



Taylor Wimpey (South Wales) Ltd, Persimmon Homes Ltd & Barratt David  
Wilson Homes Ltd

# East Quay, Barry

Surface Water and Silt Management Plan

302300 046 R01 (00)

NOVEMBER 2021

## RSK GENERAL NOTES

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**Project No.:** 302300 046 R01 (00)

**Title:** Surface Water and Silt Management Plan – East Quay, Barry

**Client:** Taylor Wimpey (South Wales) Ltd, Persimmon Homes Ltd & Barratt David Wilson Homes Ltd

**Date:** November 2021

**Office:** RSK Environment Limited, Henstaff Court, Groes Faen, Cardiff, CF72 8NG Tel: 07917 425 274

**Status:** Final (Rev 00)

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Signature

Signature

Date: November 2021

Date: November 2021

<b>Project manager</b>	<u>Andrew Przewieslik</u>	<b>Quality reviewer</b>	<u>Mel Rowley</u>
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Signature

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

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# 1 INTRODUCTION

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RSK Environment Limited (RSK) was commissioned by Taylor Wimpey (South Wales) Ltd on behalf of the consortium members (the clients) including Persimmon Homes Ltd (PHL) and Barratt David Wilson Homes Ltd (BDW) to produce a surface water and silt management plan (SWSMP) for the development at East Quay, Cory Way, Barry, South Wales, CF63 4JE. A site location plan is presented as **Figure 1**.

This site-specific SWSMP has been developed to outline the mitigation measures and water/silt management strategies that will be applied during the development of the site. The mitigation measures are applicable to the stage of development observed during the site inspection in November 2021.

**This document must be considered by the Principal Contractor as a 'living' document and must be regularly reviewed and amended as necessary to reflect the site-specific changes as the build phase progresses or should unexpected conditions be encountered during the development work. This re-assessment should be undertaken on no less than a quarterly basis or when significant development milestones are reached.**

The document has not been prepared for specific discharge of planning conditions.

This report is subject to the RSK service constraints given in **Appendix A**.

## 1.1 Site Details

The site is located on the East Quay within Barry Docks and occupies an area of former industrial land use. All former above ground and associated below ground industrial structures are understood to have been removed, with ground conditions remediated to a level suitable for residential end use.

The site is split between three consortium members including Taylor Wimpey, PHL and BDW, with each company responsible for building out their own development plot. The site is broadly split into four areas with BDW owning the western parcel of land and a second smaller parcel of land located east of Cory Way. PHL own the central parcel of land with Taylor Wimpey owning the eastern parcel of land adjacent to Cory Way. The division of the site ownership is presented as **Figure 3**. It is understood that all three consortium members are equally responsible for the associated infrastructure including storm drainage and associated outfalls to surface water.

The wider development area is of approximately 5.5Ha in area northern development parcel of site is approximately 4.3Ha in area and is centred at national Grid Reference ST 12377 67460.

The site forms the former East Quay within Barry Docks with the former Graving Dock located immediately north of the BDW and PHL parcels and west of the Taylor Wimpey parcel. Further docks are located west and south of the development site, such that the site is mostly surrounded by docks and water, apart from on the eastern site boundary.

Main access is provided from the east via Cory Way beyond which a second smaller parcel of the site is located and owner by BDW.

Table 1 describes the site surroundings. A photographic record of the site visit is included in **Appendix B**.

**Table 1: Site setting – East Quay, Barry**

	Boundary feature	Surrounding land use
<b>To the north:</b>	Undefined boundary with a large stockpile of soil (made ground) present	Ffordd y Mileniwm Road with Vale of Glamorgan Council offices beyond
<b>To the east:</b>	Cory Way and railway line with waste land	Commercial premises within Nissan Huts
<b>To the south</b>	Dock edge and open water	Commercial premises within the wider dock including timber storage
<b>To the west:</b>	Dock edge and open water	West Quay and residential areas

A site walkover was undertaken by RSK on the 8<sup>th</sup> November 2021.

The site compound (BDW and Taylor Wimpey) was located in the south-eastern corner of the site. The main site access road had been constructed and was located approximately 2-3m higher than the ground along the southern boundary, which is understood to be set aside for ecological purposes.

Piled foundations were evident across the central and northern parts of the site. Piling was ongoing in the northern most area within the Taylor Wimpey parcel. Ground levels along the north-western boundary alongside the Graving Dock were approximately 2-3m lower than the central area and were waterlogged/flooded. A hole beneath the Graving Dock coping at the eastern end of the dock, located within Taylor Wimpey’s parcel, was allowing water to drain from the flooded area directly into the dock. Water discharge was clean at the time.

The BDW parcel on the western end of the Easy Quay had commenced with the construction of buildings. No ongoing work was noted on the Persimmon parcel, who also had at the time of the visit, no site presence.

A large stockpile of made ground is located immediately beyond the north-western boundary (beyond Taylor Wimpey’s parcel) within an area set aside for future public open space. It is understood that this material may have resulted from the construction of the ASDA supermarket located 1km west of the site. It is also understood that this material will be removed from the site in due course.

Cory Way is located on the eastern boundary and provides two access points to the site. The northern access point, providing access to the piling area, had significant sediment

slurry at the entrance, allowing sediment to be remobilised onto the public highway. Whilst road sweepers (2No.) were active, residual silt on the highway could migrate to the highway storm drainage system and enter the dock via the nearest outfall.

Another small land parcel forming part of the wider development and under the ownership of BDW is located immediately west of Cory Way. At the time of the walkover, ongoing foul water pipe construction was evident.

It is understood that at the time of the walkover, no positive storm water connections were in place with rainwater draining to ground.

The site does not lie in a 'Designated Environmentally Sensitive Area' considered appropriate to the scope of this report.

Published British Geological Survey (BGS) geological records indicate that the site is underlain by superficial Tidal Flat deposits. The superficial deposits are underlain by the Mercia Mudstone Formation. However, given the historic industrial use, made ground is present and anticipated to be several meters in thickness. For the purposes of this report, no natural deposits are present at ground level.

Both superficial and bedrock deposits are classified as Secondary (undifferentiated) aquifer. The site does not fall within a designated groundwater source protection zone (SPZ). Given the presence of made ground infiltration to ground is likely, although waterlogged/flooded areas are present on site. It is likely that groundwater is coincident with water levels in the dock and that the dock walls leak water. Therefore discharges to ground would migrate to dock water.

The nearest surface water receptor is the dock surrounding the site to the north, west and south. The tidal barrier is located approximately 385m south of the site beyond which is the Bristol Channel.

No geoenvironmental data has been provided for review however, it is RSK's understanding that no obvious sources of contamination remain following site remediation. Based on our current understanding, this SWSMP does not further consider mitigation to address contamination.

## 1.2 Proposed Development & Drainage System

The site is proposed to be developed principally for residential land use, to comprise traditional residential units including apartments along with associated infrastructure, hardstanding, and areas of soft landscaping. The proposed engineer plan that shows the storm drain system is included within in **Figure 2**.

It is understood that the surface water drainage system will comprise standard highway surface water gullies across the site. These will discharge water to storm drain system with outfalls on the southern boundary of the Graving Dock. There are four outfalls on the southern boundary of the Graving Dock and a fifth on the northern boundary. No outfalls are recorded on any other site boundary. At the time of preparing this report, the storm system had no outfall to the dock.

No other above ground storm water attenuation structures (i.e. basins or swales) are proposed.

### 1.3 Sensitive Receptors to Silt

The primary receptors based on site conditions development progress in November 2021 were the dock to the west of the BDW parcel; and the Graving Dock to the north of the BDW, PHL and Taylor Wimpey parcels.

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

- Storm drain system (not positive connection as of November 2021).
- Residents in completed phases (upon completion and occupation).
- Highways on site (once constructed and completed).

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

- Public highway (Cory Way) and associated storm water drains
- Dock waters including Graving Dock from site outfalls

## 2 PROTECTION MEASURES WITHIN ACTIVE DEVELOPMENT AREA

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The following section sets out proposed mitigation to address potential risks at the current phase of development. This should be reviewed no later than February 2022 unless significant changes occur that warrant earlier re-assessment.

The following protection measures will be implemented on all consortium member parcels (please refer to attached **Figure 3**).

### 2.1 Environmental permit application for the discharge of surface waters during the construction phase

It is likely that the development will require an environmental permit for the discharge of surface waters during the construction phase. It is an offence to discharge contaminated water (including those affected by silt) to surface waters. All surface water discharge must be clean and free of contaminants. NRW require under Regulation 38 of the Environmental Permitting (England and Wales) Regulations, 2010, that all surface water discharge on an active construction site, including surface water flow and rainfall, be discharged under an environmental permit.

It is therefore recommended that an environmental permit is applied for on behalf of the development. It is noted that the permit determination period is four months from receipt of all final application materials.

