Aura Master Planned Community

Construction Environmental Management Plan

Prepared by Calibre Consulting
Prepared for Stockland Development Pty Ltd

May 2021

17-000-934CEMP01
Issue C
Urban Development

COMMERCIAL IN CONFIDENCE

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DOCUMENT CONTROL

17-000-934-CEMP01

Issue	Date	Issue Details	Author	Checked	Approved
A	4/10/2019	Draft for review	MZ	MW	BWT
B	28/05/2020	For Approval	MZ	MW	MW
C	20/05/2021	Amended Plans	MZ	MW	MW

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GLOSSARY OF TERMS

ACR	Annual Compliance Report
AHD	Australian Height Datum
ASS	Acid Sulfate Soils
PCEMP	Precinct Construction Environmental Management Plan
E&SC	Erosion and Sediment Control
EDQ	Economic Development Queensland
EPBC	Environmental Protection and Biodiversity Conservation Act 1999
EPZ	Environmental Protection Zone
HMU	Habitat Management Unit
MNES	Matters of National Environmental Significance
PDA	Priority Development Area
PER	Public Environment Report
Approval Holder	Stockland Development Pty Ltd
RL	Reduced Level
SDS	Safety Data Sheet
TSS	Total Suspended Solids
Works	All matters associated with the construction of the development
WSF	Wallum Sedge Frog
WSFMP	Wallum Sedge Frog Management Plan
WQMP	Water Quality Management Plan

DECLARATION OF ACCURACY

I declare that:

1. To the best of my knowledge, all the information contained in, or accompanying this Management Plan[1] (*use correct title of signed document*) is complete, current and correct.

2. I am duly authorised to sign this declaration on behalf of the approval holder.

3. I am aware that:

   a. Section 490 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence for an approval holder to provide information in response to an approval condition where the person is reckless as to whether the information is false or misleading.

   b. Section 491 of the EPBC Act makes it an offence for a person to provide information or documents to specified persons who are known by the person to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth) where the person knows the information or document is false or misleading.

   c. The above offences are punishable on conviction by imprisonment, a fine or both.

Signed Mark Wyer

Full name (please print) Calibre Consulting

Organisation (please print)

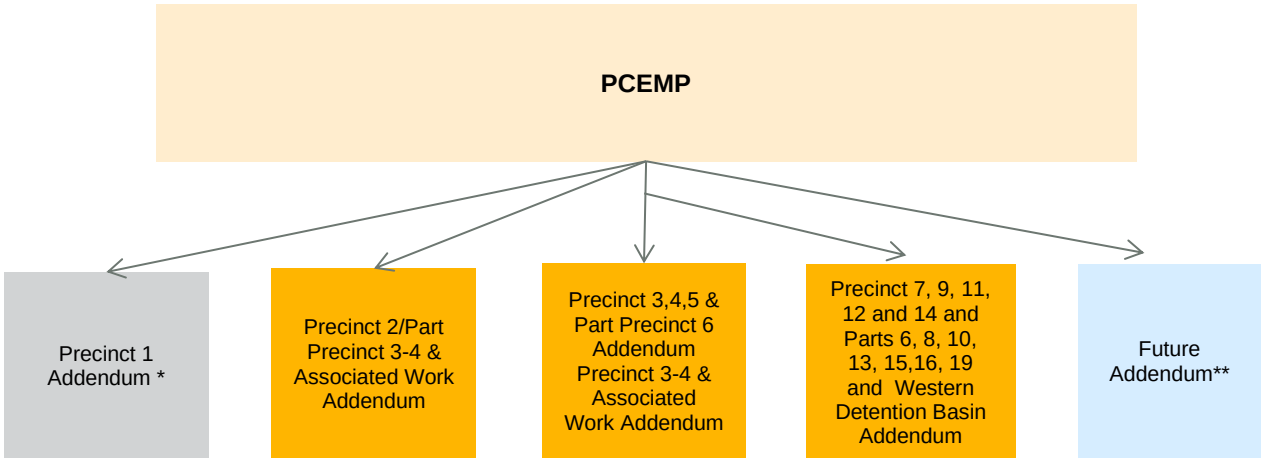
Date 24/05/21

[1] Aura Master Planned Community Construction Environmental Management Plan 17-000-934CEMP01 Issue C

1 INTRODUCTION

1.1 BACKGROUND AND STRUCTURE

This Precinct Construction Environmental Management Plan (PCEMP) sets the framework for the management of environmental impacts and risks associated with the construction of the Aura Master Planned Community (formally known as Caloundra South). A description of precinct specific construction activities and associated management actions are included as addendums to the PCEMP. An overview of the structure of the plan and addendums is provided in Figure 1-1.



** Development activities under this CEMP addendum have been completed.*

*** As future addendums are approved they will be added to the CEMP.*

Figure 1-1: Structure of PCEMP and Addendums

This plan has been prepared in accordance with the requirements of Condition 3 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval (EPBC Ref: 2011/5987) for the Caloundra South Master Planned Community (Aura). Details of Condition 3 are provided in **Section 1.2**.

1.2 STATUTORY COMPLIANCE AND CONDITIONS

Condition 3 of the EPBC Act approval details the following information requirements for each precinct.

Prior to the commencement of the action the person undertaking the Action must submit to the Minister for approval a detailed Precinct Construction Environmental Management Plan (PCEMP). The PCEMP must be submitted to the Minister at least three (3) months prior to the commencement of the action.Table 1-1 outlines the information required under Condition 3 and where the requirements are addressed in the PCEMP.

Table 1-1: EPBC Condition 3 Requirements

Item	PCEMP Report Section
a) details on the timing of construction works including (consistent with the requirements under Condition 7) any compensatory habitat works	Relevant precinct-specific addendum

Item	PCEMP Report Section
b) current and detail maps of the locations of: *i) Environmental Protection Zones, no-go areas/protected areas where only habitat creation, weed management or rehabilitation will occur;* *ii) sediment and erosion treatment and prevention devices;* *iii) prescribed Buffer Zones;* *iv) development and construction zones;* *v) essential services and easements;* *vi) roads; and* *vii) fauna protection devices and road crossings/underpasses.*	Relevant precinct-specific addendum: Civil Construction Methodology Engineering Drawings Wallum Sedge Frog Management Figures Vegetation Management Figures
c) potential impacts to Matters of National Environmental Significance;	Relevant precinct-specific addendum: Civil Construction Methodology
d) management and mitigation actions required for acid sulfate soils, surface and ground water quality, sediment and erosion controls, vegetation management, and pest and weed management to protect Matters of National Environmental Significance;	**Section 5** Mitigation Strategies **Section 5.1.3** Erosion and Sediment Control Management Measures **Section 5.2.3** Groundwater Management Measures **Section 5.3.3** Geotechnical (Acid Sulfate Soils) Management Measures **Section 5.4.3** Wallum Sedge Frog Management Measures **Section 5.5.3** Vegetation Management Measures **Section 5.6.3** Pest Management Measures **Section 5.7.3** Weed Management Measures
e) Incidental or Associated Works	Refer **Addendums**
f) the objectives, methods, parameters and monitoring strategies to be used;	**Section 5**Mitigation Strategies **Section 5.1.4** Erosion and Sediment Control Monitoring Program **Section 5.2.4** Groundwater Monitoring Program **Section 5.3.4** Geotechnical (Acid Sulfate Soils) Monitoring Program **Section 5.4.4** Wallum Sedge Frog Management Monitoring **Section 5.5.4** Vegetation Management Monitoring Program

Item	PCEMP Report Section
	Section 5.6.4 Pest Management Monitoring Program **Section 5.7.4** Weed Management Monitoring Program
g) performance criteria for each set of parameters at which point Corrective actions are required to be implemented;	**Section 5** Mitigation Strategies **Section 5.1.2** Erosion and Sediment Control Performance Criteria **Section 5.2.2** Groundwater Performance Criteria **Section 5.3.2** Geotechnical (Acid Sulfate Soils) Performance Criteria **Section 5.4.2** Wallum Sedge Frog Management Performance Criteria **Section 5.5.2** Vegetation Management Performance Criteria **Section 5.6.2** Pest Management Performance Criteria **Section 5.7.2** Weed Management Performance Criteria
h) Corrective actions, and/or mechanisms for developing Corrective actions, and the parties responsible for implementing Corrective actions.	**Section 5** Mitigation Strategies **Section 5.1.5** Erosion and Sediment Control Corrective Actions **Section 5.2.5** Groundwater Corrective Actions **Section 5.3.5** Geotechnical (Acid Sulfate Soils) Corrective Actions **Section 5.4.5** Wallum Sedge Frog Management Corrective Actions **Section 5.5.5** Vegetation Management Corrective Actions **Section 5.6.5** Pest Management Corrective Actions **Section 5.7.5** Weed Management Corrective Actions

In addition to the EPBC Act the following legislative documents are applicable to the works covered by this plan. The Approval Holder is responsible for ensuring the requirements of the following legislation are satisfied.

- Environmental Protection Act 1994.
- Nature Conservation Act 1992.
- Vegetation Management Act 1999.
- Land Protection (Pest and Stock Route Management) Act 2002.
- Water Act 2000.
- Coastal Protection and Management Act 1995.

1.3 PCEMP OBJECTIVES AND REFERENCE

This plan sets the framework for the management of environmental impacts and risks associated with the construction of the Aura Master Planned Community. The plan will ensure compliance with the obligations under Condition 3 of the EPBC Act 1999 (EPBC ref 2011/5987).

1.4 ENVIRONMENTAL POLICY

Stockland is committed to the protection and enhancement of the environment. Stockland's commitment to sustainability and the environment is outlined on the Stockland website at https://www.stockland.com.au/sustainability.

2 CIVIL CONSTRUCTION METHODOLOGY

2.1 OVERVIEW

The following sections describe the scheduling and general construction sequencing for the works covered by this plan.

2.1.1 WORKS COVERED BY THIS PCEMP

This plan relates to construction works undertaken at the Aura site including:

- Bulk Earthworks incl. temporary works such as haul roads;
- Roadworks – trunk and internal roads;
- Drainage – piped or overland swales;
- Sewer – trunk and reticulation;
- Water – trunk and reticulation;
- Stormwater Quality Improvement Devices; and
- Electrical (where works involve disturbance of natural ground and or occur in conservation areas).

2.1.2 CONSTRUCTION PHASE OVERVIEW

Construction is staged for construction sequencing. The staging locations and sizes are to be defined as the project progresses further into the detailed design process. A brief overview of the construction phases for the works is provided within **Table 2-1.** A description of precinct-specific construction activities and development layout plans are provided in the addendum relevant to each precinct works.

Table 2-1: Overview of Construction Phases

Phase	Construction Activity	Description
1	Preconstruction Activities	• Preliminary work including set out to establish the site boundary, EPZ and environmental buffers; • Site construction office will be established; • Erosion and sediment control measures will be established; • Testing of soils for Acid Sulfate Soils (ASS) and associated groundwater testing to be completed (if required); • Construction of WSF habitat areas (if required); • Site assessment to confirm the extent of the WSF habitat or other fauna/flora; and • Site Specific Inductions including addressing PCEMP requirements.
2	Construction Activities	• Existing vegetation and topsoil within earthworks areas will be stripped in accordance with current vegetation management plan (if required). • No stockpiles, haul roads or track will be established in areas other than shown on the plans or approved by the Superintendent; • Works are to be planned to ensure that the minimum area of the site is disturbed at any one time; • Earthworks will commence • Formalised overland flow channels will be stabilised to prevent erosion and scour;

Phase	Construction Activity	Description
		• Earthworks will be undertaken in a timely manner, then topsoiled, seeded/grassed and mulched immediately on completion. Site stabilisation will be carried out progressively as works are completed; • Silt fences will be provided downstream of stockpiles; • Following the construction of stormwater drainage, inlet protection will be provided to all inlets; and • Services will be progressively established as the earthworks progress.
3	Post Construction	• On the completion of the lots the sediment fencing will remain installed and removal of the fencing will only be permitted once seed strike and grass coverage is achieved and approved by the Superintendent; and • Once road sealing and landscaping of verge areas have been undertaken, general inlet protection works will be removed where approved by the Superintendent.

2.1.3 CONSTRUCTION SCHEDULING

A comprehensive construction program will be developed by the Principal Civil Contractor upon award of the contract. This program will be reviewed by the Superintendent and the Approval Holder to ensure compliance with any time frames set in the PCEMP to enable construction activities. The construction program will be broken down into specific tasks relating to each activity within the project, and nominate key processes such as critical links, milestones, percentage completions and task summaries. For precinct-specific construction sequencing information and estimated durations, refer to the relevant addendum.

In general construction works associated with the project will be undertaken between the hours outlined within **Table 2-2** below. Works outside of these hours will require prior approval from the Superintendent.

Table 2-2: Nominated Working Hours

Working Days	Nominated Work Construction Hours
Weekdays (Monday to Friday)	7:00am to 6:00pm
Saturdays	7:00am to 4:00pm
Sundays and Public Holidays	No Work

Note: Access to the site outside of these hours is permitted for deliveries, equipment maintenance, security and emergency response to ensure environmental compliance; as permitted by the relevant government approvals. It is acknowledged that safety of workers on site is paramount and that personal safety is to take priority when responding to investigations and/or corrective actions, when responding to turbidity trigger alarms or inclement weather-related incidents/notifications.

2.2 EROSION AND SEDIMENT CONTROL

The installation and maintenance of adequate erosion and sediment control measures are important in order to protect downstream waterways. Concept erosion and sediment control drawings are provided in each precinct addendum and indicate the minimum standard of erosion and sediment control measures that will be implemented during construction

and phasing of the works. Detailed design will confirm the actual erosion and sediment control measures ensuring downstream and adjacent environmental values are protected from construction activities.

During construction, an erosion and sediment control management plan will be submitted to the Construction Superintendent for acceptance. The concept erosion and sediment control drawings will be updated with further details of erosion and sediment control processes for works covered by this plan. The Principal Civil Contractor shall review the erosion and sediment control management plan regularly and make onsite amendments as required, including the installation of additional measures where site conditions dictate.

Erosion and Sediment control measures will include, but not be limited to, the following:

- Control and/or diversion of upstream surface runoff through or around works areas to prevent mixing with sediment laden site flows;
- The construction of mulch/earth bunds to control/divert surface runoff following clearing of vegetation;
- The construction of diversion drains and detention devices prior to and during earthworks operations;
- Taking care not to concentrate surface runoff unnecessarily so that is becomes a nuisance or cause damage to the works and/or the environment;
- Construction of sediment/silt fences, sediment basins, rock check dams, sand bag checks dams, cattle (vibration) grids at site entry/exit points, etc.;
- All in stream works are to be promptly completed by the Contractor while taking care not to cause adverse effects to the environment;
- The protection of batters from erosion and scour by diverting surface runoff away from the batters until vegetation is established;
- Any measures/construction to meet the requirements of the Economic Development Queensland (EDQ) approvals;
- Any amendments required to the installed erosion and sediment control measures following review and written instruction from the Superintendent to do so;
- Diversion of all surface and stormwater flows resulting from construction works, away from mapped (retained) or constructed WSF breeding habitat, so as to ensure no connection of runoff flows to WSF breeding habitat (see precinct-specific addendums);
- Regular inspection and maintenance of all erosion and sediment control measures throughout the construction period.

2.3 SITE CLEARING AND BULK EARTHWORKS

Prior to clearing, buffer zones, vegetation retention and habitat retention zones will be delineated onsite. Following the above delineation activities the construction zones are defined, and clearing and bulk earthworks activities can proceed in accordance with the Construction Erosion and Sediment Control plan devised and signed off by a Certified Professional in Erosion and Sediment Control (CPESC) which are to include details of:

- Establishment of erosion and sediment controls, refer **Section 5.1**;
- Re-establishment of the existing haul road (if required);
- Establishment of new haul roads including any creek crossings (as required);
- Clearing and grubbing of areas covered by this plan;
- Stripping of topsoil operations for areas covered by this plan;
- Excavation for cut operations for areas covered by this plan, including diversion drains and sedimentation ponds;

- Haulage of fill material along existing and newly created haul roads;
- Fill import will occur intermittently as the development progresses;
- Fill placement and compaction operations; Haul road maintenance/erosion and sediment control monitoring;
- Grass seeding (including drill seeding, hydro mulching or other methods approved by the Superintendent to achieve stabilisation) of completed lots following topsoil respread[2]; and
- Decommissioning of erosion and sediment controls on successful completion of site stabilisation works.

2.4 ESSENTIAL SERVICES (INFRASTRUCTURE SEQUENCING)

Serviceability for precincts require certain infrastructure located outside of the precinct boundaries itself. These essential services are required for the given Precinct to be suitable for residential development. essential services and easements must be established to meet the requirements of the EPBC Approval and associated approved management plans. Examples of these essential services and impact management/mitigation measures are as follows:

Table 2-3: Essential Infrastructure

Essential Infrastructure	Management/Mitigation Measure
Trunk roads to access the precinct	In accordance with the masterplan, locate roads in areas where clearing of vegetation is minimized. Implement fauna and or frog crossings to improve fauna connectivity.
Drainage infrastructure including wetlands, bioretention, drainage channels and stormwater pipes	Ensure location and maintenance access meet the requirements of the Wallum Sedge Frog Management Plan.
Sewer and water reticulation mains	Consolidate where possible into road reserves.
Electrical and communication reticulation	Consolidate where possible into road reserves.
Footpaths and maintenance access through open space and conservation areas	Minimise footpaths in close proximity to protected buffer zones. Consider use of educational signage to promote the environmental values of conservation areas.

[2] Completed lots from a bulk earthworks perspective means lots progressively stabilised for later civil construction. It is noted that other areas undergo additional stabilization by various methods

3 MATTERS OF ENVIRONMENTAL SIGNIFICANCE – SITE WIDE

The following section outlines Matters of National Environmental Significance (MNES) identified in the Public Environmental Report for the project (Stockland 2013). Reference should be made to the Public Environment Report (PER) for further details regarding each MNES.

The MNES that have been considered on the project site are as follows:

- Wetlands of international importance – the Moreton Bay Ramsar Wetland which was listed under the Convention on *Wetlands* of International Importance in 1993;
- Listed Threatened species and communities - Wallum Sedge Frog (*Litoria olongburensis*), Water Mouse (*Xeromys myoides*), Attenuate Wattle (*Acacia attenuata*), Swamp Stringybark (*Eucalyptus conglomerata*), Lesser Swamp Orchid (*Phaius Australis*), Wallum Leek (*Prasophyllum wallum*), Emu Mountain Sheoak (*Allocasuarina emuina*), Hairy-joint Grass (*Arthraxon hispidus*) and Three-leaved Bosistoa (*Bosistoa transversa*); and
- Listed Migratory Species - *Actitis hypoleucos, Arenaria interpres, Calidris acuminate, Calidris alba, Calidris canutus, Calidris ferruginea, Calidris melanotos, Calidris ruficollis, Calidris tenuirostris, Gallinago hardwickii, Heteroscelus brevipes, Heteroscelus incanus, Limicola falcinellus, Limnodromus semipalmatus, Limosa lapponica, Limosa, Numenius madagascariensis, Numenius minutus, Numenius phaeopus, Tringa glareola, Tringa nebularia, Tringa stagnatilis, Xenus cinereus, Calidris subminuta, Phalaropus lobatus, Philomachus pugnax, Charadrius bicinctus, Charadrius leschenaultia, Charadrius mongolus, Charadrius veredus, Pluvialis fulva, Pluvialis squatarola, Glareola maldivarum, Sterna albifrons, Sterna caspia, Ardea modesta, Ardea Ibis, Merops ornatus, Rhipidura rufifrons.*

Reference should be made to the following documents for further details regarding each MNES.

- Wallum Sedge Frog Management Plan (WSFMP)
- Environmental Management Plan
- Environmental Protection Plan
- Water Quality Management Plan
- Vegetation Management Rehabilitation Plans

The approved plans for the project are available on the following website:

https://www.stockland.com.au/residential/qld/aura/community-resources-and-approvals

Section 5 of this PCEMP outlines the site-wide mitigation and management strategies. Details of precinct-specific impacts on MNES and proposed mitigation and management strategies are found in the relevant addendums.

4 ENVIRONMENTAL MANAGEMENT

4.1 MANAGEMENT STRUCTURE AND RESPONSIBILITY

Figure 4-1 illustrates the general management and reporting structure that will be implemented for the project.

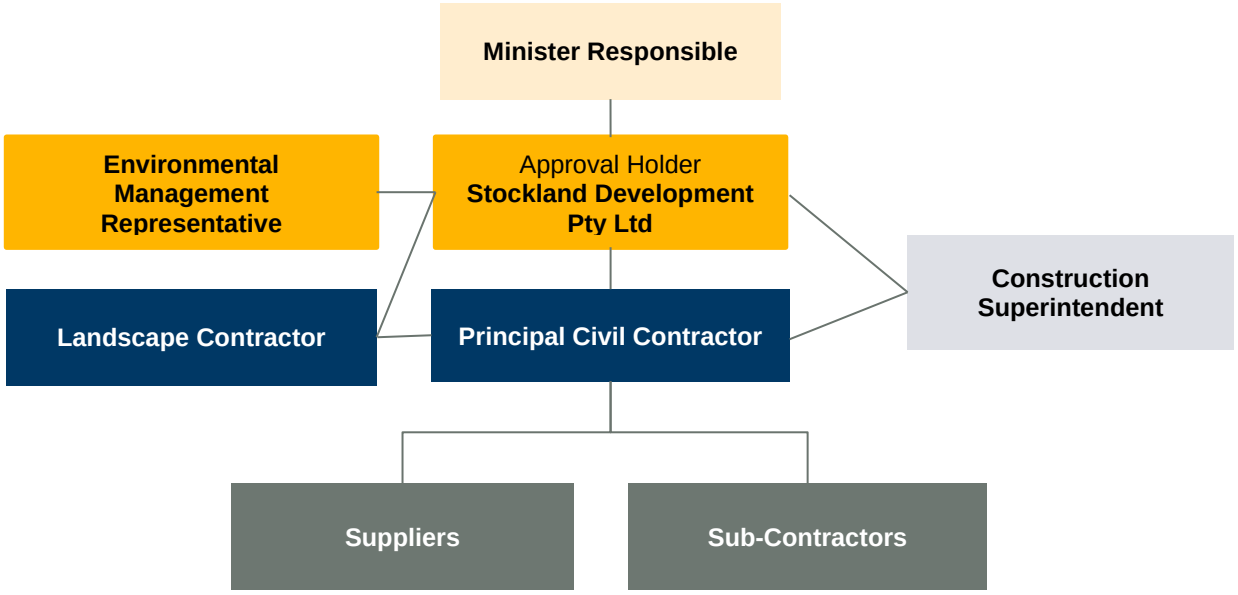


Figure 4-1: PCEMP Reporting Structure

4.1.1 STOCKLAND DEVELOPMENT PTY LTD (APPROVAL HOLDER)

Stockland as the project Approval Holder will be responsible for implementing the PCEMP. These responsibilities will be met by Stockland and include:

- Appointing a Development Manager and or Project Manager to manage and monitor compliance with the plan;
- Appointing a Construction Superintendent to manage and monitor the performance of the Principal Civil Contractor;
- Co-ordinating between the Approval Holder and Construction Superintendent;
- Appointing a Principal Civil Contractor;
- Appointing an Environmental Management Representative that is responsible for compliance reporting to the department, consistent with condition 14 of the Approval;
- Appointing a Landscape Contractor; and
- Appointing all other development driven personnel.

4.1.2 CONSTRUCTION SUPERINTENDENT

The Construction Superintendent will be responsible for managing and monitoring the performance of the Principal Civil Contractor. The Superintendent will also be responsible for:

- Being the point of contact for the Local Authorities;
- Co-ordinating between the Approval Holder/Environmental Management Representative and the Principal Civil Contractor;
- Informing the Principal Civil Contractor of complaints or enquiries from neighbouring properties; and
- Reporting non-compliances as soon as possible to the Project Manager or Development Manager and Environmental Management Representative, in order to comply with the Approval Holder notification requirements, consistent with condition 14 of Approval.

4.1.3 PRINCIPAL CIVIL CONTRACTOR

The Principal Civil Contractor will be responsible for the construction of the civil aspects of the development and the overall day to day implementation and monitoring of the plan. The responsibilities of the Principal Civil Contractor are to:

- Manage and monitor the performance of the civil works contractors and sub-contractors;
- Co-ordinate testing and maintenance activities when required;
- Co-ordinate other disciplines and ensure compliance with the plan documentation;
- Implementation, monitoring and maintenance of the erosion and sediment control device;
- Maintaining operational compliance with the approved plan; and
- Notify the Construction Superintendent of non-compliances as soon as possible in order to comply with Approval Holder notification requirements of condition 14 of the EPBC Act Approval.

4.1.4 ENVIRONMENTAL MANAGEMENT REPRESENTATIVE

The Environmental Management Representative will be appointed by the Approval Holder and will be responsible for compliance reporting in accordance with the plan. The responsibilities of the Environmental Management Representative are to:

- Monitor the performance of the Principal Civil Contractor in conjunction with the appointed Project Manager and or Development Manager;
- Conduct necessary investigations to ensure compliance with this plan;
- Provide input into plan element rectification if required;
- Report any non-compliances to the DAWE within 2 business days of being made aware of the non-compliance, consistent with condition 14 of the EPBC Approval; and,
- Prepare and submit annual compliance reports to the DAWE.

4.2 ENVIRONMENTAL TRAINING

All personnel undertaking construction activities relating to the protection of MNES, will undertake general environmental awareness and induction training. This training will outline the roles, responsibilities and management measures required by this PCEMP. This training will be undertaken as part of the site induction process and will be delivered by an appropriately qualified person.

This training will encompass (but not be limited to):

- A general site induction to familiarise personnel with the site and its surrounds;
- Awareness and induction training outlining the PCEMP requirements;
- Environmental emergency response training in the event of flood, bushfire and chemical spills;
- Site specific training with regard to environmental controls;
- Environmental responsibilities such as general environmental duties and the duty to report and notify;
- Acceptable and unacceptable practices for the site;
- Identification of the appropriate person to report to in the event of an environmental issue;
- Procedures for unexpected finds such as Aboriginal heritage sites and European heritage sites;
- Specific task training, such as dust mitigation measures for operators, and designated fuelling stations for plant and machinery;
- Procedures for threatened flora and fauna identification such as the Wallum Sedge Frog;
- Stop work and notification procedures in the event of unexpected finds and/or the identification of threatened species;
- Significant tree locations and the controls to be implemented to preserve these areas; and
- Following review of an incident, noncompliance or public complaint the corrective and preventive action will identify the need to assess and retrain the personnel involved.

The corrective and preventative actions will also identify changes to the training content and/or structure to ensure continued improvement is implemented.

A register of site induction and environmental training including the names of personnel trained, date of training, details of the trainer and the timeframe for review and retrain will be maintained onsite.

4.3 EMERGENCY CONTACTS AND RESPONSE

The Principal Civil Contractors Project Manager and Site Engineer will be responsible for reporting environmental incidents or emergencies to the appropriate authorities and action recommendations made by the given authorities to rectify the situation.

The Principal Civil Contractor must nominate an employee that will be contactable for environmental emergencies 24 hours a day, 7 days a week. This employee must have the authority to stop or direct works to ensure the mitigation of risk in the event of an emergency situation. This employee will have clear documented responsibilities and procedures to follow in the event of an emergency situation onsite.

This employee's contact details and responsibilities will be issued to adjoining residents, DEHP, the Construction Superintendent, Stockland and local authorities. Table 4-1 shows the relevant emergency contact numbers.

Table 4-1: Emergency Contact Numbers

Issue	Person/Authority	Contact Details
Bushfire, medical and other emergencies	Emergency Services (Police, Fire, Ambulance)	000
General Environmental Emergency	Queensland State Government Emergency Services	13 74 68 000
General Environmental Issues	Queensland State Government	13 74 68
Wildlife Incidents Pollution Reporting	Queensland State Government	1300 130 372
Sick or Injured Wildlife	RSPCA QLD	1300 264 625
Onsite Emergency – Internal Contact	Principal Contractors Site Engineer Principal Contractors Project Manager Superintendent	TBA TBA TBA

All personnel entering the site will be required to sign into an attendance register, and subsequently sign out upon leaving site. In the event of an emergency situation all onsite personnel will need to be accounted for.

An assembly point will be nominated for the site, and in the event of an emergency situation all personnel onsite will assemble at this point. The Principal Civil Contractor's Project Manager or appropriately delegated employee will confirm personnel numbers in preparation for the arrival of emergency services.

The Principal Civil Contractor must develop and implement a procedure where all personnel onsite will receive notification regarding emergency situation and the need for assembly.

The Principal Civil Contractors must address the requirement for onsite Safe Work Method Statements and emergency procedures in the event of the following occurrences:

- Localised onsite fire - including requirements for onsite fire protection devices such as; Fire extinguishers, fire trails and areas allocated for smoking;
- Bushfire on adjoining land - including the control mechanism to prevent or minimise combustible material onsite;
- Flooding onsite, adjoining land and roadways; and
- Chemical spills, including designated refuelling points away from flow catchment areas with appropriate controls in place.

A Hazardous Substance Register will be established for the Project and this register will be kept within the site office compound.

The Hazardous Substance Register will record details such as the product name, risk rating, storage instructions, volume kept onsite, location kept onsite and a person responsible for the maintenance of this register.

Safety Data Sheets (SDS) for all chemicals stored or used on the site will be included with the Hazardous Substance Register and made available to interested parties. SDS's must be dated and approved for use within a five (5) year period. Any SDS outside of the five-year period will be deemed non-compliant.

Personnel working with, transporting or using chemicals and/or hazardous substances must be appropriately trained, and this qualification recorded during Site Induction Training.

A copy of all current SDS's must also be stored at the first aid facilities and trained first aid personnel will have access to all SDS's for the Project.

In the event of an emergency situation, the Hazardous Substance Register is to be issued to emergency services upon their arrival to site.

All personnel involved with the construction of the Project will be trained in these procedures at the time of Site Induction.

5 MITIGATION STRATEGIES

The following sections outline the measures to avoid or minimise potential environmental impacts of construction activities. The mitigation strategies outlined below will be continually reviewed and updated as required to reflect current best management practice and learnings captured from activities onsite.

5.1 EROSION AND SEDIMENT CONTROL

5.1.1 OVERVIEW

During the construction of works covered by this PCEMP, the management of sediment laden runoff is critical to ensure no adverse impact to receiving waterways. Best practice erosion and sediment control measures will be implemented throughout the construction area in accordance with the Best Practice Erosion and Sediment Control Guidelines (IECA, 2008) with guidance from the Manual for Erosion and Sediment Control Version 1.2 (Sunshine Coast Regional Council 2008). It is proposed to use sedimentation ponds and/or high efficiency sediment basins throughout the areas covered by this PCEMP and associated works.

5.1.2 PERFORMANCE CRITERIA

The performance criteria will apply to dewatering of sediment basins for any rainfall event up to and including the design rainfall event defined in **Table 5-1**. The performance criteria have been set to discharge criteria that ensure the site-based water quality discharge parameters (i.e. creek water quality in accordance with the approved Water Quality Management Plan) are not exceeded. The performance requirements for water quality discharges are as follows:

- pH 6.5 to 8.5, if groundwater is passed through the sediment basins, then the pH of the discharged water can be less than 6.5, providing it is within the range reported within the WSFMP (2015) – a pH range of between 4 and 5;
- Dissolved Oxygen (DO) > 80% saturation;
- Total Suspended Solids (TSS) less than 50 mg/L, or the equivalent turbidity;
- Nutrients (nitrogen and phosphorus) to be managed through normal erosion and sediment control practices;
- Discharge turbidity offsite as measured by the downstream turbidity automated monitor to be no greater than +10% of the upstream turbidity monitor for up to and including the design rainfall event.

Discharge of construction related stormwater runoff is able to enter conservation corridor zones provided it meets the above water quality parameters and is contained within a defined channel that directly connects to a receiving water body (Lamerough Creek, Bells Creek North, Bells Creek South).

If during a rain event, the above discharge criteria have not been achieved, and downstream water quality is within the required criteria, then no further corrective action is required.

If performance criteria are exceeded as a result of works covered by this PCEMP, corrective actions will be implemented in accordance with **Section 5.1.5**

All water quality testing is to be in accordance with the Water Quality Management Plan approved on January 2016, or latest approved version.

5.1.3 MANAGEMENT MEASURES

A detailed Erosion and Sediment Control Plan (ESCP) will be developed for each precinct works package and any other associated essential services work covered by an addendum to this PCEMP. This ESCP will detail the proposed control (structural and non-structural) measures that will be implemented on site. The ESCP will be in accordance with IECA (2008) with guidance from *Council's Manual for Erosion and Sediment Control Version 1.2* (SCRC 2008) and EPBC Approval. Water quality discharge from sediment basins in not to enter any retained or created Wallum Sedge Frog

breeding habitat (ponds). Indirect discharge into retained or created habitat (foraging) is permitted providing discharge criteria in **Section 5.1.2 and 5.4.2** are met. This is to ensure that environmental flows are maintained to conservation areas.

Temporary erosion and sediment control measures will remain in place until stabilisation of the contributing sub catchment within each bulk earthworks or construction package is achieved through greater than 70% groundcover (grass seeding strike post bulk earthworks), establishment of permanent landscape treatment, stabilisation through paving or similar surface treatments. Stabilisation will ensure that the natural runoff from the catchment is within the discharge limits specified in **Section 5.1.2**. **Table 5-1** details the erosion and sediment control management methodology.

Table 5-1: Erosion and Sediment Control Management

Measure	Description
Dedicated Construction Areas and Clearly Identified Protection Zones	Conservation areas will be clearly identified and protected from construction activity through signage, barriers or other appropriate measures. All construction activities will occur within specified construction areas, as advised by the Superintendent.
Minimise disturbed areas/Progress Stabilisation	Areas of soil disturbance will be minimised wherever possible. Construction activities will be staged in order to reduce the area of soil exposed at any time.
Progressive Stabilisation	All areas within the site will be stabilised within 5 days of earthworks completion. Stabilisation will consist of both short term and long term stabilisation. Short term stabilisation will consist of covering disturbed areas with a suitable product such as hydro mulch, mulch, enviromulch, geofabric etc. Long term stabilisation will be achieved through drill seeding, hydro mulch, enviromulch, etc. Due to the importance of stabilisation, it is proposed that short term measures will be reinstated as required until long term stabilisation is achieved, to ensure stabilisation is maintained. Sterile exotic and/or native grass species will be used in stabilisation to prevent spread of weeds and future impact on native vegetation.
Diversion of clean flows	Where possible clean water will be diverted around the areas of disturbance. so as not to increase the concentration of TSS or other pollutants and without causing erosion or scouring. All cut-off drains will be designed to both convey and be structurally stable for the 10 year ARI event. The quality of any stormwater discharge resulting from the construction works will be tested to confirm parameters performance criteria are met, before discharge to the receiving environment.
Diversion of dirty flows	Installation of dirty water diversion drains to collect all surface run off from disturbed areas. All dirty water diversions to be discharged into the closest sediment pond for treatment prior to discharge. No diversion flows will enter Wallum Sedge Frog (WSF) breeding habitat.
Stockpiles	Any stockpiles will be located within the area of disturbance, and away from any waterways or drainage channels. Erosion and sediment control measures will be installed and maintained to prevent stockpile run-off.

Measure	Description
	Stockpile batter will be maintained at a slope of no greater than 1:1 and the height will be no greater than 2m, unless an alternative methodology for a higher stockpile height stockpile is approved by the superintendent.
Sediment Fences	Sediment fences will be installed to provide further protection and retention of runoff from disturbed areas. These will be strategically placed along contours and will include overflow weirs to prevent both scour and failure of the devices. Earthen bunds/drains may be used as an alternative technique subject to an assessment of their suitability in relation to location and catchment characteristics.
Sediment Basins (High Efficiency & Traditional)	Sediment management may include the use of High Efficiency and/ or traditional sediment basins installed on site to capture all runoff from disturbed areas throughout construction. Captured runoff will then be treated and discharged into downstream, stabilised areas. The use of high efficiency basins versus traditional sediment basins will be based on the proximity to sensitive receiving environments, erosion risk and an assessment of the best practice, practicality and appropriateness of each application. Due to the sensitive nature of the site, and also with a view to exceeding current 'best practice' outcomes specific design criteria will apply for high efficiency sediment basins or traditional basins . Where traditional sediment basins are used, this will be in accordance with the manual for Erosion and Sediment control (SCRC 2008). The design rainfall depth of 77mm over a 5-day period will be adopted. It is noted that this is somewhat higher than the 5-day 85th percentile rainfall depth for Caloundra which is the recommended design rainfall for sensitive receiving environments. For High Efficiency sediment basins, rainfall intensity and inflow duration governs the time available for suspended sediment to settle in the basin. The design criteria for storm events for High Efficiency sediment basins are as follows: - 0.5 times the peak 1 year ARI discharge For both high efficiency and traditional basins the following requirements apply: - All captured runoff shall be treated (flocculated) and discharged within 5 days of the cessation of the rain event, where practical or as soon as practical noting cumulative / successive rainfall impacts the ability to de-water in some circumstances. Any captured water post the 5 day cut off may be utilised for dust suppression. Captured runoff is to be treated to achieve the performance criteria outlined above. - No discharge of sediment basin water is to enter WSF breeding habitat Refer to the relevant precinct addendum for the conceptual Sediment Basin locations.

5.1.4 MONITORING PROGRAM

Monitoring of all erosion and sediment control measures will be undertaken by Principal Contractor and Superintendent, comprising:

- Daily inspections of all erosion and sediment control measures;
- Daily inspection of the road network for evidence of sediment being deposited external to the site;
- Inspection of all control measures after major rain events (greater than 25mm in 24 hours);
- Measurement of turbidity, pH, Electrical Conductivity (EC) and Dissolved Oxygen (DO) within sediment basins prior to discharge;
- Water Quality testing of any indirect stormwater runoff entering the foraging areas of the WSF habitat;
- Rainfall will be recorded at 9am each working day;
- Turbidity monitoring at sediment basin outlets. The following monitoring will be undertaken;
  - For traditional capture and treat systems monitoring shall be undertaken prior to discharge; and
  - For flow through systems monitoring shall be real time continuous monitoring;
- Temporary sediment control measures incl. sediment basins can be decommissioned provided the following performance criteria are met for the relevant sub-catchment:
  - Greater than 70% groundcover is to be achieved in the catchment through measures such as permanent landscape treatments, roads and roofs or temporary measures such as hydro-mulch with the design intent for permanent vegetative cover.
    - Groundcover percentage can be calculated via one of the following measures:
      - Assessment with a Quadrat to determine ground cover percentage throughout the catchment via photography; or
      - Aerial photography to determine roof, road and vegetated areas.
  - Groundcover percentage assessments must be calculated by a Certified Professional in Erosion and Sediment Control (CPESC) or a Registered Professional Engineer of Queensland (RPEQ)

Prior to the cessation of temporary sediment control measures, the Principal Contractor will confirm to the Superintendent and the Approval Holder that natural runoff from the stabilised catchment is within the discharge limits specified in **Section 5.1.2**

Receiving water quality monitoring is also undertaken by Stockland in accordance with the approved “Water Quality Management Plan”, which includes a range of monitoring activities (e.g. event-based, estuarine EHMP, real-time turbidity, load-based monitoring).

5.1.5 CORRECTIVE ACTIONS

If one or more of the performance criteria are not achieved, then at least one of the following corrective actions will be implemented until the performance criteria are achieved:

- The Principal Civil Contractor shall inspect all temporary erosion and sedimentation controls. Any defects revealed by such inspections shall be rectified immediately and these works shall be cleaned, repaired and augmented as required, to ensure effective erosion and sedimentation control thereafter.
- The Principal Civil Contactor shall review the erosion and sediment control strategy, identify opportunities for improvement of the strategy.

during the course of project construction, the Construction Superintendent or representative may make an observation or issue a direction/advice in relation to the erosion and sediment control strategy being implemented by the Principal Civil

Contractor. Notwithstanding any direction/advice issued by the Construction Superintendent, the Principal Civil Contractor shall ensure that at all times during the construction phase, best practice erosion and control measures are implemented on site.

