



SOIL & WATER MANAGEMENT PLAN

SOUTH EAST REGIONAL HOSPITAL (BEGA HOSPITAL)

REPORT NO. R00801-S&WMP

REVISION A

AUGUST 2012

PROJECT DETAILS

Property Address: 1614 Tathra Road, Bega

Development Proposal: South East Regional Hospital
(Bega Hospital)

REPORT CERTIFICATION

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DOCUMENT CONTROL

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Preface

This Soil and Water Management Plan (SWMP) has been prepared to supplement the Environmental Assessment (EA) for the South East Regional Hospital (Bega Hospital) development.

The SWMP addresses the following DGRs:

- Item 11 Staging – Stage 1 Construction Enabling Works, Part 6 – Sediment, Erosion & Dust Controls;
- Item 11 Staging – Stage 2 Main Construction Works, Part 16 – Sediment, Erosion & Dust Controls;

This SWMP has been written in accordance with the requirements of “Managing Urban Stormwater – Soils and Construction, 4th Edition (2004)” by Landcom. This SWMP shall be applied to the construction activities carried out for the development site.

Measures outlined in this Soil and Water Management Plan must be implemented prior to and maintained during and after the construction works.

It is the Contractor’s responsibility to design the sedimentation and erosion control plan for the site such that it is accordance with this Soil and Water Management Plan and the Civil Works Specification.

General Instructions

1. The Soil and Water Management Plan (SWMP) is to be read in conjunction with the engineering plans, and any other plans or specifications that may be issued in relation to the Project.
2. Contractors shall ensure that all soil and water management works are undertaken as instructed in this specification and constructed following the guidelines stated in "Managing Urban Stormwater – Soils and Construction, 4th Edition (2004)" by Landcom.
3. The Contractor shall ensure that all subcontractors are informed of their responsibilities in minimising the potential for soil erosion and pollution to downslope areas.

Site Constraints and Characteristics

1. The following design parameters have been assessed for the site :

Constraint	Value	(Source)*
Rainfall Erosivity (R-factor)	3400	(Appendix B - Map 14)
Soil Erodibility (K-factor)	0.036 – 0.041	(Table C29 – Jellat Jellat Flat)
Length/Slope Gradient Factor, LS	4.66	Table A1
Erosion Control Practice Factor (P-Factor)	1.3 (Compacted)	Table A2
Cover Factor (C-Factor)	1.0 (During Earthworks) 0.1 (Temporary Seeding – Post-Earthworks Operation)	Table A3
Calculated Soil Loss, A (RUSLE equation)	844 t/Ha/yr (During Earthworks) 84 t/Ha/yr (Post-Earthworks)	A = R K L S P C
Soil Loss Class	6 – Very High	(Table 4.2)
Soil Hydrologic Group	B	(Table C29)
75 th Percentile 5-day Rainfall Event	19.5mm (Bega)	(Table 6.3b)
Volumetric Runoff Coefficient, Cv	0.10	(Table F2)

* (NSW Landcom Managing Urban Stormwater Manual Reference)

- The sediment basin sizing has been conducted on a rate per hectare of disturbed area basis and has been sized in accordance with the requirements of the Landcom manual "Managing Urban Stormwater - Soils and Construction", for Type F soils. The disturbed area within this catchment at any one time should be limited to an area for which each sediment basin can handle.

Sediment Basin Sizing Calculation for Type F Soil*:

	TOTAL
Volumetric Runoff Coefficient, C_v	0.1 (Table F2)
75 th percentile 5 Day total rainfall depth	19.5mm
Catchment Area (A_c)	1.0 (i.e. per hectare of disturbed area)
Settling Zone Volume (per hectare), $V_{sett} = 10 \times C_v \times A_c \times R_{75th}$	20 m ³ /ha
Disturbed Catchment Area (A_d)	1.0 (i.e. per hectare of disturbed area)
R K L S P C	844 t/ha/yr
Sediment Zone Volume, $V_{sed} (0.17 A_d (R K L S P C) / 1.3$ V_{sed} should be >30% of V_{sett}	110 m ³ /ha
Total Sediment Basin Volume Required:	130 m³/ha of disturbed area

*(NSW Landcom Managing Urban Stormwater Manual Reference)

- The basins have been sized to accommodate the 75th percentile of 5 day continuous storm. The total volume of the basins required is given in m³ per hectare of disturbed area.
- Stormwater runoff from the non-disturbed portion of the catchment outside of operating area is to be bypassed around the basins by physical means such as catch drains.

Basin Management

- The captured stormwater in the settling zone should be drained to meet the minimum storage capacity required within a five (5) day period following rainfall, provided the acceptable water quality (NFR) and turbidity have been achieved.
- Chemical flocculent such as gypsum may be dosed to aid settling within 24 hours of conclusion of each storm. The applied dosing rates should achieve the target quality within 36 to 72 hours of the storm event.

Land Disturbance Conditions

1. Where practicable, the soil erosion hazard shall be kept as low as possible. Limitations to access are to be in accordance with the following table:

Land use	Limitation
Access Areas	Access is to be limited to the designated work zones.
Truck Cleaning Areas	Any truck exiting out of the site shall be thoroughly cleaned and limit the exportation of soil and sediment on public roads.
Remaining Lands (Undisturbed Areas)	Entry is prohibited to remaining lands. Access is only permitted with permission from the Project Manager and/or Superintendent, to allow for thinning of growth in the interests of fire protection and/or flora and fauna management.

