Surface and Groundwater Impact Assessment

Proposed Molong BESS:
1 Deight Street & 19 Back Saleyards Road, Molong NSW 2866

FOR: StorEnergy 3 Pty Limited

SLR PROJECT No: 620.041615.00007 Revision: 1.4

21 August 2025

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1.1 DRAFT	28 February 2025	FX	HM	KW
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1.3 DRAFT	8 August 2025	FX	NWB	KW
1.4 DRAFT	21 August 2025	FX	NWB	KW

Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with StorEnergy 3 Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

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Acronyms and Abbreviations

AEP	Annual Exceedance Probability
ANZECC/ARMCANZ	Australian Guidelines for Water Quality Monitoring and Reporting (the ANZECC guidelines)
ANZG	Australian and New Zealand Water Quality Guidelines for Fresh and Marine Water Quality
ARR	*Australian Rainfall and Runoff: A Guide to Flood Estimation* 2019 (Australian Government and Engineers Australia)
ANZG	Australian and New Zealand Governments
BESS	Battery Energy Storage System
CEMP	Construction Environmental Management Plan
CSWMP	Construction Soil and Water Management Plan
DECCW	NSW Department of Environment, Climate Change and Water
DCEEW	NSW Department of Climate Change, Energy, the Environment and Water
DPHI	NSW Department of Planning, Housing and Infrastructure and Environment
DPI	NSW Department of Primary Industries
DPIE	NSW Department of Planning, Industry and Environment
DPIRD	NSW Department of Primary Industries and Regional Development
EIS	Environmental Impact Statement
EP&A Act	Environmental Planning and Assessment Act 1979
EPL	environment protection licence
LGA	Local Government Area
MW	Megawatt
MWh	Megawatt Hours
NTU	Nephelometric Turbidity Unit
NWQMS	National Water Quality Management Strategy
POEO Act	Protection of the Environment Operations Act 1997
SSD	State Significant Development
SSP	Shared Socioeconomic Pathways
TN	Total Nitrogen
TP	Total Phosphorous
TSS	Total Suspended Solids
WBNM	Watershed Bounded Network Model
WM Act	Water Act 1912, Water Management Act 2000
WSP	Water Sharing Plan
WQO	Water Quality Objectives

1.0 Introduction

1.1 Project Overview

StorEnergy 3 Pty Ltd (Stor) seeks to establish a Battery Energy Storage System (BESS) facility with a connection to the electricity grid at the existing Transgrid Molong 132/66 Kilovolt (kV) transmission substation via a new overhead transmission line (approximately 900 m) (herein referred to as 'the Project').

The Project is deemed to be State Significant Development (SSD) being an electricity generating works development. The project therefore requires assessment and approval in accordance with Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act).

Stor have engaged SLR Consulting Australia Pty Ltd (SLR) to prepare this EIS to address the requirements of the Secretary of the NSW Department of Planning, Housing and Infrastructure and Environment (DPHI), known as the Secretary's Environmental Assessment Requirements (SEARs) for the project, SSD-75680468 dated 14 October 2024. The EIS has been prepared in accordance with the NSW Environmental Planning and Assessment Regulation 2021 (EP&A Regulation) and under the guidance of the *State Significant Development Guidelines - preparing an environmental impact statement* (Department of Planning & Environment [now known as DPHI] 2022).

1.2 Purpose of this Report

This report has been prepared by SLR on behalf of Stor as part of the Environmental Impact Statement (EIS). The report has been prepared to assess the potential impacts of constructing and operating the Project on surface water and groundwater. The report:

- Provides a summary of key legislation, policies and procedures relevant to surface and groundwater quality.
- Describes the existing surface water and groundwater environment.
- Assesses the potential impacts of construction and operation activities associated with the proposal on surface water and groundwater and relevant environmental values.
- Recommends measures to avoid, minimise, mitigate and manage the impacts identified, to demonstrate that the development is appropriate for the site, given the constraints on the land.

1.3 Project Location

1.3.1 Existing Site

The Development Footprint is located across two Lots being 1 Deight Street, legally described as Lot 99 DP 1020247, and 19 Back Saleyards Road, legally described as Lot 1 DP 542283. Both properties are within Molong NSW, 2866.

The Project is located within the Local Government area of Cabonne Shire Council. The Development Footprint area is 9.56 hectares (ha). The Project Lots conveys overland flow runoff from an upstream catchment of 5.04 ha (Figure 2 shows the location relative to the Development Footprint).