5.1.6 RESPONSIBILITIES

The Principal Civil Contractor shall be responsible the Approval Holder for planning, design, certification and carrying the whole of the Work to minimise and avoid erosion and sedimentation of the site, surrounding country, watercourses, water bodies and wetlands.

The Principal Civil Contractor should note that any Conceptual Erosion and Sediment Control drawings included in the PCEMP or approved under the approval process with EDQ are conceptual only and represent a possible erosion and sediment control strategy for the site. The Principal Civil Contractor shall be responsible for advancing the conceptual design plans to suit their construction methodology.

5.1.7 REPORTING

Onsite documentation must be held whereby a record of daily inspection documentation is kept, including but not limited to:

- Monthly environmental compliance reports (ECR) to address erosion and sediment control measures and events resulting from significant rainfall (see above)
- A log of the effectiveness of the erosion and sediment control measures will be maintained
- Daily inspections of all erosion and sediment control measures
- Rectification of defect items
- Onsite water quality testing results
- Turbidity monitoring documentation. The following monitoring documentation will be recorded:
  - For traditional capture and treat systems monitoring documentation shall be undertaken prior to discharge
  - For flow through systems documentation shall be real time continuous monitoring
- Notify the Construction Superintendent of non-compliances as soon as possible in order to comply with reporting obligations of the Approval Holder, consistent with condition 14 of the EPBC Approval and **Section 4.1** of this document
- An Annual Compliance Report (ACR) will be prepared in accordance with condition 14 of the EPBC Act Approval and will report on compliance with the approved PCEMP.

5.2 GROUNDWATER

5.2.1 OVERVIEW

Much of the current development site is underlain by relatively shallow groundwater. At the site establishment stage, there will be a need to manage local groundwater levels to allow construction activities to commence without causing adverse environmental impacts.

Due to the presence of shallow groundwater across the site, earthworks have the potential to impact groundwater where excavation activities intersect the water table and dewatering is necessary.

Where dewatering is necessary, a network of closely spaced drainage trenches intersecting the water table is likely to be constructed. Groundwater discharge is to be kept separate to the surface water discharge.

Dewatering activities will not drain areas of retained or created WSF habitat, with natural fluctuations to groundwater levels (e.g. filling and evaporative cycles of the perched, shallow aquifer) maintained in areas identified for long term WSF habitat. Monitoring of groundwater levels within created or retained WSF habitat is to be undertaken in these areas, as outlined in Section 5.2.4 and Section 5.4.4

5.2.2 PEFORMANCE CRITERIA

Performance requirements for groundwater management are as follows:

- Discharges of surface water from the site (that could be groundwater affected) are controlled and released in accordance with surface water quality discharge standards, inclusion of combined surface water and groundwater sediment basins to be sized accordingly taking into account dewatering rates;
- Sediment basins to be dewatered within 5 days;
- Acidity and/or dissolved metals are not to be conveyed off the site through groundwater as a result of the development above natural variability (determined by groundwater quality trigger values developed using baseline data as per the Water Quality Management Plan;
- Spills or other contaminant releases that could affect groundwater quality are avoided or otherwise treated immediately; and,
- No drainage of retained or created WSF breeding habitat.

The data collected as part of the groundwater monitoring program will be used to develop an adaptive monitoring approach that utilises monitoring data to inform management approaches. The groundwater monitoring program is related to the construction phases of the project.

Prior to commencement of construction/ earthworks, trigger values were established for each bore in the monitoring network. These trigger values for comparing groundwater quality data to during construction are outlined in the WQMP (BMT WBM January 2016).

The recommended trigger values and management responses are:

- Exceedance of the 80th percentile of baseline data (or 20th percentile for parameters with a lower limit). Exceedance of this trigger value at sentinel bores (refer to Water Quality Management Plan) triggers an initial investigation into impacts to Protected Matters.
- Indications that there are construction related impacts to Protected Matters (as per assessment methodology detailed in the Water Quality Management Plan) triggers corrective actions.

5.2.3 MANAGEMENT MEASURES

To minimise potential negative impacts to groundwater quality, a management structure as shown in **Figure 5-1** will be implemented. This structure identifies avoidance as the preferred management option as opposed to disposal as the least preferred.

Figure 5-1: Groundwater Management Hierarchy

Table 5-2: Groundwater Management

Management Option	Description of Measures
Avoid	The Aura development has been designed to rehabilitate and protect extensive conservation areas and waterway corridors. These conservation and waterway corridor areas extend over approximately 656 hectares within the site (over 27% of the site). It is anticipated that the protection and rehabilitation of these areas will significantly mitigate potential negative impacts to and improve the health of downstream waterway areas, through improved catchment hydrology and reduced pollutant loads. The extraction of groundwater should only occur if required, and any unnecessary groundwater extraction will be avoided.
Reduce	If groundwater extraction is required, extraction will only be undertaken at an extent and/ or rate deemed necessary to appropriately undertake required earthworks activities.
Reuse	Where practical and feasible, extracted groundwater is to be reused on site to (i) supplement on-site water demands and (ii) minimise discharges to downstream environments. As described in the report "*Aura Development: Groundwater Assessment*" (BMT WBM, 2013), the quality of shallow groundwater at the Aura site is good with generally low salinity (excepting a locally developed salt scald), although some slightly elevated nutrient and dissolved iron concentrations have been recorded for shallow groundwater. It is anticipated that extracted groundwater could be used for a variety of usages, including irrigation, and construction phase dust suppression. Whilst the water could be used as a resource to irrigate areas to be rehabilitated, it could also be irrigated on other areas within the Aura site as a form of 'disposing' the extracted groundwater (and minimising discharges to downstream waterways).

Management Option	Description of Measures
	The construction phase sediment basins will provide temporary storage for the extracted groundwater. It is, however, anticipated that additional storage will be required to provide extended storage for extracted groundwater (for subsequent reuse). This storage could be provided in areas proposed for wetlands, basins and/ or the lake for the operational phase of the site.
Treat	Sediment loads within the extracted groundwater will primarily be treated via drainage channels and sediment basins (integrated as part of the best practice Erosion and Sediment Control Plan (ESCP) for the site). In the infrequent event of not being possible to transfer groundwater from the sediment basins to other on-site storages (for subsequent reuse), stormwater flows (discharging from the basins) will be further treated via vegetated 'buffer' areas – between the basins and waterways. Stormwater flows from the sediment basins (and/ or other storages) will be dissipated/ spread over the vegetated areas (located upslope of waterways, but downslope of WSF breeding habitat) to reduce pollutant loads (particularly sediment) entering the waterways. The treatment of sediment laden stormwater will by default also assist in the removal of a range of other potential pollutants.
Dispose	Disposal has been adopted as the least preferred method of groundwater management as dictated by the management hierarchy adopted for the site. The only groundwater proposed to be disposed of includes: • Extracted groundwater which overtops the sediment basins and/ or other storages (for extracted groundwater) • Extracted groundwater which is treated in the sediment basin and control released in the event that the treated groundwater cannot be transferred to other storages (e.g. if they were already full). • Environmental flows in waterways which will not be impacted by the proposed disturbance footprint. Where feasible and practical, it is preferred that any 'disposal' of flows should be undertaken within the Lamerough Creek catchment in preference to Bells Creek. This is because Bells Creek has Ramsar wetland status and is anticipated to be more sensitive to discharged flows (e.g. due to a smaller catchment size, relative to Lamerough Creek). It is noted that due to the "avoid", "reduce" and "reuse" strategies discussed in this table, environmental flows will still be maintained to the downstream receiving waterways so that there is not an over-extraction of water resources. Where extracted groundwater is disposed (e.g. over-topping of sediment basins during major rainfall events), some sediments and associated pollutants within this water will also be disposed (and conveyed downstream).
Rehabilitation of conservation and waterway area	As described above, the Aura development has been designed to rehabilitate and protect extensive areas of conservation and waterway corridor areas. To augment the best practice approach to groundwater management, the rehabilitation of the conservation and waterway corridor areas will be undertaken as soon as practical. In particular, the rehabilitation of the conservation and waterway corridor areas adjacent to (and downstream of) construction areas will have two key benefits: • *Lowering of groundwater levels*. As described in the report "*Aura Development: Groundwater Assessment*" (BMT WBM, 2013), there is a close linkage between tree coverage of the site and associated groundwater levels, and when the site was covered (historically) with vegetation (be that pine plantation or native forest),

Management Option	Description of Measures
	groundwater levels were lower than those currently observed on the site. The planting and growth of trees within adjacent areas proposed for conservation and waterway corridor areas will subsequently augment the lowering of groundwater levels and reduce groundwater extraction requirements. • *Buffering/ Treatment of Stormwater Flows*: As described above, vegetated buffer areas downstream of sediment basins (and/ or other storages) will act to improve the quality of stormwater flows discharged to downstream waterways. The rehabilitation/ planting of these areas (if currently lacking vegetation growth) will act to augment the treatment performance of these areas.

5.2.4 MONITORING PROGRAM

There is a network of existing groundwater monitoring bores located across the site, as illustrated in **Figure 5-2**. A stratified program of monitoring has been developed, depending upon whether development works are occurring in catchments, as follows:

- Pre-construction Baseline monitoring for the site, refer to **Table 5-3**.
- All bores within catchments with active construction works will be sampled on a biannual basis, up to and for 12 months after active development works are completed in respective catchments.
- All Sentinel and Control bores within catchments where there are active construction activities occurring will be sampled on a monthly basis.
- Construction bores within catchments where construction activities are occurring and which are in close proximity (i.e. within 500m) to areas of active development works will be sampled on a monthly basis, refer to **Table 5-2** for details.

Groundwater monitoring is to be undertaken in accordance with the latest approved version of the WQMP. Refer to Table 7-1 for details of groundwater monitoring responsibilities.

Figure 5-2: Groundwater Monitoring Locations (Source BMT WBM)

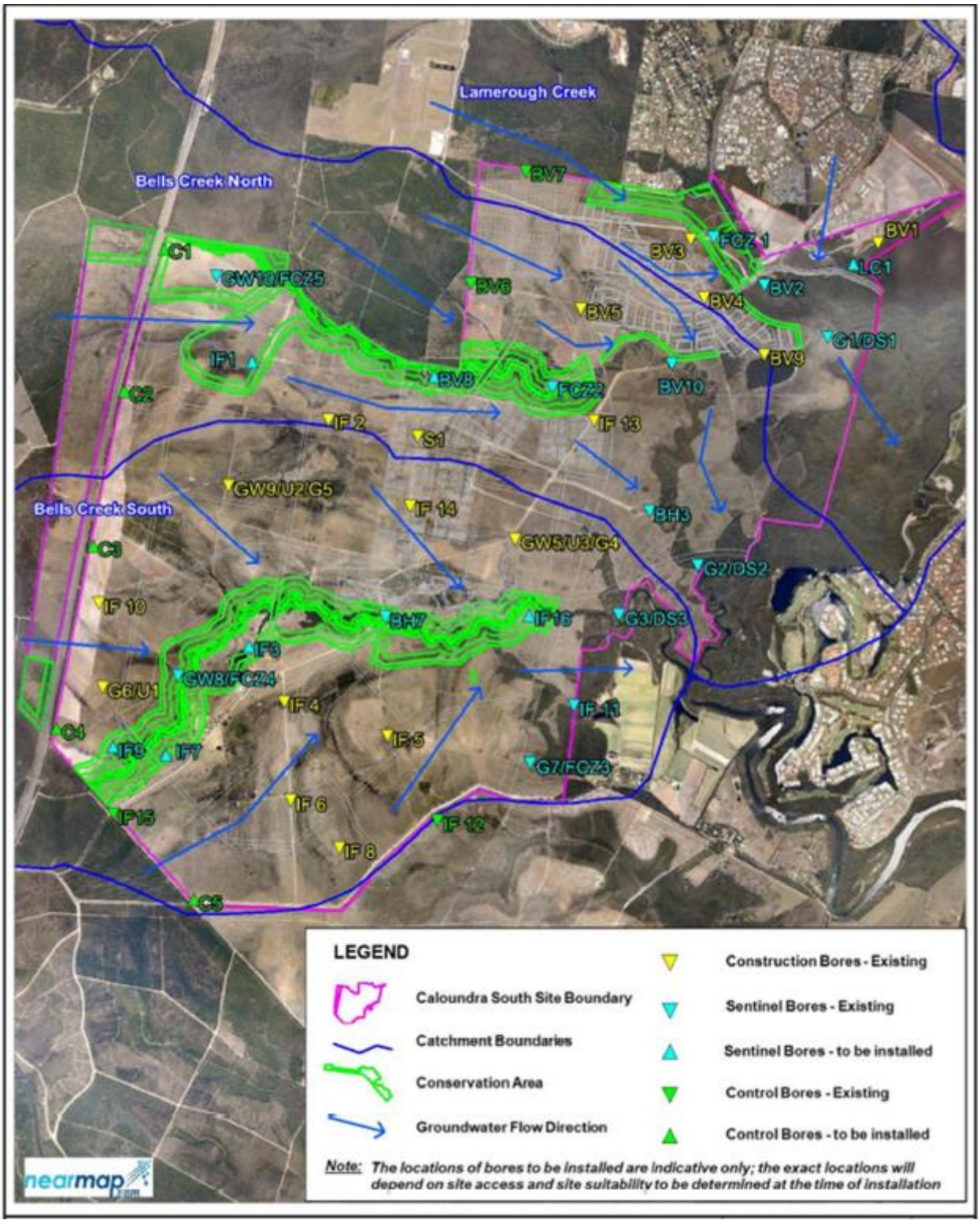


Table 5-3: Groundwater Quality Monitoring Summary

Monitoring Category	Nature of Works	Commencement	Cessation

Pre-construction Baseline	• Periodic samples and analysis at groundwater locations on site shown in Figure 5-2**.** Within at least 12 months of commencing active construction works in a catchment, all bores within the catchment proposed for active construction works will be monitored on a monthly basis until at least ten rounds of data collected over at least a 12 month period prior to construction.
	• Field Parameters:
	  ◦ Water level;
	  ◦ pH;
	  ◦ Electrical conductivity;
	  ◦ Temperature; and
	  ◦ Dissolved oxygen.
	• Analytical Parameters:
	  ◦ Major Anions (Alkalinity);
	  ◦ Major Cations;
	  ◦ Total nitrogen, Organic N, Ammonia N and NOx;
	  ◦ Total phosphorus and filterable reactive phosphorus;
	  ◦ Soluble sulfate (Cl-:SO42-) ratio;
	  ◦ Dissolved metals; and
	  ◦ PAHs including BTEXN, TPH, TRH.
		• At least 12 months prior to commencing construction in a catchment.
		• Should construction occur prior to the completion of pre-construction monitoring (e.g. new bores), site-specific baseline data (i.e. baseline data from across the entire site) will be assigned to the bore.
			Commencement of active construction works in a catchment

Monitoring Category	Nature of Works	Commencement	Cessation

Biannual Monitoring	• Biannual monitoring (once every six months) will be undertaken at all bores within catchments with active construction works occurring.
	• Field Parameters:
	  • Water level;
	  • pH;
	  • Electrical conductivity;
	  • Temperature; and
	  • Dissolved oxygen.
	• Analytical Parameters:
	  • Major Anions (Alkalinity);
	  • Major Cations;
	  • Total nitrogen, Organic N, Ammonia N and NOx;
	  • Total phosphorus and filterable reactive phosphorus;
	  • Soluble sulfate (Cl-:SO42-) ratio;
	  • Dissolved metals; and
	  • PAHs including BTEXN, TPH, TRH.
		• Once active construction works commence in a catchment, all bores within the catchment will be sampled on a biannual basis.	12 months after active construction works are completed in respective catchments

Construction Phase Monthly Monitoring	• Monthly monitoring will be conducted at all 'Construction' bores within 500m of active construction works. • Monthly monitoring will be conducted at all 'Sentinel' and 'Control' bores. • Monitoring will be conducted for the following parameters:	• Construction' bores within catchments where there are construction activities occurring and which are in close proximity (i.e. within approximately 500m) to areas of active construction works will be sampled on a monthly basis.	12 months after active construction works are completed in respective catchments

Monitoring Category	Nature of Works	Commencement	Cessation
	• Water level; • pH; • Electrical Conductivity; • Total nitrogen, Organic N, Ammonia N and NOx; • Total phosphorus and filterable reactive phosphorus; • Dissolved Iron; and • Dissolved Aluminium.	• All 'Sentinel' and 'Control' bores within catchments where active construction works are occurring will be monitored on a monthly basis.	

5.2.5 CORRECTIVE ACTIONS

If one or more of the performance criteria are not achieved, then at least one of the following corrective actions will be implemented until the performance criteria are achieved:

- Review of site construction management practices;
- Localised filling or excavation works to adjust land elevations;
- Review of current and planned filling and excavation works;
- Changes to proposed re-vegetation and ecological enhancement strategies;
- Review of site surface water management devices (WSUD) and stormwater harvesting practices;
- Detection and remediation of spills or other contaminant releases (if groundwater quality is detected as being affected); and
- Review and amendment of ASS management practices in the context of unusually low groundwater pH or the presence of dissolved metals at downstream monitoring locations.

5.2.6 RESPONSIBILITIES

As outlined above, Stockland is the EPBC Act Approval Holder and overall project administrator of the development. To oversee construction phases, Stockland will appoint an external Construction Superintendent to oversee the implementation of the project and will engage a Principal Civil Contractor as well as construction and/or building contractor(s) to undertake the works in accordance with relevant approvals, conditions and commitments (including those set out in this PCEMP).

The Principal Civil Contractor will be responsible for ensuring best practice for the management of groundwater during the construction of the works covered by this PCEMP. The Approval Holder will be responsible for the appointment of a suitably qualified Environmental Management Representative to undertake monitoring of groundwater. This consultant will be independent of the Principal Civil Contractor.

The Approval Holder and Principal Civil Contractor will be responsible for the implementation and refinements of any corrective actions to ensure environmental protection goals are achieved.

5.2.7 REPORTING

The following reporting requirements apply:

- An ACR will be prepared in accordance with condition 14 of the EPBC Approval and will report on compliance with this PCEMP.
- Notify the Construction Superintendent of non-compliances as soon as possible in order to comply with reporting obligations of the Approval Holder.
- Reporting is consistent with condition 14 of the EPBC Approval and **Section 4.1** of this document.

5.3 GEOTECHNICAL (ACID SULFATE SOILS)

5.3.1 OVERVIEW

Preliminary Geotechnical investigations have been completed over the site. Borehole results have indicated the presence of soils with generally low concentrations of natural acidity and a very low potential for additional acidity arising from oxidation of the in-situ soils as a result of excavation or filling.

During construction of the works covered by this PCEMP, the cut exercise varies and the fill material will be used to fill. While Acid Sulfate Soils (ASS) are not expected to be encountered during the construction of the works associated with this PCEMP, monitoring will be undertaken where excavations are below 5.0m AHD.

If hotspots of ASS or potential ASS are detected, an ASS management plan will be prepared by the Principal Civil Contractor. Typical management measures (i.e. bulk application of agricultural lime) will be minimised as far as practicable due to the presence of the Wallum Sedge frog and other acid frogs which prefer acidic conditions. A description of general ASS management measures is outlined in the **Table 5-4**.

Management and testing of ASS will be undertaken in accordance with the Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland (C.R. Ahern et. Al. 1998) or most recent version and the Queensland Acid Sulfate Soil Technical Manual Soil Management Guidelines. Management approaches to Acid Sulfate Soils are to be assessed on a case specific basis on advice from specialist consultants. Management methodology is to be approved in writing by the Construction Superintendent.

5.3.2 PERFORMANCE CRITERIA

The following performance criteria will apply to the management of ASS during construction of the works covered by this PCEMP:

- Significant adverse impacts to the natural or built environment on or off the site as a result of the disturbance of ASS are avoided;
- pH sensitive fauna habitats and species retained on the site in the Environmental Protection Zone (EPZ) and conservation corridors are not adversely affected by ASS treatment methods.
- Water quality discharges from construction areas must have a pH of 6.5 to 8.5. If groundwater is passed through the sediment basins, then a pH of the discharged water less than pH 6.5 is accepted, providing it is within the range specified in the approved WSFMP.
- Dissolved metals (aluminium and iron) conveyed off the construction site through groundwater or surface water are not to increase dissolved metal concentrations in downstream receiving waters beyond natural variability (determined by exceedance of groundwater and surface water trigger values as per the Water Quality Management Plan).

5.3.3 MANAGEMENT MEASURES

Table 5-4: Acid Sulfate Soils Management

Management Option	Description of Measures
Avoid	Minimise areas of excavation under RL 5.0 m (AHD) where greater concentrations of acid sulfate soils could be present.
Testing	During construction, where acid sulfate soils are expected to be encountered, progressive testing of soils to determine if acid sulfates are present in the soils. Testing to be completed by an appropriately qualified geotechnical engineer or environmental scientist/engineer. Remediation of acid sulfate soils to be determined by a qualified geotechnical engineer or environmental scientist/engineer and in accordance with the Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland (C.R. Ahern et. al. 1998) or the most recent version and the Queensland Acid Sulfate Soil Technical Manual Soil Management Guidelines
Treatment	When acid sulfate soils are encountered, ensure suitable buffer zones are allowed for between frog habitats and overland flow areas for lime dosing or other treatment measures, including on site storage. In accordance with Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland (C.R. Ahern et. Al. 1998) or the

Management Option	Description of Measures
	most recent version and the Queensland Acid Sulfate Soil Technical Manual Soil Management Guidelines

5.3.4 MONITORING PROGRAM

Monitoring requirements for ASS are as follows:

- ASS testing will be completed on areas below 5m AHD and other areas expected to contain ASS;
- Management and testing of ASS will be undertaken in accordance with the Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland (C.R. Ahern et. Al. 1998) (or most recent version),; and
- Daily measurement of water pH within construction sediment ponds.

5.3.5 CORRECTIVE ACTIONS

If one or more of the performance criteria have not been achieved, then at least one of the corrective actions will be implemented until the performance criteria have been achieved:

- Review ASS testing and management procedures and implement revised testing and management procedures;
- Isolate and separate affected stockpile material. Ensure protection against overland flows and containment of stockpile runoff is achieved; Treatment of fill or trench material to be determined by an appropriately qualified geotechnical engineer or environmental scientist/engineer; and
- Implement corrective actions for WSF habitat in accordance with **Section 5.4.5**

5.3.6 RESPONSIBILITIES

The Approval Holder (Stockland) is responsible for the below:

- Ensuring best practice design to reduce earthworks impact for levels under RL 5.0 m (AHD).
- Production of sampling regime prior to construction to determine process for future Precinct earthworks.

The Principal Contractor is responsible for:

- Onsite testing of ASS by an appropriately qualified geotechnical engineer or environmental scientist/engineer;
- Preparation of an ASS management plan if ASS or potential ASS are detected; and
- Management and treatment of ASS material.

5.3.7 REPORTING

The following reporting requirements apply:

- ASS sampling and results;
- Notify the Construction Superintendent of non-compliances as soon as possible in order to comply with reporting obligations of the Approval Holder, consistent with condition 14 of the EPBC Approval and **Section 4.1** of this document; and
- An Annual Compliance Report (ACR) will be prepared in accordance with condition 14 of the EPBC Approval and will report compliance with this PCEMP.

5.4 WALLUM SEDGE FROG MANAGEMENT

5.4.1 OVERVIEW

The Wallum Sedge Frog (*Litoria olongburensis*) is a small, arboreal frog, found in wallum habitats, characterised by acidic conditions and semi-ephemeral wetlands. It is also known as one of the 'acid frogs' due to its tolerance (and preference) for mildly acidic ground and water conditions. The Wallum Sedge Frog is present across the project site in wallum heath and sedgeland environments. Impacts to existing Wallum Sedge Frog habitat will occur progressively on the site, however, based on mitigation measures proposed, corridor functionality is not likely to be impacted and a total net gain in habitat is targeted. Development of the site will progressively occur over 30 years with mitigation measures and monitoring of frog habitat to occur commensurate with development staging. Wallum sedge frog habitat to be retained and removed across the site is shown **Figure 5-3** and reported in each precinct addendum.

5.4.2 PERFORMANCE CRITERIA

The objective of this part of the PCEMP is to conserve retained WSF breeding habitat within the EPZ and conservation corridors. Key performance criteria are as follows:

- Prevent impacts of construction (both direct and indirect) on retained WSF habitat;
- Establish a buffer between retained and created frog breeding habitat within the EPZ and conservation corridors and construction activities/works. This buffer is to be a minimum 30m or where this cannot be achieved, physical separation using bunds / swales so as to ensure no constructed water enters breeding habitat; and
- Construction site stormwater runoff does not enter created or retained frog ponds.

5.4.3 MANAGEMENT MEASURES

The following measures will be implemented to prevent construction impacts to WSF breeding habitat:

- Establish and maintain WSF movement corridor along the Bells Creek North, Bells Creek South and Lamerough Creek, incorporating recreation of WSF foraging and movement habitat, during the construction phase;
- Establish and maintain a minimum 30m buffer between created or retained frog breeding ponds and water sensitive urban design systems;
- Where a 30m buffer cannot be established, construction and development stormwater discharges will be prevented from discharging to WSF Breeding habitat. This will be achieved by constructing and maintaining swale drains and bunds to ensure no discharge of construction area surface waters to WSF breeding habitat. Additionally, when this buffer cannot be achieved, the pH of waters within the swale drains must be less than 6, preferably between 4-5;
- This buffer will be planted with semi-erect semi-aquatic emergent vegetation consistent with species common in existing habitats on site as specified in the approved WSFMP;
- All stormwater runoff from the development and discharge from the WSUD systems up to 5 year ARI event will be directed around created and retained WSF breeding ponds (to maintain pH, ensure habitat stability and limit introduction of competitor/predatory species);
- Maintain natural groundwater hydro period and other water chemistry aspects (particularly pH and tannin levels) of retained habitat areas;
- Maintain and enhance vegetation communities within retained habitat areas of the Frog Zone and Frog Buffer through, for example, weed management;
- Deter inappropriate recreational activities in retained frog habitat through signage, vegetation planting and physical barriers; and
- Reduce lighting in proximity to retained WSF habitat.

5.4.4 MONITORING PROGRAM

Conduct monitoring as per the requirements of the approved WSFMP, including:

- **Pre-construction phase** – WSF habitat survey to determine the extent and condition of habitat to be removed, on a precinct or group of precincts basis; and
- **On maintenance phase** - monitoring of WSF presence and habitat condition during the establishment of the Frog conservation areas, including retained existing WSF habitat.

5.4.5 CORRECTIVE ACTIONS

If one or more of the performance criteria have not been achieved, one or more of the following corrective actions will be implemented until the performance criteria have been achieved:

- If clearing occurs outside the delineated, approved clearing areas, cease all work in the area affected and advise the Superintendent (and regulatory agencies if protected communities/ species);
- Instigate rehabilitation efforts immediately at any area accidentally cleared in accordance with directions from the Superintendent; and,
- Specific corrective actions associated with the retained WSF breeding habitat are to be implemented in accordance with the requirements in the approved WSFMP for:
  - water chemistry;
  - surface water runoff;
  - hydro period;
  - vegetation; and
  - Wallum Sedge Frog presence.

Table 5-5: Corrective Actions

Aspect Impacted	Issue Experienced	Possible Reason	Corrective Action Including Example of maintenance activity used to identify the risk	Responsible party
Water Chemistry	Elevated pH and conductivity combined with a reduce tannin concentration within created Wallum Sedge Frog habitat ponds.	An indication of surface water flows from the development entering the habitat ponds.	Locate the overland flow path and redirect it to the appropriate drainage infrastructure. Monitoring conducted as per WSFMP will identify the occurrence of this risk.	Approval Holder/ Principal Civil Contractor
Surface water runoff	Ineffective drainage from the development.	Blocked pipes and culverts.	Clearing of the blockage in the drainage infrastructure. Monitoring conducted as per WSFMP will identify the occurrence of this risk.	Approval Holder/ Principal Civil Contractor
Hydro period	A significant increase or decrease in ponding time	Possibly the result of the stormwater driven surface water inflows or a created Wallum Sedge	Identify the overland flow path and redirect it, or isolate the pond from flow pathway via levee banks around the habitat	Approval Holder/ Principal

Aspect Impacted	Issue Experienced	Possible Reason	Corrective Action Including Example of maintenance activity used to identify the risk	Responsible party
	when compared to that achieved within retained existing Wallum Sedge Frog habitat.	Frog pond that is too shallow.	Deepen the Wallum Sedge Frog pond by further excavation. Reduce pond depth to reduce ponding time	Civil Contractor
Vegetation	Incorrect establishment of plant species and hence development of habitat not preferred by the Wallum Sedge Frog.	The incorrect hydro period and/or ineffective weed control will result in the establishment of an inappropriate plant community.	Develop correct hydro period, as stated above and implement a weed management regime. Monitoring conducted as per the WSFMP will identify the occurrence of this risk.	Approval Holder

5.4.6 RESPONSIBILITIES

The Approval Holder will appoint a Construction Superintendent to oversee the implementation of the project, with a Principal Civil Contractor as well as construction and/or building contractor(s) and landscaping/environmental/ecological contractors for WSF management, vegetation management and rehabilitation to undertake the works in accordance with relevant approvals, conditions and commitments.

The Principal Civil Contractor will be responsible for ensuring best practice for the management of WSF during construction. The Approval Holder will be responsible for the appointment of a suitably qualified ecologist to provide advice as appropriate. This consultant will be independent of the Principal Civil Contractor.

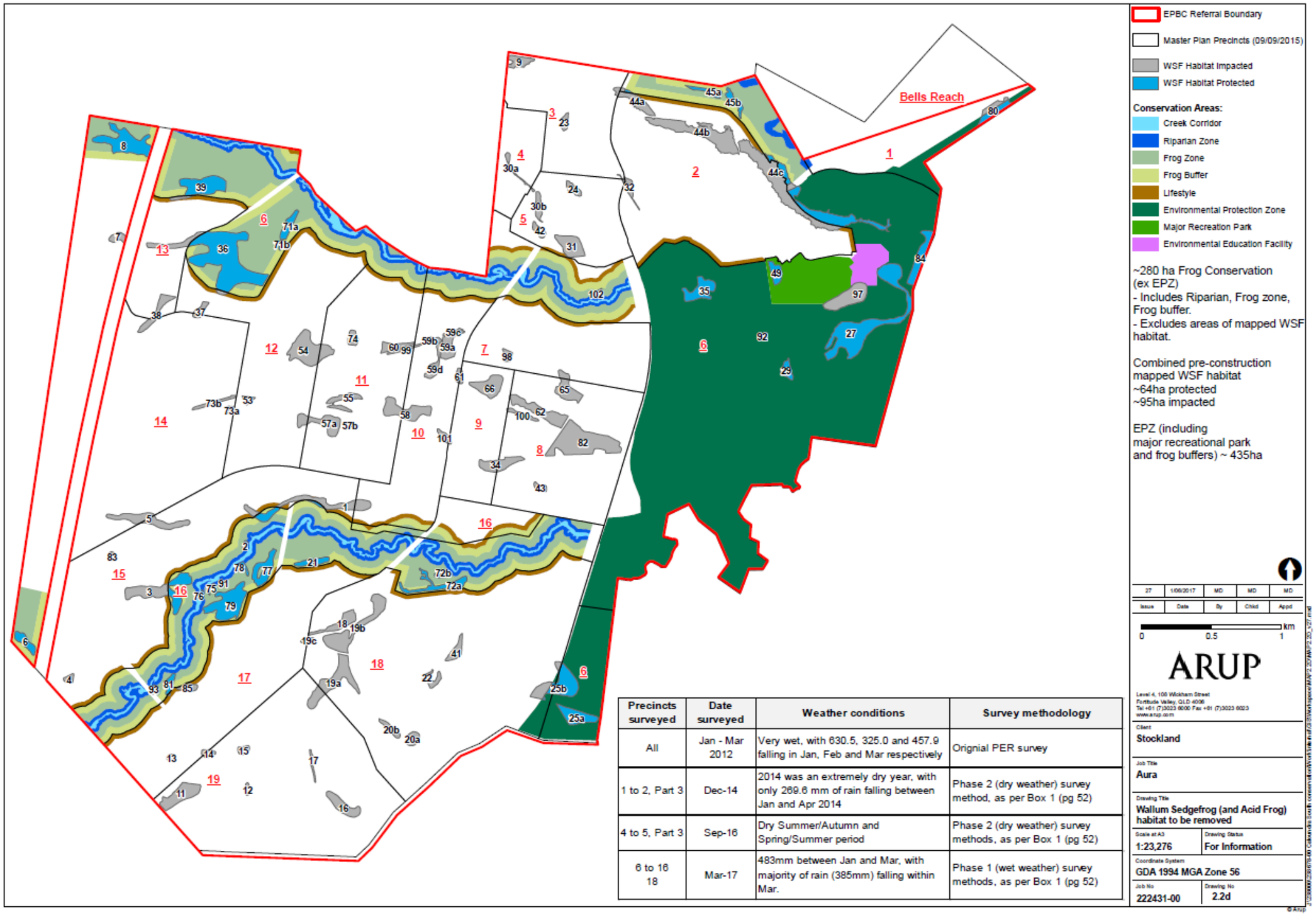
The Principal Civil Contractor will be responsible for the implementation and refinements of any corrective actions to ensure the performance criteria are attained and/or maintained.

5.4.7 REPORTING

The following reporting requirements apply:

- Annual reporting will be undertaken of all monitoring activities under the WSFMP;
- Non-compliances will be reported to the Environmental Management Representative as soon as possible in order to ensure reporting can occur, consistent with condition 14 of the EPBC Approval; and
- An ACR will be prepared in accordance with condition 14 of the EPBC Approval and will report on compliance with this PCEMP.

Figure 5-3: Wallum Sedge Frog Habitat



Precincts surveyed	Date surveyed	Weather conditions	Survey methodology
All	Jan - Mar 2012	Very wet, with 630.5, 325.0 and 457.9 falling in Jan, Feb and Mar respectively	Orignial PER survey
1 to 2, Part 3	Dec-14	2014 was an extremely dry year, with only 269.6 mm of rain falling between Jan and Apr 2014	Phase 2 (dry weather) survey method, as per Box 1 (pg 52)
4 to 5, Part 3	Sep-16	Dry Summer/Autumn and Spring/Summer period	Phase 2 (dry weather) survey methods, as per Box 1 (pg 52)
6 to 16 18	Mar-17	483mm between Jan and Mar, with majority of rain (385mm) falling within Mar.	Phase 1 (wet weather) survey methods, as per Box 1 (pg 52)

Issue	Date	By	Chkd	Appd
27	1/06/2017	MD	MD	MD

ARUP

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Client: Stockland

Job Title: Aura

Drawing Title: Wallum Sedgefrog (and Acid Frog) habitat to be removed

Scale at A3: 1:23,276

Drawing Status: For Information

Coordinate System: GDA 1994 MGA Zone 56

Job No: 222431-00

Drawing No: 2.2d

5.5 VEGETATION MANAGEMENT

5.5.1 OVERVIEW

Vegetation management across the project site is guided by the Vegetation Management and Rehabilitation Plan (VMRP). The VMRP has been prepared to inform enhancement actions within the EPZ and conservation corridors by providing an overarching site rehabilitation and enhancement plan, and by outlining the associated actions required to support its implementation. This PCEMP has been prepared in accordance with the requirements of the VMRP. Rehabilitation areas across the site are shown in **Figure 5-4** and rehabilitation requirements associated with specific precincts works are detailed in the relevant precinct addendum.

5.5.2 PERFORMANCE CRITERIA

The objective of this part of the PCEMP is to protect remnant vegetation to be retained on site and promote the successful rehabilitation of native vegetation within the EPZ and conservation corridors.

The key performance criteria are:

- To avoid impacts on native remnant vegetation located within the EPZ and conservation corridors;
- Increase the extent (ha) and quality (low, medium, high quality classes) of native vegetation within the EPZ and conservation corridors; and
- Implement corrective actions if performance criteria are not achieved (refer **Section 5.5.5**).

5.5.3 MANAGEMENT MEASURES

The following are management measures for retained and rehabilitated vegetation:

- The area of EPZ and conservation corridors to be conserved and rehabilitated must not be adversely affected by the works as identified on construction plans, marked and protected through the use of barrier fencing protection (refer to precinct-specific vegetation impact zones in relevant addendum).
- Activities such as storage of materials, parking, liquid disposal, refuelling activities, construction site office or shed, burning of trash, stockpiling of soil, any filling or excavation activity (unless approved by the Construction Superintendent or Approval Holder) and use of unauthorised chemicals will be prohibited within the EPZ and conservation corridors.
- Retained trees will not have their crown removed. The contractor is to take all reasonable care to ensure that no branches and trunks are damaged during construction.
- All staff involved in construction are made aware of the defined significant and protected vegetation areas, including all personnel engaged in preconstruction works (refer to precinct-specific vegetation impact zones in relevant addendum).
- All tree roots that are damaged during excavation and related activities will be sawn/cut to a clean surface and will be treated with a fungicidal solution prior to backfilling or within 24 hours of the damage to the root occurring.
- All construction traffic will be confined to designated access roadways to prevent soil compaction. No heavy machinery will be driven under canopies of significant vegetation nominated for retention (refer to precinct-specific haul road location details in relevant addendum).
- Livestock and the general public will be excluded from HMUs undergoing ecological enhancement, unless temporary crash grazing is being used to control exotic pasture grasses. This will help to control weed and disease (e.g. chytrid fungus) spread.
- Rehabilitation within HMUs in the EPZ and conservation corridors will be implemented in accordance with precinct Environmental Rehabilitation Plans.

5.5.4 MONITORING PROGRAM

Monitoring will continue until handover (off-maintenance) requirements are satisfied (noting these may extend beyond the development construction period within the relevant precinct).

Visual and photographic monitoring will be conducted to evaluate the effectiveness of the enhancement strategies within HMUs in the EPZ and conservation corridors. A visual monitoring point will be established in each HMU and the location and characteristics monitored will be set out in precinct Environment Rehabilitation Plans. Photo point records will be maintained every 6 months.

A permanent flora transect will be established to represent treatment types and target communities, undertaken annually and identified in precinct Environmental Rehabilitation Plans.

5.5.5 CORRECTIVE ACTIONS

At least one of the following corrective actions will be implemented if vegetation clearing or damage to vegetation, i.e. one or more of the performance criteria are not achieved, occurs outside the delineated, approved clearing areas. The corrective actions will be implemented until the performance criteria have been achieved:

- Cease all work in the area affected and advise the Superintendent (and regulatory agencies if protected vegetation).
- Instigate rehabilitation efforts immediately at any area accidentally cleared in accordance with directions from the Superintendent.
- In relation to the success of rehabilitation works, an adaptive management approach will be taken and outlined in the Environmental Rehabilitation Plan.
- If any Listed Threatened MNES vegetation species are identified during construction, the contractor will adopt the following corrective actions:
  - Confirm the identity of the species found with the assistance of a qualified ecologist; and
  - If confirmed as a Listed Threatened Species, undertake transplanting of the plant(s) into an appropriate location in the Environmental Protection Zone where it will be protected.

5.5.6 RESPONSIBILITES

To oversee construction phases, the Approval Holder will appoint an external Superintendent to oversee the implementation of the project, a Principal Civil Contractor, and construction and/or building contractor(s) and landscaping/environmental contractors for vegetation management and rehabilitation to undertake the works in accordance with relevant approvals, conditions and commitments.

The Principal Civil Contractor will be responsible for ensuring best practice vegetation management during construction. The Approval Holder will be responsible for the appointment of a suitably qualified ecologist to provide advice as appropriate. This consultant will be independent of the Principal Civil Contractor.

The Principal Civil Contractor will be responsible for the implementation and refinements of any corrective actions.

5.5.7 REPORTING

Any vegetation compliance issues and corrective actions must be incorporated into the regular environmental reporting required by the contractor to the Superintendent. A report will be produced annually for the duration of the ecological enhancement program (which may extend beyond the construction program for the rest of the development.) Notify the Construction Superintendent of non-compliances as soon as possible in order to comply with reporting obligations of the Approval Holder, consistent with condition 14 of the EPBC Approval and **Section 4.1** of this document.

