

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

ROWDEN PARK - PHASES 4 & 5

BELLWAY HOMES (SOUTH WEST)



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1.0 Introduction

Background

- 1.1 This Construction Environmental Management Plan (CEMP) has been prepared by Bellway Homes (South West). It provides details of the construction and environmental measures to be implemented during the construction phase of the development at Land at Rowden Park (Phases 4 and 5) .
- 1.2 The site comprises undeveloped greenfield land, located off Patterdown Road in Chippenham, Wiltshire. The site forms an individual phase of the wider Rowden Park development. To the north of the site lies Phase 3 of this development, which is controlled by Redcliffe Homes. To the south of the site are open fields, which are accessible to the public through an existing PROW. A small unnamed tributary to the River Avon is located adjacent to the southern boundary of Parcel 5 – the River Avon is located approximately 230m east of the site.
- 1.3 Outline Planning Permission was granted on 24th March 2017 for a mixed-use residential development of up to 1,000 homes, alongside supporting infrastructure including a local centre, school provision, new vehicular accesses and public open space (LPA ref: 14/12118/OUT)
- 1.4 Condition 10 of the Outline Permission requires:

The development hereby permitted shall not commence until a Construction Environmental Management Plan providing details of the management of heavy goods vehicle construction traffic, including their routes approaching and leaving the site, has been submitted to and approved in writing by the Local Planning Authority (including any works of demolition) which shall include the following:

- a) The parking of vehicles of site operatives and visitors;*
 - b) Loading and unloading of plant and materials;*
 - c) Storage of plant and materials used in constructing the development;*
 - d) The erection and maintenance of security hoarding including decorative displays and facilities for public viewing, where appropriate;*
 - e) Wheel washing facilities;*
 - f) Measures to control the emission of dust and dirt during construction;*
 - g) A scheme for recycling/disposing of waste resulting from demolition and construction works;*
 - h) Detailed measures for the protection of semi-natural habitats and sensitive species (as broadly set out in Chapter 5 of the Environmental Statement and associated appendices); and*
 - i) Hours of construction, including deliveries.*
- j) A programme for the regular cleaning of mud, dust and dirt from the public highway when necessary to do so.*
- h) Pollution prevention measures*

Has been submitted to, and approved in writing by, the Local Planning Authority. The approved Statement shall be complied with in full throughout the construction period. The development shall not be carried out otherwise than in accordance with the approved construction method statement.

- 1.5 Bellway Homes has obtained reserved matters consent for phases 4 and 5 of the development.

2.0 Site Location

- 2.1 The Rowden Park Phase 4 & 5 development (the site) is located off Patterdown Road in south Chippenham, Wiltshire. The nearest postcode is SN15 2NU. The site is centred at Nation Grid Reference (NRG) ST 91349 71214. A site location plan is presented at Figure 1.
- 2.2 The site area comprises approximately 8.5 hectares and is an irregular shape. The site comprised of two flat agricultural fields. Parcel 4 sits along the western half of the northern field and Parcel 5 is located across the eastern half of the northern field and across all of the southern field. A small unnamed tributary to the River Avon is located adjacent to the southern boundary of Parcel 5 – the River Avon is located approximately 230m east of the site.
- 2.3 An access road to both parcels has been constructed by a third party, Redcliffe Homes, who are constructing houses in the neighbouring parcels to the north. The access road is aligned east-west along the northern boundaries of both parcels – services have been installed up to the entrances of Parcels 4 and 5 and highway surface water drainage has also been installed along the access road.
- 2.4 The two fields are mostly covered with vegetation, with the exception of a stock-pile in the south-west of Parcel 5 and associated access tracks.
- 2.5 Two vegetated attenuation basins for the site have been constructed for the Bellway development by Redcliffe Homes to the east of Parcel 5. All surface water from Parcels 4 and 5 are directed to the attenuation basin, in addition to surface water from parcels directly north of the site. The attenuation basins feed into the unnamed watercourse to the south of Parcel 5.
- 2.6 The site is bound to the north by a Redcliffe Homes development, to the east by agricultural fields and to the west by Patterdown Road. Directly south of Parcel 5 is an unnamed watercourse, beyond that is another parcel of land being prepared for another developer, and directly south of Parcel 4 are existing residential properties.
- 2.7 The site does not lie in a 'designated environmentally sensitive area' considered appropriate to the scope of this CSWMP.

3.0 Site geology & hydrogeology

- 3.1 Published geological maps indicate that the solid geology beneath the site comprises of Kellaways Formation (sandstone, siltstone and mudstone), with the very south west of Parcel 5 potentially underlain by Cornbrash Formation (limestone). No geological faults or other lines of weakness are shown to cross the site at the surface. Geological mapping indicates that River Terrace Deposits cover the majority of Parcel 5 and the western end of Parcel 4.

- 3.2 The intrusive site investigation report states that the ground conditions encountered reflect the geology set out in the published geological maps, with the addition of topsoil found to be present across the site over River Terrace Deposits and weathered bedrock. Topsoil was found to a depth of up to 0.40m across both Parcels 4 and 5. The River Terrace Deposits were found to consist of soft to firm silt / clay, and the weathered top of the Kellaways Formation was identified as a firm to stiff blue grey clay / silt. No evidence of the Cornbrash Formation was found during the site investigation.

Hydrology and Hydrogeology

- 3.3 The Kellaways Formation is classified as unproductive strata, whilst the Cornbrash Formation, located in the very south west of Parcel 5 is classified as a secondary A aquifer by the Environment Agency (EA). The site does not lie within a groundwater source protection zone (SPZ).
- 3.4 During the site investigation ground water ingresses were recorded across Parcels 4 and 5 between 0.50 m and 3.20 m below ground level. Groundwater monitoring across both parcels found seasonal variability, with groundwater levels as shallow as ground level in winter and up to 3.66 m bgl in summer.
- 3.5 Eight soakaway tests were undertaken in Parcel 4, all eight tests failed and thus infiltration rates were considered “poor” and the use of soakaway drainage across the site was deemed not feasible.
- 3.6 An unnamed watercourse is located directly to the south of Parcel 5. This watercourse feeds into the River Avon, located approximately 230m to the east of the site.

Site Drainage Arrangements

- 3.7 The site development proposals consist of a residential development, with areas of public open space (POS), private gardens, associated infrastructure and hard-standing
- 3.8 It is understood that the surface water drainage will consist of standard highway surface water gullies across Parcels 4 and 5 that feed into two attenuation basins to the east of Parcel 5. The northern basin feeds into the southern before water is released via a hydro- brake chamber restricting flow to 41.4 l/s to the unnamed watercourse.

4.0 Parking of vehicles of site operatives and visitors

- 4.1 The proposed access from the site is from the B4528, this access will also provide the construction access to the site.
- 4.2 The location of the compound to service phase 5, including staff facilities, parking and materials storage, will be located on the southern extent of phase 5, as illustrated in Figure 3.

- 4.3 All contractor and staff parking will be within the curtilage of the site and will be located within the areas annotated in the drawings contained within Figure 3. The size of the car park will ensure all vehicles can manoeuvre safely when parking and exiting the car park area.
- 4.4 Temporary traffic management will take place to ensure that no construction, contractors or visiting vehicles will park outside of the site.
- 4.5 Signs will be erected stating that any parking associated with the construction site is prohibited near the site outside of the site curtilage.

5.0 Loading and unloading of plant and materials

- 5.1 The permanent office compound will be in the location as shown in the Construction Management drawings (Compound and Phasing Plan) contained in Figure 3. The site compound will be secured with hoarding and a gated access displaying the corporate logo for Bellway.
- 5.2 All unloading of materials will be located in the material compound. Forklift or hiab truck will be the preferred method of loading & unloading.
- 5.3 Temporary storage of topsoil from bulk earthworks will be managed via a Material Management Plan as a means of good practice. Stocks of topsoil will be covered by geotextile membranes.
- 5.4 The following measures will be applied in respect to material handling and storage:
- Material Handling and Storage
 - Locate stockpiles out of the wind (or provide wind breaks) to minimise dust generation open storage
 - We will keep stockpiles to a minimum height and use gentle slopes
 - Compact and bind stockpile surfaces if necessary
 - Minimise the storage time for materials on site
 - Store dusty materials away from site boundaries, main site access roads and downwind of sensitive receptors
 - Ensure waste skips are enclosed or covered
 - Damp down earthworks during dry weather
- 5.5 Should the need arise, all imported materials on Site will be tested in accordance with the guidance set out in 'Requirements of the Chemical Testing of Imported Materials for Various End Uses and Validation of Cover System'. Quantity will vary depending on what is required.
- 5.6 Bellway will ensure all imported soil stockpiles are out of the wind (or will provide wind breaks) to minimise dust generation of open storage. Measures will also be introduced to stockpiles are kept to a minimum height, along with the use of gentle slopes. Imported material will be compacted and bound where necessary.

- 5.7 Bellway operates a strict Waste Management Policy that involves onsite segregation of waste to lessen the impact on landfill and ensure recycling is undertaken. The removal and disposal of materials from the site will be undertaken in accordance best practice.

6.0 The erection and maintenance of security hoarding including decorative displays and facilities for public viewing

- 6.1 During the building process any open boundaries of the site will be secured by 1.8 Heras fencing to secure and help control movement for on and off the site. Hoarding will be located around the site and the materials compound.
- 6.2 Decorative advertising displays will be located within the site boundary of Phase 4, in close proximity to the B4643 road.

