

Adani Infrastructure Pty Ltd
**Supporting Information for an Application for a
Water Licence to Take Unallocated Water from
the Strategic Reserve in Sub-Catchment E of the
Burdekin Basin**

Published on DNRME Disclosure Log
RTI Act 2009

**CDM
Smith**

Adani Infrastructure Pty Ltd
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Burdekin Basin**

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10 January 2017

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Section 1 Introduction

This document has been prepared for Adani Infrastructure Pty Ltd (Adani Infrastructure), an Australian subsidiary of Adani Enterprises Ltd, to support an application for a water licence to take and use unallocated water released from the strategic reserve in sub-catchment E of the *Water Resource (Burdekin Basin) Plan 2007* (WRP) area. Adani Infrastructure is seeking the licence to ensure a reliable water supply for the construction and operation of the Carmichael Coal Project (CCP) (the Project) in the Galilee Basin, rail construction and operations, and third-party users. The proponent for the CCP is Adani Mining Pty Ltd (Adani Mining), which is also an Australian subsidiary of Adani Enterprises Ltd. This application addresses relevant criteria and provides information to allow the Department of Natural Resources and Mines (DNRM) to consider the application.

An average extraction of 10,000 megalitres (ML) per annum (ML/a), with a maximum of 12,500 ML/year is being sought from the Suttor River system, from two extraction locations around the confluence of the Suttor River and the Belyando River Anabranch.

1.1 Background

1.1.1 Carmichael Coal Project Overview

Water is required to construct and operate the CCP, a 60 million tonnes per annum (Mtpa) open-cut and underground coal mine and associated transport and support infrastructure being proposed by Adani Mining. The mine and its off-lease infrastructure comprise the CCP, and include the following:

- Mine: a greenfield coal mine over Mining Lease (ML) 70441, 70505 and 70506, which includes both open cut and underground mining, on-lease mine infrastructure and associated mine processing facilities; and
- Off-lease infrastructure: mine worker accommodation, a permanent airport site, an industrial area, quarries, and water supply infrastructure.

On 26 November 2010, the Project was declared a significant project (now known as a coordinated project) under the *State Development and Public Works Organisation Act 1971* (SDPWO Act). Adani Mining completed an Environmental Impact Statement (EIS), Supplementary EIS (SEIS) and Additional information to the EIS (AEIS) between 2012 and 2014. These documents assessed the environmental, social, and economic impacts associated with developing a 60 Mtpa product thermal coal mine in the northern Galilee Basin. Coal from the Project will be transported by rail to the Port of Abbot Point.

On 7 October 2016, the existing CCP 'prescribed project' status was renewed and expanded to include the North Galilee Water Scheme infrastructure. A prescribed project is one which is of significance, particularly economically and socially, to Queensland or a region of Queensland. The status enables the Queensland Coordinator-General, if necessary, to intervene in the approvals process in several ways that ensure timely decision making for the Project.

Pursuant to section 76E(1) of the SDPWO Act, the Project was also declared critical infrastructure on 7 October 2016. As with the prescribed project status, this designation covers what is termed (by the Queensland Government) as the 'Adani Combined Project' (comprising the Carmichael Coal Mine and Rail, the North Galilee Basin Rail and the North Galilee Water Scheme). This status provides land acquisition powers.

Due to the size of the Project, Adani Mining has progressed the assessment for much of the rail, and the Port, separately to the CCP. The entire rail line from the mine to the Port of Abbot Point will be approximately 388 kilometres (km) long, known as the Carmichael Rail Network (CRN). The proponent for the CRN is the Carmichael Rail Network Pty Ltd as trustee for the Carmichael Rail Network Trust.

The CRN will comprise one contiguous rail corridor that has been subject to two separate assessments: the first 77 km (called the Carmichael Rail Line) was included in the CCP EIS and SEIS documentation, whilst the remaining 311 km was assessed as the North Galilee Basin Rail Project (NGBR Project).

The Carmichael Rail Line starts from the proposed Carmichael Mine, and heads east towards Mistake Creek west of the Gregory Developmental Road. This section of rail was assessed as part of the Carmichael Coal Mine and Rail Project EIS, SEIS and AEIS, in which it was known as Separable Portion 1 (SP1). The NGBR section of rail consists of approximately 311 km standard gauge rail from the connection with SP1 to the Port of Abbot Point.

This application from Adani Infrastructure relates to water required for the mine, off-lease infrastructure, and construction of the 77 km section of the CRN line described in the Carmichael Coal Mine and Rail Project EIS, SEIS and AEIS. Water for the construction of the NGBR Project and Port of Abbot Point will be sought separately.

The EIS documentation was assessed under a bilateral Commonwealth and State process. The Project received conditional approval from the Queensland Coordinator-General on 7 May 2014. After receiving approval with conditions from the Commonwealth Minister for the Environment on 24 July 2014 (EPBC 2010/5736), the controlled action was re-approved under the EPBC Act on 14 October 2015 by the Minister after a legal challenge.

An application to take a maximum of 12.5 gegalitres (GL) of water (annually) from the Belyando River, at a flood harvest facility 32 km east of the mine, was included in the SEIS (Appendix C4e) (Hyder Consulting 2013). That application was subject to public notification as part of the public notice period undertaken for the Environmental Impact Assessment (EIA) process.

Since the submission of the SEIS, more detailed planning, studies and modelling undertaken by Adani Mining has identified that a more reliable source of surface water is available from the Suttor River, downstream of the confluence with the Belyando River and approximately 65 km downstream of the location proposed in the SEIS. Whilst the overall volume sought remains the same as the SEIS application, this application seeks flood harvesting water from the Suttor River system at the Belyando Junction property (Lot 3 on Plan SP278559). The previous submission and how it relates to the current application for water is described in more detail in Section 1.5.

Development of new water infrastructure is required to harvest and convey the water from the Suttor River to its delivery points at and near the mine. Adani Infrastructure have defined the proposed collective water infrastructure as the 'North Galilee Water Scheme Project' which consists of a flood harvest facility and off-stream storage dam on the Belyando Junction property, and a regional pipeline to connect the off-stream storage to the mine, with various off-takes along the way.

1.1.2 Project Location

The CCP is located in the Galilee Basin, approximately 160 km north-west of Clermont in Central Queensland (Figure 1-1). The mine component of the Project is located mostly on the Moray Downs cattle station, within the jurisdiction of Isaac Regional Council (IRC), with railway development located in the IRC and the Mackay and Whitsunday Regional Council areas.

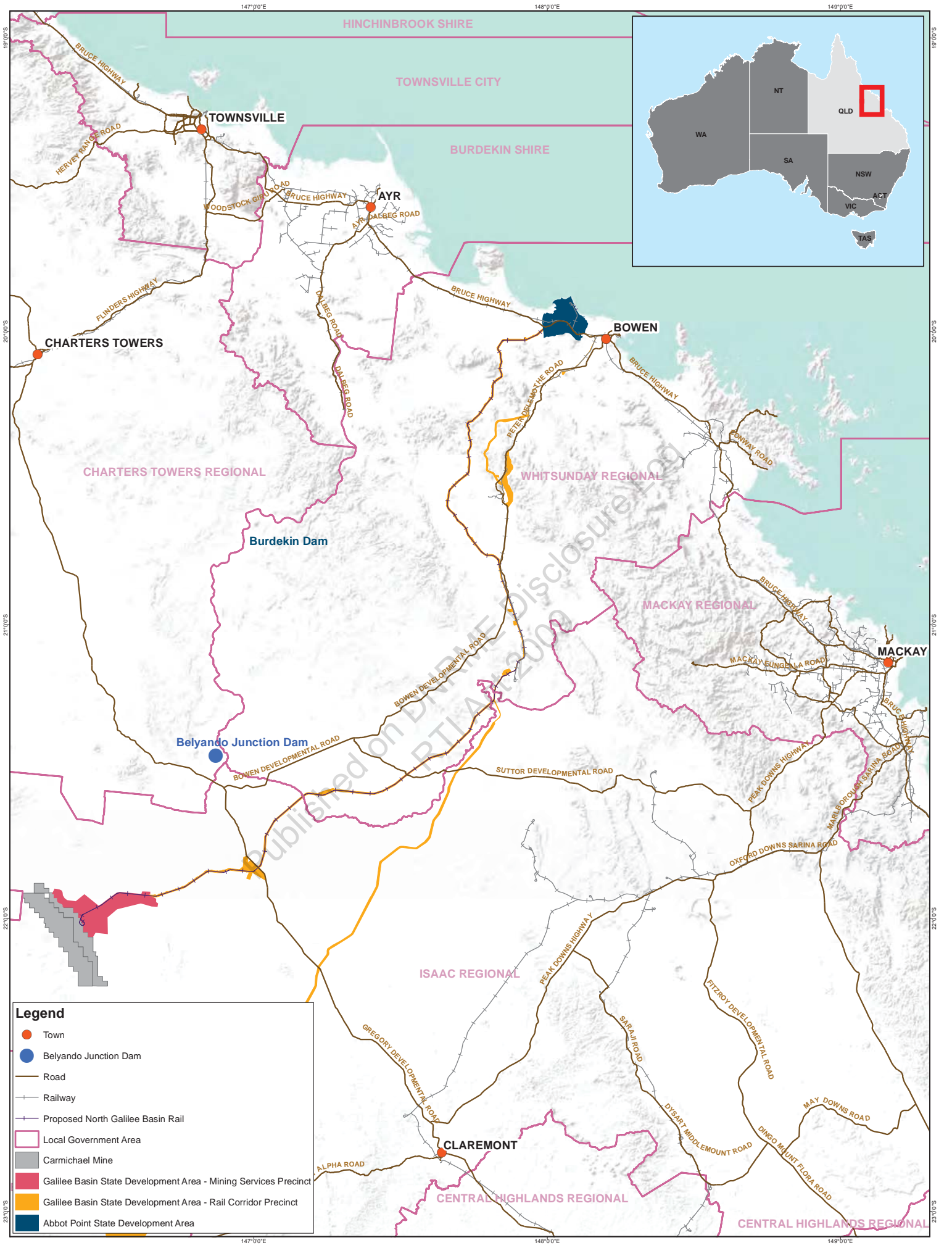
The North Galilee Water Scheme will include a 45 km water pipeline from the mine to the east, connecting to a pipeline that will head due north for 65 km to Belyando Junction property, the site of the water flood harvest facility on the Suttor River (Figure 1-2). The southern section of the scheme is located in the IRC local government area. The 8 km section to the north, including the Belyando Junction property and water extraction location, is located in the Charters Towers Regional Council area.

1.1.3 Water Requirements

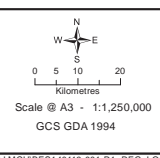
In order to facilitate the Project, a sufficient and reliable water supply must be secured for both the construction and operational stages of the mine and associated infrastructure. As part of the current development strategy water requirements for various construction and operational activities have been reviewed and it has been determined that the Project requires approximately 4.7 GL of secure supply for the first three years of the project to support construction and early operations, and approximately 6.5 GL a year of water from the end of construction onwards (these volumes are exclusive of allowances for evaporative and other losses in flood harvesting schemes).

These water resources and the associated storage and supply infrastructure are required to be proven as viable to help develop essential infrastructure. Adani Infrastructure is therefore submitting this application to DNRM for the purpose of securing water to meet long-term Project demands.

Studies completed for the Project EIS (Rail Chapter 6) and SEIS (Appendix c4e) (GHD 2012; Hyder Consulting 2013), and subsequent water supply studies and modelling undertaken indicate that there is sufficient water available locally to offer a reliable water supply.



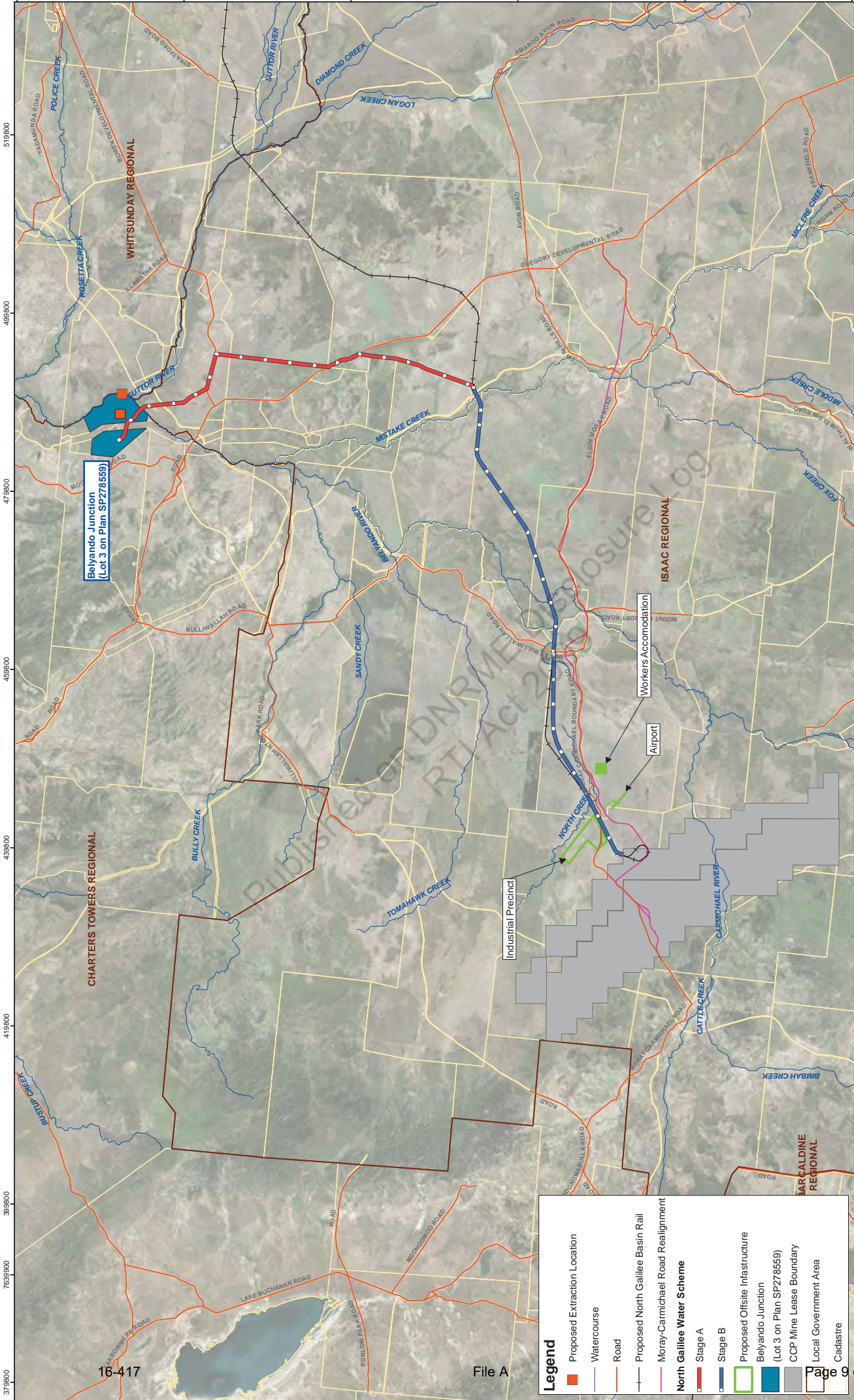
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DATA SOURCES
Adani Mining Pty Ltd, 2015
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Figure 1-1
Belyando Junction Dam Regional Area
Page 8 of 77
DRG Ref: BES140113-001-R1_REG_LOC

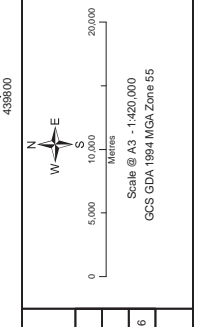


Belyando Junction
(Lot 3 on Plan SP278559)

R	Revisions	Date
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	DRAWN	MD
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Adani Mining, 2015
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FIGURE 1-2
BELYANDO JUNCTION EXTRACTION POINT, PROPOSED WATER USE LOCATION, AND NORTH GALILEE WATER SCHEME OUTLINE
DRG Ref: BES140113-002R2_LOC

Figure 1-2 - Environmental Services BES140113-002R2_FINAL_V01.dwg (S:\5045\AWND\FINAL\Water License BES140113-002R2_LOC.mxd)

1.2 Document Purpose and Scope

The purpose of this document is to provide the supporting information required by the regulator to:

- Consider the release unallocated water from the strategic reserve in sub-catchment E (Belyando Suttor) in the WRP; and
- Assess and approve Adani Infrastructure's application for a water licence to take and use water from the Suttor River system at the Belyando Junction property for the Project (Figure 1-2).

Unallocated water may be granted from the strategic reserve under a process in the WRP and the *Burdekin Basin Resource Operations Plan 2009* (ROP). The assessing agency for this process is DNRM.

This supporting documentation includes information so that the Chief Executive may make a decision based on criteria outlined in section 32(2) of the WRP. A cross-reference to where the section 32(2) Belyando WRP criteria is addressed in this report is provided below in Section 1.3 (Table 1-1). This document provides necessary information for the application for a water licence to take unallocated water from the strategic reserve. The process is referred to throughout this document as the "application".

This application also includes information regarding:

- Previous relevant water supply studies and submissions;
- Relevant legislation and policy frameworks associated with this application;
- Existing and proposed infrastructure;
- Proposed works associated with the extraction of water from the Suttor River via the Belyando Junction Dam flood harvest facility;
- Potential effects on surface water resources and major water users;
- Environmental values and potential environmental impacts of the works;
- Mitigation measures; and
- Integrated Quality and Quantity Model (IQQM) modelling results.

1.3 Cross-Reference Table

Section 32(2) of the WRP outlines the criteria that the Chief Executive must consider when dealing with unallocated water under the ROP. Table 1-1 provides the criteria and a cross-reference to where these matters are addressed in this report.

Table 1-1 Assessment criteria for dealing with unallocated water under the ROP

Criteria	Section Reference
(1) Unallocated water may be dealt with under a process in the resource operations plan. (2) In preparing and implementing the process, the chief executive must consider the following—	Responses below
(a) the purpose for which the water is required	Section 4.1
(b) the efficiency of existing and proposed water use practices	Section 4.2.1
(c) the extent to which water is being taken under existing authorisations in the plan area	Section 5.3.1.1 and 5.4
(d) the availability of an alternative water supply for the purpose for which the water is required	Section 4.2.2
(e) the impact the proposed taking of, or interfering with, the water may have on existing water users in the plan area	Section 5.3.1 and 5.4
(f) whether the proposed taking or interfering is likely to have a direct adverse effect on groundwater flows	Section 5.7
(g) the matters mentioned in section 23(1)(a) and (b). (1) In deciding the environmental management rules to be included in the resource operations plan, the chief executive must consider—	Responses below
(a) the streamflows required to maintain the following—	
(i) the longitudinal connectivity of low flow habitats throughout river systems in the plan area;	Section 5.2 (Low flow EFO objectives considered)
(ii) the wetted habitats at riffles and other streambed features;	Section 5.2
(iii) the natural seasonality of flows and zero flows;	Section 5.2
(iv) the replenishment of refuge pools that enable movement of instream biota;	Section 5.2
(v) the lateral connectivity between rivers in the plan area and their adjacent riverine environments including floodplains; and	Section 5

Criteria	Section Reference
(b) the impact the taking of, or proposed taking of, or interfering with, water may have on the following—	Responses below
(i) water quality;	Section 5.8
(ii) the natural movement of sediment;	Section 5.8
(iii) the bed and banks of a watercourse or lake;	Section 5.8
(iv) riparian vegetation;	Section 5.8
(v) habitats for native plants and animals;	Section 5.8
(vi) the movement of fish and other aquatic species;	Section 5.5, 5.6 and 5.8
(vii) the recreation and aesthetic values of the plan area;	Section 5.8
(viii) cultural values including, for example, cultural values of local Aboriginal or Torres Strait Islander communities.	Section 2.3 and 2.4

1.4 Reference Documents

The Carmichael Mine EIS and SEIS were utilised to compile background information about the CCP to support the current application, and are referenced in this document. These include the following reports:

- Carmichael Coal Mine and Rail Project EIS (GHD 2012), including:
 - Rail Hydrology Report – Appendix AB
- Carmichael Coal Mine and Rail Project SEIS; and
- ‘Surface Water Licence Application for River Flood Harvesting’ (Hyder Consulting 2013), Supplementary EIS (Appendix C4e).