Figure 5-4: Rehabilitation Areas

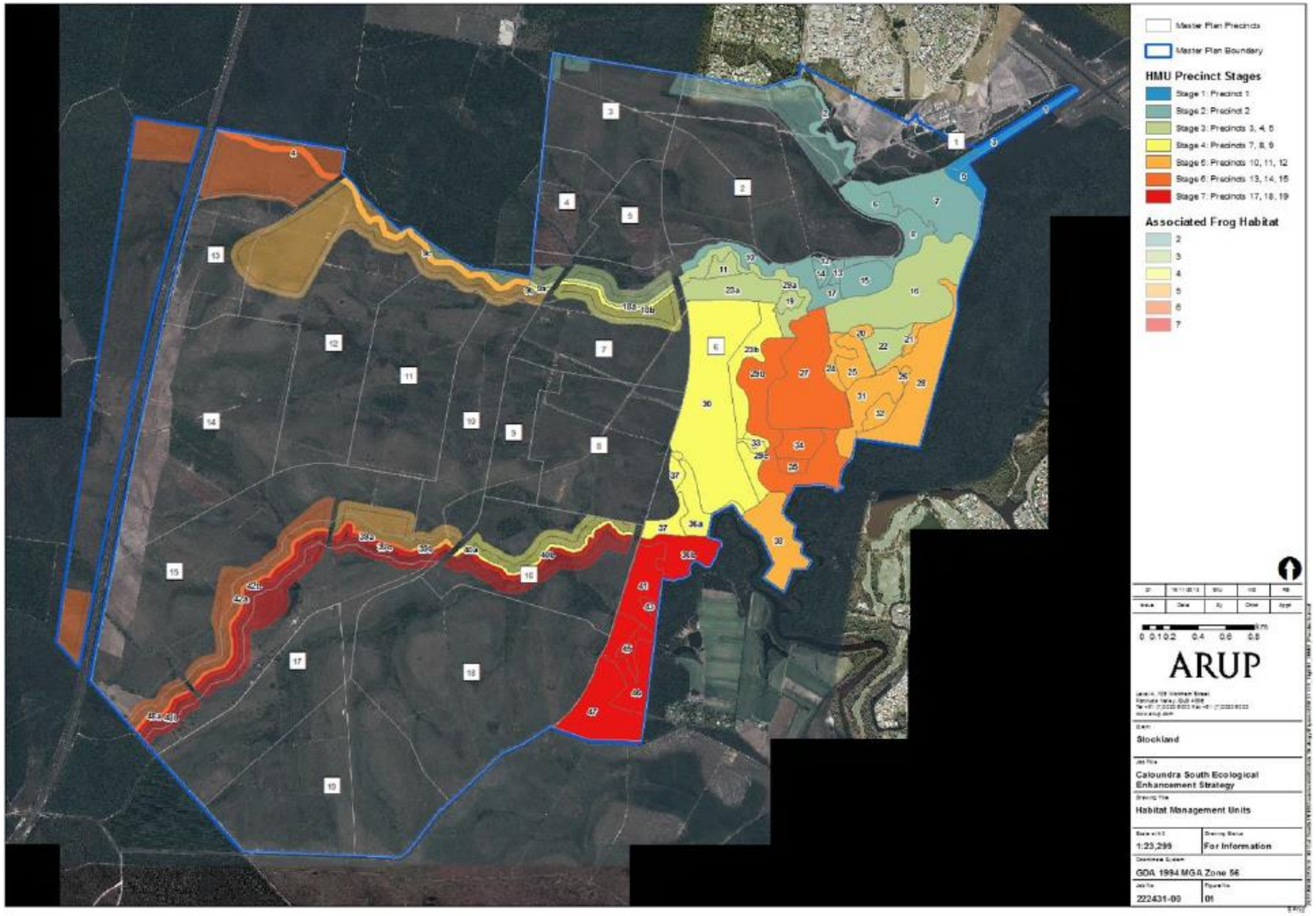


Figure C1: Habitat Management Units (EMP 2013)

5.6 PEST MANAGEMENT

5.6.1 OVERVIEW

The project site currently supports the listed Wallum Sedge Frog *Litoria olongburensis* and other acid tolerant frog species. Areas downstream from the site (e.g. along Bells Creek) support feeding habitat for migratory water birds and contains areas of potential habitat for the threatened Water Mouse *Xeromys myoide*s near the confluence of Bells Creek.

The development site potentially contains feral animals, including: dingo, wild dog, wild cat, fox, pig, black rat, brown hare, spotted turtle-dove, cane toad and eastern gambusia. These pest animals pose direct threats to native fauna, and if uncontrolled, could travel between and impact conservation values of the EPZ and other conservation areas on site.

Identifying the species of feral animals present on-site (particularly wild cats, wild dogs, foxes and pigs) is critical to ensure appropriate management responses are designed and implemented to protect native animals in retained or created conservation areas.

The following sections outline the management measures that will be enacted to control pest species.

5.6.2 PERFORMANCE CRITERIA

The performance criterion for pest management is as follows:

- To control and reduce impacts on native vegetation and fauna species from pest animal species during the construction stage.

5.6.3 MANAGEMENT MEASURES

The following measures are required to manage pest species:

- The construction crew and visitors to site will not be permitted to bring domestic animals to the construction works site or in conservation areas of the project site.
- Putrescible waste generated during construction will be stored in covered containers on site to limit access by scavenger animals and will be transported off site for disposal. The project team, construction crew and visitors to site will be required to notify the Superintendent of any sightings or evidence (e.g. vegetation/ground disturbance) of pest species; and
- The Superintended will notify responsible local authorities of any sightings or evidence of pest species.

5.6.4 MONITORING PROGRAM

Regular checking of the performance criteria will be undertaken by the contractor and the Superintendent. With respect to the retained WSF breeding habitat (ponds) in retained or newly created conservation areas, regular checking by the Approval Holder (minimum 6 monthly) is required to identify if fish predators (in particular mosquito fish *Gambusia holbrooki*) are located within retained or created WSF ponds. Monitoring results will be reported in the annual compliance report.

The conservation areas and the retained WSF habitats will be inspected weekly by the contractor to identify any ground disturbance possibly caused by feral animals, including: dingo, wild dog, wild cat, fox, pig, black rat, brown hare, spotted turtle-dove, cane toad and eastern gambusia. If this is observed, this is to be reported directly to the Approval Holder's Environmental Management Representative to enable investigations to be conducted in consultation with the Sunshine Coast Regional Council.

Maintain a record of any siting (including animal tracks) of any predatory exotic fauna (cats, foxes, dogs, pigs) including the date, time and location of the siting. Records are to be maintained in the weekly inspection checklist and made available to Stockland and SCRC on request.

5.6.5 CORRECTIVE ACTIONS

Where a pest species or an impact from pest animal species is detected, one or more of the following corrective actions will be implemented until the performance criterion is achieved:

- Review work practices regarding pest management and implement improvements; and
- If Eastern Gambusia are observed within a created frog pond over two successive surveys, corrective actions (i.e. to drain the pond) outlined in **Section 5.4.5** of this PCEMP will be implemented.

  Following the corrective action/s, a third survey will be conducted (following the drying of the frog pond) following a period of no less than 2 months from the re-inundation of the pond and whilst the pond continues to hold water.

  The corrective actions will include

  - characterising the hydroperiod for the area affected by Eastern Gambusia. The presence of Eastern Gambusia is likely to be caused by prolonged water ponding and/or inflow into the habitat from surface waters (i.e. Bells Creek North or South); and
  - modifying the pond depth water level and/or inflow (via perimeter levee bunds), thereby controlling the hydroperiod and/or connection of the pond with a broader catchment during flood events. This ensures that Eastern Gambusia are either excluded from the pond, are or unable to effectively reproduce, or both.
- Responsibilities

The Approval Holder oversees all construction phases, and will appoint an internal or external Superintendent to oversee the implementation of the project and will engage a Principal Civil Contractor as well as construction and/or building contractor(s) and landscaping/environmental contractors for weed and pest management, vegetation management and rehabilitation to undertake the works in accordance with relevant approvals, conditions and commitments.

The Principal Civil Contractor will be responsible for ensuring best practice for the management of pests during construction. The Approval Holder will be responsible for the appointment of a suitably qualified ecologist to provide advice as appropriate. This consultant will be independent of the Principal Civil Contractor.

The Approval Holder Principal Civil Contractor will be responsible for the implementation and refinements of any corrective actions.

5.6.6 REPORTING

Any pest control measures implemented (including corrective actions), must be incorporated into the regular weekly/monthly environmental report prepared by the Principal Civil Contractor to the Construction Superintendent.

The Principal Contractor is to notify the Construction Superintendent of any non-compliances as soon as possible in order to comply with reporting obligations of the Approval Holder, consistent with condition 14 of the EPBC Approval and **Section 4.1** of this document.

5.7 WEED MANAGEMENT

5.7.1 OVERVIEW

Bulk earthworks operations will include vegetation clearing to facilitate construction works. This action has the potential to introduce and spread weeds, fungi and other pathogens to, from and throughout the work area.

The introduction of weeds can pose a significant threat to biodiversity and is recognised as one of the biggest issues affecting regeneration of native vegetation. Management measures have been developed to guide any necessary vegetation clearing during construction, as well as rehabilitation and weed control during construction and operation. As

weed and pest control strategies are contingent on the protection and rehabilitation of retained native vegetation, management actions relating to native vegetation management are also provided.

Due to the history of the site, exotic pasture grasses dominate many areas requiring ecological enhancement. These include:

- *Setaria sphacelata*;
- Giant rat's tail grass (*Sporobolus pyramidalis* and *S. natalensi*), a Class 2 restricted invasive plants;
- Grass species from the genera Paspalum, Panicum, and Chloris; and
- There are also numerous other weed species on the site. Some of the more common weeds include:
  - Lantana camara, a Class 3 restricted invasive plant;
  - Groundsel Bush (*Baccharis halimifolia*) a Class restricted invasive plant; and
  - Slash Pine (*Pinus elliottii*).

These weeds are a significant threat to achieving the objectives of ecological enhancement across the site; therefore, the site wide strategy focusses on integrated weed management as one of the primary tools in rehabilitated areas. Weed management in the rehabilitated areas of the EPZ and conservation areas will be further detailed in the Environmental Rehabilitation Plan for that area.

5.7.2 PERFORMANCE CRITERIA

The objective of this part of the PCEMP is to implement effective weed management measures to prevent and minimise infestation on and off site during construction.

The key performance criteria are:

- Prevent the introduction of new weed species;
- Prevent an increase in the extent of existing weed species; and
- Avoid or otherwise minimise dieback from the introduction of pathogens.

5.7.3 MANAGEMENT MEASURES

The following measures are required to control weeds:

- Implementation of the following weed management measures:
  - Treating existing weeds within the construction site.
  - Limiting machinery access near retained vegetation, frog zone, frog buffer and the EPZ.
  - Provide on-site vehicle wash-down facilities.
  - Certifying the origin of construction material to prevent the importation of weed species onto site.
- Mechanical removal (by hand or machine) will be required for the removal of larger plants such as pine and lantana. In the area of Wallum Sedge Frog habitat within the EPZ (see **Section 5.4**), chemical spot spraying will be unsuitable, and mechanical or hand removal of pasture grasses will be required.
- Edge planting will be undertaken to prevent weed species from penetrating high conservation areas including the EPZ, conservation corridors and retained and created Wallum Sedge Frog habitat contained within. These areas of edge planting will be at least 5 metres in width.
- Green waste handling, stockpiling and disposal procedures will be developed and implemented on the site.
- Plant material will be removed from site in a manner which reduces disturbance, and will be disposed of at an approved green waste disposal facility or mulched on-site for landscaping purposes.

- Machinery used for earth-moving and vegetation-clearing will be cleaned and inspected prior to the commencement of work to remove any attached material that may spread weeds or pathogens.
- Control *Baccharis halimifolia* and *Pinus elliottii* in conservation areas.
- Control Category 2 and 3 restricted invasive plants of Queensland in construction and conservation areas. During rehabilitation within each HMU in the EPZ, measures will be implemented to prevent the spread of weed seeds and diseases such as Phytophthora, Myrtle Rust and Chytrid fungus. This will include shoe and tool disinfection, exclusion areas and the use only of clearly defined tracks.
- The use of fire, e.g. through ecological burns,for weed control within HMUs listed in **Section 5.5** will be outlined in detail in the Environmental Rehabilitation Plan for this area.

5.7.4 MONITORING

The contractor will conduct weekly visual inspections to identify infestations of restricted invasive plants within the construction area and vehicle site access points.

Monitoring of weed infestations within conservation areas will be undertaken in accordance with the Environmental Rehabilitation Plan.

5.7.5 CORRECTIVE ACTION

If one or more performance criteria are not achieved, the Superintendent will consult with a suitably qualified consultant and or contractor to determine why the performance criteria were not met and what corrective actions are required. At least one of the following corrective actions will be implemented until the performance criteria are achieved:

- a review of weed control management measures, and implementing the revised management measure/s;
- increasing the frequency and extent of weed control activities in and adjacent to the area where the performance criteria are not met;
- increasing the supervision and removal of weed or pathogen containing soil or other material from shoes, tools and vehicles entering the project site

If clearing occurs outside the delineated, approved areas, cease all work in the area affected and advise Superintendent and relevant regulatory agencies. Instigate rehabilitation efforts immediately at any area accidentally cleared in accordance with directions from the Superintendent.

For retained or rehabilitated habitat, undertake corrective actions as outlined in the Vegetation Management Plan or the detailed Environmental Rehabilitation Plan relevant to that area.

5.7.6 RESPONSIBILITIES

The Approval Holder is to oversee construction phases, the Approval Holder will appoint either an internal or external Superintendent to oversee the implementation of the project and will engage a Principal Civil Contractor as well as construction and/or building contractor(s) and landscaping/environmental contractors for weed and pest management, vegetation management and rehabilitation to undertake the works in accordance with relevant approvals, conditions and commitments.

The Principal Civil Contractor will be responsible for ensuring best practice for the management of weeds during the construction. The Approval Holder will be responsible for the appointment of a suitably qualified ecologist to provide advice as appropriate. This consultant will be independent of the Principal Civil Contractor.

The Approval Holder and Principal Civil Contractor will be responsible for the implementation and refinements of any corrective actions.

5.7.7 REPORTING

The implementation of weed and pathogen control measures, including corrective actions, will be reported in the regular environmental reporting required by the contractor to the Superintendent.

Notify the Construction Superintendent of non-compliances as soon as possible in order to comply with reporting obligations of the Approval Holder, consistent with condition 14 of the EPBC Approval and **Section 4.1** of this document.

6 AUDITING, REPORTING AND REVISIONS

6.1 AUDITING

This PCEMP describes the program and procedures for the internal and external auditing requirements of the Project.

The Audit Program detailed in **Table 6-1** will be implemented onsite for the duration of the Project. The Principal Civil Contractors will implement the Audit Program and audit procedures.

Table 6-1: Audit Program

Objective	Audit Tool	Scope	Frequency	Responsibility
Compliance with Site Activities and Controls	Site Inspection Checklist.	Assessment of onsite environmental activities and controls in accordance with this PCEMP.	Weekly	Principal Civil Contractor
Compliance with Site Activities and Controls	Monthly Report.	Compilation of weekly monitoring activities to be submitted to Construction Superintendent.	Monthly	Principal Civil Contractor Construction Superintendent
System Compliance (internal audit)	Internal system audit	Systems Audit of PCEMP to review environmental issues onsite and the effectiveness of the systems in managing these. The audit will consist of a document review or desktop audit conducted in conjunction with a technical or operational audit.	Biannual	Principal Civil Contractor Construction Superintendent Approval Holder Environment Representative
Legal and System Compliance	Internal system audit	Systems Audit of PCEMP to assess the current compliance status of the site against the EPBC Act Conditions of Approval and requirements of Approved plans and documents.	Annual	Approval Holder Environment Representative

Audits will to be entered into an audit register. The minimum content of the register is to be:

- Type of audit i.e. Sediment Control Audit.
- Date of audit, start and completion times.
- The personnel involved in the audit.
- Audit Scope – predetermined prior to audit date.

- Audit findings.
- Audit Recommendations.
- Corrective and Preventative Action.
- Audit Review.

Personnel conducting internal audits will have substantial knowledge of the construction site and training and experience designing and implementing audit techniques,.

Personnel conducting external audits will have relevant knowledge and experience such as auditor qualifications, process knowledge and previous experience in auditing.

The audit scope is to be developed by the Principle Contractor and will be circulated prior to the audit for comment and approval from the Construction Superintendent and Approval Holder.

Audit findings must be recorded at the time of the audit and provide a basis for recommendations for PCEMP review and improvement.

Corrective and preventative actions will include responsibility and time frame for action. A follow up visit or inspection will be conducted to ensure compliance measures are implemented post audit review.
The audit will be reviewed by the personnel involved and distributed for further review by the Construction Superintendent and Approval Holder.

6.2 REVIEW

This PCEMP will be reviewed as the need for review is identified through audits, compliance reporting and learnings from plan implementation.

The review will be scheduled by the Approval Holder's Environmental Management Representative and be inclusive of the Principal Civil Contractor and Construction Superintendent.

All personnel involved with the environmental management of the Project are required to attend the review.

A review agenda will be set by the Approval Holder's Environmental Management Representative and circulated to all parties one week before the review date. This agenda will include but not be limited to:

- Site Inspection Checklists
- Monthly Reports.
- Incident and investigation reports.
- Internal audit results, including corrective and preventative actions.
- External audit results and findings, including recommendations and actions.
- Completed registers such as; complaints, incidents and non-conformance.
- Training programs in place such as Site Induction training.
- Environmental Emergency Response.
- Review of legal requirements for the Project. Overall effectiveness of the PCEMP.

The Construction Superintendent will be responsible for recording the items discussed, and circulating the agreed decisions resulting from the review.

Stockland will assess the results of this review and make amendments to this PCEMP as required and circulate for comment.

7 SUMMARY OF OBLIGATIONS

A summary of obligations and associated responsibilities outlined in the PCEMP is provided in Table 7-1.

Table 7-1: Summary of Obligations

Environmental Aspect	Commencement:	Cessation:	Requirements and Responsibilities	Reporting	Monitoring & Reporting Responsibility		
					Approval Holder	Construction Superintendent	Principal Civil Contractor
Erosion and Sediment Control *(Refer **Section 3.1**)* *(Refer to **EMP by WBM BMT**)*	Once possession of the site has been granted and the subdivision works have commenced.	Once the subdivision construction works have been completed and on maintenance achieved. Inspections of all erosion and sediment control devices will need to be inspected prior to and after each major rain event during the maintenance period.	The Principal contractor shall be responsible for implementing best management practices at all times during the contract period. All planning, design, certification and construction works, are to minimize and avoid erosion and sedimentation of the site, surrounding country, watercourses, water bodies and wetlands. Regular monitoring will be required by the Principal contractor and the Superintendent: • Daily inspections of all erosion and	Records of all daily inspections are to be kept onsite at all times. These include, but are not limited to: • Log book (including daily entries) of the effectiveness of all ESC measures; • Weekly reports on water quality compliance and achievement. Following major rainfall events, reports are to be issued immediately afterwards;	☐ Preparation of an Annual Compliance Report (ACR).	☐ Monthly Environmental Compliance Report received and satisfactory. ☐ Rectification works identified have been inspected and are complete. ☐ Water Quality Testing received and satisfactory. ☐ ESC measures inspected and satisfactory. ☐ Documentation, including satisfactory	☐ Daily inspections of all erosion and sediment control measures. ☐ Daily inspection of the road network for evidence of sediment being deposited external to the site. ☐ Inspection of all control measures after major rain events (greater than 25mm in 24 hours). ☐ Water quality testing of any stormwater runoff resulting from the

Environmental Aspect	Commencement:	Cessation:	Requirements and Responsibilities	Reporting	Monitoring & Reporting Responsibility		
					Approval Holder	Construction Superintendent	Principal Civil Contractor
			sediment control measures; • Daily inspection of the road network for evidence of sediment being deposited external to the site; • Inspection of all control measures after major rain events (greater than 25mm in 24 hours); • Rainfall to be recorded at 9AM each working day; • Turbidity monitoring at sediment basin outlets; and • Water quality testing of any stormwater runoff resulting from the construction works that is proposed to enter	• Monthly environmental compliance reports (ECR); • Daily Inspection records of all ESC devices; • Records of any rectification works; • On-site water quality testing results; and • Documentation of the turbidity monitoring Report and Log Book to be issued by the contractor to the Superintendent. Superintendent to review and ensure all is satisfactory prior to issuing to the Project Certifier. Project Certifier to then issue to the Project Co-ordinator for submission to the Authority.		Monthly Environmental Compliance Report issued to the Approval Holder.	construction works that is proposed to enter the foraging areas of the WSF habitat. ☐ Rainfall will be recorded at 9am each working day. ☐ Turbidity monitoring at sediment basin outlets. ☐ ESC measures rectified where required. ☐ Notify the Construction Superintendent of non-compliances as soon as possible. ☐ Weekly reports on water quality compliance and achievement. Following major rainfall events, reports are to be

Environmental Aspect	Commencement:	Cessation:	Requirements and Responsibilities	Reporting	Monitoring & Reporting Responsibility		
					Approval Holder	Construction Superintendent	Principal Civil Contractor
			the foraging areas of the WSF habitat.				issued immediately afterwards. ☐ Monthly Environmental Compliance Report issued to the Construction Superintendent
Groundwater *(Refer **Section 3.2**)* *(Refer to **WQMP** by BMT WBM)*	12 months prior to construction works commencing.	Minimum 12 months after the active construction works are complete.	The Principal Contractor shall monitor all groundwater and minimize potential negative impacts to groundwater quality. The management structure of groundwater is in the order as follows: 1. **Avoid** any groundwater extraction through the protection and rehabilitation of the conservation and waterway corridor; 2. **Reduce** the groundwater that is extracted during the	As per **Figure 5-2**, there is an existing network of groundwater monitoring bores located across the site. All boreholes will be sampled biannually, up to and for 12 months after the active development construction works are complete. Those bores which are within catchments where construction activities are occurring and are within 500m, are to be sampled monthly. Those bores where construction is occurring but in close	☐ Preparation of an Annual Compliance Report (ACR). ☐ Coordination of pre-construction baseline monitoring for the site and confirmation it has been carried out. ☐ Coordination of sampling of bores within active construction works areas on	☐ Monthly Environmental Compliance Report received and satisfactory ☐ Rectification works identified have been inspected and are complete. ☐ Groundwater management measures have been implemented and inspected	☐ Rectification works completed. ☐ Log Books completed monthly noting the works completed to avoid, reduce, reuse, treat and dispose of groundwater. ☐ Notify the Construction Superintendent of non-compliances as soon as possible. ☐ Monthly Environmental Compliance Report

Environmental Aspect	Commencement:	Cessation:	Requirements and Responsibilities	Reporting	Monitoring & Reporting Responsibility		
					Approval Holder	Construction Superintendent	Principal Civil Contractor
			required earthworks activities. 3. **Reuse** groundwater where practical and feasible to supplement on-site water demands and minimize discharge downstream. 4. **Treat** the suspended sediments in the groundwater via drainage channels, sediment basins and the use of vegetated 'buffer' areas between the basin and waterways. 5. **Disposal** of the excess groundwater that overtops the sediment basins, or that has been treated shall be into the Lamerough Creek catchment.	proximity to active works, are to be sampled on a 3 month basis. An annual report will be prepared including the results of the monitoring, test reports of the water quality and implementation of corrective actions. Report to be issued by the contractor to the Superintendent. Superintendent to review and ensure all is satisfactory prior to issuing to the Project Certifier. Project Certifier to then issue to the Project Co-ordinator for submission to the Authority.	a biannual basis, up to and for 12 months after active development works are completed in respective catchments. ☐ Coordination of sampling of Sentinel and Control bores within catchments where there are active construction activities occurring will be sampled on a monthly basis. ☐ Coordination of sampling of Construction bores within catchments	and are all satisfactory. ☐ Documentation, including satisfactory Monthly Environmental Compliance Report issued to the Approval Holder.	issued to the Construction Superintendent.

Environmental Aspect	Commencement:	Cessation:	Requirements and Responsibilities	Reporting	Monitoring & Reporting Responsibility		
					Approval Holder	Construction Superintendent	Principal Civil Contractor
					where construction activities are occurring, and which are in close proximity (i.e. within 500m) to areas of active development works will be sampled on a monthly basis.		
Geotechnical (Acid Sulfate Soils) *(Refer **Section 3.3**)* *(Refer to **EMP** by BMT WBM)*	Prior to the commencement of the Bulk Earthworks operations.	At the completion of the construction works.	Existing geotechnical investigations note that the risk of encountering acid sulfate soils (ASS) is low however hot spots of acidity may be detected. If these are present, they will need to be tested and managed through a basic acid sulfate soil management plan. Further detailed testing	ASS Monitoring will include one or more of the following: • Acid Sulfate testing on any hot spot areas detected; • Treatment and management of stockpiled material and treated soils during construction to ensure it is contained; and	☐ Preparation of an Annual Compliance Report (ACR)	☐ Acid Sulfate Testing received and satisfactory ☐ Monitoring, management, treatment and control measures implemented on-site, inspected and satisfactory	☐ Acid Sulfate testing will be completed on areas below 5.0m AHD and any other areas expected to contain ASS with results available. ☐ Detailed testing in areas below 5m AHD prior to earthworks

Environmental Aspect	Commencement:	Cessation:	Requirements and Responsibilities	Reporting	Monitoring & Reporting Responsibility		
					Approval Holder	Construction Superintendent	Principal Civil Contractor
			is proposed to be undertaken prior to bulk earthworks, particularly where the earthworks are proposed below 5m AHD. Management and testing of ASS are to be in accordance with the Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland (C.R. Ahern et. Al. 1998) or most recent version and the Queensland Acid Sulfate Soil Technical Manual Soil Management Guidelines. The Principal Contractor will be responsible for the on-site testing, control and management, treatment of ASS soils and ensuring	• PH testing of site water and sediment pond water. If ASS are found, an ASSMP is to be prepared and lodged. This should include: • Completion of the ASS management plan; • Documentation of the on-site testing; and • Corrective actions required as a result of the monitoring. Report to be issued by the contractor to the Superintendent. Superintendent to review and ensure all is satisfactory prior to issuing to the Project Certifier. Project Certifier to then issue to the Project Co-ordinator for		☐ Report and secondary retests received and satisfactory ☐ Documentation, including satisfactory Monthly Environmental Compliance Report issued to the Approval Holder.	completed and satisfactory ☐ Management and testing of ASS will be undertaken in accordance with the Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils in Queensland (C.R. Ahern et. Al. 1998) (or most recent version) ☐ Daily measurement of water pH within construction sediment ponds. ☐ ASS management and control plan submitted to Superintendent (If ASS are found). ☐ Notify the Construction Superintendent of non-compliances

Environmental Aspect	Commencement:	Cessation:	Requirements and Responsibilities	Reporting	Monitoring & Reporting Responsibility		
					Approval Holder	Construction Superintendent	Principal Civil Contractor
			compliance with the pH conditions.	submission to the Authority.			as soon as possible. ☐ Monthly Environmental Compliance Report issued to the Construction Superintendent.
Wallum Sedge Frog Management *(Refer **Section 3.4**)* *(Refer **WSFMP** by Stockland)*	Once possession of the site is granted and construction works commence.	Once Off Maintenance is achieved.	The following measures are required: • Establishment of a planted buffer between the retained habitats and the earthworks and other development related threats; • All stormwater run-off must be diverted from habitats; and • Maintenance of silt fencing, bunding and detention basins for containing and treating stormwater run-off.	Monitoring and reporting are required throughout the construction period and until the off-maintenance period as noted in the WSFMP.	☐ Preparation of an ACR ☐ Coordination of water quality testing.	☐ ESC protection measures inspected and satisfactory. ☐ Corrective actions inspected and satisfactory. ☐ Documentation, including satisfactory Monthly Environmental Compliance Report issued to the Approval Holder.	☐ Construction water not to be directed to WSF breeding habitat. ☐ Daily inspections of ESC measure to ensure retained WSF habitat is protected from works covered by this PCEMP. ☐ Rectification works completed. ☐ Notify the Construction Superintendent of non-compliances

Environmental Aspect	Commencement:	Cessation:	Requirements and Responsibilities	Reporting	Monitoring & Reporting Responsibility		
					Approval Holder	Construction Superintendent	Principal Civil Contractor
			The Principal contractor shall be responsible for the implementation and refinements of any corrective actions to ensure appropriate environmental protection goals are achieved.				as soon as possible. ☐ Monthly Environmental Compliance Report issued to the Construction Superintendent.
Vegetation Management *(Refer **Section 3.5**)* *(Refer **VMRP** by Stockland,)*	Prior to the commencement of the works.	Once Off Maintenance is achieved and the environmental protection goals are achieved.	The Environmental Protection Zone (EPZ) and conservation corridors are required to be conserved and rehabilitated to improve habitat value. The habitat rehabilitation is identified in the Vegetation Rehabilitation and Management Plan, 2013. A detailed environmental rehabilitation plan will be prepared prior to the commencement of the subdivision works. The contractor is required to implement the	Visual and Photographic monitoring will be conducted to evaluate the effectiveness of the strategies within the HMUs in the EPZ and Conservation Corridors. A visual monitoring point will be established in each HMU and the location and characteristics monitored by Photo point records every 6 months. A report will be produced annually for the duration of the ecological enhancement program.	☐ Preparation of an ACR. ☐ Coordination of visual and Photographic monitoring to be logged and submitted every six months.	☐ Maintenance measures inspected and satisfactory. ☐ Rectification works identified have been inspected and are complete. ☐ Corrective actions inspected and satisfactory. ☐ Documentation, including satisfactory Monthly	☐ Rectification works completed. ☐ Log Book of all implemented management measures, noting regular maintenance inspections ☐ Notify the Construction Superintendent of non-compliances as soon as possible. ☐ Monthly Environmental

Environmental Aspect	Commencement:	Cessation:	Requirements and Responsibilities	Reporting	Monitoring & Reporting Responsibility		
					Approval Holder	Construction Superintendent	Principal Civil Contractor
			management measurements and restrict all access to the area to ensure that rehabilitation is achieved.	Report to be issued by the contractor to the Superintendent. Superintendent to review and ensure all is satisfactory prior to issuing to the Project Certifier. Project Certifier to then issue to the Project Co-ordinator for submission to the Authority.		Environmental Compliance Report issued to the Approval Holder.	Compliance Report issued to the Construction Superintendent.
Pest Management *(Refer **Section 3.6**)* *(Refer **Section 3.4.2** of **EMP** by BMT WBM)*	Prior to the commencement of the works.	Once Off Maintenance is achieved and the environmental protection goals are achieved.	The objective of the Pest Management is to reduce or control impacts from pest animal species during the construction stage. The following measures will be required as a minimum: • Permanent and semi-permanent structures to minimise harborage and	Regular inspections are required by the contractor and superintendent, noting all observed exotic fauna including pigs, dogs, cats and foxes. Pest control measures need to be included in the regular weekly/monthly environmental report. Report to be issued by the contractor to the Superintendent.	☐ Preparation of an ACR	☐ Maintenance measures inspected and satisfactory. ☐ Rectification works identified have been inspected and are complete. ☐ Corrective actions inspected and satisfactory.	☐ Rectification works completed. ☐ Log book to be kept to record all management measures implemented on site ☐ Weekly inspections logged and detailed records maintained. ☐ Notify the Construction Superintendent of

Environmental Aspect	Commencement:	Cessation:	Requirements and Responsibilities	Reporting	Monitoring & Reporting Responsibility		
					Approval Holder	Construction Superintendent	Principal Civil Contractor
			roosting opportunities for pest species; • A combination of measures including fencing and signage to advise that no domestic animals are to be brought onto the site or the EPZ and conservation areas by crews and employees; • Generated waste is to be stored in covered containers and be transported off site for disposal. The principal contractor will be responsible for ensuring best practice for the management of pests during the construction works. Stockland will appoint an internal or external superintendent	Superintendent to review and ensure all is satisfactory prior to issuing to the Project Certifier. Project Certifier to then issue to the Project Co-ordinator for submission to the Authority. Submissions are to be made every six months.		☐ Documentation, including satisfactory Monthly Environmental Compliance Report issued to the Approval Holder.	non-compliances as soon as possible. ☐ Monthly Environmental Compliance Report issued to the Construction Superintendent.

Environmental Aspect	Commencement:	Cessation:	Requirements and Responsibilities	Reporting	Monitoring & Reporting Responsibility		
					Approval Holder	Construction Superintendent	Principal Civil Contractor
			to oversee the implementation of these measures. And ensure environmental protection goals are achieved. If exotic fauna is observed on site, the Approval Holder is to liaise with Sunshine Coast Regional Council to determine and implement an appropriate action plan. Weekly inspections are required of the retained conservation areas, including the WSF habitat, checking for any ground disturbance resulting from feral pigs. If this is recorded, the matter is to be reported to the Approval Holders Environmental Management Representative for immediate investigation.				

Environmental Aspect	Commencement:	Cessation:	Requirements and Responsibilities	Reporting	Monitoring & Reporting Responsibility		
					Approval Holder	Construction Superintendent	Principal Civil Contractor
Weed Management *(Refer **Section 3.7**)* *(Refer to **EMP** by BMT WBM and **VMRP** by Stockland)*	Prior to the commencement of the works	Once Off Maintenance is achieved and the environmental protection goals are achieved.	Effective weed management measures need to be implemented to minimise infestation on and off site during construction. The Principal Contractor and the Approval Holder will be responsible for the implementation and refinement of all Weed Management measures, including wash down facilities, edge planting to high conservation areas. Please refer to Section 3.7 for further details.	Monthly monitoring of weeds at all disturbed areas and vehicle access locations. Results, including the control measures implemented and any non-compliance, to be included in the reporting to the superintendent. Certification of the origin of earthworks material is also required. Documentation to be issued by the contractor to the Superintendent. Superintendent to review and ensure all is satisfactory prior to issuing to the Project Certifier. Project Certifier to then issue to the Project Co-ordinator for submission to the Authority. Submission to	☐ Preparation of an ACR ☐ Coordination of weed management within the rehabilitated areas of the EPZ and other conservation areas in accordance with the Environmental Rehabilitation Plan.	☐ Report received and satisfactory. ☐ Site management measures inspected and satisfactory. ☐ Rectification works inspected and satisfactory ☐ Certification of fill material received and satisfactory ☐ Corrective actions inspected and satisfactory. ☐ Documentation, including satisfactory Monthly Environmental Compliance Report issued to	☐ Weed management measures implemented ☐ Limiting machinery access near retained vegetation, frog zone, frog buffer and the EPZ. ☐ Wash-down facilities are provided on site. ☐ Certification of the origin of construction material is required to manage the importation of weed species onto site. ☐ Green waste handling, stockpiling and disposal procedures will be developed and implemented on the site.

Environmental Aspect	Commencement:	Cessation:	Requirements and Responsibilities	Reporting	Monitoring & Reporting Responsibility		
					Approval Holder	Construction Superintendent	Principal Civil Contractor
				be made every six months.		the Approval Holder.	☐ Plant material will be removed from site in a manner which reduces disturbance and is to be disposed of at an approved green waste disposal facility or mulched on-site for landscaping purposes. ☐ Machinery used for earth-moving and vegetation-clearing will be cleaned and inspected prior to the commencement of work to identify any attached material that needs to be removed to avoid the spread of weeds. ☐ Log book to be kept to record all

Environmental Aspect	Commencement:	Cessation:	Requirements and Responsibilities	Reporting	Monitoring & Reporting Responsibility		
					Approval Holder	Construction Superintendent	Principal Civil Contractor
							management measures implemented on site. ☐ Regular monitoring noted in log book for all disturbed and access areas. ☐ Notify the Construction Superintendent of non-compliances as soon as possible. ☐ Monthly Environmental Compliance Report issued to the Construction Superintendent.

ADDENDUMS

Addendum A PRECINCT 1 AND PART PRECINCT 3-4: MANAGEMENT ACTIONS, INCIDENTAL OR ASSOCIATED WORKS[3]

1 INTRODUCTION

This addendum addresses the requirements of the PCEMP, specified in Condition 3 of the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC) approval (EPBC Ref: 2011/5987), that are specific to Precincts 1 and Part Precinct 3-4. It describes construction activities within Precincts 1 and Part Precinct 3-4 and associated works, and the potential impacts to MNES and proposed mitigation and management actions associated with these works.

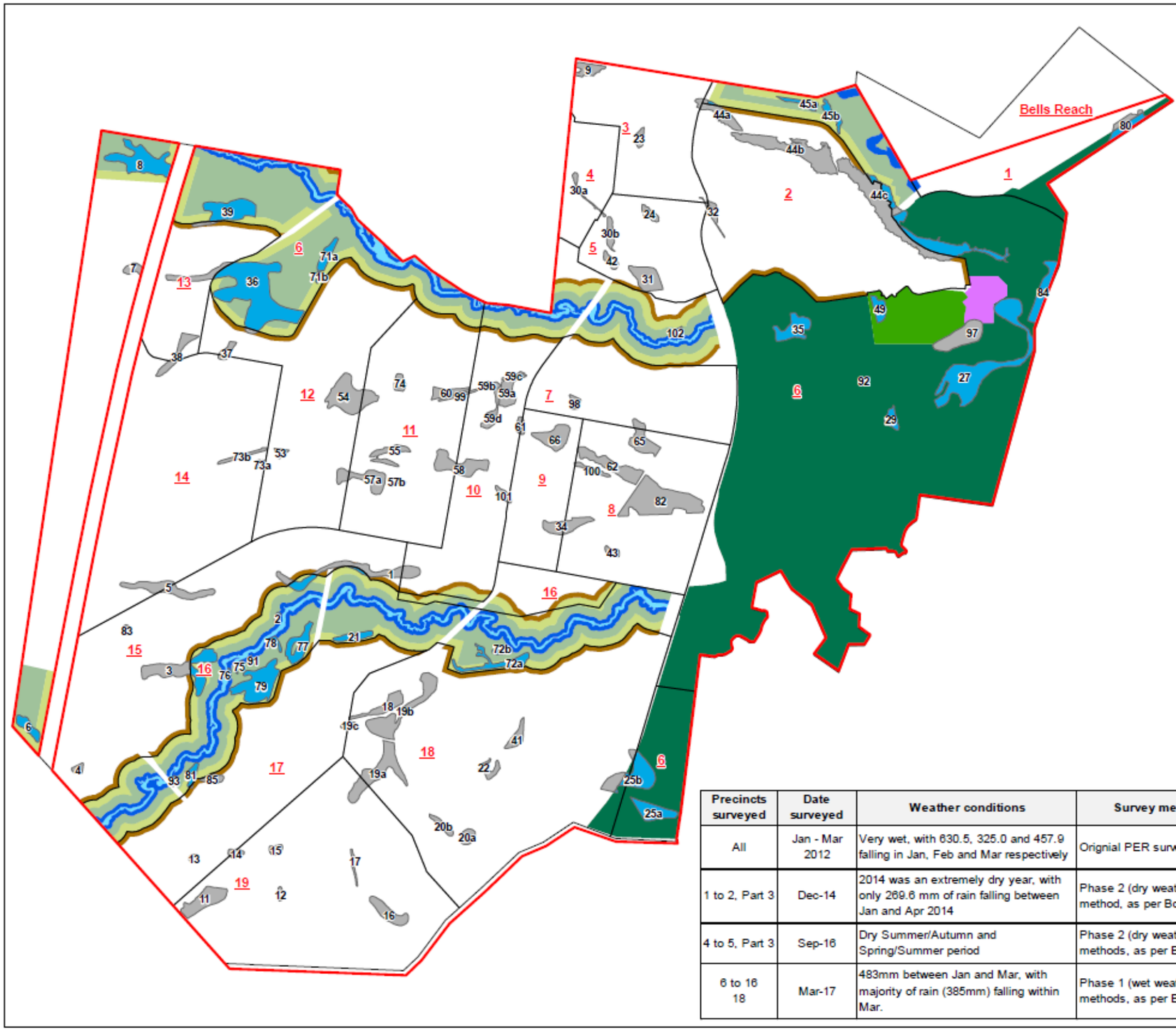
1.1 PRECINCT DESCRIPTION AND CONTEXT

Precinct 1 consists of 340 allotments and park area. Refer to Figure 1 which depicts the location of Precinct 1, relative to the Aura Priority Development Area.

