12) Attachment 1

12.1 Stormwater Management Plan

GILBERT+SUTHERLAND
agriculture · water · environment

Stormwater Management Plan
Proposed Residential Development
Altitude Aspire
Terranora, NSW

Prepared for:
Metricon Qld. Pty Ltd

April, 2010

Document control

Document:	**GJ0901-1_SMP_RAG1F.doc**	Gilbert & Sutherland P/L ABN 56 077 310 840 Originating Office: Robina Eastside 5/232 Robina Town Centre Drive, Q4230 PO Box 4115, Robina Q4230 Telephone 07 5578 9944 Facsimile 07 5578 9945 robina@access.gs Also at Kawana and Brisbane
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Synopsis:	This management plan supports the Stormwater Assessment for the Altitude Aspire development. It establishes responsibilities and procedures for the management of erosion, sediment and stormwater during the construction and operational phases of this project.	

Revision History

Revision #	Date	Edition By		Approved By	
1	22/04/10	AGG		LJV	NMS
2					

Distribution

	Revision Number									
Distribution	1	2	3	4	5	6	7	8	9	10
Metricon	1									
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Summary

Metricon Qld. Pty Ltd (Metricon) commissioned Gilbert & Sutherland Pty Ltd (G&S) to prepare a Stormwater Assessment and Stormwater Management Plan (SWMP) for the proposed residential subdivision known as Altitude Aspire at Terranora Urban Release Area E, Terranora, New South Wales.

This Stormwater Management Plan provides procedures aimed at achieving site specific stormwater quality objectives during the construction and operational phases. Ideally it should be included in the contract documents for the earthworks, roadworks and drainage construction works in this project.

Table of contents

1) Stormwater management plan

1.1 Objectives and implementation

1.1.1 Objectives

The principle objective of this SWMP is to provide mitigation measures to minimise the potential impacts of the development.

Additionally, the SWMP provides information on specific site management issues relating to potential environmental impacts from the development during the construction and operational phases.

The control measures detailed in this SWMP have been developed to minimise impacts on the environment and achieve the following objectives:

- appropriate stewardship of natural resources,
- protection of downstream flora and fauna habitats,
- confirmation of the success of impact control measures by the means of monitoring during the construction of each stage,
- compliance with statutory requirements, and
- preservation of the existing groundwater conditions.

1.1.2 Implementation

The management plan requires the Proponent to mitigate the potential environmental impacts associated with the construction of the subdivision works.

It is intended that the SWMP will provide a set of performance criteria and guiding principles with which the engineering designs for the development will comply. The plans and specifications forming part of the construction contract for each stage should also include these performance criteria.

1.2 SWMP structure

This SWMP acknowledges the environmental impacts associated with the development and details strategies to mitigate them.

Each control strategy is based upon proven environmental management methods and is presented as a commitment. The commitments made within this document will form the basis of future assessments, which will be made available to the Tweed Shire Council (TSC) for review.

1.2.1 Site-specific objectives

The stormwater quality objectives and environmental management strategies detailed in this SWMP are designed to comply with relevant laws and regulations while acknowledging the specific characteristics and localised environmental context of the site. The application of relevant legislation, guidelines and standards may necessitate specific consideration of unique or unusual natural and/or human factors in the local environment. Where necessary, variations to the relevant guidelines may be sought and, where approved, included in this SWMP.

This SWMP includes tables detailing objectives and management strategies for both the construction and operational phases of the development. The party responsible for the implementation of the measures detailed is written on the table itself. The tables then detail the issue, the performance criteria, the implementation strategy, monitoring, auditing, reporting, failure identification and the corrective action. The detachable pages within each section detail the provisions of the SWMP. The format is presented below for reference purposes.

#.# Title

Person responsible	This is the person or party who has accepted the responsibility of implementing the SWMP provisions detailed on this page

Issue	The issue with which the table deals.
Operational policy	The operational policy or management objective that applies to the element.
Performance criteria	Performance criteria (outcomes) for each element of the operation.
Implementation strategy	The strategies or tasks (to nominated operational design standards) that will be implemented to achieve the performance criteria
Monitoring	The monitoring requirements which will measure actual performance (i.e. specified limits to pre-selected indicators of change).
Auditing	The auditing requirements, which will verify implementation of, agreed construction and operation phase environmental management strategies and compliance with agreed performance criteria.
Reporting	Content, timing and responsibility for reporting and auditing of monitoring results.
Identification of incident or failure	The circumstances under which the agreed performance criteria are unlikely to be met and environmental harm is likely to result.
Corrective action	The action to be implemented in case a performance requirement is not reached and the party(s) responsible for action.

