PSBA | Environmental Assessment Report

PUBLIC SAFETY BUSINESS AGENCY

Proposed Infrastructure Designation under the *Planning Act 2016*

Charters Towers Fire and Rescue Station

3 – 5 Enterprise Road, Charters Towers QLD 4820

Lot 100 on SP303847

February 2019

Proudly supporting those who keep our community safe

Queensland Government

Document History

Version	Date	Status	Key Changes	Author(s)	Reviewer(s)
1.0	14/11/2018	Draft for Review	…	D.vanderKamp	J.Wheeler
2.0	22/02/2019	Final	…	L.S	Minor edits only

Table of Contents

List of Figures

List of Tables

Abbreviations

AHD	Australian Height Datum
AS	Australian Standards
CLR	Contaminated Land Register
DATSIP	Department of Aboriginal and Torres Strait Islander and Multicultural Affairs
DSDMIP	Department of State Development, Manufacturing, Infrastructure and Planning
EAR	Environmental Assessment Report
EMR	Environmental Management Register
EPCB	*Environmental Protection and Biodiversity Conservation Act 1999*
ESCP	Erosion and Sediment Control Plan
MGR	Ministers Guidelines and Rules July 2017
MNES	Matters of National Environmental Significance
NQ	North Queensland
PA	*Planning Act 2016*
PR	*Planning Regulation 2017*
PSBA	Public Safety Business Agency
QFES	Queensland Fire and Emergency Services
SPP	State Planning Policy

Executive Summary

The proposed Designation is for a new Fire and Rescue Station at 3 – 5 Enterprise Road, Charters Towers Queensland 4820 and formally described as Lot 100 on SP303847 (hereafter referred to as the 'subject land').

The proposal includes the following:

- A single storey fire and rescue station accommodating both the engine room and station;
- A storage shed and relief quarters building to the western side of the engine room and station. A 6.7m (approx.) high training tower between the station and storage shed;
- Two crossovers from Enterprise Road, one being emergency vehicle exit only and the second providing ingress/egress to the visitor/PWD parking space. A third crossover is proposed from Shore Street and provides non-emergency ingress/egress;
- Thirteen car parking spaces (including 1 space for people with disabilities);
- A 1.8 metre (approx.) high fence to secure the site at the north, south and west boundaries and adjacent to the southern façade of the station. A sliding electric gate is proposed at the crossover to Shore Street;
- Landscaping adjacent to the proposed fence;
- Demolition of the existing building located within the south eastern portion of the subject land; and
- Five staff members working on site with working hours from 1:00pm to 9:00pm on Monday and 7:00am to 4:00pm on Tuesday to Friday.

The new facility will provide increased operational response capability and community safety functions. The station design will provide flexibility for staffing and vehicle storage requirements to meet current and future service delivery targets for the Charters Towers locality and greater North Queensland (NQ) region.

Streamlined

The proposal was considered streamlined on 7 November 2018, as advised by the Department of State Development Manufacturing, Infrastructure and Planning (see chapter 7, Part 2, Section 3.1.a of the Minister Guidelines and Rules).

Proposed Infrastructure (*The Planning Act 2016*)

The infrastructure is described under the *Planning Regulation 2017 (PR)*, Schedule 5, Part 2 as:

(8) emergency services facilities;

Consultation Strategy

The consultation strategy as outline in section 4 of this report, details the strategy will include a sign on the land, newspaper advert and letters to stakeholders.

Budgetary Commitments

The Queensland Government 2018/19 Budget Paper 3 outlines the Public Safety Business Agency capital program. Budget has been allocated for land acquisitions, plant and equipment and for new urban and rural fire appliances for various statistical areas.

The Charters Towers Fire and Rescue Station is outlined in the Queensland Fire and Emergency Services (QFES) forward capital program. The project is expected to begin construction in the 2019/2020 period.

1.0 Introduction

In accordance with the requirements of *The Planning Act 2016* (PA) Chapter 2, Part 5, Section 35, it is proposed to undertake a designation of premises for development of infrastructure known as an infrastructure designation under the Minister's Guidelines and Rules July 2017 (MGR).

The proposed designation is located within the Charters Towers Regional Council ('the council') local government area on behalf of Queensland Fire and Emergency Services (QFES) for the purposes of the proposed Charters Towers Fire and Rescue Station.

Property and Facilities Management within the Public Safety Business Agency (PSBA) have prepared this Environmental Assessment Report for consultation and State Interest Review to provide information in the assessment of the proposed ministerial designation of land for the development of infrastructure.

As part of this Environmental Assessment Report the following documentation is provided:

- Appendix 1 – Extracts from The *Planning Act 2016* and Streamlined Designation Flow Chart
- Appendix 2 – Extent of land holders to be consulted
- Appendix 3 – Property Information (title search and EMR / CLR search)
- Appendix 4 – Survey Plan
- Appendix 5 – Proposal Plan
- Appendix 6 – EPBC Protected Matters Report
- Appendix 7 – Heritage Assessment Report
- Appendix 8 – Existing Conditions Report
- Appendix 9 – Flood and Stormwater Management Report
- Appendix 10 – State Interest Trigger Mapping
- Appendix 11 – Geotechnical Report
- Appendix 12 – Vegetation Management Report

2.0 Detailed Infrastructure Proposal Summary

2.1 Summary

Table 1 - Infrastructure Proposal Summary	
Infrastructure Proposal	Ministerial Designation for Charters Towers Fire and Rescue Station
Infrastructure Entity	Queensland Fire and Emergency Service
Proposal address	3 – 5 Enterprise Road, Charters Towers QLD 4820
Proposal lot and plan	Lot 100 on SP303847
Proposed Infrastructure	Charters Towers Fire and Rescue Station - New fire and rescue station (including 2 bay engine room)
Infrastructure Category	*(8) emergency services facilities*
Relevant State Department/s	Department of State Development, Manufacturing, Infrastructure and Planning
Pre-Lodgement Engagement	State Agencies - Department of State Development, Manufacturing, Infrastructure and Planning Local Government - Charters Towers Regional Council Adjoining Landholders - To be notified during consultation period

2.2 State Interests

Table 2 - State Interests	
State Interests	- Liveable Communities - Cultural Heritage - Water Quality - Natural Hazard, Risk and Resilience

2.3 Native Title

Table 3 - Native Title Assessment		
Native Title	Deed of Grant #: 18825239 and 18822239 Date: 2 March 1995 and 10 February 1995	NT Extinguished: Yes Relevant NTWP Module: Module BA and CA Applies Dealing satisfies the requirements of Module BA and CA.

3.0 Pre-lodgement Consultation

Prior to PSBA lodging the Infrastructure Proposal with the Department of State Development, Manufacturing, Infrastructure and Planning, pre-lodgement consultation was undertaken with the following entities.

3.1 State Agencies

Department of State Development Manufacturing Infrastructure and Planning (DSDMIP)

Pre-lodgement advice was sought from the Department, via email and at a meeting on 17 October 2018, prior to lodging the Infrastructure Proposal. The Department provided general advice regarding:

- the consultation strategy;
- the Queensland Heritage Place on the opposite frontage to Enterprise Road (Signals, Crane and Subway, Charters Towers Railway Station);
- the stone wall embankment surrounding the subject land;
- landscaping on the subject land boundaries which adjoin residential dwellings.

The above items were noted by PSBA and have been addressed in this Environmental Assessment Report (EAR).

The Department of State Development, Manufacturing, Infrastructure and Planning also advised the proposal has been endorsed to proceed through the Streamlined MID process.

A copy of the Streamlined MID process is provided at **Appendix 1.**

3.2 Local Government

Local Council

Pre-lodgement consultation was undertaken with Charters Towers Regional Council regarding the proposed use. Council provided informal comments (via email dated 25 September 2018) advising:

Table 4 - Council comment responses

Council comment 23/02/2018	**PSBA response**
Written correspondence was provided by Council on 23 February 2018 advising Council is supportive of the demolition of the onsite locally heritage listed structure given its poor condition (see section 9.9.4 of this report).	PSBA has agreed that the proposal will include installation of a plaque on the subject land that provides a summary of the social history of the place (see section 9.9.4 of this report).
Council comment 25/09/2018	**PSBA response**
The proposal would need to consider the location of both sewer and water mains which burden the subject land; In addition, previous correspondence with Council officers was made (15/06/19) and the following comments were provided: Water Infrastructure - Council watermain runs parallel with the gutter on the road side (effectively under the road) - The main is 100mm AC (Fibro) - Upgrades maybe required for the purposes of the development at applicant's expense Sewerage Infrastructure - Council sewer traverses Lot 2 on MPH21392 - Sewer manhole is currently located at the front of the lot Council as part of the application process will Condition that the sewer manhole is relocated downstream at applicant's expense	The sewer and water mains have been indicated on the site plan that was supplied with the designation. Please see the submitted plan (see **appendix 5**). The water main will not be impacted by the proposed works. See PSBA response to Council's second round of comments below for mitigation of the sewer on site. PSBA notes council's additional comments.

the proposal would need to extend the existing bitumen seal of Shore Street to the full frontage of Lot 2 on MPH21392;	It is noted that any potential works to Shore Street would be considered outside the scope of the approval that is being sought for the proposed lot. Any proposed works to Shore street that may include bitumen seal and potential kerb and channel will be undertaken in association with Charters Towers Regional Council and the Department of Environmental and Science. All relevant parties will be contacted and advised of the proposed operational works. The required permits and approvals will also be sought as required by the relevant legislation.
the proposal should amalgamate both Lots 1 and 2 on MPH21392	The lots have since been amalgamated and the single lot is now described as Lot 100 on SP303847.
Council are supportive of locating the staff vehicle parking along the northern side boundary which does not dominate the Enterprise Road frontage;	Noted.
landscaping, where possible, should be utilised to soften the frontage along Enterprise Road;	Noted. Appropriate landscaping has been provided along the relative frontages of the lot as demonstrated in the site plan (**see Appendix 5**).
Council are supportive of the 1.8m high solid fencing along the northern boundary of the subject land.	Noted.
Council comment 13/02/2019	**PSBA response**
Further clarification regarding the sewer on site was sought from council and the following response was received: - A new manhole would need to be constructed south of the storage and workshop facility. A new main would then need to be construed to the east with a new manhole for the pub site to the south.	PSBA will liaise with Charters Towers Regional Council to realign the sewer as necessary during the detailed design stage of the project.

In this instance PSBA have sought to facilitate planning approval via the Infrastructure Designation process under the PA which negates the need to submit a development application with Council. The above mentioned items have been noted by PSBA.

3.3 Private Landholders

Private landholders adjoining the site have not been engaged prior to the public notification as detailed in section 4 below.

4.0 Consultation Strategy

In accordance with Part 4 of the Infrastructure Designation Process under the MGR, PSBA is required to undertake consultation in accordance with the approved Consultation Strategy as referenced in prelodgement discussions and confirmed on 17 October 2018.

The consultation strategy for the proposed Charters Towers Fire and Rescue Station has been outlined below.

Notification Period:

- A **20 business day** Public Notification Period.

Draft sign on land:

- A sign will be placed on the land during the notification period.

Newspaper Notice:

- Public Notification in a paper circulating locally (North Queensland Register) to the area notifying of a **20 business day** submission period.

L**etters to stakeholders:**

- **Directly Affected and Surrounding Landholders:**
  - Personalised letters to directly affected and surrounding land owners outlining the infrastructure designation proposal notifying of a **20 business day** submission period (including a plan that clearly illustrates the proposed development), the consultation process and applicable contact details.
  - Plan within **Appendix 2** shows extent of land holders to be consulted.
- **Elected Representatives:**
  - The Following Elected members notifying of a **20 business day** submission period:
    - Local Member for Charters Towers Regional Council: Mayor Liz Schmidt
    - State Member for Traeger: Mr Robert Katter
    - Federal Member for Kennedy: Bob Katter MP
- **Native Title:**
  - North Queensland Land Council Native Title Representative Body Aboriginal Corporation

It is noted that the DSDMIP will liaise with the following stakeholders as part of the minister's consultation period (all parties have been engaged by PSBA for pre-consultation comment).

- **Local Council:**
  - Charters Towers Regional Council.

- **State Agencies:**
  - N/A

5.0 Background

5.1 Project History

The fire station currently operates its urban services from the station located at 204 – 206 Gill Street, Charters Towers QLD 4820 and described as Lot 21 on CT18223. Whilst the site is a suitable location for current and future service delivery, the building is inadequate in size and functionality.

The fire station lacks a number of contemporary operational and administrative requirements for current and future service delivery to the local area and the western growth corridor.

A number of minor upgrades and renovations have taken place in the fire station building over the years on an ad hoc basis however the fire station lacks a number of contemporary operational and administrative requirements for current and future service delivery to the community.

The new Charters Towers Fire and Rescue Station will provide emergency response capability, to meet the current and projected demand for services and maintain key performance indicators for service call response times. The new design will provide greater flexibility for staffing and vehicle storage requirements to meet future service delivery requirements.

5.2 Local Government Area

The Charters Tower Fire and Rescue Station is located on Enterprise Road to the East of the Charters Towers CBD having a profile that includes residential, commercial, industrial, rural, open space and conservation zones. The Charters Towers Fire and Rescue Station's strategic central location within the eastern region of the local government area provides service delivery to the surrounding area.

5.3 Suburb Profile

The Charters Towers statistical area has a population of 11,876 persons with the median age of persons being 40 years of age, according to the 2016 census data. The majority of dwellings consist of detached houses, with only 1.6% of the total dwelling composition being semi-detached or attached (i.e. townhouses, flats and apartments). Individuals within the Charters Towers statistical area are primarily employed within the beef cattle farming industry.

6.0 Proposed Designation

The proposal seeks to designate the *Charters Towers Fire and Rescue Station* site as follows:

Charters Towers Fire and Rescue Station

3 – 5 Enterprise Road, Charters Towers QLD 4820

Lot 100 on SP303847

Pursuant to Chapter 2, Part 5 of the *Planning Act 2016*, it is proposed to designate the land described above for community infrastructure. An infrastructure designation is proposed in order to facilitate the efficient allocation of resources and enable the timely supply of the community infrastructure. The proposed community infrastructure is best described in the *Planning Regulation 2017*, Schedule 5, Part 2 as:

(8) emergency services facilities;

The title search is contained at **Appendix 3**, a contour and detail survey is included at **Appendix 4** and the proposal plan concerning the infrastructure is included at **Appendix 5**.

7.0 Proposed Site

7.1 Property Overview

Table 5 - Site Overview	
Street Address	3 – 5 Enterprise Road, Charters Towers QLD 4820
Real Property Description	Lot 100 on SP303847
Site Area	3,841m²
Local Government Authority	Charters Tower Regional Council
Planning Scheme	Charters Towers Planning Scheme 2018
Site Classification	Commercial
Planning Scheme Overlays	Heritage Overlay
Regional Plan	North Queensland Regional Plan (Draft)

7.2 Site Description

The site as shown in Figure 1 and Figure 2 is currently occupied by a single storey building and has an irregular shape with an area of 3,814m². The allotment is freehold and owned by the State of Queensland (Represented by the Public Safety Business Agency). The site provides dual street frontage being approximately 72m to Enterprise Road and approximately 10m to Shore Street.

Figure 1 - Site Aerial (Source: QLD Globe)

Figure 2 - Site Location (Source: QLD Globe)

The single storey building on the subject land is located within the south eastern portion of the subject land, is currently unoccupied, is in poor condition and is considered beyond viable economic repair. The subject land is largely clear of vegetation, only containing several mature trees located within the northern and southern parts of the site.

The subject land generally slopes from the south-western site boundary at RL306.7 AHD (Australian Height Datum) (approx.) to the north-eastern site boundary at RL304.7 AHD (approx.).

The contour and detail survey of the subject land is provided at **Appendix 4.**

7.3 Vehicle Access and Parking

Vehicular access to the subject land is gained via Enterprise Road from the east and Shore Street to the west.

7.4 Pedestrian Site Access and Public Transport

The Charters Towers Railway Station is located on the opposite frontage of Enterprise Road from the subject land. This railway station forms part of the Great Northern Line which connects Charters Towers to Townsville. A pedestrian path is not located along the frontages to the subject land.

7.5 Easements and Encumbrances

There are no known easements or encumbrances affecting the property.

8.0 Proposed Infrastructure Designation

8.1 Intent of Designation

It is proposed to designate the site for the purposes of a Fire and Rescue Station which is further described below and illustrated on the proposal plan contained in **Appendix 5.** The scope of the project is to provide an emergency response capability, which meets the current and projected demand for services, and to maintain key performance indicators for vehicle response times.

8.2 Proposed Use

The existing *Charters Towers Fire Station* is located at 204 – 206 Gill Street, Charters Towers QLD 4820. This existing facility will be replaced by the proposed development which is for a new fire station located at 3 – 5 Enterprise Road, Charters Towers QLD 4820. The new Charters Towers Fire and Rescue Station will employ five staff who will work from 1:00pm to 9:00pm on Monday and 7:00am to 4:00pm on Tuesday to Friday.

It should be noted that the number of 'call outs' for the Charters Towers area station for the 2017-2018 financial year was 289 incidents. The proposed location of the facility will provide optimal operational response capability and community safety functions as well as ease for public access.

8.3 Scope of Works

The scope of the project is to provide an emergency response capability, which meets the current and projected demand for services, and to maintain key performance indicators for vehicle response times.

To accommodate current and future service delivery requirements, the facility is to be based on a 'FS' standard station design, the project will include the following:

- FS 4 – Standard Composite Fire and Rescue Station.

A station of this design typically includes:

- 2 x Bay Engine Room with Associated Facilities
- Equipment Room
- Drying Room
- Cleaners Room
- Garden Store
- Covered Public Entry
- Offices
- Data Room
- Turnout Room
- Locker Room
- Training Room
- Recreation Room
- Mess Room with Kitchen
- Gym Room
- Covered Outdoor Recreation Room
- Bathrooms
- Ladder drill platform: This consist of a platform on top of the engine room which is used for ladder training purposes i.e instructing officer of the correct ladder placement. This platform connects to the ground via a ladder
- Training tower: Used for abseiling and training drills.

8.4 Vehicle Access

It is intended that three vehicle crossovers will be provided, two from the primary street frontage (Enterprise Road) and one from the secondary street frontage (Shore Street). Emergency exit vehicle access will be via Enterprise Road (adjacent the northern site boundary), visitor/PWD vehicular access will be via Enterprise Road (adjacent the southern site boundary), and all other vehicular access (staff and emergency vehicle entry) will be via Shore Street.

The proposed access locations are considered suitable for the proposed development and is not expected to have an adverse impact on the surrounding road network.

8.5 Parking

The proposal will include twelve secure staff car parks and one visitor/PWD space. It is expected that the proposed car parking supply will be adequate to meet demand and is not expected to result in on-street parking or impacts to the safety, operation or amenity of the surrounding road network.

8.6 Proposed Staff Numbers

It is anticipated that the development will consist of five staff.

8.7 Hours of Operation

The Charters Towers Fire and Rescue Station will be staffed between the hours of (subject to change):

- 1:00pm – 9:00pm on Monday; and
- 7:00am – 4:00pm on Tuesday to Friday.

8.8 Sensitive Uses

The proposed Charters Towers Fire and Rescue Station is in proximity to residential uses. A motel (associated with a hotel) is located on land adjoining part of the southern site boundary, whilst land adjoining the northern site boundary is occupied by dwelling houses. The proposal has therefore been designed to be setback from the northern and southern site boundaries as far as practical whilst providing appropriate vehicular access (exit) to Enterprise Road for emergency vehicles. Landscaping will also be provided along the northern and southern site boundaries in addition to a 1.8m high solid fence to minimise amenity impacts to adjoining residential uses.

Furthermore, during an emergency call out, emergency vehicle sirens will only be activated if required to navigate through heavy traffic.

It is also noted that the subject land is not located within a purely residential area. Commercial uses (including a hotel, several shops and a service station) and Charters Towers Railway Station are also located in close proximity to the subject land.

8.9 Building Materials

The new Charters Towers Fire and Rescue Station has been designed to be sympathetic with the building forms within the surrounding area. In general, the buildings will complement adjoining and surrounding built form as they will be single storey and will generally reflect the materials of that used in surrounding development.

8.10 Disability Access

Under D3.4 of the *Building Code of Australia*, access by the general public is required to the entry, and accessible toilet / shower. All other areas of the station are accessible only to operational staff that are required to undertake tasks of a physical nature that would not be possible for a person with a mobility impairment or physical disability.

8.11 Statement of Public Benefit

The emergency services facilities are defined as infrastructure under Schedule 2 of the *Planning Regulations 2017*, providing assets necessary to support the community and for the public benefit. The proposed infrastructure will facilitate the efficient allocation of resources and satisfy statutory requirements or budgetary commitments of the State for the supply of infrastructure.

The project will be constructed and operated in a manner that avoids adverse environmental impacts on the surrounding natural environment.

9.0 Legislative Framework

The proposed development will be undertaken in accordance with Chapter 2, Part 5 of *Planning Act 2016*. The effect of the designation is that the use of the site for the designated infrastructure and service will be exempt from the local planning scheme and the Development Assessment Rules.

The Statutory State Planning Instruments for the designation of a premises for development of infrastructure are listed below:

1. *Planning Act 2016* – includes provisions for making or amending designations;
2. *Planning Regulation 2017* – identifies types of infrastructure that may be designated; and
3. Minister's Guidelines and Rules (MGR) – Chapter 7 provides processes for making or amending designations.

9.1 State and Commonwealth Legislation

A ministerial designation is being sought for the site, hence this will exempt the state from any development approval requirements triggered under the local planning scheme. However, it is noted that this does not exempt the state from obtaining approvals / licenses and meeting obligations under the relevant legislation.

Any future development on the site is to be carried out in a manner that avoids significant adverse impacts to the onsite and surrounding environment and which gives appropriate regard to the provisions of the following, but not limited to, commonwealth and state legislation:

- *Aboriginal Cultural Heritage Act 2003*;
- *Building Act 1975;*
- *Environmental Protection Act 1994*
- *Environmental Protection and Biodiversity Conservation Act 1999;*
- *Nature Conservation Act 1992;*
- *Queensland Heritage Act 1992;*
- *Planning Act 2016;*
- *Transport Infrastructure Act 1994.*
- *Vegetation Management Act 1999;* and
- *Water Act 2000*.

9.2 Environmental Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999 (*EPBC Act) is the Australian Government's key piece of environmental legislation which commenced 16 July 2000. The EPBC Act enables the Australian Government to join with the states and territories in providing a truly national scheme of environment and heritage protection and biodiversity conservation. The EPBC Act focuses Australian Government interests on the protection of Matters of National Environmental Significance (MNES), with the states and territories having responsibility for matters of state and local significance.

The MNES protected under national environment law include:

- listed threatened species and communities
- listed migratory species
- Ramsar wetlands of international importance
- Commonwealth marine environment
- world heritage properties
- national heritage places
- the Great Barrier Reef Marine Park
- nuclear actions
- a water resource, in relation to coal seam gas development and large coal mining development.

Where a proposed development could have a significant impact on any MNES, including National Heritage values, a referral may be required to the Australian Government Minister for the Environment for assessment. The owner or manager of the place, or person proposing to take the action, is required to decide whether or not the action proposed has the potential to have a significant impact on National Heritage values.

An EPBC Act Protected Matters Report did not identify any listed threatened ecological communities in the area. However, a number of threatened and migratory species were identified which may be present in the area (**see Appendix 6** for the EPBC Protected Matters Report).

Generally, a significant impact is an action that has an important, notable consequence. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value and quality of the environment that is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts. All these factors should be considered when determining whether an action is likely to have a significant impact on the National Heritage values of a place.

The subject land is located within an established urban area and does not exhibit any vegetation of value. The proposed development is not found to have a likely significant impact upon MNES.

9.3 The Planning Act 2016

The key purpose of an infrastructure designation is to facilitate the efficient and cost-effective provision of significant infrastructure for the State. Infrastructure required for the benefit of a community may be facilitated through a designation process prescribed under *The Planning Act 2016* (PA).

9.4 The Planning Regulation 2017

A list of infrastructure is set out in Schedule 5 of the *Planning Regulations 2017* (PR).

(8) emergency services facilities.

The Ministers Guidelines and Rules .

State Planning Policy.

Table 6 - SPP relevance to designation

Application of the SPP	Who is Responsible	Parts of the SPP that are applicable to the extent relevant						
		PART A – Introduction and context **PART B -** Application and operation, & **PART C -** Purpose and guiding principals	**PART D:** State interest statements	**PART E:** State interest policies	**PART E:** Assessment benchmarks	**PART F:** Glossary	**PART G** SPP Appendix 1	**PART G** SPP Appendix 2
Designating a premise for infrastructure	**State and Local Government**	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable	Applicable

The relevant parts of the SPP are addressed below.

9.4.1 Part C of the SPP

The SPP outlines the guiding principles and state interests that underpin the delivery of local and regional plans, and development that will advance the social, economic and environmental needs of all Queenslanders. The guiding principles should be read in conjunction with each state interest and are as important as the state interests expressed in the SPP and include the following:

- Outcomes focused
- Integrated

- Efficient
- Positive
- Accountable

The above guiding interests has been considered when the proposed development is assessed against the individual State Interests, and therefore are not required to be individually addressed.

9.4.2 Part D and E of the SPP

There are seventeen (17) state interests arranged under the following five (5) broad themes:

- Liveable Communities and Housing
- Economic Growth
- Environment and Heritage
- Safety and Resilience to Hazards
- Infrastructure

In accordance with Part D of the SPP, the proposed ministerial designation has considered the following plan making provisions.

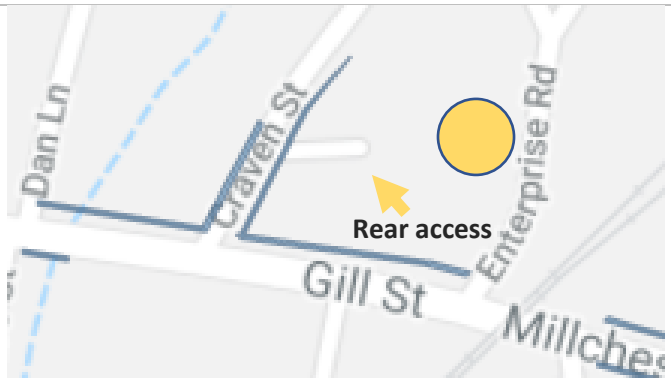
Table 7 - State Planning Policy Overview

State Interest	PSBA Comments
LIVEABLE COMMUNITIES AND HOUSING	
- Housing Supply and Diversity	Not Applicable
- Liveable Communities	Triggers
ECONOMIC GROWTH	
- Agriculture	Not Applicable
- Development and Construction	Not Applicable
- Mining and Extractive Resources	Not Applicable
- Tourism	Not Applicable
ENVIRONMENT AND HERITAGE	
- Biodiversity	Not Applicable
- Coastal Environment	Not Applicable
- Cultural Heritage	Not triggered – description of adjoining heritage provided
- Water Quality	Triggers
SAFETY AND RESILIENCE TO HAZARDS	
- Emissions and Hazardous Activities	Not Applicable
- Natural Hazards, Risk and Resilience	Triggers
INFRASTRUCTURE	
- Energy and Water Supply	Not Applicable
- Infrastructure integration	Not Applicable
- Transport infrastructure	Not Applicable
- Strategic airports and aviation facilities	Not Applicable
- Strategic ports	Not Applicable

Part E of the SPP, lists the state interests, policies and assessment benchmarks. Below is a statement on how the proposed development has been assessed against each state interest, and policy and assessment benchmark where relevant.

Table 8 - Part E: State Interest Assessment Benchmarks	
State interest	**Comment**
Liveable communities and Housing	
Liveable Communities This state interest aims to ensure that "planning delivers liveable, well designed and services communities that support wellbeing and enhance quality of life".	The proposal complies with the above intent as it provides for the delivery of an essential community infrastructure and service to support communities and promotes best practice urban design. The current proposal complies with the state interest of consolidating urban development in and around existing settlements.
Housing Supply and Diversity This state interest aims to ensure that "diverse, accessible and well serviced housing and land for housing is provided".	The proposal is for a Fire and Rescue Station and therefore this state interest has no relevance to the proposed designation.
Economic Growth	
Agriculture This state interest aims to ensure that "planning protects the resources on which agriculture depends and supports the long-term viability and growth of the agricultural sector".	The proposal complies with the above intent as it provides an essential community infrastructure and service necessary to support a strong agriculture industry and associated agricultural supply chains. Additionally, the land surrounding the proposed Fire and Rescue Station is generally urban, and any agricultural land that is within the locality, is fragmented and would not be considered land that would support the long-term viability of the agriculture sector. It is also noted that the SPP mapping does not include the subject land or the surrounding locality in the Agriculture mapping layer.
Development and Construction This state interest aims to ensure that a broad range of economic development opportunities can grow in response to current and projected economic demand, and to meet the needs of the communities in which they operate.	The proposal complies with the above intent as the proposed location is suitable land for the proposed community infrastructure activity, which is considered essential to support the surrounding land uses.
Mining and Extractive Resources This state interest aims to ensure that the issues and opportunities generated by resources development are considered as part of the planning process.	The proposal does not involve a resource activity and is not located within proximity to a key resource area, therefore this state interest has no relevance to the proposed designation.
Tourism The state interest in tourism seeks to support these economic opportunities for local communities, regions and the state.	The proposal does not involve a tourism related activity; therefore, this state interest has no relevance to the proposed designation.
Environment and Heritage	
Biodiversity This state interest aims to safeguard biodiversity at the national, state and local level, and to build ecological resilience.	The current proposal has considered matters of national environmental significance, state environmental significance and local environmental significance. The construction of the proposed station presents minimal risk and impact to the ecological communities in the wider region. It is also noted that the SPP mapping does not include the subject land in the Biodiversity layer.
Coastal Environment This state interest aims to ensure that the coastal environment, including offshore islands, along with	This state interest has no relevance to the proposed designation, as the site is not partially or wholly located in the coastal zone.

its natural processes and resources, is appropriately considered.	
Cultural heritage This state interest aims to ensure that development affecting a place of cultural heritage significance supports its long-term conservation through preservation, restoration, reconstruction or adaptive reuse and renewal.	Whilst the SPP mapping does not identify the subject land in the Heritage layer, the subject land is listed on the Charters Towers Heritage Register in the Charters Towers Planning Scheme 2018. A Heritage Assessment Report has been prepared by MacCallum Planning and Architecture and is provided at **Appendix 7**. This report identifies: • there is currently insufficient documented evidence to support the level of significance necessary for maintaining the listing on the heritage register; • the building has no discernible formal or aesthetic qualities that would support a listing under commonly accepted criteria; • the building is in poor condition (including the services) and in their opinion there is no merit in recommending its restoration. The Heritage Report further recommends permission be granted for demolition of the building, and a plaque be installed on site that provides a summary of the social history of the place. An Existing Conditions Report has also been prepared by STP Consultants and is provided at **Appendix 8**. This report identifies the existing building on the subject land: • is in poor condition with many elements requiring complete removal and/or replacement; • has severe termite damage; • is comprised of several members that do not meet minimum criteria to satisfy current building structural requirements; • is beyond viable economic Furthermore, Council has provided correspondence that states: *'the Council is supportive of the demolition of the onsite locally heritage listed structure'* Accordingly, the long term conservation of the cultural heritage significance of the subject land in this instance is not considered viable. Notwithstanding, as requested by Council a plaque will be erected that provides a summary of the social history of the place. It is also noted that the SPP mapping identifies the subject land is in proximity to State heritage place. Land located on the opposite frontage to Enterprise Road is identified as a State heritage place, known as Signals, Crane and Subway; Charters Towers Railway Station. The Queensland Heritage Register identifies the place: • is important in demonstrating the evolution or pattern of Queensland's history; • demonstrates rare, uncommon or endangered aspects of Queensland's cultural heritage • is important in demonstrating the principal characteristics of a particular class of cultural places. The kerb and channelling surrounding the southern and eastern part of the council block that the site is located on is also listed in the state heritage register (place ID 602512).

	 **Figure 3 - State Heritage place protected kerb and channel as indicated above**  **Figure 4 - Kerb and channel adjacent to the rear laneway access indicated above.** The proposed development is located an appropriate distance from the State heritage place, (separated from the place by Enterprise Road) to ensure this heritage significance is maintained.
Water Quality This state interest aims to ensure the enhancement of the environmental values of Queensland waters.	The enhancement of environment values has been considered and appropriate storm water design will be adopted as part of the proposed development.
Safety and resilience to Hazards	
Emissions and hazardous activities This state interest aims to ensure that the risk to the health and safety of communities and individuals, and the natural and built environment is adequately managed to avoid potential adverse impacts.	This state interest has no relevance to the proposed designation, as there will be no hazardous materials stored on site.
Natural hazards, risk and resilience This state interest aims to ensure that natural hazards are properly considered, community resilience is increased, and hazards are avoided or the risks are mitigated to an acceptable or tolerable level.	Whilst the SPP mapping does not indicate that the subject land is in an area affected by natural hazards, a Flood and Stormwater Management Report has been prepared by Engeny and is provided at **Appendix 9**. This report identifies: • the subject land is unlikely to be impacted from flooding caused by a regional system; • flood modelling in the 1:50, 1:100 and 1:500 AEP flood events indicates the subject land is affected by an overland flow path from Enterprise Road, with a maximum flood depth of 80 mm in the 1:500 AEP flood event. The finished floor levels required to meet flood immunity range from RL305.3 metres AHD to RL305.8 metres AHD; • potential flooding impacts within and adjoining the subject land as a result of the proposal. These impacts could be avoided through adoption of recommendations within the report (e.g. localised drainage solution, raised building platforms);

	• the proposal is not considered to pose an unacceptable risk to pedestrians or vehicles. The proposal will be constructed consistent with the relevant recommendations within the Flood and Stormwater Management Report to ensure the potential flood hazard is avoided or the risks are mitigated to an acceptable level.
Infrastructure	
Energy and Water Supply This state interest aims to ensure that provision is made for safe, reliable and affordable energy and water supply to communities.	The proposal does not require any alteration to existing energy and water supply arrangements and therefore this state interest has no relevance to the proposed designation.
Infrastructure integration This state interest aims to ensure that the benefits of past and ongoing investment in infrastructure and facilities are maximised through integrated land use planning.	This state interest has no relevance to the proposed designation, as the proposed development will not have a significant impact on surrounding infrastructure. Where relevant PSBA consults with other State Agencies and infrastructure providers.
State Transport Infrastructure This state interest aims to ensure that developments are integrated with state transport infrastructure to ensure transport networks are used safely, efficiently and sustainably, and our communities are connected, prosperous and liveable.	This state interest has no relevance to the proposed designation. The SPP mapping does not identify the subject land as located on or adjoining State transport infrastructure. Whilst located in proximity to a State transport corridor (the railway line), the proposed development does not involve works within the corridor and is not of a nature that will cause negative impacts upon the corridor.
Strategic airports and aviation facilities This state interest aims to ensure that development does not impact on the safe and efficient operation of these facilities will support continued growth of the state's economy, regional communities and national defence.	This state interest has no relevance to the proposed designation, as the building height will remain as a single storey and will not compromise the safety and efficiency of aviation facilities.
Strategic Ports This state interest aims to ensure that development does not impact on the safe and efficient operation of sea ports will support continued growth of the state economy and the national defence system.	The subject site is not identified as being near a strategic port, therefore this state interest has no relevance to the proposed designation.

A copy of the SPP mapping is provided at **Appendix 10**. Noting that the site does not trigger any mapping layers, although the relevant adjacent layers have been indicated.

9.5 Regional Planning

The site is included within the boundaries of the draft North Queensland Regional Plan. The draft North Queensland Regional Plan also includes the local government areas of Burdekin, Hinchinbrook, Palm Island and Townsville.

The purpose of the draft North Queensland Regional Plan is to set a 25 to 50 year strategic vision to guide future development, identify infrastructure priorities, address population growth and respond to challenges and opportunities across the region.

The draft North Queensland Regional Plan is currently being finalised and will be made available for community consultation by the Department of State Development, Manufacturing, Infrastructure and Planning in 2019. Accordingly, further consideration of this document is not relevant to the proposal at this current time.

9.6 Building Works

Building works, will be accepted development in accordance with Schedule 7, Part 1, of the *Planning Regulations 2017* being:

> *Building work, other than building work mentioned in section 1, carried out by or for the State or a public-sector entity, to the extent the building work complies with the relevant provisions for the building work.*

9.7 Local Planning Assessment

Where land is not designated for infrastructure, any development involving a material change of use of premises should have regard to the requirements of the relevant planning scheme. Whilst the intended designation results in the development being exempt from assessment against this planning scheme, consideration must still be given to its relevant provisions.

The Charters Towers Planning Scheme commenced on 24 July 2006. The Planning Scheme was amended for the alignment with the *Planning Act 2016* on 30 April 2018; this is the relevant scheme for the site.

9.7.1 Planning Scheme Summary

Table 9 - Planning Scheme Information (additional assessment below)	
Planning Scheme	Charters Towers Planning Scheme 2018
Zone/Precinct/Area	Commercial zone
Defined Use	Public Purpose
Applicable Planning Scheme Overlays	Heritage overlay
Approval Required	Development permit for a material change of use
Assessment Level:	Impact Assessment

9.7.2 Use Definition

The proposal to establish a new Fire and Rescue Station on the subject land is defined in the Planning Scheme as Public Purpose, which means:

> *'the use of premises by government or an instrumentality of government for the provision or delivery of services, or for the conduct of its statutory duties and affairs.*

9.7.3 Planning Scheme Zone

The Planning Scheme identifies the subject land as being in the Commercial zone as illustrated in Figure 3 below.

Figure 5 - Planning Scheme Zoning (Source – Charters Towers Planning Scheme)

The Planning Scheme identifies the purpose of the Commercial zone will be achieved through the following:

(a) The Charters Towers city centre is the principal centre for the City and the region, for the provision of high order administration, business, shopping, entertainment, leisure and cultural activities;
(b) Commercial facilities and services are provided in appropriate, cohesive, convenient and highly accessible locations in the City to meet the needs of residents;
(c) Commercial development high levels of physical amenity, visual character and safety and adopts a distinctive architecture and built form reminiscent of and complementary to the historic character of the City; and
(d) Commercial development maintains the amenity of adjoining properties.

The proposal involves establishing an essential higher order service on land that is conveniently located and highly accessible to provide support the community of Charters Towers and the wider region. The proposal has been designed to maintain the amenity, visual character and safety of adjoining properties and the wider locality. Buildings have been designed to be generally compatible with the built form within the locality and to be appropriately setback from Enterprise Road consistent with built form on adjoining land. Furthermore, the proposal provides a solid 1.8 metre high fence along the side and rear boundaries of the subject land and adjacent to the southern façade of the station building. Vegetation is also proposed adjacent to the proposed fence and within the front boundary setback to Enterprise Road. Accordingly, the proposal accords with the purpose of the Commercial zone as set out by the Planning Scheme.

9.7.4 Planning Scheme Overlays

The Planning Scheme identifies the following overlays are applicable to the subject land:

Heritage Overlay

As previously discussed, the subject land contains a building which is listed on Council's Local Heritage Register as a Category 1 Heritage Place and described as Shop "A.E. Sellars – Carrier". The remainder of the subject land is also listed in Council's Local Heritage Register as Category 3 Infill Site. The proposal on the subject land would typically trigger assessment against the Heritage code. The purpose of this code is to ensure development does negatively impact upon places of heritage significance.

As previously discussed, part of the subject land is currently occupied by a single storey building (that being, the building identified as local heritage significance) that is in very poor condition with many elements requiring complete removal and/or replacement. Accordingly, the building will be demolished. In accordance with Part 8, Division 1, Subdivision 1, Section 14 (a) of the *Planning Regulation 2017,* demolition of this heritage building is not assessable development.

A Heritage Assessment Report has been prepared by MacCallum Planning and Architecture and is included in **Appendix 7**. The report identifies:

- there is currently insufficient documented evidence to support the level of significance necessary for maintaining the listing on the heritage register;
- the building has no discernible formal or aesthetic qualities that would support a listing under commonly accepted criteria;
- the building is in poor condition (including the services) and in their opinion there is no merit in recommending its restoration.

The Heritage Report further recommends permission be granted for demolition of the building, and a plaque be installed on site that provides a summary of the social history of the place.

An Existing Conditions Report has also been prepared by STP Consultants and is provided at **Appendix 8**. This report identifies the existing building on the subject land:

- is in poor condition with many elements requiring complete removal and/or replacement;
- has severe termite damage;
- is comprised of several members that do not meet minimum criteria to satisfy current building structural requirements;
- is beyond viable economic

Furthermore, Council has provided correspondence that states:

> *'the Council is supportive of the demolition of the onsite locally heritage listed structure'*

The proposal will include installation of a plaque on the subject land that provides a summary of the social history of the place.

Tourist Areas Overlay

The planning scheme also includes a Tourist Areas Overlay. The map associated with this overlay is not currently available and therefore it is unknown if this overlay applies to the subject land. Council has advised that the mapped has been misplaced and they too are unaware of what land this overlay applies too. Accordingly, further consideration of this overlay has not been given.

9.7.5 Level of Assessment

The proposed development is defined as a material change of use, being the start of a new use of the premises. The use of the premises for a Public Purpose use is considered assessable development and requires a development permit to undertake the use on the premises. The level of assessment for this application is impact assessable.

As an Infrastructure Designation is being sought, a Development Application will not be required to be lodged with the Charters Towers Regional Council. Additionally, the effect of the designation is that the use of the site for the designated infrastructure and service will be exempt from the local government's planning scheme.

10.0 Environmental Assessment and Management

Before designating land for community infrastructure, an assessment must be made of:

- Any environmental impacts that the development or use may generate; and
- Ways in which those environmental impacts are being managed or mitigated.

Regard is given to natural and physical resources, as well as short and long-term effects and impacts on the environment and community from both the construction and operational phase of the proposed community infrastructure. The range of matters considered includes:

- Soils and geology;
- Flora and fauna;
- Natural hazards;
- Conservation values;
- Historical and cultural heritage;
- Health, safety, amenity, social and economic impacts;
- Municipal infrastructure;

These matters are considered and addressed in the following sections of this report.

10.1 Soils and Geology

A geotechnical investigation has been carried out by Douglas Partners (refer to **Appendix 11**) The soil testing and sampling investigated the nature and type of subsurface material at the site to allow engineering assessment of site classification, foundation recommendations, earthworks and site management.

Recommendations from the Geotechnical Report will be provided to the contractor at the time detailed design and construction.