These documents can be found on the Adani Mining website via this [link](#).

1.5 Previous Submissions

A previous water licence application for accessing a maximum volume of 12.5 GL/a, and an average of 10 GL/a of surface water from sub-catchment E of the Burdekin Basin, was submitted for assessment by Adani Mining as part the Carmichael Mine Project SEIS on 25 November 2013 (SEIS 2013, Appendix C4e). This application replaces the material provided in the SEIS and presents revised information based on a new extraction location, for the same maximum volume.

The SEIS application proposed for water to be extracted via a pump from the river into an off-site storage approximately 32 km east of the mine with water to be supplied via a trunk main pipeline. This was known as the local flood harvesting operation. The water harvester was proposed to be located directly downstream of the confluence of the Belyando River with the Carmichael River (approximately 70 km Adopted Middle Thread Distance (AMTD) Belyando River), with a trigger flow of 200 ML/day. The application listed the use of the water as being for supply of the Adani Mining Carmichael Mine on Lot 662 PH1491.

Adani Mining conducted a meeting with DNRM in early February 2014 on the details of the SEIS water licence application. DNRM subsequently submitted a Request for Information (**Appendix A**), which has been considered during the preparation of this present application by Adani Infrastructure. Table 1-2 below provides a summary of the issues raised by DNRM in the Request for Information, and the responses and/or where the issues have been addressed in this application.

Following submission of the SEIS, a series of studies have been undertaken to analyse the local flood harvesting operation from the CCP SEIS, water demand and sources, including a revision of the water balance model. It was determined that the water reliability and security (defined as 98 percent reliability of required water supply volumes during mine operations) could not be achieved by the local flood harvest facility as a stand-alone water source.

Studies showed that the location of the Belyando Junction off-stream storage and flood harvesting facility, located below the confluence of the Belyando and Suttor Rivers, provides a higher level of certainty for water supply, and this water licence application is therefore being sought to extract water from this location. The application is proposing the same maximum volumes for the water licence as proposed in the SEIS application.

Following informal submission of the draft water licence application, Adani received a “*Product specification discussion paper*” from DNRM regarding potential impacts to Scartwater and Blackwater Lagoons and on downstream users. The key issues raised, and how these have been addressed in the licence application, are summarised in Table 1-3 and potential impacts presented in Section 5.3.2.

This document is the result of the above-mentioned review of the water balance model, review of water sources and mine operation demands and development of the North Galilee Water Scheme proposal. It provides a description of water demands, water source, required infrastructure, updated hydrological assessment of the proposed extraction from the Suttor River system, potential impacts and mitigation measures.

Table 1-2 Issues raised by DNRM in an information request to the SEIS Appendix C4e Application for a Water Licence

Issue Raised by DNRM	Response / Where Addressed in this Document
<p>Appropriateness of water extraction arrangements in mitigating any impacts on downstream water needs and to ensure the outcomes and objectives of the Water Resource (Burdekin Basin) Plan 2007 are protected.</p>	<p>The Suttor River system extraction to Belyando Junction Dam (as per this licence application) was modelled in the Burdekin Resource Operations Plan (ROP) IQQM. Due to the simultaneous nature in which Project applications for water will be assessed by the Regulator, a cumulative assessment of all three proposed extractions were simulated in the IQQM, namely:</p> <ul style="list-style-type: none"> - The Mistake Creek Water permit (granted in March 2015); - The Belyando River water permit for 250 ML (granted in May 2015); and - This Belyando Junction Dam licence application. <p>The results of this assessment show zero breaches to the Burdekin WRP and ROP environmental flow objectives (EFO) and water allocation security objective (WASO) targets. Refer to Section 5 and Appendices B and Appendix C for results.</p>
<p>The operational assumptions for diversion of water, i.e. operation of the pump station, off-stream storage and delivery pipeline.</p>	<p>Assumptions are as follows:</p> <ul style="list-style-type: none"> - Current storage capacity of off-stream storage dam = 2.2 GL - Proposed storage capacity (after upgrade of off-stream storage dam) = 10 GL. - Install new flood harvest infrastructure, including pumps, pipeline, intake channels and weir: <ul style="list-style-type: none"> - River flow threshold prior to extraction = 2,592 ML/d; - Weir inside the river bank of the Suttor River to control inflows; - Pump capacity = 9,600 L/s total over several pumps; - Maximum pump rate at duty point = 830 ML/d (all pumps); and - Delivery pipeline = combined open gravity channel from the Suttor River to the Belyando River Anabranche, and buried pipeline to the Belyando Junction off-stream storage dam.
<p>Data sets used in the scenarios that Adani ran using DNRM's ROP IQQM model as referred to in Section 3 of the Hyder report.</p>	<p>The CDM Smith IQQM supersedes that referred to in Section 3 of the Hyder Report. The latest IQQM is supplied as supporting information to this water licence application. Please note that the latest IQQM provided in Appendix B and Appendix C assesses a 200 ML/d trigger flow, however this licence application has been revised to a 2,592 ML/day trigger flow. It is considered that the latest IQQM modelling remains valid and is in fact conservative given the pass flow threshold has increased from 200 ML/d to 2,592 ML/d.</p>
<p>Post processing outputs and interpretations of this output that were used to derive the flow statistics presented in Section 4.2 of the Hyder report, i.e. impacts on EFOs, impacts on others, cumulative impacts, etc.</p>	<p>CDM Smith conducted separate IQQM modelling and assessment of EFO and WASO objectives and targets specified under the Burdekin ROP and WRP. Refer Section 5.2 of this report.</p>
<p>If there are any instream structures (e.g. a small weir/impoundment to support in stream pumping, etc.).</p>	<p>None are proposed. A weir will be placed inside the intake channel and in the position of the Suttor River bank. The structure will not be placed in-stream.</p> <p>Pump and intake channel infrastructure are the subject of a separate Operational Works application to take and interfere with water which has been granted in November 2015 by the Department of Infrastructure, Local Government and Planning.</p>
<p>How Adani proposes to operate the infrastructure in order to meet downstream water needs.</p>	<p>Adani Infrastructure will operate the flood harvesting infrastructure to meet its downstream needs by extracting from the river once the river flow threshold has been met, and then maintain as much storage in the off-stream storage dam as</p>

Issue Raised by DNRM	Response / Where Addressed in this Document
	possible. In the wet season floods, it is anticipated that the storage dam could be filled within two to three weeks, minimising impacts to downstream users for most of the year.
Measures proposed for reducing water usage and losses to minimise the volume of water that company needs to meet the project's water needs. For example, minimising storage evaporation and seepage.	Refer to Section 4.2.1 and Table 5-5.
Address measures in the water section of the Galilee Basin Strategy Framework.	This framework no longer exists.

Table 1-3 Issues raised by DNRM following informal review of draft licence application

Issue Raised by DNRM	Response / Where Addressed in this Document
Does not meet the general ecological outcomes of the Burdekin WRP in particular the impacts on existing entitlement on the Suttor River.	Refer to Section 5.3 for assessment of the 2,592 pass flow threshold.
Does not meet the general ecological outcomes of the Burdekin WRP in particular reduction of flows that would support ecological processes of downstream Scartwater and Blackwater lagoons.	Refer to Section 5.3 for assessment of the 2,592 pass flow threshold.

On 19 March 2015 Adani Mining was granted a water permit for a total of 8,050 ML over three years to be extracted from Mistake Creek for the construction of on-lease and off-lease infrastructure (reference 614017), and a permit for 250 ML for extraction from the Belyando River (reference 614136).

Section 4.1 discusses the overall water demand for the CCP and the necessity for multiple extraction locations from alternate sources as a means of ensuring reliability of supply for the Project. The permits listed above are part of a broad strategy to develop a reliable water supply system based on local and regional flood harvesting and groundwater sources for short-term and long term water supply.



Plate 1-1: Two hillocks adjacent to the Belyando Junction Dam, providing a natural perimeter wall to the north of the storage.

1.6 The Proponent

Adani Infrastructure Pty Ltd (Adani Infrastructure) is the proponent for this Project. The relevant proponent contact details are summarised in Table 1-4 below.

Table 1-4 Proponent details

Proponent	Adani Infrastructure Pty Ltd
Contact	s.49 - Personal Information Head of Environment & Sustainability
Address	GPO Box 2569 Brisbane, QLD, 4001
Phone/ Fax	s.49 - Personal Information
Email	s.49 - Personal Information

Adani Infrastructure is an Australian subsidiary of Adani Enterprises Ltd, a listed company based in Ahmedabad, India. Adani Infrastructure Pty Ltd was registered in May 2015 and has been established to hold infrastructure assets associated with the Carmichael Mine. As such Adani Infrastructure is the proponent for this application.

Adani Mining Pty Ltd (Adani Mining) is the proponent for the CCP and Carmichael Rail Network Pty Ltd as trustee for the Carmichael Rail Network Trust for the NGBR Project. Adani Mining is also an Australian subsidiary of Adani Enterprises Limited, India. Adani Enterprises Limited has diverse interests in global trading, development and operation of ports, inland container terminals and the establishment of special economic zones, oil refining, logistics, gas distribution, power generation, transmission and trading.

Adani Mining was established in Australia in mid-2010 with the intent of engaging in exploration and mining coal resources. Adani Mining initially purchased the right to seek a Mining Lease Application (MLA 70441) over Exploration Permit for Coal (EPC) 1690 and then secured similar rights to the eastern and northern parts of EPC 1080 in December 2011. This initiated the development of the Project. Adani Mining was granted an environmental authority and mining leases ML70441, ML70505 and ML70506 in February and April 2016 respectively.

Carmichael Rail Network Pty Ltd as trustee for the Carmichael Rail Network Trust was registered in September 2014 and is the proponent for NGBR Project related approval applications.

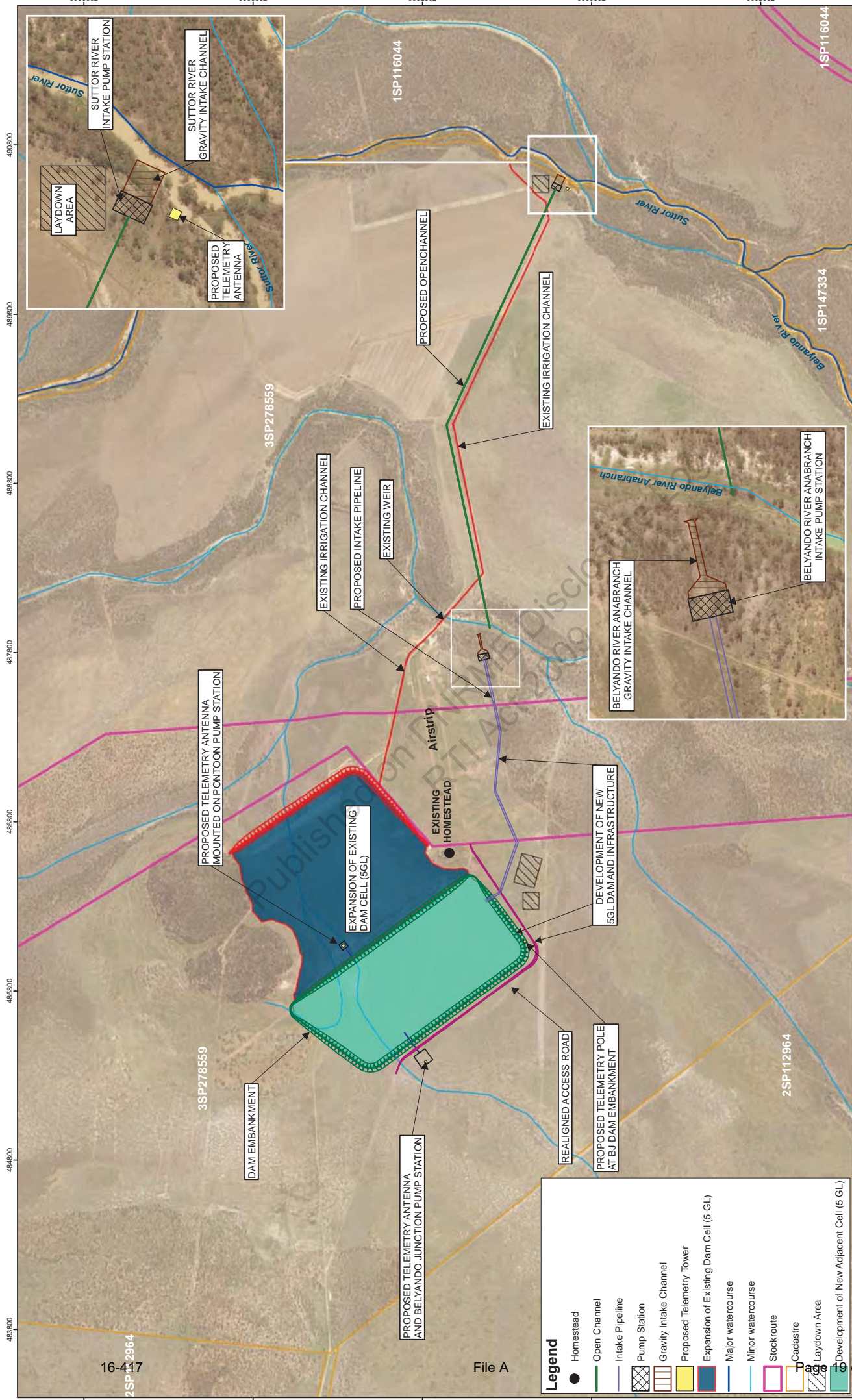
1.7 Overview of Application

Table 1-5 below summarises the proposed taking of water from the Suttor River via the flood harvest system at Belyando Junction, including coordinates of the proposed extraction location, the proposed volume of water required from this location and the purpose for the taking of water.

Table 1-5 Water application summary

Number of Locations	One property, two extraction locations (Suttor River and Belyando River Anabranh at the Belyando Junction property) (Refer to Figure 1-3 for proposed surface water locations).	
Purpose	For construction and operation of the Carmichael Coal Project and associated infrastructure including off lease infrastructure, SP1 (part of the Carmichael Rail Network Project) and off-takes to the local community. Construction water will be required for on-lease civil work and off-lease works (for example mine access road, mine workers accommodation, airport, quarries and rail). Water for operation will be required throughout the life of the Project. Water for the local community will be required long term.	
Watercourse Source	Suttor River System	
Minimum flows proposed	<ul style="list-style-type: none"> A 2,592 ML/d pass flow threshold, controlled by instating an intake weir on the Suttor River channel bank. 	
Location 1 (GDA94 – MGA55)¹ Suttor River	Easting 490,000	Northing 7,630,000
Location 2 (GDA94 – MGA55)¹ (Belyando River Anabranh)	Easting 487,990	Northing 7,627,770
Property Description	Lot 3 on SP278559	
Maximum Rate of Extraction	830 ML/day	
Required Water Quality	The majority of water will be used for earthworks conditioning, dust suppression, and mining activities. Any water used for other purposes will be treated to the appropriate standards before use.	
Volume Required/Year	12,500 ML	

1) Coordinates are plus or minus 1 km



Legend

- Homestead
- Open Channel
- Intake Pipeline
- ▣ Pump Station
- ▣ Gravity Intake Channel
- ▣ Proposed Telemetry Tower
- ▣ Expansion of Existing Dam Cell (5 GL)
- Major watercourse
- Minor watercourse
- Stockroute
- ▣ Cadastre
- ▣ Laydown Area
- ▣ Development of New Adjacent Cell (5 GL)

<p>16-417</p> <p>2SP12964</p> <p>File A</p>	<p>483800</p> <p>484800</p> <p>485800</p> <p>486800</p> <p>487800</p> <p>488800</p> <p>489800</p>	<p>7629900</p> <p>7629900</p> <p>7629900</p> <p>7629900</p> <p>7629900</p> <p>7629900</p> <p>7629900</p>	<p>1SP116044</p> <p>3SP278559</p> <p>1SP147334</p> <p>1SP116044</p>	<p>483800</p> <p>484800</p> <p>485800</p> <p>486800</p> <p>487800</p> <p>488800</p> <p>489800</p>	<p>2SP112964</p> <p>3SP278559</p> <p>2SP112964</p>	<p>PROPOSED TELEMETRY ANTENNA MOUNTED ON PONTOON PUMP STATION</p> <p>EXPANSION OF EXISTING DAM CELL (5GL)</p> <p>EXISTING HOMESTEAD</p> <p>DEVELOPMENT OF NEW SGL DAM AND INFRASTRUCTURE</p> <p>REALIGNED ACCESS ROAD</p> <p>PROPOSED TELEMETRY POLE AT BJ DAM EMBANKMENT</p> <p>DAM EMBANKMENT</p> <p>PROPOSED TELEMETRY ANTENNA AND BELYANDO JUNCTION PUMP STATION</p> <p>PROPOSED INTAKE PIPELINE</p> <p>EXISTING WEIR</p> <p>EXISTING IRRIGATION CHANNEL</p> <p>PROPOSED OPEN CHANNEL</p> <p>EXISTING IRRIGATION CHANNEL</p> <p>BELYANDO RIVER ANBRANCH GRAVITY INTAKE CHANNEL</p> <p>BELYANDO RIVER ANBRANCH INTAKE PUMP STATION</p> <p>SUTOR RIVER INTAKE CHANNEL</p> <p>SUTOR RIVER INTAKE PUMP STATION</p> <p>LAYDOWN AREA</p> <p>PROPOSED TELEMETRY ANTENNA</p>	<p>DISCLAIMER</p> <p>CDM Smith has endeavored to ensure accuracy and completeness of the data. CDM Smith assumes no legal liability or responsibility for any decisions or actions resulting from the information contained within this map.</p> <p>DATA SOURCE</p> <p>QLD Government Open Source Data</p>	<p>Scale @ A3 - 1:20,500</p> <p>GCS GDA 1984 MGA Zone 55</p>	<p>©COPYRIGHT CDM SMITH</p> <p>This drawing is confidential and shall only be used for the purpose of this project.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>DESIGNED</td> <td>TK</td> <td>CHECKED</td> <td>-</td> </tr> <tr> <td>DRAWN</td> <td>MD</td> <td>CHECKED</td> <td>-</td> </tr> <tr> <td>APPROVED</td> <td>-</td> <td>DATE</td> <td>16/09/16</td> </tr> </table> <p>Notes:</p>	DESIGNED	TK	CHECKED	-	DRAWN	MD	CHECKED	-	APPROVED	-	DATE	16/09/16	<p>CLIENT</p> <p>adani</p> <p>DESIGNER</p> <p>CDM Smith cdmsmith.com</p>	<p>FIGURE 1-3</p> <p>BELYANDO JUNCTION EXTRACTION AND STORAGE LOCATION</p> <p>DRG Ref: BES140113-003-R2_BJ_DAM_PLAN</p>
DESIGNED	TK	CHECKED	-																				
DRAWN	MD	CHECKED	-																				
APPROVED	-	DATE	16/09/16																				

Section 2 Relevant Legislation

2.1 Sustainable Planning Act 2009

The overarching framework for Queensland's planning and development assessment is the *Sustainable Planning Act 2009* (SP Act). The framework provides the assessment process to be used for assessing development in Queensland.

The Sustainable Planning Regulation 2009 (SP Regulation) complements the SP Act and prescribes certain matters for the Integrated Development Assessment System (IDAS) and the SP Act generally.

