



Davidsons Developments Ltd

Surface Water Management Plan: Land off Stoke Lane, Stoke Golding

302569 R01 (00)

Revision control sheet				
Revision ref.	Date	Reason for revision	Author	Reviewer
Rev 00	20/06/2023	-First issue	Naicheervan Abbas	Anthony Jordan

1. PREFACE

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

This Surface Water Management Plan (SWMP) for the proposed residential development by Davidsons Developments (Davidsons) includes a detailed assessment of 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 the final surface water drainage strategy is referenced in this SWMP.

The recommendations for mitigation measures are shown schematically on Figure 01. This report is to be read in conjunction with the following :

- Figure 01: Surface Water Management Plan Schematic (drawing no. 302569-DE-276-SS-D-C-27601-P01)
- Figure 02: Silt Mitigation Measures – Standard Design (drawing no. 302569-DE-276-SS-D-C-27602-P01)
- Appendix A: Inspection and Monitoring Proformas
- Appendix B: Installation Examples
- Appendix C 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 07 June 2023, and the following documents supplied by the client:

- Davidsons: E1189-ENG-0250 S104 Drainage General Arrangement, dated April 2023
- Davidsons: 1189_100 Planning Layout, dated August 2022
- ADC Infrastructure Limited: Flood Risk Assessment and Drainage Strategy. Ref. ADC2042-RP-B, dated October 2019
- GRM: Land off Wykin Lane, Stoke Godling, Phase I Site Appraisal (Desk Study). Ref. P9032/DS.1, dated August 2019
- GRM: Stoke Lane, Stoke Godling Phase II Site Appraisal. Ref. P9032/F.1, dated July 2021
- Focus Ecology Ltd: Preliminary Ecological Appraisal. Ref. 1567, dated October 2019
- Fera: DNA Analysis Report. Ref. GCN19-1175, dated 19 July 2019

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 surface water management plan (presented here) 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.

1. SITE PERSONNEL AND DOCUMENTATION

The following measures are to 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 visit audits or attendance at meetings ahead of key stages of the development in relation to silt management

2. SITE DESCRIPTION

The site is located in Stoke Golding, Hinckley and Bosworth, Leicestershire, CV13 6JN and is accessed along the western boundary of the site from Stoke Lane. The site is centred on National Grid Reference SP 40088, 96798, the site covers an area of approximately 2.00 hectares.

The site is currently utilised as agricultural land and is roughly 'L' shaped. The site is currently made up of open field with mature trees, hedgerow and vegetation forming its boundaries. properties and Wykin Lane Cemetery beyond. The following description is based on RSK's observations during a site walkover undertaken on the 25th April 2023.

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

- **Northwest:** The Site is bounded to the northwest by hedgerow and residential properties fronting onto Wykin Lane, Stoneley Road and Arnold Road.
- **Northeast:** The site is bounded to the northeast by a thick hedgerow with mature trees and a ditch onto Stoke Golding Park.
- **East and southeast:** The east of the site is bounded by a thick hedgerow with mature trees and a ditch onto a field containing a solar array. To the southeast is hedgerow with mature trees and a ditch onto an agricultural field..
- **South:** The southern boundary is marked by a hedgerow with a farm paddock and associated farm buildings beyond.

The site generally falls toward the east, from elevations of approximately 111m AOD at the north western boundary to approximately 104m AOD at the eastern boundary. A shallow drainage ditch flowing south-eastward is present along the northeastern boundary , and another shallow ditch, flowing north-eastward is present along the southeastern boundary.

BGS mapping and the site Investigation (by GRM Group dated July 2021) indicates that the site is underlain by superficial deposits of the Bosworth Clay Member, comprising clay and silt with a potential for the Oadby Member in the far western edge of the site, comprising Diamicton, clay and silt. The underlying bedrock geology is indicated as the Mercia Mudstone Group, comprising mudstone with subordinate siltstone.

Ingress of groundwater was encountered by GRM Group between 1.80m and 3.20m during site

investigation works, and at depths of 0.54m and 1.30m during groundwater monitoring at the time of the reports issue.

The Environment Agency MAGIC maps indicate that the site is underlain by Secondary A and Secondary (undifferentiated) Aquifers, within Wigston Member and Oadby Member respectively. The Mercia Mudstone Group is designated as a Secondary B Aquifer.

3. SITE DEVELOPMENT

The Davidsons Developments Ltd residential development comprises the construction of 55 houses with private gardens and associated infrastructure along with an area of public open space, and surface water attenuation basin in the west of the site..

The proposed surface water drainage strategy for the site has water falling under gravity through drains set into the roadways that will inflow via a western headwall (S13) into an attenuation basin located in the east of the site, which will then discharge via a flow control chamber at a maximum rate of 9.30 litres per second to an existing ditch along the eastern boundary via headwall S16.

In addition to the main development works it is understood that junction works will be required to be undertaken on Stoke Lane. Any dewatering or road sweeping activities associated with these junction works should conform with the overall strategy and principles presented herein. A site compound area is proposed within the field immediately to the east of the site. Access to this proposed compound area would be gained via a continuation of Road 1 (see Figure 1) that would be created during the early stages of the development. Additional silt protection measure may be required upon confirmation of this road extension from Davidsons Developments Ltd.

It is understood that a pedestrian footbridge is to be constructed across the watercourse along the northern boundary (in the vicinity of the attenuation basin) to provide a pedestrian link between the completed site and Stoke Golding Park to the north.

4. SENSITIVE RECEPTORS TO SURFACE WATER RUN OFF

The following sources, pathways and sensitive receptors on site and off site have been identified. Consideration of these along with additional factors can be used to determine a potential pollution risk rating.