Construction Sequence

Works shall be undertaken in the following sequence:

1. Install sediment fencing and cut drains to meet the requirements of the SWMP. Waste collection bins shall be installed adjacent to site office.
2. Construct stabilised site access in location nominated by the Contractor and in accordance with the Specification.
3. Install sediment control protection measures at all natural and man-made drainage structures. Maintain until all the disturbed areas are stabilised.
4. Redirect clean water around the construction site (earthworks areas).
5. Construct sediment basin(s) for disturbed areas in accordance with the rate per hectare provided in the SWMP. Install risers and two pegs in the floor of the basin and have them marked to show the top of the sediment storage zone. Ensure the basin is cleared of sediment once the design capacity is reached.
6. Clear and strip the work areas. Minimise the damage to the grass and low ground cover of non-disturbed areas.
7. Any disturbed areas, other than grading areas, shall immediately be covered with site topsoil within 7 days of clearing. Re-graded areas shall be covered with bitumen emulsion as specified.
8. Apply permanent stabilisation to the site if necessary.

Erosion Control Requirements

1. Clearly visible barrier fencing shall be installed at the discretion of the site superintendent to ensure traffic control and prohibit unnecessary site disturbance. Vehicular access to the site shall be limited to only that essential for construction work and shall enter the site only through the stabilised access points.
2. All disturbed areas are to be stabilised within 14 working days of the completion of land shaping. All disturbed areas are to be protected so that the land is permanently stabilised within six months. Topsoil shall be respread over the site, other than re-grading areas, to a minimum depth of 100mm on bare but tined soil surfaces and the site shall be revegetated in accordance with the following:

Sowing season	Seed mix
Autumn/Winter	oats@40kg/ha + Japanese millet@10kg/ha
Spring/Summer	oats@20kg/ha + Japanese millet@20kg/ha

Note : These plant species are for temporary revegetation only. They will only provide protection from erosion for six months. Where the lots are to be left undeveloped for a longer period, the Contractor shall seek advice from the site superintendent as to more appropriate revegetation methods.

Revegetation in accordance with the above table will be enhanced by adding lime at a rate of 4kg/tonne of topsoil and 7.5kg/tonne of subsoil.

3. The long term ground cover factors for the construction works is not to exceed the following limits :

Land	Maximum C-factor	Remarks
Waterways and other areas of concentrated flows, post construction	0.05	Applies after 10 working days of completion of formation and before concentrated flows are applied. Foot and vehicular traffic is prohibited in this area and 70% ground cover is required.
Stockpiles, post construction	0.10	Applies after 10 working days from completion of formation. 60% ground cover is required.
All lands, including waterways and stockpiles, during construction.	0.15	Applies after 20 days of inactivity, even though works may be incomplete. 50% ground cover is required.

Sediment Control Conditions

1. Proprietary silt fencing shall be installed by the Contractor in accordance with their approved Sediment and Erosion Control Plan and elsewhere at the discretion of the site superintendent to contain coarser sediment fractions as near as possible to their source.
2. Sediment removed from any trapping device shall be relocated where further pollution to downslope lands and waterways cannot occur.
3. Stockpiles shall be located by the Contractor in accordance with their approved Sediment and Erosion Control Plan and elsewhere at the discretion of the Project Manager and/or Superintendent. Where stockpiles are to be in place longer than 30 days they shall be stabilised by covering with mulch or with temporary vegetation.
4. Water shall be prevented from entering the permanent drainage system unless it is sediment free. Drainage pits are to be protected in accordance with the Contractor's approved Sediment and Erosion Control Plan.
5. Temporary sediment traps at pits shall be retained until after lands they are protecting are completely rehabilitated.

Site Maintenance Requirements

1. Waste bins are to be provided for all construction refuse. They are to be emptied at least weekly and refuse is to be disposed in accordance with the site manager's recommendations.
2. The site manager shall inspect the site at least weekly and shall;
 - a. Ensure that all drains are operating effectively and shall make any necessary repairs;
 - b. Remove any spilled material from area subject to runoff or concentrated flow;
 - c. Remove trapped sediment where the capacity of the trapping device falls below 60%;
 - d. Inspect the sediment basins after each rainfall event and/or weekly. Ensure that all sediment is removed once the sediment storage zone is full (refer to pegs installed in basins in accordance with the SWMP). Ensure that outlet and emergency spillway works are maintained in a fully operational condition at all times.
 - e. Ensure rehabilitated lands have effectively reduced the erosion hazard and initiate upgrading or repair as appropriate;

- f. Construct additional erosion or sediment control works as may be appropriate to ensure the protection of downslope lands and waterways;
- g. Maintain erosion and sediment control measures in a fully functioning condition at all times until the site is rehabilitated;
- h. Ensure that the revegetation scheme is adhered to and that the all grass covers are kept healthy, including watering and mowing;
- i. Remove temporary soil conservation structures as the last activity in the rehabilitation program.