A water licence does not authorise the construction of associated works. As part of the North Galilee Water Scheme Project, new infrastructure will be developed, which will require development approvals under the SP Act for works that are 'assessable development.' That is:

- *Material Change of use of premise - (c) a material increase in the intensity of scale of use of the premises (SP Act, s 10); and*
- *Operational work (other than work carried out in a priority development area or on premises to which structure plan arrangements apply) that involves—Taking or interfering with water from a watercourse, lake or spring (other than under the Water Act 2000, section 20(2), (3) or (5)) or from a dam constructed on a watercourse or lake if it is not self-assessable development under part 2.*

For works associated with the flood harvest and off-stream storage infrastructure for water harvested under this licence, the following development permit applications have either been submitted and approved or have been prepared by Adani:

- Operational Works Development Permit for Taking or Interfering with Water at the Suttor River and Belyando River Anabranch Intake Pump Station and for Gravity diversion from both watercourses. The submission also included an Operational Works for High Impact Earthworks in a Wetland Protection Area (WPA). This has been approved;
- Material Change of Use application for the upgrade of the Belyando Junction Dam to a Major Utility (as defined under the Dalrymple Shire Planning Scheme 2006) for the storage of the extracted water. This has been approved; and
- Operational Works (Excavation and Fill) permit for the construction of an outlet pipeline from the Belyando Junction Dam to the mine, under the Belyando Shire Planning Scheme 2008. Draft documentation has been prepared.

2.2 Water Act 2000

The *Water Act 2000* (Water Act) provides for the sustainable management and allocation of water to meet Queensland's future water requirements including the protection of natural ecosystems and security of supply to water users through the development of water resource plans, and other activities. Each water management area has a separate water resource plan (WRP) and associated resource operations plan (ROP) to provide a framework to regulate water extractions to ensure that they are maintained as a sustainable resource.

Given that the Project is located in the Burdekin Basin the extraction of water must comply with the Burdekin WRP and the Burdekin ROP. The relevance of these is summarised in Section 2.2.2 and Section 2.2.3 below.

2.2.1 Riverine Protection Permit

The Water Act also includes provisions for riverine protection and the granting of permits for excavating or placing fill in a water course, lake or spring (section 266). There will be two new intake channels associated with extracting the water from the Suttor River and Belyando River Anabranch under this licence. The Suttor River intake channel will be constructed from the river for approximately 50 m to the west (refer to section 4.3.2) and will require the removal of a 50 m section of river bank which will be replaced with a weir structure. The Belyando River Anabranch intake will be smaller and will not have any weir structure constructed.

Section 814 (2)(a)(ii) of the Water Act also states that permits are not required if the activities happen as a necessary and unavoidable part of some other activity that is permitted under a development permit for prescribed assessable development. As Adani has obtained other permits under a regulation, including Operational Works Permits to interfere with water (intake channels), and an Operational permit to take water (for pumps), it has been determined that exemptions for a Riverine Protection Permit(s) applies under Section 814 (2)(a)(ii).

2.2.2 Water Resource (Burdekin Basin) Plan 2007

The WRP provides a framework for the sustainable management of water resources by providing sustainable water allocation while protecting ecological values in the Burdekin Basin. The WRP provides information regarding the outcomes for sustainable management of water, performance indicators and objectives, strategies for achieving outcomes and monitoring and reporting requirements.

To ensure the objectives of the WRP are met, a hydrological assessment using IQQM was conducted (refer Section 5.2), which measures compliance against the Burdekin WRP and ROP EFO and WASO targets in relation to the water extraction proposed in this application.

Section 32 (2) of the WRP outlines the considerations required by the Chief Executive when deciding the application. The criteria and the sections of this application where they are addressed is provided in Section 1.3.

2.2.3 Burdekin Basin Resource Operations Plan 2009

The Burdekin ROP supports the implementation of the Burdekin WRP and water use plans in the Burdekin Basin. Chapter 2 of the ROP identifies the process for making available and dealing with unallocated water mentioned in Section 29 of the WRP. Section 32 (1) of the ROP identifies three unallocated water reserve classifications:

- a) General reserve;
- b) Strategic reserve; and
- c) SunWater reserve.

Section 32 (2) of the ROP states that the strategic reserve includes a volume of unallocated water for each of the following:

- a) State purposes;
- b) A future raising of the Burdekin Falls Dam of not more than 2 metres; and
- c) Water infrastructure for the Bowen and Broken subcatchments that is primarily intended for industrial use.

Attachment 1 to the ROP defines State purpose as follows: "As defined under section 5I(3) of the *Water Regulation 2002*". Former Section 5I (3) – which no longer appears in the *Water Regulation*¹ –states that a State purpose means, among other things, a coordinated project under the *State Development and Public Works Organisation Act 1971*. As one of the key purposes is to supply water to a Coordinated Project via the North Galilee Water Scheme infrastructure components, water under this application would be eligible for allocations from the strategic reserve.

As identified in Section 39 (2) of the ROP, unallocated water in sub-catchment areas E, F and G, will be granted only under water licences. The Suttor River is located in sub-catchment E of the ROP. At the time of the plan commencement, 2007, there was 20,000 ML of water in the 'strategic reserve' for this sub-catchment, and 130,000 ML in the 'general reserve'. The ROP does not identify the process for obtaining a licence to take unallocated water, however the process is prescribed in Part 2, Division 2 of the *Water Regulation 2016*. Under Part 2, Division 2, Subdivision 2 of the *Water Regulation 2016*, unallocated water may be released by public auction, tender, fixed price sale or by a grant for a particular purpose at the discretion of the Chief Executive of DNRM.

2.3 Native Title Act 1993

The *Native Title Act 1993* is a Commonwealth statute that deals with the recognition of native title in Australia, and prescribes processes to be undertaken when activities impact on native title.

The proposed intake channel and pump station will be wholly located on Lot 3 on Plan SP278559. Native Title has been extinguished upon the lot (Lot 3 on Plan SP278559) and is not considered applicable to this application. While not directly applicable, under the Water Act, the regulatory process for all water licences requires the investigation of potential native title impacts (construction impacts) and agreements.

Adani and the Queensland Government have a registered Indigenous Land Use Agreement with the Jangga People executed on 4 November 2013 which encompasses the area and activities associated with the North Galilee Water Scheme.

¹ It was removed on 11 September 2015. However, in light of the definition in the ROP, regard has been had to the former provision for the purposes of defining "State purpose".

2.4 Aboriginal Cultural Heritage Act 2003

The *Aboriginal Cultural Heritage Act 2003* (ACH Act) protects Indigenous cultural heritage in Queensland. To comply with the duty of care provision under section 23 of the Act, a proponent of a project is to prepare a Cultural Heritage Management Plan (CHMP), which is an agreement between the proponent and the native title claimants covering the identification and management of Indigenous cultural heritage.

To meet Adani's obligations under the ACH Act, Adani and Jangga People entered into an Early Works Cultural Heritage Clearance Agreement in June 2011 and a CHMP in May 2013. The CHMP was updated in May 2015. The CHMP commits to ensuring that assessments are undertaken prior to commencement of project activities and management arrangements as agreed are implemented. In accordance with these agreements:

- An initial geotechnical survey of the management area (as detailed in the CHMP) was undertaken in May 2015 by Jangga Traditional Owner field officers assisted by Everick Heritage Consultants (Everick). A survey report was provided to Adani in June 2015 by Everick;
- A cultural heritage survey of the entire management area was undertaken in June 2015. A survey report was provided to Adani in July 2015 by Northern Archaeology Consultants (NAC);
- A meeting was held in July 2015 to allow Jangga Operations Pty Ltd (Jangga Operations) and NAC to present the findings of the surveys to Adani; and
- Following consideration of cultural heritage and project design constraints, a meeting was held between Jangga Operations, NAC and Adani to finalise appropriate cultural heritage mitigation strategies over the entire management area. The management plan was signed off on 21 July 2015.

Adani have consulted with Jangga Operations regarding the proposed North Galilee Water Scheme and required water extractions. Consent for the water licence application and release of unallocated water (in accordance with this supporting document) has been provided by Jangga Operations and is included in Appendix E of this document.

Section 3 Existing Environment

This section provides an overview of the existing environment in the broader Belyando and Suttor River systems, and the values of the proposed extraction location, specific to this application.

3.1 Belyando and Suttor River Systems

The proposed development on the Belyando Junction property is located in an agricultural area, and has been predominantly cleared of vegetation. Remnant vegetation is sparse and is restricted to a thin band of riparian vegetation along the Suttor River and Belyando River Anabranch. This section describes the river systems in the broader catchment.

The Project area is located within the Belyando/Suttor sub-catchment that forms part of the Burdekin River catchment. The Belyando/Suttor sub-catchment represents a drier, more variable and typically semiarid landscape and produces intermittent / storm based stream flow, contributing comparatively less to the overall discharge from the Burdekin Basin than the other sub-catchments (DNRM 2002). It is not uncommon for more than 80% of the annual stream flow of the waterways within the area to occur between December and April. Both the Belyando and Suttor Rivers are reasonably major river systems within the Belyando River Catchment with both Rivers reaching maximum widths of up to 15 m in places and maximum depths of 3 to 4 m. Both River systems are ephemeral in nature, with flow generally only occurring for a few weeks or months per year depending on rainfall intensity (E3 2011).

The Belyando River is bound by the Great Dividing Range in the west and the Denham and Drummond Ranges to the east, and flows in a northerly direction before joining the lower reaches of the Suttor River and then flows in a northerly direction from its headwaters in the Drummond Range to the Burdekin Falls Dam. Similar to other creeks or rivers in the area, the Belyando and Suttor Rivers have shallow channel gradients which mean that even when peak discharges are high the velocities are relatively low (E3 2011). Plates 3-1 and 3-2 (E3 2011) provide examples of the river conditions in the upper and lower reaches of the Suttor River.

Studies of the Suttor River catchment (E3 2011) identify that much of the landscape surrounding the Suttor River has been cleared and that the semi-contiguous riparian vegetation and complex understory vegetation of the Suttor River would provide a regional faunal corridor for small vertebrates and important nesting, feeding and drought refuge resource for surrounding terrestrial fauna, particularly woodland birds. Field studies at the site undertaken by CDM Smith in March 2015 did not encounter any listed fauna species, and found that habitat values in terms of remnant vegetation are extremely limited.



Plate 3-1: Upper Suttor River



Plate 3-2: Lower Suttor River

The aquatic ecosystem values in the Lower Suttor River and Belyando River systems are categorised as Slightly to Moderately Disturbed condition (ANZECC 2000). Several studies have shown that water quality in the region generally exceeds Queensland Water Quality Guidelines (QWQG) Water Quality Objective (WQO). For example, work undertaken for the Waratah EIS (E3 Consult 2011) indicated that water quality data collected within the Suttor River catchment in October 2009 (dry season) and March/April 2010 (wet season) did not meet the WQO for most sites for a range of parameters measured. In addition, conductivity, iron, ammonia and total nitrogen were greater than the WQOs for most sites.

The predominant existing habitat type within the Suttor River downstream of the proposed extraction location is a riverine habitat. Riverine habitats include all aquatic habitat types that occur within a channel (i.e. rivers and creeks) and may be periodically or permanently inundated by flowing water.

3.2 Fish Species

Desktop studies and field site surveys of Mistake Creek, a major tributary into the Suttor River system, obtained from SEIS Appendix C3i identified approximately 17 freshwater fish species (Table 3-1) that have the potential to occur in Mistake Creek of which eight have actually been present during field surveys. Of these 17 species, none are listed under State or Commonwealth legislation.

Table 3-1 Fish species listed as potentially inhabiting Mistake Creek (SEIS AppendixC3i)

Status ¹	Scientific Name	Family	Common Name	Size ²	Habitat ³	
Present	<i>Craterocephalus stercusmuscarum</i>	Atherinidae	Fly-specked hardyhead	S	All	
	<i>Ambassis agassizii</i>	Chandidae	Agassiz's glassfish	S	All	
	<i>Hypseleotris sp.</i>	Eloteridae	Midgley's carp gudgeon	S	All	
	<i>Mogurnda adspersa</i>		Southern purple-spotted gudgeon	M	All	
	<i>Oxyeleotris lineolata</i>	Melanotaeniidae	Sleepy cod	L	Slow	
	<i>Melanotaenia splendida splendida</i>	Plotosidae	Eastern rainbowfish	M	All	
	<i>Neosilurus hyrtlil</i>	Terapontidae	Hyrtl's tandan	L	All	
	<i>Leiopotherapon unicolor</i>		Spangled perch			
	Possible	<i>Nematalosa erebi</i>	Clupeidae	Bony bream	M	All
		<i>Hypseleotris klunzingeri</i>	Eloteridae	Western carp gudgeon	S	All
<i>Philypnodon grandiceps</i>			Flathead gudgeon	S	Slow	
<i>Macquaria ambigua</i>		Percichthyidae	Golden perch	L	Slow	
<i>Neosilurus ater</i>		Plotosidae	Black catfish	L	Fast	
<i>Neosilurus mollespiculum</i>			Soft-spined catfish	M	Slow	
<i>Porochilus rendahli</i>			Rendahli's catfish	M	Slow	
<i>Scortum parviceps</i>		Terapontidae	Small-headed grunter	L	Fast	
<i>Toxotes chatareus</i>		Toxotidae	Seven-spotted archerfish	L	Slow	

¹ Present = recorded as present at either the mine or rail site within the project EKS, Possible = project EIS desktop search predicted

² Size as adult, S = small (<10cm), M = medium (10-20cm), L = large (>20cm)

³ Slow = relatively still and slow waters, Fast = relatively swift moving water

Similarly, studies undertaken as part of the Byerwen Coal Mine EIS (Amec 2013) found seven fish species in the Suttor River in May 2012 and a further three species in December 2013. Of the ten species found, eight were native to the project area, one was a translocated native (*Oxyeleotris lineolata*: sleepy cod) and one was an introduced pest species (*Oreochromis mossambicus*, tilapia). None of the endemic fish species are listed as threatened in either State or Commonwealth legislation.

Studies undertaken for the Waratah Coal China First Project included sampling for invertebrates within the Suttor River and surrounding tributaries (E3 2011). A total of 16 fish species were captured across the two sites within the Suttor Catchment area of the China First Project. These are listed in below. Two species of recreational fishery interest and one species with a restricted distribution endemic to the Burdekin River Basin were also observed. *Scortum parviceps* has a restricted distribution endemic to the Burdekin River Basin. *Morgurnda adspersa* is also recognised to be undergoing range reductions with the Upper Burdekin River Basin due to competition with translocated *O. lineolata*. The most abundance species observed was *Neosilurus hyrtlii* (E3 2011).

Table 3-2 Distribution of fish species across the Suttor River catchment

Family	Species	Common Name	Site 1	Site 2
Cichlidae	<i>Oreochromis mossambica</i> (E)	Tilapia		X
Clupeidae	<i>Nematalosa erebi</i>	Bony bream		X
Eleotrididae	<i>Mogurnda adspersa</i>	Southern purple-spotted gudgeon	X	X
Eleotrididae	<i>Oxyeleotris lineolata</i> (F)	Sleepy cod	X	X
Melanotaeniidae	<i>Melanotaenia splendida splendida</i>	Eastern rainbowfish	X	X
Plotosidae	<i>Neosilurus hyrtlii</i>	Hyrtl's tandan	X	X
	<i>Neosilurus ater</i> (F)	Black catfish		X
	<i>Porochilus rendahli</i>	Rendahli's catfish		X
Terapontidae	<i>Leiopotherapon unicolor</i>	Spangled perch	X	X
	<i>Scortum parviceps</i> (R)	Smallhead grunter	X	X
Total Number of Species Recorded / Site			6	10

Species type key: (E) Exotic, (F) Important to Traditional /commercial/recreational fisheries, (R) Restricted Burdekin River Basin Endemic, (T) Translocated to Basin or site

3.3 Extraction Locations

Water is proposed to be extracted from the Suttor River system. Two extraction locations are proposed to take water from this river system. Both are located on the Belyando Junction property (Lot 3 on SP278559) (Figure 1-2). The proposed extraction locations include:

- Suttor River; and
- Belyando River Anabranh.

The Suttor River and the Belyando River Anabranh are part of the same braided river system and are located just 2.7 km apart. The Belyando River Anabranh parts from the Belyando River and joins with the Suttor River approximately 6km downstream of both extraction locations.

The Belyando Junction property is located approximately 162 km north of Clermont and approximately 10 km north of the Belyando Crossing Roadhouse, located on the Gregory Developmental Road. The lot containing the extraction location and water transfer / storage infrastructure is an agricultural property involving cattle grazing and cropping, with a stock route traversing north to south through the centre of the property. Previously a portion of the stock route (on Lot A/A3529) was located over the dam. Since writing the report, the stock route on the property has been realigned to avoid the dam.

The majority of the property has been cleared for agricultural activities. However, riparian areas along the Suttor River and the western Belyando River Anabranh are mapped as containing regulated vegetation. Site observations confirmed that vegetation is present as a thin band along the edges of the Suttor River and Belyando River Anabranh. Some remnant vegetation will be required to be removed for construction of the intake channel and pump station associated with the flood harvesting infrastructure, however the route of the proposed intake pipeline and site of the off-stream storage upgrade is generally devoid of vegetation and comprises of, or is surrounded by, irrigated cropping and cattle pastures.

The extraction locations are typical of the Belyando and Suttor basin landscapes in that they are characterised by a large floodplain drained by ephemeral creeks. The three closest stream flow stations are Mount Douglas (120301) 7.45 km upstream on the Belyando River, and Belyando River at Gregory Development Road (120301B), 9.73 km upstream on the Belyando River and St Anns (120303A) which is 18 km downstream from the proposed extraction points on the Suttor River and Belyando Anabranh. A desktop review of the available gauging sites in the area, GHD (2012b) demonstrated that the flow regime is highly seasonal and dominated by the wet season. It is during this wet season that flood events of short duration generally occur. The closest mapped Palestine wetland area downstream is 500 m from the proposed take points. There are no protected areas, in the immediate vicinity of the Suttor River or the Belyando River Anabranh, between the proposed extraction points and the Burdekin Falls Dam. The closest protected areas to the extraction location are:

- Nairana National Park - approximately 13 km upstream (south); and
- Blackwood National Park – approximately 16 km to the west.

Suttor River Extraction Location

Extraction point one is located on the western bank of the Suttor River (main channel) below the confluence with the Belyando River. The site is predominantly cleared of vegetation and adjacent to an irrigated cropping area, thus it is highly disturbed. The proposed open channel will be within 200m of the mapped palustrine wetland between the main channel of the Suttor River and the Belyando River Anabranh.

No impact from the take of the water is expected to this wetland area as the wetland receives overland flow from upstream of the proposed extraction location. The wetland was found to be totally dry during a site inspection in May 2015, has been previously cleared of vegetation, and is characterised by buffel grass. It is expected that the wetland will only retain water after heavy rainfall periods and associated flooding of the nearby rivers.

With an existing irrigation channel and bund wall located between the proposed intake channel and the mapped wetland protection area, water levels at 5 – 9 m below ground level (as identified during geotechnical investigations in June 2015), and mitigation measures to be employed during construction, works and extractions associated with this license will have negligible impact on the wetlands during operation.

Belyando River Anabranh Extraction Location

Extraction point two is located on the western bank of the Belyando River Anabranh, located to the west of the Suttor River. This extraction point is upstream of an existing farm intake and weir. This location consists of mainly coolibah (*Eucalyptus coolabah*) and river red gum (*Eucalyptus camaldulensis*).

Section 4 Water Source, Demand and Infrastructure

The water source and demand, supply alternatives and required infrastructure associated with the take of surface water from the Suttor River is described in this section.

4.1 Water Source and Demand

During operation of the mine, water from external sources will be used to supplement water which is made available from within the mine as mining associated water. However, during construction of the mine and rail infrastructure (including all off-lease components) and first years of operations, the Project is reliant on external water supplies with only a small volume of around 2,500 ML annually expected from mine dewatering as mining commences. The total gross water required in this period is 10.9 GL per annum (Table 4-1).

After the first two years of construction, the mine will generate water from pit de-watering and rainfall capture, which will reduce the volume of water required from external water supplies. Based on the mine water balance model under the maximum condition (the driest year inside the mine) once operational, the net mine demand (or maximum water deficit) peaks at 6.5 GL/year in 2023 with lower values up until that time. Net water demand is described in Table 4-2.

