



CONSTRUCTION, ENVIRONMENTAL MANAGEMENT PLAN

Project Name: Stg 1,Courtney Dr, Upper Coomera
Contract Number: 41901-01
Initial Date: 29th September 2023

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CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

Contents

1.0 INTRODUCTION.....	5
2.0 OBJECTIVES	6
3.0 SCOPE OF WORK	7
4.0 SITE-SPECIFIC CONDITIONS.....	7
5.0 ROLES & RESPONSIBILITIES	8
6.0 ENVIRONMENTAL TRAINING.....	8
7.0 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)	9
8.0 ENVIRONMENTAL RISK ASSESSMENT	9
8.1 Stages of Construction.....	10
9.0 ENVIRONMENTAL MANAGEMENT	12
9.1 Water Quality	12
9.1.1 Water Quality Monitoring.....	12
9.1.2 Dewatering.....	13
9.2 Non-Potable Water.....	13
9.3 Air Quality.....	13
9.3.1 Air Quality Monitoring	14
9.4 Erosion and Sediment Control	14
9.4.1 Erosion and Sediment Control Monitoring	14
9.4.2 Stockpile management.....	14
9.5 Contaminated Soils and Materials.....	14
9.5.1 Contaminated Soils and Materials monitoring	15
9.6 Waste and Resource Use	15
9.6.1 Waste and Resource Monitoring	15
9.7 Fuels and Chemicals	16
9.7.1 Fuels and Chemicals Monitoring.....	16
9.8 Noise	16
9.8.1 Noise Monitoring.....	16
9.9 Flora and Fauna	16
9.9.1 Flora and Fauna Monitoring	17
9.10 Cultural Heritage	17
9.10.1 Cultural Heritage Monitoring	17
9.11 Weed, Pest and Disease Management.....	17

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 2 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

9.11.1 Weeds, Pests and Diseases Monitoring	18
9.12 Environmental Control Measures.....	18
10.0 MONITORING AND REPORTING.....	19
10.1. Weekly Inspections	19
10.2. Environmental Monitoring & Records	19
10.3. Incident Response, Reporting and Investigation	20
11.0 RESTORATION OF SITE	20
12.0 COMPLIANCE AND CONTINUAL IMPROVEMENT	20
12.1 System Audits	20
12.2 Non-Conformance	20

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 3 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

APPENDICES

- A. BMS ENVIRONMENTAL SYSTEM PROCEDURES INCLUDED IN CEMP
- B. RISK MANAGEMENT FORMS
- C. INCIDENT REPORTING & INVESTIGATION FORMS
- D. COMMUNICATION & CONSULTATION FORMS
- E. MONITORING FORMS
- F. COMPLIANCE & CONTINUAL IMPROVEMENT FORMS
- G. ENVIRONMENTAL CONTROL PLAN
- H. DUST MANAGEMENT PLAN

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 4 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

1.0 INTRODUCTION

This Construction Environmental Management Plan (CEMP) details the environmental management requirements to be followed for the Stg 1, Courtney Dr, Upper Coomera Project. This CEMP includes:

- a) A statement of scope and objectives.
- b) A schedule of environmental elements that are expected to be affected by the works under the Contract including an outline of proposed mitigation treatments and proposed timeframes.
- c) The identification of work activities and an assessment of their potential impacts and associated risks to onsite and offsite environmental receptors (e.g. community, land uses, waters, flora and fauna, cultural heritage, etc. including times when we are not on site.
- d) Processes and responsibilities for the implementation, onsite review and maintenance of EMP and associated controls.
- e) An adaptive approach for the review and up-date of the EMP as works progress and / or following non-conformances, complains, or previously unidentified issues.
- f) After hours response including arrangements for containing environmental damage and attendance on site in the event of an emergency.
- g) Legal and other requirements – details of approvals, licenses and permits necessary to meet statutory requirements and associated conditions.
- h) Competence, training and awareness – an induction and training plan to ensure that all site personnel (including sub-contractors) understand the EMP and are aware of how the EMP is to be implemented in relation to the works, including any possible emergency response procedures.
- i) Operational control – the EMP documents the environmental procedures to manage all identified impacts and environmental protection requirements.
- j) Scaled drawings that clearly show the location and extent of environmental controls, modifications to existing control devices and monitoring locations.

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 5 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

2.0 OBJECTIVES

This CEMP has been prepared in order to provide an accurate, detailed assessment of the environmental impacts of the project and to select appropriate environmental control measures such that the desired environmental outcomes are achieved.

The objectives of this CEMP are:

- Provide a project-specific guide to control of environmental risks associated with the project.
- To prevent the occurrence of environmental incidents.
- To ensure that all stages of the construction have been assessed for their environmental impact and adequate control measures devised.
- To ensure full compliance with Legal and Other Requirements for Environmental Management.
- To demonstrate compliance with the Contract Specification and meet client expectations.
- To demonstrate our commitment to our Environmental Policy to protect and improve the state of the environment in which we operate.
- Ensure systems are developed and implemented in accordance with AS/NZS/ISO 14001:2016

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 6 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

3.0 SCOPE OF WORK

Project Name:	Courtney Dr, Upper Coomera Stage 1-3 Bulk Earthworks & Stage 1 Civils
Scope of Works	Works under the contract for subdivision involve, clearing, earthworks and associated civil infrastructure works (retaining walls, sewer, stormwater, water, electrical & comms retic, roadworks and concreting works)
Location of Works:	97 Courtney Dr, Upper Coomera QLD 4209

PROJECT DELIVERY

Contract No: 41901-01	Job No: 17987	Contract Duration: 29 Weeks
Start Date: 04/10/2023		Completion Date: 13/05/2024
Defects Liability Period: 12 Months		Final Completion Date: 13/05/2025

PROJECT DETAILS:

Construction Manager: Anthony Rosario	Telephone: (07) 3426 4000
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Principal: HB QLD Pty Ltd	
Superintendent: Mortons Urban Solutions	Mobile: 0497 777 507
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Project Manager: Michael Jabbour	Telephone: (07) 3426 4000
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Superintendent: Ursula Weeks	Telephone: ((07) 5571 1099
Email: ursulaw@urbansolutions.com.au	Mobile: 0497 777 507
Client: HB QLD Pty Ltd	Telephone:
Email: pj@hbland.com.au	Mobile: 0400 661 594

4.0 SITE-SPECIFIC CONDITIONS

The unique Environmental Aspects of the project and the impact they will have on the construction planning and methodology will be detailed where required under the contract.

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 7 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

5.0 ROLES & RESPONSIBILITIES

Roles and responsibilities specifically pertaining to Environmental Management for this project are as follows:

Project Manager

The Project Manager has overall responsibility for site environmental management. The Project Manager is authorised to liaise with authorities, the client and other external bodies as required.

Project Engineer

The Project Engineer is responsible for Monitoring and Reporting of Environmental performance and review of the CEMP. The process will be as follows:

The CEMP shall be reviewed to incorporate any changes to.

- Scope of works
- Construction Methodology
- The Environmental Aspects and Impacts Register
- Change in environmental conditions
- Non-conformance issued

Foreman

The Foreman must assist Project Manager / Engineer in site environmental management, implementation of the CEMP and ensure its compliance through diligent maintenance of on-site controls.

HSE Co-ordinator

Monitoring the CEMP as per the audit plan and provision of legal updates as and when necessary, assisting the project team as required ensuring compliance with the Contract, and Legal and Other Requirements

6.0 ENVIRONMENTAL TRAINING

Environmental Management training is managed in accordance with procedure WINBMS-EP-03 Environmental Incident Reporting (refer Appendix A).

Winslow personnel directly involved in the implementation of this CEMP and installation and maintenance of environmental control measures will have demonstrated competence and suitable experience in environmental management in a construction environment or have completed a nationally accredited training course which addresses management practices for erosion and sediment control.

Site-specific Environmental Training for field and project staff is provided during the Site Induction (see Appendix D for Site Induction Form). During the site induction, the inductees are introduced to the environmental control measures in place on site by reference to our environmental management procedures and the Environmental Control Plan (see Appendix G).

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 8 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

7.0 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

Each revision of the CEMP will address the administrative requirements and each environmental element in:

- An Environmental Aspects & Impacts Register performed for each stage of construction (refer to CEMP Section 8 and Appendix B)
- An Environmental Control Plan (ECP) - a scaled drawing showing the environmental controls to be adopted at different stages of construction. See Appendix G
- Environmental Control Procedures which satisfy the requirements of the specification, to ensure compliance at each stage of construction.

The environmental aspects addressed in the CEMP may include:

- Soil Management
- Contaminated Soils and Materials
- Storage & Handling of Hazardous Substances
- Water Quality
- Groundwater Quality
- Non-Potable Water
- Erosion and Sediment Control
- Noise and Vibration
- Air Quality
- Flora and Fauna
- Waste and Resource Use
- Fuels and Chemicals
- Weeds, Pests and Diseases
- Cultural Heritage

8.0 ENVIRONMENTAL RISK ASSESSMENT

Environmental Hazards associated with the project have been identified and analysed for level of risk according to BMS Procedure.

The Project has been assessed using the Environmental Aspects & Impacts Register (WINBMS-SP-05-A, see Appendix B) to assign project-specific risk ratings to associated environmental risks.

The Register identifies existing system and operational procedures that have been developed to avoid or minimise risks associated with each identified hazard, and highlights potential for the requirement of special control measures to be devised.

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 9 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

8.1 Stages of Construction

Risk assessment using WINBMS-SP-05 is carried out in a manner that allows for each of the relevant Environmental Aspects associated with different types of activities, which are carried out in varying order, to be appropriately addressed.

At Winslow, we understand that different areas of a project can reach different stages of construction simultaneously, rather than set a regular time frame for review, or deferring review until each stage is imminent, our EMP contains risk assessment of each of the following stages of construction:

- Project Setup.
- Site Preparation.
- Clearing

The Environmental Aspects & Impacts Register (contained in Appendix B) presents the risk assessment in such a way that it can be displayed along-side the Environmental Control Plan for each stage (see Appendix G).

8.2 Location of buildings and structures on adjacent properties.

There are a number of residents that are adjoining directly to the works zone as identified in the markup below, works will be completed in a manner to minimize the effect of construction activities on neighbouring properties.



Neighbouring properties identified as being impacted by works.

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 10 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

8.3 Temporary vehicular access points and frequency of use (Haulage plan);

A sketch of the proposed temporary vehicle access point to the Site Compound and Material Laydown Areas is shown below, which is located at the entry to the Development Site at Stg 1, Courtney Drive, Upper Coomera. The frequency of use will be guided by the works onsite.

1. **Light Vehicles**, (1), are to use 79 Courtney Drive as the designated access and exit points.
2. **Heavy vehicles**, (2), are to use 97 Cortney Drive as the designated access and exit points.
3. **Mackellar Dr**, (3), is to be use when construction of the civil component of works commences. This access point will be used for the import materials used in the construction on the project. Thes materials can range from concrete, roadbase material, gravel, stormwater, water, sewer materials etc. The materials will change depending on the life cycle of the project.
4. **Rangeview Rd**, (4), is to be use when construction of the civil component of works commences. This access point will be used for the import materials used in the construction on the project. Thes materials can range from concrete, roadbase material, gravel, stormwater, water, sewer materials etc. The materials will change depending on the life cycle of the project.

*Access for via Rangeview Rd and Mackellar Dr will change depending on the where the project is in its llifecycle.

On average there will be 20-30 vehicles using 79 & 97 Courtney Drive as the access points for the duration of the 29 week (scheduled) project. During the road base import operation, its estimated that 6-8 truckloads per hour will be delivered to the work area through Rangeview and Mackellar Dr. During the concrete items i.e. stormwater structures, sewer structures, footpaths, kerb and so on the requirements for concrete deliveries may range from 1 delivery per day (minor works) up to 3 loads per hour during kerb construction.

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 11 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN



9.0 ENVIRONMENTAL MANAGEMENT

9.1 Water Quality

Winslow maintain a BMS procedure, WINBMS-EP-17 Water Quality Management (refer Appendix A), which outlines the processes to follow to ensure Winslow's construction activities do not have a detrimental impact on water quality in waterways.

9.1.1 Water Quality Monitoring

Winslow will conduct water quality monitoring during all stages of construction for the parameters listed in the table below to ensure water quality in the receiving waterways does not vary between the upstream and

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 12 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

downstream limits of the worksite during the period (where the upstream results become the background limits), or is as agreed between Winslow, the Superintendent and the EPA.

Parameter	Method
Turbidity - NTU	Measured with on-site meter
Electrical Conductivity - (EC) $\mu\text{S}/\text{cm}$	Measured with on-site meter
pH	Measured with on-site meter
Dissolved Oxygen (DO) - mg/L	Measured with on-site meter
Temperature - $^{\circ}\text{C}$	Measured with on-site meter
Litter	Visual
Oils and Greases	Visual

Monitoring shall be carried out within waterways and/or drainage infrastructure upstream and downstream of the limits of the site for each rain event within twelve hours of returning to work after a rain event, outside working hours.

Water Quality Monitoring results are recorded on WINBMS-ER-05 Water Quality Register (refer Appendix E).

9.1.2 Dewatering

Water quality monitoring shall take place when dewatering ponded water to receiving waterways.

The quality of ponded water shall not exceed 50 NTU or shall not exceed the turbidity of the water in the receiving waterway.

9.2 Non-Potable Water

Options for use of non-potable water have been investigated and are not feasible for the following reasons:

- A viable source of non-potable water has not been located within reasonable proximity to the works.

9.3 Air Quality

Winslow maintain a BMS Procedure, WINBMS-EP-15 Air Quality Management (refer Appendix A), which describes the manner in which Winslow undertakes its works to ensure air quality is not adversely impacted by construction works.

Winslow will ensure that:

- Dust generated from road construction activities does not create a hazard or nuisance to the public, disperse from the site or across roadways, nor interfere with crops and stock or commercial or residential properties or other dust sensitive receptors.
- Emissions of visible smoke from construction plant and equipment shall be for periods no greater than 10 consecutive seconds.
- Emissions of odorous substances or particulates shall not create or be likely to create objectionable conditions for the public.
- Materials of any type shall not be disposed of through burning.

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 13 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

- Materials that may create a hazard or nuisance dust shall be covered during transport.

9.3.1 Air Quality Monitoring

Air quality will be monitored visually for fugitive dust leaving the site during works. Air quality and plant emissions are monitored visually during weekly environmental inspections and recorded on CCABMS-SP-15-A Weekly HSE Inspection Check Sheet (refer Appendix E).

9.4 Erosion and Sediment Control

Erosion and sediment control measures will be defined and implemented as part of the Environmental Control Plans prepared for each work area.

9.4.1 Erosion and Sediment Control Monitoring

Winslow will inspect all erosion and sediment control works at least weekly, during the weekly environmental inspection, and at the following intervals during rain events:

- Within twelve hours of returning to work after a rain event outside working hours.
- When runoff is leaving site.

Winslow will ensure that any defects or deficiencies in control measures identified by monitoring undertaken is rectified immediately and the control measures are cleaned, repaired and augmented to ensure effective control measure operation.

Monitoring of erosion and sediment controls is recorded during weekly environmental inspections recorded on CCABMS-SP-15-A Weekly HSE Inspection Check Sheet (refer Appendix E).

9.4.2 Stockpile management

Winslow BMS procedure WINBMS-EP-12 Erosion and Sediment Control (refer Appendix A) provides guidance on the management of stockpiles to reduce the risk of environmental impacts of dust, erosion and sediment pollution. Stockpiles will be located no less than 10 metres away from waterways and drainage points. Where it is not possible to provide a clearance of 10 metres, stockpiles will be located above the normal high-water level of waterways and protection provided to prevent stockpiled material entering the waterways.

9.5 Contaminated Soils and Materials

Winslow maintain a BMS procedure WINBMS-EP-05 Contaminated Soils and Materials (refer Appendix A) which establishes guidelines for the handling and disposal of contaminated soils and materials. Discovery of contaminated soils and materials during excavation will be managed in accordance with this procedure, and with TMR and EPA Guidelines.

In the event contaminated soil or material is encountered during excavation Winslow will notify the Superintendent and the EPA if required. Prior to use the contaminated material shall be analysed to verify that the proposed use is in accordance with legislative requirements. The use of contaminated material within the works area shall be subject to the approval of the Superintendent. Where contaminated material is re-used on site or disposed off-site, records will be kept of the source, type of contamination, volume of contaminated material incorporated, the locations placed/legal point of disposal and any

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 14 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

investigations/testing undertaken. Details are recorded on WINBMS-EP-14 Waste Minimisation (refer Appendix A).

Winslow BMS procedures WINBMS-EP-01 Fuel and Chemicals and WINBMS-EP-08 Spill Management (refer Appendix A) describe the processes Winslow follow to ensure soils are not contaminated as a result of the works.

9.5.1 Contaminated Soils and Materials monitoring

Winslow will monitor the site for contaminated soils and materials during excavation, and during weekly environmental inspections recorded on CCABMS-SP-15-A Weekly HSE Inspection Check Sheet (refer Appendix E).

9.6 Waste and Resource Use

Winslow BMS procedure WINBMS-EP-14 Waste and Resource Use (refer Appendix A) describes the manner in which Winslow will ensure the generation of waste is managed in accordance with the hierarchy of Avoid, Reuse, Recycle or Dispose of waste material.

All waste material will be managed in accordance with the table below:

Material	Waste Management Option
Asbestos	EPA licensed landfill
Asphalt	Recycle or reuse - not to landfill
Concrete and concrete washings	Recycle or reuse - not to landfill
Contaminated soil	Recycle or reuse on site if opportunity exists, If removed from site, transported by an EPA licensed contractor and disposed in accordance with EPA Regulations
Felled Woody Vegetation (except fragments of noxious or environmental weeds capable of regeneration)	Mulched for reuse, or used for habitat logs
Woody weed fragments capable of regeneration	Burial on site, (deeper than 500mm and not in fill, pavement or other critical areas) composting or landfill
Formwork	Reuse or dispose to landfill
Plastics (Recycle No's 1,2,3,4,5,6,7)	Recycling facility - not to landfill
Metal	Recycle or reuse- not to landfill
Oils and containers and lead acid batteries	Recycling facility - not to landfill
Packaging materials	Recycle where possible or dispose to landfill
Petroleum products from spills (absorbed in spill kit materials or contaminated soil)	Recycle or reuse with rehabilitation of contaminated soils if opportunity exists Transported by an EPA licensed contractor and disposed in accordance with EPA Regulations
Timber (untreated)	Recycle - not to landfill
Litter	Recycle or dispose to landfill
Office Waste	Recycle where possible or dispose to landfill
Other waste excluding the above wastes	Recycle or reuse where the opportunity exists

9.6.1 Waste and Resource Monitoring

Winslow will monitor the site for instances of inappropriate waste management during weekly environmental inspections, recorded on CCABMS-SP-15-A Weekly HSE Inspection Check Sheet (refer Appendix E).

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 15 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

9.7 Fuels and Chemicals

Winslow BMS procedures WINBMS-OP-05 Dangerous Goods and Hazardous Substances, WINBMS-EP-01 Fuels and Chemicals, and WINBMS-EP-08 Spill Management (refer Appendix A) provide guidance on how aspects associated with the handling and storage of chemicals is managed on site in order to reduce the risk of chemical spills having an adverse impact on the environment.

Winslow will ensure that:

- Fuel and chemical storage areas comply with the Dangerous Goods (Storage and Handling) Regulations 2012 and EPA Bunding Guidelines.
- Fuel and fluid top-up points are nominated and are located not less than 20 metres from the nearest waterway or drainage point.
- Readily accessible and maintained spill kits are provided for the purpose of cleaning up chemical, fuel and oil spills.
- Personnel are trained in the efficient deployment of spill kits. and
- A contingency plan is prepared that addresses the containment, treatment, and disposal of any spill.

9.7.1 Fuels and Chemicals Monitoring

Winslow will monitor the storage and handling of fuels and chemicals weekly during weekly environmental inspections recorded on CCABMS-SP-15-A Weekly HSE Inspection Check Sheet (refer Appendix E).

9.8 Noise

Winslow procedure WINBMS-EP-16 Ground and Noise Vibration (refer Appendix A) describes how Winslow manages noise and vibration generated by its construction activities, and methods to reduce the impacts.

Winslow will undertake the works under the contract in accordance with the following requirements in accordance with the contract:

- Hours of work shall be between 6:30am and 6pm Monday to Saturday.
- Advise local residents in advance when unavoidable out-of-hours work will occur.
- Obtain Superintendents and Council approval before undertaking works outside the hours above.

9.8.1 Noise Monitoring

Winslow will monitor the site and its plant and equipment for generation of excessive noise during weekly environmental inspections recorded on CCABMS-SP-15-A Weekly HSE Inspection Check Sheet (refer Appendix E).

9.9 Flora and Fauna

Winslow BMS procedure WINBMS-EP-13 Protection of Flora and Fauna (refer Appendix A) provides guidance on how Winslow identifies and protects sensitive/protected Flora and Fauna during the undertaking of its construction activities.

Winslow will:

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 16 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

- Avoid, minimise and offset (where appropriate) the removal of native vegetation during construction.
- Avoid injury to fauna or damage to protected vegetation or habitat.
- Protect significant flora and fauna sites, species or habitat not previously identified.
- Obtain any necessary permits or approvals from the relevant authorities prior to disturbance of flora/fauna sites or relocation of native fauna affected by works under the contract.
- Areas of existing vegetation and native fauna habitat identified to be retained shall be identified as No-Go Zones and protected by temporary fencing and signage.
- Avoid placing or storing materials or debris within the limit of the root zone of vegetation to be retained.
- Avoid trafficking and compacting, storing materials on soil in areas that are currently vegetated or are to be re-vegetated.

Prior to removing any vegetation or habitat, Winslow shall arrange an on-site inspection with the Superintendent and other relevant authorities to confirm and clearly identify and mark trees, vegetation or habitat to be removed. Any removal shall be consistent with the Contract drawings and any relevant permits, and sites nominated as No-Go Zones shall be fenced and signed.

9.9.1 Flora and Fauna Monitoring

Winslow will monitor the site Flora and Fauna management and protective measures during weekly environmental inspections recorded on CCABMS-SP-15-A Weekly HSE Inspection Check Sheet (refer Appendix E).

9.10 Cultural Heritage

No Cultural Heritage sites have been identified within the construction footprint of Stage 1 & 2 of the project. In the event that suspected cultural heritage is encountered Winslow BMS procedure. Protection of Archaeological Heritage Sites describes the process Winslow follows to protect archaeological/cultural heritage.

9.10.1 Cultural Heritage Monitoring

Winslow will monitor the site for cultural/archaeological heritage during excavation and during weekly site environmental inspections recorded on CCABMS-SP-15-A Weekly HSE Inspection Check Sheet (refer Appendix E).

9.11 Weed, Pest and Disease Management

Winslow procedure WINBMS-EP-18 Weeds, Pests and Diseases (refer Appendix A) provides guidance on how Winslow manages weeds, pests and diseases on site, and measures taken to eliminate or reduce the risk of the spread of weeds, pests and diseases.

Winslow shall prevent the spread of declared weeds, pests and diseases within the site and off-site through the implementation of controls that shall include as a minimum:

- Treatment of declared weeds prior to the commencement of ground disturbing activities.
- Response to their identification through monitoring of the site.

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 17 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

- Management of weed and soil pathogen potential within imported materials.
- Provision for cleaning of plant and equipment at the following times:
 - Prior to arrival on site.
 - Prior to departure from site. and
 - Prior to movement within the site from infested to non-infested areas.

9.11.1 Weeds, Pests and Diseases Monitoring

Winslow will monitor the site for weeds, pests and diseases during weekly environmental inspections recorded on CCABMS-SP-15-A Weekly HSE Inspection Check Sheet (refer Appendix E).

9.12 Environmental Control Measures

Appendix G contains the Environmental Control Plan/s for the work (as detailed in Section 9 of the CEMP). This plan contains a scaled, diagrammatic representation of different types of protection measures that will be implemented, including but not limited to:

- Water Quality Monitoring
- De Watering locations
- Ground Water Monitoring
- Locations of sediment controls, such as silt fencing, silt logs, hay bales.

Appendix A of the CEMP contains detailed procedures employed by Winslow to implement Environmental Controls effectively.

All measures to be implemented during the works will be in accordance with the council approved project drawings, which outlines the environmental controls to be implemented.

A site specific Certified Professional Erosion & Sediment Control Plan will be devised and implemented by EnviroConsult Pty Ltd.

Ongoing monthly audits will be conducted by the CPESC to monitor compliance and implement any additions/revisions if required. It is Winslow's policy to mitigate sediment and stormwater runoff on ALC Class A & B Land and implement industry best practice standards

Alisha Croft (EnviroConsulting) will be the project's nominated Environmental Consultant

enviro consulting

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Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 18 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

10.0 MONITORING AND REPORTING

All environmental monitoring results, non-conformance reports and environmental data relating to environmental performance shall be submitted to the Superintendent monthly or as agreed.

Reporting data/information and frequency is summarised in the table below.

Data/Information	Frequency
Pollution Infringement Notices or Pollution Abatement Notices and/or any notices of prosecution.	Within 24 hours of receipt by Winslow
Statutory documents obtained by Winslow as part of the project (e.g. permits).	Within 1 week of receipt by Winslow
Results of any air quality and water quality monitoring undertaken as part of the project.	At completion of works
Itemised fuel (diesel, unleaded and LPG) use on-site by Winslow and its subcontractors.	At completion of works
Itemised volumes/quantities, including recycled materials, for the following: - Concrete - Steel (reinforced and other) - Road surface material i.e. spray seal, asphalt - Aggregate - Cement treated crushed rock - Fill material - Lime stabilised aggregate - Plastic products - Copper wire	At completion of works
Itemised quantities and types of materials sent off-site including prescribed waste certificates.	At completion of works
Itemised quantities and sources of all water used on-site.	Monthly
Itemised quantities of energy use (electricity and gas) including the proportion of renewable sources.	At completion of works

10.1. Weekly Inspections

In accordance with Winslow procedures, an inspection of the site is carried out weekly.

During the inspection, CCABMS-SP-15-A Weekly HSE Inspection Check Sheet must be filled out for permanent record. This checklist is contained in Appendix E of the CEMP. Any non-conformances, issues or follow-up action required must be reported to the Foreman and Project Manager / Project Engineer for immediate action.

10.2. Environmental Monitoring & Records

All environmental monitoring shall be performed in accordance with the contract, in addition to the weekly inspection, additional specific environmental monitoring, such as Water Quality, Air Quality, and Vibration monitoring may be required. The BMS contains appropriate registers for recording or environmental monitoring. If this monitoring is required, these forms will be found in Appendix E. The Environmental procedures contained within Appendix A each contain monitoring requirements for each aspect of environmental protection / management.

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 19 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

10.3. Incident Response, Reporting and Investigation

In the event of an incident or a near miss, an incident investigation must be carried out and the relevant form submitted to Winslow HSEQ Department for review. WINBMS-EP-03 (see Appendix A) specifies the use of the WINBMS-EP-03-A Environmental Incident Report (see Appendix F).

It is essential that all incidents are reported to Head Office immediately and that written reports are submitted within 48 hours.

The Principal will be notified of any incident within 24 hours. Incidents of an Environmental nature will be reported to the EPA immediately.

The Emergency Contacts List (see Appendix C) contains all the required contact numbers in case of an emergency, including the EPA. A register of all incidents and near misses will be maintained throughout the duration of the project, this can be found in Appendix C.

11.0 RESTORATION OF SITE

All areas disturbed by construction, both on-site and off-site will be restored at the completion of the works.

Erosion and sediment controls must remain in place and be maintained at least until the new vegetation provides sufficient protection from erosion.

Upon completion of the project, areas such as compounds, material storage areas, access roads and haul roads will be restored as close as possible to their original condition.

12.0 COMPLIANCE AND CONTINUAL IMPROVEMENT

12.1 System Audits

The audit program includes management system audits, operational and technical audits (including workplace and housekeeping inspections), and legal compliance evaluations to verify compliance.

Appendix F contains the Surveillance Audit form (WINBMS-SP-17-B) used for internal system audits.

Sub-contractors engaged by the project will participate in such audits and safety inspections and provide feedback to the project management team.

External compliance audits of the Project Management Plans shall be carried out by an independent third-party auditor if required under the contract.

12.2 Non-Conformance

Winslow Procedure WINBMS-SP-16 Non-Conformance provides guidelines for identification and resolution of non-conformances.

In the event of a non-conformance with the Contract, or the CEMP / BMS, a Non-Conformance Report will be raised using (WINBMS-SP-16-A, Appendix F) and submitted to both Winslow HSEQ Department and the Client and to ensure timely close-out is achieved.

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 20 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 21 of 29

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

APPENDIX A

BMS ENVIRONMENTAL SYSTEM PROCEDURES INCLUDED IN CEMP

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 22 of 29



MANAGEMENT OF FUELS AND CHEMICALS (WINBMS-EP-01)

1.0 Objective & Scope

To establish guidelines for management of fuels and chemicals on project sites and is applicable to all construction activities that require fuels or chemicals to be stored onsite.

2.0 Procedure

2.1 It is the responsibility of site project team to ensure that chemicals used onsite are stored and handled appropriately to reduce the risks of spills and leaks and potential impacts to human health and the environment.

2.2 Storage Locations

avoid locations:

- next to stormwater inlets, drainage lines, waterways, and sensitive receivers such as vegetation and animal habitat
- without secondary containment systems (e.g. bunding)
- with potential for direct water pollution or land contamination (e.g. in or on structures that are built over water such as boat sheds, jetties, pontoons)
- on bare ground or unsealed surfaces.

Where required a bund should be constructed to hold at least 25% of the drums stored on site and 100% of the tanks volume installed on site.

Mismanagement of chemicals on site has the potential to contaminate surface waterways, leach toxins into the groundwater, result in fitness or mortality of Flora and Fauna and result in OH&S issues. The environmental protection measures outlined in this procedure may be used to mitigate these effects.

The installation and maintenance of storage locations can be as follows.

- Nominated points for refuelling and fluid top up of vehicles and plant which shall be undertaken in a designated area at least 10 metres from any drainage point, from sensitive receivers (e.g., waterways, vegetation or animal habitats).
- with sealed surfaces
- with suitably designed and maintained secondary containment and covered roofing to exclude rainwater contact.
- Such Nominated Fuel and Chemical Storage areas comply with relevant Dangerous Goods (Storage & Handling) Regulations 2012 and EPA Bunding Guidelines (EPA Publication 347) including signing of compounds and bulk storage containers.
- Disposal of contaminated materials resulting from refuelling areas.
- Provision of readily accessible and maintained hydrocarbon spills kits for the purpose of cleaning fuel and other spillages on site.
- Trained personnel on site for deployment of spill kits in the event of an emergency.
- A contingency plan that shall address the containment, treatment and disposal of any spill.
- The facility should be constructed away from any drainage lines or major water bodies, Excavate bund to a depth of 300mm. Use excess spoil from excavation to build the walls of the bund to 600mm.

2.3 Establishing Secondary Containment Areas

- **Bunds** – Select suitable location for bunded area.

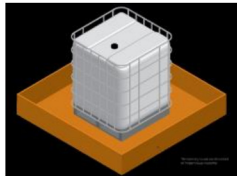
Raised impermeable barriers forming the perimeter of secondary containment areas (e.g. walls, speed humps, guttering, curbing, flexible rubber barriers constructed with robust, impermeable, UV and chemical resistant material or lined with such material)

- Two layers of thick orange plastic, impervious to chemicals contained in the bund, are required to line the excavation. A layer of sand maybe required before installation of plastic to eliminate the potential for the plastic to be ripped or pierced.
- Provide safe access to ladder and valves by positioning the tank close to the edge and installing a crushed rock platform to comfortably access the container.
- Maintain and monitor the bund area at least once a fortnight for volume and contact the Project Manager if the excavation becomes near full and requires pumping-out.

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Approved By:	Manager Systems	Date Approved:	05/03/2021	Date First Issued:	01/01/2015
Document Name:	Management Fuels & Chemicals			Revision No. 8	Page 1 of 2

MANAGEMENT OF FUELS AND CHEMICALS (WINBMS-EP-01)

- **Encasement** – storage containers with built-in (integral) secondary containment (e.g. encasing plastic pipes that carry liquid within a larger pipe which drains to a collection sump, placing drums inside larger, sealed plastic drums during transport by forklift)
- **Grading** of sealed surface areas to form a contained area, either as part of a building or an external structure.



2.4 Handling & Disposal of Chemicals

- Handle and dispose of chemicals appropriately by:
- using the appropriate personal protective equipment (PPE) for worker safety
- keeping current SDS of the chemicals in a location accessible to all staff and emergency services and informing workers of their availability and location
- purchasing smaller quantities and safer chemicals (e.g., granular products instead of dusty powders, water-based products, more dilute chemicals)
- minimising spills and splashes by using safe pouring or decanting techniques e.g., fitting drip collectors to containers with taps, and decanting over a collection tray.
- for mobile bowsers onsite, ensuring that the bowsers have a valve or a tap that either closes off automatically or is lockable to prevent leaks.
- disposing of any unused chemicals in an appropriate manner (contact your local council, local landfill, chemical waste disposal company or EPA QLD for specific advice).

2.5 Spill Response & Clean up

Ensure all spills are contained and do not spread around the site or beyond the site boundary impacting the surrounding environment. Spill response includes containment, clean-up and appropriate disposal.

Ensure employees are trained in the use of spill response equipment.

Spill kits containing absorbent material appropriate to the type of chemical being used on site must be maintained.

3.0 Mobile Refuelling

Where a fuel or a chemical bund for containment is not required to be installed on site, all items of plant or vehicles shall be refuelled on site with the help of mini oil tankers in a designated area on site in accordance with the Environmental Management & Control Plan (EMP)

4.0 Monitoring

Fuel and Chemical storage and Equipment fill areas shall be monitored for compliance at intervals of not more than 7 days.

4.0 REFERENCES

EPA Bulletin Publication 347- Bunding Guidelines, Dec. 1992.
 Dangerous Goods (Storage & Handling) regulations 2012
 Dangerous Goods (Storage and Handling) Amendment Regulations 2020
 EPA Publication 1834 Civil Construction, Building & Demolition Guide. 2020
 EPA Publication 1698 Liquid Storage and Handling Guidelines
 EPA Publication 1730 Solid Storage & Handling Guidelines.
 EPA Act 2017 (Section 25-27 General Environmental Duty)

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Document Name:	Management Fuels & Chemicals			Revision No. 8	Page 2 of 2



PROTECTION OF FLORA & FAUNA (WINBMS-EP-13)

1.0 Objective & Scope

Protection of Flora and Fauna as per the contract specifications and is applicable to all Winslow Project sites.

2.0 Procedure

- Avoid, minimize and offset (where appropriate) the removal of native vegetation during construction.
- Avoid injury to fauna or damage to protected vegetation or habitat and
- The discovery of significant flora and fauna sites, species or habitat not previously identified shall be managed to protect flora and fauna.

2.1 Permits and Approvals

Permits from relevant authorities shall be obtained in prior to disturbance if any flora or fauna sites or relocation of native fauna effected by works under the contract.