Sources of silt pollution:

The principal sources of potential soil pollution to the surface water receptors will be from the on-site material movement, stockpiles, infrastructure and housing plot activities and construction of the attenuation basin. In addition, construction of two proposed crossings of the ditches that bound the site (Road 1 extension crossing of the eastern ditch to access the proposed site compound, and the pedestrian bridge crossing of the northern ditch) have the potential to mobilise silt directly into the ditches.

Clay materials have been identified within the topsoil as well as underlying soils which can be a source of silt pollution when disturbed during ground works due to their finer grain size and mobilisation

potential .

Pathways:

Plausible pathways for silt pollution to impact the identified receptors include direct surface run-off, and run-off via the newly constructed surface water drainage network (road gulleys, road sewer network and attenuation basin)

Sensitive Receptors:

On-site:

- The proposed attenuation basin
- The proposed gullies and surface water sewers of the constructed drainage system.

Off-site:

- Ditches immediately to the northern and southeastern boundaries
- .
- Stoke Lane to the west due to vehicular movement via trackout on roads
- A farm property downgradient to the south of the site

5. RISK RATING AND ASSESSMENT

A risk rating is provided as guidance to the level of risk associated with silt pollution to the surrounding water environment receptors from the identified sources of pollution occurring from the proposed development. The risk rating assesses a number of risk factors in line with the source-pathway-receptor model. It assesses the sensitivity of any identified receptor and combines that with hazard consequence and probability to classify the risk rating as high, medium or low.

High: Indicates the positive identification of a sensitive receptor and / or the likelihood of a potential risk to the surrounding environment.

Medium: Indicates the potential identification of a sensitive receptor or the likelihood of a potential risk to the surrounding environment.

Low: Indicates the negative identification of a sensitive receptor or the likelihood of a potential risk to the surrounding environment.

Based on the identified risk rating, plans will be developed and implemented to treat, control and minimise risk.

RISK RATING AND ASSESSMENT			
Risk Factor	Identified	Detail	Risk Rating
Sensitive Receptors			
Visible flowing water course within 100 metres of site boundary and category of watercourse.	Yes	Existing ditches immediately off site to the northeast and east. These are tributaries of the Stoke Golding Brook (classified as an Ordinary watercourse) which is in turn a tributary of the River Sense.	
Discharge from site flows directly into a water course	Yes	Surface water prior to construction does not have a direct run-off route off site and will likely permeate into the subsoil or run-off towards the east. Following construction of the attenuation basin the surface water will be discharged into an existing ditch along the eastern boundary of the site via headwall.	
Water course contains visible aquatic life (fish etc.) or has been assessed as environmentally sensitive	Yes	The Fera DNA analysis (2019) report found positive identification of Great Crested Newts within the on site ditch.	
Local water course used as local amenity, fishing, canoeing, boating, swimming	Yes	Existing ditch at the northeastern boundary of the site is within 3m of a public path that runs around the perimeter of Stoke Golding Park.	
Likely volumes of temporary discharge will exceed those designed for the final discharge consent	Yes	Temporary run-off to the proposed surface water drainage system may well exceed calculated final discharge rates during storm events during the construction phase due to unsurfaced areas increasing run-off rates.	
Consortium site with shared collection and discharge outlets	No	Site is not a consortium development	
Treatment of water discharge is likely to be required to achieve the quality standard of acceptability	No	Treatment of site discharge surface water is not currently anticipated at this stage	
SSSI and Sensitive Receptors located downstream from the development.	No	No downstream SSSIs have been identified. Stoke Golding Park with a public footpath is located alongside the northeastern boundary of the site parallel to the northeastern boundary ditch..	
Ground Conditions and Topography			
Soils investigation identifies clay / silt (impermeable materials)	Yes	The site is underlain by superficial deposits of the Bosworth Clay Member, comprising clay and silt with a potential for the Oadby Member in the far western edge of the site, comprising Diamicton, clay and silt. The underlying bedrock geology is the Mercia Mudstone Group, comprising mudstone with subordinate siltstone. Given that clays and silts underlie the site there is a risk that water will slowly infiltrate to ground and that silt within waters will take a long time to settle out by gravity alone..	
Site exposed, or at high altitude, or steep gradient.	No	The Site is noted to be gently sloping to the south and south east.	
Soils investigation identifies on-site contamination that may pose as risk to controlled waters	No	A GRM Phase 2 Site Investigation (2021) did not encounter any source of contamination within the onsite soils	
Groundwater level detected at installed drainage pipework depths	Yes	A ground investigation by GRM (2021) at the Site encountered perched groundwater between depths of 1.80m bgl and 3.20m bgl. With groundwater water monitoring results indicating groundwater to be between 0.54m bgl and 1.30m bgl.	
Rainfall and Flooding			
Rainfall prediction in location relatively high	Yes	The total rainfall has been estimated from the Environment Agency Monthly Water Situation Reports for the Midlands Area. The April 2023 rainfall percentage of the long term average was 131% with above normal rainfall.	
Historical evidence indicates site suffers from seasonal flooding	No	The site is located within a Flood Zone 1 and designated as very low Risk from surface water flooding and very low risk from rivers and the sea. The Flood Risk Assessment by ADC Infrastructure (2019) prepared for the site indicates the site has minor areas of surface water flood risk at present, primarily to the eastern side of the site, associated with the natural drainage feature connecting into an ordinary watercourse near Brook Farm.	
Development Constraints			
Does the development require a programme of earthworks to change / modify site levels	No	It is understood that there are no programme for significant earthworks to alter levels. .	
Construction of attenuation basins programmed for construction within 3 months of development commencement.	No	Detailed development plans are unknown at this stage, it is recommended that the attenuation basin construction is programmed early into the development.	
Potential Pollution Risk Rating			
It is considered that Site should be classed as 'medium risk' prior to the construction of attenuation basin and temporary silt protection measures, given: 1. Sensitive receptors to the north and eastern boundaries 2. The topography of the Site 3. Clay and silt content of the underlying ground conditions The risk rating may be considered to be a 'low risk' after the construction of the attenuation basin and recommended silt protection measures. .			