Currently an existing haul road exists for the Bells Reach development for importation of materials to a previous development. This haul road is located between the Precinct 1 and 3 area and is expected to be used to transfer cut material from Precinct 3 and 4 to Precinct 1, if Precinct 3 and 4 are used to source fill material. If an external fill source is available it is expected that this haul road will be used, as per the current state, for transfer of that imported material. Refer to Appendix A for details.

[3] Incidental or Associated Works are works which are undertaken in accordance with an approved PCEMP, in order to facilitate development in another Precinct. Incidental or Associated works include the borrowing of material from a Precinct and /or trunk service infrastructure to facilitate development in another Precinct.

Figure 1: Site Locality Plan



Precincts surveyed	Date surveyed	Weather conditions	Survey methodology
All	Jan - Mar 2012	Very wet, with 630.5, 325.0 and 457.9 falling in Jan, Feb and Mar respectively	Orignial PER survey
1 to 2, Part 3	Dec-14	2014 was an extremely dry year, with only 269.6 mm of rain falling between Jan and Apr 2014	Phase 2 (dry weather) survey method, as per Box 1 (pg 52)
4 to 5, Part 3	Sep-16	Dry Summer/Autumn and Spring/Summer period	Phase 2 (dry weather) survey methods, as per Box 1 (pg 52)
6 to 16 18	Mar-17	483mm between Jan and Mar, with majority of rain (385mm) falling within Mar.	Phase 1 (wet weather) survey methods, as per Box 1 (pg 52)

2 CIVIL CONSTRUCTION METHODOLOGY

2.1 OVERVIEW

The following sections describe the scheduling and general construction sequencing for works within Precinct 1 and Part Precinct 3-4 and Associated Works.

Precinct 1 was completed in April 2016, as reported in the 2016 ACR

2.1.1 CONSTRUCTION PHASE OVERVIEW

Precinct 1 was divided into various sub stages for construction sequencing (subject to the ROL approval). The sub staging locations and sizes were defined as the project progressed further into the detailed design process. The construction of these stages allowed for the creation of residential lots, open space, drainage reserves as well as services such as electrical/telecommunications, water and wastewater. The general configuration of the development layout plan is illustrated in Appendix A.

To facilitate the development of Precinct 1, fill was imported from the borrow area within Precinct 3 and 4. If an external fill material source was readily available and feasible at the time of construction, this material was used in place of using the Precinct 3 and 4 source. Nevertheless, the importation of fill from Precinct 3 and 4 was considered as part of the PCEMP for Precinct 1.

2.1.2 CONSTRUCTION SCHEDULING

The construction scheduling of the project commenced in January 2015 and was completed August 2016. A comprehensive construction program was developed by the Principal Contractor upon award of the contract. This program was reviewed by the Superintendent and Approval Holder in order to comply with timeframe constraints within the PCEMP (as applicable), to enable construction activities to proceed without adverse effect on construction timeframes. The construction program was broken down into specific tasks relating to each activity within the project, and nominated key processes such as critical links, milestones, percentage completions and task summaries.

2.2 EROSION AND SEDIMENT CONTROL

The installation and maintenance of adequate erosion and sediment control measures were important in order to protect downstream waterways. The concept bulk earthworks/erosion and sediment control drawings in Appendix A indicate a minimum standard of erosion and sediment control measures for the works. During the construction documentation and approvals process with EDQ, being the governing body for construction approvals for this development, the attached drawings may have been updated to provide a higher level of detail for the erosion and sediment control process for Precinct 1 and 3. The Contractor reviewed the EDQ approved drawings and made onsite amendments as required, including the installation of additional measures where site conditions dictated.

2.3 SITE CLEARING AND BULK EARTHWORKS

Prior to clearing, delineation of the buffer zones, vegetation retention and habitat retention zones were defined onsite. Following on from the delineation activities the construction zones were established and clearing and bulk earthworks activities proceeded in accordance with the Construction Erosion and Sediment Control plan devised and signed off by a CPESC. In particular regard to Precinct 1:

- Haulage of fill material along existing haul road; if not sourced externally to Precincts 3 and 4:

- Expected 300,000m³ fill required;
- Fill transportation of approximately 5,000m³/day;
- Fill transport assumed to be completed within a three month period
- Fill placement and compaction operations for Precinct 1.

Material was initially sourced from the Precinct 3 and 4 areas and ensured that all surface and ground water from disturbed areas was discharged into the sediment basin(s) located throughout the earthworks operations. Exposed areas were progressively stabilised as cutting was completed, to minimise areas of disturbance at any given time.

3 MATTERS OF ENVIRONMENTAL SIGNIFICANCE

The following section identifies the Matters of National Environmental Significance (MNES) specified in the Public Environmental Report for Aura (Stockland 2013) and relevance to the development of Precinct 1. Please refer to the Public Environment Report (PER) for further details regarding each MNES.

The following table describes for each MNES whether they have been identified within Precinct 1 pre-construction and therefore could have been directly impacted by this part of the development or if there was the potential for indirect effects on these MNES if not located within the Precinct.

Section 5 of the PCEMP describes in detail the mitigation and management strategies proposed in relation and appropriate to each MNES described below in **Table 1**.

Table 1: Works covered by this addendum – Summary of Potential Impacts identified pre-construction and Mitigation of impacts on MNES

MNES		Precinct 1 - Summary of Potential Direct Impacts on MNES & Mitigation	Precinct 1 - Summary of Potential Indirect Impacts on MNES & Mitigation
Listed Threatened Species	Wallum Sedge Frog	• The 2012 Wallum Sedge Frog survey undertaken for the PER, identified one habitat patch located in Precinct 1, named Polygon 80. Polygon 80 was 1.7ha in area, with 0.6ha assessed as being lost to the development with the rest retained as it was already located within the EPZ. • The 2014 pre-construction habitat survey (AWC, 2014) did not identify any Wallum Sedgefrog habitat present within Precinct 1. This change is attributed to the fact that 2013/2014 period has been drier (see Drawing B14030-SK01 in Appendix A). • Notwithstanding this, a buffer is proposed to be provided to the retained portion of Wallum Sedge Frog habitat located in the EPZ (see PCEMP Section 5.4 for more details).	• Adjacent earthworks (i.e. filling works, clearing of vegetation etc) to be undertaken so as to avoid impact on retained habitat. • Stormwater runoff from the development in Precinct 1 to be diverted away from retained Wallum Sedge Frog habitat to avoid indirect impacts.
	Water Mouse	• Water mouse habitat as identified in the PER (Stockland, 2013) will not be	• Water mouse habitat as identified in the PER (Stockland, 2013) will not be directly impacted by the development of Precinct 1.

MNES		Precinct 1 - Summary of Potential Direct Impacts on MNES & Mitigation	Precinct 1 - Summary of Potential Indirect Impacts on MNES & Mitigation
		directly impacted by the works covered by this PCEMP.	
Habitat with potential to contain EPBC list species		• No EPBC Act listed threatened flora species were located on the project site during the targeted surveys and as such no direct impacts on these MNES are predicted (PER, 2013).	• The project site has been assessed as containing habitat with the potential to contain EPBC Act listed flora species to occur based on the quality of extant habitats and the proximity of nearby populations. Stockland has committed to appropriate rehabilitation within conservation and rehabilitation areas across the site. An area contained within and to the east of Precinct 1 (adjacent Caloundra Aerodrome) has been defined as the EPZ which will be conserved and rehabilitated to improve habitat value. The nature of habitat rehabilitation across the site is identified in the Vegetation Rehabilitation and Management Plan, 2014, through the designation of habitat management units or HMUs.
Listed Migratory species		• The works covered by this PCEMP are not expected to directly impact migratory birds that use the site.	
Wetland of International importance (RAMSAR)		• As a result of the works covered by this PCEMP, there is expected to be no direct impacts on the RAMSAR site.	• There would be no indirect impacts on the Ramsar site as downstream water quality would be maintained to protect environmental values.

Notwithstanding that the 2014 pre-construction survey did not identify Wallum Sedge Frog habitat within Polygon 80 due to drier climatic conditions, 1.1ha of the originally mapped area of habitat was retained (as it is located within the EPZ) and a buffer is provided to this retained portion of Wallum Sedge Frog habitat. In 2012, the Wallum Sedge Frog survey identified two habitat polygons within Precinct 3 and 4 that is Polygon 9 and 23. However, the 2014 pre-construction habitat survey (AWC, 2014) found no Wallum Sedge Frog habitat located within these polygons (due to drier climactic conditions at the time of survey). Polygon 23 was identified in the Wallum Sedge Frog Management Plan, 2014 as being lost to the development and Polygon 9 identified as being retained. Polygon 9 has been assessed as not being adversely affected by direct construction activities or indirect activities such as groundwater drawdown.

Within the development area of Precinct 1 no EPBC Act listed threatened flora species were located during targeted surveys (PER, 2013). In addition, no areas of native remnant vegetation were identified for retention. An area to the east of and within Precinct 1 (adjacent Caloundra Aerodrome) has been defined as the EPZ which has been conserved and rehabilitated to improve habitat value.

The extent and nature of habitat rehabilitation across the site is identified in the Vegetation Rehabilitation and Management Plan, 2013, through the designation of habitat management units or HMUs. **Table 2** outlines details of HMUs associated with Precinct 1 works, their. area, target species, existing flora and target community.

Table 2: Habitat Management Unit Details

HMU	Approx. Area (ha)	Target Species	Current Ecological Condition	Current Flora	Target Community	Treatment
1	2.288	Aa, WSF, Pa, Pw	Low to Moderate	Melaleuca regrowth +/- Pine. High quality WSF habitat present	Melaleuca Forest, Sedgeland	Assisted regeneration
2	2.222	Aa, Ae, WSF, Ec, Pa, Pw	Moderate	Remnant RE 12.3.4 and wet low heath regrowth	Melaleuca Forest, Wet Heath.	Remnant enhancement
3	4.246	Aa, Ae, WSF, Ec, Pa, Pw	Moderate to high	Remnant RE 12.3.13/14. Wet heath regrowth	12.3.13, 12.3.14	Remnant enhancement

Two of the HMUs in the EPZ within Precinct 1 (HMU 3 and 5) were treated by remnant enhancement which means that the existing remnant native vegetation is intact and whilst weeds may be present, the areas can regenerate on its own if the weeds are treated. HMU No.1 within the EPZ requires assisted regeneration, meaning that the native plant population is largely healthy and functioning but that natural regeneration processes are being inhibited by external factors such as weed invasion, pest animals, soil compaction, cattle grazing, mechanical slashing etc.

A detailed Environmental Rehabilitation Plan was prepared prior to the commencement of subdivision works and implemented in accordance with state planning approvals.

APPENDIX A CONCEPT ENGINEERING DRAWINGS/PRECINCT STAGING

CALOUNDRA SOUTH
EPBC CONDITION VARIATION
STOCKLAND CALOUNDRA DOWNS PTY LTD

DRAWING INDEX

DEVELOPMENT APPLICATION DRAWINGS		REV
N12056-SK00	SITE, LOCALITY PLAN & DRAWING INDEX	A
N12056-SK01	PLAN OF BORROW AREA FOR PRECINCT 1 WITH FROG MANAGEMENT PLAN OVERLAY	A
N12056-SK02	PRECINCT 3 BORROW AREA DEWATERING TRENCH AND SEDIMENT EROSION STRATEGY	A
N12056-SK03	CONCEPTUAL BULK EARTHWORKS SHEET 1 OF 3	A
N12056-SK04	CONCEPTUAL BULK EARTHWORKS SHEET 2 OF 3	A
N12056-SK05	CONCEPTUAL BULK EARTHWORKS SHEET 3 OF 3	A
N12056-SK06	CONCEPTUAL BULK EARTHWORKS SEDIMENT CONTROL NOTES	-
N12056-SK07	CONCEPTUAL BULK EARTHWORKS SEDIMENT CONTROL DETAILS	-
N12056-SK08	CONCEPTUAL BULK EARTHWORKS SEDIMENT CONTROL DETAILS	-

SITE PLAN

LOCALITY PLAN
N.T.S

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FILE: B14030-SK00.dwg DATE: 27-05-2014 TIME: 13:06
Xref's: X-B14030-TIF N14.002-BASE-OVERALL USR: wesley pike

FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
A	WP	DM	10.01.13	
AMENDMENTS B	WP	WP	27.05.14	DRAWING REVIONS UPDATED
C				
D				
E				
F				

DESIGN CHECK
DRAWN CHECK
SCALE (METRES)
1:5000 1:10000 100 50 0 100 200 A1 A3
MICROFILM No.
PROJECT No. B14030
RPS Australia East Pty Ltd
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Phone:(07) 5436 7888 - Fax:(07) 5493 6630
APPROVED
FOR & ON BEHALF OF BROWN CONSULTING (QLD) PTY LTD
CLIENT STOCKLAND DEVELOPMENTS PTY LTD
PROJECT CALOUNDRA SOUTH PRECINCT 1 Construction and Environmental Management Plan
BROWN Smart Consulting
CONSULT AUSTRALIA
Brown Consulting (QLD) Pty Ltd
Level 3, 16 Innovation Parkway, Birtinya QLD Australia 4575
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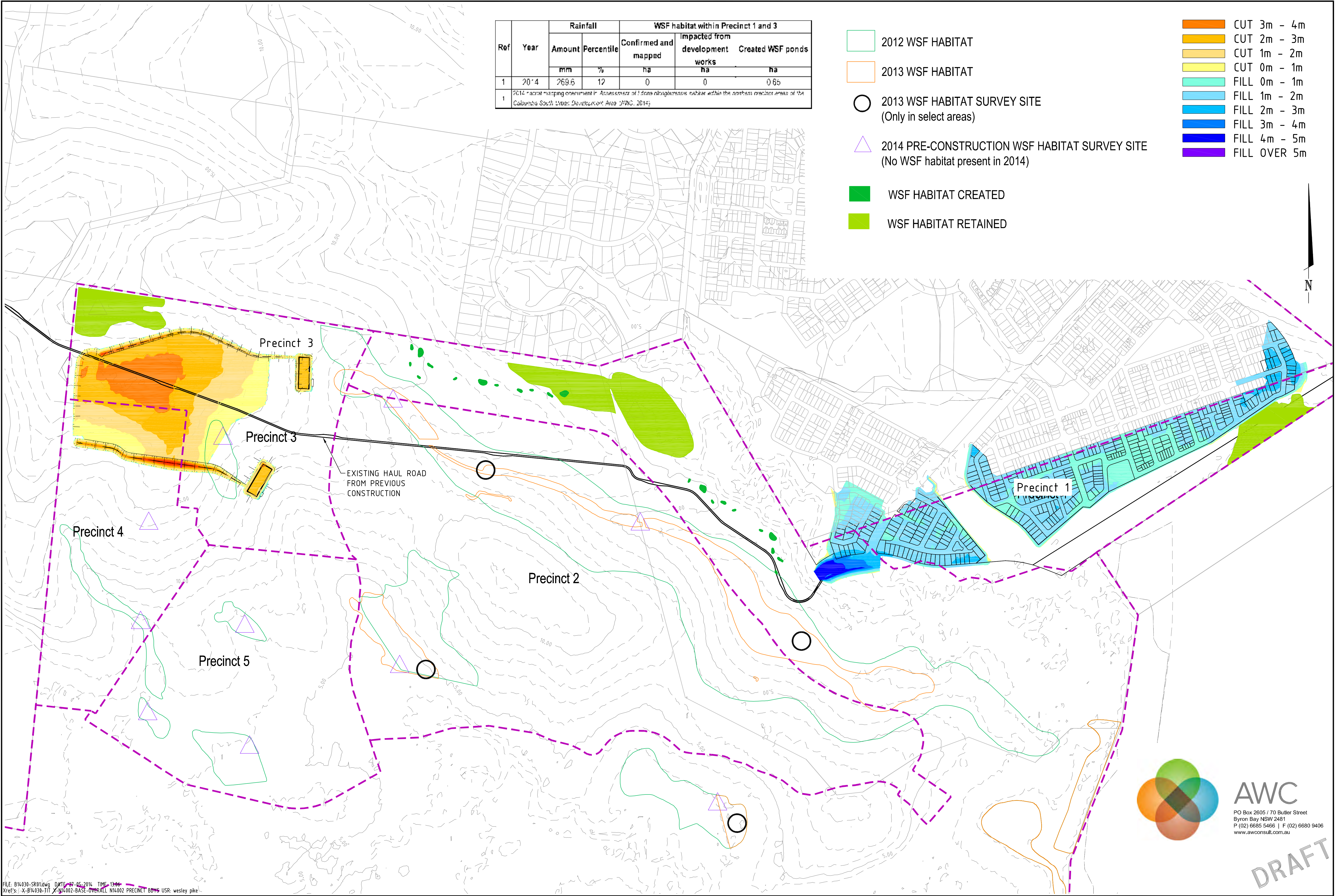
Brisbane Canberra Melbourne Sydney Singapore Sunshine Coast
Quality Endorsed Company ISO 9001 Lic 4084
DRAWING TITLE
SITE, LOCALITY PLAN & DRAWING INDEX
DRAWING NUMBER B14030-SK00
ISSUE A

Ref	Year	Rainfall		WSF habitat within Precinct 1 and 3		
		Amount	Percentile	Confirmed and mapped	Impacted from development works	Created WSF ponds
		mm	%	ha	ha	ha
1	2014	269.6	12	0	0	0.65
1	2014 habitat mapping document in Assessment of Litoria olongburensis habitat within the northern precinct areas of the Caloundra South Urban Development Area (AWC, 2014)					



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FILE: B14030-SK01.dwg DATE: 27-05-2014 TIME: 13:06
Xref's: X-B14030-TIT X-N14002-BASE-OVERALL N14002 PRECINCT BDYS USR: wesley pike

FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
	KK	KK	21.02.14	
A	WP	WP	27.05.14	AWC DATA ADDED
B				
C				
D				
E				
F				

AMENDMENTS

DESIGN CHECK

DRAWN CHECK

SCALE (METRES)
100 50 0 100 200
1 : 5000 (UNREDUCED)

MICROFILM No.

PROJECT No.
B14030

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Construction and Environmental Management Plan

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Quality System
Quality Endorsed Company ISO 9001 Lic 4084

DRAWING TITLE
PLAN OF BORROW AREA FOR PRECINCT 1 WITH FROG MANAGEMENT PLAN OVERLAY

DRAWING NUMBER
B14030-SK01

ISSUE
A

PROPERTY BOUNDARY

PROPERTY BOUNDARY

I.L 14.20

TOPSOIL AND GRASS SEEDING TO DOWNSTREAM FACE

DEWATERING CHANNEL

I.L 13.60

I.L 15.20

CLEAN WATER CUT-OFF DRAIN

END OF DRAIN I.L 13.27

SEDIMENT BASIN
BASE RL 11.17
WIER LEVEL 12.67
BUND LEVEL 12.97

DIRTY WATER CUT-OFF DRAIN

HAUL ROAD THROUGH BORROW AREA TO BE REINSTATED TO ALLOW USE BY CONSTRUCTION TRAFFIC FROM EXTERNAL ROAD NETWORK

CLEAN WATER CUT-OFF DRAIN

I.L 13.4

EXTENT OF BORROW SITE

TOPSOIL STOCKPILE AREA WITH SILT FENCE

DIRTY WATER CUT-OFF DRAIN

SILT FENCE

EXISTING HAUL ROAD FROM PREVIOUS CONSTRUCTION

I.L 12.50

DEWATERING CHANNEL

I.L 11.2

TOPSOIL AND GRASS SEEDING TO DOWNSTREAM FACE

I.L 11.00

SEDIMENT BASIN
BASE RL 8.90
WIER LEVEL 10.40
BUND LEVEL 10.70

TOPSOIL STOCKPILE AREA WITH SILT FENCE

15.00

10.00

N

2012 WSF HABITAT

2013 WSF HABITAT

2013 WSF HABITAT SURVEY SITE
(Only in select areas)

2014 PRE-CONSTRUCTION WSF HABITAT SURVEY SITE
(No WSF habitat present in 2014)

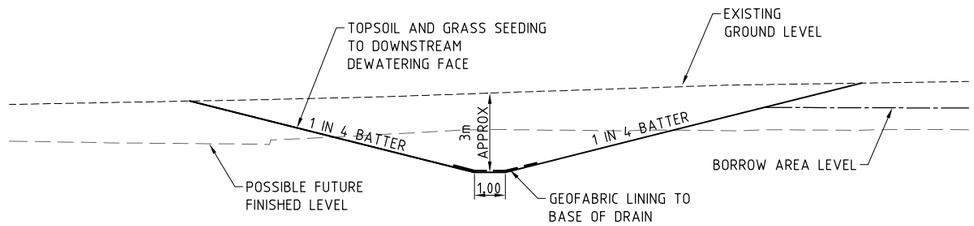
WSF HABITAT CREATED

WSF HABITAT RETAINED

CUT 3m - 4m
CUT 2m - 3m
CUT 1m - 2m
CUT 0m - 1m
FILL 0m - 1m
FILL 1m - 2m
FILL 2m - 3m
FILL 3m - 4m
FILL 4m - 5m
FILL OVER 5m

NOTE
PRECINCT 3 BORROW AREA TO BE TOPSOILED AND GRASSED ON COMPETION OF CUT EXERCISE. STABILISATION OF FINISHED AREAS TO BE COMPLETED AS SOON AS POSSIBLE

NOTE
USE OF HIGH EFFICIENCY SEDIMENT BASINS (HSE) TO BE CONFIRMED PRIOR TO CONSTRUCTION



TYPICAL SECTION OF DEWATERING DRAIN

SCALE 1:100 (A1)

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FILE: B14030-SK02.dwg DATE: 27-05-2014 TIME: 13:06
Xref's: X-B14030-TIT X-N14002-BASE-OVERALL N14002 PRECINCT BDYS USR: wesley pike

FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
	WP	DM	10.01.13	
A	WP	WP	27.05.14	AWC DATA ADDED
B				
C				
D				
E				
F				

AMENDMENTS

DESIGN CHECK

DRAWN CHECK

SCALE (METRES)

1:2000 1:4000 20 10 0 20 40 60 80 100 A1 A3

MICROFILM No.

PROJECT No. B14030

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APPROVED

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CLIENT
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PROJECT
CALOUNDRA SOUTH PRECINCT 1
Construction and Environmental Management Plan

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Quality Endorsed Company ISO 9001 Lic-10841

DRAWING TITLE
PRECINCT 3 BORROW AREA DEWATERING TRENCH STRATEGY AND SEDIMENT EROSION CONTROL

DRAWING NUMBER B14030-SK02

ISSUE A

- CUT 3m - 4m
- CUT 2m - 3m
- CUT 1m - 2m
- CUT 0m - 1m
- FILL 0m - 1m
- FILL 1m - 2m
- FILL 2m - 3m
- FILL 3m - 4m
- FILL 4m - 5m
- FILL OVER 5m

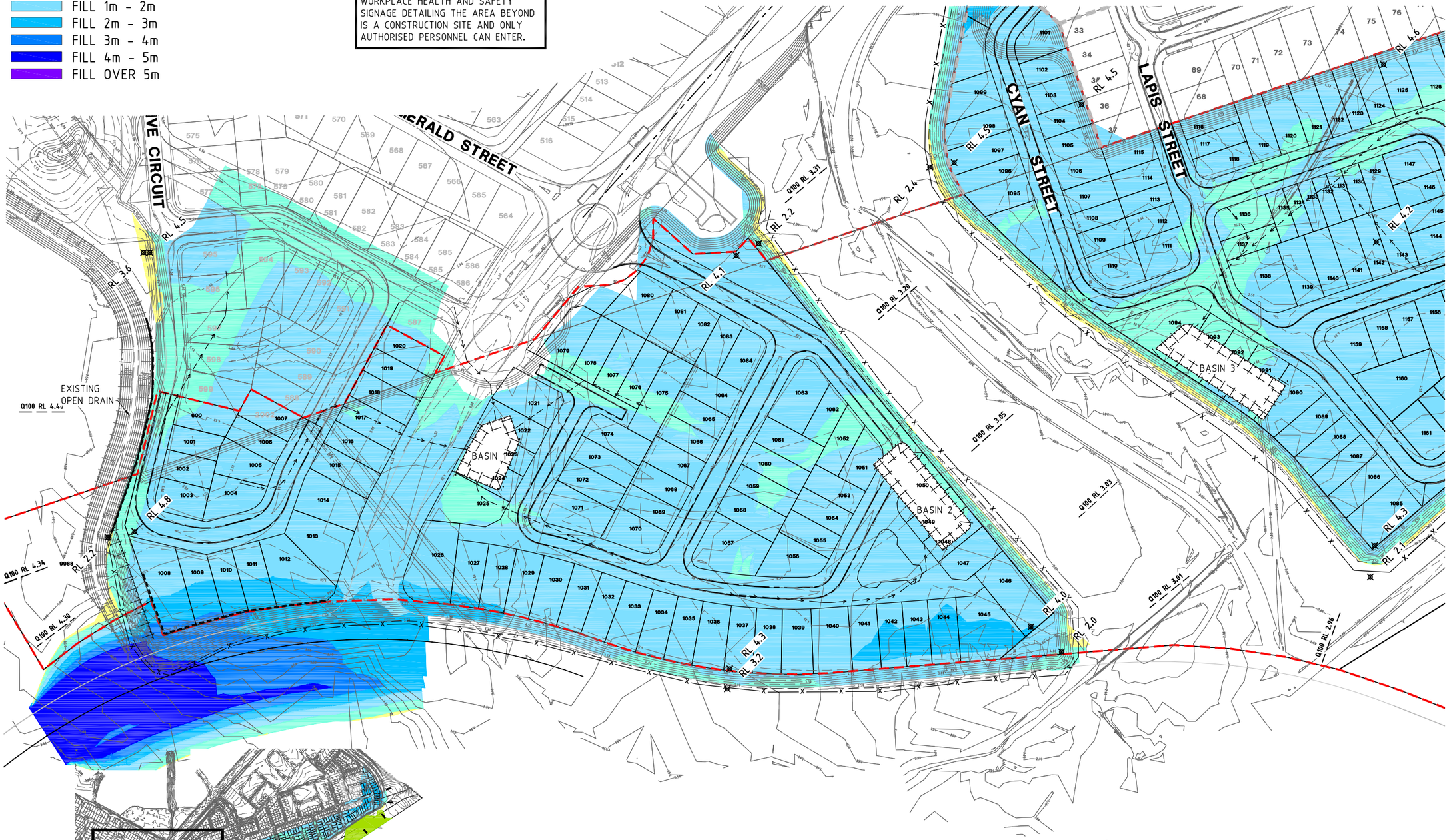
NOTE
USE OF HIGH EFFICIENCY SEDIMENT BASINS (HSE) TO BE CONFIRMED PRIOR TO CONSTRUCTION

CONTRACTOR TO TAKE ALL REASONABLE MEASURES TO ENSURE THAT ALL RUNOFF FROM SITE DOES NOT EXCEED 50mg/L TSS.

CONTRACTOR TO DISPLAY APPROPRIATE WORKPLACE HEALTH AND SAFETY SIGNAGE DETAILING THE AREA BEYOND IS A CONSTRUCTION SITE AND ONLY AUTHORISED PERSONNEL CAN ENTER.

THE EROSION & SEDIMENT CONTROL PLAN IS A CONCEPT PLAN DEMONSTRATING AN APPROACH TO EROSION & SEDIMENTATION CONTROL FOR THE SITE. IT IS THE CONTRACTORS RESPONSIBILITY TO PROVIDE AN EROSION & SEDIMENT CONTROL DESIGN AND A COMPLETED DESIGN CERTIFICATE PRIOR TO COMMENCEMENT OF WORK. CERTIFICATION MUST BE UNDERTAKEN BY A SUITABLY QUALIFIED, EXPERIENCED PROFESSIONAL NOT DIRECTLY EMPLOYED BY THE PRINCIPAL.

N



CONTINUES ON SHEET 2 OF 3

KEY PLAN
SCALE 1:10000 (A1)

FILE: B14030-SK03.dwg DATE: 27-05-2014 TIME: 13:16
Xref's: X-B14030-Tif N14004-BASE X-N14004-Design Contours Combined X-N14004 - Fill Areas Precinct 1-Local Coords USR: wesley pike

	FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
AMENDMENTS	A	WP	DM	10.01.13	
	B	WP	WP	27.05.14	AWC DATA ADDED
	C				
	D				
	E				
	F				

DESIGN CHECK
DRAWN CHECK

SCALE (METRES)
1:1000 10 5 0 10 20 30 40 50 A1
1:2000 A3

MICROFILM No.

PROJECT No.
B14030

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APPROVED
FOR & ON BEHALF OF BROWN CONSULTING (QLD) PTY LTD

CLIENT
STOCKLAND DEVELOPMENTS PTY LTD

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CALOUNDRA SOUTH PRECINCT 1
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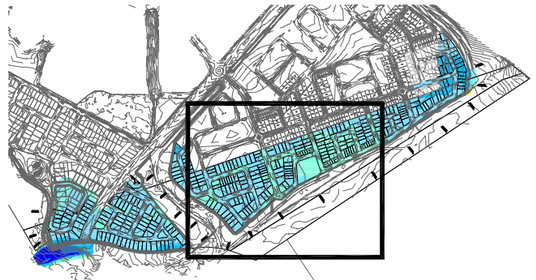
DRAWING TITLE
CONCEPTUAL BULK EARTHWORKS SHEET 1 OF 3

DRAWING NUMBER
B14030-SK03

ISSUE
A



KEY PLAN
SCALE 1:10000 (A1)

- CUT 3m - 4m
- CUT 2m - 3m
- CUT 1m - 2m
- CUT 0m - 1m
- FILL 0m - 1m
- FILL 1m - 2m
- FILL 2m - 3m
- FILL 3m - 4m
- FILL 4m - 5m
- FILL OVER 5m

N

SAPPHIRE STREET
SKY STREET
SIENNA STREET
LAPIS STREET
BELLS REACH DRIVE
CAPRI STREET
CITRINE STREET
BASIN 3
BASIN 4
BASIN 5
REMNANT VEGETATION (NO CONSTRUCTION)
WMA WETLAND AREA (NO CONSTRUCTION)
Q100 RL 3.03
Q100 RL 3.01
Q100 RL 2.96
Q100 RL 2.88
Q100 RL 2.79
Q100 RL 2.75
Q100 RL 2.23
RL 4.5
RL 4.6
RL 4.2
RL 4.1
RL 3.7
RL 2.9
RL 3.5
RL 2.7
RL 4.3
RL 2.1
RL 3.1

CONTINUES ON SHEET 1 OF 3
CONTINUES ON SHEET 3 OF 3

NOTE
USE OF HIGH EFFICIENCY SEDIMENT BASINS (HSE) TO BE CONFIRMED PRIOR TO CONSTRUCTION

THE EROSION & SEDIMENT CONTROL PLAN IS A CONCEPT PLAN DEMONSTRATING AN APPROACH TO EROSION & SEDIMENTATION CONTROL FOR THE SITE. IT IS THE CONTRACTORS RESPONSIBILITY TO PROVIDE AN EROSION & SEDIMENT CONTROL DESIGN AND A COMPLETED DESIGN CERTIFICATE PRIOR TO COMMENCEMENT OF WORK. CERTIFICATION MUST BE UNDERTAKEN BY A SUITABLY QUALIFIED, EXPERIENCED PROFESSIONAL NOT DIRECTLY EMPLOYED BY THE PRINCIPAL.

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FILE: B14030-SK04.dwg DATE: 27-05-2014 TIME: 13:06
Xref's: X-B14030-TIT N14004-BASE X-N14004-Design Contours Combined X-N14004 - Fill Areas Precinct 1-Local Coords USR: wesley pike

AMENDMENTS	FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
	A	WP	DM	10.01.13	
	B	WP	WP	27.05.14	AWC DATA ADDED
	C	\			
	D				
	E				
	F				

DESIGN CHECK
DRAWN CHECK

SCALE (METRES)
1:1000 10 5 0 10 20 30 40 50 A1
1:2000 A3

MICROFILM No.

PROJECT No. B14030

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APPROVED
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CLIENT: STOCKLAND DEVELOPMENTS PTY LTD

PROJECT: CALOUNDRA SOUTH PRECINCT 1 Construction and Environmental Management Plan

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DRAWING TITLE: CONCEPTUAL BULK EARTHWORKS SHEET 2 OF 3

DRAWING NUMBER: B14030-SK04

ISSUE: A

KEY PLAN
SCALE 1:10000 (A1)

N

2012 WSF HABITAT

2013 WSF HABITAT

2013 WSF HABITAT SURVEY SITE
(Only in select areas)

2014 PRE-CONSTRUCTION WSF HABITAT SURVEY SITE
(No WSF habitat present in 2014)

WSF HABITAT CREATED

WSF HABITAT RETAINED

CUT 3m - 4m
CUT 2m - 3m
CUT 1m - 2m
CUT 0m - 1m
FILL 0m - 1m
FILL 1m - 2m
FILL 2m - 3m
FILL 3m - 4m
FILL 4m - 5m
FILL OVER 5m

AUBURN STREET
OCHRE CRESCENT
AUBURN DRIVE
AMBER STREET
GOLDEN STREET
OSAGE STREET
SIENNA STREET
CITRINE STREET
BASIN 5
BASIN 6
BASIN 7
RL 5.0
RL 4.1
RL 3.3
RL 3.6
RL 3.7
RL 1.8
RL 2.0
RL 2.4
RL 3.6
RL 3.7
Q100 RL 2.93
Q100 RL 2.75
Q100 RL 2.73
Q100 RL 2.73
Q100 RL 2.73
EXISTING DRAIN FROM PREVIOUS CONSTRUCTION
HABITAT AREA (NO CONSTRUCTION)
REMNANT VEGETATION (NO CONSTRUCTION)

CONTINUES ON SHEET 2 OF 3

NOTE
USE OF HIGH EFFICIENCY SEDIMENT BASINS (HSE) TO BE CONFIRMED PRIOR TO CONSTRUCTION

THE EROSION & SEDIMENT CONTROL PLAN IS A CONCEPT PLAN DEMONSTRATING AN APPROACH TO EROSION & SEDIMENTATION CONTROL FOR THE SITE. IT IS THE CONTRACTORS RESPONSIBILITY TO PROVIDE AN EROSION & SEDIMENT CONTROL DESIGN AND A COMPLETED DESIGN CERTIFICATE PRIOR TO COMMENCEMENT OF WORK. CERTIFICATION MUST BE UNDERTAKEN BY A SUITABLY QUALIFIED, EXPERIENCED PROFESSIONAL NOT DIRECTLY EMPLOYED BY THE PRINCIPAL.

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FILE: B14030-SK05.dwg DATE: 27-05-2014 TIME: 13:16
Xref's: X-B14030-TIT B14004-BASE X-N14004-Design Contours Combined X-N14004 - Fill Areas Precinct 1-Local Coords USR: wesley pike

FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
	WP	DM	16.01.13	
A	WP	WP	27.05.14	AWC DATA ADDED
B				
C				
D				
E				
F				

DESIGN CHECK

DRAWN CHECK

SCALE (METRES)
1:1000 10 5 0 10 20 30 40 50 A1
1:2000 A3

MICROFILM No.

PROJECT No. B14030

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APPROVED
FOR & ON BEHALF OF BROWN CONSULTING (QLD) PTY LTD

CLIENT: STOCKLAND DEVELOPMENTS PTY LTD

PROJECT: CALOUNDRA SOUTH PRECINCT 1 Construction and Environmental Management Plan

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DRAWING TITLE: CONCEPTUAL BULK EARTHWORKS SHEET 3 OF 3

DRAWING NUMBER: B14030-SK05

ISSUE: A

GENERAL NOTES

1. THIS DESIGN FOR EROSION AND SEDIMENT CONTROL IS CONCEPTUAL ONLY. THE CONTRACTOR SHALL MODIFY OR INSTALL ADDITIONAL/ ALTERNATIVE MEASURES DURING THE CONSTRUCTION AND MAINTENANCE PERIOD IN ORDER TO COMPLY WITH BEST PRACTICE STANDARDS IN ACCORDANCE WITH BUT NOT LIMITED TO BROWN CONSULTING'S SPECIFICATION 17 , THE MANUAL FOR EROSION AND SEDIMENT CONTROL (V1.2) AND ALL STATUTORY REQUIREMENTS .