Works shall comply with all permits and approvals and associated conditions in accordance with the contract.

2.2 Discovery of Significant Flora and Fauna

In the event that significant flora and fauna is discovered, Winslow shall cease work immediately and notify the superintendent.

An appropriately qualified ecologist shall be engaged to accurately identify and provide advice for the management of the discovered significant flora and fauna species.

Winslow shall submit to the superintendent a management plan/procedure that has been approved by the relevant authority to manage the flora and fauna species.

2.3 Protection of Flora and Fauna.

Particular care shall be taken to avoid any damage to the roots, trunks and branches. Protection shall include the erection of fencing outside the limit of the canopy of the vegetation or outside of the fauna site. Fencing shall consist of not less than three strands of wire (located top, middle and bottom) weaved through the Para webbing and appropriately strained, and be located to avoid disturbance and damage to the vegetation or fauna site. The fence shall be erected prior to commencing work on site.

2.4 Removal of Flora and Fauna

Winslow shall engage a qualified ecologist with appropriate permits/licenses to be present on site during the removal of vegetation to;

- Identify and examine any trees (Incl: hollow bearing trees) and fallen logs affected by the works under the contract to identify, capture and relocate fauna identified within the zone to be cleared.
- Provide advice on alternative fauna habitat sites

If appropriate, relocation of any fauna or nests shall be made to adjacent habitat and shall be undertaken in accordance with the requirements of Department of Sustainability and Environment (DSE), where practicable any nests found to be inhabited by native birds or mammals (e.g. possums or gliders) shall be removed outside of species breeding season. Any targeted vegetation removal from within the No-Go Zones shall be undertaken utilising methods that avoid impact on any other flora or habitat within the No-Go Zone.

Pruning of any vegetation to be retained shall be undertaken by a suitably qualified practising arborist. (with a minimum qualification of AQF Level 3, Cert III in Horticulture (Arboriculture).

All trees, shrubs and other vegetation outside the limits of stripping are nominated for identification and protection. An Internal PERMIT TO CLEAR (WINBMS-EP-13-A) must be completed prior to clearing within or outside the stripping area.

2.5 Damage to Protected Vegetation

Prepared By:	Systems Administrator	Date Revised:	24/03/2022	Document No:	WINBMS-EP-13
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Document Name:	Protection of Flora & Fauna			Revision No. 12	Page 1 of 2



PROTECTION OF FLORA & FAUNA (WINBMS-EP-13)

Where damage to flora and fauna habitat has occurred as a result of the works under the contract, the superintendent reserves the right to direct Winslow to repair or replace the vegetation or provide fauna habitat to an equivalent or better quality in accordance with the document 'Victoria's Native Vegetation: A Framework for Action' and 'Native Vegetation Revegetation Planning Standards June 2006'.

3.0 Monitoring Requirements

The contractor shall undertake monitoring of the condition of Flora and Fauna habitat sites and protective measures at the sites during construction activities and at other times as per the following intervals.

When construction activities are occurring in the vicinity of the sites: **Daily.**

At other times: **Once in 7 Days**

Identify wildlife habitats, remove them sympathetically and relocate displaced animals. All personnel involved in site clearing shall be inducted into these processes. Habitat trees shall be felled with care to minimize impact.

Wherever required, all flora assets shall be protected during the course of the works as far as practical. Confirm the removal of any tree/shrub with the Client Representative prior to its removal. Selection and Relocation of Tree Trunks for Wildlife Habitat

4.0 References:

Flora and Fauna Guarantee Act 1988

Wild Life Act 1975 (Amended 2002)

EPA Act 2017 (Section 25-27 General Environmental Duty)

EPA Amendment Act 2018

Prepared By:	Systems Administrator	Date Revised:	24/03/2022	Document No:	WINBMS-EP-13
Approved By:	Manager Systems	Date Approved:	24/03/2022	Date First Issued:	01/01/2015
Document Name:	Protection of Flora & Fauna			Revision No. 12	Page 2 of 2

AIR QUALITY MANAGEMENT (WINBMS-EP-15)

1.0 Objective & Scope

To consider all factors impacting air quality including climatic conditions, physical characteristics of the site and the nature of activities to be undertaken. This is applicable to all Winslow project sites.

2.0 Procedure

To minimize air pollution generated from construction works that could impact the health and wellbeing of sensitive environments and receptors, control measures may be implemented in accordance with the project aspects register **WINBMS-SP-05-A** and the requirements outlined in the State Environment Protection Policy (Air Quality Management) and EPA Publication 1834/2020.

Where required:

- grass seeding of earth stockpiles or other protective measures to prevent dust.
 - the progressive topsoiling and revegetation of the Site as work proceeds.
 - watering of Works areas and temporary paving of haul roads to suppress dust.
 - cessation of works at areas of the Site where climatic conditions are such that construction operations generate unacceptable levels of dust pollution; and
 - Minimise the extent of exposed stripped surface to be covered with appropriate fill material.
 - Avoid generating greenhouse gases where practicable including disposal of any material through burning.
- Conduct operations on site in such a manner as to ensure that no visible dust escapes the site into adjacent residences, properties and roadways. At any time where visible dust crosses into adjacent properties or roadways, take immediate action to stop the movement of dust from the site, including cessation of plant movement and work.

Results of dust monitoring shall be submitted for testing within 24 hours of collection and sampling.

Undertake ongoing monitoring and measurement of dust from the site during the course of the Works shall not exceed the limits, in accordance with the requirements of Australian Standard **AS3580.10.1 - 2003**.

3.0 Operate and maintain dust monitoring stations if required in accordance with State Environmental Protection Policy and the project aspects register. Ensure that all monitoring stations are secure from vandalism and tampering at all times.

The monitoring stations shall be at locations where dust is likely to have the greatest impact on adjacent properties or create inconvenience to the general public. One monitoring station may be a reference station placed in proximity to the site which is unaffected by work under the contract. Where required under the contract, results of dust monitoring shall be submitted to the client superintendent within 14 days of collection.

The risk identification process for dust is carried out in the weekly environmental check and recorded on the Environmental Checklist (**CCABMS-SP-15-A**). If an issue arises the NCR procedure shall follow to resolve the issue.

Ensure that all dust levels experienced throughout the Contract period do not exceed levels as per the table below or as required contractually. Should the monthly dust monitoring reports show that this level has been exceed, undertake measures to reduce the dust to the required level.

Table:

Period	Total Solids (Max)
November to March	2 grams/square metre, for any 14 day consecutive period
April to October	4 grams/square metre, for any 30 day consecutive period

Figures for total solids (max) are exclusive of background dust (dust unrelated to the construction works).

Emissions of visible smoke to the atmosphere from construction plant and equipment shall be for periods no greater than the periods as shown in Table below.

Prepared By:	Systems Administrator	Date Revised:	31/03/2021	Document No:	WINBMS-EP-15
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Document Name:	Air Quality Management			Revision No. 11	Page 1 of 2

AIR QUALITY MANAGEMENT (WINBMS-EP-15)

Table

Construction Plant & Equipment Type	Maximum period for visible smoke
Plant not registered for use on public roads	15 Consecutive seconds
Plant registered for use on public roads	10 Consecutive seconds

Plant Emissions

All construction plant and equipment shall be effectively maintained such that they do not emit to the atmosphere visible smoke for any period greater than fifteen consecutive seconds (in the case of plant not being registered for use on public roads), and ten consecutive seconds (in the case of plant registered for use on public roads).

Odorous Substances and Particulate

The emission of odorous substances or particulate which creates or is likely to create objectionable conditions for the public shall not be permitted.

Noise Pollution

Construction vehicles and equipment shall have appropriate measures fitted and be effectively maintained to minimize engine noise and comply with the appropriate regulations and by-laws relating to noise. In addition, work shall be programmed to avoid noisy operations outside normal construction hours. Where possible, noise attenuation measures shall be programmed early in the construction period to minimize disturbance to adjacent properties.

4.0 References:

EPA Technical Guidelines. Publication 1834/2020, 1254/2008 (except Section 2,) specifically for noise limits applying to times outside normal working hours. All noise emissions generated within the project boundaries shall comply with EPA publication as above.

Winslow legal registers.

EPA Publications 440.1 and 852 Air Quality

EPA Act 2017 (GED Section 25-27 and Section 31-33)

EPA Amendment Act 2018

Prepared By:	Systems Administrator	Date Revised:	31/03/2021	Document No:	WINBMS-EP-15
Approved By:	Manager Systems	Date Approved:	31/03/2021	Date First Issued:	01/01/2015
Document Name:	Air Quality Management			Revision No. 11	Page 2 of 2



WATER QUALITY MANAGEMENT (WINBMS-EP-17)

1.0 Objective & Scope

To establish guidelines to minimise the discharge of elements and other pollutants to surface waters and is applicable to all Winslow Project Sites

2.0 Procedure

2.1 All water runoff from the site discharged directly and indirectly into any surrounding waterway and/or drainage network, shall meet the water quality criteria as per Table below **or as required under the contract**. Winslow to sample and test the water quality at the earliest opportunity and submit such test results to the client's Superintendent **as required**.

Where the measured background levels are above the objectives stipulated vide table below, the background levels shall become the objective for each individual parameter.

2.2 The sampling/monitoring of significant storm events shall include the collection, of samples from each point where water leaves the site. Regularly collect data from at least two control points, upstream and downstream respectively of the stormwater treatment and drainage system.

All water run-offs from the site discharged both directly and indirectly into any surrounding waterway and/or drainage network and for all rain events up to and including the 1 in 2 year ARI, (Average Recurrence Interval) shall meet the parameter criteria requirements of the EPA PUBLICATION 480- Section 4.3 both for the periods during and after construction.

Stockpiles located on site shall provide where possible a clearance of not less than 10 metres from the watercourses. Where it is not possible to provide a 10-meter clearance, the stockpile shall be above the high normal water level of the watercourse and additional protection shall be provided to prevent the stockpile entering the watercourses.

Results of routine water quality monitoring shall be submitted to the Superintendent **as required** within twenty four hours of test results being available except that any nonconforming test results shall be reported immediately.

3.0 Monitoring Requirements

Monitoring shall be carried out at locations as follows or as required under the contract,

- In waterways upstream and downstream of the limits of the site.
- At appropriate locations within the site including immediately upstream and downstream of each discharge point.
- At all discharge points from the site to surrounding waterways and drainage networks, immediately to the waterway/drainage network.
- Winslow to maintain equipment capable of providing instantaneous monitoring of turbidity, and have such equipment available on site at all times.

The frequency of monitoring shall be in accordance with Table as below or as required under the contract.

Prepared By:	Systems Administrator	Date Revised:	19/04/2021	Document No:	WINBMS-EP-17
Approved By:	Manager Systems	Date Approved:	19/04/2021	Date First Issued:	01/01/2015
Document Name:	Water Quality Management			Revision No. 11	Page 1 of 2

WATER QUALITY MANAGEMENT (WINBMS-EP-17)

Table - WATER QUALITY MONITORING		
FREQUENCY	LOCATION	WATER QUALITY PARAMETER
Prior to work commencing	All Discharge Points	All
Daily	All Discharge Points	Litter, Oil & Grease
Weekly	All Discharge Points	Flow, PH, Electrical Conductivity, Turbidity & Dissolved Oxygen, Suspended Solids.
Each Rain Event* as follows	Discharge points to waterways and drainage networks.	Turbidity and Suspended Solids
Within one hour of commencement during working hours		
Every four hours for periods of continuous rain during working hours.		
Within 12 hours of a rain event outside of working hours.		
At 24 hours and 48 hours after a rain event to determine stream recovery.		
* a rain event is defined as a rainfall of 10mm or more over a maximum period of 24 hours and /or run off is evident on site. * Testing of Water Quality parameters subject to site specific contaminants of concern or in accordance with requirements in the contract.		

Details of all monitoring locations shall be maintained on a site plan.

4.0 Dewatering

Water Quality Monitoring shall be undertaken when dewatering ponded water to receiving waterways

The quality of ponded water to be dewatered to receiving waterways shall not exceed 30 NTU or shall be equal to or better than the water quality in the receiving waterways if the turbidity in the receiving waterway is less than 30 NTU.

The pH of the ponded water to be dewatered shall be within the range Of 6.4-7.7

Monitoring for dewatering activities shall be undertaken at the following frequencies.

- a) The ponded water at the pump intake
- a) At appropriate locations within the site including immediately upstream and downstream of each discharge point.
- b) At the pump outlet where dewatering occurs into drainage infrastructure

5.0 Bypass Pumping

Water Quality monitoring shall be undertaken when bypass pumping of water around works is being undertaken within a waterway

Monitoring shall be carried out

- In waterways upstream and downstream of limits of the site;
- At appropriate locations in waterways within the site including immediately upstream and downstream of each point source (or flow) entering along the length of waterways within the project site.

Details of all monitoring locations shall be maintained on the scaled drawings associated with the EMP. Monitoring sites shall be accessible during all on site activity and in all weather conditions.

6.0 References:

The Winslow Legal Register.

Water Quality Monitoring Register

EPA publication 441- a guide to sampling and analysis of waters,

Waste waters, soils and wastes.

EPA Publication 1834 Civil Construction, Building & Demolition Guide

EPA Act 2017 (Sec 25-27 General Environmental Duty)

Prepared By:	Systems Administrator	Date Revised:	19/04/2021	Document No:	WINBMS-EP-17
Approved By:	Manager Systems	Date Approved:	19/04/2021	Date First Issued:	01/01/2015
Document Name:	Water Quality Management			Revision No. 11	Page 2 of 2

FIRE ANT MANAGEMENT (WINBMS-EP-21)

1.0 Purpose and Scope

The objective of this procedure is to identify and appropriately manage Fire Ants on all Winslow construction sites.

2.0 Definitions

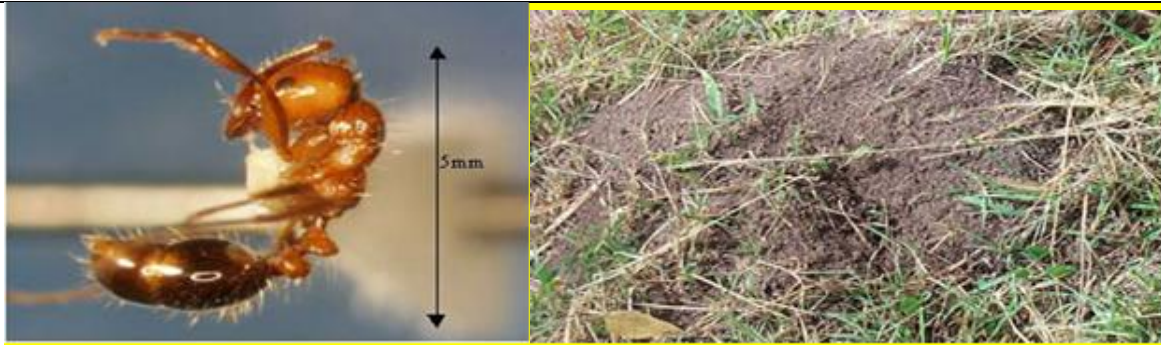
None

3.0 Procedure

PROCESS STEP	RESPONSIBILITY	TASK DETAILS	REFERENCE DOCUMENT
3.1 Environmental Aspects	Project Manager Site Supervisory Staff	Fire Ants are a declared 'notifiable pest' under the Plant Protection Act 1989 and pose serious social, economic and environmental impacts. These impacts include: - Painful burning and itching stings to people and domestic animals. In some cases, serious allergic reactions can occur if medical attention is not sought; - Reduce and/or loss of native species of small ground fauna, such as insects, spiders, lizards, frogs, birds and mammals through fire ants aggressively preying and feeding on such fauna. Feeding on insects and animals that pollinate native plants is also a major threat; - Consuming or damaging seeds can results in major changes to ecosystems; - Effects on agriculture such as attacking newborn or hatching animals, infestation of food and water supplies, tunnelling through roots systems of plants and consuming seeds, assist in spread of diseases.	Environmental Protection Act 1994 (Department of Environment and Heritage Protection) Site Specific IPMP or CEMP
3.2 Control Measures	Project Manager Site Supervisory Staff	Control of Fire Ants on our construction sites involves firstly identification followed by the correct management procedures. Failure to manage fire ants may be considered an offence under the Plant Protection Act 1989 and Biosecurity Queensland.	Environmental Protection Act 1994 (Department of Environment and Heritage Protection)
3.3 Fire Ant Identification	Project Manager Site Supervisory Staff	Fire ants are generally found around South East Queensland ((refer Fire and map – Biosecurity Qld). Fire ants are small ants approximately 2-6mm in size with a coppery-brown coloured head and body and darker abdomen. Fire ants are particularly aggressive near their nests and nests can be of various shape and size but are usually dome shaped mounds up to 40cm high. There are no obvious entry or exit holes and nest can contain a variety of ant sizes. Nests can be found in areas such as lawns, pastures, along roadsides, next to or under other objects such as logs, rocks or bricks, and also in buildings or electrical equipment. The fire ant and their nests are shown in the following pictures:	Work Health and Safety Act and Regulations 2011 Site Specific IPMP or CEMP

Prepared By:	HSE Manager	Date Revised:	9/01/2017	Document No:	WINBMS-EP-21
Approved By:	Manager - Systems	Date Approved:	9/01/2017	Date First Implemented:	01/03/2017
Document Name:	Fire Ant Management			Revision No. 1	Page 1 of 2

FIRE ANT MANAGEMENT (WINBMS-EP-21)



PROCESS STEP	RESPONSIBILITY	TASK DETAILS	REFERENCE DOCUMENT
3.4 Fire Ant Management	Project Manager Site Supervisory Staff	Fire Ant Management on our construction sites is generally an issue where we may be required to move restricted items into and out Fire Ant Restricted Areas. Restricted items that may be encountered on our sites include: • soil (includes fill, clay, overburden, scrapings, topsoil, decomposed granite (deco), potting media and any other material from the ground) • mulch • manure • bark • baled hay • turf • sleepers/logs • gravels If our activities require the movement of restricted items into or out of the Fire Ant Restricted Area, refer to Section 4.0 Monitoring and Reporting.	Environmental Protection Act 1994 (Department of Environment and Heritage Protection) Site Specific IPMP or CEMP
2.5 Monitoring and Reporting	Project Manager Site Supervisory Staff	To report a Fire Ant sighting contact Biosecurity Queensland through the Department of Agriculture, Fishing and Forestry (DAFF) on their website http://www.daff.qld.gov.au/31_846.htm. If our activities require the movement of restricted items into or out of the Fire Ant Restricted, a Biosecurity Inspector's approval is required prior to movement. An inspector can be requested from Biosecurity Queensland on 13 25 23.	Environmental Protection Act 1994 (Department of Environment and Heritage Protection)

Prepared By:	HSE Manager	Date Revised:	9/01/2017	Document No:	WINBMS-EP-21
Approved By:	Manager - Systems	Date Approved:	9/01/2017	Date First Implemented:	01/03/2017
Document Name:	Fire Ant Management			Revision No. 1	Page 2 of 2

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

APPENDIX B

RISK MANAGEMENT FORMS

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 23 of 29



Job No: 17987

Document: Register of Safety Data Sheets	Version No: 10	WINBMS-OP-05-A	Page. No: 1
Date Issued: 25/10/2021	Issued By: Systems Coordinator	Approved By: Systems Manager	

HAZARDOUS SUBSTANCES and DANGEROUS GOODS RISK ASSESSMENT

Product Name:											
Date of Assessment:			Storage Location:								
Hazardous substance:		☐ Yes ☐ No		SDS Reference Number & Date:							
Dangerous Good:		☐ Yes ☐ No		Class:	UN Number: Scheduled Poison:						
Signal Word: DANGER / WARNING				Used by (occupation):							
Hazard Class:		(tick the appropriate box)		Adequacy of current controls							
	Severe Health Hazards	☐		Current controls are inadequate if not present when SDS requires them or if not functioning well. A 'no' under OK means action is needed. Consider each control - does the SDS recommend it, and is it present?							
	Health Hazards	☐		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td>Present</td> <td>OK</td> </tr> <tr> <td>Isolation</td> <td>☐ Yes ☐ No</td> <td>☐ Yes ☐ No</td> </tr> </table>			Present	OK	Isolation	☐ Yes ☐ No	☐ Yes ☐ No
	Present	OK									
Isolation	☐ Yes ☐ No	☐ Yes ☐ No									
	Acute Toxicity	☐		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Local extraction ventilation</td> <td>☐ Yes ☐ No</td> <td>☐ Yes ☐ No</td> </tr> <tr> <td>General ventilation</td> <td>☐ Yes ☐ No</td> <td>☐ Yes ☐ No</td> </tr> </table>		Local extraction ventilation	☐ Yes ☐ No	☐ Yes ☐ No	General ventilation	☐ Yes ☐ No	☐ Yes ☐ No
Local extraction ventilation	☐ Yes ☐ No	☐ Yes ☐ No									
General ventilation	☐ Yes ☐ No	☐ Yes ☐ No									
	Explosive	☐		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Natural ventilation</td> <td>☐ Yes ☐ No</td> <td>☐ Yes ☐ No</td> </tr> <tr> <td>Other engineering controls</td> <td>☐ Yes ☐ No</td> <td>☐ Yes ☐ No</td> </tr> </table>		Natural ventilation	☐ Yes ☐ No	☐ Yes ☐ No	Other engineering controls	☐ Yes ☐ No	☐ Yes ☐ No
Natural ventilation	☐ Yes ☐ No	☐ Yes ☐ No									
Other engineering controls	☐ Yes ☐ No	☐ Yes ☐ No									
	Flammable	☐		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Safe work methods (e.g. pumping instead of pouring)</td> <td>☐ Yes ☐ No</td> <td>☐ Yes ☐ No</td> </tr> <tr> <td>Reduce quantity and/or concentration</td> <td>☐ Yes ☐ No</td> <td>☐ Yes ☐ No</td> </tr> </table>		Safe work methods (e.g. pumping instead of pouring)	☐ Yes ☐ No	☐ Yes ☐ No	Reduce quantity and/or concentration	☐ Yes ☐ No	☐ Yes ☐ No
Safe work methods (e.g. pumping instead of pouring)	☐ Yes ☐ No	☐ Yes ☐ No									
Reduce quantity and/or concentration	☐ Yes ☐ No	☐ Yes ☐ No									
	Oxidising	☐		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Information (at least MSDS and label)</td> <td>☐ Yes ☐ No</td> <td>☐ Yes ☐ No</td> </tr> <tr> <td>Ongoing training (hazards, safe use, PPE, health surveillance if applicable)</td> <td>☐ Yes ☐ No</td> <td>☐ Yes ☐ No</td> </tr> </table>		Information (at least MSDS and label)	☐ Yes ☐ No	☐ Yes ☐ No	Ongoing training (hazards, safe use, PPE, health surveillance if applicable)	☐ Yes ☐ No	☐ Yes ☐ No
Information (at least MSDS and label)	☐ Yes ☐ No	☐ Yes ☐ No									
Ongoing training (hazards, safe use, PPE, health surveillance if applicable)	☐ Yes ☐ No	☐ Yes ☐ No									
	Corrosive	☐		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Personal protective equipment (list):</td> <td>☐ Yes ☐ No</td> <td>☐ Yes ☐ No</td> </tr> <tr> <td colspan="3">Other measures</td> </tr> </table>		Personal protective equipment (list):	☐ Yes ☐ No	☐ Yes ☐ No	Other measures		
Personal protective equipment (list):	☐ Yes ☐ No	☐ Yes ☐ No									
Other measures											
	Gases under pressure	☐		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>First aid supplies/equipment (e.g. safety shower)</td> <td>☐ Yes ☐ No</td> <td>☐ Yes ☐ No</td> </tr> <tr> <td>First aid training</td> <td>☐ Yes ☐ No</td> <td>☐ Yes ☐ No</td> </tr> </table>		First aid supplies/equipment (e.g. safety shower)	☐ Yes ☐ No	☐ Yes ☐ No	First aid training	☐ Yes ☐ No	☐ Yes ☐ No
First aid supplies/equipment (e.g. safety shower)	☐ Yes ☐ No	☐ Yes ☐ No									
First aid training	☐ Yes ☐ No	☐ Yes ☐ No									
	Environmental Hazard	☐		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Evacuation plan, emergency plan, and required emergency equipment</td> <td>☐ Yes ☐ No</td> <td>☐ Yes ☐ No</td> </tr> <tr> <td>Other controls (specify):</td> <td>☐ Yes ☐ No</td> <td>☐ Yes ☐ No</td> </tr> </table>		Evacuation plan, emergency plan, and required emergency equipment	☐ Yes ☐ No	☐ Yes ☐ No	Other controls (specify):	☐ Yes ☐ No	☐ Yes ☐ No
Evacuation plan, emergency plan, and required emergency equipment	☐ Yes ☐ No	☐ Yes ☐ No									
Other controls (specify):	☐ Yes ☐ No	☐ Yes ☐ No									
Monitoring	Needed	Present	Results ok	Conclusion: ☒							
Health surveillance program	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Risks not significant now and not likely to increase ☐ Risks significant but effectively controlled at the moment ☐ Risks significant and not adequately controlled at the moment ☐ Uncertain about risks; more detailed assessment required							
Air monitoring program	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No								
Action required to reduce risks: (list changes needed, by when and by whom, attach further pages if needed)											
☐ Yes (specify):				Date completed:							
☐ No				Signature:							
Comments:											
Assessment carried out by:			Signature:		Date:						
Assessment approved by (person in charge):			Signature:		Date:						
Next assessment due:											

ENVIRONMENTAL ASPECTS AND IMPACTS REGISTER

1 OBJECTIVE OF ASSESSMENT

To identify, evaluate for significance, monitor and communicate the environmental impacts and aspects of Winslow's construction activities on the Stg 1, Courtney Dr, Upper Coomera.

2 SCOPE OF ASSESSMENT

This applies to all products, services and activities that Winslow has control over which it can be expected to have an influence, including those carried out by subcontractors.

Note: Any project undertaken by Winslow with an activity that is not addressed by this Risk Assessment - or a subcontractor Environmental Plan and risk assessment shall have a risk assessment completed by the Project Manager and be included in the Integrated Project Management Plan (IPMP).

3 PROCESS

3.1 Environmental Impacts

Winslow has adopted a process line model to facilitate continuous improvement of its business activities. The assessments of products / activities undertaken by Winslow that have an environmental impact include:

1. Clearing
2. Bulk Earthworks
3. Trenching
4. Drainage

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Approved By:	Manager - Systems	Date Approved:	09/01/2016	Date First Issued:	01/03/2017
Document Name:	Environmental Aspects Register			Revision No. 1	Page 1 of 10

ENVIRONMENTAL ASPECTS AND IMPACTS REGISTER

ENVIRONMENTAL RISK ASSESSMENT

The following risk assessment of Winslow's activities has been reviewed for implementation on the Stg 1, Courtney Dr, Upper Coomera project. Also refer to the attached;

- Probability and consequences tables, and

(Note: all implemented control measures must reduce the residual risk to a moderate or low level)

RISKS	OBJECTIVE	Inherent Risk (Tables 1 & 2)	STRATEGY	Residual Risk
PRELIM WORKS				
Site Establishment	Minimise the risk of environmental harm from site establishment activities	B3 High	Ensure IPMP is completed prior to commencing site establishment and all nominated site control measures are in place.	D1 Low
Licenses, Permits and Approvals Work being undertaken on South Place Stage 1 & 2 without the correct licenses and fines being issued.	To ensure all licenses required are identified and applied for well prior to commencement of construction.	B4 Extreme	Upon receipt of licenses, all conditions they are to be appropriately communicated to all personnel on site during the site induction process.	D1 Low

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Approved By:	Manager - Systems	Date Approved:	09/01/2016	Date First Issued:	01/03/2017
Document Name:	Environmental Aspects Register			Revision No. 1	Page 2 of 10

ENVIRONMENTAL ASPECTS AND IMPACTS REGISTER

RISKS	OBJECTIVE	Inherent Risk (Tables 1 & 2)	STRATEGY	Residual Risk
PROCUREMENT		B		B
Plant and Equipment Leaking of oil and/or fuel from equipment. Excessive air pollution from exhaust emissions. Excessive noise from operating plant. Excessive vibration from operating equipment.	Minimise the risk of environmental harm from the operation of plant and equipment.	B3 High	To ensure plant and equipment procured for the project is fully inspected and is in good condition and well maintained before commencement of work on site and throughout the project. Refer to the Plant Authorisation Inspection Checklist (WINBMS-OP-03-F). Ensure appropriate spill kits available at the workface and that all of the environmental requirements of project are well communicated during the site induction process.	E2 Low
Labour Workers untrained in environmental controls and management. Low commitment to environmental protection.	To ensure that all employees working on the project are committed to environmental protection and willing to undertake appropriate training.	D3 Medium	Induction, training and ongoing education of all project workers to ensure good knowledge of environmental issues onsite, as well as the appropriate use and maintenance of environmental controls. In addition, provide site employees with easy and clear access to project employees with appropriate environmental knowledge.	D2 Low
Subcontractor Subcontractors untrained in environmental controls and management.	To ensure that all subcontractors working on the project are committed to environmental protection and	A2 High	Induction, training and ongoing education to ensure good knowledge of environmental issues on-site, as well as the appropriate use and maintenance of environmental	D2 Low

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Approved By:	Manager - Systems	Date Approved:	09/01/2016	Date First Issued:	01/03/2017
Document Name:	Environmental Aspects Register			Revision No. 1	Page 3 of 10

ENVIRONMENTAL ASPECTS AND IMPACTS REGISTER

RISKS	OBJECTIVE	Inherent Risk (Tables 1 & 2)	STRATEGY	Residual Risk
Low commitment to environmental protection.	willing to undertake appropriate training.		controls. Provide contractors with easy access to project employees with appropriate environmental knowledge.	
Materials Weed seeds and/or weeds being brought onto site in imported materials. Hazardous materials being stored on site inappropriately with environmental damage occurring subsequently.	To ensure that all materials procured for the project are weed and fire ant free and stored appropriately on-site to minimise environmental risks.	B3 High	All materials, as appropriate, should be certified as weed-free prior to acceptance on-site. All materials with the potential to impact on the environment should be stored in compliance with the applicable licenses, standards and IPMP. Implement Winslow's Fire Ant management Requirements for the site.	E1 Low
Work being conducted that does not comply with license conditions and environmental damage occurring.	To ensure all licenses requirements are identified and implemented prior to construction.	B2 High	Upon approval of licenses, all conditions are complied with at all times and fully communicated during the site induction process.	E2 Low

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Approved By:	Manager - Systems	Date Approved:	09/01/2016	Date First Issued:	01/03/2017
Document Name:	Environmental Aspects Register			Revision No. 1	Page 4 of 10

ENVIRONMENTAL ASPECTS AND IMPACTS REGISTER

Risk (Aspect)	Potential Impact	Inherent Risk (Tables 1 & 2)	Control Measures	Residual Risk
Construction				
Air quality	Fumes and dust can be generated by construction and maintenance equipment. Dust can be generated from clearing operations. Clearing activities at the site have the potential to create large amounts of dust, which could affect flora and fauna and surrounding stakeholders. If significant amounts of dust settle on vegetation, it could affect the health of the vegetation and impact on fauna that feed on the vegetation.	D3 Medium	Visual Monitoring Weekly Inspection Records Water Dust Suppression Education / Site Inductions	E2 Low
Water contamination	Inadequate sediment control procedures or heavy rainfall periods may lead to contamination of the local creeks or other nearby waterways. Contamination could be from oil associated with construction equipment. Recycled water potential to transport pathogens and microbes	B4 Extreme	Implement Acid Sulphate Soil Management Plan if required Site Erosion & Sedimentation Control Plan Site Inspections / monitoring Education / Site Inductions Use of potable water versus recycled water	E2 Low

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Document Name:	Environmental Aspects Register			Revision No. 1	Page 5 of 10

ENVIRONMENTAL ASPECTS AND IMPACTS REGISTER

Risk (Aspect)	Potential Impact	Inherent Risk (Tables 1 & 2)	Control Measures	Residual Risk
Soil erosion and stability	Where exposed by removal of vegetation and consequent loss of stabilising root systems, or where exposed by clearing are the subject of erosive forces by wind and water due to the lack of soil stability. Erosion will contribute to the sedimentation and increased turbidity of water courses. Erosion and sedimentation can adversely affect drainage capacity and drainage patterns as well as impact on any adjacent vegetation habitat areas and species composition.	B3 High	Site Erosion & Sedimentation Control Plan Site Inspections Education / Site Inductions	E2 Low
Flora and Fauna	Noise and vibration levels are likely to increase during clearing operations which may disturb native fauna. Physical disturbance within areas of the native vegetation would generally promote weed colonisation from other areas.	A4 Extreme	Education / Site Inductions Education and Site Inspections No Go zones Habitat and species translocation Relative approved permits Any necessary approvals (both written and verbal)	D2 Low
Noise and vibration	The major potential generation of noise during the construction period	D3	Hours of Work – 6:30am to 6pm	D2

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Document Name:	Environmental Aspects Register			Revision No. 1	Page 6 of 10

ENVIRONMENTAL ASPECTS AND IMPACTS REGISTER

Risk (Aspect)	Potential Impact	Inherent Risk (Tables 1 & 2)	Control Measures	Residual Risk
	is the operation of vehicles, plant and equipment, trucks. Ground vibrations generated during clearing has the potential to cause disturbance to property and/or nuisance.	Medium	Monitor complaints Smaller plant to be utilised if required	Low
Natural Resources	Natural resources are affected by the removal of trees and vegetation and site generated waste.	A2 High	Education / Site Inductions	E2 Low
Community Resources	Community resources are affected by the removal of trees, use of community assets, use of local infrastructure and possible damage to other utility services. The visual impact that results from the loss of a natural environment and the potential for the loss of flora and fauna habitats.	B3 High	Education / Site Inductions Site Inspections	E3 Low
Transport	Work carried out during clearing operations may create a disruption to transport and pedestrian flow in work areas. The use of construction	B2 High	Traffic Management Plan Education / site induction Carbon reduction where possible by substituting plant used on site	E2 Low

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Document Name:	Environmental Aspects Register			Revision No. 1	Page 7 of 10

ENVIRONMENTAL ASPECTS AND IMPACTS REGISTER

Risk (Aspect)	Potential Impact	Inherent Risk (Tables 1 & 2)	Control Measures	Residual Risk
	plant results in the emission of Greenhouse Gasses.			
Waste Generation	The potential still exists for litter from construction workers to impact upon the habitat conditions of local flora and fauna. Refuse, construction, sanitary and equipment waste should always be disposed of correctly. Decomposing plant material stored on site can produce contaminates	B3 High	Recycle and use recycle materials whenever viable. Education / Site Inductions Visual water monitoring	E1 Low
Wind Blown Dust / Soil	Soil and dust blowing over the existing houses	B4 Extreme	Keep mulch piles damp if possible. Site Inspections	E2 Low
Oil and Fuel Spills and Leaks	Occurs when machines blow hydraulic hoses, machinery leaks oil/fuel, re-fuelling plant, incorrect storage of oil/fuel.	B4 Extreme	Spill kits available, kept re-stocked on-site and staff well informed on their use. Mopped up spills to be disposed of correctly Fuelling of plant only to be done by experienced personnel in designated areas Spill kit on refuelling vehicle Plant checks to be done daily to identify any leaks	D2 Low

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Document Name:	Environmental Aspects Register			Revision No. 1	Page 8 of 10

ENVIRONMENTAL ASPECTS AND IMPACTS REGISTER

Risk (Aspect)	Potential Impact	Inherent Risk (Tables 1 & 2)	Control Measures	Residual Risk
			Fuel/Oil stored on-site to be in proper containers and be isolated from entering stormwater etc. should leakage occur.	
Fire Ants	Spread of Fire Ants causing damage to native flora and fauna.	B4 Extreme	Implement Biosecurity Qld's Fire Ant Management Requirements	E2 Low

Notes: The above table is to be read in conjunction with Winslow's RISK (ASPECTS) Classification tables 1 & 2 and the RISK (ASSESSMENT) Classification Matrix diagram

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Document Name:	Environmental Aspects Register			Revision No. 1	Page 9 of 10

TABLE 1 - QUALITATIVE MEASURES OF PROBABILITY

Almost Certain	A	The event is expected to occur in most circumstances.
Likely	B	The event will probably occur in most circumstances.
Possible	C	The event might occur at some time.
Unlikely	D	The event could occur at some time.
Rare	E	The event may occur only in exceptional circumstances.

