Erosion, Sediment and Stormwater Management Control Plan

For Brookfield Multiplex

Prepared by:

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AMENDMENTS REGISTER

BROOKFIELD MULTIPLEX CONSTRUCTIONS PTY LTD ENVIRONMENTAL MANAGEMENT PLAN REGISTER OF AMENDMENTS						
Amendment/ Revision No:	**Page No:**	**Sect No:**	**Date of Issue**	**Prepared By:**	**Approved By:**	**Description of Amendments**

1 INTRODUCTION

1.1 PROJECT DESCRIPTION

Brookfield Multiplex Constructions PTY LTD will be building the Sydney Water Authority's new office and warehouse to house 350 staff members. The 4.37 hectare site is located on Bunker Rd in the suburb of Potts Hill. Due to the nature and location of the project measures will be put in place to manage the erosion, sediment and storm water runoff from the site.

1.2 PURPOSE & SCOPE

The purpose of the erosion, sediment and stormwater management plan is to minimise land degradation and erosion to protect air quality, water quality, drainage infrastructure and the visual amenity of the area.

The Potts Hill site will require an extensive, considered and well designed Erosion, Sediment and Storm Water Control Plan (ESSP). The Potts Hill team can call on the experience of the on-site site management team and deliver a plan which is based on a proven system not only in its design but also in its implementation and delivery.

2 PROJECT PLANNING

2.1 INTRODUCTION

Erosion and sediment in the stormwater drains has the potential of occurring on site due to the nature of the site. Removal of the vegetation and excavation of top soil can result in:

- Turbid water run off
- Erosion of the surrounding areas
- Potential turbid water in the reservoir
- Potential turbid water in the stormwater drains
- Pollutants associated with the sediment include nutrients, pesticides, construction wastes and other contaminates.

2.2 LEGISLATIVE REQUIREMENTS

New South Wales (Australia)

- Protection of the Environment Operations Act and Regulations 1997 (POEO)
- Protection of the Environment Administration Act and Regulations 1998
- Catchment Management Act 1989
- Department of Land and Water Conservation's Erosion and Sediment Control Manual
- Department of Housing Manual Managing Urban Stormwater – Soils and Construction (August 1998). Environmental Planning and Assessment Act 1979
- Soil Conservation Act 1983
- NSW Guidelines for Construction Sites Act 1998

2.3 CONSEQUENCE AND LIKELIHOOD ANALYSIS

Due to the removal of site vegetation and exposure of soil, not only will there be potential runoff of turbid water but erosion may occur. The location of the site is near the Potts Hill reservoir and the site will be built within 25 meters of the reservoir. The likelihood and consequence of risk at Potts Hill should be compared with one another to determine a risk rating for the aspects and impacts. This indicates how much effort and planning should be spent in avoiding designated risks.

This is the Environmental Risk Assesment Matrix Guideline used for rating risk at Potts Hill.

	Consequences				
Likelihood	**Insignificant**	**Minor**	**Moderate**	**Major**	**Catastrophic**
Rare	Low	Low	Low	Moderate	Moderate
Remote	Low	Low	Low	Moderate	High
Occasional	Low	Moderate	Moderate	High	High
Probable	Moderate	Moderate	Moderate	High	High
Frequent	Moderate	High	High	High	High

3 MONITORING ENVIRONMENTAL PERFORMANCE

3.1 INSPECTIONS

The Environmental Co-ordinator (EC) shall monitor each element of the ESSP to ensure that appropriate environmental protection and procedures are in place. The site Environmental Inspection Checklist (checklist) will be filled out on a daily basis by the Environmental Co-ordinator or their delegate and signed off by the Site Manager(SM) to monitor the ESSP that affect Potts Hill. The EC will track environmental documents and file them in the projects filing system.

Consultants and sub-contractors will carry out applicable physical monitoring of discharges and emissions required as part of legal obligations, or at the request of management.