6. PREVENTATIVE MEASURES WITHIN EACH ACTIVE DEVELOPMENT AREA / PHASE

The following specific protection measures should be implemented within the active development areas of the site to protect the surface water system. The protection measures are shown in Figure 1. Further detail of proposed installation measures are provided within Figure 2, installation examples are shown within Appendix B and manufacturers product sheets are provided within Appendix C.

It is understood that the south western parcel of the Site will be developed first. The Site topsoil strip should be controlled with a dedicated site strip phasing plan, with areas of wholesale site topsoil strip kept to a minimum. Furthermore, it is recommended that the access roads be installed first to enable construction of the attenuation basin as early as possible in the construction phase of the development.

- Temporary compounds should be stoned up at the earliest opportunity with designated vehicle tracking routes lined with stone.
- A minimum of 5 m should be retained as a vegetated buffer zone around the perimeter of the Site, or as much as practicable. Maintain natural vegetation along all site boundaries for as long as practicably possible.
- Topsoil and hydroseeding to be installed on and surrounding the attenuation basin upon construction
- Silt fencing should be constructed along the south eastern and eastern boundaries adjoining the farm land and field respectively. Silt fencing downstream of attenuation basin will no longer be required once the attenuation basin construction is complete and vegetation established.
- Silt protection measures should be installed at all inflow and outfall headwalls. Protection measures should constitute a minimum of a timber framed silt fencing and matting as described in Section 7.
- Soil bunding should be constructed along the northern boundary upgradient of the retained vegetation to prevent uncontrolled run-off toward the ditch to the north until plots along northern boundary are complete.
- At proposed crossings of the northern ditch (by proposed foot bridge) and eastern ditch (temporary road to proposed site compound area) mitigation measures should be placed down stream of the crossings, This should comprise ditch timber framed silt fence check dam with silt matting.
- Along the southern boundary the reduced dig from site topsoil strip should provide a step-down in site levels that should mitigate uncontrolled run-off toward the farm buildings to the south.
- Specific monitoring points (shown schematically in Figure 1) should be established and monitored at regular intervals and periods of heavy rain.
- Soil bunding should be installed down gradient of stockpiles.

6. PREVENTATIVE MEASURES WITHIN EACH ACTIVE DEVELOPMENT AREA / PHASE

For each construction phase the additional following protection measures should be implemented. –

Site Set Up:

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 6m) should be established from the top of any ditch or watercourse which is in turn protected by silt fencing.

1. Prioritisation should be given to the construction of drainage runs connecting to the constructed attenuation basin in the east of the site. Prompt construction will enable its use in the control of surface water run-off and silt management and will greatly increase the temporary run-off storage capacity. This should enable more efficient and reliable silt management. Appropriate silt protection methods will be utilised at each headwall and outfall. The general methods that should be adopted are outlined in Section 7.
2. The maintenance and repair of existing drainage infrastructure that is to be retained: ditches or culverts that are to be retained in and adjacent to the proposed development should be repaired and suitably maintained to ensure their effective function.
3. Any temporary surface water discharge undertaken during the construction phase should comply with any discharge permit (gained from the Environment Agency EA) or discharge consent (gained from the lead local flood authority LLFA) and may be subject to be undertaken under a bespoke EA permit application. It is recommended that liaison is undertaken with the EA to ascertain the EA regional approach on this matter.
4. The site may temporarily discharge dewatering waters under the appropriate EA Regulatory Positional Statement (RPS) for a period of 3 months subject to the strict conditions of the EA positional statement. Any unconsented discharge or discharge not meeting the requirements of the EA RPS may be liable to enforcement action.
5. 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 surface water receptors (ditches) or any road gullies. The placement of a silt fence / soil bund at the base of any stockpile should be considered in order to control silty run-off.
6. Consideration as to the placement of materials storage areas where they can be accessed directly from a surfaced road, and placement of hardstanding or stoning up of the storage areas, to prevent tracking on unsurfaced ground to access materials.
7. The installation of hard standing areas to the front of all plots to enable 'clean' forklift access.
8. General good housekeeping of the site.

Plant and machinery operation:

9. Avoid tracking or washing out next to the attenuation basin, ditch or any gully.
10. Avoid tracking in the vicinity of the attenuation basin or any area of standing water that may be present.
11. 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:

6. PREVENTATIVE MEASURES WITHIN EACH ACTIVE DEVELOPMENT AREA / PHASE

12. 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.
13. 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.
14. Placement of stockpiled materials (topsoil / subsoil) away from all attenuation basins and any ditch identified across the site area.
15. 5 m wide retained vegetation strip along banks of the on site drainage ditches.
16. Installation of silt fencing or bunds immediately upgradient of any sensitive surface water feature (ditches).

Road and sewer maintenance:

17. Minimise the movement of plant on and off roads to prevent the tracking of excess soil onto surfaced roads (i.e. planning of the working day and work areas, utilising designated machine and dumper road crossing points).
18. Regular scraping of roads to remove significant silt build-up.
19. The placement of gully protection (gully bags) in all gullies during construction and for these to be inspected and replaced / cleaned on a regular basis.
20. Provision of a road sweeper on site and on the adjacent road network during periods of inclement weather (frequency to be continually assessed by site management), but particularly during bulk soil movements.
21. If required, construction of speed ramps to slow traffic down and to help direct surface water to collection areas.

Management of dewatering – excavations:

22. Should dewatering of excavations be required, the following options may be considered:
 - a. Over-pumping into the constructed surface water drainage system i.e., any on-site temporary attenuation basin, permanent attenuation basin or surface water sewer (when constructed). 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 or silt capture system) to prevent discharge of silt into the constructed surface water drainage system and subsequently off-site. The implemented measures should be frequently monitored and maintained to prevent discharge of silt into the drainage system.