7.0 Wheel washing facilities

- 7.1 A designated operative is to carry out the wheel washing of construction vehicles leaving the site (via a hand held jet wash) to ensure that as far as reasonably practical, no mud is to be carried on to the public highway. The effectiveness of the wheel wash facilities will be monitored throughout the construction of the development.
- 7.2 The operation will be carried out within the development boundary so that the resulting water runoff is suitably controlled.
- 7.3 The wheel wash facilities will be repositioned accordingly as the construction timeline progresses.
- 7.4 In addition to this, a road brush will be in attendance when any 'cart away' arising relating to earthworks takes place.
- 7.5 During periods of high rainfall, there is potential for large amounts of dirt, mud and debris to arise during the construction period. Therefore, a construction site wheel wash keeps roads free from mud, dirt and debris, thereby reducing environmental impacts.
- 7.6 The following measures will be implemented during the construction phase:
- Plant and wheel washing will be carried out in a designated area of hard-standing at least 10 metres from any watercourse or surface water drain.
 - Run-off will be collected in a sump and recycled/reused wherever possible.
 - Settled solids will be removed regularly.
 - Discharge of contained water will go to a foul sewer with prior permission from the local sewerage provider.
 - Regular brush and scraping of roads to reduce dust and mud deposits.

- Minimise the amount of exposed ground and soil stockpiles from which the water drains and the period of time such water drains.
- The wheel wash equipment will include a series of spray nozzles strategically positioned to direct water onto the wheels and undercarriage of vehicles.
- Wheel washing equipment will be inspected regularly to ensure proper operation.

8.0 Measures to control the emission of dust and dirt during construction

- 8.1 The local authority has the power under the Clean Air Act 1993, to limit the dust, emissions and odours generated by a site. Failure to comply with these limits can result in abatement notices being served if complaints are made.
- 8.2 Complaints can be avoided by adopting good working practices:
- Identify sensitive receptors and inform the authorities of any likely nuisance that may occur.
 - Instigate control measures to mitigate any negative impacts.
- 8.3 Bellway will develop a daily monitoring regime to record dust conditions while noting weather conditions, construction activities, their location and duration on site.
- 8.4 Dust levels will be kept to a minimum by utilising high pressure hoses to deliver fine mist water sprays onto the working area. A constant water supply will also be provided to any crushing plant required during the operation. The movement of any crushed material will be kept to a minimum with stockpiles located away from site boundaries and maintained at heights less susceptible to the effects of wind.
- 8.5 Regarding earthworks, during periods of dry weather, when dust is likely to cause a nuisance, specific work areas will be 'damped down'. In relation to dust generated by plant movements this operation will normally be carried out by a suitably specified road brush. At times when the works do not require the full-time attendance of a road brush, water will be introduced to the work area via other means i.e. hose pipe, water bowser, sprinkler etc. In addition, prior to disturbing any stockpile of soil or crushed material, consideration will be given to the introduction of water.
- 8.6 In addition to the above, the following principles will be followed during the construction phase:
- 8.7 Roads:
- Construct and tarmac the site at site commencement.
 - Pave heavily used areas and sweep regularly
 - Sweep public roads regularly with a vacuum sweeper
 - Limit vehicle speeds – slower speeds generate less dust
 - Minimise vehicle movements
 - Damp down.

Plant & Vehicles:

- Ensure vehicle wheels are cleaned before leaving site – a wheel wash facility will be located on site and a banksman will wash all vehicle wheels with a high-power pressure washer before they leave the site and enter public roads.
- A road sweeper will be on hand to use as and when necessary.
- Exhaust fumes should be directed upwards.
- All lorries leaving the site will be fitted with sheet covers to contain dust.
- Plant and vehicles should be maintained in good working order.
- Drivers must observe site speed limits to minimise dust generation.

Cutting/Grinding/Grouting/Packing:

- Minimise cutting and grinding on site where possible.
- Use equipment with dust extraction and wet cut where possible.
- Spray water during cutting of paving slabs.
- Use block splitters.

Water Damping

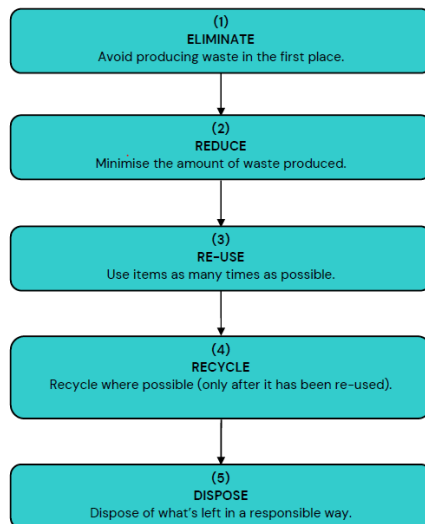
8.8 As aforementioned, the fine spraying of water is the most effective way of suppressing dust. This will be carried out with a water bowser and hose. Spraying will be repeated regularly during warm and sunny conditions. However, spraying will not be allowed to create excessive mud, which could cause run-off into drainage systems or water courses.

8.9 Bellway will consider the use of water sprays on:

- Areas of unpaved work subject to traffic or wind
- Sand, spoil, and aggregate stockpiles
- During the loading and unloading of dust generating materials

9.0 A scheme for recycling/disposing of waste resulting from demolition and construction works

9.1 The fundamental strategy applied to the application site will be to minimise waste by applying a waste hierarchy to implement actions to eliminate, reduce, reuse and re-cycle, before considering disposal. The Waste Hierarchy (see image below) is consistent with the objectives of the Waste Strategy for England, and other adopted policy documents.



9.2 The Applicant will monitor and review the sustainability credentials of the development project. This offers the opportunity for further recycling and efficiency improvements and cost savings on the development site.

9.3 Waste materials will be generated during the planning and construction of the development, as well as after completion once new residents have moved in. Therefore, our waste management plan has been divided, to focus on each of these three stages.

Planning

9.4 Care will be taken during the planning stage to ensure that all methods to reduce the amount of waste generated in the first instance are utilised. Methods of preventing or minimising waste may include:

- Assess packaging requirements- can suppliers reduce their packaging so less waste is brought to the site?
- Optimising the production process to reduce off-cuts, rejects and off-spec products, such as a cutting area for timber is good practice to reduce waste and minimise the risk of inhalation of timber dust.
- Purchase materials in bulk, ensuring compounds/material storage is designed to store large or bulky items without compromising the quality.
- Provide a composting bin outside the canteen for long-term sites.
- Sell, donate or swap unwanted items, such as topsoil.

9.5 Waste can also be minimised in the first instance through re-using items, rather than disposing of them. This can take place on Bellway's development through:

- Printer toner cartridges – some suppliers allow cartridges to be refilled with ink and used again.
- Paper – paper from misprints and drafts can be used as scrap paper, and some envelopes can be reused.

- Durable cups, mugs, glasses and cutlery should be used rather than disposable alternatives.

- 9.6 Usual Bellway practice focuses on first establishing a baseline waste total. The results of this research will identify the possible maximum construction waste generated from development, which then allow Bellway to put in place appropriate targets and mitigation procedures.
- 9.7 Waste reduction targets are also established to ensure that when waste elimination in the first instance is not possible, the amount of waste to landfill is reduced as much as possible. This can be achieved through reusing materials elsewhere on site, or utilising other methods that align with the government's Waste and Resources Action Programme (WRAP).
- 9.8 To ensure each of these targets are met (waste to landfill and material recovery rates), the principal contractor will closely monitor progress and aim to achieve good and or best practice recovery rates. This contractor will also ensure that waste is being managed in accordance with statutory and policy requirements as well as Bellway's waste reduction targets.

Construction

- 9.9 A key focus throughout the construction stage is Bellway's policy requiring all developments to follow Good and Best Practice Procedures on site. This will be monitored by the principal contractor and aims to utilise waste minimisation techniques, to avoid creating unnecessary waste, including:
- Maximise the use of reclaimed materials in the construction
 - Maximise recycling opportunities at the end of the building's life
 - Use prefabricated and standardised components in the standard product sizes. As these are made in factory-controlled environments, they tend to generate less waste and if standard product sizes are made use of, this minimises off-cut wastage on-site.
 - Segregate construction waste on-site to maximise the potential for reuse/recycling
 - Use of suppliers who collect and reuse/recycle packaging materials
 - Temporary offices will obtain details relating to the Strategy, health and safety and waste management monitoring and reporting details
 - Potential hazardous material to be kept secure in banded compounds or site offices in appropriate containers which are clearly labelled to identify their hazards
- 9.10 Construction operations will generate waste materials as a result of general handling losses and surpluses. These wastes will accord with the legal 'Duty of Care' by being stored safely to ensure waste does not pollute the environment. Bellway will use suitable waste containers, using covers to prevent waste from blowing away and providing waterproof covers if rain could cause contaminated run-off or prevent the waste from being reused.