Commitment #
A promise made by management.

An objective of the tabular format is to allow for change and allow the management plan to be a working document. If items need altering, changes may be made (after the appropriate consultation with the statutory authorities) to the individual tables.

1.3 General commitments

Commitment 1
The Proponents undertake to comply with the environmental implementation strategy as contained within the approved Stormwater Management Plan (SWMP).

Commitment 2
The Proponents undertake to fulfil all commitments made in this SWMP and to carry out their activities on the project site in accordance with relevant current statutory requirements and approved amendments

1.4 Compliance

Compliance with the provisions of this SWMP requires the objectives and management strategies contained herein to be both reasonable and achievable within the context of the approval(s) to which they relate. Incidents and/or failures that involve factors beyond the control of the responsible party(s) and the response and/or corrective actions taken by the responsible party(s) should be considered in assessing compliance with this SWMP.

1.5 Definitions

In this SWMP the terms have the following meanings:
SWMP means the approved Stormwater Management Plan and includes any amendments that may be approved from time to time;
Development means the development of the site for the purposes of dwelling houses and other land uses;
TSC means Tweed Shire Council;
Proponent means the person undertaking the development of the land and includes the person nominated by the Proponent as having the responsibility for implementing the provisions of the SWMP;
DECCW means New South Wales Department of Environment, Climate Change and Water.

1.6 Contact details

The following persons are responsible for the implementation of the management measures described in the individual tables of the SWMP.

Contractor's Site Manager
The name and address of the Contractor and its representative will be notified to Council by the Consulting Engineer prior to the commencement of each contract/stage of the project.

Consulting Engineer
Unless advised otherwise the Consulting Engineer is:

Company:	BradLees Consulting
Address:	Level 1, 34 Thomas Drive
	Chevron Island Q 4217
Contact Details:	Brian Lees
Phone:	55286411
Facsimile:	55286422

Environmental Consultant
Unless advised otherwise the Environmental Consultant is:

Company	Gilbert & Sutherland Pty Ltd
Address:	Eastside 5/232 Robina Town Centre Drive
	PO Box 4115
	Robina Q 4230
Contact Details:	Mr Neil Sutherland
Phone:	55789944
Facsimile:	55789945

2) Management of potential impacts – background and construction phase

The SWMP requires the Proponent to mitigate the potential environmental impacts associated with the construction of the subdivision works.

Prior to commencement of construction in any stage, detailed erosion and sediment control plans will be prepared, based on the requirements of this SWMP and the NSW Landcom, *Managing Urban Stormwater Soils and Construction*,[1] and submitted to and approved by Council.

The development should be built in stages to minimise the potential for soil erosion and water pollution. This would enable the site to be progressively rehabilitated as the development proceeds.

As soon as is practicable after the completion of the earthworks, the disturbed areas will be reseeded to establish a fast-growing cover crop which will minimise erosion and movement of sediment across and off the site. On steeper slopes and the road cuttings, it is likely that hydromulching and/or placing of hoop pine mulch will be required.

Wherever possible the site will remain grassed and otherwise undisturbed until construction commences.

Although no MUSIC modelling has been completed for the construction phase, it is evident that temporary sedimentation ponds and other sediment control measures should be installed during this phase.

Prior to commencement of earthworks in any stage, temporary sedimentation ponds should be installed. The exact number, location and size will be determined at the detailed design stage concurrently with the development of the staging plan. All runoff from disturbed areas is to be collected by means of surface drains and diverted to a sedimentation pond. Where practicable, runoff from undisturbed areas should be diverted around disturbed areas and away from the sedimentation pond. The temporary sedimentation ponds may be removed when the site has been revegetated, after completion of the bulk earthworks.

Other control measures such as (but not limited to) temporary sedimentation basins, silt fences and contour drains should be installed and maintained in accordance with recommendations contained in the NSW Landcom, *Managing Urban Stormwater Soils and Construction*.

Erosion and sediment control measures must be installed in disturbed areas during the building construction phase in accordance with the requirements of Council's *Sediment and Erosion and Control Guidelines for Builders and Developers*. These measures should be maintained until landscaping has been completed and becomes established.

