: Strata Homes Limited

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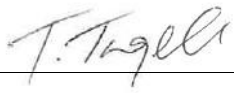
Signature		Signature	
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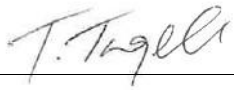
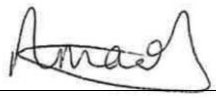
Signature		Signature	

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FIGURES

Figure 1 – Construction Surface Water and Silt Management Plan Schematic (drawing no. 302826-DE-276-XX-D-G-27601-C01)

Figure 2 – Section 104 Layout Plan (drawing no. 2153-QD-XX-HD-DR-C-17-01)

APPENDICES

Appendix A – Service Constraints

Appendix B – Inspection and Monitoring Proformas

Appendix C – Installation Examples

Appendix D – Example Manufacturers and Product Sheets

1. INTRODUCTION

RSK Environment Limited were engaged by Strata Homes Ltd, Quay Point, Lakeside, Doncaster, DN4 5PL, to provide a Construction Surface Water Management Plan (CSWMP) at their Main Avenue, Cowersley development, Main Avenue, Cowersley, Huddersfield, HD4 5US by means of our fee proposal dated 11 June, 2025 including RSK Standard Terms and Conditions [Issue No.15, July 2025] which forms the appointment between ourselves and the Client. Service Constraints are included as **Appendix A**.

This document presents a strategy to manage construction surface water and run-off occurring during the construction phases of development. The strategy is designed to mitigate silt-laden construction surface water entering the on-site construction surface water drainage system (when constructed), and silt laden run-off impacting down gradient sensitive receptors such as watercourses and neighbouring properties.

This CSWMP for the proposed residential development by Strata Homes Limited includes a detailed assessment of silt potential risk to the identified sensitive surface water receptors. It makes recommendations for appropriate silt mitigation measures to be undertaken by the developer and associated contractors.

The recommendations made within this report have been made for the construction phase of this residential project. The drainage strategy for the development when it is completed has been designed by the infrastructure design engineer, and that final surface water drainage strategy is referenced in this CSWMP.

Any surface water discharge undertaken during the construction phase must comply with any discharge permit (gained from the Environment Agency EA) or discharge consent (gained from the lead local flood authority LLFA) and is subject to be undertaken under a bespoke EA permit application. The site may temporarily discharge localised, small scale dewatering waters under the appropriate EA Regulatory Positional Statement (RPS 265) for a period of 3 months subject to the strict conditions of the EA RPS. Any unpermitted discharge or discharge not meeting the requirements of the EA RPS may be liable to enforcement action.

It is the client's responsibility to ensure that such permits are place before commencing construction works that could result in discharges to surface water.

The recommended silt pollution intervention and mitigation measures are shown schematically on **Figure 1**. This report is to be read in conjunction with the following:

- **Figure 1: Construction Surface Water Management Plan Schematic (drawing no. 302826-DE-276-XX-D-G-27601-C01)**
- **Appendix A: Service Constraints**
- **Appendix B: Inspection and Monitoring Proformas**
- **Appendix C: Installation Examples**
- **Appendix D: Example Manufacturers and Product Sheets**

This plan has been produced by RSK with reference to available online information (MAGIC Maps, Google earth, www.gov.uk), a site walkover undertaken on 05 August 2025, and the following documents supplied by the client:

- Apex Consulting Engineers; Ground Appraisal Report; Ref: 1152-ACE-GEO-GAR-001; Dated: March 2025.
- Apex Consulting Engineers; Remediation Strategy; Ref: 1152-ACE-GEO-RS-003; Dated: March 2025.
- Haycock and Todd; Site Survey; Ref: S10846; Dated: May 2024.
- ID Planning; Proposed Site Layout; Ref: 102-P7; Dated: October 2024.
- ID Planning; Site Location Plan; Ref: 100-P1; Dated: October 2024.
- Queensbury Design Limited; Flood Risk Assessment and Drainage Strategy; Ref: 0003-QD-XX-HD-RP-C-100-01-FRA-P04; Dated: December 2024.
- Queensbury Design Limited; Section 104 layout; Ref: 2153-QD-XX-HD-DR-C-17-01-P01; Dated: February 2025.

As a result of global warming, it is generally accepted that extreme weather events, including increased intensity and frequency of heavy rainfall events is likely to be more common during the proposed construction period of this development. Therefore, it is considered that a consistent implementation of a coherent CSWMP will help reduce the risk of silt pollution to controlled waters from the construction of the proposed development and thus lessen the environmental impact and increase the sustainability of the construction project as a whole.

2. SITE PERSONNEL AND DOCUMENTATION

The following measures should be implemented to increase awareness and bring existing site documentation up to date:

1. Undertake site-based awareness training (Site Safety briefing / Toolbox Talks) on silt management and protection for all site staff including the ground workers;
2. Include a detailed section within the site induction folder relating to silt protection; and
3. Undertake a daily site inspection of key areas and a weekly site audit; maintain a written and photographic record of the audits and obtain support from the appointed environmental consultant if or when required.

Note: This document is intended as a live document, to be continually reviewed and updated as the development progresses. RSK may provide support with supplementary site inspections or attendance at meetings ahead of key stages of the development in relation to silt management.

3. SITE DESCRIPTION

Site location

The site is located to the south of Cowersley, postcode HD4 5US and is centred on National Grid Reference SE 11014 15108.

Site description

The site is irregularly shaped and is approximately 2.1 hectares in size. The following description is based on Geosciences' observations during a site walkover undertaken on the 05.08.2025. At the time of the walkover, construction work had not begun across the site and so site wide topsoil stripping or stockpiling had not yet commenced. There were no drainage ditches identified onsite during the site walkover. Prior to development comprises a parcel of greenfield land, with a number of hedgerows and trees. The site features small footpaths, metal wire fences, and dry-stone walls crossing various sections. Garage buildings and associated hard paved access are located at the northern end of the site, large parts of the site are heavily vegetated/overgrown. There is a small hardcore-surfaced area within the site boundary just off Main Avenue

Current development boundary demarcation and adjacent land uses are described below:

- **North:** The Site is bound to the north by Woodside Green Primary School with dwellings to the west of the school and further beyond to the north.
- **East:** To the East, the site is bound by a small parcel of land and dwellings.
- **South:** The site is bound to the south by an area of woodland on a steep gradient which leads to a ridgeline beyond.
- **West:** Agricultural fields and dwellings lay to the west of the site.

Site levels generally fall from the north-west towards the south-east. The existing topography is steep with areas with gradients up to 1 in 4.

Hydrology:

Environment Agency (EA) catchment data shows the site to be in catchment of the River Colne which generally flows east to west approximately 500 m to the north of the site. The River Colne is classed as an Environment Agency Main River. The River Colne flows easterly through Huddersfield and is a tributary of the River Calder. Immediately north of River Colne is the Huddersfield Narrow Canal which follows a similar route as the River Colne to the River Calder.

There are no watercourses or drainage ditches running through the site.

The site is located entirely within Flood Zone 1 and so is considered to have the lowest probability of flooding from rivers and the sea, of 1 in 1000 in any one year (0.1%).

The development will be subject to a significant amount of run-off from the land beyond the southern boundary.

Ground conditions and hydrogeology:

The British Geological Survey (BGS) online GeoIndex mapping and previous reports indicate that the site is underlain by the Rossendale Formation, with localised made ground. During previous ground investigations, bedrock was encountered across the site typically shallower, and Sandstone in the north, with mudstone in the south. Depths to bedrock ranged between 0.60 m and 4.00 m.

The site is underlain by a veneer of topsoil and localised made ground, with residual soils below. Bedrock was encountered across the site, typically shallower and Sandstone in the north, with mudstone in the south. Previous reports have indicated contamination within the topsoil with elevated concentrations of PAHs which will remediated through a remediation strategy produced by others.

Groundwater presented at depths of c.1m in the north, becoming deeper (up to c.5.00 m) further south in the topographically higher areas.

The solid strata of the Rossendale formation underlying the site are classified as Secondary A Aquifer. The site does not lie within a groundwater Source Protection Zone.

Existing infrastructure

The provided FRA confirm that an existing 450 mm diameter combined sewer crossing the site from Main Avenue flowing in an eastern direction leaving the site at the eastern boundary to the rear of the existing dwellings on Warneford Road. Two combined sewers are shown entering the site from the northern boundary from Windsor Road and Jubilee Lane, these sewers connect into the 450 mm diameter sewer. The provided records also show an existing 225 mm diameter sewer passing along the school boundary connecting into the 450 mm diameter sewer.

It is understood that there is a culvert at the eastern edge of the site. The culvert is fed by over land flow. This discharges to a watercourse at the junction of Warneford Road and Manse Drive, an open channel then runs through the rear of dwellings fronting Avison Road.

4. SITE DEVELOPMENT

The Strata Homes residential development comprises the construction of no. 45 plots with private gardens and associated infrastructure along with areas of public open space. To facilitate the sites development, it is understood that a phase of earthworks will be undertaken to create the necessary development platforms and infrastructure.

The proposed construction surface water drainage strategy for the site has water falling under gravity through drains set into the highways that will inflow into an underground storage tank prior to discharge from site via a flow restrictor and into the existing combined sewer system at a maximum controlled rate of 3.5 litres per second. Attenuation will be provided by the means of a pre-cast attenuation tank located within the green space on the development's eastern boundary.

Due to the significant level changes across the site, a retaining wall will be required to form the southern boundary. To collect and divert the overland flow from the land to the south, the retaining wall is proposed to include a 450 mm high parapet. It is understood that the surface water is then diverted to an inlet headwall (HW1) which will convey the water through the site and into the existing culvert at the eastern edge of the site which ultimately outfalls to the watercourse at the junction of Warneford Road and Manse Drive.

5. SOURCE-PATHWAY-RECEPTOR EVALUATION

The following potential sources, pathways and sensitive receptors on-site and off-site have been identified.

Potential sources of silt pollution:

The principal sources of potential silt (soil) pollution are anticipated to l be from:

- The topsoil strip.
- On-site earthworks and groundworks.
- Infrastructure and housing plot activities.

With particular point sources occurring when:

- Any activities are undertaken in the immediate vicinity upgradient of the existing storm and foul water drainage system to the northeast of the site.
- Dewatering excavations.
- Jetting of the constructed drainage system.

Potential pathways:

Plausible pathways for silt pollution to impact the identified receptors include:

- Direct construction surface water run-off (generally in the northeasterly directions).
- Run-off via historical land drains.
- Run-off via the newly constructed construction surface water drainage network (road gulleys, road sewer network and attenuation tank).

Potential sensitive receptors:

On-site:

- The existing stormwater and foul drainage system to the northeast of the site.
- The proposed gullies and construction surface water sewers of the constructed drainage system.

Off-site:

- The noted culverted watercourse to the eastern edge of the site.
- Residential properties to the north, northeast, and east of the site.
- Woodside Green Primary Academy to the north of the site.

SUMMARY OF RISK FACTORS AND QUALITATIVE EVALUATION		
Risk Factor	**Identified**	**Risk factor detail and qualitative evaluation**
Sensitive Receptors		
Visible flowing water course within 100 metres of site boundary and category of watercourse.	**Yes**	An unnamed watercourse which culverts to the east of the site and then opens up into an ordinary watercourse within 100 m of the Site, flowing south to north. It is classed as a known tributary to the Colne River defined as an EA main River.
Discharge from site flows directly into a water course	**No**	Site stormwater is proposed to be discharged into an existing combined sewer system.
Water course contains visible aquatic life (fish etc.) or has been assessed as environmentally sensitive	**No**	None known.
Local water course used as local amenity, fishing, canoeing, boating, swimming	**No**	Due to the size of the unnamed watercourse is not anticipated it is used for fishing, canoeing, boating or swimming.
Likely volumes of temporary discharge will exceed those designed for the final discharge consent	**No**	Temporary run-off to the proposed construction surface water drainage system is not anticipated to exceed calculated final discharge rates during storm events during the construction phase due to unsurfaced areas increasing run-off rates and attenuation tank (not) being installed at the commencement of the development.
Treatment of water discharge is likely to be required to achieve the quality standard of acceptability	**No**	Chemical treatment intervention of the site's construction surface water discharge is not currently anticipated at this stage
SSSI, designated sites or other potentially sensitive receptors located downstream from the development.	**No**	No SSSI or designated site has been identified downstream of the construction site.
Ground Conditions and Topography		
Soils investigation identifies clay / silt (impermeable materials)	**Yes**	The British Geological Survey (BGS) online GeoIndex mapping and previous reports indicate that the site is underlain by the Rossendale Formation, with localised made ground. The ground conditions underlying the site have the potential to generate silt in run-off that may remain in suspension for long periods of time and be slow to settle with gravity based settlement techniques.
Site exposed, or at high altitude, or steep gradient.	**Yes**	The Site is noted to be steeply sloping towards the northeast where the existing storm and foul water drainage systems and the unnamed watercourse culverts away from the site. Surface water run-off is anticipated to follow this direction.
Soils investigation identifies on-site contamination that may pose as risk to controlled waters	**Yes**	The provided third party ground investigation reports do indicate a risk to controlled water receptors if the area specified is not remediated prior to development works.
Groundwater level detected at installed drainage pipework depths	**Yes**	The ground investigation indicates groundwater may be encountered between depths of c. 1.00 m and 5.00 m, generally shallower in lower-lying areas of the site towards the north, becoming deeper further south (uphill). During trial pitting, strikes were encountered at between 0.90 m and 1.90 m, mainly in lower-lying site areas.
Rainfall and Flooding		
Historical evidence indicates site suffers from seasonal flooding	**Yes**	The development will be subject to a significant amount of run-off from the land beyond the southern boundary.
Development Constraints		
Does the development require a programme of earthworks to change / modify site levels	**Yes**	Due to the sloping topography of the site, a programme of earthworks early on in the development of the site is anticipated.
Construction of attenuation basins programmed for construction within 3 months of development commencement.	**No**	Detailed development plans provided / are unknown at this stage, however due to the necessity for a programme of earthworks at the site, it is anticipated that attenuation features and associated drainage infrastructure will not be immediately constructed on commencement of site works.
Potential Pollution Risk Rating		
Initial construction activities carry an innate increased silt pollution risk with the stripping of surface vegetation or hardstanding and exposure of subsoils that are prone to erosion and run-off. As construction is a dynamic process these pollution risks reduce when areas are completed, surfaced and landscaped as planned in the final development scheme. The development is considered to be at 'High risk' due to the risk of overland flow from the adjoining land to the southern. The risk may be reduced to low/medium risk once the proposed stormwater sewers are installed and on the demonstrated effective implementation of the pollution mitigation measures outlined in this CSWMP and the recording of their effectiveness through a documented monitoring, testing and maintenance plan.	