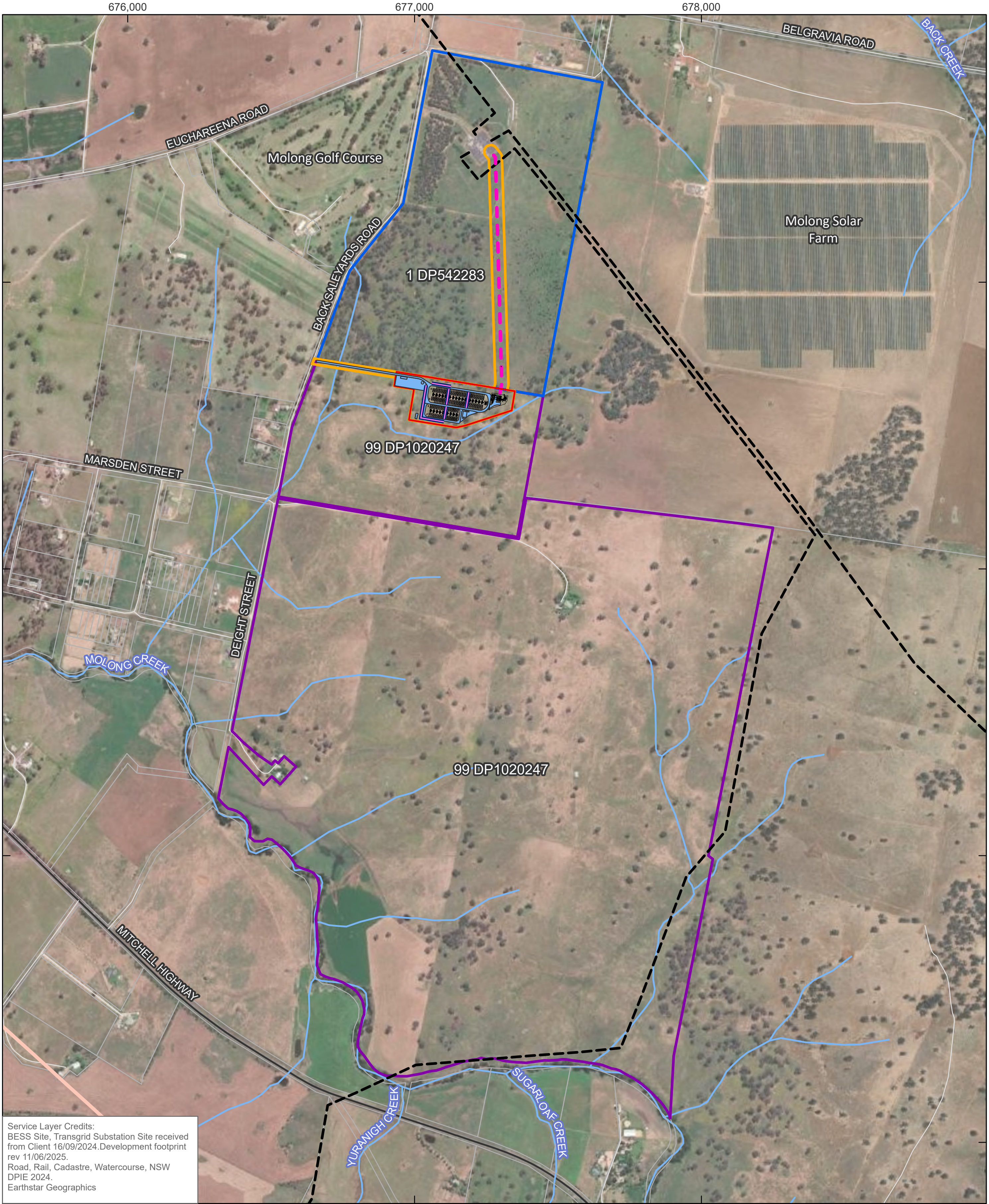
Neighbouring lots are predominantly large rural lots, similar in nature to the Project Lots . Molong Solar Farm is located approximately 1 km north-east of the Project Lots.

Stormwater runoff from the Development Footprint currently drains to an unnamed tributary of Molong Creek which is located more than 40m from the southern boundary of the Development Footprint. This tributary then discharges from Lot 99 at the south-west of the property boundary at the southern end of Back Saleyards Road. Molong Creek drains into the Bell River, which ultimately flows into the Darling River.

The project location and existing Lot layout is illustrated in Figure 1.

