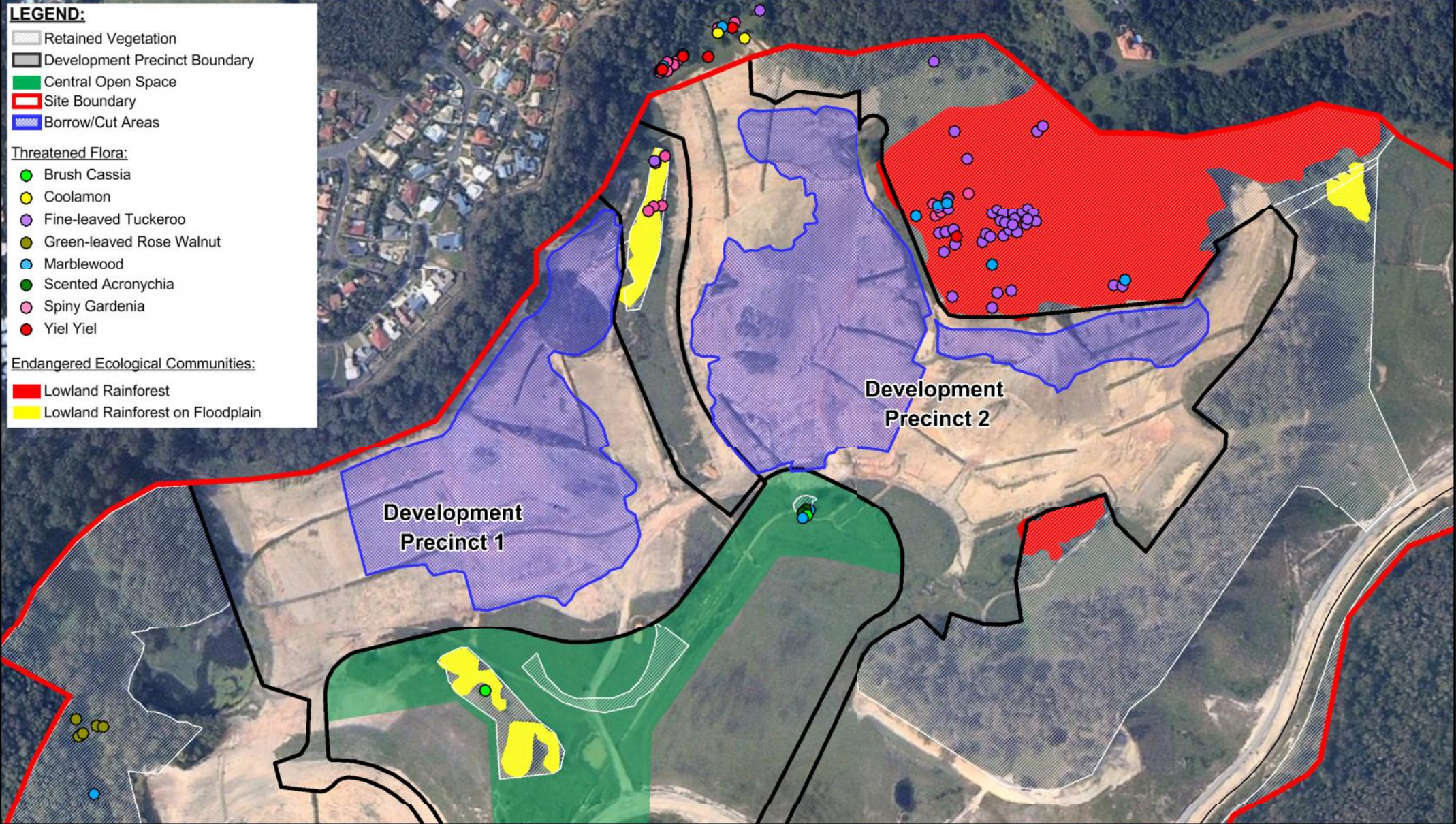


Figure 4: Threatened Flora Records and Endangered Ecological Communities



COORDINATE SYSTEM
GDA 1994 MGA Zone 56

0 200 400m
Scale: 1 : 6,000 @ A4

FIGURE 4 - Flora & EECs

REVISION 0

STATUS FINAL

CREATED BY AM11482

DATE 29/01/2013

ISSUED FOR INFORMATION



PROJECT NO. 3003773 **PROJECT TITLE** Cobaki Estate Management Plans

SOURCE
The State of Queensland (Department of Environment and Resource Management), Copyright 2010
Aerial Imagery from Nearmap Hypertiles, copyright 2011

CLIENT
LEDA MANORSTEAD
PTY LTD

CONSULTANT SMEC Australia
Copyright SMEC Australia Pty Ltd. All Rights Reserved.

3.2.2 Endangered Ecological Communities (EEC's)

Two (2) Endangered Ecological Communities (EEC) listed under Schedule 1 of the TSC Act have been recorded adjacent to precincts 1 and 2: Lowland rainforest and Lowland rainforest on floodplain.

The location of these Endangered Ecological Communities is shown in Figure 4.

Lowland Rainforest

This EEC occurs on Mt. Woodgee and associated slopes in the northern portion of the site and covers a total area of approximately 9.24 hectares. Vegetation of this type on Mt. Woodgee is relatively intact and is considered to represent one of the most ecologically significant vegetation communities on the site, particularly in terms of habitat value for existing Threatened flora species.

Precincts 1 and 2 borrow area bulk earthworks will not involve the removal of any Lowland Rainforest. Further, the Lowland Rainforest community adjacent to the borrow areas within precinct 2 is at a higher elevation than the Precinct, and as such any runoff from the proposed works will not impact on this community. The proposed works are highly unlikely to result in any impacts on this endangered ecological community.

Lowland Rainforest on Floodplain

This vegetation type generally occurs in association with drainage lines and depressions (i.e. riparian forest). A 0.49-hectare patch of Lowland Rainforest on Floodplain is located within a Rehabilitation and Management Area east of precinct 1 (Figure 4). The conservation significance of this vegetation type on the site has been compromised by historical clearing activities and ongoing grazing activities resulting in fragmentation and degradation, especially within the isolated patches and edges of more extensive areas.