6. INTERVENTIONS, POLLUTION MITIGATION MEASURES AND GOOD PRACTICE TO MITIGATE SILT POLLUTION RISK

The following site specific interventions and risk mitigation measures should be installed prior to commencement of, and then maintained during, the relevant construction activity within the relevant development phase to ensure their effectiveness in mitigating silt pollution risk. The protection measures are shown in **Figure 1**. Installation examples are shown within **Appendix C** and example manufacturers product sheets are provided within **Appendix D**.

- Prioritisation must be given to the construction of the proposed stormwater drainage runs and features. Prompt construction will enable their use in the control of surface water run-off from the adjoining land to the south, reducing the volume of water flowing onto the site during the construction phase.
- Due to the steep gradient, it is important to minimise the volume water flowing onto site from off-site sources. Significant overland flow anticipated during future rainfall events. Prior to the construction of the retaining wall and proposed stormwater sewer, the contractor must implement suitable control measures to capture, divert and dispose of surface water run-off. This could include the use a capture ditch, soil bund and silt fencing. Active pumping of stored water to an appropriate discharge point may need to be considered.
- The placement of silt fencing with capture channels to the east of the site to mitigate the likelihood of silt laden waters effecting sensitive receptors to the east. The capture channels will help to slow down water flow and give suspended solids the opportunity to settle prior to discharge.
- Silt fencing to the northern perimeter fence line to help protect sensitive receptors to the north and also mitigate the amount of water flowing at speed onto the development site.

For each construction phase the following good practices and mitigation interventions and should also be implemented.

Site Set Up:

1. Control of site surface strip: it is imperative that the wholesale stripping of surface vegetation and associated topsoil should be minimised. For the effective management of run-off, it is critical that the site strip should be carefully managed in accordance with a site strip plan that phases the site strip to enable specific areas to be developed whilst maintaining surface vegetation to promote infiltration and minimising run-off. A suitable standoff distance (at least 6.00 m) should be established from the top of any ditch or watercourse which is in turn protected by silt fencing. A 6.00 m wide buffer zone should be retained along the downgradient perimeter of the site. The site strip phasing plan should be incorporated into the CSWMP for each development phase.
2. The maintenance and repair of existing drainage infrastructure that is to be retained: ditches or culverts that are to be retained in the proposed development should be repaired and suitably maintained to ensure their effective function. If any land drainage discovered during excavations on site, it is recommended that the drain is repaired or diverted. Should this not be possible due to layout constraints, then it is recommended that the land drain is further investigated by the development engineer, to determine if the drain is still required post development.
3. Soil bunding and silt fencing should be constructed up and down gradient of surface water crossing points to prevent vehicle tracking displacing silt / mud into the watercourse.

4. Any surface water discharge undertaken during the construction phase must comply with any discharge permit (gained from the Environment Agency EA) or discharge consent (gained from the lead local flood authority LLFA) and is subject to be undertaken under a bespoke EA permit application. It is the client's responsibility to ensure that such permits are place before commencing construction works that could result in discharges to surface water.
5. The site may temporarily discharge localised, small scale dewatering waters under the appropriate EA Regulatory Positional Statement (RPS 265) for a period of 3 months subject to the strict conditions of the EA RPS. Any unpermitted discharge or discharge not meeting the requirements of the EA RPS may be liable to enforcement action.
6. Consideration should be given to the location of stockpiled materials (topsoil / subsoil) within designated areas to be located as far as practicably possible from any identified construction surface water receptors (ditches) or any road gullies. The placement of a silt fence at the base of any stockpile should be considered in order to control silty run-off.
7. Temporary compounds should be stoned up at the earliest opportunity with designated vehicle tracking routes lined with stone.
8. Locate materials storage areas where they can be accessed directly from a surfaced road, and placement of hardstanding or stoning up of the storage area, to prevent tracking on unsurfaced ground to access materials.
9. The installation of hard standing areas to the front of all plots to enable 'clean' forklift access.
10. General good housekeeping of the site.

Plant and machinery operation:

11. Avoid tracking or washing out next to any ditches or any road gullies.
12. Avoid tracking through standing water that may be present.
13. Use designated separate machine and dumper tracking routes that avoid surfaced roads (that may be used by road-going vehicles). Designate specific machine crossing points of surfaced roads.

Protection measures to install / maintain throughout construction:

14. Existing access tracks / haul roads: where run-off is channelled along existing haul roads run-off should be intercepted and diverted off the track way by means of suitable French drainage placed across the track way to a grip or ditch downgradient of the track way. Deposition of mud into constructed French drains may be minimised by capping the clean washed stone infill with track-matts.
15. Where haul roads or constructed roads cross retained ditches: suitable measures should be adopted to ensure silt does not enter the ditch. This may include construction of a temporary pipe culvert with potential run-off from the crossing prevented from impacting the ditch with either bunding or silt fencing. Where permanent constructed roads cross ditches, the ditch headwalls either side of the crossing should be protected with tightly fitting timber framed silt fence placed across the headwall apron with tightly fitting silt matts (weighted with sandbags) packed between the headwall wingwalls. The protection measures should be suitably tight fitting within the headwall to ensure water cannot bypass the measures. Silt matting should be frequently checked

to ensure it is sufficiently weighted to remain in place. Installation of silt entrapment materials within retained ditches at suitable intervals along the length of the ditches.

16. Placement of stockpiled materials (topsoil / subsoil) away from all drainage infrastructure and any ditch identified across the site area.
17. 6.00 m wide retained vegetation strip along banks of any on site drainage ditches.
18. Installation of silt fencing or bunds immediately upgradient of any sensitive features such as surface water feature (ditches), or public rights of way (PROW).

Road and sewer maintenance:

19. Minimise the movement of plant on and off roads to prevent the tracking of excess soil (track out) onto surfaced roads (i.e. planning of the working day and work areas, utilising designated machine and dumper road crossing points as documented in the traffic management plan).
20. Regular scraping of roads to remove significant track-out (silt) build-up. Frequency of sweeping should be continually assessed by site management to maintain a clean road surface
21. Provision of a road sweeper on site and on the adjacent road network during periods of inclement weather to remove track out deposited on road surfaces. Frequency of sweeping should be continually assessed by site management to maintain a clean road surface. Additional frequency may be required during bulk soil movements.
22. The placement of proprietary gully protection (e.g. gully bags) in all gullies during construction to mitigate track out ingress into the constructed surface water drainage system. These to be inspected and replaced / cleaned on a regular basis.
23. The placement of proprietary surface water drainage chamber protection in all chambers during construction to mitigate track out ingress into the constructed surface water drainage system. These to be inspected and replaced / cleaned on a regular basis.
24. If required, construction of speed ramps to slow traffic down and to help direct construction surface water to collection areas.
25. Jetting of constructed surface water drainage runs should be undertaken by a specialist competent contractor under the control of a site specific RAMS that states the additional silt pollution mitigation measures that are to be undertaken during the activity.

Management of dewatering – excavations:

26. Should dewatering of excavations be required, the over-pumping into the existing or constructed foul drainage system (when constructed) with the consent of the local water company gained in a trade effluent discharge consent. Adequate protection measures should be implemented (potentially comprising but not limited to; use of filter bags on any pump inlet and outlet and passing water through either a settlement tank) to prevent discharge of elevated total suspended solids (TSS – silt) into the foul drainage system. The implemented measures should be frequently monitored, recorded and maintained to achieve and demonstrate compliance with the consent gained form the local water company.
27. Any proposed short term (less than 3 calendar months), localised dewatering to ditches or water courses conducted under an Environment Agency RPS – **https://www.gov.uk/government/publications/temporary-dewatering-from-excavations-to-**

surface-water. should only be undertaken under specific strict controls recorded to demonstrate compliance with all conditions of the RPS (e.g. < 3 calendar months duration and clear unpolluted water discharge). Detailed records should be maintained by the site team to demonstrate compliance. Non-compliance and/or discharge of silt polluted water is likely to result in enforcement action being undertaken.

Re-instatement of completed / fallow areas:

28. The placement of topsoil and planting / seeding at the earliest opportunity to establish vegetation root growth that binds and stabilises soils to mitigate surface run-off from both completed areas and fallow areas where the construction of plots is not planned in the current growing season.

Temporary works:

29. Details (such as height, width or depth) of mitigation features such as bunds, grips or ditches shall be designed by the temporary works designer, accepted by the principal designer and recorded on the temporary works register in accordance with BS5975.

7. ATTENUATION TANK

Drainage infrastructure, and outfall headwalls should be programmed to be completed as soon as possible. This will enable their use to store and control site generated run-off.

Prior to construction of the attenuation tank, temporary cut off ditches or bunds should be created on upgradient sides of the works to divert run-off from the work area. The effectivity of these ditches may be enhanced with periodic placement of wattle check dams with silt capture matting to slow the flow of water and capture suspended silt.

It would be prudent to install 'Turtle Chamberbloks' at manhole chambers points S12 & S27, the Chamberblok is fitted within the inlet chamber and filters large lumps and particles of silt, mud and sediment prior to its inlet destination, in this case, the PCC storage tank. Where monitor and maintained appropriately, this will reduce the amount of silt entering the tank and to also ensure the discharge to the local sewer system is also less silt laden.

8. MONITORING PROCEDURES AND RECORDS

Depending on site conditions as development progresses and as site levels change, other interventions or mitigation measures may be required to be implemented. These should be identified through regular monitoring and at key milestones during the development and the CSWMP for that particular phase updated accordingly.

For each phase the following monitoring procedures should be carried out by the site construction team to enable continuous review of the mitigation measures prescribed in the CSWMP and a regular written / photographic record kept. A comprehensive record of the effectiveness of the system will then be documented to enable review by any statutory authorities attending site:

1. Inspection of the primary monitoring locations (as described on **Figure 1** – Construction Surface Water and Silt Management Plan Schematic) on a **daily basis during periods of heavy / prolonged rainfall**, and at a suitable (weekly) frequency during periods of dry weather.

2. Inspection of the secondary monitoring locations (as described on **Figure 1** – Construction Surface Water and Silt Management Plan Schematic) on a **daily basis during periods of heavy / prolonged rainfall**, and at a suitable frequency during periods of dry weather.
3. Monitoring of all other implemented specific silt pollution interventions shall be conducted to assess their effectiveness and prompt maintenance if required
4. Road and gully condition: Monitor the road surface condition (for track out) and the condition and effectiveness of road gully and chamber protection measures within the active construction areas. A gully inspection form is provided in **Appendix B**.
5. Stockpiles: Monitor each stockpile to assess if uncontrolled run-off is occurring. Assess the requirement for placement of silt fencing at the base of the stockpile to control run-off.
6. Excavations: Monitor all excavations to ascertain if run-off may / is flooding the excavation, and therefore if there is a need to install a bund or silt fence up-gradient of the excavation to control run-off flow direction
7. Maintain a photographic log and written record of monitoring using the site inspection form within **Appendix B** on a weekly basis (as a minimum), which will assist in documenting changes on site and identifying any changes needed to the protection systems as the development progresses.
8. All records should be reviewed on a quarterly basis by the HSE team or appointed environmental consultant. Advice can be obtained by the site team at any time from the HSE team or appointed environmental consultant.

9. ON-GOING MAINTENANCE OF SILT MITIGATION MEASURES

- Maintenance of the installed silt mitigation measures should be undertaken as appropriate prompted by the regular monitoring regime being undertaken by the site team.
- On site storage/availability of silt fencing and silt matting to enable deployment at short notice if required (i.e., during inclement weather) and to facilitate on-going maintenance of potential installations.
- Removal of residual silt held back by installed protection measures (i.e., behind silt fencing, chamberbloks etc).
- Fuel storage: fuel stored on-site in above ground oil storage tanks should be handled and stored safely to minimise the risk of causing pollution in accordance with The Control of Pollution (Oil Storage) (England) Regulations 2001. Best practices of on-site fuel storage may be gained from The Oil Storage Regulations for Businesses (on GOV.UK). Failure to adequately secure and store fuel in a manner to avoid pollution may be prosecutable under the 1990 Environmental Protection Act.

10. EMERGENCY / ADDITIONAL MEASURES

In the event of heavy rainfall breaching protective measures, the appointed Strata Homes Limited staff member should be contacted for advice. Further advice may be gained by the appointed environmental consultant. Contact details are provided below.

It may be necessary to fit a suitably sized bung within the stormwater sewer to prevent the release of water with an unacceptably high level of suspended solids into the stormwater sewer

network. Retained silty water may need to be pumped out of the stormwater sewer and disposed offsite until appropriate measures are in place to reduce the volume of silt entering the stormwater network.

To enable a prompt response to changing site conditions a supply of silt fencing / silt matting / sand bags shall be readily available on-site to implement emergency measures.

11. CONTACT DETAILS		
Strata Homes Ltd.	Nathan Eastwood	07534 210577
RSK Environment Ltd (appointed Environmental Consultants)	Tristan Trigell	07553 606863
	Kevin Holmes	07768 753024

FIGURES

DO NOT SCALE FROM THIS DRAWING

Notes:-

This schematic is to be displayed in the site managers office to aid communication of silt related pollution risk to all relevant site staff.