TABLE 2 - QUALITATIVE MEASURES OF CONSEQUENCES

People Safety		
Insignificant	1	No lost time
Minor	2	Minor lost time injury or illness
Possible	3	Moderate lost time injury or illness
Major	4	Serious lost time injury or illness
Catastrophic	5	Fatality or permanent disability
Possible Environmental Consequences		
Insignificant	1	No environmental harm or effects
Minor	2	Theoretically could affect the environment or people but unlikely. Public complaints unlikely. Unlikely to affect legal compliance.
Moderate	3	Water, soil or air likely to be affected, probably in the short term. No damage to flora or fauna. Public complaints unlikely. Prosecution unlikely. Damage costs less than \$5,000.
Major	4	Water, soil or air affected badly, possibly in the long term. Damage or death to limited numbers of flora or fauna. Public complaints likely. Damage or relocation of archaeological/heritage property. Likely prosecution. Damage costs between \$5,000 and \$50,000.
Catastrophic	5	Long term damage to water, soil or air. Damage or death to significant numbers of flora or fauna. Many public complaints, possible evacuation. Destruction of archaeological/heritage property. Almost certain environmental prosecution. Damage costs exceeding \$50,000.

RISK (ASSESSMENT) CLASSIFICATION MATRIX

Risk Assessment Matrix

Likelihood	Consequence				
	Insignificant -1	Minor -2	Moderate -3	Major -4	Catastrophic -5
Almost Certain -5	Low (5)	Medium (10)	High (15)	High (20)	High (25)
Likely -4	Low (4)	Medium (8)	Medium (12)	High (16)	High (20)
Possible -3	Low (3)	Medium (6)	Medium (9)	Medium (12)	High (15)
Unlikely -2	Low (2)	Low (4)	Medium (6)	Medium (8)	Medium (10)
Rare -1	Low (1)	Low (2)	Low (3)	Low (4)	Low (5)

Scores: 1-5 = Low / 6-14 = Medium / 15-25 = High

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Document Name:	Environmental Aspects Register			Revision No. 1	Page 10 of 10

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

APPENDIX C

INCIDENT REPORTING & INVESTIGATION FORMS

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 24 of 29



ENVIRONMENTAL INCIDENT REPORTING (WINBMS-EP-03)

1. PURPOSE & SCOPE

The purpose and scope of this procedure is to provide a uniform control mechanism when an emergency environmental incident occurs. It covers:

- Preparedness and training
- Managing the incident during and following the Emergency
- Incident Notification, investigation, reporting & recording

2. DEFINITIONS

Emergency: An Emergency is any incident that has caused or has the potential to cause a significant impact on the Environment.

Incident: Any occurrence that had the potential to impact on the environment during the course of the project works.

- Any occurrence that has disrupted the orderly conduct of work on site
- All emergencies are incidents.

3. PROCEDURE

3.1 Management Responsibilities

The Project Manager is responsible for

- Ensuring all employees have, the opportunity to be trained and be prepared in the event of an incident occurring.
- Preparation of Environmental Instructions or Procedures or a Environmental Management Plan if required
- Identifying environmental aspects and their impacts and assessing the risk level
- Ensuring that employees have access to appropriate PPE and resources applicable to the risk and activity to be carried out.
- Ensuring that Worksite inspections are carried out weekly as per procedure.
- Obtaining approvals from superintendent, client, authority or environmental regulatory body, where required.

3.2 Environmental Preparedness

Prior to commencing any project the Project Manager shall ensure that the project specific EMP/EMS is prepared and includes the following:

- Project specific Environmental Management Plan/Strategy
Assessment of risks and development of work instructions for additional environmental Aspects and Impacts identified, Risk Register (**WINBMS-SP-05-A**)
- Details of the training in Emergency procedures that is to be carried out at the worksite induction during the duration of the project.
- Emergency numbers including that of the EPA or other Regulatory Authorities.
- Emergency assembly point in case of an emergency that requires an evacuation of the site.

Worksite Inductions should be held with all employees and subcontractors to explain & inform them of the following:

- The emergency numbers and their location
- Name of the site environmental officer
- Person responsible for calling for assistance
- Emergency Procedures Training

Employees should be trained so that they are familiar with all the environmental procedures and instructions. Where required, all relevant employees shall be trained in the environmental **GREEN CARD** requirements

Emergency Response Procedures should be tested periodically for its effectiveness and must ensure that all employees are familiar with them. This could be part of the Worksite Induction.

3.3 Prior to commencement on site

Hold a Worksite Induction and discuss environmental issues, procedures and instructions that control activities on site. Ensure that environmental control measures are in place and are adequate.

Conduct a toolbox meeting in the use of spill kits.

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Approved By:	Manager Systems	Date Approved:	10/01/2017	Date First Issued:	01/01/2015
Document Name:	Environmental Incident Reporting			Revision No. 4	Page 1 of 2



ENVIRONMENTAL INCIDENT REPORTING (WINBMS-EP-03)

3.4 Managing the Incident

All incidents will be managed during their development through to the completion, when the situation is safe. Where the initial incident occurs on the Worksite, we shall manage the incident until emergency response professionals arrive at the Emergency location.

3.5 Procedure when there is an Environmental Breach or Incident

Notify the Project Manager or HSE Manager immediately and take all steps to minimise the damage and limit the impact (effect) of the breach.

If the breach is serious and additional resources other than what is available to us is required, then notify the local authorities and the EPA with the aim of getting specialist assistance quickly.

All Environmental Incidents which have caused (or have the potential to cause) an impact on the environment, shall be reported and investigated (**WINBMS-EP-03-A**) These Incidents include but are not limited to:

- Spillage or leakage of a hazardous substance or dangerous goods
- Contaminated material e.g. asbestos, prescribed waste
- Water contamination of a watercourse such as a creek, river, stream, etc
- Soil erosion and sedimentation
- Damage or destruction of an Archaeological / Heritage site
- Damage or destruction of specified or protected Flora and Fauna
- An explosion or fire.

3.6 Reporting and Investigation of an Environmental Breach

Immediately notify the superintendent/client of the breach and in case of Notifiable incidents, the EPA must be informed through an environmental report (**WINBMS-EP-03-A**)

Prepare a *Non Conformance Report* using **WINBMS-SP-16-A**

Investigate the breach and put in place corrective action to minimise the risk.

4.0 REFERENCES:

WINBMS-EP-03-A Environmental Incident Report

WINBMS-SP-16-A Non Conformance Report

Prepared By:	Systems Administrator	Date Revised:	10/01/2017	Document No:	WINBMS-EP-03
Approved By:	Manager Systems	Date Approved:	10/01/2017	Date First Issued:	01/01/2015
Document Name:	Environmental Incident Reporting			Revision No. 4	Page 2 of 2



WINSLOW

EMERGENCY CONTACTS

PROJECT: Stg 1,Courtney Dr, Upper Coomera	
LOCATION: 97 Courtney Dr, Upper Coomera	
JOB No: 17987	CUSTOMER: HB QLD Pty Ltd

AMBULANCE:	000
FIRE BRIGADE:	000
POLICE:	000

FIRST AIDER:	Desmond Ramak	Mobile: 0437 928 665
DOCTOR:	Sonic HealthPlus Southport	Tel.No: (07)5552 0800
ADDRESS: 10-12-Younf Street Southport, QLD, 4215		
HOURS: Mon – Fri: 8.00am – 4.00pm		
HOSPITAL:	Gold Coast university Hospital	Tel.No: 1300 744 284
ADDRESS: 1 Hospital Blvd, Southport QLD, 4215		

TELEPHONE	TELSTRA	13 22 03
ELECTRICITY	ORIGIN	13 19 62
	ENERGEX	13 19 62
	ERGON	13 22 96
GAS	ENVESTRA	1800 808 526
	AGL ASSIST	1300 763 106

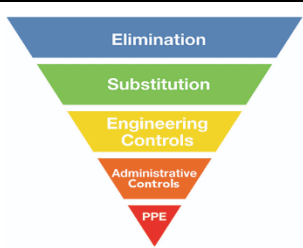
ENVIRONMENT	DEHP(Department of Environment & Heritage Protection)	13 74 68
SEWER & WATER	City of Gold Coast	07 5667 5801

WORK HEALTH & SAFETY: Department of Justice & Attorney General		1300 369 915
INCIDENT NOTIFICATION:		1300 369 915
POISON INFO'	INFORMATION Centre, BRISBANE	13 11 26

Prepared By:	HSE Manager	Date Revised:	09/01/2016	Document No:	CCABMS-SP-08-A
Approved By:	Manager - Systems	Date Approved:	09/01/2016	Date First Issued:	01/03/2017
Document Name:	Emergency Contacts			Revision No. 1	Page 1 of 1

INCIDENT / HAZARD REPORT

ADMINISTRATION				
Date:	Time:	Report By:		
Location:			Job No.	
Winslow Division: ☐ Const ☐ Infra ☐ Maintenance		HSE Representative:		
Supervisor:		Operations Manager:		
Raised by: ☐ Winslow ☐ Client ☐ Subcontractor ☐ Authority / Stakeholder				
INCIDENT TYPE				
☐ INJURY TO PERSON(S)	☐ DAMAGE TO PROPERTY	☐ VEHICLE/PLANT/EQUIP INCIDENT		
☐ NEAR MISS REPORT	☐ DAMAGE TO LIVE SERVICES	☐ QUALITY IMPROVEMENT		
☐ HAZARD IDENTIFICATION	☐ DAMAGE TO ASSET	☐ ENVIRONMENTAL INCIDENT		
REPORT DETAILS				
NAME	COMPANY	PHONE	INJURED	WITNESS
			☐	☐
			☐	☐
			☐	☐
ASSET DETAILS				
WINSLOW VEHICLE:		3 RD PARTY VEHICLE:		
WINSLOW VEHICLE:		PLANT ID/NO.:		

INCIDENT RATING												
☐ MINOR	☐ MODERATE	☐ SERIOUS	☐ SEVERE									
(PLEASE SELECT THE RELEVANT INCIDENT CATEGORY FROM THE INCIDENT MATRIX)												
TREATMENT TYPE												
☐ Hospital	☐ Doctor	☐ First Aid	☐ Repair	☐ Replace	☐ None							
IMMEDIATE - CORRECTIVE ACTIONS												
Details: <table border="1"> <tr><td></td></tr> <tr><td></td></tr> <tr><td></td></tr> <tr><td></td></tr> <tr><td></td></tr> <tr><td></td></tr> <tr><td></td></tr> </table>											☐ Change Method or Task ☐ Replace Equipment or Task ☐ Install Safety Device / Guard ☐ Change Process / Update SWMS ☐ Toolbox / Retrain Staff ☐ Raise NCR ☐ Increase / Adapt PPE	
LONG-TERM - PREVENTATIVE ACTIONS												
Details: <table border="1"> <tr><td></td></tr> <tr><td></td></tr> <tr><td></td></tr> <tr><td></td></tr> <tr><td></td></tr> </table>							HSE Coordinator:					
Signature:												
Date:												
Operations Manager:												
Signature												
Date:												

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

APPENDIX D

COMMUNICATION & CONSULTATION FORMS

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 25 of 29

INDUCTION OF SITE PERSONNEL



NAME OF INDUCTEE: _____ Known Allergies: _____ Emergency Contact Number: _____

Date Of Induction: _____ CI Card No: _____ Employer: _____

Operator Ticket: yes/no _____ Type _____ Date of Issue: _____

- ☐ Name of Site Safety/First Aid Officer in case of Emergencies/Incidents.
- ☐ Location of First Aid Kits, Spill Kits, Fire Extinguishers, Health & Safety Co-ordination Plan.
- ☐ All Inductees and personnel are responsible for their own Health & Safety and the safety of others affected by their actions.
- ☐ Location of Emergency phone numbers & procedures/assembly area. Assemble at the emergency evacuation area and do not leave until directed to do so by a Winslow representative.
- ☐ All hazards, incidents and near misses must be reported to the Supervisor/Foreman immediately.
- ☐ All Site personnel are to wear long sleeve high visibility clothing/safety boots at all times. Hard hats are mandatory on all sites and hearing and hand/eye protection to be worn when required.
- ☐ Safe controls must be implemented while undertaking high risk construction work as detailed in NSW Work Health & Safety Act and Regs 2011 and you must ensure that appropriate permits are in place prior to undertaking any task that requires such permits. Safe Work Method Statement for all High-Risk Activities.
- ☐ Maintain good housekeeping on Site and dispose of waste material appropriately and as directed by Winslow.
- ☐ Entry and Exit requirements to Site are as directed and must be strictly complied with at all times.
- ☐ No mobile phone use near plant and no personal phone calls during work hours.
- ☐ Winslow Sites are Drug and Alcohol free. Smoking is strictly prohibited in enclosed places.
- ☐ Any form of Bullying or Harassment will not be tolerated and will be dealt with in accordance with Winslow's company policy
- ☐ Daily Plant prestart checklists to be completed prior to start and unsafe plant must be tagged out and not operated.
- ☐ All plant fitted with quick hitches; the **SAFETY PINS** must be fitted at all times during operation.
- ☐ Spotter must be present while operating under Over Head Power Lines and while excavating close to or over underground assets.
- ☐ All sub-contractors must provide copies of their Construction Induction Card, licences & plant risk assessments.
- ☐ Safety Data Sheets are kept in site office and must be reviewed when appropriate.
- ☐ Environmental requirements of the client and Winslow for water/air quality/erosion/sediment controls/vibration/noise pollution & testing methods must be met. Flora must be protected at all times.
- ☐ Do not handle contaminated soils without appropriate personal protective equipment. When asbestos is located on or near the Site (or suspected asbestos) it must be reported to the Foreman immediately and the area to be secured.
- ☐ Good community relations must be maintained at all times inclusive of acceptable behaviour on Site to the satisfaction of Winslow.
- ☐ Respect all archaeological/cultural/heritage values in accordance with law and any direction by Winslow.
- ☐ Comply with all Winslow's policies, procedures and High Risk COVID Safe Plan as advised by Winslow.

PUBLIC LIABILITY

- ☐ Noncompany issued vehicles must be parked off Site and Winslow does not accept any responsibility if damage occurs whilst personal vehicles are parked on Site.
- ☐ All persons entering the worksite must obey all directions by Winslow as to traffic management including movement of equipment and vehicles within or surrounding the Site.
- ☐ Under no circumstances be in, or park any vehicle near, the vicinity of operating plant or machinery except by express written direction from Winslow and must at all times give way to operating plant/machinery.
- ☐ Any person entering the Site does so entirely at his/her own risk and to the fullest extent permitted by law, Winslow, it's servants or agents, will not in any case be liable in tort, or in contract, or in any other way for any damage which occurs on the Site or as a result of the project to any property of any person who enters this Site howsoever that damage or liability may occur.
- ☐ All Winslow policies, including Quality Management, Occupational Health & Safety, Environmental Management, Bullying and Discrimination must be read and clearly understood by all employees, sub-Contractors, and visitors to the site.
- ☐ Everick Heritage – Cultural Heritage Induction, Deebling Heights – Yuggera Ugarapul People's Country

I, _____ (please sign) verify and agree that, prior to commencing work at the Site, I have received my induction and clearly understand all matters discussed and contained in the above documentation and will carry out any duties or obligations expressly or impliedly contained in the induction documents to the absolute satisfaction of Winslow.

Name of Inductor: _____ (PLEASE PRINT)

Project/Location ("Site"): South Place Stage 1 & 2 – 152-280 Grampian Drive, Deebling Heights (PLEASE PRINT)

Prepared By:	HSE Manager	Date Revised:	09/01/2016	Document No:	WINBMS-SP-04-A
Approved By:	Manager - Systems	Date Approved:	09/01/2016	Date First Implemented:	01/03/2017
Document Name:	Induction of Site Personnel			Revision No. 1	Page 1 of 1

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

APPENDIX E

MONITORING FORMS

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 26 of 29

WEEKLY HSE INSPECTION CHECK SHEET

Project / Work Location: _____ Project No. _____ Inspection Date: ____/____/____

Inspection Participants: CCA Winslow Rep/s _____

CCA Winslow Senior Management Representative _____

Contractor Rep/s (Name and Company) _____

Note: Copies of site inspection must be circulated to responsible persons for any rectifications required.

House Keeping / Emergency Equipment	OK ✓/✗	Description and Action Required	Person Responsible	Date Fixed
Are all areas clean, clear & free of slip / trip hazards				
Caps on Reinforcement bars and Star pickets				
Are all materials stored appropriately				
Are access ladders & stairs in good condition				
Is Waste Management Effective				
Site specific emergency preparedness plan in place				
Is installed fire equipment maintained				
Site first aiders known to employees				
First aid treatment being recorded				
Are first-aid kits available & maintained				
Personal Protective Equipment (PPE)	OK ✓/✗	Description and Action Required	Person Responsible	Date Fixed
Is safety foot wear worn by all				
Are hard hats being worn				
Is hearing protection used in noisy work areas				
Are respirators being worn where required				
Is approved eye protection being worn				
Is correct PPE available				
Plant Safety	OK ✓/✗	Description and Action Required	Person Responsible	Date Fixed
Is all moving machinery & nip points guarded / Quick Hitch Safety Pins in place and lock out devices OK				
Are all 2 way radios and flashing lights operational				
Reverse/travel beepers working and operational				
Have Plant Authorisations been completed for all CCA and hired / sub-contracted plant on site				
Where required, do operators hold appropriate competency and have VOC's been completed				
Have all operators signed onto the excavation permit				
All services identified and protected				
Plant clear of overhead powerlines and qualified spotter in place where required				
Electrical Safety	OK ✓/✗	Description and Action Required	Person Responsible	Date Fixed
Is electrical equipment tested, is it tagged (in date)				
Where required, are leads elevated or protected				
Is electrical equipment free of water and other hazards				
Excavations / Confined Spaces	OK ✓/✗	Description and Action Required	Person Responsible	Date Fixed
Is the required access/works permit held				
Are all openings barricaded or protected				
Are all excavations correctly benched/battered/shored				
Is access and egress provided				
Are Spoil heaps clear of excavation				
Has water been removed from the excavation				
Hazardous Materials	OK ✓/✗	Description and Action Required	Person Responsible	Date Fixed
Are all hazardous materials clearly labelled				
Are all Safety Data Sheets (SDS) available				

Prepared By:	HSE Manager	Date Revised:	09/01/2016	Document No:	CCABMS-SP-15-A
Approved By:	Manager - Systems	Date Approved:	09/01/2016	Date First Issued:	01/03/2017
Document Name:	Weekly HSE Inspection Checklist			Revision No. 1	Page 1 of 2

WEEKLY HSE INSPECTION CHECK SHEET

Is material stored in the correct location				
Working from Heights (if applicable)	OK ✓/✗	Description and Action Required	Person Responsible	Date Fixed
Are heights clear of power lines				
Are ladders tied off, angled correctly (1in 4) & extend 1m above landing.				
Are protections in place to protect from falling objects				
Work at heights equipment utilised correctly				
SWMS In order to meet legislative compliance requirement activities on site should be checked against the applicable SWMS (e.g. on site tick and flick of one selected CCAW or sub-contractor SWMS per week)	OK ✓/✗	Description and Action Required	Person Responsible	Date Fixed
Workers involved in SWMS development, are site specific				
Reviews carried out on all subbie SWMS's				
Are controls implemented, effective as per SWMS's				
Have all workers signed on to the relevant SWMS				
Attach reviewed SWMS to this checklist as evidence				
Environmental Controls	OK ✓/✗	Description and Action Required	Person Responsible	Date Fixed
Are dust control activities effective				
Are sedimentation controls effective in containing sediment on site and in good condition				
Is emergency spill kit on site				
Is the noise generated on site within acceptable limits				
Weed Species management in place				
Is the Fire Ants Management Plan being applied				
Is dewatering undertaken in an approved manner				
Are bins in place and regularly emptied				
Are public roads clear of mud and debris				
Are all cultural heritage requirements being adhered to (if applicable)				
General	OK ✓/✗	Description and Action Required	Person Responsible	Date Fixed
Are all required access & other permits held including high risk licences				
Safety signage and CCA Site signs in place				
Incidents and accidents being reported				
Lifting equipment in good order and tested and tagged				
Do on site amenities comply (i.e. toilet, site office/crib, water and hand washing facilities)				
Are all Project plans and documents up to date				
Have all been site inducted				
Are manual handling aids used where applicable				
OTHER Problems Found During Inspection		Action Required	Person Responsible	Date Fixed



Contract No:

Prepared By:	Systems Administrator	Date Revised:	22/12/2016	Document Number:	WINBMS-ER-05
Approved By:	Manager-Systems	Date Approved:	22/12/2016	Date First Issued:	1/01/2015
Document Name:	Water Quality Register			Revision No.9	Page No.1

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

APPENDIX F

COMPLIANCE & CONTINUAL IMPROVEMENT FORMS

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 27 of 29



ENVIRONMENTAL INCIDENT REPORT

Complete this page only if the incident was reported to the EPA (Environmental Protection Authority)

To be completed by: the relevant Supervisor/Project Manager/Project Engineer

Was EPA Notified ☐ YES ☐ NO

Reported to the EPA by Name: Position:

Notification Method: ☐ Phone ☐ On Site

Date of Notification: Time: AM/PM

Any other authorities notified and why:

Name:	Position:
Signature:	Date:

Note: If the EPA was contacted, the incident report must be faxed to the GM/BUL immediately.

Legend: GM- General Manager, BUL- Business Unit Leader

Prepared By:	Systems Administrator	Date Revised:	22/12/2016	Document Number:	WINBMS-EP-03-A
Approved By:	Manager Systems	Date Approved:	22/12/2016	Date First Issued	1/01/2015
Document Name:				Revision No. 5	Page 3



NON-CONFORMANCE REPORT (WINBMS-SP-16-A)

Entity Issued to:		NCR No:
Project Name:		Date:
☐ Operational	☐ Procedural	☐ Material

NCR raised as a result of	☐ Inspection & Testing	☐ Co's NC Product
☐ Suppliers NC Product	☐ Customer Compliant	☐ Audit

Non-Conformance Details:	
Signature of Person Raising NCR:	Date:

Proposed Method of Disposition to Non - Conformance		
☐ Accept as it is	☐ Accept with Concession	☐ Rework or Repair
☐ Reject & Replace	☐ Return to Supplier	☐ Regrade for other use
Details:		
Company Approval Signature:	Date:	

Customer/Client Approval:	☐ Required	☐ Not Required
---------------------------	-----------------------------------	---------------------------------------

Disposition Completed on:	Date:	Completed By:
Date Approved:	Date NCR Closed:	Closed By:

Corrective Action:	☐ Required	☐ Not Required
Preventive Action:	☐ Required	☐ Not Required

Details of CA/PA taken if required:

CA/PA Closed:	Date:	Closed By:
---------------	-------	------------

Prepared By:	Systems Coordinator	Date Revised:	17/01/2022	Document No:	WINBMS-SP-16-A
Approved By:	Manager Systems	Date Approved:	17/01/2022	Date First Issued:	01/01/2015
Document Name:	Non- Conformance Report			Revision No. 11	Page 1 of 1

Page 1 of 27



NOTE: = planned audit ; = planned audit performed

OCTOBER 2010

COMMITMENT BY EVERYONE EVERYWHERE EVERYDAY WE SUCCEED AS ONE



Individual Leader



Leaders



Senior Leaders



Executive Leaders

	Individual Leader	Leaders	Senior Leaders	Executive Leaders
Standards	Follow standards and rules	Ensure compliance	Set high standards	Demonstrate commitment
Communication	Speak up	Encourage the team	Communicate openly	Motivates & encourages
Risk Management	Be mindful	Promote risk awareness	Confront risk	Commitment to risk reduction
Engagement	Get involved	Involve the team	Involve the workforce	Inspires with a compelling vision

SENIOR AND EXECUTIVE LEADER Managers' Leadership Behaviours

People generally consider the attitude and behaviour of their manager's towards Health, Safety & Environment to be very important. Those managers who demonstrate their commitment to Health, Safety & Environment by applying their own knowledge and valuing the experience of their teams, including

contractors, usually achieve good Health, Safety & Environment results.

Managers must elevate the message about Health, Safety & Environment to a strategic business priority and not permit HSE to be considered merely the job of a safety officer.



1. DELIVER HSE EXCELLENCE STANDARDS

To embed Health, Safety & Environment in our culture

I will ...

Hold others to account for their actions and regularly explain HSE expectations

Focus on sustainable performance improvements and measure progress via leading and lagging indicators

Continually emphasise that our commitment to Safety will never be sacrificed in pursuit of achieving any other business targets or KPIs

Consistently recognise good HSE behaviours and performance, and address poor HSE performance and unsafe behaviour when it happens

Define the rationale for Safety behaviours and challenge the business to consider breakthrough ways to improve HSE

I will not ...

React to circumstances, and not plan how to achieve desired Safety performance

Delay following up on agreed HSE actions and provide feedback

Tolerate variable and inconsistent HSE standards

Allow short-term production pressures to win over HSE

Place undue emphasis on occupational safety, to the detriment of process safety

2. ENCOURAGE THE TEAM COMMUNICATION

To embed Health, Safety & Environment in our culture

I will ...

Talk face-to-face with my team about HSE performance and concerns

Regularly vary communication methods to deliver the HSE message

Keep the HSE message simple and direct

Provide prompt honest feedback on concerns raised

Be open and honest when mistakes are made

I will not ...

Ignore poor safety culture

Wait for others to communicate on HSE

Disregard team views about HSE

Fail to include HSE on the leadership meeting agenda

3. CONFRONT RISK RISK MANAGEMENT

To embed Health, Safety & Environment in our culture

I will ...

Ensure effective mechanisms exist for people to raise HSE concerns

Be approachable by any employee to discuss HSE concerns

Actively encourage and support ideas to improve HSE performance

Review incidents and investigations to understand root causes and communicate learning

Practice what I preach and be accountable for my actions

I will not ...

Fail to seek new ideas to support HSE performance improvement

Fail to provide a response or feedback to the team about HSE or welfare concerns raised

Show more concern about statistics, reputation and profile than caring for people

Fail to lead by example

Blame others for my actions

4. INVOLVE THE WORKFORCE ENGAGEMENT

To embed Health, Safety & Environment in our culture

I will ...

Ensure adequate HSE resources and training are available, allocate sufficient time and priority for these initiatives

Regularly discuss HSE performance during operational meetings and include sub-contractors in these meetings

Take personal action to improve HSE performance by showing enthusiasm, decisiveness and support

Continually seek new ways to widen team participation and involvement

I will not ...

Unnecessarily delegate attendance at HSE meetings and personal involvement in HSE initiatives

Commit with words but do not take whole actions, or be slow to act

Show negative interest, enthusiasm or support for HSE initiatives or issues

Give a low priority to the development and maintenance of team HSE competence

PROJECT MANAGER / ENGINEER HSE LEADERSHIP AUDIT CHECKLIST

Audit Date:	 PM / PE MUST COMPLETE ALL CRITERIA ON THIS FORM AND SPEAK TO AN OPERATOR, SUBCONTRACTOR OR LABOURER TO COMPLETE Sec 2 (HSE Leadership)
Project Name:	 ALL PM / PE MUST COMPLETE A MINIMUM OF 2 AUDITS PER MONTH
Person Completing Audit:	 ALL COMPLETED AUDITS ARE TO BE RETURNED TO THE HSE MANAGER TO BE ENTERED INTO THE DATA BASE
Site Foreman:	 SITE FOREMAN MUST BE NOTIFIED OF ALL THE REQUIRED CORRECTIVE ACTIONS AND THEY MUST BE CLOSED OUT

Rating Scale:	0 Unacceptable: 1 Poor: 2 Fair: 3 Acceptable: 4 Good:
Based On:	0 Potential for serious injury / major damage to equipment/Serious Non conformance to criteria 1 Likelihood of an incident occurring 2 General non compliance with legal and or site safety requirements 3 Compliance substantial but not 100% 4 All areas satisfy both legal and site safety requirements
Not applicable	* Not Applicable N/A

SECTION 1: SITE AUDIT	POSSIBLE	ACTUAL	%	OBSERVATION
1.1 GENERAL SITE				
a) Are all sharp objects capped? i.e.: star pickets, reo bars	4			
b) Winslow & Red Zone signs displayed at all entrances?	4			
c) First aid facilities clearly identified? (sign displayed)	4			
d) Site accommodation Access / Egress clear walkways around site sheds no trip hazards?	4			
e) Are all plant flashing lights and reversing beepers working?	4			
f) ARE SAFETY PINS FITTED?	4			
g) Are site amenities kept clean and tidy?	4			
h) Is the site adequately fenced as per client requirements? (fences in place & maintained, adequately braced, lockable gates etc)	4			
i) Are all pits adequately covered or barricaded?	4			
j) Public Interaction: Are pedestrian paths clear & are public interaction areas maintained in a safe manner?	4			
k) Are environmental controls in place as per EMP and are controls working? i.e. Dust suppressed, mud on roads, no escape of turbid waters	4			
Total Possible Score	44			
1.2 EXCAVATION WORK				
a) Are all excavations greater than 1.5m in depth battered, benched or shielded?	4			
b) Are all excavations, pits and unsafe areas adequately barricaded?.	4			
c) Is the Winslow Services Permit available on site?	4			
d) Have all relevant personnel signed on to the permit?	4			
e) Is Winslow Asset Protection Plan (APP) on site, displayed & as built's added?	4			
f) Have all known services been located, proved & protected?	4			
g) Are ALL overhead services adequately protected with signage, barricades and crossing points installed?	4			
g) Are any machines working in the vicinity of overhead or underground assets? Is a spotter available?	4			
h) Are service authority permits required for the work being undertaken & are they available?	4			
Total Possible Score	36			

Prepared By:	Systems Administrator	Date Revised:	3/03/2018	Document Number:	WINBMS-SP-17-B
Approved By:	Manager Systems	Date Approved:	3/03/2018	Date First Issued:	01/01/2015
Document Name:	PM/PE Surveillance Audit Format			Revision Number: 10	Page No. 1

SECTION 2: EMPLOYEE / OPERATOR / SUB-CONTRACTOR INTERVIEW	POSSIBLE	ACTUAL	%	OBSERVATION
NAME OF PERSON INTERVIEWED:.....				
ROLE:.....				
a) Has worker been inducted? (Check Induction Records)	4			
b) Has worker been signed on to task specific SWMS?	4			
c) Does the worker understand the risks and controls identified in the SWMS? (Check work against SWMS)	4			
d) Has the plant daily pre-start checklist been completed?	4			
e) Does the worker have a whitecard?	4			
f) Do operators have correct competency tickets?	4			
g) Does plant operator know production target for the activity being undertaken?	4			
h) Is there a KPI measurement being recorded for the major activity undertaken on site?	4			
i) Does the foreman or leading hand know the KPI target for their next planned construction activity?	4			
Total Possible Score	36			

SECTION 3: ADMINISTRATION	POSSIBLE	ACTUAL	%	OBSERVATION
a) Is there a copy of the site specific PMP on site?	4			
b) Is the site specific Health & Safety Coordination Plan and Hazard Register available on site?	4			
c) Are emergency numbers displayed and are they relevant to the site?	4			
d) Have weekly safety & environmental checklists been completed?	4			
e) Is TMP available on site?	4			
f) Does the TMP allow for pedestrian access / movements & is it adequate?	4			
g) Are TMP controls in place & have traffic checklists been completed?	4			
h) Are sub contractors working in accordance with SWMS and are personnel signed on to the SWMS?	4			
i) Are company policies and all relevant paperwork displayed in lunchrooms?	4			
j) Are operations adequately seperated and 30m red zones being adhered to?	4			
Total Possible Score	40			

CORRECTIVE ACTIONS			
Corrective Actions Required	Who is responsible for close out?	Date of close out	Comments

Prepared By:	Systems Administrator	Date Revised:	3/03/2018	Document Number:	WINBMS-SP-17-B
Approved By:	Manager Systems	Date Approved:	3/03/2018	Date First Issued:	01/01/2015
Document Name:	PM/PE Surveillance Audit Format			Revision Number:	10
				Page No.:	2

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

APPENDIX G

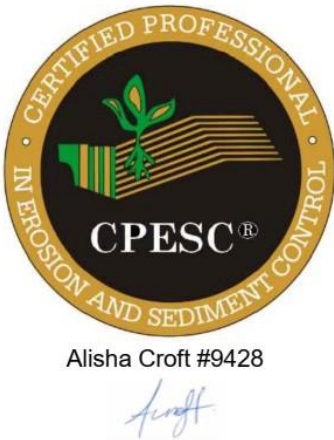
ENVIRONMENTAL CONTROL PLAN

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 28 of 29

Progressive Erosion and Sediment Control Plan – Earthworks 002

Revision No	Date	Prepared by	Reviewed By	Approval
0	16/10/2023	Alisha Croft	Michael Williams	Alisha Croft CPESC #9428

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EROSION & SEDIMENT CONTROL PLAN

Courtney Drive Stage 1-3, Upper Coomera

Rev: 0

Date: 16/10/23

ESCP No. 002

1. SCOPE

This Progressive Erosion and Sediment Control Plan (ESCP) has been developed for the Earthworks phase for the Courtney Drive residential estate for Stage 1-3, Upper Coomera QLD. With additional progressive erosion and sediment control plans to be prepared for the Civil stages.

1.1 Guidelines

This ESCP has been prepared in accordance with the following document(s):

- Best Practice Erosion and Sediment Control (IECA, 2008)

1.2 Certification

This ESCP will be reviewed and certified by a CPESC prior to commencement of works. This review and certification will ensure the plan has been prepared to satisfy the intent and minimum standards nominated within the IECA (2008) Best Practice Erosion and Sediment Control Guideline.