Any proposed pumping to ditches or water courses will need to be conducted under an EA RPS – <https://www.gov.uk/government/publications/temporary-dewatering-from-excavations-to-surface-water>. Following commencement of pumping the RPS is applicable

6. PREVENTATIVE MEASURES WITHIN EACH ACTIVE DEVELOPMENT AREA / PHASE

for a period of 3 months and careful treatment of the water MUST occur to ensure the requirements of the Positional Statement are met. Records should be maintained to demonstrate compliance. Non-compliance and/or discharge of silt water is likely to result in enforcement action being undertaken.

Re-instatement of completed areas:

23. The placement of topsoil and planting / seeding at the earliest opportunity to stabilise soils and control surface run-off from completed areas and areas which are not proposed for construction of plots within the current growing season (if possible).

7. ATTENUATION BASIN AND OUTFALLS TO WATERCOURSES

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

It is recommended that at each headwall a tightly fitting timber framed silt fence should be placed across the headwall apron with tightly fitting silt mats (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. At inflow or outfall headwalls, to withstand peak water flows, a more robust alternative may be adopted: silt fence material lined wire gabion baskets. The wire baskets should be formed to tightly fit between the headwall wingwalls to act as a check-dam, with suitably weighted silt mats placed behind the gabion baskets to capture silt.

At inflow headwalls Rip Rap stone may be placed immediately downgradient of the headwall concrete apron to prevent scouring during peak flow events.

At the upgradient margins of the attenuation basin, silt fencing may be placed around the upgradient margin to prevent uncontrolled run-off toward the basin and scouring of the basin banks.

8. ON-GOING SITE MAINTENANCE

- On site storage / availability of silt fencing, silt matting and straw bales 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., at headwalls, behind silt fencing 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.

9. MONITORING PROCEDURES AND RECORDS

Depending on site conditions as development progresses and as site levels change, other measures may be required to be implemented. These should be identified through regular monitoring and at key milestones during the development and the SWMP 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 measures prescribed in the SWMP 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 - 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 - 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.

Records of monitoring may be kept using the monitoring point inspection form within Appendix A.

3. Inspection of all gullies and manholes to monitor the discharge entering the constructed surface water system using the gulley inspection form within Appendix A.
4. Maintenance, cleaning and replacement of gully protection and all silt entrapment materials (whichever are utilised) as required.
5. Maintain a photographic log and written record of monitoring using the site inspection form within Appendix A 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.
6. 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 appointed environmental consultant.

10. EMERGENCY / ADDITIONAL MEASURES

In the event of heavy rainfall breaching protective measures, the appointed Davidsons Developments Ltd 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 or flow reducing plate within the outlet headwalls of the attenuation basin to prevent discharge of water with an unacceptably high level of suspended solids into the surface water system beyond. Retained silty water should be retained within the attenuation basin until silt settles out to an acceptable level, whereupon the bung / flow restrictor plate may be removed and the clean silt free water may be discharged.

To enable a prompt response to changing site conditions, it is advisable to ensure a supply of silt fencing / silt matting and suitably sized pipe bungs and flow reducing plates are readily available on-site to implement emergency measures.

11. CONTACT DETAILS

Davidsons Developments Ltd	Paul Causer	07799 262220
RSK Environment Ltd (appointed Environmental Consultants)	Naicheervan Abbas	01332 542740 07917 425227
	Anthony Jordan	01332 542740 07711 075236

Enclosed:

Figure 01 – Surface Water and Silt Management Plan Schematic (drawing no302569-DE-276-SS-D-C-27601-P01

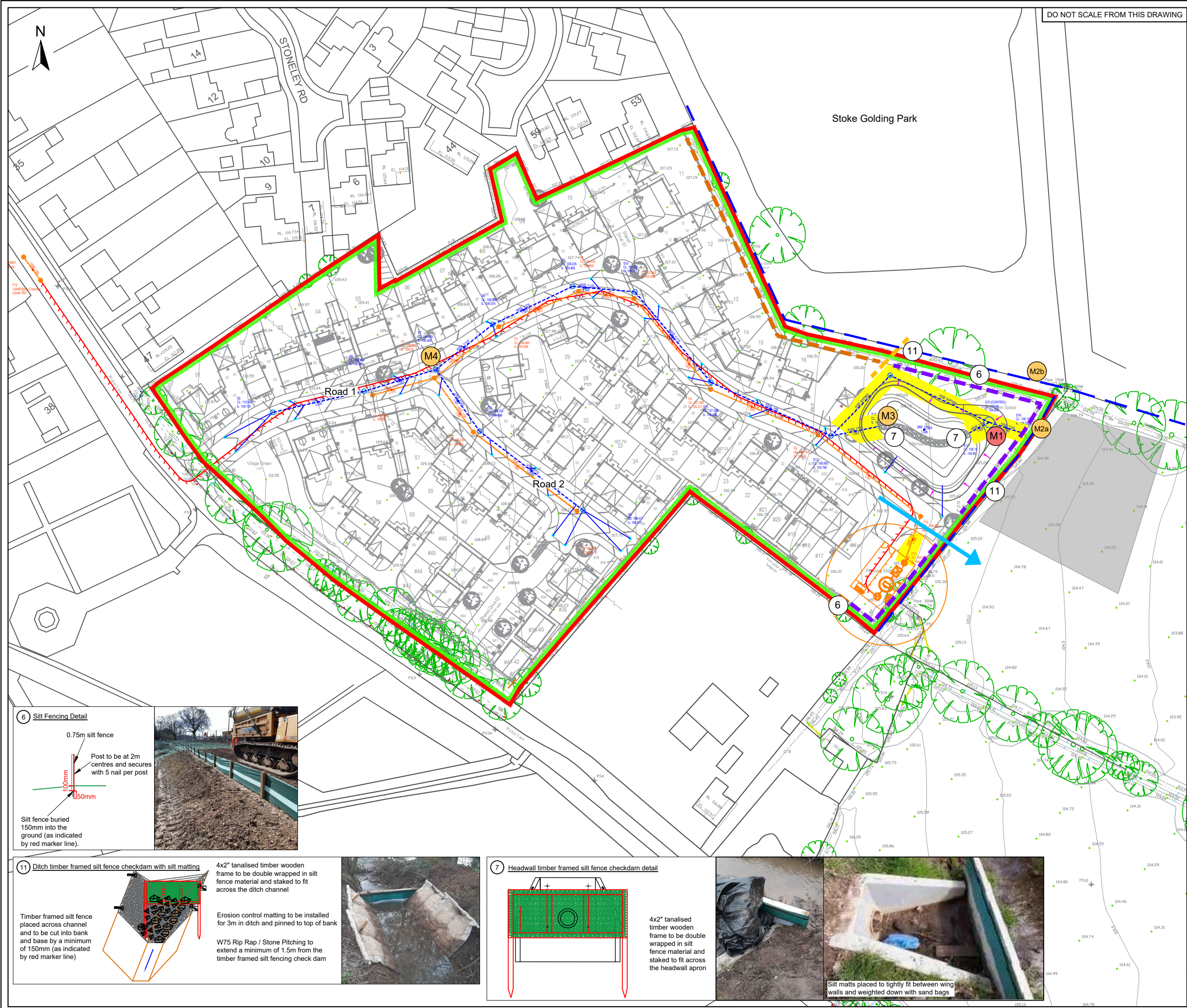
Figure 02 - Silt Mitigation Measures – Standard Design (drawing no. 302569-DE-276-SS-D-C-27602-P01