10.2 Erosion and Sediment Control

The release of sediments or other contaminants to water is an offence under Section 440ZG of the *Environmental Protection Act 1994*. All activities that expose soil have the potential to result release of sediment to waterways or stormwater systems. To minimise the risk of releasing sediment and other contaminants to waters during construction and to the meet the general environmental duty under the EP Act, a site erosion and sediment control plan (ESCP) will be prepared in accordance with the IEA Best Practice Erosion and Sediment Control prior to commencing construction. The ESCP will address the erosion risks identified for the site.

The ESCP will be implemented and monitored throughout the construction phase.

10.3 Flora and Fauna

The site is not mapped as containing remnant nor regrowth vegetation refer to **Appendix 12**. Limited tree clearing may be necessary for the development to occur and all trees are to be inspected for hollows and nests during planning and design. If hollows, nests or potential other breeding places are present they will be assessed by a suitably qualified person to determine if they are breeding places in accordance with the *Nature Conservation Act 1992*. If any breeding places are located within the development footprint a species management program will be lodged with DEHP prior to impacting on the breeding place.

Immediately prior to removal, vegetation will be inspected for fauna. If fauna is present vegetation clearing is to cease and fauna allowed to move out of the vegetation clearing area of its own accord.

Vegetation that is not required to be cleared for the proposed development should be protected from construction impacts in accordance with the AS 4970-2009 Protection of Trees on *Development Sites*.

10.4 Natural Hazards

10.4.1 Stormwater Management

The proposed fire station is to be constructed on land which currently is primarily pervious, therefore once developed the total infiltration area will decrease. Therefore, it will result in an increase in hard surface area and impact the existing stormwater disposal systems within the site. A Flood and Stormwater Management Report has been prepared by Engeny and is provided at **Appendix 9**. This report identifies:

- stormwater detention for the proposed development is not proposed. Stormwater from the impervious areas on the subject land will be discharged, through an internal drainage system, to a proposed lawful point of discharge to Shore Street. All other areas not impacted by the proposal will continue to sheet flow across the northern boundary as per the existing situation;
- stormwater management quality plan for the proposal is not required. Best practice water quality management will be required during construction.

The proposed fence to be erected will be constructed of an appropriate material to ensure that it does not alter the water flow dramatically and effectively water will be able to flow through the site as modelled in the Flood and Stormwater Management Report.

If groundwater is encountered during construction or if dewatering practice is required at the site, the contractor shall arrange for the analysis of the water to verify that it is suitable for release in line with local Authority guidelines.

10.4.2 Flooding

As previously discussed, a Flood and Stormwater Management Report has been prepared by Engeny and is provided at **Appendix 9**. This report identifies:

- the subject land is unlikely to be impacted from flooding caused by a regional system;
- flood modelling in the 1:50, 1:100 and 1:500 AEP flood events indicates the subject land is affected by an overland flow path from Enterprise Road, with a maximum flood depth of 80 mm in the 1:500 AEP flood event. The finished floor levels required to meet flood immunity range from RL305.3 metres AHD to RL305.8 metres AHD;
- potential flooding impacts within and adjoining the subject land as a result of the proposal. These impacts could be avoided through adoption of recommendations within the report (e.g. localised drainage solution, raised building platforms);
- the proposal is not considered to pose an unacceptable risk to pedestrians or vehicles.

The proposal will be constructed consistent with the relevant recommendations within the Flood and Stormwater Management Report to ensure the potential flood hazard is avoided or the risks are mitigated to an acceptable level.

10.4.3 Bushfire

The SPP Mapping does not identify the subject land as being within a bushfire hazard area. It is also note, the planning scheme does not map bushfire hazard areas. Therefore, a formal bushfire assessment is not considered necessary for this project.

10.4.4 Landslip

The risk of landslide on the site is considered minimal due to the topography of the site.

10.5 Conservation Values

10.5.1 Protected and Vulnerable Areas

The site is not located within close proximity to any protected and / or vulnerable areas. The Flora Trigger map indicates the subject land is not in a High Risk Area. Refer to the Vegetation Management Report at **Appendix 12.**

10.6 Historical and Cultural Heritage

10.6.1 Historical Heritage

The site is listed on the local heritage register. Refer to previous sections of this report for further discussion on this matter (Sections 9.6.2 and 9.9.4). The proposal is considered appropriate on the subject land, given the current condition of the existing building and the lack of documented evidence that supports the heritage listing of the subject land. Notwithstanding, the proposal will include installation of a plague that provides a summary of the social history of the place.

As previously discussed, the subject land is not identified on SPP mapping as a Queensland heritage place. Whilst land on the opposite frontage of Enterprise Road to the subject land is identified as a Queensland heritage place as well as the kerb and channelling on the southern and eastern border of the block, the proposal is considered to be located an appropriate distance from these places to ensure their heritage significance is maintained.

10.6.2 Cultural Heritage

It is noted that any Aboriginal cultural heritage, if found, is protected under the terms of the *Aboriginal Cultural Heritage Act 2003* (even if DATSIP has no record relating to it). Contract documents will include provisions for works to cease and the relevant Aboriginal Party to be contacted if evidence of Aboriginal cultural heritage is encountered during site works.

10.6.3 Native Title

Native Title has been extinguished by virtue of deed of grant 18825239 and 18822239 issued 2 March 1995 and 10 February 1995.

10.7 Health, Safety, Amenity, Social and Economic Impacts

10.7.1 Construction Impacts

The proposed extension is being undertaken on a site bound by residential and commercial /industrial areas. The construction of the proposed development is unlikely to create nuisance for the neighbouring properties. It is possible that dust, noise and lighting impacts on surrounding residences will need to be considered during design, construction and operation of any future development within the site.

A construction environmental management plan should be prepared for the development. The plan will include at a minimum default noise standards detailed in the *Environmental Protection Act 1999*, dust mitigation methods, waste control and erosion and sediment control plans.

Unless otherwise approved in any development approvals and/or statutory permits, Works must comply as a minimum with default noise standard detailed in the *Environmental Protection Act 1999* including:

- Building work should be restricted to Monday to Saturday (excluding public holidays) between 6.30am and 6.30pm;
- Operation of regulated devices such as chainsaws, mulches and electrical, mechanical or pneumatic power tools should be restricted to Monday to Saturday (excluding public holidays) between 7 am and 7 pm; and
- Work should not be undertaken on public holidays.

10.7.2 Air Quality

Owing to the nature of the proposed use no negative air quality impacts are likely to be generated from the new *Queensland Fire and Rescue Station*.

10.7.3 Site Contamination

The subject site is not listed on the Environmental Management Register (EMR), or on the Contaminated Land Register (CLR) refer to **Appendix 3**. No notifiable activities have been identified on the site and it is considered unlikely that any notifiable activities would be conducted as part of the proposed development.

10.7.4 Noise and Light

The proposal is not considered to result in the generation of adverse noise or light. The use of Emergency Service vehicle lights and sirens during an emergency call out, will only be activated if required to navigate through heavy traffic which is considered highly unlikely for this location. The Appliance will not leave the site with sirens engaged unless there is a hazard on the road, and sirens are required.

Lighting will be provided to the station including parking area in accordance with the applicable Australian Standards (AS). This Australian Standard (AS) addresses obtrusive outdoor lighting from car parking lots, parks and reserves, sports lighting, floodlighting and yard lighting that that can give rise to discomfort or pose a safety hazard to neighbours in accordance with the applicable Australian Standards.

The construction of the proposal may create nuisance for neighbouring properties. Possible dust, noise and lighting impacts on existing site uses and surrounding land uses will be considered during design, construction and operation of proposed development within the subject lot.

Measures will be put in place by the contractors to manage dust which may potentially be generated from tree removal and construction activities through the Construction Environment Management Plan.

10.7.5 Visual and Scenic Amenity

The site is not identified by the planning scheme as an area of high visual amenity or scenic value.

10.7.6 Social Impacts

The proposed Charters Towers Fire and Rescue Station will benefit the local and broader community through the provision of a new and well-designed station. The new station constitutes essential emergency services infrastructure which is required to meet service delivery needs in the public interest.

Negative impacts associated with the emergency services facility are anticipated to be minimal given the nature and need for the use on site.

10.7.7 Economic Impacts

The proposed location is suitable land for the community infrastructure activity, which is considered essential to support the surrounding land uses and economic viability of the area by contributing to the health, safety and well-being of all residents. There are considered to be no negative economic impacts that the projects will create.

10.8 Municipal Infrastructure

10.8.1 Water and Sewer

Municipal water infrastructure is available to the site. Checks by the design team will be undertaken to verify location, condition and capacity of all services to ensure these are adequate to service demands and that they are compatible with the future design. Reticulated wastewater is available to the site.

10.8.2 Power, Gas and Telecommunications

Electricity and telecommunication services are available to the site.

10.8.3 Road Infrastructure, Site Access and Traffic

A formal traffic study is considered necessary due to the limited amount of traffic generated by the use.

11.0 Conclusion

This EAR has been prepared by PSBA, seeking an Infrastructure Designation of land for the proposed Charters Towers Fire and Rescue Station. The proposed designation applies to land located at 3 – 5 Enterprise Road, Charters Towers being more formally described as 100 on SP303847.

The PA prescribes the way in which a designation can be undertaken. Chapter 2, Part 5 of the PA prescribes that a Minister, before designating land for infrastructure, must be satisfied that for development the subject of the proposed designation:

- the infrastructure will satisfy statutory requirements, or budgetary commitments, for the supply of the infrastructure; or
- there is or will be a need for the efficient and timely supply of the infrastructure.

A Fire and Rescue Station is defined as Infrastructure under Schedule 5, Part 2 of the Planning Regulation 2017, being assets necessary to support the community and for the public benefit.

The proposed designation as part of this proposal is therefore best described as:

(8) emergency services facilities;

The proposed infrastructure will facilitate the efficient and timely supply of infrastructure; and satisfy statutory requirements and budgetary commitments of the State for the supply of community infrastructure. The assessment provided within the EAR provides key details with respect to the Charters Towers Fire and Rescue Station and has undertaken an assessment of the proposed infrastructure against the relevant statutory frameworks, incorporating local and state assessment criteria and Commonwealth legislation.

12.0 Appendices

The following is a list of appendices to this Environmental Assessment Report:

- Appendix 1 – Extracts from The *Planning Act 2016* and Streamlined Designation Flow Chart
- Appendix 2 – Extent of land holders to be consulted
- Appendix 3 – Property Information (title search and EMR / CLR search)
- Appendix 4 – Survey Plan
- Appendix 5 – Proposal Plan
- Appendix 6 – EPBC Protected Matters Report
- Appendix 7 – Heritage Assessment Report
- Appendix 8 – Existing Conditions Report
- Appendix 9 – Flood and Stormwater Management Report
- Appendix 10 – State Interest Trigger Mapping
- Appendix 11 – Geotechnical Report
- Appendix 12 – Vegetation Management Report

Appendix 1

Extracts from the Planning Act 2016 and Streamlined Designation Flow Chart

Part 5 Designation of premises for development of infrastructure

35 What is a designation

(1) A ***designation*** is a decision of the Minister, or a local government, (a ***designator***) that identifies premises for the development of 1 or more types of infrastructure that are prescribed by regulation.

(2) A designation may include requirements about any or all of the following—

(a) works for the infrastructure (the height, shape, bulk, landscaping, or location of works, for example);

(b) the use of premises, for example—

(i) vehicular and pedestrian access to, and circulation on, premises; and

(ii) operating times for the use; and

(iii) ancillary uses;

(c) lessening the impact of the works or use (environmental management procedures, for example).

(3) The chief executive may, by notice, require a local government to include a matter in subsection (2) in a designation made by the local government.

Note—

For the effect of a designation on the categorisation of development, see section 44(6)(b).

36 Criteria for making or amending designations

(1) To make a designation, a designator must be satisfied that—

(a) the infrastructure will satisfy statutory requirements, or budgetary commitments, for the supply of the infrastructure; or

(b) there is or will be a need for the efficient and timely supply of the infrastructure.

(2) To make or amend a designation, if the designator is the Minister, the Minister must also be satisfied that adequate environmental assessment, including adequate consultation, has been carried out in relation to the development that is the subject of the designation or amendment.

(3) The Minister may, in guidelines prescribed by regulation, set out the process for the environmental assessment and consultation.

(4) The Minister is taken to be satisfied of the matters in subsection (2) if the process in the guidelines is followed.

(5) However, the Minister may be satisfied of the matters in another way.

(6) Sections 10 and 11 apply to the making or amendment of the guidelines as if the guidelines were a State planning policy.

(7) To make or amend a designation, a designator must have regard to—

(a) all planning instruments that relate to the premises; and

(b) any assessment benchmarks, other than in planning instruments, that relate to the development that is the subject of the designation or amendment; and

(c) if the premises are in a State development area under the State Development Act—any approved development scheme for the premises under that Act; and

(ca) if the premises are in a priority development area under the *Economic Development Act 2012*—any development scheme for the priority development area under that Act; and

(d) any properly made submissions made as part of the consultation carried out under section 37; and

(e) the written submissions of any local government.

37 Process for making or amending designation

(1) This section is about the process for—

(a) making a designation for premises; or

(b) amending a designation for premises, including by amending—

(i) the area of the premises; or

(ii) the type of infrastructure for which the premises were designated.

(2) If the Minister proposes to make or amend a designation, the Minister must give notice of the proposal to the affected parties.

(3) However, the Minister need not give the notice to an owner of premises if—

(a) a notice has already been given to the owner as part of the consultation for an assessment under section 36(2); or

(b) the Minister can not notify the owner after making reasonable efforts.

(4) The notice must invite the affected parties to make submissions about the proposal to the Minister within a period of at least 15 business days after the notice is given.

(5) If, after considering any properly made submissions, the Minister decides not to proceed with the proposal, the Minister must give a decision notice to the affected parties.

(6) If a local government proposes to make or amend a designation, the local government must follow the process in the designation process rules, before the local government makes or amends the designation.

(7) Sections 10 and 11 apply to the making or amendment of the designation process rules as if the designation process rules were a State planning policy.

(8) In this section—

designation process rules means rules made by the Minister and prescribed by regulation.

38 Process after making or amending designation

(1) If, after considering any properly made submissions, the designator decides to make or amend a designation, the designator must publish a gazette notice that states—

(a) that the designation has been made or amended; and

(b) a description of the designated premises; and

(c) the type of infrastructure for which the premises were designated; and

(d) for an amendment—the nature of the amendment.

(2) The designator must give the following things to each affected party and the chief executive—

(a) a copy of the gazette notice;

(b) a notice of any requirements included in the designation under section 35(2);

(c) a notice of how the designator dealt with any properly made submissions.

39 Duration of designation

(1) A designation stops having effect on the day (the ***end day***) that is 6 years after the designation starts to have effect, unless—

(a) on the end day—

(i) a public sector entity owns, or has an easement for the same purpose as the designation over, the designated premises; or

(ii) another entity owns, or has an easement over, the designated premises and construction of the infrastructure for which the premises were designated started before the end day; or

(b) before the end day—

(i) a public sector entity gave a notice of intention to resume the designated premises under the Acquisition Act, section 7; or

(ii) a public sector entity signed an agreement to take designated premises under the Acquisition Act or to otherwise buy the premises; or

(iii) the designator complies with subsection (3).

(2) The designator may extend the duration of a designation, for up to 6 years, by publishing a gazette notice about the extension before the designation stops having effect.

(3) The designator must give notice of the extension of the designation to—

(a) if the Minister is the designator—each of the affected parties and the chief executive; or

(b) if a local government is the designator—the owner of the premises and the chief executive.

(4) If a public sector entity discontinues proceedings to resume designated premises, either before or after the end day, the designation stops having effect on the day when the proceedings are discontinued.

40 Repealing designation—designator

(1) A designator may repeal a designation made by the designator by publishing a gazette notice that states—

(a) that the designation is repealed; and

(b) a description of the designated premises; and

(c) the type of infrastructure for which the premises were designated; and

(d) the reasons for the repeal.

(2) The designator must give a copy of the notice to—

(a) if the Minister is the designator—each of the affected parties and the chief executive; or

(b) if a local government is the designator—the owner of the premises and the chief executive.

(3) Any development started under the designation may be completed as if the designation had not been repealed.

(4) Subject to any requirements under section 35(2), a use of the premises that is the natural and ordinary consequence of the development is taken to be a lawful use.

41 Repealing designation—owner's request

(1) An owner of an interest in designated premises may request a designator to repeal a designation made by the designator on the basis that the designation is causing the owner hardship.

(2) Subsection (1) does not apply if—

(a) the premises are subject to an easement for the infrastructure for which the premises are designated; or

(b) the designation also applies to other premises and relates to a land corridor for the infrastructure; or

(c) the premises are a road.

(3) The request must be in writing, and contain any information that the guidelines made under section 36(3) require.

(4) The designator must, within 40 business days after receiving the request—

(a) repeal the designation, using the process under section 40; or

(b) decide to refuse the request; or

(c) decide to take other action that the designator considers appropriate in the circumstances.

(5) The designator must, within 5 business days after making a decision under subsection (4)(b) or (c), give a decision notice to the owner.

42 Noting designation in planning scheme

(1) This section applies if a local government—

(a) makes, amends, extends or repeals a designation; or

(b) receives a notice about the Minister making, amending, extending or repealing a designation.

(2) The local government must include a note about the making, amendment, extension or repeal in—

(a) the local government's planning scheme; and

(b) any planning scheme that the local government makes before the designation stops having effect.

(3) The note must—

(a) identify the premises that were designated; and

(b) describe the type of infrastructure for which the premises were designated; and

(c) state the day when the designation, amendment, extension or repeal started to have effect.

(4) The local government must include the note in the planning scheme in a way that ensures the other provisions of the scheme that apply to the designated premises remain effective.

(5) To remove any doubt, it is declared that—

(a) the note is not an amendment of a planning scheme; and

(b) a designation is taken to be part of a planning scheme; and

(c) a designation is not the only way that a planning scheme may identify infrastructure; and

(d) a designation does not affect the provisions of a planning scheme that apply to designated premises, even after the designation stops having effect.

Streamlined Ministerial Infrastructure Designation (MID) process

Pre-lodgement

Pre-lodgement process to confirm:

- Proposal details
- State interests
- Consultation strategy
- Key issues
- Endorsement to apply streamlined process

Lodgement of EAR

Entity submits Environmental Assessment Report to DSDMIP via online portal

DSDMIP Preliminary Assessment

DSDMIP review of EAR:

- s36 criteria
- State interests
- Planning instruments
- Consultation strategy
- Draft consultation material

Consultation by Minister and DSDMIP Assessment

Minister gives s37 notice of proposal

Minister's consultation with:

- local government
- landowner/s
- general public

Consultation includes:

- sign on land
- notice in newspaper
- letters to neighbours
- available on website

DSDMIP undertakes State assessment concurrently

DSDMIP Final Assessment and Recommendations to Minister

DSDMIP carries out:

- Final assessment
- Review of submissions
- Preparation of recommendations
- Preparation of decision package (notice, gazette, requirements, address of submissions)

Minister's decision

Minister makes s37 decision

Actions following Minister's Decision

Minister provides following material to **local government, land owners and the chief executive**:

- Gazette notice
- Decision notice – including approved plans, requirements and address of all submissions

DSDMIP publishes following material (**publicly available**):

- Gazette notice
- Decision notice – including approved plans, requirements and address of all submissions
- Spatial data - mapping layer

Appendix 2

Extent of land holders to be consulted

Charters Towers

LEGEND

	Proposed facility location
	Property to be notified

Appendix 3

Property Information (title search and EMR / CLR search)

CURRENT TITLE SEARCH

NATURAL RESOURCES, MINES AND ENERGY, QUEENSLAND

Request No: 29693776
Search Date: 04/10/2018 15:11 **Title Reference: 51161202**
Date Created: 02/10/2018

Previous Title: 18822239
18825239

REGISTERED OWNER

Dealing No: 719015262 27/09/2018

THE STATE OF QUEENSLAND
(REPRESENTED BY PUBLIC SAFETY BUSINESS AGENCY)

ESTATE AND LAND

Estate in Fee Simple

LOT 100 SURVEY PLAN 303847
Local Government: CHARTERS TOWERS

EASEMENTS, ENCUMBRANCES AND INTERESTS

1. Rights and interests reserved to the Crown by
Deed of Grant No. 18822239 (Lot 2 on CP MPH21392)
Deed of Grant No. 18825239 (Lot 1 on CP MPH21392)

ADMINISTRATIVE ADVICES - NIL
UNREGISTERED DEALINGS - NIL

CERTIFICATE OF TITLE ISSUED - No

** End of Current Title Search **

Requested By: SMIS .

Department of Environment and Science (DES)
ABN 46 640 294 485
400 George St Brisbane, Queensland 4000
GPO Box 2454 Brisbane QLD 4001 AUSTRALIA
www.des.qld.gov.au

SEARCH RESPONSE
ENVIRONMENTAL MANAGEMENT REGISTER (EMR)
CONTAMINATED LAND REGISTER (CLR)

Transaction ID: 50495937 EMR Site Id: 09 November 2018
This response relates to a search request received for the site:
Lot: 100 Plan: SP303847

EMR RESULT

The above site is NOT included on the Environmental Management Register.

CLR RESULT

The above site is NOT included on the Contaminated Land Register.

ADDITIONAL ADVICE

All search responses include particulars of land listed in the EMR/CLR when the search was generated.
The EMR/CLR does NOT include:-

1. land which is contaminated land (or a complete list of contamination) if DES has not been notified
2. land on which a notifiable activity is being or has been undertaken (or a complete list of activities) if DES has not been notified

If you have any queries in relation to this search please phone 13QGOV (13 74 68)

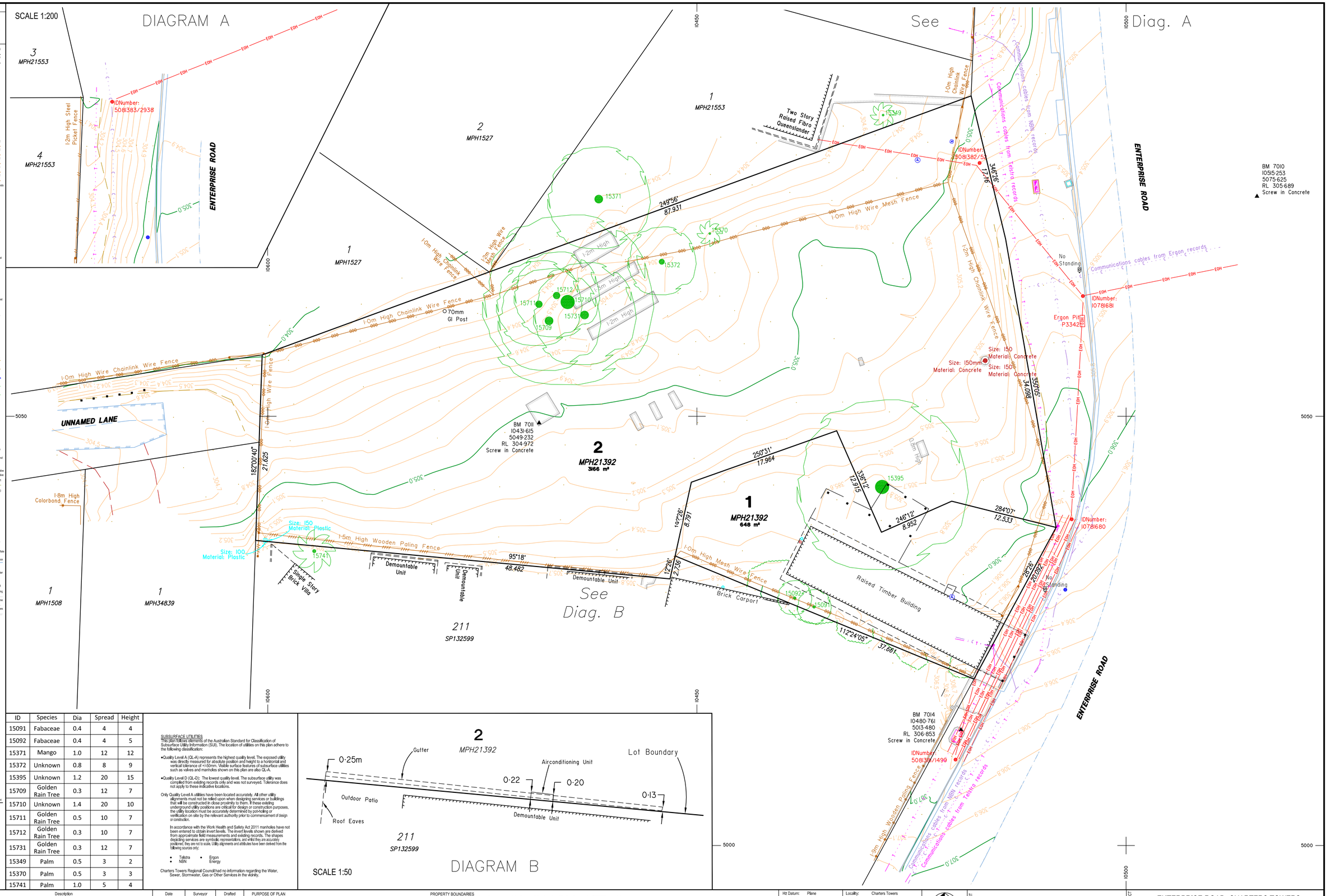
Administering Authority

Appendix 4

Survey Plan

SCALE 1:200

DIAGRAM A



ID	Species	Dia	Spread	Height
15091	Fabaceae	0.4	4	4
15092	Fabaceae	0.4	4	5
15371	Mango	1.0	12	12
15372	Unknown	0.8	8	9
15395	Unknown	1.2	20	15
15709	Golden Rain Tree	0.3	12	7
15710	Unknown	1.4	20	10
15711	Golden Rain Tree	0.5	10	7
15712	Golden Rain Tree	0.3	10	7
15731	Golden Rain Tree	0.3	12	7
15349	Palm	0.5	3	2
15370	Palm	0.5	3	3
15741	Palm	1.0	5	4

SUBSURFACE UTILITIES
This plan follows elements of the Australian Standard for Classification of Subsurface Utility Information (SUI). The location of utilities on this plan adhere to the following classification:

- Quality Level A (QL-A) represents the highest quality level. The exposed utility was directly measured for absolute position and height to a horizontal and vertical tolerance of +/-50mm. Visible surface features of subsurface utilities such as valves and manholes shown on this plan are also QL-A.
- Quality Level D (QL-D): The lowest quality level. The subsurface utility was compiled from existing records only and was not surveyed. Tolerance does not apply to these indicative locations.

Only Quality Level A utilities have been located accurately. All other utility alignments must not be relied upon when designing services or buildings that will be constructed in close proximity to them. If these existing underground utility positions are critical for design or construction purposes, the utility location must be accurately determined by pot-holing or verification on site by the relevant authority prior to commencement of design or construction.

In accordance with the Work Health and Safety Act 2011 manholes have not been entered to obtain invert levels. The invert levels shown are derived from approximate field measurements and existing records. The shapes depicting services are symbolic representations, and whilst they are accurately positioned, they are not to scale. Utility alignments and attributes have been derived from the following sources only:

- Telstra
- NBN
- Ergon Energy

Charters Towers Regional Council had no information regarding the Water, Sewer, Stormwater, Gas or Other Services in the vicinity.

SCALE 1:50

DIAGRAM B

PURPOSE OF PLAN
This plan represents a ground survey of the site to enable architectural and engineering design. For reason of clarity, certain information is not shown on this plan. Please refer to the accompanying digital data for all survey information and attributes.

CONTOURS
The contours shown represent the site as it was at the time of survey. This is not necessarily the "natural surface" or "ground level" as defined by some councils and thus cannot be used to calculate compliance with some council's building height limits. Minor Contour Interval: 0.1m

VEGETATION
Only trees greater than or equal to <<300mm>> breast height diameter have been located. Tree heights are approximate only. Whilst all care has been taken by the field surveyor to correctly identify the species and type of trees located during this survey, they are only estimates to assist with identification on site. If accurate identification of tree types is to be relied upon for any purpose, then all trees listed will require on site verification by a suitably qualified expert.

PROPERTY BOUNDARIES
The property boundaries and dimensions shown on this plan are plotted from Identification Survey plan IS251884 completed by RPS Australia East at the same time as this detail survey. Boundary corners were marked on site in the course of the Identification Survey. For further information refer to IS251884.

Amendment	Description	Date	Surveyor	Drafted
A	First Issue	13/3/2018	KFR	KFR

Htz Datum:	Plane	Locality:	Charters Towers
Htz Origin:	IS251884	Local Authority:	Charters Towers Regional
Vrt Datum:	AHD	Lat Long:	N/A
Vrt Origin:	PM20675	DWG:	139253 - 002
Origin RL:	308.770m	TZD:	139253 Complete Detail Survey

SCALE IN METERS AT ORIGINAL REDUCTION RATIO

NORTH

PAPER SIZE: A1

SCALE: 1:200

CLIENT: PUBLIC SAFETY BUSINESS AGENCY

RPS Australia Asia Pacific
Level 5, Central Plaza
370 Flinders Street
Townsville, QLD 4810
t (07) 9288 0840
www.rpsgroup.com.au
PO Box 977
Townsville
QLD 4810

PROJECT: ENTERPRISE ROAD, CHARTERS TOWERS

Contour and Detail Survey
of Lots 1 and 2 on MPH21392 (3-5 Enterprise Road, Charters Towers)
Surveyed: 21st - 23rd February 2018

SHEET: 2 OF 2

PR139253-1 139253-002A

Appendix 5

Proposal Plan

LOCATION PLAN

SCALE 1:2000@A3

PRELIMINARY

NOT FOR CONSTRUCTION

SEWER AND WATER LINES **APPROXIMATE ONLY** AND TO BE CONFIRMED VIA SURVEY PLAN

ALL DIMENSIONS AND LAYOUTS ARE **INDICATIVE ONLY** SUBJECT TO CONFIRMATION ON SITE AND CONSULTATION WITH THE CLIENT IN DETAILED DESIGN

LANDSCAPING **INDICATIVE ONLY** SIZE AND TYPE OF PLANTING TO BE DETERMINED AT DETAILED DESIGN PHASE

EXISTING FOLIAGE

PROPOSED LANDSCAPING

SEWER LINE (TO BE REALIGNED)

WATER LINE

AMENDMENTS

ISSUE	DATE	SUBJECT	CHECKED BY
A	16.08.2018	PRELIMINARY ISSUE	N. SAPPHOKHA
B	28.08.2018	ADJUSTED PLAN TO FEEDBACK	N. SWAINSTON
C	12.09.2018	ADDED LADDER PLATFORM	N. SWAINSTON
D	20.09.2018	REISSUE	N. SWAINSTON
E	08.11.2018	ADJUSTED PLAN TO FEEDBACK	N. SWAINSTON
F	10.01.2019	ADDED SEWER AND WATER LINES	N. SWAINSTON

Queensland Government
Public Safety Business Agency
ASSET & PROCUREMENT SERVICES

IN PARTNERSHIP WITH

QUEENSLAND FIRE & EMERGENCY SERVICES

PROPERTY AND/OR FACILITY

QFES CHARTERS TOWERS NEW FIRE AND RESCUE STATION

SHEET DESCRIPTION

PROPOSED SITE PLAN

ADDRESS

3-5 ENTERPRISE ROAD, CHARTERS TOWERS.
LOT 100 ON SP303847

SCALE	AT
1:300	A3

CAD FILE PATHWAY

...\CHARTERS TOWERS\190110_Charters

DRAWING NO.	SHEET NO.	ISSUE
SD01	1 of 4	F

Appendix 6

EPBC Protected Matters Report

Australian Government
Department of the Environment and Energy

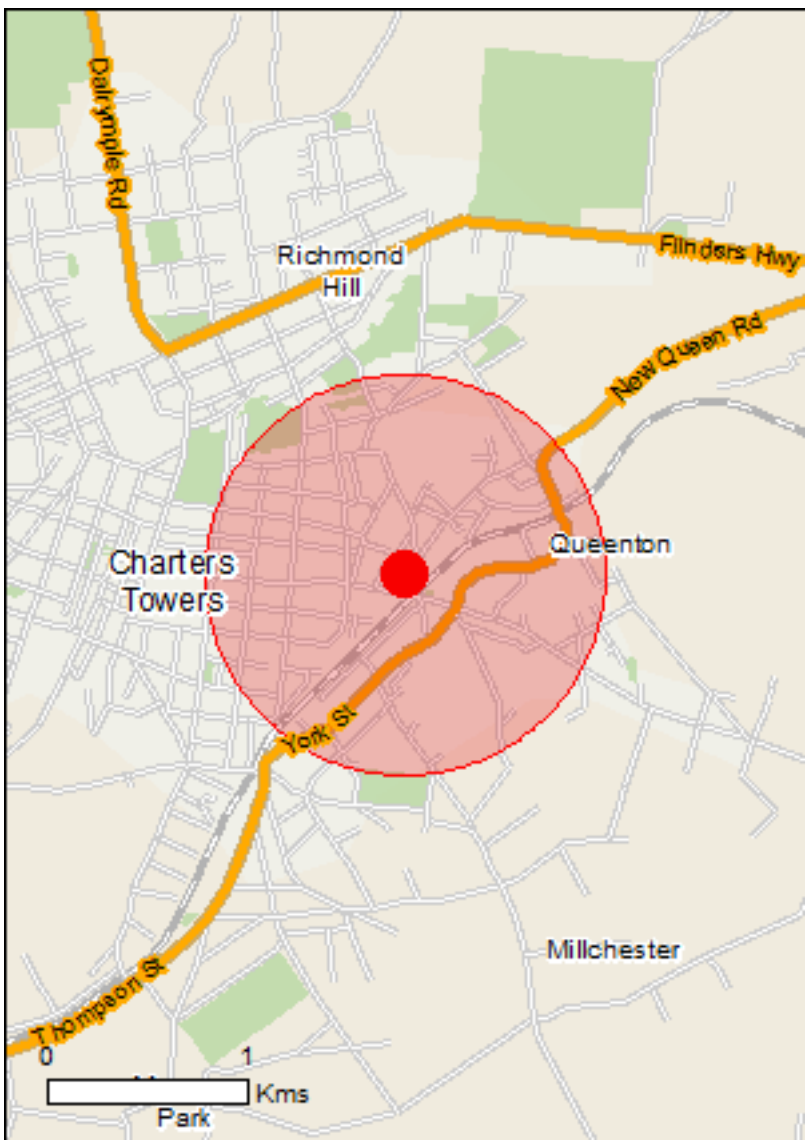
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

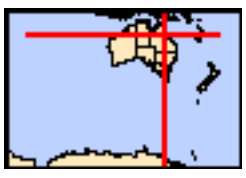
Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 10/12/18 18:04:53



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
Buffer: 1.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	13
Listed Migratory Species:	11

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	17
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	20
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus		
Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Neochmia ruficauda ruficauda		
Star Finch (eastern), Star Finch (southern) [26027]	Endangered	Species or species habitat likely to occur within area
Poephila cincta cincta		
Southern Black-throated Finch [64447]	Endangered	Species or species habitat likely to occur within area
Rostratula australis		
Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Tyto novaehollandiae kimberli		
Masked Owl (northern) [26048]	Vulnerable	Species or species habitat may occur within area
Mammals		
Dasyurus hallucatus		
Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area
Macroderma gigas		
Ghost Bat [174]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat may occur within area
Plants		
Dichanthium setosum		
bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Denisonia maculata		
Ornamental Snake [1193]	Vulnerable	Species or species habitat known to occur within area
Egernia rugosa		
Yakka Skink [1420]	Vulnerable	Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Lerista vittata		
Mount Cooper Striped Skink, Mount Cooper Striped Lerista [1308]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Marine Species		
Crocodylus porosus		
Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava		
Yellow Wagtail [644]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii		
Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]		
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Chrysococcyx osculans Black-eared Cuckoo [705]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within

Name	Threatened	Type of Presence area
Reptiles		
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area

Extra Information

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Acacia nilotica subsp. indica Prickly Acacia [6196]		Species or species habitat may occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Jatropha gossypifolia Cotton-leaved Physic-Nut, Bellyache Bush, Cotton-leaf Physic Nut, Cotton-leaf Jatropha, Black Physic Nut [7507]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Vachellia nilotica Prickly Acacia, Blackthorn, Prickly Mimosa, Black Piquant, Babul [84351]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-20.07664 146.27019

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

Department of the Environment
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

Appendix 7

Heritage Assessment Report

Heritage
Assessment Report

3 Enterprise Road
Charters Towers
Building Condition Report

For: Public Safety Business Agency

MacCallum Planning & Architecture

MPA
MANAGEMENT
PLANNING
ARCHITECTURE

Architecture
Town Planning
Urban Design & Master Planning
Project Management
Landscape Architecture
Heritage & Conservation

Queensland . New South Wales . Victoria

P:\1.0 MPA\14018 - Cloncurry Court House\Heritage Report\Cover.wpd

INDEX

Report Authorisation			
Version	A	Date	04.11.17
Comments	Heritage Report		
Prepared by	Roger MacCallum	Date	04.11.17
Checked by	Jana Keane	Date	08.11.17
Approved by	Roger MacCallum	Date	15.11.17

1.0 INTRODUCTION

1.1 OVERVIEW

This report has been prepared on instructions of STP Consultants following a request from the Public Safety Business Agency for a heritage assessment of the building on the subject site, this to include considerations of it's heritage value and importance, and whether is should be retained on or removed from the register of the local council.

1.2 SCOPE OF REPORT

MPA are to:

- Visit the place
- Inspect the building
- Obtain and review the criteria for the listing
- Assess the significance
- Advise on the merits of retention, restoration, and demolition

1.3 BACKGROUD INFORATION

MPA carried out the following to obtain necessary background information to prepare this assessment:

- The place was inspected on 25th October 2017
- MPA were accompanied by representatives of STP including a structural engineer and electrical engineer
- MPA contacted the Charters Towers Council Planning Department to obtain details of the listing – see Attachment A
- MPA contacted the Charters Towers Archives to obtain particulars of the material supporting the listing- see Attachment B

1.4 REFERENCE DOCUMENTS

Charters Towers Heritage Register – Planning Scheme - Category 1: Heritage Places

The place is listed in the planning scheme as below:

- Assessment: 01719-00000-000
- Lot & Plan: 1MPH21392
- Heritage Description: Shop "A.E. Sellars- Carrier"

On enquiry MPA were advised that council has no further information on file to support this listing and that this would be available from the Charters Towers Archives.

The extract from the planning scheme is included in Attachment 'A'

Charters Towers Archives

On enquiry MPA were advised for the payment of a fee information would be provided relevant to the listing of the place.

1.0 INTRODUCTION

There is no citation or material available that specifically supports or is directed to the inclusion of the place on the heritage register

The material provided addresses some aspects of social history with no mention of the building structure itself.

It includes the following documents:

- "Forwarding Agents on Enterprise Road", by Michael Brumby August 2011
- "Interview with Glenda Meeson and Joyce Archer August 17th, 20011"
- Some photographs of the locality, individuals, mining lease maps, vehicles and the building.

These are included as attachment 'B'.

2.0 HERITAGE SIGNIFICANCE

2.1 CULTURAL SIGNIFICANCE

Criteria for assessing significance involves:

- Assessing what criteria are appropriate in determining why the place is significant
- Methodology for an assessment of the degree of significance
- Determining who should do the assessment

Relevant to this process:-

- Guidelines for the criteria are provided in the state heritage legislation- the Queensland Heritage Act
- The methodology is provided in the accepted reference document: *Australia ICOMOS Guidelines to the Burra Charter: Cultural Significance*
- The assessment should be carried out by an accredited expert practitioner well versed in the principles involved

2.2 DOCUMENTARY EVIDENCE

Social History Assessment

The documents provided by the Charters Towers Historical Group solely address social history.

This information is the only material available to support the inclusion of the place on council's register.

The documents provide information about the individuals and family members who operated a carrying business from the site.

They are exclusively focussed on local history and the development of mining and business in Charters Towers in the early days of the 20th century.

As such they are of community interest and if not recorded this aspect of life and business in the early days of the district may well have been lost forever.

There is however no specific description or references to the cultural values of the place.

If this was to be provided it could be considered under the criteria similar to that of the Queensland Heritage Act for consideration under category

(a) "The place is important in demonstrating the evolution or pattern of Queensland history"

However on balance I do not believe there is sufficient evidence provided at this time to support the level of significance necessary for maintaining the listing on the register.

2.0 HERITAGE SIGNIFICANCE

2.3 PHYSICAL EVIDENCE

Building Assessment

The building was inspected with the view of determining it's:

- Formal or aesthetic qualities
- Condition
- Heritage significance

Formal or Aesthetic Qualities

The street façade and awning is typical of timber framed industrial construction of the early 20th century- consisting of a weatherboard clad wall, two windows, central door, on-street awning and timber parapet sign written to identify the business operating from the premises.

Of rudimentary single storey low set timber framed construction, the building is approx. 6m wide and 20m long, with clearance internally of about 2.3 m at the wall line, this being reduced by the roof frame braces, which are set out at 2.7m centres.. The ridge is approximately 3m off the floor.

The front "office" area has ceiling and wall linings, the rear areas, being storage space, displaying the structural framing.

Two toilets are located to the rear of the storage space.

External cladding is a mixture of weatherboard and sheet materials. Windows and ventilation shutters are timber framed. Doors are timber.

The building has no discernible formal or aesthetic qualities that would support a listing under commonly accepted criteria.

Condition

The building is not secure.

The roof is corrugated AC, damaged and leaking, with some sheeting missing.

Flooring is varied with widespread evidence of previous repairs and in some areas, exhibits excessive movement and is potentially unsafe.

The building structure and enclosing fabric is in poor condition. There is extensive termite and weathering damage. The assessment by STP Consultants details this and should be read together with this report.

The power and light services are also in poor condition and are non-functional. The assessment by STP Consultants details this and should be read together with this report.

2.0 HERITAGE SIGNIFICANCE

Water is not connected and the toilet facilities are dysfunctional.

The building in its present condition does not comply with the most basic requirements of the BCA and relevant Australian Standards.

3.0 CONCLUSION

3.1 RECOMMENDATIONS

Having regard for all of the above I see no merit in recommending its restoration or refurbishment.

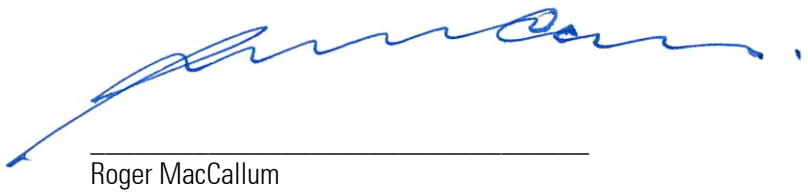
The Code included within the regulations under the Queensland Heritage Act – Schedule 2, Part 2 – Purpose of the Code clause (2) provides

" In considering whether there is no prudent and feasible alternative to demolition or removal the Assessment Manager (Charters City Council) *must have regard to*

(a) Saftey health and economic considerations
(b) Any other matters that the assessment manager considers relevant"

In the circumstances, and in our opinion, we recommend that:

- Council permit the demolition of the building; and that
- A condition be made requiring a plaque providing a summary of the social history of the place with appropriate graphic to be erected in a prominent position to be determined as appropriate to any proposed re-development of the site.