- 9.11 Suitable waste processing facilities for construction waste arisings will be identified and agreed upon with the Waste Planning Authority ('WPA'). These facilities will reuse, recycle and recover as much waste as possible generated from the construction process, and be located as close to the Site as possible, in accordance with the proximity principle and the waste hierarchy structure.
- 9.12 When required, the principal contractor will employ a licenced waste carrier to assess the waste removal needed on site, focusing on options with the lowest environmental impact. When the mentioned carrier removes the waste, this will also be monitored by the principal contractor.
- 9.13 Other key considerations within construction waste management include the management of soil. To minimise the effects of this important resource, engineers must carry out precise take-off calculations. To avoid wastage, with reference to DEFRA's Soil Strategy (2009), stripped soils will be stored in separate resource bunds no more than 3m high, and kept grassed and free from construction traffic, to ensure that the soil can be re-used elsewhere on or off-site.
- 9.14 The primary measures to mitigate against the loss of soil resources will be to re-use as much of the surplus resources on-site in the cut and fill balance, detailed design of gardens, amenity and open spaces; to dispose of any surplus soils thereafter in a sustainable manner (i.e. as close to the Application Site as possible and to an after-use appropriate to the soil's quality).
- 9.15 Cumulatively, these strategies contribute to the overall reduction in waste materials that are generated in the construction process, in line with the requirements of the Wiltshire Waste Core Strategy, which will in turn minimise the impact that the construction phase waste will have on the environment and landfill capacity in the district.

Development Completion

- 9.16 Guidance will be sought from the Local Waste Authority at the appropriate time. It is expected the Council will provide new residents with the necessary wheelie bins and recycling containers. Currently, participation in the 'Garden Waste Club' is voluntary and subject to an annual subscription fee for which the Council will provide a garden waste bin and a fortnightly kerbside collection.
- 9.17 The developer will provide:
- Suitable storage for bins and recycling containers within the property boundaries
 - Communal waste storage where necessary for apartment blocks.
 - Easy access to storage areas that encourage the use and minimise the distance to collection points and avoid obstructions such as steps and kerbs.
 - Internal road layouts that ensure access by refuse collection vehicles through swept path tracking.

- A new resident information pack detailing kerbside collection and recycling facilities

10.0 Detailed measures for the protection of semi-natural habitats and sensitive species (as broadly set out in Chapter 5 of the Environmental Statement and associated appendices)

- 10.1 Our development proposals include the preservation and safeguarding of trees and hedgerows, which will be enclosed with fencing during the site clearance phase to prevent any adverse effects. This fencing will be installed before the commencement of any construction or groundworks, adhering to the British standards outlined in BS5837:2012.
- 10.2 Once the fencing is in place, it will be maintained throughout the duration of the project until all works are finalized. This approach ensures that the integrity of these natural features is upheld during the entire construction process.
- 10.3 Furthermore, the preserved habitats will be enclosed with fencing to safeguard them from possible harm during the setup and subsequent activities on the site.
- 10.4 The site manager will conduct regular inspections of the protective fencing to assess its condition and ensure it remains properly positioned.
- 10.5 Prior to the commencement of construction, the site will be re-surveyed to check for badger setts or any other signs of protected species that could be harmed by the development.
- 10.6 Where vegetation suitable for reptiles needs to be removed, it will be carried out according to a precautionary working method in agreement with the project ecologist.
- 10.7 All construction stage lighting will be directed away from the site boundaries to avoid impacts on bats.

11.0 Hours of Construction

- 11.1 All works on the site, including deliveries, will be carried out in strict accordance with the following working hours:

08:00am to 18:00pm Monday to Friday
09:00am to 13:00pm on Saturdays
- 11.2 No works will be undertaken on Sundays or Bank Holidays.

12.0 A programme for the regular cleaning of mud, dust and dirt from the public highway when necessary to do so

- 12.1 The principal contractor, alongside Bellway's appointed site manager, will ensure drainage management to control stormwater run-off, implementing effective drainage management strategies to direct and treat runoff effectively.
- 12.2 Regular inspections and audits will occur over the duration of the construction process to evaluate.
- 12.3 The following principles will be followed during the construction phase:
- Early installation of suitably surfaced access roads to provide a clean running surface and reduce vehicle movements over bare/exposed ground (i.e. gravel cover) and allow better road cleaning.
 - Install a suitable running surface along the site access haul road and any internal temporary access roads to reduce the likelihood of soft ground disturbance generating sediment run-off (i.e. gravel cover).
 - Minimise, as far as practicable, the movement of machinery on and off-site access roads to prevent tracking excess soil onto roads and highways.
 - Prevent, as far as practicable, the movement of machinery on undisturbed ground, such a retained areas of vegetation.
 - Utilisation of a road sweeper, or other suitable road cleaning equipment on site roads, as they completed, and surrounding public highways where necessary. Frequency of road cleaning to be continually assessed and updated as appropriate to address site conditions.
 - Install a suitable surfacing in construction material storage areas, site offices and contractor car parking and key access points to each development phase (i.e. gravel cover).
 - An appropriate wheel wash is to be used, ahead of the junction between the site access and the public highway/completed development area, to remove mud from vehicle wheels before leaving the development site. The location of the wheel will be reviewed throughout the site development, as works progress. However, waste wheel wash water will not be allowed to enter the wider development or site surface water drains. The water must be diverted to areas where infiltration to ground is possible, such as exposed service trenches, soft ground or other temporary catchment/infiltration pit. The use of rumble strips to clear bulk sediment from vehicles wheels may need to be considered depending on the effectiveness of the wheel washing. It may be necessary to routinely uplift wash water and dispose by vacuum tanker.

13.0 Pollution prevention measures

- 13.1 The main receptors as identified from the site walkover, known facts regarding the site and OS mapping are considered to be:

On-site sensitive receptors to surface water and silt are identified as follows:

- Below ground surface water drainage system and associated pipes.
- Residents in completed phases (upon completion and occupation).

- Highways on site (once constructed and completed).
- Attenuation basins.

Off-site sensitive receptors to surface water and silt are identified as follows:

- Wider public highway realm off site beyond construction site entrances and site boundaries, in particular the spine road between the parcels of Bellway Homes and Redcliffe Homes.
- Outfall from the onsite drainage network, to the unnamed watercourse to the south and the River Avon beyond.

13.2 The principal sources of potential sediment pollution to the identified receptors will be from the on-site earthworks, infrastructure and residential plot construction activities. Particular point sources will occur when any excavation works are undertaken within close proximity to any of the site boundaries, on site water-courses, or dewatering of any excavations.

13.3 Additional sources of potential pollution include:

- Leaks / spills of hazardous materials (mortar, oils and fuels) associated with the construction process
- Spills of collected / ponded waters containing sediment
- Vandalism resulting in release of contaminants stored in containers on site.

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

- Direct surface run-off
- Discharge via installed below ground drainage infrastructure
- Transported off site by site vehicles.

14.0 Risk Assessment

14.1 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. **See appendices for further information.** 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.

14.2 **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 limited 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.

15.0 Surface water discharge control measures

Introduction

- 15.1 The potential sources, pathways and receptors to surface water pollution associated with discharges from the site have been considered and assessed for the Rowden Park Phase 4 & 5 development (parcels 4 and 5).
- 15.2 In order to prevent unacceptable surface water pollution and reduce the risk of surface water pollution incidents or accidents, the following control measures will be employed at the site, as required and reviewed on a regular basis.
- 15.3 Bellway Homes Limited and their appointed groundwork contractor shall be responsible for the implementation and maintenance of appropriate control measures.

Procedural & management control measures

- 15.4 The following procedural and management control measures shall be implemented as appropriate depending on the progression of construction activities within any particular phase:

Earthworks and site strip

- Strip topsoil and vegetation in sections where necessary to the programme of work at the time, and commence works as soon as possible thereafter.
- Where possible, undertake bulk excavation and earthworks during periods of dry weather.
- Ensure that heavy good vehicles (HGVs) being utilised to remove soils from site can gain clear access to the loading point(s) via hardstanding, to prevent driving over soft ground to prevent silt remobilisation and transfer.
- Ensure that HGVs are parked as close to the loading point as possible, away from existing highway gullies, to prevent spoil from falling into gullies and spread on highways.
- A road sweep should be available and in use for the duration of all earthworks to cover the hardstanding onsite and the surrounding highways.

Soil stockpiling

- 15.5 It is likely that large stockpiles will be retained on site for significant duration to facilitate completion of the development. Where stockpiles are retained on site, it should be ensured that:
- Soil stockpiling procedures are utilised to ensure that the number and condition of stockpiles maintained on site are closely maintained and monitored in accordance with DEFRA guidance on best practice for storage during the construction phase

- Locating stockpiles in designated areas as far as practicably feasible, away from site boundaries and existing off site surface water gullies in the public highway realm
- Seal stockpiles to prevent water ingress / runoff
- Stockpiles being retained during periods of wet weather should have silt fencing installed around stockpile(s) base to control run-off
- Stockpiles are kept as far as practicable from haul roads, completed highways and gullies and onsite and offsite watercourse.

Surface water management infrastructure

- Installation of surface water management infrastructure will be undertaken, as far as is practicable, as a priority when commencing activities in active construction areas, with the exception of subsurface drainage crates
- Installed surface water drainage infrastructure will be regularly inspected and appropriately cleaned, when required, to remove excess sediment and maintain surface water drainage rates / capacity.