The soils identified on the site are assessed as low to very low fertility soils. Nevertheless, it is considered that nutrient transport from the site during the construction phase should be minimised by implementation of appropriate control measures.

The following detachable pages detail the provisions of this SWMP for the construction phase.

[1] Landcom, 2004, 'Managing Urban Stormwater, Soils and Construction' 4th Edition, March 2004.

2.1 Construction phase dust management.

Person responsible	Contractor's Site Manager

Issue	Minimisation of movement of dust offsite.
Operational policy	To achieve acceptable air quality standards through the control of the movement of dust offsite from site works.
Performance criteria	The target level for complaints by nearby residents is no more than one in any seven day period. Ambient air quality should not deteriorate by more than 30% over a period of seven consecutive days. Dust deposition at any nearby residence should not exceed 100mg/m^2/day.
Implementation strategy	The minimisation of the movement of dust offsite will be achieved through the following onsite practices: • All permanent bunds and reshaped areas will be revegetated within 10 days after completion of earthworks (including excavation and backfilling of services trenches). • Stockpiling onsite will be minimised where possible. • An onsite water cart will be available at all times. The site will be watered daily and additional watering will be conducted during high-risk times such as high winds and low rainfall and after receipt of complaints. • All dust creating activities to cease if wind speed exceeds 10m/sec. • Contractors' staff to be trained to implement dust minimisation measures.
Monitoring	Daily inspections will be carried out to verify that dust mitigation measures are being implemented. Dust monitoring will be conducted upon receipt of complaints by residents. If dust monitoring is to take place, the following will occur: • Temporary dust deposition gauges will monitor the movement of dust offsite at the nearest residences adjacent to the proposed stages and within the predominant wind directions. • Monitoring will be undertaken in accordance with AS 3580.10.1(1991).
Auditing	Management to examine the complaints register weekly and review corrective action taken.
Reporting	• The contractor to notify DECCW of a possible environmental nuisance on receipt of 3 or more dust complaints in any 24 hour period. • Receipts will be provided to TSC upon request. • Complaints by residents are to be recorded in a Complaints Register and notified to TSC.
Identification of incident or failure	Any dust-related complaints by residents will indicate a failure of the dust control measures.
Corrective action	Locate the source of the dust and implement the following measures: • Apply water sprays to vegetation • Cover or water exposed areas • If dust persists, cease the dust creating activities. All dust complaints to be addressed in consultation with council officers.

Commitment 3
Dust generated during the construction of the subdivision works will be managed to ensure that dust movement offsite is controlled.

2.2 Construction phase sediment and erosion controls

Person responsible	Contractor's Site Manager, Consulting Engineer

Issue	Sediment and Erosion Controls.
Operational policy	To prevent the displacement of sediment and soil across and offsite.
Performance criteria	Offsite discharges to comply with requirements for suspended sediments as detailed in Section 2.5 of the SWMP. No visual indication of erosion on stages under construction, including evidence of rilling (an indicator of sheet erosion).
Implementation strategy	• Detailed erosion and sediment control plans shall be prepared in accordance with the provisions outlined in Annexure A of Tweed Shire Council's Development Design Specification D7 Stormwater Quality. These plans shall be submitted to and approved by TSC Prior to commencement of construction in any stage. • Erosion and sediment control devices shall be installed prior to commencement of work in each stage in accordance with the approved plans and to the reasonable satisfaction of TSC. • Temporary erosion measures (eg. silt fences) are to be employed onsite during construction where reasonably deemed necessary by TSC from an assessment of slope and soil type. Such measures should be in accordance with the recommendations in the NSW Landcom, *Managing Urban Stormwater Soils and Construction*. • Stockpiled soil should be stored/bunded in a manner to prevent soil being washed offsite (i.e. bunding where necessary.) • Outside the construction area of each stage existing surface water conditions should be maintained wherever possible.
Monitoring	• Carry out visual inspections weekly and after rainfall events to ensure that erosion measures are in place and operational to suit the activities taking place at the time. • Surface water quality to be monitored monthly (refer to the Section titled 'Surface Water Monitoring' which details monitoring of surface water and stormwater quality).
Auditing	Visual inspections to be carried out monthly and after rainfall events to verify that control measures are in place and properly maintained.
Reporting	Reporting only required if insufficient sediment and erosion measures are identified.
Identification of incident or failure	• Signs of erosion on site. • Damaged or failed erosion control devices. • Falling stormwater quality as identified by Environmental Contractor. • Build-up of sediment.
Corrective action	Apply remedial measures to improve sediment and erosion measures, for example: silt fences, shake down areas.