The following types of compliance monitoring will be mandatory at Potts Hill:

- Water quality monitoring during the excavation phases
- Water quality monitoring during construction phase

3.2 NON CONFORMANCE

Project non-conformances and observations may be identified during site inspections, at scheduled internal and external audits or as a result of complaints or incidents that demonstrate a failure in implementation of the relevant controls. Non-conformances and observations identified against the ESSP requirements should be recorded and monitored by an electronic recording / filing method. Any non-conformances that are the subject of simple adjustments to procedures or low, medium or high response actions are to be closed out in a reasonable time frame and shall be filed with evidence of close out.

BMPX will investigate non conformances in order to determine the cause and to prevent reoccurrence

3.3 RECORDS

Records are an essential component of an effective ESSP and are required as part of legislative compliance.

The Sydney Water Project at Potts Hill will maintain records of the following:

- Training records
- Audit results
- Monitoring records
- Incident reports
- Follow ups
- Site Inspections
- Dewatering Register

These records will be easily accessible and available both electronically and in hard copy for review on request.

4 SEDIMENT CONTROL

4.1 INTRODUCTION

Urban and commercial runoff is a major source of pollutants in natural water systems of New South Wales. Contaminants will be transported away from Potts hill by wind, rainfall or overland flow. Overland flow is particularly relevant around this site as there will be large areas with unprotected land surfaces.

The main pollutants concerning the project are:

- Suspended Solids
- Nutrient Concentrations
- Rubbish
- Micro-organisms
- Litter

All these pollutants can change and effect other water systems in various ways and need to be kept to a minimum before, during and after the construction process.

4.2 WIND EROSION

Research (Livingstone, et al., 1998) has shown that dust emission rates of over 2.5 tonnes per hectare per month occur at urban construction sites. Similar values are expected over the Potts Hill site.

Measures available to minimize such emissions include:

- Lowering the amount of exposed soil
- Applying a protective ground cover including mulches, vegetation, organic binders or dust retardants.
- Keeping the ground surface damp (not wet)
- Installing wind barriers
- Limiting traffic movement over disturbed areas

4.3 CATTLE GRID AND SHAKE OFF AREAS

Construction and Transport vehicles have a large impact on erosion especially in disturbed areas. To reduce sediment and dust leaving the worksite a Sediment Control Cattle Grid can be installed which reduces the amount of loose material leaving the site.

Examples include:

Figure 5.1 Possible solutions to sediment lost via motor vehicles.

Another variation on this idea is to run the vehicles through a trough of water which would also remove a large amount of accumulated debris.

4.4 AGEING PIPELINES

The water flow systems are being upgraded to accompany the changing conditions in drainage and sediment flow.

Figure 5.2 Ageing drainage systems found at the EASTERN end of the project site.

The drainage systems at Potts Hill currently have no additional sediment retention methods or techniques and are of a degraded quality.

4.5 STORMWATER RUNOFF CONTROL MEASURES

The choice of sediment control is not limited to those nominated in this document and each can be adapted to suite the conditions at Potts Hill. Regarding stormwater runoff the three main control measures include:

- Sediment Retention Basins; dams or impoundments designed to intercept and retain sediment in laden runoff. Basin types include Earth, rock and gabion sediment basins.
- Sediment Retention Traps; are temporary measures used in mitigation of sediment pollution to downslope lands and waterways. Basin types include straw bales, woven geotextiles or crushed concrete.
- Filter Strips; are strips of vegetation left or constructed downslope from earthworks used to trap coarse sediment. Can be an economical easy addition to the sediment control program.

Figure 5.3 Common commercial systems preventing sediments entering drains.

Nylon Capture bags are cheap and commonly used to reduce the amount of sediment leaving the project site through the storm water drains. This can also prevents pollution of other water systems.

5 STORM WATER

5.1 INTRODUCTION

Due to the nature of Potts Hill and the design of the building there will be minimal excavation as a result there will be limited dewatering required. In the event of a storm or heavy rain there may be a pooling of water on site which will need to be treated before discharge.

It is recommended that water is pumped to purpose built settlement tanks for testing and treatment before discharge. The settlement tanks are able to contain 25,000 litres of water at a time.