Dewatering of excavations

15.6 Dewatering of excavations during the pre-construction works without appropriate water treatment can result in significant pollution of controlled waters. It should be reiterated that if dewatering is required then dewatered silt-contaminated surface water should not be discharged into the surface water system, or directly to the off-site water courses. The EA regulatory position statement (RPS) "Temporary dewatering of excavations to surface waters", No. 261 January 2023 requires discharged water to:

- Be clean water, for example clear rainwater or infiltrated groundwater which has collected in the bottom of temporary excavations.
- Not result in water containing fine or coarse suspended solids (silty water) entering surface water.
- Not last more than three consecutive months (the activity may stop and restart, but the clock does not restart) – if the activity is likely to go over three consecutive months, then a permit must be applied for.
- Be made to surface water, such as a river, stream or the sea.
- Have a method statement that minimises the risk of pollution.

The discharge must not:

- Pollute surface water.
- Contain any chemical dosing agents, flocculants or coagulants.
- Be from a site which is contaminated by oil, metals, hydrocarbons.
- Solvents or pesticides or other polluting substances.
- Result in the spread of non-native invasive species, parasites or disease.
- Cause flooding from surface water.
- Cause erosion of the banks or bed of the receiving watercourse
- Contain concrete wash water even if it has been treated

- Contain site drainage from surface areas such as haul roads, storage or working areas
- Be from a site with naturally elevated concentrations of substances which exceed environmental quality standards.

15.7 If active pumping of water from investigation trenches is considered, care needs to be taken that water will not be discharged direct to surface water drains without prior treatment to remove silt to <60 mg/l.

15.8 Importantly, following three months, an environmental permit will be required for continued pumping and discharge. The statutory appraisal time for permit applications may be up to 12 months.

- Where dewatering of excavations is required, water will be pumped to a dewatering pump cell located on an area of vegetation set back from any watercourse. The pump cell should comprise a dirt bag fitted to the end of the pump pipework, situated within a cell of silt mats with a silt fence installed around the outside. It is imperative that the cell is located within an area of soft landscaping with good vegetation cover.
- Dewatering activities will immediately cease in the event of significant sediment levels, which pose a risk to identified receptors, are observed leaving the dewatering arrangements.
- An alternative may be dewatering to foul sewer with the local water company's consent.

Site access roads, surfacing and vehicle movements

- Early installation of suitably surfaced access roads to provide a clean running surface and reduce vehicle movements over bare / exposed ground (i.e. gravel cover) and allow better road cleaning
- Install a suitable running surface along the site access haul road and any internal temporary access roads to reduce the likelihood of soft ground disturbance generating sediment run-off (i.e. gravel cover)
- Minimise, as far as practicable, the movement of machinery on and off-site access roads to prevent tracking excess soil onto roads and highways
- Prevent, as far as practicable, the movement of machinery on undisturbed ground, such as retained areas of vegetation
- Utilisation of a road sweeper, or other suitable road cleaning equipment, on site roads, as they become completed, and surrounding public highways where necessary. Frequency of road cleaning to be continually assessed and updated as appropriate to address site conditions
- An appropriate wheel wash is to be used, ahead of the junction between the site access and the public highway / completed development area, to remove mud from vehicle wheels before leaving the development site. The location of the wheel wash will be reviewed throughout the site development, as works progress. However, wastewheel wash water must not be allowed to enter the wider development or site surface water drains. The water must be diverted to areas where infiltration to ground is possible, such as exposed service trenches, soft ground or other temporary catchment/ infiltration pit. The use of rumble strips to clear bulk sediment

from vehicle wheels may need to be considered depending on the effectiveness of the wheel washing. It may be necessary to routinely uplift wash water and dispose by vacuum tanker.

Areas of vegetation

- Landscaping of completed areas of public open space (POS) to be undertaken as soon as practicable following their installation.
- Placement of topsoil and seeding of completed areas should be done at the earliest opportunity upon completion. Where climatic or seasonal conditions do not allow for seeding, consideration should be given to the placement of coir matting (erosion control matting) to stabilise the soils and prevent the mobilisation of sediment during periods of rainfall.

Site Personnel and Documentation

15.9 The following measures are recommended for implementation to increase awareness and bring existing site documentation up to date:

- Include a detailed section relating to surface water and silt protection within the site induction folder for all phases of the work.
- Continued documented review by the site management team of the existing site conditions in relation to this CSWMP and update the requirements on a routine basis.
- The technical team to undertake documented routine site inspections and obtain support from the appointed Environmental Consultant if / when required. This will be supported by routine inspections by the site management team, of key areas such as dewatering activities, silt mitigation measures and discharge point.
- Conduct a site pre-start meeting with all relevant parties to agree methods of working to control surface water and silt management.
- Undertake additional detailed site-based awareness training (Site Briefing / Toolbox Talk) on surface water and silt management and protection for all pertinent site staff including groundworkers. Clear guidance should be given to groundworkers on the mitigation measures discussed.

15.10 Actions reported for project personnel include:

Technical team:

- Ensure this CSWMP is communicated to the site management team and updated as necessary
- Undertake regular reviews of site inspection documents to identify potential areas where additional protection is required and communicate this to both the site management team and to their appointed Environmental Consultant.

Site managers/Principal Contractor:

- Review contractor method statement for works in and around surface water features and obtain advice from the appointed Environmental Consultant.
- Undertake environmental monitoring of the offsite surface water features.
- Ensure the measures presented within this CSWMP are implemented by the site construction contractors.
- Brief sub-contractors and site operatives on effective water management and their responsibilities.
- Undertake regular documented inspections and checks to ensure the effectiveness of the pollution prevention measures, especially before, during and after heavy rainfall events, adverse weather and during the wetter seasons (winter and spring).
- Undertake regular monitoring inspections of the condition of the watercourse, downstream from the site, ensuring pollution events are not occurring and reporting any degradation in condition.
- Key monitoring points have been identified as:
 - i. The vegetated buffer zone west of Parcel 4
 - ii. The vegetated buffer zone south of Parcel 4
 - iii. The silt fence and soil bund south of Parcel 5
 - iv. The southern attenuation basin and outfall
 - v. The northern attenuation basin
 - vi. The spine road and site entrances and exits.
- Additional monitoring points should include
 - i. Fuel and chemical storage areas including mobile plant locations
 - ii. On site gullies and highways.
- Report any environmental incident (such as silt ingress to the stream / drain) to a designated coordinator who will contact / report the incident with the EA.

Contractors

- Ensure that this CSWMP is communicated to all relevant site teams and groundworkers.
- Ensure appropriate water management controls are included in relevant risk assessments and method statements, as well as detailed arrangements regarding increased supervision and management during adverse weather, or large scale works that may impact upon the drainage basins / surface watercourses.
- Ensure gully protection is fitted as soon as the surface water drainage system is completed and thereafter maintain the gully bags until completion of the construction phase.
- Report any damage to silt mitigation features (e.g. silt fencing) as a result of plant movement or work and arrange for repairs to be made as soon as practicable.

- Follow and implement water management and pollution prevention controls as instructed by the site manager and identified in the risk assessment/method statements (RAMS).
- Immediately report to the site manager if pollution prevention measures are not in place, are damaged or ineffective, or if works results in a silt release to surface water or the storm water sewer system.
- Report any environmental incident or near miss to the site manager immediately.

Maintenance

- Replacement / repair of storage equipment and site equipment / plant containing hazardous materials (e.g., fuel and oils) if damage or evidence of leaking is observed.
- Site plant will be inspected routinely for damage and wear by plant users.
- Any defects noted by site personnel will be reported to the site management team so repairs can be scheduled.
- All plant items and equipment will be serviced and maintained with due regard to the manufacturer's recommendations in order to minimise the risk of breakdown or leaks.

Hazardous material storage

- All hazardous materials, including fuel and oils will be stored in suitable containers within an appropriately bunded area and on impermeable ground
- Mortar silos will be located in designated areas and securely bunded to prevent surface water run-off.

Spill control

- A supply of surface water protection and silt management equipment; including spill kits, silt mats, coir rolls and silt fence, will be maintained within the site compound / material storage for rapid deployment in the event of an emergency. If necessary, a supply of materials will also be maintained next to any temporary works being undertaken in sensitive areas, such as the pipeline diversion within close proximity to a surface water course or a location where surface water run-off has the potential to circumvent installed protection measures.

15.11 **Physical control measures**

15.12 To supplement the procedural and management controls listed in Section 5.2, the following physical control measures listed below shall be implemented by the site management team. The implementation of these measures will be made with due consideration to site activities, build programme and commensurate to the associated risk posed by the build phasing.

15.13 Figure 2 visually depicts the indicative locations of large-scale long-term physical silt pollution controls on a site wide level. Shorter duration temporary physical controls should be implemented as required during the construction process and their locations recorded on a site plan held within the site office for reference by the site management team and visitors.

Silt fencing

- To be installed as per the site wide mitigation plan contained within Figure 2 and is buried into the ground. Maintain the silt fencing across the site, ensuring that it is not knocked down.
- Silt fencing is to comprise a semi-permeable membrane staked at regular intervals with typical installation details presented on Figure 2. Importantly, the base of the membrane on silt fencing should be buried to prevent surface water from passing beneath it. For longer term protection and to reduce maintenance requirements, the fence installation would benefit from stockproof wire mesh fencing to reduce wind damage to the membrane. Examples of the silt fence materials and installation are also presented within Appendix B.