1.3.2 Proposed Development

The Project will involve the development, construction, operation, and eventual decommissioning of a Battery Energy Storage System (BESS), with a capacity of 150 Megawatts (MW), 730 Megawatt Hours (MWh). The BESS will comprise of battery units, inverters, transformers, a substation and ancillary infrastructure all within the Development Footprint. The battery units will be within individual containers (or enclosures), with each container measuring approximately 6 metres (m) or 20 feet (ft) in length with an approximate weight of 43,000 kilograms (kg).



Coordinate System:	GDA2020 MGA Zone 55
Scale:	1:17,500 at A4
Project Number:	620.041615
Date Drawn:	30-Jul-2025
Drawn by:	NT

LEGEND

- Watercourse
- Primary Road
- Road
- 132kV
- 66kV
- Cadastre
- Proposed Electricity Transmission Line
- Noisewall
- BESS Footprint (5.06 ha)
- Development Footprint (9.56 ha)
- BESS Layout
- Title Containing BESS
- Title Containing Transgrid Substation

MOLONG BESS

SITE OVERVIEW

SLR

FIGURE 1

2.0 Legislative and Policy Framework

This section provides a summary of the legislation that applies to the proposal and the policy framework that forms the basis of this assessment. Further information about the legislative context for the proposal is provided in the EIS.

2.1 Relevant Legislation and Planning Instruments

2.1.1 Environmental Planning and Assessment Act 1979

The EP&A Act specifies that the applicable approval pathway for the proposed development is through the State Significant Development (SSD) process, under Part 4 Section 4.36. In accordance with Section 4.12 of the EP&A Act, a SSD application must be accompanied by an EIS. To inform the content of the EIS, a request for SEARs from the Secretary DPE is required. The SEARS specify the issues that must be addressed in the EIS. This surface and groundwater assessment forms part of the EIS being prepared for the proposal and assesses the potential hydrology and flooding impacts of the proposal.

2.1.2 Water Act 1912, Water Management Act 2000 and Water Management (General) Regulation 2011

The *Water Act 1912* and the *Water Management Act 2000* (WM Act) are two key pieces of legislation for the management of water in NSW and contain provisions for the licensing of water access and use. The *Water Act 1912* is being progressively phased out and replaced with the WM Act.

The aims of the WM Act are to provide for the sustainable and integrated management of the State’s water sources for the benefit of both present and future generations. The WM Act implicitly recognises the need to allocate and provide water for the environmental health of our rivers and groundwater systems, while also providing licence holders with more secure access to water and greater opportunities to trade water through the separation of water licences from land. The WM Act enables the State’s water resources to be managed under water sharing plans, which establish the rules for the sharing of water in a particular water source between water users and the environment, and rules for the trading of water in a particular water source.

Under the WM Act the sharing of water must protect the water source and its dependent ecosystems and must protect basic landholder rights. Sharing or extracting water under any other right must not produce these rights. Therefore, water for licenced water users is effectively the next priority for water sharing. Water sharing plans provide a legal basis for sharing water between the environment and consumptive purposes.

The Project is located within the area covered by the *Water Sharing Plan for the Macquarie/Wambuul Bogan Unregulated Rivers Water Sources 2025*. This Plan applies to unregulated water sources across the Macquarie and Bogan catchments, including Molong Creek, which is the receiving watercourse for stormwater runoff from the site. The Plan establishes rules for water access and use to support the sustainable management of surface water and protect environmental flows, particularly during low-flow periods. It also reflects the importance of maintaining waterway health in areas influenced by rural and peri-urban development, such as Molong.

The Water Sharing Plan for the Macquarie/Wambuul Bogan Unregulated Rivers Water Sources 2025 include the respective water sources:

- Backwater Boggy Cowal Water Source
- Bell River Water Source
- Bulbodney Grahway Creek Water Source
- Burrendong Dam Tributaries Water Source
- Campbells River Water Source
- Coolbaggie Creek Water Source
- Cooyal Wialdra Creek Water Source
- Ewenmar Creek Water Source
- Fish River Water Source
- Goolma Creek Water Source
- Lawsons Creek Water Source
- Little River Water Source
- Lower Bogan River Water Source
- Lower Macquarie River Water Source
- Lower Talbragar River Water Source
- Macquarie River above Burrendong Water Source
- Marra Creek Water Source
- Marthaguy Creek Water Source
- Maryvale Geurie Creek Water Source
- Molong Creek Water Source
- Piambong Creek Water Source
- Pipeclay Creek Water Source
- Queen Charlottes Vale Evans Plains Creek Water Source
- Summerhill Creek Water Source
- Turon Crudine River Water Source
- Upper Bogan River Water Source
- Upper Cudgegong River Water Source
- Upper Talbragar River Water Source
- Wambangalong Whylandra Creek Water Source
- Winburndale Rivulet Water Source

2.1.3 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) aims to protect, restore and enhance the quality of the environment. It prescribes offences mainly regarding pollution of the environment and establishes a regime for the licensing of certain scheduled activities.