2. PROJECT DESCRIPTION

2.1 Location & Land use

The site is located off Courtney Drive in Upper Coomera and will connect Courtney Drive with Rangeview Road. (Figure 1).



Figure 1: Locality Plan

2.1.1 Scope of Works

The scope of works is as follows:

- Site clearing and grubbing, inclusive of the removal of existing site trees;
- Undertake bulk earthworks activities;
- Construction of proposed lots and establishment of retaining between lots in accordance with design;
- Construction of stormwater infrastructure;
- Construction of proposed residential streets
- Installation of all relevant signage and line marking;

The general arrangement of Erosion and Sediment Controls are illustrated in figure 2.

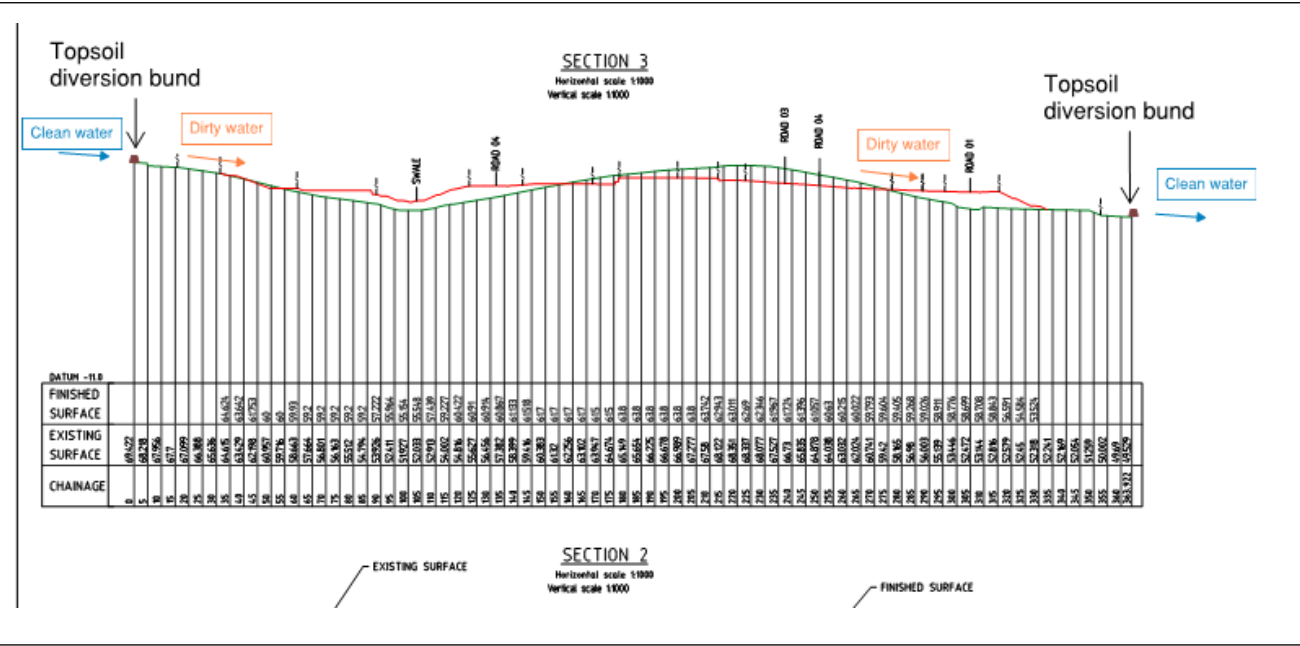


Figure 2: Typical Erosion and sediment control arrangement

EROSION & SEDIMENT CONTROL PLAN

Courtney Drive Stage 1-3, Upper Coomera

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3. SITE DESCRIPTION

3.1 Climate & Rainfall risk

Historic rainfall data for Upper Coomera has been extracted from the Coomera Foxwell Road Weather Station (Station No. 40516) the closest long-term gauging station to the site, is illustrated in **Figure 3**. Relatively wetter conditions typically occur from November to June and drier conditions tend to persist from July to October. The corresponding Erosion Risk Rating (rainfall depth) is colour coded from **Table 1** (Based on IECA Table 4.4.2).

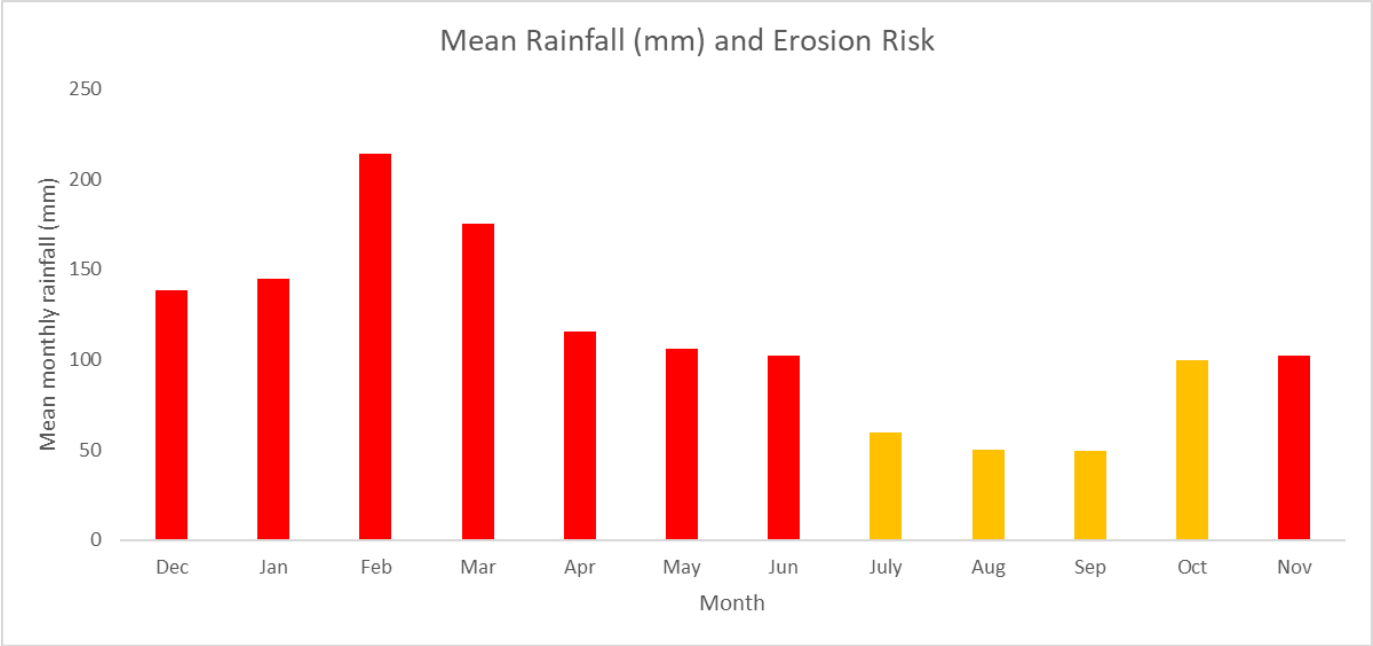


Figure 3: Mean Rainfall data, Coomera Foxwell Road Alert Weather Station #40516 (1997-2023)

Table 1: Erosion Risk Rating Categories (rainfall depth) as per Table 4.4.2, IECA, 2008

Erosion Risk Rating	Average Monthly rainfall depth (mm)
Very Low	0 to 30
Low	30+ to 45
Moderate	45+ to 100
High	100+ to 225
Extreme	>225

3.2 Topography and drainage

Based on contours presented on the IFC Drawings and the Geotechnical report prepared by Pacific Geotech in January 2023, ‘the site topography typically comprises a ridge line which meanders in a north south lineation through the centre of the site. The ridge line typically comprises flat or gentle sloping terrain of less than 5° in slope gradient. This ridge line is flanked to the east and west by mild sloping terrain typically ranging between 5° and 15° in slope gradient with some localised steeper areas ranging up to approximately 20° in slope gradient.’ (*Geotechnical Investigation and Landslide Risk Assessment for proposed residential subdivision, end of Courtney Drive, Upper Coomera, January 2023, Pacific Geotech*)

Numerous drainage lines are currently present across the site, with the main drainage line traversing from the South western corner towards the north, a wide drainage area discharges to the west and another drainage feature discharges to the north. Each drainage line moves through an existing dam within the confines of the site prior to discharging offsite. The project shall utilize these existing dams as part of the clearing and grubbing phase of the project until the final sediment basins can be established for utilization during earthwork stages.

3.3 Soils

Soils located onsite consist of high plasticity clay soils or clayey sands.

4. RISK ASSESSMENT

4.1 IECA Soil loss assessment

Based on the requirements of IECA (2008), an erosion risk assessment has been conducted using the Revised Universal Soil Loss Equation (RUSLE). The calculated soil loss is then used to determine the level of sediment control required.

$$A = K \times R \times LS \times P \times C$$
Equation 1 (IECA 2008)

Where:

- A is the predicted soil loss (t/Ha/yr)
- K is the soil erodibility factor
- R is the rainfall erosivity factor
- LS is the slope length/gradient factor
- P is the erosion control practice factor
- C is the ground cover and management factor

4.1.1 K - Factor - Soils

Soils located onsite consist of Sandy Clay/ Clay present in area. As such a conservative assumption has been made for the K factor resulting in an adopted K factor of 0.051.

4.1.2 R - Factor - Rainfall

An annual erosivity factor of 5489 has been adopted based on a 2-year, 6-hour rainfall intensity of 15.6mm/hr and the following equation from section E3.2 of IECA (2008).

$$R = 164.74 (1.1177)^S S0.6444$$

4.1.3 LS – Slope Length

As described in Section 3.2, the topography of the site comprises of moderate slopes. Based on existing/design surface levels, LS factors have been adopted as follows:

- Grades up to 8.75%, slope length will be limited to 25m between checks – adopted LS-factor 2.05
- Grades up to 10.62%, slope length will be limited to 25m between checks – adopted LS-factor 2.81
- Grades up to 16.87%, slope length will be limited to 10m between checks – adopted LS-factor 5.52

4.1.4 Cover (C) and Practice (P) Factors

A C factor of 1 has been adopted in accordance with industry practice to reflect the worst-case level of cover offered during the proposed development activities.

The P factor represents the combined effect of management practices and structural methods to control erosion. An industry default P factor value of 1.3 has been applied to the risk assessment, which is recommended for the construction phase condition (per table E11 of IECA, 2008).

4.1.5 Estimated Soil Loss

Results of the erosion risk assessment are presented in **Table 2**. Sediment control type derived from IECA (2008) Table 4.5.1

Table 2: Estimated soil loss from each site catchment

Site	Disturbed Area (HA)	R	K	LS	P	C	A (t/ha/yr)	Adopted Control	Comment
Catchment 1	4.36	5489	0.05	1.47	1.3	1	535	Type 1	Check dam spacing at 25m; excavated sediment traps at outlet/discharge locations; and C-factor reduction during months when soil loss exceeds 12.5t/ha/month i.e. from December to March. Note: C-factor reduction can be achieved in a number of ways including application of soilbinder and revegetation treatments
Catchment 2	2.91	5489	0.05	2.05	1.3	1	746	Type 1	
Catchment 3	5.4	5489	0.05	2.05	1.3	1	746	Type 1	

Due to an estimated soil loss of a maximum of 746t/ha/yr based on the construction stage of the proposed works and maximum area proposed for disturbance associated with the project, the Erosion risk is nominated as High in accordance with Table 4.4.3 of IECA (**Table 2**). Erosion and sediment control will be installed for the project in accordance with the risk profile and specific constraints of the site (Table 4).

Table 4: Erosion risk rating based on estimated soil loss rate (as per Table 4.4.3 IECA 2008)

Erosion Risk Rating*	Soil loss (t/ha/yr)
Very Low	0 to 150
Low	150+ to 225
Moderate	225+ to 500
High	500+ to 1500
Extreme	>1500

Table 5: Erosion Control Standards

Erosion Risk as per Table 4.4.7 of IECA	Limit of forward Clearing	Stabilisation – Temporary	Stabilisation – Permanent
All	All reasonable and practicable steps taken to apply best practice erosion control measures to completed earth works, or otherwise stabilise such works, prior to anticipated rainfall-including existing unstable, undisturbed, soil surfaces under the management or control of the building/construction works.		
Low	Clearing and stripping is limited to 8 weeks prior to the scheduled commencement of bulk earthworks	Unfinished earthworks are suitably stabilised if disturbance is expected to be suspended for a period exceeding 30 days	Disturbed soil surfaces are stabilised with a minimum 70% cover within 30 days of the completion of works within any area of a work site.
Moderate	Clearing and stripping is limited to 6 weeks prior to the scheduled commencement of bulk earthworks	Unfinished earthworks are suitably stabilised if disturbance is expected to be suspended for a period exceeding 20 days.	Disturbed soil surfaces are stabilised with a minimum 70% cover within 20 days of the completion of works within any area of a work site.
High	Clearing and stripping is limited to 4 weeks prior to the scheduled commencement of bulk earthworks	Soil Stockpile & unfinished earthworks are suitably stabilised if rainfall is reasonably possible, and disturbance is expected to be suspended for a period exceeding 10 days.	Disturbed soil surfaces are stabilised with a minimum 75% cover within 10 days of the completion of works within any area of a work site

5. GENERAL NOTES

- This Erosion and Sediment Control Plan (ESCP) has been prepared to provide a site specific ESCP to demonstrate the management of erosion and sediment control in accordance with the Best Practice Erosion and Sediment Control Guidelines (IECA, 2008).
- This ESCP shall be supplemented by Progressive Erosion and Sediment Control Plans (PESCP). PESCPs are to be developed to identify the specific location and, where required, additional erosion and sediment controls applicable to individual work stages. PESCPs shall be documented via mark ups to approved plans. Where a change in the level of sediment control standard is proposed in a PESCP, the PESCP shall be reviewed and approved by an appropriately qualified person prior to the change being implemented.
- Minimise the extent and duration of disturbance, maintaining existing ground cover to the greatest extent possible.
- Commissioning / decommissioning of plant and refuelling to be undertaken a minimum of 30m away from any watercourse/drainage line.
- All ERSED controls to be inspected regularly (weekly, pre/post rainfall event i.e. forecast or actual rainfall of >10mm) with maintenance/repairs to be undertaken when necessary
- Revegetation of disturbed/bare areas to be progressively implemented
- Where clean water drains and sediment traps/sumps are necessary, all clean water drains, and sediment traps and associated drainage must be installed and commissioned prior to the commencement of any grubbing works within the catchment area
- All controls must be installed within approved project footprint.
- Ensure all site access is stabilised with rumble grid and clean rock.

6. STAGING

Stage 1 - Vegetation removal, clear and grub, topsoil strip	Phase 1: - Site Establishment of access tracks, clearing and minor topsoil strip in locations for clean water drains only, installation of clean water drains, diversion bunds, clean water diversion drains, sediment basins and traps and other appropriate erosion and sediment controls. Temporary crossings are also to be installed where necessary with clean water diversion drains. Phase 2: - Clearing and grubbing to commence on approval from Project Environmental Site Representative of all clean water drains, sediment traps/basins and establishment controls installed appropriately. Clearing to commence in a sequential approach. Clearing activities will only remove large vegetation and retain groundcover wherever possible. - Vegetation will be stockpiled downslope of cleared zone and accessible from access track in readiness for mulching. Phase 3: - Mulching of stockpiled vegetation and stockpiling of mulch or integration into erosion and sediment controls. Phase 4:
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	Topsoil strip to commence in a staged approach across site and topsoil placed in designated topsoil stockpile areas with controls installed and maintained.
Stage 2 – Bulk Earthworks	Phase 1: - Cut and fill will continue through footprint, establishing supplementary controls as required (locations tbd onsite) such as mulch bunds and sediment fence or geofabric overplaced and wrapped up to act as filter fence at base of fill zones and around drainage inlet locations. Stabilisation to occur on cut/fill batters throughout works. Areas to be progressively revegetated as they are completed. Phase 2: - Civil works to commence, ensuring all site dirty water is directed into site sediment basins.
Stage 3 – Stabilisation/Revegetation	Site wide stabilisation and revegetation via seeding of any areas not already revegetated as part of progressive stabilisation works. Site must achieve 70% vegetated cover for works to be considered effectively stabilised.

7. DEWATERING AND WATER QUALITY

- Basins to be dewatered prior to rain event that is likely to produce runoff; however, during dry conditions water may be retained in the settling pond as a source of construction water (i.e. dust suppression).
- If possible, it is recommended that dewatering/spread of collected runoff from basins be applied to well vegetated lands at least 40m away from any waterway to allow it to infiltrate within the site boundary, if this is done, ensure water is applied slowly and in a manner that avoids concentrated surface runoff and/or erosion.
- If actively discharging (pumping or siphoning) the water out of the basin, water must be treated to achieve, pH 6.5-8.5, <10mg/L oil and grease and no visible trace and a standard 90%ile total suspended solids concentration not exceeding 50mg/L or 50%ile NTU reading (as per IECA Best Practice Erosion and Sediment Control Guidelines Appendix B) and no more than a 10% increase in background conditions.
- Where captured basin water is to be used onsite for dust suppression or construction purposed, water does not require testing or treatment.

8. DESILTING

- Install an appropriate painted desilting marker in the basin to indicate top of sediment storage zone. Basin must be desilted if the next storm event is likely to cause sediment to rise above this marker point; or if sediment is already above the marker; or if the sediment has exceeded 90% of the nominated sediment storage volume.
- Removal of all sediment/materials collected from the basin to be disposed of in a suitable manner that will not cause an erosion or pollution/environmental hazard.
- Refer to ESCP for recommended volume and dimensions for proposed sediment basin. Note that all dimensions are approximate and subject to verification with review of detailed ground survey and alignment.
- All earthen embankments (for basins or otherwise) greater than 1m in height to be certified by a qualified geotechnical specialist to ensure structural integrity for the desired design criteria and anticipated period of operation
- Upon decommissioning of sediment basins, all water contained within must be removed and disposed of appropriately before the removal of any basin embankments

9. OVERVIEW OF KEY ESC TECHNIQUES

Drainage Controls – Catch Drains (CD) and Diversion Banks (DB)

This ESCP identifies the location of catch drains and diversion banks required to divert upslope clean water away from areas of soil disturbance, stockpiles and excavations, and to collect dirty runoff water from disturbed areas and stockpiles and direct it to a sediment trap and to control water flow through the worksite to avoid damage to unfinished areas of earthworks and infrastructure. Due to the presence of potentially dispersive subsoils on the site, diversion banks have been used wherever possible. Diversion banks, when constructed by pushing soil from the down-slope side, avoid exposing sodic subsoils and maintain in-situ groundcover in the flow path.

Where site mulch is available in sufficient quantities, temporary diversion banks/sediment filters may be formed from mulch. Temporary sandbag diversion banks will also be used to provide temporary diversion of water in locations of limited space and active construction areas prior to forecast wet weather.

Erosion Controls – Soil Binders

Soil binders are a form of chemical surface stabiliser and/or soil-bonding agent applied to exposed soil surfaces to control erosion. Soil binders are suitable for minor drainage lines, upper waterway banks, batters and topsoil stockpiles. Soil binders have been specified for use on batter locations and drainage lines in the project area, to provide temporary erosion control during construction activities and reduce predicted soil loss and associated requirements for sediment controls.

Soilbinders (or revegetation treatments) are required to be applied to disturbed batters between the months of December to March to reduce C-factor prior to rainfall forecast >10mm in 24 hours.

Sediment Controls

The following key sediment controls are specified in this plan and have been applied to individual catchments based on the results of the RUSLE soil loss predictions (Section 3.5).

Sediment basins – Due to the size and slopes present onsite, Type B sediment basins have been nominated to capture and treat site runoff in applicable catchments.

Rock Checks/Filter Dam (Type 2) – Where drainage topography allows, rock checks and rock filter dams have been utilised to slow the velocities of site dirty water.

Sediment Fence (Type 3) - Sediment fences have been nominated to provide sediment controls in locations that are likely to receive predominantly sheet flows. Used in conjunction with concentrated flow sediment treatment techniques. Where site mulch is available in sufficient quantities, Type 3/perimeter controls may be formed from mulch.

Site Exit / Entry - To prevent sediment tracking onto public roads, stabilised rock pad entry locations have been identified. Associated drainage and sediment controls have been identified to contain and treat runoff in accordance with the adopted sediment control standard for individual catchments. Adjacent roads should be inspected regularly, and any sediment deposited on public roads should be removed in a safe manner and disposed of to an approved disposal facility

Mulch berms and bunds – site won mulch berms and bunds have been nominated across the slopes and perimeter of the project to slow sheet flows and velocity of dirty water down slopes.

10. STOCKPILE MANAGEMENT

Place stripped soil at approved stockpile locations

Stockpile topsoil at a height no greater than 2m.

Stockpile any excess subsoil or spoil separately from topsoils and at designated stockpile locations upslope of sediment traps.

Install non-woven sediment fence (bidim A34 or equiv) around stockpiles as per SD-FF-1

Where topsoil stockpiles will remain undisturbed for greater than nominated erosion standard, apply seeding of a cover crop at the rate of 10kg/ha to topsoil stockpiles. Refer to revegetation specifications for seed mix.

Where subsoil / spoil stockpiles will remain undisturbed for greater then nominated erosion standard, apply temporary cover or soil binder.

Temporary Stabilisation Erosion Standard

Month	Temporary Stabilisation Erosion Standard
Dec, Jan, Feb	10 days
Mar – Jun, Oct – Nov	20 days
July – Sept	30 days

11. INSPECTIONS & MONITORING

All erosion and sediment control measures, including drainage measures, must be always maintained and in proper working order during their operational life.

All drainage, erosion and sediment controls shall be inspected daily when rain is occurring (if site access is available) weekly, prior to and following a rainfall event of sufficient intensity and duration to cause on-site runoff immediately prior to and following periods of site shutdown.

Inspections shall include checks of all drainage, erosion and sediment control measures including site discharge points for:

- evidence of excessive sediment transport and or deposition either on or off site
- evidence of excessive erosion either on site or immediately downstream
- treatment and de-watering requirements for sediment basins / sediment traps
- the progress and stability of site rehabilitation and revegetation works.

Where inspections identify a non-conforming control measure, or issues that are likely to prevent the achievement of the erosion and sediment control objectives, corrective or preventative actions will be developed and implemented as necessary to achieve the required erosion and sediment control performance standards.

A written record / register of monitoring observations and maintenance tasks shall be kept on site and available for inspection.

12. SITE REHABILITATION

The following site rehabilitation requirements are to be read in conjunction with the project specific landscaping, soil management and revegetation plans and applicable project requirements. Where there is an inconsistency between the site rehabilitation measures in this document, and the project specific contract documents, the site specific and contract documents shall prevail.

Disturbed areas shall be stabilised within the following time frames

Permanent Stabilisation Erosion Standard

Month	Temporary Stabilisation Erosion Standard
Dec, Jan, Feb	10 days
Mar – Jun, Oct – Nov	20 days
July – Sept	30 days

Areas shall be considered stable once they achieve 70% cover in 90% of the relevant catchment. Temporary drainage, erosion and sediment control structures shall not be decommissioned until this level of cover is achieved within the upslope catchment.

Compacted areas / areas subject to construction traffic shall be first scarified to a minimum depth of 50mm to address compaction from construction traffic and assist in tying in topsoil. On steeper slopes (<3H:1V) scarification may alternatively be undertaken via track walking up and down the slope.

Stripped topsoil shall be reinstated in accordance with pre-stripping profiles and depths. Topsoil shall be placed at a minimum of 75mm and lightly compacted, reinstating the original top 50mm as the final layer. On slopes steeper than 4H:1V topsoil reinstatement shall be reduced to 50mm to minimise slumping.

Ensure all dispersive / sodic subsoil is adequately covered with a minimum of 50mm of non-dispersive topsoil.

Apply seed, fertiliser and hydromulch to disturbed areas as per rehabilitation specifications.

Apply follow up watering on a daily basis (subject to weather conditions) to hydromulched areas.

Any excess spoil shall be removed from the site to an approved disposal location and the stockpile location rehabilitated as per other disturbed areas

Seed Mix

Where a site-specific seed mix is not specified, the below table provides a seed mix suitable for use in site rehabilitation or temporary seeding.

Seed Mix Specifications

	Summer Blend (Nov – Feb)	Mid-Season (Mar/Apr & Sep/Oct)	Winter Blend (May – Aug)
Unhulled green couch (Cynodon dactalyon)	35kg/ha	35 kg/ha	35 kg/ha
Hulled green couch (Cynodon dactalyon)	35 kg/ha	35 kg/ha	35 kg/ha
Japanese or Shirohie Millet	30 kg/ha	15 kg/ha	0
Perennial Rye Grass	0	15 kg/ha	30 kg/ha

Hydromulch Specifications

Paper pulp at 2t/ha or wood pulp at 2.5t/ha plus tackifier at 5 to 10% by weight.

	EROSION & SEDIMENT CONTROL PLAN		Rev: 0
	Courtney Drive Stage 1-3, Upper Coomera		Date: 16/10/23
			ESCP No. 002

Appendix A : Progressive Erosion and Sediment Control Drawings

F:\Autocad Client\119 - HB Land\01 - Courtney Drive\Project\Stage 01\Engineering Drawings\Current\11901-01-050.dwg, EARTHWORKS SECTION KEY PLAN, 10/09/2023 7:46:45 AM, 1:2

LEGEND

Stabilised exit

Mulch bund

Sediment Basin

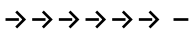
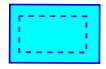
Sediment trap

Dirty water drain

Dirty water flow direction

Sediment fence

Rock Checks



Install rock checks
down access track
every 25m and
trafficable rollover
bunds at 50m intervals
to divert water into site
controls

Sediment trap 1
Dimensions -
10m(L) x 5m(W) x 0.6m(D)

Install rock checks in
dirty water drain

Install perimeter
controls around topsoil
site - sediment fence
and mulch bund.

Sediment trap 2
Dimensions -
10m(L) x 8m(W) x 1m(D)

Basin 3
Minimum capacity 2660m³
Spillway: 12m wide - lined with
geofab and d50 300mm rock

Install rock checks in
dirty water drain

Utilise site-won mulch
as mulch bunds
around perimeter
across slopes onsite

Install rock checks in
dirty water drain

Catchment 3

Catchment 1

Sediment trap 5
Dimensions -
10m(L) x 6m(W) x 1m(D)

Basin 1
Minimum capacity 2030m³
Spillway: 11m wide - lined with
geofab and d50 300mm rock

Sediment trap 3
Dimensions -
10m(L) x 10m(W) x 1.5m(D)

Install rock checks in
dirty water drain

Catchment 2

Install rock checks in
dirty water drain

Install sediment fence
on completion of cut of
batter

Progressively stabilise
batters across site or
utilise soil binder prior
to forecast wet weather

Basin 2
Minimum capacity 1433m³
Spillway: 10m wide - lined with
geofab and d50 300mm rock

Sediment trap 4
Dimensions -
10m(L) x 6m(W) x 1m(D)

LEGEND

- EXISTING KERB (INVERT)
- EXISTING PROPERTY LINE
- EXISTING CONTOURS
- FUTURE KERB (INVERT)
- FUTURE PROPERTY LINE
- PROPOSED KERB (INVERT)
- PROPOSED PROPERTY LINE
- PROPOSED RETAINING WALL
- DESIGN CONTOURS
- SITE BOUNDARY
- STAGE BOUNDARY

PROJECT NAME
**COURTNEY DR
UPPER COOMERA**

STAGE 01

RP DESCRIPTION
LOT 188, 189, 190, 191 & 192 ON RP173728
COURTNEY DRIVE
LOCALITY OF UPPER COOMERA
LOCAL AUTHORITY - GOLD COAST CITY COUNCIL

CLIENT



0 15 30 45 60 75m
Scale 1:1500 - A1 (1:3000 - A3)

B	14-07-23	RFI AMENDMENTS	EP
A	03-03-23	COUNCIL ISSUE	JB
REV	DATE	DESCRIPTION	INT

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DRAWING TITLE

**BULK EARTHWORKS
SECTION KEY PLAN**

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Civil Engineering
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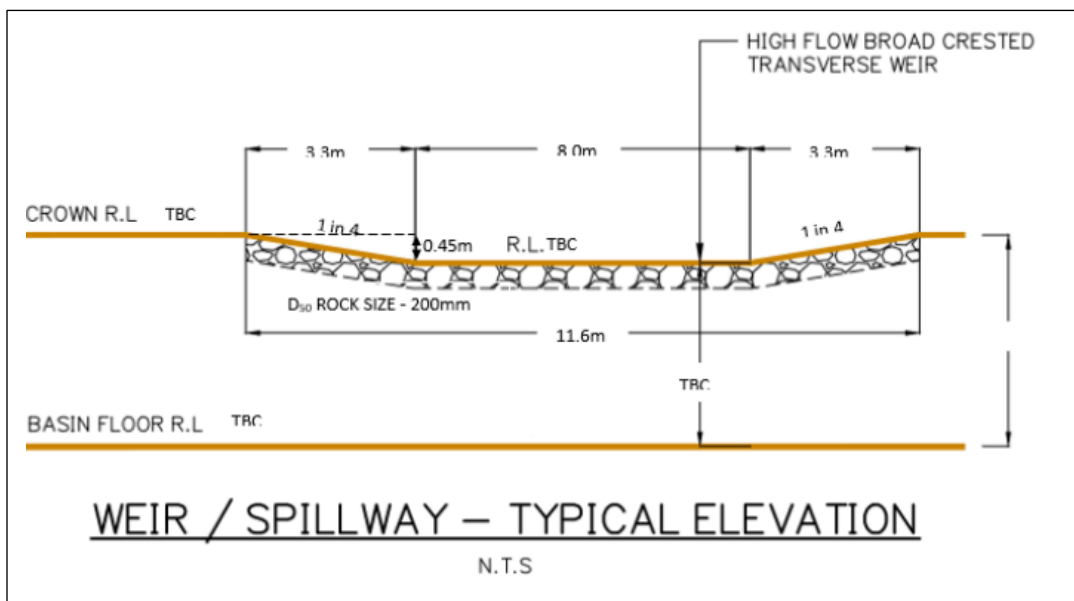
Gold Coast Office
Suite 9, 19 Short St
Southport QLD 4215

DESIGNED RB	DRAWN EMH	DATE 03-03-23
APPROVED <i>AK</i>	RPE 4706	REV
DRAWING NUMBER 41901-01-050	A	

Rev: 0

Date: 16/10/23

ESCP No. 002



EROSION & SEDIMENT CONTROL PLAN

Courtney Drive Estate Stage 1-3, Upper Coomera

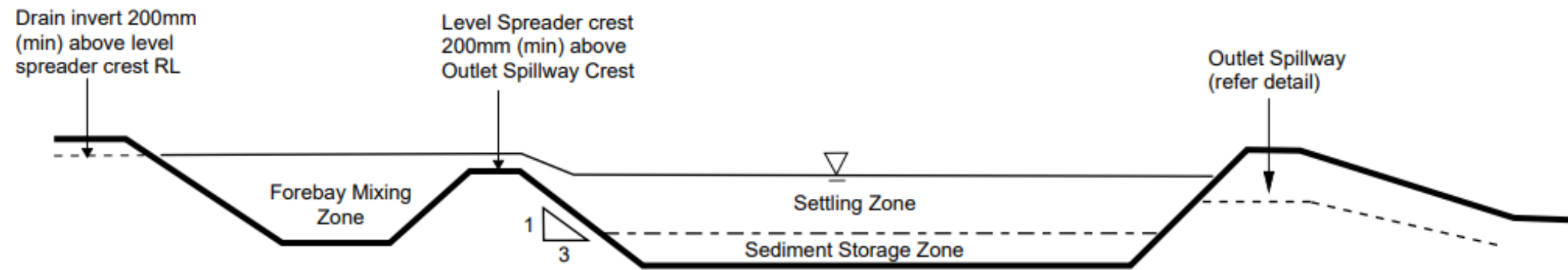
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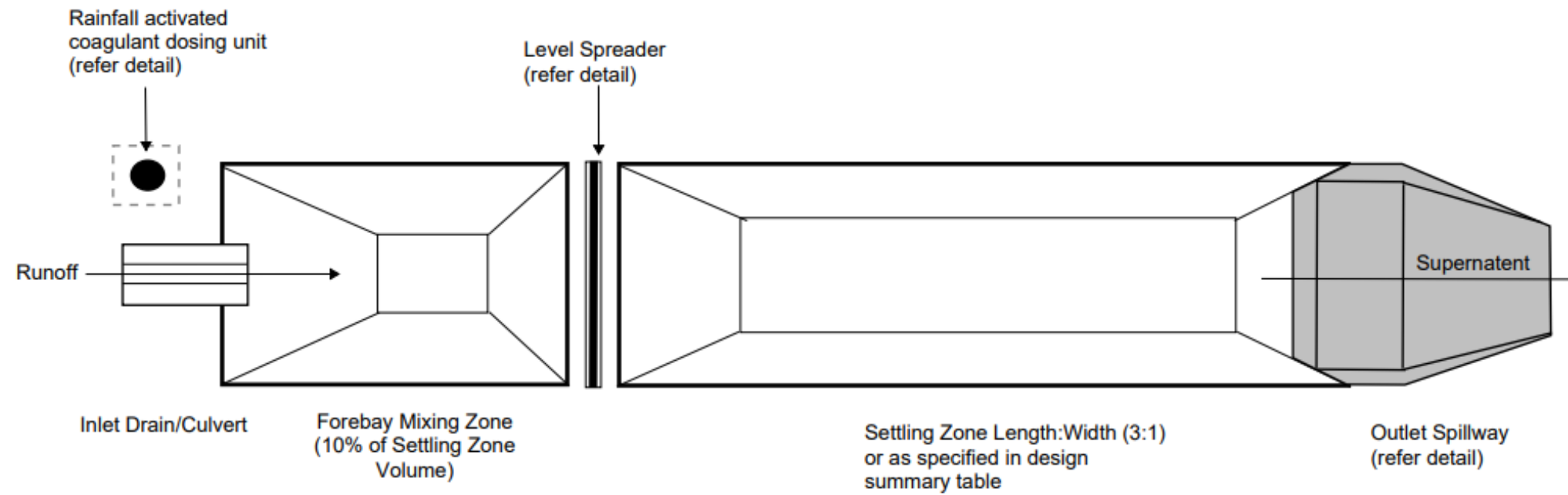
ESCP No. 002