Soil bund

- 15.14 Maintain the existing soil bund along the western half of the southern boundary of Parcel 5, as shown in Figure 2.
- 15.15 The bund shall be kept in place until all construction is completed within the proximity of the bund and there is also deemed to be no risk to the unnamed water course to the south the site.
- 15.16 The bund should be seeded or covered with coir matting to ensure it does not act as a potential source of silt runoff.
- 15.17 If the soil bund is to be removed before construction is complete within the proximity, it is to be replaced along its entire length with silt fencing connecting to the line of silt fencing depicted in Figure 2.

Gully protection

- 15.18 Gully protection must be installed within all road gullies at the earliest possible opportunity following construction. The condition of the gully protection should be reviewed at regular intervals by the site management team to ensure they remain in good condition and replaced / cleaned when necessary. A layer of geotextile (terram) should also be placed over the top of the gully guard and secured immediately beneath the metal grate cover to prevent bulk ingress of sediment to the gully. This will also prolong the effectiveness of the gully guard itself. Alternatively gully guards may be used in gullies to prevent suspend solids from entering the drainage system.

POS and Soft Landscaping

- 15.19 A margin of vegetation cover should be retained along around the boundary of the site where possible to protect the drainage ditches surrounding the site

- 15.20 Areas of soft landscaping and POS should be seeded / planted / turfed as soon as practicable upon completion. Where these are located adjacent to swales and basins and planting / seeding is not feasible, the use of an erosion control blanket, such as coir matting, should be placed, to prevent erosion and remobilisation of sediment.

Dewatering pump cell

- 15.21 Where dewatering of excavations is required, water should be pumped to a dewatering cell arrangement, comprising measures to remove any suspended sediments from the water. Pump cell measures may include passing uplifted water through a silt sock or dewatering bag, situated on a bed of gravel and wooden pallet within an area of soft landscaping away and down-gradient of active construction areas. An area of POS is best suited for this.
- 15.22 The dewatering cell will be surrounded by appropriate media; such as silt fence wrapped gabion baskets or coir rolls, with an outer layer of silt fencing to capture any residual sediment.
- 15.23 Should dewatering of excavations be required, where practicable, dewatering cells will be located in fully vegetated areas or areas where suitable erosions control measures have been deployed across the ground surface to prevent filtered water from remobilising any sediment.
- 15.24 Dewatering activities will only be undertaken when appropriate supervision is available to confirm that water passing through the dewatering cell is clear and free of contaminants. Therefore, an assessment can be made that no risk is posed to identified receptors.
- 15.25 Dewatering activities will immediately cease in the event of significant sediment levels, which pose a risk to identified receptors are observed leaving the dewatering cell arrangements.

Basin compartmentalisation

- 15.26 The following section need only apply if vegetation from the basins is to be removed
- Appropriate basin compartmentalisation features will be installed within the surface water attenuation basin at the point of construction to provide additional energy dispersion and sediment settlement capacity.
 - Examples of measures used to facilitate basin compartmentalisation include permeable berms, e.g. gabion baskets wrapped in a suitable geotextile supporting silt curtains.
- 15.27 *Headwall protection*
- Suitable headwall protection measures will be installed at inlets, outlets, and outfalls from site surface water management infrastructure. Examples

of these measures include silt matting, silt wattles, gabion baskets and silt fencing. Specification for each headwall protection is given in Figure 2.

- Headwall protection measures will be retained at each location until the risk of contamination from construction related activities to the corresponding drainage catchment has ceased.

15.28 Installation of physical control measures

15.29 The physical control measures discussed in Section 15 will be installed in a phased approach determined by activities being undertaken across the site and the associated levels of risk posed to identified sensitive receptors.

15.30 Maintenance of physical control measures

15.31 The physical control measures discussed in Section 15 shall be maintained in their position throughout the construction period and for the duration that a risk to the identified receptors remains.

15.32 Condition and efficacy of physical control measures will be monitored and those measures, such as silt fencing and curtains, shall be replaced as required to ensure continued efficiency.

15.33 Removal of physical control measures

15.34 The site management team will undertake regular reviews of protection measures installed at the site and whether the level of protection remains commensurate to risks posed by site activities. If required, advice shall also be sought from a specialist Environmental Consultant.

15.35 Physical control measures will be removed in a phased approach determined by the residual risk posed to sensitive receptors.

15.36 Complete removal of physical control measures will only be undertaken when the risks posed to sensitive receptors from construction related activities is negligible

16.0 Surface water discharge monitoring and recording

Surface Water Monitoring

16.1 The following monitoring procedures shall be carried out on a regular basis by the site management team to enable continuous review of site management practices.

- 16.2 A comprehensive record of the effectiveness of surface water management measures should then be maintained to enable further review by any parties attending site.
- 16.3 Any emissions to surface water identified will result in the implementation of the protocols detailed herein. Any complaints in relation to surface water emissions will be fully investigated. The resultant actions will be recorded.

Meteorological Conditions

- 16.4 Meteorological forecasts and weather conditions (including precipitation) will be monitored to identify high rainfall events, which could result in elevated site water levels to be predicated and appropriate additional management measure implemented.

Regular inspection and monitoring

- 16.5 Due to the nature of the development, visual monitoring techniques will principally be used within the boundary of the site. These may be supplemented by the collection of water samples from each outfall location, where safely and practicably accessible.
- 16.6 Regular visual inspections of surface water discharge quality as well as the overall condition of the wider site will be undertaken as part of general site walkovers completed by the site management team and site operatives during their tasks – the walkover should ensure that all monitoring points as shown in Figure 2 and mentioned in section above are included.
- 16.7 In addition to this, routine inspections of the site to monitor and record surface water run-off quality and other environmental issues will be undertaken by the site management team or other appointed person. Records of these inspections will be kept for the duration of the project.
- 16.8 Inspection frequencies will be increased as required in response to prevailing meteorological conditions.

Site Records

- 16.9 In addition to regular site monitoring, the following significant events at the site will be recorded:
- Maintenance
 - Breakdowns
 - Emergencies
 - Site inspections
 - Severe weather conditions
 - Complaints received
 - Visitors to the site.

- 16.10 The site management team or nominated person(s) will maintain a record of all the above information in the site log, on inspection forms, or as part of wider environmental management records, as appropriate. They are also responsible for ensuring that management measures are maintained and repaired, as required.
- 16.11 All records and copies of inspection forms will be maintained and will be made available for inspection at all reasonable times by any authorised officer of the EA.

17.0 Emergency procedure and complaints handling

Emergency Procedure

- 17.1 Supplementary surface water protection measures, treatment capacity or off-site removal of surface water shall be deployed as necessary to provide additional surface water containment / management capacity.
- 17.2 Prior to commencing works at the site, it is recommended that the local foul water drainage provider be contacted, to determine if an agreement to pump to foul can be agreed during peak rainfall conditions.
- 17.3 If required, advice should also be sought from specialist Environmental Consultant.

Spillage Emergency Procedure

- 17.4 In the event of a major liquid spillage / leak the following actions will be taken, where appropriate:
- Report the occurrence to the site management team immediately
 - Trained facility operatives to take immediate action to try and contain the spillage / leak where it is safe to do so using appropriate materials (such as spill kits)
 - If it is safe to do so, the cause of the spill or leak will be isolated and/or moved to a bunded area
 - Inert material such as clay or sandbags are to be used to make a temporary containment bund to prevent pollution of any water or land
 - Drainage covers will be installed over any road gullies to prevent ingress into the site's drainage system
 - Access to the immediate area will be restricted until a disposal/clean up solution is implemented
 - If the spillage cannot be contained using approved methods, senior management will be contacted immediately, and specialist advice and help will be sought.
- 17.5 Once the spillage has been contained the site management team will make necessary arrangements for the appropriate removal of the spillage from the site.
- 17.6 Any incidents or near misses should be reported as soon as possible so that the appropriate Environmental Consultant is notified as soon as possible. Where

damaged or missing protection measures have been identified, the site manager should implement repairs or replacements as soon as possible.

17.7 Report any environmental incident (such as silt ingress to the stream / drain) to a designated coordinator who will contact / report the incident with the EA.

17.8 Site staff should immediately report to the site manager if pollution prevention measures are not in place, are damaged or ineffective, or if works results in a silt release to surface water or the storm water sewer system.

Complaints Process

17.9 Any complaints received at the site or via the regulatory bodies (including the EA and Local Authority), will be recorded and investigated via a combination of visual inspection at the location of the complaint and collection of water samples for analysis to determine the source of the pollution to be identified.

17.10 Where possible, as much information and detail about the complaint will be recorded, whether this be from the relevant authority or complainant. This information will assist the investigation in determining the source of the surface water pollution.

17.11 Should a complaint be received, the following information will be gathered and recorded:

- Complaint details (including the address of the complainant where possible) and the location where surface water pollution is perceived
- Weather conditions including rainfall levels
- Results of the latest round of monitoring carried out by site personnel
- Operational status of the site (noting any abnormal conditions that may have caused the complaint)
- Inspection of site conditions upon the receipt of a complaint (where feasible)
- Details of the proposed corrective action, if required.

17.12 A subsequent follow up to the complainant shall be provided, detailing whether the corrective action, if required, was successful. If not, details shall be set out of any new strategy implemented, until the issue is resolved.