Appendix A – Inspection and Monitoring Proformas

Appendix B – Installation Examples

Appendix C – Example Manufacturers Product Sheets

FIGURES



DO NOT SCALE FROM THIS DRAWING

LEGEND

- Site boundary
- Potential off-site compound location
- Surface water drainage
- Foul water drainage
- Retention of vegetation
- Recommended line of silt fencing
- Possible foot bridge
- Recommended line of topsoil bund
- Existing land drain
- Possible road extension
- Primary monitoring location
- Secondary monitoring location
- Silt protection measures as detailed in Miller Homes drawing PPP Standard Details Rev - B
- Reduced dig step down in level

Primary Monitoring Locations:

Monitoring Location M1: Monitor the water quality at the attenuation basin outflow headwall.

Secondary Monitoring Locations:

Monitoring Location M2a and M2b: Monitor the water quality within the eastern and western ditches (and the condition of the silt fencing upgradient of the ditch if installed).

Monitoring Location M3: Monitor the water quality at the attenuation basin inflow headwall and condition of silt mitigation measures installed.

Monitoring Location M4: Stockpiles and Excavation to remain the same.

Stockpiles:

Monitor each stockpile to ensure no surface water run-off is occurring. Assess the requirement for placement of silt fencing or soil bunds at the base of the stockpile to control run-off.

Excavations:

Monitor each excavation to ascertain whether surface water has begun to flood the excavation or if they are already flooded and at risk of over-topping, and therefore whether there is any requirement for the placement of bunds or silt fencing down-gradient of the excavation to control run-off.

Notes:

Base plan provided by Client
No.Ref: E1189-ENG-0250 - Drainage General Arrangement

C01	20.06.23	First Issue	LS	NA	NA
Rev	Date	Amendment	Drawn	Chkd	Appd

RSK GEOSCIENCES
12 Royal Scot Road
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Derby
DE24 8AJ
Tel: +44(0)1332 542740
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Client
Davidsons Developments Ltd

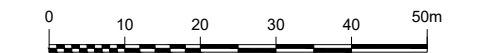
Project Name
Land off Stoke Lane, Stoke Golding