Precincts 1 and 2 borrow area bulk earthworks will not involve the removal of any Lowland Rainforest on Floodplain. Potential impacts would be limited to runoff due to poorly managed sediment erosion control around the adjacent bulk earthworks borrow areas. However, with implementation of the actions contained within the environmental management and rehabilitation plans proposed for the area, the likelihood of significant impact on adjacent native vegetation is considered low.

3.3 Impacts on Groundwater

A Groundwater Management Plan (Appendix B) was prepared by SMEC (May, 2012) which the wider site but inclusive of Precincts 1 and 2 and whilst identifying some potential impacts the likelihood of these occurring is considered very low. Potential impacts to groundwater as a result of the proposed works may include:

- Impacts on the pre-development groundwater flow regimes as a result of excavation
- Impacts on groundwater quality as a result of chemical/oil spills during works
- Excavation causes soil disturbance, which can alter the permeability of the subsurface and the groundwater recharge regime. Reduction in the depth to groundwater may shorten the

pathway to the watertable for any surface contaminants, making the groundwater system more vulnerable to pollution.

However, based on bulk earthworks drawings (Appendix A) and groundwater contours derived for the site (Appendix B), no interception of groundwater is anticipated within the bulk earthworks borrow areas. Therefore, no significant impact on groundwater is likely.

The cut and fill extents are summarised in the plans in Appendix A.

3.3.1 Disturbance of Acid Sulfate Soils

An Acid Sulfate Soils Investigation of Precincts 1 and 2 was undertaken by SMEC (April, 2012). The fieldwork undertaken as part of the ASS investigation indicated that the surface soils exposed and the subsurface soils encountered in the borrow area, were residual soils developed from the weathering of the insitu underlying Metasediments and not alluvial soils that had been deposited in a fluvial or estuarine environment. Refer to Appendix C for Geotechnical logs within the Borrow Areas.

As a consequence of the presence of this soil type in Precincts 1 and 2 there is little or no likelihood of ASS being present. In the unlikely event of ASS being encountered management procedures have been proposed. These management procedures in regards to ASS are contained within the Acid Sulfate Soils Investigation (SMEC, 2012) and Section 4.4.

3.3.2 Contamination

Based on previous investigations, no contaminated areas have been identified within Precinct 1 and 2 and the risk from contaminating activities in these areas is considered very low.

A preliminary Contamination Assessment was undertaken by Gilbert and Sutherland, Environmental Scientists in May 2008 (Appendix D). That Assessment was in association with the Concept Plan Application and was in relation to the entire Cobaki Estate. The preliminary assessment identified several potentially contaminating activities within the site including:

- An abandoned cattle dip that has been capped and has an approved (by Tweed Shire Council) Remediation Action Plan.
- Cattle yards, crush, spray race, sump and pumping station.
- Farm sheds used for miscellaneous machinery, grease, oil and fuel storage.
- Asbestos building products and lead-based paints associated with the construction and maintenance of an on-site residential dwelling.
- Site construction (quarry) office and compound area containing workshops, miscellaneous grease and oil storage, workers' amenity hut and related infrastructure.
- On site effluent treatment systems associated with dwellings.

The report further states:

“The extent and types of contaminating activities identified on site suggest that further investigation is warranted and that the resultant remediation plans would manage the contamination to make the

site suitable for residential development. It is recommended that a Stage 2 (Detailed) Site Contamination Assessment would be required to allow the formulation of a remediation action plan(s) and implement appropriate management measures to ensure the site is rendered suitable for its intended purposes. The preliminary assessment indicates that areas requiring Stage 2 investigation are localised and the contamination that may be present on site poses no impediment to the development of the Cobaki Lakes concept plan.” (Gilbert and Sutherland, 2008).

The areas identified where the potentially contaminating activities have been undertaken within Cobaki are well documented and are not within the immediate locality of the land within Precincts 1 and 2. Condition C18 of the Concept Plan Approval only requires a “Stage 2” (detailed) Contamination Assessment for Precincts 10 and 17.

In summary the land within Precincts 1 and 2 where excavation is proposed is unlikely to be contaminated.

3.3.3 Dewatering

No dewatering is planned as part of the proposed bulk earthworks.

A Groundwater Management Plan (Appendix B) was undertaken for Precincts 1 and 2 by SMEC (May, 2012). Based on earthworks drawings (Appendix A) and groundwater contours derived for the site (Appendix B), excavation activities may intercept groundwater at the north-south swale adjacent to proposed Road No. 10 – cutting along length of swale to RLs between 2.617 and 3.836 m AHD. However, this swale is not part of the bulk earthworks borrow areas, and will not be impacted by the currently proposed works.

3.4 Noise and Vibration

Construction activities may produce some level of noise emissions causing disturbance to local residents and other land users.

Due to the nature of construction work, noise levels will vary and are dependent on:

- the location and proximity of plant equipment to each other and to sensitive receptors; and
- the type of work being undertaken at any given time and whether work involves all machinery operating at the maximum sound power levels.

The nearest sensitive receptors to the proposed works are residences on Ajax Court and Sawtell Drive, Currumbin Waters. These residences are approximately 100m north of precinct 2, buffered by vegetation and ridgeline. Mitigation Measures for noise and vibration are outlined in section 4.6.

3.5 Air Quality

Dust issues may result from construction activities. Key impacts could include release of pollutants, greenhouse gas emissions, odour emissions, and temporary reduction in amenity. Mitigation Measures for air quality management are outlined in section 4.7.

3.6 Fuel and Chemical Storage

Storage of fuels, chemicals, cleaning products, solvents, oil and other lubricants may be required on site during construction. Impacts associated with fuel and chemical storage include contamination of soil and water, safety hazards to personnel and the public, and odour/air emissions. However, on site fuel storage will be restricted to the appropriate areas at the site compound, and will not impact on precincts 1 and 2.