2. PRESCRIBED WATER CONTAMINANTS (AS DEFINED IN THE ENVIRONMENTAL PROTECTION ACT 1994) MUST NOT BE RELEASED FROM THE SITE, OR BE LIKELY TO BE RELEASED SHOULD RAINFALL OCCUR, UNLESS ALL REASONABLE AND PRACTICABLE MEASURES ARE TAKEN TO PREVENT OR MINIMISE THE RELEASE AND CONCENTRATION OF CONTAMINATION. THESE MEASURES MUST INCLUDE AS A MINIMUM, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   - A. ENSURE NON ESSENTIAL EXPOSURE OF SOIL IS PREVENTED BY: RESTRICTING THE EXTENT OF CLEARING TO THAT NECESSARY FOR ACCESS TO, AND SAFE CONSTRUCTION OF, THE APPROVED WORKS; PROTECTING VEGETATION IN ALL OTHER AREAS OF THE SITE; AND BY MINIMISING THE DURATION OF SOIL EXPOSURE BY:
     - STAGING THE WORKS TO MINIMISE THE AREA OF SOIL EXPOSED AT ANY ONE TIME;
     - EFFECTIVELY STABILISING CLEARED AREAS PRIOR TO RAINFALL IF WORKS ARE DELAYED OR
       WORKS ARE NOT INTENDED TO OCCUR IMMEDIATELY. SEE E&SC ADVICE NOTE 1;
     - EFFECTIVELY STABILISING AREAS AT FINISHED LEVEL WITHOUT DELAY AND PRIOR TO RAINFALL; AND
     - EFFECTIVELY STABILISING STEEP AREAS, SUCH AS STOCKPILES, BATTERS AND EMBANKMENTS,
       WHICH ARE NOT BEING ACTIVELY WORKED AND PRIOR TO RAINFALL.
   - B. WHERE IT IS NOT FEASIBLE TO EFFECTIVELY STABILISE CLEARED AREAS OF EXPOSED SOIL, SUCH AS AREAS BEING ACTIVELY WORKED, IMPLEMENT A FULL SUITE OF EROSION AND SEDIMENT CONTROLS TO MAXIMISE SEDIMENT CAPTURE IN THOSE AREAS AND TO MINIMISE EROSION SUCH THAT EROSION BY ALL FORMS OTHER THAN SPLASH (RAINDROP IMPACT) EROSION AND SHEET EROSION DOES NOT OCCUR; AND
   - C. IN AREAS OF EXPOSED SOIL WHERE IT IS NOT FEASIBLE TO EITHER EFFECTIVELY STABILISE THE SURFACE OR IMPLEMENT A FULL SUITE OF EROSION AND SEDIMENT CONTROLS, FOR EXAMPLE IN THE AREAS BEING ACTIVELY WORKED AND WHERE THE IMPLEMENTATION OF SOME EROSION AND SEDIMENT CONTROLS WOULD IMPEDE CONSTRUCTION ACTIVITIES, ENSURE CONTINGENCY MEASURES ARE AVAILABLE ON SITE AND ARE IMPLEMENTED, PRIOR TO RAIN, TO MAXIMISE SEDIMENT CAPTURE AND TO MINIMISE EROSION SUCH THAT EROSION BY ALL FORMS OTHER THAN SPLASH (RAINDROP IMPACT) EROSION AND SHEET EROSION DOES NOT OCCUR
   - D. EFFECTIVELY STABILISE ALL STOCKPILES, BATTERS AND EMBANKMENTS WITHOUT DELAY. WHERE IT IS NOT FEASIBLE TO EFFECTIVELY STABILISE A STOCKPILE, BATTER OR EMBANKMENT, SUCH AS AREAS BEING ACTIVELY WORKED, ENSURE THAT SEDIMENT CONTROLS ARE INSTALLED AND SURFACE STORMWATER FLOWS ARE MANAGED SUCH THAT EROSION OF STOCKPILES, BATTERS OR EMBANKMENTS IS NOT CAUSED BY CONCENTRATED STORMWATER FLOWS.
   - E. ENSURE CLEAN STORMWATER IS DIVERTED OR MANAGED AROUND OR THROUGH THE SITE WITHOUT INCREASING THE CONCENTRATION OF TOTAL SUSPENDED SOLIDS OR OTHER CONTAMINANTS IN THE FLOW AND WITHOUT CAUSING EROSION (ON SITE OR OFF SITE). IF IT IS NOT FEASIBLE TO DIVERT ALL AREAS DISCHARGING CLEAN STORMWATER AROUND OR THROUGH THE SITE, MANAGE THE CLEAN STORMWATER RUNOFF AS FOR CONTAMINATED STORMWATER RUNOFF, AND ENSURE THAT SEDIMENT BASINS ARE SIZED TO ACCOMMODATE THE ADDITIONAL VOLUME OF RUNOFF (SEE E&SC ADVICE NOTE 2).
   - F. ENSURE SHEET FLOWS OF STORMWATER ARE MANAGED SUCH THAT SHEET AND RILL EROSION IS PREVENTED OR MINIMISED.
   - G. ENSURE THAT ALL CONCENTRATED STORMWATER FLOWS INCLUDING DRAINAGE LINES, DIVERSION DRAINS, CHANNELS AND BATTER CHUTES ARE MANAGED ONTO, THROUGH, AND AT RELEASE POINTS FROM THE SITE IN ALL RAIN EVENTS UP TO AND INCLUDING THE AVERAGE RECURRENCE INTERVAL (ARI) EVENT OF 1 IN 2 YEAR ARI WITHOUT CAUSING WATER CONTAMINATION, SHEET, RILL OR GULLY EROSION, SEDIMENTATION, OR DAMAGE TO STRUCTURES OR PROPERTY
   - H. ENSURE MEASURES HAVE BEEN IMPLEMENTED SUCH THAT THE RUNOFF FROM ALL DISTURBED AREAS FLOWS TO A SEDIMENT BASIN OR BASINS. WHERE IT IS NOT FEASIBLE TO DIVERT RUNOFF FROM DISTURBED AREAS OF THE SITE TO A SEDIMENT BASIN, IMPLEMENT COMPENSATORY EROSION AND DRAINAGE CONTROLS PRIOR TO RAINFALL TO ENSURE THAT EROSION OF THOSE AREAS DOES NOT OCCUR, INCLUDING EROSION CAUSED BY EITHER SPLASH (RAINDROP IMPACT), SHEET, RILL OR GULLY EROSION PROCESSES (SEE E&SC ADVICE NOTE 3).
   - I. ENSURE EACH SEDIMENT BASIN HAS THE CAPACITY TO TREAT FLOWS TO CURRENT BEST PRACTICE STANDARDS (SEE E&SC ADVICE NOTE 4) AND AS A MINIMUM TO CONTAIN ALL THE STORMWATER RUNOFF FROM THE 80TH PERCENTILE 5 DAY RAINFALL DEPTH AND STORE 2 MONTHS SEDIMENT FROM THE RECEIVING CATCHMENT, AS DETERMINED USING THE REVISED UNIVERSAL SOIL LOSS EQUATION.
   - J. ENSURE SEDIMENT BASINS ARE MAINTAINED WITH SUFFICIENT STORAGE CAPACITY TO CAPTURE AND TREAT THE RUNOFF FOR THE DESIGN RAINFALL DEPTH OR EVENT. WHERE SEDIMENT BASINS ARE PROPOSED TO BE OVERSIZED FOR STORAGE OF CAPTURED WATER FOR RE-USE, INSTALL SURVEY MARKERS IN EACH SUCH BASIN TO INDICATE THE LEVEL THAT WATER WITHIN THE BASIN MUST BE LOWERED TO, IN ORDER TO MEET THE STORAGE CAPACITY SPECIFIED IN THE ABOVE REQUIREMENT.
   - K. ENSURE SEDIMENT BASINS ARE DEWATERED AS SOON AS PRACTICABLE AFTER EACH RAINFALL EVENT.
   - L. ENSURE THAT DURING DEWATERING, THE CONCENTRATION OF TOTAL SUSPENDED SOLIDS (TSS) DISCHARGED DOES NOT EXCEED 50MG/L AND THAT PH IS WITHIN THE RANGE OF 6.5-8.5. THE CONCENTRATION OF TSS RELEASED BY DEWATERING MAY ONLY EXCEED 50MG/L WHERE IT CAN BE DEMONSTRATED AND SUPPORTED THROUGH DOCUMENTATION THAT:
     - FURTHER SIGNIFICANT RAINFALL IS FORECAST TO OCCUR BEFORE THE TSS CONCENTRATION IS LIKELY TO BE REDUCED TO 50MG/L ; AND
     - RELEASING A HIGHER CONCENTRATION OF TOTAL SUSPENDED SOLID WILL RESULT IN A BETTER ENVIRONMENTAL OUTCOME BY PROVIDING STORAGE FOR THE CAPTURE AND TREATMENT OF RUNOFF FROM THE IMMINENT RAINFALL AND RUNOFF; AND
     - FLOCCULENT HAS BEEN APPLIED AND THE CONCENTRATION OF TSS IN THE CAPTURED WATER HAS ALREADY SIGNIFICANTLY DECREASED.
   - M. ENSURE SEDIMENT BASINS AND ASSOCIATED STRUCTURES SUCH AS INLETS, OUTLETS AND SPILLWAYS ARE STRUCTURALLY SOUND FOR 10 YEAR ARI RAINFALL EVENT.
   - N. ENSURE ACCUMULATED SEDIMENT FROM BASINS AND OTHER CONTROLS IS REMOVED AND DISPOSED OF APPROPRIATELY WITHOUT CAUSING WATER CONTAMINATION.
   - O. ENSURE SEDIMENT DOES NOT LEAVE THE SITE ON THE TYRES OF VEHICLES.

3. THE ENVIRONMENTAL PROTECTION ACT 1994 STATES THAT A PERSON MUST NOT CARRY OUT ANY ACTIVITY THAT CAUSES, OR IS LIKELY TO CAUSE, ENVIRONMENTAL HARM UNLESS THAT PERSON TAKES ALL REASONABLE AND PRACTICAL MEASURES TO PREVENT OR MINIMISE THE HARM. ENVIRONMENTAL HARM INCLUDES ENVIRONMENTAL NUISANCE. IN REGARD PERSONS AND ENTITIES, INVOLVED IN THE CIVIL, EARTHWORKS AND CONSTRUCTION PHASES OF THIS DEVELOPMENT, ARE TO ADHERE TO THEIR 'GENERAL ENVIRONMENTAL DUTY' TO MINIMISE THE RISK OF CAUSING ENVIRONMENTAL HARM.

   ENVIRONMENTAL; HARM IS DEFINED BY THE ACT AS ANY ADVERSE AFFECT, OR POTENTIAL ADVERSE AFFECT WHETHER TEMPORARY OR PERMANENT AND OF WHATEVER MAGNITUDE, DURATION OR FREQUENCY ON AN ENVIRONMENTAL VALUE AND INCLUDES ENVIRONMENTAL NUISANCE. THEREFORE, NO PERSON SHOULD CAUSE ANY INTERFERENCE WITH THE ENVIRONMENT OR AMENITY OF THE AREA BY REASON OF THE EMISSION OF NOISE, VIBRATION, SMELL, FUMES, SMOKE, VAPOR, STEAM, SOOT, ASH, DUST, WASTE WATER, WASTE PRODUCTS, GRIT, SEDIMENT, OIL OR OTHERWISE, OR CAUSE HAZARDS LIKELY IN THE OPINION OF THE ADMINISTERING AUTHORITY TO CAUSE UNDUE DISTURBANCE OR ANNOYANCE TO PERSONS OR AFFECT PROPERTY NOT CONNECTED WITH THE USE.

4. THE CONTRACTOR IS TO TAKE ALL NECESSARY PRECAUTIONS TO CONTROL EROSION AND DOWNSTREAM SEDIMENTATION DURING ALL STAGES OF CONSTRUCTION INCLUDING THE MAINTENANCE PERIOD.

5. WHERE IT IS REQUIRED TO SLASH EXISTING VEGETATION EITHER PRIOR TO THE COMMENCEMENT OF WORKS, DURING THE CONSTRUCTION WORKS AND / OR DURING THE MAINTENANCE PERIOD, SAID VEGETATION SHALL BE SLASHED TO A MINIMUM HEIGHT OF 75mm TO ASSIST WITH THE RETENTION OF SOILS ON SITE (I.E. ASSIST IN THE PREVENTION OF EROSION).

6. WHERE THE EXISTING VEGETATION WITHIN THE PROPOSED LOTS AND / OR PARKLAND IS DISTURBED AS A RESULT OF THE CONSTRUCTION WORKS, SAID EARTHWORKS ARE TO BE TOPSOILED AND EFFECTIVELY STABILISED WITHIN FIVE (5) DAYS, (EARLIER IF RAIN EXPECTED) OF FINAL ALLOTMENT EARTHWORKS. AN EFFECTIVELY STABILISED SURFACE IS DEFINED AS ONE THAT DOES NOT HAVE
   - VISIBLE EVIDENCE OF SOIL LOSS CAUSED BY SHEET, RILL OR GULLY EROSION
     OR
   - LEAD TO SEDIMENTATION, OR
   - LEAD TO WATER CONTAMINATION.

7. ALL CONSTRUCTION VEHICLES ARE TO ACCESS THE SITE VIA A SINGLE POINT OF ACCESS; THE POINT OF ACCESS, TOGETHER WITH THE MEASURES TO BE IMPLEMENTED, ARE TO BE AGREED WITH COUNCIL'S DESIGNATED REPRESENTATIVE ON SITE. THE PRINCIPLE AIM OF THE MEASURE(S) TO BE IMPLEMENTED IS / ARE TO LIMIT THE TRACKING OF DELETERIOUS MATERIALS ONTO THE SURROUNDING ROAD NETWORK.

8. THE CONTRACTOR SHALL PROVIDE GULLY INLET PROTECTION TO ALL GULLY INLET STRUCTURES LOCATED, DIRECTLY DOWNSTREAM OF THE PROPOSED DEVELOPMENT WORKS.

9. APPROPRIATE PROVISIONS ARE TO BE PROVIDED TO THE INTERFACE BETWEEN THE EXISTING ROADWAY PAVEMENTS AND THE NEW ROADWORK'S CONSTRUCTION. THE PROVISIONS SHALL ADDRESS WORKPLACE HEALTH AND SAFETY CONCERNS (I.E. RESTRICTING ACCESS BY THE GENERAL PUBLIC TO THE SITE).

10. THE LOCATION OF THE CONSTRUCTION VEHICLE COMPOUND, SITE OFFICE AND THE VEHICLE SERVICING AREA SHALL BE AGREED WITH COUNCIL'S DESIGNATED REPRESENTATIVE ON SITE, PRIOR TO THE COMMENCEMENT OF WORKS.

11. CLEARED VEGETATION IS TO NOT BE BURNED ON SITE, ALL VEGETATIVE WASTE(S) SHALL BE MULCHED AND THEREAFTER RETAINED ON SITE FOR USE AS PART OF THE EROSION AND SEDIMENTATION CONTROL STRATEGY OR THE LANDSCAPING / REVEGETATION WORKS. ALL STUMPS AND / OR OTHER ORGANIC MATTER NOT SUITABLE FOR MULCHING SHALL BE DISPOSED OF AT AN APPROVED WASTE DISPOSAL FACILITY.

12. SEDIMENT FENCE AND TURFING RUNNING DOWNSLOPES SHALL HAVE REGULAR FLOW DISSIPATERS AT 45° TO SLOPE AS DIRECTED CONSISTING OF SAND BAGS OR SIMILAR AS REQUIRED.

13. DURING THE CONSTRUCTION PROCESS INCLUDING THAT PERIOD DURING WHICH THE WORKS ARE "ON MAINTENANCE' SHOULD COUNCIL'S DESIGNATED REPRESENTATIVE REQUEST ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES BE IMPLEMENTED, SAID MEASURES SHALL BE IMPLEMENTED AT THE EARLIEST TIME POSSIBLE. NOTWITHSTANDING THE ABOVE REQUIREMENT ANY MEASURES REQUESTED TO BE IMPLEMENTED BY COUNCIL'S DESIGNATED REPRESENTATIVE SHALL BE IMPLEMENTED WITHIN 24 HOURS OF THE TIME OF THE REQUEST.

14. ALL ROOFWATER / SEWER RETICULATION TRENCHES EITHER ADJACENT TO EXISTING DEVELOPMENT OR PERPENDICULAR TO THE CROSSFALL OF THE LAND ARE TO BE TOPSOILED (75mm MINIMUM) AND TURFED. FOR A MINIMUM 900mm WIDTH.

15. THE CONTRACTOR SHALL CONSTRUCT LINED CUTOFF DRAINS IN WORK AREAS SO AS TO LIMIT SLOPE LENGTHS TO A MAXIMUM OF 80M.

16. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT NO RELEASE OR FLOW IS PERMITTED FROM THE SITE, THROUGHOUT THE EARTHWORKS AND CONSTRUCTION PERIOD TO ANY WATER WAYS OR STORMWATER DRAINLINES LEADING TO A WATERWAY OR AREA OF NATIVE VEGETATION UNLESS THE LEVELS OF TOTAL SUSPENDED SOLIDS DOES NOT EXCEED A CONCENTRATION OF 50 MGL.

17. ALL SEDIMENT CONTROL DEVICES SHALL BE MONITORED, CLEANED AND/OR REPAIRED WHENEVER THE ACCUMULATED SEDIMENT REDUCES THE CAPACITY BY 50%.

18. ALL PERIMETER BANK/SWALE SHALL HAVE UNINTERRUPTED POSITIVE GRADE TO AN OUTLET.

19. AT ALL TIMES THE CONTRACTOR SHALL MONITOR THE PREVAILING WEATHER CONDITIONS AND PROTECT OR STABILISE ANY DOWNSTREAM CONSTRUCTION AND GULLY INLETS.

20. CLEARING OF SITE AND STOCK PILE AREAS TO BE AS DIRECTED BY THE SUPERINTENDENT.

21. WHERE PRACTICAL THE CONTRACTOR SHALL DIVERT CLEAN WATER ENTERING THE SITE FROM EXTERNAL CATCHMENT(S) AND DIRECTED TO THE STORMWATER SYSTEM. THIS DISCHARGE POINT SHOULD BE ROCK LINED. REGULAR ROCK CHECK DAMS SHOULD BE POSITIONED ALONG THE VEGETATED DRAINAGE LINE LEADING TO THIS DISCHARGE POINT.

22. REGULAR INSPECTIONS AND MAINTENANCE OF VEHICLE WASHDOWN AREA, SITE AND STORAGE COMPOUND TO BE CARRIED OUT BY CONTRACTOR.

23. AREAS USED FOR STORAGE OF CHEMICALS USED FOR CONSTRUCTION PURPOSES SHALL HAVE STORMWATER CONTROL DEVICES ERECTED ADJACENT TO THEM (I.E. EARTH BUND AND SEDIMENT FENCES). UPON COMPLETION OF ROADWORKS WASTE PRODUCTS ARE TO BE DISPOSED OF AS PER LOCAL AUTHORITY GUIDELINES AND TEMPORARY DEVICES ARE TO BE REMOVED AND AREA REHABILITATED.

FILE: B14030-SK06.dwg DATE: 27-05-2014 TIME: 13:06
Xref's: X-B14030-TIT USR: wesley pike

AMENDMENTS	FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
		WP	DM	10.01.13	
	A				
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	C				
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	E				
	F				

DESIGN CHECK

DRAWN CHECK

SCALE (METRES)

MICROFILM No.

PROJECT No. B14030

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FOR & ON BEHALF OF BROWN CONSULTING (QLD) PTY LTD

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PROJECT: CALOUNDRA SOUTH PRECINCT 1 Construction and Environmental Management Plan

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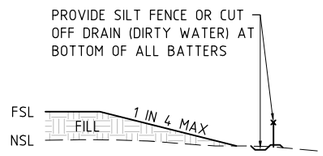
Quality Endorsed Company ISO 9001 Lic:4084

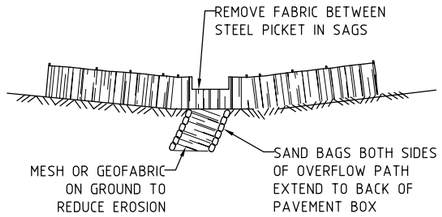
DRAWING TITLE: CONCEPTUAL BULK EARTHWORKS SEDIMENT CONTROL NOTES

DRAWING NUMBER: B14030-SK06

ISSUE

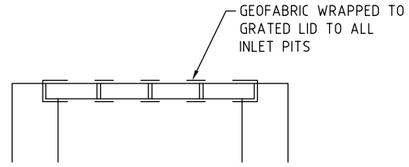


TYPICAL BATTER TREATMENT DETAIL



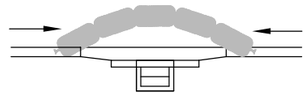
SPILL THROUGH WEIR DETAIL

INSTALL AT ALL SAG POINTS IN SILT FENCES



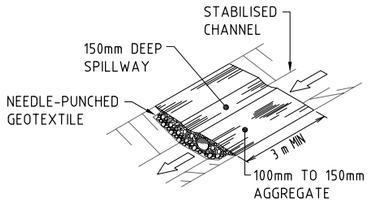
INLET GULLY DETAILS

N.T.S.

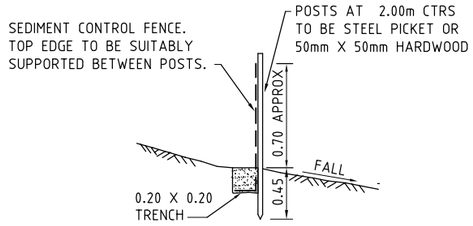


SANDBAGS AT SAG GULLIES

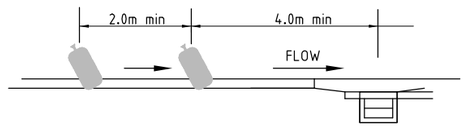
TO BE PROVIDED AT ALL SAG GULLIES



TEMPORARY WATER CROSSING

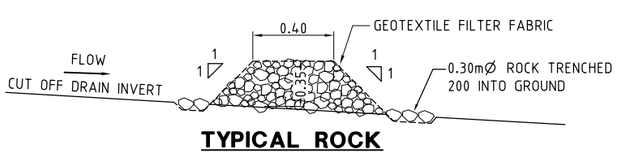


SEDIMENT FENCE DETAIL



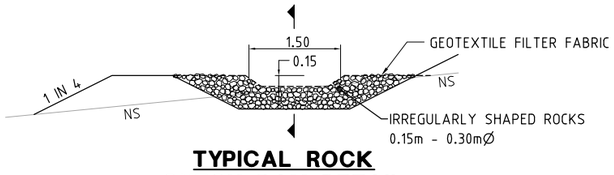
SANDBAGS AT GULLIES ON GRADE

TO BE PROVIDED AT ALL ON-GRADE GULLIES

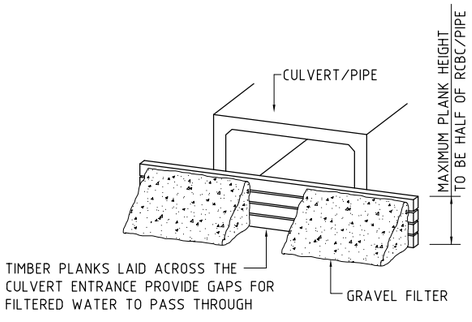


TYPICAL ROCK CHECK DAM SECTION

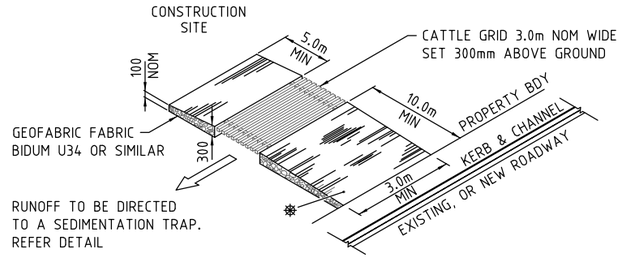
ROCK CHECK DAMS TO BE EVERY 50.00m



TYPICAL ROCK CHECK DAM DETAIL



TEMPORARY CULVERT INLET PROTECTION



NOTE:-
THE TOP ELEVATION OF THE AGGREGATE AND THE MESH FILTER SHALL BE AT LEAST 150mm BELOW THE SURROUNDING GROUND LEVEL INCLUDING ANY NECESSARY PERIMETER BERMS.

UNBOUND PAVEMENT MATERIAL (GRAVEL) TO GRADING 'B', TABLE 9 OF QT SPECIFICATION MRS11.05, EXCLUDE MATERIAL FINER THAN A.S. SIEVE 2.36mm

TEMPORARY CONSTRUCTION ENTRY/EXIT SEDIMENT TRAP

NTS

FILE: B14030-SK07.dwg DATE: 27-05-2014 TIME: 13:06
Xref's: X-B14030-TIT USR: wesley pike

FIRST ISSUE	CALCS	DRAWN	DATE
	WP	DM	10.01.13

AMENDMENTS: A, B, C, D, E, F — AMENDMENT DETAILS — DESIGN CHECK — DRAWN CHECK

SCALE (METRES)

MICROFILM No.

PROJECT No. B14030

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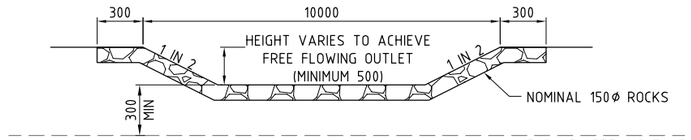
Quality Endorsed Company ISO 9001 Lic-4084

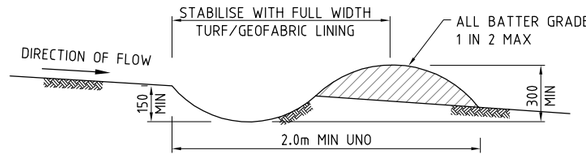
DRAWING TITLE: CONCEPTUAL BULK EARTHWORKS SEDIMENT CONTROL DETAILS

DRAWING NUMBER: B14030-SK07

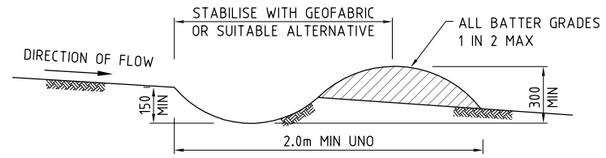
ISSUE



OVERFLOW WEIR DETAIL



CLEAN WATER CUTOFF DRAIN DETAIL



DIRTY WATER CUTOFF DRAIN DETAIL

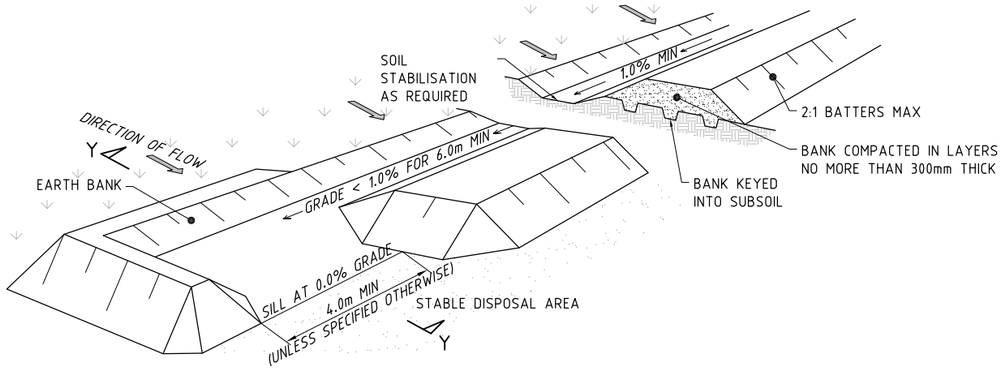
CUTOFF DRAINS - MAINTENANCE PROGRAM

1. INSPECTIONS TO BE CARRIED OUT AFTER EACH RUNOFF EVENT.
2. SEDIMENT BUILD UP TO BE REMOVED DURING CONSTRUCTION AS REQUIRED BY THE SUPERINTENDENT.

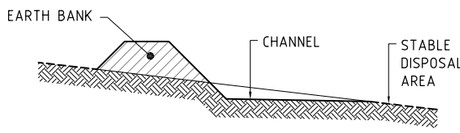
NOTE: DRAIN TO BE CIRCULAR PARABOLIC OR TRAPEZOIDAL, V SHAPED IS NOT ACCEPTABLE. GRADIANT BETWEEN 1.0% TO 5.0%

CONSTRUCTION NOTES:

1. AVOID REMOVING TREES AND SHRUBS WORK AROUND THEM IF POSSIBLE
2. ENSURE THEY ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD IMPEDE WATER FLOW
3. BUILD THE DRAIN WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTIONS. NOT V SHAPED
4. ENSURE BANKS ARE PROPERLY COMPACTED TO PREVENT FAILURE
5. COMPLETE TEMPORARY OR PERMANENT STABILISATION WITHIN 10 DAYS OF CONSTRUCTION
6. WERE DISCHARGING TO ERODIBLE LANDS ENSURE THEY OUTLET THROUGH A LEVEL SPREADER
7. CONSTRUCT THE LEVEL SPREADER AT THE GRADIENT SPECIFIED (REFER DETAIL)
8. WHERE POSSIBLE ENSURE THEY DISCHARGE WATER INTO EITHER STABILISED OR UNDISTURBED DISPOSAL SITES WITHIN THE SAME SUBCATCHMENT AREA FROM WHICH THE WATER ORIGINATED



TYPICAL EARTH BANK AND LEVEL SPREADER DETAIL



SECTION Y-Y

FILE: B14030-SK08.dwg DATE: 27-05-2014 TIME: 13:06
Xref's: X-B14030-TIT USR: wesley pike

AMENDMENTS	FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
		WP	DM	10.01.13	
	A				
	B				
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DESIGN CHECK

DRAWN CHECK

SCALE (METRES)

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DRAWING TITLE: CONCEPTUAL BULK EARTHWORKS SEDIMENT CONTROL DETAILS

DRAWING NUMBER: B14030-SK08

ISSUE

Addendum B PRECINCT 2 / PART PRECINCT 3/4: MANAGEMENT ACTIONS, INCIDENTAL OR ASSOCIATED WORKS[4]

1 INTRODUCTION

This addendum addresses the requirements of the PCEMP, specified in Condition 3 of the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC) approval (EPBC Ref: 2011/5987), that are specific to Precinct 2 and Part Precinct 3-4. It describes construction activities within Precinct 2 and Part Precinct 3-4 and associated works, and the potential impacts to MNES and proposed mitigation and management actions associated with these works.

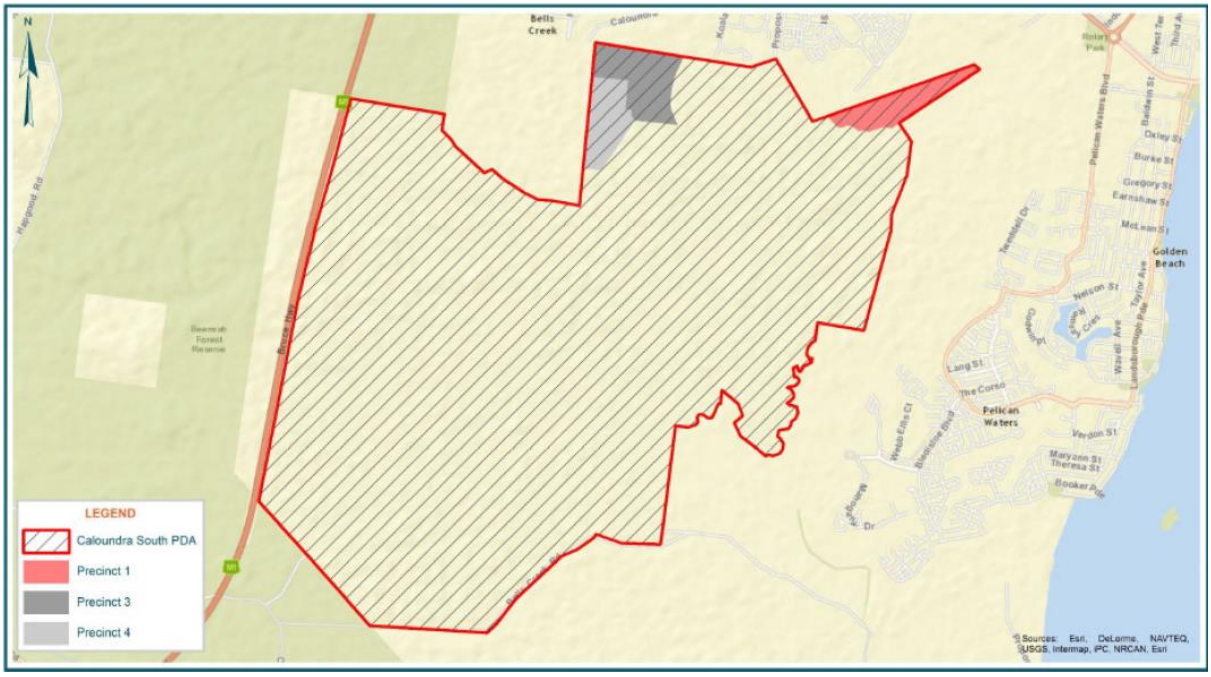

Figure 1: Site Locality

[4] Incidental or Associated Works are works which are undertaken in accordance with an approved PCEMP, in order to facilitate development in another Precinct. Incidental or Associated works include the borrowing of material from a Precinct and /or trunk service infrastructure to facilitate development in another Precinct.

1.1 PRECINCT DESCRIPTION AND CONTEXT

Precinct 2 is divided into various sub stages for construction sequencing. The sub staging locations and sizes are to be defined as the project progresses further into the detailed design process. The construction of these stages will allow for the creation of residential lots, open space, drainage reserves as well as services such as electrical/telecommunications, water and wastewater. The general configuration of the development layout plan is illustrated in Appendix A.

To facilitate the development of Precinct 2, fill was required to be imported from the borrow area within Precinct 3 and 4. If an external fill material source was readily available and feasible at the time of construction, this material may have been used in place of using the Precinct 3 and 4 sources. Nevertheless, the importation of fill from Precinct 3 and 4 was considered as a part of the PCEMP addendum for Precinct 2.

2 CIVIL CONSTRUCTION METHODOLOGY

2.1 OVERVIEW

The following sections describe the scheduling and general construction sequencing for works within Precinct 2.

2.1.1 CONSTRUCTION PHASE OVERVIEW

Construction was divided into various sub stages for construction sequencing. The sub staging locations and sizes are defined as the project progresses into the detailed design process. The general configuration of the development layout plan is illustrated in Appendix A.

To facilitate construction works, fill was required to be imported from the borrow area within Precincts 3 and 4. If an external fill material source was readily available and feasible at the time of construction, this material may have been used.

2.1.2 CONSTRUCTION SCHEDULING

The construction of Precinct 2 commenced in December 2016. Bulk earthworks was completed in October 2017, with construction completion expected in 2021.

A comprehensive construction program was developed by the Principal Civil Contractor upon award of the contract. This program was reviewed by the Superintendent and Stockland to ensure compliance with timeframe constraints within the PCEMP addendum (if applicable), to enable construction activities to proceed without affecting construction timeframes.

The construction programming was broken down into specific tasks relating to each activity within the project, and nominated key processes such as critical links, milestones, percentage completions and task summaries.

Additional to the above, **Table 1** details the indicative construction sequencing with reference to Appendix A for the precinct staging plans.

Table 1: Indicative Construction Sequencing

Caloundra South Precinct 2 Indicative Construction Sequencing		
Works Package	Commencement	Completion
Estate Major Works		

Caloundra South Precinct 2 Indicative Construction Sequencing		
Frog Ponds	**Complete**	**Complete**
East-West Link Phase 1	Complete	Complete
East-West Link Phase 2	Complete	Complete
East-West Link Phase 3	Complete	Complete
Trunk Pump Station CS1	Complete	Complete
Trunk Water Main	Complete	Complete
Bulk Earthworks Works Packages	**Complete**	**Complete**
Subdivision Works	2016	2021
Rehabilitation	2017	2021

2.2 EROSION AND SEDIMENT CONTROL

The concept erosion and sediment control drawings in Appendix A indicate the minimum standard of erosion and sediment control measures that were implemented during construction and phasing of the works. Detailed design confirmed the erosion and sediment control measures required to ensure downstream and adjacent environmental values are protected from construction activities. During construction, an erosion and sediment control management plan was prepared and submitted to the Construction Superintendent for acceptance. The drawings attached to the erosion and sediment control management plan will be updated with further details of erosion and sediment control processes for works covered by this PCEMP addendum. The Principal Civil Contractor will review the erosion and sediment control management plan regularly and make onsite amendments as required, including the installation of additional measures where site conditions dictate.

2.3 SITE CLEARING AND BULK EARTHWORKS

Prior to clearing, delineation of the buffer zones, vegetation retention and habitat retention zones were defined onsite. Following the above activities, construction zones were delineated and clearing and bulk earthworks activities proceeded in accordance with the CSECP devised and signed off by a CPESC.. In particular regard to Precinct 2:

- Haulage of fill material along existing haul roads, if not sourced externally to Precincts 3 and 4:
- Expected 350,000m³ fill required;
- Fill transportation of approximately 5,000 m³/day;
- Fill placement and compaction operations for Precincts 2.

Initial construction works involved the removal of material from the Precinct 3 and 4 ensuring that all surface and ground water from disturbed areas was discharge into the sediment basin(s) located throughout the earthworks operations. Exposed areas were progressively stabilised as cutting is completed to minimise areas of disturbance at any given time.

3 MATTERS OF ENVIRONMENTAL SIGNIFICANCE

The following section specifies the Matters of National Environmental Significance (MNES) identified in the Public Environmental Report for Aura (Stockland 2013) and if they are relevant to the development of Precincts 2/Part Precinct 3/4 and Associated Works. Reference should be made to the Public Environment Report (PER) for further details regarding each MNES.

The following table describes for each MNES whether they have been identified pre-construction commencement within Precincts 2/Part Precincts 3/4 and therefore could be directly impacted by this part of the development or if there was the potential for indirect effects on these MNES if not located within the Precinct.

Section 5 of this PCEMP describes in detail the mitigation and management strategies proposed in relation and appropriate to each MNES described below in **Table 2**.

Table 2: Precinct 2 - Summary of Potential Impacts identified pre-construction and Mitigation of impacts on MNES

MNES		Precinct 2 – Summary of Potential Direct Impacts on MNES & Mitigation	Precinct 2 – Summary of Potential Indirect Impacts on MNES & Mitigation
Listed Threatened Species	Wallum Sedge Frog	• A preconstruction survey was undertaken in December 2014 in accordance with Condition 8g of the approval and consistent with the method outlined in the updated WSFMP (February 2015). Based on the results from the survey, 13.007ha of WSF habitat is assessed as being lost within Precinct 2 of the development. • In accordance with the approved WSFMP and Condition 7 of the Approval, 16.101ha of WSF habitat is being created along the Lamerough Creek frog conservation corridor. • A total area of 9.235ha of existing WSF habitat (identified in the preconstruction survey) will be retained and conserved within the Lamerough Creek frog conservation corridor. • There is a net gain of 3.094ha of WSF habitat (16.101-13.007=3.094) within Precinct 2.	• Adjacent earthworks (i.e. filling works, clearing of vegetation etc.) to be undertaken to avoid impacts on retained habitat. • Stormwater runoff from the development in Precinct 2 to be diverted away from retained or created Wallum Sedge Frog breeding habitat (ponds) to avoid potential impacts.
	Water Mouse	• Water mouse habitat as identified in the PER will not be directly impacted by the development of Precinct 2.	• No Water Mouse habitat exists within or adjoining Precinct 2, thus there will be no direct impact as a result of the development of Precinct 2 Indirect impacts would not be anticipated as surface water and ground water, if discharged, will be directed into Lamerough Creek and Bells Creek North.
Habitat with potential to contain EPBC list species		• No EPBC Act listed threatened flora species were located on the Caloundra South site during the targeted surveys and as such no direct impacts on these MNES are predicted (PER, 2013).	• The Caloundra South site has been assessed as containing habitat with the potential to contain EPBC Act listed flora species to occur based on the quality of extant habitats and the proximity of nearby populations.

MNES		Precinct 2 – Summary of Potential Direct Impacts on MNES & Mitigation	Precinct 2 – Summary of Potential Indirect Impacts on MNES & Mitigation
			Stockland has committed to appropriate rehabilitation within conservation and rehabilitation areas across the site. An area bounding the northern and eastern boundaries of Precinct 2 has been defined as the EPZ which will be conserved and rehabilitated to improve habitat value. The nature of habitat rehabilitation across the site is identified in the Vegetation Rehabilitation and Management Plan, 2014, through the designation of habitat management units or HMUs.
Listed Migratory species		• The development of Precinct 2 would not directly impact migratory birds that use the site.	
Wetland of International importance (RAMSAR)		• As a result of the development of Precinct 2 there would be no direct impacts on the RAMSAR site.	• There would be no indirect impacts on the Ramsar site as downstream water quality would be maintained to protect environmental values.

If Precinct 3 and 4 are used for borrow material habitat polygons 30, and 23 will be impacted;

- Polygon 23 0.625ha (assessed 2014)
- Polygon 30 1.460ha (assessed 2012)

The use of Precinct 3 and 4 as borrow material resulted in the removal of vegetation, topsoil and subsoil for use in other parts of the development, consistent with the Approved Precinct 1 Part 3/4 June 2014 PCEMP addendum. This removal of vegetation, topsoil and subsoil resulted in the loss of WSF habitat from mapped polygon 23 and 30, consistent with the Figure 2.2d of the WSFMP (February 2015) and that displayed in the Appendix A of the Approved Precinct 1 Part 3/4 June 2014 PCEMP addendum.

Within the development area of Precinct 2 no EPBC Act listed threatened flora species were located during targeted surveys (PER, 2013). In addition, no areas of native remnant vegetation were identified for retention.

An area to the east of and within Precinct 2 (adjacent Caloundra Aerodrome) has been defined as the Environmental Protection Zone (EPZ) which will be conserved and rehabilitated to improve habitat value.

The nature of habitat rehabilitation across the site is identified in the Vegetation Rehabilitation and Management Plan, 2013, through the designation of habitat management units or HMUs. Table 3 outlines HMUs associated with Precinct 2 work, their area, target species, existing flora and target communities.

Table 3: Habitat Management Unit Details

HMU	Approx. Area (ha)	Target Species 2	Current Flora	Target Community
2	2.288	Aa, WSF, Pa, Pw	Melaleuca regrowth +/- Pine. High quality WSF habitat present	Melaleuca Forest, Sedgeland
6	2.222	Aa, Ae, WSF, Ec, Pa, Pw	Remnant RE 12.3.4 and wet low heath regrowth	Melaleuca Forest, Wet Heath.
7	4.246	Aa, Ae, WSF, Ec, Pa, Pw	Remnant RE 12.3.13/14. Wet heath regrowth	12.3.13, 12.3.14

A detailed Environmental Rehabilitation Plan was prepared prior to the commencement of subdivision works and endorsed by the state government on 27/05/2016.

