

## 15.0 Groundwater

### 15.1 Introduction

This chapter provides an assessment of groundwater within the Study Area in terms of environmental values (EV), potential impacts on the hydrogeological regime as a result of Project activities, and mitigation measures to minimise and manage the identified potential impacts through the design, construction and operational phases of the Project.

The Project is located approximately 180 km northwest of Brisbane, approximately 65 km north of Dalby, within the geological Surat Basin and the hydrogeological Great Artesian Basin (GAB). Groundwater within the Study Area has historically and is currently extensively developed for agricultural, stock, domestic, and industrial applications. The primary aquifers utilised for groundwater resources within the Study Area include various alluvial aquifers, Main Range Volcanics, Marburg Sandstone (Subgroup) and the Walloon Coal Measures.

### 15.2 Scope of assessment

The scope of the assessment is to identify the potential impacts on groundwater resources as a result of the Project and provide suitable mitigation measures to avoid or minimise the potential impacts. The matters potentially relevant to groundwater in regards to the Project include:

- taking, using or interfering with the flow of water under the site
- changes to groundwater flow
- groundwater quality
- biodiversity and conservation values of the site
- Proximity to nearby resource extraction areas and associated infrastructure. The closest resource extraction area is a coal seam gas tenement located approximately 40 km southwest of the Study Area; therefore this matter is not considered relevant to the Project.

In order to accurately understand and identify the groundwater users, EVs, and potential impacts in relation to the proposed Project activities, the Study Area (for the purposes of the groundwater study) includes a 10 km buffer around the Project Site.

An assessment methodology is presented in Section 15.4.

### 15.3 Legislation and policy

A number of legislative instruments and strategies are relevant to the management of groundwater in Queensland. The key regulatory requirements, both State and Commonwealth, applicable to the Project are summarised in this section. Project activities, inclusive of construction and operational stages, will be undertaken in accordance with these acts, policies, plans, and guidelines:

- *Environment Protection Act 1994*
  - Environmental Protection Policy (EPP) (Water)
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- *Water Act 2000*:
  - Water Regulation 2002 (QLD)
  - Water Resource (Condamine and Balonne) Plan 2004 (current as at 19 December 2014)
  - Condamine and Balonne Resource Operations Plan 2008 (amended July 2015, Revision 5)
  - Water Resource (Burnett Basin) Plan 2014 (current as at 1 July 2015)
  - Burnett Basin Resource Operations Plan 2003 (amended November 2014, Revision 12)
  - Water Resource (Great Artesian Basin) Plan 2006 (current as 11 September 2015)

- Great Artesian Basin Resource Operations Plan 2006 (current as of November 2012)
  - *Water Reform and Other Legislation Amendment Act 2014* (WROLA Act) (QLD)
- *Sustainable Planning Act 2009* (SP Act).

Additionally, guidelines, plans, and industry tools that may be applicable and/or utilised in regards to the Project include:

- Australia and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC Guidelines) (ANZECC/ARMCANZ, October 2000, under review)
- Australian Drinking Water Guidelines (ADWG) (NHMRC, 2011; updated February 2016)
- Queensland Water Quality Guidelines (DEHP, 2009)
- Surat Basin Regional Planning Framework (DLGP, 2011a)
- Wide Bay Burnett Regional Plan (DLGP, 2011b)
- Australian Groundwater-Dependent Ecosystems Toolbox
- Atlas of Groundwater Dependent Ecosystems.

#### **Environmental Protection Act 1994**

The EP Act aims to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development).

#### **Environmental Protection (Water) Policy 2009**

The EPP (Water) was established to protect Queensland waters while allowing for ecologically sustainable development. It sets the broad environmental protection measures for the protection of Queensland waters and provides a framework for identifying environmental values for aquatic ecosystems and for human uses, and determining water quality guidelines and objectives to enhance or protect the environmental values.

The EPP Water states the relevant environmental values and water quality objectives for water, and the relevant water quality guidelines and indicators for protecting these values. Environmental values of specific waters to be protected or enhanced are defined in Schedule 1 of the EPP Water. Where waters are not specifically identified in Schedule 1, the environmental values are defined under Section 6(2) of the EPP Water.

#### **Environment Protection and Biodiversity Conservation Act 1999**

Operations likely to have a significant impact on a MNES are subject to assessment and approval under the EPBC Act.

Developments that have potential for significant impact on nationally threatened plants and animals, including GAB spring communities, must also be referred for assessment.