Roger MacCallum

FORWARDING AGENTS on ENTERPRISE ROAD

FORWARDING AGENTS on ENTERPRISE ROAD

KELLY'S QUEEN BLOCK MINE

In the 1870s, Tom Kelly and Frank Stubley took up a mining claim on the Queen line of reef as a block to Richard Craven's No. 4 Queen Mine. After this mine was worked out, it was amalgamated with Kelly's to become Kelly's Queen Block Mine. When it was surveyed in 1895 as gold mining lease No. 1595, the ground was triangular in shape. It comprised a little over eight acres of ground that covered both sides of the railway line at Queenton. The lease was wedged quite tightly between the Brilliant St George in the west, the Phoebe in the south and the Brilliant Central and New Queen to the north east. By 1897 Kelly's Queen Block Mine "was in the centre of the famous group at Queenton." (North Queensland Register Mining History, 1897) The estimated gold retrieved from the mine, according to Ken Levingston was 95,000 oz. The mine comprised a set of deep underground workings that were accessed via two connecting vertical shafts. The first was on the eastern side of the railway station near Millchester Road. It tapped into the Queen and the Victory lines of reef. The other on the other side of the railway station was to the west of Enterprise Road. It followed the St George, and ultimately the Brilliant lines of reef at 1450 ft.

It is the site of the second shaft and surface workings of Kelly's Queen Block Mine that predate the establishment of a forwarding agency here after the mine closed in 1913. The concrete footings of the mine's engine house etc can be still found along the north side of the allotment. Long term resident Henry Weare remembered Kelly's Queen Block Mine being here: "You know there was a big mine there, Kelly's Queen Block went down after the ... but all that ground behind, there was a laneway behind that run of buildings and there was a laneway in there, the railway line the other side of the mullock heaps, and the mountains of mullock there and across the road they had a bridge across and the roadway and they had another."

The run of buildings that Henry referred to faced onto Gill Street. At its intersection with Enterprise Road stood the two storied Enterprise Hotel. A 1911 street directory listed only one set of occupants beyond this hotel and in front of the former mine site. This was George and Maria Elizabeth James who were living at *Rose Villa*. James was a blacksmith. There were two train lines between their residence and the Enterprise Hotel: one had connected into the mine and the other had linked the Victoria Saw Mill to the main line. Both were only removed completely in more latter times.

JAMES KETTLE

The first infill between *Rose Villa* and the Enterprise Hotel took place in September 1918. This was when the the water meter man noticed that James Kettle had commenced a wood depot here on Enterprise Road. (MPH 21392 shows this sawmill on this site.) Henry Weare remembered Kettle this way: "He finished up with a small saw mill, and his sons had round behind Shore's carrying office, up against the old engine beds of the Kelly's Queen, you know there was a big mine there, Kelly's Queen Block went down..."

MICHAEL DUNNE

Michael Patrick Dunne or Dunn was 37 years old when he volunteered for military service in the AIF. His attestation took place at the town hall, Charters Towers in March 1915. At the time Dunne had been living and working in Charters Towers as a horse dealer although he was a blacksmith by trade. Dunne served with the 26 Battalion at Gallipoli. On 14 November 1915 he was struck in the neck by a bomb. His injuries were serious, it being noted that he suffered shock and paralysis. Dunne was discharged in June 1916 and returned to Charters Towers. Dunne was living at the North Queensland Hotel in Gill Street when he applied for Miner's Homestead Lease (MHL) 8413 in 1917. This was land between Kettle's sawmill and the Enterprise Hotel. Mining records indicate that improvements made to the 25.6 perch block that included a shop,

outhouses and fencing to the value of£80. Unfortunately, Michael Dunne died from pneumonia in 7 July 1919 and land and improvements were forfeited.

ALEX SELLARS

In 1922, MHL 8413 was transferred from Dunne to Alexander Edward Sellars (1875-1970). Sellars was from New Zealand but went on to spent most of his working life on the Charters Towers Goldfield. He was especially known as one of the pioneering users of cyaniding. In 1923, a postal directory listed the following people living on this part of Enterprise Road: Alex Sellars, forwarding agent; James Kettle; and George James at *Rose Villa.* An advertisement for A. E. Sellars & Company included in the 1972 Centenary Book provided the following account of the business: Sellars had been in partnership with Jack Inglis when he bought out Arthur Powell's carrying service. Then as the sole owner, Sellars ordered the first motor lorry on the Towers. A postal directory listed the following people here in 1938: Alex Sellars, forwarding agent; James Kettle, fuel agent; Frederick Critchley. In this same year MHPL 9224, which had been owned by Kettle was transferred to Alexander Edward Sellars thus expanding the ground to its present day size.

SID HUTCHINSON

The 1972 Centenary Book also stated that Sellars sold his business to Sidney Charles Hutchinson (1888-1961) and his son Herbert. Sid and Herb in 1949 but continued to trade under the Sellars name. (In 1949 MHPL 8961 and MHPL 9224 were transferred to Sydney and Herbert Hutchinson.)

CECIL AND STELLA SHORE

Cecil Shore (1913-1969) bought the business from the Hutchinsons in 1953. Cec died suddenly on 27 February 1969 aged 56. In 1970 MHPL 8961 and MHPL 9224 were transferred to his widow Stella May Shore (1909-2005). (MHPL 1891 comprising MHPL 8961 and MHPL 9224 was freeholded in 1994.) Stella carried on the business until she retired in 2001, aged 92. She died in 2005. Stella Hayston was born on 7 May 1909. She was one of five children born to William Hayston and Ada Hoy, her siblings being George, Gordon, Victor and Alma. Stella attended Kings Gully School. According to Sharon Hayston, Stella's father was a pioneer of early Charters Towers transport. Bill regularly visited outlying stations like Mt McConnell, Lornsleigh, Cranbourne, Harvest Home and Cardigan with his dray and two wagons pulled by 14 draught horses.

"He, with his son George were away from home for up to two weeks, having to cope with all manner of conditions on roads not more than roughly hewn tracks. Bill was welcomed warmly by the isolated homesteaders for the mail, timber, food supplies and the lively conversations he brought them. He bought a chevrolet lorry in 1926." As Sharon Hayston reflected in 1982: "Mrs Shore and her family are proud that this firm not only continues to provide Charters Towers with a vital service, but it serves to remind us of an essential factor in the economic development of the Towers from the early days to the present and onto the future."

Written and Researched by Michael Brumby August 2011

REFERENCES

Charters Towers Centenary 1872 - 1972
Sharon Hayston, correspondence 07/06/1982)
The Northern Miner, 04/08/2006
Glenda Meeson and Joyce Archer Interview 17/08/2011
Henry Weare Interview 17/05/1996

INTERVIEW WITH GLENDA MEESON AND JOYCE ARCHER 17/08/2011

Glenda Meeson and Joyce Archer are the daughters of Cecil and Stella Shore.

THE WORK
Shores were general carriers. It carted goods from the railway for businesses like Aridas, Pollards, Paul Wherry's furniture shop. Mum carted all the deliveries for NORQEB, for Jimmy Bell for all their white goods. She was over 25 years in delivery with NORQEB.

She had the contract for shifting people from Mosman Hall, the education department, the Commonwealth Bank and doing the packing and shifting furniture.

Tenex Ipec came in and brought goods over the night and she'd deliver them during the day.

Sh'd take the mail the royal mail from the rail and deliver them to the post office and then she was delivering parcels around town.

When our mum was alive there were other carriers like. Jimmy Chappel, the Carroll boys, old Mr Les Davis, Kenny Collins, Len Smith.

Furniture could be stored at the office until people found a house and then it could be delivered.

There was all beer deliveries in our dad's day.

It was a petrol agency as well. There were ramps for fuel through the big gates. There used to be drums of fuel on them and oil inside. Eventually it moved down to the Shell Depot in Dundee Lane. Even then there was still bulk plus the drums for the various properties. Around 1972 they lost it. Glenda: My Husband Ronny Meeson was working there and it was in the name of Shore and Meeson. After 1972 it all moved down to Dundee Lane and Ronny worked it from there.

MODES OF TRANSPORT
There were three trucks: a bedford, an austin and a dodge. The dodge was smallest. It was used for parcels. 13cwt. The bedford was biggest. The bedford is still down there. In later years there was a toyota. The dodge was sold.

THE WORKERS
Clem Archer was there when dad died. There used to be Bert Richards, Lenny Wales, Arthur Prideaux, Mr Meeson, Ron's father, Altogether there were six when dad was doing it, if that. During mum's time there was Billy MacAulley, Gill Engler, Chrissy Larsen. Tommy Bell used to do the mail deliveries, and Mr Larsen used to do the parcels, the packing; Robby Reid, Frank Thomas used to help. John Regan was the last one working with mum.

As it went she lost the mail contract. The dodge used to have Royal Mail on the side. During Mr Lucas's time at the post office, mum lost the mail contract to Hazel Chappel. Whack Wheeler does it now.

Joyce: I went to work for dad in 1953-4 until I got married in 1959 and went to Townsville for five years. He had taken it over from Sid and Herb Hutchinson. Dad used to work for Hutchinson. They were selling out and dad said he'd like to take it over. (Reference to Hutchinson letterhead) The business was maintained. Dad mostly worked with the railway. And then he had the packing.

Joyce: I did clerical work. There was another girl Shirley Fanning. She was there when dad died. And she left and then I went in and Clem was there. Robyn, my daughter was there too. I did accounts, pays, served the fuel, and carted the oil over to the railway and sent it and parcels away. I was getting £3.00 per week. Glenda: I was in there working too. I was writing up dockets for Tenex. Shows photo: Neal Busby's motor bike outside the shop. Wally Brewer and Robyn were down there for a while selling insurance after he got out of the police service. This was before he moved down Aridas building in Gill Street.

THE WORK
I think it's always been a carrying business. Every day we'd go up to the railway. There were hardly any trucks on the road. Mum used buy in the cartons. She'd buy sisal craft. It was hard to tear. It was pretty stiff stuff to wrap around the furniture. They used have their closed in wagons waiting for them to put their furniture in. Then it'd be consigned away

THE EFFORT
Joyce: That's how dad died.
Glenda: Dad used to come home bent like ***that*** lots of times. His back was gone. And he'd stay like that for a few days and he'd straighten up after a while. Joyce: The day he died, they did a furniture job. He came back to the office. "You go and get the kids now from school", he said. He did not say he felt unwell. He shouldn't have been on the furniture. but there was only one thing he'd lifted and there was a leg broken and it twisted. I went to pick up Clemmy. Robyn [my daughter] went in and then came running out and said Fa Fa's on the floor. He was laying down dead. Bruce Cunningham used to throw in the newspaper though the door and he didn't know dad was dead.

Dad died when he was 56. So mum carried on. Mum used to deliver the mail and that was about it. Mum never drove. Until then she was a stay-at-home mum. Clem was there then. She was there until she was 92. She went in to it aged 58. She was thrown into it. She enjoyed it. She only ever had one day sick. We made her stop. At the end she would be found there asleep. By this time the business wasn't doing much. It stopped around 2002. She'd lost the railway because they got their own truck, NORQEB got their own carrier. There wasn't much to do. It just finished. Just closed it up .

THE NEIGHBOURHOOD
Keoghs have always been there beside it in Enterprise Road. Bonny Jones used to be barmaid at the RSL. Bonny is Norm Carrington's mother in law. On the other side of Gill Street there was the hairdresser was Norm Wallace in the little old shop. The Autoglass used to be Sagers. In between there was a pie shop. Mr Robbins had the pie shop and later it was Ivan Mann. Across the rail line there was Georgie Go Wing. It was a fish shop and Chinese. Gladys Shun used to work for Mrs Soilleux at the Queenton Post Office. Danny Jones ran the Railway Refreshment Rooms. Mrs Goddard had the Enterprise when I worked for dad and then there was Mrs Suhr. Then there was Merle and Howard Alford.

The piece of concrete near the shop was from the saw mill being there. There was no access to the lane way. The mine was capped. Rhane Renton phoned me up about it. Today there's Peter and Margot Weston (Weston's Carrying Service), and Giddy's. There's no more goods shed.

		
Reid 1916 Section	200091.723 Railway Gates	Screen shot 2011-08-24 at 4.18.01 PM
		
Charters Towers Station 1901	2008172.3372 Kelly's Queen Block	GML 1595 Kelly's Queen Block
		
2002132.508-1 Sellars	Alexander Edward Sellars (WC2006.758)	9604.3887 Aerial Railway

Cover: from A. E. Sellars and Company in *Charters Towers Centenary 1872-1972:96*	Cover: from A. E. Sellars and Company in *Charters Towers Centenary 1872-1972:96*	
2002132.508-1 Sellars	2002132.508-1 Sellars	MPH 21392
		
Shore Carrier Truck	Stella Shore	Shore Carriers
		
Vacated premises August 2011	Vacated premises August 2011	Vacated premises August 2011

Charters Towers Heritage Register - Category 1 : Heritage Places

Assessment_No	Lot & Plan	Heritage_Description	Address
01719-00000-000	6RP707261	Queenton Post Office	8 MILLCHESTER ROAD
01731-25000-000	35USL46805	Gold Recovery Works	HALDANE STREET
01731-50000-000	1DV617	Strong Room	35 DEANES ROAD
01743-20000-000	3SP148693	Fuel Depot WW2	7 HARRIS LANE
01743-30000-000	1RP901157	Fuel Depot WW2	3-9 NORMAN DUNGAVELL DRIVE
01745-00000-000	1MPH21511	House	17-19 NORMAN DUNGAVELL DRIVE
01769-00000-000	1MPH21569	Woollen Mill	7 NEW QUEEN ROAD
01815-00000-000	1MPH21392	Shop "A.E. Sellars - Carrier"	3 ENTERPRISE ROAD
01819-50000-000	18SP108016	Enterprise Mill	ENTERPRISE ROAD
01866-00000-000	1MPH1262	Church	25 YORK STREET
01870-10000-000	2MPH31787	York Street Methodist Church	35 YORK STREET
01874-00000-000	1MPH1217	Butcher Shop	41 YORK STREET
01893-10000-000	2MPH30687	Shop	85 YORK STREET
02015-00000-000	259CT1822	Pioneer Cemetery	2-32 NORTH STREET
02028-50000-000	1MPH30356	House	26 ARMSTRONG ROAD
02221-00000-000	1MPH1155	House	7 FARRELLY STREET
02226-00000-000	1MPH1293	House	15 OLIVER STREET
02261-00000-000	1SP108211	House "Day Dawn"	22 DAY DAWN ROAD
02280-00000-000	2MPH1337	House	2 PAULL STREET
02405-00000-000	1MPH20868	House	57 DALRYMPLE ROAD
02405-00000-000	1MPH20868	House	57 DALRYMPLE ROAD
02409-00000-000	218C8220	Lynd Cemetery	32-62 LYND HIGHWAY
02419-00000-000	2RP732069	House "Tower Villa"	12 CHURCHILL STREET
02420-00000-000	1RP712773	House	16 CHURCHILL STREET
02424-00000-000	2MPH33827	House - Samuel Allen & Sons	42 GORDON STREET
02429-30000-000	17RP835587	House (Old Church of England)	25 GORDON STREET
02429-50000-000	15RP835587	Advent House	29 GORDON STREET
02451-10000-000	190DV546	Richmond Hill House	2 BURDEKIN STREET
02460-00000-000	5SP113252	Airport	1-13 MACPHERSON STREET
02460-00000-000	2RP724021	WW2 Bore Sight Range - Airport	1-13 MACPHERSON STREET
02492-00000-000	2MPH40276	House	13 DAVIES STREET
02531-00000-000	2MPH13681	House	9 WILSON STREET
02535-00000-000	22CT18267	Old Brewery	11-27 DUMAN ROAD
02565-80000-000	1MPH40482	All Souls' School	1-59 FLINDERS HIGHWAY
02584-00000-000	23CP855246	Significance related to remnants of Fair Rosamond Mill	149 PALMER ROAD

4.3 SITE PHOTOS

INTERIOR SPACES

4.3 SITE PHOTOS

INTERIOR DETAILS

4.3 SITE PHOTOS

INTERIOR DETAILS - CONTINUED

4.3 SITE PHOTOS

EXTERIOR VIEWS








4.3 SITE PHOTOS

EXTERIOR DETAILS








4.3 SITE PHOTOS

EXTERIOR DETAILS - CONTINUED








Appendix 8

Existing Conditions Report

PARTNERS
TREVOR SLOGROVE
STEPHEN TOBIAS
ANTHONY FLORENCE
BRIAN MAYER

OFFICES
CAIRNS
TOWNSVILLE
MACKAY
BRISBANE

CONSULTING CIVIL,
STRUCTURAL,
MECHANICAL,
ELECTRICAL AND
HYDRAULIC
ENGINEERS

PROJECT MANAGERS

3 Enterprise Road Charters Towers

Existing Condition Report

for: Public Safety Business Agency

Prepared by Anthony Florence, Josiah Hosking & Roger MacCallum

REV: A
22 November 2017
STP Job No. STP17-1235

TOWNSVILLE
LEVEL 1 MASTER BUILDERS HOUSE
316 STURT STREET TOWNSVILLE
PO BOX 1777 TOWNSVILLE QLD 4810
TELEPHONE 07 4724 2626
FACSIMILE 07 4724 2417

CAIRNS
SUITE 7 FIRST FLOOR
78 MULGRAVE ROAD
CAIRNS QLD 4870
TELEPHONE 07 4031 8777
FACSIMILE 07 4031 8799

BRISBANE
LEVEL 1, 99 BRIDGE STREET
FORTITUDE VALLEY QLD 4006
TELEHPHONE 07 3255 2122
FACSIMILE 07 3255 2411

MACKAY
104B SYDNEY STREET
MACKAY QLD 4740
TELEPHONE 07 4944 1577
FACSIMILE 07 4944 1588

Table of Contents

REPORT AUTHORISATION			
Version	A	Date	22/11/2017
Comments	Structural Components		
Prepared by	 Anthony Florence, BEng, MIEAust, RPEQ 04683 Structural Manager Townsville	Date	22/11/2017
Approved by	 Anthony Florence, BEng, MIEAust, RPEQ 04683 Structural Manager Townsville	Date	22/11/2017

1.0 INTRODUCTION

1.1 Overview

This report has been prepared by STP Consultants (STP) and MacCallum Planning and Architecture (MPA) following a request from the Public Safety Business Agency for a building condition assessment of an existing building in Charters Towers. The client identified that the existing building, a privately-owned timber building utilized as a workshop and store, has been heritage listed. The condition assessment was to be completed as part of a Due Diligence process associated with the potential purpose of the site to house the new Charters Towers Fire Station. The PSBA requested that the report address:

- Requirements for structural rectification to satisfy current building construction standards.
- Assessment of existing electrical infrastructure to determine suitability for re-use
- Heritage assessment of the site and outlining of pathways associated with demolition, refurbishment, and retention.

Representatives of STP and MPA attended site on the 25th October 2017 for an initial condition assessment. No existing design or construction documentation was available during the assessment process due to the age of the building. All observations and recommendations within this report are based on this initial site visit.

The building is located at 3 Enterprise Road, Charters Towers, North Queensland. It is located on Lot 1 and Lot 2 of MPH21392.

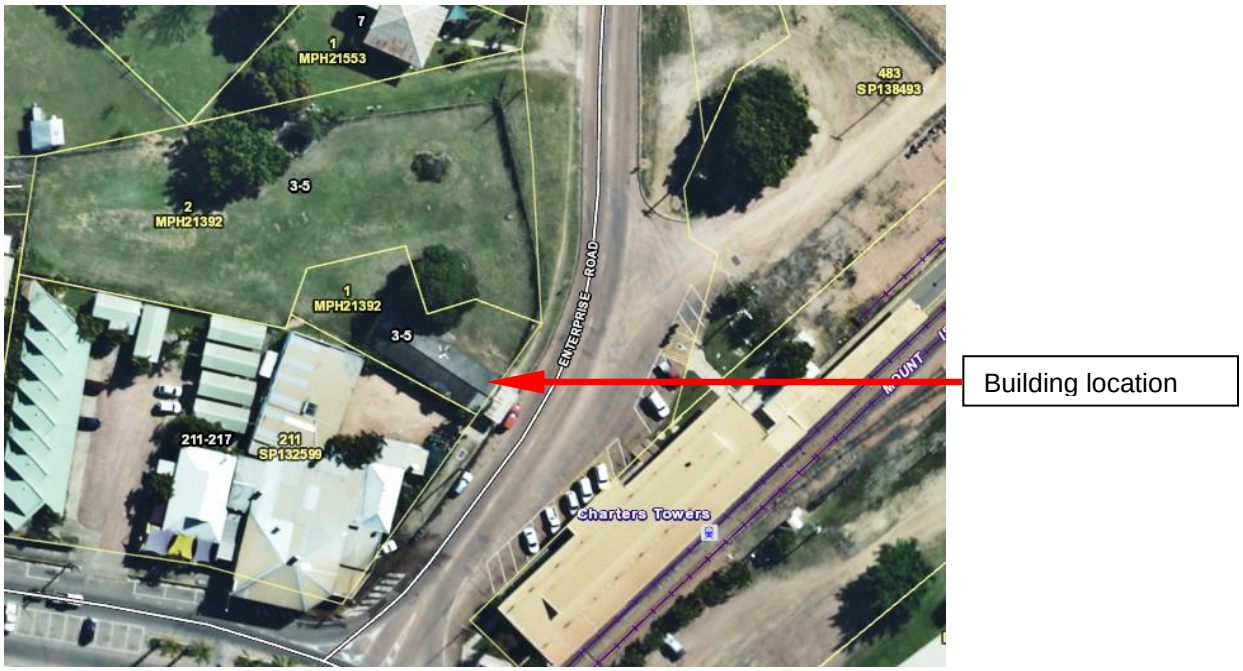


Image 1 – Site and building location.

2.0 Structural Condition Assessment

2.1 Scope of Works

To allow structural assessment of the building, the following scope of works has been determined;

- Site inspection to determine condition and sizes of existing structural elements.
- Determine site wind speed to allow checking of existing structural members.
- Determine likely future floor loads to allow checking of existing structural members.
- Review existing connection condition and adequacy for design loads.
- Provide engineer recommendations for upgrade, repair or replacement of structural elements where necessary.
- Provide engineer recommendations for upgrade, repair or replacement of structural connections where necessary.

2.2 Limitations

STP Consultants were not provided with structural documentation. The condition assessment was limited to visible structural elements and connections only.

Areas with significant termite damage and/or timber rot was observed, however the extent of the damage could not be fully determined due to visual limitations.

Footing sizes and condition were not able to be determined.

2.3 BUILDING CONSTRUCTION

The building is timber framed on steel and timber stumps. A typical section is shown in image 2 with the main frames on a 2.7m bay spacing.

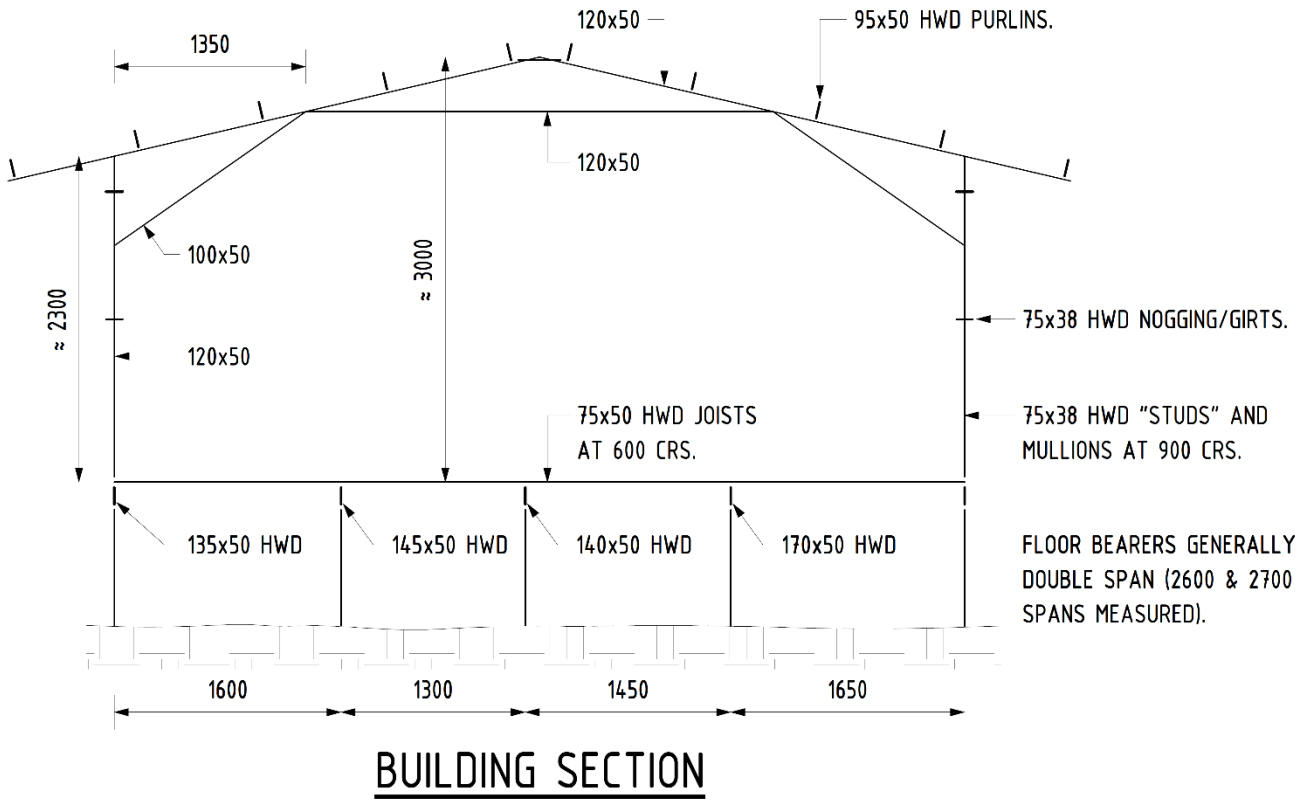


Image 2 – Typical Building Section

Steel and timber stumps support timber bearers of varying sizes. Various repair works were noted to have been completed to the bearers in several locations.


Bolted timber frames supporting roof purlins and wall girts are positioned at 2.7m centers along the length of the building.



The main building frame has bolted connections, forming a braced frame.

The front of the building has a framed awning roof over the foot path with a parapet aligning with the front wall. Timber posts support the awning.

2.4 BUILDING CONDITION

The building structure is generally in poor condition. Significant termite activity was observed, particularly to the front wall framing and cladding.

The front awning is in extremely poor condition with individual members rotted, damaged or termite affected. It is recommended that pedestrian access is prevented from this area.

The front wall timber cladding and framing has severely deteriorated due to timber rot and termites.

The timber awning support columns have rotted and where timber is in contact with the ground, termite intrusion and damage has occurred.

Significant damage has occurred to the front wall framing, cladding and awning of the building. Termite damage was severe and is likely to have damaged all structural elements to the front wall.

A set of timber stairs and small platform to the side of the building have also been affected by termites and timber rot. Both these elements are in extremely poor condition.

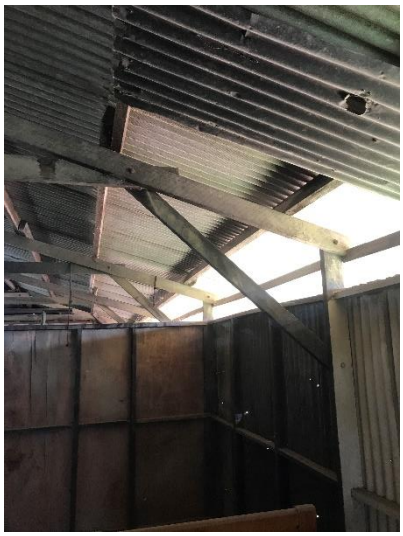
It appears several timber stumps have been replaced with steel posts. The remaining timber stumps are in poor condition with rot and potential termite damage evident. The depth of embedment for the timber stumps could not be determined. The timber stumps typically were not vertical.

The size of the steel post footings could not be determined.

The timber floor framing was generally in reasonable condition, with areas of repair previously undertaken to the timber bearers.


There are areas where roof sheeting is missing and where timber roof framing damaged.




The main timber frames are generally in reasonable condition. The bolted connections also appeared to be in reasonable condition, with limited splitting of members at bolt locations. Some bolts may need to be replaced.

2.5 ADDITIONAL CONSIDERATIONS

The buildings potential use needs to be taken into consideration when reviewing the condition of the building. While a building element may be in reasonable condition, the future use and likely loadings on that element must also be considered and structural assessed as to whether it is fit for future purpose.

Similarly, the site wind speed should be calculated based on current Australian Standards to allow assessment of the existing members and their capacity to meet current design requirements. Charters Towers is located approximately 100km from the coast. Australian and New Zealand Standard AS/NZS 1170.2 defines the boundary of Region B as 100km in from a smoothed coastline, thus locating Charters Towers on the border of a Region B and a Region A4 wind region.

For Region B, the design wind speed is calculated as 50m/s (N3 residential wind classification). For Region A4, the design wind speed is calculated as 40m/s (N2 residential wind classification). Given recent cyclonic events in North Queensland, with large systems crossing the coast and remaining as Tropical Cyclones well inland, this office adopts a conservative approach when there is any doubt or ambiguity. A design wind speed of 50m/s for Region B has been adopted for initial structural review of existing framing members.

The future use of this building, if it were to remain, is likely to be for offices and related storage. Australian and New Zealand Standard AS/NZS 1170.1 nominates general use office area live loads to be 3.0kPa and 2.7kN with file rooms and office storage space to be 5.0kPa and 4.5kN. These values have been adopted for initial structural review of existing framing members.

The following members have been initially structurally reviewed;

Member	Existing size	Required size	Comments
Floor joists	75x50 HWD at 600crs	100x38 F14 at 600crs 75x50 F14 at 300crs	Existing inadequate
Floor bearer	145x50 HWD	200x50 F14	Existing inadequate
Wall girt	75x38 HWD	75x38 HWD	Existing adequate
Wall stud	75x38 HWD	75x38 HWD	Existing adequate
Roof Purlin	95x50 HWD at 1000crs	120x38 F14 at 1000crs	Existing inadequate

A full design review of the timber frame has not been completed at this stage.

Given the quantity of structural members requiring to be upgraded, a review of the existing tie down connections has not been undertaken, as these would need to be replaced if new members are provided.

2.6 CONCLUSION

The building is in poor condition with many elements requiring complete removal and/or replacement.

Severe termite damage was observed in several locations through the building.

Several existing members do not meet the minimum criteria to satisfy current building structural requirements.

It is the considered opinion of this office that the building is beyond viable economical repair, with many members requiring replacement, rectification or upgrading.

3.0 ELECTRICAL CONDITION ASSESSMENT

3.1 Scope of Works

To allow electrical assessment of the building, the following scope of works was determined;

- Site inspection to determine:
  - Locations of existing supply authority infrastructure (Ergon Energy and Telstra)
  - Approximate sizes and conditions of incoming network connections
  - Location and condition of metering and distribution infrastructure
  - Condition of existing internal electrical services including lighting, power, and communications equipment
- Provide recommendations for upgrade, repair or replacement of electrical infrastructure and equipment where necessary.

3.2 Limitations

No existing electrical documentation was available for the development, so all observations were based on a visual inspection only. No electrical testing was completed during the inspection. At this stage, no advice has been obtained from Ergon Energy relating to the available capacity at the site.

Due to the age of the equipment, no electrical control equipment was operated on site.

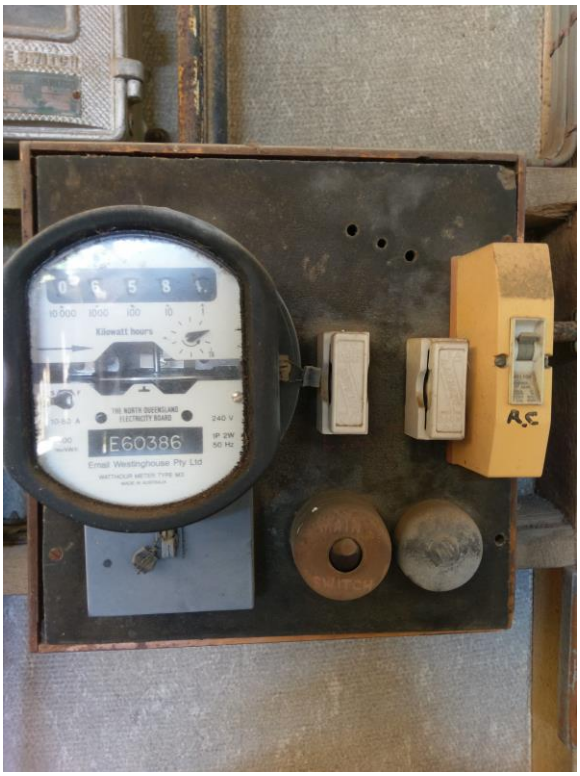
3.3 Supply Authority Connections

The site is currently supplied with a single-phase aerial connection to an existing Ergon Pole (#5081381) on Enterprise Road. The aerial service size and service fuse size could not be confirmed from visual inspection. The aerial cable and connection point are both in poor condition. It is recommended that the existing aerial service and connections be replaced with infrastructure compliant with the requirements of the current Queensland Electricity Connection and Metering Manual (QECMM). A number of Ergon Energy distribution poles are located around the boundary of the lot as per the below sketch.

It appears the existing facility is connected to the surrounding Telstra network via a single copper lead-in supply. The incoming copper connection route could not be confirmed on site, but it is expected that it extends from an unlabelled pit at the entry to a single phone outlet located within the front office area.

3.4 Meter Panel and Main Switchboard

The existing main switchboard and meter panel are located adjacent to the entry to the large store room. The facility is provided with a single-phase analogue meter that is estimated to be over 20 years old. There were no metering isolation links installed and the meter is not located in a position that is compliant with the requirements of the QECMM. The existing metering installation is non-compliant with the current QECMM and would need to be replaced if the building was to be retained and refurbished.



The main switchboard for the existing building is of considerable age and is in very poor condition. The MSB is installed on a plywood frame with no cover to prevent accidental contact or operation. Due to the age of the installation, it is possible that the enclosure is constructed of ACM, but this could not be confirmed as no ACM register was available at the site. The MEN link and earthing stake could not be located to confirm condition, although it is likely that the existing water supply point is utilised as the earthing conductor. The existing MSB consists of:

- Main Isolator (rating unknown, heavily corroded)
- 2 x 15A rewireable fuses
- 1 x 20A circuit breaker (for supply of removed AC unit)
- Time switch (function unknown)

The main switchboard does not incorporate any identification, labelling or diagrams to indicate the existing electrical arrangement. It was noted that the existing circuit breaker was switched on despite the indicated equipment being decommissioned. RCD protection has not been provided on any existing power or lighting circuits as required under AS/NZS 3000 Clause 2.6.3. The majority of existing sub-circuits have been installed within surface mounted metallic conduits. There is no evidence that the main switchboard has been replaced or significantly refurbished since the construction of the building.

No surge protection or lightning protection system is installed at the site.

The switchboard is not compliant with the current requirements of AS/NZS 3000 and would not be suitable for re-use or modification. If the building is to be retained, it is recommended that a new circuit breaker type distribution board is provided to service the refurbishment. It is expected that, if the building is retained, it would be connected as sub-distribution board below the site main switchboard.

3.5 General Lighting

The lighting throughout the existing building consists of a number of surface mounted incandescent lightbulb holders. At the time of inspection, bulbs were only present in two of the existing seven locations. It is unlikely that light levels complying with the recommendations of AS/NZS 1680.1 could be achieved with the existing system. No existing lighting circuits are provided with RCD protection. The fittings were generally in very poor condition and require replacement.

There are no existing evacuation lights or illuminated exit signs throughout the building.

If the building is to be retained, a new internal and external lighting system will be required to the entire facility. It is recommended that nay new system incorporate time clock and motion sensor controls in order to comply with BCA/NCC requirements and minimise energy usage.

3.6 General Power

The general power installation is in fair condition and some outlets appear to have been refurbished during the life of the building. However, the majority of existing outlets are of considerable age and the associated cabling may no longer be suited for use.

New power outlets and supplies are to be provided to the refurbished building as required if it is retained.

3.7 Smoke Detection/Alarms

No existing smoke detection or smoke alarm systems were observed on site.

3.8 Electrical Recommendations

The existing electrical services and equipment are generally in very poor condition. It is not practical, safe, or economically viable to re-use any of the existing electrical services installed throughout the building.

If the building is retained or refurbished, a complete new electrical installation will need to be provided with all existing electrical elements removed and demolished. This includes, but is not limited to, the provision of:

- New supply authority connections, compliant with the current QECMM
- A new metering arrangement, compliant with the current QECMM
- A new circuit-breaker switchboard to supply installation
- Surge protection and new earthing equipment
- New earthing arrangement in accordance with AS/NZS 3000
- New luminaires and automatic lighting control system in accordance with the BCA/NCC
- New power outlets and supplies to any equipment
- Smoke detection/alarm system and emergency lighting to client specification

The exact configuration of the electrical services provided will be dependent on the use of the surrounding site.

4.0 ARCHITECTURAL/HERITAGE ASSESSMENT

Refer to Appendix A for the full Heritage Report prepared by MacCallum Planning & Architecture.

If you require further information or clarification, do not hesitate to contact Trent Graham or Anthony Florence in the Townsville Office on (07) 4724 2626

Yours faithfully

STP Consultants

Anthony Florence

BEng, MIEAust, RPEQ

Townsville Structural Manager / Partner

Josiah Hosking

BEng, GradIEAust

Electrical Engineer

THIS PAGE HAS BEEN LEFT BLANK

Appendix 9

Flood and Stormwater Management Report

Queensland Government

ENGENY WATER MANAGEMENT

PUBLIC SAFETY BUSINESS AGENCY

3-5 Enterprise Road, Charters Towers QFES

Flood and Stormwater Management Report




November 2018

M50000_016

www.engeny.com.au
P: 07 3221 7174 | F: 07 3236 2399
Lvl 7, 500 Queen St Brisbane QLD 4000 | PO Box 10183 Brisbane QLD 4000

DISCLAIMER

This report has been prepared on behalf of and for the exclusive use of PUBLIC SAFETY BUSINESS AGENCY and is subject to and issued in accordance with PUBLIC SAFETY BUSINESS AGENCY instruction to Engeny Water Management (Engeny). The content of this report was based on previous information and studies supplied by PUBLIC SAFETY BUSINESS AGENCY

Engeny accepts no liability or responsibility whatsoever for it in respect of any use of or reliance upon this report by any third party. Copying this report without the permission of PUBLIC SAFETY BUSINESS AGENCY or Engeny is not permitted.

M50000_016 CHARTERS TOWERS QFES STORMWATER MANAGEMENT PLAN					
DOC PATH FILE: \\EGIBRAPP02\management$\Projects\M50000 Qld Govt Departments\M50000_016 PSBA Charters Towers QFES SMP\07 Deliv\Docs\Report\Revs\M50000_016-REP-001-1-Charters Towers QFES-SMP.docx					
REV	**DESCRIPTION**	**AUTHOR**	**REVIEWER**	**APPROVED BY**	**DATE**
Rev 0	Client Issue	Kelsey Mundt	Mark Page RPEQ 15454	Mark Page RPEQ 15454	9 November 2018
Rev 1	Client Issue	Kelsey Mundt	Mark Page RPEQ 15454	Mark Page RPEQ 15454	20 November 2018
Signatures					

CONTENTS

Appendices

List of Tables

List of Figures

1. INTRODUCTION

The Public Safety Business Agency (PSBA), on behalf of the Queensland Fire and Emergency Services (QFES), has identified a need to construct a new fire station on Enterprise Road, Charters Towers (the Site). Engeny Water Management (Engeny) has been engaged to undertake a Flood and Stormwater Management Report for the Site.

1.1 Existing and Proposed Site Characteristics

The proposed site is located on Lot 100 on SP303847 on 3-5 Enterprise Road in Charters Towers, totalling approximately 3,800 sqm for both lots. The lots are predominantly vacant, with an existing raised timber building located on the south-east corner of the lot. This site has dual access from Craven Street via Gill Street and Enterprise Road via Millchester Road.

Charters Towers is located within the Charters Towers Regional Council (CTRC) local government area (LGA). The designated flood event for planning purposes is the 1:500 Annual Exceedance Probability (AEP) flood event. The area of interest is illustrated in Figure 1.1.

Figure 1.1 Area of Interest

The proposed development of a QFES station will consist of the main fire station, workshop/storage facility, relief quarters, parking and other associated hardstand areas. The development plans are provided in Appendix A.

1.2 Project Scope

The project scope has included the following:

- Assess previous flood study mapping in regard to local and regional flood risk.
- Development of a TUFLOW GPU rain-on-grid hydraulic model of the Site and surrounding areas and undertake a joint hydrologic and hydraulic assessment using the TUFLOW model in accordance with *Australian Rainfall and Runoff 2016* for the 1:500, 1:100 and 1:50 AEP design flood events.
- Development of flood maps for the 1:500, 1:100 and 1:50 AEP design flood events.
- Produce a flood impact map for the proposed site layout for the 1:500, 1:100 and 1:50 AEP design flood events.
- Develop a stormwater quality and quantity management strategy for the proposed QFES station.

1.3 Project Data

The following data was utilised in this study:

- 2012 LiDAR topographic survey data (1 m resolution) obtained from Geosciences Australia.

1.4 Previous Studies

The following previous studies were utilised to inform the flooding conditions at the Site:

- *DNRM Flood Hazard Mapping: Bundle 1 – Charters Towers and Milchester* (DHI, 2014)
- *Burdekin River Basin Level 2 Flood Investigation Report* (KBR, 2015).

2. REGIONAL FLOOD RISK ASSESSMENT

The Department of Natural Resources and Mines (DNRM) *FloodCheck* online tool (http://dnrm-floodcheck.esriaustraliaonline.com.au/floodcheck/) was utilised to ascertain the risk of regional flooding to the proposed QFES site. Charters Towers is covered by the *Burdekin River Basin Level 2 Flood Investigation Report* (KBR, 2015). The results from this investigation show that the Site is not impacted by flooding from a regional system.