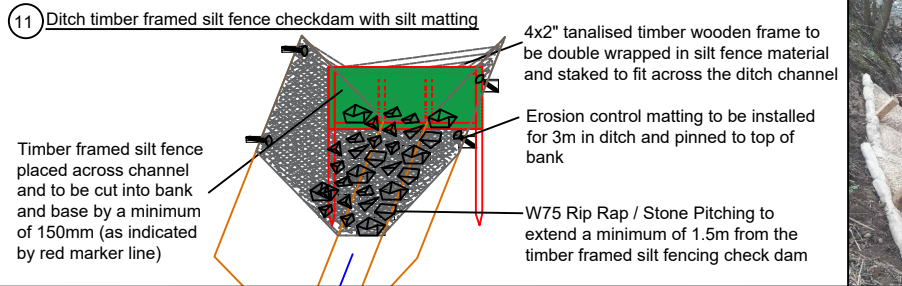
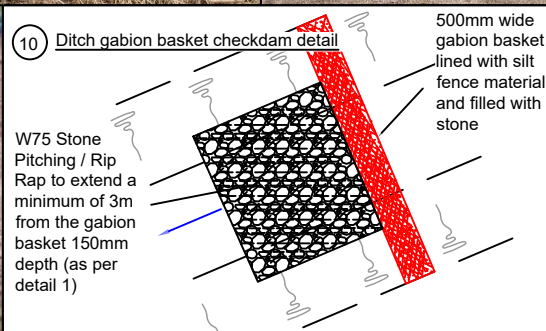
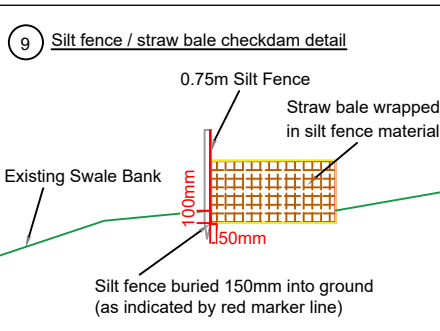
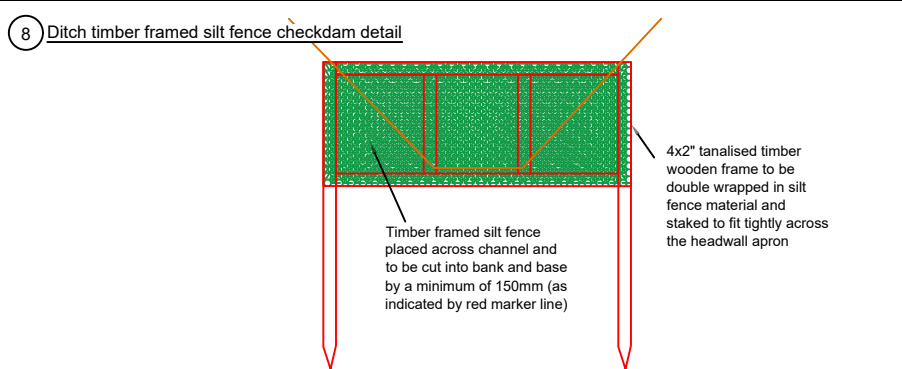
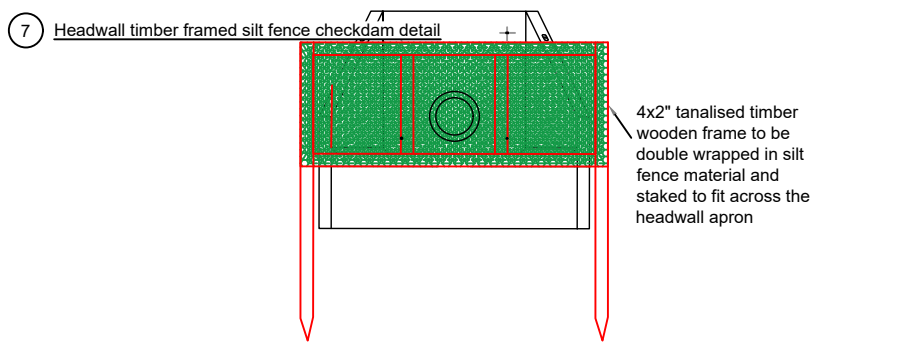
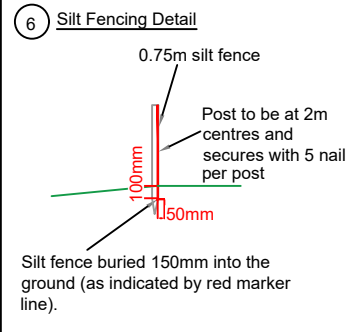
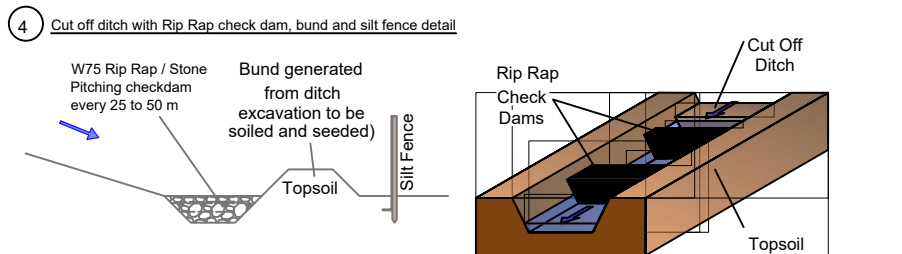
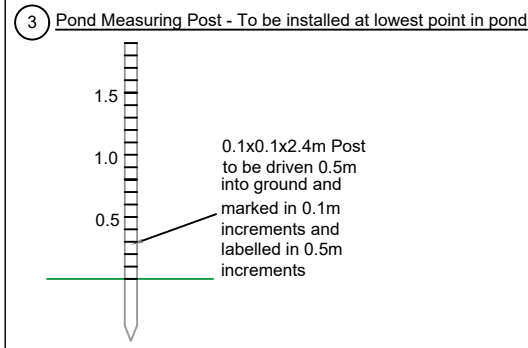
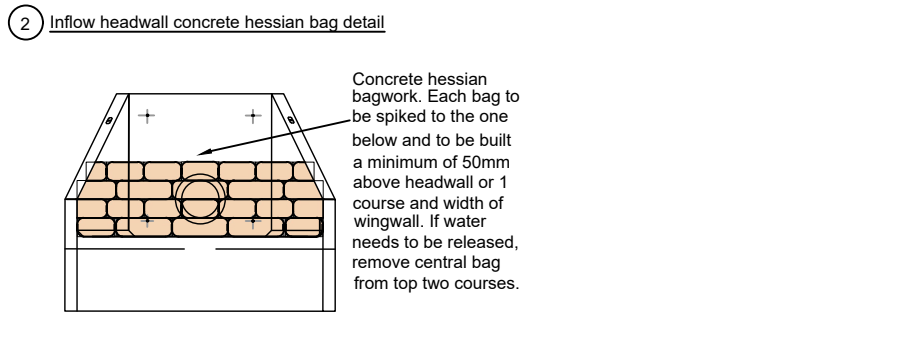
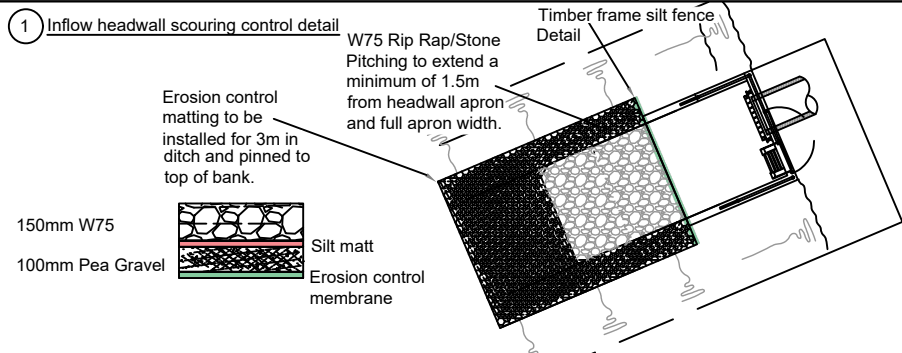
Description
Surface Water Management Plan Schematic