Section 120 prohibits the pollution of waters. Potential water quality impacts are discussed in Section 5.0. Stor are obliged to notify the EPA if a pollution incident occurs that causes or threatens material harm to the environment. Under Part 3.2 of the POEO Act an environment protection licence (EPL) is required for scheduled activities or scheduled development work.

2.1.4 Macquarie Valley Environmental Water Management Plan 2024–25

The Macquarie Valley Environmental Water Management Plan provides a framework for managing Commonwealth environmental water to support the health and resilience of riverine ecosystems within the Macquarie River catchment, including tributaries such as the Bell River and Molong Creek. The plan is designed to adapt to varying water availability, ecological conditions, and local knowledge, aiming to improve environmental outcomes for aquatic habitats, native species, and cultural values.

2.1.5 Macquarie Regulated Rivers Water Sharing Plan 2016 (amended 2024–25)

The Macquarie Valley Environmental Water Management Plan and associated Water Sharing Plan guide how surface water is managed across the Macquarie catchment, including Molong Creek and its connection to the Bell River. While Molong Creek is unregulated, flow releases from Molong Creek Dam are managed by Cabonne Shire Council under an environmental flow framework to support downstream ecological health, water quality, and connectivity. These plans aim to balance environmental protection with community and cultural values, while informing local flood and catchment management strategies relevant to Molong.

2.2 Guidelines and Policies

2.2.1 Climate Risk Ready NSW Guide

The *Climate Risk Ready NSW Guide* (Department of Planning, Industry and Environment (DPIE), 2020) has been developed to help the NSW Government sector to lead, influence and enable their organisations to better understand their exposure to climate change risks and opportunities, and to develop plans to address them. The guide provides practical guidance to assess and manage climate change risks.

2.2.2 Australian Rainfall and Runoff: A guide to Flood Estimation

Australian Rainfall and Runoff: A Guide to Flood Estimation 2019 (Australian Government and Engineers Australia) (ARR v4.2) is used nationally as a guideline document, data and software suite, providing the information necessary for the estimation of design flood characteristics in Australia. The purpose of ARR is to provide a framework for reliable and robust estimates of flood characteristics to enable the assessment of flooding risk and design of infrastructure. ARR also provides procedures for climate change impact estimation.

2.2.3 Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions

The Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions is a protocol that helps decision-makers manage the impact of land-use activities on waterway health in New South Wales. It integrates existing principles from the National Water Quality Management Strategy to assess risks and determine management responses for protecting waterway health.

2.2.4 NSW Aquifer Interference Policy

The *NSW Aquifer Interference Policy* (DPI, 2012) (the Aquifer Interference Policy) was finalised in September 2012 and clarifies the water licensing and approval requirements for aquifer interference activities in NSW. Many aspects of this policy will be given legal effect in the future through an Aquifer Interference Regulation. Stage 1 of the Aquifer Interference Regulation started on 30 June 2011.

The *NSW Aquifer Interference Policy* requires that potential impacts on groundwater sources, including their users and groundwater dependant ecosystems, be assessed against the minimal impact considerations outlined in the policy. If the predicted impacts of the proposal are less than the minimal impact considerations, then the potential groundwater impacts of the proposal are acceptable.

The policy outlines the water licensing requirements under the Water Act 1912 and WM Act. A water access licence is required whether water is taken for consumptive use or whether it is taken incidentally by the aquifer interference activity (such as groundwater filling a void) even where that water is not being used consumptively as part of the activity’s operation.

The *NSW Aquifer Interference Policy* requires that potential impacts on groundwater sources, including their users and groundwater dependant ecosystems, be assessed against the minimal impact considerations outlined in the policy. Potential impacts of the proposal on groundwater are considered acceptable if they are less than the minimal impact considerations.