Commitment 4
Best management practices will be implemented into work practices throughout the construction of the subdivision works to minimise erosion and sediment transport offsite.

2.3 Construction phase surface water monitoring on site

Person responsible	Contractor's Site Manager, Environmental Consultant

Issue	Surface water controls on site – temporary sedimentation ponds.
Operational policy	To maintain stormwater quality conditions of runoff during the construction phase.
Performance criteria	All water discharged from the site during the construction phase should comply with the following criteria:

Water Quality Parameter	Release Criteria	Criteria Type
pH	>5.0	Minimum
Turbidity	50NTU	Maximum

Implementation strategy	• Stormwater control should be achieved by directing as much runoff as practicable from disturbed areas to temporary sedimentation ponds. 'Clean' runoff from undisturbed areas should be diverted around disturbed areas if possible. • All samples must be analysed at a NATA registered laboratory for the indicators listed in 'Monitoring' below.
Monitoring	• Surface water monitoring during construction should be conducted in all temporary sedimentation basins for the parameters listed above. Flow rates are to be estimated and recorded at the time of sampling. • Sampling frequency is to be monthly and during the first rainfall event (>25mm in any 24hr period) each month. • Daily visual surveillance of water bodies for changes in conditions.
Auditing	The Consulting Engineer to audit stormwater quality results to verify that all discharges comply with the performance criteria above.
Reporting	• Result sheets to be compiled for monitoring results. All results to be kept on site for inspection by local and state government officers at all times. • Monthly reports to TSC including raw data, a results summary and a discussion comparing results with baseline values and ANZECC guidelines.
Identification of incident or failure	• Degradation of surface water quality (i.e. Suspended Solids) at the monitoring points to below the levels specified in 'Performance Criteria' above prior to discharge. • Visible changes in water body conditions.
Corrective action	• If the test result for any parameter fails to meet the performance criteria, then weekly monitoring shall commence and continue until the recorded value/s meet the performance criteria. • If a pH is detected outside the criteria range, then such waters should be contained, and the pH adjusted to within the range of 6.5 to 9.0 prior to release. • If total suspended solids exceed the water quality criteria for this parameter, then water may need to be contained on site for a

[redacted]	period sufficient to allow suspended solids to settle out prior to release, or settling should be aided by dosing with flocculation agents at the rate recommended by the manufacturer (for example Gypsum at dose rate of 30kg/100m^3). • Erosion control devices should be immediately inspected and cleaned if necessary. • Additional devices should be installed if a need is detected to prevent future breaches of the suspended solids criteria. The placement of stockpiles and management of disturbed areas should be reviewed with regard to sediment and silt control.

Commitment 5

The Proponent will take all reasonable steps to ensure that all waters discharged from the site meet the performance criteria set out above.

2.4 Construction phase surface water monitoring – permanent treatment measures

Person responsible	Contractor's Site Manager, Consulting Engineer, Environmental Consultant

Issue	Surface water controls, permanent treatment measures.
Operational policy	To maintain water quality condition of receiving waters during the construction phase.
Performance criteria	All water discharged from the site during the construction phase should comply with the following criteria:

Water Quality Parameter	Release Criteria+	Criteria type
pH	>5.0	Minimum
Suspended Solids	<50mg/L	Maximum
Dissolved Oxygen (field measured)	>80% saturation	Minimum
Total N	<0.50mg/L	Maximum
Total P	<0.20mg/L	Maximum
Salinity	<5g/L	Maximum
Oil and Grease	None visible	Maximum

These performance criteria may be adjusted upon submission of suitable background data and calculation of revised site specific objectives derived in accordance with ANZECC guidelines. Any amendment to the performance criteria must receive written approval by TSC prior to alteration of the approved SWMP.

Implementation strategy	• Surface water samples to be collected during the first rainfall event (>25mm in 24 hours) each month from the monitoring points and analysed at a NATA registered laboratory. • Monitoring results should be reviewed after 6 months and sampling frequency revised in consultation with Council Officers. • Stormwater control should be achieved by directing as much runoff as practicable from disturbed areas to the temporary control measures. 'Clean' runoff from undisturbed areas should be diverted around disturbed areas if possible.
Monitoring	• Surface water monitoring during construction should be conducted at the monitoring points for the parameters shown above. Flow rates are to be estimated and recorded at the time of sampling. • Sampling frequency is to be after the first rainfall event (>25mm in 24hours) each month. • Daily visual surveillance of water bodies for changes in conditions.
Auditing	The consulting engineer to audit stormwater quality results to verify all discharges comply with the performance criteria.