This procedure will be consistent with the principles and practices set out in the Department of Land and Water Conservation's Erosion and Sediment Control Manual and the Department of Housing Manual Managing Urban Stormwater – Soils and Construction (August 1998).

5.2 DAILY DEWATERING CHECKLIST

Procedure for Dewatering	**Sign off**	**Date**	**Time**
Establish base line testing by having water samples taken by a NATA accredited laboratory and respond accordingly			
Ensure permission for de watering is received from authorities before pumping out			
An on-site treatment process discharging to the stormwater system will be implemented. All site waters during construction will be contained on site and released only when pH is between 8.5 and 6.5, suspended solids are less than 50 mg/L, turbidity less than 100 NTUs, oil and grease less than 10mg/L and Biochemical Oxygen Demand (BOD5) less than 30mg/L (for storms less intense than one-in–five-year events).			
Methods of sampling and analysis of water quality will be in accordance with the applicable method listed in the EPA published Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales.			
Testing will be undertaken by the Risk Management Coordinator or other suitably qualified person, where required, using a calibrated water quality meter for in-situ testing.			
Where laboratory analysis is required as indicated by in-situ testing, appropriate sample bottles and preservatives will be used and guidance for the sampling method obtained from applicable parts of AS 5667.1 and AS 5667.6. Analysis will be undertaken where practical by a NATA registered laboratory certified to perform the applicable analysis.			
Treatment options could include the use of a mobile specialist plant for this procedure and may prove more cost-effective than pumping-out and/or on-site storage of this water.			
All site personnel will undergo site-specific induction training which will include environmental awareness and project specific objectives and targets. It will also include training in the need for effective sediment and erosion control on site. Toolbox meetings will be arranged when required, covering specific environmental issues.			
Site personnel directly involved in sediment and erosion control will be given training in the construction, operation and maintenance of the measures to be implemented.			
The Site Environmental Representative will conduct a detailed inspection at least once a week and produce a list of items requiring attention. An inspection will be conducted just prior to a long weekend or other periods when the site will be shutdown for a lengthy time. If rain is forecast, an inspection will be conducted to ensure all controls are satisfactory.			

A further inspection will be carried out during a storm event (during work hours where possible) to ensure controls are coping with the event. This applies to any rain event as well.							
As excavation of top soil progresses, any water collected at the bottom of excavations will be diverted to a temporary sedimentation basin or settlement tank. If the water contains only sediments, it will be filtered and pumped to stormwater. Before this can happen it must contain less than 50mg/L total suspended solids							
Polluted water must not enter the stormwater system. In some circumstances, a liquid waste company may be required to collect contaminated water for disposal at a licensed treatment facility.							
Document test results in daily diary							
Visually check the de watering discharge point hourly for turbidity							
Ensure back flow prevention devices are in place and functioning							
Date of Dewatering	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Sat**	**Sign Off**
Ph Level							
Turbidity reading							
Visual check							
Time of Dewatering							

6 EROSION AND SEDIMENT CONTROL SUB PLAN

Introduction

The Potts Hill site will require an extensive, considered and well managed Erosion , Sediment and Stormwater Control Plan (ESSCP),The following has been developed to recognise Aspects, Impacts and Risk's and Management Strategies for the site.

Aspect	Impact	Risk	Management Strategies and Controls	Monitoring and reporting	Targets	Responsibility
Site establishment	Site debris in stormwater drains and potential discharge to Stormwater	High	Install geo tech socks around drains around Broadman Road Install geo tech fabric on drains on the drains around the perimeter of the site Install Geo tech socks inside the perimeter of the fence behind shade cloth. Install Geo Tech sock around site drains	Daily site inspection from EC and security	Nil debris to stormwater or Stormwater	SM EC Sub contractors
Excavation	Exposure of soil causing air pollution and stormwater pollution	High	Prepare a stormwater, erosion and sediment control plan and a maintenance schedule.	Plan approved by client before commencement of works on site	Sign off by authorities before commencement on site	EC
Excavation	Transporting excavated materials	Moderate	Trucks to be covered after filing and before leaving the site	Daily site inspection report from sub contractor. Daily site inspection from EC	Nil excavated material on roads	SM EC Sub contractors
Vehicles leaving the construction site	Potential depositing soil and dust on adjoining roads which are then washed into local stormwater drains during rain and causing stormwater pollution	Moderate	Truck shaker bay facility to be installed near construction access prior to excavation. Vehicles to have wheels inspected before leaving the site Any vehicles with spoil on wheels will need to have them washed by a gurney before leaving the site Any sediment on the roads to be cleaned with a road	Daily site inspection from EC and security	Nil spoil on roads Nil infringement notices	SM EC Sub contractors