#### **Water Act 2000 and Water Regulation 2002**

The Water Act governs all surface water and groundwater in the State which has been divided into 23 catchments that are individually managed. Through this legislation the allocation and use of groundwater is managed.

The provisions of the Water Regulation include the development of a Water Resource Plan (WRP) for individual catchments to outline the objectives for achieving a balance between the allocation and sustainable use of water to meet human needs and meeting the needs of the environment. A Resource Operations Plan (ROP) has also been developed for each catchment which details management practices to meet the objectives specified in the WRP. The Project Study Area is included within the Burnett Basin in the east and the Condamine and Balonne Basin to the west (refer to Figure 14.1, Volume 2) and is subject to the provisions of the WRP Burnett and the Water Resource (Condamine and Balonne) Plan 2004 (WRP Condamine and Balonne) within those respective areas.

Additionally the formations of the Great Artesian Basin (GAB) underlie the Study Area where artesian and subartesian waters connected to those sediments are subject to the provisions of the Water Resource (Great Artesian Basin) Plan 2006 (WRP Great Artesian Basin). Furthermore, the portion of the Study Area within the Condamine Catchment area is also contained within the Eastern Downs Subartesian Area and within the Murray Darling Basin Plan Area.

ROP have also been developed for the catchments to detail how the government will achieve the goals specified in the WRP. In the Project Study Area these WRPs include the *Burnett Basin Resource Operations Plan 2003* and the *Condamine and Balonne Resource Operations Plan 2008*. Under the Water Act, there are a number of options to access groundwater in these catchments; the legislative means of access to this water include:

- water allocations
- water licences
- water permits.

Under the Water Act, water allocation holders are able to trade water. Additionally, temporary water permits can be obtained to take water for an activity, such as construction, which has a foreseeable conclusion date. Consideration of the impacts on existing water entitlements and natural ecosystems must be given.

#### **Water Resource (Condamine and Balonne) Plan 2004**

The WRP Condamine and Balonne was originally enacted in 2004 under the Water Act. The latest reprint of the WRP was released in December 2014. The following are the purposes of the plan:

- a. to define the availability of water in the plan area
- b. to provide a framework for sustainably managing water and the taking of water
- c. to identify priorities and mechanisms for dealing with future water requirements
- d. to provide a framework for establishing water allocations
- e. to provide a framework for reversing, where practicable, degradation in natural ecosystems
- f. to regulate the taking of overland flow water.

#### **Condamine and Balonne Resource Operations Plan 2008**

The purpose of the Condamine and Balonne Resource Operations Plan 2008 (Condamine and Balonne WRP) is to implement the WRP Condamine and Balonne. The latest version of the Condamine and Balonne ROP is dated July 2015 (Revision 5).

#### **Water Resource (Burnett Basin) Plan 2014**

WRP Burnett commenced on 22 August 2014 and replaced the repealed WRP from 2000. The latest reprint the WRP was released in July 2015. The following are the purposes of the plan:

- a. to define the availability of water in the plan area
- b. to provide a framework for sustainably managing water and the taking of water
- c. to identify priorities and mechanisms for dealing with future water requirements
- d. to provide a framework for establishing water allocations
- e. to provide a framework for reversing, where practicable, degradation in natural ecosystems
- f. to regulate the taking of overland flow water
- g. to regulate the taking of groundwater
- h. to provide interim rules for the taking or sharing of water.

#### **Burnett Basin Resource Operations Plan 2003**

The purpose of the WRP Burnett is to provide a strategic framework for the allocation and management of water within the Burnett Basin to meet defined outcomes. The Burnett ROP is the primary mechanism by which the WRP Burnett is to be implemented. It defines the rules that will guide the day-to-day management of groundwater extraction, use and infrastructure to achieve the objectives of the WRP Burnett. The latest version of the Burnett ROP is dated November 2014 (Revision 12).

#### **Water Resource (Great Artesian Basin) Plan 2006**

The WRP Great Artesian Basin overlaps the Study Area and regulates the groundwater resources of the GAB. Specifically, the plan defines the availability of groundwater in the area; provides a framework for the sustainable management of groundwater and taking of groundwater; and to identify priorities and mechanisms for dealing with

future water requirements. The plan identifies management areas and details the stratigraphic units and aquifers to which the plan applies.