Figure 2.1 shows the extreme flood event (Probable Maximum Flood) flood extent in relation to the proposed QFES site from the *Burdekin River Basin Level 2 Flood Investigation Report* (KBR, 2015). It can be seen from this figure that the QFES station is unlikely to be impacted by flooding from a regional flood source.

Figure 2.1 Burdekin River Level 2 Flood Investigation PMF Mapping

3. MODEL DEVELOPMENT

A local scale hydraulic model has been developed for the proposed QFES Site and its reporting catchment in order to assess flood risk from local flooding and overland flow paths. The TUFLOW Rain-on-Grid software was utilised to apply rainfall directly to the catchment in order to define overland flow paths. The following sections detail the model development.

3.1 Design Rainfall

Design rainfall depths were obtained from the AR&R 2016 intensity-frequency-duration (IFD) generation tool available on the Bureau of Meteorology (BoM) website (www.bom.gov.au).

The following storm losses have been sourced from AR&R 2016 (EA, 2016) for the Charters Towers township:

- Initial Storm Loss – 30 mm.
- Continuing Loss – 1.7 mm/hr.

The Initial Storm Loss has been adjusted in accordance with AR&R 2016 to determine the Burst Loss for the design flood events. Burst losses were calculated as:

Burst Loss (mm) = Storm Loss (mm) – Pre-Burst Rainfall (mm) (EA, 2016)

Median pre-burst rainfall depths (obtained from AR&R Data Hub) were subtracted from the initial storm losses for each AEP and duration of interest.

3.2 Model Setup

The general catchment topography in Charters Towers is relatively flat with a catchment considered to be potentially contributing to overland flow on the Site located generally south-west of the Site. The model utilised a 1 m digital elevation model (DEM) derived from the latest 2012 LIDAR data provided by Geosciences Australia. The model extent and DEM are presented in Figure 3.1.

Publicly available aerial photography has been reviewed to assess the local drainage network. Significant drainage structures were not observed. Pipe drainage networks are typically designed for frequent (i.e. 2-year average recurrence interval (ARI)) events and would have a negligible effect on the rare flood events of interest for this study. Pipe drainage has therefore been excluded from the model.

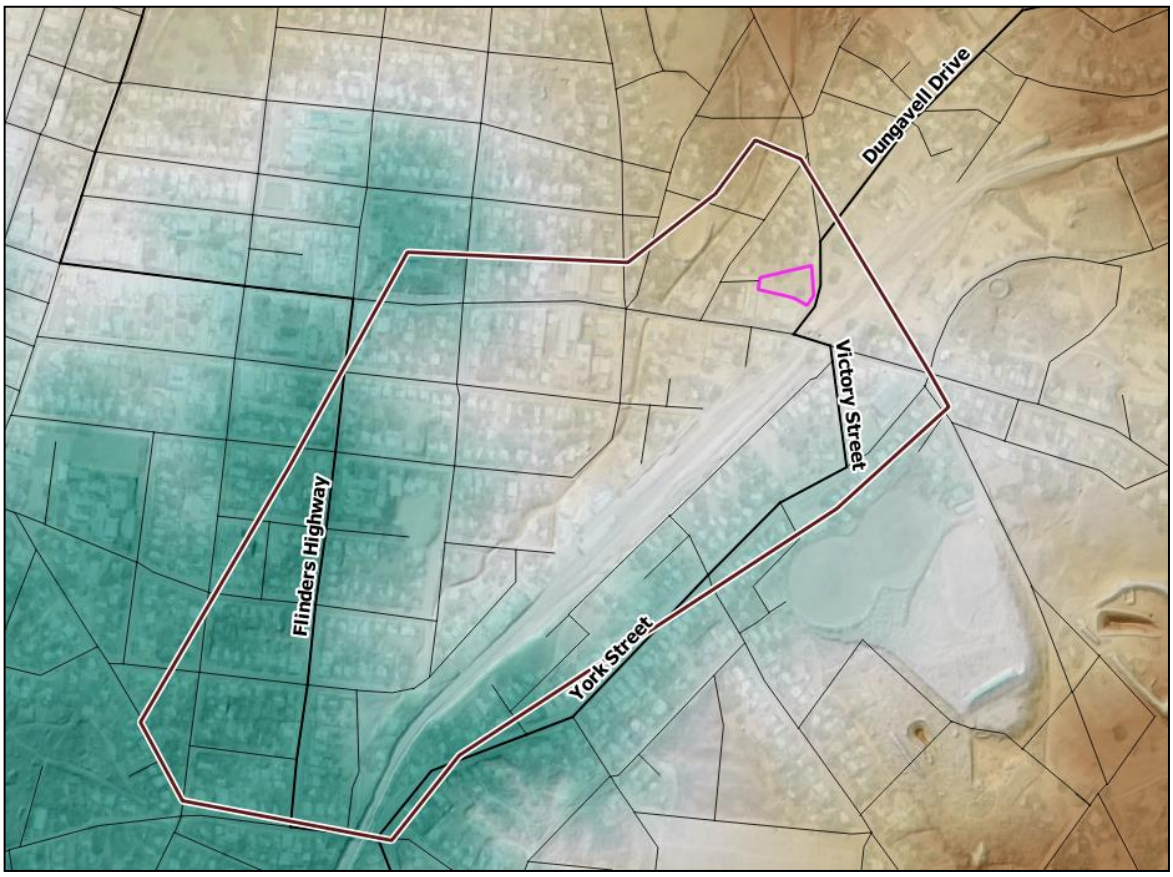


Figure 3.1 Hydraulic Model Extent and DEM

The key model parameters included:

- A cell size of 2 m and the adaptive time-stepping inherent in the GPU package.
- A normal slope boundary condition was applied at all boundaries to simulate free outflow conditions. Model results at the area of interest are not sensitive to the downstream boundary condition.
- A materials layer based on existing land use was developed using aerial imagery.
- Industry standard Manning's "n" roughness values and impervious fractions adopted for each material type are presented in Table 3.1.

Table 3.1 Land Use Parameters

Land Use Type	Fraction Impervious	Manning's 'n' values
Road	90%	0.025
Open Space	0%	0.050

Land Use Type	Fraction Impervious	Manning's 'n' values
Low Density Residential	65%	0.150
Local Centre	80%	0.200
Flow Path Obstructions (i.e. dwellings, railway station)	90%	0.500

3.3 Temporal Pattern and Critical Duration Analysis

The critical duration and temporal pattern for the 1:50, 1:100 and 1:500 AEP flood event was determined by first simulating the model with the Average Variability Method temporal pattern. The 30 minute and 60-minute durations were determined to be critical for the Site.

Following this, the ensemble of temporal patterns for the 'Monsoonal North' zone was applied to the model. Five locations in the vicinity of the Site were inspected for the 30 minute and 60-minute for the ten AR&R 2016 temporal patterns. The temporal pattern that resulted in the average flood level was determined for each duration. The temporal pattern and critical duration combinations selected for the modelling are summarised in Table 3.2.

Table 3.2 Temporal Pattern and Critical Duration Selection

Flood Event	30 Minute Storm Temporal Pattern	60 Minute Storm Temporal Pattern
1:50 AEP	T7	T8
1:100 AEP	T5	T7
1:500 AEP	T7	T5

4. MODEL RESULTS

4.1 Results Summary

Model results indicated that the Site was primarily affected by an overland flow path from Enterprise Road. The flow path drains from south to north through the main proposed administration building on the Site. Some minor ponding was also observed to the west of this main flow path.

Flood depth mapping for the 1:500 AEP flood event is shown in Figure 4.2, with the 1:100 and 1:50 AEP design flood events also presented in Appendix B.

Depth, level and depth-velocity product results for the existing scenario are provided in Table 3.1 for the key reporting points illustrated on Figure 3.1 (and also shown on the figures in Appendix B). These values should be read in conjunction with the mapping provided in Appendix B.

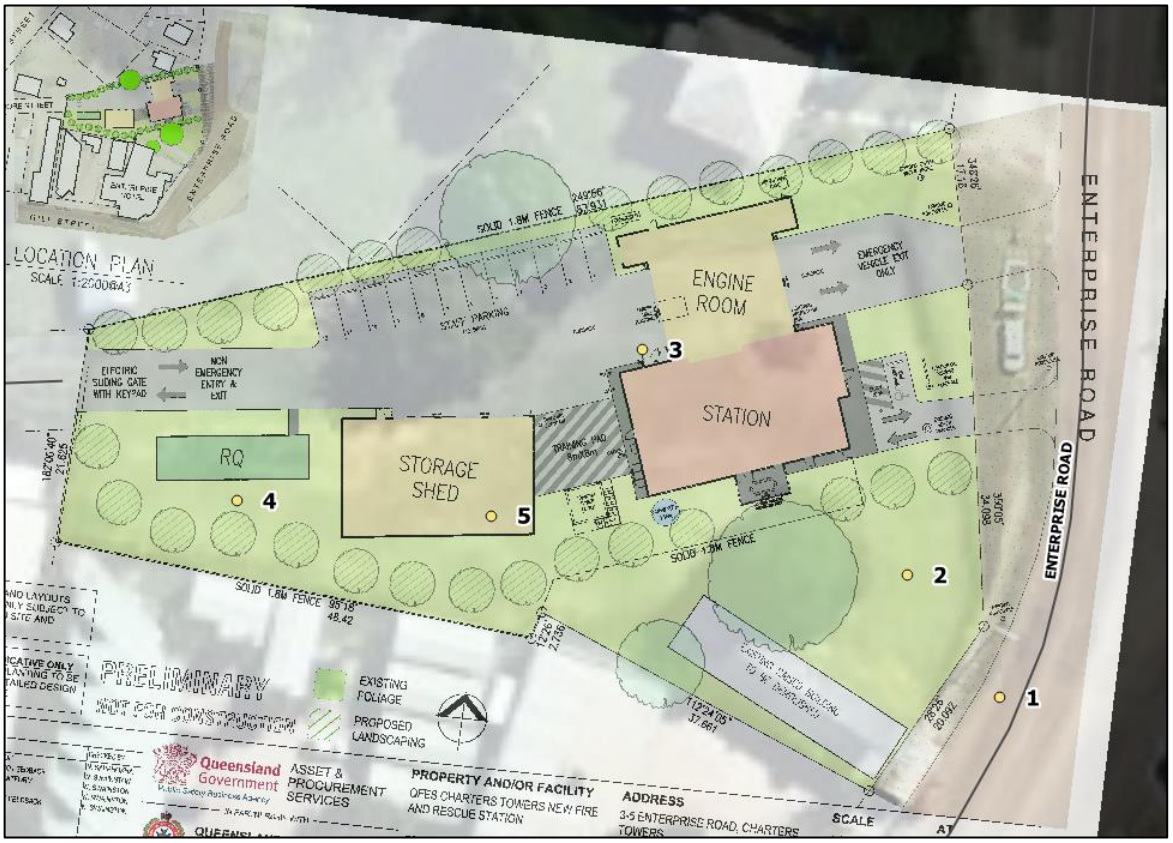


Figure 4.1 Reporting Locations

Table 4.1 Results Summary - Existing Scenario

Reporting Point	Ground Level (m AHD)	Water Surface Level (m AHD)			Depth (m)			Depth x Velocity (m^2/s)		
		1:500 AEP	1:100 AEP	1:50 AEP	1:500 AEP	1:100 AEP	1:50 AEP	1:500 AEP	1:100 AEP	1:50 AEP
1	306.18	306.27	306.25	306.25	0.06	0.05	0.05	0.05	0.04	0.04
2	305.67	305.72	305.71	305.71	0.06	0.04	0.04	0.03	0.02	0.02
3	304.77	304.86	304.84	304.84	0.08	0.06	0.06	0.04	0.03	0.03
4	304.96	305.00	304.99	-	0.04	0.03	-	0.01	0.01	
5	305.09	305.16	305.15	305.15	0.06	0.05	0.05	0.01	0.01	0.01

Level 7, 500 Queen St Brisbane QLD 4000
PO Box 10183 Brisbane QLD 4000
www.engeny.com.au
P: 03 3221 7174
F: 03 3236 2399

ENGENY WATER MANAGEMENT

Queensland Government

0 19 38 m

Scale in metres (1:800 @ A3)

Map Projection: Tranverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Vertical Datum: Australia Height Datum
Grid: Map Grid of Australia, Zone 56

Charters Towers QFE S Flood and Stormwater Report

1:500 AEP Flood Depth

Job Number: M50000_016
Revision: 0
Drawn: KM
Date: 20 /11 /2018

4.2 Site Flood Levels

As summarised above, the proposed location of on-site infrastructure for the proposed QFES station is affected by shallow overland flow (i.e. less than 60 mm) in the existing scenario. The primary flow path transects the proposed administration building, with a maximum flood depth in the 1:500 AEP flood event of 80 mm. Minor ponding of a maximum depth of 60 mm in the 1:500 AEP flood event was observed on the upstream side of the proposed storage/workshop facility and relief quarter.

The overland flooding observed on the Site is not considered to pose an unacceptable risk to pedestrians or vehicles, as the modelled depth x velocity product (DxV) in the 1:500 AEP flood event (maximum 0.05 m^2/s on-site) is well below the maximum limits for trafficability and stability recommended in Australian Rainfall and Runoff 2016 (Ball, et. al., 2016).

The limits for vehicle trafficability are:

- Small passenger vehicle: DxV ≤ 0.30 m^2/s
- Large passenger vehicle: DxV ≤ 0.45 m^2/s
- Large 4WD: DxV ≤ 0.60 m^2/s.

The limits for pedestrian stability are:

- Children: DxV ≤ 0.40 m^2/s (providing depth <0.5 m and velocity <3 m/s)
- Adults: DxV ≤ 0.60 m^2/s (providing depth <1.2 m and velocity <3 m/s).

4.3 Road Access

The site is proposed to be accessed from the east and west, via Enterprise Road and Craven Street, respectively. The 1:500 AEP depth x velocity product (DxV) results were more broadly inspected to determine if there were any areas where DxV exceeded the large 4WD limit for trafficability of 0.60 m^2/s.

Generally, Charters Towers is relatively flat and areas where the DxV product exceeds 0.60 m^2/s to likely to be limited. Within the model limits, the only areas of potential concern were the locations where roads intersect a major overland flow path flowing from south to north. Roads potentially affected by this overland flow path include Hodgkinson Street, Melville Street, Mexican Street and Aland Street. The 1:500 AEP DxV mapping is provided in Figure 4.3.

Legend

Road
Site Boundary
Cadastre

Depth x Veloxity (m2/s)

<= 0.1
0.1 - 0.3
0.3 - 0.45
0.45 - 0.6
> 0.6

GILL STREET
DAN LANE
CRAVEN STREET
SHORE STREET
ENTERPRISE ROAD
NEW QUEEN R
VULTURE STREET
QUEENTON LANE
MILLCHESTER ROAD
HODGKINSON STREET
BARRONS LANE
ROAD
HIGH STREET
BOUNDARY STREET
MILTON LANE
VICTORY STREET
ROAD
ALAND STREET
SADDS LANE
YORK STREET
VICTORIA STREET
MEXICAN STREET
MEXICAN STREET
BLUFF LANE
MCCABE LANE
VICTORIA STREET
CASSIDY LANE
BLUFF ROA

Level 7, 500 Queen St Brisbane QLD 4000
PO Box 10183 Brisbane QLD 4000
www.engeny.com.au
P: 03 3221 7174
F: 03 3236 2399

ENGENY WATER MANAGEMENT

Queensland Government

0 60 120 m

Scale in metres (1:2,500 @ A3)

Map Projection: Tranverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Vertical Datum: Australia Height Datum
Grid: Map Grid of Australia, Zone 56

Charters Towers QFE S Flood and Stormwater Report

1:500 AEP Flood Hazard
Deptuh x Veloxity Product

Job Number:
M50000_016
Revision: 0
Drawn: KM
Date: 20 /11 /2018

4.4 Flood Impacts of Proposed Layout

A post-development scenario TUFLOW model was developed from the existing scenario model by representing the proposed QFES station buildings as full obstructions. This essentially simulates what would happen if the buildings were built on solid pads to ensure that they have 1:500 AEP flood immunity to floor level. The resulting Finished Floor Levels (FFL) required for 1:500 AEP flood immunity on-site are as follows:

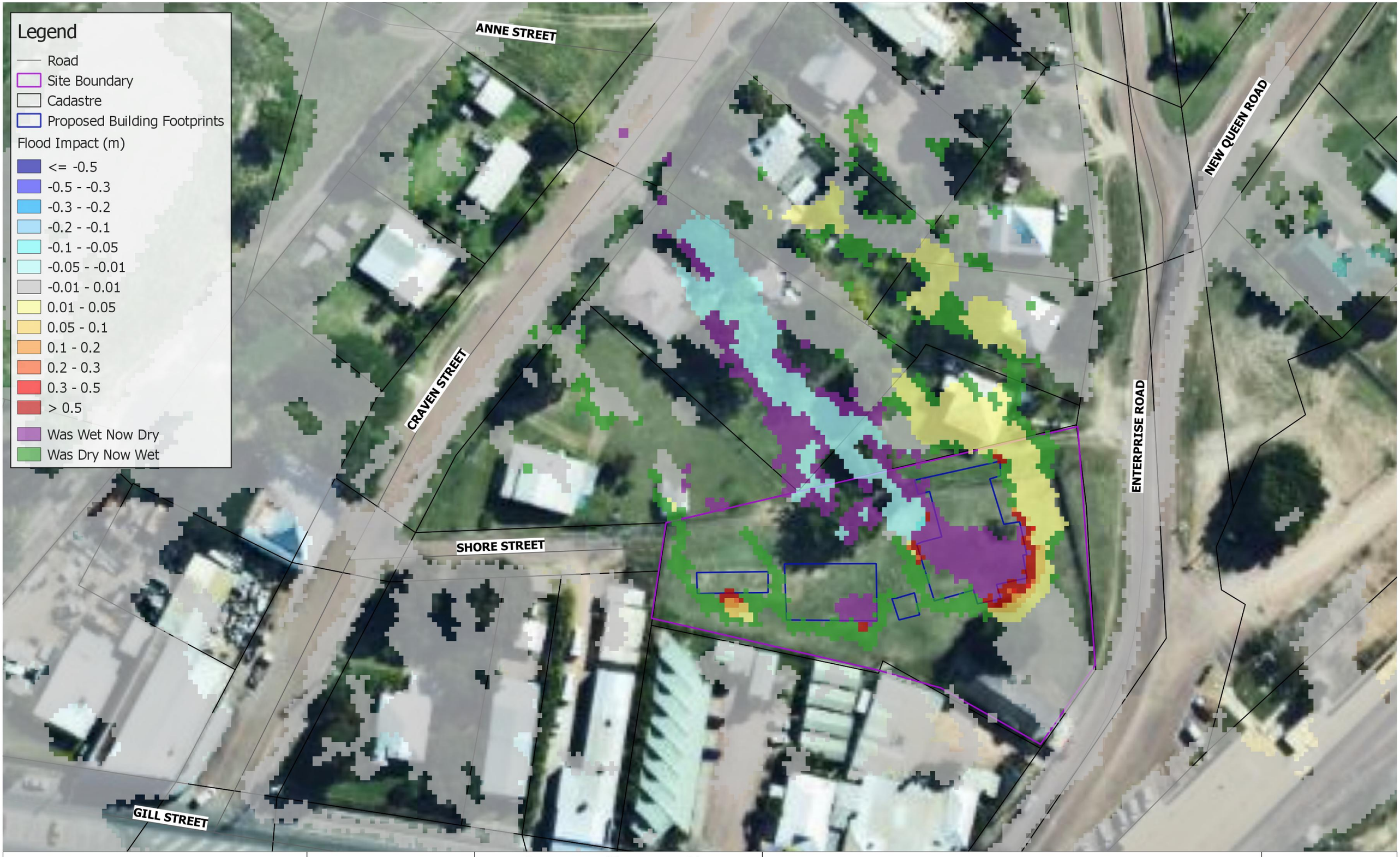
- Main administration building = 305.6 m AHD.
- Workshop/storage facility = 305.8 m AHD.
- Relief quarter = 305.3 m AHD.

A flood afflux map which shows the expected increases in flood level following the incorporation of the proposed buildings as obstructions has also been prepared for the 1:50, 1:100 and 1:500 AEP flood events and are provided in Appendix B. The impact mapping indicates the following:

- Localised increases in flood level were observed upstream of the proposed buildings due to blocking the natural flow path.
- Areas which were previously dry in the existing case were indicated as being wet in the post-developed case due to re-direction of the flow path through the Site.
- Reductions in flood level up to 22 m were observed in the 1:500 AEP flood event on Lot 1 on MPH21553 and Lot 2 on MPH1527 due to re-direction of the flow path through the Site, accompanied by increases in flood level of on Lot 1 (50 mm), Lot 3 (15 mm), Lot 4 (30 mm) and Lot 5 (15 mm) on MPH21553.

In terms of managing the impacts associated with the construction of the proposed QFES buildings, the following options could be considered:

- Incorporation of a localised drainage solution around the buildings that ensures conveyance around the proposed buildings without impacting downstream properties. In order to avoid impacting downstream properties, controlled discharge to a formalised drainage system within Shore Street, or alternatively an easement may be required to ensure no nuisance flooding to adjacent private properties. Alternatively, a discharge agreement may be required with affected properties.
- Raised building platforms that enable the overland flow to be conveyed underneath the building envelope.



Level 7, 500 Queen St Brisbane QLD 4000
PO Box 10183 Brisbane QLD 4000
www.engeny.com.au
P: 03 3221 7174
F: 03 3236 2399

ENGENY WATER MANAGEMENT

Queensland Government

0 17 34 m

Scale in metres (1:700 @ A3)

Map Projection: Tranverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Vertical Datum: Australia Height Datum
Grid: Map Grid of Australia, Zone 56

Charters Towers QFE S Flood and Stormwater Report

1:500 AEP Flood Impact

Job Number: M50000_016
Revision: 0
Drawn: KM
Date: 20 /11 /2018

5. STORMWATER QUANTITY

It is proposed that stormwater detention not be provided for the development. The new station buildings will result in an impervious fraction less than the zoning indicated in the Charter Towers Planning Scheme (CTRC, 2006). Stormwater flows from the development will be discharged directly to the Lawful Point of Discharge (LPD) on the Shore Street linking to Craven Street.

5.1 Identification of LPD

Currently, overland flow from the Site discharges over the northern boundary of the Site to the adjacent private properties. Following the development of the QFES station, the roof and impervious areas will be connected via an internal site drainage system and discharged to Shore Street. As such, a formalised drainage system may be required for Shore Street (i.e. kerb and channel). Any remaining areas of the Site not impacted by the development and not connected to the stormwater system will continue to sheet flow across the northern boundary as per the existing condition.

5.2 Stormwater Management

The fraction of the total site area (3,800 sqm) that is proposed to be impervious following construction of the station is approximately 55%. The new buildings for the station are also proposed to be constructed entirely on a single lot, which is zoned as Commercial according to the CTRC Planning Scheme Zone Map. An impervious fraction of 55% is considered less than the maximum impervious fraction possible for a commercial development (90% impervious). Therefore, following formalisation of a drainage system on Shore Street, and the expected impervious fraction in consideration of the development zoning, flows from the Site will be catered for in Craven Street.

6. STORMWATER QUALITY

The SPP (DILGP 2017) Part D and Table B establish policies around matters of state interest for land designated for community infrastructure (e.g. a fire station). In accordance with the SPP, best practise stormwater quality management will be required during construction phases of the proposed Charters Towers QFES station, including erosion and sediment control and installation of a gross pollutant trap (if desirable to CTRC).

Appendix 2, Table B of the SPP 2017 provides stormwater management design objectives for the operational phase of developments. Charters Towers is in the Western Queensland climatic region, which has an exemption for development where the local population centre is smaller than 25,000 persons or if the development is smaller than 2,500 m² in size. The Site does exceed this minimum as it is approximately 3,800 m^2 in size. However, the Australian Bureau of Statistics (ABS) 2016 census data (ABS, 2016) states that the population of the Charters Towers is 8,120. As such, a stormwater quality management plan is not required for the development.

7. CONCLUSIONS

The following summarises the findings from the Flooding and Stormwater Management Report for the proposed Queensland Fire and Emergency Services (QFES) Station at 3-5 Enterprise Road, Charters Towers.

Regional Flood Assessment

- The extreme flood event (Probable Maximum Flood) from the *Burdekin River Basin Level 2 Flood Investigation Report* (KBR, 2015) extent was utilised to inform the regional flood risk to the Site. It can be seen from this figure that the QFES station is unlikely to be impacted by flooding from a regional flood source.

Local Flood Assessment

- A TUFLOW 2d hydraulic Rain-on-Grid (ROG) model was developed specifically to determine the local flood risk to the Site from the 1:50, 1:100 and 1:500 AEP flood events in relation to the Site. The model results indicate that the Site is affected by an overland flow path from Enterprise Road, with a maximum flood depth of 80 mm in the 1:500 AEP flood event.

- In regard to flood free access, generally in the vicinity of the Site there are limited areas where the DXV exceeds 0.60 m^2/s. Within the model limits, high DxV values are observed where roads intersect a major overland flow path. These roads include Hodgkinson Street, Melville Street, Mexican Street and Aland Street.

- If the buildings currently proposed for the QFES station were constructed upon raised slabs, impacts of up to 50 mm in the 1:500 AEP flood event and re-direction of flow is expected on private properties adjacent to the Site. These impacts could be avoided through an on-site drainage solution that conveys flow around the proposed buildings and through to Craven Street.

Stormwater Management Plan

- The proposed LPD for the Site is a future formalised drainage system (i.e. kerb and channel) on the Shore Street linking to Craven Street and stormwater detention for the Site is not proposed.

- Best practise stormwater quality management will be required during construction phases of the proposed QFES station including erosion and sediment control and installation of a gross pollutant trap (if desirable to CTRC). Under the SPP specifications, a bioretention basin will not be required.

8. QUALIFICATIONS

a. In preparing this document, including all relevant calculation and modelling, Engeny Water Management (Engeny) has exercised the degree of skill, care and diligence normally exercised by members of the engineering profession and has acted in accordance with accepted practices of engineering principles.

b. Engeny has used reasonable endeavours to inform itself of the parameters and requirements of the project and has taken reasonable steps to ensure that the works and document is as accurate and comprehensive as possible given the information upon which it has been based including information that may have been provided or obtained by any third party or external sources which has not been independently verified.

c. Engeny reserves the right to review and amend any aspect of the works performed including any opinions and recommendations from the works included or referred to in the works if:

   (i) Additional sources of information not presently available (for whatever reason) are provided or become known to Engeny; or

   (ii) Engeny considers it prudent to revise any aspect of the works in light of any information which becomes known to it after the date of submission.

d. Engeny does not give any warranty nor accept any liability in relation to the completeness or accuracy of the works, which may be inherently reliant upon the completeness and accuracy of the input data and the agreed scope of works. All limitations of liability shall apply for the benefit of the employees, agents and representatives of Engeny to the same extent that they apply for the benefit of Engeny.

e. This document is for the use of the party to whom it is addressed and for no other persons. No responsibility is accepted to any third party for the whole or part of the contents of this report.

f. If any claim or demand is made by any person against Engeny on the basis of detriment sustained or alleged to have been sustained as a result of reliance upon the report or information therein, Engeny will rely upon this provision as a defence to any such claim or demand.

g. This report does not provide legal advice.

9. REFERENCES

DEWS (2013), *Queensland Urban Drainage Manual – Third Edition 2013 – Provisional*. Department of Energy and Water Supply.

Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I (Editors) (2016), *Australian Rainfall and Runoff: A Guide to Flood Estimation*, © Commonwealth of Australia (Geoscience Australia).

Charters Towers Regional Council (CTRC) (2006), *Charters Towers Planning Scheme.* July 2006.

DHI (2014), *DNRM Flood Hazard Mapping: Bundle 1 – Charters Towers and Milchester.*

KBR (2015), *Flood Mapping for the Burdekin River Basin.* Also referred to as *Burdekin River Basin Level 2 Flood Investigation Report*.

Smith, G., Modra, B., Tucker, T., Cox, R. (2017), *Vehicle Stability Testing for Flood Flows.* Water Research Laboratory, UNSW.

APPENDIX A

Development Layout

LOCATION PLAN

SCALE 1:2000@A3

ENTERPRISE ROAD

SOLID 1.8M FENCE 249°56' 87.931

ENGINE ROOM

GENERATOR

PEDESTRIAN GATE

EXISTING ONSITE WATER METRE

EXISTING POWERPOLE

346°26' 17.16

EMERGENCY VEHICLE EXIT ONLY

CONCRETE

LIGHTNING PROTECTION MAST

LADDER DRILL PLATFORM

STAFF PARKING (12 BAYS)

CONCRETE

STATION

SHARE ZONE

DISABLED PARK

CORPORATE SIGNAGE AND FLAGPOLE

EXISTING SEWER MANHOLE

EXISTING POWERPOLE

ELECTRIC SLIDING GATE WITH KEYPAD

NON EMERGENCY ENTRY & EXIT

DRINKING FOUNTAIN

TRAINING PAD 8mX8m

BATTERY BOX

COVERED OUTDOOR RECREATION AREA

RQ

STORAGE SHED

TRAINING TOWER (6.7M)

RAINWATER TANK

350°05' 34.098

182°00'40" 21.625

SOLID 1.8M FENCE

SOLID 1.8M FENCE 95°18' 48.42

12°26' 2.736

EXISTING RAISED BUILDING TO BE DEMOLISHED

112°24'05" 37.661

28°26' 20.092

ALL DIMENSIONS AND LAYOUTS ARE INDICATIVE ONLY SUBJECT TO CONFIRMATION ON SITE AND DETAILED DESIGN

LANDSCAPING **INDICATIVE ONLY** SIZE AND TYPE OF PLANTING TO BE DETERMINED AT DETAILED DESIGN PHASE

PRELIMINARY

NOT FOR CONSTRUCTION

EXISTING FOLIAGE

PROPOSED LANDSCAPING

AMENDMENTS

ISSUE	DATE	SUBJECT	CHECKED BY
A	16.08.2018	PRELIMINARY ISSUE	N. SAPPHOKHA
B	28.08.2018	ADJUSTED PLAN TO FEEDBACK	N. SWAINSTON
C	12.09.2018	ADDED LADDER PLATFORM	N. SWAINSTON
D	20.09.2018	REISSUE	N. SWAINSTON
E	08.11.2018	ADJUSTED PLAN TO FEEDBACK	N. SWAINSTON

Queensland Government
Public Safety Business Agency

ASSET & PROCUREMENT SERVICES

IN PARTNERSHIP WITH

QUEENSLAND FIRE & EMERGENCY SERVICES

PROPERTY AND/OR FACILITY

QFES CHARTERS TOWERS NEW FIRE AND RESCUE STATION

ADDRESS

3-5 ENTERPRISE ROAD, CHARTERS TOWERS.
LOT 100 ON SP303847

SHEET DESCRIPTION

PROPOSED SITE PLAN

SCALE	AT
1:300	A3

CAD FILE PATHWAY

...\CHARTERS TOWERS\181101_Charters

DRAWING NO.	SHEET NO.	ISSUE
SD01	1 of 4	E

APPENDIX B

Flood Mapping

Level 7, 500 Queen St Brisbane QLD 4000
PO Box 10183 Brisbane QLD 4000
www.engeny.com.au
P: 03 3221 7174
F: 03 3236 2399

ENGENY WATER MANAGEMENT

Queensland Government

0 19 38 m

Scale in metres (1:800 @ A3)

Map Projection: Tranverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Vertical Datum: Australia Height Datum
Grid: Map Grid of Australia, Zone 56

Charters Towers QFE S Flood and Stormwater Report

1:50 AEP Flood Depth

Job Number: M50000_016
Revision: 0
Drawn: KM
Date: 20 /11 /2018

133

Level 7, 500 Queen St Brisbane QLD 4000
PO Box 10183 Brisbane QLD 4000
www.engeny.com.au
P: 03 3221 7174
F: 03 3236 2399

ENGENY WATER MANAGEMENT

Queensland Government

0 19 38 m

Scale in metres (1:800 @ A3)

Map Projection: Tranverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Vertical Datum: Australia Height Datum
Grid: Map Grid of Australia, Zone 56

Charters Towers QFE S Flood and Stormwater Report

1:100 AEP Flood Depth

Job Number: M50000_016
Revision: 0
Drawn: KM
Date: 20 /11 /2018

Level 7, 500 Queen St Brisbane QLD 4000
PO Box 10183 Brisbane QLD 4000
www.engeny.com.au
P: 03 3221 7174
F: 03 3236 2399

ENGENY WATER MANAGEMENT

Queensland Government

0 19 38 m

Scale in metres (1:800 @ A3)

Map Projection: Tranverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Vertical Datum: Australia Height Datum
Grid: Map Grid of Australia, Zone 56

Charters Towers QFE S Flood and Stormwater Report

1:500 AEP Flood Depth

Job Number: M50000_016
Revision: 0
Drawn: KM
Date: 20 /11 /2018

Level 7, 500 Queen St Brisbane QLD 4000
PO Box 10183 Brisbane QLD 4000
www.engeny.com.au
P: 03 3221 7174
F: 03 3236 2399

ENGENY WATER MANAGEMENT

Queensland Government

0 17 34 m

Scale in metres (1:700 @ A3)

Map Projection: Tranverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Vertical Datum: Australia Height Datum
Grid: Map Grid of Australia, Zone 56

Charters Towers QFE S Flood and Stormwater Report

1:50 AEP Flood Impact

Job Number: M50000_016
Revision: 0
Drawn: KM
Date: 20 /11 /2018

Level 7, 500 Queen St Brisbane QLD 4000
PO Box 10183 Brisbane QLD 4000
www.engeny.com.au
P: 03 3221 7174
F: 03 3236 2399

ENGENY WATER MANAGEMENT

Queensland Government

0 17 34 m

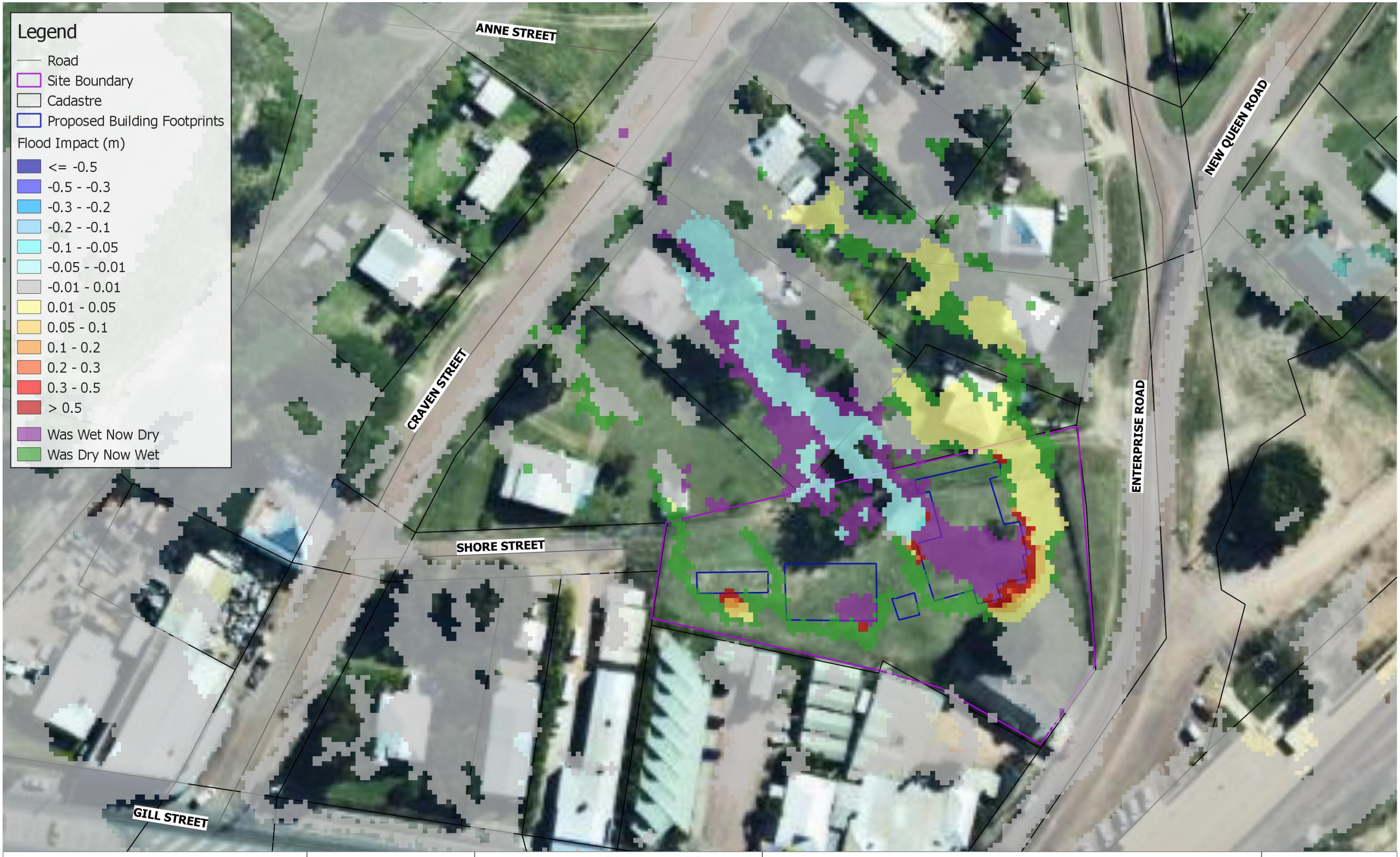
Scale in metres (1:700 @ A3)

Map Projection: Tranverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Vertical Datum: Australia Height Datum
Grid: Map Grid of Australia, Zone 56

Charters Towers QFE S Flood and Stormwater Report

1:100 AEP Flood Impact

Job Number: M50000_016
Revision: 0
Drawn: KM
Date: 20 /11 /2018



Level 7, 500 Queen St Brisbane QLD 4000
PO Box 10183 Brisbane QLD 4000
www.engeny.com.au
P: 03 3221 7174
F: 03 3236 2399

ENGENY WATER MANAGEMENT

Queensland Government

0 17 34 m

Scale in metres (1:700 @ A3)

Map Projection: Tranverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Vertical Datum: Australia Height Datum
Grid: Map Grid of Australia, Zone 56

Charters Towers QFE S Flood and Stormwater Report

1:500 AEP Flood Impact

Job Number: M50000_016
Revision: 0
Drawn: KM
Date: 20 /11 /2018

Level 7, 500 Queen St Brisbane QLD 4000
PO Box 10183 Brisbane QLD 4000
www.engeny.com.au
P: 03 3221 7174
F: 03 3236 2399

ENGENY WATER MANAGEMENT

Queensland Government

0 60 120 m

Scale in metres (1:2,500 @ A3)

Map Projection: Tranverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Vertical Datum: Australia Height Datum
Grid: Map Grid of Australia, Zone 56

Charters Towers QFE S Flood and Stormwater Report

1:50 AEP Flood Hazard
Deptuh x Veloxity Product

Job Number:
M50000_016
Revision: 0
Drawn: KM
Date: 20 /11 /2018

Legend

Road
Site Boundary
Cadastre

Depth x Veloxity (m2/s)

<= 0.1
0.1 - 0.3
0.3 - 0.45
0.45 - 0.6
> 0.6

GILL STREET
DAN LANE
CRAVEN STREET
SHORE STREET
ENTERPRISE ROAD
NEW QUEEN R
VULTURE STREET
QUEENTON LANE
MILLCHESTER ROAD
HODGKINSON STREET
BARRONS LANE
ROAD
HIGH STREET
BOUNDARY STREET
MILTON LANE
VICTORY STREET
ROAD
ALAND STREET
SADDS LANE
YORK STREET
VICTORIA STREET
MEXICAN STREET
MEXICAN STREET
BLUFF LANE
MCCABE LANE
CASSIDY LANE
BLUFF ROA
VICTORIA STREET

Level 7, 500 Queen St Brisbane QLD 4000
PO Box 10183 Brisbane QLD 4000
www.engeny.com.au
P: 03 3221 7174
F: 03 3236 2399

ENGENY WATER MANAGEMENT

Queensland Government

0 60 120 m

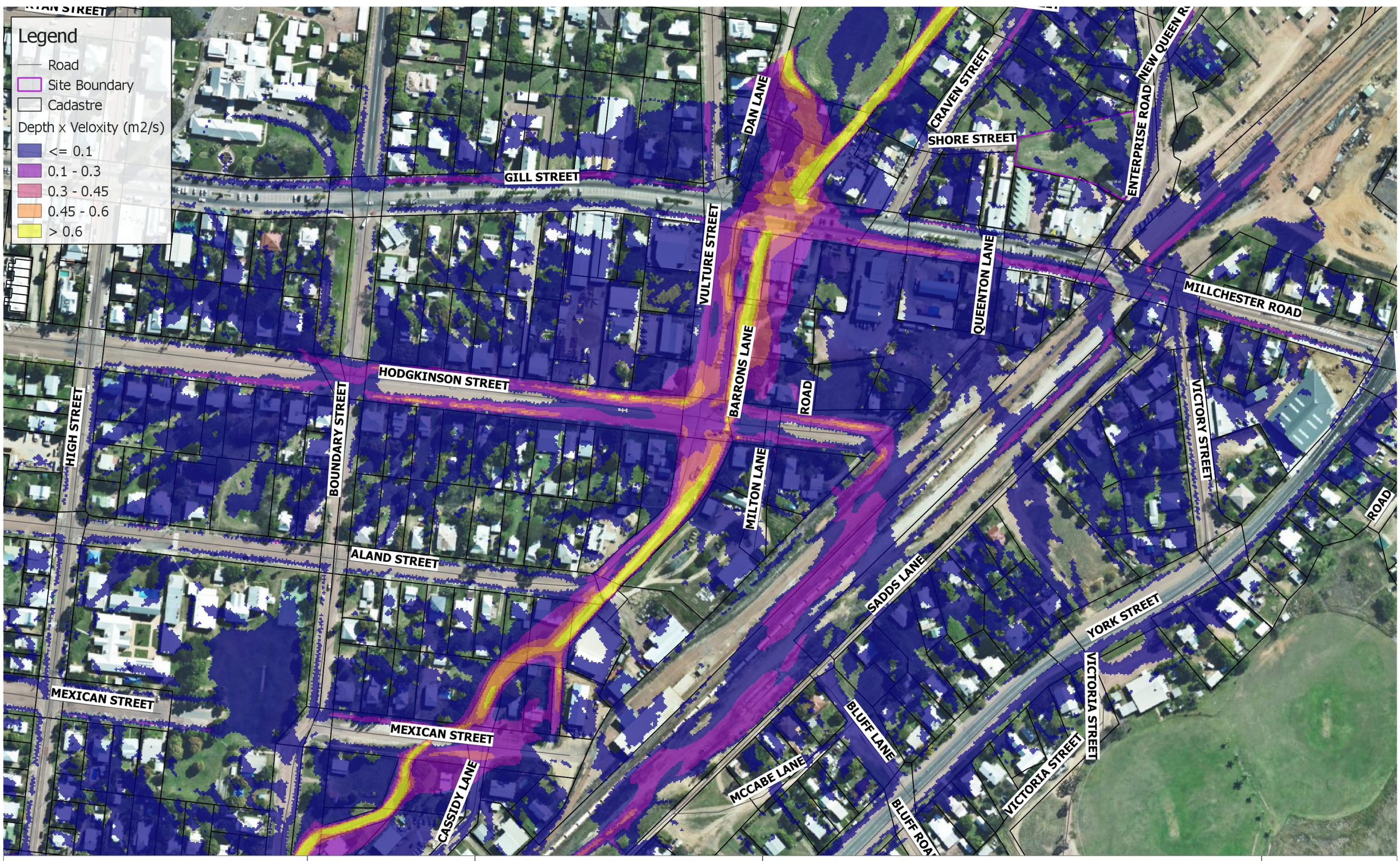
Scale in metres (1:2,500 @ A3)