			sweeper or swept by security.			
Construction personal littering the site	Litter may enter stormwater drains polluting the Stormwater	Moderate	Regular site clean ups especially along fence and along the perimeter of the site. Sediment fences to be installed and maintained around the perimeter of the site.	Daily site walks along the perimeter by the EC	Nil litter in Stormwater or on streets	SM EC Sub contractors
Excavation and construction activity	Sediment control structures can become blocked and overload causing run off	Low	Check sediment control structures routinely, clean and reset using appropriate methods such as an excavator, backhoe or manually.	Weekly site inspections by EC	Sediment control structures in place and operational.	SM EC Sub contractors
One in five year storm	Damage to sediment controls causing build up of debris	Low	If storms are expected all sediment controls to be cleaned out thoroughly. Inspect the sediment/detention basins and stormwater treatment devices and remove any build up of debris. Reinforce if required. Check all structures are intact after a storm.	Site inspection by EC and SM before a storm.	Management structures in place before a storm.	SM EC Sub contractors
Excavation and landscaping	Material from stockpiles can cause run off into stormwater	Moderate	Install sediment controls on site such as sediment traps and barriers where required by the shifting location and the material. Ensure all stockpiles are located away from stormwater drains. If material is not stockpiled in this location surround stockpiles with sediment controls.	Daily site walks around stockpiles by the EC	Nil run off of sediment from stockpiled material.	SM EC Sub contractors
Haul Roads	Material from trucks and haul roads can entre drains.	Moderate	Gravel / road base tracks installed where required to minimise dust pollution and ground disturbance.	Daily site walks around stockpiles by the EC	Nil run off of stockpiled material	SM EC Sub contractors