#### **Great Artesian Basin Resource Operation Plan 2006**

The GAB ROP (amended November 2012) provides the criteria and mechanisms to implement the GAB Water Resource Plan. Specifically, the ROP provides criteria to set conditions for water licenses to protect springs and groundwater baseflow to watercourses, protection of current groundwater entitlements, identifies the amount of unallocated water to be made available, and the release of unallocated water.

As a component of the ROP, a spring register which lists the GAB springs that support significant cultural and environmental values is to be created. The spring register is to contain information about the spring type, the management units that are connected or supply water to the springs, decisions made about water licenses that could impact the flow of water to the springs, and the cumulative spring factor for each spring.

Spring factors are estimates of the change in pressure at a spring that results from a water licence decision, as established under the GAB ROP. They are determined for new water licences granted from the unallocated water reserves (identified in the GAB WRP), and for water licence relocations, amendments, surrenders, and cancellations; and added to the pre-existing cumulative spring factors for each relevant spring in the register. The spring register is currently unavailable due to the tender process in progress for the release of general reserve unallocated water in the Surat, Surat East and Surat North management areas. It is assumed that all springs listed in the register are also contained in DEHP (Queensland Herbarium) springs database.

#### **Water Reform and Other Legislation Amendment Act 2014**

The *Water Reform and Other Legislation Amendment Act 2014* (Qld) (WROLA Act) was passed on 26 November 2014. This act includes a number of changes to the *Water Act 2000* and other resource related legislation. A number of WROLA Act provisions commenced in December 2014, February 2015 and September 2015 and include:

##### Ecologically sustainable development:

The WROLA Act included a new purpose of the Water Act, which did not previously expressly articulate the principles of ecologically sustainable development. To address this, the WROLA Act reinstates the principles of ecologically sustainable development, and replaces the term "responsible and productive management" with "sustainable management" throughout the Water Act.

##### Water development option:

The WROLA Act removes all provisions for water development options from the Water Act. These provisions would allow for an option for proponents of large scale developments that gave a commitment of future access to water independent of a water planning process. Omission of the provisions addresses some stakeholder concerns about the science and consultation process. It also addresses concerns about the potential risks to the Great Barrier Reef, and potential over-allocation of water resources.

##### Designated watercourse provisions:

The WROLA Act removes provisions in the Water Act for the chief executive to declare a designated watercourse. These provisions would remove the requirement for a water licence or permit to take or interfere with water from a designated watercourse. Omitting the provisions responds to some stakeholder concerns about the transparency and appropriateness of water resource regulation.

#### **Sustainable Planning Act 2009**

The SP Act seeks to achieve ecological sustainability by:

- a. managing the process by which development takes place, including ensuring the process is accountable, effective and efficient and delivers sustainable outcomes;
- b. managing the effects of development on the environment, including managing the use of premises; and
- c. continuing the coordination and integration of planning at the local, regional and State levels.

Works for taking or interfering with groundwater in the GAB are assessable development under the SP Act and require a development permit.

## 15.4 Methodology

The groundwater assessment methodology included the following phased approach:

1. Review of relevant legislation and policy applicable to the Project
2. Assessment of EVs which may be affected by the Project. Draft EVs have been compiled for both the Condamine Catchment and the Burnett Catchment. These EVs have been assessed against the Project's activities and then compared to the publically available Department of Natural Resources and Mines (DNRM) registered groundwater bore database to assess current groundwater quality within the Study Area
3. Review of publicly available information in regards to groundwater quality, use and availability in the Study Area. To further assess groundwater environmental values, available groundwater data was compared to relevant guidelines, which included:
  - a. Australian and New Zealand guidelines for fresh and marine water quality, 2000
  - b. Queensland Water Quality Guidelines, 2009.
4. Discussions with DNRM (Bundaberg and Toowoomba Offices) with regards to construction and operational water supply options.

The assessment was undertaken as a desktop exercise only and did not involve a site visit, groundwater sampling or analyses.

## 15.5 Description of environmental values

Environmental Values are the qualities that make water suitable to support aquatic ecosystems and human uses. EVs are being progressively determined for areas of Queensland by DEHP. As EVs are defined for Queensland waters, they are added to Schedule 1 of the EPP (Water).

Groundwater environmental values are included as MNES, referenced under the EPBC Act, and defined under the EPP (Water). The environmental values to be enhanced or protected are:

- biological integrity of a pristine or modified aquatic ecosystem
- suitability for primary, secondary, and visual recreational use
- suitability for minimal treatment before supply as drinking water
- suitability for use in agriculture
- suitability for use in aquaculture
- suitability for producing aquatic food for human consumption
- suitability for industrial use
- cultural and spiritual values of the water.