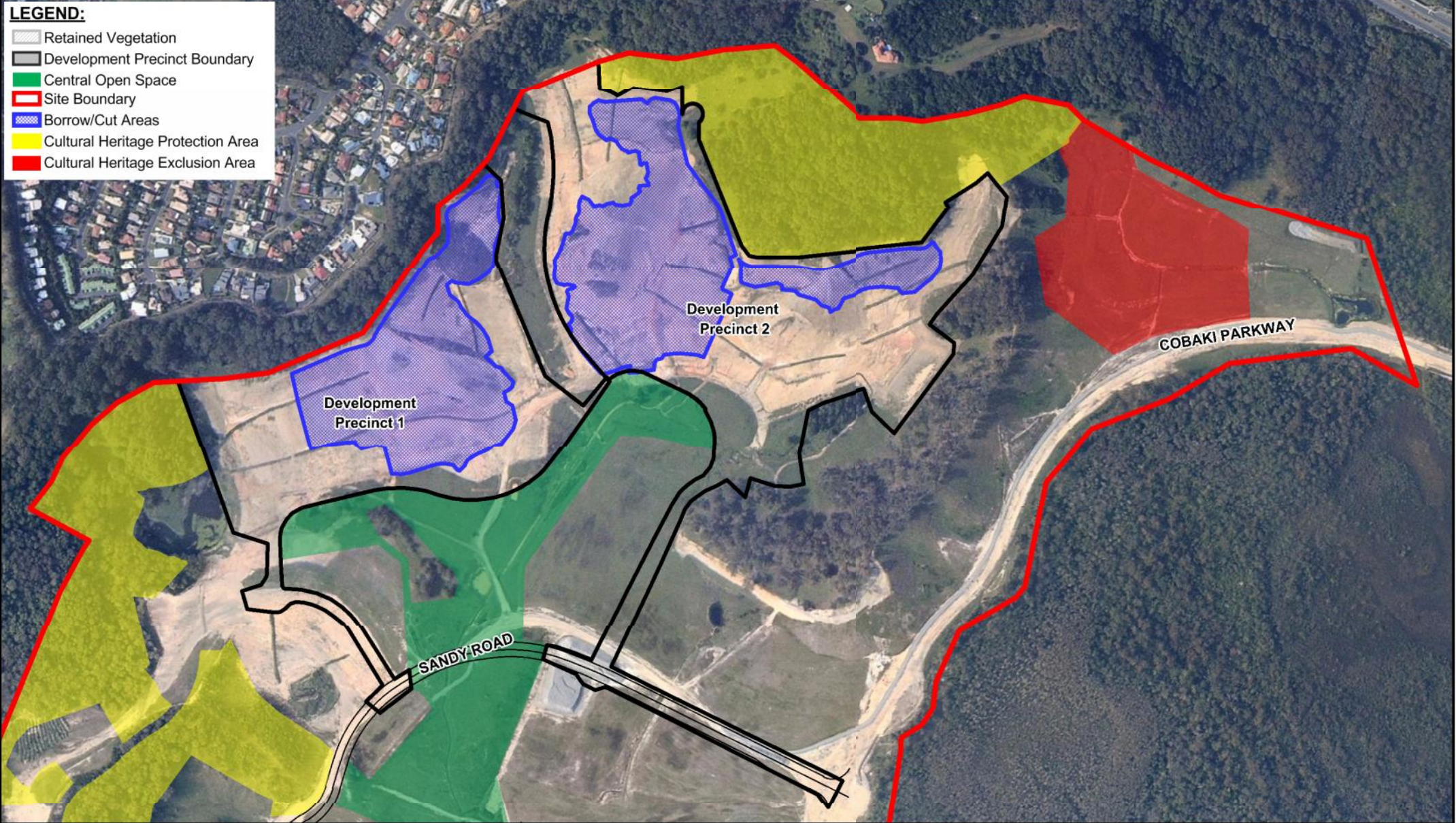
3.7 Cultural Heritage

A Cultural Heritage Management Plan (CHMP, Appendix E) has been prepared for the site (Everick, 2010). This CHMP has been approved by the Department of Planning under Part 3A of the Environmental Planning and Assessment Act 1979 (NSW).

Under the terms of the approved CHMP, no specific cultural heritage impact mitigation works are required in Precincts 1 and 2. These are all within highly disturbed areas, and the likelihood of construction works impacting on Aboriginal objects is considered low.

Precincts 1 and 2 are immediately adjacent to Cultural Heritage Protection Areas (Figure 5). These areas are zoned as Environmental Protection Areas within the Development Concept Plan and will be managed as per Section 4.1 and 4.2 of this plan. No earthworks are to occur within the Cultural Heritage Protection Areas.

Figure 5: Cultural Heritage



COORDINATE SYSTEM GDA 1994 MGA Zone 56 0 200 400m Scale: 1 : 8,000 @ A4	FIGURE 5 - Cultural Heritage CREATED BY AM11482 SOURCE The State of Queensland (Department of Environment and Resource Management), Copyright 2010 Aerial Imagery from Nearmap Hypertiles, copyright 2011	REVISION 0 DATE 24/04/2013 STATUS FINAL ISSUED FOR INFORMATION	CLIENT LEDA MANORSTEAD PTY LTD CONSULTANT SMEC Australia Copyright SMEC Australia Pty Ltd. All Rights Reserved.
PROJECT NO. 3003773 PROJECT TITLE Cobaki Estate Management Plans	FIGURE 5 - Cultural Heritage		

4 ENVIRONMENTAL MANAGEMENT ACTIVITIES AND CONTROLS

A number of environmental management plans including a detailed construction environmental management plan (CEMP) have been prepared for the construction phase of the project. Each environmental management plan contains mitigation measures relevant to the pre-construction and construction stages of the project. The mitigation measures relevant to the proposed bulk earthworks within precincts 1 and 2 are detailed below.