Sediment Basin

		Q3mth Design Flowrate Calc.						Settling Zone						Forebay		Sediment Storage Zone			Overall Dimensions relative to spillway crest (excl. Forebay)			Spillway								
Basin ID	Catchment Area (Ha)	C ₁₀	C ₁	t _c	I _{1yr,t_c} (mm/hr)	Q _{1yr} (m ³ /s)	Q _{3mth} (m ³ /s)	Residence Time (hr)	Settling Zone Depth (m)	Ave. settling zone area (m ²)	Settling Volume (m ³)	W:L (1:X)	Scour Velocity (m/s)	Forebay Min. Depth (m)	Forebay Vol (m ³)	Sed Storage Vol (m ³)	Sed Storage depth (approx.) (m ³)	Batter (1:X)	Width (m)	Length (m)	Depth (m)	Basin Design Life	Design ARI	C	I (mm/hr)	Q (m ³ /s)	Head over spillway (m)	Spillway crest length (m)	Spillway Crest RL (m)	Min Embankment RL (m)
1	4.36	0.7	0.56	10	5.19	0.04	0.02	2	0.6	471	1369	3	✔0.002	1	137	311	0.2	3	14.3	43.0	0.8	3-12months	1:20yr	0.74	143	1.27	0.3	4.6	10	10.75
2	2.91	0.7	0.56	10	5.19	0.02	0.01	2	0.6	314	914	3	✔0.002	1	91	289	0.2	3	12.0	36.1	0.8	3-12months	1:20yr	0.74	143	0.85	0.3	3.0	10	10.75
3	5.4	0.7	0.56	10	5.19	0.04	0.02	2	0.6	583	1695	3	✔0.003	1	170	537	0.2	3	15.7	47.2	0.8	3-12months	1:20yr	0.74	143	1.58	0.3	5.6	10	10.75



Type B Sediment Basin Long Section (Typical NTS)



Type B Sediment Basin Plan View (Typical NTS)

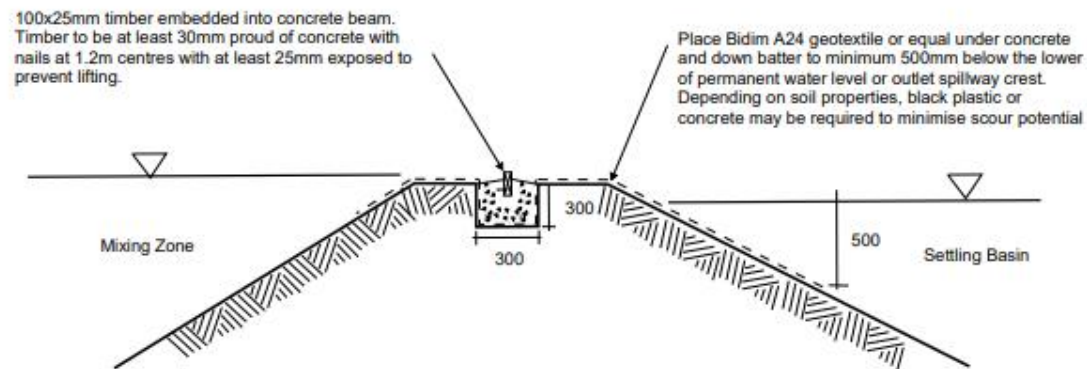
EROSION & SEDIMENT CONTROL PLAN

Courtney Drive Estate Stage 1-3, Upper Coomera

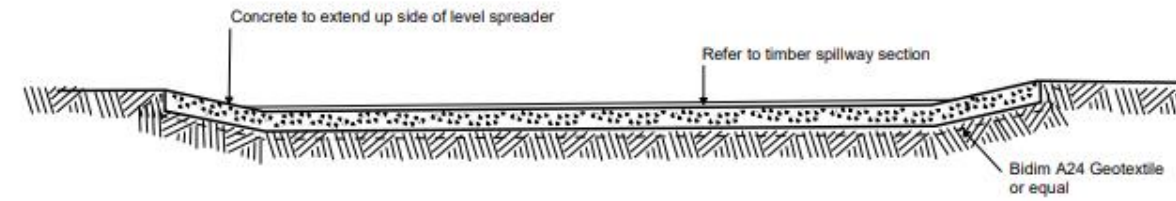
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Date: 16/10/23

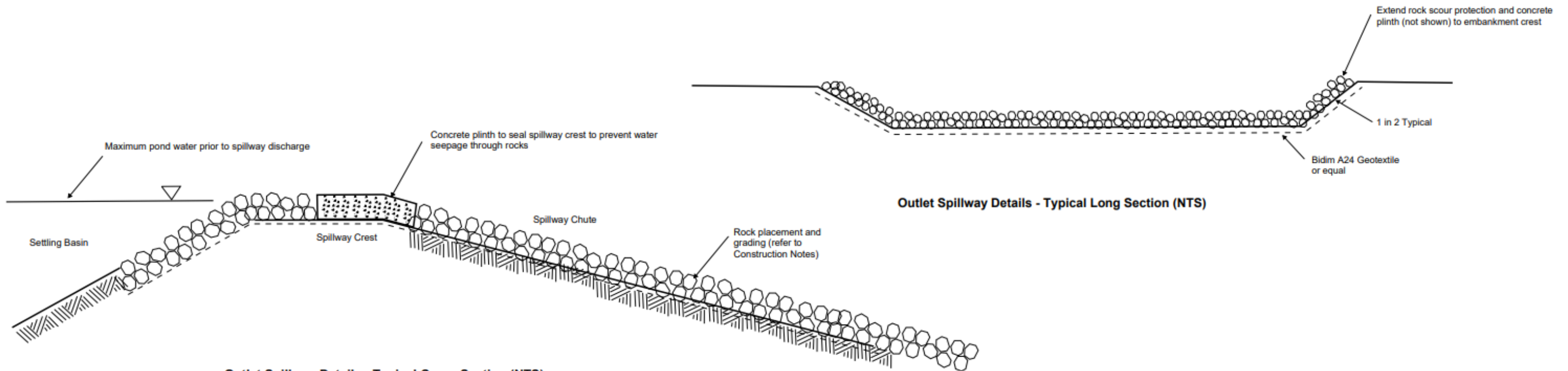
ESCP No. 002



Level Spreader Details - Typical Cross Section (NTS)



Level Spreader Details - Typical Long Section (NTS)



Outlet Spillway Details - Typical Cross Section (NTS)

Notes:

Auto Doser
1. Provided as either Floc Box or iFOD-Rain to manufacturers specification.
2. Doser and supply of flocculant to be provided on level pad 4mx4m within 10m of dosing point.
3. All-weather access track to be provided to doser.
4. Flocculant provided as Turbiclear (ACH). If alternative flocculant used then the basin size is to be increased according to jar settlement test (refer to table below.

Jar Settlement after 15 mins (mm)	Multiplication Factor to Settling Zone Volume
50	x3
75	x2
100	x1.5
150	x1

Basin construction:
Materials-
5. Earth Fill: clean soil with Emerson Class 2(1), 3, 4 or 5 and free of roots, woody vegetation, rocks and other unsuitable material. Soil with Emerson Class 4 and 5 may not be suitable depending on particle size distribution and degree of dispersion. Class 2(1) should only be used upon recommendation from geotechnical specialist.
6. Spillway rock: hard, angular, durable, weather resistant and evenly graded rock with 50% by weight larger than the specified nominal (d50) rock size. Large rock should dominate, with sufficient small rock to fill the voids between larger rock. the diameter of the largest rock should be no larger than 1.5 times the nominal rock size. The specific gravity should be at least 2.5.
7. Geotextile fabric: heavy duty, needle-punched, non-woven cloth, minimum 'bidim' A24 or equivalent.

Construction-
8. Notwithstanding any description contained with approved plans or specifications, the Contractor shall be responsible for satisfying themselves as to the nature and extent of the specified works and the physical and legal conditions under which the works will be carried out. This shall include means of access, extent of clearing, nature of the materials to be excavated, type and size of mechanical plant required, location and suitability of water supply for construction and testing purposes, and any other likely matters affecting the construction of the works.
9. Refer to approved plans for location, dimensions, and construction details. If there are questions or problems with the location, dimensions, or method of installation, contact the engineer or responsible on-site officer for assistance.
10. Before starting any clearing or construction, ensure all the necessary materials and components are on the site to avoid delays in completing the sediment basin once works begin.
11. Install requires short term sediment control measures downstream of the proposed earthworks to control sediment runoff during construction of the basin.
12. The area to be covered by the embankment, borrow pits and incidental works, together with an area extending beyond the limits of each for a distance not exceeding five (5) metres all around must be cleared of all trees, scrub, stumps, roots, dead timber and rubbish and disposed of in a suitable manner. Delay clearing the main basin area until the embankment is complete.
13. Ensure all holes made by grubbing within the embankment footprint are filled with sound material, adequately compacted, and finished flush with the natural surface.

Cut-off Trench-
14. Before construction of the cut-off trench or any ancillary works within the embankment footprint, all grass growth and topsoil must be removed from the area to be occupied by the embankment and must be deposited clear of this area and reserved for topdressing the completed embankment.

15. Excavate a cut-off trench along the centre line of the earth fill embankment. Cut the trench to stable soil material, but in no case make it less than 600mm deep. the cut-off trench must extend into both abutments to at least the elevation of the outlet spillway crest. Make the minimum bottom width wide enough to permit operation of the excavation and compaction equipment, but in no case less than 600mm. Make the side slopes of the trench no steeper than 1:1 (H:V).
16. Ensure all water, loose soil, and rock are removed from the trench before backfilling commences. The cut-off trench must be backfilled with select earth-fill of the type specified for the embankment, and this soil must have a moisture content and degree of compaction the same as specified for the core zone.
17. Material excavated from the cut-off trench may be used in the construction of the embankment provided it is suitable and it is placed in the correct zone according to its classification.

Embankment-
18. Scarify areas on which fill is to be placed before placing the fill.
19. Ensure al fill material used to form the embankment meets the specifications certified by a soil scientist of geotechnical specialist.
20. The fill material must contain sufficient moisture so it can be formed by hand into a ball without crumbling. If water can be squeezed out of the ball, it is too wet for proper compaction. Place fill material in 150 to 200mm continuous layers over the entire length of the fill area and then compact before placement of further fill.
21. Unless specified on the approved plans, compact the soil at about 1% to 2% wet optimum and to 95% modified or 100% standard compaction.embankment to an elevation 10% higher than the design height to allow for settling
22. Where both dispersive and non-dispersive classified earth-fill materials are available, non-dispersive earth-fill must be used in the core zone. the remaining classified earth-fill materials must only be used as directed by the site superintendent.

23. Where specified, construct the embankment to an elevation 10% higher than the design height to allow for settling; otherwise finished dimensions of the embankment after spreading of topsoil must conform to the drawing with a tolerance of 75mm from specified dimensions.
24. Ensure debris and other unsuitable building waste is not placed within the earth embankment.
25. After completion of the embankment all loose uncompacted earth-fill material on the upstream and downstream batter must be removed prior to spreading topsoil.
26. Topsoil and re-vegetate/stabilise all exposed earth as directed within the approved plans.

Spillway construction-
27. The spillway must be excavated as shown on the plans, and the excavated material if classified as suitable, must be used in the embankment, and if not suitable it must be disposed of into spoil heaps.
28. Ensure excavated dimensions allow adequate boxing-out such that the specified elevations, grades, chute width, and entrance and exit slopes for the emergency spillway will be achieved after placement of the rock or other scour protection measures as specified in the plans.
29. Place specified scour protection measures on the emergency spillway. Ensure the finished grade blends with the surrounding area to allow a smooth flow transition from spillway to downstream channel.
30. If a synthetic filter fabric underlay is specified, place the fabric directly on the prepared foundation. if more than 1 sheet of filter fabric is required, overlap the edges by at least 300mm and place anchor pins at minimum 1m spacing along the overlap. bury the upstream end of the filter fabric a minimum 300mm below ground and where necessary, bury the lower end of the fabric or overlap a minimum 300mm over the next downstream section as required. Ensure the filter fabric extends at least 1000mm upstream of the spillway crest.
31. Take care not to damage the fabric during or after placement. If damage occurs, remove the rock and repair the sheet by adding another layer of fabric with a minimum overlap of 300mm around the damaged area.3If extensive damage is suspected, remove and replace the entire sheet.

32. where large rock is used, or machine placement is difficult, a minimum 100mm layer of fine gravel, aggregate, or sand may be needed to protect the fabric.
33. Placement of rock should follow immediately after placement of the filter fabric. Place rock so that it forms a dense, well graded mass of rock with a minimum of voids. the desired distribution of rock throughout the mass may be obtained by selective loading at the quarry and controlled dumping during final placement.
34. The finished slope should be free of pockets of small rock or clusters of large rocks. Hand placing may be necessary to achieve the proper distribution of rock sizes to produce a relatively smooth, uniform surface. the finished grade of the rock should blend with the surrounding are. No overfall or protrusion of rock should be apparent.
35. Ensure that the final arrangement of the spillway crest will not promote excessive flow through the rock such that the water can be retained within the settling basin at the elevation no less than 50mm above of below the nominated spillway crest elevation.

Establishing the settling pond-
36. The area to be covered by the stored water outside of the limits of the borrow pits must be cleared rubbish. Trees must be cut down stump high and removed from the immediate vicinity of the work.
37. Establish all required inflow chutes and inlet baffles, if specified, to enable water to discharge into the basin in a manner that will not cause soil erosion or the re-suspension of settled sediment.
38. Install a sediment storage level marker post with a cross member set just below the top of the sediment storage zone (as specified on the approved plans). Use at least a 75mm wide post firmly set into the basin floor.
39. If specified, install internal settling pond baffles. Ensure the crest of these baffles is set level with, or just below, the elevation of the emergency spillway.
40. Install all appropriate measures to minimise safety risk to on-site personnel and the public caused by the presence of the settling pond. Avoid steep, smooth internal slopes. Appropriately fence the settling pond and post warning signs if unsupervised public access is likely or there is considered to be an unacceptable risk to the public.

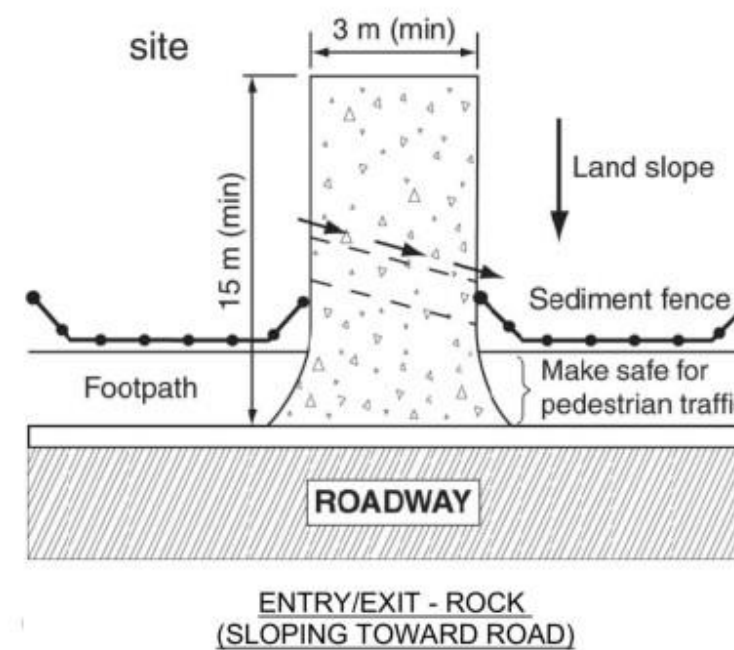
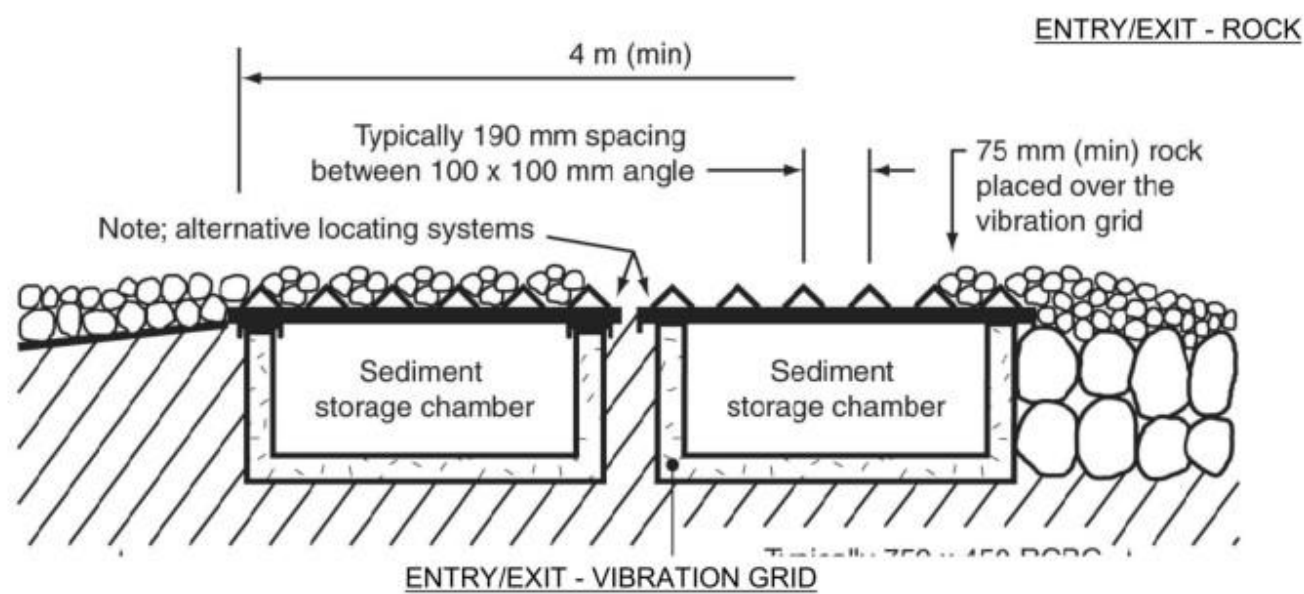
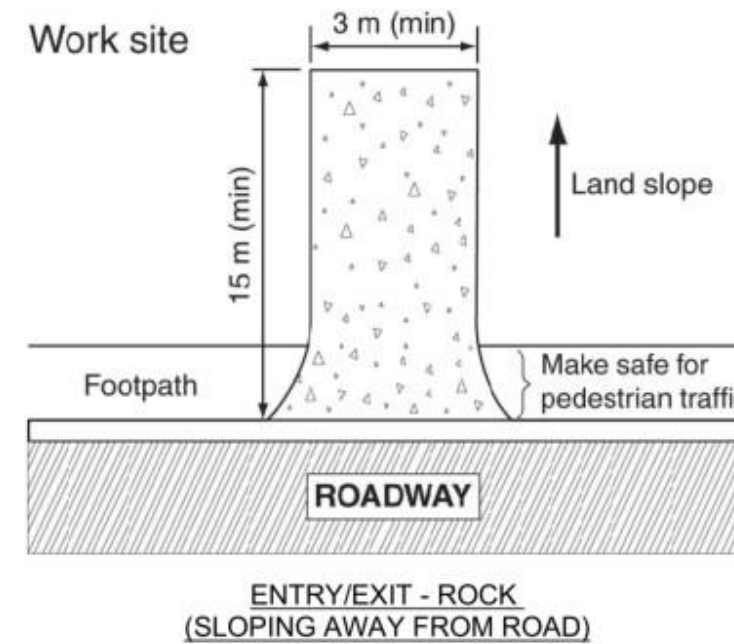
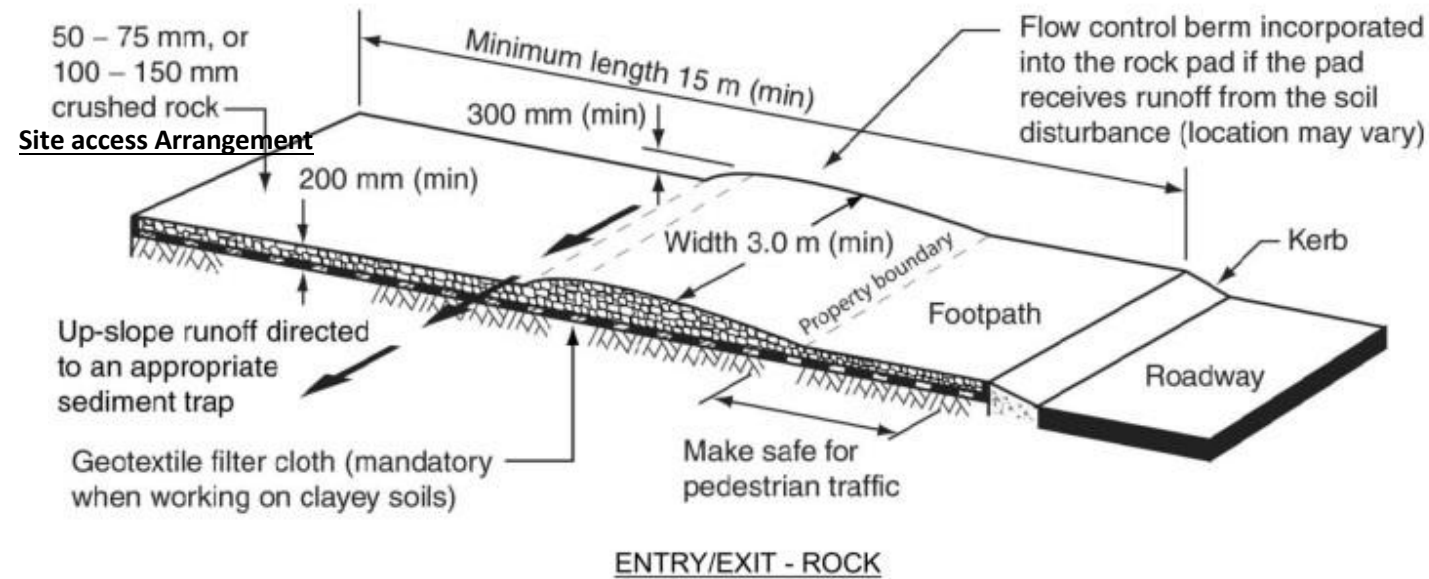
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MATERIALS

ROCK: 150 TO 300mm NOMINAL DIAMETER, HARD, EROSION RESISTANT ROCK. SMALLER ROCK MAY BE USED IF SUITABLE LARGE ROCK IS NOT AVAILABLE.

SANDBAGS: GEOTEXTILE BAGS (WOVEN SYNTHETIC, OR NON-WOVEN BIODEGRADABLE) FILLED WITH CLEAN COARSE SAND, CLEAN AGGREGATE, STRAW OR COMPOST.

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION AND INSTALLATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. PRIOR TO PLACEMENT OF THE CHECK DAMS, ENSURE THE TYPE AND SIZE OF EACH CHECK DAMS WILL NOT CAUSE A SAFETY HAZARD OR CAUSE WATER TO SPILL OUT OF THE DRAIN.

3. LOCATE THE FIRST CHECK DAM AT THE DOWNSTREAM END OF THE SECTION OF CHANNEL BEING PROTECTED. LOCATE EACH SUCCESSIVE CHECK DAM SUCH THAT THE CREST OF THE IMMEDIATE DOWNSTREAM DAM IS LEVEL WITH THE TOE OF THE CHECK DAM BEING INSTALLED.

4. ENSURE THE CHANNEL SLOPE IS NO STEEPER THAN 10:1 (H:V). OTHERWISE CONSIDER THE USE OF A SUITABLE CHANNEL LINER INSTEAD OF THE CHECK DAMS.

5. CONSTRUCT THE CHECK DAM TO THE DIMENSIONS AND PROFILE SHOWN WITHIN THE APPROVED PLAN.

6. WHERE SPECIFIED, THE CHECK DAMS SHALL BE CONSTRUCTED ON A SHEET OF GEOTEXTILE FABRIC USED AS A DOWNSTREAM SPLASH PAD.

7. EACH CHECK DAM SHALL BE EXTENDED UP THE CHANNEL BANK (WHERE PRACTICABLE) TO AN ELEVATION AT LEAST 150mm ABOVE THE CREST LEVEL OF THE DAM.

MAINTENANCE

1. INSPECT EACH CHECK DAM AND THE DRAINAGE CHANNEL AT LEAST WEEKLY AND AFTER RUNOFF-PRODUCING RAINFALL.

2. CORRECT ALL DAMAGE IMMEDIATELY. IF SIGNIFICANT EROSION OCCURS BETWEEN ANY OF THE CHECK DAMS, THEN CHECK THE SPACING OF DAMS AND WHERE NECESSARY INSTALL INTERMEDIATE CHECK DAMS OR A SUITABLE CHANNEL LINER.

3. CHECK FOR DISPLACEMENT OF THE CHECK DAMS

4. CHECK FOR SOIL SCOUR AROUND THE ENDS OF EACH CHECK DAM. IF SUCH EROSION IS OCCURRING, CONSIDER EXTENDING THE WIDTH OF THE CHECK DAM TO AVOID SUCH PROBLEMS.

5. IF SEVERE SOIL EROSION OCCURS EITHER UNDER OR AROUND THE CHECK DAMS, THEN SEEK EXPERT ADVICE ON AN ALTERNATIVE TREATMENT MEASURE.

6. REMOVE ANY SEDIMENT ACCUMULATED BY THE CHECK DAMS, UNLESS IT IS INTENDED THAT THIS SEDIMENT WILL REMAIN WITHIN THE CHANNEL.

7. DISPOSE OF COLLECTED SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

REMOVAL

1. WHEN CONSTRUCTION WORK WITHIN THE DRAINAGE AREA ABOVE THE CHECK DAMS HAS BEEN COMPLETED, AND THE DISTURBED AREAS AND THE DRAINAGE CHANNEL ARE SUFFICIENTLY STABILISED TO RESTRAIN EROSION, ALL TEMPORARY CHECK DAMS MUST BE REMOVED.

2. REMOVE THE CHECK DAMS AND ASSOCIATED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

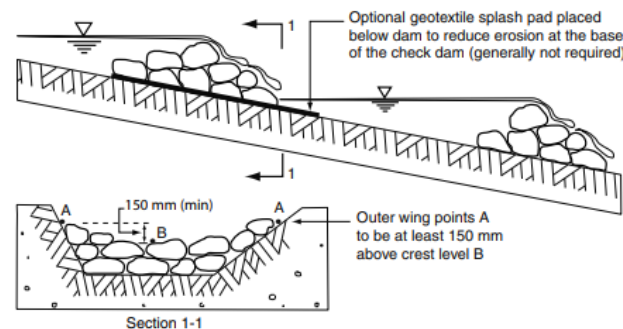


Figure 1 - Layout and profile of check dams (rock check dams shown)

Drawn:	Date:	Check Dams	RCD-01
GMW	Dec-09		

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND CONSTRUCTION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. ENSURE ALL NECESSARY SOIL TESTING (e.g. SOIL pH, NUTRIENT LEVELS) AND ANALYSIS HAS BEEN COMPLETED, AND REQUIRED SOIL ADJUSTMENTS PERFORMED PRIOR TO PLANTING.

3. CLEAR THE LOCATION FOR THE CHANNEL, CLEARING ONLY WHAT IS NEEDED TO PROVIDE ACCESS FOR PERSONNEL AND CONSTRUCTION EQUIPMENT.

4. REMOVE ROOTS, STUMPS, AND OTHER DEBRIS AND DISPOSE OF THEM PROPERLY. DO NOT USE DEBRIS TO BUILD ANY ASSOCIATED EMBANKMENTS.

5. EXCAVATE THE DIVERSION CHANNEL TO THE SPECIFIED SHAPE, ELEVATION AND GRADIENT. THE SIDES OF THE CHANNEL SHOULD BE NO STEEPER THAN A 2:1 (H:V) IF CONSTRUCTED IN EARTH, UNLESS SPECIFICALLY DIRECTED WITHIN THE APPROVED PLANS.

6. STABILISE THE CHANNEL AND BANKS IMMEDIATELY UNLESS IT WILL OPERATE FOR LESS THAN 30 DAYS. IN EITHER CASE, TEMPORARY EROSION PROTECTION (MATTING, ROCK, ETC.) WILL BE REQUIRED AS SPECIFIED WITHIN THE APPROVED PLANS OR AS DIRECTED.

7. ENSURE THE CHANNEL DISCHARGES TO A STABLE AREA.

ADDITIONAL REQUIREMENTS FOR TURF PLACEMENT:

1. TURF SHOULD BE USED WITHIN 12 HOURS OF DELIVERY, OTHERWISE ENSURE THE TURF IS STORED IN CONDITIONS APPROPRIATE FOR THE WEATHER CONDITIONS (e.g. A SHADED AREA).

2. MOISTENING THE TURF AFTER IT IS UNROLLED WILL HELP MAINTAIN ITS VIABILITY.

3. TURF SHOULD BE LAID ON A MINIMUM 75mm BED OF ADEQUATELY FERTILISED TOPSOIL. RAKE THE SOIL SURFACE TO BREAK THE CRUST JUST BEFORE LAYING THE TURF.

4. DURING THE WARMER MONTHS, LIGHTLY IRRIGATE THE SOIL IMMEDIATELY BEFORE LAYING THE TURF.

5. ENSURE THE TURF IS NOT LAID ON GRAVEL, HEAVILY COMPACTED SOILS, OR SOILS THAT HAVE BEEN RECENTLY TREATED WITH HERBICIDES.

6. ENSURE THE TURF EXTENDS UP THE SIDES OF THE DRAIN AT LEAST 100mm ABOVE THE ELEVATION OF THE CHANNEL INVERT, OR AT LEAST TO A SUFFICIENT ELEVATION TO FULLY CONTAIN EXPECTED CHANNEL FLOW.

7. ON CHANNEL GRADIENTS OF 3:1(H:V) OR STEEPER, OR IN SITUATIONS WHERE HIGH FLOW VELOCITIES (i.e. VELOCITY >1.5m/s) ARE LIKELY WITHIN THE FIRST TWO WEEK FOLLOWING PLACEMENT, SECURE THE INDIVIDUAL TURF STRIPS WITH WOODEN OR PLASTIC PEGS.

8. ENSURE THAT INTIMATE CONTACT IS ACHIEVED AND MAINTAINED BETWEEN

THE TURF AND THE SOIL SUCH THAT SEEPAGE FLOW BENEATH THE TURF IS AVOIDED.

9. WATER UNTIL THE SOIL IS WET 100mm BELOW THE TURF. THEREAFTER, WATERING SHOULD BE SUFFICIENT TO MAINTAIN AND PROMOTE HEALTHY GROWTH

MAINTENANCE

1. DURING THE SITE'S CONSTRUCTION PERIOD, INSPECT THE DIVERSION CHANNEL WEEKLY AND AFTER ANY INCREASE IN FLOWS WITHIN THE CHANNEL. REPAIR ANY SLUMPS, WHEEL TRACK DAMAGE OR LOSS OF FREEBOARD.

2. ENSURE FILL MATERIAL OR SEDIMENT IS NOT PARTIALLY BLOCKING THE CHANNEL. WHERE NECESSARY, REMOVE ANY DEPOSITED MATERIAL TO ALLOW FREE DRAINAGE.

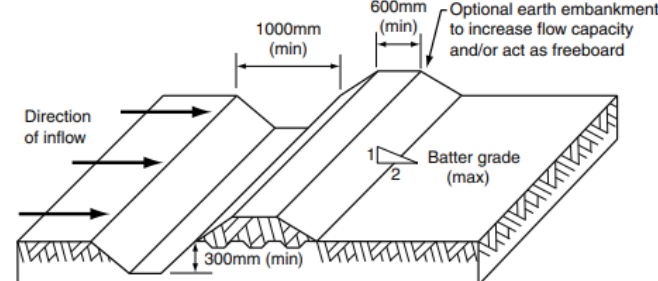


Figure 1 - Typical profile of diversion channel with bank

Drawn:	Date:	Diversion Channels	DC-01
GMW	Dec-09		

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND CONSTRUCTION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. CLEAR THE LOCATION FOR THE BERM, CLEARING ONLY THE AREA THAT IS NEEDED TO PROVIDE ACCESS FOR PERSONNEL AND EQUIPMENT.

3. REMOVE ROOTS, STUMPS, AND OTHER DEBRIS AND DISPOSE OF THEM PROPERLY.

4. FORM THE BERM FROM THE MATERIAL, AND TO THE DIMENSION SPECIFIED IN THE APPROVED PLANS.

5. IF FORMED FROM SANDBAGS, THEN ENSURE THE BAGS ARE TIGHTLY PACKED SUCH THAT WATER LEAKAGE THROUGH THE BAGS IS MINIMISED.

6. CHECK THE ALIGNMENT OF THE BERM TO ENSURE POSITIVE DRAINAGE IN THE DESIRED DIRECTION.

7. ENSURE THE BERM DISCHARGES TO A STABLE OUTLET.

8. ENSURE THE BERM DOES NOT DISCHARGE TO AN UNSTABLE FILL SLOPE.

MAINTENANCE

1. INSPECT FLOW CONTROL BERMS AT LEAST WEEKLY AND AFTER RUNOFF-PRODUCING RAINFALL.

2. INSPECT THE BERM FOR ANY SLUMPS, WHEEL TRACK DAMAGE OR LOSS OF FREEBOARD. MAKE REPAIRS AS NECESSARY.

3. CHECK THAT FILL MATERIAL OR SEDIMENT HAS NOT PARTIALLY BLOCKED THE DRAINAGE PATH UP-SLOPE OF THE EMBANKMENT. WHERE NECESSARY, REMOVE ANY DEPOSITED MATERIAL TO ALLOW FREE DRAINAGE.

4. DISPOSE OF ANY COLLECTED SEDIMENT OR FILL IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

5. REPAIR ANY PLACES IN THE BERM THAT ARE WEAKENED OR IN RISK OF FAILURE.

REMOVAL

1. WHEN THE SOIL DISTURBANCE ABOVE THE BANK IS FINISHED AND THE AREA IS STABILISED, THE FLOW CONTROL BERM SHOULD BE REMOVED, UNLESS IT IS TO REMAIN AS A PERMANENT DRAINAGE FEATURE.

2. DISPOSE OF ANY SEDIMENT OR EARTH IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

3. GRADE THE AREA AND SMOOTH IT OUT IN PREPARATION FOR STABILISATION.

4. STABILISE THE AREA BY GRASSING OR AS SPECIFIED IN THE APPROVED PLAN.

Table 1 - Recommended dimensions of flow control berms

Parameter	Earth banks	Vegetated banks	Compost berms	Sandbag berms
Height (min)	500 mm	500 mm	300 mm	N/A
Top width (min)	500 mm	500 mm	100 mm	N/A
Base width (min)	2500 mm	2500 mm	600 mm	N/A
Side slope (max)	2:1 (H:V)	2:1 (H:V)	1:1 (H:V)	N/A
Freeboard	300 mm	150 mm	100 mm	50 mm

Drawn:	Date:	Flow Control Berms	CB-01
GMW	Dec-09		

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND CONSTRUCTION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. CLEAR THE LOCATION FOR THE BANK, CLEARING ONLY THE AREA THAT IS NEEDED TO PROVIDE ACCESS FOR PERSONNEL AND EQUIPMENT.

3. REMOVE ROOTS, STUMPS, AND OTHER DEBRIS AND DISPOSE OF THEM PROPERLY. DO NOT USE DEBRIS TO BUILD THE BANK.

4. FORM THE BANK FROM THE MATERIAL, AND TO THE DIMENSION SPECIFIED IN THE APPROVED PLANS.

5. IF EARTH IS USED, THEN ENSURE THE SIDES OF THE BANK ARE NO STEEPER THAN A 2:1 (H:V) SLOPE, AND THE COMPLETED BANK MUST BE AT LEAST 500mm HIGH.