Table 4-1 Mine gross water demand for construction and operation of the CCP

	Year	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
	Unit								
Construction water demand									
Open cut	ML	0	1,384	449	0	0	0	0	1,833
Underground	ML	95	909	0	0	0	0	0	1,004
Off-lease Infrastructure	ML	147	1,065	563	0	0	0	0	1,775
Sub-total construction	ML	242	3,358	1,012	0	0	0	0	4,612
Operations water demand									
Open Cut	ML	0	0	3,053	5,759	6,453	6,034	6,149	27,448
Under Ground	ML	0	0	576	1,379	1,626	1,626	1,626	6,833
Coal handling plant	ML	0	0	151	344	451	462	460	1,868
Coal processing plant	ML	0	0	1,596	1,361	1,806	1,902	1,655	8,320
Potable Water	ML	0	0	210	182	188	188	198	966
Utilities	ML	0	0	100	400	400	400	400	1,700
Sub-total operations	ML	0	0	5,686	9,425	10,924	10,612	10,488	47,135
Total water demand for Construction & Operation phases	ML	242	3,358	6,698	9,425	10,924	10,612	10,488	51,747

In order to determine the water sources that would provide the reliability required for the Project in the short and long-term, a review of water supply requirements and potential sources was undertaken. The review found that whilst most supply options provide sufficient security to support operations, there were limited options to support the initial requirement for a 6.5 GL secure supply for construction water demand in the first 18 months of project development. As a result, the nature of secure water infrastructure and supply is governed by the initial construction period. Accordingly, Adani determined that multiple water supply sources need to be secured to supply the initial construction period and beyond. A combination of the following sources will be utilised to supply the necessary quantities:

- 1) Flood harvesting from Mistake Creek and Belyando River – water permits granted by DNRM for extraction of a total of 8,300 ML (permit references: 614017 and 614136 respectively);
- 2) Flood harvesting from the Suttor River (12.5 GL) – the subject of this application; and
- 3) Groundwater extraction– investigations are being progressed for this source.

As a key component of the water supply strategy, the North Galilee Water Scheme is being developed to convey water from the sources to various off-takes, where the water is needed, as described below.

4.2 Proposed Water Supply Strategy

As described in this document, Adani is seeking to obtain a licence to extract up to 12.5 GL (12,500 ML/year) of water from the Suttor River system and for it to be stored in the Belyando Junction Dam which will be increased to accommodate 10 GL (10,000 ML). The water extracted from the Suttor River system will be transferred to the mine via a new pipeline to be constructed as part of the North Galilee Water Scheme, which is scheduled to be operational by year 3 of the development. Water under this licence will be used for the following:

- Construction of off-lease and on-lease infrastructure, for example including dust suppression, washdown, earthworks, civil works, firewater system, and commissioning;
- Potable water supply to meet the needs of the workers; and
- Operation of the mine, for example including dust suppression (stockpiles, transfer stations, and roads), tailings cell management, coal washing and processing, equipment and vehicle washdown, and longwall mining equipment cooling water.

Water will also be made available to some third party users in the Basin, predominantly adjacent landholders for stock and domestic purposes. These landholders will have an offtake which has been agreed to in relevant landholder agreements. Each offtake location will have a flow control valve capable of passing up to 40KL/day when the North Galilee Water Scheme pipeline is pressurised and transporting water.

Table 4-2 lists the purposes and associated timeframes for which the water under the licence is required. The volumes provided are the net water demand required from the offsite system, which incorporate anticipated evaporation losses at both the flood harvest dam and raw water dam that will receive and store water at the mine. Construction water will be supplemented from Mistake Creek and Belyando River under water permits granted from DNRM (reference 614017 and 614136) and other sources if required, in consultation with DNRM.

Table 4-2 Net water requirements and time period

Package	Volume* (ML)	Time period
Commissioning of BJ Dam		
BJ Dam commission and first fill	Up to 10,000	-
Construction Water Demand		
Open Cut Development	1,883	Year 1 – 3
Underground	1,004	Year 0 – 2
Offlease Infrastructure	1,775	Year 0 – 3
CONSTRUCTION TOTAL	4,662	
Operations Water Demand (Indicative)		
Open Cut	6,034	annually
Underground	1,626	annually
Coal Handling Plant	462	annually
Coal Processing Plant	1,902	annually
Potable Water	188	annually
Utilities	400	annually
OPERATION TOTAL	10,612	annually
To be supplied by the mine	2,500	annually
Balance to be supplied under this licence	8,000	annually

*Note: It is estimated that approximately 2,500 ML of the annual operational demand will be supplied via mine dewatering, leaving the annual supply requirements from Belyando Junction Dam at approximately 8,000 ML. The 12,500 ML/year application volume allows for evaporation losses and for some water to be retained in the dam at the start of the wet season in the event that the wet season is late or the river does not flow.

4.2.1 Efficiency of Water Supply

Efficiency measures for water storage are being incorporated in the design of the upgrade of the off-stream storage dam at Belyando Junction property through the following methods:

- Development of two separate 5 GL cells, with a common wall, that can be operated to reduce evaporative losses by decreasing the surface area of the dam for a given volume (total capacity will be 10 GL); and
- Operation of primary and secondary storage cell.

Water supply to the mine will be via the western (primary) cell, which connects to the intake from the Sutor River. As the stored volume is drawn down in the western cell, water will be progressively replaced by pumping from the eastern (second) cell. The above measures roughly halve evaporative losses from the upgraded dam when there is 5 GL or less of stored water in the dam.

The final design will minimise seepage losses to maximise available supply to the mine by using a low permeability layer using in-situ material. This will maximise the efficiency of stored water and reduce the likelihood of piping failure of the dam embankment.

Practices on the mine to minimise water demand and impacts on the local river systems include the following:

- Reuse of on-lease water from dewatering activities for dust suppression requirements;
- Capture and reuse of stormwater on disturbed areas;
- Reuse of return water from the tailing facilities for the coal handling and processing plant; and
- Temporary source of water from a range of resources including existing dams, surface water and bores.

The primary use of water for the open cut mine will be for civil construction activities and associated dust suppression. The major water saving efficiencies at the open cut mine will be implemented through the design of the mine affected water (MAW) management system and supplementation of water with excess MAW water from the underground mine. Mine affected water from both open cut and the underground mine will be stored in a series of MAW dams across the site, and rain water will be harvested from catchments across the site and directed into the dams. The MAW water system will be used to transfer water between MAW dams to maximise operational efficiencies, eliminate overflow and runoff, and minimize evaporative water loss via a ring pipeline and pumping system. Treated waste water and stormwater from the open cut Mine Industrial Area will also be directed into the MAW dams for reuse.

The usage of the MAW water will be for dust suppression or will be re-used in the coal process plant in the process circuit.

4.2.2 Alternative Supply Options

4.2.2.1 No Development

The CCP requires considerable water supply to service the construction and operational aspects of the project. The North Galilee Water Scheme is a critical component of the infrastructure to convey the water supply from Belyando Junction property to the mine. Not developing the North Galilee Water Scheme and not obtaining a water allocation is not considered a feasible option due to the considerable financial investment already made for the development of the CCP and the critical nature of the water supply to the viability of the Project.

4.2.2.2 Available External Water Sources

Detailed analysis on various water supply options has been undertaken by Adani and recognised firms. In September 2014, CDM Smith was engaged by Adani to review all water supply options and recommend a strategy to provide a secure and reliable source of water to the Project to meet the project schedule.

This review considered the following water sources for construction and operation phases, categorised into regional and local water supplies:

The local supplies that were considered were:

- Belyando River flood harvesting via the Local flood harvest facility, similar to that proposed in the SEIS (new dam on the Moray Downs property – leasehold held by Adani);
- Mistake Creek flood harvesting at the Disney property (existing and/or upgraded dam on the Disney property); and
- Groundwater.

The regional supplies that were considered were:

- Flood harvesting from the Sutor River (existing and/or upgraded dams on the Belyando Junction and Llanarth properties);
- Accessing water from the Burdekin – Moranbah pipeline; and
- Accessing water from the Burdekin Falls Dam.

The results of the review found the following sources provided the most reliable and economically viable water supply:

- Construction phase: Mistake Creek, Belyando River and other sources; and
- Construction and operation phase: the Suttor River below the confluence of the Belyando River at Belyando Junction, as proposed in this application.

Extraction Points

Various extraction points on Belyando River, Suttor River and Mistake Creek were considered. Integrated Quantity Quality Model (IQQM) modelling was undertaken to identify the most reliable source which maintained compliance with the Burdekin WRP.

The Belyando Junction flood harvesting scheme considered various extraction points, including an anabranch of the Belyando River (1km to the east of the existing Belyando Junction Dam and within the same system) and other points along the Suttor River.

It was determined that two extraction points on watercourses traversing the Belyando Junction property would provide the most economic and flexible operating scenarios. The Belyando River Anabranch alone would not provide the minimum reliability for the Project, however, scenarios produced for the Suttor River indicate that this option provides a higher yield when compared to the anabranch. A combined scenario of the Belyando River Anabranch and the Suttor River is predicted to meet Project criteria.

4.3 Existing and Required Infrastructure

Some existing infrastructure used by the landholder for current practices is located on the Belyando Junction property. To support the water extraction under this application, new flood harvesting infrastructure will be constructed, including an intake channel, pump station and pipeline from the Suttor River to the dam, and upgrade of the existing off-stream storage dam, as described below and shown in Figure 1-3². Existing and proposed infrastructure is described below.

4.3.1 Existing Infrastructure

Existing Dam and Pump Infrastructure

The Belyando Junction Dam is an existing off-stream storage dam situated in the upper Burdekin catchment offline of the confluence with the Belyando and Suttor Rivers, with a current capacity of 2.2 GL. The flood harvest infrastructure extracts water from an anabranch of the Belyando River, approximately 2.66 km to the west of the Suttor River channel.

The dam is a turkey's nest storage (i.e. no external contributing catchment) impounding water between two hills via earth embankments approximately 1 km long (see Figure 4-1 and Plate 1-1). The dam is located approximately 1,150 m to the west of an anabranch of the Belyando River.

² Refer to Appendix E for landholder consent to the North Galilee Water Scheme and release of unallocated water for the water licence.



Figure 4-1 Existing Belyando Junction Dam

4.3.2 Required North Galilee Water Scheme Infrastructure

The proposed Suttor River intake channel will include a weir, constructed parallel to the existing bank, that will control inflow from the river and create a basin where water is lifted to an open channel via the Suttor River Pump Station. Water will then travel through an open channel approximately 2.8 km in length to a discharge location on the Belyando River Anabranh. An existing in-stream weir on the Belyando River Anabranh impounds water whereby a second intake channel, constructed at the Belyando River Anabranh invert level, will allow ingress of water to a basin where a second pump station is proposed. The Belyando River Anabranh Pump Station will lift water to the upgraded Belyando Junction Dam via dual buried Mild Steel Concrete Lined (MSCL) 1,626 mm diameter pipes, approximately 1.5 km in length and traversing a stock route (Lot A/A3529). Both pump stations will be powered by diesel and thus diesel storage tanks are required at each of the two pump station locations.

The upgrade of the storage will involve increasing the capacity of the existing dam to a nominal 10 GL by adding an additional 5GL cell adjacent to the south-west of the existing dam, and increasing the height of the existing north-eastern embankment.

Section 5 Potential Effects on Surface Water

Resources

5.1 Suttor River Flow Analysis

Flows at the Suttor River were estimated using data from the existing DNRM St Anns gauging station (Station number 120303A) data. This station is the closest station to the extraction location and reliable flow statistics can be characterised (1967 – present).

Figure 5-1 shows the mean daily gauged flows in ML for the Suttor River, separated by month (station number 120303A). The flow through the Suttor River is significantly higher in the wetter months (January, February and March) with mean daily flows exceeding 17,000 ML for the month of February. This indicates there is a significant supply of water during the wetter months which may also coincide with flood events.

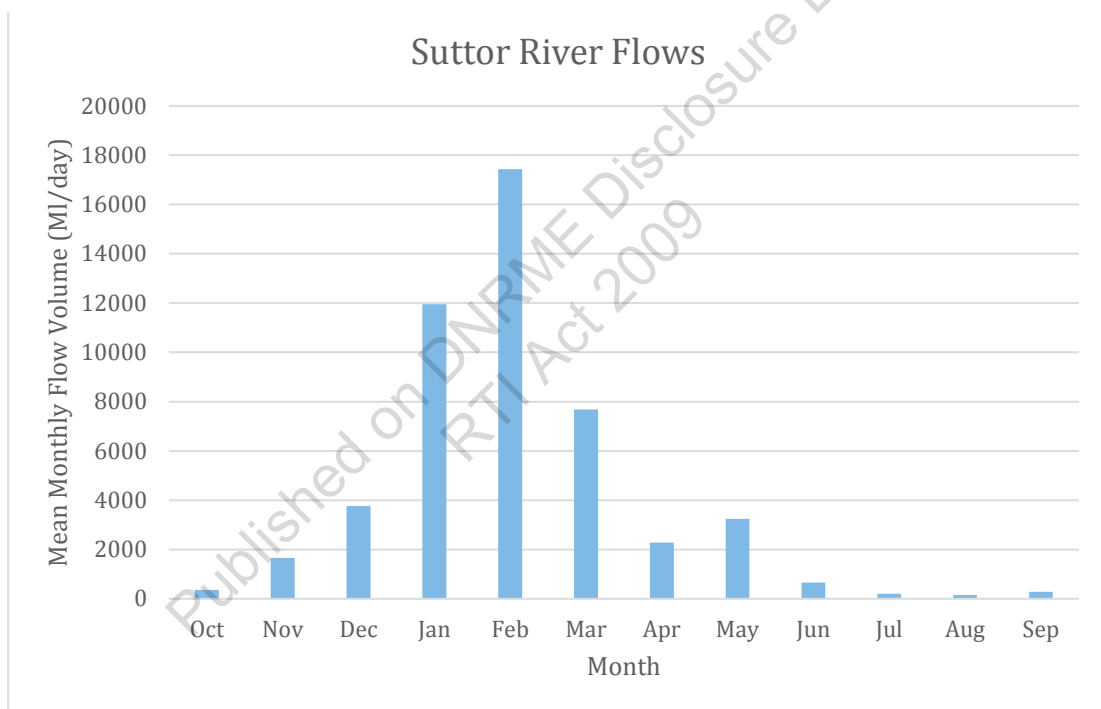


Figure 5-1 Estimated seasonal flows

The results of the flow analysis indicate that flows within the Suttor River are more reliable through the months of November through to May. During wetter periods, water is on average available with daily flows ranging from approximately 3,760 ML in December increasing to approximately 17,400 ML in February and 7,680 ML in March.

5.2 Integrated Quality and Quantity Modelling

It is important to note that since development of the IQQM modelling contained herein, the pass flow threshold has increased from 200 ML/d to 2,592 ML/d. Since the pass flow threshold has been increased, the IQQM modelling contained herein is considered conservative and therefore still applicable for the 2,592 ML/d pass flow threshold.

The proposed extraction conditions from the Suttor River to the Belyando Junction Dam were modelled in the Burdekin ROP IQQM. The proposed extraction location was included upstream of existing allocations on the Suttor River reach directly downstream of the confluence with Belyando River (i.e. between node 790 and node 701 in Figure 5-2). The modelled extraction conditions are presented in Table 5-1.

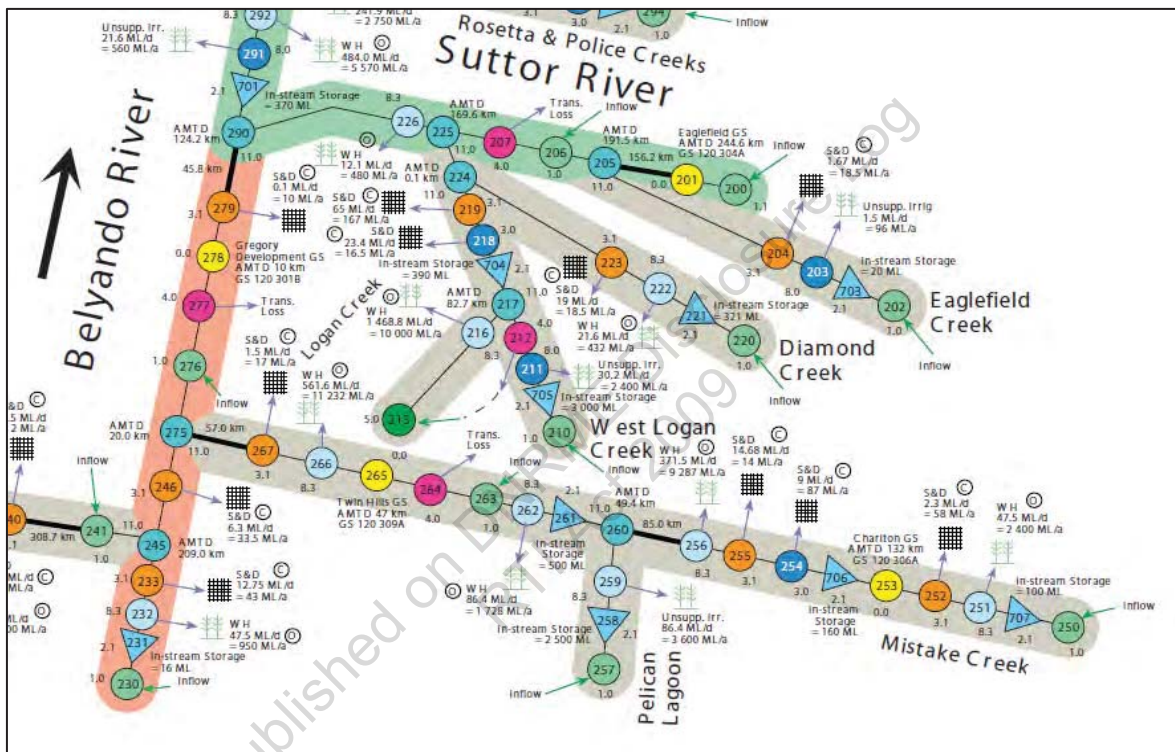


Figure 5-2 Extract from Burdekin ROP IQQM node diagram

Table 5-1 IQQM modelled extraction conditions

Characteristic	Suttor River
Flow threshold prior to extraction (ML/d)	2,592
Maximum pump rate (L/s)	9,600
Total maximum annual demand (ML/year)	12,500

Based on a flow threshold prior to extraction of 200 ML/day, the IQQM results show **zero** breaches to the targets against all Burdekin WRP and ROP EFO and WASO (summarised in **Appendix B**). This is largely due to the proposed extraction being either:

- Disconnected from the system / storage in which the EFO or WASO is measured in some instances i.e. the Haughton and Bowen River systems are contained within the Burdekin ROP IQQM however are not impacted by extractions from the Suttor River; or
- Sufficiently small to not cause a breach; or

- Due to the extraction being in the upper reaches of the catchment, thus not measurably impacting on EFOs and WASOs measured further downstream and with a far greater contributing catchment.

No change to WASO targets, whether supplemented or un-supplemented, was observed between the ROP base case and the simulated Belyando River extraction case in which this licence application supports.

The only EFO affected by the proposed Belyando River extraction is WRP node 11 (IQQM node 347), which is situated on the Suttor River at the upstream impounded limit of the Burdekin Falls Dam. However, this is not considered an issue of concern as the EFO target under the Burdekin WRP was not breached. Table 5-2 summarises EFO results from the IQQM simulations at the WRP node 11.