4.1 Fauna Management

Table 4: Fauna Management Procedures relevant to Precincts 1 and 2

Mitigation Measure	Responsibility	Construction Phase		
		Prior	During	Post
Parawebbing around vegetation protection areas, as per Appendix F – Earthworks Fencing Plan.	Environmental Officer	X		
Installation of cattle fencing as per the Earthworks Fencing Plan (Appendix F)	Construction Manager/Site Superintendent Sign off: Environmental officer	X		
If contractors are to utilise Boyd Street overpass for site entry, installation of signage at the site entry and along Cobaki Parkway to notify staff, particularly plant operators, of the possible occurrence of potoroo.	Construction Manager/Site Superintendent Sign off: Environmental officer	X		
Site-specific threatened species inductions for all site staff. Induction will cover issues relating to threatened species, designated and restricted areas of access and waste disposal	Environmental Officer	X		
Ongoing education of site staff through 'toolbox talks', ensuring important information relating to the protection of fauna are reiterated regularly. To be signed off by all attendees.	Environmental Officer		X	
Fencing inspections	Environmental Officer/ Site Superintendent		X	
Post-earthworks report to Tweed Shire Council	Environmental Officer		X	
Weekly inspection of construction site/works (Weekly Construction Checklist – Appendix G)	Environmental Officer		X	

Inspection to ensure that operations are leaving the site free draining with no ponding of stormwater.	Environmental Officer		X	
Maintenance of protection fencing and monitoring to ensure that non permitted activities do not occur within protected areas	Environmental Officer		X	
Monitoring compliance with the <i>Companion Animals Act 1998</i> (That no unrestrained dogs are allowed on site during construction)	Environmental Officer		X	
Contact details for the ecologist/fauna specialist, Wildlife Relocation and Management Services (07 5590 4301) and the Local Veterinary Hospital (Billinudgel: 02 6680 3480) must be kept at all times in the site offices and with the on-site Environmental Officer.	Environmental Officer	X	X	
Notification of any additional threatened species identified to DECCW (NPWS)	Environmental Officer	X	X	
No works within 100m of the raptor nests (subject to confirmation of usage)	Project Manager/ Environmental Officer		X	

Earthworks Report

A post-earthworks report will be prepared, detailing:

- Information on earthworks operations, dates, procedures, areas
- Detailed information about any incursion into no-go zones.
- Detailed information regarding any fauna mortality or injury.
- Assessment against the performance criteria detailed in Section 9 of the FMP (SMEC, 2012).
- Recommended remediation measures for any incursions into no-go zones.

Final reports will be submitted to TSC at the completion of Earthworks.

4.2 Vegetation Management

Table 5: Mitigation Measures for Vegetation Management

Mitigation Measure	Responsibility	Prior to Construction	During Construction
Pre-clearing survey of habitat trees, including flagging and GPS recording	Fauna Spotter Catcher	X	
Parawebbing/exclusion fencing installation around vegetation protection areas/ threatened flora species as per Earthworks Fencing Plan (Appendix F)	Site Superintendent Sign off: Environmental officer	X	
Installation of cattle fencing as per Stage 1 Earthworks Fencing Plan (Appendix F)	Site Superintendent Sign off: Environmental officer	X	
Primary weed control within rehabilitation and management areas at commencement of earthworks in adjacent Development Precincts	Rehabilitation contractor	X	
Installation of erosion and sediment controls to protect vegetation protection areas	Site Superintendent Sign off: Environmental Officer	X	X
Maintenance of protection fencing	Environmental Officer/ Site Superintendent		X
Fencing inspections	Environmental Officer and Site Superintendent	X	X
Notification of additional threatened species to DECCW (NPWS)	Environmental Officer	X	X
Ongoing education of site staff through 'toolbox talks', ensuring important information relating to vegetation protection are reiterated regularly. To be signed off by all attendees.	Environmental Officer and Site Superintendent	X	X
Completion of the weekly construction checklist (Appendix G)	Environmental Officer		X
Post-earthworks report to Tweed Shire Council	Environmental Officer		X
Inspection for weed species on a six monthly basis	Environmental Officer		X
Monitoring of stockpiled materials to ensure weed infested topsoil is stockpiled separately	Environmental Officer		X

4.3 Groundwater Management

Table 6: Measures for Groundwater Management

Mitigation Measure	Responsibility	Prior to Construction	During construction
Erosion and Sediment Control measures will be implemented and maintained during construction and operation in accordance with the approved Stormwater Management Plan and Erosion and Sediment Control Plan (Yeats, 2012).	Environmental Officer to authorise	X	X
Any unidentified or accidental potential contamination encountered during construction will be documented, investigated by a specialist and remedial action applied before works continue in that area.	Construction Manager / Environmental Officer		X
Vehicles and machinery shall be maintained appropriately with no leaks.	Environmental Officer		X
Fill material shall be certified free from contaminants.	Environmental Officer		X
If required, mechanical dewatering of excavations shall be of short duration (hours/days) to minimise any alteration to natural groundwater regime	Site Superintendent / Environmental Officer		X
Works timed to avoid periods of high rainfall	Construction Manager		X
Possible re-use of water of suitable quality for dust suppression	Construction Manager / Site Superintendent		X
Discharge of water of suitable quality into constructed surface water bodies or local waterways	Construction Manager		X
Treatment or disposal of groundwater that exceeds water quality criteria, e.g.: - treatment of turbid water in settlement basins - application of lime to acidic water	Construction Manager / Environmental Officer		X
Containment of polluted water until appropriate collection and disposal to licensed facilities	Construction Manager / Environmental Officer		X
The Groundwater Monitoring Program (detailed in the GMP) shall be complied with.	Environmental Officer	X	X

Reporting;

The following documents shall be collected, maintained in the project files and made available for review by authorities if requested:

- Groundwater monitoring field sheets containing water level and field parameter data, and sampling, weather and well condition information
- Water quality meter calibration records

- Laboratory reports
- Up-to date data tables and figures (survey data, water level tables and contour figures, field parameter and laboratory analysis summary tables, etc)
- Corrective action notices
- Approvals/licenses for works, where required
- External consultants/contractor reports
- Contaminated water transport and disposal records

A monthly report collating and detailing all monitoring results, comparison to performance criteria and management/treatment procedures is to be prepared for TSC and the OEH. A copy will be maintained in the project file.