The schematic is a visual summary of identified sources of silt generation, receptors sensitive to silt pollution, pathways by which the silt pollutant may move and the specific required interventions to mitigate the identified silt pollution risks.

Monitoring and maintenance

Primary Monitoring location:

M1 - Monitor water quality at manhole SC14.

Secondary monitoring locations:

M2 - Monitor water and potential silt build p and ingress at manhole chamber S27
M3 - Monitor water and potential silt build p and ingress at manhole chamber S12.

•Maintenance of the installed silt mitigation measures should be undertaken as appropriate prompted by the regular monitoring regime being undertaken by the site team.

•Monitoring of all other implemented specific silt pollution interventions shall be conducted to assess their effectiveness and prompt maintenance if required.

•Road and gully condition: Monitor the road surface condition (for track out) and the condition and effectiveness of road gully and chamber protection measures within the active construction areas. Implement maintenance to retain effectiveness.

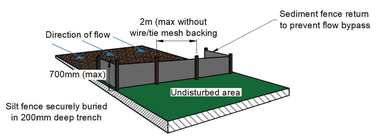
•Stockpiles: Monitor each stockpile to asses if uncontrolled run-off is occurring. Assess the requirement for placement of silt fencing at the base of the stockpile to control run-off.

•Excavations: Monitor all excavations to ascertain if run-off may / is flooding the excavation, and therefore if there is a need to install a bund or silt fence up-gradient of the excavation to control run-off flow direction.

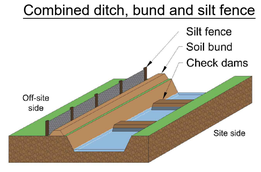
Contingency:
On site storage / availability of silt fencing and silt matting to enable deployment at short notice if required (i.e., during inclement weather) and to facilitate on-going maintenance of potential installations.

"A healthy and continuous vegetation cover is one of the most effective forms of erosion control. It is imperative that the wholesale stripping of surface vegetation and associated topsoil should be minimised. For the effective management of run-off it is critical that the site strip should be carefully managed in accordance with a dedicated site strip plan that phases the site strip to enable specific areas to be developed whilst maintaining surface vegetation to promote infiltration and minimising run-off. The site strip phasing plan should be incorporated into the CSWMP for each development phase. "

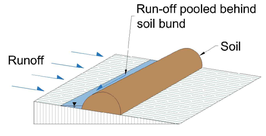
Silt Fencing

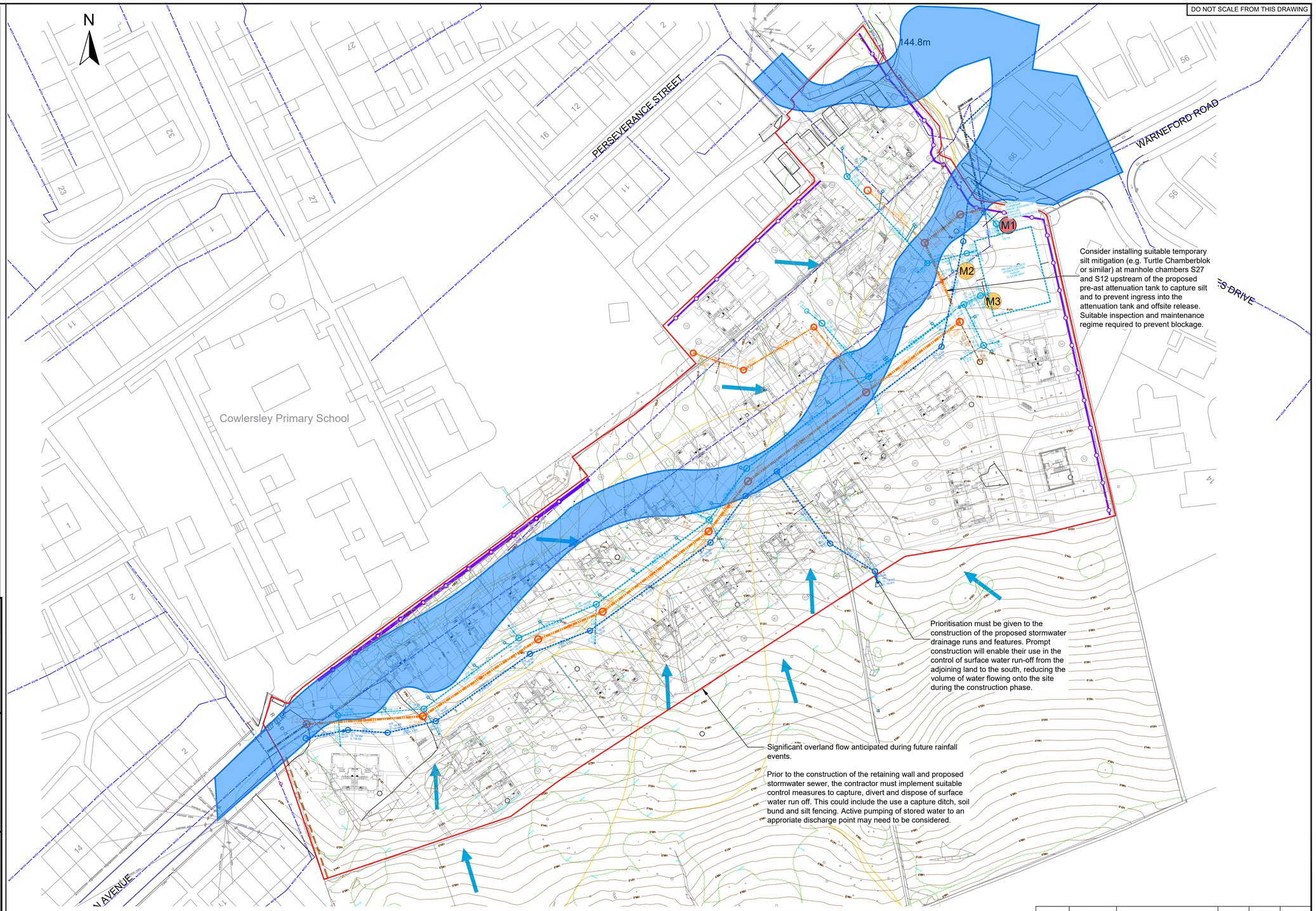


Combined ditch, bund and silt fence



Soil Bund





Rev	Date	Amendment	Drawn	Chkd	Appd
C01	22.09.2025	First Issue	BS	TT	KH

Legend

- Site boundary
- Recommended line of soil bund (SB-01)
- Recommended line of silt fencing (SF-01)
- Anticipated direction of surface water run-off based on topography
- Surface water drainage
- Foul water drainage
- Existing Yorkshire Water Infrastructure (WATER)
- Area of potential surface water flooding
- M1 Primary monitoring location
- M2 Secondary monitoring location

DRAFT FOR CLIENT APPROVAL

Notes:
The schematic drawing is not meant to be an accurate engineering drawing but is used to present the general relative locations of features on, and surrounding, the site. Features annotated on this schematic are not drawn to scale but are centered over the approximate location. Such features should not be used for setting out, nor should it be considered a schedule and should be considered indicative only.
Details (such as height, width or depth) of mitigation features such as bunds, grips or ditches shall be designed by the temporary works designer, accepted by the principal designer and recorded on the temporary works register in accordance with BS5975.

Base plan provided by client
Drawing Ref.:
1) ACAD-QD2153_ENG 2025.07.03-Model-2025.08.27.dwg
2) Cowlersley OSMM.dwg
3) S10800 - Main Avenue, Huddersfield.dwg

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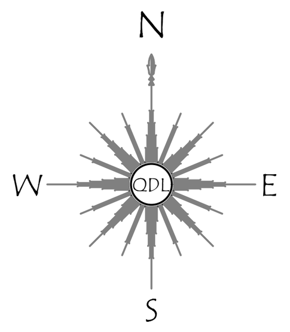
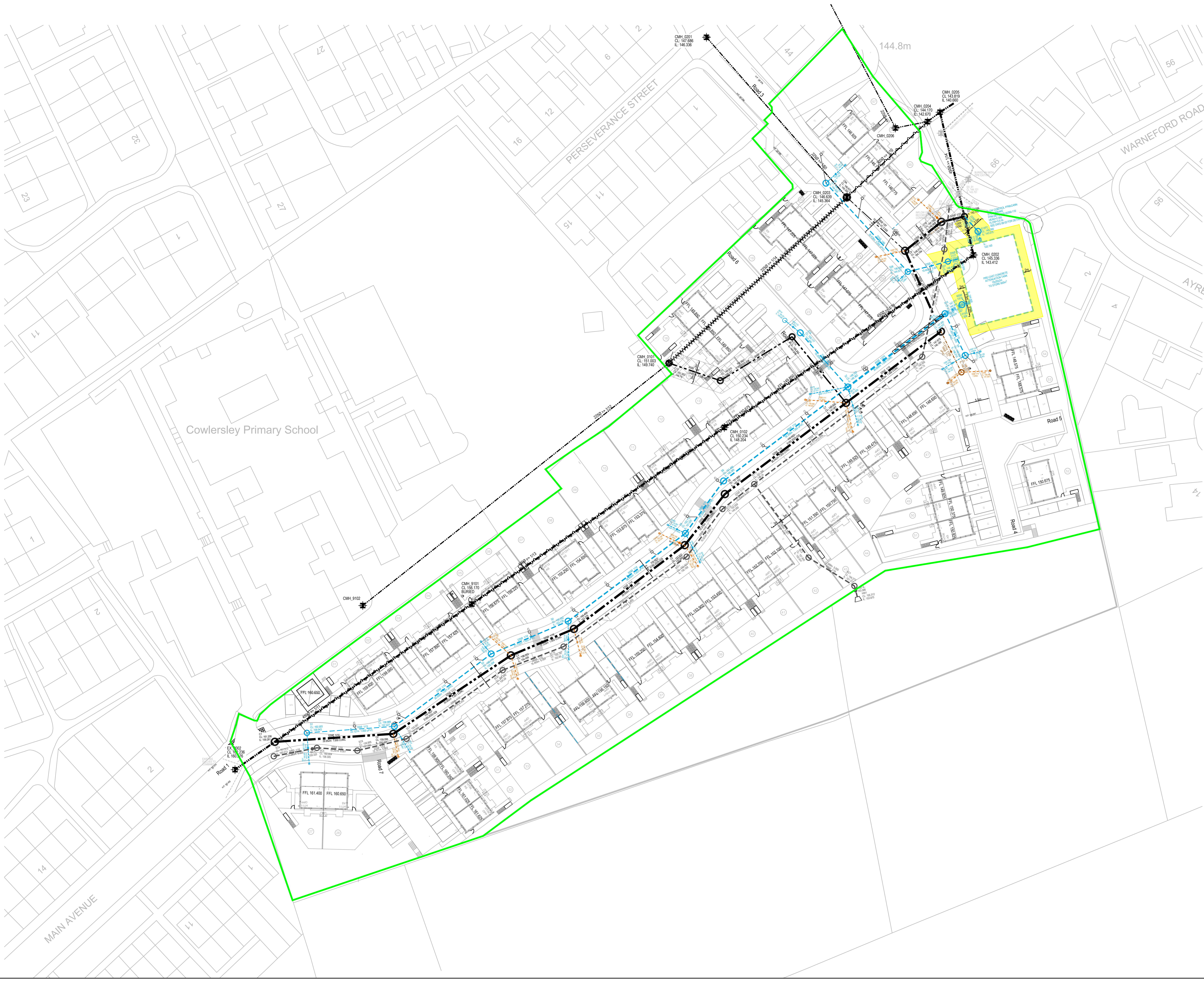
Client	Strata Homes Limited
Project Name	Main Avenue, Cowersley
Description	Surface Water Management Plan Schematic
File Name	302826-DE-276-XX-D-G-27601-C01

Dimensions	Scale	Size	Project ID	Drawing no.	Revision
m	NTS	A1	302826	27601	C01

YW REF: S104-2025-051





LEGEND

ADOPTABLE DRAINAGE

- PROPOSED ADOPTABLE FOUL MANHOLE
- PROPOSED ADOPTABLE STORM MANHOLE
- EXISTING MANHOLE
- PROPOSED S185 MANHOLE
- PROPOSED S104 DRAINAGE EASEMENT
- PROPOSED S185 DRAINAGE EASEMENT

Only PDF/ DWF Issues of this drawing are controlled. All other formats (eg. DWG AutoCAD FILES) are UN-controlled and are used at your own risk.