Table 5-2 Suttor River (WRP node 11) EFO Results

EFO Objective	Units	WRP Objective	ROP Base Case	Proposed Case
Low Flow Objectives				
Percent of days 50% non-zero daily flow is equalled or exceeded	%	32	33	32
Percent of days 80% non-zero daily flow is equalled or exceeded	%	52	53	53
Percent of days zero flow is not more than	%	35	33	33
Number of 30-182 day (1-6 month) zero flow spells be less than	No.	118	118	118
Number of 182 day (6 month) zero flow spells be less than	No.	1	1	1
Medium to High Flow Objectives				
Mean annual flow be at least	% of Pre-development case	92	93	92
Median annual flow be at least		88	89	88
1.5 year daily flow volume be greater than		94	95	95
5 year daily flow volume be greater than		96	97	97
20 year daily flow volume be greater than		98	98	98
Annual proportional flow deviation (APFD) be no more than		1	0.9	1

In summary, the modelling identified that there were no breaches to EFOs specified under the Burdekin WRP. The impacts on EFOs shown in the model as a result of the proposed extraction include:

- A slight reduction in the mean and median annual flow;
- A slight increase to the annual proportional flow deviation; and
- A slight decrease to the number of days that the mean daily flow is equalled or exceeded.

As discussed earlier, Adani has also been granted water permits for water in the upper Burdekin catchment for a total of 8,300 ML over a period of three years. Due to the simultaneous nature in which the applications will be assessed by the regulator a cumulative assessment of all three extractions, namely the Mistake Creek and Belyando River permits and the Belyando Junction Dam licence application, were simulated in IQQM. The results of this assessment are presented in **Appendix C** and show zero breaches to the Burdekin WRP and ROP EFO and WASO targets and identical EFO results at WRP node 11 as shown in Table 5-2.

5.3 Impact on Downstream Users and Environmental Receptors

This section assesses the impact of the water extraction proposed under this license application on downstream users and environmental receptors.

5.3.1 Impact on Downstream Users

The impact to downstream licenced users as a result of the extraction conditions proposed in this licence application was assessed for a 2,592 ML/d pass flow threshold. This was done to better understand the sensitivity of the impacts to affected parties to the particulars of the licence conditions. The downstream users assessed are those located between the extraction location proposed under this licence application and St Anns gauge.

5.3.1.1 Downstream User Location and License Conditions

License conditions applied to the impact assessment are summarised below and illustrated in the Burdekin ROP IQQM schematic in Table 5-3. It should be noted that there are discrepancies between the license conditions shown on the ROP diagram and the records held by the DNRM water entitlement attributes database³. In the event of a discrepancy, the DNRM water entitlement attributes database was favoured and reproduced as follows:

- Node 291 (3/SP278559) – Irrigation use;
 - 17.3 ML/d; no flow threshold; 560 ML Annual Volumetric Limit (AVL)
- Node 292 (3/SP278559) Irrigation use;
 - 478 ML/d extraction; 2,592 ML/d flow threshold; 5,570 ML AVL
 - 6 ML/d extraction; impoundment controlled threshold; 430 ML AVL
- Node 293 (5078/PH955) – Irrigation use;
 - 241.9 ML/d extraction; 172.8 ML/d flow threshold; 2,750 ML AVL
- Node 300 (22/SP218335) – Irrigation use;
 - 43.2 ML/d extraction; 172.8 ML/d flow threshold; no AVL
- Node 302 (5060/PH387) – Mining use;
 - 56.2 ML/d extraction; 172.8 ML/d flow threshold; 1,150 ML AVL
- Node 303 – Stock and domestic use.
 - 17.7 ML/d; no threshold flow specified; 51 ML AVL

³ Data accessed from: <https://data.qld.gov.au/dataset/water-entitlements>

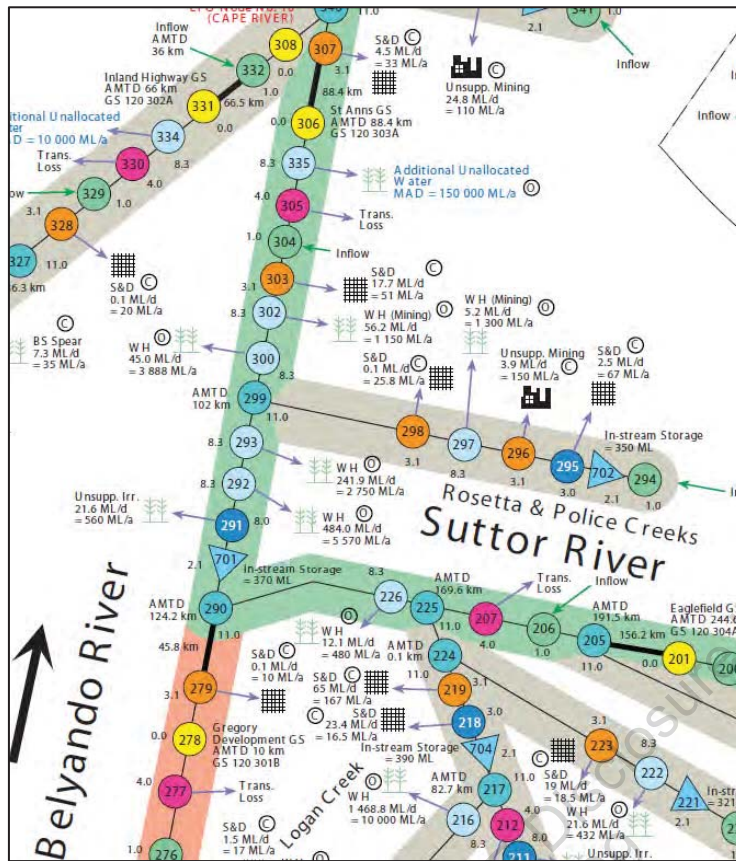


Figure 5-3 Burdekin Basin ROP IQQM Schematic

Note that the 478 ML/d extraction at Node 292 has a default pass flow threshold of 14,688 ML/d, however extraction can occur after a lower 2,592 ML/d threshold if all of the below conditions are met.

- (a) There is continuous flow from the pump site to the storage of Burdekin Falls Dam;
- (b) The surface flow exceeds 2,592 ML/d at St Anns gauging station;
- (c) In excess of 500,000 megalitres has passed St Anns gauging station in the preceding 12 months or the Burdekin Falls Dam is full from other sources;
- (d) The Burdekin Falls Dam is storing more than 10,000 ML (54% of Stage 1 capacity);
- (e) Irrigators in the Burdekin Haughton Water Supply Scheme are not on less than 100% announced allocation; and
- (f) Taking water will not adversely affect beneficial flooding on properties downstream to the Burdekin Falls Dam.

The lower 2,592 ML/d pass flow threshold was adopted for the purposes of the landowner impact assessment as a conservative measure and without simulating the complexity of the above conditions.

5.3.1.2 Downstream User Impact Assessment Method

The downstream user impact assessment method is summarised by the following steps:

- Calculate the present percentage reliability of existing licensed users, described in Section 5.3.1.1, meeting the AVL listed on their license and lesser total annual extraction volumes, until the reliability of extraction reaches 100%; and
- As in the step above, calculate the percentage reliability of the users extracting the defined volumes for post extraction conditions described by this license application for a 2,592 ML/d pass flow threshold.

5.3.1.3 Downstream User Impact Assessment Results

The impact to downstream licenced users (for licence conditions defined in Section 5.3.1.1) is presented in the Figure 5-4 through Figure 5-8. The figures show the percentage reliability of each licenced user extracting volumes up to their AVL under both existing and post extraction conditions as proposed under this licence application. The figures also show, from left to right, the probability of receiving the nominated annual volume that is lesser than the AVL on their licence.

For example, Figure 5-4 shows that for Node 291 and 292, both of which are licenced to the Belyando Junction Property (3/SP278559), there is:

- A 44% (88%-44%) reduction in the reliability of extracting to the AVL of the licence for the 2,592 ML/d pass flow threshold;
- A 1% (89%-88%) reduction in the reliability of receiving at least 5,000 ML/annum for the 2,592 ML/d pass flow threshold; and
- No impact to extracting 1,000 ML.

In summary, the results show that:

- A 2,592 ML/d pass flow threshold results in moderate level impacts on Nodes 291, 292 and 293 (Belyando Junction and Llanarth properties) in terms of the possibility of extracting to the AVL of their licenses;
- A 2,592 ML/d pass flow threshold results in the low level impact on Nodes 300 and 302 located further downstream (irrigator and mining users);
- There is no impact to the stock and domestic user at Node 303 under the 2,592 ML/d pass flow threshold condition;
- The proposed extraction has a relatively minor impact to the existing licenced users' capacity to extract water, except for at very high volumes such as the AVL; and
- The impact on the licenced users' capacity to extract to the AVL on their licence is somewhat buffered by the limiting storage capacities for which they harvest to and/or by the area of cropping. For example, the Belyando Junction property harvests water to fill a 2,200 ML off stream storage, however the combined licenced AVL associated with this title is 6,560 ML. The impact on extracting the AVL is 44% reduced reliability whereas the impact on filling the 2,200 ML storage from empty is a 1% reduced reliability.

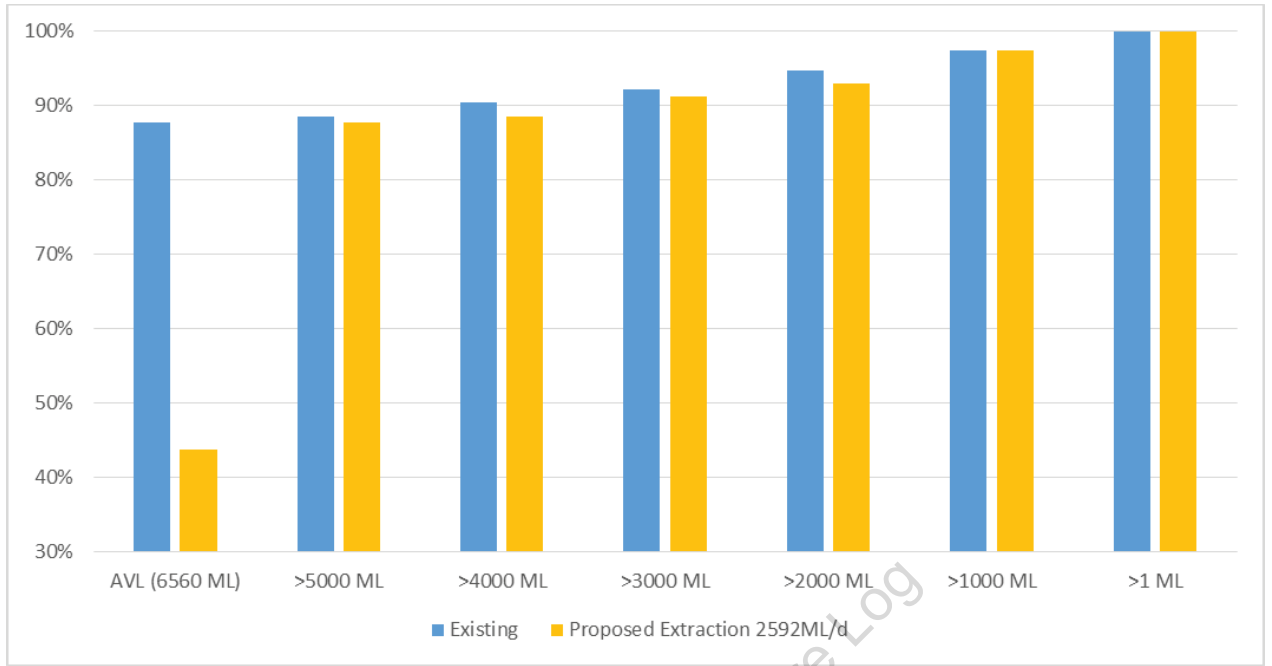


Figure 5-4 Node 291/292 Impact Assessment

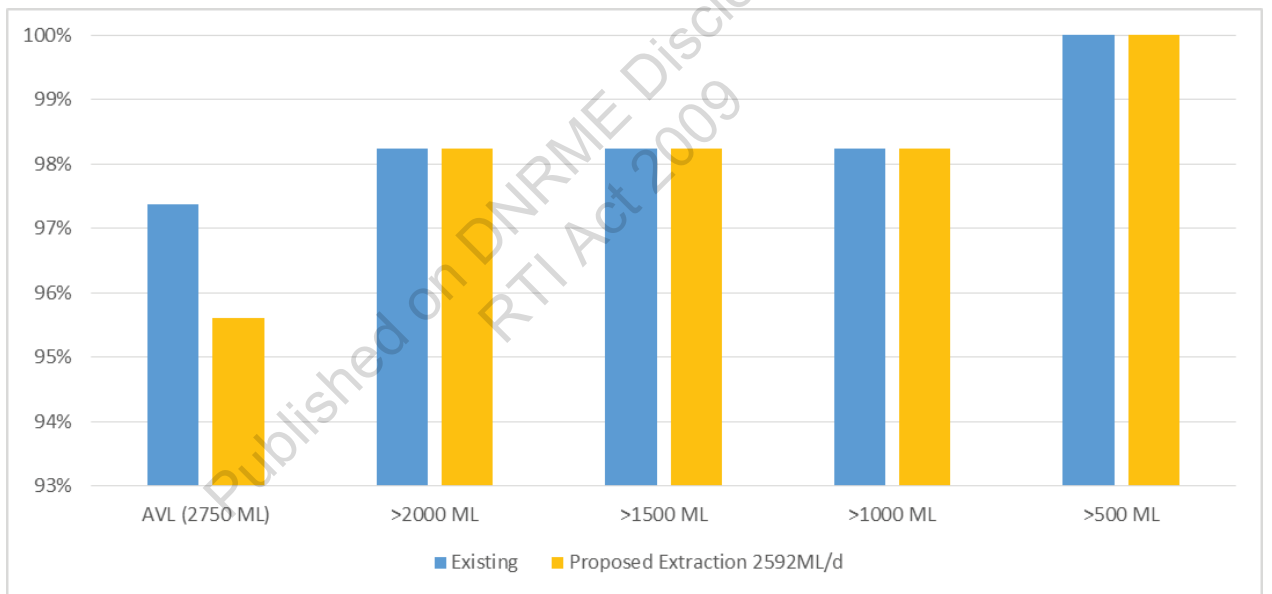


Figure 5-5 Node 293 Impact Assessment

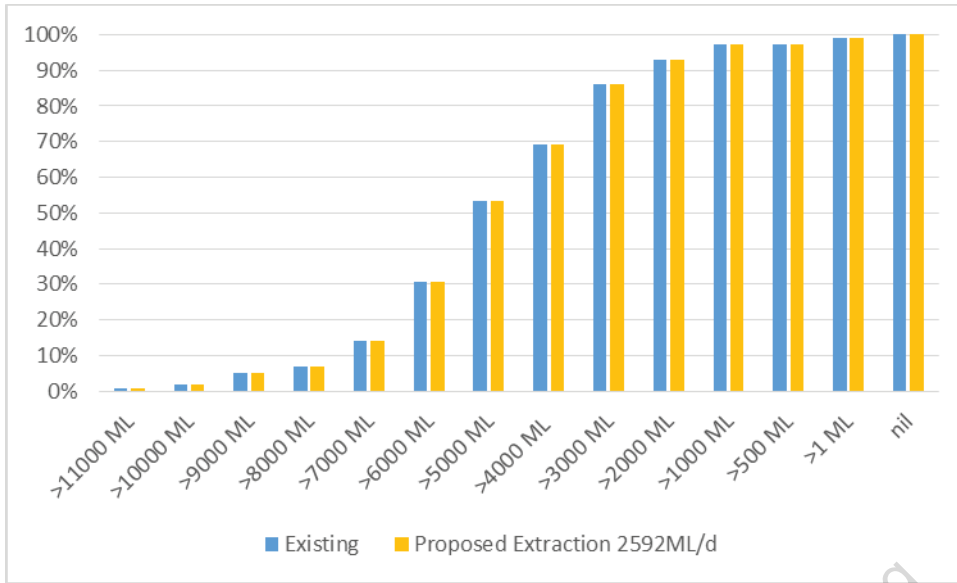


Figure 5-6 Node 300 Impact Assessment

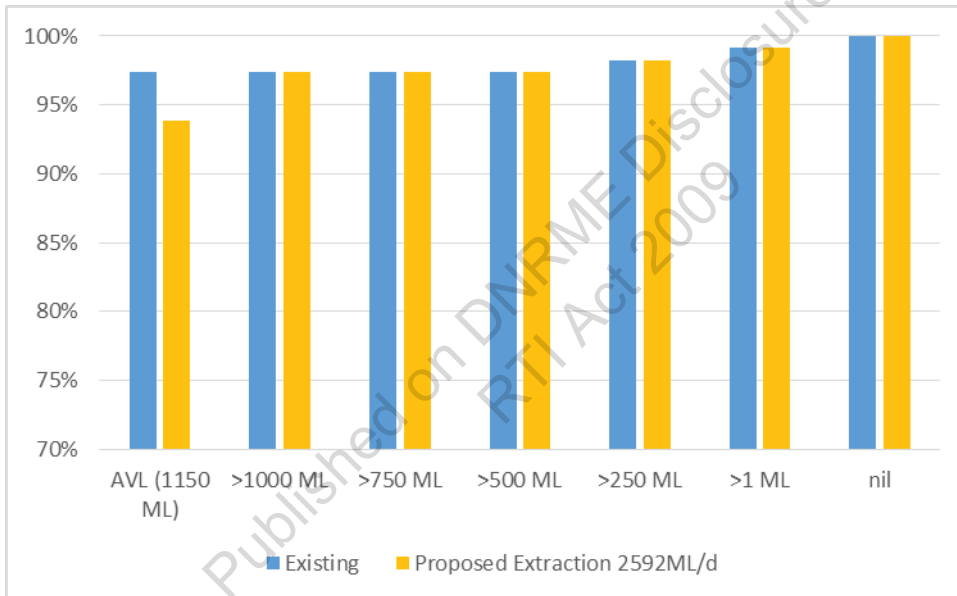


Figure 5-7 Node 302 Impact Assessment

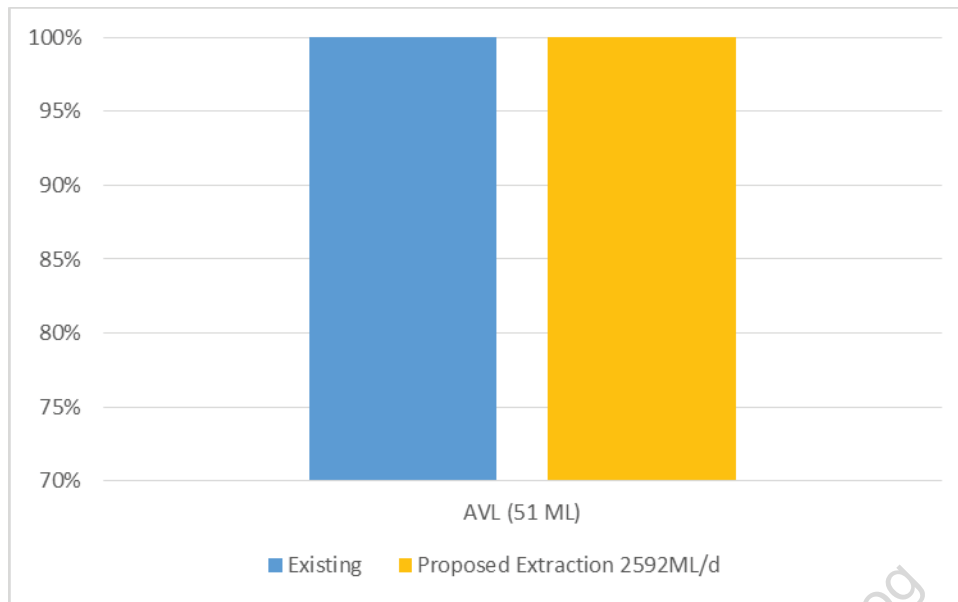


Figure 5-8 Node 303 Impact Assessment

5.3.2 Impact on Environmental Receptors – Scartwater and Blackwater Lagoons

An impact assessment of the proposed extraction on the Scartwater and Blackwater Lagoons is provided herein and responds to comments received from DNRM on the draft application⁴ where higher pass flow thresholds were requested for assessment and the impact on the lagoons quantified. The following data sources were referenced in the assessment:

- Land Court Decision, dated 25 September 1998, for which a Suttor River flow of 140 m³/s (12,096 ML/d) at St Anns gauge was deemed sufficient to cause water to spill into Scartwater Lagoon and a flow of 170 m³/s (14,688 ML/d) deemed sufficient to allow harvesting in combination with filling of Scartwater Lagoon. It was also deemed that “Blackwater Lagoon will not unduly suffer from the granting of these licenses”;
 - A flow of **14,688 ML/d** or greater is referred to herein as a **full fill** event
 - A flow of between **12,096 ML/d** and 14,688 ML/d is referred to herein as a **partial fill** event.
- Daily flow series data for the Suttor River at St Anns gauge (1890-2004), referenced from the Burdekin Resource Operation Plan (ROP) Integrated Quantity and Quality Model (IQQM); and
- License conditions for downstream users that extract water between the proposed extraction location under this license application and Scartwater and Blackwater Lagoon, obtained from the DNRM water entitlement attributes database⁵ and reproduced in Section 5.3.1.1.