APPENDIX A CONCEPT ENGINEERING DRAWINGS/PRECINCT STAGING

DATE PLOTTED: 9 May 2016 2:54 PM BY: - PATRICK MCDONALD

XREF's: X-249931 Design Drainage (PG); X-TITLE BORDER; X-249931 LOT LAYOUT; X-249931 Design Roads (PG); swd sub catchments; IM-249931-AERIALS
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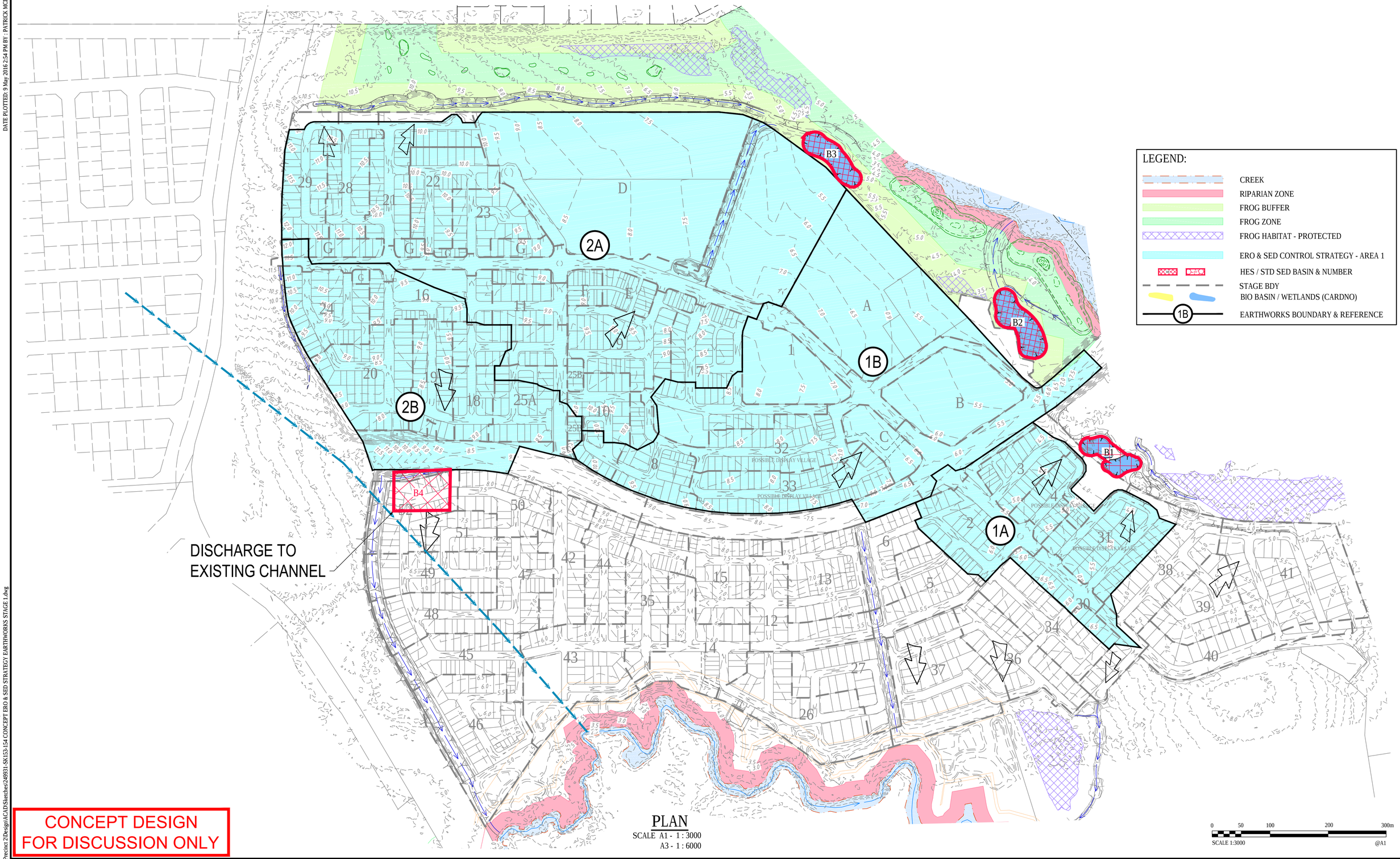

LEGEND:

- CREEK
- RIPARIAN ZONE
- FROG BUFFER
- FROG ZONE
- FROG HABITAT - PROTECTED
- ERO & SED CONTROL STRATEGY - AREA 1
- HES / STD SED BASIN & NUMBER
- STAGE BDY
- BIO BASIN / WETLANDS (CARDNO)
- 1B — EARTHWORKS BOUNDARY & REFERENCE

PLAN

SCALE A1 - 1 : 3000
A3 - 1 : 6000

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SCALE 1:3000 @A1

CONCEPT DESIGN
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Rev.	Date	Description	Des.	Verif.	Appd.
0	9/05/2016	FOR INFORMATION	CK	CP	

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Drawn	PPM	9/05/2016
Checked	CP	9/05/2016
Designed	CK	9/05/2016
Verified	CP	9/05/2016
Approved		

Client: STOCKLAND DEVELOPMENT PTY LTD

Project: AURA PRECINCT 2
SUBDIVISIONAL CIVIL WORKS
SKETCHES

Title: CONCEPT EROSION & SEDIMENT CONTROL STRATEGY - STAGE 1 - PHASE 1

Status: FOR INFORMATION ONLY
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DATUM	Orig. Date	Scale	Size
AHD	May-16	AS SHOWN	A1

Drawing Number: 249931-SK153
Revision: 0

DATE PLOTTED: 9 May 2016 2:31 PM BY : PATRICK MCDONALD

XREFs: X-249931 Design Drainage (PG); X-TITLE BORDER; X-249931 LOT LAYOUT; X-249931 Design Roads (PG); swd sub catchments; IM-249931-AERIALS

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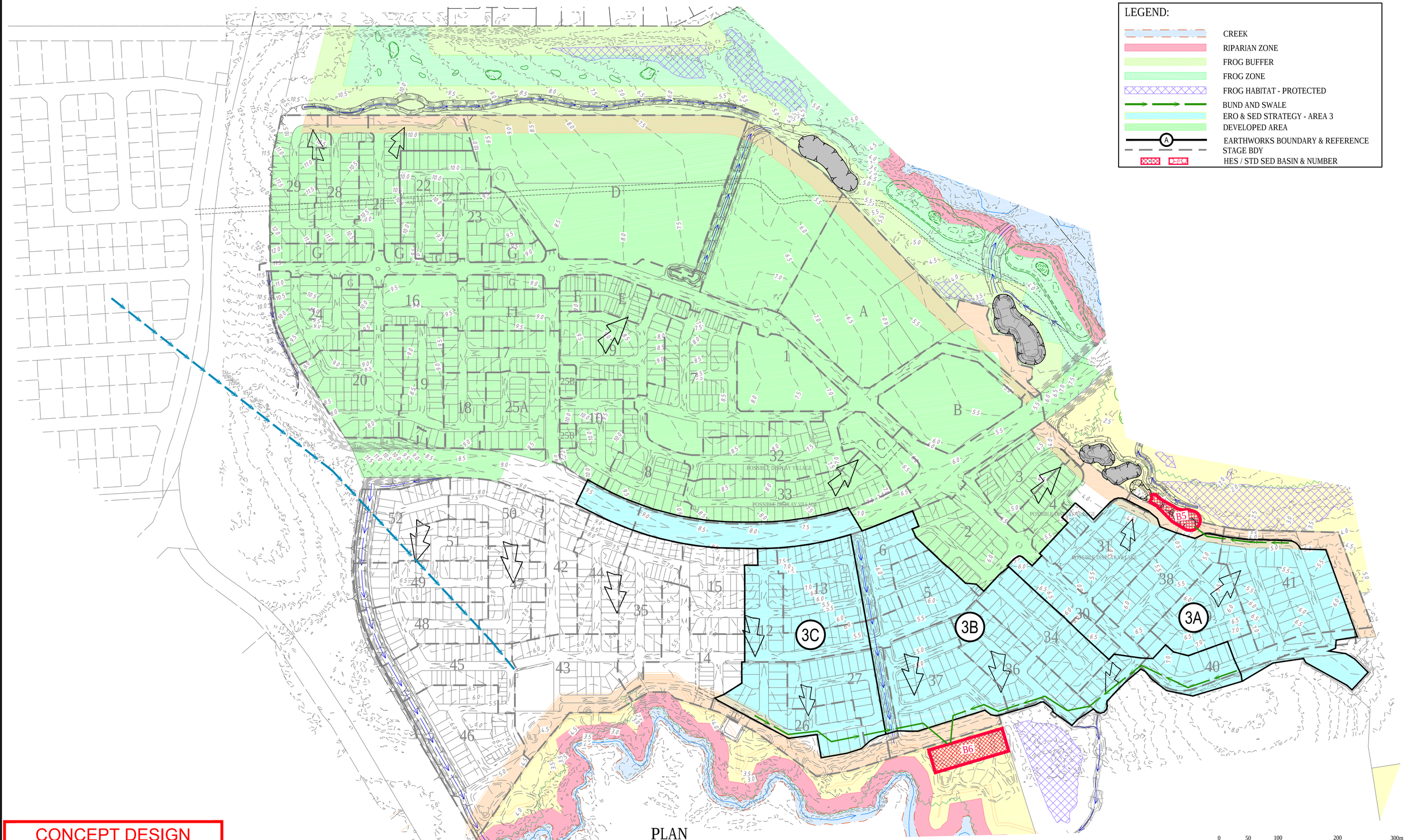

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NORTH

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SKETCHES

Title: CONCEPT EROSION & SEDIMENT CONTROL STRATEGY - STAGE 3 - PHASE 1

Status: FOR INFORMATION ONLY
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DATUM	Orig. Date	Scale	Size
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Drawing Number: 249931-SK155

Revision: 0

DATE PLOTTED: 9 May 2016 2:34 PM BY : PATRICK MCDONALD

XREF's: X-249931 Design Drainage (PG); X-TITLE BORDER; X-249931 LOT LAYOUT; X-249931 Design Roads (PG); swd sub catchments

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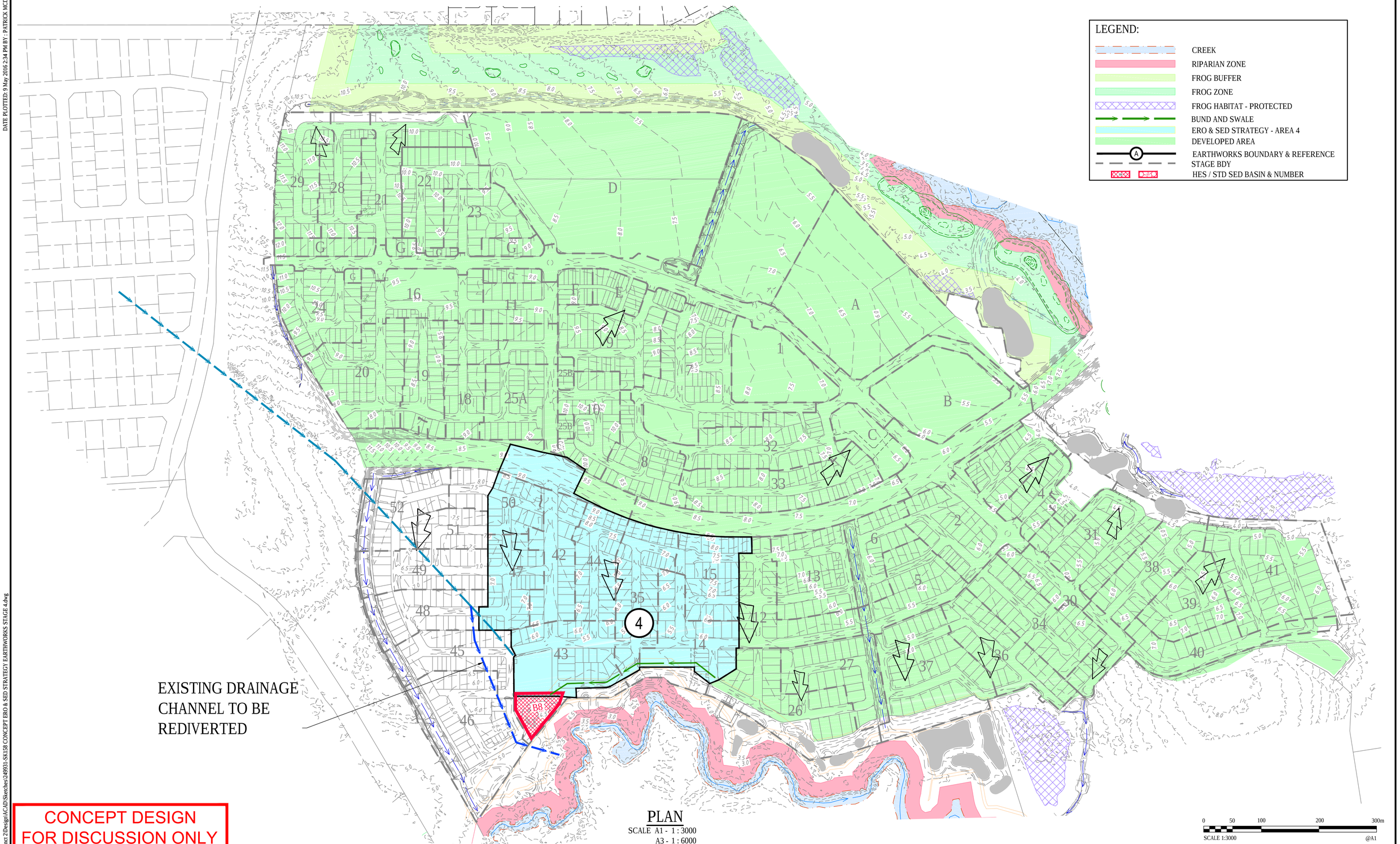

PLAN

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A3 - 1 : 6000

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Approved		

Client: STOCKLAND DEVELOPMENT PTY LTD

Project: AURA PRECINCT 2
SUBDIVISIONAL CIVIL WORKS
SKETCHES

Title: CONCEPT EROSION & SEDIMENT CONTROL STRATEGY - STAGE 4 - PHASE 1

Status: FOR INFORMATION ONLY
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DATUM	Orig. Date	Scale	Size
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Drawing Number: 249931-SK158

Revision: 0

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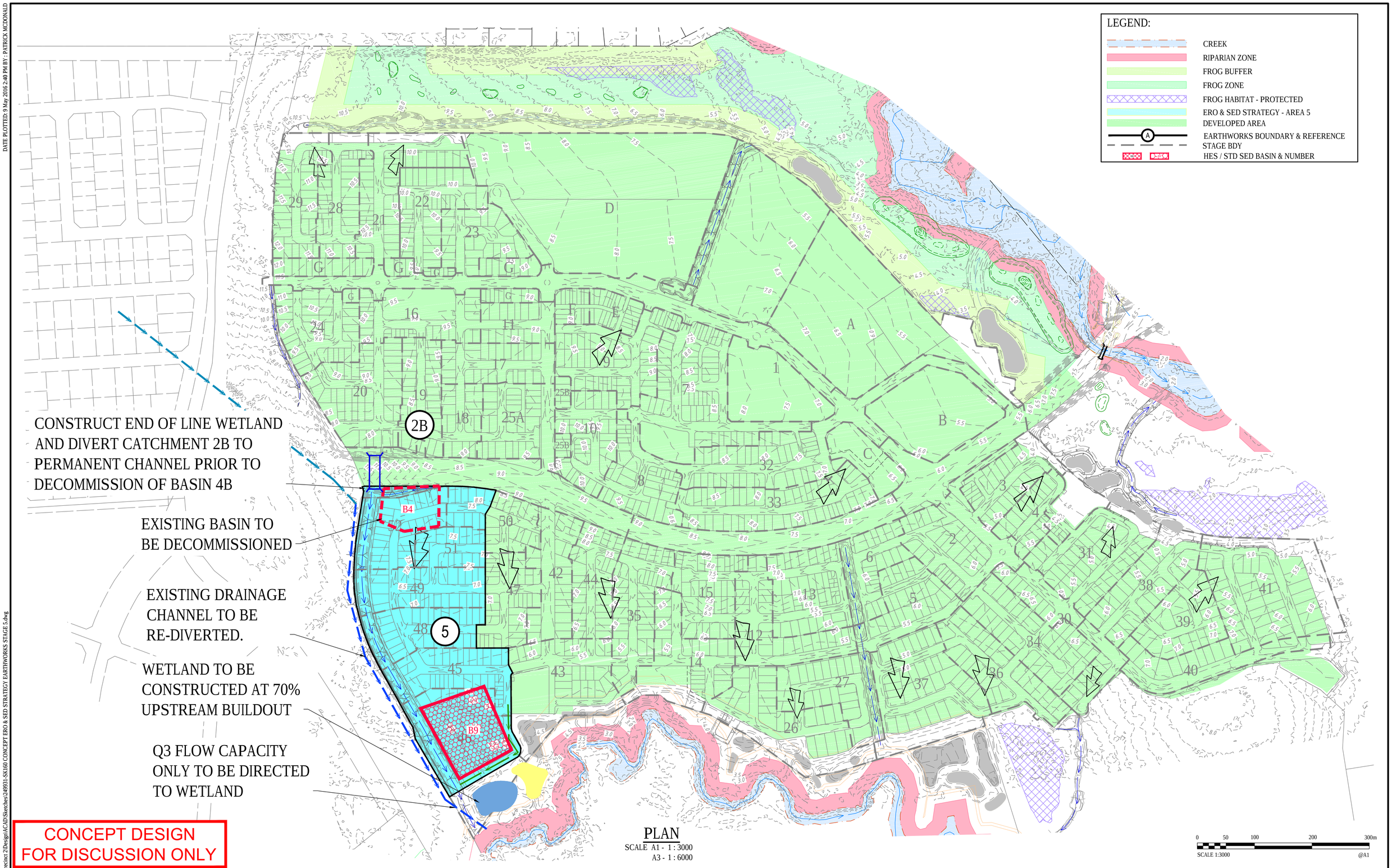

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A3 - 1 : 6000

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XREF's: X-249931 Design Drainage (PG); X-TITLE BORDER; X-249931 LOT LAYOUT; X-249931 Design Roads (PG); swd sub catchments

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Client: STOCKLAND DEVELOPMENT PTY LTD

Project: AURA PRECINCT 2
SUBDIVISIONAL CIVIL WORKS
SKETCHES

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Drawing Number: 249931-SK160

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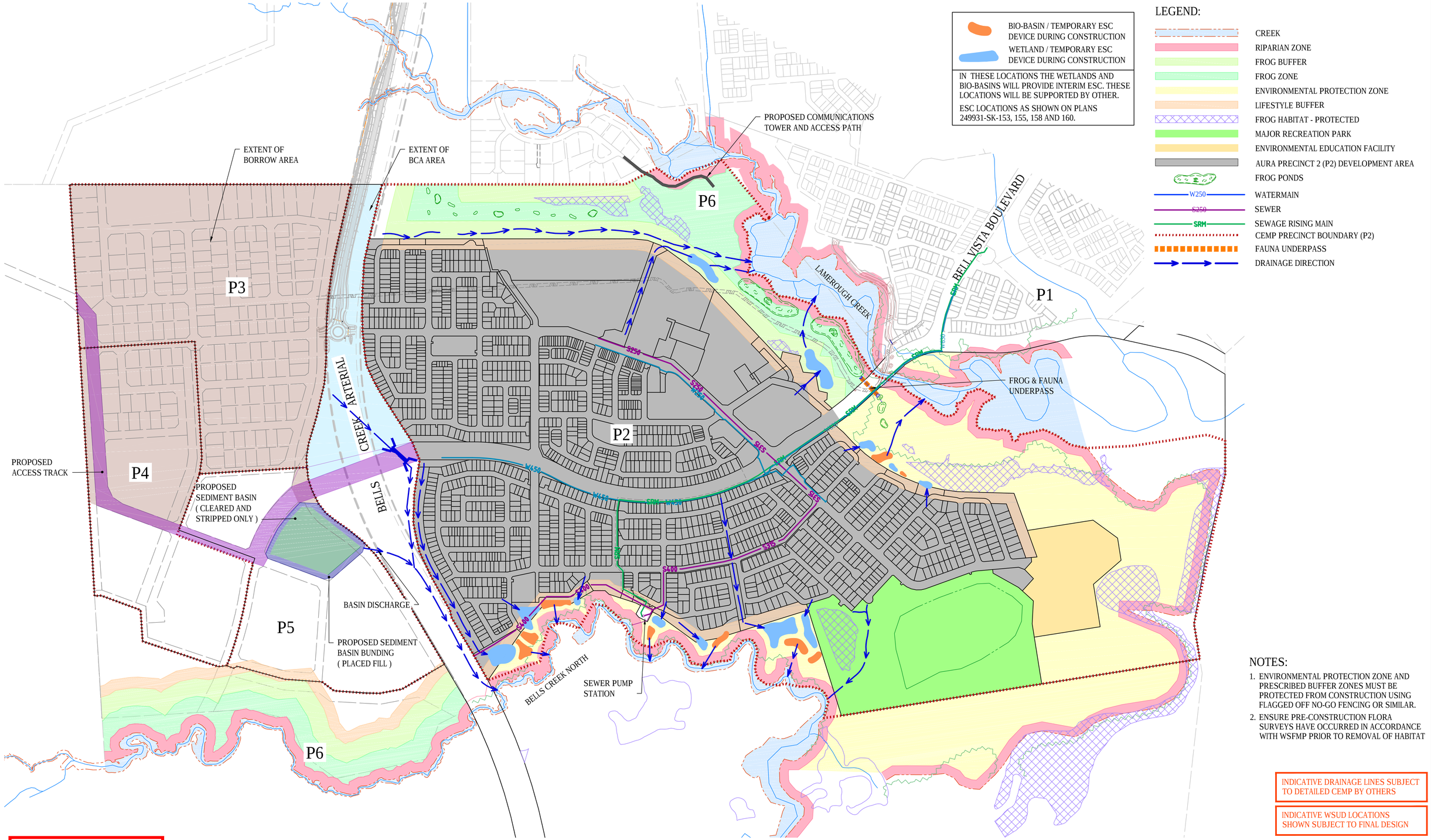

SUBJECT TO DETAILED DESIGN

PLAN

SCALE A1 - 1 : 5000
A3 - 1 : 10000

NOTES:

1. ENVIRONMENTAL PROTECTION ZONE AND PRESCRIBED BUFFER ZONES MUST BE PROTECTED FROM CONSTRUCTION USING FLAGGED OFF NO-GO FENCING OR SIMILAR.
2. ENSURE PRE-CONSTRUCTION FLORA SURVEYS HAVE OCCURRED IN ACCORDANCE WITH WSFMP PRIOR TO REMOVAL OF HABITAT

INDICATIVE DRAINAGE LINES SUBJECT TO DETAILED CEMP BY OTHERS

INDICATIVE WSUD LOCATIONS SHOWN SUBJECT TO FINAL DESIGN

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Scale 1:5000

Rev.	Date	Description	Des.	Verif.	Appd.
2	2/08/2016	P3 TO P5 BOUNDARIES ADDED, NOTES AMENDED	AJH	BK	
1	21/06/2016	FOR INFORMATION	CK	CP	
0	9/05/2016	FOR INFORMATION	CK	CP	

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Drawn	LC	17/05/2016
Checked	BK	17/05/2016
Designed	LC	17/05/2016
Verified	BK	17/05/2016
Approved		

Client: STOCKLAND DEVELOPMENT PTY LTD
Project: AURA PRECINCT 2 SUBDIVISIONAL CIVIL WORKS SKETCHES
Title: CEMP PLAN

Status: FOR INFORMATION ONLY
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DATUM	Orig. Date	Scale	Size
AHD	May-16	AS SHOWN	A1

Drawing Number: 249931-SK162
Revision: 2

DATE PLOTTED: 9 May 2016 2:31 PM BY : PATRICK MCDONALD

XREFs: X-249931 Design Drainage (PG); X-TITLE BORDER; X-249931 LOT LAYOUT; X-249931 Design Roads (PG); swd sub catchments; IM-249931-AERIALS

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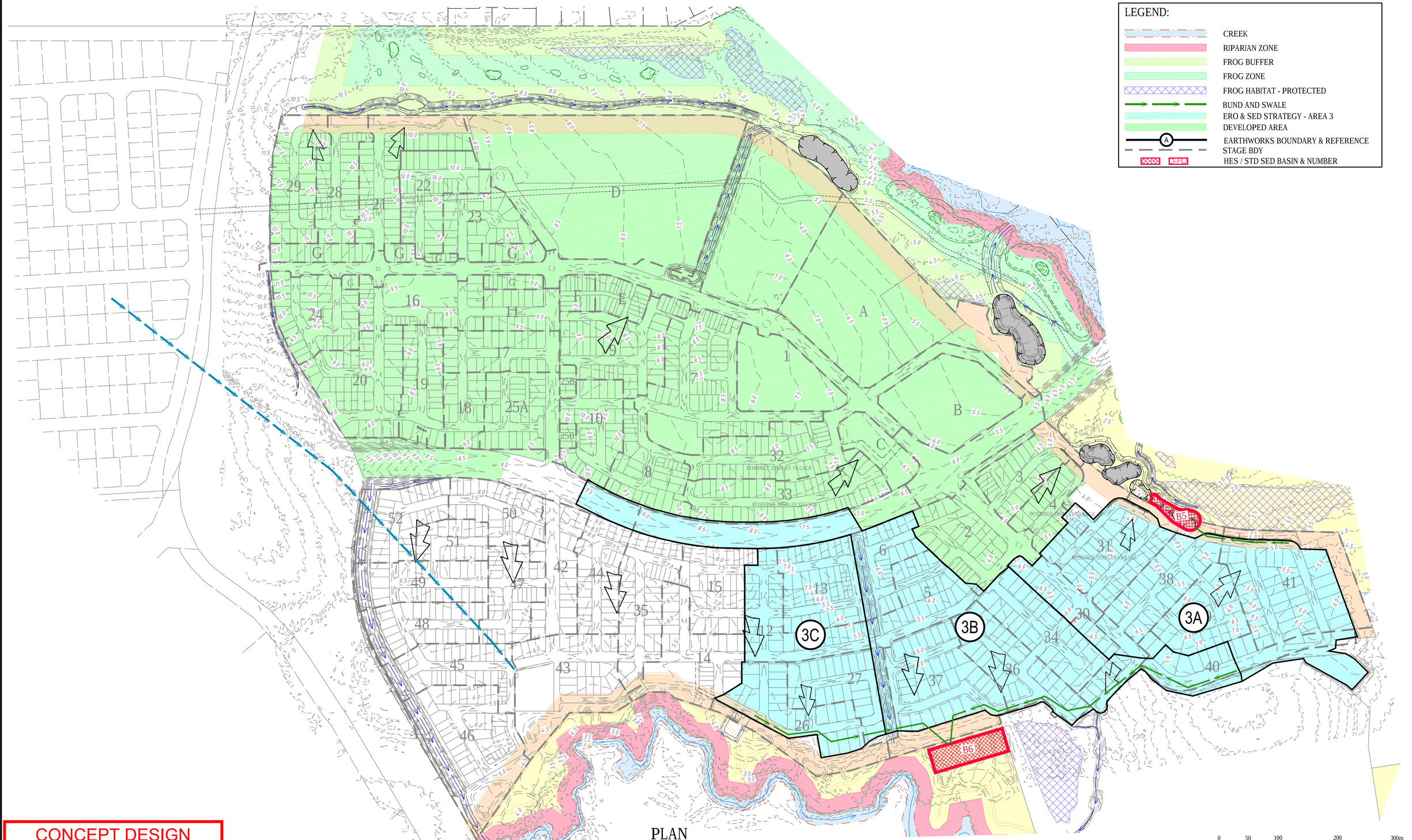

Rev.	Date	Description	Des.	Veril.	Appd.
0	9/05/2016	FOR INFORMATION	CK	CP	

NORTH

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		Date
Drawn	PPM	9/05/2016
Checked	CP	9/05/2016
Designed	CK	9/05/2016
Verified	CP	9/05/2016
Approved		

Client: STOCKLAND DEVELOPMENT PTY LTD

Project: AURA PRECINCT 2
SUBDIVISIONAL CIVIL WORKS
SKETCHES

Title: CONCEPT EROSION & SEDIMENT CONTROL STRATEGY - STAGE 3 - PHASE 1

Status: FOR INFORMATION ONLY
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DATUM	Orig. Date	Scale	Size
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Drawing Number: 249931-SK155

Revision: 0

DATE PLOTTED: 9 May 2016 2:34 PM BY : PATRICK MCDONALD

XREF's: X-249931 Design Drainage (PG); X-TITLE BORDER; X-249931 LOT LAYOUT; X-249931 Design Roads (PG); swd sub catchments

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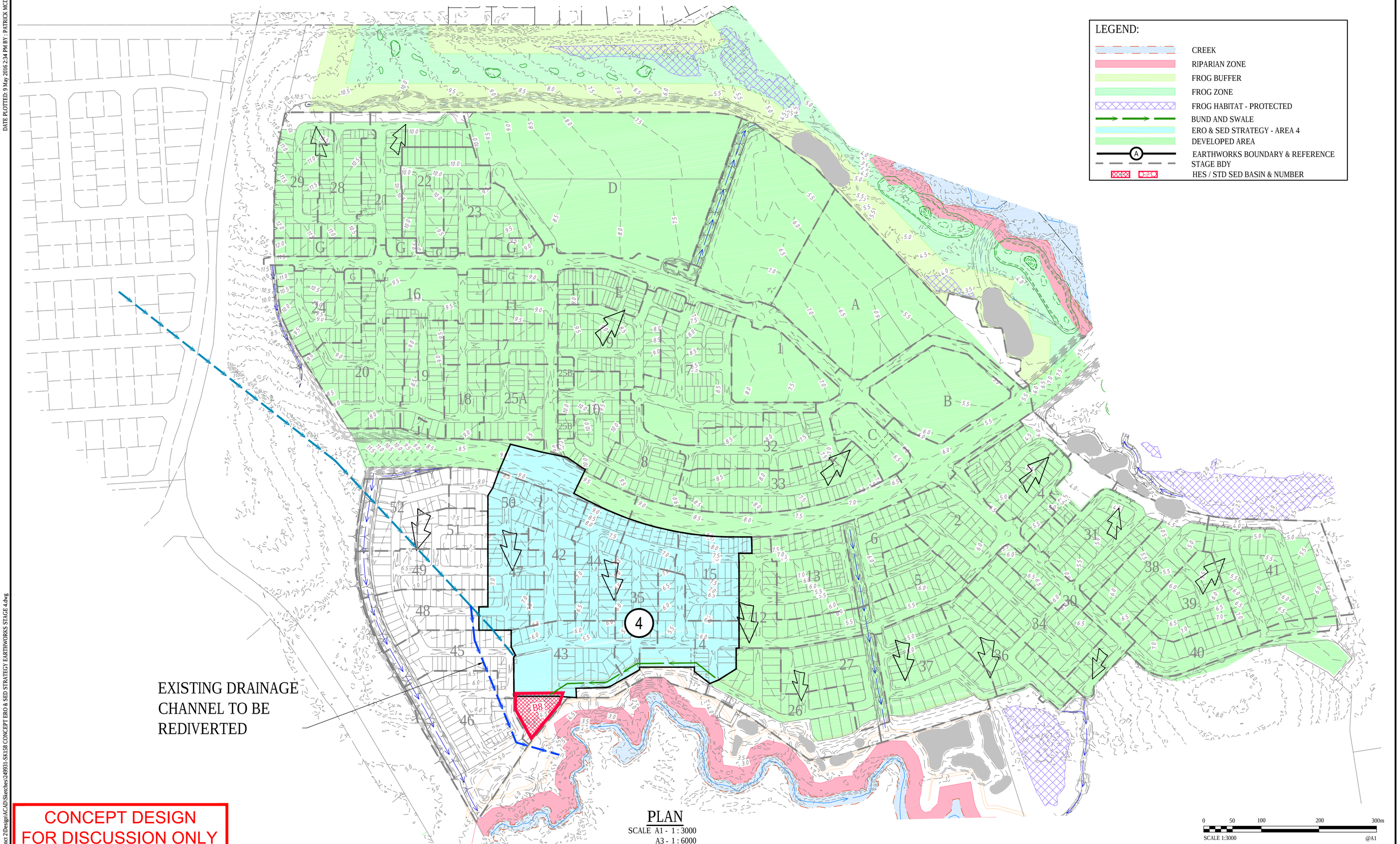

PLAN

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A3 - 1 : 6000

CONCEPT DESIGN
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Designed	CK	Date 9/05/2016
Verified	CP	Date 9/05/2016
Approved		

Client: STOCKLAND DEVELOPMENT PTY LTD

Project: AURA PRECINCT 2
SUBDIVISIONAL CIVIL WORKS
SKETCHES

Title: CONCEPT EROSION & SEDIMENT CONTROL STRATEGY - STAGE 4 - PHASE 1

Status: FOR INFORMATION ONLY
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DATUM	Orig. Date	Scale	Size
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Drawing Number: 249931-SK158

Revision: 0

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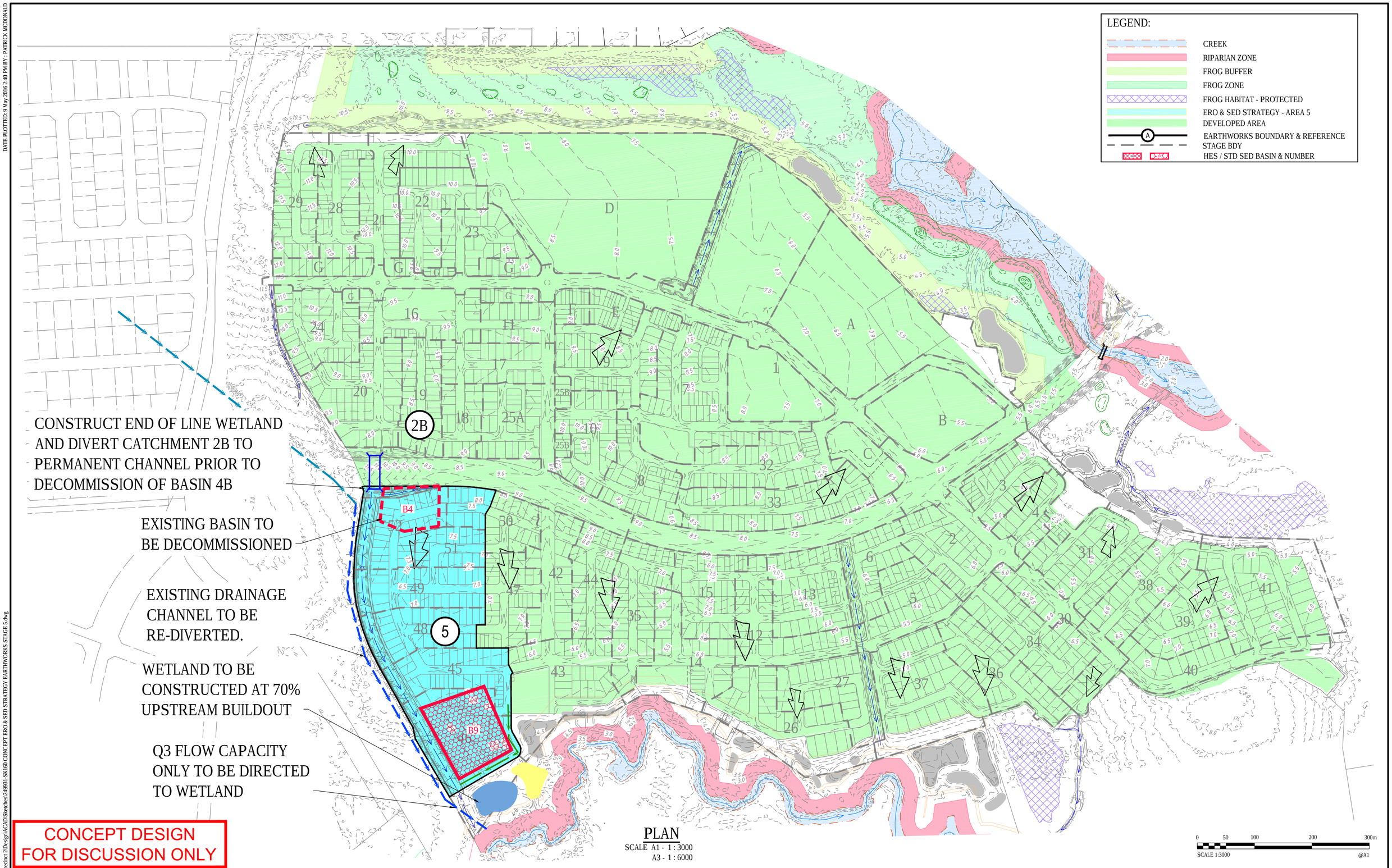

PLAN

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A3 - 1 : 6000

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SCALE 1:3000 @A1

XREF's: X-249931 Design Drainage (PG); X-TITLE BORDER; X-249931 LOT LAYOUT; X-249931 Design Roads (PG); swd sub catchments

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Approved		

Client: STOCKLAND DEVELOPMENT PTY LTD

Project: AURA PRECINCT 2
SUBDIVISIONAL CIVIL WORKS
SKETCHES

Status: FOR INFORMATION ONLY
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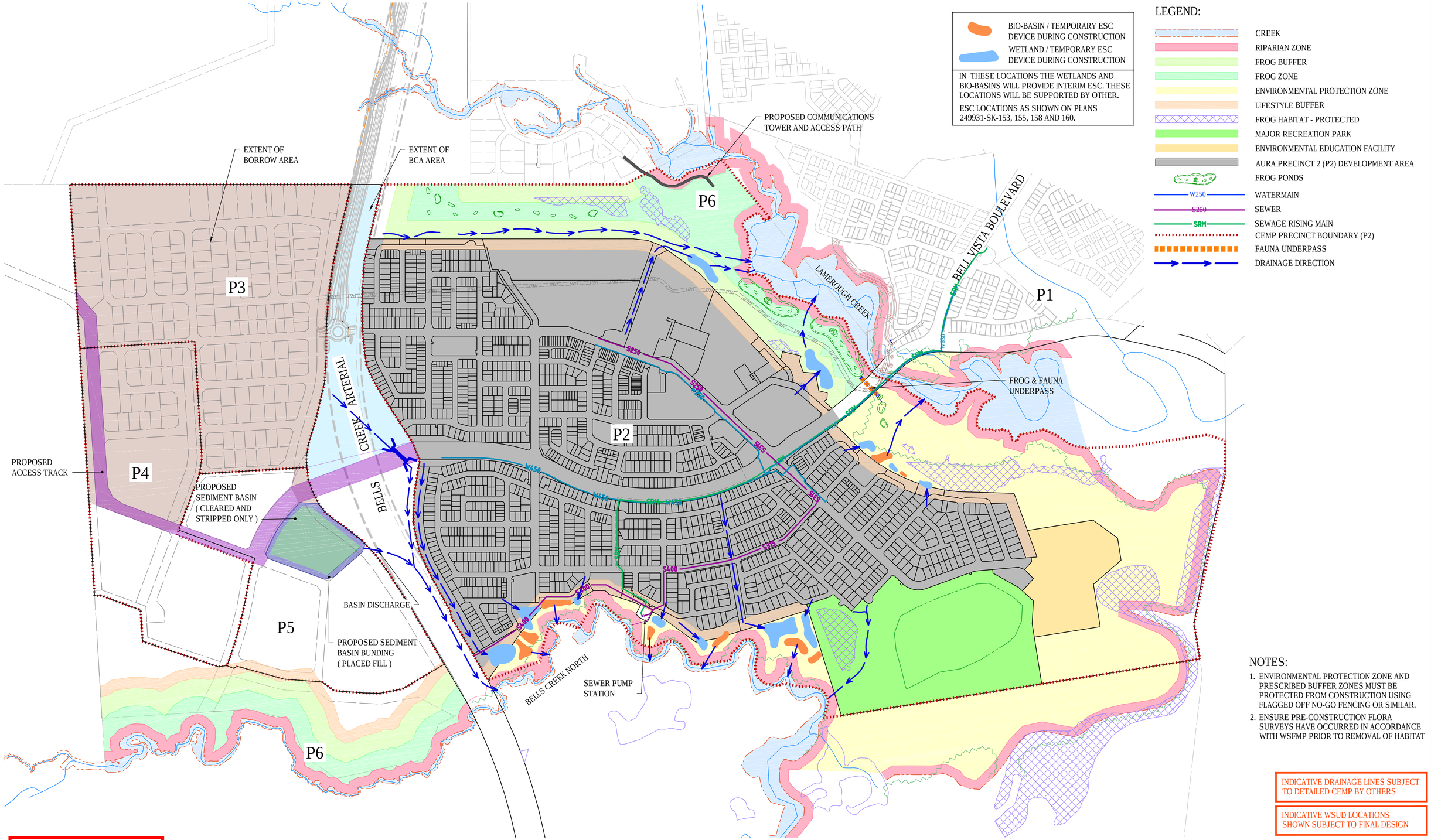
DATUM	Orig. Date	Scale	Size
AHD	May-16	AS SHOWN	A1

Title: CONCEPT EROSION & SEDIMENT CONTROL STRATEGY - STAGE 5 - PHASE 1

Drawing Number: 249931-SK160

Revision: 0



SUBJECT TO DETAILED DESIGN

PLAN

SCALE A1 - 1 : 5000
A3 - 1 : 10000

NOTES:

1. ENVIRONMENTAL PROTECTION ZONE AND PRESCRIBED BUFFER ZONES MUST BE PROTECTED FROM CONSTRUCTION USING FLAGGED OFF NO-GO FENCING OR SIMILAR.
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INDICATIVE DRAINAGE LINES SUBJECT TO DETAILED CEMP BY OTHERS

INDICATIVE WSUD LOCATIONS SHOWN SUBJECT TO FINAL DESIGN

50 0 50 100 150 200 250m
Scale 1:5000

Rev.	Date	Description	Des.	Verif.	Appd.
2	2/08/2016	P3 TO P5 BOUNDARIES ADDED, NOTES AMENDED	AJH	BK	
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Checked	BK	17/05/2016
Designed	LC	17/05/2016
Verified	BK	17/05/2016
Approved		

Client: STOCKLAND DEVELOPMENT PTY LTD
Project: AURA PRECINCT 2 SUBDIVISIONAL CIVIL WORKS SKETCHES
Title: CEMP PLAN

Status: FOR INFORMATION ONLY
NOT TO BE USED FOR CONSTRUCTION PURPOSES

DATUM	Orig. Date	Scale	Size
AHD	May-16	AS SHOWN	A1

Drawing Number: 249931-SK162
Revision: 2

Addendum C PRECINCTS 3, 4, 5 AND PART PRECINCT 6: MANAGEMENT ACTIONS, INCIDENTAL OR ASSOCIATED WORKS[5]

1 INTRODUCTION

This addendum addresses the requirements of the PCEMP, specified in Condition 3 of the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC) approval (EPBC Ref: 2011/5987), that are specific to Precincts 3,4,5 and Part Precinct 6. It describes construction activities within Precincts 3,4,5 and Part Precinct 6 and associated works, and the potential impacts to MNES and proposed mitigation and management actions associated with these works.