Map Projection: Tranverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Vertical Datum: Australia Height Datum
Grid: Map Grid of Australia, Zone 56

Charters Towers QFE S Flood and Stormwater Report

1:100 AEP Flood Hazard
Deptuh x Veloxity Product

Job Number:
M50000_016
Revision: 0
Drawn: KM
Date: 20 /11 /2018



Level 7, 500 Queen St Brisbane QLD 4000
PO Box 10183 Brisbane QLD 4000
www.engeny.com.au
P: 03 3221 7174
F: 03 3236 2399

ENGENY WATER MANAGEMENT

Queensland Government

0 60 120 m

Scale in metres (1:2,500 @ A3)

Map Projection: Tranverse Mercator
Horizontal Datum: Geocentric Datum of Australia
Vertical Datum: Australia Height Datum
Grid: Map Grid of Australia, Zone 56

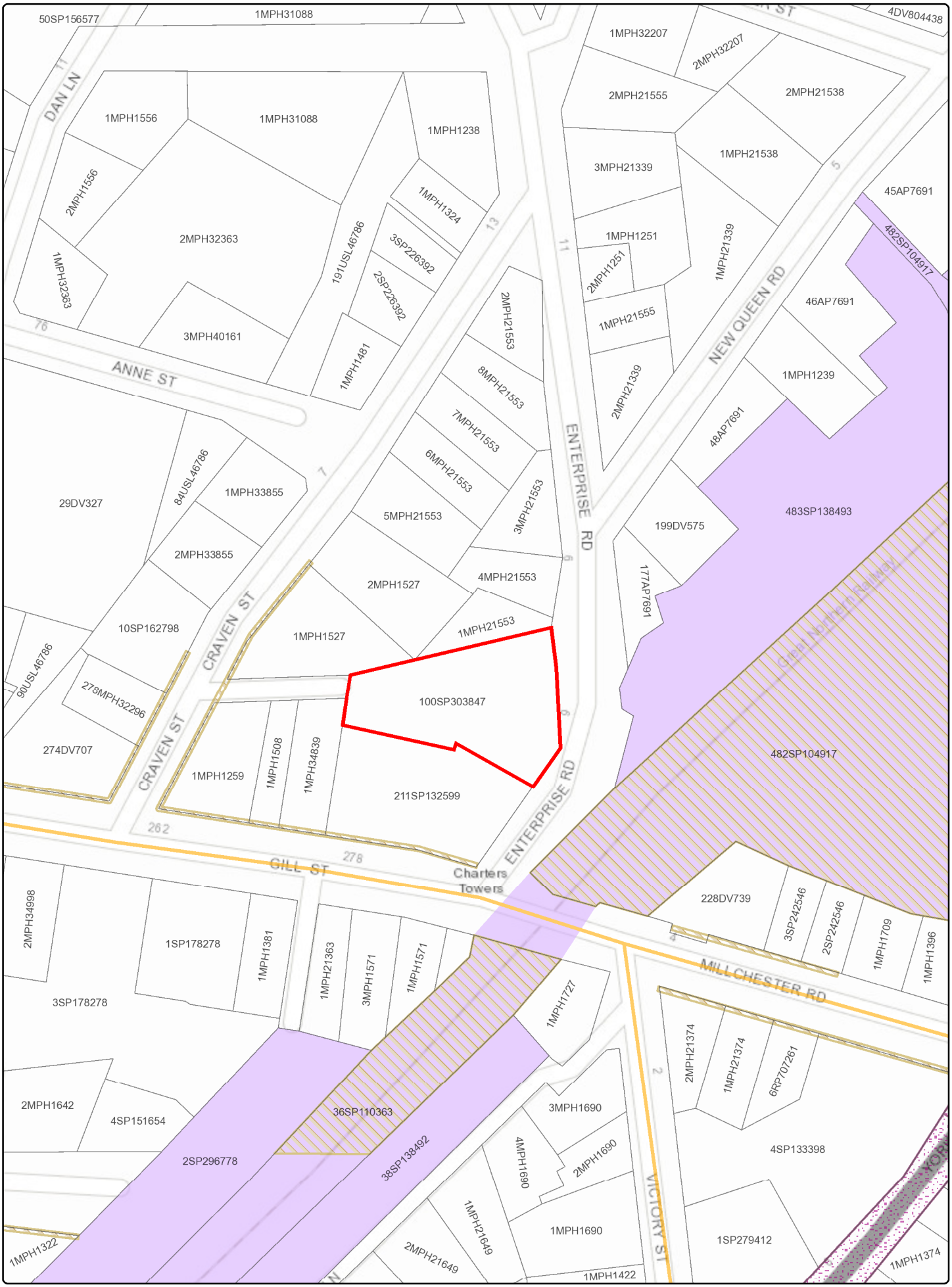
Charters Towers QFE S Flood and Stormwater Report

1:500 AEP Flood Hazard
Deptuh x Veloxity Product

Job Number:
M50000_016
Revision: 0
Drawn: KM
Date: 20 /11 /2018

Appendix 10

State Interest Trigger Mapping



State Planning Policy

Making or amending a local planning instrument and designating land for community infrastructure

Date: 11/12/2018

Department of State Development, Manufacturing, Infrastructure and Planning

Queensland Government

0 30 60 90 120

Metres

Legend

Drawn Polygon Layer

Override 1

Cadastre

Cadastre

Public passenger transport facility

Public passenger transport facility

Future public passenger transport facility

Future public passenger transport facility

Active transport corridor

Active transport corridor

Future State-controlled transport tunnel

Future State-controlled transport tunnel

State-controlled transport tunnel

State-controlled transport tunnel

Future busway corridor

Future busway corridor

Busway corridor

Busway corridor

Future light rail corridor

Future light rail corridor

Light rail corridor

Light rail corridor

Coastal management district

Coastal management district

State heritage place

State heritage place

National heritage place

National heritage place

State-controlled road

State-controlled road

Future State-controlled road

Future State-controlled road

Future railway corridor

Future railway corridor

Railway corridor

Railway corridor

Queensland Government

Department of State Development, Manufacturing, Infrastructure and Planning

Appendix 11

Geotechnical Report

Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Geotechnical Investigation

Proposed Fire Station
3-5 Enterprise Road, Charters Towers

Prepared for
Public Safety Business Agency (PSBA)

Project 93893.00
June 2018

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

Document details

Project No.	93893.00	Document No.	R.001.Rev0
Document title	Report on Geotechnical Investigation Proposed Fire Station		
Site address	3-5 Enterprise Road, Charters Towers		
Report prepared for	Public Safety Business Agency (PSBA)		
File name	93893.00.R.001.Rev0		

Document status and review

Status	Prepared by	Reviewed by	Date issued
Revision 0	Kate Fulham	Bruce Stewart	8 June 2018

Distribution of copies

Status	Electronic	Paper	Issued to
Revision 0	1	0	Julie Huynh, Public Safety Business Agency (PSBA)

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		8 June 2018
Reviewer		8 June 2018

bsi. ISO 9001 Quality Management

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
29 Civil Road
Garbutt QLD 4814
Phone (07) 4779 9866

Table of Contents

Report on Geotechnical Investigation
Proposed Fire Station
3-5 Enterprise Road, Charters Towers

1. Introduction

This report presents the results of a geotechnical investigation undertaken for a proposed fire station at 3-5 Enterprise Road, Charters Towers. The investigation was commissioned in an email dated 3 May 2018 by Julie Huynh of Public Safety Business Agency (PSBA) and was undertaken in accordance with Douglas Partners Pty Ltd (DP) proposal TWN180013.P.001.Rev0 dated 18 January 2018.

It is understood that the proposed fire station will comprise the construction of a number of buildings, likely constructed of masonry block, together with heavy duty access pavements suited to heavy vehicles.

The aim of the investigation was to provide the following information:

- subsurface and groundwater conditions at the field test locations;
- comments on site preparation requirements;
- comments on excavatability of site soils and temporary batter slopes;
- comments on the suitability of excavated soil for re-use as engineered filling;
- site classification and estimated surface movements (y_s) based on the methods in AS 2870-2011 (Ref 1);
- earthquake site factor in accordance with AS 1170.4-2007 (Ref 2)
- maximum allowable bearing pressure and estimated settlements for upper level footings;
- ultimate bearing pressure and skin friction parameters for shallow bored piles founded within the depth of investigation;
- agronomist's report on the site topsoil samples detailing texture, pH, organic content, salt content and other characteristics appropriate for determining their suitability for use under seeded, stolonised, turfed or planted areas; and
- recommended design subgrade California bearing ratio (CBR) for pavement design by others.

The investigation included the drilling of seven boreholes and laboratory testing of selected samples. Details of the field and laboratory work are presented in this report, together with comments and recommendations on the items listed above.

2. Site Description

The site is located on the western side of Enterprise Road, Charters Towers and is identified as Lots 1 and 2 MPH21392. The site has an irregular shaped area of about 3,200 m^2 and has a 40 m road frontage as indicated in Figure 1 below and Drawing 1, Appendix A.

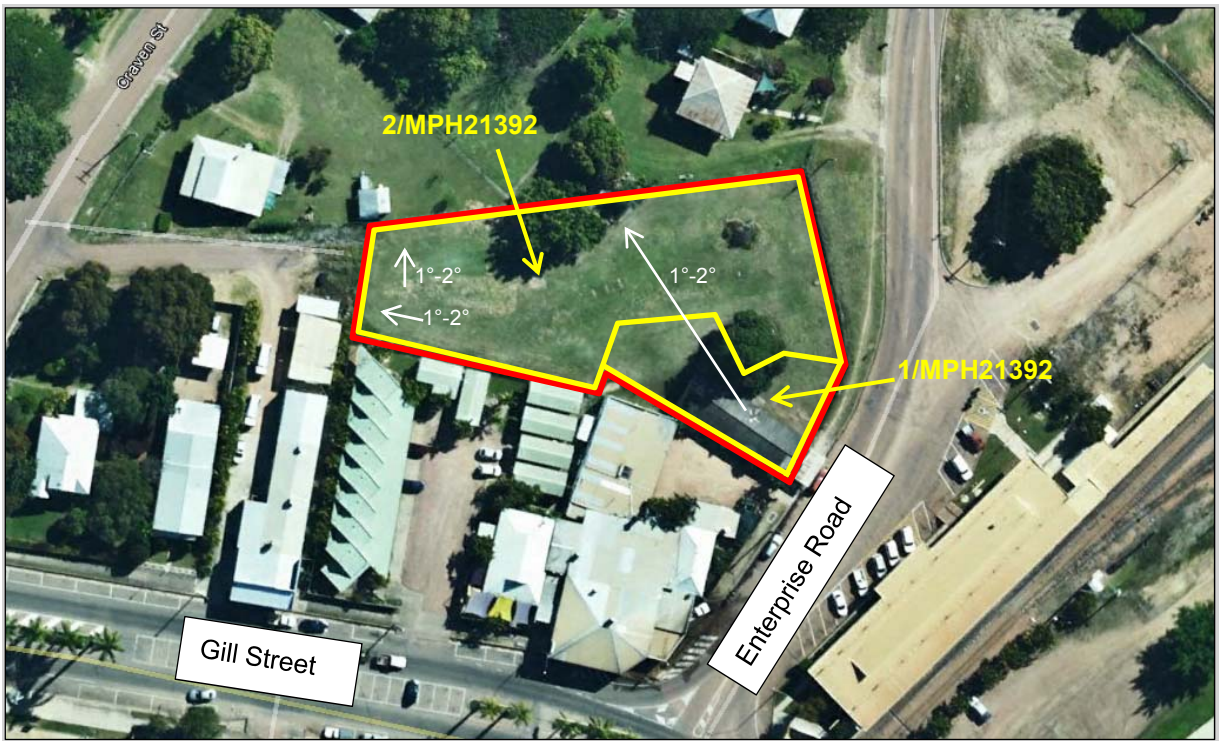


Figure 1: Aerial photograph of site (site boundary in red, lot boundaries in yellow). Source – Google Earth

The site is bounded by residential and commercial properties to the north, south and west. The Enterprise Hotel is located south of the site and the Great Northern rail line and station is located 40 m south west of the eastern site boundary.

The site is currently vacant, with grass cover and several mature trees. The site is almost level, with a slight slope down to the north-west at 1° to 2° and localised slopes in the western portion of the site sloping at 1° to 2° as shown in Figure 1, above.

An existing dwelling is located in the south-western corner of the site. It is understood that this structure is no longer in use, but will remain in the upgrade works

Figures 2 and 3 show the general site conditions at the time of investigation field work.

Figure 2: General site condition, looking east towards Enterprise Road

Figure 3: General site condition, looking west from the centre of the site

Other site features of note include the following:

- Pre-existing concrete slabs, which were generally located in the centre of the site, refer to Figure 4 below;
- Concrete footings, several metres long, which were located under both of the existing trees, refer to Figure 5 over the page;
- Possible bonded asbestos containing material (ACM), which appeared to be in sound condition, was observed sitting on top of one of the concrete footings, along the northern boundary of the site, refer to Figure 6 over the page; and
- A possible stockpile, which was located in the north-eastern portion of the site, refer to Figure 7.

Figure 4: Pre-existing concrete slabs, located in the centre of the site. Photo looking east

Figure 5: Concrete footings, located under the trees. Photo taken from centre of site, looking north

Figure 6: Possible bonded ACM, in sound condition, on concrete footing in northern part of site

Figure 7: Possible stockpile in north-eastern portion of the site, photo looking west.

Information from available geological mapping indicates that the site is underlain by residual soils derived from Silurian-Devonian aged medium-grained, biotite-hornblende, tonalite and granodiorite. The investigation generally encountered filling overlying natural clay and sand, the latter of which is considered to be of residual origins and hence in broad agreement with the geological mapping.

3. Field Work Methods

The field work was undertaken on 11 May 2018 and comprised the drilling of seven test bores (designated as Bores 1 to 7) to depths ranging from 0.8 m to 2.95 m using a utility mounted drilling rig fitted with 90 mm diameter solid flight augers. The approximate test locations, determined by reference to existing site features, are shown in Drawing 1 in Appendix A.

Standard penetration tests (SPTs) were performed at selected depths within the soil / extremely weathered granodiorite at each bore location.

Dynamic cone penetrometer tests (DCPs) were performed in general accordance with test method AS 1289.6.3.2 adjacent to each bore to provide information on the strength consistency and relative density of the near-surface soils.

A geotechnical engineer logged the subsurface profiles in the bores. Representative bulk, disturbed and 'undisturbed' tube samples were collected for identification and laboratory testing purposes.

The bores were reinstated with drilled spoil following logging and sampling.

The UTM coordinates at the test locations were determined using a handheld GPS using MGA94 as the datum. A temporary benchmark of RL 10 m (refer Drawing 1 in Appendix A), was assigned to a concrete service pit located on the eastern boundary of the site. The ground surface levels and co-ordinates at the bore locations are shown on the borehole logs in Appendix B.

4. Field Work Results

The subsurface conditions encountered in the test bores, and the DCP results are presented in detail in the borehole logs in Appendix B. These should be read in conjunction with the notes about this report in Appendix A and the explanatory notes in Appendix B which comment on the sampling methods, soil descriptions and symbols and abbreviations used in their preparation.

The subsurface profiles encountered in Bores 1 to 7 generally comprised filling overlying predominantly sandy soils with some sandy clay, overlying very low strength granodiorite, and are described further below.

Topsoil	Generally sandy silt / silty sand filling encountered to 0.1 m depth in Bores 1 to 3.
Filling	Poorly to moderately well compacted filling generally comprising sand with variable proportions of clay, silt and gravel to depths of up to 1.1 m. Anthropogenic inclusions, including concrete (Bore 5) and glass fragments and ash (Bore 6) were encountered within the filling.
Sandy Clay	Typically stiff sandy clay was encountered in Bores 2 to 4 and 6.
Clayey Sand	Typically medium dense clayey sand was encountered in all bores and continued to the termination depth of the bores, with the exception of Bore 2, which encountered granodiorite, which is described below.
Granodiorite	Very low strength granodiorite was encountered in Bore 2 from 2.1 m depth and continued to the termination depth of the bore.

No free groundwater was observed within the bores while they remained open. It should be noted that groundwater levels are affected by climatic conditions and soil permeability and will therefore vary with time.

5. Laboratory Testing

Laboratory testing comprised the following:

- Two shrink-swell index tests;
- Two Atterberg limits, linear shrinkage (plasticity) and field moisture tests;
- Three CBR tests. The samples were compacted to approximately 98% Standard dry density ratio at the estimated optimum moisture content (OMC) for Standard compaction and soaked for four days under surcharge loadings of 4.5 kg prior to penetration;
- One blended topsoil and one blended subsoil sample, with an agronomist report;
- Five pH, electrical conductivity (EC), Emerson Class and cation exchange capacity (CEC) tests on blended topsoil and subsoil samples;
- Two particle size distribution tests (including hydrometer) on blended topsoil / subsoil samples; and
- Two particle size distribution tests (sieve only).

The results of the laboratory testing are provided in the test report sheets presented in Appendix C and are summarised in Tables 1 to 6 below.

Table 1: Results of Plasticity Testing

Bore	Depth (m)	W_F (%)	W_L (%)	W_P (%)	PI (%)	LS (%)	Description
1	0.4-0.6	14.2	46	16	30	13.5	Clayey sand
4	0.7-0.8	12.1	45	13	32	13	Sandy clay

Legend: W_F – field moisture content; W_L – liquid limit; W_P – plastic limit; PI – plasticity index; LS – linear shrinkage

Table 2: Results of Shrink-Swell Index (I_{ss}) Testing

Bore	Depth (m)	Shrinkage (%)	Swell under 25 kPa (%)	Pocket Penetrometer (kPa)		I_{ss} (% per ΔpF)	Description
				Initial	Final		
1	0.3-0.52	1.0	0.2	560	260	0.6	Filling – silty clay
2	0.5-0.68	0.8	0.4	490	350	0.6	Sandy clay

Table 3: Results of CBR Testing

Bore	Depth (m)	W_F (%)	SMDD (t/m^3)	OMC (%)	Swell (%)	CBR (%)	Description
1	0.4-0.6	14.2	1.82	14.5	0.5	15	Clayey sand
5	0.2-0.3	4.1	1.91	12.5	-0.5	18	Filling – sand with gravel and silt
7	0.2-0.5	8.4	1.92	11.5	0.5	10	Filling – clayey sand

Legend: W_F – field moisture content
OMC – optimum moisture content for Standard compaction
SMDD – Standard maximum dry density
CBR – California bearing ratio, prepared at 98% SMMD and at OMC, and soaked for 4 days

Table 4: Results of pH, EC, CEC and Emerson Class Number Testing

Location	Depth (m)	Emerson Class No	pH	EC (µS/cm)	CEC	Description
1	0-0.1	6	8.4	133	6.0	Filling – sandy silt
5	0-0.1	4	8.5	144	6.7	Filling – sand with gravel and silt
5	0.2-0.3	4	-	-	-	Filling – sand with gravel and silt
7	0-0.1	6	8.5	170	5.5	Filling – clayey sand
Topsoil 1	0-0.1	-	8.2	180	6.3	Blended from Bores 1-6
Subsoil 1	0.2-0.5	-	8.6	150	6.2	Blended from Bores 1, 3-6

Table 5: Results of Particle Size Distribution Testing (including hydrometer)

Location	Depth (m)	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Description
Topsoil 1	0-0.1	11	21	41	27	Slightly gravelly silty sand with some clay (from Bores 1-6)
Subsoil 1	0.3-0.4	30	20	44	6	Silty clay and sand with trace gravel (from Bores 1, 3-6)
3	0.4-0.6	32		63	5	Silty clayey sand with trace gravel
6	1.8-2.0	50		43	7	Sandy clay with trace gravel

6. Proposed Development

It is understood that the proposed fire station will comprise a number of single storey masonry block buildings, with truck ports, staff parking, RCR pad, training tower and associated heavy duty internal pavements. Cut and fill details were not provided, however, based on our experience with similar developments and existing site levels, it is anticipated that only minor earthworks would be required to prepare the site for the proposed development.

At the time of report preparation, no information on building loads was available.

7. Comments

7.1 Appreciation of Geotechnical Conditions

The subsurface conditions at the test locations typically comprised poorly to moderately well compacted sand filling with variable proportions of silt, clay and gravel to depths of between 0.4 m and 1.1 m in Bores 1, 3, 4 and 5. A 'Level 1' earthworks inspection and testing report (as defined in AS3798 - 2007, Ref 3) regarding the placement and compaction of the filling at the site was not available at the time of reporting, and hence, this filling should be regarded as 'uncontrolled' for site classification purposes. This is due to the potential for variation in filling compaction between the test locations and hence differential settlement. The filling is considered suitable for the support of pavements, provided that site preparation is consistent with Section 7.4 below. Another option would be to remove and replace all filling with compaction in layers under 'controlled' conditions.

The natural soils underlying the filling at the test locations mostly comprised residual sandy clay and clayey sand. The clays were generally stiff to very stiff, although stiff sandy clay was encountered in Bore 2 from 0.1 m to 1.1 m depth. The sands were typically medium dense.

Bore 2 encountered very low strength granodiorite from 2.1 m depth.

Free groundwater was not observed during the field work. Groundwater levels at this site are likely to be affected by seasonal rainfall and could be relatively shallow during the wet season.

The laboratory testing indicates that the sandy clay soils tested are of low to intermediate plasticity and are not particularly prone to shrink and swell with changes in moisture content. The filling materials were also dry of optimum and will require moisture conditioning during site preparation as discussed in Section 7.4 below.

A possible bonded fibro fragment (ACM) was observed at the surface of the investigation area. ACM was not identified in subsurface materials at the locations tested, although observation tends to be difficult in bores. Although ACM was not encountered, building rubble including concrete and glass fragments were observed at a number of locations within the site, which are indicators of the potential for ACM. The possible presence of ACM, therefore, cannot be precluded within fill material at the site.

Further comments on design and construction practice are given in the following sections of this report.

7.2 Excavation Conditions and Temporary Batter Slopes

Minor earthworks would be required to prepare the site for the proposed development. All filling, topsoil and soil should be readily removable using a conventional medium sized excavation plant such as 10 – 15 tonne hydraulic excavators (or similar).

The soil exposed in cut will not stand vertically without support in the longer term. Temporary side slopes of 1.5H:1V are therefore suggested in the sands and clays.

A maximum batter slope of 2H:1V is recommended for permanent slopes in clay and sand, provided that the slopes are protected against surface erosion and local slumping. A maximum batter slope of 3H:1V is recommended where the slopes are to be vegetated.

Notwithstanding the above comments on excavation stability, the contractor should comply with all statutory requirements for excavation support.

7.3 Re-use of Excavated Materials

The majority of soils, including any very low strength granodiorite, derived from excavation of the site or bored piers should be suitable for re-use as engineered filling after moisture conditioning has been carried out. Any particles greater than about 75 mm in diameter should be removed from filling, prior to placement and compaction.

7.4 Site Preparation and Earthworks

All site preparation and replacement filling (where necessary) for the support of pavements and upper level footings should be placed in accordance with the following guidelines:

- Strip to design subgrade level in pavement areas and remove all vegetation and 'uncontrolled' filling from building envelopes. It is envisaged that this may require excavation to depths of up to approximately 1.1 m in proposed building envelopes.
- Roll the base of the excavation with at least six passes of a minimum 12 tonne deadweight roller, with a final test roll pass accompanied by a careful visual inspection to identify any soft or otherwise compressible zones. Further DCPs should be carried out on a regular grid in pavement subgrade areas to assess if there are any poorly compacted zones remaining that may require further remediation.
- Place filling (where required to raise the site or for replacement of excavated material) in near horizontal layers of maximum 300 mm loose thickness. Filling should be approved, homogeneous, free of organic or other deleterious material, and have a maximum particle size of 75 mm.
- Compact each layer of structural filling beneath footings and pavements to at least 98% and 100% Standard maximum dry density ratio (for clay soils), respectively.
- Maintain moisture contents for clay filling in the range of 2% dry to 2% wet of optimum moisture content for Standard compaction.

Where filling is to be used for the support of structural loads, earthworks testing and inspections should be carried out under controlled conditions, that is, to a Level 1 standard of testing and full time supervision, as defined in Appendix B of AS 3798 (Ref 3).

7.5 Site Classification

Site classification of foundation soil reactivity strictly only applies to residential buildings up to two-storeys and to other buildings of similar size, loading and flexibility as defined in accordance with AS 2870 (Ref 1). Such classification indicates the ground surface propensity to move with seasonal moisture variation and the potential for cracking to occur in brittle materials such as concrete, blockwork and tiles.

Due to more than 0.4 m depth of uncontrolled filling, a 'Class P' designation applies.

AS2870 provides recommended values of change in suction (Δu) and depth of design suction (H_s) for major and regional centres throughout Australia, however values are not provided for North Queensland. Based on previous experience in the area and on data published by Fox (Ref 4) and the Institution of Engineers Australia Footings Sub-Committee (Ref 5) relating climatic conditions to suction, a depth of design suction of 3.0 m has been adopted for the site.

Shrink-swell testing on both the silty clay filling from Bore 1 and the natural sandy clay sample from Bore 2 returned a shrink-swell index of 0.6% ΔpF. Plasticity testing on the natural sandy clay returned a liquid limit of 45% and linear shrinkage of 13%. Previous experience with similar soils in the local area and in-house correlations between shrink-swell and plasticity suggests shrink-swell indices for the natural sandy clay soil are likely to be in the range of approximately 1.0% to 3.0% per ΔpF. On the basis of the above, a shrink-swell index of 2.0% per ΔpF has been adopted for the natural sandy clay at this site.

Using the methods outlined in Section 2 of AS 2870, together with the results of the field testing, characteristic surface movement (y_s) values are estimated to be between 20 mm and 30 mm for the site in its current condition, which would be consistent with a 'Class M-D' (moderately reactive - deep) classification for existing site soils if the site wasn't classified as 'Class P' as outlined above.

Where the existing residual sandy clay is removed, moisture conditioned and replaced under controlled engineered conditions or cohesive material of a similar plasticity, the above estimated y_s values may increase and should be rechecked once the final design is confirmed. This is due to the need to consider uncracked conditions in the analysis for the first five years after filling placement.

Tree effects on soil moisture changes and hence additional reactive movements have not been considered in the y_s estimates above, which could be relevant for the relatively large trees in the south-eastern portion of the site and centrally on the northern boundary. The building designer should refer to AS2870 and account for additional movements if buildings are located within the root influence zone for these trees.

If 'abnormal' soil moisture conditions are experienced at the site, the site would remained classified as 'Class P' (problem site) which would require more extensive foundation works to avoid any adverse foundation performance. Abnormal soil moisture conditions are defined in AS 2870 (Clause 1.3.3) and, in summary, comprise:

- Recent removal of building or structures likely to affect soil moisture conditions (potentially likely if demolition of the existing residential dwelling is proposed));
- Recent removal of large trees;
- Growth of trees too close to a structure;
- Lack of maintenance of site drainage; and
- Failure to repair plumbing leaks.

The above results indicate good practice in design, construction and management of the site will be required to accommodate the potential site movements. In particular, good surface and subsurface drainage will be required, along with limits on landscaping and adequate moisture preparation and prompt overlay sealing of clay subgrades with non-reactive granular fill (e.g. CBR 15%).

7.6 Earthquake Site Sub-Soil Classification and Hazard Factor

In accordance with AS 1170.4-2007, it is recommended that a site sub-soil classification of "Class C_e – Shallow Soil Site" be adopted, in accordance with the definitions presented in *Section 4.2 – Class Definitions*. This is based on a sub-soil profile of no more than 25 m of firm soil.

The Hazard Factor, Z, for the site is 0.09, as defined in Clause 3.2 of AS 1170.4 - 2007.

7.7 Upper Level Footings

High level pad or strip footings founding in the natural stiff (i.e. c_u of at least 50 kPa) or stronger clays or medium dense sands would be suitable for the support of light structural loads.

Pad footings up to 1 m wide and strip footings up to 0.6 m wide, founding on stiff sandy clay may be proportioned for a maximum allowable bearing pressure of 100 kPa.

Settlements for the above footing geometries and working pressures are estimated to be between 10 mm and 15 mm.

Geotechnical inspection and testing is recommended during construction in order to verify the presence of at least stiff cohesive soils to a depth of at least twice the footing width below the base of the footing excavations.

During construction, some loosening of the soils exposed at foundation level is expected. Therefore, the base of any excavation should be re-compacted using a vibratory plate compactor prior to constructing any footings. Confirmation of adequate compaction of clayey sands / silty sands could be obtained by carrying out DCPs to achieve not less than 8 blows per 150 mm in accordance with AS 1289.

7.8 Deep Footings

Should upper level footings be deemed impracticable for the support of the proposed structures, uncased bored piles founding on medium dense (or denser), clayey sand or very low strength granodiorite are suggested as the most suitable deep footing system for the site. The ultimate parameters shown in Table 6 are suggested for the design of uncased bored piles subject to vertical compressive and uplift loads, with length on diameter ratios of at least four and at least two pile diameters of embedment in the founding stratum. The values for sands assume groundwater level below approximately 3 m depth.

Table 6: Ultimate Unfactored Bored Pile Design Parameters – Vertical Load

Founding Material	Ultimate Unfactored Pressure, $R_{d,ug}$ (kPa)		
	End Bearing	Shaft Adhesion (compression)	Shaft Adhesion (tension)
Stiff cohesive soils	-	25	25
Very stiff cohesive soils	-	50	50
Medium dense granular soils	$600H_1$[#]	$5H_2$[#]	$2.5H_2$[#]
Dense (or denser) granular soils	$1000H_1$[#]	$8H_2$[#]	$4H_2$[#]
Very low strength or stronger granodiorite	2500	350	150

Note: H_1 – depth to pile toe (in metres), limiting value of 15 MPa
H_2 – depth to centre of pile shaft within sand layer (in metres), limited to 15 times pile diameter
[#] – value for bored piles in sand is approximate only and dependent upon construction practices

The parameters contained within Table 6 are based on the assumption that all pile excavations are clean, dry and the walls are free of smear. Cleaning of pile excavations should be undertaken using a cleaning bucket. Prior to the placement of concrete, it is advised that all pile excavations should be inspected to verify their construction.

The shaft adhesion developed within the upper 1.2 m depth (seasonal crack depth) or depth to which temporary steel casing is installed (whichever is deeper) should be ignored in any capacity calculations, due to the potential loss of soil contact with the pile.

The pile parameters presented in Table 6 are unfactored ultimate values. A factor of safety of 2.5 should be applied to all ultimate values for working stress analysis. Alternatively, a geotechnical strength reduction factor (ϕ_g) of 0.45 is recommended for limit state design of piles in accordance with AS 2159 – 2009 (Ref 6). This is based on the data presented in this report, the method of soil strength assessment used in this investigation and after assessing the overall design average risk rating (ARR) for the site, design and installation risk factors anticipated for low redundancy piling systems. Higher values of ϕ_g may be applied if selected piles are to be subjected to confirmatory load testing.

Settlements of single piles at working loads equivalent to about 75% of the limit state design geotechnical strength would be approximately 1% of pile diameter; however greater settlements could occur for groups of piles. It is recommended that settlement of specific proposed pile groups be assessed as part of detailed design.

7.11 Design Subgrade CBR

Laboratory testing undertaken on samples of clayey sand and sand filling materials and natural clayey sand subgrade materials indicated CBR values ranging from 10% to 18%. It is recommended that a CBR value of 10% be adopted for the existing filling and natural clayey sand materials, based on results of laboratory testing and experience with similar materials.

All pavement construction will require incorporation of appropriately designed and maintained surface and subsurface drainage, to prevent moisture ingress into the pavement materials and subgrade.

8. References

1. Australian Standard AS2870-2011, 'Residential Slabs and Footings', April 2011, Standards Australia
2. Australian Standard AS1170.4-2007, 'Structural Design Actions – Earthquake Actions in Australia', October 2007, Standards Australia
3. Australian Standard AS 3798 – 2007: "Guidelines on Earthworks for Commercial and Residential Developments", Standards Association of Australia.
4. Fox, E: "A Climate-based Design Depth of Moisture Change Map of Queensland and the Use of Such Maps to Classify Sites under AS 2870 – 1996", Australian Geomechanics Vol 35, Number 4, December 2000.
5. Boddie K, Eckersley J, Johnstone LC, Murray P and Slogrove T, "Recommended Procedures for the Classification of Foundation Soils in the Townsville and Surrounding Areas," Consulting Engineers Group, Institution of Engineers Australia, Footings Sub Committee, Townsville, 18 December 2001.
6. Australian Standard AS 2159 – 2009, "Piling Design and Installation", November 2009, Standards Association of Australia.

9. Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for this project at 3-5 Enterprise Road, Charters Towers, in accordance with DP's proposal TWN180013.P.001.Rev0 dated 18 January 2018 and acceptance received from Ms Julie Huynh of Public Safety Business Agency dated 3 May 2018. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Public Safety Business Agency for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The scope for work for this investigation did not include the assessment of surface or sub-surface materials or groundwater for contaminants, within or adjacent to the site. Should evidence of filling of unknown origin be noted in the report, and in particular the presence of building demolition materials, it should be recognised that there may be some risk that such filling may contain contaminants and hazardous building materials.

Suspected asbestos containing materials (ACM) have been detected by observation on the surface of the site. Building demolition materials, such as concrete and glass were, however, observed in filling and these are considered as indicative of the possible presence of hazardous building materials (HBM), including asbestos.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the geotechnical components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

Douglas Partners Pty Ltd

Appendix A

About This Report
Drawing 1 – Site and Test Location Plan

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT: Public Safety Business Agency		TITLE: Site and Test Location Plan Proposed Fire Station 3-5 Enterprise Road, Charters Towers	PROJECT No: 93893.00
OFFICE: Townsville	DRAWN BY: KMF		DRAWING No: 1
SCALE: As shown	DATE: 8/3/16		REVISION: 168 0

Appendix B

Soil Descriptions
Rock Descriptions
Symbols and Abbreviations
Sampling Methods
Results of Field Work

Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:

  4,6,7
  N=13

- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:

  15, 30/40 mm

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.

Soil Descriptions

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726-1993, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	20 - 63
Medium gravel	6 - 20
Fine gravel	2.36 - 6
Coarse sand	0.6 - 2.36
Medium sand	0.2 - 0.6
Fine sand	0.075 - 0.2

The proportions of secondary constituents of soils are described as:

Term	Proportion	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	20 - 35%	Sandy Clay
Slightly	12 - 20%	Slightly Sandy Clay
With some	5 - 12%	Clay with some sand
With a trace of	0 - 5%	Clay with a trace of sand

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	vs	<12
Soft	s	12 - 25
Firm	f	25 - 50
Stiff	st	50 - 100
Very stiff	vst	100 - 200
Hard	h	>200

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	SPT N value	CPT qc value (MPa)
Very loose	vl	<4	<2
Loose	l	4 - 10	2 -5
Medium dense	md	10 - 30	5 - 15
Dense	d	30 - 50	15 - 25
Very dense	vd	>50	>25

Soil Descriptions

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

- Alluvium - river deposits
- Lacustrine - lake deposits
- Aeolian - wind deposits
- Littoral - beach deposits
- Estuarine - tidal river deposits
- Talus - scree or coarse colluvium
- Slopewash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.

Rock Strength

Rock strength is defined by the Point Load Strength Index ($Is_{(50)}$) and refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects. The test procedure is described by Australian Standard 4133.4.1 - 2007. The terms used to describe rock strength are as follows:

Term	Abbreviation	Point Load Index $Is_{(50)}$ MPa	Approximate Unconfined Compressive Strength MPa*
Extremely low	EL	<0.03	<0.6
Very low	VL	0.03 - 0.1	0.6 - 2
Low	L	0.1 - 0.3	2 - 6
Medium	M	0.3 - 1.0	6 - 20
High	H	1 - 3	20 - 60
Very high	VH	3 - 10	60 - 200
Extremely high	EH	>10	>200

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$. It should be noted that the UCS to $Is_{(50)}$ ratio varies significantly for different rock types and specific ratios should be determined for each site.