GENERAL NOTES:-

1. DO NOT USE THIS DRAWING IN ISOLATION. THIS DRAWING HAS BEEN PREPARED AS PART OF A SET, AND MUST THEREFORE BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER PRIOR TO COMMENCING WORKS.
2. THIRD PARTY INFORMATION IS USED TO PREPARE THE ENGINEERING DESIGN (INCLUDING, ARCHITECTURAL LAYOUT, GROUND INVESTIGATION, EXISTING UTILITIES RECORDS, AND SPECIALIST DESIGN ITEMS). THE ENGINEERING DESIGN MUST THEREFORE BE READ IN CONJUNCTION WITH ALL THIRD PARTY INFORMATION PRIOR TO COMMENCING WORK. QUEENSBERRY DESIGN LTD ARE NOT RESPONSIBLE FOR ANY THIRD PARTY INFORMATION OR DETAILS.
3. DRAWING STATUS WILL REMAIN PRELIMINARY UNTIL FULL TECHNICAL APPROVAL IS RECEIVED FROM LOCAL AUTHORITY AND SEWERAGE UNDERTAKER. WORKS COMMENCED PRIOR TO TECHNICAL APPROVAL ARE DONE SO AT RISK AND MAY BE SUBJECT TO CHANGE.
4. THE CONTRACTOR IS EXPECTED TO PREPARE APPROPRIATE CONSTRUCTION METHOD STATEMENTS FOR ALL ASPECTS OF APPOINTED WORK. THIS SHOULD INCLUDE ANY TEMPORARY PROTECTION / WORKS.
5. LAND DRAINAGE IS NOT PERMITTED TO DISCHARGE INTO THE PUBLIC SEWER NETWORK. ANY NEED FOR LAND DRAINAGE SHOULD BE ASSESSED BY THE GROUND WORKER AND LANDSCAPER DURING CONSTRUCTION AND PLACEMENT OF GARDENS ON AN INDIVIDUAL PLOT BASIS. IF LAND DRAINAGE DESIGNS ARE REQUIRED, THEY SHOULD BE APPOINTED PRIOR TO PLOT COMPLETION.
6. THE CONTRACTOR IS EXPECTED TO CROSS CHECK ALL DRAINAGE INVERTS PRIOR TO COMMENCING WORK, THIS MAY INVOLVE COMPLETION OF TRIAL HOLES IF INVERT LEVELS HAVE BEEN INTERPOLATED. THE POSITION, LINE AND DIAMETER OF ALL EXISTING DRAINAGE APPARATUS SHOULD BE CONFIRMED ON SITE PRIOR TO THE COMMENCEMENT OF THE WORKS. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER IMMEDIATELY.
7. THE CONTRACTOR MUST MONITOR THE "AS BUILT" PROGRESS OF EACH CONSTRUCTION STAGE (ROADS/SEWERS/PLOT WORKS ETC), TO ENABLE THE NEXT STAGES OF CONSTRUCTION TO BE CHECKED BEFORE INSTALLATION.

HIGHWAYS

1. ALL HIGHWAY WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE CURRENT LOCAL AUTHORITY DESIGN GUIDE AND SPECIFICATION
2. ALL EXCAVATIONS BELOW PROPOSED AND EXISTING HIGHWAYS TO BE BACK FILLED WITH GRANULAR TYPE 1 SUB BASE AND WELL COMPACTED IN LAYERS NOT EXCEEDING 150MM, UNLESS OTHERWISE AGREED.
3. HIGHWAY AUTHORITY TO BE NOTIFIED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF WORKS.

ADOPTABLE DRAINAGE

1. ALL ADOPTABLE SEWER WORKS AND MATERIAL TO BE IN ACCORDANCE WITH "CODE FOR ADOPTION". THE RELEVANT BRITISH/EUROPEAN AND YORKSHIRE WATER'S STANDARDS/REQUIREMENTS/ADDENDUM TO THE MECHANICAL AND ELECTRICAL SPECIFICATION AND KITEMARKED
2. MANHOLE COVERS SHALL/MUST HAVE A CLEAR OPENING OF 600MM AND SHALL BE CLASS D400 TO BS EN 124 WITH 150MM DEEP FRAMES IN HIGHWAYS
3. FILLED GROUND MUST BE FILLED AND CONSOLIDATED UNDER THE SUPERVISION AND TO THE SATISFACTION OF YORKSHIRE WATER BEFORE ANY SEWER WORKS ARE CARRIED OUT
4. YORKSHIRE WATER IS NOT OBLIGED TO ACCEPT FILTER DRAIN/LAND DRAINAGE RUN-OFF INTO THE PUBLIC SEWER NETWORK OR ADOPTABLE DRAINAGE SYSTEM (DIRECTLY OR IN-DIRECTLY). AN ALTERNATIVE METHOD OF DISPOSAL OF THE LAND DRAINAGE RUN-OFF WILL THEREFORE BE REQUIRED AND YOU WILL HAVE TO LIAISE WITH THE LOCAL AUTHORITY, LAND DRAINAGE SECTION REGARDING THE DISPOSAL OF THE FILTER DRAIN/LAND DRAINAGE RUN-OFF
5. THE ADOPTABLE SEWERS SHOULD BE A MINIMUM OF 1M AND MANHOLES 0.5M FROM KERB FACES AND SERVICE MARGINS
6. SEWERS MUST HAVE 5 METRES CLEARANCE FROM TREES AND HEDGES OR THE WIDTH OF THE CANOPY AT MATURE HEIGHT.
7. SEWERS TO BE LAID IN CLASS "S" BEDDING (150MM GRANULAR BED AND SURROUND). WHERE DEPTH OF COVER TO TOP OF THE SEWER IS LESS THAN 1.2M IN HIGHWAYS AND VERGES (OR LESS THAN 900MM IN NONVEHICULAR ACCESS AREAS) THEN A CONCRETE SLAB SHOULD BE PROVIDED ABOVE GRANULAR BED AND SURROUND
8. BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENT OF WATER INDUSTRY SPECIFICATION 4-08-02 (TABLE A2).
9. YORKSHIRE WATER POLICY IS THAT TYPE "C" BRICK MANHOLES AND 1050MM DIAMETER MANHOLE RINGS ARE NOT PREFERRED. INSTEAD, IT IS PREFERRED THAT YOU USE A TYPE "B" MANHOLE WITH 1200MM DIAMETER OR 1500MM DIAMETER RINGS, WITH THE OPENING SITED OVER THE CHANNEL WHERE DEPTH OF COVER TO PIPE SOFFIT IS 1 - 1.5M
10. ADOPTABLE PLASTIC SEWER PIPES TO BE BSI KITEMARKED (CERTIFIED TO WIS 4-35-01 AND BS/EN13476). ADOPTABLE PLASTIC SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS. PLASTIC CHANNEL SECTIONS IN MANHOLES ARE NOT ACCEPTABLE AND YORKSHIRE WATER WOULD REQUIRE CLAY WARE CHANNEL IN MANHOLES
11. THE MINIMUM CRUSHING STRENGTH FOR CLAY PIPES SHOULD BE AS FOLLOWS: 100MM DIA. 40KN/M, 150MM DIA. 40KN/M, 225MM DIA. 45KN/M AND 300MM DIA. 72KN/M. THE MINIMUM CRUSHING STRENGTH FOR CONCRETE PIPES SHOULD BE - (CLASS120 TO EN 1916/BS5911-1 2002). PLASTIC PIPES SHOULD CONFORM TO WIS 4-35-01 AND BS EN13476
12. WHERE A B125 COVER AND FRAME HAS BEEN APPROVED, THIS MUST NOT BE COATED IN PLASTIC AND MUST HAVE LIFTING EYES SUITABLY SIZED TO ACCOMMODATE STANDARD LIFTING KEYS. SCREW DOWN COVERS ARE NOT ACCEPTABLE
13. THERE MUST BE ENOUGH CLEARANCE AT CROSSOVERS TO ACCOMMODATE BEDDING TO BOTH PIPES, APPROX. 300MM : IF CROSSOVER IS NEAR THE ROCKER THEN THE CLEARANCE NEEDED MAY NEED TO BE INCREASED".

DRAINAGE WITHIN HIGHWAY REQUIREMENTS

14. ALL ADOPTABLE SEWER WORKS AND MATERIALS TO BE IN ACCORDANCE WITH CODE FOR ADOPTION AND NATIONAL SPECIFICATION DESIGN MANUAL FOR ROADS AND BRIDGES
15. ALL PCC UNITS IN OVERSIZE MANHOLES MUST HAVE A DESIGN WORKING LIFE OF 100 YEARS (MIN) IN ACCORDANCE WITH BS 8500-1:2015+A2:2019-TABLE A5.
16. PRECAST CONCRETE MANHOLE UNITS INCLUDING THEIR PCC COVER SLABS SHALL COMPLY WITH THE RELEVANT PROVISIONS OF BS EN 1917 AND BS 5911-3 AND SHALL BE MANUFACTURED FROM CONCRETE WITH A DESIGN CHEMICAL CLASS DC-4 UNLESS SATISFACTORY EVIDENCE THROUGH SOIL ANALYSIS CAN BE PROVIDED THAT A LOWER CLASS WILL RESIST ATTACK FROM SOILS AND GROUND WATER.
17. PRECAST CONCRETE CORBEL SLABS SHALL COMPLY WITH BS 5911-3 TABLE 3 AND FIGURE 8.
18. COVER SLABS SHALL BE INSTALLED WITH A MINIMUM OF 300mm COVER TO FINISHED GROUND LEVEL.
19. SUBMISSION OF A CONSTRUCTION COMPLIANCE CERTIFICATE SHALL BE PROVIDED UPON COMPLETION OF DRAINAGE WORKS

EXISTING SERVICES

PRIOR TO THE COMMENCEMENT OF ANY WORKS UNDER GROUND MAPPING SURVEYS AND CONSTRAINTS PLAN IS TO BE REFERRED TO ANY DISCREPANCIES ARE TO BE REPORTED TO ENGINEER.

ANY EXISTING SERVICES WHICH MAY BE AFFECTED BY THE PROPOSED WORKS SHOULD BE LOCATED BY MEANS OF A HAND DIG IN CLOSE LIAISON WITH THE STATUTORY SERVICE AUTHORITIES. THE CONTRACTOR SHALL INFORM THE DEVELOPER OF ANY SERVICES THAT MAY AFFECT THE PROPOSED DESIGN. CONTRACTOR TO NOTIFY STATUTORY SERVICE AUTHORITIES PRIOR TO COMMENCEMENT OF WORK. AS CONSTRUCTED INFORMATION IT IS THE CONTRACTORS RESPONSIBILITY TO PROVIDE THE FOLLOWING AS CONSTRUCTED DRAWINGS TO THE DEVELOPER UPON THE COMPLETION OF THE WORKS COVERED BY THE CONTRACT :-

14. POSITION/CO-ORDINATES OF ALL ADOPTABLE MANHOLES.
15. INVERT AND COVER LEVELS OF ALL ADOPTABLE MANHOLES.
16. NEW GULLY POSITIONS AND CONNECTIONS.
17. POSITION AND DEPTH OF SERVICE DUCTS FOR WATER, GAS, ELECTRIC, BT, CABLE AND STREET LIGHTING, STATING SIZE AND NUMBER OF DUCTS.

Rev.	Date	Revision Details	Drawn	Checked
P06	14.11.25	CL'S OF MH'S S4 & S5 RAISED TO SUIT ADDITION OF SPEED CALMING FEATURE.	JR	RPB
P05	14.10.25	DOUBLE GULLY CONNECTIONS AMENDED TO SINGLE CONNECTIONS. S185 REFERENCE ADDED ON DRAWING	JF	ND
P04	06.10.25	DRAWING AMENDED FOR PLANNING TO SUIT REVISED ARCHITECTS LAYOUT REV P11	JR	ND
P03	21.07.25	UPDATED TO SUIT STRATA COMMENTS	JR	ND
P02	16.07.25	UPDATED TO SUIT STRATA COMMENTS	JR	ND
P01	28.02.25	FIRST ISSUE	CW	ND

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www.queensberrydesign.co.uk

Client

STRATA/THIRTEEN

Project

MAIN AVENUE
COWERSLEY

Title

SECTION 104 LAYOUT

Drawn	Checked	Date
ND	CW	28.02.2025

Drawing Number: 2153-QD-XX-HD-DR-C-17-01

Drawing Status	Scale	Rev.
TENDER	1:500 - A1	P06

APPENDICES

APPENDIX A
SERVICE CONSTRAINTS

APPENDIX A
SERVICE CONSTRAINTS

1. Service Constraints

1.1. This Report (the “Report”) and any study, inspection, investigation, sampling, testing and or interpretation carried out in connection with the Report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) trading as Leap Environmental or RSK Geosciences, for the Client named in the first paragraph of the Report (the "Client") in accordance with the terms of an RSK Fee Proposal including RSK Environment Standard Terms and Conditions (the “Appointment”) between RSK and the Client, unless otherwise stated in the first paragraph of the Report. The Services were performed by RSK with the reasonable skill and care ordinarily exercised by a geo-environmental consultant at the time the Services were performed. Nothing in this Report shall be construed as imposing any fitness for purpose obligation. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the Client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the Client.

1.2 Other than that, expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services. RSK shall not be liable in respect of any action or proceedings arising out of or in connection with this Report whether in contract, in tort, for breach of statutory duty or otherwise after the expiry of six (6) years from either (i) the date of the Report or (ii) such earlier date as prescribed by law, unless varied in the terms of the Appointment.

1.3 Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the Client. RSK is not aware of any interest of or reliance by any party other than the Client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent, or condone any party, other than the Client relying upon the Services. Should this Report or any part of this Report, or details of the Services or any part of the Services, be made known to any such party, and such party relies thereon, that party does so wholly at its own and sole risk, and RSK disclaims any liability to such parties. Any such party would be well advised to seek independent advice from a competent geo-environmental consultant and/or lawyer.

1.4 The Client shall not, without the prior written consent of RSK, assign, transfer, charge, mortgage, subcontract, or deal in any other manner with all or any of the benefits provided in this Report. Unless specified in the Appointment, RSK shall not be obliged to assign the benefit of the Report whether by collateral warranty, third party rights pursuant to the Contracts (Rights of Third Parties) Act 1999, letter of reliance or otherwise. If RSK agrees to any assignment of the benefit of this Report, in whatever form, benefits to third parties through collateral warranties, third party rights or letters of reliance shall not be provided unless a fee for each right, warranty or letter is agreed. The form of wording used in the warranty or letter shall be provided by RSK for agreement by the Client. Any reasonable changes to the form of wording will be implemented by mutual agreement, however the terms in the warranty or letter cannot offer the third party any greater benefit than the Appointment offered to the Client.

1.5 It is the understanding of RSK that this Report is to be used for the purpose described in the introduction to the Report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the Report is used, or the proposed use of the site change, this Report may no longer be valid and any further use of or reliance upon the Report in those circumstances by the Client without the review and advice of RSK shall be at the Client's sole and own risk. RSK shall not be liable for any use of this Report for any purpose other than that for which it was provided.

1.6 The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the Report inaccurate or unreliable. The information and conclusions contained in this Report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the Report in the future shall be at the Client's own and sole risk.