⁴ “Adani strategic reserve application - Product specification discussion paper”, April 2016.

⁵ Data accessed from: <https://data.qld.gov.au/dataset/water-entitlements>

5.3.2.1 Scartwater and Blackwater Lagoon Impact Assessment Method

The Scartwater and Blackwater Lagoon analysis method is summarised by the following steps:

- Calculate Suttor River flows at St Anns gauge considering existing licensed users located on the Suttor River and described in Section 5.3.1.1;
- Calculate Suttor River flows at St Anns gauge considering the existing users in conjunction with the proposed extraction rate (830 ML/d) under this license application, and with a 2,592 ML/d pass flow threshold; and
- For both the existing case and post extraction conditions proposed under this licence application, determine the:
 - Annual reliability of filling of Scartwater and Blackwater Lagoon;
 - The average number of days per year that filling of the Scartwater and Blackwater Lagoon occurs;
 - The total number of events that Scartwater and Blackwater Lagoon receive a full fill flow;
 - This is defined as the number of days where 14,688 ML/d is equalled or exceeded in the Suttor River at St Anns gauge.
 - The total number of days that Scartwater and Blackwater Lagoon do not receive a full fill flow
 - This is defined as the number of days where the Suttor River receives less than 14,688 ML/d at St Anns gauge.

Note that – in accordance with the Court decision - the flushing performance of Blackwater Lagoon is deemed to be equivalent to that of Scartwater Lagoon – i.e. those impacts to the Scartwater Lagoon inferred by the proposed extraction will be the same for Blackwater Lagoon.

5.3.2.2 Scartwater and Blackwater Lagoon Impact Assessment Results

Table 5-3 provides a result summary for the filling of Scartwater and Blackwater Lagoon for both existing and post extraction conditions as defined by this licence application. The impact assessment results were generated by considering the IQQM Suttor River time-series for St Anns gauge for years 1890 to 2004. The table shows, between existing and post proposed extraction conditions:

- No impact at all to the annual reliability of Scartwater and Blackwater Lagoons receiving a (single or greater) full fill event (>14,688 ML/d);
- Negligible change in the average number of fill days per year (two tenths of a day on average);
- A slight reduction (2) in the total number of Scartwater and Blackwater Lagoon full fill events; and
- A slight increase (<0.05%) in the total number of days that the full fill flow is not met.

Table 5-3 Scartwater Lagoon Existing and Post Proposed Extraction Filling Reliability (1890-2004)

Statistic	Existing Licensed User Conditions	Post Proposed Licence Application Extraction Conditions
Annual full fill reliability – 14,688 ML/d	78%	78%
Average number of fill days per year	14.6	14.4
Total number of lagoon fill events	211	209
Total number lagoon fill days	40,153	40,173

The percentile distribution of duration between fill events is presented in

Figure 5-9 for the 2,592 ML/d pass flow threshold.

Figure 5-9 shows that there is little change between existing conditions and post extraction conditions proposed under this licence application as evidenced by the lines being over the top of each other. These results suggest that the proposed extraction will have negligible impact on the frequency and duration of dry periods between full fill events.

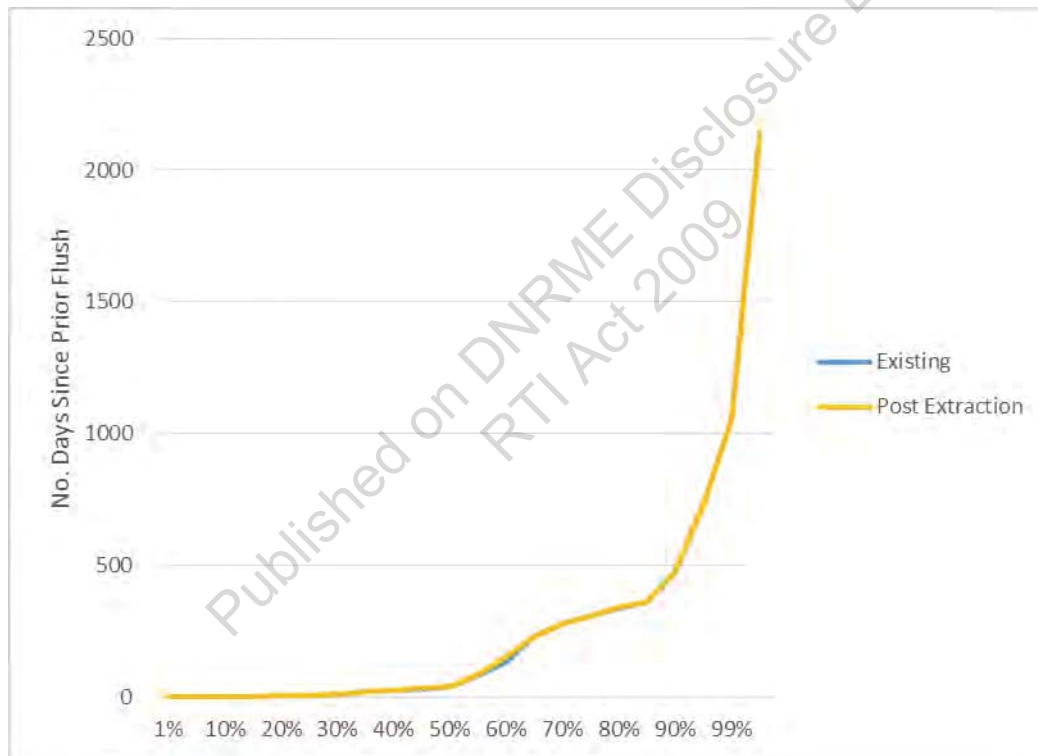


Figure 5-9 Percentile Distribution of Duration between Full Fill Events

Based on the results contained herein, the proposed Suttor River extraction has negligible impact on filling of the Scartwater Lagoon and the Blackwater Lagoon. It should also be noted that the Scartwater Lagoon and Blackwater Lagoon will still receive some flow from the Suttor River during days where the proposed extraction reduces flow below the full fill flow (14,688 ML/d) because the total existing and proposed licenced daily extraction volume (1,690 ML/d) is less than the difference between a lagoon full fill event and partial fill event (14,688 ML/d - 12,096 ML/d = 2,592 ML/d).

5.4 Major Water Users

The landholder of Belyando Junction property (Lot 3 on Plan SP278559) holds three water licences for water harvesting water from the Suttor River system, including the Belyando River Anabranh. The details of these licences are as follows:

- 5,570 ML/year maximum allowable rate of harvest is 5,530 L/s (478 ML/day). This harvest can only commence once St Anne's gauging station is reading flow of 14,688 ML/day. Once this flow is reached it does not have to be maintained;
- 430 ML/year maximum allowable rate of harvest is 70 L/s (6 ML/day) – all year around – not limited by any environmental flow triggers; and
- 560 ML/year maximum allowable rate of harvest is 200 L/s (17.3 ML/day) – all year around – not limited by any environmental flow triggers.

The Suttor River system provides a reliable source of water for the current licence holder. IQQM modelling detailed in Section 5.2 indicates no significant impact on water levels and major water users as defined under the Burdekin WRP and ROP EFOs and WASOs.

The water allocations held by the Belyando Junction landholder are included in the IQQM model and were therefore accounted for in the modelling undertaken for the current application for 12.5 GL. Proposed operational arrangements are described below in Section 5.4.1.

5.4.1 Landowner Agreements

Adani proposes to construct new infrastructure and upgrade the existing off-stream storage infrastructure under an agreement with the Belyando Junction landholder. Water under this application will be stored in the off-stream storage on the Belyando Junction property. To ensure ongoing access during construction, operation and maintenance of the flood harvesting facility, Adani will seek a sub-lease over the land subject to the flood harvesting infrastructure proposed to be developed for the North Galilee Water Scheme (including the off-stream storage, intake channel, pump stations, access road, telemetry towers and pipelines and other infrastructure as required). Tenure-related matters are further described below in Section 5.4.2.

The landholder currently extracts water under licence from the Suttor River system, including the Belyando River Anabranh, and stores it in a 2.2 GL off-stream storage, as described above. Under new arrangements proposed for the North Galilee Water Scheme, water will be harvested via the new flood harvest infrastructure and stored in the upgraded 10 GL storage dam (see Section 4.3).

s.49 - Business Affairs

Further discussions with the landholder and DNRM will be undertaken to ensure the landholder retains his ability to harvest under his current water licences, subject to availability of storage dam capacity and in accordance with relevant legislation and licences. All water extracted under licence will be metred during operation.

Furthermore, no known Indigenous corporations requiring water have been identified as a downstream impacted landowner.

Refer to Appendix E for landholder consent to the North Galilee Water Scheme and release of unallocated water for the water licence.

5.4.2 Tenure

The Belyando Junction Dam and intake channel and pipeline from the Suttor River system are contained within a freehold allotment (Lot 3 on SP278559) where Adani Infrastructure has an option to enter into a lease arrangement with the landholder. The intake channel and pipeline also cross over a stock route Figure 5-10.

The existing extraction points are located within watercourses adjacent to Lot 3 on SP278559. The proposed extraction points will be located within a non-boundary watercourse, the Suttor River, and the Belyando River Anabranh.

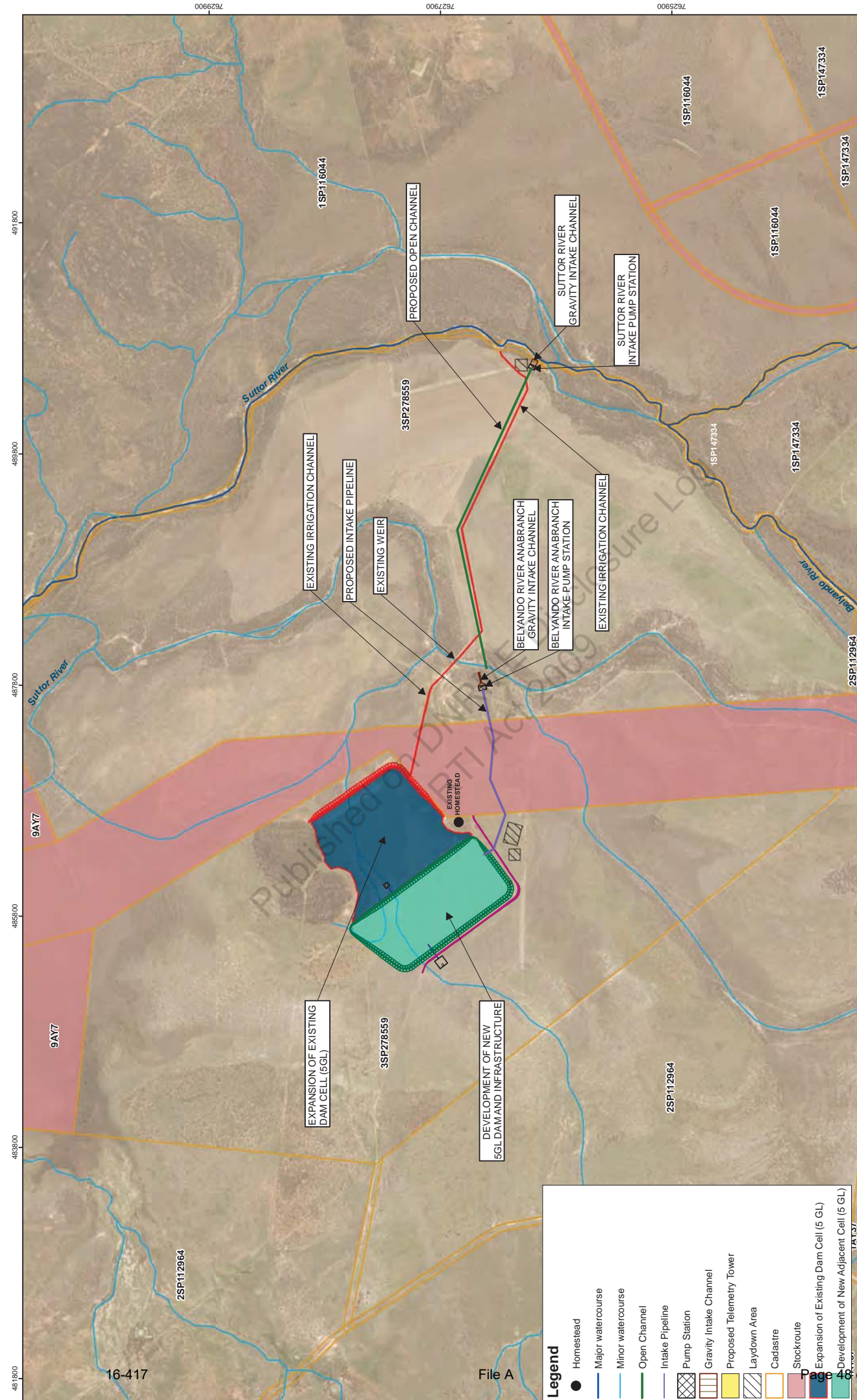
5.5 Environmental Considerations

Under the Burdekin WRP, a list of ecological outcomes are identified for the sustainable management of water within the plan area. These ecological outcomes are:

- *To maintain the natural variability of flows that support the habitats of native plants and animals and migratory birds in watercourses, floodplains, wetlands, lakes and springs;*
- *To provide for the continued capability of one part of a river system to be connected to another, including by maintaining flood flows that—*
 - *allow for the movement of native aquatic fauna between riverine, floodplain, wetland, estuarine and marine environments; and*
 - *deliver nutrients and organic matter throughout the plan area to support natural processes such as breeding, growth and migration in riverine, floodplain, wetland, estuarine and marine environments; and*
 - *deliver water and sediments throughout the plan area to support river-forming processes;*
- *To minimise changes to natural variability in water levels and to support natural ecological processes, including maintaining refugia associated with waterholes and lakes particularly in the Belyando-Suttor sub-catchment;*
- *To promote improved understanding of the matters affecting the flow-related health of ecosystems in the plan area;*
- *To maintain flooding in the Lower Burdekin and Haughton sub-catchments to provide freshwater inputs to wetlands on the Burdekin Haughton floodplain;*
- *To provide a flow regime that—*
 - *maintains delivery of fresh water to the estuaries of watercourses and the Great Barrier Reef Lagoon; and*
 - *maintains natural sedimentation processes to support the replenishment of beaches along the Burdekin Haughton floodplain and Cape Bowling Green; and*
 - *supports productivity in the receiving waters of the Great Barrier Reef and inshore reefs.*

According to the EIS, Chapter 6, Volume 3 (GHD 2012a), the aquatic ecosystem values of parts of the Belyando/Suttor Rivers sub-catchments are considered to be Slightly to Moderately Disturbed as a result of cattle grazing. The vegetation assessment shows that approximately 50% of the entire Belyando River/Suttor River catchment areas had less than 50% ground cover.

The potential impacts and management of the proposed water extraction will therefore be mainly related to environmental purposes and ensuring there is sufficient flow of water in the Suttor River during periods of low flow. As previously identified, the nominated trigger level for flows is 2,592 ML/day at which point extraction may occur if this is required by Adani. As per the IQQM results, this threshold will ensure downstream EFOs are maintained.



16-417

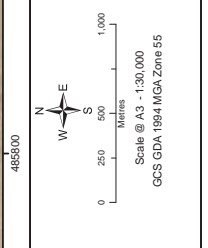
File A

Legend

- Homestead
- Major watercourse
- Minor watercourse
- Open Channel
- Intake Pipeline
- Pump Station
- Gravity Intake Channel
- Proposed Telemetry Tower
- Laydown Area
- Cadastre
- Stockroute
- Expansion of Existing Dam Cell (5 GL)
- Development of New Adjacent Cell (5 GL)

R	Revisions	Date	Comments
1		16/09/16	This drawing is confidential and shall only be used for the purpose of this project.
	DESIGNED	TK	CHECKED
	DRAWN	MD	CHECKED
	APPROVED		DATE
	Notes:		16/09/16

©COPYRIGHT CDM SMITH
This drawing is confidential and shall only be used for the purpose of this project.



DISCLAIMER
CDM Smith has endeavored to ensure accuracy and completeness of the data. CDM Smith assumes no legal liability or responsibility for any decisions or actions resulting from the information contained within this map.
DATA SOURCE
Adani Mining Pty. Ltd. 2015;
QLD Government Open Source Data.

DESIGNER
CDM Smith
cdmsmith.com

CLIENT
adani

FIGURE 5-10
LOT BOUNDARIES AND TENURE, LOT BOUNDARIES AND TENURE, AND EXISTING INFRASTRUCTURE
DRG Ref: BES140113-004-R1_TEN

5.6 Impacts on Fish Species

Potential impacts that relate to fish species include the following:

- The pump station works and placement of the pipeline or intake channel would potentially result in a loss of some local riparian vegetation and habitat, minor erosion and an increase in sediment loads within the watercourse immediately surrounding the site, reduced bank stability surrounding the pump house, and localised bank scouring during high flow events; and
- Chemical spills or low-level exposure of the aquatic environment to chemicals (e.g. run-off from machinery) would most likely involve hydrocarbon products such as fuels and lubricants. Fuels and chemicals will be stored, transported, handled and used in accordance with relevant legislation, regulations, standards and guidelines. As such, the risk of spillage would be low.

Due to the nature of the proposed works, any potential impacts are likely to be localised and temporary in nature. A Construction Environmental Management Plan, including a site specific erosion and sediment control plan, will be prepared and implemented for the construction phase to minimise impacts arising from construction activities. The potential impact of extracting the proposed quantity of water has been addressed in the IQQM assessment and shown to comply with the Burdekin WRP and ROP EFO and WASO targets.

Through implementation of the management measures identified in Table 5-4, extraction of water from Suttor River is unlikely to significantly impact the fish species that currently inhabit the waterways.

5.7 Impacts on Groundwater

According to the Springs of Queensland dataset (EPA 2005), there are no reported spring complexes in the vicinity of the proposed surface water extraction. Potentially sensitive environmental receptors surrounding, and downstream of, the extraction location are ecosystems associated with watercourses that are possibly dependent on groundwater. Sections of the Suttor River downstream of the extraction location have been mapped as areas with high potential to support groundwater dependent vegetation. Other smaller watercourses in the area have been mapped as having a moderate potential for reliance on groundwater.

The National Atlas of Groundwater Dependent Ecosystems (GDE) (BoM 2013) presents the current knowledge of GDEs across Australia, and shows known GDEs as well as ecosystems that potentially use groundwater. No GDEs have been identified within proximity to the extraction through desktop investigations; however, (as per the National Atlas) the Suttor River, downstream of the extraction, has been identified through previous desktop studies as potentially containing GDEs reliant on subsurface groundwater (vegetation) and surface expression of groundwater (rivers, springs, wetlands). Most watercourses in the region have been assessed in the National Atlas mapping as having some level of reliance on subsurface or surface expression of groundwater. Mapping for the Suttor River is consistent with the surrounding region and does not represent a higher density of potential GDEs than other systems in the area.

During extraction and storage, possible leakage of water from the diversion channel and dam floor could supply recharge to shallow groundwater which has the potential to cause localised mounding

of the water table and, depending on the connectivity of groundwater with surface water, a localised increase in baseflow.