The Project's relationship to these environmental values is described in the subsections below.

### 15.5.1 Biological integrity of a pristine or modified aquatic ecosystem

The GAB and any associated groundwater dependent ecosystems (GDE) are listed under the EPBC Act as MNES, particularly the GDEs associated with springs and aquifers. There are no springs located within the Study Area; however several derived surface expression GDEs associated with the Tertiary basalts and alluvial aquifers are within the Study Area.

Additionally, it is considered that there is the potential for groundwater supported semi-permanent pools along the surface water features; however, none have been identified as a result of the desktop assessment.

### 15.5.2 Suitability for recreational use (primary recreation)

This category of environmental values is not considered relevant in relation to groundwater of the Study Area as it applies to surface water features which are either accessible for recreational use or visual interaction.

### 15.5.3 Suitability for minimal treatment before supply as drinking water

Hydrochemistry results compiled from bores in the Study Area included the DNRM registered groundwater bore database indicate the groundwater quality is variable. Aquifers are recognised to have areas of brackish groundwater quality. This groundwater may require complex and expensive water treatment, such as reverse osmosis, to achieve drinking water quality which satisfies the Queensland Water Quality Guidelines 2009 of the Australian Drinking Water Guidelines 2011.

Issues of salinity and the ease to obtain a rainwater tank supply are factors which preclude the potential usage of the groundwater as a drinking water source. However, groundwater within the Study Area is recognised to also include areas of fresh, potable groundwater. Groundwater within the Study Area is understood to generally be utilised for stock watering, irrigation, and domestic use based on the available data from the Queensland Government water license database and the water quality data included in the DNRM registered groundwater bore database.

### 15.5.4 Suitability for use in agriculture, aquaculture, aquatic food for human consumption

The majority of groundwater bores within the Study Area are reportedly utilised for irrigation, stock watering and domestic uses. Comparison to the National Water Quality Management Strategy - Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ 2000), groundwater present within the bores indicates that the majority of the groundwater is suitable for livestock watering, irrigation and domestic uses.

The water quality salinity data indicates groundwater is within or above the range recommended for irrigation of crops. The groundwater is considered to have some potential use in terms of irrigation, dependant on crop type, soil type, and irrigation regime.

The GAB aquifers are recognised to have good quality groundwater, which could potentially be utilised for aquaculture and/or the production of aquatic food for human consumption.

### 15.5.5 Suitability for industrial use

Available groundwater data reviewed from public datasets (DNRM groundwater bore database and water license attributes) indicates that the groundwater quality and availability within the Study Area is considered suitable for industrial processes, inclusive of but not limited to, cooling water, process water, utility water, and wash water. A specific industry is considered to have particular water quality requirements and constraints which will determine the suitability of the use of groundwater resources.

### 15.5.6 Maintenance of cultural and spiritual values

No specific groundwater resources of cultural or spiritual values are recognised within the Study Area. However, groundwater that discharges into springs or water courses, which result in permanent pools, may have important cultural significance. Consultation with the relevant Aboriginal Parties is required to identify the cultural and/or spiritual values within the Study Area. Further information on cultural and spiritual values can be found in Chapter 18 Cultural Heritage.

### 15.5.7 Summary of Project scale groundwater environmental values

Groundwater related environmental values relevant to the Study Area include domestic use, aquatic ecosystems, agricultural purposes, and GAB aquifers. There is also the potential for cultural and spiritual environmental values and GDEs to be present within the Study Area.

## 15.6 Potential impacts

Potential impacts on groundwater which may occur as a result of the construction and operational phases of the Project include:

- Drawdown of groundwater from sourced aquifer(s) for construction purposes
- Drawdown of groundwater in overlying and underlying units of sourced aquifer(s)
- Reduction in piezometric head, within aquifers sourced for construction purposes, which could result in the reduction of landholder bore yields
- The reduction in baseflow to surface water systems
- Impacts on GDEs in the context of groundwater quality, quantity, and flow characteristics.