### 2.2 Current construction condition/phase (November 2021)

The following measures should be implemented as a minimum and are shown on **Figure 3**:

BDW parcel (west):

- The BDW parcel at its western edge, slopes down to the west and the dock edge. Currently, no protection is present to prevent surface water run off directly into the dock. Surface waters could therefore wash sediment into the dock in an uncontrolled setting or silt entrained within surface water run off could enter the dock. A silt fence and/or supported by an earth bund should be installed along the western boundary of the parcel as shown on **Figure 3**. Installation examples are given in **Appendix C**.
- The northern boundary adjoining the Graving Dock had waterlogged/flooded ground. The height of the coping stones adjoining the dock ranged between 10cm and 30cm above the flood water and there was no immediate risk of this water from overtopping and entering the dock. However, should prolonged rainfall occur, then it is feasible that the flood water would rise, increasing the ponding and presenting a risk from overtopping. It is suggested that a silt fence or bund is installed along the northern boundary, however, this needs to be continuous along the entire northern length of the Graving Dock and therefore its installation needs to be undertaken in conjunction with PHL and Taylor Wimpey on their land parcels to form a single and continuous silt fence/bund along the northern development area boundary as presented on **Figure**

3. Liaison between the consortium members for this activity will be necessary. The work should also be undertaken with the minimal disturbance of sediment in the flooded area to prevent its remobilisation to the dock. The flooded area is in direct continuity with dock water via a small hole at the eastern end of the Graving Dock.

- The southern boundary has been set aside for ecological mitigation and is fenced off with herras fencing. This undisturbed ground should remain undisturbed as it forms a good buffer zone between the development edge and the dock to prevent surface water and silt migration.
- All road gully's need to be inspected. Where gully protection is missing, new bags should be fitted. Regular monitoring and maintenance of the storm drain system, including gully's needs to be undertaken to avoid excess sediment from becoming entrained within the drainage system, which could then at the point of commissioning be flushed into the dock. To ensure reduced volumes of fine particulates entering the drainage system (through the gully bag), regular road sweeping will be required.

BDW parcel (east):

- The site entrance off Cory Way had significant sediment remobilisation to the highway as a result of ongoing machine tracking and operations. Should this be ongoing in the medium term, improvement to the site entrance will be required including the placing of hardstanding. This will reduce sediment remobilisation onto the highway and the spread of suspended solids to the highway storm drain system.

PHL parcel:

- No ongoing construction work was evident on the PHL parcel.
- The northern boundary adjoining the Graving Dock had waterlogged/flooded ground. The height of the coping stones adjoining the dock ranged between 10cm and 30cm above the flood water and there was no immediate risk of this water from overtopping and entering the dock. However, should prolonged rainfall occur, then it is feasible that the flood water would rise, increasing the ponding and presenting a risk from overtopping. It is suggested that a silt fence or bund is installed along the northern boundary, however, this needs to be continuous along the entire northern length of the Graving Dock and therefore its installation needs to be undertaken in conjunction with BDW and Taylor Wimpey on their land parcels to form a single and continuous silt fence/bund along the northern development area boundary as presented on **Figure 3**. Liaison between the consortium members for this activity will be necessary. The work should also be undertaken with the minimal disturbance of sediment in the flooded area to prevent its remobilisation to the dock. The flooded area is in direct continuity with dock water via a small hole at the eastern end of the Graving Dock. Installation examples are given in **Appendix C**.
- The southern boundary has been set aside for ecological mitigation and is fenced off with herras fencing. This undisturbed ground should remain undisturbed as it forms a good buffer zone between the development edge and the dock to prevent surface water and silt migration.
- All road gully's need to be inspected. Where gully protection is missing, new bags should be fitted. Regular monitoring and maintenance of the storm drain system,

including gully's needs to be undertaken to avoid excess sediment from becoming entrained within the drainage system, which could then at the point of commissioning be flushed into the dock. To ensure reduced volumes of fine particulates entering the drainage system (through the gully bag), regular road sweeping will be required.

#### Taylor Wimpey parcel:

- A small hole beneath the coping stone of the Graving Dock's edge is present at the dock's eastern end on the Taylor Wimpey parcel. This hole was allowing water from the flooded area along the northern edge of the site (and south of the dock) to drain into the dock. It is likely that the presence of this hole has been key to controlling flood water levels across the BDW and PHL parcels. It is therefore suggested that the hole is retained to allow the floodwater to drain, however, this location presents a key risk area should the flood water become contaminated with silt. The hole is also located close to an area of active construction and machine tracking on the Taylor Wimpey site. It is recommended that silt protection (similar in specification to headwall protection) and consisting of hay bales and silt fencing is installed at the hole. This will allow continued draining of the flood water and reduce the potential for disturbed silts from directly entering the dock. This location is shown on **Figure 3** and **Appendix B**.
- To prevent active construction work and machine tracking from remobilising silt or silt contaminated surface water to the flood water area and the hole beneath the coping, it is recommended that an earth bund is extended alongside the access track in this area as shown on **Figure 3**. The earth bund should aim to isolate the working area from the flood water ponding areas.
- The stockpiled soils north/north-west of the site present a potential risk for silt contaminated run off to enter the northern edge of the Graving Dock. A low earth bund is partially present at the base of the stockpile. However, this earth bund needs to be extended and tied into a small, vegetated bund on the western edge of the site to prevent the bund from being circumvented. The height of the existing bund should be increased to at least 450mm.
- A temporary compound has been set up by a site contractor on the north-eastern corner of the dock in support of coring activity to form the storm water outfalls into the dock. The presence of the dock means that the earth bund to prevent run off from the stockpile cannot be fully extended along the northern dock boundary. Once the contractor's compound has been removed, the earth bund shown on **Figure 3**, should be extended and the gap closed.
- The site entrance in the north off Cory Way (**Figure 3**) had significant sediment slurry and ponded water. This was allowing sediment slurry to be remobilised onto the highway and whilst road sweeping was ongoing, road sweepers are not designed to clean heavy sediment slurry contamination. The entrance should be tidied up, with sediment slurry removed. A hardstanding entrance should be installed at the first opportunity to better control road conditions.
- The eastern edge of the Taylor Wimpey parcel adjacent to Cory Way contains debris, rubbish and provides a potential for silt contaminated surface waters to leave the site boundary and enter the highway. The boundary should be tidied and if possible, a silt

fence should be installed along its length as shown on **Figure 3**. Installation examples are given in **Appendix C**.

- Whilst located on the Taylor Wimpey parcel, the spine road entrance and associated storm water gullies are the responsibility of the consortium. The first two gullies on the road were noted to be missing gully bags/protection. These need to be fitted as soon as possible to prevent sediment from becoming entrained in the storm system and all gullies along the spine road need to be inspected, fitted with protection, monitored, and maintained.

General measures:

- **Whilst there is currently no positive connection of the storm drain system to the dock, the storm drains have been installed. It is evident that some gully bags are absent and therefore sediment will have already become entrained within the storm drain itself. This was confirmed by RSK during the site inspection on the 8<sup>th</sup> November 2021 and sediment is present within the drains at the first two drains closest to Cory Way. Further sediment is likely within the wider storm network. To protect the dock during the connection process, the final manhole(s) must be bunged/closed, to ensure that sediment is not washed into the dock. These final manhole(s) should be bunged immediately, if not already. Prior to the positive connection to the outfalls, the storm drain system should be cleaned to prevent a pollution incident at the dock.**
- Bungs for the manholes should be kept on site in case of an emergency (silt or fuel spill) to allow the storm drain to be shut off at short notice.
- Provision of road sweepers on the surrounding public highway and site roads should continue. The sweeping intensity is to be continually assessed by site management teams (consortium members) and the frequency increased during periods of inclement weather and on/off site plant movement. Tipping of road sweeper wastes **must not** be allowed on site.
- Retain additional spare silt fencing and gully protection materials on site to enable deployment at short notice and to facilitate on-going maintenance of installations.
- The deployment of a vehicle washing facility if necessary. However, the wheel wash should not be located close to the entrance with the public highway, because the wash facility generates significant volumes of silt contaminated water that could migrate off site. Its location needs to be assessed at the time, based on the progress of the build phase.

## 2.3 General and standard construction phase mitigation measures (all sites)

In addition to the above measures, the following should also be utilised during construction works:

- The proper fitting of gully guards within all completed highway surface water gullies at the earliest convenience. A layer of geotextile (terram) could 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. All gully guards to be periodically inspected and replaced / cleaned when necessary; it is recommended that this is made part of weekly site housekeeping activities and documented by the site manager or designated assistant.