4.4 Acid Sulphate Soils Management

Table 7: Mitigation Measures for Acid Sulfate Soils

Mitigation Measure	Responsibility	Prior to Construction	During Construction
No ASS and/or PASS shall be stockpiled in overland flow areas.	Site Superintendent / Environmental Officer		X
All stockpiles should have bunded drains surrounding them to allow collection, containment and treatment of surface runoff from the stockpile.	Site Superintendent / Environmental Officer		X
The base of all areas used for stockpiling/ treatment areas and all surrounding bunds and drains shall be treated with a minimum guard layer of 5kg/m ² of fine Aglime per vertical metre of fill to be placed to neutralise the downward seepage of acidic drainage water. If the soils underlying the stockpile area are not of low permeability (clay) then the placement of a low permeability clay layer or an impermeable membrane may be undertaken to contain any leachate from the ASS/PASS if this is a significant risk to groundwater quality.	Site Superintendent / Environmental Officer		X
The leachate pH of the excavated material stockpile to range between 6.5 and 8.5 prior to release off site (if required)	Site Superintendent / Environmental Officer		X
ASS material spills to be cleaned and /or neutralised within 12 hours of occurring	Site Superintendent / Environmental Officer		X

Reporting:

In accordance with legislative requirements, the Director-General (DG) will be notified of any incident with actual or potential significant off-site impacts on people or the biophysical environment as soon as practicable after the occurrence of the incident. The DG will be provided with written details of the incident within seven days of the date on which the incident occurred.

In addition, an annual report will be prepared that reviews the performance of the Project against the ASSMP, provides an overview of environmental management actions and summarises monitoring results over the 12 month period.

4.5 Contaminated Lands Management

Table 8: Mitigation Measures for Contaminated Lands Management

Mitigation Measure	Responsibility	Prior to Construction	During Construction
Any unidentified or accidental potential contamination encountered during construction will be documented, investigated by a specialist and remedial action applied before works continue in that area	Construction Manager / Site Superintendent / Environmental Officer		X
Storage, use and accidental spillage of chemicals, fuel and dangerous goods shall be reported	Construction Manager / Site Superintendent / Environmental Officer		X
Vehicles and machinery shall be maintained appropriately with no leaks	Site Superintendent		X
Imported fill material shall be certified free from contaminants	Site Superintendent		X

Reporting:

Permanent records of the following activities will be kept on-site and updated regularly to enable audit/review by means of a simple check list or similar method:

- Locations of contaminated soil
- Records of field tests and visual assessments
- Records of sampling locations, chain of custody forms and laboratory reports
- Records of regulatory correspondence
- Quantities of material disposed of offsite and waste disposal locations
- Requests for corrective actions lodged
- Any changes to construction or management procedures

A certificate in the form of a Site Audit Statement completed by a NSW EPA Accredited Site Auditor shall be submitted to TSC prior to the dedication to land containing the approved remediation works.

4.6 Noise and Vibration Management

Table 9: Mitigation Measures for Noise and Vibration Management

Mitigation Measure	Responsibility	Prior to Construction	During Construction
Hours of Work must be adhered to: - Between 7am and 5pm, Mondays to Saturdays - No work is permitted on Sundays and public holidays.	Construction Manager / Site Superintendent		X
Unless previously approved/agreed with relevant authorities, Rock breaking, rock hammering, sheet piling, pile driving and any similar activity are only permitted between the following hours: 9am to 12pm, Monday to Saturday 2pm to 5pm, Monday to Saturday	Construction Manager / Site Superintendent		X
Ensure that wherever practical, and where sensitive receivers may be affected, piling activities are completed using bored piles.	Construction Manager / Site Superintendent		X
Ensure that workers are trained to manage the use of noise producing plant or equipment in a way that noise is minimised.	Construction Manager / Site Superintendent		X
Vibration levels must not exceed the Criteria presented in the <i>Environmental Noise Management – Assessing Vibration: A Technical Guide (DEC, 2006)</i>	Construction Manager / Site Superintendent		X
All reasonable steps shall be undertaken to muffle and acoustically baffle all plant and equipment.	Construction Manager / Site Superintendent		X
The use of vibratory compaction equipment (other than hand held devices) within 100m of any dwelling house, building or structure is strictly prohibited.	Construction Manager / Site Superintendent		X
Identify nearby residents and other sensitive land uses and notify of vibration generating activities if required.	Site Superintendent / Environmental Officer	X	X

Mitigation Measure	Responsibility	Prior to Construction	During Construction
In the event of complaints from nearby residents, which Council deem to be reasonable, the noise from the construction site is not to exceed the following: A. Short Term Period (4 weeks) – $L_{Aeq, 15min}$ noise level measured over a period of not less than 15 minutes when the construction site is in operation, must not exceed the background level by more than 20dB(A) at the boundary of the nearest likely affected residence. B. Long term period (the duration) – $L_{Aeq, 15min}$ noise level measured over a period of not less than 15 minutes when the construction site is in operation, must not exceed the background level of more than 15dB(A) at the boundary of the nearest affected residence.	Construction Manager/Site Superintendent		X
Safety inductions prior to the commencement of construction, including awareness of commitments, directives, working hours and managing equipment to minimise vibration impacts.	Site Superintendent / Environmental Officer	X	
Ensure that all site workers have suitable personal protective equipment (PPE) to be worn at all times when near or operating plant and equipment making noise.	Site Superintendent		X

Reporting:

- The daily site diary will be used to record auditory observations during site works when necessary.
- Where required, noise and/or vibration monitoring results will be reviewed by the Environmental Officer and kept on file on site.
- Monitoring results will be checked on a regular basis and recorded on the weekly environmental checklist in addition to periodic reporting to Project Managers.
- In the event of receipt of a noise complaint the following timeframes for response will be provided:
 - The complaints register will be updated within the same work day with timeframe for response/action noted
 - Responses to resident complaints will be completed within two business days
 - Complaints will be submitted to TSC weekly and include details of the complaint and actions carried out to close out the complaint.