7 WATER QUALITY MANAGEMENT SUB-PLAN

Introduction

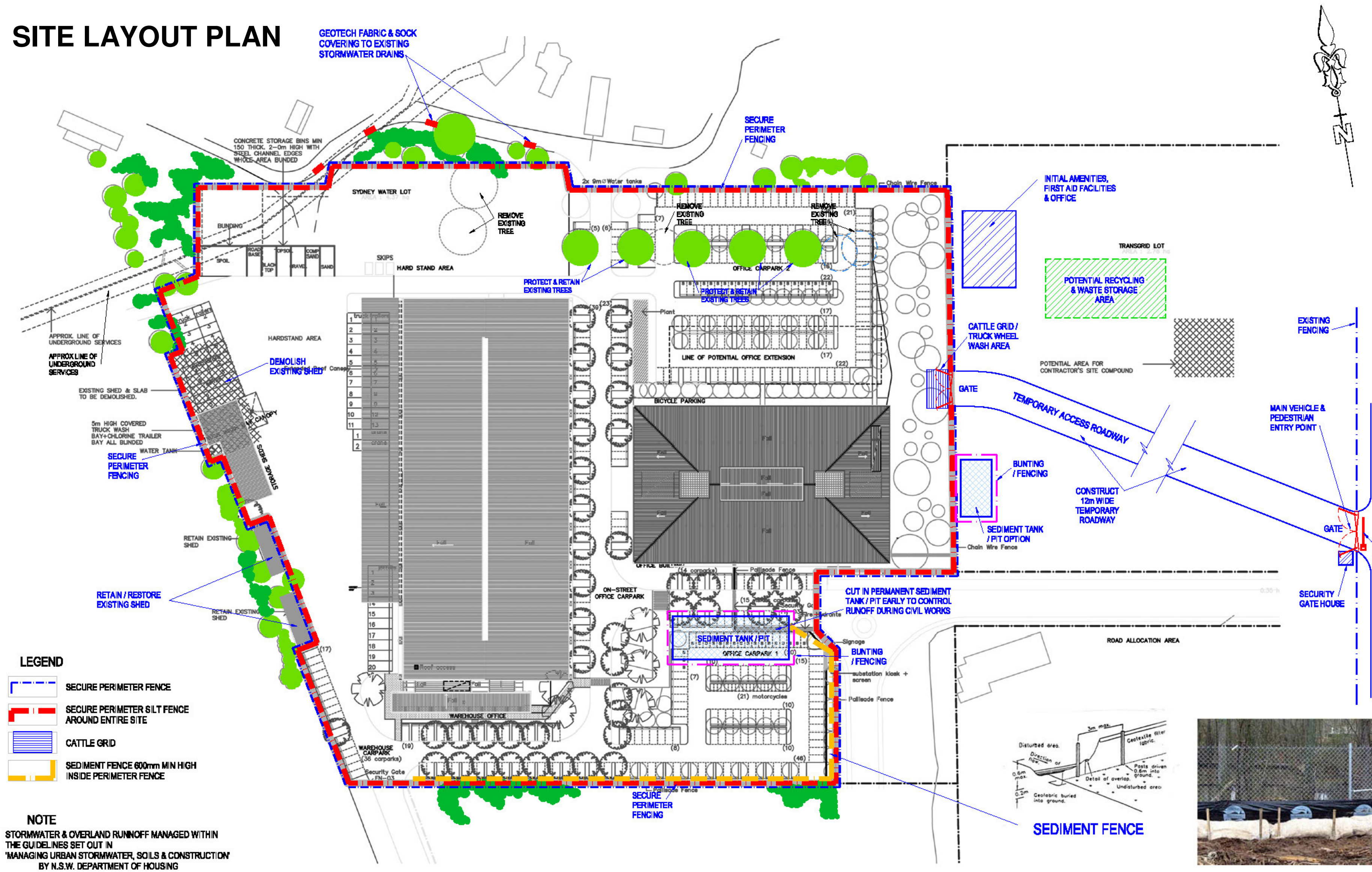
Water quality on the Potts Hill project is an aspect of the ESSP which is red flagged with the Site Management Team. The risk of potentially polluted water entering the storm water system and the reservoir will require increased diligence and the reaction time should an incident occur .

Aspect	Impact	Risk	Management strategies and controls	Monitoring and reporting	Targets	Responsibility
Site establishment	Potential debris to the stormwater drain	Moderate	Install geo tech socks around drains around the perimeter of the site. Install geo tech fabric on drains on the drains around the perimeter of the site Install Geo tech socks inside the perimeter of the fence behind shade cloth. Install Geo Tech sock around site drains	Daily Inspection of the perimeter Report in daily diary.	Nil litter or debris in the stormwater drains	SM EC
Excavation	Release of ground water Build up of ground water during rain Build up of ground water during storm events	High	All clean storm water to be directed to a central pond and then diverted through a temporary sediment settlement tank.	Site Inspection Daily Report in daily	Nil turbid water in reservoir or stormwater drains	Sub contractor SM EC
Dewatering	Discharge of polluted ground water into the reservoir or stormwater	High	Establish a baseline monitoring through a NATA accredited laboratory Develop a dewatering plan for the site and submit to Bankstown Council for sign off before commencing dewatering Ensure permission for de watering is received from the authorities and has been signed off also by the Bankstown Council Environmental Manager	Analyse Test result Receive document from Bankstown Council indicating permission to dewater Distribute and file on site and electronically	Comply to requirements from authorities	SM EC Sub contractor
Dewatering	Discharge of polluted ground water into the reservoir or	High	Ensure on site treatment of stormwater before discharging to the stormwater	REF DECC published Approved Methods for sampling and	Comply with DECC approved	SM EC