Given that no water will be extracted from the system until a threshold of 2,592 ML/day is reached, flow in the Suttor River will be maintained during extraction periods. As such, recharge of shallow alluvial aquifers associated with the Suttor River are unlikely to be adversely impacted by the extraction. Furthermore, the Scartwater and Blackwater Lagoon impact assessment identified negligible to no impact on the annual reliability of the downstream lagoons receiving a (single or greater) full fill event due to the extraction. Therefore, in accordance with the assessment criteria in Section 32(2) of the WRP, the proposed taking is unlikely to have a direct adverse impact on groundwater associated with the Suttor River flows.

5.8 Potential Environmental Impacts and Management Measures

The potential environmental impacts for the proposed water extraction with regard to both construction and operational phases, and the corresponding management measures are identified in Table 5-4 below.

Activities related to the construction of a new intake channel, pump station and intake pipelines are expected to be limited to a small footprint and will not require extensive clearing of riparian vegetation along the western bank of the Suttor River (main channel) or the Belyando River Anabran. Clearing of regulated vegetation for the intake channel, pump station and associated works is expected to be limited to approximately 3.1 ha (including clearing on the Belyando River Anabran for the triple intake pipeline).

Table 5-4 Potential environmental impacts and management measures

Potential Impacts	Management Measures
The construction of the intake channel on the Suttor River, and construction of the pump station, may disturb the river bank and riparian vegetation (including the Suttor River Anabranh) causing bank erosion, bank instability, and an increase in sediment loads into the river.	An overarching Construction Environmental Management Plan and Erosion and sediment Control Plan will be implemented during construction works, including measures in accordance with IECA guidelines.
Construction within rivers and creeks may impact fish passage ways.	Construction within the Suttor River will only be undertaken in the drier periods, as far as practicable.
Clearing in riparian zone and modification to Suttor River at the intake channel and pump station site and anabranh crossing may disturb habitat for listed fauna species (mainly birds and some mammals).	Clearing required for the infrastructure described in this application will be minimised, as will clearing of remnant vegetation required for infrastructure adjacent to the Suttor River and Belyando River Anabranh.
Potential weed invasion from plant movement in sensitive areas, particularly along watercourses.	A weed management plan will be developed for the works and the management measures within that plan will be adhered to for these works. Measures include weed wash downs for all new plant.
Disturbance of watercourse during construction of the intake channel and pipeline crossings at the Suttor and anabranh, resulting in increased erosion and sediment transport to downstream areas impacting water quality.	Minimise any runoff and sedimentation from the storage location to the Suttor River. All pipes and storage devices will be checked regularly for leaks that may cause scouring and erosion. Before commencement of works to install the storage device minor perimeter catch drains to prevent upslope clean water runoff from entering the site and bunding and basins downslope to confine dirty water within the site will be installed. Design and manage the installation of such controls in accordance with IECA guidelines (IECA 2008).
Noise, vibration and dust (associated with construction and operational phases) – may mean some species avoid areas they currently utilise.	Pumps will be located away from sensitive receptors.
Impacts on downstream water users (stock, domestic, irrigation) during construction.	A Construction Environmental Management Plan will be prepared prior to all works associated with the flood harvest infrastructure. Complete the storage setup and piping in drier periods when most waterways are dry or have minimal flow, as far as possible. Water quality monitoring will be undertaken in accordance with the Guidelines for Water Quality Monitoring and Reporting (NWQMS 2000). Including TSS, turbidity and pH in this program.
Impacts on downstream water users (stock, domestic, irrigation) during extraction.	Modelling has shown the proposed water take will have minimal impact on downstream water users. Records will be kept of all water taken. Do not permit spillages of concrete or wash down to enter water courses. No refuelling or servicing of vehicles and plant to be undertaken within the low flow channel. Clean up spills immediately and dispose of contaminated soil and clean-up materials off site at an appropriate facility. Bunding in place for all fuel storages.
Reduction in baseline flows.	Baseline flow to be maintained that meets the WRP environmental flow objectives.

Potential Impacts	Management Measures
<p>Impacts to recreation and aesthetic values of the Suttor River and downstream waterbodies.</p>	<p>The extraction will result in only a minor physical alteration and aesthetic impact to the Suttor River at the point of extraction. The extraction location is on private freehold land not accessible to the public. The site will be viewable from the Suttor River; however, this waterway is not known to be utilised for boating purposes due to the ephemeral nature of the system. As such, aesthetic alterations to the western bank of the river are unlikely to be viewed by the public.</p> <p>Given that no water will be extracted from the system until a threshold of 2,592 ML/day is reached, and flow in the Suttor River will be maintained during extraction periods, no impacts to downstream recreational or aesthetic values are envisaged.</p>
<p>High water consumption and water losses.</p>	<p>To reduce water usage and losses to minimise the volume of water that company needs to meet the project's water needs. The following measures will be implemented:</p> <ul style="list-style-type: none"> - The intake pipes and pumps will be regularly checked for leaks as part of an Operations and Maintenance agreement and repaired if defects are identified; - During detailed design for the dam expansion an increase in depth to reduce surface area will be considered; - The storage dam uniquely uses two adjacent hillocks (Plate 1-1), thus minimising the perimeter length of dam walls when compared to conventional "turkey's nest" storage dams; - Preparation of a mine water management plan, which will include a water management system for the mine during operations, aimed at minimising the release of mine affected water from the site; - The mine operations will preferentially use water from within the mine footprint over water from the flood harvesting scheme; and - Accordingly, the extraction rates and volumes sought in this application are maximum volumes modelled as being required.

Section 6 Summary and Conclusions

This document has outlined the potential effects of taking water on the natural ecosystems along with the effects on the physical integrity of Belyando Junction Dam and the Suttor River system.

The proposed water extraction has been assessed against the Burdekin Resource Operation Plan (ROP) IQQM. The IQQM outputs are assessed in this report against the Burdekin WRP and Environmental Flow Objectives (EFO) and Water Allocation Security Objectives (WASO) for compliance.

The assessment found that the ongoing extraction of water over 2,592 ML/day trigger flow from the Suttor River system at the Belyando Junction intake channel would not adversely impact on existing water allocations and environmental flow objectives required to maintain existing ecosystems as measured against the Burdekin ROP and WRP targets and objectives. This is qualified by IQQM results that show no breaches to the Burdekin ROP and WRP objectives and targets, and negligible change in EFO results between the base case and simulated (200 ML/d trigger flow) case.

An assessment of the impacts on the downstream water users was undertaken and found that:

- The proposed extraction has a relatively minor impact to the existing licenced users' capacity to extract water, except for at very high volumes such as the AVL;
- A 2,592 ML/d pass flow threshold results in moderate level impacts on Nodes 291, 292 and 293 (Belyando Junction and Llanarth properties) in terms of the possibility of extracting to the AVL of their licenses;
- A 2,592 ML/d pass flow threshold results in the low level impact on Nodes 300 and 302 located further downstream (irrigator and mining users); and
- There is no impact to the stock and domestic user at Node 303 under the 2,592 ML/d pass flow threshold condition.

An assessment of the impacts on the downstream Scartwater and Blackwater Lagoon was undertaken and found:

- No impact at all to the annual reliability of Scartwater and Blackwater Lagoons receiving a (single or greater) full fill event (>14,688 ML/d);
- Negligible change in the average number of fill days per year (two tenths of a day on average); and
- A slight reduction (2) in the total number of Scartwater and Blackwater Lagoon full fill events; and
- A slight increase (<0.05%) in the total number of days that the full fill flow is not met.

A summary of the information required to support this water licence application is provided in Table 6-1.

Table 6-1 Surface water summary

Number of Locations	Two (Belyando Junction property) (Refer to Figure 1-3 for proposed surface water locations)	
Purpose	For construction and operation of the Carmichael Coal Project and associated infrastructure including off lease infrastructure, SP1 (part of the Carmichael Rail Network Project), and off-takes to the local community.	
Watercourse Source	Suttor River and Belyando River Anabranh	
Minimum flows proposed	<ul style="list-style-type: none"> ▪ A 2,592 ML/d trigger flow, controlled by instating a weir 	
Location 1 (GDA94 – MGA55) ¹ (Suttor River)	Easting 490,000	Northing 7,630,000
Location 2 (GDA94 – MGA55) ¹ (Belyando River Anabranh)	Easting 487,990	Northing 7,627,770
Property Description	Lot 3 on SP278559	
Maximum Rate of Extraction	830 ML/day	
Required Water Quality	The majority of water will be used for earthworks conditioning and dust suppression. Any water used for other purposes will be treated to the appropriate standards before use.	
Volume Required/Year	12,500 ML (averaging at about 10,000 ML per year)	

1) Location nominated here is plus or minus 1km, subject to final design

Section 7 References

ANZECC, 2000, *Australian Water Quality Guidelines for Fresh and Marine Waters*, Australian and New Zealand Environment and Conservation Council, Kingston.

Amec, 2013, *Byerwen Coal Mine Environmental Impact Statement*, Report for Aquatic Ecology, Prepared for QCoal Group.

BoM 2013, *Groundwater Dependant Ecosystems Atlas*, viewed 9 March 2015, <www.bom.gov.au/water/groundwater/gde>.

E3 Consult, 2011, *Galilee Coal Project Environmental Impact Statement*, Report for Aquatic Ecology – Rail, Prepared for Waratah Coal Pty Ltd.

Environmental Protection Agency (EPA) 2005, *Springs of Queensland dataset*, Queensland Government, Brisbane.

GHD, 2012a, *Carmichael Coal Mine and Rail Project Environmental Impact Statement*, Rail, Chapter 6, Prepared for Adani Mining Pty Ltd.

GHD, 2012b, *Carmichael Coal Mine and Rail Project Environmental Impact Statement*, Report for Mine Hydrogeology, Prepared for Adani Mining Pty Ltd.

GHD, 2013, *Carmichael Coal Mine and Rail Project, Supplementary Environmental Impact Statement Appendix C3i, Mistake Creek Water Application* Prepared for Adani Mining Pty Ltd.

Hyder Consulting, 2013, *Carmichael Coal Mine and Rail Project, Supplementary Environmental Impact Statement Appendix C4e, Surface Water Licence Application for River Flood Harvesting*, Prepared for Adani Mining Pty Ltd.

Appendix A - Email RFI from DNRM on the SEIS Water Licence Application

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From: BATTS Kathy
Sent: Monday, 10 November 2014 3:16 PM
To: [REDACTED] - Personal Information <[REDACTED]@adani.in>
Cc: GORDON Ian (Mackay); SMITH Wedeena; CRONK Kylie; DEMPSTER Shannon; LUCK Gary
Subject: Strategic Reserve Application

s.49HIP Personal Information

I have attached the original application supplied to the department.

The information requested was made through Dylan Brown, DSDIP during a pre-lodgement meeting dated 5 February 2014 department. The advice to Adani at that time was:

It will be important for Adani to clearly address the appropriateness of water extraction arrangements (e.g. daily pump/diversion rates, flow conditions, etc) in mitigating any impacts on downstream water needs and to ensure the outcomes and objectives of the Water Resource (Burdekin Basin) Plan 2007 are protected. The draft document provided is on track in addressing this through presenting the IQQM outputs for its water resource development case and comparing that to the EFOs and WASOs of the Water Resource (Burdekin Basin) Plan 2007 and the ROP IQQModel case.

To fully assess the information provided in the report Adani are requested to provide the following additional information:-

- The operational assumptions for diversion of water, i.e. operation of the pump station, off-stream storage and delivery pipeline,*
- Data sets used in the scenario's that Adani ran using DNRM's ROP IQQModel as referred to in Sect 3 of the Hyder report,*
- Post processing outputs and interpretations of this output that were used to derive the flow statistics presented in Sect 4.2 of the Hyder report, ie impacts on EFOs, impacts on others, cumulative impacts, etc.*
- If there are any instream structures (e.g. a small weir/impoundment to support instream pumping, etc);*
- Documentation of how Adani proposes to operate the infrastructure in order to meet downstream water needs*
- Measures proposed for reducing water usage and losses to minimise the volume of water that company needs to meet the project's water needs. For example, minimising storage evaporation and seepage.*

In addition, there are some matters listed in the Water section of the Galilee Basin Infrastructure Framework (as per the following website) that set some eligibility criteria, including holding a mining lease and reiteration of the need to demonstrate water use efficiency.

<http://www.dsdip.qld.gov.au/infrastructure-planning-and-reform/galilee-basin-infrastructure-framework-water.html>

If anything has changed from the original application could you please advise, as well as submitting information outlined above to support the application. If you are able to get as much information together within the next couple of weeks I would like to organise a meeting specifically focused on this application and the process. I'll be in touch toward the end of the week to see if we can work out a time.

Kathy Batts

A/Manager Major Projects

Water Management & Use, Central Region

Department of Natural Resources and Mines

Telephone: 48373481 **Facsimile:** 49273079

209 Bolsover Street, Rockhampton

PO Box 1762, Rockhampton Q 4700

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Appendix B - Suttor River (Belyando Junction Dam) IQQM EFO and WASO Results

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WATER ALLOCATION SECURITY OBJECTIVES

WASO statistics are calculated for the water year (Jul-Jun) and for the period 1890 – 2004.

WRP WAG	WATER ALLOCATION GROUP	IOQM NODE NO.	PART 2 - UNSUPPLEMENTED WATER						
			- OBJECTIVE 6 - COLUMN 2 30% WATER SHARING INDEX (%)	- OBJECTIVE 6 - COLUMN 3 50% WATER SHARING INDEX (%)	- OBJECTIVE 6 - COLUMN 3 70% WATER SHARING INDEX (%)	- OBJECTIVE 6 - COLUMN 3 ANNUAL VOLUME PROBABILITY (%)	- OBJECTIVE 7 - COLUMN 2 ANNUAL VOLUME PROBABILITY (%)		
A1	LOWER BURDEKIN	465, 483, 500, 501, 502, 503, 512, 528, 529, 648, 651, 656, 657, 542	107	107	107	89			
		BHO20R ROP BASE CASE	107	107	107	89			
		BHO20R Proposed Belyando Dam Case	107	107	107	91			
B1	HAUGHTON	578, 607, 613	107	107	107	91			
		BHO20R ROP BASE CASE	107	107	107	91			
C1	BOWEN	430, 451	111	111	110	79			
		BHO20R Proposed Belyando Dam Case	111	111	110	79			

Note: Must Be Within Range

UNSUPPLEMENTED WSI MUST BE AT LEAST WRP Target (%)						
- OBJECTIVE 6 - COLUMN 2 30% WATER SHARING INDEX (%)	- OBJECTIVE 6 - COLUMN 3 50% WATER SHARING INDEX (%)	- OBJECTIVE 6 - COLUMN 3 70% WATER SHARING INDEX (%)	- OBJECTIVE 6 - COLUMN 3 ANNUAL VOLUME PROBABILITY (%)	- OBJECTIVE 7 - COLUMN 2 ANNUAL VOLUME PROBABILITY (%)		
107	107	107	85			
107	107	107	85			
110	110	110	75			

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ENVIRONMENTAL FLOW OBJECTIVES

EFO statistics are calculated for the water year (Jul-Jun) and for the period 1890 – 2004.

EFO_SUMMARY

WRP NODE NO.	LOCATION	IQOM NODE NO.	PART 1 - LOW FLOW OBJECTIVES										PART 2 - MEDIUM TO HIGH FLOW OBJECTIVES					
			TABLE 1 - COLUMN 2	TABLE 1 - COLUMN 3	TABLE 1 - COLUMN 4	TABLE 2 - COLUMN 1	TABLE 2 - COLUMN 2	TABLE 2 - COLUMN 3	TABLE 2 - COLUMN 4	TABLE 2 - COLUMN 5	TABLE 3 - COLUMN 1	TABLE 3 - COLUMN 2	TABLE 3 - COLUMN 3	TABLE 3 - COLUMN 4	TABLE 3 - COLUMN 5	TABLE 3 - COLUMN 6	TABLE 4 - COLUMN 2	
			PD 50%ILE DAILY NON-ZERO FLOW (%)	PD 80%ILE DAILY NON-ZERO FLOW (%)	PERCENT OF TIME DAILY NON-ZERO FLOW (%)	SEASON 1 (Jan-Mar): 80th %ILE NON-ZERO FLOW (%)	SEASON 2 (Apr-Jun): 80th %ILE NON-ZERO FLOW (%)	SEASON 3 (Jul-Sep): 80th %ILE NON-ZERO FLOW (%)	SEASON 4 (Oct-Dec): 80th %ILE NON-ZERO FLOW (%)	NUMBER OF 30 DAY (1 MONTH) ZERO FLOW SPELLS	NUMBER OF 30-182 DAY (1-6 MONTH) ZERO FLOW SPELLS	NUMBER OF 182 DAY (6 MONTHS) ZERO FLOW SPELLS	MEAN ANNUAL FLOW (% OF PD CASE)	MEDIAN ANNUAL FLOW (% OF PD CASE)	5 YEAR DFV (% OF PD CASE)	20 YEAR DFV (% OF PD CASE)	APPD	
1	Burdekin River at river mouth (AMTD 0.0 km)	540	1,558	342	N/a	342	342	342	342	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	
			27	67	4	93	85	45	45	45	4	4	0	79	65	80	87	2.6
2	Haughton River at river mouth (AMTD 0.0 km)	621	203	39	N/a	39	39	39	39	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	
			17	35	56	76	41	10	16	184	144	40	93	89	96	99	100	1.6
8	Burdekin River at the upstream limit of the impounded area of the Burdekin Falls Dam	196	873	171	N/a	171	171	171	171	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	
			44	70	14	97	87	49	46	58	57	1	98	97	100	100	0.5	
10	Cape River at the Suttor River confluence (AMTD 0.0 km)	308	275	52	N/a	52	52	52	52	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	
			27	43	47	77	39	21	34	168	165	3	99	98	100	100	0.2	
11	Suttor River at the upstream limit of the impounded area of the Burdekin Falls Dam	347	661	100	N/a	100	100	100	100	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	
			33	53	33	86	50	31	47	119	118	1	93	89	95	97	98	0.9
12	Bowen River at the upstream limit of the impounded area of the Blue Valley Weir	453	32	53	33	86	50	31	46	119	118	1	92	88	95	97	98	
			344	80	N/a	80	80	80	80	80	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
			41	64	10	86	82	49	37	33	33	0	96	95	100	100	99	
			41	64	10	86	82	49	37	33	33	0	96	95	100	100	99	0.4

Note: Non-Zero Flow is defined in the Burdekin as flows greater than or equal to 10 ML per day, while zero flows are flows less than 10 ML per day for all environment reporting nodes except for Bowen (WRP #12) and Haughton (WRP #2), which used 5 ML per day.

Must Be Within Range

WRP No.	EQUALED OR EXCEEDED WRP Target (%)		NOT MORE THAN WRP Target		MUST BE AT LEAST WRP Target (%)		NOT MORE THAN WRP Target		MUST BE AT LEAST WRP Target (%)						
	50%ILE	80%ILE	OF TIME	OF TIME	ANNUAL	ANNUAL	ANNUAL	ANNUAL	ANNUAL	ANNUAL					
01	24	65	5	92	84	45	44	11	0	75	59	50	79	86	2.9
02	15	26	66	64	29	4	9	144	43	92	88	95	99	99	1.8
08	44	69	15	-	-	-	-	57	1	97	96	99	99	99	0.6
10	25	41	49	-	-	-	-	165	3	98	97	98	99	99	0.2
11	32	52	35	-	-	-	-	118	1	92	88	94	96	98	1.0
12	32	62	15	85	81	46	35	54	2	82	80	92	86	86	1.2

Appendix C - Cumulative Impact IQQM EFO and WASO Results

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WATER ALLOCATION SECURITY OBJECTIVES

WASO statistics are calculated for the water year (Jul-Jun) and for the period 1890 – 2004.