Reporting	Results sheets to be compiled for monitoring results relating to water quality of water bodies. All results to be kept on site for inspection by local and state government officers at all times. Monthly reports to TSC including raw data, a results summary and a discussion comparing results with baseline values and ANZECC guidelines.
Identification of incident or failure	Degradation of surface water quality at the monitoring points to below the levels specified in 'Performance Criteria' above prior to discharge. Apparent visual changes in water body conditions.
Corrective action	Locate the source of the contaminant. Take all possible actions to contain and control the contaminant. Investigate the cause of the contamination and take action to prevent a recurrence. If the test result for any parameter fails to meet the performance criteria, then weekly monitoring shall commence and continue until the recorded value/s meets the performance criteria. For example: • If total suspended solids exceed the stormwater quality criteria for this parameter, then water may need to be contained on site for a period sufficient to allow suspended solids to settle out prior to release, or settling shall be aided by dosing with flocculation agents at the rate recommended by the manufacturer. Erosion control devices should be immediately inspected and cleaned if necessary. Additional devices should be installed if a need is detected to prevent future breaches of the suspended solids criteria. The placement of stockpiles and management of disturbed areas should be reviewed with regard to sediment and silt control. • If Total N levels are high, check upstream stormwater quality. Check fertiliser application rates on landscaping work on site and adjust as required. • If Total P levels are high, check effluent disposal practices upstream. Check fertiliser rates on landscaping work on site and adjust as required. • If Oil and Grease levels are high, locate the source of the contamination and clean up source and contaminated waters in consultation with Council officers.

Commitment 6

Surface water quality should be maintained during the construction of the subdivision works in accordance with the criteria detailed above.

2.5 Construction phase contractor management

Person responsible	Consulting Engineer

Issue	Contractor management.
Operational policy	To ensure the proponent's duty of care is met by ensuring the Contractor is aware of his responsibilities under the terms of the SWMP and the DECCW.
Performance criteria	Contractor is fully aware of their responsibilities under the terms of the SWMP.
Implementation strategy	• Review of the SWMP and the construction phase contracts by the proponent. • Periodic checks to be made by an independent Environmental Consultant. • Training for construction staff in implementation of SWMP provisions.
Monitoring	Weekly site inspections to be carried out.
Auditing	Inspections will be carried out monthly during the construction phase by an Environmental Consultant for every stage of development.
Reporting	Full details to be available to the contractor together with suggested corrective actions if required.
Corrective action	To be detailed at the time.

Commitment 7

A proactive program of contractor management will be implemented.

3) Management of potential impacts – on maintenance phase

3.1 Intent

This part of the SWMP specifies those matters which must be complied with by the Proponent during the 6 months 'on-maintenance period', being the period after construction but before Tweed Shire Council assumes responsibility for the subdivision works. The Proponents' obligations in this Section of the SWMP conclude at the end of the maintenance period for each stage.

3.2 Implementation

At the completion of the construction of the development's civil works, the GPT's (if any have been installed) should be cleaned out to become part of the permanent stormwater quality control treatment train.

3.3 On maintenance phase sediment and erosion controls

Person responsible	Contractor's site manager, consulting engineer

Issue	Sediment and erosion controls.
Operational policy	To prevent the displacement of sediment and soil across and offsite.
Performance criteria	Offsite discharges to comply with requirements for suspended sediments as detailed in Section 3.4 of the SWMP.
Implementation strategy	Temporary erosion and sediment control devices shall be maintained in an operational state during the maintenance period.
Monitoring	• Temporary erosion control measures are to be inspected monthly and after rainfall events. • Permanent stormwater quality control structures (GPT's, basins etc.) are to be inspected monthly and after rainfall events.
Auditing	Quarterly inspections to be carried out by an independent Environmental Consultant.
Reporting	Reporting only required in the event of failure of the sediment and erosion control measures.
Identification of incident or failure	• Signs of erosion on site • Build up of sediment • Falling stormwater quality
Corrective action	Repair temporary sediment and erosion control measures. Check permanent measures for build up of sediment and clean out as necessary.