Project ID
302569
Drawing no.
27601
Revision
C01

File name
302569-DE-276-SS-D-C-27601-C01

Dimensions
m
Scale
1:1000
Size
A3





APPENDIX A

INSPECTION AND MONITORING PROFORMAS

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 and straw bales installed across an outlet headwall within an attenuation basin, to promote settlement of silt within the basin prior to discharge into the surface watercourse



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 C

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 • Silbuster – 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 • Silbuster – Siltstopa 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.	• Silbuster – wide range of settlement units available • Andrew Sykes Group – settlement tanks / Silt Away. • Dirtbags UK – Dirtbox



RSK
GEOSCIENCES

GULLY PROTECTION

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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Email: info@forestgroupuk.co.uk

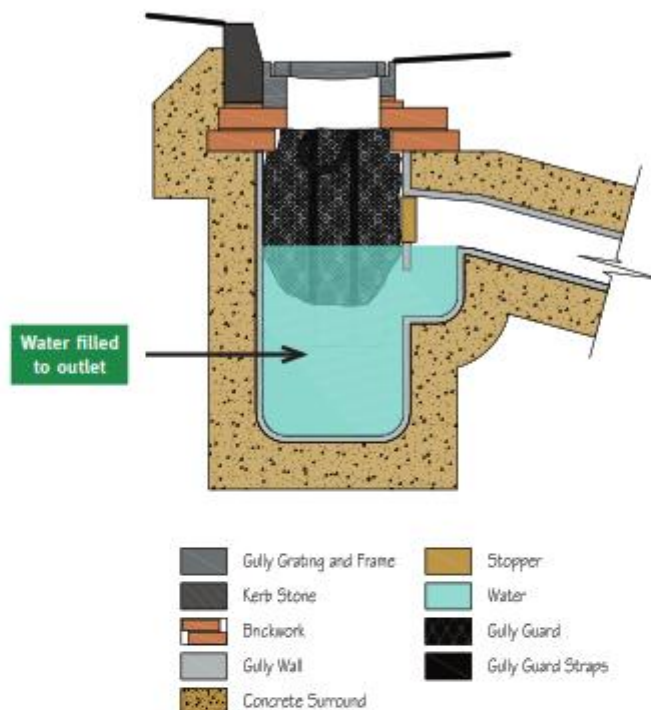
www.forestgroupuk.co.uk

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")

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www.forestgroupuk.co.uk



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High performance, versatile solutions

2039 / 69145

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

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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.

Technical information

Silt Fence

Dimensions: 100 metres x 0.9 metres (single roll)

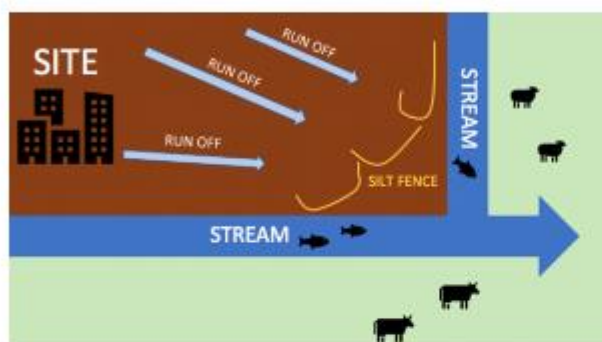
Dry Weight p/m: 110 g/m² (9.9 kg single roll)

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

for technical support and sales of
Silt Fence contact frog environmental

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SILT MATTING



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

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

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Silt Wattle contact frog environmental

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FLOCCULANT TREATED SILT MATTING



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 CO₂**

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

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Silt Wattle contact frog environmental

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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

agrotexiles

accessories

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

☒ Ideal for small dewatering jobs.

☒ Traps sediment and oil.



AVOID THIS

USE THIS



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 absorb 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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Committed to Quality, Value & Service

FILTER BAGS

wildlife	specialist	biodegradables	geotextiles	agrotextiles	accessories
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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.



Cut open bag to show trapped silt

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.

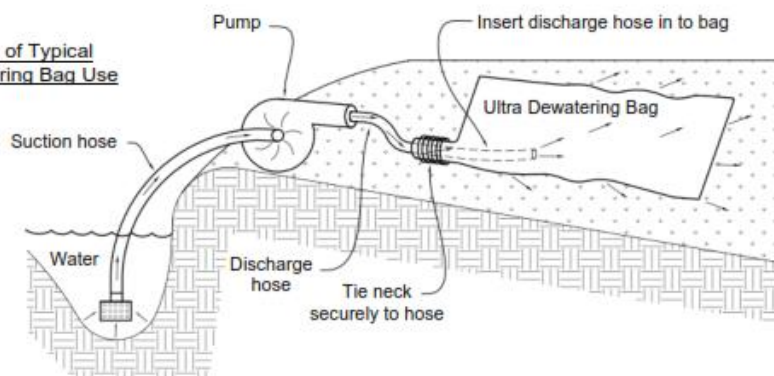
Flow rates will vary depending on the size of the Ultra Dewatering Bag, the type and amount of sediment discharged into the bag, the type of ground, rock or other substance under the bag and the degree of the slope on which the bag lies.