2.2.5 NSW Groundwater Strategy

The objective of the *NSW Groundwater Strategy* (Department of Planning and Environment (DPE), 2022) is to manage the State's groundwater resources so that they can sustain environmental, social and economic uses for the people of NSW. The N*SW Groundwater Strategy* has three strategic priorities:

- Protect groundwater resources and the ecosystems that depend on them.
- Build community and industry resilience through sustainable groundwater use.
- Improve groundwater information and knowledge.

This groundwater impact assessment has had regard to the *NSW Groundwater Strategy*.

2.2.6 Managing Urban Stormwater – Soils and Construction

The principles for the management of stormwater during construction are documented in *Managing Urban Stormwater – Soils and Construction Volume 1* (Landcom 2004). These guidelines are commonly referred to in the construction industry as 'the Blue Book'. The Blue Book provides guidelines to help mitigate the impacts of land disturbance activities on soils, landforms and receiving waters by focussing on erosion and sediment control. Implementation of management measures listed in the Blue Book would be defined by the Construction Soil and Water Management Plan (CSWMP) developed as part of the Construction Environmental Management Plan (CEMP) for the proposal.

2.2.7 National Water Quality Management Strategy

The *National Water Quality Management Strategy* (NWQMS) (ANZECC/ARMCANZ, 2000) was developed with the objective of achieving sustainable use of the nation's water resources with the aim of protecting and enhancing water resources quality and maintaining economic and social development.

The NWQMS contains guidelines for setting water quality objectives to sustain current or likely future environmental values for water resources. The NWQMS includes the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018) and are relevant to the proposal.

2.2.8 Australian and New Zealand Water Quality Guidelines for Fresh and Marine Water Quality

The *Australian and New Zealand Water Quality Guidelines for Fresh and Marine Water Quality* (ANZG, 2018) provides benchmarks for the assessment of existing water quality of water courses. The ANZG (2018) outline recommended trigger values which have been considered when describing the existing water quality and key indicators of concern.

The application of the ANZG (2018) guidelines have been applied to understand the current health of the nearby watercourses to the proposal area and the ability to support nominated environmental values, particularly the protection of aquatic ecosystems.

2.2.9 NSW Water Quality and River Flow Objectives

The NSW Water Quality and River Flow Objectives (DECCW, 2006) are the agreed environmental values and long-term goals for NSW surface waters. They set out:

- The community's values and uses (ie healthy aquatic ecosystems, water suitable for recreation or drinking water) for our watercourses (eg rivers, creeks, lakes and estuaries).
- A range of water quality indicators to assess whether the current condition of the watercourse supports these values and uses.

The Water Quality Objectives (WQO) provide environmental values for NSW waters and the ANZG (2018) provide the technical guidance to assess the water quality needed to protect these values. The proposal is located within the Macquarie-Bogan catchment. The watercourses within these catchments have been categorised, and each category has numerous water quality objectives or environmental values for protection.

2.3 Secretary's Environmental Assessment Requirements (SSD-75680468)

The SEARs issued by DPHI outline the following requirements for the EIS:

- *a detailed justification of the suitability of the site and that the site can accommodate the proposed development having regard to its potential environmental impacts, land contamination, permissibility, strategic context and existing site constraints*
- *an assessment of the likely impacts of the development (including flooding and flood modelling) on surrounding watercourses (including their Strahler Stream Order), groundwater resources and surface water movements, and measures proposed to monitor, reduce and mitigate these impacts including water management issues*
- *a site water balance for the development*
- *details of water requirements and supply arrangements for construction and operation (including consultation with suppliers)*
- *a description of the erosion and sediment control measures that would be implemented to mitigate any impacts in accordance with Managing Urban Stormwater: Soils & Construction (Landcom, 2004) and Managing Urban Stormwater: Soils and construction - Volume 2A manual (Landcom, 2008)*

This Surface and Groundwater Impact Assessment has been prepared to address the requirements of the SEARs.