1.7 The observations and conclusions described in this Report are based solely upon the Services which were provided pursuant to the agreement between the Client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out, or required by the Appointment between the Client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this Report, RSK did not seek to evaluate the presence on or off site of asbestos, invasive plants, electromagnetic fields, lead paint, heavy metals, radon gas, fuel storage, persistent bio-accumulative or toxic chemicals (including PFAS and related compounds) or other radioactive or hazardous materials, unless specifically identified in the Services.

1.8 The Services are based upon RSK's observations of existing physical conditions at the Site gained from a visual inspection of the site together with RSK's interpretation of desk based publicly available information, including documentation, obtained from third parties and from the Client on the history and usage of the site, unless specifically identified in the Services and the limitations below:

a. The Services were based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely.

b. The Services were limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the visual inspection.

c. The Services did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the Client or third parties, including laboratories and information services, during the performance of the Services.

d. The Client has identified in writing to RSK, the information, reports, findings, surveys and preliminary works RSK may not rely upon when providing the Services.

RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK, and including the doing of any independent investigation of the information provided to RSK, save as otherwise provided in the terms of the Appointment between the Client and RSK.

1.9 Any site drawing(s) provided in this Report is (are) not meant to be an accurate base plan for scale measurement but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (intrusive and sample locations etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for accurate setting out and should be considered indicative only.

1.10 Should RSK be requested to review the Report after the date of issue of this Report, RSK shall be entitled to additional payment at the existing rates, or such other terms as agreed between RSK and the Client.

2. Service Constraints where the Report provides an intrusive assessment of ground conditions:

2.1 The intrusive environmental ground investigation aspects of the Services are a limited sampling of soil from the site, at pre-determined locations based on the known historic / operational configuration of the site. The conclusions given in this Report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent

of the limited area depends on the properties of the materials adjacent and local conditions, together with the position of any current structures and underground utilities and facilities, and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters (as stipulated in the scope agreed between the Client and RSK, based on an understanding of the available operational and historical information) and it should not be inferred that other chemical species (not tested) are not present.

2.2 The comments given in this Report and the opinions expressed are based on the ground conditions encountered during the site work and on the results of tests made in the field and in the laboratory. The extent of the exploratory holes, laboratory testing and monitoring undertaken may have been restricted due to a number of factors including accessibility, the presence of buried or overhead services, current development, site usage, timescales or the Client's specification. The exploratory holes only assess a small proportion of the site area with respect to the site as a whole, and as such may only provide an indicative assessment of ground conditions on site. There may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account. In particular, it should be noted that there may be areas of made ground not detected due to the limited nature of the investigation or the thickness and quality of made ground across the site may be variable. In addition, groundwater levels and ground gas concentrations and flows, may vary from those reported due to seasonal, or other, effects and the limitations stated in the data should be recognised. The presence of hotspots of undisclosed contamination or exceptional and unforeseen ground conditions cannot be discounted.

2.3 Where the Services include Investigation of an exploratory nature or relating to physical ground works, any costings and prices provided in the Report are estimated and provided for guidance purposes only. The actual cost and time quantities shall be remeasured and shall be dependent upon the ground or other conditions, constraints present, and number and depth of the investigation locations, which shall influence the number of samples and tests required, and the quantities of soil being classified.

2.4 Asbestos is often observed to be present in soils in discrete areas. Whilst asbestos-containing materials may have been locally encountered during the fieldworks or supporting laboratory analysis, the history of brownfield and demolition sites indicates that asbestos fibres may be present more widely in soils and aggregates, which could be encountered during more extensive ground works. However, this Report does not constitute an asbestos survey. On this basis, the presence of asbestos on site cannot be discounted and a full asbestos survey should be undertaken.

2.5 Unless stated otherwise, only preliminary geotechnical recommendations are presented in this Report and these should be verified in a Geotechnical Design Report, once proposed construction and structural design proposals are confirmed. Eurocode 7 gives guidance on the type of sampling, sample quality, number and spacing of intrusive investigations, and number of laboratory tests required. It is intended that the Geotechnical Information section of this Report will fulfil the general requirements of the Ground Investigation Report as set out in section 6 of Eurocode7, although this is subject to the restrictions imposed on the investigation, as listed above. For geotechnical design, Eurocode 7 requires the Geotechnical Design Report to address both the geotechnical and structural aspects of the geotechnical design for both the limit and serviceability states. The Geotechnical Appraisal section of this Report will not meet the requirements of a Geotechnical Design Report (GDR) and should therefore be used for preliminary guidance only.

3. Service Constraints where the Report relates to Surface Water Management:

3.1 The Surface Water Management Inspection (SWMI) Report, documents provided, observations, actions, and recommendations, with respect to the management of potential pollution issues to surface waters, made during the site Inspection visit, are those present at the time of the visit, and may not represent those recorded by others on the same day.

3.2 The comments given in this Report and the opinions expressed are based on the weather, ground and ground water conditions encountered during the site work and on the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the inspection and therefore could not be taken into account. In addition, groundwater levels and flows, may vary from those Reported due to seasonal, or other, effects and the limitations stated in the data should be recognised.

3.3 RSK places a degree of dependence upon oral information provided by site representatives, which is not readily verifiable through visual inspection, or supported by any available written documentation. RSK shall not be held responsible for conditions or consequences arising from relevant facts that were not fully disclosed by facility or site representatives at the time this Report was prepared.

3.4 This Report is a live document, to be continually reviewed and updated as the development progresses or other changes occur on site. RSK can only maintain the currency of this Report through the Client requesting support with supplementary site visits or attendance at meetings ahead of key stages of the development in relation to surface water management. Our risk rating assesses a number of risk factors in line with the source-pathway- receptor model and is therefore subject to constant change.

3.5 Standard design drawings are indicative. Material types, dimensions and construction details will need to be adjusted by the Client to suit the specific conditions / flows on Site.

3.6 The full responsibly for implementing the site-specific protection and maintenance measures to protect the surface water system as stated in this Report, remains with the Client and their site management team. Additional control measures may be required to achieve the objectives set out in the Surface Water Management Plan to be implemented and financed by the Client.

4. Service Constraints where the Report relates to Waste Management:

4.1 In accordance with the definition provided in the Waste Framework Directive (WFD), materials are only considered waste if 'they are discarded, intended to be discarded or required to be discarded, by the holder'. Naturally occurring soils are not considered waste if re-used on the site of origin for the purposes of development. Soils such as made ground that are not of clean and natural origin (irrespective of whether they are contaminated or not) and other materials such as recycled aggregate, do not necessarily become waste until the criteria above are met. Excavation arisings from the development may therefore be classified as waste if surplus to requirements and/or unsuitable for re-use.

4.2 It is the duty of the waste producer, to ensure that all waste is accurately classified prior to waste disposal. Technical Guidance WM3 (EA, 2018) sets out in its Appendix D requirements for waste sampling. It is a legal requirement to correctly assess and classify waste. The level of sampling should be proportionate to the volume of waste and its heterogeneity. Unless otherwise stated, the waste assessment presented in this Report should be considered as preliminary and further testing and assessment of the waste under the provisions of a Waste Sampling Plan may be required to obtain the necessary level of data required for basic characterisation of the waste in support of disposal.

4.3 Unless stated otherwise in the Report, information relating to historical operations at the site was not reviewed as part of the assessment by RSK. In addition, unless otherwise stated in the Services, RSK was not present during the collection of the samples nor had any input on the chemical testing suite. Therefore, the waste assessment and classification detailed in this Report are based solely on any information that were provided to RSK (e.g., laboratory chemical data, exploratory hole records) and were completed without prejudice for our Client.

4.4 RSK's assumes that any ground investigation data, chemical testing results etc., that were provided by the Client to inform the waste assessment and supporting review were carried out in accordance with current best practice and relevant guidance/ standards, where applicable. Thus, the

comments given in this Report and the opinions expressed are based solely on the information provided by the Client. However, it is noted that there may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account as part of the RSK assessment.

5. Service Constraints for Construction Environmental Management Plan Reports:

5.1 This Report should be considered in the light of any changes in legislation, statutory requirement or industry practices that may have occurred subsequent to the date of issue.

5.2 The measures and comments outlined in this Report and any opinions expressed are based on the plans provided at the time and discussions with relevant parties. However, there may be conditions pertaining to the site that have not been disclosed by investigations and therefore could not be taken into account.

5.3 This CEMP is a live document and is subject to change throughout the project, as and when necessary, to ensure management of environmental aspects remains relevant, and to ensure continued compliance with legislation and commitments as they may change. RSK understands that this CEMP will be reviewed by the Client every six months and updated as and when necessary.

5.4 It is the full responsibility of the Principal Contractor/ Client to ensure that their works do not contravene legal requirements, and adherence to this CEMP alone cannot be a full defence regarding legal action against the Principal Contractor.

6. Service Constraints where the Report relates to Ground Gas Membrane Verification:

6.1 This Report is limited to the verification of the gas resistant membrane/vapour membrane/ radon barrier after installation and no inspections were undertaken of the substrate (i.e. prepared ground). The Report therefore does not constitute as a full verification of ground gas protection system.

6.2 The comments given in this Report and the opinions expressed, are based on the condition of the ground gas membrane as encountered at the time of inspection by suitably qualified personnel. RSK cannot accept liability for any subsequent change to the status of the gas membrane by follow-on trades or other construction activity.

6.3 Where not designed by RSK, the verification of protection measures is carried out with reference to the gas protection design provided by the Client. RSK assume the scope of gas protection measures as determined by third parties to be correct and to have achieved any required approval from authorities.

6.4 The Ground Gas Design Report/Remediation Strategy and Verification Plan contains details of the procedures to be adopted for inspection and validation of the works. However, it should be noted that responsibility for the correct implementation of the strategy lies with the appointed contractor. RSK cannot be held responsible for any remedial works that are carried out without the agreed procedures involving either direct supervision by RSK, or inspection and validation of the works by a representative from RSK.

7. Service Constraints for Environmental Due Diligence (EDD)Reports:

7.1 The comments given in this Report and the opinions expressed are based on the information obtained and reviewed as part of the desk-based assessment. However, there may be conditions pertaining to the Site that have not been disclosed by the assessment and therefore could not be taken into account. Furthermore, no intrusive investigations, monitoring or sampling have been undertaken to confirm the environmental status of the site, therefore any comments relating to ground conditions and subsurface contamination are based solely on a review of desk-based information.

7.2 This Report describes the results of the EDD exercise. The scope of this EDD Report, where appropriate, covers legal or regulatory compliance with respect to UK or international regulations associated with environmental matters.

7.3 As with any EDD exercise, there is a certain degree of dependence upon information provided by the target company. The EDD does not include a site walkover / visit or liaison with site representatives unless identified in the Services. Therefore, the assessment is based on the available desk study information. Also, there is a certain degree of dependence upon oral information provided by site representatives, which is not readily verifiable through visual inspection, or supported by any available written documentation. RSK shall not be held responsible for conditions or consequences arising from relevant facts that were not fully disclosed by facility or site representatives at the time this EDD exercise was performed.

7.4 This Report, including all supporting data and notes (collectively referred to hereinafter as "information"), was prepared or collected by RSK for the benefit of its Client.

7.5 The comments given in this Report and the opinions expressed are based on the information obtained and reviewed as part of the desk-based assessment and the site inspection visit. However, there may be conditions pertaining to the Site that have not been disclosed by the assessment and therefore could not be taken into account. Furthermore, no intrusive investigations, monitoring or sampling have been undertaken to confirm the environmental status of the Site therefore any comments relating to ground conditions and subsurface contamination are based solely on a review of desk-based information and observations collected during the site inspection visit.

8. Service Constraints for Ground source heat energy Reports:

8.1 It is understood that this is a desktop survey only and that there are no requirements for a site walkover, service utility survey, or provision of service plans. These services can be provided upon request if required.

8.2 At a later stage, it is possible that a thermal response test (TRT) will need to be completed, for which a test borehole will have to be drilled, and these would be costed at the time. RSK can provide all aspects of subsequent site work for a GSHP system if required.

9. Service Constraints for Water Abstraction Borehole Reports:

9.1 The Report aims principally to only identify and assess the suitability of the site for a water abstraction borehole. This Report should be considered in the light of any changes in legislation, statutory requirements, and industry practices, that have occurred subsequent to the date of the Report.

9.2 Unless stated in the Report, the opinions expressed in this Report including all comments and recommendations provided are on the basis of the information obtained from a desk-based assessment.

APPENDIX B
INSPECTION AND MONITORING PROFORMAS

GULLY INSPECTION CHECKLIST
SITE: MAIN AVENUE, COWERSLEY, HUDDERSFIELD

Date	Road or Gully Ref.	Gully clear and functional (yes/no)	If no - action required: e.g. (gully clean / gully bag replace)	Further comment	Sign off / Signature

SITE INSPECTION CHECKLIST
SITE: MAIN AVENUE, COWERSLEY, HUDDERSFIELD

Name of person undertaking inspection: .....

Date: .....

Current weather conditions: .....