17.13 Records of complaints received will be kept for inspection and review by both internal and external personnel.

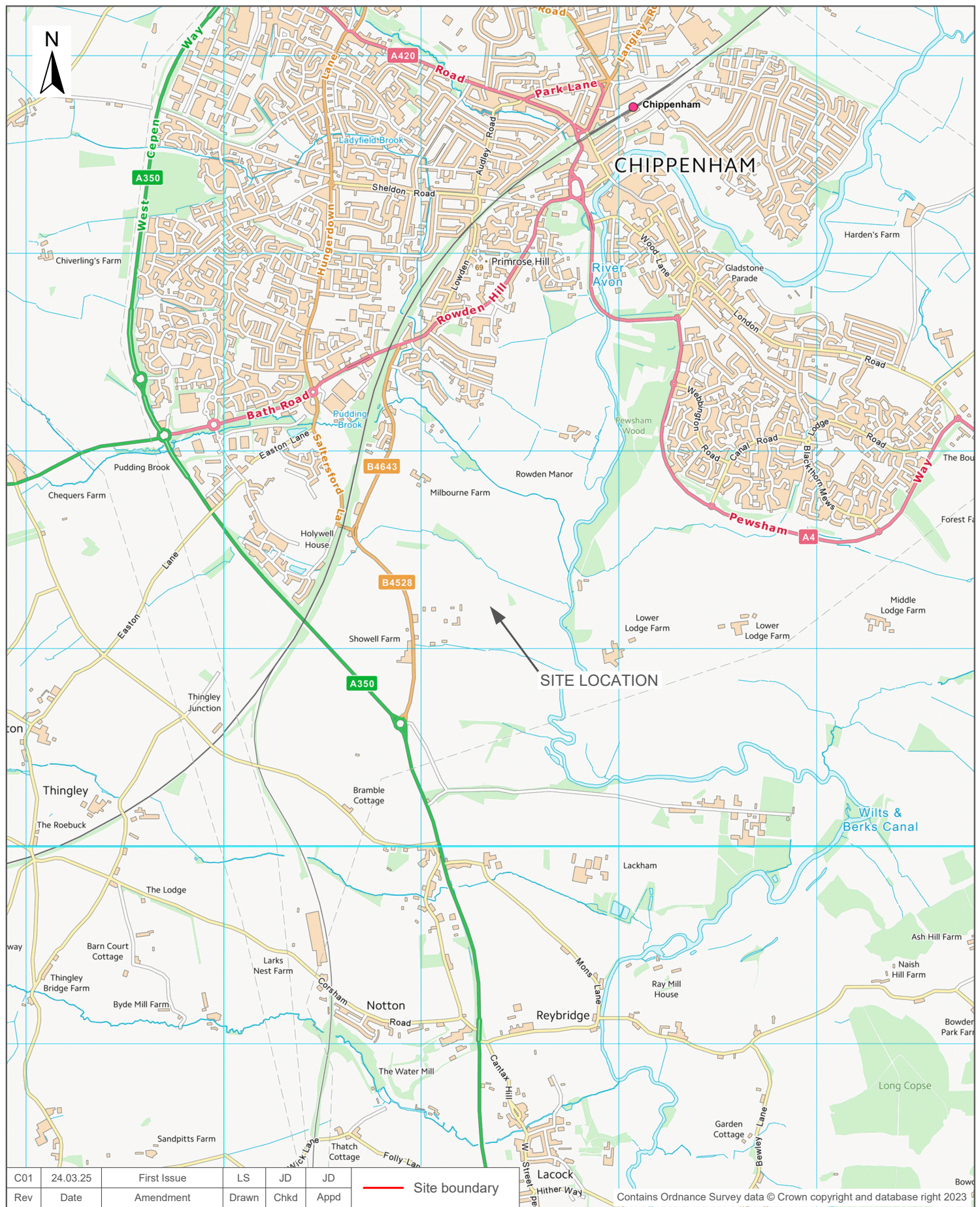
17.14 In the event that surface water discharges from the site are found to be causing a pollution incident – as determined by investigation into off site complaints or during routine monitoring, the following measures will be taken to confirm the source:

- Supplementary monitoring will be undertaken to identify the extent and potential cause of the event i.e., damage to perimeter protection measures

- Examination of the operational activities at the site at the time of the complaint or event identification
- Examination of the meteorological conditions at the time of the complaint or event identification
- Examination of the process conditions via the plant operational records / telemetry (where recorded)
- A review of the operational procedure, process controls and the instigation of any control measures immediately following identification of the pollution
- Further visual monitoring will be carried out to ensure the issue has been addressed and to monitor the effectiveness of any control measures undertaken.

17.15 All complaints will be investigated, however, direct calls to site from complainants will allow for an immediate response and investigation. However, it is the site management team's experience that complaints submitted to regulatory authorities can sometimes be made long after the occurrence of a surface water pollution event. This can result in a delayed notification to the site management team and commencement of investigation works. Due to the transient nature of surface water pollution and meteorological conditions, this may result in the pollution pathway being unidentifiable.

Figure 1 – Site Location Plan



C01	24.03.25	First Issue	LS	JD	JD
Rev	Date	Amendment	Drawn	Chkd	Appd

— Site boundary

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Client

Bellway Homes Limited (South West)

Project Name

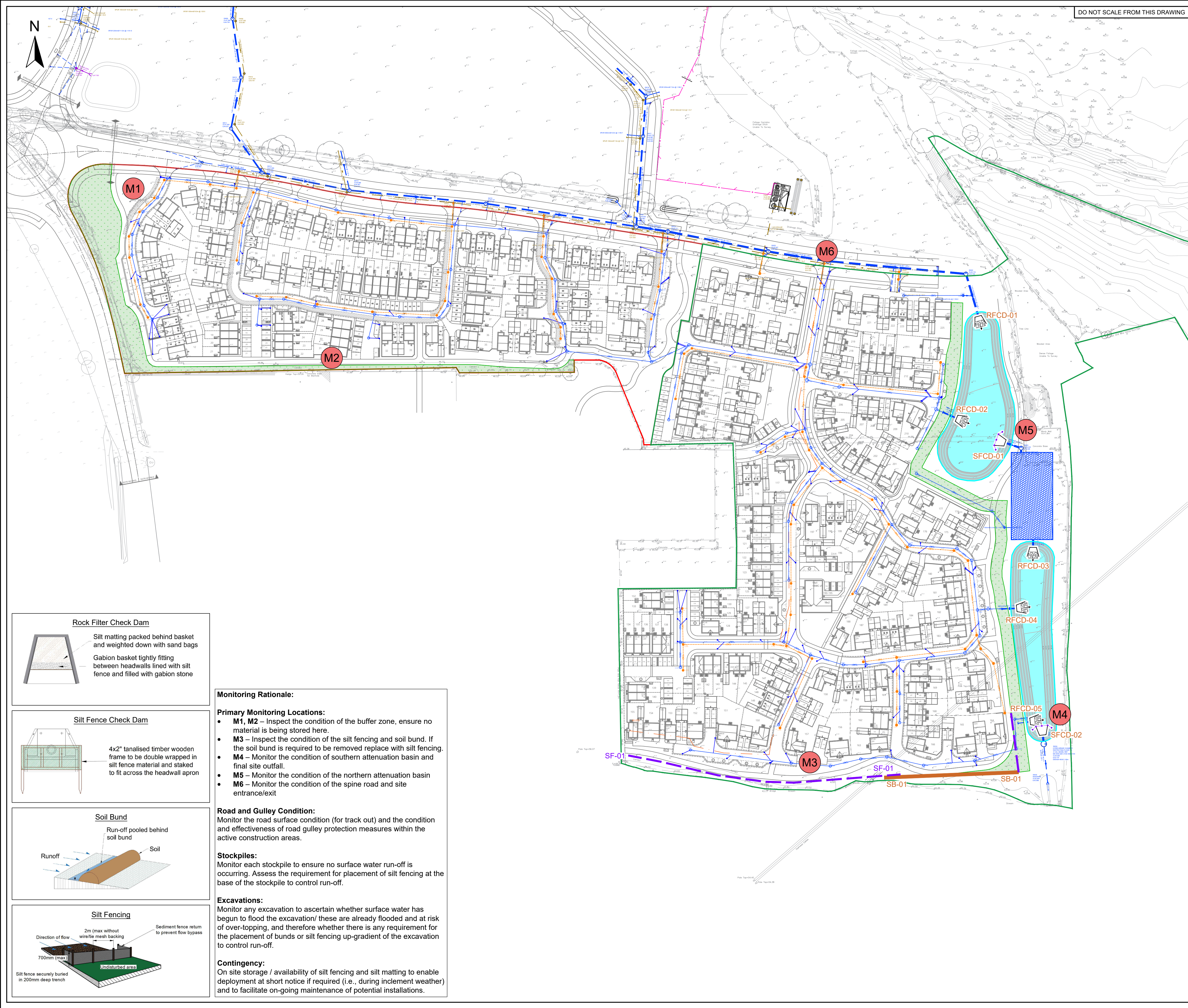
Rowden Park, Phase 4 & 5

Description

Site Location Plan

Dimension	Size	Scale	Geolocation	Project ID	Drawing no.	Rev	File name
m	A4	1:25,000	391349,171214	315813	11101	C01	315813-BL-111-XX-D-G-11101-C01

Figure 2 – Surface Water Management Plan



LEGEND

- Site boundary - parcel 4
- Site boundary - parcel 5
- Surface water drainage
- Foul water drainage
- Proposed underground water attenuation
- Attenuation pond
- Buffer zones
- Installed soil bund (to be retained and re-seeded)
- Recommended line of silt fencing
- Rock filter check dam
- Silt fence check dam
- Primary monitoring location

Notes:
The drawing must be read in conjunction with the Construction Surface Water Management Plan.