2.3.1 Department of Climate Change, Energy, the Environment and Water

The NSW Department of Climate Change, Energy, the Environment and Water (NSW DCEEW) input into the Department of Planning, Housing and Infrastructure Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact State for the Project includes the following requirements for water:

The EIS must map the following features relevant to water and soils including:

a. *Acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Planning Map)*
b. *Rivers, streams, wetlands, estuaries (as described in s4.2 of the Biodiversity Assessment Method)*
c. *Wetlands as described in s4.2 of the Biodiversity Assessment Method*

d. *Groundwater*
e. *Groundwater dependent ecosystems*
f. *Proposed intake and discharge locations.*

The EIS must describe background conditions for any water resource likely to be affected by the development, including:

a. *Existing surface and groundwater*
b. *Hydrology, including volume, frequency and quality of discharges at proposed intake and discharge locations*
c. *Water Quality Objectives (as endorsed by the NSW Government) including groundwater as appropriate that represent the community's uses and values for the receiving waters*
d. *Indicators and trigger values/criteria for the environmental values identified at (c) in accordance with the ANZECC (2000) Guidelines for Fresh and Marine Water Quality and/or local objectives, criteria or targets endorsed by the NSW Government*
e. *Risk-based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions.*

The EIS must assess the impacts of the development on water quality, including:

a. *The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the development protects the Water Quality Objectives where they are currently being achieved, and contributes towards achievement of the Water Quality Objectives over time where they are currently not being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction;*
b. *Identification of proposed monitoring of water quality.*

The EIS must assess the impact of the development on hydrology, including:

a. *Water balance including quantity, quality and source*
b. *Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas*
c. *Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems*
d. *Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g. river benches)*
e. *Changes to environmental water availability, both regulated/licensed and unregulated/rules-based sources of such water*
f. *Mitigating effects of proposed stormwater and wastewater management during and after construction on hydrological attributes such as volumes, flow rates, management methods and re-use options*
g. *Identification of proposed monitoring of hydrological attributes.*

This Surface and Groundwater Impact Assessment has been prepared to address the requirements of the SEARs.

2.3.1.1 Cabonne Local Environmental Plan 2012 (2013 EPI 2)

Clause 6.2 of the Cabonne LEP aims to minimise the impact of urban stormwater on the development site, neighbouring properties, native bushland, and receiving waters. It applies to land zoned RU5 Village as well as residential and employment zones. Development can only proceed if it is designed to maximise permeable surfaces, includes on-site stormwater retention where practical, and avoids or mitigates adverse runoff impacts.

3.0 Methodology

3.1 Study Area

The study area for the surface and groundwater impact assessment is the area directly affected by the proposal and any areas likely to be indirectly affected by the proposal.

The proposal is located within the Macquarie-Bogan River catchment, near the floodplain of Molong Creek, and does not include any mapped or defined watercourses or tributaries within the development footprint. The study area primarily encompasses the construction and operational areas of the proposed development.

In general, the proposal sits within an agricultural setting that has been greatly modified from its pre-anthropogenic state and as such the waterways and sources within the study area can be classified as "moderately disturbed ecosystems" defined by ANZG (2018).

3.1.1 Surface Water Quality

The surface water assessment involves:

- Desktop review and analysis of existing surface water quality reports and plans to understand the existing environment and identify potential waterway-specific risks.
- Identifying assessment criteria for the proposal based on a qualitative assessment of the Australian Guidelines for Water Quality Monitoring and Reporting (ANZECC/ARMCANZ, 2000) (the ANZECC guidelines) which are the same as those adopted by the ANZG (2018).
- Identifying activities that could affect surface water hydrology and quality during the construction, operation and decommissioning of the facility.
- Assessing potential impacts on hydrology and water quality during construction, operation and decommissioning, including:
  - Identifying existing and future predicted pollutant loads;
  - Assessing future predicted pollutant loads against pollutant load reduction targets; and
  - Assessing potential changes to surface water flow by water balance modelling for the site to assess site discharges.
- Recommending safeguards and management measures, including proposed treatment measures and water quality monitoring for identified impacts during pre-construction, construction, operation and decommissioning of the proposal.

3.1.1.1 Water Quality Assessment Criteria

Environmental values associated with water quality

As described in Section 2.2.9, the WQO provide the agreed environmental values and long-term goals for NSW's surface waters. The objectives are consistent with the national framework for assessing water quality set out in the ANZG (2018). The WQO provide environmental values for NSW waters and the Water Quality Guidelines provide the technical guidance to assess the water quality needed to protect those values.

Establishing ambient water quality in receiving waters

The Water Quality Guidelines recommend default trigger values associated with the identified environmental values for various physical, biological and chemical pollutants that could be present in water. Trigger values are the criteria used for concentrations that, if exceeded, would indicate a potential environmental problem, and so 'trigger' the need for a management response.