- The installation of temporary hardstanding in storage areas (e.g. brick yard and mortar silo compound) and car parking to enable these to be cleaned by road sweepers.
- The installation of hardstanding areas at key points across each phase to allow 'clean' forklift access.
- The placement of hardstanding or topsoil and reseeded on unit gardens at the earliest opportunity to control surface run-off from completed areas.
- General good housekeeping of the site.
- Where required, apply scraping of the roadways using a grading bucket or agricultural brush to remove the bulk of the sediment. A road brush should then be applied to remove excess sediment and lastly a road sweeper should be applied to provide a final finish to the road surface. Road sweepers should not be used to treat heavily silt-impacted roads as the equipment is not designed to treat heavy silt burden on roads. Road sweepers should not be allowed to tip sweeper wastes on site. All sweeper wastes should be disposed of off site at a licensed waste facility. Uncontrolled tipping of road sweeper wastes on site can lead to the ingress of contamination or silt laden water into the drainage system, groundwater, and surface waters. It should be noted that it is always preferable to avoid material being deposited in the first place and the use of road cleaning equipment should be seen as a last resort if other measures (rumble strips for example) are not sufficient.
- Mortar silo's will be present on site. These are typically located at the site compound or designated storage area. Mortar silos can give rise to contamination through the mixing of construction surface water run-off with the mortar, which has a high pH (alkaline). This can lead to alkaline enriched waters entering the drainage system and making their way to surface waters and affecting wildlife. The direct ingress of mortar to the drainage system rarely occurs when managed appropriately and is not considered to be a significant risk. Silos should have a low bund formed to control run off.
- Small-scale storage of hydrocarbons (typically diesel fuel) of low volume will occur on site. The hydrocarbons are used to re-fuel heavy plant. Heavy plant also contains small volumes of hydrocarbons, lubricants, oils, and hydraulic fluids. The accidental release/spillage of fuel is a possibility. Likewise, trespassing and vandalism can result in the release of hydrocarbons. Regulations which set standards for the storage of oil are set out in the Control of Pollution (Oil Storage) (England and Wales) Regulations 2001. The regulations set standards for oil storage facilities which aim to prevent the escape of oil and the resulting risk of water pollution and damage to land and property. As a minimum, a spill kit, boom and fire extinguisher should be present at the fuel cell, with the cell placed on a drip tray.

- General chemicals including cleaning products are to be stored in the compound. They are of very low volume and used for cleaning of toilets and kitchen areas. These are unlikely to drive a significant risk through spillage/leaks at the development.

## 2.4 Site Personnel and Documentation

The following measures are to be implemented 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.
- Continued documented review by the site management teams of the existing site conditions in relation to this SWSMP and update the requirements on an as necessary basis.
- Undertake documented weekly site inspections and obtain support from the appointed Environmental Consultant if/when required.
- 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 / Tool-Box 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.

Actions reported for project personnel include:

### Technical team:

- Ensure this SWSMP is communicated to the site management team and updated as necessary with any required discharge consents applied for.

### Site managers:

- Ensure the measures presented within this SWSMP 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).
- Notify consortium company safety / environmental managers should the site be contacted by any enforcing authority and/or members of the public raising concerns over the quality of water leaving the site.
- Report any environmental incident (such as silt ingress to the unnamed surface watercourse) to an appointed environmental advisor.
- Provision of a vacuum tanker for periods of heavy rainfall to remove water from flooded areas (i.e. along Graving Dock) if at risk of overtopping.

### **Contractors:**

- Ensure that this SWSMP is communicated to all relevant site teams and groundworkers. The requirement for surface water mitigation measures as set out in this document should be presented to the ground worker at contract tender stage, so that its requirements are fully acknowledged and incorporated into the project. The contractor needs to be aware that mitigation measures will change (type and location) as the development progresses and is not a 'fit once and forget' item associated with the build. The mitigation and its effectiveness needs to be reviewed regularly.
- Ensure appropriate water management controls are included in relevant risk assessments and method statements (RAMS), including detailed arrangements regarding increased supervision and management during adverse weather or large scale works that may result in significant silt generation/release.
- 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. Immediately report to the site manager if pollution prevention measures are not in place, are damaged or ineffective.
- Contractors are to never directly over pump excavations or other silt contaminated waters to the dock or storm drainage system without pre-treatment.

## **2.5 Dewatering of excavations**

Dewatering of excavations from footing trenches/service trenches without appropriate water treatment can result in significant pollution of controlled waters. Dewatered silt contaminated surface water should not be discharged into the surface water drainage system or directly to surface waters. The NRW Regulatory Position Statement (RPS) "Temporary dewatering of excavations to surface waters", April 2021 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 3 consecutive months (the activity may stop and re-start but the clock does not restart) – if the activity is likely to go over 3 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.

If active pumping of water from foundation 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 <25mg/L. If required, consideration to dispose of silt-contaminated water into the foul water system, which may allow up to 1,000mg/L (depending upon water company) of suspended soil should be sought. This would require approval from the local water board and there is typically up to 6 months of lead in time to obtain appropriate licences. Where dewatering of significant volumes of water is anticipated, early advice from an appointed environmental advisor should be sought.

Importantly, following three months, an environmental permit would be required for continued pumping and discharge. The statutory appraisal time for permit applications may be up to 4 months, therefore early consideration for permit application is paramount.

### 3 SITE MONITORING PROCEDURES AND RECORDS

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The following monitoring procedures should be carried out on a regular basis by the site management teams to enable continuous review of the measures listed above. Examples of monitoring sheets are included in **Appendix D**. A comprehensive record of the effectiveness of the system should then be maintained to enable further review by any parties attending site:

- Monitoring of on site for surface water and silt run-off, main site entrance and the adjacent public highway realm. The proposed monitoring points for the current (November 2021) development phase are set out on **Figure 3**.
- Regular inspection of all gullies and manholes and conditions of the on-site roadways.
- Maintenance, cleaning and replacement of gully guards and silt fencing as required.
- All records should be reviewed on a regular basis, but advice can be obtained by the site management team at any time from an appointed Environment Consultant.
- Calls to the appointed Environmental Consultant should be made in the event of heavy rainfall breaching protective measures or silt pollution incidents being recorded.
- To enable a prompt response to changing site conditions, it is advisable to ensure a supply of straw bales, silt fencing and silt matting is readily available to implement emergency measures.

This SWSMP is intended to be a live working document to be regularly reviewed and updated as required.

# FIGURES

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312000

313000

168000

167000



Legend:  
 Site Boundary

Coordinate System: British National Grid  
 Projection: Transverse Mercator  
 Datum: OSGB 1936  
 Units: Meter