Commitment 8

Erosion and sediment control devices will be maintained during the on-maintenance period until the risk of soil erosion and sediment transport is considered negligible.

3.4 On maintenance phase surface water monitoring

<table>
<tr><td>Person responsible</td><td>Contractor's Site Manager, Environmental Consultant.</td></tr>
<tr><td>Issue</td><td>Surface water monitoring in new permanent water bodies.</td></tr>
<tr><td>Operational policy</td><td>To establish stable surface water conditions and verify that development management is appropriate.</td></tr>
<tr><td>Performance criteria</td><td>All water discharged from the site should comply with the following criteria:
<table>
<tr><th>Water Quality Parameter</th><th>Release Criteria+</th><th>Criteria type</th></tr>
<tr><td>pH</td><td>>5.0</td><td>Range</td></tr>
<tr><td>Suspended Solids</td><td><50mg/L</td><td>Maximum</td></tr>
<tr><td>Dissolved Oxygen (field measured)</td><td>>80% saturation</td><td>Minimum</td></tr>
<tr><td>Total N</td><td><0.50mg/L</td><td>Maximum</td></tr>
<tr><td>Total P</td><td><0.20mg/L</td><td>Maximum</td></tr>
<tr><td>Salinity</td><td><5g/L</td><td>Maximum</td></tr>
<tr><td>Oil and Grease</td><td>None visible</td><td>Maximum</td></tr>
</table>
These performance criteria may be adjusted upon submission of suitable background data and calculation of revised site specific objectives derived in accordance with ANZECC guidelines. Any amendment to the performance criteria must receive written approval by TSC prior to alteration of the approved SWMP.</td></tr>
<tr><td>Implementation strategy</td><td>• Surface water entering and exiting the development shall be monitored at the environmental monitoring points during the 'On-maintenance' period.
• Surface water monitoring shall be undertaken at the discharge points from the development stages until stable water quality criteria have been established.
• Monitoring will also be undertaken during flood events where practicable. This monitoring will allow water quality comparisons to be made.</td></tr>
<tr><td>Monitoring</td><td>• Surface water monitoring for all parameters will be conducted monthly at all monitoring points.
• To revert to construction phase provisions if problems are identified.
• If problems are identified, laboratory analysis at a NATA registered laboratory for the parameters listed above until such a time as TSC is satisfied that the Proponent's duty of care under the DECCW has been discharged.
• These provisions will conclude at the end of the 'on maintenance' period.</td></tr>
<tr><td>Auditing</td><td>The Proponent to audit water quality results quarterly to verify that discharges comply with the performance criteria.</td></tr>
</table>

Reporting of monitoring results	• Monitoring test results are to be compiled on monthly result sheets. Monthly reports containing raw data and an interpolation sheet to be sent to TSC. • Results to be available at all times.
Identification of incident or failure	Fall in surface water quality at the environmental monitoring points.
Corrective action	• Identify reason for deterioration in surface water quality to identify if it is linked to the development. • Take necessary steps to address the problem such as improved temporary sediment and erosion controls.

Commitment 9

Subdivision works will be maintained during the maintenance period to ensure surface water quality complies with the water quality criteria detailed above.

3.5 On maintenance phase maintenance

Person responsible	Contractor's Site Manager, Consulting Engineer.

Issue	Maintenance
Operational policy	To maintain the stormwater quality control structures to ensure adequate performance during the maintenance period.
Performance criteria	The control measures are maintained and operational.
Implementation strategy	Ensure inlets and outlets are not blocked and are structurally stable. All waste to be disposed of at council approved waste facilities.
Monitoring	• Monthly inspection of control structures during the maintenance period. • Any recurring problems with the control structures to be rectified during the maintenance period. • Structures also to be inspected following major rainfall events.
Auditing	The Proponent to carry out quarterly inspections to verify that the stormwater quality control structures are properly maintained by the contractor.
Reporting of monitoring results	• Record inspection details. • Record details of all maintenance activities (including volume of silt removed from each GPT or other control structure) and include in monthly reports to TSC. • Results to be available to DECCW at all times.
Identification of incident or failure	• Blockage of stormwater system. • Re-entrainment of trapped sediments. • Deterioration of water quality within or downstream of control structure.
Corrective action	• Clean or maintain stormwater control structure as appropriate. • Take necessary steps to address the problem to prevent a recurrence.