Relevant environmental values

The proposal is located within the Macquarie-Bogan Regulated Rivers category and as such, the watercourse within the study area have been nominated for protection of the following values, outlined in the NSW WQO:

- Aquatic Ecosystems
- Visual Amenity
- Secondary contact recreation
- Primary contact recreation
- Livestock water supply
- Irrigation water supply
- Homestead water supply
- Drinking water at point of supply-Disinfection only
- Drinking water at point of supply-Clarification and disinfection
- Drinking water at point of supply-Groundwater
- Aquatic foods (cooked)

The long-term goal of the NSW WQO is to return the sub-catchments to a condition where the water courses are suitable for primary contact activities and aquatic food. For the purposes of managing the potential short-term impacts of the proposal, the primary environmental values are considered to be 'aquatic ecosystems' and 'irrigation water supply' and the water quality objective is to 'maintain or improve the ecological condition of waterbodies and their riparian zones over the long term', which is relevant in all watercourses.

The indicators and criteria (trigger values) for this objective are listed below for lowland rivers, as drawn from the ANZG (2018):

- Total phosphorous – 25 micro grams per litre (µg/L)
- Total nitrogen – 350 µg/L
- Chlorophyll-a – 5 µg/L

- Turbidity – 6-50 Nephelometric Turbidity Unit (NTU)
- Salinity (electrical conductivity) – 120-2200 micro-Siemens per centimetre (µS/cm)
- Dissolved oxygen – 85-110%
- pH – 6.5-8.5.

As noted above, trigger values are the numeric criteria that if exceeded indicate potential for harmful environmental effects to occur. If they are not exceeded, a very low risk of environmental damage can be assumed. If they are exceeded, further investigation is 'triggered' for the pollutant concerned.

3.1.2 Groundwater

The scope of the desktop groundwater resources assessment undertaken to address the Secretary's Environmental Assessment Requirements (SEARs) is outlined as follows:

- Collation and assessment of available information for existing bores in the vicinity of the site including (where available) hydrostratigraphy, standing water level, and water quality from public databases (BoM-Australian Groundwater Explorer, GDE Atlas) or previous studies.
- Identify the groundwater values in the development area or that are potentially impacted by the development.
- Review of the NSW Aquifer Interference Policy and the Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020.
- Based on available data, assessing the local hydrogeology and aquifer properties, groundwater flow pathways to potential receptors and if possible, the likelihood of impact from contamination events at the facility relating to floods and fires.
- Provide a high-level intrinsic vulnerability assessment for the aquifer(s) within the proposed site's operational footprint using available information on groundwater confinement, overlaying lithology and depth to the water table.
- Provide preventative and mitigatory measures to protect groundwater (on-site) during construction, operation, and decommissioning.
- Discussion of potential containment measures if contamination is released from the site into the local groundwater environment.

3.1.3 Water Source Assessment and Site Water Balance

Water supply may be required for the construction period, including for:

- Dust suppression
- Concrete works for construction of infrastructure
- Access road construction and compaction
- Vehicle washdown
- Potable water usage

Water extraction from surface water or groundwater sources is not proposed for the Project.

There will be no direct operational requirement for water to be used in the operation or maintenance of the proposed batteries.

Construction water supply arrangements and anticipated volumes are contained in the On-Site Facilities (Water and Sewage) Report (SLR Consulting, 2025).

4.0 Existing Environment

The Development Footprint is located in Molong, within the Cabonne Shire Council local government area (LGA), in central western New South Wales. Molong is situated approximately 30 km northwest of Orange and approximately 300 km west of Sydney. The township is located along the Mitchell Highway forming part of a regional transport corridor within the Central Tablelands.

4.1 Watercourses

There are no mapped watercourses within the Development Footprint, as shown on Figure 1. An unnamed watercourse intersects the proposed access road between the BESS Footprint and Back Saleyards Road. Although limited design detail is currently available for the crossing, it has been considered as part of the planning process. The crossing will be designed to ensure appropriate flow management, minimise potential environmental impacts, and support emergency access requirements through adequate flood immunity or alternative measures outlined in the site's emergency response plan. The Development Footprint lies within the catchment of Molong Creek, which is a tributary of the Macquarie River. Molong Creek passes through the township to the west of the Project but no direct tributaries or defined drainage lines intersect the proposed Development Footprint.

The Macquarie River catchment is a significant sub-catchment within the Murray–Darling Basin, with Molong Creek contributing flow from the upland agricultural and peri-urban zones around Molong. The catchment area in the vicinity of the project is relatively elevated and undulating, draining towards the Macquarie River system via Molong and Bell River. While Molong Creek has historically experienced flood events, the Development Footprint is not located within a high-risk flood zone and is primarily influenced by overland flow rather than defined creek or riverine channels.