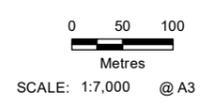


Rev	Date	Description	Drm	Chk	App
00	11/11/2021	First Draft	DR	AP	AP

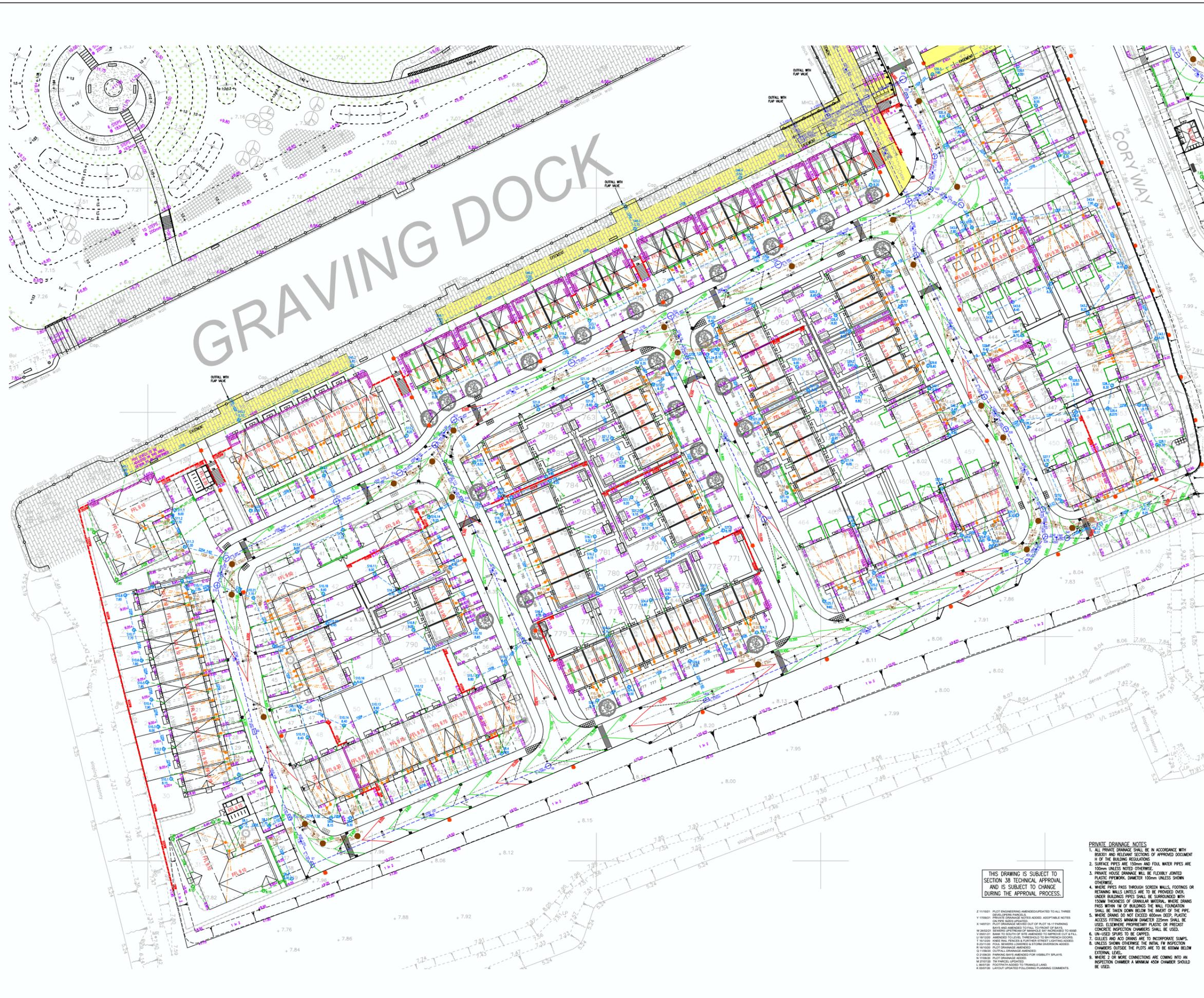
East Quay, Barry



TITLE: Figure 1:  
Site Location Plan



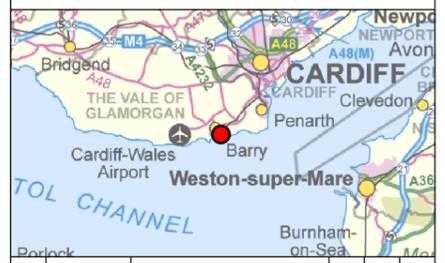
REV 00



GRAVING DOCK

Legend:

Coordinate System: British National Grid  
 Projection: Transverse Mercator  
 Datum: OSGB 1936  
 Units: Meter



Rev	Date	Description	Drm	Chk	App
00	11/11/2021	First Draft	DR	AP	AP

East Quay, Barry



TITLE: 10225-100-01Z-Engineering

NOT TO SCALE

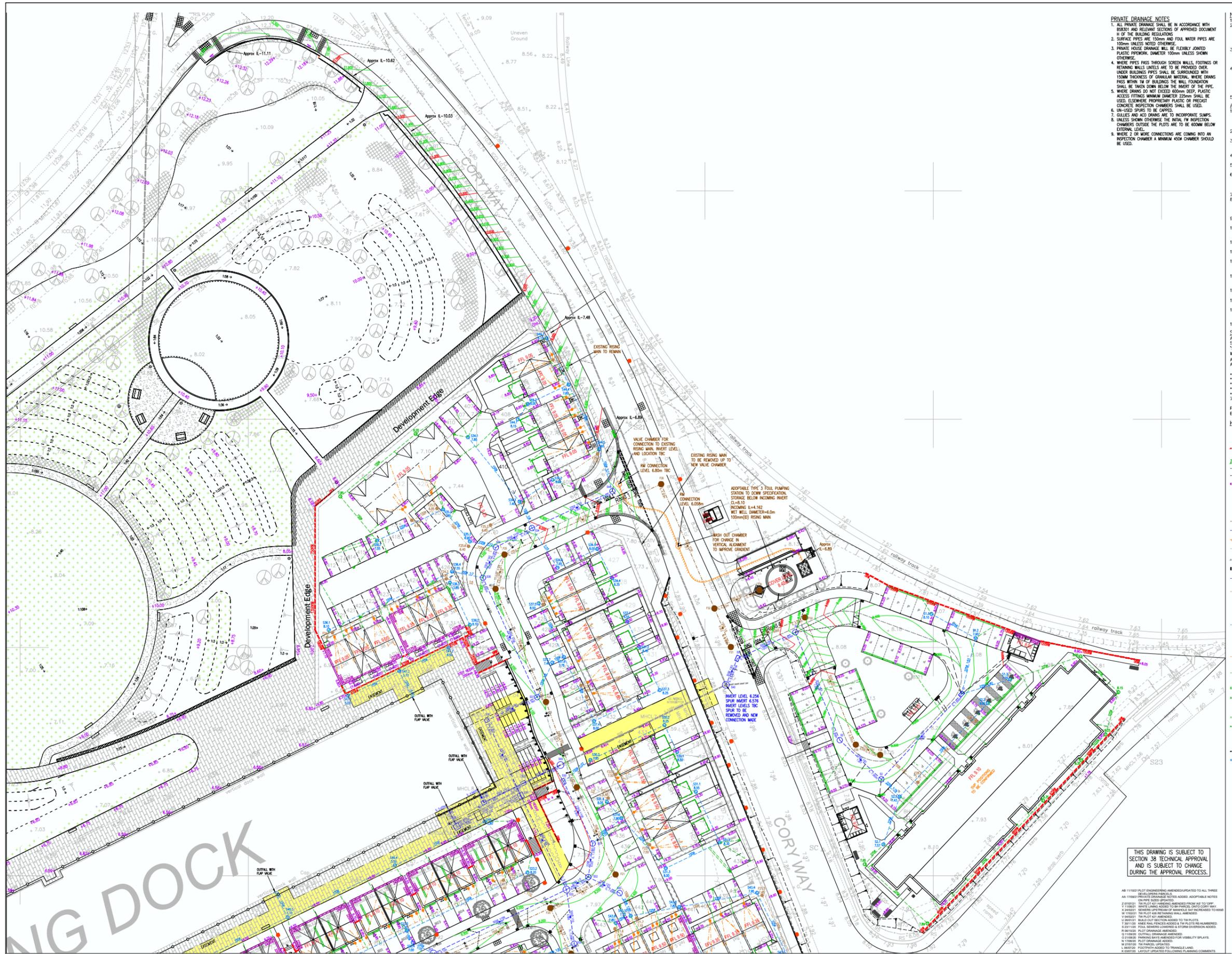
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THIS DRAWING IS SUBJECT TO SECTION 38 TECHNICAL APPROVAL AND IS SUBJECT TO CHANGE DURING THE APPROVAL PROCESS.

- PRIVATE DRAINAGE NOTES**
1. ALL PRIVATE DRAINAGE SHALL BE IN ACCORDANCE WITH BS8001 AND RELEVANT SECTIONS OF APPROVED DOCUMENT 14 OF THE BUILDING REGULATIONS.
  2. SURFACE PIPES ARE 150mm AND FOUL WATER PIPES ARE 100mm UNLESS NOTED OTHERWISE.
  3. PRIVATE HOUSE DRAINAGE WILL BE FLEXIBLY JOINTED PLASTIC PIPEWORK DIAMETER 100mm UNLESS SHOWN OTHERWISE.
  4. WHERE PIPES PASS THROUGH SCREEN WALLS, FOOTINGS OR RETAINING WALLS UNITS ARE TO BE PROVIDED OVER UNDER BUILDINGS PIPES SHALL BE SURROUNDED WITH 150mm THICKNESS OF GRANULAR MATERIAL. WHERE DRAINS PASS WITHIN 1M OF BUILDINGS THE WALL FOUNDATION SHALL BE TAKEN DOWN BELOW THE INVERT OF THE PIPE.
  5. WHERE DRAINS DO NOT EXCEED 600mm DEEP, PLASTIC ACCESS FITTINGS MINIMUM DIAMETER 225mm SHALL BE USED. EXTERNALLY PROPRIETARY PLASTIC OR PRECAST CONCRETE INSPECTION CHAMBERS SHALL BE USED.
  6. UN-USED SPACES TO BE CAPTED.
  7. CALLIES AND AOD DRAINS ARE TO INCORPORATE SIMPS.
  8. UNLESS SHOWN OTHERWISE THE MIN. FW INSPECTION CHAMBERS OUTSIDE THE PLOTS ARE TO BE 600MM BELOW EXTERNAL LEVEL.
  9. WHERE 2 OR MORE CONNECTIONS ARE COMING INTO AN INSPECTION CHAMBER A MINIMUM 450M CHAMBER SHOULD BE USED.