1.1 PRECINCT DESCRIPTION AND CONTEXT

Precincts 3, 4, 5 and Part Precinct 6 will consist of up to 230 business, industry, showroom allotments, open space, rehabilitation areas and also include major arterial roads to connect to the future city centre. **Figure 1** depicts the location of Precincts 3, 4, 5 and Part Precinct 6 relative to the project Priority Development Area.

[5] Incidental or Associated Works are works which are undertaken in accordance with an approved PCEMP, in order to facilitate development in another Precinct. Incidental or Associated works include the borrowing of material from a Precinct and /or trunk service infrastructure to facilitate development in another Precinct.

Figure 1: Site Locality Plan

2 CIVIL CONSTRUCTION METHODOLOGY

2.1 OVERVIEW

The following sections describe the scheduling and general construction sequencing for works within Precincts 3, 4, 5 and Part Precinct 6.

2.1.1 CONSTRUCTION PHASE OVERVIEW

Construction will be divided into various sub stages for construction sequencing. The sub staging locations and sizes are to be defined as the project progresses further into the detailed design process. The general configuration of the development layout plan is illustrated in Appendix A.

To facilitate construction of the Works, fill was required from Precincts 3,4,5. If an external fill material source was readily available and feasible at the time of construction, this material may have also be used.

2.1.2 CONSTRUCTION SCHEDULING

Construction of the project commenced in January 2018 with the completion expected within 10-15 years.

A comprehensive construction program was developed by the Principal Civil Contractor upon award of the contract. This program was reviewed by the Superintendent and Approval Holder in order to comply with timeframe constraints within the PCEMP (if applicable), to enable construction activities to proceed without adverse effect on site constraint items.

The construction program was broken down into specific tasks relating to each activity within the project, and nominate key processes such as critical links, milestones, percentage completions and task summaries.

Additional to the above, **Table 1** details the indicative construction sequencing with reference to Appendix A for the precinct staging plans.

Table 1: Indicative Construction Sequencing

Precincts 3, 4, 5 and Part Precinct 6 Indicative Construction Sequencing		
Works Package	Commencement	Completion
Estate Major Works		
Frog Ponds within the relevant Precincts covered by this PCEMP.	Prior to any works occurring within the relevant Precinct.	Prior to any works occurring within the relevant Precinct.
PT Sub-Arterial Road	January 2018	Completed
Connection to Racecourse Road	July 2030	December 2030
Bells Creek Arterial Phase 2 & 3	January 2018	December 2025
Trunk Sewer Gravity Main	January 2018	Completed
Trunk Water Main	January 2018	Completed
Bulk Earthworks Works Packages		
Bulk Earthworks Phases including sediment basin construction, erosion and sediment controls, clearing and grubbing, topsoil strip, bulk earthworks, topsoil re-spread and site stabilisation	June 2017	August 2022

Precincts 3, 4, 5 and Part Precinct 6 Indicative Construction Sequencing		
Subdivision Works & Rehabilitation		
Stage works including WSUD (wetlands, rain gardens, bio retention) erosion and sediment control, services, roadworks, landscaping and rehabilitation	June 2017	December 2030

2.2 EROSION AND SEDIMENT CONTROL

The concept erosion and sediment control drawings detailed in Appendix A indicate the minimum standard of erosion and sediment control measures that will be implemented during construction and phasing of the works. Detailed design will confirm the actual erosion and sediment control measures ensuring downstream and adjacent environmental values are protected from construction activities. During construction, an erosion and sediment control management plan will be submitted to the Construction Superintendent for acceptance. The attached drawings will be updated with further details of erosion and sediment control processes for works covered by this PCEMP. The Principal Civil Contractor shall review the erosion and sediment control management plan regularly and make onsite amendments as required, including the installation of additional measures where site conditions dictate.

2.3 SITE CLEARING AND BULK EARTHWORKS

Prior to clearing, delineation of the buffer zones, vegetation retention and habitat retention zones will be defined onsite. Following on from the delineation activities the construction zones are established and clearing and bulk earthworks activities can proceed in accordance with the CESCP devised and signed off by a CPESC.. In particular regard to Precincts 3, 4, 5 and Part Precinct 6:

- Haulage of fill material along existing and newly created haul roads; if sourced externally to Precincts 3, 4, 5 and Part Precinct 6:
- Expected 380,000m³ fill required;
- Fill transportation of approximately 5,000 to 8,000m³/day;
- Fill placement and compaction operations for Precincts 3, 4, 5 and Part Precinct 6.

. Exposed areas are to be progressively stabilised as works are completed, to minimise the extent of areas of disturbance at any given time.

3 MATTERS OF ENVIRONMENTAL SIGNIFICANCE

The following section specifies the MNES identified in the PER and if they are relevant to the development of Precincts 3, 4, 5 and Part Precinct 6. Reference should be made to the PER for further details regarding each MNES.

The following table describes for each MNES whether they have been identified pre-construction commencement within Precincts 3, 4, 5 and Part Precinct 6 and therefore could be directly impacted by this part of the development or if there is the potential for indirect effects on these MNES if not located within the Precinct.

Section 5 of this PCEMP describes in detail the mitigation and management strategies proposed in relation and appropriate to each MNES described in **Table 2**.

Table 2: Works covered by the PCEMP addendum – Summary of Potential Impacts identified pre-construction and Mitigation of impacts on for MNNES

MNES		Summary of Potential Direct Impacts on MNES & Mitigation	Summary of Potential Indirect Impacts on MNES & Mitigation
Listed Threatened Species	Wallum Sedge Frog	• A preconstruction survey was undertaken in September 2016 in accordance with Condition 8g of the approval and consistent with the method outlined in the updated WSFMP (August 2016). Based on the results from the survey, 4.54ha of WSF habitat is assessed as being lost within Precincts 4 and 5 of the development (polygons 24, 30, 31 and 42). Impacted WSF habitat within Precinct 3 has been previously accounted for in the PCEMP from Precinct 2 and Part Precincts 3/4. • In accordance with the approved WSFMP and Condition 7 of the Approval, 12.53ha of WSF habitat is being created, conserved and embellished along the Bells Creek North (northern bank) frog conservation corridor (Frog Zone and Frog Buffer). This will reduce somewhat with the introduction of storm water drainage corridors and WSUD placement within the Frog Buffers. • A total area of 0.175ha of potential existing WSF habitat (identified in the preconstruction survey) will be retained and conserved within the Bells Creek North (northern bank) frog conservation corridor. • There is a maximum net gain of 8.03ha of WSF habitat (12.53-4.54=8.03).	• Adjacent earthworks (i.e. filling works, clearing of vegetation etc.) to be undertaken to avoid impacts on retained habitat. • Stormwater runoff from the development in areas of construction covered by this PCEMP to be diverted away from retained or created Wallum Sedge Frog habitat (ponds) to avoid potential impacts.
	Water Mouse	• Water mouse habitat as identified in the PER (Stockland, 2013) will not be directly impacted by the works covered by this PCEMP.	• No Water Mouse habitat exists within or adjoining any areas covered by this PCEMP. Indirect impacts would not be anticipated as surface water and ground water, if discharged, will be directed into Lamerough Creek and Bells Creek North.
Habitat with potential to contain EPBC list species		• No EPBC Act listed threatened flora species were located on the Aura site during the targeted surveys and as such no direct impacts on these MNES are predicted (PER, 2013).	• The project site has been assessed as containing habitat with the potential to contain EPBC Act listed flora species to occur based on the quality of extant habitats and the proximity of nearby

MNES		Summary of Potential Direct Impacts on MNES & Mitigation	Summary of Potential Indirect Impacts on MNES & Mitigation
			populations. Stockland has committed to appropriate rehabilitation within conservation and rehabilitation areas across the site. An area bounding the northern and eastern boundaries of Precincts 3, 4, 5 and Part Precinct 6 has been defined as the EPZ which will be conserved and rehabilitated to improve habitat value. The nature of habitat rehabilitation across the site is identified in the Vegetation Rehabilitation and Management Plan, 2014, through the designation of habitat management units or HMUs.
Listed Migratory species		• The development of works covered by this PCEMP are expected to not directly impact migratory birds that use the site.	
Wetland of International importance (RAMSAR)		• As a result of the works covered by this PCEMP, there is expected to be no direct impacts on the RAMSAR site.	• There would be no indirect impacts on Ramsar as downstream water quality would be maintained to protect environmental values.

Based on the previous survey data and as discussed in **Table 2**, 0.175ha of WSF habitat will be retained across Precincts 4 and 5, with an additional 12.53ha created as part of the approved WSF management plan. This includes large forage and buffer areas contiguous with retained and created WSF breeding ponds.

A total area of 4.54ha of WSF habitat is expected to be lost to the development across Precincts 4 and 5, consisting of:

- Polygon 24 0.597ha
- Polygon 30 0.544ha
- Polygon 31 2.264ha
- Polygon 42 1.139ha

Polygons 24, 30, 31 and 42 were identified in the WSFMP, 2018 as being lost to the development (impacted). Polygons 9 and 23 within Precinct 3 were previously addressed in the Precinct 2 and Part 3/4 PCEMP.

Pre-construction survey data will confirm areas of habitat to be removed and this will be recorded in the ACR which tracks compliance with condition 6 of the EPBC Approval (EPBC ref. 2011/5987).

The approved WSFMP is consistent with the details within this PCEMP.

Retained and recreated WSF habitat traverses the riparian zones of Lamerough Creek and Bells Creek North and South. Retained and recreated WSF habitat has been incorporated into the Frog Zone and Frog Buffer, as per the approved WSFMP. As such, stormwater runoff during the construction and final developed stage of the project will need to traverse all conservation zones for discharge to the receiving environments. It is important that conveyance of stormwater through the Frog Zone and Frog Buffer does not compromise attributes of either retained or recreated WSF habitat. There are numerous examples on site where WSF habitat can exist in close proximity to major drainage lines

(**Figure 2**,), thus the inclusion of drainage corridors through the dedicated Frog Zone should not be seen as a threat to meeting the mitigation plan presented in the WSFMP, nor meeting its Key Performance indicators.

Figure 2: Existing Site Conditions - Deep Drainage line (not WSF habitat) adjacent (<5m) to known WSF habitat

Within the development area of Precincts 3, 4, 5 and Part Precinct 6 no EPBC Act listed threatened flora species were located during targeted surveys (PER, 2013). In addition, no areas of native remnant vegetation were identified for retention.

An area to the south of and within Precincts 3, 4 and 5 designated as Part Precinct 6 (adjacent Bells Creek North) has been defined as the EPZ which will be conserved and rehabilitated to improve habitat value.

The nature of habitat rehabilitation across the site is identified in the Vegetation Rehabilitation and Management Plan, 2013, through the designation of habitat management units or HMUs. **Table** 3 outlines HMUs associated with Precincts 3, 4, 5 and Part Precinct 6 works, their area, target species, existing flora and target community.

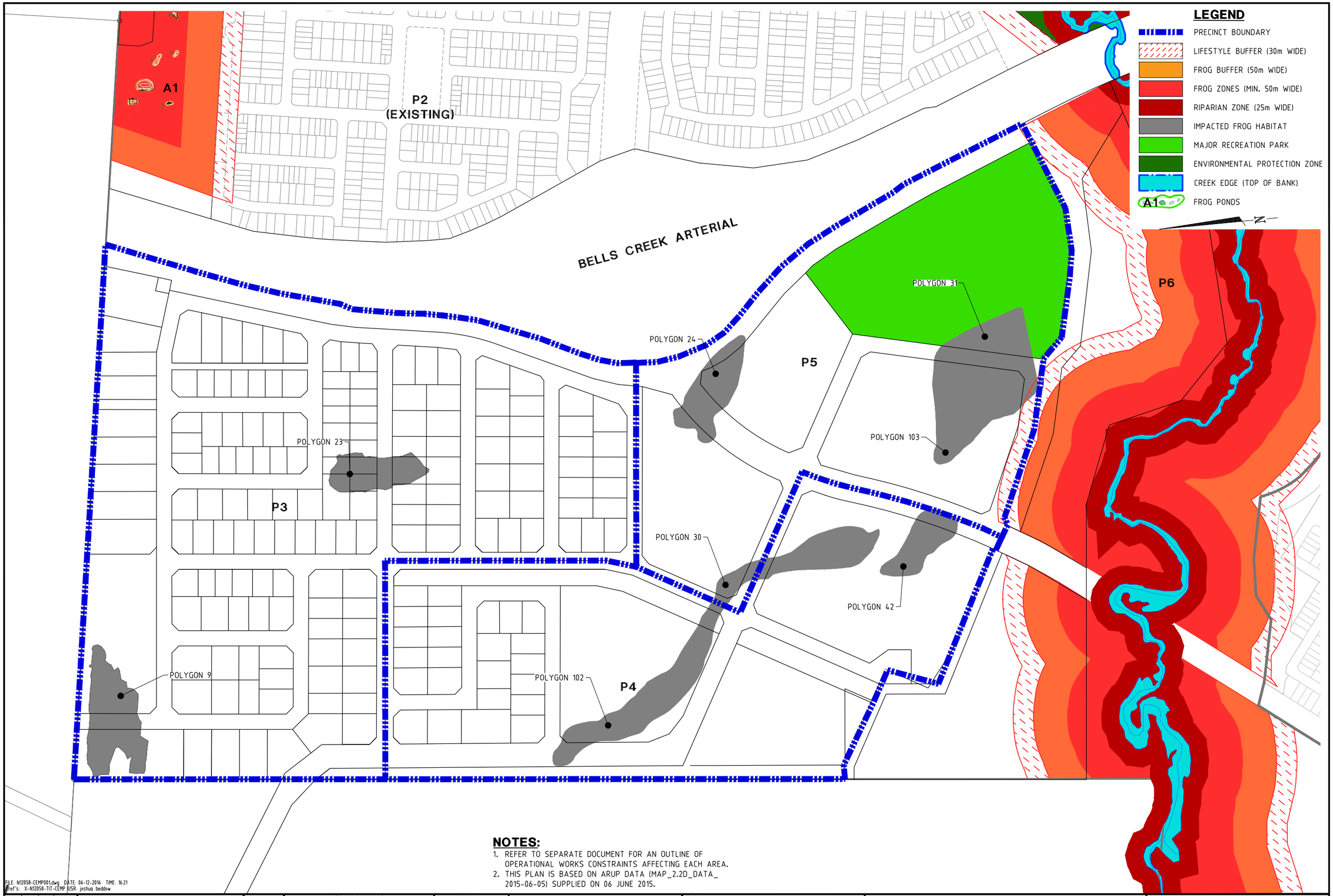
Table 3: Habitat Management Unit Details

HMU	Approx. Area (ha)	Target Species2	Current Flora	Target Community
9a	0.487	Aa, Ec, Pa, Pw	Bells Creek North Riparian Buffer. Remnant RE 12.3.4 and 12.3.5 and cleared areas that contain pasture grasses, some regrowth M. quinquenervia and native sedge	Melaleuca Forest, Sedgeland
11	2.861	Aa, Ec, Pa, Pw	Melaleuca regrowth with pasture grasses	Melaleuca Forest Biohub for Aa, Ec, Pa.
16	37.529	Aa, Ae, WSF, Pa, Pw	Low regrowth heath. Pasture grasses co-dominating with heath elements. Very high quality WSF habitat present throughout area.	Heath, Sedgeland Biohub areas for Ae
18a	2.356	Aa, Ec, Pa, Pw	Bells Creek North Riparian Buffer. Remnant RE 12.3.5 and large areas of cleared pasture	Melaleuca Forest, Sedgeland
19	2.014	Aa, Ec, Pa, Pw	Melaleuca regrowth with pasture grasses	Melaleuca Forest, Sedgeland Biohub for Aa, Ec, Pa, Pw

HMU	Approx. Area (ha)	Target Species2	Current Flora	Target Community
23a	11.708	Aa, WSF, Ec, Pa, Pw	Predominantly pasture with some juvenile pine and M. quinquenervia (due to proximity to remnant RE area). High and low quality WSF habitat present.	Melaleuca Forest, Sedgeland
29a	10.519	Aa, WSF, Ec, Pa, Pw	Remnant RE 12.3.5	12.3.5

A detailed Environmental Rehabilitation Plan will be prepared prior to the commencement of subdivision works and endorsed by the state government on 06/09/2017.

APPENDIX A CONCEPT ENGINEERING DRAWINGS/PRECINCT STAGING



NOTES:

1. REFER TO SEPARATE DOCUMENT FOR AN OUTLINE OF OPERATIONAL WORKS CONSTRAINTS AFFECTING EACH AREA.
2. THIS PLAN IS BASED ON ARUP DATA (MAP_2.2D_DATA_2015-06-05) SUPPLIED ON 06 JUNE 2015.

FILE: N12058-CEMP001.dwg DATE: 06-12-2016 TIME: 16:21
Xref's: X-N12058-TIT-CEMP USR: joshua beddow

AMENDMENTS	FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
	A	WP	WP	14.07.16	
	B				
	C				
	D				
	E				
	F				

DESIGN CHECK

DRAWN CHECK

SCALE (METRES)

1:2500 1:5000 50 0 50 100 A1 A3

MICROFILM No.

PROJECT No. N12058

APPROVED BRENT THOMAS RPEQ 7862

FOR & ON BEHALF OF CALIBRE CONSULTING PTY LTD

CLIENT STOCKLAND DEVELOPMENTS PTY LTD

PROJECT AURA PRECINCTS 3, 4, 5 and 6 (Part)

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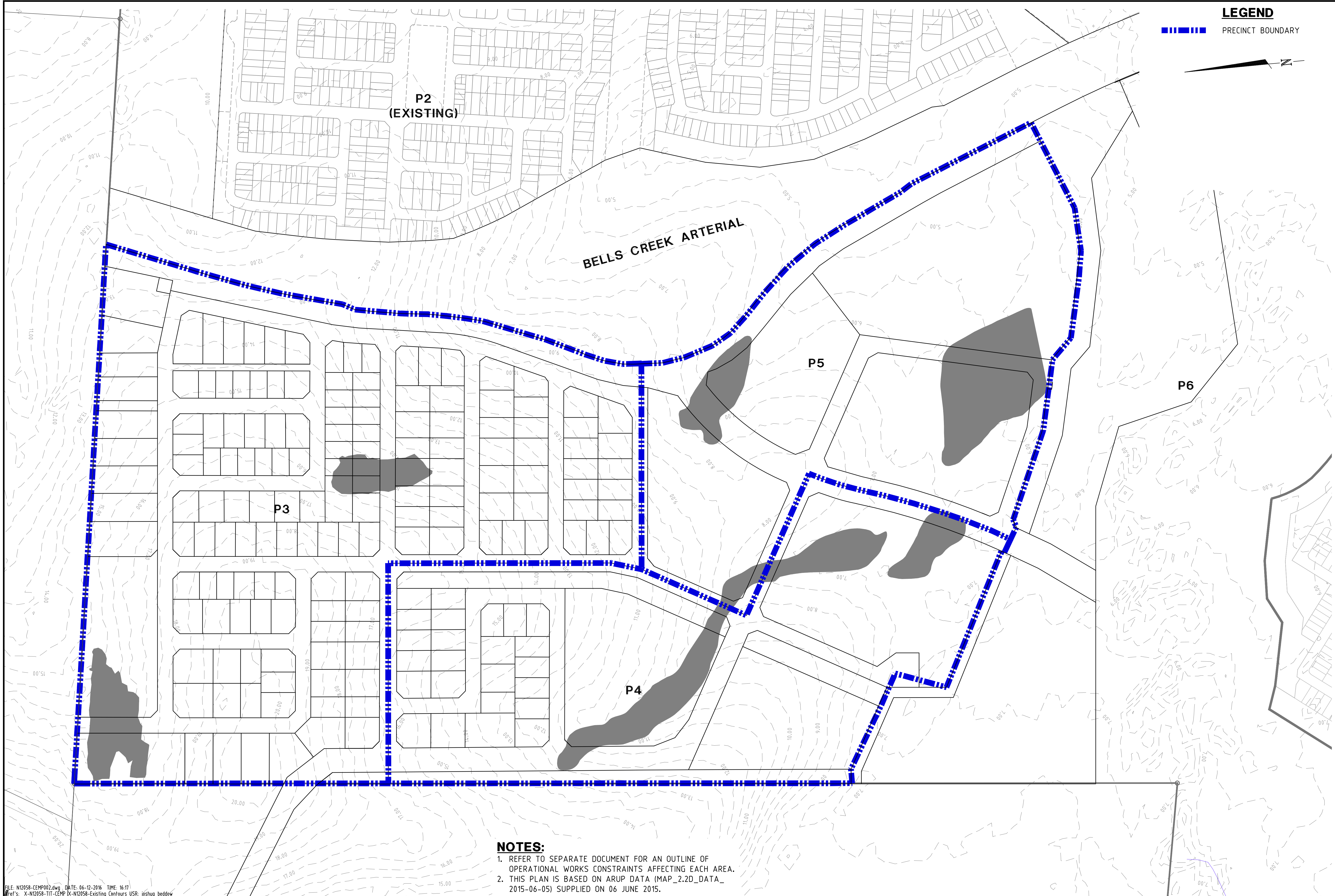
DRAWING TITLE

AURA PLAN OF ENVIRONMENTAL CONSTRAINTS

DRAWING NUMBER N12058-CEMP001

ISSUE



NOTES:

1. REFER TO SEPARATE DOCUMENT FOR AN OUTLINE OF OPERATIONAL WORKS CONSTRAINTS AFFECTING EACH AREA.
2. THIS PLAN IS BASED ON ARUP DATA (MAP_2.2D_DATA_2015-06-05) SUPPLIED ON 06 JUNE 2015.

FILE: N12058-CEMP002.dwg DATE: 06-12-2016 TIME: 16:17
Xref's: X-N12058-TIT-CEMP X-N12058-Existing Contours USR: joshua beddow

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	B				
	C				
	D				
	E				
	F				

DESIGN CHECK

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1:5000 A3
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PROJECT No.
N12058

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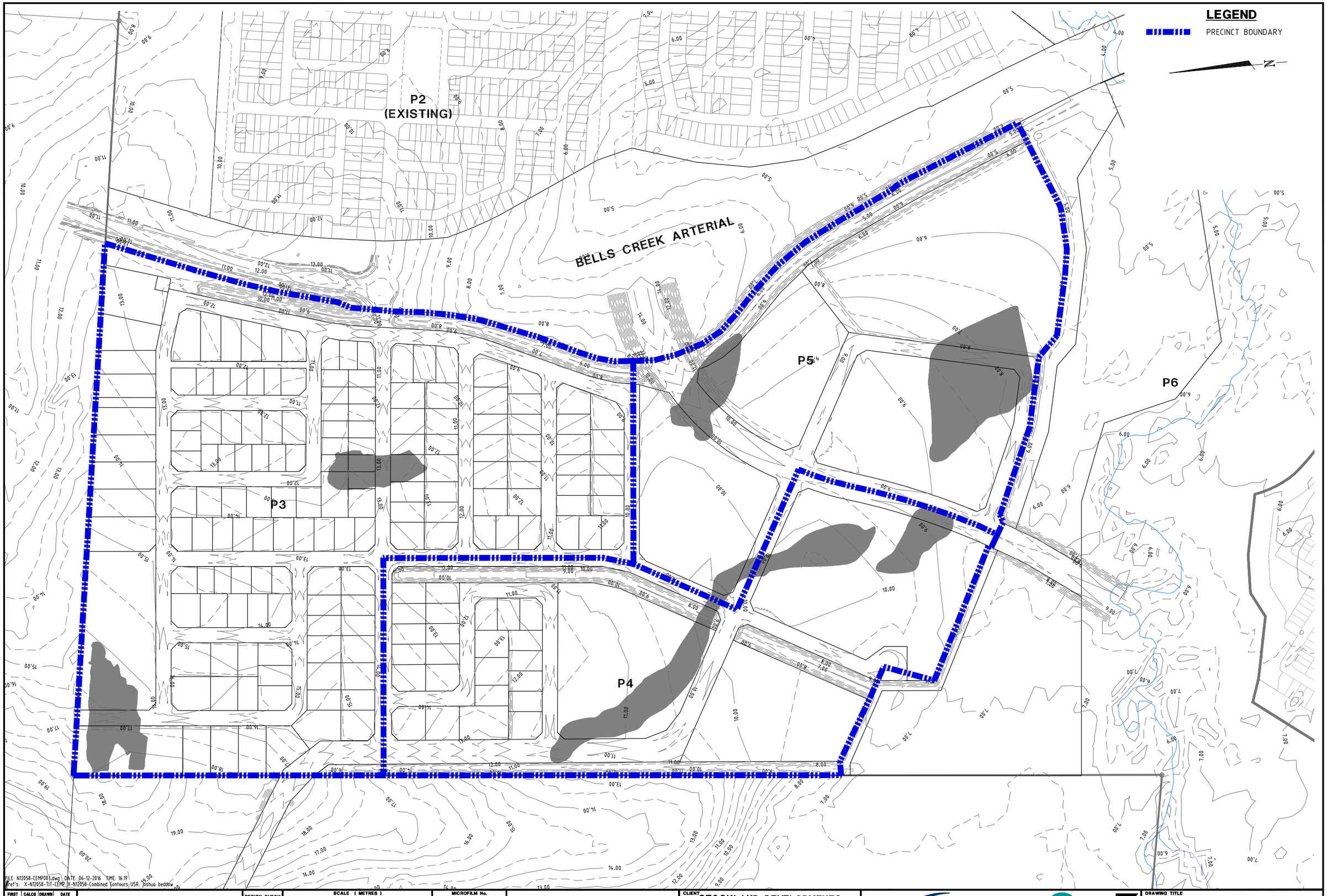
Quality Endorsed Company ISO 9001 Lic 4084

DRAWING TITLE
AURA
PLAN OF EXISTING CONTOURS

DRAWING NUMBER
N12058-CEMP002

ISSUE



FILE: N12058-CEMP003.dwg DATE: 06-12-2016 TIME: 16:19
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AMENDMENTS: A, B, C, D, E, F

AMENDMENT DETAILS

DESIGN CHECK

DRAWN CHECK

SCALE (METRES)
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MICROFILM No.

PROJECT No.
N12058

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CLIENT
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DRAWING TITLE
AURA
PLAN OF PROPOSED CONTOURS

DRAWING NUMBER
N12058-CEMP003

ISSUE

LEGEND

- PROPOSED BORROW AREA
- NEW HAUL ROAD
- PRECINCT BOUNDARIES
- BH53 — DOUGLAS PARTNERS BORE HOLE LOCATIONS (APPROX)

N

BRUCE HIGHWAY

RACECOURSE ROAD

BELLS REACH

Lamerough Creek

Existing P2

WESTERN BOROW AREA

POTENTIAL HAUL ROAD (ALIGNMENT TO BE CONFIRMED AT DETAILED DESIGN STAGE)

POTENTIAL HAUL ROAD (ALIGNMENT TO BE CONFIRMED AT DETAILED DESIGN STAGE)

CREEK CROSSING

POTENTIAL BORROW AREA PRECINCT 11

SEDIMENT BASIN SIZED FOR DESIGN EVENT

Fall

Bells Creek North

BELLS CREEK ARTERIAL (FUTURE CONSTRUCTION)

P3 P4 P5 P6 P7 P8 P9 P10 P11 P12 P13 P14

BH34 BH35 BH36 BH38 BH39 BH40 BH41 BH42 BH43 BH44 BH45 BH46 BH47 BH48 BH49 BH50 BH51 BH53 BH54 BH55 BH56 BH57 BH58 BH59 BH60 BH61 BH62 BH63 BH64 BH65 BH66 BH67 BH68 BH69 BH70 BH71 BH72 BH73 BH74 BH75 BH76 BH77 BH78 BH79 BH80 BH81 BH82 BH83 BH84 BH117 BH118 BH119 BH120 BH121 BH122 BH123 BH124 BH125 BH126 BH127 BH128

FILE: N12058-CEMP003.dwg DATE: 11-08-2016 TIME: 09:43
Xref's: X-N12058-TIT-CEMP X-N12058-BASE-Overall USR: wesley pike

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E				
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AMENDMENTS

DESIGN CHECK

DRAWN CHECK

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MICROFILM No.

PROJECT No. N12058

APPROVED BRENT THOMAS RPEQ 7862

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CLIENT STOCKLAND DEVELOPMENTS PTY LTD

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Quality Environment Occupational Health & Safety Lic-4884

DRAWING TITLE: PRECINCT 3,4,5 and 6 (Part) PROPOSED BORROW AREAS

DRAWING NUMBER: N12058-CEMP004

ISSUE

PRECINCT 2
(Existing)

BELLS CREEK ARTERIAL
EXISTING CONSTRUCTION

BELLS CREEK ARTERIAL
(Future Construction)

FUTURE BRIDGE LOCATION
OVER BELLS CREEK ARTERIAL

BELLS CREEK ARTERIAL

TEMPORARY
ROUNDABOUT
(Existing)

800
SP209290

P3

P4

P5

P6

Bells Creek North

BH34
BH119
BH122
BH35
BH126
BH127
BH117
BH36
BH121
BH123
BH125
BH128
BH118
BH120
BH38
BH124

FUTURE BRIDGE
LOCATION

DRAINAGE CHANNEL

CONNECTION TO RACECOURSE ROAD

-999	-5	acad 012	Over 5 metres Cut
-5	-4	acad 020	4 to 5 metres Cut
-4	-3	acad 030	3 to 4 metres Cut
-3	-2	acad 040	2 to 3 metres Cut
-2	-1	acad 041	1 to 2 metres Cut
-1	0	acad 051	0 to 1 metre Cut
0	1	acad 121	0 to 1 metre Fill
1	2	acad 141	1 to 2 metres Fill
2	3	acad 140	2 to 3 metres Fill
3	4	acad 150	3 to 4 metres Fill
4	5	acad 170	4 to 5 metres Fill
5	999	acad 190	Over 5 metres Fill

NOTE
BOREHOLE LOCATIONS SHOWN ARE FROM DOUGLAS AND PARTNERS GEOTECH REPORTS 80967.00 AND 80967.01

FINAL LEVELS SUBJECT TO DETAIL DESIGN

FILE: N12058-CEMP005.dwg DATE: 06-12-2016 TIME: 16:20
Xref's: X-N12058-TIT-CEMP X-N12058-BASE X-N12058-Cut Fill depths USR: joshua.beddow

FIRST ISSUE	CALCS	DRAWN	DATE
	WP	JB	08.03.16

AMENDMENTS: A, B, C, D, E, F

AMENDMENT DETAILS

DESIGN CHECK

DRAWN CHECK

SCALE (METRES)
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MICROFILM No.

PROJECT No.
N12058

APPROVED
BRENT THOMAS RPEQ 7862
FOR & ON BEHALF OF CALIBRE CONSULTING PTY LTD

CLIENT
STOCKLAND DEVELOPMENTS PTY LTD

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PRECINCTS 3, 4, 5 and 6 (Part)

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DRAWING TITLE
PRECINCTS 3,4,5 AND 6 (Part)
PRELIMINARY BULK EARTHWORKS

DRAWING NUMBER
N12058-CEMP005

ISSUE

FILE: N12058-CEMP009.dwg DATE: 06-12-2016 TIME: 16:14
Xref's: X-N12058-TIT X-N12058-BASE USR: joshua beddow

AMENDMENTS	FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
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	B				
	C				
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DESIGN CHECK

DRAWN CHECK

SCALE (METRES)

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MICROFILM No.

PROJECT No.
N12058

APPROVED
BRAD THOMPSON RPEQ 07818
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Quality Environment Occupational Health and Safety Lic-4854

DRAWING TITLE
APPLICATION 3 - 5
COMBINED SERVICES
OVERALL LAYOUT PLAN

DRAWING NUMBER
N12058-CEMP009

ISSUE

Addendum D PRECINCTS 7, 9, 11, 12, 14, PARTS 6, 8, 10, 13, 15, 16, 19 AND THE WESTERN BORROW AREA: MANAGEMENT ACTIONS, INCIDENTAL OR ASSOCIATED WORKS[6]

1 INTRODUCTION

This addendum addresses the requirements of the PCEMP, specified in Condition 3 of the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC) approval (EPBC Ref: 2011/5987), that are specific to Precincts 7,9,11,12,14 and Part Precincts 6,8,10,13,15,16,19 and the western borrow area. It describes construction activities within Precincts 7,9,11,12,14 and Part Precincts 6,8,10,13,15,16,19 and the western borrow area, and associated works, and the potential impacts to MNES and proposed mitigation and management actions associated with these works.

1.1 PRECINCT DESCRIPTION AND CONTEXT

The project is a major master planned community situated to the southwest of existing residential areas at Caloundra West and Little Mountain. The precincts will create areas of residential development surrounding the future Town Centre. In addition to this, the Precincts will contain (but not limited to) open spaces, sporting facilities, schools, neighbourhood parks, plus environmental and rehabilitation areas. The Precincts will also include major arterial roads and bridges connecting to Bells Creek North. The proposed construction and bulk earthworks elements will include the Western Borrow Area and Bells Creek Arterial connecting north through to Precincts 3, 4 and 5.

Figure 1 depicts an indicative location of the works covered by this PCEMP relative to the Aura Priority Development Area. Refer to Appendix A for a layout of the proposed development and earthworks proposal under this PCEMP.

2 CIVIL CONSTRUCTION METHODOLOGY

2.1 OVERVIEW

The following sections describe the scheduling and general construction sequencing for works within Precincts 7, 9,11,12,14 Parts 6, 8,10,13,15,16, 19 and the Western Borrow Area.

2.1.1 CONSTRUCTION PHASE OVERVIEW

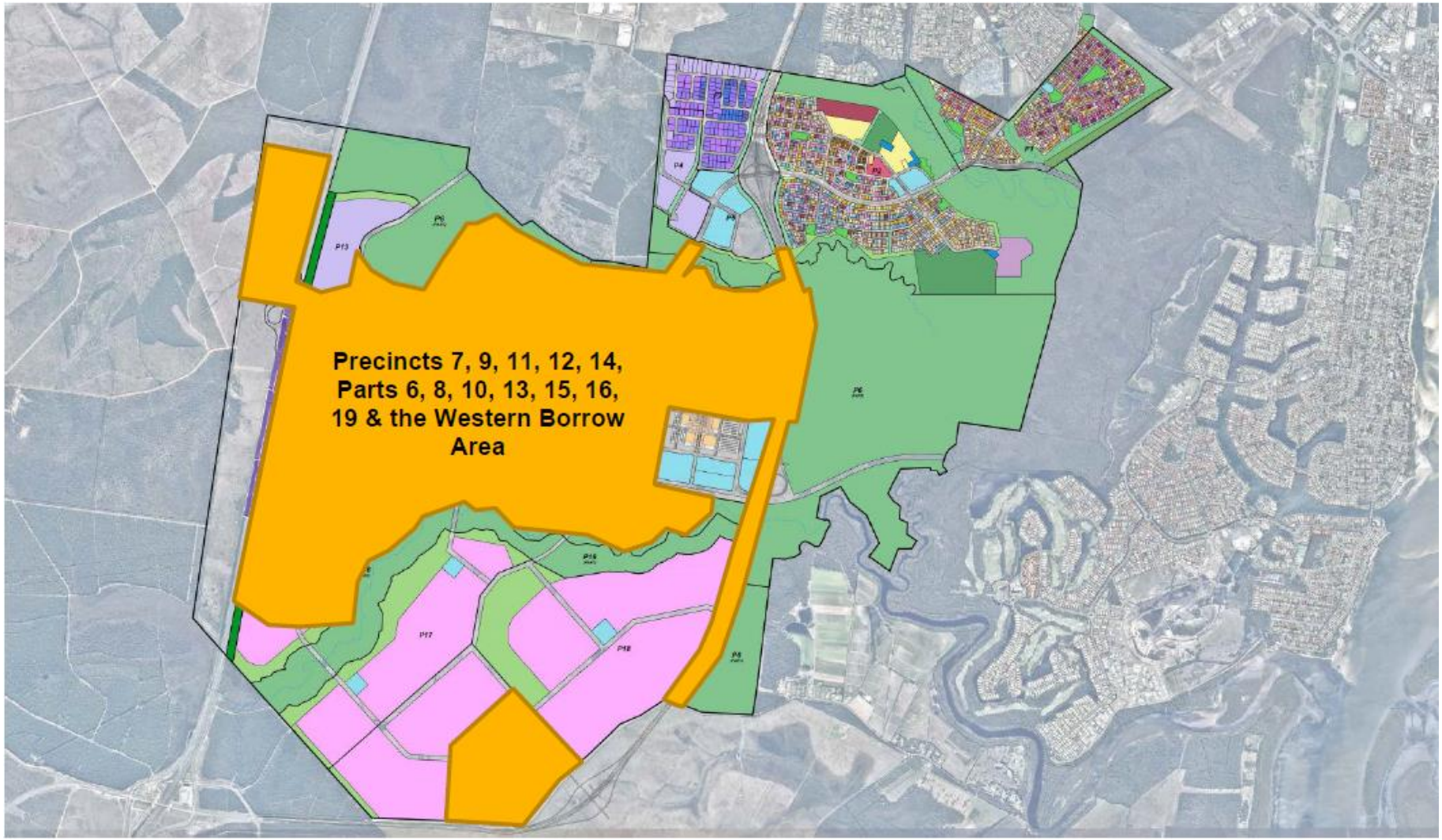
Construction will be divided into various sub stages for construction sequencing. The sub staging locations and sizes are to be defined as the project progresses further into the detailed design process. The general configuration of the development layout plan is illustrated in Appendix A.

To facilitate construction of the Works, fill is required to be imported from the borrow area within the Western Borrow Area and part of Precinct 11 and 12. If an external fill material source is readily available and feasible at the time of construction, this material may be used in place of the Western Borrow Area and Precinct 11 and 12 sources.

[6] Incidental or Associated Works are works which are undertaken in accordance with an approved PCEMP, in order to facilitate development in another Precinct. Incidental or Associated works include the borrowing of material from a Precinct and /or trunk service infrastructure to facilitate development in another Precinct.

Nevertheless, the importation of fill from the Western Borrow Area and Precinct 11 and 12 has been considered as a part of the PCEMP addendum for Precincts 7, 9,11,12,14 Parts 6, 8,10,13,15,16,19.

Figure 1: Locality Plan



Construction Scheduling
The construction scheduling of the project commenced in October 2017, with the completion expected within 10-15 years.

A comprehensive construction program will be developed by the Principal Civil Contractor upon award of the contract. This program will be reviewed by the Superintendent and in order to comply with timeframe constraints within the PCEMP (if applicable), to enable construction activities to proceed without adverse effect on site constraint items.

The construction program will be broken down into specific tasks relating to each activity within the project, and nominate key processes such as critical links, milestones, percentage completions and task summaries.