6. IF FORMED FROM SANDBAGS, THEN ENSURE THE BAGS ARE TIGHTLY PACKED SUCH THAT WATER LEAKAGE THROUGH THE BAGS IS MINIMISED.

7. CHECK THE BANK ALIGNMENT TO ENSURE POSITIVE DRAINAGE IN THE DESIRED DIRECTION.

8. THE BANK SHOULD BE VEGETATED (TURFED, SEEDED AND MULCHED), OR OTHERWISE STABILISED IMMEDIATELY, UNLESS IT WILL OPERATE FOR LESS THAN 30 DAYS OR IF SIGNIFICANT RAINFALL IS NOT EXPECTED DURING THE LIFE OF THE BANK.

9. ENSURE THE EMBANKMENT DRAINS TO A STABLE OUTLET, AND DOES NOT DISCHARGE TO AN UNSTABLE FILL SLOPE.

MAINTENANCE

1. INSPECT FLOW DIVERSION BANKS AT LEAST WEEKLY AND AFTER RUNOFF-PRODUCING RAINFALL.

2. INSPECT THE BANK FOR ANY SLUMPS, WHEEL TRACK DAMAGE OR LOSS OF FREEBOARD. MAKE REPAIRS AS NECESSARY.

3. CHECK THAT FILL MATERIAL OR SEDIMENT HAS NOT PARTIALLY BLOCKED THE DRAINAGE PATH UP-SLOPE OF THE EMBANKMENT. WHERE NECESSARY, REMOVE ANY DEPOSITED MATERIAL TO ALLOW FREE DRAINAGE.

4. DISPOSE OF ANY COLLECTED SEDIMENT OR FILL IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

5. REPAIR ANY PLACES IN THE BANK THAT ARE WEAKENED OR IN RISK OF FAILURE.

REMOVAL

1. WHEN THE SOIL DISTURBANCE ABOVE THE BANK IS FINISHED AND THE AREA IS STABILISED, THE FLOW DIVERSION BANK SHOULD BE REMOVED, UNLESS IT IS TO REMAIN AS A PERMANENT DRAINAGE FEATURE.

2. DISPOSE OF ANY SEDIMENT OR EARTH IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

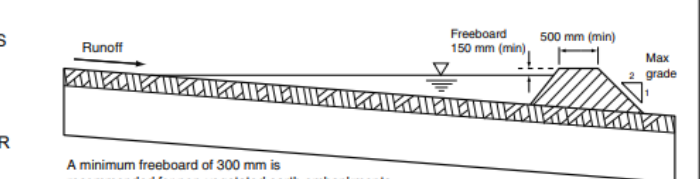


Figure 1 - Typical profile of flow diversion bank formed from earth

Table 1 - Recommended dimensions of flow diversion banks

Parameter	Earth banks	Vegetated banks	Compost berms	Sandbag berms
Height (min)	500 mm	500 mm	300 mm	N/A
Top width (min)	500 mm	500 mm	100 mm	N/A
Base width (min)	2500 mm	2500 mm	600 mm	N/A
Side slope (max)	2:1 (H:V)	2:1 (H:V)	1:1 (H:V)	N/A
Freeboard	300 mm	150 mm	100 mm	50 mm

Drawn:	Date:	Flow Diversion Banks	DB-01
GMW	Dec-09		

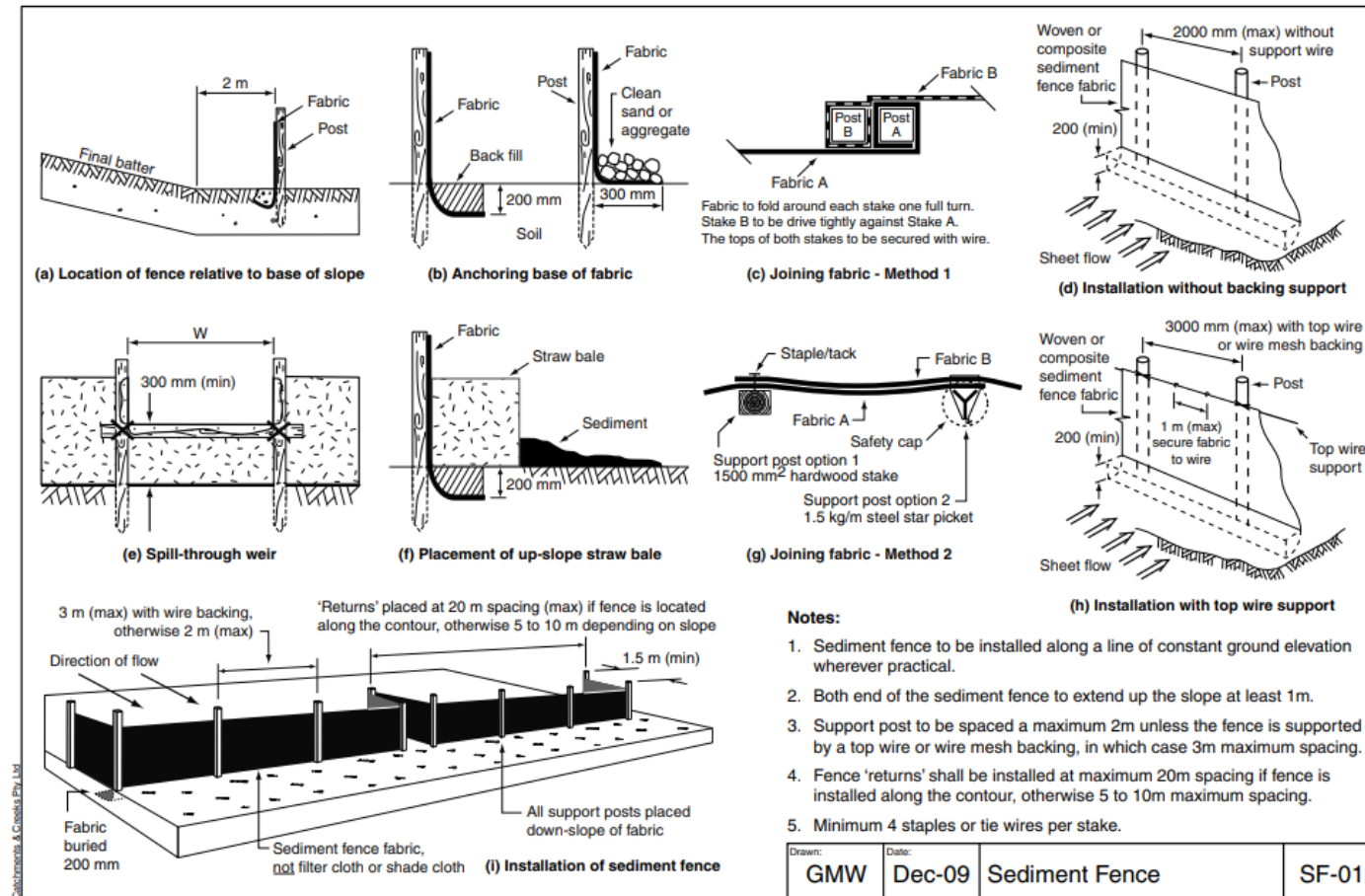
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MATERIALS

POLYACRYLAMIDE:

(i) CHOICE OF POLYACRYLAMIDE SHOULD BE BASED ON THE MOST ENVIRONMENTALLY SAFE, ANIONIC PRODUCT AVAILABLE. CATIONIC POLYACRYLAMIDE SHALL NOT BE USED.

(ii) POLYACRYLAMIDE USED FOR EROSION AND SEDIMENT CONTROL SHALL BE WATER SOLUBLE, LINEAR, OR NON-CROSS LINKED.

(iii) GRANULAR POLYACRYLAMIDE MUST BE STORED OUT OF THE SUN WHILE NOT IN USE.

APPLICATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND APPLICATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF APPLICATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. POLYACRYLAMIDE, COMBINED WITH WATER, IS VERY SLIPPER AND CAN REPRESENT A SAFETY HAZARD. APPROPRIATE MANAGEMENT OF ANY SAFETY HAZARD MUST BE ACHIEVED.

3. ENSURE ALL POLYACRYLAMIDE ARE USED FOR PURPOSES AND AT APPLICATION RATES IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.

4. POLYACRYLAMIDE MUST NOT BE ADDED TO WATER DISCHARGING DIRECTLY FROM THE SITE.

5. PRE-DISSOLVE THE DRY, GRANULAR POLYACRYLAMIDE INTO A CONCENTRATED SOLUTION OVERNIGHT OR SEVERAL HOURS BEFORE USAGE.

6. PRIOR TO APPLICATION, ENSURE SUPPLEMENTARY EROSION AND SEDIMENT CONTROL PRACTICES COMPLY WITH BEST PRACTICE.

7. PRE-FILL A TANK APPROXIMATELY 1/8 FULL WITH WATER PRIOR TO INPUT OF THE PRE-PREPARED, CONCENTRATED POLYACRYLAMIDE SOLUTION. CONTINUE TO FILL THE TANK WITH THE REQUIRED WATER VOLUME. THE WATER MUST HAVE LOW TURBIDITY IN THE RANGE OF 20 NTU OR LESS.

8. APPLY THE MIXTURE UNTIL THE SOIL SURFACE IS UNIFORMLY AND COMPLETELY WETTED.

9. ALL REASONABLE EFFORTS SHOULD BE TAKEN TO APPLY POLYACRYLAMIDE SOLUTION TO THE SOIL WHILE THE SOIL IS IN A 'DRY' CONDITION.

10. DURING APPLICATION, ALL REASONABLE EFFORTS MUST BE TAKEN TO AVOID SPRAY ONTO ROADS, PATHWAYS, DRAINAGE CHANNELS NOT INTENDED FOR APPLICATION, AND EXISTING VEGETATION.

MAINTENANCE

1. INSPECT THE TREATED SURFACE PRIOR TO FORECAST RAIN, DAILY DURING EXTENDED PERIODS OF RAINFALL, AFTER SIGNIFICANT RUNOFF PRODUCING STORMS OR OTHERWISE AT FORTNIGHTLY INTERVALS.

2. REAPPLY WITHIN 48 HOURS AFTER THE TREATED AREAS HAS BEEN DISTURBED BY EARTHMOVING MACHINERY IF EROSION CONTROL IS REQUIRED.

3. REAPPLY AS NECESSARY ON DAMAGED AREAS.

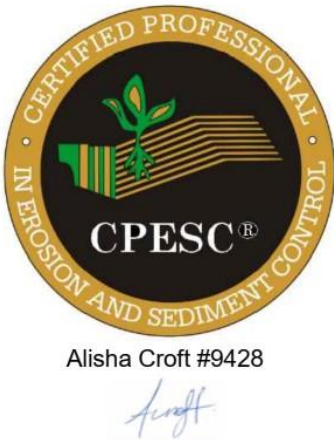
4. REAPPLICATION IS GENERALLY NOT REQUIRED UNLESS THE TREATED AREA IS DISTURBED, A PERIOD OF 60-DAYS HAS PASSED, OR UNLESS ACCEPTABLE TURBIDITY LEVELS ARE EXCEEDED. IF THE TREATED AREA HAS BEEN MULCHED, THEN REAPPLICATION MAY NOT BE REQUIRED FOR SEVERAL MONTHS.

MATERIALS FABRIC: POLYPROPYLENE, POLYAMIDE, NYLON, POLYESTER, OR POLYETHYLENE WOVEN OR NON-WOVEN FABRIC, AT LEAST 700mm IN WIDTH AND A MINIMUM UNIT WEIGHT OF 140GSM. ALL FABRICS TO CONTAIN ULTRAVIOLET INHIBITORS AND STABILISERS TO PROVIDE A MINIMUM OF 6 MONTHS OF USEABLE CONSTRUCTION LIFE (ULTRAVIOLET STABILITY EXCEEDING 70%). FABRIC REINFORCEMENT: WIRE OR STEEL MESH MINIMUM 14-GAUGE WITH A MAXIMUM MESH SPACING OF 200mm. SUPPORT POSTS/STAKES: 1500mm ² (MIN) HARDWOOD, 2500mm ² (MIN) SOFTWOOD, OR 1.5kg/m (MIN) STEEL STAR PICKETS SUITABLE FOR ATTACHING FABRIC. INSTALLATION 1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND REQUIRED TYPE OF FABRIC (IF SPECIFIED). IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, FABRIC TYPE, OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE. 2. TO THE MAXIMUM DEGREE PRACTICAL, AND WHERE THE PLANS ALLOW, ENSURE THE FENCE IS LOCATED: (i) TOTALLY WITHIN THE PROPERTY BOUNDARIES; (ii) ALONG A LINE OF CONSTANT ELEVATION WHEREVER PRACTICAL; (iii) AT LEAST 2m FROM THE TOE OF ANY FILLING OPERATIONS THAT MAY RESULT IN SHIFTING SOIL/FILL DAMAGING THE FENCE. 3. INSTALL RETURNS WITHIN THE FENCE AT MAXIMUM 20m INTERVALS IF THE FENCE IS INSTALLED ALONG THE CONTOUR, OR 5 TO 10m MAXIMUM SPACING (DEPENDENT ON SLOPE) IF THE FENCE IS INSTALLED AT AN ANGLE TO THE CONTOUR. THE 'RETURNS' SHALL CONSIST OF EITHER: (i) V-SHAPED SECTION EXTENDING AT LEAST 1.5m UP THE SLOPE; OR (ii) SANDBAG OR ROCK/AGGREGATE CHECK	DAM A MINIMUM 1/3 AND MAXIMUM 1/2 FENCE HEIGHT, AND EXTENDING AT LEAST 1.5m UP THE SLOPE. 4. ENSURE THE EXTREME ENDS OF THE FENCE ARE TURNED UP THE SLOPE AT LEAST 1.5m, OR AS NECESSARY, TO MINIMISE WATER BYPASSING AROUND THE FENCE. 5. ENSURE THE SEDIMENT FENCE IS INSTALLED IN A MANNER THAT AVOIDS THE CONCENTRATION OF FLOW ALONG THE FENCE, AND THE UNDESIRABLE DISCHARGE OF WATER AROUND THE ENDS OF THE FENCE. 6. IF THE SEDIMENT FENCE IS TO BE INSTALLED ALONG THE EDGE OF EXISTING TREES, ENSURE CARE IS TAKEN TO PROTECT THE TREES AND THEIR ROOT SYSTEMS DURING INSTALLATION OF THE FENCE. DO NOT ATTACH THE FABRIC TO THE TREES. 7. UNLESS DIRECTED BY THE SITE SUPERVISOR OR THE APPROVED PLANS, EXCAVATE A 200mm WIDE BY 200mm DEEP TRENCH ALONG THE PROPOSED FENCE LINE, PLACING THE EXCAVATED MATERIAL ON THE UP-SLOPE SIDE OF THE TRENCH. 8. ALONG THE LOWER SIDE OF THE TRENCH, APPROPRIATELY SECURE THE STAKES INTO THE GROUND SPACED NO GREATER THAN 3m IF SUPPORTED BY A TOP SUPPORT WIRE OR WEIR MESH BACKING, OTHERWISE NO GREATER THAN 2m. 9. IF SPECIFIED, SECURELY ATTACH THE SUPPORT WIRE OR MESH TO THE UP-SLOPE SIDE OF THE STAKES WITH THE MESH EXTENDING AT LEAST 200mm INTO THE EXCAVATED TRENCH. ENSURE THE MESH AND FABRIC IS ATTACHED TO THE UP-SLOPE SIDE OF THE STAKES EVEN WHEN DIRECTING A FENCE AROUND A CORNER OR SHARP CHANGE OF DIRECTION. 10. WHEREVER POSSIBLE, CONSTRUCT THE SEDIMENT FENCE FROM A CONTINUOUS ROLL OF FABRIC. TO JOIN FABRIC EITHER: (i) ATTACH EACH END TO TWO OVERLAPPING STAKES WITH THE FABRIC FOLDING AROUND THE ASSOCIATED STAKE ONE TURN, AND WITH	THE TWO STAKES TIED TOGETHER WITH WIRE; OR (ii) OVERLAP THE FABRIC TO THE NEXT ADJACENT SUPPORT POST. 11. SECURELY ATTACH THE FABRIC TO THE SUPPORT POSTS USING 25 X 12.5mm STAPLES, OR TIE WIRE AT MAXIMUM 150mm SPACING. 12. SECURELY ATTACH THE FABRIC TO THE SUPPORT WIRE/MESH (IF ANY) AT A MAXIMUM SPACING OF 1m. 13. ENSURE THE COMPLETED SEDIMENT FENCE IS AT LEAST 450mm, BUT NOT MORE THAN 700mm HIGH. IF A SPILL-THROUGH WEIR IS INSTALLED, ENSURE THE CREST OF THE WEIR IS AT LEAST 300mm ABOVE GROUND LEVEL. 14. BACKFILL THE TRENCH AND TAMP THE FILL TO FIRMLY ANCHOR THE BOTTOM OF THE FABRIC AND MESH TO PREVENT WATER FROM FLOWING UNDER THE FENCE. ADDITIONAL REQUIREMENTS FOR THE INSTALLATION OF A SPILL-THROUGH WEIR 1. LOCATE THE SPILL-THROUGH WEIR SUCH THAT THE WEIR CREST WILL BE LOWER THAN THE GROUND LEVEL AT EACH END OF THE FENCE. 2. ENSURE THE CREST OF THE SPILL-THROUGH WEIR IS AT LEAST 300mm THE GROUND ELEVATION. 3. SECURELY TIE A HORIZONTAL CROSS MEMBER (WEIR) TO THE SUPPORT POSTS/ STAKES EACH SIDE OF THE WEIR. CUT THE FABRIC DOWN THE SIDE OF EACH POST AND FOLD THE FABRIC OVER THE CROSS MEMBER AND APPROPRIATELY SECURE THE FABRIC. 4. INSTALL A SUITABLE SPLASH PAD AND/OR CHUTE IMMEDIATELY DOWN-SLOPE OF THE SPILL-THROUGH WEIR TO CONTROL SOIL EROSION AND APPROPRIATELY DISCHARGE THE CONCENTRATED FLOW PASSING OVER THE WEIR.	MAINTENANCE 1. INSPECT THE SEDIMENT FENCE AT LEAST WEEKLY AND AFTER ANY SIGNIFICANT RAIN. MAKE NECESSARY REPAIRS IMMEDIATELY. 2. REPAIR ANY TORN SECTIONS WITH A CONTINUOUS PIECE OF FABRIC FROM POST TO POST. 3. WHEN MAKING REPAIRS, ALWAYS RESTORE THE SYSTEM TO ITS ORIGINAL CONFIGURATION UNLESS AN AMENDED LAYOUT IS REQUIRED OR SPECIFIED. 4. IF THE FENCE IS SAGGING BETWEEN STAKES, INSTALL ADDITIONAL SUPPORT POSTS. 5. REMOVE ACCUMULATED SEDIMENT IF THE SEDIMENT DEPOSIT EXCEEDS A DEPTH OF 1/3 THE HEIGHT OF THE FENCE. 6. DISPOSE OF SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD. 7. REPLACE THE FABRIC IF THE SERVICE LIFE OF THE EXISTING FABRIC EXCEEDS 6-MONTHS. REMOVAL 1. WHEN DISTURBED AREAS UP-SLOPE OF THE SEDIMENT FENCE ARE SUFFICIENTLY STABILISED TO RESTRAIN EROSION, THE FENCE MUST BE REMOVED. 2. REMOVE MATERIALS AND COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD. 3. REHABILITATE/REVEGETATE THE DISTURBED GROUND AS NECESSARY TO MINIMISE THE EROSION HAZARD.
Drawn: GMW Date: Apr-10 Sediment Fence SF-02			

Progressive Erosion and Sediment Control Plan – Clearing and Grubbing 001

Revision No	Date	Prepared by	Reviewed By	Approval
0	28/09/2023	Alisha Croft	Michael Jabbour	Alisha Croft CPESC #9428

CPESC	Alisha Croft	0419 674 283
Senior Project Manager	Michael Williams	0401 857 055



EROSION & SEDIMENT CONTROL PLAN

Courtney Drive Stage 1-3, Upper Coomera

Rev: 0

Date: 28/09/23

ESCP No. 001

1. SCOPE

This Progressive Erosion and Sediment Control Plan (ESCP) has been developed for the clearing and grubbing phase for the Courtney Drive residential estate for Stage 1-3, Upper Coomera QLD. With additional progressive erosion and sediment control plans to be prepared for the Earthworks and Civil stages.

1.1 Guidelines

This ESCP has been prepared in accordance with the following document(s):

- Best Practice Erosion and Sediment Control (IECA, 2008)

1.2 Certification

This ESCP will be reviewed and certified by a CPESC prior to commencement of works. This review and certification will ensure the plan has been prepared to satisfy the intent and minimum standards nominated within the IECA (2008) Best Practice Erosion and Sediment Control Guideline.

2. PROJECT DESCRIPTION

2.1 Location & Land use

The site is located off off Courtney Drive in Upper Coomera and will connect Courtney Drive with Rangeview Road. (Figure 1).



Figure 1: Locality Plan

2.1.1 Scope of Works

The scope of works is as follows:

- Site clearing and grubbing, inclusive of the removal of existing site trees;
- Undertake bulk earthworks activities;
- Construction of proposed lots and establishment of retaining between lots in accordance with design;
- Construction of stormwater infrastructure;
- Construction of proposed residential streets
- Installation of all relevant signage and line marking;

The general arrangement of Erosion and Sediment Controls are illustrated in figure 2.

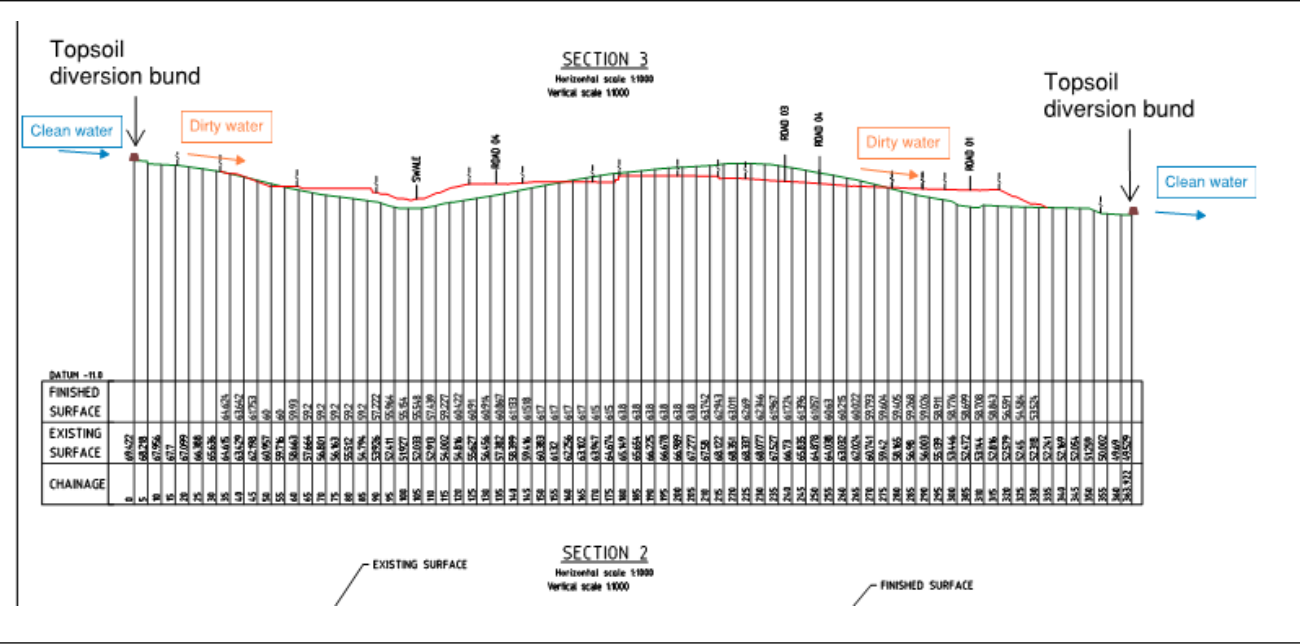


Figure 2: Typical Erosion and sediment control arrangement

EROSION & SEDIMENT CONTROL PLAN

Courtney Drive Stage 1-3, Upper Coomera

Rev: 0

Date: 28/09/23

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3. SITE DESCRIPTION

3.1 Climate & Rainfall risk

Historic rainfall data for Upper Coomera has been extracted from the Coomera Foxwell Road Weather Station (Station No. 40516) the closest long-term gauging station to the site, is illustrated in **Figure 3**. Relatively wetter conditions typically occur from November to June and drier conditions tend to persist from July to October. The corresponding Erosion Risk Rating (rainfall depth) is colour coded from **Table 1** (Based on IECA Table 4.4.2).

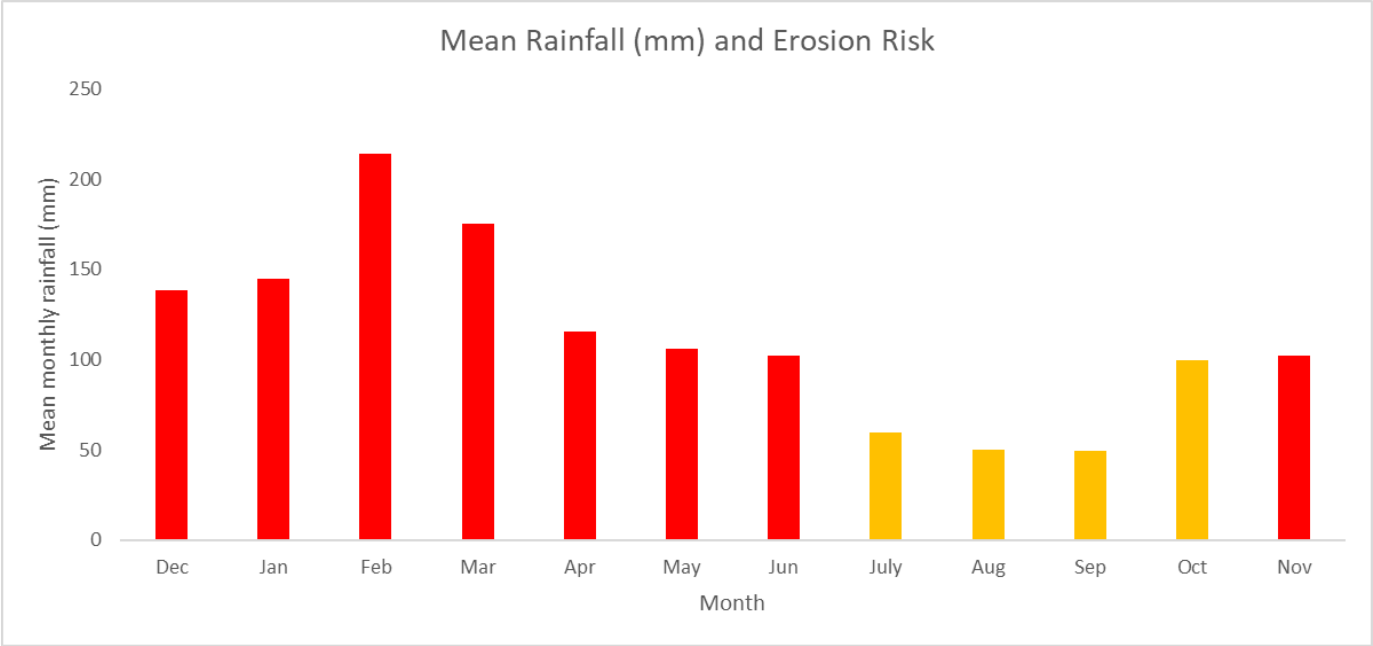


Figure 3: Mean Rainfall data, Coomera Foxwell Road Alert Weather Station #40516 (1997-2023)

Table 1: Erosion Risk Rating Categories (rainfall depth) as per Table 4.4.2, IECA, 2008

Erosion Risk Rating	Average Monthly rainfall depth (mm)
Very Low	0 to 30
Low	30+ to 45
Moderate	45+ to 100
High	100+ to 225
Extreme	>225

3.2 Topography and drainage

Based on contours presented on the IFC Drawings and the Geotechnical report prepared by Pacific Geotech in January 2023, ‘the site topography typically comprises a ridge line which meanders in a north south lineation through the centre of the site. The ridge line typically comprises flat or gentle sloping terrain of less than 5° in slope gradient. This ridge line is flanked to the east and west by mild sloping terrain typically ranging between 5° and 15° in slope gradient with some localised steeper areas ranging up to approximately 20° in slope gradient.’ (*Geotechnical Investigation and Landslide Risk Assessment for proposed residential subdivision, end of Courtney Drive, Upper Coomera, January 2023, Pacific Geotech*)

Numerous drainage lines are currently present across the site, with the main drainage line traversing from the South western corner towards the north, a wide drainage area discharges to the west and another drainage feature discharges to the north. Each drainage line moves through an existing dam within the confines of the site prior to discharging offsite. The project shall utilize these existing dams as part of the clearing and grubbing phase of the project until the final sediment basins can be established for utilization during earthwork stages.

3.3 Soils

Soils located onsite consist of high plasticity clay soils or clayey sands.

4. RISK ASSESSMENT

4.1 IECA Soil loss assessment

Based on the requirements of IECA (2008), an erosion risk assessment has been conducted using the Revised Universal Soil Loss Equation (RUSLE). The calculated soil loss is then used to determine the level of sediment control required.

$$A = K \times R \times LS \times P \times C$$
Equation 1 (IECA 2008)

Where:

- A is the predicted soil loss (t/Ha/yr)
- K is the soil erodibility factor
- R is the rainfall erosivity factor
- LS is the slope length/gradient factor
- P is the erosion control practice factor
- C is the ground cover and management factor

4.1.1 K - Factor - Soils

Soils located onsite consist of Sandy Clay/ Clay present in area. As such a conservative assumption has been made for the K factor resulting in an adopted K factor of 0.051.

4.1.2 R - Factor - Rainfall

An annual erosivity factor of 5489 has been adopted based on a 2-year, 6-hour rainfall intensity of 15.6mm/hr and the following equation from section E3.2 of IECA (2008).

$$R = 164.74 (1.1177)^S S0.6444$$

4.1.3 LS – Slope Length

As described in Section 3.2, the topography of the site comprises of moderate slopes. Based on existing/design surface levels, LS factors have been adopted as follows:

- Grades up to 8.75%, slope length will be limited to 25m between checks – adopted LS-factor 2.05

4.1.4 Cover (C) and Practice (P) Factors

A C factor of 1 has been adopted in accordance with industry practice to reflect the worst-case level of cover offered during the proposed development activities.

The P factor represents the combined effect of management practices and structural methods to control erosion. An industry default P factor value of 1.3 has been applied to the risk assessment, which is recommended for the construction phase condition (per table E11 of IECA, 2008).

4.1.5 Estimated Soil Loss

Results of the erosion risk assessment are presented in **Table 2**. Sediment control type derived from IECA (2008) Table 4.5.1

Table 2: Estimated soil loss from each site catchment

Site	Disturbed Area (HA)	R	K	LS	P	C	A (t/ha/yr)	Adopted Control	Comment
Catchment 1	4.36	5489	0.05	1.47	1.3	1	535	Type 1	Check dam spacing at 25m; excavated sediment traps at outlet/discharge locations; and C-factor reduction during months when soil loss exceeds 12.5t/ha/month i.e. from December to March. Note: C-factor reduction can be achieved in a number of ways including application of soilbinder and revegetation treatments
Catchment 2	2.91	5489	0.05	2.05	1.3	1	746	Type 1	
Catchment 3	5.4	5489	0.05	2.05	1.3	1	746	Type 1	

Due to an estimated soil loss of a maximum of 746t/ha/yr based on the construction stage of the proposed works and maximum area proposed for disturbance associated with the project, the Erosion risk is nominated as High in accordance with Table 4.4.3 of IECA (**Table 2**). Erosion and sediment control will be installed for the project in accordance with the risk profile and specific constraints of the site (Table 4).

Table 4: Erosion risk rating based on estimated soil loss rate (as per Table 4.4.3 IECA 2008)

Erosion Risk Rating*	Soil loss (t/ha/yr)
Very Low	0 to 150
Low	150+ to 225
Moderate ✓	225+ to 500
High	500+ to 1500
Extreme	>1500

Table 5: Erosion Control Standards

Erosion Risk as per Table 4.4.7 of IECA	Limit of forward Clearing	Stabilisation – Temporary	Stabilisation – Permanent
All	All reasonable and practicable steps taken to apply best practice erosion control measures to completed earth works, or otherwise stabilise such works, prior to anticipated rainfall-including existing unstable, undisturbed, soil surfaces under the management or control of the building/construction works.		
Low	Clearing and stripping is limited to 8 weeks prior to the scheduled commencement of bulk earthworks	Unfinished earthworks are suitably stabilised if disturbance is expected to be suspended for a period exceeding 30 days	Disturbed soil surfaces are stabilised with a minimum 70% cover within 30 days of the completion of works within any area of a work site.
Moderate	Clearing and stripping is limited to 6 weeks prior to the scheduled commencement of bulk earthworks	Unfinished earthworks are suitably stabilised if disturbance is expected to be suspended for a period exceeding 20 days.	Disturbed soil surfaces are stabilised with a minimum 70% cover within 20 days of the completion of works within any area of a work site.
High	Clearing and stripping is limited to 4 weeks prior to the scheduled commencement of bulk earthworks	Soil Stockpile & unfinished earthworks are suitably stabilised if rainfall is reasonably possible, and disturbance is expected to be suspended for a period exceeding 10 days.	Disturbed soil surfaces are stabilised with a minimum 75% cover within 10 days of the completion of works within any area of a work site

5. GENERAL NOTES

- This Erosion and Sediment Control Plan (ESCP) has been prepared to provide a site specific ESCP to demonstrate the management of erosion and sediment control in accordance with the Best Practice Erosion and Sediment Control Guidelines (IECA, 2008).
- This ESCP shall be supplemented by Progressive Erosion and Sediment Control Plans (PESCP). PESCPs are to be developed to identify the specific location and, where required, additional erosion and sediment controls applicable to individual work stages. PESCPs shall be documented via mark ups to approved plans. Where a change in the level of sediment control standard is proposed in a PESCP, the PESCP shall be reviewed and approved by an appropriately qualified person prior to the change being implemented.
- Minimise the extent and duration of disturbance, maintaining existing ground cover to the greatest extent possible.
- Commissioning / decommissioning of plant and refuelling to be undertaken a minimum of 30m away from any watercourse/drainage line.
- All ERSED controls to be inspected regularly (weekly, pre/post rainfall event i.e. forecast or actual rainfall of >10mm) with maintenance/repairs to be undertaken when necessary
- Revegetation of disturbed/bare areas to be progressively implemented
- Where clean water drains and sediment traps/sumps are necessary, all clean water drains and sediment traps and associated drainage must be installed and commissioned prior to the commencement of any grubbing works within the catchment area
- All controls must be installed within approved project footprint.
- Ensure all site access is stabilised with rumble grid and clean rock.