Commitment 10

Stormwater quality control structures will be adequately maintained during the maintenance period to ensure continued performance.

4) Management of potential impacts – operational phase

4.1 Intent

This part of the SWMP specifies those matters that must be complied with by TSC after it assumes responsibility for the subdivision works.

4.2 Implementation

Permanent stormwater quality control structures are to be monitored and maintained as detailed in the following tables.

4.3 Operational phase surface water monitoring

Person responsible	Tweed Shire Council

Issue	Surface water monitoring.
Operational policy	To verify that stable surface water conditions are maintained.
Performance criteria	All water discharged from the site should comply with the following criteria: **Water Quality Parameter / Release Criteria / Criteria type** pH — >5.0 — Range Suspended Solids — <50mg/L — Maximum Dissolved Oxygen (field measured) — >80% saturation — Minimum Total N — <0.50mg/L — Maximum Total P — <0.20mg/L — Maximum Salinity — <5g/L — Maximum Oil and Grease — None visible — Maximum These performance criteria may be adjusted upon submission of suitable background data and calculation of revised site specific objectives derived in accordance with ANZECC guidelines. Any amendment to the performance criteria must receive written approval by TSC prior to alteration of the approved SWMP.
Implementation strategy	• Surface water entering and exiting the development shall be monitored at the environmental monitoring points during the operational phase of the development. • Monitoring will also be undertaken during flood events where practicable. This monitoring will allow water quality comparisons to be made.
Monitoring	• Surface water monitoring will be conducted for all parameters quarterly for 12 months then half yearly. • To revert to construction phase provisions if problems are identified. • If problems are identified, laboratory analysis at a NATA registered laboratory for Suspended Solids, Total N, and Total P until such a time as TSC determines the cause of the problem and rectifies it.
Auditing	Council to audit water quality results quarterly to verify that discharges comply with the performance criteria.
Reporting of monitoring results	• Monitoring test results are to be compiled annually. Annual reports containing raw data and an interpretation to be made available to all persons on request. • Results to be available at all times.
Identification of incident or failure	Fall in surface water quality at the environmental monitoring points.
Corrective action	• Identify reason for deterioration in surface water quality to identify if it is linked to the development and/or the treatment structures. • Take necessary steps to address the problem such as a public education program regarding fertilisers and other nutrients.

4.4 Operational phase maintenance of treatment measures

Person responsible	Tweed Shire Council

Issue	Operation and maintenance of the treatment measures.
Operational policy	To maintain the stormwater quality control structures to ensure adequate performance during the operational period.
Performance criteria	The control measures are maintained and operational. Pollutant concentration of stormwater released from the treatment system to satisfy the quality criteria set out in Section 4.3.
Implementation strategy	• Ensure inlets and outlets are not blocked. • Ensure that sediment accumulation does not impair operation of GPT.
Monitoring	• Water sampling to be carried out according to Section 4.3. • If elevated levels are found for any parameter, commence weekly sampling and testing for the parameter concerned and if possible examine the composition/constituents of the pollutant. • Establish complaints register and record details of complaints. • Inspect control structures after rainfall events. These inspections are to be recorded.
Auditing	TSC to carry out quarterly inspections to verify that monitoring has been carried out and that action has been implemented if required to correct any shortcomings.
Reporting of monitoring results	• Monthly reports to TSC. • Record details of all maintenance activities. • Results to be available to DECCW at all times.
Identification of incident or failure	Water quality of outflow fails to meet the release criteria. Complaints from residents about odours or increased mosquito numbers.
Corrective action	Clean or maintain stormwater control structure as appropriate.

5) Administration of the SWMP

5.1 Amendment of the SWMP

The proponent may make application to TSC to amend the provisions of this SWMP. The application shall:

a. be in writing;
b. specify the provisions of the SWMP to which the application relates; and
c. state how the proposed amendment(s) achieve the objectives of the provisions to which the amendment(s) relate.

TSC shall approve the amendment(s) where TSC is satisfied acting reasonably that the proposed amendment(s) achieve the objective of the provisions to which the amendment(s) relates.

5.2 Incident management

The Proponent and any person appointed by the Proponent as having responsibility for a control strategy set out in this SWMP have clearly defined responsibilities under the Environmental Planning and Assessment Act 1979 to report any incidents likely to cause material or serious environmental harm.