- PRIVATE DRAINAGE NOTES**
1. ALL PRIVATE DRAINAGE SHALL BE IN ACCORDANCE WITH BS5101 AND RELEVANT SECTIONS OF APPROVED DOCUMENT 4 OF THE BUILDING REGULATIONS
  2. SURFACE PIPES ARE 150mm AND FOUL WATER PIPES ARE 100mm UNLESS NOTED OTHERWISE
  3. PRIVATE HOUSE DRAINAGE WILL BE FLEXIBLY JOINTED PLASTIC PIPING, DIAMETER 100mm UNLESS SHOWN OTHERWISE
  4. WHERE PIPES PASS THROUGH SCREEN WALLS, FOOTINGS OR RETAINING WALLS UNLESS ARE TO BE PROVIDED OVER UNDER BUILDINGS PIPES SHALL BE SURROUNDED WITH 150MM THICKNESS OF GRANULAR MATERIAL, WHERE DRAINS PASS WITHIN 1M OF BUILDINGS THE WALL FOUNDATION SHALL BE TAKEN DOWN BELOW THE INVERT OF THE PIPE
  5. WHERE DRAINS DO NOT EXCEED 600mm DEEP, PLASTIC ACCESS FITTINGS MINIMUM DIAMETER 225mm SHALL BE USED, OTHERWISE PROPRIETARY PLASTIC OR PRECAST CONCRETE INSPECTION CHAMBERS SHALL BE USED
  6. UN-USED SPURS TO BE CAPPED
  7. GULLIES AND A/C DRAINS ARE TO INCORPORATE STAMPS, UNLESS SHOWN OTHERWISE, THE INITIAL IN INSPECTION CHAMBERS OUTSIDE THE PLOTS ARE TO BE 600MM BELOW EXTERNAL LEVEL
  8. WHERE 2 OR MORE CONNECTIONS ARE COMING INTO AN INSPECTION CHAMBER A MINIMUM 450W CHAMBER SHOULD BE USED

**Legend:**

Coordinate System: British National Grid  
 Projection: Transverse Mercator  
 Datum: OSGB 1936  
 Units: Meter



Rev	Date	Description	Dm	Chk	App
00	11/11/2021	First Draft	DR	AP	AP

**East Quay, Barry**



TITLE: 10225-100-02AB-Engineering

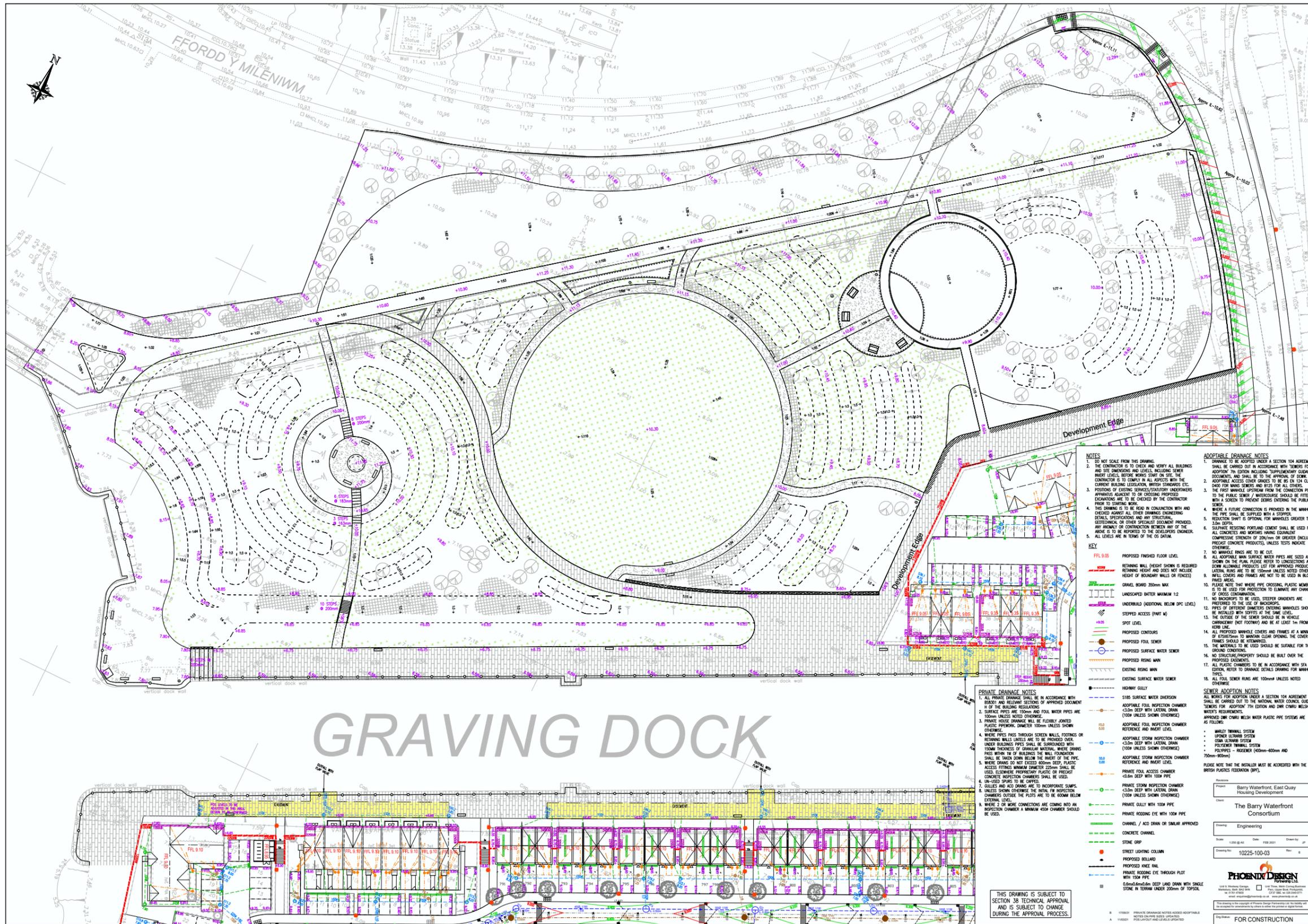
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REV 00

Legend:



# GRAVING DOCK

- NOTES**
- DO NOT SCALE FROM THIS DRAWING.
  - THE CONTRACTOR IS TO CHECK AND VERIFY ALL BUILDINGS AND THE CHANGING AND LEVELS INCLUDING SEWER HEIGHT LEVELS BEFORE WORKS START ON SITE. THE CONTRACTOR IS TO COMPLY IN ALL ASPECTS WITH THE CURRENT BUILDING LEGISLATION, WRITER STANDARDS ETC.
  - POSITIONS OF EXISTING SERVICES/UTILITIES UNDERGROUND APPROPRIATE TO OR CROSSING PROPOSED ENGINEERING ARE TO BE CHECKED BY THE CONTRACTOR PRIOR TO STARTING WORK.
  - THIS DRAWING IS TO BE READ IN CONJUNCTION WITH AND CHECKED AGAINST ALL OTHER DRAWINGS ENGINEERING DETAILS SPECIFICATIONS AND ANY STRUCTURAL, GEOTECHNICAL OR OTHER SPECIALIST DOCUMENT PROVIDED. ANY AMENDMENTS OR CORRECTIONS BETWEEN ANY OF THE ABOVE IS TO BE REPORTED TO THE DEVELOPER'S ENGINEER.
  - ALL LEVELS ARE IN TERMS OF THE OS DATUM.
- KEY**
- PROPOSED FINISHED FLOOR LEVEL
  - RETAINING WALL HEIGHT SHOWN IS REQUIRED RETAINING HEIGHT AND DOES NOT INCLUDE HEIGHT OF BOUNDARY WALLS OR FENCES
  - GRAVEL BOARD 300mm MAX
  - LANDSCAPED BATTER MAXIMUM 1:2
  - UNDERBUILD (OPTIONAL, BELOW OPC LEVEL)
  - STEPPED ACCESS (PART M)
  - SPOT LEVEL
  - PROPOSED CONTOURS
  - PROPOSED FOUL SEWER
  - PROPOSED SURFACE WATER SEWER
  - PROPOSED RISING MAIN
  - EXISTING RISING MAIN
  - EXISTING SURFACE WATER SEWER
  - ROADWAY GULLY
  - SUBS SURFACE WATER DIVERSION
  - ADAPTABLE FOUL INSPECTION CHAMBER <math>4.0m</math> DEEP WITH LATERAL DRAIN (100 UNLESS SHOWN OTHERWISE)
  - ADAPTABLE FOUL INSPECTION CHAMBER REFERENCE AND INVERT LEVEL
  - ADAPTABLE STORM INSPECTION CHAMBER <math>4.0m</math> DEEP WITH LATERAL DRAIN (100 UNLESS SHOWN OTHERWISE)
  - ADAPTABLE STORM INSPECTION CHAMBER REFERENCE AND INVERT LEVEL
  - PRIVATE FOUL ACCESS CHAMBER <math>4.0m</math> DEEP WITH LATERAL DRAIN (100 UNLESS SHOWN OTHERWISE)
  - PRIVATE STORM INSPECTION CHAMBER <math>4.0m</math> DEEP WITH LATERAL DRAIN (100 UNLESS SHOWN OTHERWISE)
  - PRIVATE GULLY WITH 100mm PIPE
  - PRIVATE RISING EYE WITH 100mm PIPE
  - CHANNEL / ACC DRAIN OR SIMILAR APPROVED CONCRETE CHANNEL
  - STONE GRIP
  - STREET LIGHTING COLUMN
  - PROPOSED BOLLARD
  - PROPOSED KNEE RAIL
  - PRIVATE RISING EYE THROUGH PLOT WITH 100mm PIPE
  - 0.6m dia x 0.6m DEEP LAND DRAIN WITH SINGLE STONE IN TERNUM UNDER 200mm OF TOPSOIL
- PRIVATE DRAINAGE NOTES**
- ALL PRIVATE DRAINAGE SHALL BE IN ACCORDANCE WITH BS8101 AND RELIEVE SECTIONS OF APPROVED DOCUMENT 11 OF THE BUILDING REGULATIONS
  - SURFACE PIPES ARE 100mm AND FOUL WATER PIPES ARE 150mm UNLESS NOTED OTHERWISE
  - PRIVATE HOUSE DRAINAGE WILL BE FLEXIBLY JOINTED PLASTIC PIPEWORK, MAXIMUM 100mm UNLESS SHOWN OTHERWISE
  - WHERE PIPES PASS THROUGH SCREEN WALLS, FOOTINGS OR RETAINING WALLS LINES ARE TO BE PROVIDED OVER UNDER BUILDINGS PIPES SHALL BE SURROUNDED WITH 150mm THICKNESS OF GRANULAR MATERIAL, MADE DRAINS PASS WITHIN 100mm OF BUILDINGS THE WALL FOUNDATION SHALL BE TAKEN FROM BELOW THE INVERT OF THE PIPE
  - WHERE DRAINING IS NOT EXCEED 4000mm DEEP, PLASTIC ACCESS FITTINGS MINIMUM DIMENSION 225mm SHALL BE USED, ELSEWHERE PROPRIETARY PLASTIC OR PRECAST CONCRETE INSPECTION CHAMBERS SHALL BE USED.
  - UN-USED SPURS TO BE CUTTED.
  - GULLIES AND ACC DRAINS ARE TO INCORPORATE SAMPS, UNLESS SHOWN OTHERWISE THE INITIAL 100mm INSPECTION CHAMBERS OUTSIDE THE PLOTS ARE TO BE ROOM BELOW EXTERNAL LEVEL.
  - WHERE 2 OR MORE CONNECTIONS ARE COMING INTO AN INSPECTION CHAMBER A MINIMUM 400mm CHAMBER SHOULD BE USED.
- ADOPTABLE DRAINAGE NOTES**
- DRAINAGE TO BE ADOPTED UNDER A SECTION 104 AGREEMENT SHALL BE CARRIED OUT IN ACCORDANCE WITH TENDERS FOR ADOPTION TO BE OBTAINED INCLUDING SUPERINTENDENT ENGINEER'S DOCUMENTS AND SHALL BE TO THE APPROVAL OF DOWN LOCAL AUTHORITY. ALL EXISTING CHAMBERS TO BE IN 124 CLASS 3400 FOR MANHOLE COVERS AND BRIS FOR ALL OTHERS.
  - THE FIRST MANHOLE DOWN FROM THE CONNECTION POINT TO THE PUBLIC SEWER / WATERCOURSE SHOULD BE FITTED WITH A STOPPER. ALL OTHERS SHOULD BE FITTED WITH A STOPPER.
  - WHERE A FUTURE CONNECTION IS PROVIDED IN THE MANHOLE THE PIPE SHALL BE SUPPLIED WITH A STOPPER.
  - SEWERAGE INSPECTION PORTLAND CEMENT SHALL BE USED FOR ALL CONCRETES AND MORTARS HAVING EQUIVALENT COMPRESSIVE STRENGTH OF 20N/mm<sup>2</sup> OR GREATER INCLUDING PRECAST CONCRETE PRODUCTS, UNLESS TESTS INDICATE OTHERWISE.
  - MANHOLE FRAMES ARE TO BE CUT.
  - ALL ADOPTABLE MAIN SURFACE WATER PIPES ARE SIZES AS SHOWN ON THE PLAN, PLEASE REFER TO CONNECTIONS AND DOWN ALLOWABLE PRODUCTS LIST FOR APPROVED PRODUCTS. LATERAL DRAINS TO BE 100mm UNLESS NOTED OTHERWISE.
  - INVERT COVERS AND FRAMES ARE NOT TO BE USED IN BLOCK PAVED AREAS.
  - PLEASE NOTE THAT WHERE PIPE CROSSING, PLASTIC MEMBRANE IS TO BE USED FOR PROTECTION TO EXISTING AND NEW CHANGES OF CROSS CONTAMINATION.
  - SEWERAGE INSPECTION PORTLAND CEMENT SHALL BE USED FOR ALL CONCRETES AND MORTARS HAVING EQUIVALENT COMPRESSIVE STRENGTH OF 20N/mm<sup>2</sup> OR GREATER INCLUDING PRECAST CONCRETE PRODUCTS, UNLESS TESTS INDICATE OTHERWISE.
  - ALL PLASTIC CHAMBERS TO BE IN ACCORDANCE WITH SPA 77th EDITION, REFER TO DRAINAGE DETAILS DRAWING FOR MANHOLE COVERS.
  - NO STRUCTURE/PROPERTY SHOULD BE BUILT OVER THE PROPOSED DRAINAGE.
  - ALL PLASTIC CHAMBERS TO BE IN ACCORDANCE WITH SPA 77th EDITION, REFER TO DRAINAGE DETAILS DRAWING FOR MANHOLE COVERS.
  - NO STRUCTURE/PROPERTY SHOULD BE BUILT OVER THE PROPOSED DRAINAGE.
  - ALL PLASTIC CHAMBERS TO BE IN ACCORDANCE WITH SPA 77th EDITION, REFER TO DRAINAGE DETAILS DRAWING FOR MANHOLE COVERS.
  - NO STRUCTURE/PROPERTY SHOULD BE BUILT OVER THE PROPOSED DRAINAGE.
  - ALL PLASTIC CHAMBERS TO BE IN ACCORDANCE WITH SPA 77th EDITION, REFER TO DRAINAGE DETAILS DRAWING FOR MANHOLE COVERS.
  - NO STRUCTURE/PROPERTY SHOULD BE BUILT OVER THE PROPOSED DRAINAGE.
  - ALL PLASTIC CHAMBERS TO BE IN ACCORDANCE WITH SPA 77th EDITION, REFER TO DRAINAGE DETAILS DRAWING FOR MANHOLE COVERS.
  - NO STRUCTURE/PROPERTY SHOULD BE BUILT OVER THE PROPOSED DRAINAGE.
- SEWER ADOPTION NOTES**
- ALL PIPES FOR ADOPTION UNDER A SECTION 104 AGREEMENT SHALL BE CARRIED OUT TO THE NATIONAL WATER COUNCIL GUIDE TENDERS FOR ADOPTION 7TH EDITION AND DMR CHAIN WELSH WATER'S REQUIREMENTS.
  - APPROVED DMR CHAIN WELSH WATER PLASTIC PIPE SYSTEMS ARE AS FOLLOWS:
    - WALLEY TERNAL SYSTEM
    - UPONER ULTRAM SYSTEM
    - LOWE ULTRAM SYSTEM
    - POLYMER TERNAL SYSTEM
    - POLYMER TERNAL SYSTEM
    - POLYMER TERNAL SYSTEM
    - POLYMER TERNAL SYSTEM
  - PLEASE NOTE THAT THE INSTALLER MUST BE ACCREDITED WITH THE BRITISH PLASTICS FEDERATION (BPF).
- THIS DRAWING IS SUBJECT TO SECTION 38 TECHNICAL APPROVAL AND IS SUBJECT TO CHANGE DURING THE APPROVAL PROCESS.**
- FOR CONSTRUCTION**



Rev	Date	Description	Dm	Chk	App
00	11/11/2021	First Draft	DR	AP	AP

East Quay, Barry

The Barry Waterfront Consortium

Engineering

Scale: 1:200

Drawing No: 10225-100-03

PHOENIX DESIGN

TITLE: 10225-100-03B-Engineering

NOT TO SCALE

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REV 00



**Legend:**

- Silt fence along BDW plot
- Soil bund to be installed and tied into a vegetated bund, no less than 450mm height. Increase height of existing bund where present (note break in line due to subcontractor compound).
- Slace silt fence along perimeter
- Add headwall protection to hole beneath coping stone to allow pond to drain to dock but prevent silt migration
- Improve site entrance conditions by removing sediment slurry
- Place gully protection and check all remaining gully's on site

Coordinate System: British National Grid  
 Projection: Transverse Mercator  
 Datum: OSGB 1936  
 Units: Meter



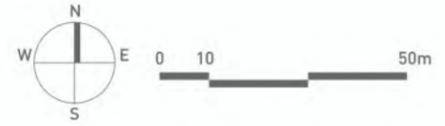
Rev	Date	Description	Drn	Chk	App
00	11/11/2021	First Draft	DR	AP	AP

**East Quay, Barry**



TITLE: Initial surface water & silt management plan

NOT TO SCALE  
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# APPENDIX A

## SERVICE CONSTRAINTS

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1. This report and the site investigation carried out in connection with the report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) for Taylor Wimpey South Wales, Persimmon Home Limited and Barratt David Wilson Homes Limited (the "client") in accordance with the terms of a contract [RSK Environment Standard Terms and Conditions] between RSK and the "client", dated November 2021. The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK considering the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.
2. Other than that, expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.
3. Unless otherwise agreed in writing the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent, or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.
4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates, or such other terms as agreed between RSK and the client.
5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate, or such other terms as may be agreed between RSK and the client.
6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, invasive plants, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials, unless specifically identified in the Services.
7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a visual inspection of the site together with RSK's interpretation of information, including documentation, obtained from third parties and from the client on the history and usage of the site, unless specifically identified in the Services or accreditation system (such as UKAS ISO 17020:2012 clause 7.1.6):
  - a. the Services were based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely
  - b. the Services were limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the visual inspection
  - c. the Services did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services.