Based on the available information it is considered that using groundwater (under a Water Permit) would be the most appropriate option for the construction period. The Project's construction water supply requirements are estimated to be approximately 250 ML over a two to two and a half year period. However, this is subject to confirmation during detailed design of the Project. Operational water supply options will also be determined during the detailed design of the Project and confirmed prior to construction

Other events, such as accidents or human errors, can also have negative groundwater-related impacts, such as:

- Impacts on groundwater quality as a result of surficial impacts in the form of leaks, spills, surface runoff and seepage into shallow aquifers
- Vertical leakage within groundwater systems through incorrect or incomplete well installation and construction.

## 15.7 Mitigation measures

Mitigation measures associated with each of the potential groundwater impacts identified in Section 15. 6 are presented in Table 15.1.

**Table 15.1 Potential groundwater impacts and mitigation measures**

Phase	Potential groundwater impact	Mitigation measures
Construction	Drawdown of groundwater from sourced aquifer(s) for construction purposes	<ul style="list-style-type: none"> <li>- A groundwater supply bore network will be developed which considers bore placement, depth(s), various aquifers, bore yields and extraction rates, and water requirements for all phases of the Project in order to minimise the overall drawdown on each of the selected aquifer(s) for extraction</li> <li>- A groundwater monitoring program will be developed for all Project stages which identifies suitable drawdown thresholds to allow for early identification of groundwater drawdown below the identified thresholds. Should drawdown of landowner bores as a result of the Project be identified, AGL will seek to negotiate appropriate mitigation with landowners including the use of compensation agreements</li> <li>- Pump tests (for application of existing groundwater wells for supply purposes) will be carried out to identify areas of increased hydraulic connectivity between units prior to design/ identification of landholder bores to use for water supply.</li> </ul>
	Drawdown of groundwater in overlying and underlying units of sourced aquifer(s)	<ul style="list-style-type: none"> <li>- A groundwater supply bore network will be developed which considers various aquifers for extraction and the hydraulic connectivity between the units</li> <li>- Groundwater supply bores will be constructed in accordance with the Minimum Construction Requirements for Bores in Australia (NUDLC, 2012) and will be supervised by a qualified geologist or hydrogeologist to ensure the aquifers are accurately identified</li> <li>- A groundwater monitoring program will be developed which allows for early identification of groundwater drawdown</li> <li>- Pump tests (for application of existing groundwater wells for supply purposes) will be carried out to identify areas of increased hydraulic connectivity between units prior to design/ identification of landholder bores to use for water supply.</li> </ul>
	Reduction of landholder bore yields	<ul style="list-style-type: none"> <li>- Landholder bores, corresponding aquifers, and details of the use of the bore by the landholder will be identified (i. e. frequency of use, application, etc. ), via performance of a landholder bore census prior to design of the groundwater supply bore network</li> <li>- A monitoring program will be developed to provide indication of any variation of the yield of landholder bores.</li> </ul>

Phase	Potential groundwater impact	Mitigation measures
	Reduction in baseflow to surface water systems	<ul style="list-style-type: none"> <li>- Pump tests (for application of existing groundwater wells for supply purposes) will be carried out to identify areas of increased hydraulic connectivity between units prior to design/ identification of landholder bores to use for water supply</li> <li>- The surface water systems will be assessed during detailed design in order to identify seasonal variation and identify areas with potential to have reduced baseflow conditions</li> <li>- Areas of seasonally reduced baseflow conditions will be considered for groundwater supply bore network design to ensure the area of influence from water supply extraction activities does not extend near these locations.</li> </ul>
	Impacts on GDEs	<ul style="list-style-type: none"> <li>- The source aquifers which provide groundwater to the GDEs (if any) in the Study Area will be identified during detailed design and avoided where possible</li> <li>- A monitoring program will be developed to provide an indication of any variation to the groundwater quality and/or levels that could impact on GDEs.</li> </ul>
	Impacts on groundwater quality as a result of surficial impacts in the form of leaks, spills, surface runoff and seepage into shallow aquifers	<ul style="list-style-type: none"> <li>- All chemicals, fuel and oil storage facilities will be contained within bunded areas</li> <li>- Accurate records will be maintained of chemical, fuel and oil volumes purchased and stored onsite for regular quantity audits;</li> <li>- All chemicals will be stored in above ground tanks with appropriate secondary containment (bunded) areas</li> <li>- Inspections and audits will be conducted on all equipment which uses/stores oil, fuel, and other chemicals in order to identify potential structural integrity issues prior to a potential release</li> <li>- A Materials Handling Plan (MHP), emergency response and spill response procedures will be developed and implemented as a component of the site specific CEMP to minimise any impacts that could occur as a result of releases</li> <li>- All relevant Australian Standards will be adhered to, inclusive of but not limited to: <ul style="list-style-type: none"> <li>• AS1940- The Storage and Handling of Flammable and Combustible Liquids</li> <li>• AS3780- The Storage and Handling of Corrosive Substances.</li> </ul> </li> </ul>
	Vertical leakage within groundwater systems through incorrect or incomplete well installation and construction	<ul style="list-style-type: none"> <li>- The Minimum Construction Requirements for Bores in Australia (NUDLC, 2012) will be adhered to.</li> <li>- Well installation will be undertaken by a Licenced Water Bore Driller and supervised by a suitable geologist / hydrogeologist for accurate identification of aquifers</li> <li>- Pump tests (for application of existing groundwater wells for supply purposes) will be carried out to identify areas of increased hydraulic connectivity between units prior to design/ identification of landholder bores to use for water supply.</li> </ul>
Operations	Drawdown of groundwater from sourced aquifer(s) for construction purposes	<ul style="list-style-type: none"> <li>- Groundwater extractions are expected to primarily occur for the construction phase; limited extraction is anticipated for the Operations Phase. No specific mitigation is considered necessary.</li> </ul>
	Impacts on groundwater quality as a result of surficial impacts in	<ul style="list-style-type: none"> <li>- All chemicals, fuel and oil storage facilities will be contained within bunded areas</li> <li>- Accurate records will be maintained of chemical, fuel and oil volumes purchased and stored onsite for regular quantity audits</li> </ul>