The drawing is not meant to be an accurate base plan but is used to present the general relative locations of features on, and surrounding, the site. Features annotated on site plans are not drawn to scale but are centered over the approximate location. Such features should not be used for setting out and should be considered indicative only.

Base plan provided by client
Drawing Ref.: '240841-RAP-P5-XX-DR-D-0181-0184 - Engineering Layout'

C01	24.03.25	First Issue	LS	JD	JD
Rev	Date	Amendment	Drawn	Chkd	Appd

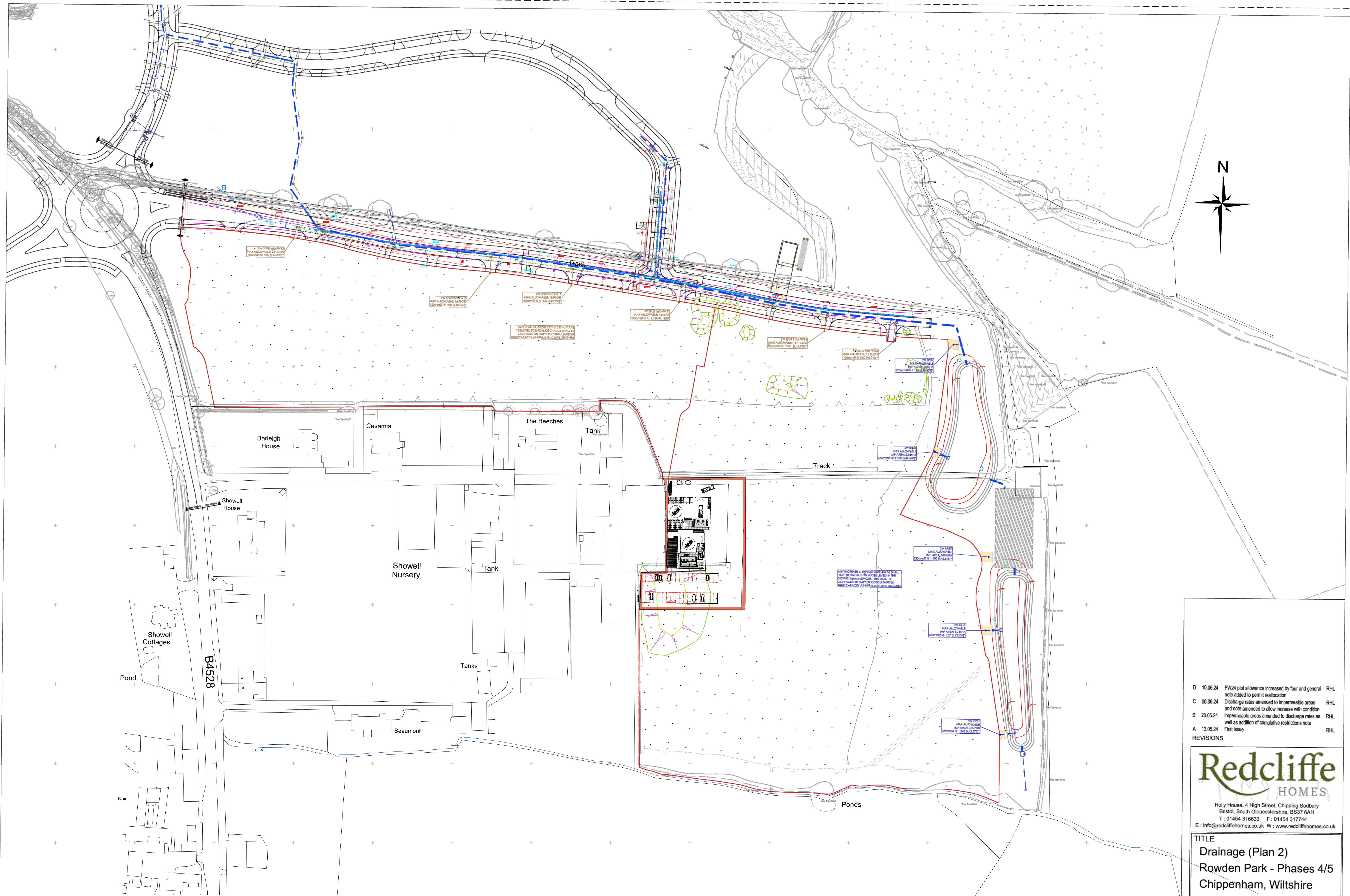
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Client		
Bellway Homes Limited (South West)		
Project Name		
Rowden Park, Phase 4 & 5		
Description		
Surface Water Management Plan		
Project ID	Drawing no.	Revision
315813	27601	C01
File name		
315813-BL-276-XX-D-G-27601-C01		
Dimensions	Scale	Size
m	1:1000	A1
<		

Figure 3 – Compound Plan



D	10.06.24	FW24 plot allowance increased by four and general note added to permit reallocation	RHL
C	06.06.24	Discharge rates amended to impermeable areas and note amended to allow increase with condition	RHL
B	20.05.24	Impermeable areas amended to discharge rates as well as addition of cumulative restrictions note	RHL
A	13.05.24	First issue	RHL

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TITLE
Drainage (Plan 2)
Rowden Park - Phases 4/5
Chippingham, Wiltshire

DRAWN	RHL	DATE	APR 24
CHECKED		SCALE	1:1000 @ A1
DRG. NO.	100-322	REV	D

NOTES
(N99 9999) - INVERT AND PIPE SIZE TO BE CHECKED
PRIOR TO DETAILED DESIGN COMMENCING
INDICATES RIGHT OF ENTRY TO
CONNECT TO INFRASTRUCTURE SERIES

Appendix A – Risk Assessment

RISK RATING AND ASSESSMENT			
Risk Factor	Identified	Detail	Risk Rating
Sensitive Receptors			
Visible flowing water course within 100 m of site boundary and category of watercourse.	Yes	An unnamed watercourse is located directly south of Parcel 5	High
Discharge from site flows directly into a water course	Yes	Surface water drains to attenuation basins in the east of the site before flowing into the watercourse via a hydrobrake	Medium
Water course contains visible aquatic life (fish etc.) or has been assessed as environmentally sensitive	No	No specific assessment provided. Site or adjacent watercourse does not lie within an environmentally sensitive area. Watercourse is likely to small to support significant aquatic life	Low
Local water course used as local amenity, fishing, canoeing, boating, swimming	No	No surface waters likely to be used for such activities identified on or within 100m of the site.	Low
Likely volumes of temporary discharge will exceed those designed for the final discharge consent	No	Temporary run-off to the proposed surface water drainage system is unlikely to exceed calculated final discharge rates. Discharge of surface water from the site is expected to be restricted to discharge rates as agreed through planning.	Low
Consortium site with shared collection and discharge outlets	No	Site is not a consortium development – however surface water is collected from Redcliffe parcels directly north of the Bellway site into the shared attenuation basins and outfall.	Medium
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. However, a contingency for potential treatment may be allowed for, if specific construction activities increase the pollution risk.	Low
Designated environmentally sensitive sites and Sensitive Receptors located downstream from the development.	No	No downstream designated environmentally sensitive sites have been identified.	Low
Ground Conditions and Topography			
Soils investigation identifies clay / silt (impermeable materials)	Yes	British Geological Survey (BGS) mapping indicates that the Site is underlain by Kellaways Formation (silt, sand mudstone). This geology is rich in clay and silt.	High
Site exposed, or at high altitude, or steep gradient.	No	Site is noted to be generally flat and low lying.	Low
Soils investigation identifies on-site contamination that may pose as risk to controlled waters	No	No evidence of on-site contamination was encountered during the site investigation.	Low
Groundwater level detected at installed drainage pipe-work depths	Yes	Groundwater has been monitored at surface level in the winter – it is recommended that drainage pipework is installed in the summer where possible.	Medium
Rainfall and Flooding			
Rainfall prediction in location relatively high	Yes	The average annual rainfall for the greater area calculated between 1991 – 2020, as provided from the Met Office is 771mm per year	Medium
Historical evidence indicates site suffers from seasonal flooding	No	The site lies within an area of low flood risk - designated as being within Flood Zone 1 of the government flooding categorisation. RSK are not in possession of a Flood Risk Assessment for the site.	Low
Development Constraints			
Does the development require a programme of earthworks to change / modify site levels	Yes	A relatively small amount of earthworks is required in the south of Parcel 5 to realign a right of way	Medium
Construction of attenuation basins programmed for construction within 3 months of development commencement.	N/A	Attenuation basins and headwalls already constructed – just headwall protections to be installed.	Low
Potential Pollution Risk Rating			
It is considered that the site should be classed as ‘High risk’ given: 1. The proximity of surface watercourse receptors 2. The geology of the site, clay / silt rich soils. 3. Minor earthworks occurring close to the watercourse The risk rating may be considered to be a ‘medium risk’ after installation of the recommended silt protection measures			

Appendix B - Installation examples and example manufacturers and product sheets

INSTALLATION EXAMPLES

Retention of a wide vegetated buffer adjacent to a surface watercourse



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



INSTALLATION EXAMPLES

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.