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Extremely weathered	EW	Rock substance has soil properties, i.e. it can be remoulded and classified as a soil but the texture of the original rock is still evident.
Highly weathered	HW	Limonite staining or bleaching affects whole of rock substance and other signs of decomposition are evident. Porosity and strength may be altered as a result of iron leaching or deposition. Colour and strength of original fresh rock is not recognisable
Moderately weathered	MW	Staining and discolouration of rock substance has taken place
Slightly weathered	SW	Rock substance is slightly discoloured but shows little or no change of strength from fresh rock
Fresh stained	Fs	Rock substance unaffected by weathering but staining visible along defects
Fresh	Fr	No signs of decomposition or staining

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with some fragments
Fractured	Core lengths of 40-200 mm with some shorter and longer sections
Slightly Fractured	Core lengths of 200-1000 mm with some shorter and longer sections
Unbroken	Core lengths mostly > 1000 mm

Rock Descriptions

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq \text{100 mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or better. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Symbols & Abbreviations

Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U_{50}	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

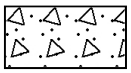
Symbols & Abbreviations

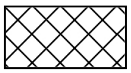
Graphic Symbols for Soil and Rock

General

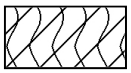

Asphalt

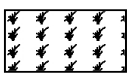

Road base

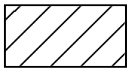

Concrete

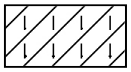

Filling

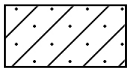
Soils


Topsoil

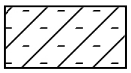

Peat

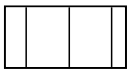

Clay

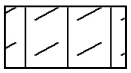

Silty clay

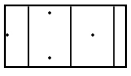

Sandy clay

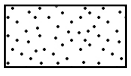

Gravelly clay

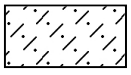

Shaly clay

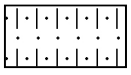

Silt


Clayey silt


Sandy silt

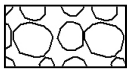

Sand

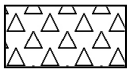

Clayey sand


Silty sand


Gravel

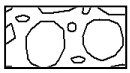

Sandy gravel


Cobbles, boulders

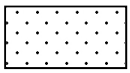

Talus

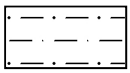
Sedimentary Rocks

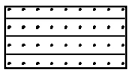

Boulder conglomerate

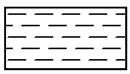

Conglomerate


Conglomeratic sandstone

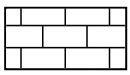

Sandstone


Siltstone

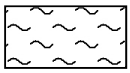

Laminite

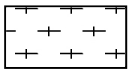

Mudstone, claystone, shale

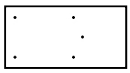

Coal


Limestone

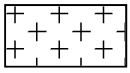
Metamorphic Rocks

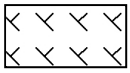

Slate, phyllite, schist

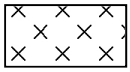

Gneiss

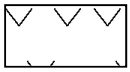

Quartzite

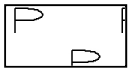
Igneous Rocks


Granite


Dolerite, basalt, andesite


Dacite, epidote


Tuff, breccia


Porphyry

BOREHOLE LOG

CLIENT: Public Safety Business Agency (PSBA)
PROJECT: Proposed Charters Towers Fire Station
LOCATION: 3-5 Enterprise Road, Charters Towers

SURFACE LEVEL: 9.4 m RL*
EASTING: 423724
NORTHING: 7779882
DIP/AZIMUTH: 90°/--

BORE No: 1
PROJECT No: 93893.00
DATE: 11/5/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 100mm)
9	0.1	FILLING - Generally comprising stiff, dark brown, sandy silt filling, sand portion is fine grained		D	0.0				
		FILLING - Generally comprising poorly to moderately well compacted, brown silty clay filling with some fine grained sand			0.1				
					0.2				
				D	0.3				
	0.4	CLAYEY SAND (SC) - Stiff to very stiff, brown clayey fine to coarse grained sand, moist [RESIDUAL]			0.4	U			
				B	0.52				
					0.6				
	1				1.0				1
	1.1	CLAYEY SAND (SC) - Medium dense, brown mottled white and red, clayey fine to medium grained sand, moist [RESIDUAL GRANODIORITE]		S			3,5,10 N = 15		
8					1.45				
	2	Becomes damp below approximately 2.0 m depth							2
					2.5				
7				S			21/150mm refusal		
					2.65				
	2.95	Bore discontinued at 2.95m , limit of investigation							

RIG: Drillman GT50 **DRILLER:** Swavley **LOGGED:** Knott **CASING:** Nil

TYPE OF BORING: 90mm diameter solid flight auger

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in GDA94 Zone 55K. Surface levels relative to temporary benchmark (refer Drawing 1)

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Public Safety Business Agency (PSBA)
PROJECT: Proposed Charters Towers Fire Station
LOCATION: 3-5 Enterprise Road, Charters Towers

SURFACE LEVEL: 9.6 m RL*
EASTING: 423707
NORTHING: 7779864
DIP/AZIMUTH: 90°/--

BORE No: 2
PROJECT No: 93893.00
DATE: 11/5/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 100mm)
					0.0				5 10 15 20
	0.1	TOPSOIL - Medium dense, dark brown silty fine to medium grained sand with trace fine to medium gravel, moist [TOPSOIL]		D	0.1				
		SANDY CLAY (CL) - Stiff, brown sandy clay, sand portion is fine to coarse grained [RESIDUAL]		D	0.4				
					0.5				
9				U	0.68				
	1				1.0				1
	1.1	CLAYEY SAND (SC) - Dense, pale brown mottled white and red, clayey fine to medium grained sand, damp [RESIDUAL GRANODIORITE]		S			6,12,19 N = 31		
					1.45				
8		Becomes moist below approximately 1.7m depth							
	2								2
	2.1	GRANODIORITE - Very low strength, highly weathered, pale brown mottled white and red granodiorite							
					2.5				
7				S			17,20,30/120 refusal		
	2.93	Bore discontinued at 2.93m , limit of investigation			2.93				

RIG: Drillman GT50 **DRILLER:** Swavley **LOGGED:** Knott **CASING:** Nil

TYPE OF BORING: 90mm diameter solid flight auger

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in GDA94 Zone 55K. Surface levels relative to temporary benchmark (refer Drawing 1)

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Public Safety Business Agency (PSBA)
PROJECT: Proposed Charters Towers Fire Station
LOCATION: 3-5 Enterprise Road, Charters Towers

SURFACE LEVEL: 9.5 m RL*
EASTING: 423705
NORTHING: 7779880
DIP/AZIMUTH: 90°/--

BORE No: 3
PROJECT No: 93893.00
DATE: 11/5/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 100mm)
	0.0				0.0				
	0.1	FILLING - Generally comprising poorly compacted, dark brown grey, slightly gravelly sandy silt, gravel portion is fine to coarse, humid [FILLING]		D	0.1				
		FILLING - Generally comprising moderately compacted, dark brown, gravelly sandy silt filling, sand portion is fine to coarse grained, gravel portion is fine to coarse, humid [FILLING]							
	0.4	SILTY SAND (SM) - Medium dense, dark brown black, silty fine grained sand, moist [RESIDUAL]		D	0.4				
9	0.6	SANDY CLAY (CL) - Stiff, brown sandy clay with some fine gravel, sand portion is fine to coarse grained [RESIDUAL]		D	0.6				
					0.9				
	1				1.0				1
	1.1	CLAYEY SAND (SC) - Medium dense, pale brown mottled white and red, fine to medium grained clayey sand, moist [RESIDUAL GRANODIORITE]		S			4,7,15 N = 22		
8					1.45				
	2								2
7		- becoming dense from approximately 2.5m depth			2.5				
				S			18,21,18 N = 39		
	2.95	Bore discontinued at 2.95m , limit of investigation			2.95				

RIG: Drillman GT50 **DRILLER:** Swavley **LOGGED:** Knott **CASING:** Nil

TYPE OF BORING: 90mm diameter solid flight auger

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in GDA94 Zone 55K. Surface levels relative to temporary benchmark (refer Drawing 1)

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Public Safety Business Agency (PSBA)
PROJECT: Proposed Charters Towers Fire Station
LOCATION: 3-5 Enterprise Road, Charters Towers

SURFACE LEVEL: 9.9 m RL*
EASTING: 423694
NORTHING: 7779853
DIP/AZIMUTH: 90°/--

BORE No: 4
PROJECT No: 93893.00
DATE: 11/5/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 100mm)
9	0	FILLING - Generally comprising moderately compacted, dark brown silty fine grained sand filling, moist [FILLING]		D	0.3				
	0.4	SANDY CLAY (CL) - Stiff to very stiff, dark brown sandy clay with some fine to medium gravel [RESIDUAL]			0.5				
	1			D	0.7	D			1
					0.8				
	1.1				1.0				
		CLAYEY SAND (SC) - Medium dense, pale grey mottled brown and orange fine to coarse grained clayey sand, damp [RESIDUAL GRANODIORITE]		S			3,3,9 N = 12		
8					1.45				
	2	- becomming dense from approximately 2.5m depth			2.5				2
				S			11,17,22 N = 39		
7	2.95	Bore discontinued at 2.95m , limit of investigation			2.95				

RIG: Drillman GT50 **DRILLER:** Swavley **LOGGED:** Knott **CASING:** Nil

TYPE OF BORING: 90mm diameter solid flight auger

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in GDA94 Zone 55K. Surface levels relative to temporary benchmark (refer Drawing 1)

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U$_x$	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Public Safety Business Agency (PSBA)
PROJECT: Proposed Charters Towers Fire Station
LOCATION: 3-5 Enterprise Road, Charters Towers

SURFACE LEVEL: 9.4 m RL*
EASTING: 423687
NORTHING: 7779869
DIP/AZIMUTH: 90°/--

BORE No: 5
PROJECT No: 93893.00
DATE: 11/5/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 100mm)
9	0.0	FILLING - Generally comprising moderately well compacted, brown, fine to coarse grained sand filling, with fine to coarse gravel and silt, humid [FILLING]		D	0.0				
	0.1				0.1				
	0.2			B	0.2				
	0.3	- becoming red-orange brown below 0.4m depth			0.3				
	0.7	FILLING - Generally comprising moderately well compacted, brown and grey sandy fine to coarse gravel filling, sand fraction is fine to coarse grained							
1		- (refusal on concrete at 0.95m in first attempt)							1
	1.1	CLAYEY SAND (SC) - Medium dense, pale grey, pink and orange brown, clayey fine to coarse grained sand, damp [RESIDUAL GRANODIORITE]			1.2				
8				S			4,5,6 N = 11		
	1.65				1.65				
2				D	2.0				2
7	2.5				2.5				
				D			5,17,22 N = 39		
	2.95	Bore discontinued at 2.95m , limit of investigation			2.95				

RIG: Drillman GT50 **DRILLER:** Swavley **LOGGED:** Knott **CASING:** Nil

TYPE OF BORING: 90mm diameter solid flight auger

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in GDA94 Zone 55K. Surface levels relative to temporary benchmark (refer Drawing 1)

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Public Safety Business Agency (PSBA)
PROJECT: Proposed Charters Towers Fire Station
LOCATION: 3-5 Enterprise Road, Charters Towers

SURFACE LEVEL: 9.6 m RL*
EASTING: 423660
NORTHING: 7779858
DIP/AZIMUTH: 90°/--

BORE No: 6
PROJECT No: 93893.00
DATE: 11/5/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 100mm)
9	0.0	FILLING - generally comprising moderately well compacted, pale orange grey gravelly sand filling, sand portion is fine to coarse grained, gravel portion is fine to medium, humid [FILLING]		D	0.0				
	0.1				0.1				
	0.2	FILLING - generally comprising moderately well compacted, dark brown fine to coarse grained sand filling, with fine gravel and trace glass fragments and ash							
	0.3	SANDY CLAY (CL) - Very stiff, dark brown sandy clay with some fine to medium gravel [RESIDUAL]		D	0.5				
	1				1.0				1
				S			5,5,7 N = 12		
	1.3	CLAYEY SAND (SC) - Medium dense, pale brown mottled orange, clayey fine to coarse grained sand, with some fine gravel, moist [RESIDUAL GRANODIORITE]			1.45				
8					1.8				
		- becomming brown mottled white and gravelly with some interbedded sandy clay bands below approximately 1.8m depth		D					
	2				2.0				2
					2.5				
7		- white band of gravelly fine to coarse grained ssand, gravel fraction is fine to medium		S			6,11,10 N = 21		
	2.95	Bore discontinued at 2.95m , limit of investigation			2.95				

RIG: Drillman GT50 **DRILLER:** Swavley **LOGGED:** Knott **CASING:** Nil

TYPE OF BORING: 90mm diameter solid flight auger

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in GDA94 Zone 55K. Surface levels relative to temporary benchmark (refer Drawing 1)

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

BOREHOLE LOG

CLIENT: Public Safety Business Agency (PSBA)
PROJECT: Proposed Charters Towers Fire Station
LOCATION: 3-5 Enterprise Road, Charters Towers

SURFACE LEVEL: 8.9 m RL*
EASTING: 423664
NORTHING: 7779873
DIP/AZIMUTH: 90°/--

BORE No: 7
PROJECT No: 93893.00
DATE: 11/5/2018
SHEET 1 OF 1

RL	Depth (m)	Description of Strata	Graphic Log	Sampling & In Situ Testing: Type	Depth	Sample	Results & Comments	Water	Dynamic Penetrometer Test (blows per 100mm)
8	0	FILLING - Poorly to moderately well compacted, brown gravelly clayey sand filling, sand portion is fine to medium grained, gravel portion is fine to coarse, humid [FILLING]							
		- with some fine to medium gravel below approximately 1.2m depth		B	0.2				
					0.3	U			
					0.38				
				D	0.5				
					0.6				
	0.8	- gravel band from 0.75m depth							
		Bore discontinued at 0.8m , auger refusal on probable gravel							
7	1								
6	2								

Dynamic Penetrometer Test (blows per 100mm): 5, 10, 15, 20

RIG: Drillman GT50 **DRILLER:** Swavley **LOGGED:** Knott **CASING:** Nil

TYPE OF BORING: 90mm diameter solid flight auger

WATER OBSERVATIONS: No free groundwater observed

REMARKS: Location coordinates are in GDA94 Zone 55K. Surface levels relative to temporary benchmark (refer Drawing 1)

☐ Sand Penetrometer AS1289.6.3.3
☒ Cone Penetrometer AS1289.6.3.2

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U_x	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	▼	Water level	V	Shear vane (kPa)

Douglas Partners
Geotechnics / Environment / Groundwater

Appendix C

Results of Laboratory Testing

Material Test Report

Douglas Partners
Geotechnics | Environment | Groundwater
Douglas Partners Pty Ltd
Brisbane Laboratory
439 Montague Road West End QLD 4101
Phone: (07) 3237 8900
Fax: (07) 3237 8999
Email: serge.jajcanin@douglaspartners.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Serge Jajcanin
NATA Accredited Laboratory Number: 828

Report Number: **93893.00-1**
Issue Number: 1
Date Issued: 04/06/2018
Client: Public Safety Business Agency (PSBA)
GPO Box 2336, Brisbane QLD 4001
Contact: Julie Huynh
Project Number: 93893.00
Project Name: Proposed Charters Towers Fire Station
Project Location: 3-5 Enterprise Road, Charters Towers
Work Request: 3425
Sample Number: 18-3425C
Date Sampled: 11/05/2018
Sampling Method: Sampled by Engineering Department
Sample Location: **Bore 1 (0.00 - 0.10m)**
Material: Filling

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**6**		
Soil Description	Filling		
Nature of Water	De-ionised		
Temperature of Water (^{o}C)	22		

Material Test Report

Douglas Partners
Geotechnics | Environment | Groundwater
Douglas Partners Pty Ltd
Brisbane Laboratory
439 Montague Road West End QLD 4101
Phone: (07) 3237 8900
Fax: (07) 3237 8999
Email: serge.jajcanin@douglaspartners.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

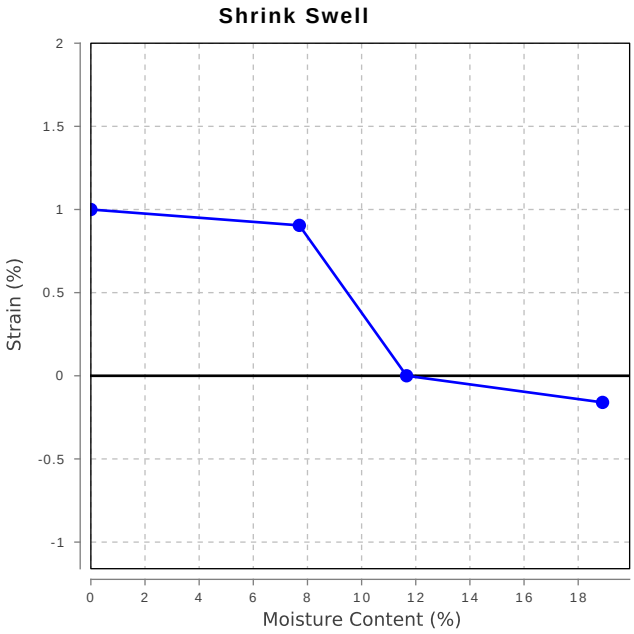
Approved Signatory: Serge Jajcanin
NATA Accredited Laboratory Number: 828

Report Number:	**93893.00-1**
Issue Number:	1
Date Issued:	04/06/2018
Client:	Public Safety Business Agency (PSBA) GPO Box 2336, Brisbane QLD 4001
Contact:	Julie Huynh
Project Number:	93893.00
Project Name:	Proposed Charters Towers Fire Station
Project Location:	3-5 Enterprise Road, Charters Towers
Work Request:	3425
Sample Number:	18-3425D
Date Sampled:	11/05/2018
Sampling Method:	Sampled by Engineering Department
Sample Location:	**Bore 1 (0.30 - 0.52m)**
Material:	Filling

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	**0.6**
Visual Description	Filling
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	**1.0**
Estimated % by volume of significant inert inclusions	0
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	11.7

Swell Test	
Initial Pocket Penetrometer (kPa)	560
Final Pocket Penetrometer (kPa)	260
Initial Moisture Content (%)	14.4
Final Moisture Content (%)	18.9
Swell (%)	**0.2**
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

Douglas Partners
Geotechnics | Environment | Groundwater
Douglas Partners Pty Ltd
Brisbane Laboratory
439 Montague Road West End QLD 4101
Phone: (07) 3237 8900
Fax: (07) 3237 8999
Email: serge.jajcanin@douglaspartners.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Serge Jajcanin
NATA Accredited Laboratory Number: 828

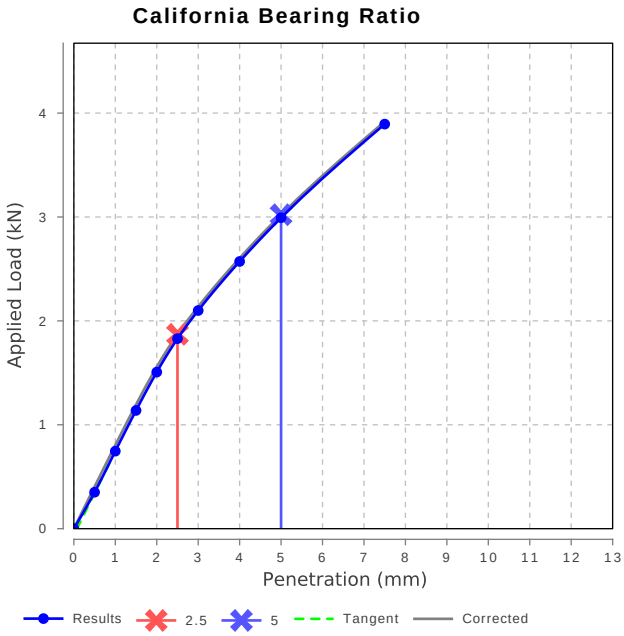
Report Number: **93893.00-1**
Issue Number: 1
Date Issued: 04/06/2018
Client: Public Safety Business Agency (PSBA)
GPO Box 2336, Brisbane QLD 4001
Contact: Julie Huynh
Project Number: 93893.00
Project Name: Proposed Charters Towers Fire Station
Project Location: 3-5 Enterprise Road, Charters Towers
Work Request: 3425
Sample Number: 18-3425E
Date Sampled: 11/05/2018
Sampling Method: Sampled by Engineering Department
Sample Location: **Bore 1 (0.40 - 0.60m)**
Material: Natural

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	5 mm		
CBR %	**15**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	AS1289 3.1.1		
Maximum Dry Density (t/m^3)	1.82		
Optimum Moisture Content (%)	14.5		
Laboratory Density Ratio (%)	97.5		
Laboratory Moisture Ratio (%)	102.0		
Dry Density after Soaking (t/m^3)	1.77		
Field Moisture Content (%)	14.2		
Moisture Content at Placement (%)	15.0		
Moisture Content Top 30mm (%)	18.4		
Moisture Content Rest of Sample (%)	18.3		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	48.0		
Swell (%)	0.5		
Oversize Material (mm)	19		
Oversize Material Included	Included		
Oversize Material (%)	0.1		

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	46		
Plastic Limit (%)	16		
Plasticity Index (%)	**30**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	13.5		
Cracking Crumbling Curling	Curling		

Moisture Content (AS 1289 2.1.1)	
Moisture Content (%)	14.2



Material Test Report

Douglas Partners
Geotechnics | Environment | Groundwater
Douglas Partners Pty Ltd
Brisbane Laboratory
439 Montague Road West End QLD 4101
Phone: (07) 3237 8900
Fax: (07) 3237 8999
Email: serge.jajcanin@douglaspartners.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

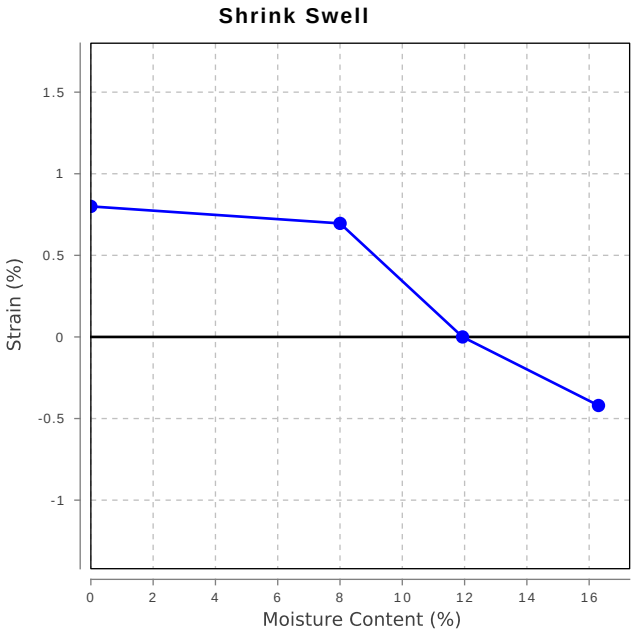
Approved Signatory: Serge Jajcanin
NATA Accredited Laboratory Number: 828

Report Number:	**93893.00-1**
Issue Number:	1
Date Issued:	04/06/2018
Client:	Public Safety Business Agency (PSBA) GPO Box 2336, Brisbane QLD 4001
Contact:	Julie Huynh
Project Number:	93893.00
Project Name:	Proposed Charters Towers Fire Station
Project Location:	3-5 Enterprise Road, Charters Towers
Work Request:	3425
Sample Number:	18-3425F
Date Sampled:	11/05/2018
Sampling Method:	Sampled by Engineering Department
Sample Location:	**Bore 2 (0.50 - 0.68m)**
Material:	Natural

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	**0.6**
Visual Description	Natural
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	**0.8**
Estimated % by volume of significant inert inclusions	0
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	11.9

Swell Test	
Initial Pocket Penetrometer (kPa)	490
Final Pocket Penetrometer (kPa)	350
Initial Moisture Content (%)	12.5
Final Moisture Content (%)	16.3
Swell (%)	**0.4**
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

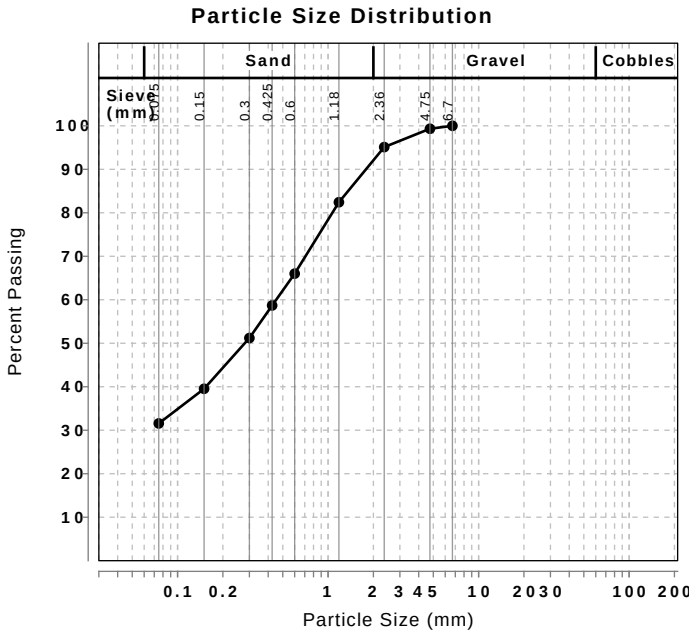
Douglas Partners
Geotechnics | Environment | Groundwater
Douglas Partners Pty Ltd
Brisbane Laboratory
439 Montague Road West End QLD 4101
Phone: (07) 3237 8900
Fax: (07) 3237 8999
Email: serge.jajcanin@douglaspartners.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Serge Jajcanin
NATA Accredited Laboratory Number: 828

Report Number: **93893.00-1**
Issue Number: 1
Date Issued: 04/06/2018
Client: Public Safety Business Agency (PSBA)
GPO Box 2336, Brisbane QLD 4001
Contact: Julie Huynh
Project Number: 93893.00
Project Name: Proposed Charters Towers Fire Station
Project Location: 3-5 Enterprise Road, Charters Towers
Work Request: 3425
Sample Number: 18-3425G
Date Sampled: 11/05/2018
Sampling Method: Sampled by Engineering Department
Sample Location: **Bore 3 (0.40 - 0.60m)**
Material: Natural

Particle Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
6.7 mm	**100**		
4.75 mm	**99**		
2.36 mm	**95**		
1.18 mm	**82**		
0.6 mm	**66**		
0.425 mm	**59**		
0.3 mm	**51**		
0.15 mm	**40**		
0.075 mm	**32**		



Material Test Report

Douglas Partners
Geotechnics | Environment | Groundwater
Douglas Partners Pty Ltd
Brisbane Laboratory
439 Montague Road West End QLD 4101
Phone: (07) 3237 8900
Fax: (07) 3237 8999
Email: serge.jajcanin@douglaspartners.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Serge Jajcanin
NATA Accredited Laboratory Number: 828

Report Number: **93893.00-1**
Issue Number: 1
Date Issued: 04/06/2018
Client: Public Safety Business Agency (PSBA)
GPO Box 2336, Brisbane QLD 4001
Contact: Julie Huynh
Project Number: 93893.00
Project Name: Proposed Charters Towers Fire Station
Project Location: 3-5 Enterprise Road, Charters Towers
Work Request: 3425
Sample Number: 18-3425H
Date Sampled: 11/05/2018
Sampling Method: Sampled by Engineering Department
Sample Location: **Bore 4 (0.70 - 0.80m)**
Material: Natural

Atterberg Limit (AS1289 3.1.2 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	45		
Plastic Limit (%)	13		
Plasticity Index (%)	**32**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Linear Shrinkage (%)	13.0		
Cracking Crumbling Curling	Curling		

Moisture Content (AS 1289 2.1.1)	
Moisture Content (%)	12.1

Material Test Report

Douglas Partners
Geotechnics | Environment | Groundwater
Douglas Partners Pty Ltd
Brisbane Laboratory
439 Montague Road West End QLD 4101
Phone: (07) 3237 8900
Fax: (07) 3237 8999
Email: serge.jajcanin@douglaspartners.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Serge Jajcanin
NATA Accredited Laboratory Number: 828

Report Number: **93893.00-1**
Issue Number: 1
Date Issued: 04/06/2018
Client: Public Safety Business Agency (PSBA)
GPO Box 2336, Brisbane QLD 4001
Contact: Julie Huynh
Project Number: 93893.00
Project Name: Proposed Charters Towers Fire Station
Project Location: 3-5 Enterprise Road, Charters Towers
Work Request: 3425
Sample Number: 18-3425I
Date Sampled: 11/05/2018
Sampling Method: Sampled by Engineering Department
Sample Location: **Bore 5 (0.00 - 0.10m)**
Material: Filling

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4 ***		
Soil Description	Filling		
Nature of Water	De-ionised		
Temperature of Water (^{o}C)	22		
* Mineral Present	Carbonate		

Material Test Report

Douglas Partners
Geotechnics | Environment | Groundwater
Douglas Partners Pty Ltd
Brisbane Laboratory
439 Montague Road West End QLD 4101
Phone: (07) 3237 8900
Fax: (07) 3237 8999
Email: serge.jajcanin@douglaspartners.com.au

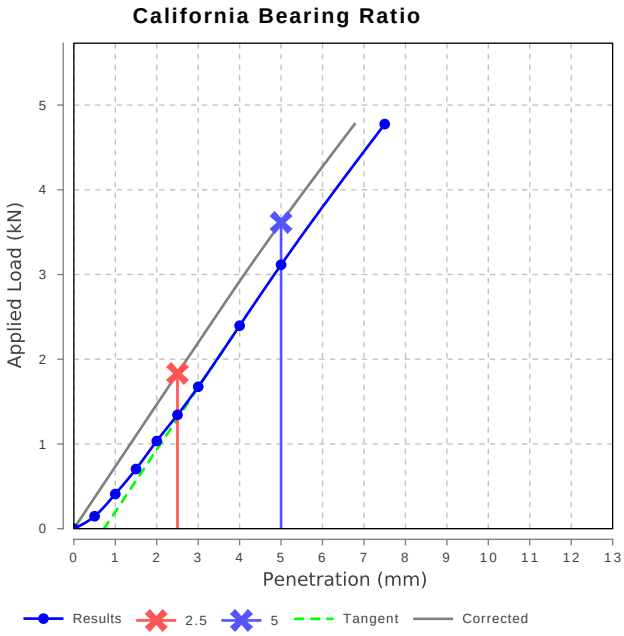
Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Serge Jajcanin
NATA Accredited Laboratory Number: 828

Report Number: **93893.00-1**
Issue Number: 1
Date Issued: 04/06/2018
Client: Public Safety Business Agency (PSBA)
GPO Box 2336, Brisbane QLD 4001
Contact: Julie Huynh
Project Number: 93893.00
Project Name: Proposed Charters Towers Fire Station
Project Location: 3-5 Enterprise Road, Charters Towers
Work Request: 3425
Sample Number: 18-3425J
Date Sampled: 11/05/2018
Sampling Method: Sampled by Engineering Department
Sample Location: **Bore 5 (0.20 - 0.30m)**
Material: Filling

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	5 mm		
CBR %	**18**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m^3)	1.91		
Optimum Moisture Content (%)	12.5		
Laboratory Density Ratio (%)	97.5		
Laboratory Moisture Ratio (%)	101.5		
Dry Density after Soaking (t/m^3)	1.87		
Field Moisture Content (%)	4.1		
Moisture Content at Placement (%)	12.7		
Moisture Content Top 30mm (%)	14.0		
Moisture Content Rest of Sample (%)	13.5		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	24.0		
Swell (%)	-0.5		
Oversize Material (mm)	19		
Oversize Material Included	Included		
Oversize Material (%)	22.4		
Variation from Test Method	Curing time		

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**4 ***		
Soil Description	Filling		
Nature of Water	De-ionised		
Temperature of Water (^{o}C)	22		
* Mineral Present	Carbonate		



Material Test Report

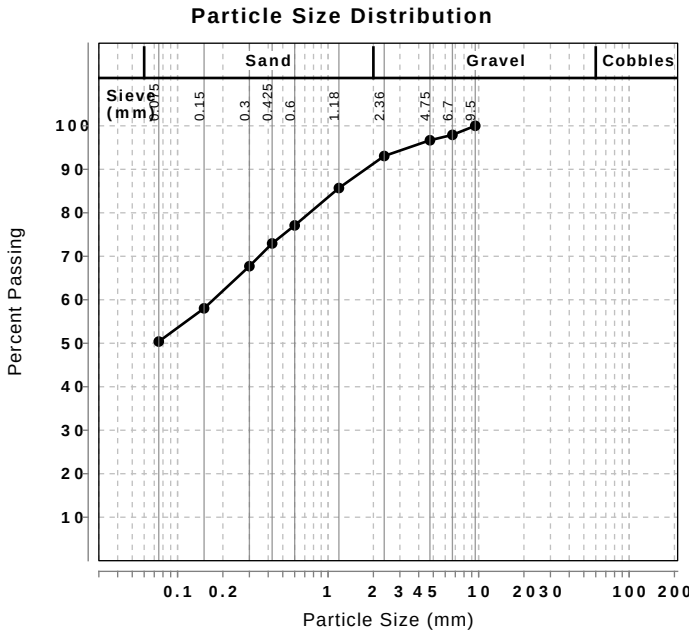
Douglas Partners
Geotechnics | Environment | Groundwater
Douglas Partners Pty Ltd
Brisbane Laboratory
439 Montague Road West End QLD 4101
Phone: (07) 3237 8900
Fax: (07) 3237 8999
Email: serge.jajcanin@douglaspartners.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Serge Jajcanin
NATA Accredited Laboratory Number: 828

Report Number: **93893.00-1**
Issue Number: 1
Date Issued: 04/06/2018
Client: Public Safety Business Agency (PSBA)
GPO Box 2336, Brisbane QLD 4001
Contact: Julie Huynh
Project Number: 93893.00
Project Name: Proposed Charters Towers Fire Station
Project Location: 3-5 Enterprise Road, Charters Towers
Work Request: 3425
Sample Number: 18-3425K
Date Sampled: 11/05/2018
Sampling Method: Sampled by Engineering Department
Sample Location: **Bore 6 (1.80 - 2.00m)**
Material: Natural

Particle Distribution (AS1289 3.6.1)			
Sieve	Passed %	Passing Limits	
9.5 mm	**100**		
6.7 mm	**98**		
4.75 mm	**97**		
2.36 mm	**93**		
1.18 mm	**86**		
0.6 mm	**77**		
0.425 mm	**73**		
0.3 mm	**68**		
0.15 mm	**58**		
0.075 mm	**50**		



Material Test Report

Douglas Partners
Geotechnics | Environment | Groundwater
Douglas Partners Pty Ltd
Brisbane Laboratory
439 Montague Road West End QLD 4101
Phone: (07) 3237 8900
Fax: (07) 3237 8999
Email: serge.jajcanin@douglaspartners.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Serge Jajcanin
NATA Accredited Laboratory Number: 828

Report Number: **93893.00-1**
Issue Number: 1
Date Issued: 04/06/2018
Client: Public Safety Business Agency (PSBA)
GPO Box 2336, Brisbane QLD 4001
Contact: Julie Huynh
Project Number: 93893.00
Project Name: Proposed Charters Towers Fire Station
Project Location: 3-5 Enterprise Road, Charters Towers
Work Request: 3425
Sample Number: 18-3425L
Date Sampled: 11/05/2018
Sampling Method: Sampled by Engineering Department
Sample Location: **Bore 7 (0.00 - 0.10m)**
Material: Filling

Emerson Class Number of a Soil (AS 1289 3.8.1)		Min	Max
Emerson Class	**6**		
Soil Description	Filling		
Nature of Water	De-ionised		
Temperature of Water (^{o}C)	22		

Material Test Report

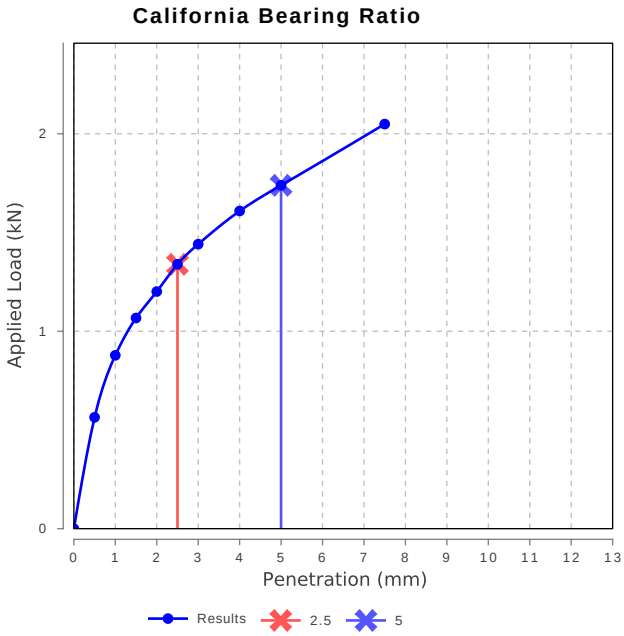
Douglas Partners
Geotechnics | Environment | Groundwater
Douglas Partners Pty Ltd
Brisbane Laboratory
439 Montague Road West End QLD 4101
Phone: (07) 3237 8900
Fax: (07) 3237 8999
Email: serge.jajcanin@douglaspartners.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Serge Jajcanin
NATA Accredited Laboratory Number: 828

Report Number: **93893.00-1**
Issue Number: 1
Date Issued: 04/06/2018
Client: Public Safety Business Agency (PSBA)
GPO Box 2336, Brisbane QLD 4001
Contact: Julie Huynh
Project Number: 93893.00
Project Name: Proposed Charters Towers Fire Station
Project Location: 3-5 Enterprise Road, Charters Towers
Work Request: 3425
Sample Number: 18-3425M
Date Sampled: 11/05/2018
Sampling Method: Sampled by Engineering Department
Sample Location: **Bore 7 (0.20 - 0.50m)**
Material: Filling

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	**10**		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m^3)	1.92		
Optimum Moisture Content (%)	11.5		
Laboratory Density Ratio (%)	98.0		
Laboratory Moisture Ratio (%)	101.0		
Dry Density after Soaking (t/m^3)	1.87		
Field Moisture Content (%)	8.4		
Moisture Content at Placement (%)	11.8		
Moisture Content Top 30mm (%)	16.6		
Moisture Content Rest of Sample (%)	14.9		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	24.0		
Swell (%)	0.5		
Oversize Material (mm)	19		
Oversize Material Included	Included		
Oversize Material (%)	16.2		
Variation from Test Method	Curing time		



Material Test Report

Douglas Partners
Geotechnics | Environment | Groundwater
Douglas Partners Pty Ltd
Brisbane Laboratory
439 Montague Road West End QLD 4101
Phone: (07) 3237 8900
Fax: (07) 3237 8999
Email: serge.jajcanin@douglaspartners.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Serge Jajcanin
NATA Accredited Laboratory Number: 828

Report Number: **93893.00-1**
Issue Number: 1
Date Issued: 04/06/2018
Client: Public Safety Business Agency (PSBA)
GPO Box 2336, Brisbane QLD 4001
Contact: Julie Huynh
Project Number: 93893.00
Project Name: Proposed Charters Towers Fire Station
Project Location: 3-5 Enterprise Road, Charters Towers
Work Request: 3425
Date Sampled: 11/05/2018
Sampling Method: Sampled by Engineering Department

Moisture Content AS 1289 2.1.1			
Sample Number	Sample Location	Moisture Content	Material
18-3425E	Bore 1 (0.40 - 0.60m)	14.2 %	Natural
18-3425H	Bore 4 (0.70 - 0.80m)	12.1 %	Natural

Material Test Report

Douglas Partners
Geotechnics | Environment | Groundwater
Douglas Partners Pty Ltd
Brisbane Laboratory
439 Montague Road West End QLD 4101
Phone: (07) 3237 8900
Fax: (07) 3237 8999
Email: serge.jajcanin@douglaspartners.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Serge Jajcanin
NATA Accredited Laboratory Number: 828

Report Number: **93893.00-1**
Issue Number: 1
Date Issued: 04/06/2018
Client: Public Safety Business Agency (PSBA)
GPO Box 2336, Brisbane QLD 4001
Contact: Julie Huynh
Project Number: 93893.00
Project Name: Proposed Charters Towers Fire Station
Project Location: 3-5 Enterprise Road, Charters Towers
Work Request: 3425
Date Sampled: 11/05/2018
Sampling Method: Sampled by Engineering Department

Shrink Swell Index AS 1289 7.1.1 & 2.1.1		
Sample Number	18-3425D	18-3425F
Sampling Method	Sampled by Engineering Department	Sampled by Engineering Department
Date Sampled	11/05/2018	11/05/2018
Date Tested	23/05/2018	23/05/2018
Material Source	Filling	Natural
Sample Location	Bore 1 (0.30 - 0.52m)	Bore 2 (0.50 - 0.68m)
Inert Material Estimate (%)	0	0
Pocket Penetrometer before (kPa)	560	490
Pocket Penetrometer after (kPa)	260	350
Shrinkage Moisture Content (%)	11.7	11.9
Shrinkage (%)	**1.0**	**0.8**
Swell Moisture Content Before (%)	14.4	12.5
Swell Moisture Content After (%)	18.9	16.3
Swell (%)	**0.2**	**0.4**
Shrink Swell Index Iss (%)	**0.6**	**0.6**
Visual Description	Filling	Natural
Cracking	Slightly Cracked	Slightly Cracked
Crumbling	No	No
Remarks	**	**

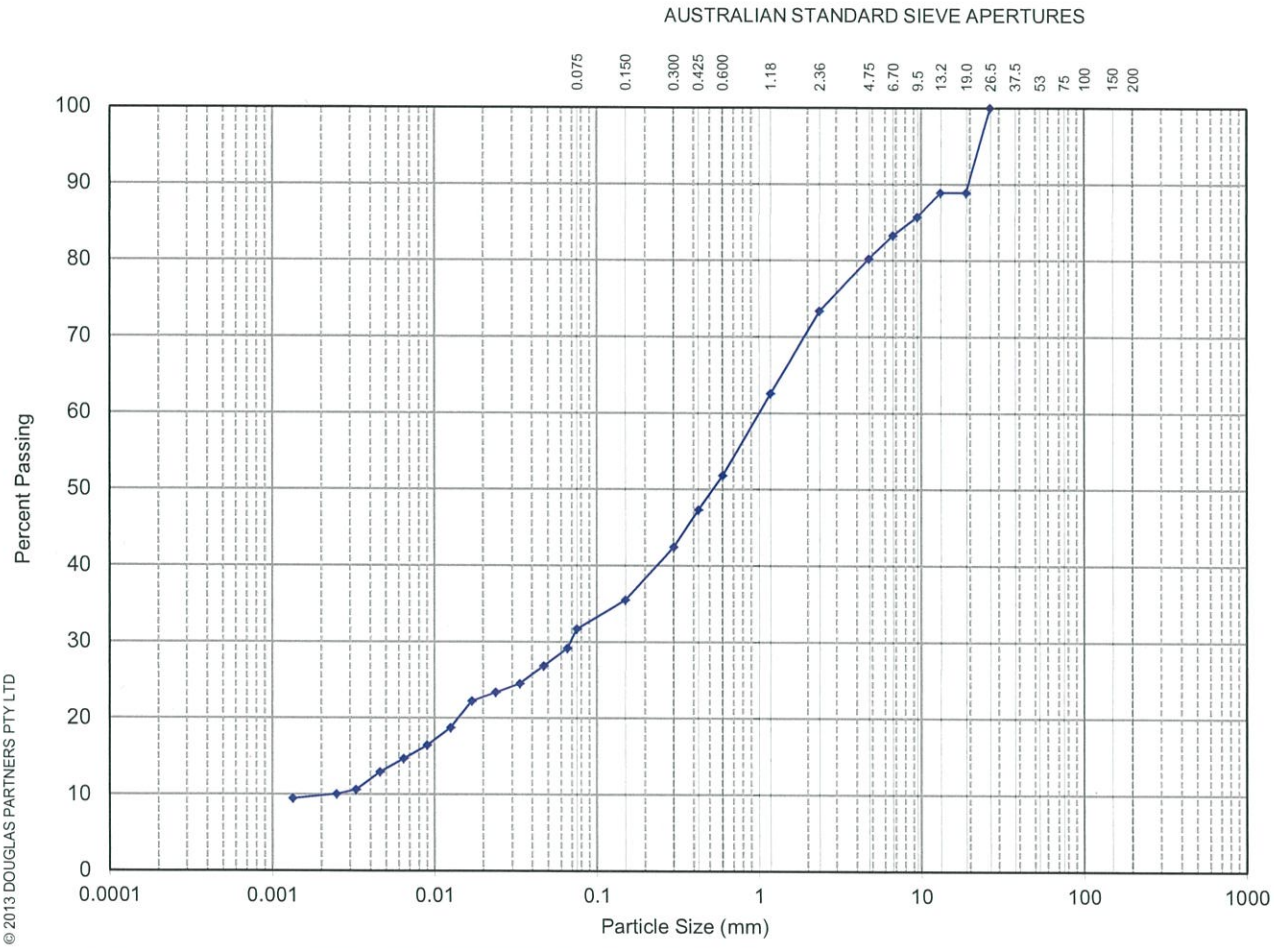
Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.
NATA Accreditation does not cover the performance of pocket penetrometer readings.