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

8. The intrusive environmental site investigation aspects of the Services is a limited sampling of the site at pre-determined locations based on the known historic / operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the properties of the materials adjacent and local conditions, together with the position of any current structures and underground utilities and facilities, and natural and other activities on-site. In addition, chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and RSK] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.

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



# APPENDIX B PHOTOGRAPHIC LOG

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# APPENDIX B WALKOVER PHOTOGRAPHS

Entrance off Cory Way to main site access spine road



View of the main spine road



# APPENDIX B WALKOVER PHOTOGRAPHS



Western boundary of BDW plot alongside dock



View across BDW & Persimmon parcels along boundary with Graving Docks



# APPENDIX B WALKOVER PHOTOGRAPHS

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Gap beneath Graving Dock coping allowing flooded water on site to enter the dock



Stockpiles in the northern area of the site, north of the Graving Dock

# APPENDIX B WALKOVER PHOTOGRAPHS



Site entrance off Cory Way with heavy sediment slurry present





# APPENDIX C

## INSTALLATION EXAMPLES

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# APPENDIX C

## EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

Product:	Application	Manufacturer and product
<b>Gully Protection</b>	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.	<ul style="list-style-type: none"> <li>• Forest Group – Gully Guard</li> <li>• Hy-Tex – Ultra drain guards</li> </ul>
<b>Silt Fencing</b>	Attenuate water on site to promote settlement of silt within overland run-off.	<ul style="list-style-type: none"> <li>• Frog Environmental – Silt Fence</li> <li>• Hy-Tex – Terrastop Silt Fence</li> <li>• Siltbuster – Silt Fence</li> </ul>
<b>Silt Matting</b>	Capture settled silt as it naturally falls from suspension within watercourses, swales, attenuation basins to prevent its resuspension.	<ul style="list-style-type: none"> <li>• Frog Environmental – Silt Mat</li> <li>• Hy-Tex – SediMat</li> </ul>
<b>Flocculant Treated Silt Matting</b>	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.	<ul style="list-style-type: none"> <li>• Frog Environmental – Flocc Mat</li> </ul>
<b>Silt Wattle</b>	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).	<ul style="list-style-type: none"> <li>• Frog Environmental – Silt Wattle</li> <li>• 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).</li> </ul>
<b>Filter socks</b>	Fitted to hose end during dewatering of excavations to collect sediment. Capable of dealing with smaller volumes and lower flow rates.	<ul style="list-style-type: none"> <li>• Hy-Tex – Pro-Tex Pipe Socks</li> <li>• Murlac – Silt Sock</li> <li>• Dirtbags UK – Utility Bag</li> </ul>
<b>Filter bags</b>	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.	<ul style="list-style-type: none"> <li>• Hy-Tex – Ultra Dewatering Bag</li> <li>• Siltbuster – Siltstoppa Dewatering Bag*</li> <li>• Murlac – Silt Bag</li> <li>• Dirtbags UK – Dirtbag / Titan Dirtbag*</li> </ul>
<b>Settlement Tanks</b>	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.	<ul style="list-style-type: none"> <li>• Siltbuster – wide range of settlement units available</li> <li>• Andrew Sykes Group – settlement tanks / Silt Away.</li> <li>• Dirtbags UK – Dirtbox</li> </ul>

# APPENDIX C

## 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.

#### Forest Drainage Products Ltd

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[www.forestgroupuk.co.uk](http://www.forestgroupuk.co.uk)

Patent no. 2472690

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



# APPENDIX C

## EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

wildlife specialist biodegradables **geotextiles** agrotextiles accessories

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



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

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

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

Installation:

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

Maintenance and disposal:

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



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



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 <sup>-1</sup>
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 <sup>2</sup> (8 oz/yd <sup>2</sup> )
Flow Rate - Fabric	D 4491	3,660 l/min/m <sup>2</sup> (90 gal/min/ft <sup>2</sup> )
Flow Rate - Bypass Ports	D 4491	2,914 l/min



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

All data stated and the recommendations made herein are offered free of charge and are accurate to the best of our knowledge. Hy-Tex (UK) Ltd assumes no liability for the accuracy or completeness of this information or for the ultimate use by the purchaser. Hy-Tex disclaims any and all express, implied, or statutory standards, warranties or guarantees, including without limitation any implied warranty as to merchantability or fitness for a particular purpose or arising from a course of dealing or usage of trade as to any equipment, material, or information furnished herewith. Final determination of the use of any information or material, or how it is useful, and whether the use infringes any patents is the sole responsibility of the user.

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Hy-Tex (UK) Limited

Committed to Quality, Value & Service

# APPENDIX C

## EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

### SILT FENCING



product information sheet  
**Silt Fence**  
 temporary silt control barrier



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

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

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

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

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

#### Applications

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

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

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

# APPENDIX C

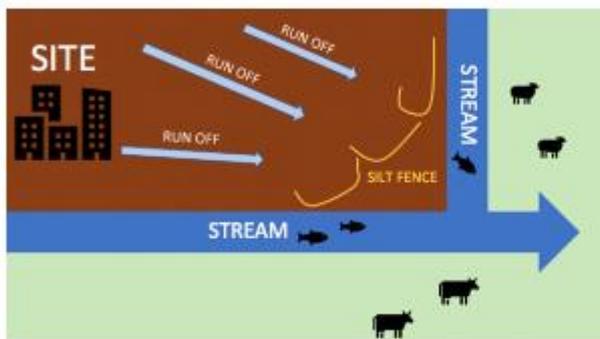
## EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

### Technical information Silt Fence

**Dimensions:** 100 metres x 0.9 metres (single roll)  
**Dry Weight p/m:** 110 g/m<sup>2</sup> (9.9 kg single roll)  
**Permeability:** 7 (l/m<sup>2</sup> /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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 Midlands: The Byre, Blakenhall Park, Barton Under  
 Needwood, Staffordshire, DE13 8AJ



# APPENDIX C

## 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**

# APPENDIX C

## EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

### Technical information SiltMat

**Dimensions:** 2 x 1 x 0.12 metres  
**Dry Weight:** 12kg per mat  
**Material used:** coir (80%) jute (20%)  
**Function:** Captures and prevents resuspension of silt

**Performance:** Single mat captures up to 40kg of silt  
**Disposal:** Fully biodegradable, with correct permissions used mats can be disposed ofland.



#### four step guide to using SiltMats

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

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

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

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

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

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

for technical support and sales of  
**Silt Wattle** contact frog environmental  
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# APPENDIX C

## 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 CO<sub>2</sub>**

# APPENDIX C

## EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

### Technical information

### FlocMat™

**Dimensions:** 2x1 x 0.10m

**Variants:** FM1 (30g/m<sup>2</sup>), FM2 (100g/m<sup>2</sup>)  
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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Silt Wattle contact frog environmental

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# APPENDIX C

## 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**

# APPENDIX C

## 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.



**AVOID THIS**



**USE THIS**



#### OIL DETECTION INDICATOR

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



If strip turns **DARK BLUE**  
**OIL PRESENT**  
Stop pumping

Contact your Environmental Manager

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

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

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

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

#### Advantages

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

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

Other benefits include:

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



Product: Pro-Tex Dewatering Sediment Bag. Premium Pipe Sock.

Application: Oil and Sediment Filter

Effective Pore Size: 90 micron

Sediment Capacity: Approx 18kg

Permeability: 72 litres/m<sup>2</sup>/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

# APPENDIX C EXAMPLE MANUFACTURERS AND PRODUCT SHEETS



## FILTER BAGS



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



**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."

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.