Description	Comments	Action	Initial
1) What is the current condition of the gully protection measures within the active areas of the site? *Note any gullies requiring maintenance measures*			
2) Are site roads clean and relatively free of mud? Is the frequency of visits by the road sweeper adequate? *Consider whether additional visits should be scheduled.*			
3) Are there currently unsurfaced areas being trafficked which may be causing silt to enter the site drainage? *Note if additional measures are required to reduce the run-off from these unsurfaced areas.*			
5) Are control measures in place to prevent silt run-off from unsurfaced areas and soil stockpiles? *Note if the control measures are adequate and whether the increased runoff requires an increase in the frequency of inspection of any control measures.*			

6) What is the current condition of run-off? *Note any discolouration of the water or obvious sign of sediment within the water.*			
7) What is the current water condition at the at monitoring locations? *Note any discolouration of the water or obvious sign of sediment within the water.*			
8) Is any off-site run-off occurring? *Note whether any run-off is occurring – especially in the vicinity of any boundaries.* *Note any control measures in place.*			
9) Is there any dewatering of excavations taking place on site? *Note what activities are taking part and their location.* *Note any control measures in place.*			
Further notes and actions to be taken:			

Completed by	Name	Signature	Date
Site Manager			

APPENDIX C
INSTALLATION EXAMPLES

Retention of a wide vegetated buffer and step down in site levels due to reduced dig

Placement of stone to the front of plots to create clean forklift access

Installation of silt fencing to control run-off from an unsurfaced area

Placement of silt matting to capture settled silt downgradient within a surface watercourse (image courtesy of Frog Environmental)

Silt matting installed along the base of an unsurfaced swale to capture settled suspended solids prior to discharge into a surface watercourse

Dewatering bag used to treat water pumped from excavations. Dewatering bag is placed upon a pallet for ease of movement, onto clean gravel to dissipate the flow and prevent scouring, in a vegetated area for infiltration.

Utilisation of flocculant treated silt matting (Floc Mat) to treat water pumped from excavations (image courtesy of Frog Environmental)

Silt Wattles utilised to separate clean and silty water within a watercourse (image courtesy of Frog Environmental)

Silt Wattles utilised to intercept silt laden run-off on a road
(image courtesy of Frog Environmental)

Silt matting and Silt Wattles deployed within a surface watercourse. Silt Wattles create a check dam promoting settlement of suspended solids, which is captured by the silt matting. (image courtesy of Frog Environmental)

Coarse stone used to create periodic check dams (in conjunction with a geotextile) to reduce scouring within a swale until vegetation establishes.

Silt Wattles utilised to intercept silt laden run-off from an unsurfaced slope
(image courtesy of Frog Environmental)

Silt fencing and straw bales installed across an inlet headwall within an attenuation basin, to promote settlement of silt within the concrete apron (where it can more easily be removed) prior to discharge into the attenuation basin. Coarse stone installed to dissipate flow and prevent scouring, and further promote settlement at the headwall.

Silt fencing installed across an outfall headwall, to promote settlement of silt within the concrete apron prior to discharge into the surface watercourse (in the event of breach of other control measures)

APPENDIX D
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

Product:	Application	Manufacturer and product
Gully Protection	Prevent silt and construction debris entering the drainage system and blocking gully pots. Proprietary products often yield superior results to straw and terram and require less maintenance.	• Forest Group – Gully Guard • Hy-Tex – Ultra drain guards
Silt Fencing	Attenuate water on site to promote settlement of silt within overland run-off.	• Frog Environmental – Silt Fence • Hy-Tex – Terrastop Silt Fence • Siltbuster – Silt Fence
Silt Matting	Capture settled silt as it naturally falls from suspension within watercourses, swales, attenuation basins to prevent its resuspension.	• Frog Environmental – Silt Mat • Hy-Tex – SediMat
Flocculant Treated Silt Matting	Capture settled silt within watercourses, swales, attenuation basins to prevent its resuspension. The addition of flocculant treatment encourages silt to settle out of suspension more readily. The Environment Agency must be consulted prior to utilisation of flocculants, and an environmental permit gained where required.	• Frog Environmental – Floc Mat
Silt Wattle	Used as check dams within watercourses / swales providing filtration and also slowing the flow of water to promote settlement of silt. Typically used in conjunction with silt matting (or flocculant coated silt matting) to capture sediment that was caused to settle. Can also be used to separate silty and clear water (i.e. within attenuation basins, or watercourses), on slopes to reduce erosion from overland run-off or to divert silty water to collection areas (i.e. on roads to divert silty run-off away from gullies).	• Frog Environmental – Silt Wattle • Hy-Tex – Ultra Erosion Guard (suitable for use as a check dam to control erosion only, due to its different construction to the Frog Environmental Silt Wattle).
Filter socks	Fitted to hose end during dewatering of excavations to collect sediment. Capable of dealing with smaller volumes and lower flow rates.	• Hy-Tex – Pro-Tex Pipe Socks • Murlac – Silt Sock • Dirtbags UK – Utility Bag
Filter bags	Fitted to hose end during dewatering of excavations to collect sediment. Capable of dealing with larger volumes and larger flow rate, typically up to a 6" pump. Note – * denotes those bags which are sized to be used within a roll on roll off skip for ease of disposal of capture silt.	• Hy-Tex – Ultra Dewatering Bag • Siltbuster – Siltstoppa Dewatering Bag* • Murlac – Silt Bag • Dirtbags UK – Dirtbag / Titan Dirtbag*
Settlement Tanks	Settlement and capture of suspended solids during dewatering / over pumping works of a larger volume than suitable for a dewatering bag, or during extended periods of dewatering / over pumping. The unit required is dependent on the grain size of suspended particles, how quickly these settle from suspension, and the required flow rate. Liaison with the supplier is best undertaken to ensure a suitable product is selected. Can be used in conjunction with flocculants and coagulants to promote settlement, however the Environment Agency must be consulted prior to their utilisation, and an environmental permit gained where required.	• Siltbuster – wide range of settlement units available • Andrew Sykes Group – settlement tanks / Silt Away. • Dirtbags UK – Dirtbox

GULLY PROTECTION

Installation video: https://www.forestgroupuk.co.uk/gully-guard-installation-video/

The Gully Guard

Installation guide

1. Lever open gully grid. Gully Guard is designed to fit all size gullies.

2. Hold handles at top of the Gully Guard, work beads to top and insert base into water filled gully pot.

3. Lower the Gully Guard into the pot. The beads will fall freely into the void within the pot.

4. Tuck the holding handles to the side of the Gully Guard.

5. Close gully grid.

Forest Drainage Products Ltd
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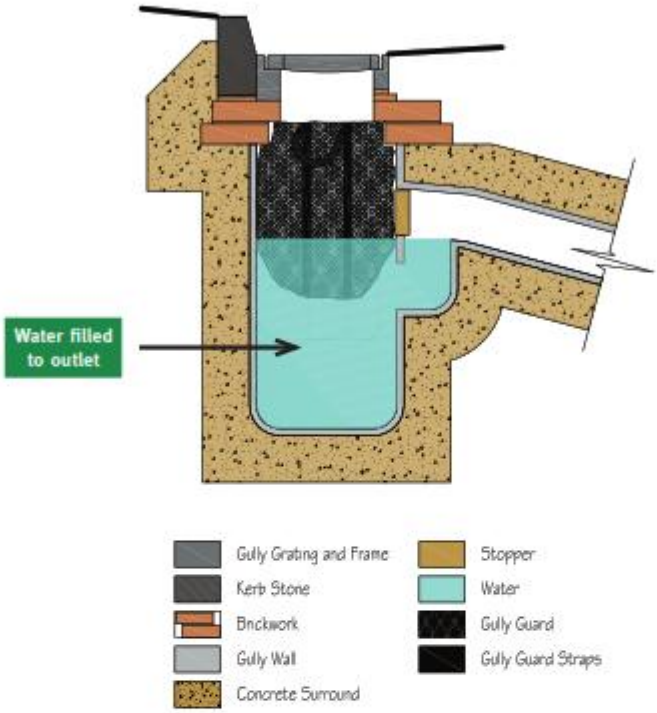
Tel: 01531 828960 Fax: 01531 828969
Email: info@forestgroupuk.co.uk
www.forestgroupuk.co.uk

Patent no. 2472690

fg The Forest Group
High performance, versatile solutions

The Gully Guard

Installation diagram



Maintenance

The Company (Forest Drainage Products) would recommend that an inspection procedure be put in place for the product by the organisation on a 3–4 months basis depending on site conditions.

Maintenance would simply involve the removal of the Product and power hose off in a bund to contain and manage silt and any contaminants prior to reinsertion back into the gully pot.

Without prior knowledge of the type and concentration of the contaminants that each Gully Guard has been subjected to, the Company cannot advise on appropriate disposal. The Company advises that an environmental risk assessment is conducted on an individual case-by-case basis to fully evaluate the nature of contaminants. In order to determine the appropriate method of disposal the Company would recommend that you follow your organisation's environmental waste disposal policy.

Forest Drainage Products Limited (the "Company")

Forest Drainage Products Ltd, Stardens Works,
Tewkesbury Road, Newent, Gloucestershire GL18 1LG
Tel: 01531 828960 Email: info@forestgroupuk.co.uk
www.forestgroupuk.co.uk

The Forest Group
High performance, versatile solutions

2019 / 69145

RSK GEOSCIENCES

wildlife | specialist | biodegradables | **geotextiles** | agrotextiles | accessories

Hy-Tex **Ultra Drain Guard** for Drainage Gully Sediment Control

Ultra Drain Guards are designed to remove oil and sediment pollution from surface water running into gully drains from surrounding construction sites, farms, industrial estates, or other areas prone to storm water pollution or cleaning operations.

Ultra Drain Guards are made from a high permeability non-woven polypropylene geotextile that trap solids and oils but allow water to drain through and also incorporate bypass ports to further maintain flow into the drain.

They are designed to be easily placed directly into the drain gully pot to filter out materials as they flow into the drain without compromising drainage, and the Oil and Sediment model absorbs up to 3.29 litres of hydrocarbons as well as up to 18 kg of sediment, sand or debris.

Installation:

1. Remove catch basin grating
2. Clean dirt and debris from grating ledge
3. Insert Drain Guard.
4. Reinstall grate. To insure maximum effectiveness, Drain Guard skirt should be secured (pinched) between grating and ledge.
5. Cut the excess fabric off with a blade or knife if desired.

Maintenance and disposal:

6. The Ultra-Drain Guard filters are designed to be used for 3 to 6 months under normal conditions.
7. Where heavy contamination is present the unit will have a reduced life expectancy. When the unit has collected about 6 inches of sediment it is recommended that it be replaced. The unit should also be replaced if free oil can be seen floating and is not being absorbed. The Ultra-Drain Guards should be inspected on a regular basis.
8. Dispose of unit in accordance with applicable environmental laws and regulations. The user is solely responsible for compliance with maintenance and disposal laws and regulations. The manufacturer or seller assumes no responsibility for proper or improper maintenance or disposal.

Model	Code	Oil Capture	Sediment Capture	Collection Area	Flow Rate	Size
Oil & Sediment	9217	3.29 l (.87 gal)	18 kg (40 lbs)	25.4 x 45.7cm (10" x 18")	1893 l/min (500 gpm)	121.9 x 91.4 x 45.7cm (48" x 36" x 18")

All of this was removed from 50 Ultra Drain Guards after just two weeks in storm drains

Property	ASTM Test	Value
Material		Non-woven polypropylene geotextile
Grab Tensile Strength	D 4632	979 N (220 lb)
Elongation	D 4632	50%
Trapezoid Tear	D 4533	423 N (95 lb)
Puncture Resistance	D 4833	600 N (135 lbs)
Mullen Burst	D 3786	2,896 kpa (420 psi)
Permittivity	D 4491	1.4 sec^{-1}
Pore Size	D 4751	180 micron (80 US sieve no)
UV Stability	D 4355	70% strength retained after 500hr
Weight	D 5261	272 g/m^2 (8 oz/yd^2)
Flow Rate - Fabric	D 4491	3,660 $l/min/m^2$ (90 $gal/min/ft^2$)
Flow Rate - Bypass Ports	D 4491	2,914 l/min

Aldington Mill, Mill Lane,
Aldington, ASHFORD, Kent TN25 7AJ
sales@hy-tex.co.uk www.hy-tex.co.uk

Tel: 01233 720097
Fax: 01233 720098

Hy-Tex (UK) Limited
Committed to Quality, Value & Service

SILT FENCING

frog environmental

product information sheet

Silt Fence

temporary silt control barrier

frog environmental supply Silt Fence and quarter cut 1.2 metre posts, ideal for providing support

Silt Fence is inexpensive to buy and install, but it must be correctly positioned and maintained for it to be an effective pollution control measure.

Each line of Silt Fence should be inspected on a regular basis, especially after rainfall.

If stakes are broken or gaps appear between the fence and the ground, then the fence should be re-trenched. Accumulated silt must be removed regularly from Silt Fence, typically when it reaches a third of the way up the fence.

Multiple smaller runs of silt fence are usually more effective at controlling pollution than longer lines.

Applications

- Silt Fence is deployed on construction sites to help prevent silt pollution in water bodies or from impacting public highways.
- Silt Fence provides a 'ponding' function; it allows silt laden water to collect behind it and for silt to drop out of suspension while the water slowly drains away or evaporates.
- Silt Fence is usually deployed in conjunction with other silt pollution control measures, especially on sites with clayey soils.

frog environmental Silt Fence is made from high specification geo-textile material and has medium porosity, making it suitable for use on most construction sites.

Poorly installed Silt Fence can cause erosion underneath or around the edges of fencing. This can lead to an increased silt pollution risk.