Douglas Partners
Geotechnics / Environment / Groundwater

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
439 Montague Road
West End QLD 4101
Phone (07) 3237 8900
Fax (07) 3237 8999

Results of Particle Size Distribution (Hydrometer)

Client :	Public Safety Business Agency (PSBA)	**Project No. :**	93893
		Report No. :	BO18-0116
Project :	Proposed Charters Towers Fire Station	**Report Date :**	31.05.2018
Location :	3-5 Enterprise Road, Charters Towers	**Date Sampled:**	11.05.2018
Test Location:	Topsoil 1	**Date of Test:**	28.05.2018
Depth / Layer:	0.00 - 0.10m	**Page:**	1 of 1



Sieve Size (mm)	% Passing
75.0	~
53.0	~
37.5	~
26.5	100%
19.0	89%
13.2	89%
9.5	86%
6.7	83%
4.75	80%
2.36	73%
1.18	63%
0.600	52%
0.425	47%
0.300	42%
0.150	36%
0.075	32%
0.047	27%
0.034	25%
0.024	23%
0.017	22%
0.013	19%
0.009	16%
0.006	15%
0.005	13%
0.003	11%
0.002	10%
0.001	9%

CLAY FRACTION	SILT FRACTION			SAND FRACTION			GRAVEL FRACTION			COBBLES
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	
0.002	0.006	0.02		0.06	0.2	0.6	2.0	6.0	20	60

Description: Blended Topsoil

Test Method(s): AS 1289.3.6.1, 3.6.3

Sampling Method(s): Samples by DP Engineering

Loss in pretreatment: 0%

Remarks:

Type of Hydrometer: g/l

NATA Accredited Laboratory Number: 828

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025

Tested:	AC
Checked:	SJ

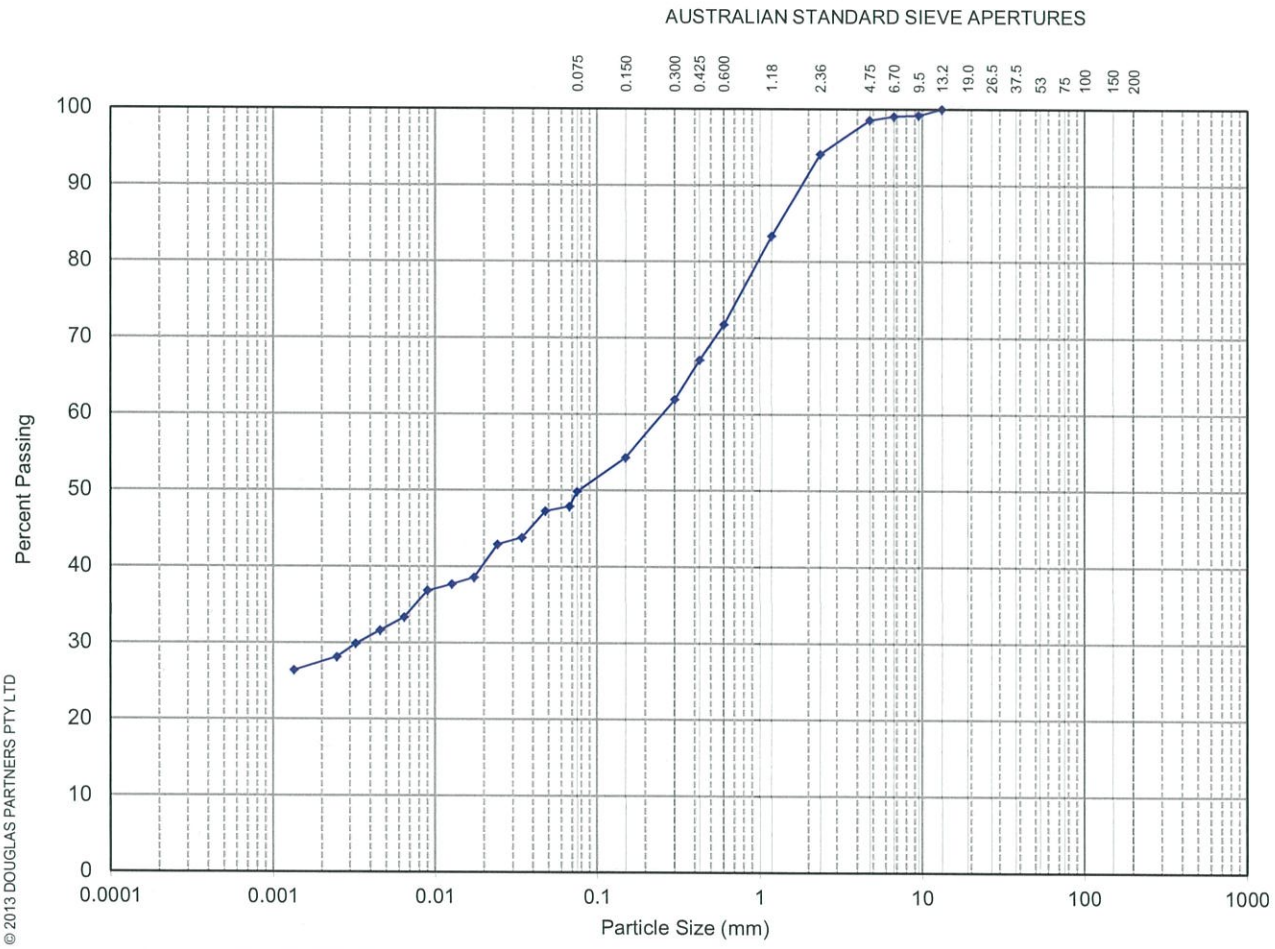
Srdjan Jajcanin
Laboratory Manager

Douglas Partners
Geotechnics / Environment / Groundwater

Douglas Partners Pty Ltd
ABN 75 053 980 117
www.douglaspartners.com.au
439 Montague Road
West End QLD 4101
Phone (07) 3237 8900
Fax (07) 3237 8999

Results of Particle Size Distribution (Hydrometer)

Client :	Public Safety Business Agency (PSBA)	**Project No. :**	93893
		Report No. :	BO18-0117
Project :	Proposed Charters Towers Fire Station	**Report Date :**	31.05.2018
Location :	3-5 Enterprise Road, Charters Towers	**Date Sampled:**	11.05.2018
Test Location:	Subsoil 1	**Date of Test:**	28.05.2018
Depth / Layer:	0.50 - 0.80m	**Page:**	1 of 1



Sieve Size (mm)	% Passing
75.0	~
53.0	~
37.5	~
26.5	~
19.0	~
13.2	100%
9.5	99%
6.7	99%
4.75	99%
2.36	94%
1.18	83%
0.600	72%
0.425	67%
0.300	62%
0.150	54%
0.075	50%
0.048	47%
0.034	44%
0.024	43%
0.017	39%
0.013	38%
0.009	37%
0.006	33%
0.005	32%
0.003	30%
0.002	28%
0.001	26%

CLAY FRACTION	SILT FRACTION			SAND FRACTION			GRAVEL FRACTION			COBBLES
	Fine	Medium	Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	
0.002	0.006	0.02	0.06	0.2	0.6	2.0	6.0	20	60	

Description: Blended Subsoil

Test Method(s): AS 1289.3.6.1, 3.6.3

Sampling Method(s): Samples by DP Engineering

Loss in pretreatment: 0%

Remarks:

Type of Hydrometer: g/l

NATA Accredited Laboratory Number: 828

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025

Tested:	AC
Checked:	SJ

Srdjan Jajcanin
Laboratory Manager

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **EB1811830**	Page	: 1 of 2
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: TOWNSVILLE	Contact	: John Pickering
Address	: 29 Civil Road Garbutt Townsville AUSTRALIA 4814	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 0747799866	Telephone	: +61-7-3243 7222
Project	: Charters Towers, Proposed Fire Station	Date Samples Received	: 16-May-2018 09:30
Order number	: 93893	Date Analysis Commenced	: 17-May-2018
C-O-C number	: ----	Issue Date	: 22-May-2018 17:37
Sampler	: ----		
Site	: ----		
Quote number	: EN/222/17		
No. of samples received	: 3		
No. of samples analysed	: 3		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ED006 (Exchangeable Cations on Alkaline Soils): It is recognised that the Exchangeable K LCS biases low, however this is deemed acceptable as the target concentration is at LOR and the Cation Exchange Capacity LCS is within acceptable limits.
- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Client sample ID	**Bore 1 (0.0-0.1m)**	**Bore 5 (0.0-0.1m)**	**Bore 7 (0.0-0.1m)**	**----**	**----**
			Client sampling date / time	11-May-2018 00:00	12-May-2018 00:00	13-May-2018 00:00	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**EB1811830-001**	**EB1811830-002**	**EB1811830-003**	**--------**	**--------**
				Result	Result	Result	----	----
EA002 : pH (Soils)								
pH Value	----	0.1	pH Unit	**8.4**	**8.5**	**8.5**	**----**	**----**
EA010: Conductivity								
Electrical Conductivity @ 25°C	----	1	µS/cm	**133**	**144**	**170**	**----**	**----**
ED006: Exchangeable Cations on Alkaline Soils								
Exchangeable Calcium	----	0.2	meq/100g	**5.1**	**5.3**	**4.4**	**----**	**----**
Exchangeable Magnesium	----	0.2	meq/100g	**0.5**	**1.0**	**0.8**	**----**	**----**
Exchangeable Potassium	----	0.2	meq/100g	**0.4**	**0.4**	**0.3**	**----**	**----**
Exchangeable Sodium	----	0.2	meq/100g	<0.2	<0.2	<0.2	**----**	**----**
Cation Exchange Capacity	----	0.2	meq/100g	**6.0**	**6.7**	**5.5**	**----**	**----**
Exchangeable Sodium Percent	----	0.2	%	<0.2	<0.2	<0.2	**----**	**----**

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ Sydney: 277 Woodpark Rd, Smithfield NSW 2176 Ph: 02 8784 8555 E:samples.sydney@alsenviro.com
☐ Newcastle: 5 Rosegum Rd, Warabrook NSW 2304 Ph:02 4968 9433 E:samples.newcastle@alsenviro.com
☐ Brisbane: 32 Shand St, Stafford QLD 4053 Ph:07 3243 7222 E:samples.brisbane@alsenviro.com
☐ Townsville: 14-15 Desma Ct, Bohle QLD 4818 Ph:07 4796 0600 E: townsville.environmental@alsenviro.com
☐ Melbourne: 2-4 Westall Rd, Springvale VIC 3171 Ph:03 8549 9600 E: samples.melbourne@alsenviro.com
☐ Adelaide: 2-1 Burma Rd, Pooraka SA 5095 Ph: 08 8359 0890 E:adelaide@alsenviro.com
☐ Perth: 10 Hod Way, Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsenviro.com
☐ Launceston: 27 Wellington St, Launceston TAS 7250 Ph: 03 6331 2158 E: launceston@alsenviro.com

CLIENT:	Douglas Partners Pty Ltd	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g. Ultra Trace Organics)	☒ Standard TAT (List due date): 5 day TAT please ☐ Non Standard or urgent TAT (List due date):
OFFICE:	Townsville - 29 Civil Road, Garbutt	ALS QUOTE NO.:	EN/222/17
PROJECT:	Charters Towers, Proposed Fire Station		EN/222/17
ORDER NUMBER:	93893	COC SEQUENCE NUMBER	COC: 1
PROJECT MANAGER:	KML	CONTACT PH: (07) 4779 9866	OF: 1
SAMPLER:	Douglas Partners Pty Ltd	SAMPLER MOBILE:	
COC emailed to ALS?	Yes	EDD FORMAT (or default):	

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact?	Yes	No	N/A
Free ice / frozen ice bricks present upon receipt?	Yes	No	N/A
Random Sample Temperature on Receipt:		°C	
Other comment:			

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
DATE/TIME:	DATE/TIME: 15.5.18 12.30pm	DATE/TIME: 15.5.18 4.30pm	DATE/TIME: 16/5/18 9.30

Email Reports to (will default to PM if no other addresses are listed): townsville@douglaspartners.com.au

Email Invoice to (will default to PM if no other addresses are listed): townsville@douglaspartners.com.au

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).								Additional Information
LAB ID	SAMPLE ID	DATE / TIME Sampled	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	EC	Cation Exchange Capacity	pH						Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	Bore 1 (0.0-0.1m)	11/05/2018	s		1	1	1	1						
2	Bore 5 (0.0-0.1m)	12/05/2018	s		1	1	1	1						
3	Bore 7 (0.0-0.1m)	13/05/2018	s		1	1	1	1						

Environmental Division Brisbane
Work Order Reference
EB1811830

Telephone : +61-7-3243 7222

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **EB1811830**

Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: TOWNSVILLE	Contact	: John Pickering
Address	: 29 Civil Road Garbutt Townsville AUSTRALIA 4814	Address	: 2 Byth Street Stafford QLD Australia 4053
E-mail	: townsville@douglaspartners.com.au	E-mail	: john.pickering@alsglobal.com
Telephone	: 0747799866	Telephone	: +61-7-3243 7222
Facsimile	: ----	Facsimile	: +61-7-3243 7218
Project	: Charters Towers, Proposed Fire Station	Page	: 1 of 2
Order number	: 93893	Quote number	: EM2017DOUPAR0002 (EN/222/17)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	:		

Dates

Date Samples Received	: 16-May-2018 09:30	Issue Date	: 16-May-2018
Client Requested Due Date	: 23-May-2018	Scheduled Reporting Date	: **23-May-2018**

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 14.1°C - Ice present
Receipt Detail	:	No. of samples received / analysed	: 3 / 3

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- Discounted Package Prices apply only when specific ALS Group Codes ('W', 'S', 'NT' suites) are referenced on COCs.
- **Where 'Cation Exchange Capacity' has been referenced, pH and electrical conductivity have been assigned as the results for these methods will be used to determine the correct method for analysis. Once the correct method has been determined, CEC will be added to this work order.**
- Please direct any turn around / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- Analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818 (Micro site no. 18958).
- **Breaches in recommended extraction / analysis holding times (if any) are displayed overleaf in the Proactive Holding Time Report table.**

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **SOIL**

Laboratory sample ID	Client sampling date / time	Client sample ID	SOIL - EA002 pH (1:5)	SOIL - EA010 (solids): Electrical Conductivity (1:5)
EB1811830-001	11-May-2018 00:00	Bore 1 (0.0-0.1m)	✓	✓
EB1811830-002	12-May-2018 00:00	Bore 5 (0.0-0.1m)	✓	✓
EB1811830-003	13-May-2018 00:00	Bore 7 (0.0-0.1m)	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV)	Email	accounts@douglaspartners.com.au

TOWNSVILLE

- *AU Certificate of Analysis - NATA (COA)	Email	townsville@douglaspartners.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	townsville@douglaspartners.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	townsville@douglaspartners.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	townsville@douglaspartners.com.au
- A4 - AU Tax Invoice (INV)	Email	townsville@douglaspartners.com.au
- Chain of Custody (CoC) (COC)	Email	townsville@douglaspartners.com.au
- EDI Format - ENMRG (ENMRG)	Email	townsville@douglaspartners.com.au
- EDI Format - ESDAT (ESDAT)	Email	townsville@douglaspartners.com.au
- EDI Format - XTab (XTAB)	Email	townsville@douglaspartners.com.au

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EB1811830**	Page	: 1 of 3
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: TOWNSVILLE	Contact	: John Pickering
Address	: 29 Civil Road Garbutt Townsville AUSTRALIA 4814	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 0747799866	Telephone	: +61-7-3243 7222
Project	: Charters Towers, Proposed Fire Station	Date Samples Received	: 16-May-2018
Order number	: 93893	Date Analysis Commenced	: 17-May-2018
C-O-C number	: ----	Issue Date	: 22-May-2018
Sampler	: ----		
Site	: ----		
Quote number	: EN/222/17		
No. of samples received	: 3		
No. of samples analysed	: 3		

ilac-MRA NATA
Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils, Stafford, QLD

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA002 : pH (Soils) (QC Lot: 1647492)									
EB1811759-001	Anonymous	EA002: pH Value	----	0.1	pH Unit	7.9	7.8	0.00	0% - 20%
EB1811689-001	Anonymous	EA002: pH Value	----	0.1	pH Unit	8.5	8.5	0.00	0% - 20%
EA010: Conductivity (QC Lot: 1647491)									
EB1811759-001	Anonymous	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	174	155	11.9	0% - 20%
EB1811689-001	Anonymous	EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	111	111	0.00	0% - 20%
ED006: Exchangeable Cations on Alkaline Soils (QC Lot: 1657342)									
EB1811696-001	Anonymous	ED006: Exchangeable Calcium	----	0.2	meq/100g	7.2	# 3.2	76.5	0% - 20%
		ED006: Exchangeable Magnesium	----	0.2	meq/100g	1.9	0.9	73.9	No Limit
		ED006: Exchangeable Potassium	----	0.2	meq/100g	0.2	<0.2	0.00	No Limit
		ED006: Exchangeable Sodium	----	0.2	meq/100g	0.5	0.2	68.8	No Limit
		ED006: Cation Exchange Capacity	----	0.2	meq/100g	9.8	# 4.3	77.4	0% - 20%
EB1811830-001	Bore 1 (0.0-0.1m)	ED006: Exchangeable Calcium	----	0.2	meq/100g	5.1	# 2.2	76.9	0% - 20%
		ED006: Exchangeable Magnesium	----	0.2	meq/100g	0.5	<0.2	89.8	No Limit
		ED006: Exchangeable Potassium	----	0.2	meq/100g	0.4	0.2	65.2	No Limit
		ED006: Exchangeable Sodium	----	0.2	meq/100g	<0.2	<0.2	0.00	No Limit
		ED006: Cation Exchange Capacity	----	0.2	meq/100g	6.0	# 2.5	83.7	0% - 20%

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **SOIL**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA002 : pH (Soils) (QCLot: 1647492)								
EA002: pH Value	----	----	pH Unit	----	4 pH Unit	100	98	102
				----	7 pH Unit	100	98	102
EA010: Conductivity (QCLot: 1647491)								
EA010: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	1412 µS/cm	98.2	97	103
ED006: Exchangeable Cations on Alkaline Soils (QCLot: 1657342)								
ED006: Exchangeable Calcium	----	0.2	meq/100g	<0.2	5.12 meq/100g	94.3	70	130
ED006: Exchangeable Magnesium	----	0.2	meq/100g	<0.2	3.52 meq/100g	77.9	70	130
ED006: Exchangeable Potassium	----	0.2	meq/100g	<0.2	----	----	----	----
ED006: Exchangeable Sodium	----	0.2	meq/100g	<0.2	1.76 meq/100g	79.9	70	130
ED006: Cation Exchange Capacity	----	0.2	meq/100g	<0.2	10.8 meq/100g	85.4	70	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) or Matrix Spike Duplicate (MSD) Results are required to be reported.**

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **EB1811830**	Page	: 1 of 4
Client	: **DOUGLAS PARTNERS PTY LTD**	Laboratory	: Environmental Division Brisbane
Contact	: TOWNSVILLE	Telephone	: +61-7-3243 7222
Project	: Charters Towers, Proposed Fire Station	Date Samples Received	: 16-May-2018
Site	: ----	Issue Date	: 22-May-2018
Sampler	: ----	No. of samples received	: 3
Order number	: 93893	No. of samples analysed	: 3

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **Duplicate outliers exist - please see following pages for full details.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **SOIL**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
ED006: Exchangeable Cations on Alkaline Soils	EB1811696--001	Anonymous	**Exchangeable Calcium**	----	76.5 %	0% - 20%	**RPD exceeds LOR based limits**
ED006: Exchangeable Cations on Alkaline Soils	EB1811830--001	Bore 1 (0.0-0.1m)	**Exchangeable Calcium**	----	76.9 %	0% - 20%	**RPD exceeds LOR based limits**
ED006: Exchangeable Cations on Alkaline Soils	EB1811696--001	Anonymous	**Cation Exchange Capacity**	----	77.4 %	0% - 20%	**RPD exceeds LOR based limits**
ED006: Exchangeable Cations on Alkaline Soils	EB1811830--001	Bore 1 (0.0-0.1m)	**Cation Exchange Capacity**	----	83.7 %	0% - 20%	**RPD exceeds LOR based limits**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **SOIL**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)							
Snap Lock Bag (EA002) Bore 1 (0.0-0.1m)	**11-May-2018**	**17-May-2018**	18-May-2018	✓	**17-May-2018**	17-May-2018	✓
Snap Lock Bag (EA002) Bore 5 (0.0-0.1m)	**12-May-2018**	**17-May-2018**	19-May-2018	✓	**17-May-2018**	17-May-2018	✓
Snap Lock Bag (EA002) Bore 7 (0.0-0.1m)	**13-May-2018**	**17-May-2018**	20-May-2018	✓	**17-May-2018**	17-May-2018	✓
EA010: Conductivity							
Snap Lock Bag (EA010) Bore 1 (0.0-0.1m)	**11-May-2018**	**17-May-2018**	18-May-2018	✓	**17-May-2018**	14-Jun-2018	✓
Snap Lock Bag (EA010) Bore 5 (0.0-0.1m)	**12-May-2018**	**17-May-2018**	19-May-2018	✓	**17-May-2018**	14-Jun-2018	✓
Snap Lock Bag (EA010) Bore 7 (0.0-0.1m)	**13-May-2018**	**17-May-2018**	20-May-2018	✓	**17-May-2018**	14-Jun-2018	✓
ED006: Exchangeable Cations on Alkaline Soils							
Snap Lock Bag (ED006) Bore 1 (0.0-0.1m)	**11-May-2018**	**21-May-2018**	08-Jun-2018	✓	**22-May-2018**	08-Jun-2018	✓
Snap Lock Bag (ED006) Bore 5 (0.0-0.1m)	**12-May-2018**	**21-May-2018**	09-Jun-2018	✓	**22-May-2018**	09-Jun-2018	✓
Snap Lock Bag (ED006) Bore 7 (0.0-0.1m)	**13-May-2018**	**21-May-2018**	10-Jun-2018	✓	**22-May-2018**	10-Jun-2018	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Electrical Conductivity (1:5)	EA010	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Electrical Conductivity (1:5)	EA010	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
pH (1:5)	EA002	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Electrical Conductivity (1:5)	EA010	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Exchangeable Cations on Alkaline Soils	ED006	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	In house: Referenced to Rayment and Lyons 4A1 and APHA 4500H+. pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3)
Electrical Conductivity (1:5)	EA010	SOIL	In house: Referenced to Rayment and Lyons 3A1 and APHA 2510. Conductivity is determined on soil samples using a 1:5 soil/water leach. This method is compliant with NEPM (2013) Schedule B(3)
Exchangeable Cations on Alkaline Soils	ED006	SOIL	In house: Referenced to Soil Survey Test Method C5. Soluble salts are removed from the sample prior to analysis. Cations are exchanged from the sample by contact with alcoholic ammonium chloride at pH 8.5. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil.

Preparation Methods	Method	Matrix	Method Descriptions
Exchangeable Cations Preparation Method (Alkaline Soils)	ED006PR	SOIL	In house: Referenced to Rayment and Lyons 2011 method 15C1.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of reagent grade water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.

ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS		LABORATORY DETAILS	
Contact	Kate Fulham	Manager	Jon Dicker
Client	DOUGLAS PARTNERS PTY LTD	Laboratory	SGS Cairns Environmental
Address	29 CIVIL ROAD GARBUTT QLD 4814	Address	Unit 2, 58 Comport St Portsmith QLD 4870
Telephone	61 7 4779 9866	Telephone	+61 07 4035 5111
Facsimile	07 4725 1224	Facsimile	+61 07 4035 5122
Email	kate.fulham@douglaspartners.com.au	Email	AU.Environmental.Cairns@sgs.com
Project	**93893 - Proposed Fire Station Charters T**	SGS Reference	**CE133570 R0**
Order Number	(Not specified)	Date Received	16 May 2018
Samples	2	Date Reported	28 May 2018

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(3146).

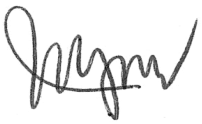
AGRON REPORT

SIGNATORIES

Anthony Nilsson
Operations Manager

Jon Dicker
Manager Northern QLD

Leanne Orsmond
Quality & Microbiology Coordinator



Maristela Ganzan
Metals Team Leader

Mark Ayers
Team Leader - Agri Plant/Soil

Parameter	Units	LOR	Sample Number: CE133570.001 Sample Matrix: Soil Sample Date: 11 May 2018 Sample Name: Topsoil 1	Sample Number: CE133570.002 Sample Matrix: Soil Sample Date: 11 May 2018 Sample Name: Subsoil 1
Moisture Content Method: AN002 Tested: 16/5/2018				
% Moisture	%w/w	0.5	**2.5**	**9.1**
pH in soil (1:5) Method: AN101 Tested: 21/5/2018				
pH	pH Units	-	**8.2**	**8.6**
pH (CaCl2)*	pH Units	-	**7.6**	**8.0**
Conductivity and TDS by Calculation - Soil Method: AN106 Tested: 21/5/2018				
Conductivity of Extract (1:5 dry sample basis)	µS/cm	1	**180**	**150**
Total Dissolved Solids (by calculation)	mg/kg	5	**530**	**460**
Chloride (water extractable) Method: AN274 Tested: 21/5/2018				
Chloride (water extractable 1:5)	mg/kg	5	**32**	<5
Nitrate Nitrogen and Nitrite Nitrogen (NOx) by Auto Analyser in Soil Method: AN248 Tested: 18/5/2018				
Nitrate/Nitrite Nitrogen, NOx as N	mg/kg	0.1	**6.6**	**2.0**
Colwell Phosphorus Method: AN015 Tested: 22/5/2018				
Colwell Phosphorus	mg/kg	1	**35**	**5**

Parameter	Units	LOR	Sample Number: CE133570.001 Sample Matrix: Soil Sample Date: 11 May 2018 Sample Name: Topsoil 1	Sample Number: CE133570.002 Sample Matrix: Soil Sample Date: 11 May 2018 Sample Name: Subsoil 1
Total Organic Carbon by Heanes Oxidation Method: AN273 Tested: 23/5/2018				
Total Organic Carbon	%w/w	0.05	**3.5**	**0.50**
Organic Matter	%w/w	0.1	**6.0**	**0.86**
Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) Method: AN122 Tested: 21/5/2018				
Exchangeable Sodium, Na	mg/kg	2	**11**	**10**
Exchangeable Potassium, K	mg/kg	2	**100**	**41**
Exchangeable Calcium, Ca	mg/kg	2	**1100**	**1100**
Exchangeable Magnesium, Mg	mg/kg	2	**48**	**97**
Exchangeable Sodium, Na	meq/100g	0.01	**0.05**	**0.04**
Exchangeable Potassium, K	meq/100g	0.01	**0.26**	**0.10**
Exchangeable Calcium, Ca	meq/100g	0.01	**5.6**	**5.3**
Exchangeable Magnesium, Mg	meq/100g	0.02	**0.39**	**0.79**
Exchangeable Sodium Percentage*	%	0.1	**0.7**	**0.7**
Exchangeable Potassium Percentage*	%	0.1	**4.1**	**1.7**
Exchangeable Calcium Percentage*	%	0.1	**88.9**	**85.0**
Exchangeable Magnesium Percentage*	%	0.1	**6.2**	**12.7**
Cation Exchange Capacity	meq/100g	0.02	**6.3**	**6.2**
Cation Exchange Capacity (soluble salts removed)	meq/100g	0.02	-	-
Sodium Adsorption Ratio*	No unit	0.1	<0.1	<0.1
Exchangeable Calcium/Exchangeable Magnesium Ratio*	No unit	0.1	**14.3**	**6.7**
DTPA Extractable Metals in Soil Method: AN025/AN320 Tested: 21/5/2018				
Copper, Cu	mg/kg	0.05	**3.0**	**2.2**
Zinc, Zn	mg/kg	0.05	**37**	**4.4**
Manganese, Mn	mg/kg	0.5	**7.5**	**3.8**
Iron, Fe	mg/kg	0.5	**12**	**7.6**
Calcium Chloride Extractable Boron Method: RL 12C2/AN320 Tested: 24/5/2018				
CaCl2-extractable Boron, B*	mg/kg	0.05	**0.64**	**1.4**
Potassium Chloride Extractable Sulphur Method: RL 10D1/AN320 Tested: 21/5/2018				
KCl-40-extractable Sulphur, S*	mg/kg	1	**9**	**15**

Parameter	Units	LOR	Sample Number: CE133570.001 Sample Matrix: Soil Sample Date: 11 May 2018 Sample Name: Topsoil 1	Sample Number: CE133570.002 Sample Matrix: Soil Sample Date: 11 May 2018 Sample Name: Subsoil 1
Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES Method: AN040/AN320 Tested: 22/5/2018				
Phosphorus, P	mg/kg	10	**690**	**120**
Soil - Nitrogen by Leco Method: PRN002 Tested: 21/5/2018				
Nitrogen*	mg/kg	150	**1850**	**333**
Soil - Aluminium (KCL Extraction) Method: SOL061 Tested: 23/5/2018				
Exchangeable Aluminium*	mg/kg	1	-	-
Exchangeable Aluminium*	cmol (+)/kg	0.01	-	-

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Calcium Chloride Extractable Boron Method: RL 12C2/AN320

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
CaCl2-extractable Boron, B*	LB056708	mg/kg	0.05	<0.05	1 - 9%	NA

Chloride (water extractable) Method: ME-(AU)-[ENV]AN274

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Chloride (water extractable 1:5)	LB056556	mg/kg	5	<5	0 - 1%	106%

Colwell Phosphorus Method: ME-(AU)-[ENV]AN015

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Colwell Phosphorus	LB056595	mg/kg	1	<1	0 - 2%	82 - 89%

Conductivity and TDS by Calculation - Soil Method: ME-(AU)-[ENV]AN106

Parameter	QC Reference	Units	LOR	DUP %RPD
Conductivity of Extract (1:5 dry sample basis)	LB056535	µS/cm	1	7 - 12%
Total Dissolved Solids (by calculation)	LB056535	mg/kg	5	6 - 12%

DTPA Extractable Metals in Soil Method: ME-(AU)-[ENV]AN025/AN320

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Copper, Cu	LB056515	mg/kg	0.05	<0.05	0%	NA
Zinc, Zn	LB056515	mg/kg	0.05	0.10	0%	NA
Manganese, Mn	LB056515	mg/kg	0.5	<0.5	4%	NA
Iron, Fe	LB056515	mg/kg	0.5	<0.5	3%	NA

Exchangeable Cations and Cation Exchange Capacity (CEC/ESP/SAR) Method: ME-(AU)-[ENV]AN122

Parameter	QC Reference	Units	LOR	MB	DUP %RPD
Exchangeable Sodium, Na	LB056516	mg/kg	2		23 - 26%
Exchangeable Potassium, K	LB056516	mg/kg	2		13 - 22%
Exchangeable Calcium, Ca	LB056516	mg/kg	2		1 - 22%
Exchangeable Magnesium, Mg	LB056516	mg/kg	2		16 - 22%
Exchangeable Sodium, Na	LB056516	meq/100g	0.01	<0.01	
Exchangeable Potassium, K	LB056516	meq/100g	0.01	<0.01	
Exchangeable Calcium, Ca	LB056516	meq/100g	0.01	<0.01	
Exchangeable Magnesium, Mg	LB056516	meq/100g	0.02	<0.02	
Exchangeable Sodium Percentage*	LB056516	%	0.1	<0.1	
Exchangeable Potassium Percentage*	LB056516	%	0.1	310.9	
Exchangeable Calcium Percentage*	LB056516	%	0.1	<0.1	
Exchangeable Magnesium Percentage*	LB056516	%	0.1	<0.1	
Cation Exchange Capacity	LB056516	meq/100g	0.02	<0.02	
Sodium Adsorption Ratio*	LB056516	No unit	0.1	<0.1	
Exchangeable Calcium/Exchangeable Magnesium Ratio*	LB056516	No unit	0.1	1.1	

QC SUMMARY

MB blank results are compared to the Limit of Reporting
LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.
DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Nitrate Nitrogen and Nitrite Nitrogen (NOx) by Auto Analyser in Soil **Method: ME-(AU)-[ENV]AN248**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Nitrate/Nitrite Nitrogen, NOx as N	LB056488	mg/kg	0.1	<0.1	1%	97%

pH in soil (1:5) **Method: ME-(AU)-[ENV]AN101**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
pH	LB056535	pH Units	-	5.9	0 - 1%	100%
pH (CaCl2)*	LB056535	pH Units	-		0 - 2%	

Potassium Chloride Extractable Sulphur **Method: RL 10D1/AN320**

Parameter	QC Reference	Units	LOR	DUP %RPD
KCl-40-extractable Sulphur, S*	LB056517	mg/kg	1	11%

Soil - Nitrogen by Leco **Method: PRN002**

Parameter	QC Reference	Units	LOR	MB
Nitrogen*	LB056527	mg/kg	150	<150

Total Organic Carbon by Heanes Oxidation **Method: ME-(AU)-[ENV]AN273**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Total Organic Carbon	LB056652	%w/w	0.05	<0.05	8 - 10%	93 - 94%	89%
Organic Matter	LB056652	%w/w	0.1	<0.10	8 - 10%	NA	

Total Recoverable Elements in Soil/Waste Solids/Materials by ICPOES **Method: ME-(AU)-[ENV]AN040/AN320**

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Phosphorus, P	LB056604	mg/kg	10	<10	1%	NA

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN015	Soil sample is extracted in an end over end roller in 0.5 N sodium bicarbonate at pH 8.5 with the supernatant liquor analysed for Phosphorous. Orthophosphate anion (PO43-) is reacted with ammonium molybdate and potassium antimony tartrate in sulfuric acid solution. The resulting phospho-molybdate complex is reduced, using ascorbic acid, to an intense blue coloured complex Molybdenum Blue. The absorbance of this complex is measured at 880 nm by Discrete Analyser, and compared with calibration standards to obtain the concentration of orthophosphate in the sample. Based on Rayment & Higginson 9B1.
AN025/AN320	A chelating agent is used to complex metal ions in solution. The extracted elements are determined byICP OES.
AN040/AN320	A portion of sample is digested with nitric acid to decompose organic matter and hydrochloric acid to complete the digestion of metals. The digest is then analysed by ICP OES with metals results reported on the dried sample basis. Based on USEPA method 200.8 and 6010C.
AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode and is calibrated against 3 buffers purchased commercially. For soils, sediments and sludges, an extract with water (or 0.01M CaCl2) is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.
AN103	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode (glass plus reference electrode) and is calibrated against 3 buffers purchased commercially. For soils, an extract with water is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.
AN106	Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as µmhos/cm or µS/cm @ 25°C. For soils, an extract with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Salinity can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. Reference APHA 2510 B.
AN122	Exchangeable Cations, CEC and ESP: Soil sample is extracted in 1 M Ammonium Acetate at pH=7 (or 1M Ammonium Chloride at pH=7) with cations (Na, K, Ca & Mg) then determined by ICP OES/ICP MS and reported as Exchangeable Cations. For saline soils, these results can be corrected for water soluble cations and reported as Exchangeable cations in meq/100g or soil can be pre-treated (aqueous ethanol/aqueous glycerol) prior to extraction. Cation Exchange Capacity (CEC) is the sum of the exchangeable cations in meq/100g.
AN122	The Exchangeable Sodium Percentage (ESP) is calculated as the exchangeable sodium divided by the CEC (all in meq/100g) times 100. ESP can be used to categorise the sodicity of the soil as below: ESP < 6% non-sodic ESP 6-15% sodic ESP >15% strongly sodic Method is referenced to Rayment and Lyons, 2011, sections 15D3 and 15N1.-
AN248	Nitrate / Nitrite in extract by Auto Analyser: In an acidic medium, nitrate is reduced quantitatively to nitrite by cadmium metal. This nitrite plus any original nitrite is determined as an intense red-pink azo dye at 540 nm following diazotisation with sulphanilamide and subsequent coupling with N-(1-naphthyl) ethylenediamine dihydrochloride. Reference APHA 4500-NO3- F.
AN273	The sample is digested in Dichromate / Sulfuric Acid to oxidise the organic carbon. The determination is completed colourimetrically by Aquakem Discrete Analyser at 600 nm. Based on Rayment & Higginson 6B1.

METHOD SUMMARY

METHOD	METHODOLOGY SUMMARY
AN274	Chloride by Aquakem DA following 1:5 or 1:2 DI water extraction: Chloride reacts with mercuric thiocyanate forming a mercuric chloride complex. In the presence of ferric iron, highly coloured ferric thiocyanate is formed which is proportional to the chloride concentration. Results reported on dry sample basis. Reference APHA 4500Cl-
RL 10D1/AN320	Air dried <2mm soil is extractedin 0.25M KCl at 40 deg C followed by analysis of filtrate for S by ICP OES. Referenced to Rayment and Lyons method 10D1.
RL 12C2/AN320	Air dried <2mm soil is extracted in 0.01M CaCl2 by refluxing gently for 10 minutes. Extract is then filtered and analysed by ICP OES. Referenced method Rayment and Lyon, 12C2.
SOL061	Soil sample is extrcated 1:10 in 1MKCl with aluminium determined by ICP OES.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
		NVL	Not Validated

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calcuated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the " Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.
Note that in terms of units of radioactivity:

a. 1 Bq is equivalent to 27 pCi
b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here : http://www.sgs.com.au/~/media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf

G.L.T. HORTICULTURAL SERVICES PTY. LTD.

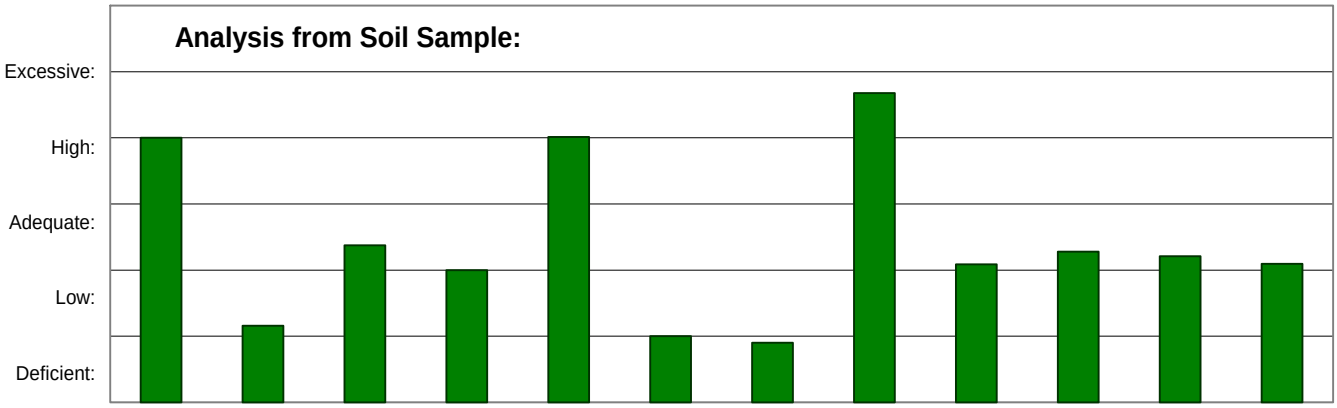
A.B.N. 14 009 695 550

Graeme Thomas H.D. App. Sc. (Ag)
Horticulturist
20 Geoffrey Partridge Place
Frederickton
NSW 2440

Telephone : 02 6566 8002
Mobile: 0419 977 267
Email: glthort@bigpond.com

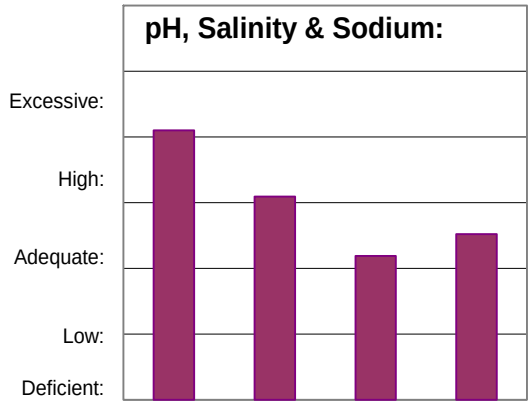
SOIL ANALYSIS REPORT

Name:	**Douglas Partners Pty. Ltd**			***Date Sampled:***	11/05/18
Address:	**29 Civil Road Garbutt Qld 4814**			***Date Received:***	16/05/18
Block Name:	Topsoil 1	***Existing Crop:***		***Future Crop:***	Top Dressing
Area Sampled:		***Irrigation type:***		***Soil type:***	Loam
Drainage:				***Sample Number:***	**CE 133570.001**



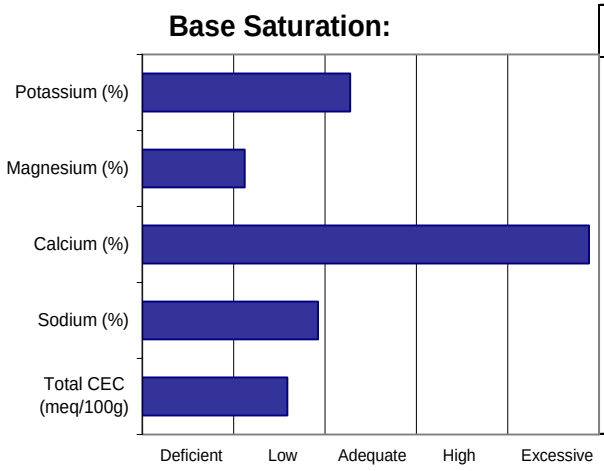
Results:

Organic Matter %	Nitrate mg/kg	Phosphorus mg/kg	Potassium mg/kg	Calcium mg/kg	Magnesium mg/kg	Sulphur mg/kg	Zinc mg/kg	Manganese mg/kg	Copper mg/kg	Iron mg/kg	Boron mg/kg
6	6.6	35	100	1100	48	9	37	7.5	3	12	0.64



Soil PH	Chloride mg/kg	Sodium mg/kg	Electrical Conductivity
8.2	32	11	0.18

Results:



	Suggested % of Total CEC
4.1	3 - 7%
6.2	15-20%
88.9	65-75%
0.7	0-5%
6.3	

Recommendations:

Apply 400 Kg. / Ha. Sulphate of Ammonia
Apply 300 Kg. / Ha. Magnesium Sulphate
SIDE DRESSING
Apply 250 Kg. / Ha. Sulphate of Ammonia after 6 months

G.L.T. HORTICULTURAL SERVICES PTY. LTD.