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 <sup>-1</sup>
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 <sup>2</sup> (8 oz/yd <sup>2</sup> )
Flow Rate	D 4491	3,660 l/min/m <sup>2</sup> (90 gal/min/ft <sup>2</sup> )

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# APPENDIX C

## EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

wildlife specialist biodegradables **geotextiles** agrotextiles accessories

### 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.

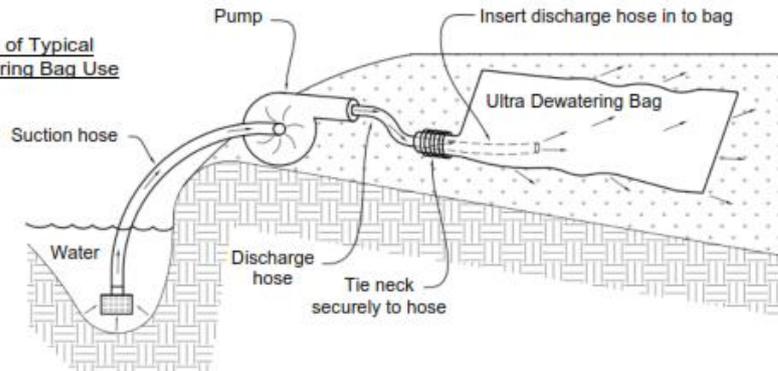
Flow rates will vary depending on the size of the Ultra Dewatering Bag, the type and amount of sediment discharged into the bag, the type of ground, rock or other substance under the bag and the degree of the slope on which the bag lies.

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 <sup>2</sup> (72 ft <sup>2</sup> )	2,730 l/min (500 gal/min)	10 cm (4 inch)	0.51 m <sup>3</sup> / 980 kg (18 ft <sup>3</sup> / 2,160 lbs)	14 l (3.7 gal)
3.05 x 4.55 m (10 x 15 ft)	9725	27.87 m <sup>2</sup> (300 ft <sup>2</sup> )	6,818 l/min (1,500 gal/min)	15 cm (6 inch)	4.20 m <sup>3</sup> / 4,082 kg (150 ft <sup>3</sup> / 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/m<sup>2</sup> (90 gal/min/ft<sup>2</sup>) to allow for pump pressure build up due to silt accumulation.

Sediment capacity is calculated using wet sand weight of approx 1,920kg/m<sup>3</sup> (120 lbs/ft<sup>3</sup>) and a bag fill height of approx 150mm

Oil capacity is estimated at low flow conditions with approx 2.09 l/m<sup>2</sup> (0.5 gal/ft<sup>2</sup>) absorption capacity

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# APPENDIX C

## 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 <sup>3</sup>
Operating Range	Material Dependent

### Siltbuster Siltstoppa Skip

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

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

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

#### Siltbuster Siltstoppa Skip Specs

Separation Method	Geotextile Membrane
Height	1.2m
Length	6.1m
Width	2.6m
Dry Weight	2.0 tonne
Material	Floculated Particles
Operating Capacity	1 Bag
Lifting Method	RORO Hooklift
Operating Range	Material Dependent



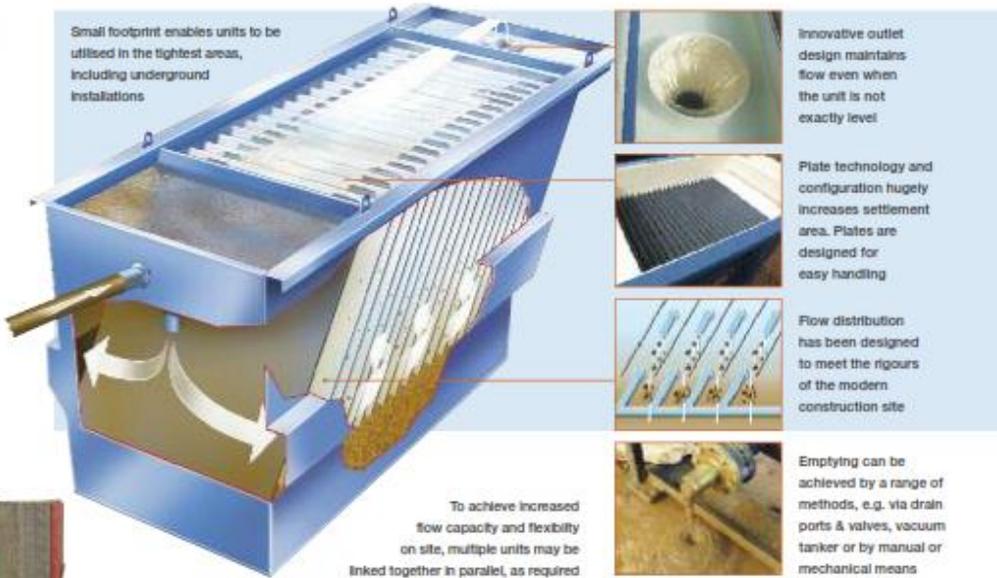
# SETTLEMENT TANKS



## Gravity Settlement ▶ Siltbuster Settlement Units & Water Clarifiers

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

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



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

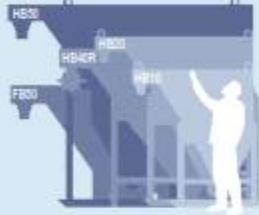
Silt Management

[www.siltbuster.com](http://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: 2.0m	Height: 3.1m	Height: 3.1m
Length: 3.7m	Length: 1.9m	Length: 2.5m	Length: 3m	Length: 3.7m
Width: 1.45m	Width: 0.9m	Width: 1.2m	Width: 2.2m	Width: 1.7m
Effective Settlement Area: 50m <sup>2</sup>	Effective Settlement Area: 10m <sup>2</sup>	Effective Settlement Area: 20m <sup>2</sup>	Effective Settlement Area: 40m <sup>2</sup>	Effective Settlement Area: 50m <sup>2</sup>
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 <sup>3</sup> /hr	Typical Operating Capacity: 1-10m <sup>3</sup> /hr	Typical Operating Capacity: 1-20m <sup>3</sup> /hr	Typical Operating Capacity: 1-40m <sup>3</sup> /hr	Typical Operating Capacity: 1-30m <sup>3</sup> /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

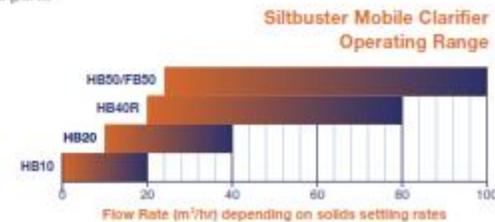


### Options & Process Add-ons

#### 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



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



## Process Add-ons

### ► Chemical Dosing, Pre-treatment & Reaction Systems

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



## Silt Management

[www.siltbuster.com](http://www.siltbuster.com)

### 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 1m<sup>3</sup> to 30m<sup>3</sup> 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 m<sup>3</sup>/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 D

## INSPECTION CHECKLISTS

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**SITE INSPECTION CHECKLIST**  
**SITE:**

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Name of person undertaking inspection: .....

Date: .....

Current weather conditions: .....

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

<p>6) What is the current condition of water within the two on-site surface watercourses?</p> <p><i>Note any discolouration of the water or obvious sign of sediment within the water.</i></p>			
<p>7) What is the current water condition of the attenuation basin and swale?</p> <p><i>Note any discolouration of the water or obvious sign of sediment within the water.</i></p>			
<p>8) Is any off-site run-off occurring?</p> <p><i>Note whether any run-off is occurring – considered most likely to occur at the southern and western boundaries.</i></p> <p><i>Note any control measures in place.</i></p>			
<p>9) Is there any dewatering of excavations taking place on site?</p> <p><i>Note what activities are taking part and their location.</i></p> <p><i>Note any control measures in place.</i></p>			

Notes and actions to be taken:

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Completed by	Name	Signature	Date
Site Manager			

**MONITORING POINT INSPECTION RECORD**  
**SITE:**

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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 1.1 and 1.2 – depicted by red monitoring symbols) on a <b>daily basis during periods of rainfall</b> , and at a suitable frequency during periods of dry weather				
<b>Monitoring Location M1</b>	Monitor levels of silt in water discharging from ditch to Carr Brook and the condition of the silt protection measures at this discharge point. To consider requirements for further measures/ improvements/ maintenance required.			
<b>Monitoring Location M2:</b>	Monitor levels of silt in water entering the proposed SWALE and any improvements/ deterioration in water quality as it passes through the SWALE and the silt protection measures installed. Condition of water as it passes out of the SWALE at outlet headwall should also be noted. Checks to include the condition of silt protection measures installed and the requirement for any maintenance.			
<b>Monitoring Location M3:</b>	Monitor condition of water passing out of the water retention pond to discharge to Carr Brook. Checks to include the condition of the silt matting placed at the inlet/ outlet headwall, designed to entrap silt.			
<b>Monitoring Location M4:</b>	Monitor condition of water in boundary ditches flowing into Carr Brook. These should be unaffected by the site's development, however, there is the potential for rubbish from site to cause blockages which may result in flooding.			
<b>Monitoring Location M5:</b>	Monitor condition of gullies along main spine roads on site, particularly those in close proximity to construction works. Monitoring of gullies also to include general condition/ level of debris of roads, localised build-up of silt.			

Completed by	Name	Signature	Date
Site Manager			