RSK GEOSCIENCES

Technical information — Silt Fence

Dimensions: 100 metres x 0.9 metres (single roll)

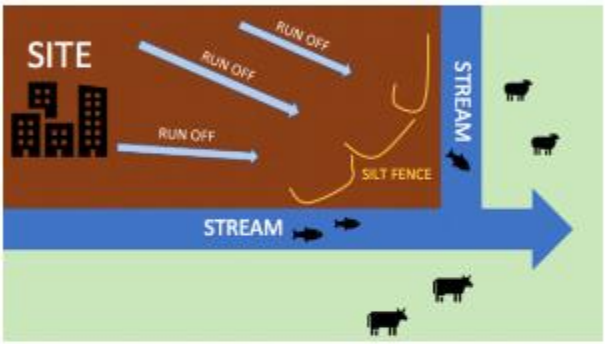
Dry Weight p/m: 110 g/m2 (9.9 kg single roll)

Permeability: 7 (l/m2 /sec)

Material used: tear resistant polypropylene geotextile, PFSC timber stakes (cable ties or staples/ nails to fix)

Function: creates a temporary fence to provide a pooling function that allows silt to drop from suspension

Disposal: all materials fully reusable or recyclable



Shorter J shaped runs of silt fence typically provide more effective pollution control than longer runs

Silt Fence can be used as a temporary measure to prevent muddy water escaping from construction sites

10 TIPS for successful Silt Fence deployments:

- Fence posts should be spaced a maximum of 1.5m apart
- Silt Fence should be trenched a minimum of 20cm into the ground and compacted
- Shorter 'J shaped' installations of Silt Fence act like mini-retention areas and are typically more effective than longer runs (as shown in the diagram above)
- Longer runs of silt fence will concentrate water in the lowest point, where the fence can become weakened and water can undercut or overflow the fence avoid these where possible
- Water flowing around the edges of silt fence can cause erosion and add to the pollution loading from site
- The lower part of the end of each run of silt fence should ideally be above the top of the middle section of the run
- Removal of accumulated silt and regular inspection are key maintenance activity for silt fence. A named individual should be responsible for this action on site
- Silt fences are not designed to handle continuous high volume flows and will not be an effective stand-alone control in these circumstances
- Factors such as soil type, slope angle and slope length are key factors in determining how much silt fence is needed on site
- If ground conditions are clayey Silt Fence alone is unlikely to be an effective pollution control

SILT MATTING

frog environmental

product information sheet
SiltMat
silt capture mat

SiltMat is a fully biodegradable mat that captures and prevents sediment resuspension.

The mats can be placed in natural or artificial channels, ditches or directly on land to trap suspended sediments.

SiltMat can be orientated sideways or lengthways and fits into all channel types.

SiltMats are used to manage sediment release to watercourses from construction sites and for capturing silts suspended by in channel or works on river banks.

Applications

- Silt control from construction sites
- Silt control from river or bank works
- Deployed in rivers, streams and ditches
- Deployed in Silt Capture Channels
- Used in forestry and agricultural applications

SiltMat is proven in the field to reduce downstream levels of suspended solids

RSK GEOSCIENCES

Technical information — SiltMat

Dimensions: 2 x 1 x 0.12 metres

Dry Weight: 12kg per mat

Material used: coir (80%) jute (20%)

Function: Captures and prevents resuspension of silt

Performance: Single mat captures up to 40kg of silt

Disposal: Fully biodegradable, with correct permissions used mats can be disposed ofland.

four step guide to using SiltMats

Use our reference table (below) to judge optimal placement. As a rule of thumb, SiltMat is best placed in areas where stream energy is reduced and natural deposition takes place.

SiltMat is unfolded and orientated to cover the width of the channel. The edges of silt mat can be overlaid without gaps. Mats are staked in place or weighted with local material.

SiltMat will trap large amounts of sediment. Stakes or weights are removed and the mats rolled up ready for disposal.

With correct permission SiltMat can be seeded and left on site, creating an environmental enhancement and avoiding disposal costs.

Reference table showing the distance that different particle sizes travel at differing water velocities

Particle Size	Water Speed (m/s)				
	0.2	0.4	0.6	0.8	1
Fine Gravel	20 cm	40 cm	60 cm	80 cm	1 m
Sand	70 cm	1.4 m	2.1 m	2.8 m	3.5 m
Fine Sand	8 m	17 m	25 m	33 m	40 m
Silt	228 m	456 m	683 m	911 m	1139 m

for technical support and sales of
Silt Wattle contact frog environmental
0345 057 4040
info@frogenvironmental.co.uk
www.frogenvironmental.co.uk
@frogenv

Wales: Llanwrda, Dyfed SA19 8NA
Midlands: The Byre, Blakenhall Park, Barton Under Needwood, Staffordshire, DE13 8AJ

FLOCCULANT TREATED SILT MATTING

frog environmental

product information sheet

Floc Mat™

water treatment mat

Floc Mat™ is a versatile silt control device

A mat created to treat and capture fine silts and suspended particles in construction site run off.

The main function of the mat is to flocculate very fine particles, making them easier to separate from water.

Floc Mats can be laid flat out in dispersion fields, used with Silt Wattles or silt fence and deployed in the frog environmental Silt Capture Channel as part of a versatile water treatment process to remove silt from construction site run off.

Applications

- In a Silt Capture Channel
- With Silt Wattles and SiltMats
- In site ditches and low flow channels
- In combination with silt fence
- On natural dispersion fields
- In combination with dewatering bags and silt socks

- **Floc Mat™ is a fully biodegradable water treatment and silt capture mat that treats muddy water and helps prevent silt pollution**
- **They are a cost effective way of treating water in ditches and channels, without the need for pumps – saving energy and CO_2**

RSK GEOSCIENCES

Technical information — FlocMat™

Dimensions: 2x1 x 0.10m

Variants: FM1 (30g/m2), FM2 (100g/m2) FM0(untreated)

Active ingredient: Water Lynx™

Dry Weight: 12 kg per mat

Material used: coir fibres, coir netting, coir rope, anionic flocculant, water

Function: Water treatment – aids solid water separation. Can be used to segregate low flow channel to in bankside works.

Performance: Single mat captures up to 50kg of silt in live test

Disposal: Fully biodegradable, suitable for re-use on site (with correct permit).

Waste classification and disposal legislation must be followed at all times. Always liaise with the regulator before deploying a product containing flocculant. If in doubt contact frog environmental on 0345 0574040 for further information and advice.

Close up FlocMat showing accretion of silt

Deployed in Silt Capture Channels with Silt Wattles

100% sustainably sourced natural fibres are used to create Floc Mat, this ensures the mats are biodegradable and suitable for use as backfill material once used, reducing waste disposal costs. Floc Mat is available in treated and untreated forms.

The fibres of the treated version of Floc Mat are coated with Water Lynx™, a non-hazardous, non-toxic, synthetic anionic polymer which contains no coagulants, cations or metals such as Al and Fe that are ecotoxic.

When deployed in a Silt Capture Channel the Floc Mat provides a safe, low carbon and easy solution to support the removal of suspended solids and associated pollutants from construction site run off.

Deployed to treat muddy excavation water

for technical support and sales of Silt Wattle contact frog environmental

0345 057 4040

info@frogenvironmental.co.uk

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Midlands: The Byre, Blakenhall Park, Barton Under Needwood, Staffordshire, DE13 8AJ

SILT WATTLE

frog environmental

product information sheet

Silt Wattle

silt control sausage

Silt Wattles are a versatile silt control device.

They are deployed on building sites to control movement of suspended silt and in ditches, channels and streams to slow the flow and naturally capture silt.

Silt Wattles are often deployed with frog environmental SiltMats and FlocMats as part of a silt pollution prevention strategy.

Applications

- Silt Wattles can be used to reduce silt release into watercourses from construction sites and deployed directly in channel to reduce movement of suspended silts.
- The tough exterior netting means they can be left for months on site with out degradation, whilst the biodegradable treated wood fibre continues to slow the flow and trap silt particles.
- Silt Wattles mould to the shape of the river bed or ground and can be joined end on end or pyramided to help clean dirty water.
- Wattles are highly versatile and can be weighted or staked in position depending on bed/ground conditions and flows.
- Silt Wattles can be joined end of end to create temp low flow channel and protect rivers from pollution arising from bank works.

Silt Wattles are a versatile product suitable for use in a wide range of silt control applications on construction sites and in river works

FILTER SOCKS

wildlife | specialist | biodegradables | **geotextiles** | agrotextiles | accessories

Hy-Tex **Pro-Tex Dewatering Socks** for Pumped Sediment Control

☑ **Ideal for small dewatering jobs.**

☑ **Traps sediment and oil.**

OIL DETECTION INDICATOR

A light blue paper oil detection strip is attached to each bag

If strip turns **DARK BLUE**
OIL PRESENT
Stop pumping
Contact your Environmental Manager

Pro-Tex Dewatering Socks control pollution caused when pumping dirty water from excavations, and offers an economical alternative to traditional dewatering bags or filtration products.

These easy to use and popular sediment filters bags are ideal for projects with small budgets and minor pollution problems to control of sediment and oil sheen from pumped water.

Designed to attach directly to the discharge pipe, they quickly filter water to help prevent unwanted sediment, silt, debris or pollutants leaving the site in run-off.

The socks have been designed to control pollution caused by pumping dirty water from excavations, trenches, lift shafts, bunds and the like, by filtering out sediment from contaminated water down to 90 micron, while the fabric the socks are constructed from has an inherent ability to absorbs hydrocarbons too.

Advantages

The main advantage of using an Oil & Sediment filter is that it removes hydrocarbons and sediment from pumping activities.

It provides an alternative solution that delivers a considerable cost saving and is user friendly. Furthermore it reduces site time over existing methods such as hiring a vacuum tanker. If you wish to carry out street works with a minimal disruption to the public, this is the ideal solution.

Other benefits include:

- Simple set-up with built in tie
- Hydrocarbon detection strip to identify oil pollution
- Lightweight and compact
- Very easy to empty

Product: Pro-Tex Dewatering Sediment Bag. Premium Pipe Sock.
Application: Oil and Sediment Filter
Effective Pore Size: 90 micron
Sediment Capacity: Approx 18kg
Permeability: 72 litres/m²/sec
Tensile Strength: 19 kN/m
CBR Puncture Strength: 2,900N
Material: UV stabilised. continuous filament, non-woven, needle punched polypropylene fabric.
Bag Size: Approx 1.00 x 0.30m lay flat
Additional Features: Tying cord and hydrocarbon detection strip

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Hy-Tex (UK) Limited
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FILTER BAGS

wildlife | specialist | biodegradables | **geotextiles** | agrotextiles | accessories

Hy-Tex **Ultra Dewatering Bags** for Pumped Sediment Control

Hy-Tex Ultra Dewatering Bags provide an effective way to collect harmful sediments from dirty water pumped out of excavation works (such as foundations, pipe line construction, water, sewer and utility trenches, waterways and lakes) that would otherwise pollute the surrounding environment.

It is a legal requirement to prevent silty water from leaving site untreated, and a finable offence if you do not take appropriate pollution control measures. The Environment Agency Pollution Prevention Guidelines PPG6 (See side panel), in summary, require that the majority of suspended solids (gravel, sand, and silt) must be removed from site water before it is discharged into a drain, sewer or watercourse.

Traditionally settlement methods (such as straw bale structures or settlement ponds/tanks) are often ineffective, rely on slow water movement, long settlement times, expensive and time consuming tank maintenance and large works areas.

Ultra Dewatering Bags are an efficient, practical, quick, simple and cost effective alternative solution to manage this ongoing environmental problem of removing suspended solid pollutants from pumped water on construction sites.

Sediment-laden water is simply pumped into the high quality filter bags, which trap the solids inside and allow filtered water to flow freely out through the geotextile fabric to disperse into the surrounding ground or another collection point.

Ultra Dewatering Bags can also be used for gravity feed applications such as outfall pipes from site drainage or lagoons.

The silt filter bags provide a passive non-mechanical solution, without the use of excessive or specialist machinery (other than possible lifting equipment when full), and do not require a large work area.

The sediment bags are also light, compact and easy to store, with minimal cleaning up required - when full just dispose of the bag and replace with another bag.

The Ultra Dewatering Bags detain both oil and sediment, offering a combination of benefits not available in alternative products. They can also be used to contain contaminated sediment whilst treatments are applied (such as flocculants or absorbents).

The standard 1.80 x 1.80m Ultra Dewatering bags has the capacity to trap near 1 tonne of silt and cope with flow rates up to 2,730 l/min, while the larger 3.05 x 4.55m bags can trap over 4 tonnes of silt and cope with flow rates up to 6,818 l/min.

The Environment Agency

"Working at construction and demolition sites: PPG6 Pollution Prevention Guidelines"

"Poor management of silt and silty water is a major cause of serious pollution incidents from construction sites. Silt for these purposes is a fine inert sediment derived from soil and rocks.

Silt pollution can: damage and kill aquatic life by smothering and suffocating; reduce water quality; cause flooding by blocking culverts and channels..."

"You must not discharge any silty water to a drain or watercourse without prior treatment to settle or remove suspended solids. If you've identified that you will be generating silty water, identify suitable means to treat the water before discharge; examples include: lagoons, settlement tanks, silt traps grassy areas that slow water and allow solids to settle..."

"You must have prior permission from the local sewerage provider if you intend to discharge settled water to the foul sewer because this will be regarded as a trade effluent.

You must have prior permission from [the Environment Agency] if you need to discharge anything to a watercourse. In Scotland if you comply with certain conditions, a discharge will be covered by a General Binding Rule and you will not need to contact SEPA."

Property	ASTM Test	Value
Material		Non-woven polypropylene geotextile
Grab Tensile Strength	D 4632	912 N (205 lb)
Elongation	D 4632	50%
Trapezoid Tear	D 4533	378 N (85 lb)
Puncture Resistance	D 4833	578 N (130 lbs)
Mullen Burst	D 3786	2,758 kpa (400 psi)
Permittivity	D 4491	1.4 sec^{-1}
Pore Size	D 4751	180 micron (80 US sieve no)
UV Stability	D 4355	70% strength retained after 500hr
Weight	D 5261	272 g/m^2 (8 oz/yd^2)
Flow Rate	D 4491	3,660 $l/min/m^2$ (90 $gal/min/ft^2$)

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Hy-Tex **Ultra Dewatering Bags** for Pumped Sediment Control

Usage Guidelines

Ideally position the Ultra Dewatering Bag on a slope, so incoming water flows downhill through the bag, and, as a precaution, install Terrastop Premium silt fence down slope of the bags to control any potential run-off pollution.

The bag is fitted with a collar which fits around delivery hoses or connectors. Strap the neck of the Ultra Dewatering Bag tightly to the discharge hose using the attached tying cord.

To increase filtration efficiency place the bag on an aggregate, or a layer of Hy-Pave tiles, to maximize water flow through the under surface of the bag.

Plan ahead for removal, if the filled bags are to be lifted for disposal then place suitable lifting straps under bag prior to pumping, alternatively you can roll the bags into a digger bucket.