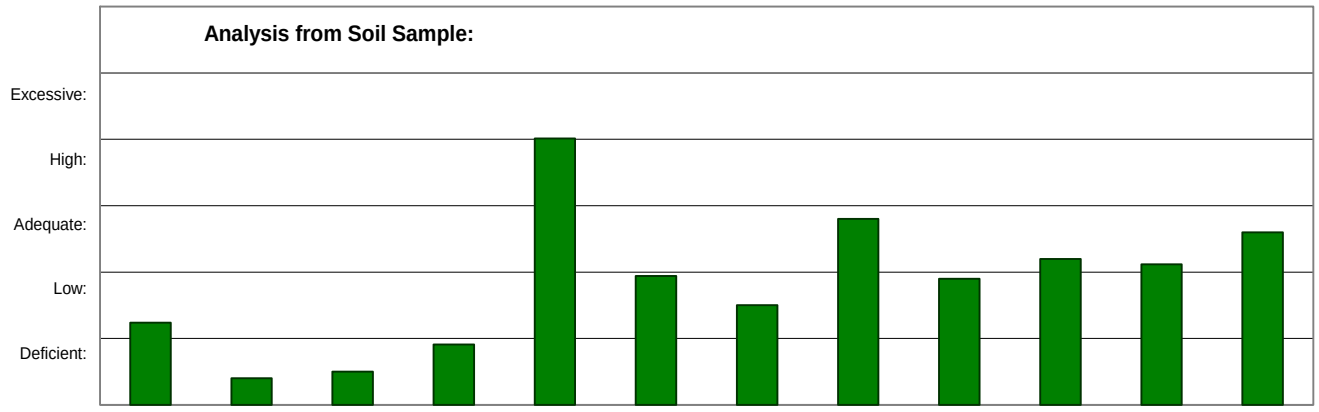
A.B.N. 14 009 695 550

Graeme Thomas H.D. App. Sc. (Ag)
Horticulturist
20 Geoffrey Partridge Place
Frederickton
NSW 2440

Telephone : 02 6566 8002
Mobile: 0419 977 267
Email: glthort@bigpond.com

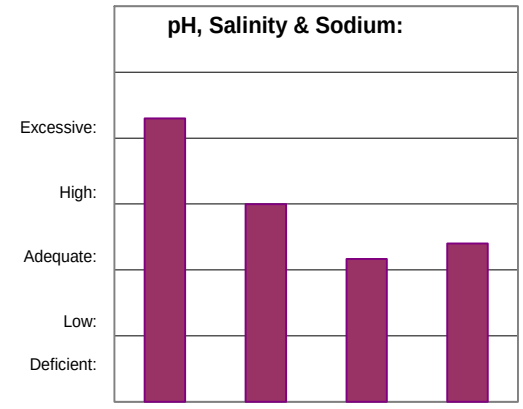
SOIL ANALYSIS REPORT

Name:	**Douglas Partners Pty. Ltd**			***Date Sampled:***	11/05/18
Address:	**29 Civil Road Garbutt Qld 4814**			***Date Received:***	16/05/18
Block Name:	Subsoil 1	***Existing Crop:***		***Future Crop:***	Top Dressing
Area Sampled:		***Irrigation type:***		***Soil type:***	Loam
Drainage:				***Sample Number:***	**CE 133570.002**



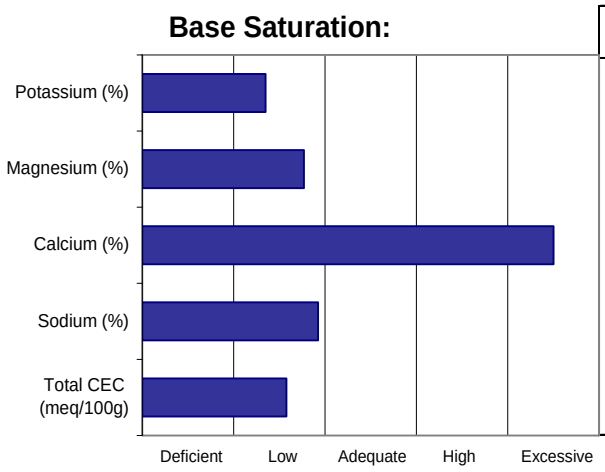
Results:

Organic Matter %	Nitrate mg/kg	Phosphorus mg/kg	Potassium mg/kg	Calcium mg/kg	Magnesium mg/kg	Sulphur mg/kg	Zinc mg/kg	Manganese mg/kg	Copper mg/kg	Iron mg/kg	Boron mg/kg
0.86	2	5	41	1100	97	15	4.4	3.8	2.2	7.6	1.4



Results:

Soil PH	Chloride mg/kg	Sodium mg/kg	Electrical Conductivity
8.6	5	10	0.15



	Suggested % of Total CEC
1.7	3 - 7%
12.7	15-20%
85	65-75%
0.7	0-5%
6.2	

Recommendations:

Apply 500 Kg. / Ha. CK 55s
Apply 200 Kg. / Ha. Magnesium Sulphate
SIDE DRESSING
Apply 350 Kg. / Ha. CK 55s after 6 months

SGS

CHAIN OF CUSTODY & ANALYSIS REQUEST

CE133570

CAIRNS

Job Reference Number: 93893 *(SGS use only)*

Page 1 of 1

Laboratory ID	Client SAMPLE ID	Sample Date	Matrix: SOIL	Matrix: WATER	Matrix: OTHER	Preservation: ICE	Preservation: ACID	Preservation: NONE	Analysis Required: TopSoil Agronomy Testing and report	Analysis Required: Subsoil Agronomy Testing and Report	Analysis Required: SSU As Suite	Analysis Required: SSB As Report
	topsoil 1	11/05/2018	x					x	x		1x	1x
	subsoil 1	11/05/2018	x					x		x	1x	1x

SGS Cairns Environmental

CE133570 COC

Received: 16 – May – 2018

for grassed effluent disposal, turf and / or ornamental gardens

Company Name: Douglas Partners
Company Number:
Address: 29 Civil Road
GARBUTT QLD 4814
Contact Name: Kate Fulham
Telephone: 07 4779 9866 **Facsimile:**

Purchase Order Number:
Project Name: Proposed Fire Station, Charters Towers
Project Number: 93893
Laboratory Contact: 2 x Soil
Results Required By: STD T/A
Total Number of Containers/Bottles:
Total Number of Samples/Sites: 2
Email: kate.fulham@douglaspartners.com.au

Relinquished by: Kate Fulham **Date:** 14/5/18 **Time:** **Received by:** EQD **Date:** 16/5 **Time:** 9am

Relinquished by: **Date:** **Time:** **Received by:** **Date:** **Time:**

* Circle whichever is applicable

Sample Cooler Sealed: YES/NO*	Samples Intact: YES/NO*	Correct Sample Bottles Used: YES/NO*	Tempera AMBIENT/CHILLED*
(D)	(D)	(D)	(D)

COMMENTS:

SAMPLE RECEIPT ADVICE

CE133570

CLIENT DETAILS

Contact	KAte Fulham
Client	DOUGLAS PARTNERS PTY LTD
Address	29 CIVIL ROAD GARBUTT QLD 4814
Telephone	61 7 4779 9866
Facsimile	07 4725 1224
Email	kate.fulham@douglaspartners.com.au
Project	**93893 - Proposed Fire Station Charters T**
Order Number	(Not specified)
Samples	2

LABORATORY DETAILS

Manager	Jon Dicker
Laboratory	SGS Cairns Environmental
Address	Unit 2, 58 Comport St Portsmith QLD 4870
Telephone	+61 07 4035 5111
Facsimile	+61 07 4035 5122
Email	AU.Environmental.Cairns@sgs.com
Samples Received	Wed 16/5/2018
Report Due	Wed 23/5/2018
SGS Reference	**CE133570**

SUBMISSION DETAILS

This is to confirm that 2 samples were received on Wednesday 16/5/2018. Results are expected to be ready by COB Wednesday 23/5/2018.
Please quote SGS reference CE133570 when making enquiries. Refer below for details relating to sample integrity upon receipt.

Samples clearly labelled	Yes	Complete documentation received	Yes
Sample container provider	SGS	Sample cooling method	na
Samples received in correct containers	Yes	Sample counts by matrix	2 x soil
Date documentation received	16/5/2018	Type of documentation received	COC
Number of eskies/boxes received	na	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	ambient
Sufficient sample for analysis	Yes	Turnaround time requested	Standard

Unless otherwise instructed, water and bulk samples will be held for one month from date of report, and soil samples will be held for two months.

COMMENTS

AGRON REPORT

Use - for grassed effluent disposal, turf and/or ornamental gardens

SAMPLE RECEIPT ADVICE

CE133570

CLIENT DETAILS

Client DOUGLAS PARTNERS PTY LTD

Project 93893 - Proposed Fire Station Charters T

SUMMARY OF ANALYSIS

No.	Sample ID	Chloride (water extractable)	Colwell Phosphorus	Conductivity and TDS by Calculation - Soil	DTPA Extractable Metals in Soil	Exchangeable Cations and Cation Exchange Capacity	Moisture Content	Nitrate Nitrogen and Nitrite Nitrogen (NOx) by Auto	pH in soil (1:5)	Total Organic Carbon by Heanes Oxidation
001	Topsoil 1	1	1	2	4	16	1	1	2	2
002	Subsoil 1	1	1	2	4	16	1	1	2	2

CONTINUED OVERLEAF

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

225

SAMPLE RECEIPT ADVICE

CE133570

CLIENT DETAILS

Client DOUGLAS PARTNERS PTY LTD

Project 93893 - Proposed Fire Station Charters T

SUMMARY OF ANALYSIS

No.	Sample ID	Calcium Chloride Extractable Boron	Potassium Chloride Extractable Sulphur	Soil - Aluminium (KCL Extraction)	Soil - Nitrogen by Leco	Total Recoverable Elements in Soil/Waste
001	Topsoil 1	1	1	2	1	1
002	Subsoil 1	1	1	2	1	1

The above table represents SGS' interpretation of the client-supplied Chain Of Custody document.
The numbers shown in the table indicate the number of results requested in each package.
Please indicate as soon as possible should your request differ from these details .
Testing as per this table shall commence immediately unless the client intervenes with a correction .

226

Appendix 12

Vegetation Management Report

Vegetation management report

For Lot: 100 Plan: SP303847

Current as at 10/12/2018

Queensland Government

Recent changes

New vegetation clearing laws

New vegetation management laws were passed by the Queensland Parliament on 3 May 2018 and may affect the clearing you can undertake on your property.

For more information, read about the new vegetation management laws (https://www.dnrme.qld.gov.au/land-water/initiatives/vegetation-management-laws/) or call 135VEG (13 58 34) between 8.30am and 4.30pm Monday to Friday.

Updated mapping

The Regulated Vegetation Management Map and Supporting Map was updated in March 2018 to reflect the most up to date information available in relation to regional ecosystems, essential habitat and wetland mapping (Version 10).

Overview

Based on the lot on plan details you have supplied, this report provides the following detailed information:

- *Vegetation management framework* - an explanation of the application of the framework.
- *Property details* - information about the specified Lot on Plan, lot size, local government area, bioregion(s), subregion(s), catchment(s), coastal or non coastal status, and any applicable area management plans associated with your property.
- *Vegetation management details for the specified Lot on Plan* - specific information about your property including vegetation categories, regional ecosystems, watercourses, wetlands, essential habitat, and protected plants.
- *Contact information.*
- *Maps* - a series of colour maps to assist in identifying regulated vegetation on your property.
- *Other legislation contact information.*

This information will assist you to determine your options for managing vegetation under the vegetation management framework, which may include:

- exempt clearing work
- accepted development vegetation clearing code
- an area management plan
- a development approval.

Other laws

The clearing of native vegetation is regulated by both Queensland and Australian legislation, and some local governments also regulate native vegetation clearing. You may need to obtain an approval or permit under another Act, such as Queensland's Protected Plants framework or the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Section 6 of this guide provides contact details of other agencies you should confirm requirements with, before commencing vegetation clearing.

Table of Contents

1. Vegetation management framework

The *Vegetation Management Act 1999* (VMA), the Vegetation Management Regulation 2012, the *Planning Act 2016* and the Planning Regulation 2017, in conjunction with associated policies and codes, form the Vegetation Management Framework.

The VMA does not apply to all land tenures or vegetation types. State forests, national parks, forest reserves and some tenures under the *Forestry Act 1959* and *Nature Conservation Act 1992* are not regulated by the VMA. Managing or clearing vegetation on these tenures may require approvals under these laws.

The following native vegetation is not regulated under the VMA but may require permit(s) under other laws:

- grass or non-woody herbage;
- a plant within a grassland regional ecosystem prescribed under Schedule 5 of the Vegetation Management Regulation 2012; and
- a mangrove.

1.1 Exempt clearing work

Exempt clearing work is an activity for which you do not need to notify DNRME or obtain an approval approval under the vegetation management framework. Exempt clearing work was previously known as exemptions.

In areas that are mapped as Category X (white in colour) on the regulated vegetation management map (see section 5.1), and where the land tenure is freehold, indigenous land and leasehold land for agriculture and grazing purposes, the clearing of vegetation is considered exempt clearing work and does not require notification or development approval approval under the vegetation management framework. For all other land tenures, contact DNRME before commencing clearing to ensure that the proposed activity is exempt clearing work.

A range of routine property management activities are considered exempt clearing work. A list of exempt clearing work is available at
https://www.qld.gov.au/environment/land/vegetation/exemptions/.

Exempt clearing work may be affected if the proposed clearing area is subject to development approval conditions, a covenant, an environmental offset, an exchange area, a restoration notice, or an area mapped as Category A. Contact DNRME prior to clearing in any of these areas.

1.2 Accepted development vegetation clearing codes

Some clearing activities can be undertaken under an accepted development vegetation clearing code. The codes can be downloaded at
https://www.qld.gov.au/environment/land/vegetation/codes/

If you intend to clear vegetation under an accepted development vegetation clearing code, you must notify DNRME before commencing. The information in this report will assist you to complete the online notification form.

You can complete the online form at
https://apps.dnrm.qld.gov.au/vegetation/

1.3 Area management plans

Area Management Plans (AMP) provide an alternative approval system for vegetation clearing under the vegetation management framework. They list the purposes and clearing conditions that have been approved for the areas covered by the plan. It is not necessary to use an AMP, even when an AMP applies to your property.

As a result of the new laws, AMPs for fodder harvesting, managing thickened vegetation and managing encroachment will continue for 2 years. New notifications cannot be made for these AMPs.

New notifications can be made for all other AMPs. These will continue to apply until their nominated end date.

If an area management plan applies to your property for which you can make a new notification, it will be listed in Section 2.2 of this report. Before clearing under one of these AMPs, you must first notify the DNRME and then follow the conditions and requirements listed in the AMP.
https://www.qld.gov.au/environment/land/vegetation/area-plans/

1.4 Development approvals

If under the vegetation management framework your proposed clearing is not exempt clearing work, or is not permitted under an accepted development vegetation clearing code, or an AMP, you may be able to apply for a development approval. Information on how to apply for a development approval is available at
https://www.qld.gov.au/environment/land/vegetation/applying/

2. Property details

2.1 Tenure

All of the lot, plan and tenure information associated with property Lot: 100 Plan: SP303847, including links to relevant Smart Maps, are listed in Table 1. The tenure of the property (whether it is freehold, leasehold, or other) may be viewed by clicking on the Smart Map link(s) provided.

Table 1: Lot, plan and tenure information for the property

Lot	Plan	Tenure	Link to property on SmartMap
100	SP303847	Freehold	https://apps.information.qld.gov.au/data/cadastre/GenerateSmartMap?q=100\SP303847

The tenure of the land may affect whether clearing is considered exempt clearing work or may be carried out under an accepted development vegetation clearing code.

2.2 Property location

Table 2 provides a summary of the locations for property Lot: 100 Plan: SP303847, in relation to natural and administrative boundaries.

Table 2: Property location details

Local Government(s)
Charters Towers Regional

Bioregion(s)	Subregion(s)
Einasleigh Uplands	Broken River

Catchment(s)
Burdekin

For the purposes of the accepted development vegetation clearing codes and the State Development Assessment Provisions (SDAP), this property is regarded as*
Non Coastal

*See also Map 5.4

Area Management Plan(s)
Area Management Plan for the control of pest plants in the Dry Tropics region

3. Vegetation management details for Lot: 100 Plan: SP303847

3.1 Vegetation categories

Vegetation categories are shown on the regulated vegetation management map in section 5.1 of this report. A summary of vegetation categories on the subject lot are listed in Table 3. Descriptions for these categories are shown in Table 4.

Table 3: Vegetation categories for subject property. Total area: 0.38ha

Vegetation category	Area (ha)
Category X	0.38

Table 4

Category	Colour on Map	Description	Requirements / options under the vegetation management framework
A	red	Compliance areas, environmental offset areas and voluntary declaration areas	Special conditions apply to Category A areas. Before clearing, contact DNRME to confirm any requirements in a Category A area.
B	dark blue	Remnant vegetation areas	Exempt clearing work, or notification and compliance with accepted development vegetation clearing codes, area management plans or development approval.
C	light blue	High-value regrowth areas	Exempt clearing work, or notification and compliance with managing Category C regrowth vegetation accepted development vegetation clearing code.
R	yellow	Regrowth within 50m of a watercourse or drainage feature in the Great Barrier Reef catchment areas	Exempt clearing work, or notification and compliance with managing Category R regrowth accepted development vegetation clearing code or area management plans.
X	white	Clearing on freehold land, indigenous land and leasehold land for agriculture and grazing purposes is considered exempt clearing work under the vegetation management framework. Contact DNRME to clarify whether a development approval is required for other State land tenures.	No permit or notification required on freehold land, indigenous land and leasehold land for agriculture and grazing. A development approval may be required for some State land tenures.

Property Map of Assessable Vegetation (PMAV)

This report does not confirm if a Property Map of Assessable Vegetation (PMAV) exists on a lot. To confirm whether or not a PMAV exists on a lot, please check the PMAV layer on the Queensland Globe2, or contact DNRME on 135VEG (135 834).

3.2 Regional ecosystems

The endangered, of concern and least concern regional ecosystems on your property are shown on the vegetation management supporting map in section 5.2 and are listed in Table 5.

A description of regional ecosystems can be accessed online at
https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/descriptions/

Table 5: Regional ecosystems present on subject property

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
non-rem	None	X	0.38	None	None

Please note:

1. All area and area derived figures included in this table have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

2. If Table 5 contains a Category 'plant', please be aware that this refers to 'plantations' such as forestry, and these areas are considered non-remnant under the VMA.

The VMA status of the regional ecosystem (whether it is endangered, of concern or least concern) also determines if any of the following are applicable:

- exempt clearing work
- accepted development vegetation clearing codes
- performance outcomes in State Development Assessment Provisions (SDAP).

3.3 Watercourses

Vegetation management watercourses and drainage features for this property are shown on the vegetation management supporting map in section 5.2.

3.4 Wetlands

There are no vegetation management wetlands present on this property.

3.5 Essential habitat

Protected wildlife is native wildlife prescribed under the *Nature Conservation Act 1992* (NCA), and includes endangered, vulnerable or near-threatened wildlife.

Essential habitat for protected wildlife includes suitable habitat on the lot, or where a species has been known to occur up to 1.1 kilometres from a lot on which there is assessable vegetation. These important habitat areas are protected under the VMA.

Any essential habitat on this property will be shown as blue hatching on the vegetation supporting map in section 5.2.

If essential habitat is identified on the lot, information about the protected wildlife species is provided in Table 6 below. The numeric labels on the vegetation management supporting map can be cross referenced with Table 6 to outline the essential habitat factors for that particular species. There may be essential habitat for more than one species on each lot, and areas of Category A, Category B and Category C can be mapped as Essential Habitat.

Essential habitat is compiled from a combination of species habitat models and buffered species records. Regional ecosystem is a mandatory essential habitat factor, unless otherwise stated. Essential habitat, for protected wildlife, means an area of vegetation shown on the Regulated Vegetation Management Map as assessable vegetation -

1) that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database. Essential habitat factors are comprised of - regional ecosystem (mandatory for most species), vegetation community, altitude, soils, position in landscape; or

2) in which the protected wildlife, at any stage of its life cycle, is located.

If there is no essential habitat mapping shown on the vegetation management supporting map for this lot, and there is no table in the sections below, it confirms that there is no essential habitat on the lot.

Category A and/or Category B and/or Category C

Table 6: Essential habitat in Category A and/or Category B and/or Category C

No records

3.6 Protected plants (administered by the Department of Environment and Science (DES))

In Queensland, all plants that are native to Australia are protected plants under the *Nature Conservation Act 1992* (NCA), with clearing of protected plants in the wild regulated by the Nature Conservation (Wildlife Management) Regulation 2006. These requirements apply irrespective of the classification of the vegetation under the *Vegetation Management Act 1999*.

Prior to clearing, if the plants proposed to be cleared are in the wild (see Operational policy: When a protected plant in Queensland is considered to be 'in the wild') and the exemptions under the Nature Conservation (Wildlife Management) Regulation 2006 are not applicable to the proposed clearing, you must check the flora survey trigger map to determine if any part of the area to be cleared is within a high risk area. The trigger map for this property is provided in section 5.5. The exemptions relate to:

- imminent risk of death or serious injury (refer s261A)
- imminent risk of serious damage to a building or other structure on land, or to personal property (refer s261B)
- *Fire and Emergency Service Act 1990* (refer 261C)
- previously cleared areas (refer s261ZB)
- maintenance activities (refer s261ZC)
- firebreak or fire management line (refer s261ZD)
- accepted development vegetation clearing code (refer s261ZE)
- conservation purposes (refer s261ZG)
- authorised in particular circumstances (refer s385).

Some exemptions under the NCA are the same as exempt clearing work (formerly known as exemptions) from the *Vegetation Management Act 1999* (i.e. listed in the Planning Regulations 2017) while some are different.

If the proposed area to be cleared is shown as blue (i.e. high risk) on the flora survey trigger map, a flora survey of the clearing impact area must be undertaken in accordance with the flora survey guidelines. The main objective of a flora survey is to locate any endangered, vulnerable or near threatened plants (EVNT plants) that may be present in the clearing impact area.

If a flora survey identifies that EVNT plants are not present within the clearing impact area or clearing within 100m of EVNT plants can be avoided, the clearing activity is exempt from a permit. An exempt clearing notification form must be submitted to the Department of Environment and Science, with a copy of the flora survey report, at least one week prior to clearing. The clearing must be conducted within two years after the flora survey report was submitted.

If a flora survey identifies that EVNT plants are present in, or within 100m of, the area to be cleared, a clearing permit is required before any clearing is undertaken. The flora survey report, as well as an impact management report, must be submitted with the application form clearing permit.

In an area other than a high risk area, a clearing permit is only required where a person is, or becomes aware that EVNT plants are present in, or within 100m of, the area to be cleared. You must keep a copy of the flora survey trigger map for the area subject to clearing for five years from the day the clearing starts. If you do not clear within the 12 month period that the flora survey trigger map was printed, you need to print and check a new flora survey trigger map.

Further information on protected plants is available at
http://www.ehp.qld.gov.au/licences-permits/plants-animals/protected-plants/

For assistance on the protected plants flora survey trigger map for this property, please contact the Department of Environment and Science at palm@des.qld.gov.au.

3.7 Emissions Reduction Fund (ERF)

The ERF is an Australian Government scheme which offers incentives for businesses and communities across the economy to reduce emissions.

Under the ERF, landholders can earn money from activities such as planting (and keeping) trees, managing regrowth vegetation and adopting more sustainable agricultural practices.

The purpose of a project is to remove greenhouse gases from the atmosphere. Each project will provide new economic opportunities for farmers, forest growers and land managers.

Further information on ERF is available at https://www.qld.gov.au/environment/land/state/use/carbon-rights/.

4. Contact information for DNRME

For further information on vegetation management:
Phone 135VEG (135 834)
Email vegetation@dnrme.qld.gov.au
Visit www.dnrme.qld.gov.au/our-department/contact-us/vegetation-contacts to submit an online enquiry.

For contact details for other State and Commonwealth agencies, please see Section 6.

5. Maps

The maps included in this report may also be requested individually at:

https://www.dnrme.qld.gov.au/qld/environment/land/vegetation/vegetation-map-request-form
and
http://www.ehp.qld.gov.au/licences-permits/plants-animals/protected-plants/map-request.php

Regulated vegetation management map

The regulated vegetation management map shows vegetation categories needed to determine clearing requirements. These maps are updated monthly to show new property maps of assessable vegetation (PMAV).

Vegetation management supporting map

The vegetation management supporting map provides information on regional ecosystems, wetlands, watercourses and essential habitat.

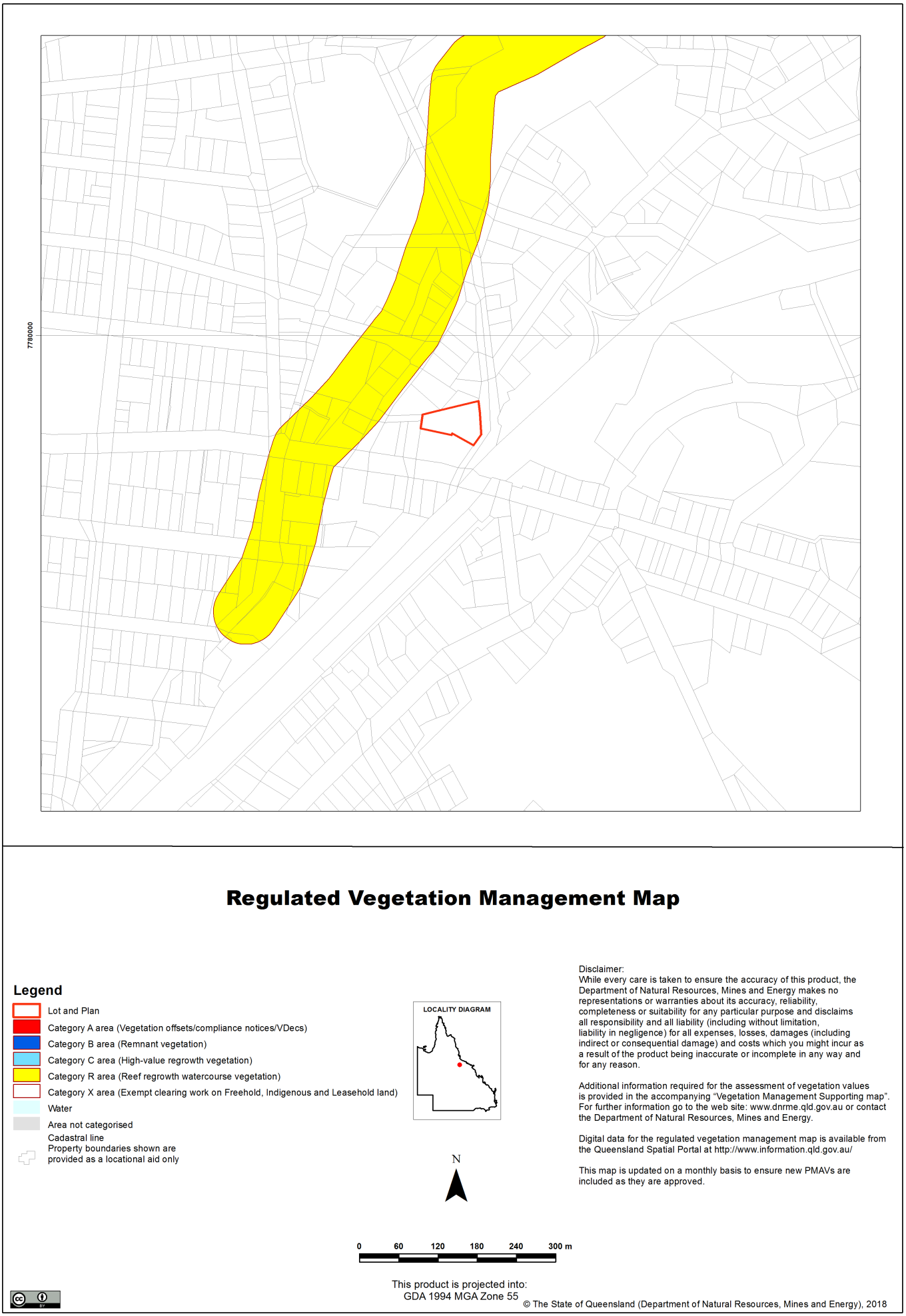
Coastal/non coastal map

The coastal/non-coastal map confirms whether the lot, or which parts of the lot, are considered coastal or non-coastal for the purposes of the accepted development vegetation clearing codes and the State Development Assessment Provisions (SDAP).

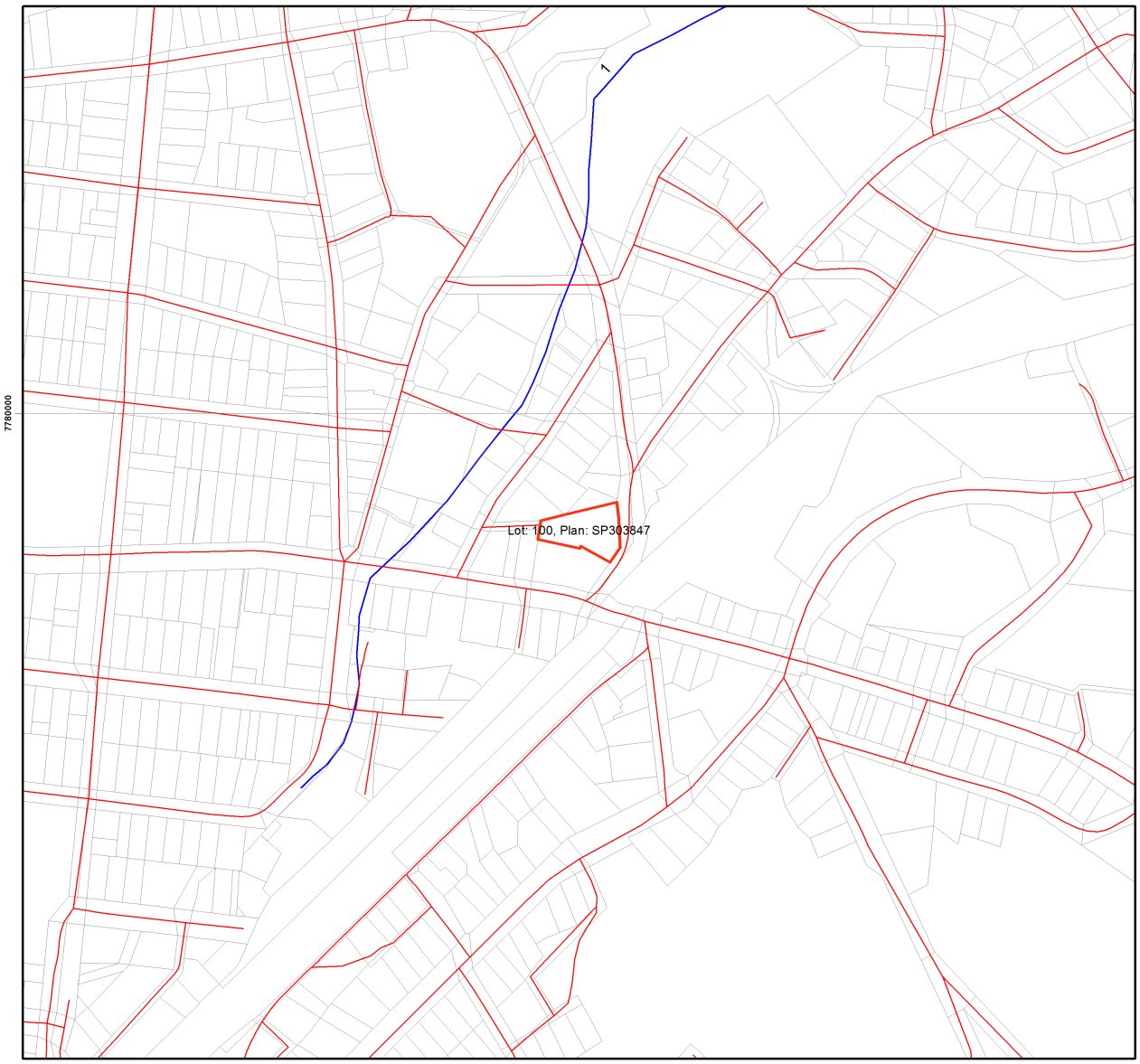
Protected plants map

The protected plants map shows areas where particular provisions of the *Nature Conservation Act 1992* apply to the clearing of protected plants.

5.1 Regulated vegetation management map



5.2 Vegetation management supporting map

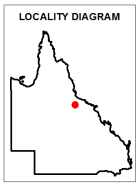


Vegetation Management Supporting Map

Legend

- Lot and Plan
- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category A or B area under Section 20AH
  These areas are edged in yellow and filled with the remnant RE Status
- Category C area containing endangered regional ecosystems
- Category C area containing of concern regional ecosystems
- Category C area that is a least concern regional ecosystem
- Category C area under Section 20AI
  These areas are edged in purple and filled with the remnant RE Status
- Non Remnant
- Water
- Wetland on the vegetation management wetlands map
- Essential habitat on the essential habitat map
- Essential habitat species record
- Watercourses and drainage features on the vegetation management watercourse and drainage features map
  (Stream order shown as black number against stream where available)
- Roads
- National Parks, State Forest and other reserves
- Cadastral line
  Property boundaries shown are provided as a locational aid only

LOCALITY DIAGRAM



N

0 40 80 120 160 200 m

This product is projected into:
GDA 1994 MGA Zone 55

Labels for Essential Habitat are centred on the area of enquiry.

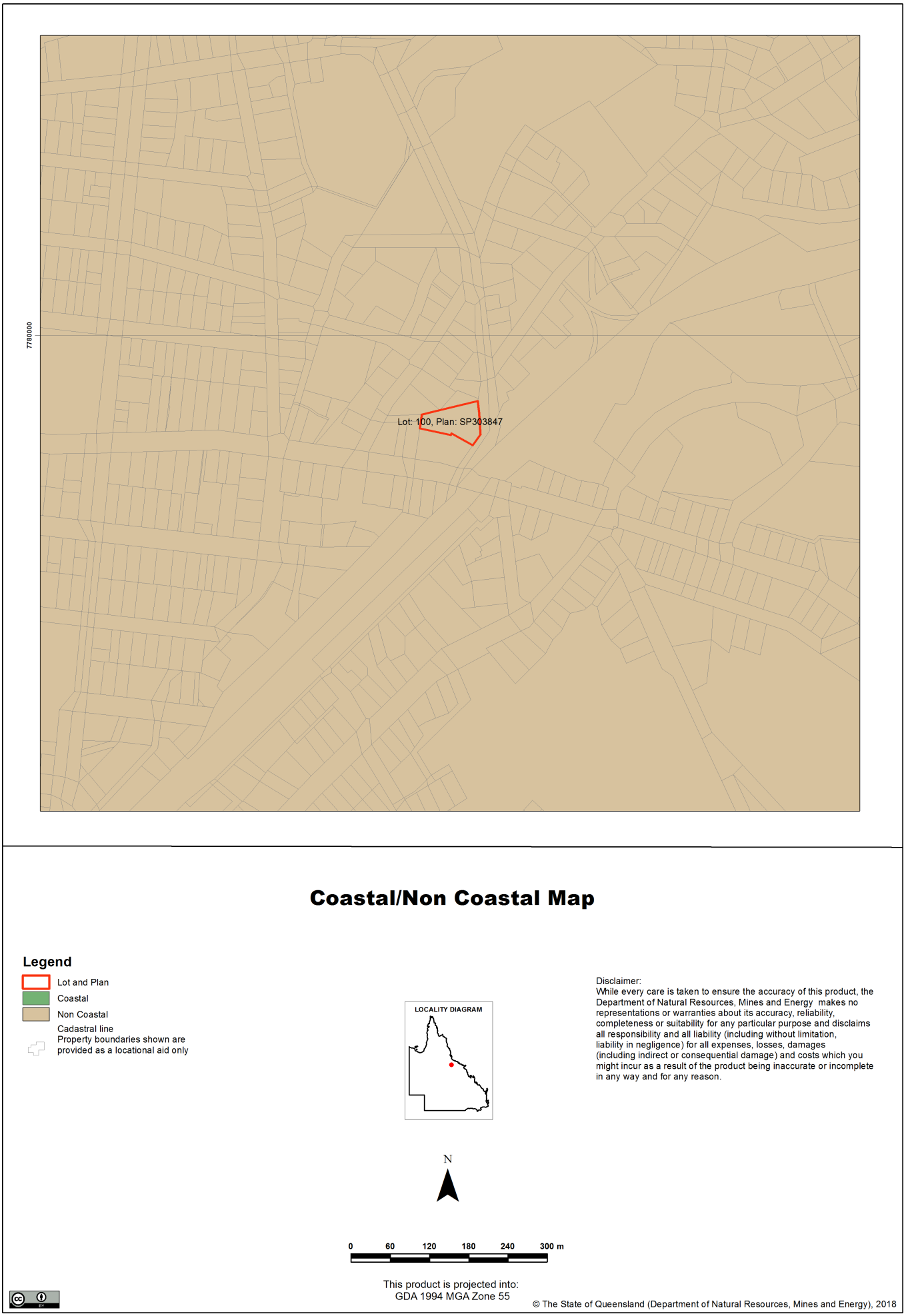
Regional ecosystem linework has been compiled at a scale of 1:100 000, except in designated areas where a compilation scale of 1:50 000 is available. Linework should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100 000 is +/- 100 metres.

Disclaimer:
While every care is taken to ensure the accuracy of this product, the Department of Natural Resources, Mines and Energy makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

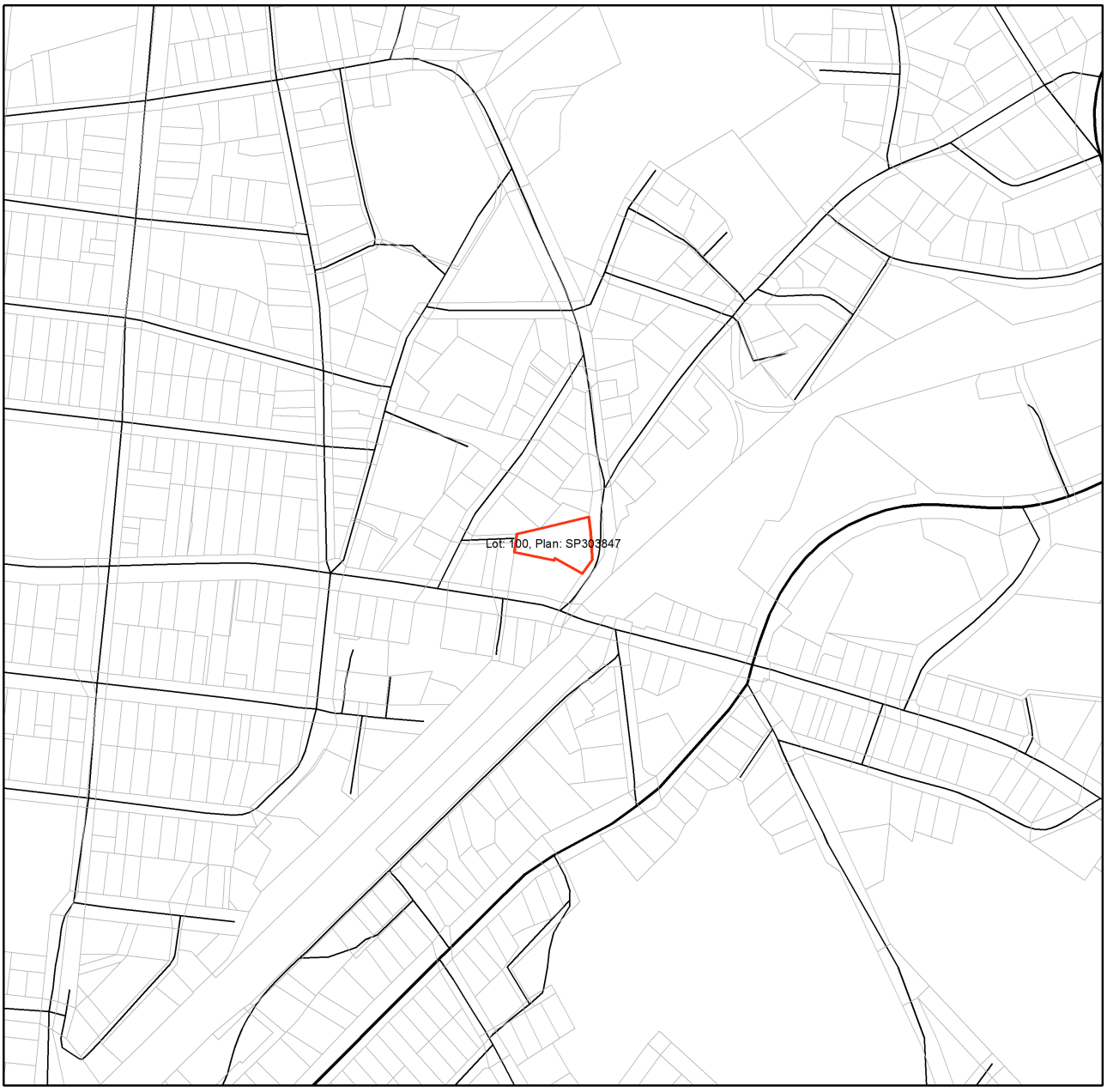
Additional information may be required for the purposes of land clearing or assessment of a regional ecosystem map or PMAV applications. For further information go to the web site: www.dnrme.qld.gov.au or contact the Department of Natural Resources, Mines and Energy.

Digital data for the vegetation management watercourse and drainage feature map, vegetation management wetlands map, essential habitat map and the vegetation management remnant and regional ecosystem map are available from the Queensland Spatial Portal at http://www.information.qld.gov.au/

5.3 Coastal/non coastal map



5.4 Protected plants map administered by DES



Protected Plants Flora Survey Trigger Map

Legend

- Lot and Plan
- High risk area
- Cadastral line
  Property boundaries shown are provided as a locational aid only
- Freeways / motorways / highways
- Secondary roads / streets

LOCALITY DIAGRAM

N

0 40 80 120 160 200 m

This product is projected into:
GDA 1994 MGA Zone 55

This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science at palm@ehp.qld.gov.au

Disclaimer:
While every care is taken to ensure the accuracy of the data used to generate this product, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which might be incurred as a consequence of reliance on the data, or as a result of the data being inaccurate or incomplete in any way and for any reason.

6. Other relevant legislation contacts list

Activity	Legislation	Agency	Contact details
Interference with overland flow Earthworks, significant disturbance	*Water Act 2000* *Soil Conservation Act 1986*	Department of Natural Resources, Mines and Energy (Queensland Government)	Ph: 13 QGOV (13 74 68) www.dnrme.qld.gov.au
Indigenous Cultural Heritage	*Aboriginal Cultural Heritage Act 2003* *Torres Strait Islander Cultural Heritage Act 2003*	Department of Aboriginal and Torres Strait Islander Partnerships (Queensland Government)	Ph: 13 QGOV (13 74 68) www.datsip.qld.gov.au
Mining and environmentally relevant activities Infrastructure development (coastal) Heritage issues Protected plants and protected areas[1]	*Environmental Protection Act 1994* *Coastal Protection and Management Act 1995* *Queensland Heritage Act 1992* *Nature Conservation Act 1992*	Department of Environment and Science (Queensland Government)	Ph: 13 QGOV (13 74 68) www.des.qld.gov.au
Interference with fish passage in a watercourse, mangroves Forestry activities[2]	*Fisheries Act 1994* *Forestry Act 1959*	Department of Agriculture and Fisheries (Queensland Government)	Ph: 13 QGOV (13 74 68) www.daf.qld.gov.au
Matters of National Environmental Significance including listed threatened species and ecological communities	*Environment Protection and Biodiversity Conservation Act 1999*	Department of the Environment (Australian Government)	Ph: 1800 803 772 www.environment.gov.au
Development and planning processes	*Planning Act 2016* *State Development and Public Works Organisation Act 1971*	Department of State Development, Manufacturing, Infrastructure and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) www.dsdmip.qld.gov.au
Local government requirements	*Local Government Act 2009* *Planning Act 2016*	Department of Local Government, Racing and Multicultural Affairs (Queensland Government)	Ph: 13 QGOV (13 74 68) Your relevant local government office

1. In Queensland, all plants that are native to Australia are protected plants under the *Nature Conservation Act 1992*, which endeavours to ensure that protected plants (whether whole plants or protected plants parts) are not illegally removed from the wild, or illegally traded. Prior to clearing, you should check the flora survey trigger map to determine if the clearing is within a high-risk area by visiting www.des.qld.gov.au. For further information or assistance on the protected plants flora survey trigger map for your property, please contact the Department of Environment and Science on 13QGOV (13 74 68) or email palm@des.qld.gov.au.

2. Contact the Department of Agriculture and Fisheries before clearing:

- Any sandalwood on state-owned land (including leasehold land)
- On freehold land in a 'forest consent area'
- More than five hectares on state-owned land (including leasehold land) containing commercial timber species listed in parts 2 or 3 of Schedule 6 of the Vegetation Management Regulation 2012 and located within any of the following local government management areas-Banana, Bundaberg Regional, Fraser Coast Regional, Gladstone Regional, Isaac Regional, North Burnett Regional, Somerset Regional, South Burnett Regional, Southern Downs Regional, Tablelands Regional, Toowoomba Regional, Western Downs Regional.