6. STAGING

Stage 1 - Vegetation removal, clear and grub, topsoil strip	Phase 1: - Site Establishment of access tracks, clearing and minor topsoil strip in locations for clean water drains only, installation of clean water drains, diversion bunds, clean water diversion drains, sediment basins and traps and other appropriate erosion and sediment controls. Temporary crossings are also to be installed where necessary with clean water diversion drains. Phase 2: - Clearing and grubbing to commence on approval from Project Environmental Site Representative of all clean water drains, sediment traps/basins and establishment controls installed appropriately. Clearing to commence in a sequential approach. Clearing activities will only remove large vegetation and retain groundcover wherever possible. - Vegetation will be stockpiled downslope of cleared zone and accessible from access track in readiness for mulching. Phase 3: - Mulching of stockpiled vegetation and stockpiling of mulch or integration into erosion and sediment controls. Phase 4:
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	Topsoil strip to commence in a staged approach across site and topsoil placed in designated topsoil stockpile areas with controls installed and maintained.
Stage 2 – Bulk Earthworks	Phase 1: - Cut and fill will continue through footprint, establishing supplementary controls as required (locations tbd onsite) such as mulch bunds and sediment fence or geofabric overplaced and wrapped up to act as filter fence at base of fill zones and around drainage inlet locations. Stabilisation to occur on cut/fill batters throughout works. Areas to be progressively revegetated as they are completed. Phase 2: - Civil works to commence, ensuring all site dirty water is directed into existing site sediment basins.
Stage 3 – Stabilisation/Revegetation	Site wide stabilisation and revegetation via seeding of any areas not already revegetated as part of progressive stabilisation works. Site must achieve 70% vegetated cover for works to be considered effectively stabilised.

7. DEWATERING AND WATER QUALITY

- Basins to be dewatered prior to rain event that is likely to produce runoff; however, during dry conditions water may be retained in the settling pond as a source of construction water (i.e. dust suppression).
- If possible, it is recommended that dewatering/spread of collected runoff from basins be applied to well vegetated lands at least 40m away from any waterway to allow it to infiltrate within the site boundary, if this is done, ensure water is applied slowly and in a manner that avoids concentrated surface runoff and/or erosion.
- If actively discharging (pumping or siphoning) the water out of the basin, water must be treated to achieve, pH 6.5-8.5, <10mg/L oil and grease and no visible trace and a standard 90%ile total suspended solids concentration not exceeding 50mg/L or 50%ile NTU reading (as per IECA Best Practice Erosion and Sediment Control Guidelines Appendix B) and no more than a 10% increase in background conditions.
- Where captured basin water is to be used onsite for dust suppression or construction purposed, water does not require testing or treatment.

8. DESILTING

- Install an appropriate painted desilting marker in the basin to indicate top of sediment storage zone. Basin must be desilted if the next storm event is likely to cause sediment to rise above this marker point; or if sediment is already above the marker; or if the sediment has exceeded 90% of the nominated sediment storage volume.
- Removal of all sediment/materials collected from the basin to be disposed of in a suitable manner that will not cause an erosion or pollution/environmental hazard.
- Refer to ESCP for recommended volume and dimensions for proposed sediment basin. Note that all dimensions are approximate and subject to verification with review of detailed ground survey and alignment.
- All earthen embankments (for basins or otherwise) greater than 1m in height to be certified by a qualified geotechnical specialist to ensure structural integrity for the desired design criteria and anticipated period of operation
- Upon decommissioning of sediment basins, all water contained within must be removed and disposed of appropriately before the removal of any basin embankments

9. OVERVIEW OF KEY ESC TECHNIQUES

Drainage Controls – Catch Drains (CD) and Diversion Banks (DB)

This ESCP identifies the location of catch drains and diversion banks required to divert upslope clean water away from areas of soil disturbance, stockpiles and excavations, and to collect dirty runoff water from disturbed areas and stockpiles and direct it to a sediment trap and to control water flow through the worksite to avoid damage to unfinished areas of earthworks and infrastructure. Due to the presence of potentially dispersive subsoils on the site, diversion banks have been used wherever possible. Diversion banks, when constructed by pushing soil from the down-slope side, avoid exposing sodic subsoils and maintain in-situ groundcover in the flow path.

Where site mulch is available in sufficient quantities, temporary diversion banks/sediment filters may be formed from mulch. Temporary sandbag diversion banks will also be used to provide temporary diversion of water in locations of limited space and active construction areas prior to forecast wet weather.

Erosion Controls – Soil Binders

Soil binders are a form of chemical surface stabiliser and/or soil-bonding agent applied to exposed soil surfaces to control erosion. Soil binders are suitable for minor drainage lines, upper waterway banks, batters and topsoil stockpiles. Soil binders have been specified for use on batter locations and drainage lines in the project area, to provide temporary erosion control during construction activities and reduce predicted soil loss and associated requirements for sediment controls.

Soilbinders (or revegetation treatments) are required to be applied to disturbed batters between the months of December to March to reduce C-factor prior to rainfall forecast >10mm in 24 hours.

Sediment Controls

The following key sediment controls are specified in this plan and have been applied to individual catchments based on the results of the RUSLE soil loss predictions (Section 3.5).

Sediment basins – Due to the size and slopes present onsite, one Type D sediment basin has been nominated to capture and treat site runoff in applicable catchments.

Rock Checks/Filter Dam (Type 2) – Where drainage topography allows, rock checks and rock filter dams have been utilised to slow the velocities of site dirty water.

Sediment Fence (Type 3) - Sediment fences have been nominated to provide sediment controls in locations that are likely to receive predominantly sheet flows. Used in conjunction with concentrated flow sediment treatment techniques. Where site mulch is available in sufficient quantities, Type 3/perimeter controls may be formed from mulch.

Site Exit / Entry - To prevent sediment tracking onto public roads, stabilised rock pad entry locations have been identified. Associated drainage and sediment controls have been identified to contain and treat runoff in accordance with the adopted sediment control standard for individual catchments. Adjacent roads should be inspected regularly, and any sediment deposited on public roads should be removed in a safe manner and disposed of to an approved disposal facility

10. STOCKPILE MANAGEMENT

Place stripped soil at approved stockpile locations

Stockpile topsoil at a height no greater than 2m.

Stockpile any excess subsoil or spoil separately from topsoils and at designated stockpile locations upslope of sediment traps.

Install non-woven sediment fence (bidim A34 or equiv) around stockpiles as per SD-FF-1

Where topsoil stockpiles will remain undisturbed for greater than nominated erosion standard, apply seeding of a cover crop at the rate of 10kg/ha to topsoil stockpiles. Refer to revegetation specifications for seed mix.

Where subsoil / spoil stockpiles will remain undisturbed for greater then nominated erosion standard, apply temporary cover or soil binder.

Temporary Stabilisation Erosion Standard

Month	Temporary Stabilisation Erosion Standard
Dec, Jan, Feb	10 days
Mar – Jun, Oct – Nov	20 days
July – Sept	30 days

11. INSPECTIONS & MONITORING

All erosion and sediment control measures, including drainage measures, must be always maintained and in proper working order during their operational life.

All drainage, erosion and sediment controls shall be inspected daily when rain is occurring (if site access is available) weekly, prior to and following a rainfall event of sufficient intensity and duration to cause on-site runoff immediately prior to and following periods of site shutdown.

Inspections shall include checks of all drainage, erosion and sediment control measures including site discharge points for:

- evidence of excessive sediment transport and or deposition either on or off site
- evidence of excessive erosion either on site or immediately downstream
- treatment and de-watering requirements for sediment basins / sediment traps
- the progress and stability of site rehabilitation and revegetation works.

Where inspections identify a non-conforming control measure, or issues that are likely to prevent the achievement of the erosion and sediment control objectives, corrective or preventative actions will be developed and implemented as necessary to achieve the required erosion and sediment control performance standards.

A written record / register of monitoring observations and maintenance tasks shall be kept on site and available for inspection.

12. SITE REHABILITATION

The following site rehabilitation requirements are to be read in conjunction with the project specific landscaping, soil management and revegetation plans and applicable project requirements. Where there is an inconsistency between the site rehabilitation measures in this document, and the project specific contract documents, the site specific and contract documents shall prevail.

Disturbed areas shall be stabilised within the following time frames

Permanent Stabilisation Erosion Standard

Month	Temporary Stabilisation Erosion Standard
Dec, Jan, Feb	10 days
Mar – Jun, Oct – Nov	20 days
July – Sept	30 days

Areas shall be considered stable once they achieve 70% cover in 90% of the relevant catchment. Temporary drainage, erosion and sediment control structures shall not be decommissioned until this level of cover is achieved within the upslope catchment.

Compacted areas / areas subject to construction traffic shall be first scarified to a minimum depth of 50mm to address compaction from construction traffic and assist in tying in topsoil. On steeper slopes (<3H:1V) scarification may alternatively be undertaken via track walking up and down the slope.

Stripped topsoil shall be reinstated in accordance with pre-stripping profiles and depths. Topsoil shall be placed at a minimum of 75mm and lightly compacted, reinstating the original top 50mm as the final layer. On slopes steeper than 4H:1V topsoil reinstatement shall be reduced to 50mm to minimise slumping.

Ensure all dispersive / sodic subsoil is adequately covered with a minimum of 50mm of non-dispersive topsoil.

Apply seed, fertiliser and hydromulch to disturbed areas as per rehabilitation specifications.

Apply follow up watering on a daily basis (subject to weather conditions) to hydromulched areas.

Any excess spoil shall be removed from the site to an approved disposal location and the stockpile location rehabilitated as per other disturbed areas

Seed Mix

Where a site-specific seed mix is not specified, the below table provides a seed mix suitable for use in site rehabilitation or temporary seeding.

Seed Mix Specifications

	Summer Blend (Nov – Feb)	Mid-Season (Mar/Apr & Sep/Oct)	Winter Blend (May – Aug)
Unhulled green couch (Cynodon dactalyon)	35kg/ha	35 kg/ha	35 kg/ha
Hulled green couch (Cynodon dactalyon)	35 kg/ha	35 kg/ha	35 kg/ha
Japanese or Shirohie Millet	30 kg/ha	15 kg/ha	0
Perennial Rye Grass	0	15 kg/ha	30 kg/ha

Hydromulch Specifications

Paper pulp at 2t/ha or wood pulp at 2.5t/ha plus tackifier at 5 to 10% by weight.

	EROSION & SEDIMENT CONTROL PLAN		Rev: 0
	Courtney Drive Stage 1-3, Upper Coomera		Date: 28/09/23
			ESCP No. 001

Appendix A : Progressive Erosion and Sediment Control Drawings

F:\Autocad Client\19 - HB Land\01 - Courtney Drive\Project\Stage 01\Engineering Drawings\Current\1901-01-050.dwg, EARTHWORKS SECTION KEY PLAN, 10/9/2023 7:46:45 AM, 12

LEGEND

Stabilised exit



Mulch bund



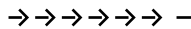
Sediment Basin - in existing dam location



Sediment trap



Dirty water drain



Dirty water flow direction



Sediment trap 2
Dimensions -
10m(L) x 8m(W) x 1m(D)

Sediment trap 1
Dimensions -
10m(L) x 5m(W) x 0.6m(D)

Basin 3
Minimum capacity 2660m3
Spillway: 12m wide - lined with
geofab and d50 300mm rock
Note - utilise existing dam during
clearing and direct all water into dam

Basin 1
Minimum capacity 2030m3
Spillway: 11m wide - lined with
geofab and d50 300mm rock
Note - utilise existing dam during
clearing and direct all water into dam

Sediment trap 3
Dimensions -
10m(L) x 10m(W) x 1.5m(D)

Basin 2
Minimum capacity 1433m3
Spillway: 10m wide - lined with
geofab and d50 300mm rock
Note - utilise existing dam during
clearing and direct all water into dam

LEGEND

- EXISTING KERB (INVERT)
- EXISTING PROPERTY LINE
- EXISTING CONTOURS
- FUTURE KERB (INVERT)
- FUTURE PROPERTY LINE
- PROPOSED KERB (INVERT)
- PROPOSED PROPERTY LINE
- PROPOSED RETAINING WALL
- DESIGN CONTOURS
- SITE BOUNDARY
- STAGE BOUNDARY

PROJECT NAME
**COURTNEY DR
UPPER COOMERA**

STAGE 01

RP DESCRIPTION
LOT 188, 189, 190, 191 & 192 ON RP173728
COURTNEY DRIVE
LOCALITY OF UPPER COOMERA
LOCAL AUTHORITY - GOLD COAST CITY COUNCIL

CLIENT



0 15 30 45 60 75m
Scale 1:1500 - A1 (1:3000 - A3)

B	14-07-23	RFI AMENDMENTS	EP
A	03-03-23	COUNCIL ISSUE	JB
REV	DATE	DESCRIPTION	INT

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ASSOCIATED CONSULTANTS



DRAWING TITLE

**BULK EARTHWORKS
SECTION KEY PLAN**

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APPROVED <i>AK</i>	DATE 03-03-23
DRAWING NUMBER 41901-01-050	REV A

EROSION & SEDIMENT CONTROL PLAN

Courtney Drive Estate Stage 1-3, Upper Coomera

Rev: 0

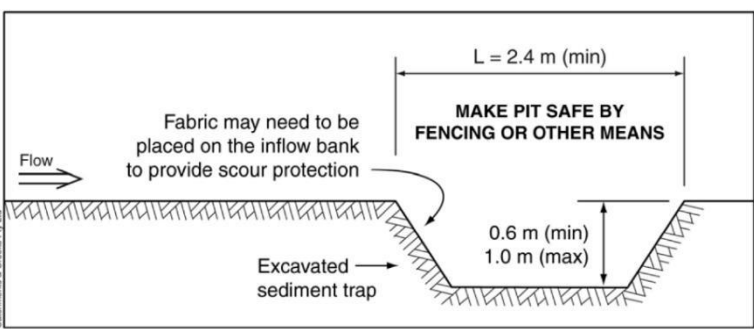
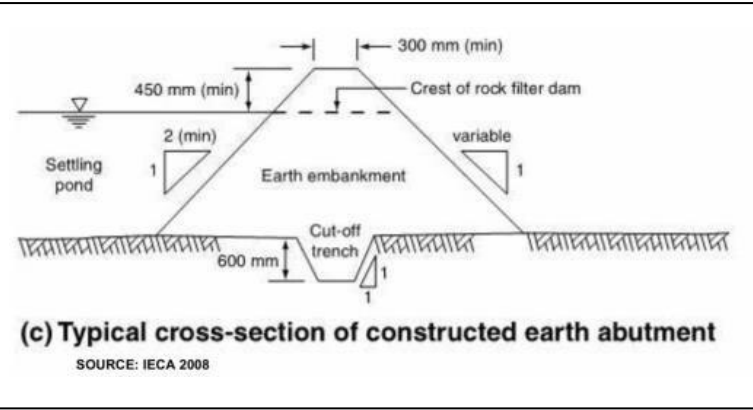
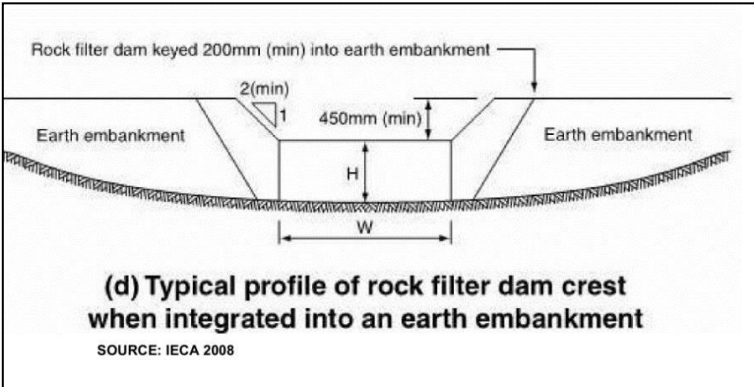
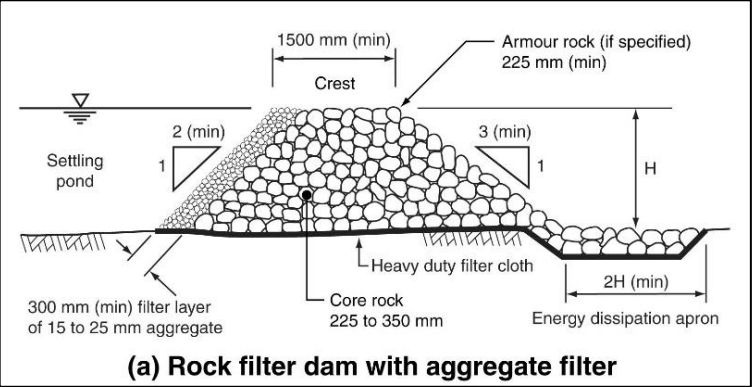
Date: 28/09/23

ESCP No. 001

Appendix B : Standard Drawings and Calculations

Excavated Sediment Trap Calculator

Excavated Sediment Trap Calculator									
Chainage		Size only	Size only	Size only	Size only	Size only	Size only	Size only	Size only
Control design life	time	5	5	5	5	5	5	5	5
Max catchment size	m2	20000	15000	10000	7500	5000	2500	1000	500
ToC	Minutes	10.0	9.0	8.0	7.0	6.0	5.0	3.0	3.0
Rainfall	mm/h	143.0	148.0	154.0	161.0	168.0	176.0	194.0	194.0
Runoff	coefficient	1	1	1	1	1	1	1	1
Rational Method	m3/s	0.794	0.617	0.428	0.335	0.233	0.122	0.054	0.027
Particle Size targetted	lookup	0.100	0.100	0.100	0.100	0.100	0.150	0.150	0.15
Surface area	m2/m3/s	111	86	60	47	33	8	3	2
Volume at 0.6m		67	52	36	28	20	5	2	1



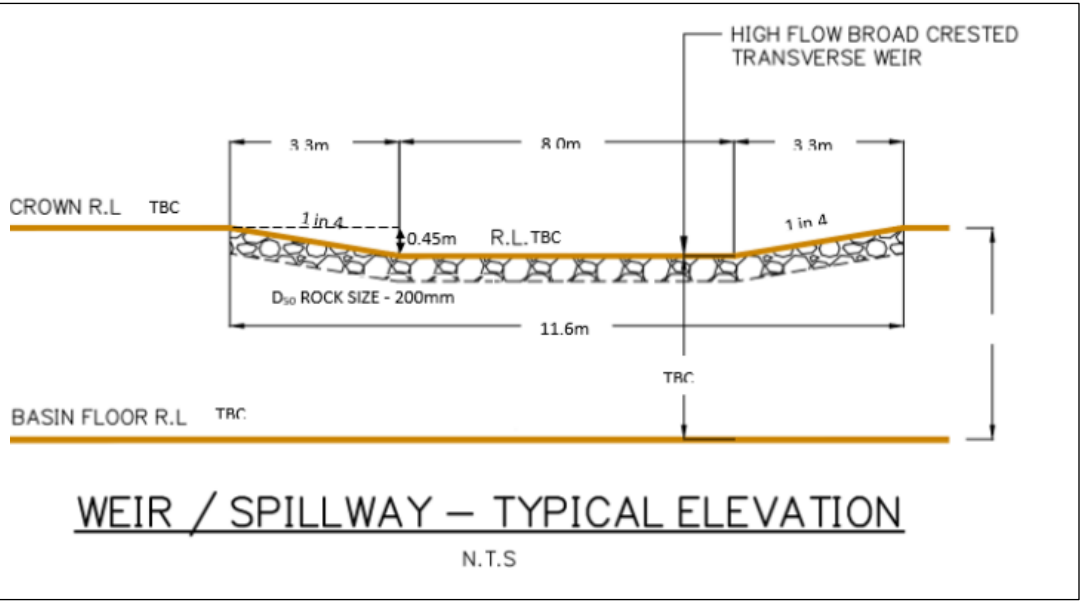
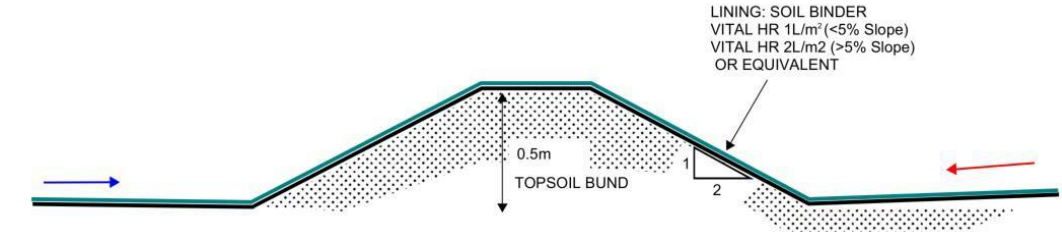
Design standard	Critical sediment size (mm)	Surface area of settling pond per unit discharge (m ² /m ³ /s) [1]			Allowable through-velocity (m/s)
		10° C [2]	15° C [2]	20° C [2]	
Type 3 sediment trap	0.50	6	5.2	4.6	0.3
	0.20	38	33	29	0.3
	0.15	67	60	52	0.3
Type 2 sediment trap	0.10	150	130	115	0.2
	0.05	600	525	460	0.2
Type 1 sediment trap	0.04	940	820	720	0.2
	0.02	3700	3230	2860	0.2

[1] Pond area is based on a rectangular pond operating with uniform inflow conditions across its width.
[2] Assume a pond temperature the same as the typical rainwater temperature during the time of year when the pond is likely to be operating at capacity.

Classification	Minimum particle size	Typical trapped particles
Type 1	< 0.045mm	Clay, silt & sand
Type 2	0.045 – 0.14mm	Silt & sand [1]
Type 3	> 0.14mm	Sand
Supplementary	> 0.14mm	Sand

[1] Technically, silt particles have a grain size of 0.002 to 0.02mm, which means that only Type 1 sediment traps are likely to capture silt-sized particles. However, for general discussion purposes, it can be assumed that Type 2 systems capture a significant proportion of silt-sized particles.

DIVERSION BUND SECTION



EROSION & SEDIMENT CONTROL PLAN

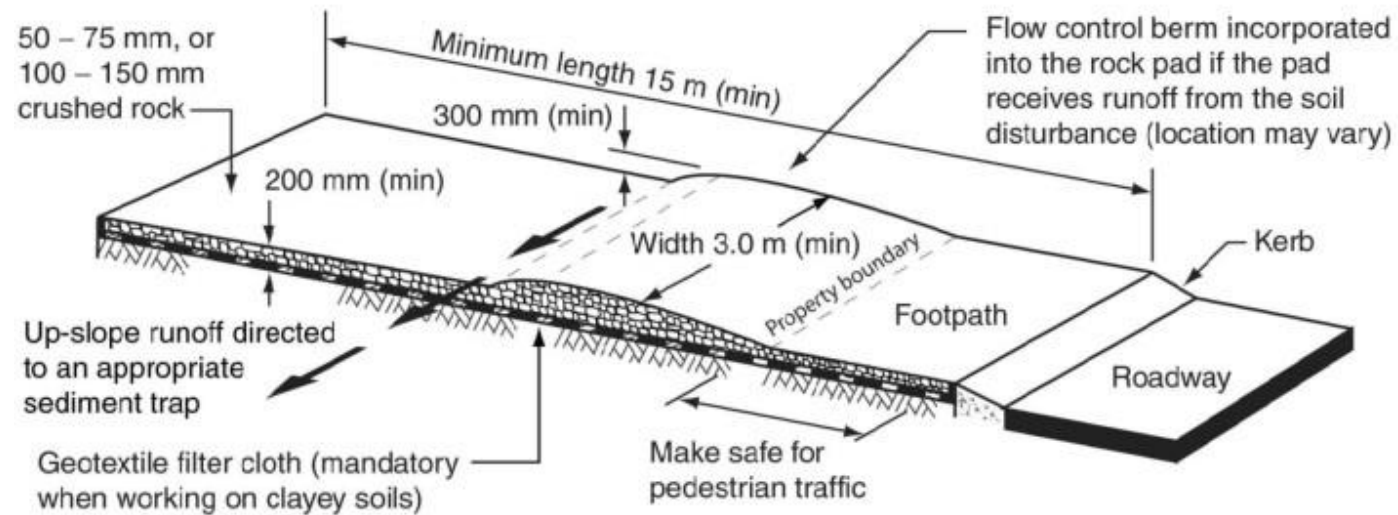
Courtney Drive Estate Stage 1-3, Upper Coomera

Rev: 0

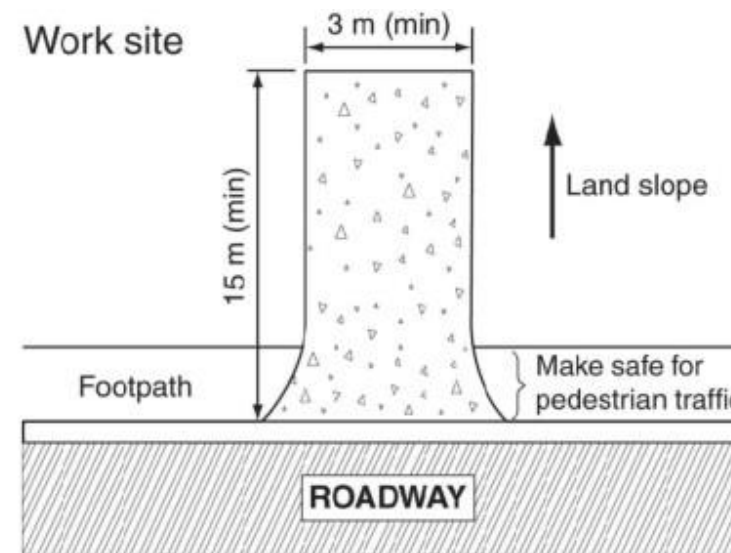
Date: 28/09/23

ESCP No. 001

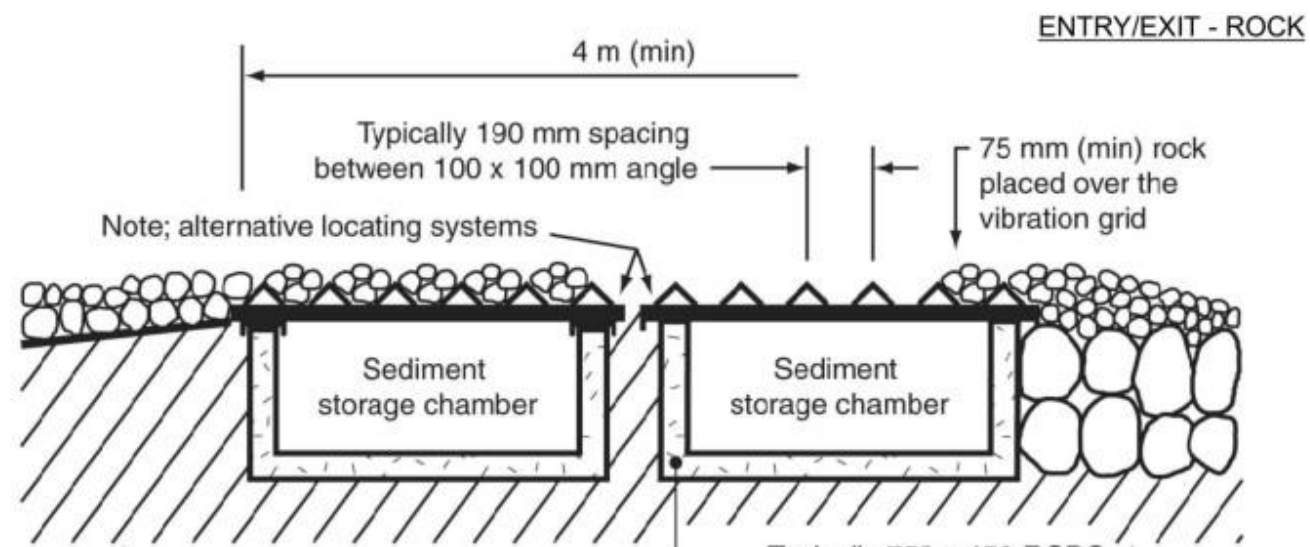
Site access Arrangement



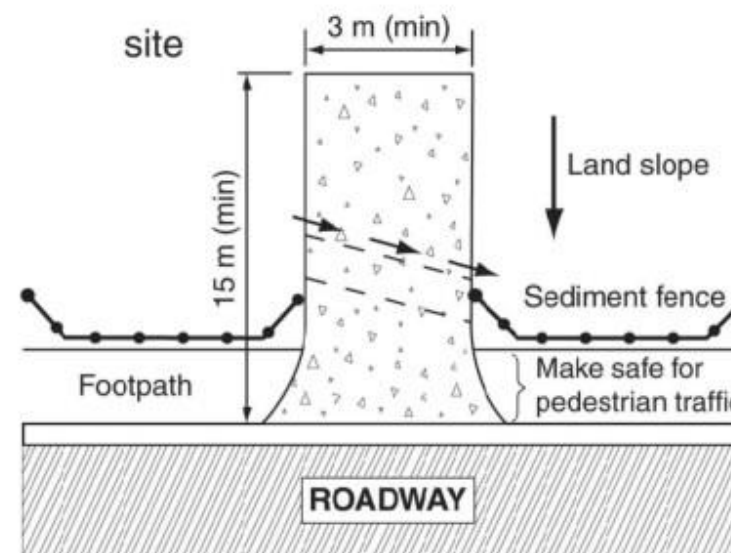
ENTRY/EXIT - ROCK



ENTRY/EXIT - ROCK
(SLOPING AWAY FROM ROAD)



ENTRY/EXIT - VIBRATION GRID



ENTRY/EXIT - ROCK
(SLOPING TOWARD ROAD)

EROSION & SEDIMENT CONTROL PLAN

Courtney Drive Estate Stage 1-3, Upper Coomera

Rev: 0

Date: 28/09/23

ESCP No. 001

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND CONSTRUCTION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. CLEAR THE LOCATION FOR THE BANK, CLEARING ONLY THE AREA THAT IS NEEDED TO PROVIDE ACCESS FOR PERSONNEL AND EQUIPMENT.

3. REMOVE ROOTS, STUMPS, AND OTHER DEBRIS AND DISPOSE OF THEM PROPERLY. DO NOT USE DEBRIS TO BUILD THE BANK.

4. FORM THE BANK FROM THE MATERIAL, AND TO THE DIMENSION SPECIFIED IN THE APPROVED PLANS.

5. IF EARTH IS USED, THEN ENSURE THE SIDES OF THE BANK ARE NO STEEPER THAN A 2:1 (H:V) SLOPE, AND THE COMPLETED BANK MUST BE AT LEAST 500mm HIGH.

6. IF FORMED FROM SANDBAGS, THEN ENSURE THE BAGS ARE TIGHTLY PACKED SUCH THAT WATER LEAKAGE THROUGH THE BAGS IS MINIMISED.

7. CHECK THE BANK ALIGNMENT TO ENSURE POSITIVE DRAINAGE IN THE DESIRED DIRECTION.

8. THE BANK SHOULD BE VEGETATED (TURFED, SEEDED AND MULCHED), OR OTHERWISE STABILISED IMMEDIATELY, UNLESS IT WILL OPERATE FOR LESS THAN 30 DAYS OR IF SIGNIFICANT RAINFALL IS NOT EXPECTED DURING THE LIFE OF THE BANK.

9. ENSURE THE EMBANKMENT DRAINS TO A STABLE OUTLET, AND DOES NOT DISCHARGE TO AN UNSTABLE FILL SLOPE.

MAINTENANCE

1. INSPECT FLOW DIVERSION BANKS AT LEAST WEEKLY AND AFTER RUNOFF-PRODUCING RAINFALL.

2. INSPECT THE BANK FOR ANY SLUMPS, WHEEL TRACK DAMAGE OR LOSS OF FREEBOARD. MAKE REPAIRS AS NECESSARY.

3. CHECK THAT FILL MATERIAL OR SEDIMENT HAS NOT PARTIALLY BLOCKED THE DRAINAGE PATH UP-SLOPE OF THE EMBANKMENT. WHERE NECESSARY, REMOVE ANY DEPOSITED MATERIAL TO ALLOW FREE DRAINAGE.

4. DISPOSE OF ANY COLLECTED SEDIMENT OR FILL IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

5. REPAIR ANY PLACES IN THE BANK THAT ARE WEAKENED OR IN RISK OF FAILURE.

REMOVAL

1. WHEN THE SOIL DISTURBANCE ABOVE THE BANK IS FINISHED AND THE AREA IS STABILISED, THE FLOW DIVERSION BANK SHOULD BE REMOVED, UNLESS IT IS TO REMAIN AS A PERMANENT DRAINAGE FEATURE.

2. DISPOSE OF ANY SEDIMENT OR EARTH IN A MANNER THAT WILL NOT CREATE AN EROSION OR POLLUTION HAZARD.

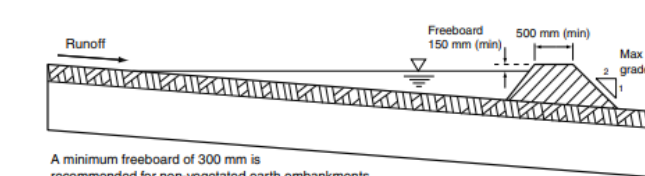


Figure 1 - Typical profile of flow diversion bank formed from earth

Table 1 - Recommended dimensions of flow diversion banks

Parameter	Earth banks	Vegetated banks	Compost berms	Sandbag berms
Height (min)	500 mm	500 mm	300 mm	N/A
Top width (min)	500 mm	500 mm	100 mm	N/A
Base width (min)	2500 mm	2500 mm	600 mm	N/A
Side slope (max)	2:1 (H:V)	2:1 (H:V)	1:1 (H:V)	N/A
Freeboard	300 mm	150 mm	100 mm	50 mm

Drawn:	Date:		
GMW	Dec-09	Flow Diversion Banks	DB-01

MATERIALS

ROCK: 150 TO 300mm NOMINAL DIAMETER, HARD, EROSION RESISTANT ROCK. SMALLER ROCK MAY BE USED IF SUITABLE LARGE ROCK IS NOT AVAILABLE.

SANDBAGS: GEOTEXTILE BAGS (WOVEN SYNTHETIC, OR NON-WOVEN BIODEGRADABLE) FILLED WITH CLEAN COARSE SAND, CLEAN AGGREGATE, STRAW OR COMPOST.

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION AND INSTALLATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. PRIOR TO PLACEMENT OF THE CHECK DAMS, ENSURE THE TYPE AND SIZE OF EACH CHECK DAMS WILL NOT CAUSE A SAFETY HAZARD OR CAUSE WATER TO SPILL OUT OF THE DRAIN.

3. LOCATE THE FIRST CHECK DAM AT THE DOWNSTREAM END OF THE SECTION OF CHANNEL BEING PROTECTED. LOCATE EACH SUCCESSIVE CHECK DAM SUCH THAT THE CREST OF THE IMMEDIATE DOWNSTREAM DAM IS LEVEL WITH THE TOE OF THE CHECK DAM BEING INSTALLED.

4. ENSURE THE CHANNEL SLOPE IS NO STEEPER THAN 10:1 (H:V). OTHERWISE CONSIDER THE USE OF A SUITABLE CHANNEL LINER INSTEAD OF THE CHECK DAMS.