Phase	Potential groundwater impact	Mitigation measures
	the form of leaks, spills, surface runoff and seepage into shallow aquifers	<ul style="list-style-type: none"> <li>- All chemicals will be stored in above ground tanks with appropriate secondary containment (bunded) areas</li> <li>- Inspections and audits will be conducted on all equipment which uses/stores oil, fuel, and other chemicals in order to identify potential structural integrity issues prior to a potential release</li> <li>- A MHP, emergency response and spill response procedures will be implemented as a component of the site specific CEMP to minimise any impacts that could occur as a result of releases</li> <li>- All relevant Australian Standards will be adhered to, inclusive of but not limited to:               <ul style="list-style-type: none"> <li>• AS1940- The Storage and Handling of Flammable and Combustible Liquids</li> <li>• AS3780- The Storage and Handling of Corrosive Substances.</li> </ul> </li> </ul>

## 15.8 Residual impacts

With the mitigation measures identified in Table 15.1 in place, the Project is not anticipated to cause significant impacts on groundwater EVs. Any potential residual impacts on groundwater quality are likely to be minor in nature and localised in extent.

## 15.9 Cumulative impacts

The impacts on the groundwater environment associated with the Project are considered to be minor. Implementation of the identified mitigation and control strategies are considered suitable to adequately protect the identified EVs in the Study Area. On a regional scale, the groundwater impacts associated with the Project are considered to be negligible and are therefore unlikely to contribute to any cumulative impacts from other similar projects in the region.

## 15.10 Summary and conclusions

The Study Area falls within the catchments of the Burnett and Condamine Rivers and is underlain by the sediments of the GAB. The catchments and the GAB are regulated under the Water Act and have current WRPs and ROPs which impose rigid operational conditions.

Access to groundwater supplies via the installation of new bores requires an application for a Water Permit from DNRM. Access to groundwater via current landholders with a water allocation is anticipated to be procured through negotiations with nearby landholders where the volume of groundwater to be extracted is limited by the water permit obtained by AGL.

All entitlements will be obtained prior to the construction and operational phases of the Project.

The Project is not expected to have a significant impact on the overall groundwater regime within the Study Area. Potential impacts associated with the Project are considered to relate to the extraction of groundwater for construction purposes. The potential impacts of the Project activities on groundwater quality and quantity arise from a range of activities associated with the construction and operation phases. This assessment considered that the impacts associated with the Project can be appropriately managed by the implementation of a range of mitigation measures during the various phases of the Project.

The construction contractor will be responsible to develop and ensure suitable procedures are in place in regards to erosion and sediment control procedures, a MHP, emergency response and spill response procedures will be contained within a site specific CEMP.

## 15.11 References

Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand Council (ANZECC & ARMCANZ) 2000, 'National Water Quality Management Strategy - Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)', Canberra.

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