		PART 1 - SUPPLEMENTED WATER				
OBJECTIVE (PART)	ANNUAL AND MONTHLY SUPPLEMENTED WATER SHARING INDEX	OBJECTIVE 1	OBJECTIVE 2	OBJECTIVE 3	OBJECTIVE 4	OBJECTIVE 5
(A)	WEIGHTED MEAN ANNUAL RELIABILITY (% of YEARS)	100	90	96	91	68
		100	90	96	91	68
(B)	WEIGHTED MEAN MONTHLY RELIABILITY (% of MONTHS)	100	96	99	98	87
		100	96	99	98	87

SUPPLEMENTED WSI MUST BE AT LEAST WRP Target (%)					
OBJECTIVE 1	OBJECTIVE 2	OBJECTIVE 3	OBJECTIVE 4	OBJECTIVE 5	
HIGH PRIORITY GROUP IN THE BHWSS	MEDIUM PRIORITY GROUP IN THE BHWSS	HIGH A1 (BOWEN RIVER WEIR) PRIORITY GROUP IN THE BHWSS	HIGH A2 (EUNGELLA DAM) PRIORITY GROUP IN THE BHWSS	MEDIUM PRIORITY GROUP IN THE BHWSS	
100	90	95	90	65	
100	95	98	98	85	

Note: BHWSS - Burdekin Haughton Water Supply Scheme
 BBWSS - Bowen Broken Water Supply Scheme

Must Be Within Range

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WATER ALLOCATION SECURITY OBJECTIVES

WASO statistics are calculated for the water year (Jul-Jun) and for the period 1890 – 2004.

WRP WAG	WATER ALLOCATION GROUP	IOQM NODE NO.	PART 2 - UNSUPPLEMENTED WATER						
			- OBJECTIVE 6 - COLUMN 2 30% WATER SHARING INDEX (%)	- OBJECTIVE 6 - COLUMN 3 50% WATER SHARING INDEX (%)	- OBJECTIVE 6 - COLUMN 3 70% WATER SHARING INDEX (%)	- OBJECTIVE 6 - COLUMN 3 70% WATER SHARING INDEX (%)	- OBJECTIVE 7 - COLUMN 2 ANNUAL VOLUME PROBABILITY (%)	- OBJECTIVE 7 - COLUMN 2 ANNUAL VOLUME PROBABILITY (%)	
A1	LOWER BURDEKIN	465, 483, 500, 501, 502, 503, 512, 528, 529, 648, 651, 656, 657, 542	107	107	107	107	89		
		BHO20R ROP BASE CASE	107	107	107	107	89		
		BHO20R Proposed Combined Case	107	107	107	107	91		
B1	HAUGHTON	578, 607, 613	107	107	107	91			
		BHO20R Proposed Combined Case	107	107	107	91			
C1	BOWEN	430, 451	111	111	110	79			
		BHO20R Proposed Combined Case	111	111	110	79			

Note: Must Be Within Range

UNSUPPLEMENTED WSI MUST BE AT LEAST WRP Target (%)						
- OBJECTIVE 6 - COLUMN 2 30% WATER SHARING INDEX (%)	- OBJECTIVE 6 - COLUMN 3 50% WATER SHARING INDEX (%)	- OBJECTIVE 6 - COLUMN 3 70% WATER SHARING INDEX (%)	- OBJECTIVE 6 - COLUMN 3 70% WATER SHARING INDEX (%)	- OBJECTIVE 7 - COLUMN 2 ANNUAL VOLUME PROBABILITY (%)	- OBJECTIVE 7 - COLUMN 2 ANNUAL VOLUME PROBABILITY (%)	
107	107	107	107	85		
107	107	107	107	85		
110	110	110	110	75		

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ENVIRONMENTAL FLOW OBJECTIVES

EFO statistics are calculated for the water year (Jul-Jun) and for the period 1990 – 2004.

WRP NODE NO.	LOCATION	IOM NODE NO.	PART 1 - LOW FLOW OBJECTIVES					PART 2 - MEDIUM TO HIGH FLOW OBJECTIVES											
			- TABLE 1 - COLUMN 2	- TABLE 1 - COLUMN 3	- TABLE 1 - COLUMN 4	- TABLE 2 - COLUMN 3	- TABLE 2 - COLUMN 4	- TABLE 2 - COLUMN 5	- TABLE 3 - COLUMN 2	- TABLE 3 - COLUMN 3	- TABLE 3 - COLUMN 4	- TABLE 3 - COLUMN 5	- TABLE 3 - COLUMN 6						
			PD 50%ILE DAILY NON-ZERO FLOW (%)	PD 80%ILE DAILY NON-ZERO FLOW (%)	PERCENT OF TIME DAILY ZERO FLOW (%)	SEASON 1 (Jan-Mar), 80th %ILE NON-ZERO FLOW (%)	SEASON 2 (Apr-Jun), 80th %ILE NON-ZERO FLOW (%)	SEASON 3 (Jul-Sep), 80th %ILE NON-ZERO FLOW (%)	SEASON 4 (Oct-Dec), 80th %ILE NON-ZERO FLOW (%)	NUMBER OF 30 DAY (1 MONTH) ZERO FLOW SPELLS	NUMBER OF 30-182 DAY (1-6 MONTH) ZERO FLOW SPELLS	NUMBER OF 182 DAY (6 MONTHS) ZERO FLOW SPELLS	MEAN ANNUAL FLOW (% OF PD CASE)	MEDIAN ANNUAL FLOW (% OF PD CASE)	1.5 YEAR DFV (% OF PD CASE)	5 YEAR DFV (% OF PD CASE)	20 YEAR DFV (% OF PD CASE)	APFD	
1	Burdekin River at river mouth (AMTD 0.0 km)	540	1,558	342	N/a	342	342	342	342	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
			27	67	4	93	85	45	45	4	4	0	79	65	55	80	87	2.6	
			27	67	4	93	85	45	45	4	4	0	79	65	55	80	87	2.6	
2	Houghton River at river mouth (AMTD 0.0 km)	621	203	39	N/a	39	39	39	39	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
			17	35	56	76	41	10	16	184	144	40	93	89	96	99	100	1.6	
			17	35	56	76	41	10	16	184	144	40	93	89.1	96	99	100	1.6	
8	Burdekin River at the upstream limit of the impounded area of the Burdekin Falls Dam	196	873	171	N/a	171	171	171	171	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
			44	70	14	97	87	49	46	58	57	1	98	97	99	100	100	0.5	
			44	70	14	97	87	49	46	58	57	1	98	97	99	100	100	0.5	
10	Cape River at the Sutor River confluence (AMTD 0.0 km)	308	275	52	N/a	52	52	52	52	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
			27	43	47	77	39	21	34	168	165	3	99	98	98	100	100	0.2	
			27	43	47	77	39	21	34	168	165	3	99	98	98	100	100	0.2	
11	Sutor River at the upstream limit of the impounded area of the Burdekin Falls Dam	347	661	100	N/a	100	100	100	100	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
			33	53	33	86	50	31	47	119	118	1	93	89	95	97	98	0.9	
			32	53	33	86	50	31	46	119	118	1	92	88	95	97	98	1.0	
12	Bowen River at the upstream limit of the impounded area of the Blue Valley Weir	453	344	80	N/a	80	80	80	80	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a	N/a
			41	64	10	86	82	49	37	33	33	0	96	95	98	100	100	0.4	
			41	64	10	86	82	49	37	33	33	0	96	95	98	100	100	0.4	

Note: Non-Zero Flow is defined in the Burdekin as flows greater than or equal to 10 ML per day, while zero flows are flows less than 10 ML per day for all environment reporting nodes except for Bowen (WRP #12) and Houghton (WRP #2), which used 5 ML per day.

Must Be Within Range

WRP No.	EQUALLED OR EXCEEDED WRP Target (%)		NOT MORE THAN WRP	MUST BE AT LEAST WRP Target (%)				NOT MORE THAN WRP Target				MUST BE AT LEAST WRP Target (%)			
	50%ILE DAILY NON-ZERO FLOW (%)	PD 80%ILE DAILY NON-ZERO FLOW (%)		SEASON 1 (Jan-Mar) 80th %ILE NON-ZERO FLOW (%)	SEASON 2 (Apr-Jun) 80th %ILE NON-ZERO FLOW (%)	SEASON 3 (Jul-Sep) 80th %ILE NON-ZERO FLOW (%)	SEASON 4 (Oct-Dec) 80th %ILE NON-ZERO FLOW (%)	NUMBER OF 30-182 DAY (1-6 MONTH) ZERO FLOW SPELLS	NUMBER OF 182 DAY (6 MONTHS) ZERO FLOW SPELLS	MEAN ANNUAL FLOW (% OF PD CASE)	MEDIAN ANNUAL FLOW (% OF PD CASE)	1.5 YEAR DFV (% OF PD CASE)	5 YEAR DFV (% OF PD CASE)	20 YEAR DFV (% OF PD CASE)	APFD
01	24	65	5	92	84	45	44	11	0	75	59	50	79	86	2.9
02	15	26	66	64	29	4	9	144	43	92	88	95	99	99	1.8
08	44	69	15	-	-	-	-	57	1	97	96	99	99	99	0.6
10	25	41	49	-	-	-	-	165	3	98	97	98	99	99	0.2
11	32	52	35	-	-	-	-	118	1	92	88	94	96	98	1.0
12	32	62	15	85	81	46	35	54	2	82	80	92	86	86	1.2

Appendix D - Discussion Paper

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Adani strategic reserve application Product specification discussion paper

Background

Investigation to define a water licence for Adani to divert 10 000 ML/yr Mean Annual Volume (MAV) from the Burdekin Basin strategic reserve unallocated water on the Suttor River.

The water licence elements have been developed around the following information;

- diversion from the Suttor River and Belyando River Anabranh at approximately AMTD 124.0 km (Suttor River);
- diversion capacity of up to 9600 litres per second OR 830 megalitres per day;
- an Annual Volumetric Limit (AVL) of 12 500 ML/yr to allow efficient operation of a total of 10 000 ML of off-stream storage; and
- annual requirement of at least 10 000 ML/yr of mean annual diversion to meet total operational requirements.

Table 1 – Suttor River, existing entitlements

Licence No	Client	Nominal Entitlement (ML/yr)	Maximum Rate (litres /sec)	Pass flow condition at St. Anns (ML/day)	Comments
55005A	s.49 - Personal Information	560	200	0	Linked to 370 ML storage LTI 55006A
45019A		430	200	0	Linked to 100 ML storage LTI 96644A
96640A		5570	5530	14 688 Or 2 592	conditional to various Burdekin Falls Dam reliability of supply conditions.
52401A		2750	2800	175.0	
52426A		Nil	500	172.5	
57382A		Nil	100	172.5	
57383A		Nil	100	172.5	
57220A		Nil	450	172.5	

Adani water licence proposal

In conjunction with the above, Adani had proposed a flow condition of;

1. 200 ML/day at GS 120303A St. Anns to deliver 10 000 ML/yr mean annual diversion at a preferred reliability, and
2. a once off 50 ML/day at GS 120303A St. Anns for at least the first two wet seasons to deliver water supply to meet mine construction requirements at improved reliability.

The DNRM investigation team determined that the Adani proposal does not meet the general and ecological outcomes of the Burdekin WRP in particular:

- the impacts on existing entitlements on the Suttor River; and
- reduction of flows that would support ecological processes of downstream Scartwater and Blackwater lagoons.

Impacts on existing entitlements

It is necessary for the department to consider the impact of the taking of water under the proposed water licence would have on existing water entitlements in the plan area.

The pass flow threshold of 200 ML/day is slightly above the pass flow of most other entitlements and therefore does not have any impact. However, it is below pass flow condition of the Kenny 96640A water licence which has a lowest possible pass flow 2592 ML/day. Therefore, any additional diversion at 200 ML/day would impact on this entitlement.

The temporary pass flow threshold of 50 ML/day is below most existing entitlement pass flow conditions. Despite being only for a temporary period of up to 2 years, the department must have consideration for any impact to existing entitlements. In a year of low flow the daily volumetric limit of 830 ML/day diversion at 50 ML/day would have likely impacts to existing entitlements and downstream stock and domestic demands.

Impacts on environment and ecology

Scartwater and Blackwater off-stream lagoons adjacent to the Suttor River were found to have less filling and flushing opportunities under the proposed 200 ML/day pass flow threshold. There were 7 years over the IQQM simulation period where likely inundation events observed in the pre-development case and not in the proposed 200 ML/day pass flow threshold scenario. To remain consistent with previous department licencing decision and to apply precautionary principle to minimise impacts to the ecological processes of the lagoons the department does not support a pass flow threshold of 200 ML/day.

DNRM Investigation

To be consistent with previous licencing decision on the Suttor River, it is appropriate that the Adani water licence be conditioned with a pass flow condition of no less than the lowest pass flow condition on the Kenny 96604A water licence. The water licence diversion was investigated with a condition of 2592 ML/day and assessment of results showed no impacts to existing entitlements and flows likely to support ecological processes of the downstream lagoons. The annual reliability of the water licence to supply 10 000 ML/yr was determined to be about 85%.

The 2592 ML/day option was discussed with Adani and concern was raised about the reliability of supply during the construction of the mine. Adani highlighted this stage of the project to be critical and reliant only on water supply from the Suttor River diversion. The DNRM investigation team investigated possible solutions to improve water supply security for Adani. The following objectives were identified;

1. limited period conditions that improve reliability of water supply during mine construction whilst minimising the risk of impact to existing water users and the environment; and
2. maintain conditions that meet water resource plan objectives for long-term resource demand.

'Mine construction volume'

Investigating the Adani mine construction demand volume the investigation team has reviewed the *"Application for Licence to Take Water from the Sub-Catchment E of the Burdekin Basin (Suttor River)"*

Supporting Document”, CDM Smith report and notes that Table 4-1 details total water requirements summarised in the table below;

Year	2015	2016	2017	2018	2019	2020	2021	Total
Total Construction Volume (ML)	242	3357	1011	0	0	0	0	4611
Total Operation Volume (ML)	0	0	5686	9425	10923	10613	10488	47135

For the purpose of this investigation to simplify assumptions, the investigation considers that the total mine construction water requirement volumes are to be met entirely from the Suttor River diversion.

Revised condition options

When considering the required ‘mine construction volumes’ in isolation of the ongoing ‘mine operation volume’, it is likely that Adani will not require the full 830 ML/day proposed daily volumetric limit (DVL) diversion rate. As the proposed diversion site is upstream of all existing entitlements and key ecological interests of downstream lagoon/wetlands, a large DVL at a low flow condition presented risks to meeting Burdekin WRP outcomes. If the DVL was sufficient only to meet the ‘mine construction volume’ requirements and only applicable for the mine construction period; risks to downstream existing entitlements and ecological processes are greatly minimised. It is therefore possible to develop special conditions that provide a reduced DVL at a lower pass flow condition to improve reliability of water supply for the critical mine construction phase.

Pass flow condition

It is suggested to allow a flow condition that is consistent with the flow condition of the majority of existing entitlements at 175 ML/day (about 2 cumecs) at GS 120303A St. Ann s. It is not supported to allow a flow condition that is less than 175 ML/day as impacts on existing entitlements will occur.

Daily volumetric limit (DVL)

The investigation team highlighted that a diversion rate up to 830 ML/day at 175 ML/day pass flow condition was an obvious imbalance of water sharing to existing entitlements and environmental water needs. It was suggested the DVL at the lower threshold only be sufficient to meet the ‘mine construction volume’. Assuming that in any of the first two years, Adani would only require up to 3500 ML for mine construction purpose, a DVL that is within the range of current entitlement water share ratio (volumetric limit ÷ DVL) would support equitable water sharing amongst existing entitlements. The best water share ratio among the existing entitlement with a pass flow condition of 175 ML/day is about 11.5 days. The highest rate of take for an existing entitlement with a pass flow condition of 175 ML/day is 242 ML/day. The investigation team suggests that an appropriate DVL for Adani to divert water at a reduced pass flow threshold should not exceed 250 ML/day. At this condition flow opportunity of 14 days will be required to achieve 3500 ML of diversion.

Volumetric limit

As Adani have indicated meeting ‘mine construction volume’ during the first two years of the project life is critical; the special conditioning of licence to take at low threshold is required only to meet the mine construction requirements either for a volumetric limit, or a time period, or for both. Adani have indicated the first two years or two wet seasons are critical to meet the mine construction requirements. Mine construction water requirement for the first two years are 3600 ML. Following this time period and/or volume taken at following the commencement of mine construction, the

condition will become null and the licence will revert to the standard conditions of DVL = 830 ML/day at flow condition of 2592 ML/day only.

A time frame limit, eg. "for the first two years...." would allow a defined time period in which the special condition applies. However, if Adani were to change the schedule of activities the licence would require amendment to accommodate.

A volumetric limit, eg. "for the first 999 ML taken....", would allow a limited and defined volume in which the special condition applies. A volume would allow Adani flexibility within their schedule of construction activities. The investigation team has recognised a volumetric limit will need to accommodate for transmission losses from the diversion site on the Suttor River to the mine location. It is suggested that the special condition volumetric limit should be not greater than 6000 ML. This volume should also be discussed with Adani to ensure it is adequate to meet the mine construction water requirements and transmission losses that may occur

A combination of both a volumetric and time limit to the special reduced pass flow condition is also an option but may restrict Adani if construction goes beyond the scheduled two years. A combination of both limits would provide a better mitigation of risks to existing entitlements and the environment.

Example of the condition:

1. *The taking of water is permitted at a daily volumetric limit of 830 megalitres when the flow of water in the Suttor River at St Anns Gauging Station exceeds 2592 megalitres per day.*
2. *For the first 6000 megalitres diverted OR the first two years following the from the first day of water diverted under this licence; the taking of water is permitted;-*
 - a. *at a daily volumetric limit of 250 megalitres when the flow of water in the Suttor River at St Anns Gauging Station exceeds 173 megalitres per day.*

Despite, the special conditioning to provide increased reliability of water supply during the mine construction period, Adani will always be able to utilise their full licence condition, and encouraged to do so if the river flow at the time was sufficient. Modelling data from 1890 to 2004 has indicated that three consecutive years of failure to divert their annual volumetric limit (AVL) of 12 500 ML is very unlikely with a pass flow condition of 2592 ML/day. Therefore, this special condition should provide sufficient time and volume to mitigate any risks to meet Adani water demands (construction and operational) over the initial three year period.

Further information required

The following points need clarification from Adani:

- The maximum annual volume required from Suttor River to meet their immediate construction activities. This will help define the DVL for diversion at the lower threshold.
- The total volume required from the Suttor River to meet their construction activities with consideration of transmission losses.

Hydrologic Modelling Results

Below is a summary of the annual diversion volumes for water years (from the simulation period 1890 to 2004) that fail to deliver the AVL of 12 500 ML under the normal licence condition, compared with volumes that the special condition allows.

<i>Annual diversion volumes for Adani strategic reserve licence</i>		
Year	<i>Normal Licence condition</i>	<i>with Special Licence condition</i>
1891 - 1892	2 900	10 300
1900 - 1901	8 450	12 500
1901 - 1902	0	1 500
1914 - 1915	2 750	7 250
1915 - 1916	0	6 750
1918 - 1919	900	12 100
1925 - 1926	0	450
1930 - 1931	0	1 250
1934 - 1935	0	1 400
1937 - 1938	4 800	12 500
1944 - 1945	9 350	12 500
1947 - 1948	50	8 400
1951 - 1952	500	9 650
1963 - 1964	2 650	12 500
1966 - 1967	9 600	12 500
1968 - 1969	0	1 150
1991 - 1992	50	12 500
1992 - 1993	0	2 650

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Appendix E - Letters of Consent and Support

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Appendix F - Disclaimer and Limitations

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This report has been prepared by CDM Smith Australia Pty Ltd (CDM Smith) for the sole benefit of Adani Infrastructure Pty Ltd for the sole purpose of providing supporting information for a request to release unallocated water from the strategic reserve and a water licence application for the taking of water.

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If further information becomes available, or additional assumptions need to be made, CDM Smith reserves its right to amend this report.