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 m ² (72 ft ²)	2,730 l/min (500 gal/min)	10 cm (4 inch)	0.51 m ³ / 980 kg (18 ft ³ / 2,160 lbs)	14 l (3.7 gal)
3.05 x 4.55 m (10 x 15 ft)	9725	27.87 m ² (300 ft ²)	6,816 l/min (1,500 gal/min)	15 cm (6 inch)	4.20 m ³ / 4,082 kg (150 ft ³ / 9,000 lbs)	57 l (15.1 gal)

Notes:

Flow/Dewatering rates will vary according to soil type (Sand typically dewateres at the fastest rate, while clay dewateres 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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Hy-Tex (UK) Limited

Committed to Quality, Value & Service

Siltbuster Siltstoppa Bags

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

Pre-conditioned (floculated) 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	6.3m
Width	2.1m
Dry Weight	Size Dependent
Materials	Sludges and Slurries
Material Colour	Black
Bag Capacity	6m ³
Operating Range	Material Dependent

Siltbuster Siltstoppa Skip

Siltstoppa De-Watering Bags have been conveniently 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	2.6m
Dry Weight	2.0 tonne
Material	Floculated Particles
Operating Capacity	1 Bag
Lifting Method	RORO Hooklift
Operating Range	Material Dependent



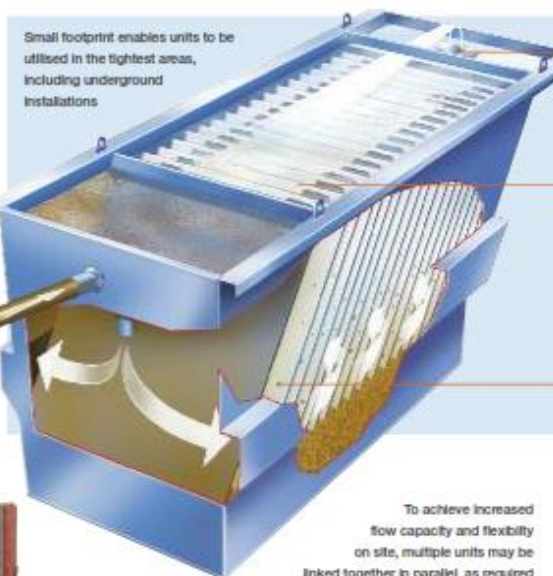
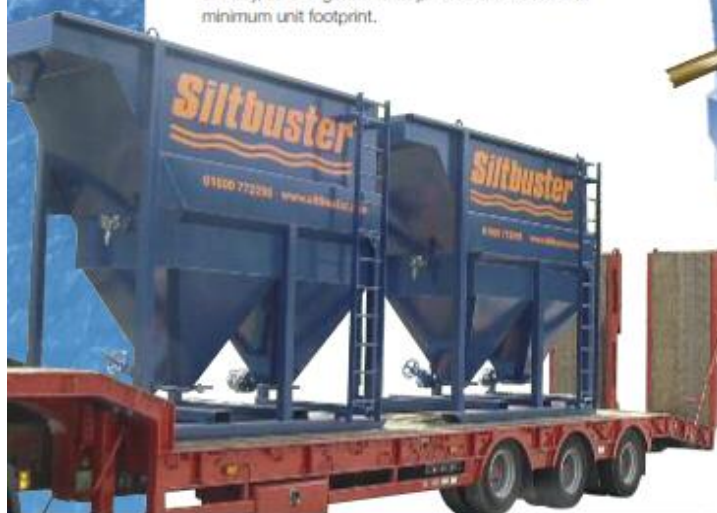
SETTLEMENT TANKS




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



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

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

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

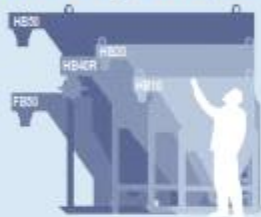
Silt Management

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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: 2.0m	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: 50m ²	Effective Settlement Area: 10m ²	Effective Settlement Area: 20m ²	Effective Settlement Area: 40m ²	Effective Settlement Area: 50m ²
Dry Weight: 1,900kg	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: 1-50m ³ /hr	Typical Operating Capacity: 1-10m ³ /hr	Typical Operating Capacity: 1-20m ³ /hr	Typical Operating Capacity: 1-40m ³ /hr	Typical Operating Capacity: 1-50m ³ /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 characteristics



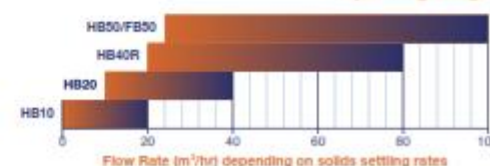
Options & Process Add-ons

Total Water Treatment Solutions

Siltbuster Clarifiers can be configured as single or multiple 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

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 interrupted 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 complement its award-winning settlement units.



Silt Management

www.siltbuster.com

► Chemical Dosing, Pre-treatment & Reaction Systems

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 pipefloculators. 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.

Pipefloculators

For faster reacting chemicals, various pipefloculators 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 pipefloculators
- 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.

GULLEY INSPECTION CHECKLIST
SITE: Land off Stoke Lane, Stoke Golding

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

SITE INSPECTION CHECKLIST

SITE: Land off Stoke Lane, Stoke Golding

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? <i>Note any gullies requiring maintenance measures</i>			
2) Are site roads clean and relatively free of mud? Is the frequency of visits by the road sweeper adequate? <i>Consider whether additional visits should be scheduled.</i>			
3) Are there currently unsurfaced areas being trafficked which may be causing silt to enter the site drainage? <i>Note if additional measures are required to reduce the run-off from these unsurfaced areas.</i>			
5) Are control measures in place to prevent silt run-off from unsurfaced areas and soil stockpiles? <i>Note if the control measures are adequate and whether the increased runoff requires an increase in the frequency of inspection of any control measures.</i>			

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

Completed by	Name	Signature	Date
Site Manager			