Regularly check the bags. The Ultra Dewatering Bag is full when it no longer can efficiently filter sediment or pass water at a reasonable rate.

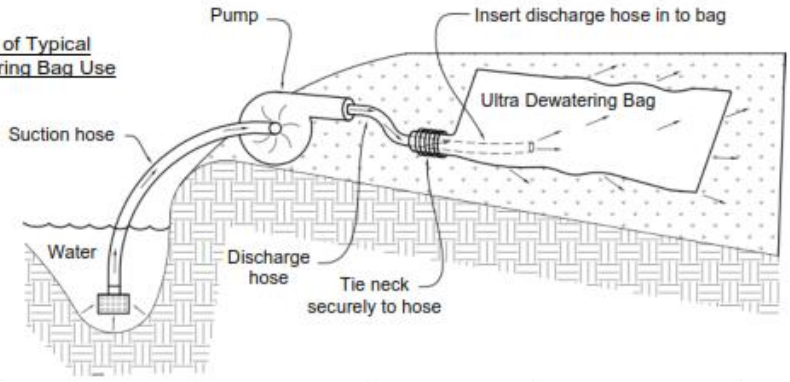
Flow rates will vary depending on the size of the Ultra Dewatering Bag, the type and amount of sediment discharged into the bag, the type of ground, rock or other substance under the bag and the degree of the slope on which the bag lies.

Under most circumstances Ultra Dewatering Bags will accommodate flow rates of up to 2,730 l/min for the 1.80 x 1.80m bags and 6,816 l/min for the 3.05 x 4.55m bags.

Use of excessive flow rates, or overfilling Ultra Dewatering Bags with sediment, may cause ruptures of the bags or failure of the hose attachment straps.

Dispose of the Ultra Dewatering Bag as directed by the site engineer. Normally allow the bags to dry in place then either cut open, spread and landscape on site or remove and dispose of the filled bags (Heavy lifting machinery may be required).

Illustration of Typical Ultra Dewatering Bag Use



Size	Code	Surface Area	Max Flow Rate	Max Pump Size	Sediment Capacity	Oil Capacity
1.80 x 1.80 m (6 x 6 ft)	9724	6.68 m² (72 ft²)	2,730 l/min (500 gal/min)	10 cm (4 inch)	0.51 m³ / 980 kg (18 ft³ / 2,160 lbs)	14 l (3.7 gal)
3.05 x 4.55 m (10 x 15 ft)	9725	27.87 m² (300 ft²)	6,818 l/min (1,500 gal/min)	15 cm (6 inch)	4.20 m³ / 4,082 kg (150 ft³ / 9,000 lbs)	57 l (15.1 gal)

Notes:

Flow/Dewatering rates will vary according to soil type (Sand typically dewaters at the fastest rate, while clay dewaters at the slowest). Clay may also blind over the fabric in some instances, significantly reducing flow.

Max flow rate is a cautious figure based on a significantly de-rating of the clean fabric flow rate of approx 3,660 l/min/m² (90 gal/min/ft²) to allow for pump pressure build up due to silt accumulation.

Sediment capacity is calculated using wet sand weight of approx 1,920kg/m³ (120 lbs/ft³) and a bag fill height of approx 150mm

Oil capacity is estimated at low flow conditions with approx 2.09 l/m² (0.5 gal/yd²) absorption capacity

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Siltbuster Siltstoppa Bags

Siltstoppa Bags provide a low cost solution for the dewatering of sludges and slurry.

Pre-conditioned (flocculated) slurry is pumped into the Siltstoppa Bag and allowed to dewater. The water released from the sludge bleeds through the geotextile fabric whilst the trapped solids remain in the bag.

Siltstoppa De-watering Bags are available individually, to sit on a suitable slab or drainage area or can be supplied as a complete treatment solution including as required sludge conditioning unit, and roll-on/roll-off (RORO) container.

When the bag is full and the trapped solids have dewatered, the Siltstoppa bag can either be split open on-site and the dewatered solids removed by means of an excavator (or similar equipment), or the full RORO container can be transported for off-site disposal.

Siltbuster Siltstoppa Bags Specs

Separation Method	Geotextile Membrane
Height	Expands until full
Length	5.5m
Width	2.1m
Dry Weight	Size Dependant
Materials	Sludges and Slurries
Material Colour	Black
Bag Capacity	6m³
Operating Range	Material Dependant

Siltbuster Siltstoppa Skip

Siltstoppa De-Watering Bags have been conviently sized to fit an industry standard roll on roll off (RORO) Siltstoppa skip. The RORO dewatering skip provides a secure and environmentally acceptable means of bunding a Siltbuster Siltstoppa Dewatering Bag.

When the skip is full with either single or multiple bags (stacked up on top of each other), the skip and its contents can be transported to a Waste Management Facility for disposal of the dewatered sludge/slurry contained within the Siltstoppa Bags.

The Siltstoppa Skip comes complete with an integral sump, allowing easy removal of the water which escapes from the dewatering sludge/slurry.

Siltbuster Siltstoppa Skip Specs

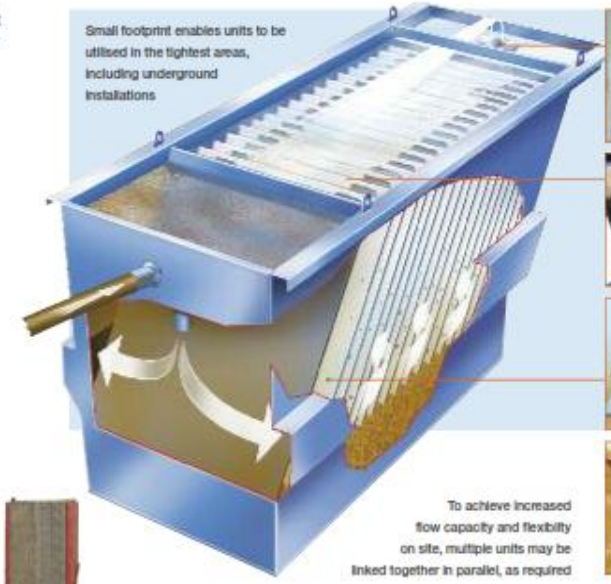
Separation Method	Geotextile Membrane
Height	1.2m
Length	6.1m
Width	2.0m
Dry Weight	2.0 tonne
Material	Flocculated Particles
Operating Capacity	1 Bag
Lifting Method	RORO Hookbill
Operating Range	Material Dependant

SETTLEMENT TANKS

Gravity Settlement ▸ Siltbuster Settlement Units & Water Clarifiers

Siltbuster is the UK's leading provider of mobile settlement units and Lamella Clarifiers. Each unit in the extensive range is specifically designed to remove suspended solids and settleable matter from silt and solids laden surface run-off and groundwater.

Effective gravity based solid/liquid separation requires the largest possible settlement area and optimum hydraulic flow. Siltbuster Clarifiers utilise lamella plate technology to maintain ideal settlement conditions within each unit, thereby, ensuring maximum particle settlement and minimum unit footprint.

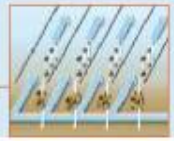


Small footprint enables units to be utilised in the tightest areas, including underground installations

To achieve increased flow capacity and flexibility on site, multiple units may be linked together in parallel, as required

Innovative outlet design maintains flow even when the unit is not exactly level

Plate technology and configuration hugely increases settlement area. Plates are designed for easy handling



Flow distribution has been designed to meet the rigours of the modern construction site

Emptying can be achieved by a range of methods, e.g. via drain ports & valves, vacuum tanker or by manual or mechanical means

Siltbuster mobile clarifiers are robust; skid-mounted; compact and lightweight, making them simple to transport, install and operate. They are ideal for sites with limited access, restricted spaces and temporary projects.
Hopper bottomed units can be fitted (on request) with an automatic sludge removal system making their operation virtually maintenance-free.

Typical applications

Construction

- Pumping & de-watering
- Groundwater treatment
- Site run-off treatment
- Drilling, piling & coffer dams
- In-river & near-river works
- De-silting & dredging
- Roads, pipelines & other linear projects
- Plant, vehicle & wheel washing
- Site water management

Silt Management

www.siltbuster.com

Silt Management

The Siltbuster Mobile Range

Siltbuster offers a range of various sized units to provide customers with flexibility and the opportunity to hire or purchase a tailored, yet off the shelf, solution.

The Mobile Range, Size Comparison

FB50	HB10	HB20	HB40R	HB50
Flat-bottomed, skid-mounted unit. The Construction Industry's favourite	Hopper-bottomed, skid-mounted unit	Enlarged version of HB10. Increased flow rate and sludge storage. Batch or continuous sludge draw-off	Hopper-bottomed, skid-mounted unit	Performance of the FB50 but with twin hoppers for larger capacity, primary thickening applications and batch or continuous sludge draw-off
Height: 1.9m	Height: 2.1m	Height: 2.6m	Height: 3.1m	Height: 3.1m
Length: 3.7m	Length: 1.9m	Length: 2.5m	Length: 3m	Length: 3.7m
Width: 1.45m	Width: 0.9m	Width: 1.2m	Width: 2.2m	Width: 1.7m
Effective Settlement Area: 50m²	Effective Settlement Area: 10m²	Effective Settlement Area: 20m²	Effective Settlement Area: 40m²	Effective Settlement Area: 50m²
Dry Weight: 1,960kg	Dry Weight: 510kg	Dry Weight: 1,120kg	Dry Weight: 2,480kg	Dry Weight: 2,370kg
Inlet: 4" bauer	Inlet: 2" bauer	Inlet: 3" bauer	Inlet: 4" bauer	Inlet: 4" bauer
Outlet: 6" bauer	Outlet: 3" bauer	Outlet: 4" bauer	Outlet: 6" bauer	Outlet: 6" bauer
Typical Operating Capacity: 1-50m³/hr	Typical Operating Capacity: 1-10m³/hr	Typical Operating Capacity: 1-20m³/hr	Typical Operating Capacity: 1-40m³/hr	Typical Operating Capacity: 1-50m³/hr

The benefits

- Readily transportable, fast and simple to setup, easy to operate.
- Small footprint units with large settlement area
- Unique design enables rapid particle settlement and water clarification
- Up to 20 times more efficient than conventional settlement tanks and lagoons of the same plan area
- Choice of unit sizes and capabilities to suit most applications
- Units can be used individually or linked to accommodate a wide range of flows, pump sizes and particle charcteristics

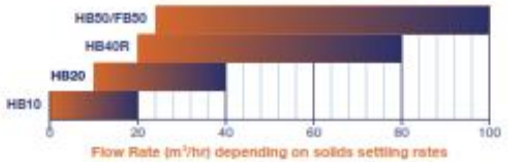
Options & Process Add-ons

Total Water Treatment Solutions

Siltbuster Clarifiers can be configured as single or mulitiple units for basic gravity separation and discharge-to-sewer applications. They can also be supplied as part of a complete, tailored, packaged treatment solution – including ancillary equipment, such as:

- Lids, covers, walkways & access platforms
- Flow splitter valves, flow meters & flanged ports
- Automatic, flow proportional, single or multi-stage chemical pre-treatment
- Fully containerised dosing systems
- Flash mixers
- Pipe flocculators or mixing/aging tanks
- Automatic desludging systems
- Sludge pumps & sludge storage tanks
- De-watering systems

Siltbuster Mobile Clarifier Operating Range



For hire, sales or more details call Siltbuster on 01600 772256

Process Add-ons

Chemical Dosing, Pre-treatment & Reaction Systems

Siltbuster believes that, wherever possible, the use of chemicals to treat excess site water should be avoided. However, there are some types of waste water, contaminants and effluent which still require the use of chemicals to increase the particle settlement rate, so as to enable their removal. This can be due to either the presence of very fine particles; clay; colloidal matter; colour or simply the soil's own interparticle electrical bonds which need to be interupted in order for settlement to occur.

In such cases, chemical dosing is unavoidable. Consequently, Siltbuster has developed an extensive range of chemical dosing systems to compliment it's award-winning settlement units.

Treatment Systems

Flocculant Blocks
Basically, a flocculant in a solid form. When immersed in water the solid dissolves, releasing the chemicals, causing a reaction.

Single-Stage & Multi-Stage Dosing Systems
Siltbuster's Single-Stage dosing systems range from a single dosing pump linked to a drum of coagulant or acid/alkali for pH adjustment, through to an IBC based flocculant batch makeup system and associated pumped dosing. The dosing rate is fully controllable and can be linked to flow rate and chemicals can be added to mixing/reaction tanks, in-line or via pipeflocculators. For more complex dosing regimes requiring similar levels of accuracy, Siltbuster offers Multi-stage dosing systems, including staged coagulant and flocculant dosing, often with an intermediate stage for pH adjustment.

Chemical Reaction Systems

The reaction rate of treatment chemicals, dictates the system required.

Mixing Tanks
Siltbuster can supply mixing tanks, ranging from 1m³ to 30m³ capacity.

Pipeflocculators
For faster reacting chemicals, various pipeflocculators are available.

Containerised Integrated Dosing Units

Siltbuster can provide secure, self-contained, in-line dosing units which enable the controlled, flow-proportional, multi-stage addition of treatment chemicals. For flows up to 150 m³/hr, the 'plug & play' systems come pre-installed in a 10ft (3m), 20ft (6m) or 40ft (12m) shipping container, as required.

Options include:

- Bunded chemical storage
- Flow-proportional dosing systems
- Reaction/aging tanks and pipeflocculators
- Control panels and datalogging
- Insulation, lighting and heating
- Integrated Lamella or DAF Units (subject to model and size).
- Automatic monitoring of feed and discharge water

Full Treatment Packages

Siltbuster's in-house laboratory can test a wide range of chemicals to identify the treatment regime most suited to your needs. A sample of the untreated water, your flowrate and the required discharge limits are all that is needed.

Silt Management

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