	stormwater		All site waters during construction will be contained on site and released only when the PH is between 6.5 and 8.5 and suspended solids are less that 50mg/l,turbidity less that 100 NTU's, oil and grease less than 10mg/L and Biochemical Oxygen Demand (BOD5) less than 30 mg/.	analyses of water pollutants in New South Wales	methods	Sub Contractor
Dewatering	Discharge of polluted ground water into the reservoir or stormwater	High	Site personal directly involved in dewatering will be required to attend training in dewatering procedures and the operation and maintenance of the measures to be implemented. Ensure sub contractors if they are in control of the dewatering process have dewatering procedures in place and on site training of personal responsible for pumping out the water	Training register	Updated training register	SM EC Sub contractors
Dewatering	Discharge of polluted ground water into the reservoir or stormwater	High	Ensure hourly monitoring of the settlement tank for Turbidity and PH at the point of discharge. Visually check the stormwater drains hourly to ensure no turbid water enters the drains Cease pump out if there are any signs of turbidity.	Document results hourly in dewatering register	Updated dewatering register filed and available on site	SM EC Sub contractors
Dewatering	Blockage of pumps causing backflow and overflow	Moderate	Ensure back flow prevention devices are in place and functioning. Maintain equipment and monitor level of settlement in settlement tank. Remove settlement by a liquid waste transport company when there is a considerable build up.	Weekly inspection by EC. Evidence that the sediment has been removed by a licensed contractor.	Nil backflow issues	SM EC Sub Contractors
Traffic on site	Release of debris and excavation material into drains	Moderate	Ensure all construction zones and roads are maintained and cleaned to prevent debris and excavation material from entering stormwater drains.	Daily Site Inspection by EC	Nil debris in stormwater drains	SM EC Sub contractors
Pouring of concrete	Concrete in stormwater drains	Moderate	Allow concrete waste to dry in purpose build trays and remove following day. Ensure all concrete trucks have plastic under hopper to prevent concrete spill	Daily site inspection report from sub contractor. Daily site inspection from EC	Nil concrete in stormwater drain which may enter Stormwater	SM EC Sub contractors
Wet trades on site including	Trade waste may enter stormwater	High	Specify facilities to enable paint brush, rollers and spray equipment to be cleaned without discharge of by-product into the stormwater system.	Daily site inspection from EC	Nil discharge of wet waste	SM

Painting Block work Rendering Plastering	causing pollution.		Ensure painters, block workers, renders and plasterers have a designated area away from stormwater drains. Provide on going education through the project induction, regular toolbox and sub contractor meetings. Do not plumb washout facilities to permanent drainage.		to sewer.	EC Sub contractors
Wet trades on site including Painting Block work Rendering Plastering	Trade waste may enter sewer without trade waste permit	Moderate	Ensure Trade Waste Permit has been obtained from Sydney Water before and discharge to sewer. Ensure concrete washout and paint washout is to a designated area managed by the sub-contractor and does not go to sewer.	Weekly inspection by EC. Evidence from the sub contractor that liquid waste has been transported to a licensed facility.	Nil discharge to sewer without Trade Waste Permit	SM EC Sub contractors
Re fuelling on site	Diesel, fuel, oil may enter the stormwater drains	Moderate	Ensure all refuelling on site is by Mini Tankers and spill kits are available. Any fuel diesel or oil is bunded in allocated are All bunds need to be to 133% capacity	Weekly site inspections by EC	Nil oil, fuel, diesel to Stormwater	SM EC Sub contractors
Chemical use on site	Chemical spill into the stormwater drains or to sewer	Low	Ensure all liquid chemicals are bunded on site including oil, form oil, hydraulic fluid, diesel, paints and waterproofing material.	Weekly site inspections by EC	Nil chemical discharge to stormwater drains or to the sewer	SM EC Sub Contractors

8 SITE LAYOUT PLAN



INTERNAL VIEW OF SEDIMENT FENCE

Sydney WATER

Sydney Water Potts Hill

ENVIRONMENTAL MANAGEMENT OF OVERLAND FLOW

Date 15-12-08

Drawing No. Sk. 01

EcCell environmental management pty ltd