4.7 Air Management and Dust Control

Table 10: Mitigation Measures for Air and Dust Control Management

Mitigation Measure	Responsibility	Prior to Construction	During Construction
Areas disturbed by earthworks: - Disturb only the minimum area necessary for earthworks of the construction footprint - Remove topsoil and rehabilitate disturbed areas as soon as practicable after the completion of earthworks	Site Superintendent / Environmental Officer		X
Topsoil stripping: - Tracks used by topsoil stripping scrapers during their loading and unloading cycle will be watered - Stripping will occur preferably in damp conditions of practical and during favourable wind conditions	Site Superintendent / Environmental Officer		X
Topsoils stockpiling: - Long terms stockpiles, not used for over six months, will be sown with cover crops - Drawings of temporary stockpiles including spoil and topsoil will be marked up as earthworks progress	Site Superintendent / Environmental Officer		X
Haul roads: - All unsealed roads and frequently trafficked areas will be watered using water carts or sprays to minimise the generation of dust and particulate - All haul roads will have edges clearly defined with marker posts or equivalent to control their locations Dust suppressant will be used when necessary	Site Superintendent / Environmental Officer		X

Reporting:

Air quality management reporting is designed to comply with the Project Approval and Development Assessment conditions, and provide stakeholder access to relevant air quality information and data.

Regular monitoring data will be reported in the Annual Monitoring report for the project. Such reporting will include:

- Air quality monitoring results and comparison to performance criteria;
- Air quality related complaints and management/mitigation measures undertaken;
- Management/mitigation measures undertaken in the event of any confirmed non-compliance with performance criteria; and
- Review of the performance of management measures and the monitoring program.

4.8 Waste Management

Table 11: Mitigation Measures for Waste Management

Mitigation Measure	Responsibility	Prior to Construction	During Construction
Soil, topsoil and mulch are to be stockpiled in allocated areas	Construction Manager / Site Superintendent		X
Hazardous wastes are to be stored in appropriate containers (as shown in Figure 4 of the CEMP) and transported by a licensed waste transporter	Construction Manager / Site Superintendent / Environmental Officer		X
Concrete wash out areas located in designated locations and cleaned out on a regular basis.	Construction Manager / Site Superintendent		X
All other recyclable or non-recyclable wastes are to be stored in covered bins/skips at appropriate locations on site and emptied on a regular basis	Environmental Officer		X

Reporting:

Waste Management protocols for the site will be subject to review and the performance of such protocols will be described in annual environmental reporting. Within the annual reports, registers of waste will be analysed and presented.

4.9 Cultural Heritage Management

Table 12: Mitigation Measures for Cultural Heritage Management

Mitigation Measure	Responsibility	Prior to Construction	During Construction
All construction staff engaged in undertaking initial subsurface disturbance will undergo a Cultural Heritage Induction prior to working on site	Site Superintendent / Environmental Officer	X	X
The Cultural Heritage Protection Areas are Zoned Environmental Protection Areas within the Development Concept Plan, and as such, mitigation measures detailed in Sections 4.1 and 4.2 of this plan will apply, including the installation and maintenance of exclusion fencing as per Earthworks Fencing Plan (Appendix F).	Site Superintendent / Environmental Officer	X	X
In the event that a suspected Aboriginal Object is identified during construction, work in the immediate area should cease, and a qualified archaeologist should verify the cultural origins of the find. Should the object be of Aboriginal origin, the Find Procedure in Section 11 of the CHMP (Everick, 2010) must be followed.	Site Superintendent / Environmental Officer	X	X

Mitigation Measure	Responsibility	Prior to Construction	During Construction
The Activity Response Hierarchy in Section 12.3 of the CHMP (Everick, 2010) should be adhered to.	Site Superintendent / Environmental Officer	X	X

Reporting:

- A progress report shall be provided to the Registered Aboriginal Stakeholders every six months.
- A report shall be generated where a find has occurred and been investigated.

4.10 Erosion and Sediment Control

Table 13: Mitigation Measures for Sediment and Erosion Control Management

Mitigation Measure	Responsibility	Prior to Construction	During Construction
Erosion and sediment control measures installed and operational	Construction Manager / Site Superintendent	X	X
No soil, sand, gravel, clay or other material shall be disposed of off the site without the prior written approval of Tweed Shire Council General Manager or his delegate	Construction Manager / Site Superintendent		X
The surrounding carriageways are to be kept clean of any material carried onto the roadway by construction vehicles	Construction Manager / Site Superintendent		X
Regular inspections are to be carried out to ensure adequate erosion control measures are in in good working order and in place	Environmental Officer		X
Additional inspections after each storm event by the Supervising Engineer to ensure the erosion control devices are intact, and no sediment has left the site or is deposited on public land or in waterways. The inspection program will be carried out until the site is fully rehabilitated to Councils satisfaction	Environmental Officer		X

Reporting:

Results of the monitoring program, the effectiveness of established water management structures, sediment control devices and the particulars of any remedial measures undertaken in instances where uncontrolled erosion or heavy sediment deposition occurred will be reported in annual reports.

4.11 Construction Traffic and Pedestrian Management

Table 14: Mitigation Measures for Traffic and Pedestrian Management

Mitigation Measure	Responsibility	Prior to Construction	During Construction
Existing access tracks on site will be utilised.	Construction Manager / Site Superintendent		X
Ingress and egress of all vehicles will be via Piggabeen Road and Boyd Street	Site Superintendent / Environmental Officer		X
Rock shake down or rumble grids will be installed at the exit points, to ensure sediment will not be dragged onto the road pavement.	Construction Manager / Site Superintendent	X	X
Work zone speed limit of 40km/hr is to be obeyed at all times.	Construction Manager / Site Superintendent		X
All material will be loaded and unloaded wholly within the site via excavators and truck and dog trailers.	Construction Manager / Site Superintendent	X	X
In order to make others aware of the on-going activity signs such as Entry to Authorized Personnel Only, Personal Protective Equipment must be worn, etc will be prominently displayed.	Construction Manager / Site Superintendent		X
Under no circumstances shall an employee answer an incoming or make an outgoing phone call whilst operating machinery or a vehicle.	Construction Manager / Site Superintendent		X
Any personnel controlling construction traffic should do so with the aid of portable two-way radios.	Site Superintendent		X
Surrounding road carriageways are to be kept clean of any material carried onto the roadway by construction vehicles.	Construction Manager / Site Superintendent		X
The work site shall be suitably protected and free of hazards which could result in tripping or falling by workers and road users. Hazards which cannot be removed shall be suitably protected to prevent injury to workers and road users, including sight impairment.	Construction Manager / Site Superintendent		X
Where works extend beyond daylight hours and adjacent lighting is insufficient to illuminate hazards to workers and non-motorised road users, appropriate temporary lighting shall be installed.	Construction Manager / Site Superintendent		X
Where level differences are significant, suitable barriers which prevent access shall be used.	Construction Manager / Site Superintendent		X