Additional to the above, **Table 1** details the indicative construction sequencing with reference to Appendix A for the precinct staging plans.

Table 1: Indicative Construction Sequencing

Precincts 5 to 15 and Part Precinct 6 Indicative Construction Sequencing		
Works Package	Commencement	Completion
Estate Major Works		
Frog Ponds within the relevant Precincts covered by this PCEMP.	Prior to any works occurring within the relevant Precinct.	Prior to any works occurring within the relevant Precinct.
PT Sub-Arterial Road	January 2018	March 2019
Bells Creek Arterial Phase 2 & 3	January 2020	December 2020
Trunk Sewer Gravity Main	January 2018	April 2019
Trunk Water Main	January 2018	March 2019
Bulk Earthworks Works Packages		
Bulk Earthworks Phases including sediment basin construction, erosion and sediment controls, clearing and grubbing, topsoil strip, bulk earthworks, topsoil re-spread and site stabilisation	October 2017	August 2023
Subdivision Works & Rehabilitation		
Stage works including WSUD (wetlands, rain gardens, bio retention) erosion and sediment control, services, roadworks, landscaping and rehabilitation	November 2017	December 2030

2.2 EROSION AND SEDIMENT CONTROL

The concept erosion and sediment control drawings detailed in Appendix A indicate the minimum standard of erosion and sediment control measures that will be implemented during construction and phasing of the works. Detailed design will confirm the actual erosion and sediment control measures ensuring downstream and adjacent environmental values are protected from construction activities. During construction, an erosion and sediment control management plan will be submitted to the Construction Superintendent for acceptance. The attached drawings will be updated with further details of erosion and sediment control processes for works covered by this PCEMP. The Principal Civil Contractor shall review

the erosion and sediment control management plan regularly and make onsite amendments as required, including the installation of additional measures where site conditions dictate.

2.3 SITE CLEARING AND BULK EARTHWORKS

Prior to clearing, delineation of the buffer zones, vegetation retention and habitat retention zones will be defined onsite. Following on from the delineation activities the construction zones are established and clearing and bulk earthworks activities can proceed in accordance with the CESCP devised and signed off by a CPESC. In particular regard to Precincts 7, 9, 11, 12, 14 Parts 6, 8,10, 13, 15, 16 and 19 and the Western Borrow Area:

- Establishment of new haul roads including any creek crossings (as required);
- Haulage of fill material along existing and newly created haul roads; if sourced externally to Precincts 7, 9,11,12,14 Parts 6, 8,10,13,15,16, 19 and the Western Borrow Area;
- Fill transportation of approximately 5,000 to 8,000m³/day;
- Fill placement and compaction operations for Precincts 3, 4, 5 and Part Precinct 6.

The removal of material from the Western Borrow Area and Precinct 11 and 12 will ensure that all surface and ground water from disturbed areas will discharge into sediment basin(s) located throughout the earthworks operations. Exposed areas will be progressively stabilised as works are completed, to minimise the extent of areas of disturbance at any given time.

3 MATTERS OF ENVIRONMENTAL SIGNIFICANCE

The following section specifies the Matters of National Environmental Significance (MNES) identified in the PER and if they are relevant to the development of Precincts 7, 9,11,12,14 Parts 6, 8,10,13,15,16, 19 and the Western Borrow Area. Reference should be made to the (PER for further details regarding each MNES.

The following table describes for each MNES whether they have been identified pre-construction within Precincts 7, 9,11,12,14 Parts 6, 8,10,13,15,16, 19 and the Western Borrow Area and therefore could be directly impacted by this part of the development or if there is the potential for indirect effects on these MNES if not located within the Precinct.

Section 5 of the PCEMP outlines the mitigation and management strategies proposed to protect each MNES described below in **Table 2**.

Table 2: Works covered by the PCEMP addendum – Summary of Potential Impacts identified pre-construction and Mitigation of impacts on MNES

MNES		Summary of Potential Direct Impacts on MNES & Mitigation	Summary of Potential Indirect Impacts on MNES & Mitigation
Listed Threatened Species	Wallum Sedge Frog	• A preconstruction survey was undertaken in September 2016 in accordance with Condition 8g of the approval and consistent with the method outlined in the updated WSFMP (August 2016). Based on the results from the survey, 4.54ha of WSF habitat is assessed as being lost within Precincts 4 and 5 of the development (polygons 24, 30, 31 and	• Adjacent earthworks (i.e. filling works, clearing of vegetation etc.) to be undertaken to avoid impacts on retained habitat. • Stormwater runoff from the development in areas of construction covered by this PCEMP to be diverted away from retained or created Wallum Sedge Frog habitat (ponds) to avoid potential impacts.

MNES		Summary of Potential Direct Impacts on MNES & Mitigation	Summary of Potential Indirect Impacts on MNES & Mitigation
		42). Impacted WSF habitat within Precinct 3 has been previously accounted for in the PCEMP from Precinct 2 and Part Precincts 3/4. • In accordance with the approved WSFMP and Condition 7 of the Approval, 12.53ha of WSF habitat is being created, conserved and embellished along the Bells Creek North (northern bank) frog conservation corridor (Frog Zone and Frog Buffer). This will reduce somewhat with the introduction of storm water drainage corridors and WSUD placement within the Frog Buffers. • A total area of 0.175ha of potential existing WSF habitat (identified in the preconstruction survey) will be retained and conserved within the Bells Creek North (northern bank) frog conservation corridor. • There is a maximum net gain of 8.03ha of WSF habitat (12.53-4.54=8.03).	
	Water Mouse	• Water mouse habitat as identified in the PER (Stockland, 2013) will not be directly impacted by the works covered by this PCEMP addendum.	• No Water Mouse habitat exists within or adjoining any areas covered by this PCEMP. Indirect impacts would not be anticipated as surface water and ground water, if discharged, will be directed into Lamerough Creek and Bells Creek North.
Habitat with potential to contain EPBC list species		• No EPBC Act listed threatened flora species were located on the Aura site during the targeted surveys and as such no direct impacts on these MNES are predicted (PER, 2013).	• The project site has been assessed as containing habitat with the potential to contain EPBC Act listed flora species to occur based on the quality of extant habitats and the proximity of nearby populations. Stockland has committed to appropriate rehabilitation within conservation and rehabilitation areas across the site. • An area bounding the northern, southern and eastern boundaries of Precincts 6 (Part), 7-15 and 16 (part) has been defined as the EPZ which will be conserved and rehabilitated to improve habitat value. The EPZ runs the entire length of the eastern boundary with Precincts 7 and 8. The conservation

MNES		Summary of Potential Direct Impacts on MNES & Mitigation	Summary of Potential Indirect Impacts on MNES & Mitigation
			corridors are composed of areas of riparian corridor, frog zone, frog buffer and lifestyle buffer and occur along the entire length of Bells Creek North and Bells Creek South. • The nature of habitat rehabilitation across the site is identified in the Vegetation Rehabilitation and Management Plan, 2014, through the designation of habitat management units or HMUs.
Listed Migratory species		• The development of works covered by this PCEMP are expected to not directly impact migratory birds that use the site.	
Wetland of International importance (RAMSAR)		• As a result of the works covered by this PCEMP, there is expected to be no direct impacts on the RAMSAR site.	• There would be no indirect impacts on Ramsar as downstream water quality would be maintained to protect environmental values.

Based on the most recent survey data, 62.5ha of WSF habitat is to be retained across the subject site, including the Precincts covered under this PCEMP and shown in **Figure 5-3**, with additional habitat re-created as part of the approved WSF management plan. Both retained and recreated habitat are contained within the conservation zones (Riparian Zone, Frog Zone, Frog Buffer) adjoining each of the creeks which dissect the subject site, and land east of the Bells Creek Arterial – Environmental Protection Zone. Retained WSF habitat and areas to recreate WSF habitat, are shown in Map 2.2d of the WSFMP.

A total area of 96.84ha of WSF habitat is expected to be lost to the development across the Precincts covered under this PCEMP as shown **Figure 5-3**.

All WSF Habitat Polygons identified as impacted in **Figure 5-3** are consistent with the approved WSFMP.

Phase 2 pre-construction surveys will be conducted immediately prior to the removal of any WSF habitat as per the methodology outlined in the WSFMP. This will confirm area/s of habitat to be removed, and will be recorded in the ACR which reports compliance with Condition 6 of the EPBC Approval (EPBC ref. 2011/5987).

Retained and recreated Wallum Sedge Frog habitat traversed the riparian zones of Bells Creek North and South. Retained and recreated Wallum Sedge Frog habitat has been incorporated into the Frog Zone and Frog Buffer, as per

the WSFMP. As such, stormwater runoff during the construction and final developed stage of the project will need to traverse through all conservation zones for discharge to the receiving environments. It is important that conveyance of stormwater through the Frog Zone and Frog Buffer does not compromise attributes of either retained or recreated Wallum Sedge Frog habitat.

Figure 2: Existing Site Conditions - Deep Drainage line (not WSF habitat) adjacent (<5m) to known WSF habitat

There are numerous examples on site where WSF habitat exists in close proximity to major drainage lines (**Figure 2**), thus the inclusion of drainage corridors through the dedicated Frog Zone is not a threat to meeting the objectives and Key Performance indicators of the approved WSFMP.

Within the development area of Precincts 6 (part), 7-15 and 16 (part) no EPBC Act listed threatened flora species were located during targeted surveys (PER, 2013). In addition, no areas of native remnant vegetation were identified for retention.

The Bells Creek North and Bells Creek South corridors, as well as the EPZ to the east of the development area will be conserved and rehabilitated to improve habitat value.

The nature of habitat rehabilitation across the site is identified in the Vegetation Rehabilitation and Management Plan, 2013, through the designation of habitat management units or HMUs within the conservation corridors and EPZ in **Figure 5-4** defines the HMUs within and associated with Precincts 6 (part), 7-15 and 16 (part). The table below contains details of each of these HMUs in relation to area, target species, existing flora and target community.

Table 3: Habitat Management Unit Details

HMU	Approx. Area (ha)	Target Species[1]	Current Flora	Target Community
9b	0.411	Aa, Ec, Pa, Pw	Bells Creek North Riparian Buffer. Remnant RE 12.3.4 and 12.3.5 and cleared areas that contain pasture grasses, some regrowth *M. quinquenervia* and native sedge.	Melaleuca Forest
18b	2.326	Aa, Ec, Pa, Pw	Bells Creek North Riparian Buffer. Remnant RE 12.3.5 and large areas of cleared pasture.	Melaleuca Forest
22	6.888	Aa, WSF, Ec, Pa, Pw	*M. quinquenervia* regrowth with patches of sedge. Setaria and other exotic pasture grasses common and dense. Very high WSF habitat present.	Melaleuca Forest, Sedgeland
23b	15.720	Aa, WSF, Ec, Pa, Pw	Predominantly pasture with some juvenile pine and *M. quinquenervia* (due to proximity to remnant RE area). High and low quality WSF habitat present.	Melaleuca Forest, Sedgeland
29c	0.920	Aa, WSF, Ec, Pa, Pw	Remnant RE 12.3.5	12.3.5
30	59.525	Aa, WSF, Pa, Pw	Pasture and juvenile pine regrowth. Low quality WSF habitat present.	Melaleuca Forest, Sedgeland
33	1.115	Aa, WSF, Ec, Pa, Pw	Melaleuca regrowth with pasture grasses. Low quality WSF habitat present.	Melaleuca Forest, Sedgeland
36a	8.256	Aa, WSF, Ec, Pa, Pw, WM	Remnant RE 12.3.5	Biohub for Pa and potentially Ec and Pw
37	11.811	Aa, WSF, Pa, Pw	Grazed pasture. Occasional juvenile *M. quinquenervia* and pine.	12.3.5

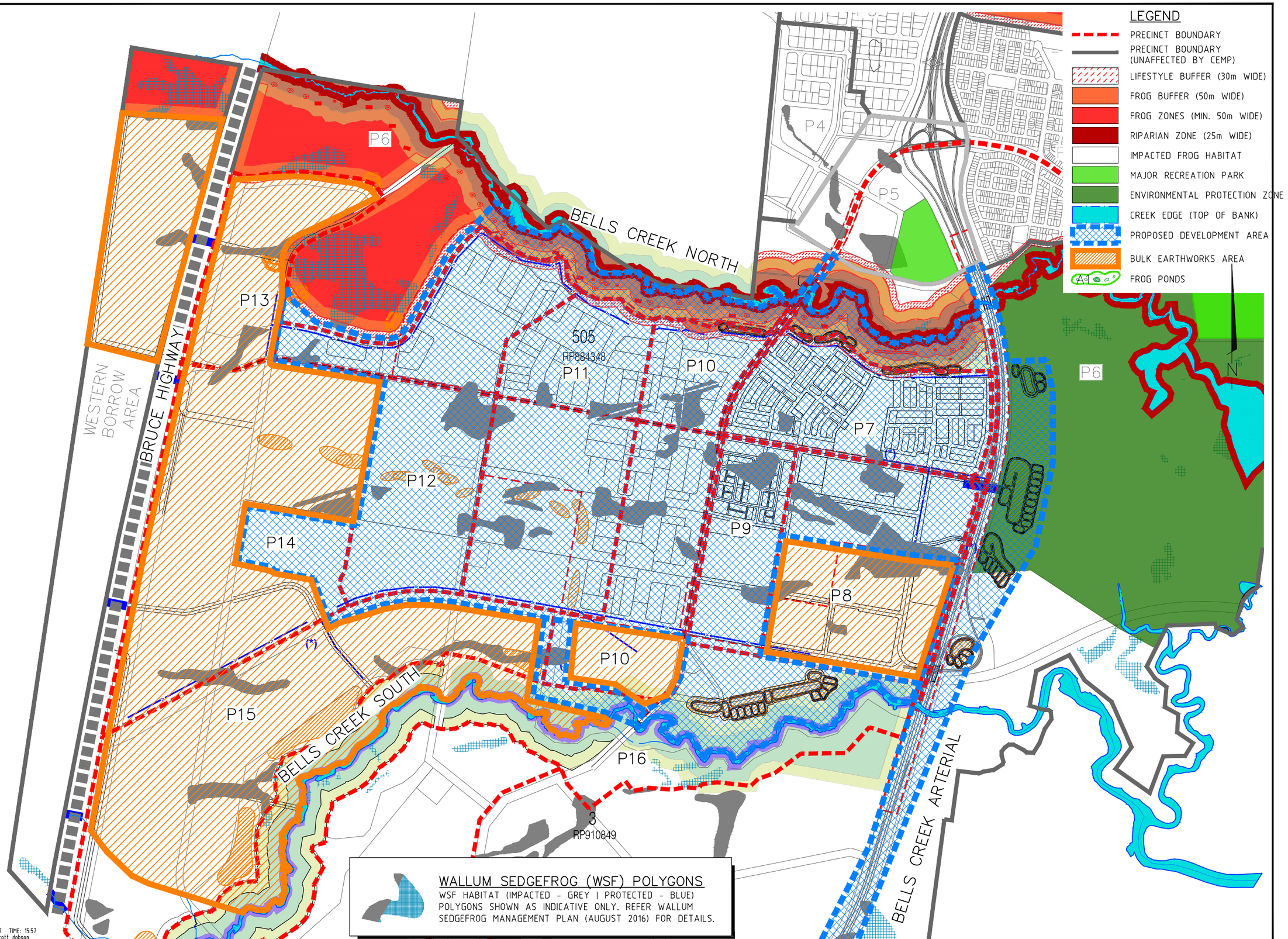
HMU	Approx. Area (ha)	Target Species[1]	Current Flora	Target Community
40a	3.826	Aa, Ec, Pa, Pw	Bells Creek South Riparian Buffer. Remnant RE 12.3.5 and large areas of cleared pasture.	Melaleuca Forest
9c	8.946	Aa, Ec, Pa, Pw	Bells Creek North Riparian Buffer. Remnant RE 12.3.4 and 12.3.5 and cleared areas that contain pasture grasses, some regrowth *M. quinquenervia* and native sedge.	Melaleuca Forest
20	1.360	Ai	Remnant RE 12.3.1	12.3.1
21	1.618	Ae, Ae, WSF, Pa, Pw	Remnant RE 12.3.8/13. Very high WSF habitat present.	12.3.8, 12.3.13
24	3.831	Aa, WSF, Ec, Pa, Pw	Melaleuca regrowth +/- Pine. Very high WSF habitat present.	Melaleuca Forest, Sedgeland
25	6.502	Aa, Ec, Pa, Pw	Remnant RE 12.3.5	12.3.5
26	0.714	Aa, WSF, Ec, Pa, Pw	Remnant RE 12.3.8 with areas of regrowth *M. quinquenervia* +/- pine regrowth.	12.3.8 and Melaleuca Forest
28	25.918	Aa, WSF, Ec, Pa, Pw	Remnant RE 12.3.5 with areas of regrowth *M. quinquenervia* +/- pine regrowth. Some areas of very high quality WSF habitat present.	12.3.5
31	11.715	Aa, WSF, Ec, Pa, Pw	Melaleuca regrowth with pasture grasses. Many heathy forbs and sedges. High and low quality WSF habitat present.	Melaleuca Forest, Sedgeland
32	3.756	Aa, Ec, Pa, Pw	Melaleuca regrowth +/- Pine	Melaleuca Forest, Sedgeland
38	16.223	Aa, WSF, Ec, Pa, Pw	Dense Melaleuca forest regrowth, with an average high of 1.5m. Patches of Sedgeland (low quality WSF habitat) also present.	Melaleuca Forest, Sedgeland
39b	0.9691	Aa, Ec, Pa, Pw	Bells Creek South Riparian Buffer. Remnant RE 12.3.5 and areas of cleared pasture.	Melaleuca Forest
4	4.496	Aa, Ec, Pa, Pw	Bells Creek North Riparian Buffer. Remnant RE 12.3.4 and large areas of cleared pasture.	Melaleuca Forest, Biohub for Aa, Ae, Ec, Pa, Pw
27	32.970	Aa, WSF, Ec, Pa, Pw	Pasture grasses with juvenile pine regrowth. Small saplings (30cm) and low density of MQ. Low density of sedge. Areas of low, high and very high quality WSF habitat present	Melaleuca Forest, Sedgeland
29b	29.075	Aa, WSF, Ec, Pa, Pw	Remnant RE 12.3.5	12.3.5

HMU	Approx. Area (ha)	Target Species[1]	Current Flora	Target Community
34	6.315	Aa, WSF, Ec, Pa, Pw	Pasture Grass	Melaleuca Forest, Sedgeland
35	2.195	Aa, Ec, Pa, Pw	Pasture grass. Occasional juvenile *M. quinquenervia* and pine.	Melaleuca Forest, Sedgeland
39a	1.73	Aa, Ec, Pa, Pw	Bells Creek South Riparian Buffer. Remnant RE 12.3.5 and areas of cleared pasture.	Melaleuca Forest
42a	4.422	Aa, WSF, Ec, Pa, Pw	Bells Creek South Riparian Buffer. Unmapped Regrowth 12.3.4 with some small areas of high and very high WSF habitat. Some cleared pasture areas also exist.	Melaleuca Forest
48a	1.347	Aa, WSF, Ec, Pa, Pw	Bells Creek South Riparian Buffer. Remnant 12.3.5 with cleared pasture areas.	Melaleuca Forest

[1] This column represents what species shall be targeted. This does not necessarily mean that these species will be planted direct; however, the target community is aimed at providing suitable habitat. Aa =*Acacia attenuata;* WSF = Acid Frogs, Ae = *Allocasuarina emuina*, Bg = B*landfordia grandiflora*; Ec = *Eucalyptus conglomerata*; Pa = *Phaius australis*; Pw = *Prasophyllum wallum*; WM = Water Mouse

A detailed Environmental Rehabilitation Plan will be prepared prior to the commencement of subdivision works and endorsed by the state government on 22/06/2018.

APPENDIX A CONCEPT ENGINEERING DRAWINGS/PRECINCT STAGING



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DESIGN CHECK

DRAWN CHECK

SCALE (METRES)
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MICROFILM No.

PROJECT No. 17-000934

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DRAWING TITLE
AURA
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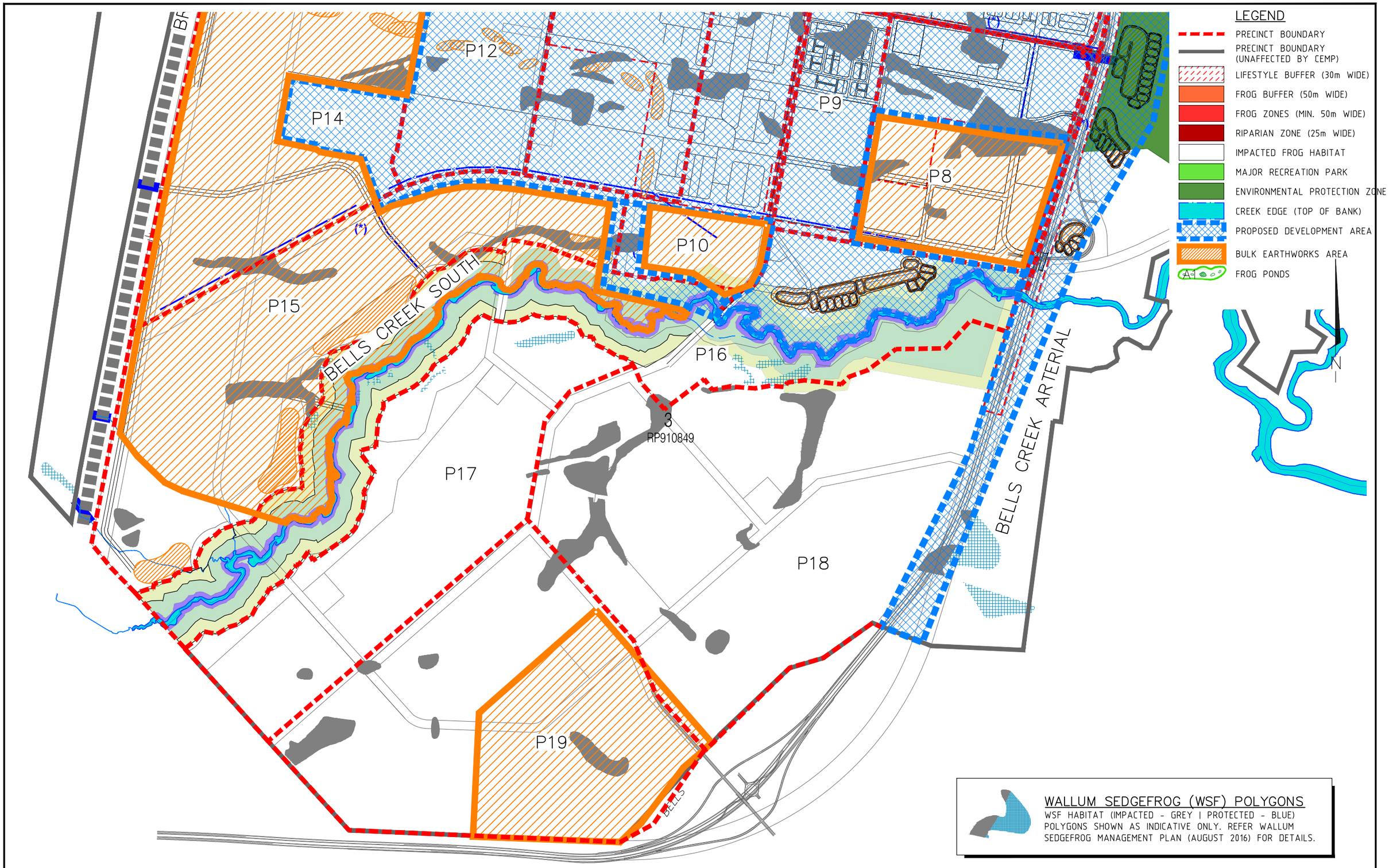
DRAWING NUMBER 17-000934-CEMP001

ISSUE B



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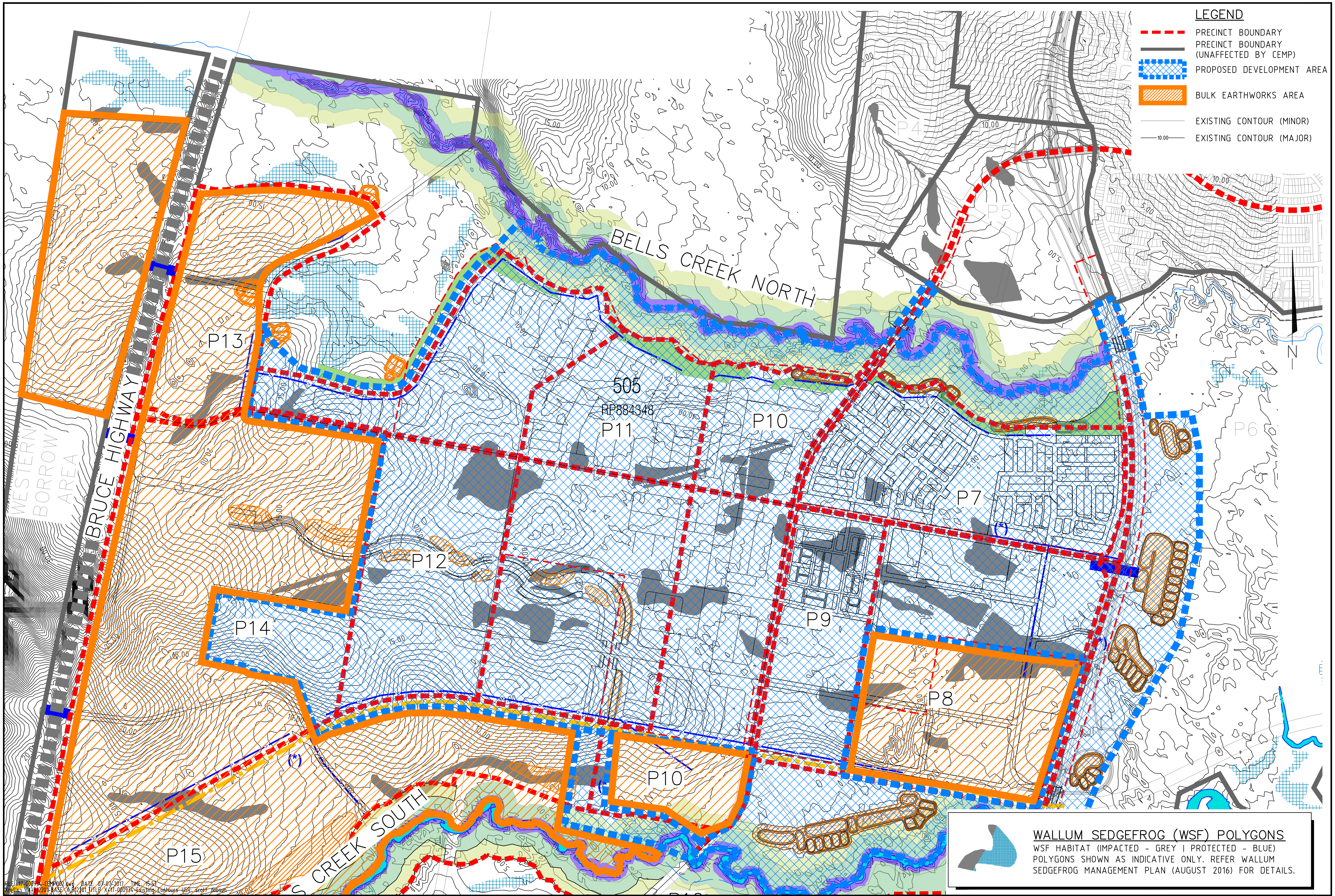
ISSUE A



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DESIGN CHECK

DRAWN CHECK

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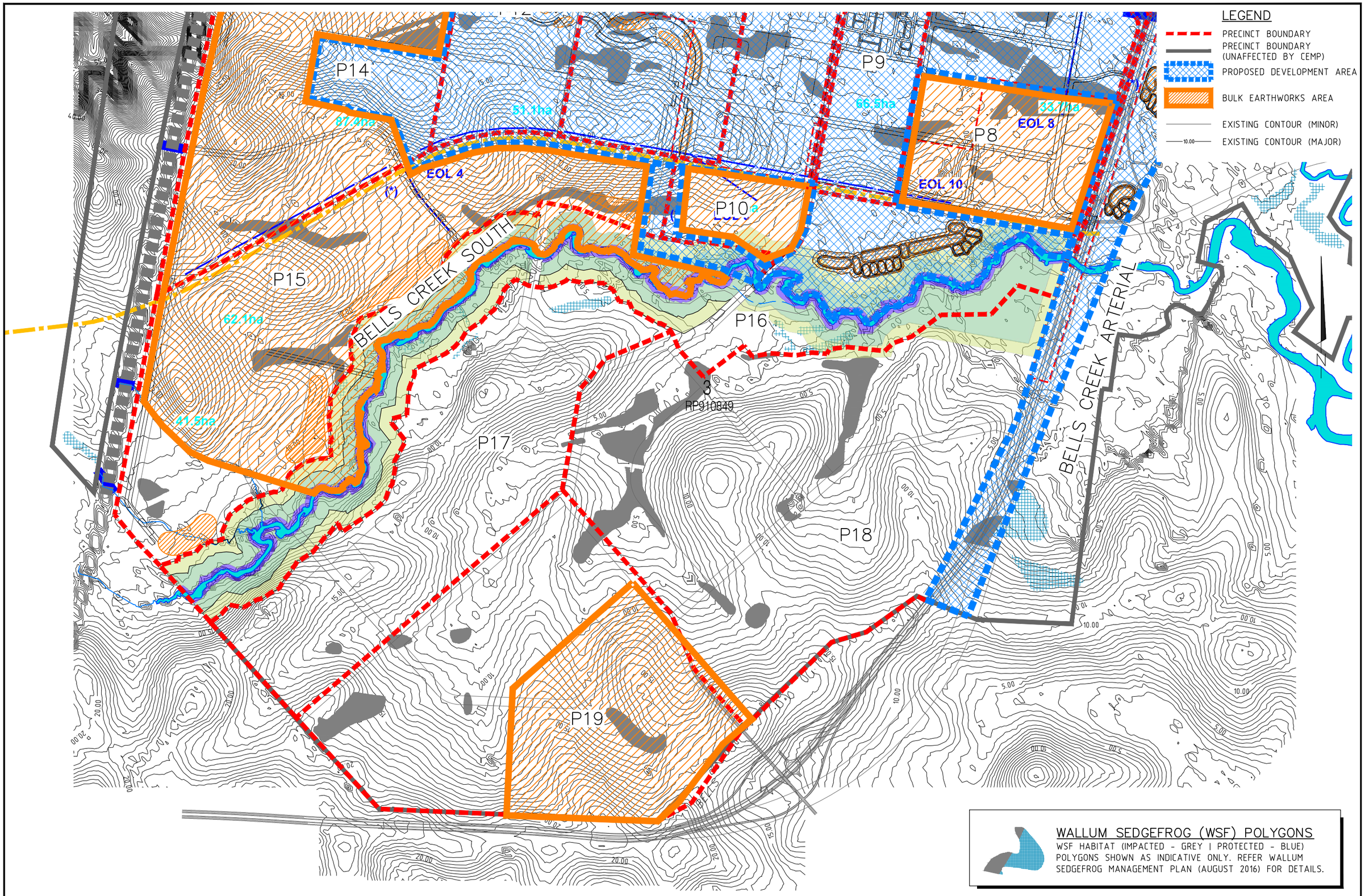
DRAWING NUMBER: 17-000934-CEMP002 | ISSUE: C



WALLUM SEDGEFROG (WSF) POLYGONS

WSF HABITAT (IMPACTED - GREY | PROTECTED - BLUE)
POLYGONS SHOWN AS INDICATIVE ONLY. REFER WALLUM SEDGEFROG MANAGEMENT PLAN (AUGUST 2016) FOR DETAILS.

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AMENDMENTS

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MICROFILM No.

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17-000934-CEMP002.2

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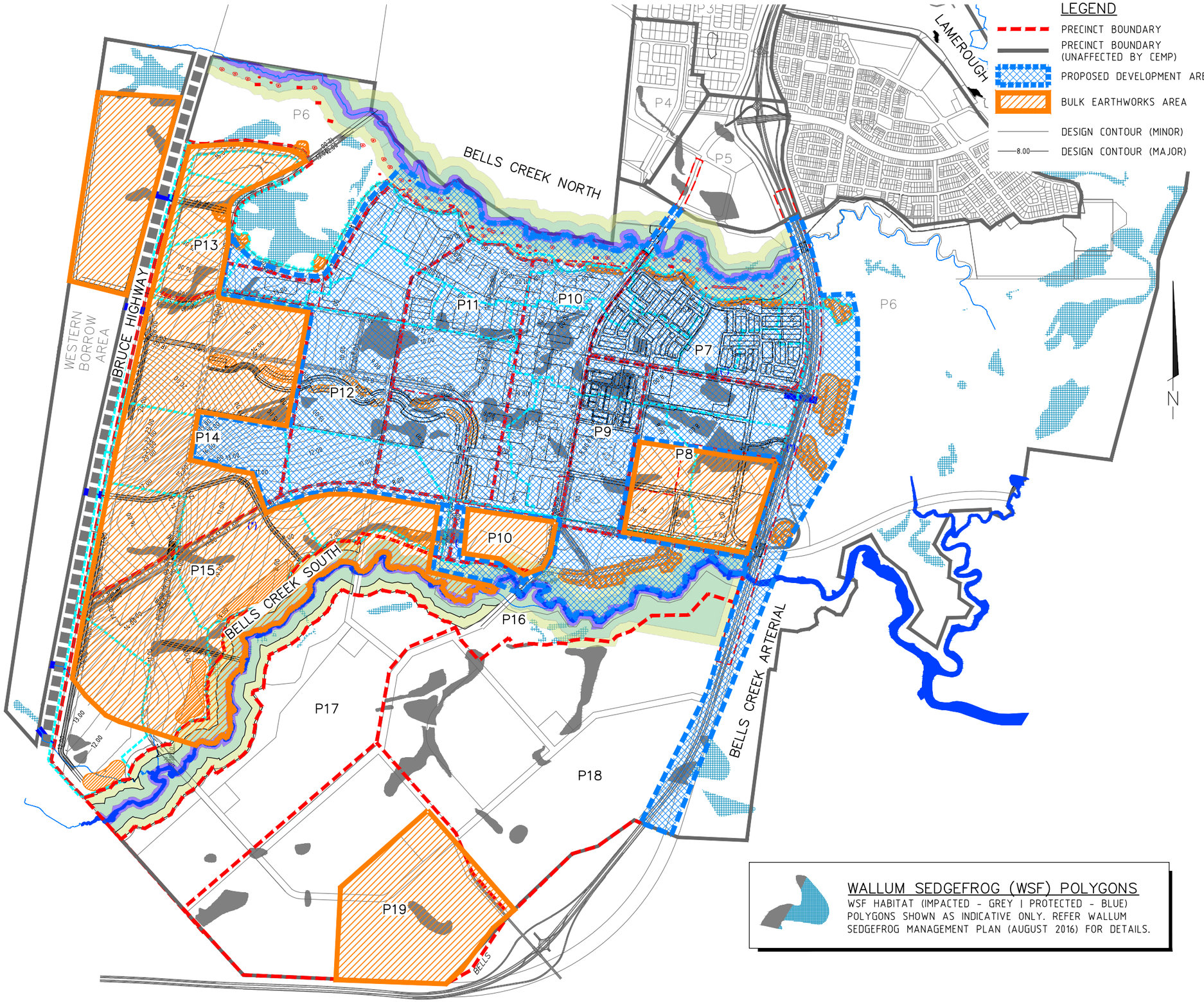

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C	MW	DC	21.08.19	ISSUED TO REFLECT AMENDED REPORT
D	MW	DC	18.05.21	PRECINCT 13 BULK EARTHWORKS AREA EXTENDED
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AMENDMENTS

DESIGN CHECK

DRAWN CHECK

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PLAN OF PROPOSED CONTOURS

DRAWING NUMBER
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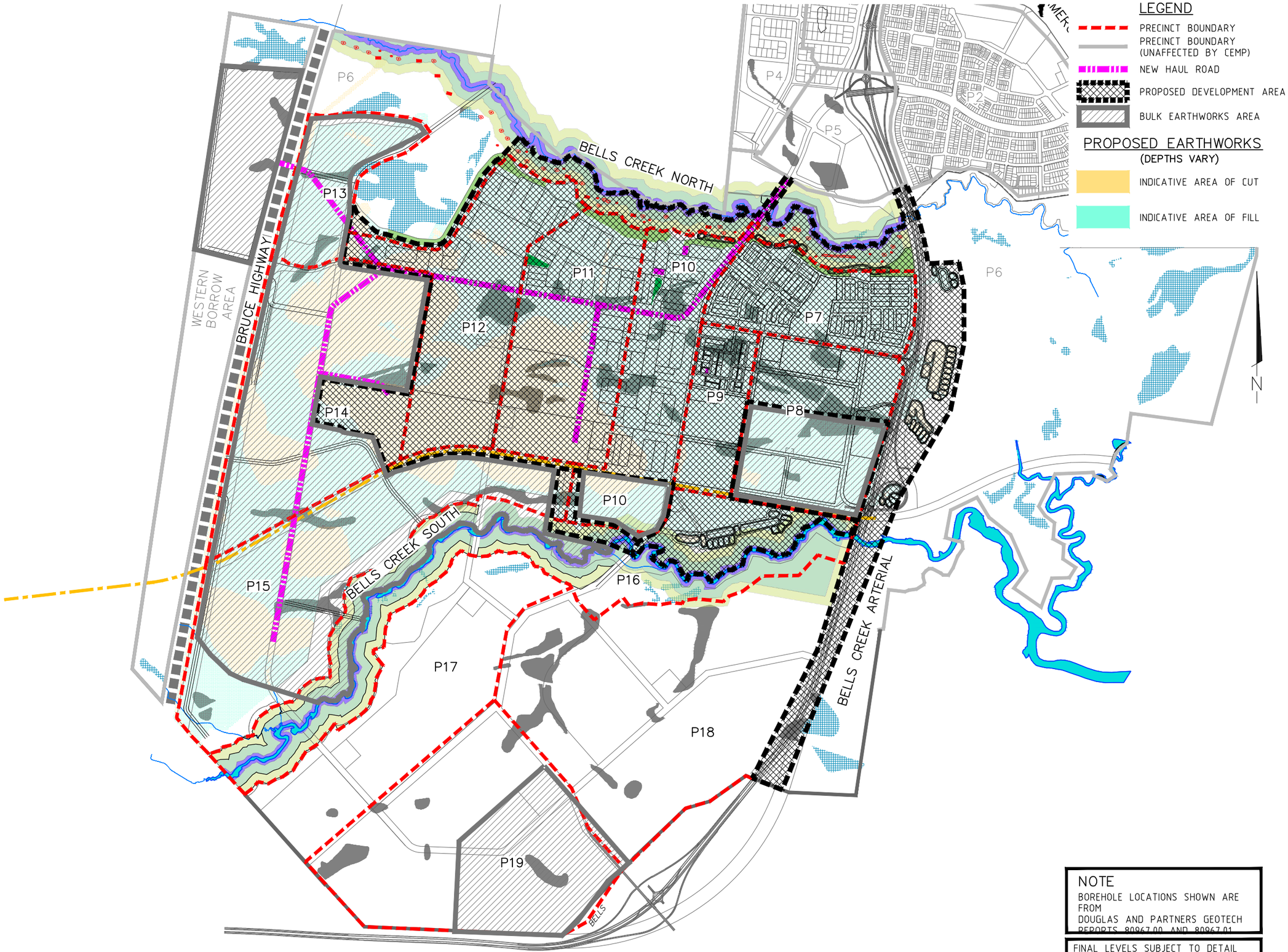

NOTE
BOREHOLE LOCATIONS SHOWN ARE FROM DOUGLAS AND PARTNERS GEOTECH REPORTS 80967.00 AND 80967.01

FINAL LEVELS SUBJECT TO DETAIL DESIGN

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B	MW	DC	21.08.19	ISSUED TO REFLECT AMENDED REPORT
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SCALE (METRES)
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DRAWING TITLE
AURA
PLAN OF PRELIMINARY
BULK EARTHWORKS

DRAWING NUMBER
17-000934-CEMP004

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