5. CONSTRUCT THE CHECK DAM TO THE DIMENSIONS AND PROFILE SHOWN WITHIN THE APPROVED PLAN.

6. WHERE SPECIFIED, THE CHECK DAMS SHALL BE CONSTRUCTED ON A SHEET OF GEOTEXTILE FABRIC USED AS A DOWNSTREAM SPLASH PAD.

7. EACH CHECK DAM SHALL BE EXTENDED UP THE CHANNEL BANK (WHERE PRACTICABLE) TO AN ELEVATION AT LEAST 150mm ABOVE THE CREST LEVEL OF THE DAM.

MAINTENANCE

1. INSPECT EACH CHECK DAM AND THE DRAINAGE CHANNEL AT LEAST WEEKLY AND AFTER RUNOFF-PRODUCING RAINFALL.

2. CORRECT ALL DAMAGE IMMEDIATELY. IF SIGNIFICANT EROSION OCCURS BETWEEN ANY OF THE CHECK DAMS, THEN CHECK THE SPACING OF DAMS AND WHERE NECESSARY INSTALL INTERMEDIATE CHECK DAMS OR A SUITABLE CHANNEL LINER.

3. CHECK FOR DISPLACEMENT OF THE CHECK DAMS

4. CHECK FOR SOIL SCOUR AROUND THE ENDS OF EACH CHECK DAM. IF SUCH EROSION IS OCCURRING, CONSIDER EXTENDING THE WIDTH OF THE CHECK DAM TO AVOID SUCH PROBLEMS.

5. IF SEVERE SOIL EROSION OCCURS EITHER UNDER OR AROUND THE CHECK DAMS, THEN SEEK EXPERT ADVICE ON AN ALTERNATIVE TREATMENT MEASURE.

6. REMOVE ANY SEDIMENT ACCUMULATED BY THE CHECK DAMS, UNLESS IT IS INTENDED THAT THIS SEDIMENT WILL REMAIN WITHIN THE CHANNEL.

7. DISPOSE OF COLLECTED SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

REMOVAL

1. WHEN CONSTRUCTION WORK WITHIN THE DRAINAGE AREA ABOVE THE CHECK DAMS HAS BEEN COMPLETED, AND THE DISTURBED AREAS AND THE DRAINAGE CHANNEL ARE SUFFICIENTLY STABILISED TO RESTRAIN EROSION, ALL TEMPORARY CHECK DAMS MUST BE REMOVED.

2. REMOVE THE CHECK DAMS AND ASSOCIATED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

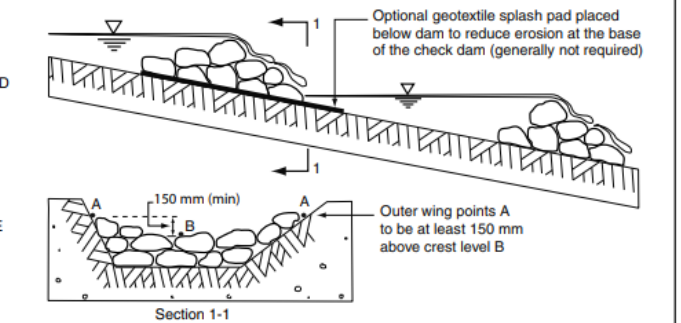


Figure 1 - Layout and profile of check dams (rock check dams shown)

Drawn:	Date:		
GMW	Dec-09	Check Dams	RCD-01

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND CONSTRUCTION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF INSTALLATION, CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. ENSURE ALL NECESSARY SOIL TESTING (e.g. SOIL pH, NUTRIENT LEVELS) AND ANALYSIS HAS BEEN COMPLETED, AND REQUIRED SOIL ADJUSTMENTS PERFORMED PRIOR TO PLANTING.

3. CLEAR THE LOCATION FOR THE CHANNEL, CLEARING ONLY WHAT IS NEEDED TO PROVIDE ACCESS FOR PERSONNEL AND CONSTRUCTION EQUIPMENT.

4. REMOVE ROOTS, STUMPS, AND OTHER DEBRIS AND DISPOSE OF THEM PROPERLY. DO NOT USE DEBRIS TO BUILD ANY ASSOCIATED EMBANKMENTS.

5. EXCAVATE THE DIVERSION CHANNEL TO THE SPECIFIED SHAPE, ELEVATION AND GRADIENT. THE SIDES OF THE CHANNEL SHOULD BE NO STEEPER THAN A 2:1 (H:V) IF CONSTRUCTED IN EARTH, UNLESS SPECIFICALLY DIRECTED WITHIN THE APPROVED PLANS.

6. STABILISE THE CHANNEL AND BANKS IMMEDIATELY UNLESS IT WILL OPERATE FOR LESS THAN 30 DAYS. IN EITHER CASE, TEMPORARY EROSION PROTECTION (MATTING, ROCK, ETC.) WILL BE REQUIRED AS SPECIFIED WITHIN THE APPROVED PLANS OR AS DIRECTED.

7. ENSURE THE CHANNEL DISCHARGES TO A STABLE AREA.

ADDITIONAL REQUIREMENTS FOR TURF PLACEMENT:

1. TURF SHOULD BE USED WITHIN 12 HOURS OF DELIVERY, OTHERWISE ENSURE THE TURF IS STORED IN CONDITIONS APPROPRIATE FOR THE WEATHER CONDITIONS (e.g. A SHADED AREA).

2. MOISTENING THE TURF AFTER IT IS UNROLLED WILL HELP MAINTAIN ITS VIABILITY.

3. TURF SHOULD BE LAID ON A MINIMUM 75mm BED OF ADEQUATELY FERTILISED TOPSOIL. RAKE THE SOIL SURFACE TO BREAK THE CRUST JUST BEFORE LAYING THE TURF.

4. DURING THE WARMER MONTHS, LIGHTLY IRRIGATE THE SOIL IMMEDIATELY BEFORE LAYING THE TURF.

5. ENSURE THE TURF IS NOT LAID ON GRAVEL, HEAVILY COMPACTED SOILS, OR SOILS THAT HAVE BEEN RECENTLY TREATED WITH HERBICIDES.

6. ENSURE THE TURF EXTENDS UP THE SIDES OF THE DRAIN AT LEAST 100mm ABOVE THE ELEVATION OF THE CHANNEL INVERT, OR AT LEAST TO A SUFFICIENT ELEVATION TO FULLY CONTAIN EXPECTED CHANNEL FLOW.

7. ON CHANNEL GRADIENTS OF 3:1 (H:V) OR STEEPER, OR IN SITUATIONS WHERE HIGH FLOW VELOCITIES (i.e. VELOCITY >1.5m/s) ARE LIKELY WITHIN THE FIRST TWO WEEK FOLLOWING PLACEMENT, SECURE THE INDIVIDUAL TURF STRIPS WITH WOODEN OR PLASTIC PEGS.

8. THE TURF AND THE SOIL SUCH THAT SEEPAGE FLOW BENEATH THE TURF IS AVOIDED.

9. WATER UNTIL THE SOIL IS WET 100mm BELOW THE TURF. THEREAFTER, WATERING SHOULD BE SUFFICIENT TO MAINTAIN AND PROMOTE HEALTHY GROWTH

MAINTENANCE

1. DURING THE SITE'S CONSTRUCTION PERIOD, INSPECT THE DIVERSION CHANNEL WEEKLY AND AFTER ANY INCREASE IN FLOWS WITHIN THE CHANNEL. REPAIR ANY SLUMPS, WHEEL TRACK DAMAGE OR LOSS OF FREEBOARD.

2. ENSURE FILL MATERIAL OR SEDIMENT IS NOT PARTIALLY BLOCKING THE CHANNEL. WHERE NECESSARY, REMOVE ANY DEPOSITED MATERIAL TO ALLOW FREE DRAINAGE.

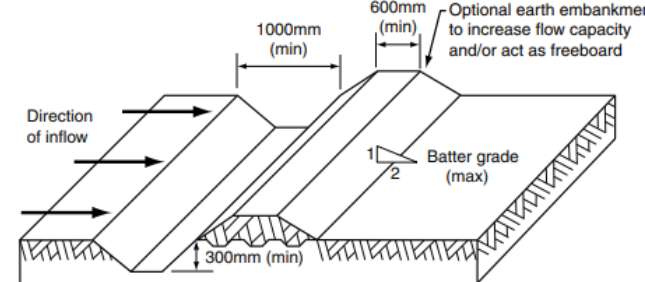


Figure 1 - Typical profile of diversion channel with bank

Drawn:	Date:		
GMW	Dec-09	Diversion Channels	DC-01

MATERIALS

POLYACRYLAMIDE:

(i) CHOICE OF POLYACRYLAMIDE SHOULD BE BASED ON THE MOST ENVIRONMENTALLY SAFE, ANIONIC PRODUCT AVAILABLE. CATIONIC POLYACRYLAMIDE SHALL NOT BE USED.

(ii) POLYACRYLAMIDE USED FOR EROSION AND SEDIMENT CONTROL SHALL BE WATER SOLUBLE, LINEAR, OR NON-CROSS LINKED.

(iii) GRANULAR POLYACRYLAMIDE MUST BE STORED OUT OF THE SUN WHILE NOT IN USE.

APPLICATION

1. REFER TO APPROVED PLANS FOR LOCATION, EXTENT, AND APPLICATION DETAILS. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, OR METHOD OF APPLICATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.

2. POLYACRYLAMIDE, COMBINED WITH WATER, IS VERY SLIPPER AND CAN REPRESENT A SAFETY HAZARD. APPROPRIATE MANAGEMENT OF ANY SAFETY HAZARD MUST BE ACHIEVED.

3. ENSURE ALL POLYACRYLAMIDE ARE USED FOR PURPOSES AND AT APPLICATION RATES IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.

4. POLYACRYLAMIDE MUST NOT BE ADDED TO WATER DISCHARGING DIRECTLY FROM THE SITE.

5. PRE-DISSOLVE THE DRY, GRANULAR POLYACRYLAMIDE INTO A CONCENTRATED SOLUTION OVERNIGHT OR SEVERAL HOURS BEFORE USAGE.

6. PRIOR TO APPLICATION, ENSURE SUPPLEMENTARY EROSION AND SEDIMENT CONTROL PRACTICES COMPLY WITH BEST PRACTICE.

7. PRE-FILL A TANK APPROXIMATELY 1/8 FULL WITH WATER PRIOR TO INPUT OF THE PRE-PREPARED, CONCENTRATED POLYACRYLAMIDE SOLUTION. CONTINUE TO FILL THE TANK WITH THE REQUIRED WATER VOLUME. THE WATER MUST HAVE LOW TURBIDITY IN THE RANGE OF 20 NTU OR LESS.

8. APPLY THE MIXTURE UNTIL THE SOIL SURFACE IS UNIFORMLY AND COMPLETELY WETTED.

9. ALL REASONABLE EFFORTS SHOULD BE TAKEN TO APPLY POLYACRYLAMIDE SOLUTION TO THE SOIL WHILE THE SOIL IS IN A 'DRY' CONDITION.

10. DURING APPLICATION, ALL REASONABLE EFFORTS MUST BE TAKEN TO AVOID SPRAY ONTO ROADS, PATHWAYS, DRAINAGE CHANNELS NOT INTENDED FOR APPLICATION, AND EXISTING VEGETATION.

MAINTENANCE

1. INSPECT THE TREATED SURFACE PRIOR TO FORECAST RAIN, DAILY DURING EXTENDED PERIODS OF RAINFALL, AFTER SIGNIFICANT RUNOFF PRODUCING STORMS OR OTHERWISE AT FORTNIGHTLY INTERVALS.

2. REAPPLY WITHIN 48 HOURS AFTER THE TREATED AREAS HAS BEEN DISTURBED BY EARTHMOVING MACHINERY IF EROSION CONTROL IS REQUIRED.

3. REAPPLY AS NECESSARY ON DAMAGED AREAS.

4. REAPPLICATION IS GENERALLY NOT REQUIRED UNLESS THE TREATED AREA IS DISTURBED, A PERIOD OF 60-DAYS HAS PASSED, OR UNLESS ACCEPTABLE TURBIDITY LEVELS ARE EXCEEDED. IF THE TREATED AREA HAS BEEN MULCHED, THEN REAPPLICATION MAY NOT BE REQUIRED FOR SEVERAL MONTHS.

Drawn:	Date:		
GMW	Dec-09	Polyacrylamide	PAM-01

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

APPENDIX H

DUST MANAGEMENT PLAN

Prepared By:	Project Engineer	Date Revised:	29/09/2022	Document No:	WINBMS-SP-11-A
Approved By:	Systems Manager	Date Approved:	29/09/2022	Date First Issued:	29/06/2015
CEMP	Contract No: 30033922	Project Revision No: 1	Date: 10/08/2023	Template Revision No. 8	Page 29 of 29



DUST MANAGEMENT PLAN -
FOR
WINSLOW CCA, COURTNEY DRIVE URBAN ESTATE,
UPPER COOMERA

DMP SUB PLAN AUTHORISATION AND CONTROL

The Dust Management Plan (DMP) is authorised internally by the Project Manager or delegate and accepted by the Client.

REVISION

This document shall be reviewed at least six (6) monthly and approved by the Project Manager, with all updates communicated to all Workers. The Project Manager shall ensure the document remains controlled and up-to-date.

PROJECT DOCUMENT REVISION HISTORY

Rev No.	Rev. Date	Sections Revised	Revision Description	Prepared by	Checked by	Approved by
0	26/10/2023		Document preparation	A Croft	M Williams	
1						
2						
3						

CONTENTS

GLOSSARY / ABBREVIATIONS.....	3
1 INTRODUCTION	4
1.1 CONTEXT.....	4
1.2 SCOPE.....	4
2 LEGISLATION.....	5
3 PROJECT TARGETS	5
3.1 CONTROLS USED TO MANAGE AIR QUALITY	6
4 ENVIRONMENTAL ASPECTS AND IMPACTS.....	6
4.1 CONSTRUCTION ACTIVITIES.....	6
4.2 FACTORS LIKELY TO AFFECT DUST GENERATION AND IMPACTS	7
4.3 IMPACTS	7
5 ENVIRONMENTAL CONTROL MEASURES	8
6 COMPLIANCE MANAGEMENT	14
6.1 ROLES AND RESPONSIBILITIES	14
6.2 TRAINING	14
7 MONITORING	14
7.1.1 METEOROLOGICAL MONITORING	15
7.2 INSPECTION	15
7.2.1 INCIDENT RESPONSE AND CONTINGENCY MEASURES	15
7.3 AUDITING.....	16
8 REVIEW AND IMPROVEMENT	16
8.1 CONTINUOUS IMPROVEMENT	16

Tables

TABLE 1: AIR QUALITY HAZARDS AND RISKS	4
TABLE 2: AIR QUALITY LEGISLATION	5
TABLE 3: AIR QUALITY PROJECT TARGETS	5
TABLE 4: AIR QUALITY CONTROLS.....	6
TABLE 5 AIR QUALITY MANAGEMENT AND MITIGATION MEASURES	9
TABLE 6: AIR QUALITY METEOROLOGICAL MONITORING	15

GLOSSARY / ABBREVIATIONS

AQ	Air Quality
AS	Australian Standards
DMP	Dust Management Plan
CEMP	Construction Environmental Management Plan
ERSED	Erosion and sedimentation
ESCP	Erosion and Sediment Control Plan
EWMS	Environmental Work Method Statements
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measures
Project, the	Courtney Drive, Upper Coomera

1 INTRODUCTION

1.1 CONTEXT

This Dust Management Plan (DMP or the Plan) forms part of the Construction Environmental Management Plan (CEMP) for the Urban Development on Courtney Drive, Upper Coomera (the Project) to be constructed by Winslow CCA.

This plan has been developed to comply with the Development Approval conditions and to provide strategies for dust control during activities on site to ensure dust levels are maintained to an acceptable level that meets legislative requirements.

1.2 SCOPE

This plan addresses the management of emissions to the atmosphere that may be caused by Project activities and that have the potential to adversely affect the environment or community by affecting air quality. It describes how Winslow CCA proposes to manage and protect air quality and address requirements of Courtney Drive Estates Planning Approval Conditions and requirements and applicable legislation.

Activities conducted on the project that have the potential to impact air quality are provided below.

Table 1: Air Quality Hazards and Risks

Project Activity	Environmental Hazard	Environmental Risk
Vehicle movements	Generation of dust	Nuisance to community ¹
Vegetation clearing	Generation of dust and pollens	Nuisance to community ¹
Wind erosion of exposed areas	Generation of dust	Nuisance to community ¹
Stockpiling of material	Generation of dust	Nuisance to community ¹
Temporary access tracks	Generation of dust	Nuisance to community ¹
Bulk earthworks (cut and fill)	Generation of dust	Nuisance to community ¹
Air emissions, other than dust including exhaust fumes, odours/gases from construction activities	Generation of fumes and/or odours	Nuisance to community ¹

1. The generation of dust can have nuisance effects on the community which may include (but not limited to) aesthetic effects from visible airborne dust plumes, residences requiring additional cleaning, increased maintenance of air filters, potential health risks, impacts on water quality or vegetation health, residential living areas such as pools, air conditioning living etc.
2. Affecting flora with dust on leaves etc.

This plan does not address workplace respiratory dust which is covered through implementation of the Project's Health and Safety Management Plan.

During construction the following activities would potentially result in air quality impacts:

- vegetation clearing
- stripping and stockpiling topsoil
- windblown dust from exposed surfaces e.g. stockpiles, roads etc.
- earthworks

- road construction
- transport and handling of soils and materials
- vehicular dust from traffic movements on unpaved roads
- use of construction vehicles, generating exhaust fumes.

2 LEGISLATION

The Australian Standard (ISO 14001:2015, 6.1.3) requires the Company to:

- a) determine and have access to the compliance obligations related to its environmental aspects.
- b) determine how these compliance obligations apply to the organisation.
- c) take these compliance obligations into account when establishing, implementing, maintaining and continually improving its environmental management system.”

The constructing contractor understands the importance of meeting, and where practicable, exceeding, its regulatory obligations. All required compliance obligations are available electronically at site and displayed on the site noticeboard when required.

Winslow CCA has developed a site-specific CEMP and relevant environmental procedure to comply with legislation outlined in the CEMP.

2.1 SPECIFIC CONDITIONS OF LOCAL, STATE AND COMMONWEALTH LEGISLATION

Conditions of local, state and Commonwealth laws, regulations and protection policies that apply specific criteria to emissions to the atmosphere relevant to the Project include:

Table 2: Air Quality Legislation

Legislation Title
<i>Environmental Protection Act 1994</i>
<i>Environmental Protection (Air) Policy 2019</i>

3 PROJECT TARGETS

The Project's risk management processes and the potential impacts to the community, the following air quality targets have been set for the Project. Any deviance from the targets will result in Project management immediately implementing corrective actions.

Table 3: Air Quality Project Targets

Key Performance Indicator	Target	Time Frame	Accountability
Number of non-compliant monitoring results	Zero	At all times	Project Manager
Number of actions taken by regulators and/or client	Zero	At all times	Project Manager

3.1 CONTROLS USED TO MANAGE AIR QUALITY

Controls that are adequate to ensure compliance and reduce risk to as low as reasonably practical (ALARP) are implemented before any relevant work commences. Elimination of a hazard is the preferred method of control, followed by engineering and then administrative controls. Controls used on the Project include:

Table 4: Air Quality Controls

Control	Accountability
Minimising the areas in which vegetation has been removed or disturbed	Site Engineer/Supervisor
Progressively rehabilitating or grassing areas as soon as they become available	Project Engineer
During high winds (i.e. greater than 25 km/hr) an inspection of the site will take place and the dust situation will be assessed (i.e. dust risks to residents/road traffic). Possible controls are water cart or alter operating procedures.	Environment Manager / Superintendent
Applying dust suppressant (water) to areas that present a high risk for dust generation at a frequency sufficient to ensure contractual and compliance requirements are achieved and the community is not adversely affected	Site Engineer/ Supervisor
Establishing properly constructed rumble pads (as required) at all gates, for the ingress and egress of all vehicles	Project Engineer
Establishing traffic speeds in order to minimise dust generation and/or implement dust suppression measures in active construction areas	Superintendent
Assessing exhaust emissions as part of plant inspections, with excessive emissions resulting in the plant being removed from use	Plant Manager/Supervisor
Ensuring that burning-off does not occur on the Project	Superintendent
Plant and machinery will be switched off when not in use. Plant will be fitted with emission control devices complying with Australian Design Standards. Construction plant, vehicles and equipment will be maintained in good working condition to limit impacts on air quality	Supervisor
The use of alternative fuels and power sources for construction plant and equipment will be investigated and implemented, where appropriate.	Environment Manager

4 ENVIRONMENTAL ASPECTS AND IMPACTS

4.1 CONSTRUCTION ACTIVITIES

Emissions to the atmosphere during construction that could result in adverse impacts to air quality are typically divided into two categories:

- Dust and particulates.
- Gaseous.

Key aspects of the Project that could result in dust emissions include:

- General earthworks particularly during site establishment.
- Vegetation clearing.
- Bulk earthworks.
- Drilling and blasting.
- Operating, crushing and screening.
- Topsoil / material handling including stockpiling, material loading and material haulage.
- Vehicular movements over unpaved surface (including unsealed access roads).
- Wind erosion of exposed areas and temporary stockpiles.
- Tracking of dirt onto roads.
- Liming operations.
- Mulching/chipping.
- Concrete cutting.

Air emissions, other than dust, which may be generated by construction activities include:

- Vehicle and plant exhaust emissions, which may be excessive if vehicles and plant are poorly maintained.
- Herbicide and pesticide spraying.
- Odours/gases released during:
 - Excavations of organic or contaminated materials
 - During sealing works
 - Waste storage.

4.2 FACTORS LIKELY TO AFFECT DUST GENERATION AND IMPACTS

In addition to the inherent risks of specific construction activities creating the potential to generate dust, a number of other environment factors also affect the likelihood of dust emissions. These include:

- Wind direction – determines whether dust and suspended particles are transported in the direction of the sensitive receivers.
- Wind speed – governs the potential suspension and drift resistance of particles.
- Soil type – more erodible soil types have an increased soil or dust erosion potential.
- Soil moisture – increased soil moisture reduces soil or dust erosion potential.
- Rainfall or dew – rainfall or heavy dew that wets the surface of the soil and reduces the risk of dust generation.
- Extent of vegetation cover – vegetation assists in stabilising soils and reduces the ability for dust erosion to occur.

4.3 IMPACTS

The potential for impacts on air quality will depend on a number of factors. Primarily impacts will be dependent on the nature, extent and magnitude of construction activities and their interaction with the natural environment. Potential impacts attributable to construction might include:

- Deposition of dust on surfaces where it may cause damage and/or lead to a need for increased cleaning or repair.
- Aesthetic effects that arise from visible airborne dust plumes and from deposits of dust on surfaces.
- Need for increased maintenance of air filtering systems (eg air conditioners etc).
- Potential adverse health effects including eye, nose and throat irritation from excessive inhalation of fine particles.
- Impacts on water quality and/or vegetation health from dust deposition.
- Impacts on residential sensitive receivers, including impacts on living areas, swimming pools and general amenities.
- Complaints from the public relating to dust or odours.
- Dust deposition impacts on threatened flora species or habitat for threatened fauna species.
- Dust deposition impacts on sensitive agricultural receivers, including sugar cane and horticulture farms.
- Dust contamination of water tanks.

Section 5 provides a suite of mitigation measures that will be implemented to avoid or minimise dust impacts.

5 ENVIRONMENTAL CONTROL MEASURES

A range of environmental requirements and control measures will be identified in the various environmental documents, Assessments and Conditions of Approval. These specific measures and requirements to address impacts on air quality are incorporated into Table 5.

Table 5 Air quality management and mitigation measures

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
GENERAL					
AQ1	Training will be provided to all project personnel, including relevant sub-contractors on sound air quality control practices and the requirements from this plan through inductions, toolboxes and targeted training.		Pre-construction Construction	Environmental Site Representative	Good practice
AQ2	Air quality control measures from this plan will be included in relevant Environmental Work Method Statements (EWMS) and/or Erosion and Sediment Control Plans (ESCP).		Pre-construction / Construction	Environmental Site Representative	Good practice
AQ3	Vegetation clearing will be staged where possible to minimise the area and time that surfaces are exposed.		Construction	Supervisor Project Engineer Foreman	Good practice
AQ4	Exposed surfaces with no scheduled work for two weeks will be treated to minimise dust generation. Exposed surfaces will be stabilised progressively using the most practical site specific methods, such as watering and geo-fabrics for short term exposure and emulsion spray, spray grass, soil compaction and revegetation for longer term exposed areas or final finishes.		Construction	Supervisor Project Engineer Foreman	Good practice
AQ5	Construction activities will be modified, reduced or controlled during high or unfavourable wind conditions if they have a potential to increase off-site dust generation.		Construction	Supervisor Project Engineer Foreman	Good practice
AQ6	Control measures including water carts, sprinklers, sprays, dust screens or the application of geo-binding agents will be utilised where applicable to control dust emissions. The frequency of use will be modified accommodate prevailing conditions. Dust		Construction	Supervisor Project Engineer Foreman Environmental Site Representative	Good practice

DUST MANAGEMENT PLAN

PROJECT: COURTNEY DRIVE, UPPER COOMERA



ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
	control equipment will be maintained to ensure its operability.				
AQ7	Erosion control structures will be checked regularly for build-up of silt and other materials to ensure deposits do not become a dust source.		Construction	Supervisor Foreman Environmental Site Representative	Good practice
AQ8	Waste will be segregated and collected on a regular basis to ensure odours associated with waste do not become an issue.		Construction	Supervisor Project Engineer Foreman	Good practice
AQ9	The application of pesticides and herbicides will be modified, reduced or controlled during high or unfavourable wind conditions where wind can carry pesticides outside of the defined treatment area.		Construction	Supervisor Project Engineer Foreman	Good practice
AQ10	Stockpiles will be located in accordance with the ESCP. Control measures including water carts, sprinklers, sprays, dust screens or the application of geo-binding agents will be utilised where applicable to control dust emissions. A suitable cover crop or provision of other covering over topsoil stockpiles will be established where stockpiles are in place for longer than 4 weeks.		Construction	Supervisor Project Engineer Foreman Environmental Site Representative	Good practice
AQ11	If required shade cloths will be installed around low growing threatened species, in situ populations and threatened invertebrate habitat to provide dust protection and maintain microclimate.		Construction	Supervisor Project Engineer Foreman Environmental Site Representative	Good practice
AQ12	There will be no burning off of waste.		Construction	Foreman	Good practice
AQ13	Stormwater, recycled water or other water sources shall be used, where feasible and reasonable, in preference to potable water for construction activities, including concrete mixing and dust control.		Construction	Supervisor Project Engineer Foreman	Good practice
AQ14	Disturbed areas will be progressively rehabilitated as soon as practical.		Construction/ Post-construction	Supervisor Project Engineer Foreman	Good practice

DUST MANAGEMENT PLAN

PROJECT: COURTNEY DRIVE, UPPER COOMERA



ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
VEHICLE MOVEMENT AND MATERIAL STORAGE					
AQ15	Compounds, ancillary facilities, administration access roads and standing areas will be hard surfaced as soon as possible.		Construction	Supervisor Project Engineer Foreman	Good practice
AQ16	Measures implemented to minimise dust, soil or mud from being deposited from vehicles on public roads. This will be achieved by implementing mitigation measures such as rumble grids and large aggregate at entry/exit points. In the event of any spillage or tracking, the spilt material will be removed within 24 hours. Management measures should include: • Watering of unsealed haul roads, as required • Visual checks of exhaust emissions. Vehicle movements on unsealed roads is to be minimised i.e. taking alternate routes, car-pooling, avoiding un-necessary trips. Unsealed roads will be avoided following rain events (where possible).		Construction	Supervisor Foreman Environmental Site Representative	Good practice
AQ17	Hardstand areas and surrounding public roads will be cleaned, as required, using methods including brooms, bobcat attachments or street sweepers.		Construction	Supervisor Project Engineer Foreman	Good practice
AQ18	Vehicle movement will be confined to designated haul roads and areas. These roads will have speed limits of 40km/h in order to reduce dust generation. Reduced speed limit may be implemented where dust generation persists		Construction	Supervisor Project Engineer Foreman	Good practice
AQ19	All loaded haulage trucks will be covered where there is a risk of release of dust or other materials and at all times on public roads.		Construction	Foreman	Good practice

DUST MANAGEMENT PLAN

PROJECT: COURTNEY DRIVE, UPPER COOMERA



ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
PLANT AND EQUIPMENT					
AQ20	Haul trucks and plant equipment will be switched off when not in operation for periods of more than 30 minutes. No Idling policy will be implemented (where possible)		Construction	Foreman Operators	Good practice
AQ21	Engines of plant parked next to residents will be switched off when not in operation. In the event that stationary equipment (i.e. generators, etc) is required, the location and orientation for this equipment must be considered in relation to any surrounding sensitive receptors.		Construction	Foreman Operators	Good practice
AQ22	Exhaust systems of construction plant, vehicles and machinery will be maintained in accordance with manufacturer's specifications to ensure that emissions do not exceed regulations. Periodic visual checks will be undertaken to ensure ongoing compliance, typically weekly.		Construction	Supervisor Project Engineer Foreman Operators	Good practice
AQ23	Any plant, equipment or machinery will be immediately switched off should there be visible signs of smoke emissions emitting from equipment/machinery.		Construction	Foreman Operators	Good practice
AQ26	Dust suppression systems will be installed and used on crushing and screening plants and mulching equipment to minimise generation of dust from these activities.		Construction	Supervisor Project Engineer Foreman	Good practice
INSPECTION, MONITORING AND RECORDS					
AQ27	Public roads will be inspected each day at main entry and exit points to and from areas where construction activities are taking place and compound. Material tracked onto the road pavement will be removed in accordance with AQ16.		Construction	Supervisor Project Engineer Foreman	Good practice
AQ28	Weather forecast will be reviewed on a daily basis and appropriate measures implemented where		Construction	Supervisor Project Engineer Foreman	Good practice

DUST MANAGEMENT PLAN

PROJECT: COURTNEY DRIVE, UPPER COOMERA



ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Reference
	unfavourable weather conditions (dry weather, wind speed>10m/s) are anticipated. Measures to be implemented during unfavourable weather conditions are outlined in AQ5 and AQ9.			Environmental Site Representative	
AQ29	Dust control and operational procedures will be reviewed and modified if results exceed the air quality criteria and are attributable to construction activities.		Construction	Supervisor Project Engineer Environmental Site Representative	Good practice
AQ30	Water captured in excavations will be used for construction or dust suppression.		Construction	Supervisor Project Engineer Foreman	Good practice

6 COMPLIANCE MANAGEMENT

Winslow CCA will manage the environmental performance and compliance of the Courtney Drive Urban Estate by ensuring ongoing awareness training is delivered to project personnel and through independent inspections and audits. Winslow CCA will be required to complete their own environmental inspections (including any sub-contractors works) and report outcomes, to provide evidence of the works compliance with legislative requirements, conditions of approval and standards and guidelines.

6.1 ROLES AND RESPONSIBILITIES

The organisational structure and overall roles and responsibilities for Winslow CCA are outlined in the project CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Section 5 of this Plan.

6.2 TRAINING

All employees, contractors and subcontractors working on site will undergo site induction training relating to air quality management issues. The induction training will address elements related to air quality management including:

- Existence and requirements of this sub-plan.
- Relevant legislation.
- DA conditions (e.g. specifically dust management competency and maintenance of plant and equipment conditions)
- Roles and responsibilities for air quality management.
- Air quality mitigation and management measures.
- Procedure to be implemented in the event of an incident (eg release of dust or gaseous emissions from site).

Targeted training in the form of toolbox talks and ongoing awareness training will also be provided to personnel with a key role in air quality management. Examples of training topics include:

- ERSED control installation methodology.
- Planning and preparedness for high wind events / dust risk periods.
- Lessons learnt from dusty periods, incidents and other event e.g. low rainfall/high wind.

Further details regarding staff induction and training are outlined in the project CEMP.

7 MONITORING

Air quality monitoring is performed that complies with legal and contractual requirements and which is sufficient to identify potential non-compliances before they occur. Where monitoring determines non-compliance to be a risk, work practices are altered and/or additional controls are implemented immediately.

Monitoring and analysis of data will be carried out by competent personnel. Training records will be maintained.

Visual impacts during construction would generally be associated with:

- Road embankment construction
- Plant and equipment along the alignment
- Vegetation removal
- Establishing the site compound and stockpile sites.

Monitoring for the Courtney Drive Urban Estate is to be conducted through:

- Daily visual monitoring for dust

7.1.1 METEOROLOGICAL MONITORING

The weekly weather will be distributed to the project team and the predicted wind speed will be accessed in the weekly weather reports. The project team will be advised if winds of greater than 25 km /hour are predicted, high dust generating operations may be rescheduled if required.

Adequate meteorological measurements are to be made to enable correct interpretation of monitoring data for the assessment of compliance and to identify potential non-compliances. The sources of these data are:

Table 6: Air Quality Meteorological Monitoring

Location	Air Quality Parameter	Equipment Type	Frequency
Bureau of Meteorology weather forecasts for Coomera 7 day forecast	Monitor for wind expected speeds greater than 25 km/hr	Bureau of Meteorology weather forecasts	Weekly

7.2 INSPECTION

Regular inspections will be undertaken during construction. Inspections will include, but not be limited to:

- Winslow CCA's supervisory inspections on a daily basis and environmental site representative weekly inspections.
- Observations to be recorded by the Winslow CCA's Site Supervisor will include:
 - Time, date and general direction of any event when significant dust is observed leaving the project area with the potential to impact nearby sensitive receivers (including residents and traffic) will be logged in the daily diary
 - Time, date and general direction of any external dust sources will be logged in the daily diary

Appropriate mitigation measures will be implemented to facilitate a proactive approach to the management of dust on site. These mitigation measures include water carts continuously providing dust suppression across the site.

7.2.1 INCIDENT RESPONSE AND CONTINGENCY MEASURES

Response to incidents will be undertaken as described Winslow CCA's CEMP.

If visual monitoring undertaken by Winslow CCA indicates that mitigation measures are not fully effective or if dust complaints are received during the construction activities. Winslow CCA will notify their client and halt works to implement additional measures to mitigate the dust issues. Winslow CCA will determine if additional air / dust mitigation measures (e.g. additional water carts or site stabilisation such as soil binder or temporary cover crops) are needed and amend this DMP accordingly.

7.3 AUDITING

Audits will be undertaken to assess the effectiveness of environmental controls, compliance with this plan and other relevant approvals, licenses and guidelines.

8 REVIEW AND IMPROVEMENT

8.1 CONTINUOUS IMPROVEMENT

Continuous improvement of this Plan will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance.
- Determine the cause or causes of non-conformances and deficiencies.
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies.
- Verify the effectiveness of the corrective and preventative actions.
- Document any changes in procedures resulting from process improvement.
- Make comparisons with objectives and targets.