5 MONITORING

The timing of installation of control measures will be critical to ensuring that environmental obligations are met within the required timeframe and that controls are effective in achieving their purpose. A program of routine monitoring will be conducted on environmental controls.

Inspections of work areas by the Environmental Officer will provide a means for monitoring effectiveness or maintenance requirements before potential environmental impact occurs.

All post-construction monitoring will be undertaken in accordance with the approved specific management plans. Refer to the specified management plan for details.

Environmental monitoring will involve collecting and interpreting data to verify the compliance of the CEMP, and environmental mitigation measures employed for the construction phase of the project. The monitoring program will assist in the auditing of safeguard measures to ensure they achieve their objectives and to facilitate modification where necessary.

Monitoring results will be used to identify existing or potential problems and where practical, the results will be obtained at the time of the assessment. Where monitoring results do not meet the outlined criteria or accepted levels, a corrective action will be raised and followed up accordingly. All monitoring results and checklists will be filed and stored at the site office and recorded on the monitoring register, and where necessary sent to the according authority.

The methodology, frequency, timing and responsibilities for the proposed environmental monitoring programs are specified in each respective Management Plan. Where practical, a number of requirements from each Management Plan have been incorporated into the Weekly Site Inspection Checklist. Table 15 below outlines the monitoring frequencies from each Management Plan relevant to the borrow area bulk earthworks in precincts 1 and 2.

All inspection reports and non-conformances will be recorded in a centralised register and acted on within two weeks, detailing the action taken or proposed to address the issue.

Table 15: Monitoring relevant to the borrow area bulk earthworks within precincts 1 and 2

Monitoring Issue	Location	Frequency	Criteria	Person Responsible	Further Detail
Pre- Construction					
Fauna	Overall site	Prior to the commencement of earthworks.	Fauna protection fencing, erosion and sediment control and all other construction environment controls 100% intact and functional prior to clearing and construction (Appendix F).	Environmental Officer/Site Foreman	Refer to FMP
Flora	Work Areas	Once, prior to earthworks	High visibility exclusion netting, erosion and sediment control and all other construction environment controls remain 100% intact and functional prior to and during clearing and construction for effective protection of trees/vegetation/habitat/buffers to be retained.	Ecologist/Site Foreman	Refer to VMP.
		Prior to earthworks	Vegetation protection measures included in the Environmental Induction and all workers inducted.	Environmental Officer	Refer to VMP.
Acid Sulfate Soils	ASS identified areas	Once	One sample per 250m ³ collected to determine the net acidity and appropriate liming rate for the disturbed soil in the ASS risk area in accordance with the Acid Sulfate Soil Management Plan (SMEC, 2012a).	Qualified ASS person	Refer to Acid Sulphate Soils Management Plan (SMEC, 2012).
Construction					
Fauna	Work areas	Daily	Erosion and sediment control and all other construction environment controls 100% intact and functional during construction.	Environmental Officer /Site foreman	Refer to FMP (SMEC, 2012).
	Work areas	Daily	Environmental Protection Areas and buffers are clearly marked and maintained for the duration of clearing and construction	Environmental Officer	Refer to FMP
	Work Areas	During all earthworks activities.	No injury or death of identified fauna during clearing and earthworks	Fauna Spotter Catcher	Refer to FMP
	Work Areas	Weekly	A general inspection completed for fencing associated with fauna. Rectifications reported and completed.	Environmental Officer	Refer to FMP

Monitoring Issue	Location	Frequency	Criteria	Person Responsible	Further Detail
Flora	Work Areas	During construction	All threatened flora and retained EEC's are buffered in accordance with the VMP and BMP.	Environmental Officer	Refer to VMP and BMP.
	Work Areas	During construction	- No earthworks outside nominated clearing zones. - No clearing of or damage to threatened flora during construction. - No clearing of or damage to retained Endangered Ecological Communities.	Environmental Officer/Ecologist	Refer to VMP.
	Work Areas	During all earthworks activities	No alterations in drainage impacting on retained vegetation.	Environmental Officer	Refer to VMP.
Surface Water Quality	Boards 1 to 4	Monthly	Water quality results are in compliance with the specified ANZECC guideline values for prescribed monitoring parameters.	Environmental Officer	Refer to Section 9.2 of the GMP (SMEC, 2012).
Groundwater during De-Watering	At any groundwater seepage into any excavation occurs	Daily water quality testing and sampling.	No increase in groundwater contamination in excess of pre-construction concentrations as a result of construction activities. Applicable groundwater quality criteria include the: - ANZECC 2000 guideline values - Pre-construction levels	Environmental Officer	Refer to Section 9.2 of the GMP (SMEC, 2012).
Stormwater	Stormwater retention basis	Weekly/ 12 hourly during rainfall events (>25 mm)/ when pH is recorded < 6.5.	Water is of suitable quality that discharging runoff complies with the provisions of Council's Design Specification D7-Stormwater Quality, before being released.	Environmental Officer	Refer to Stormwater Management Plan (Yeats, 2012).
Noise	Nearest possible location to likely affected residence or boundary of.	Reactive (complaint based)	Short term (4 weeks), LAeq, 15min, over a period of 15min. When construction is in operations must not exceed the background level by more than 20dB(A) at the boundary of the nearest likely affected residence. Long term (the duration) – LAeq, 15min, over a period of not less than 15min when construction is in operation, must not exceed the	Environmental Officer	Refer to Section 3.7