INSTALLATION EXAMPLES

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)



INSTALLATION EXAMPLES

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)



INSTALLATION EXAMPLES

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)



INSTALLATION EXAMPLES

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)

INSTALLATION EXAMPLES



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.



INSTALLATION EXAMPLES

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)



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 – Flocc 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

EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

GULLEY 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.

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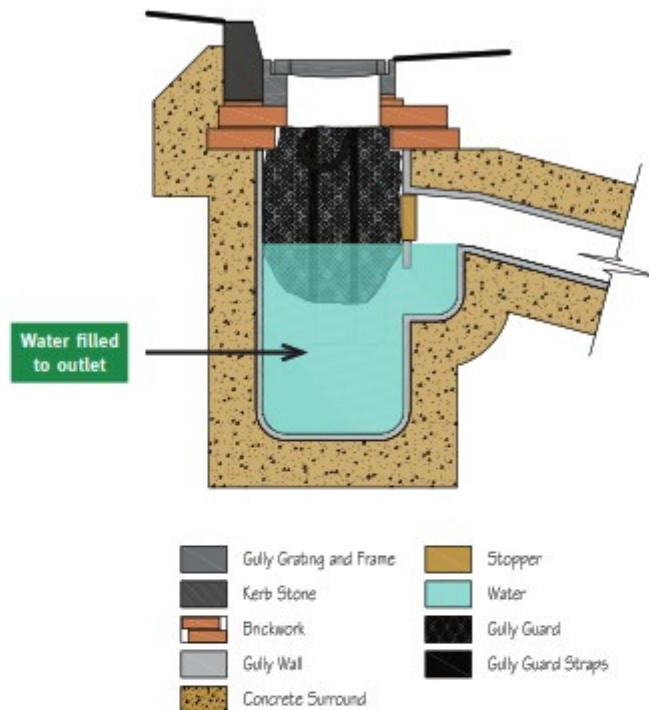
Patent no. 2472690

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High performance, versatile solutions

EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

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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 **The Forest Group**
High performance, versatile solutions

EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

wildlife	specialist	biodegradables	geotextiles	agrotexiles	accessories
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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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Committed to Quality, Value & Service

EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

SILT FENCING



product information sheet
Silt Fence
temporary silt control barrier



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.

EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

Technical information

Silt Fence

Dimensions: 100 metres x 0.9 metres (single roll)

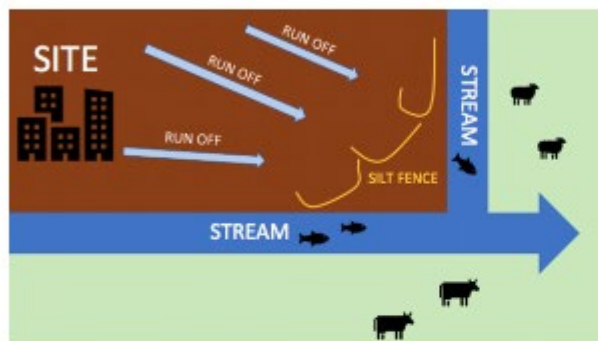
Dry Weight p/m: 110 g/m² (9.9 kg single roll)

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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EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

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

EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

Technical information

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



SiltMat

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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EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

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**

EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

Technical information

FlocMat™

Dimensions: 2x1 x 0.10m

Variants: FM1 (30g/m²), FM2 (100g/m²)
FMO(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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EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

SILT WATTLE



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

EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

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 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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EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

FILTER BAGS

wildlife	specialist	biodegradables	geotextiles	agrotexiles	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.



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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EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

wildlife	specialist	biodegradables	geotextiles	agrotextiles	accessories
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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.

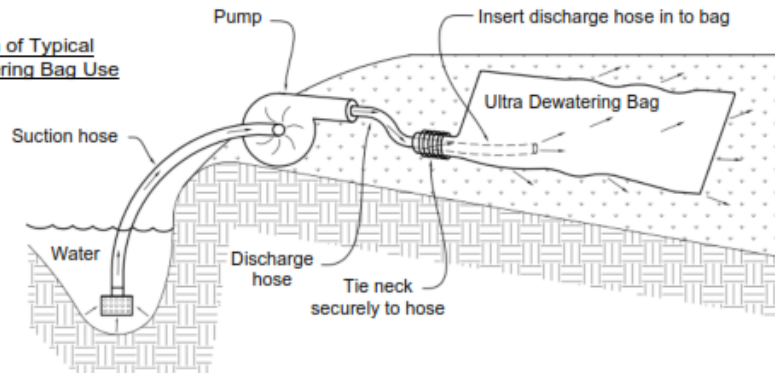
Flow rates will vary depending on the size of the Ultra Dewatering Bag, the type and amount of sediment discharged into the bag, the type of ground, rock or other substance under the bag and the degree of the slope on which the bag lies.

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/ft²) absorption capacity

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Hy-Tex (UK) Limited

Committed to Quality, Value & Service

EXAMPLE MANUFACTURERS AND PRODUCT SHEETS



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	6.5m
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

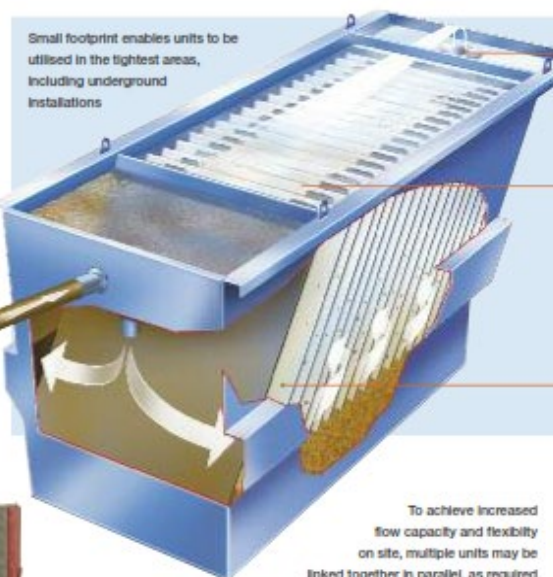
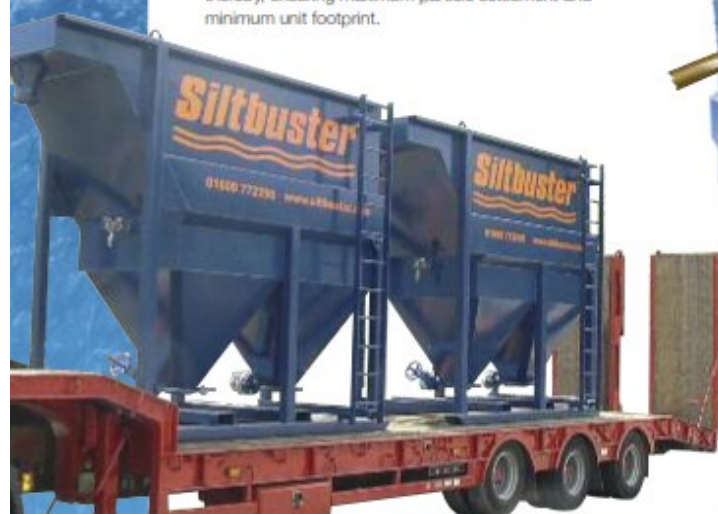
Siltbuster®



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

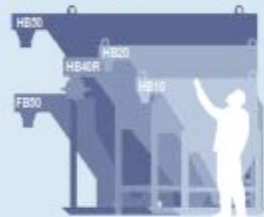
Silt Management

www.siltbuster.com

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: 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



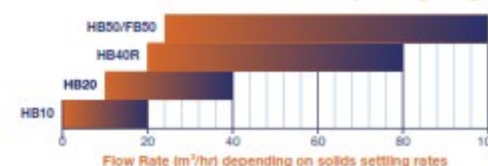
Options & Process Add-ons

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.

Appendix C - Inspection checklist example

GULLEY INSPECTION CHECKLIST

SITE:

[illegible]

SITE INSPECTION CHECKLIST

SITE: _____

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 water within the two on-site surface watercourses? <i>Note any discolouration of the water or obvious sign of sediment within the water.</i>			
7) What is the current water condition of the attenuation basin and swale? <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 – considered most likely to occur at the southern and western 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>			

Notes and actions to be taken:

Completed by	Name	Signature	Date
Site Manager			

**MONITORING POINT INSPECTION
RECORD SITE:**

Name of person undertaking inspection:

Date:

Current weather conditions:

Monitoring Location	Monitoring Location Rationale	Inspection Record	Action required	Initial
Monitoring of the following primary monitoring locations (as shown on Figure 3 – depicted by purple monitoring symbols) on a daily basis during periods of rainfall , and at a suitable frequency during periods of dry weather				
Monitoring Location MP1:	Monitor the water quality and sediment-contamination of the drainage (retention) basins.			
Monitoring Location MP2:	Monitor the water quality and sediment-contamination of the surface watercourse.			
Monitoring Location MP3:	Monitor surface water and sediment run-off / deposition across the site's infrastructure (roads, drainage, gulleys etc).			

Completed by	Name	Signature	Date
Site Manager			