Monitoring Issue	Location	Frequency	Criteria	Person Responsible	Further Detail
			background level by more than 15dB(A) at the boundary of the nearest affected residence.		
Cultural Heritage	Entire site	As detected	Detection of Aboriginal objects or Aboriginal human remains reported and addressed.	Cultural Heritage Consultant	Refer to Cultural Heritage Management Plan (Everick, 2009).
Erosion and Sediment Control	Work Areas	Daily	Erosion and sediment controls are clean and functioning effectively according to design.	Environmental Officer/ Site foreman	Refer to Stormwater Management Plan (Yeats, 2012).
Air Quality	Work Areas	Daily	Visual observations for dust assessed, reported and managed. Zero complaints related to air quality.	Environmental Officer	Refer to Section 3.10
Waste	Work Areas	Daily inspection of receptacles. Monthly volumes of waste streams monitored.	Waste register is accurate and complete with all waste types (generated) identified Receptacles maintained at >75% capacity. No harm to environmental receptors.	Environmental Officer	Refer to Section 3.12 of this plan.
Acid Sulfate Soils	Where water has ponded	Twice Weekly	Testing undertaken for pH, turbidity and dissolved oxygen to determine ASS potential	Environmental Officer	Refer to ASSMP (SMEC, 2012).
	Following Liming	Once	One sample per 250m ³ and testing to ensure that treated soils have sufficient acid neutralising capacity and a pH > 5.5 and < 8.5	Qualified ASS person	Refer to ASSMP (SMEC, 2012).
	Commencement of tying and operations of final cut platforms	Once	One sample per 250m ³ and testing to ensure that treated soils have sufficient acid neutralising capacity and a pH > 5.5 and < 8.5	Qualified ASS person	Refer to ASSMP (SMEC, 2012).

Monitoring Issue	Location	Frequency	Criteria	Person Responsible	Further Detail
Traffic and Pedestrian Management	Work Areas	Daily inspection of washing facilities, road traffic & public access roads.	Evidence provided that all statutory responsibilities with regard to road traffic impacts have been complied with Public access roads remain clean and free of dirt and debris.	Environmental Officer	Refer to Section 3.6.
Revegetation and Regeneration Areas	Within Rehabilitation and Management Areas adjacent to Precincts 1 and 2.	Initial monitoring event no more than 6 weeks after primary weed control or planting preparation. Ongoing monitoring annually.	• All Declared noxious weeds effectively and appropriately controlled. • <5% cover of all weeds at the end of the 5 year maintenance period. • Negligible evidence of herbicide damage to native ground covers and native species regeneration. • Sufficient seed collected for propagation requirements of the current project only. • Revegetation areas planted out in general accordance with approved revegetation lists. • At least 1 established woody native plant per square meter throughout revegetation areas. • Increase in the cover of native groundcovers at each annual monitoring event. • For planted rainforest species, an average growth of >1 m after three (3) years, >1.5 m and >70% canopy cover after 5 years. • For planted sclerophyll species, >50% cover after 3 years and >70% cover after 5 years. • >85% survival of stems planted. • Presentable mulch to finish at 100–150 mm deep along visible edges of high profile areas subject to establishment of buffers through revegetation.	Rehabilitation contractor	Refer to SRRMP (SMEC, 2012).

Note: While no fauna survey is proposed within Precincts 1 and 2 for the bulk earthworks phase of the project, annual fauna monitoring is proposed over the entire site, as detailed in the Flora and Fauna Monitoring Program (SMEC, 2012).

REFERENCES

- Department of Environment and Conservation (NSW), 2006, Environmental Noise Management – Assessing Vibration: A Technical Guide
- Gilbert and Sutherland. 2008. Stage 1 Preliminary Site Contamination Assessment – Cobaki Lakes Concept Plan
- Everick Heritage Consultants. 2010. Cultural Heritage Management Plan
- JBA Urban Planning. 2008. Environmental Assessment Report Part 3A Concept Plan
- JBA Urban Planning. 2009. Environmental Assessment Report Part 3A Project Application
- James Warren & Associates. 2008a. Ecological Assessment – Volume 1
- James Warren & Associates. 2008b. Vegetation Management Plan
- James and Warren & Associates. 2009. Fauna Management Plan
- James and Warren & Associates. 2010a. Ecological Assessment Precinct 1 & 2
- James and Warren & Associates. 2010b. Ecological Assessment Precinct 6
- James and Warren & Associates. 2010c. Revised Regeneration and Revegetation Plan
- SMEC. 2011. Long Nosed Potoroo Management Plan
- SMEC. 2012a. Acid Sulphate Soils Management Plan
- SMEC. 2012b. Buffer Management Plan – Central Open Space and Precincts 1, 2 & 6
- SMEC. 2012c. Fauna Management Plan – Central Open Space and Precincts 1, 2 & 6
- SMEC. 2012d. Groundwater Management Plan – Central Open Space and Precincts 1, 2 & 6
- SMEC. 2012e. Flora and Fauna Monitoring Program
- SMEC. 2012f. Site Regeneration and Rehabilitation Management Plan – Central Open Space and Precincts 1, 2 & 6
- SMEC. 2012g. Vegetation Management Plan – Central Open Space and Precincts 1, 2 & 6
- Yeats. 2010a. Stormwater Quality Concept Plan
- Yeats. 2010b. Construction Environmental Management Plan – Statement of Intent

Yeats 2012. Erosion and Sediment Control Plan Drawings

APPENDIX A – BULK EARTHWORKS DRAWINGS

Location and Extent of Earthworks

The bulk earthworks proposed, including locations of areas of cut and fill are illustrated in the following series of drawings.

In accordance with the project approval MP 08_020 (as per drawing YC0029-1P1-SK02), areas of development precincts 1 and 2 are the identified sources of fill material required for the Central Open Space earthworks.