Given the surrounding topography and land use, stormwater runoff across the site drains via diffuse overland flow toward the broader urban stormwater system in Molong. No natural watercourses or riparian corridors are impacted by the proposed BESS development.

4.2 Vegetation and Biodiversity

Scattered vegetation occurs intermittently along the boundaries of the Project Lots , but the majority of the land has been historically cleared for agricultural use, including grazing and cropping. Overhead powerlines traverse the Project Lots in several locations. The surrounding lots are predominantly rural and agricultural, with land uses typical of a small township fringe. The closest residence is located approximately 600 metres to the west. The Project Lots are bordered by Deight Street and Back Saleyards Road to the west, with the existing transmission substation located near the northern boundary of the Project Lots.

The Development Footprint does not contain any mapped areas of high biodiversity value and is situated within a highly modified landscape with limited remnant native vegetation. The site itself comprises cleared, disturbed land and existing utility infrastructure. The surrounding environment reflects extensive anthropogenic alteration.

4.3 Soils

The Project is located within the South Western Slopes Interim Biogeographic Regionalisation for Australia (IBRA) region and the Lower Slopes IBRA subregion. According to the *Reconnaissance Soil and Land Resources of the Murray Catchment* (DCCEEW, 2024), the site is situated within the *Molong Residual* soil landscape unit.

The Molong Residual soil landscape is characterised by undulating low hills with elevations ranging from 540 to 690 m and slopes of 4–8%, with slope lengths typically between 1,200 and 3,000 m. Local relief averages around 60 m. This landscape is underlain by andesite, tuff, slate, and limestone of the Cargo Andesite geological unit, with soils formed in situ and from alluvial-colluvial materials.

The dominant soils in this landscape are euchrozems (Dr4.21, Gn3.12, Gn4.12), typically occurring on upper slopes, and non-calcic brown soils (Dr2.12, Dr2.22, Db1.22), found more commonly on lower slopes. Yellow podzolic soils (Dy2.11) and terra rossa soils also occur in association with scattered limestone outcrops.

Euchrozems are moderately well-drained, friable, and moderately permeable, with pH levels between 6.0 and 7.0 and high available water-holding capacity. Non-calcic brown soils are typically well-drained and moderately permeable with slightly lower fertility and pH around 5.5–6.5. Soil salinity and flood hazards are low across the landscape, and erosion hazards range from low to moderate depending on topsoil structure and slope position.

The land capability classification for this area ranges from Class III to IV, and current land use includes grazing on both improved and unimproved pastures as well as cropping. Minor evidence of soil erosion such as gullying has been observed.

4.4 Climate

Climate in the Molong region includes warm to hot summers with the average maximum temperature in January being 31.0ºCelsius (ºC). Winters are cool to mild with average maximum temperature in July of 21.7ºC. Molong receives an average annual rainfall of 707.7 mm, with the highest mean monthly rainfall occurring in January at 69.8 mm. The climate data has been taken from the MOLONG (HILL ST) (065023), approximately 3.4 km from the proposed site.

4.5 Flooding

Existing flooding behaviour upstream and downstream of the proposed Development Footprint has been modelled using TUFLOW software. Flood mapping for the range of events modelled is provided in Flood Impact Assessment report.

4.6 Site Water Management

There is currently no water management infrastructure located within the Development Footprint . The Development Footprint is currently used for agricultural purposes (grazing) with an existing drinking trough for livestock,

4.7 Surface Water Quality

There is no existing stormwater or drainage system on the Development Footprint or natural overland flow features. Surface water quality in the Development Footprint is likely to be a function of its current agricultural (grazing) land use. Typical surface pollutants from the pre-existing conditions include sediment from surface runoff, nutrients, including nitrogen and phosphorous, primarily from pasture management practices i.e. fertilisation and soil enhancement practices and gross pollutants including vegetation and debris.

4.8 Groundwater

The following summary provides a high level overview of the existing hydrogeological environment. It is based on a more detailed assessment, which is provided in Appendix A for reference.

The Development Footprint is underlain primarily by Ordovician-aged volcanic and volcaniclastic rocks of the Fairbridge Volcanics (Cabonne Group), forming a fractured rock aquifer system that dominates local hydrogeology. Overlying regolith consists of clay-rich weathered rock to approximately 5 m depth, which may support perched or semi-confined groundwater zones but is not considered a significant regional aquifer. While unconsolidated sediments such as alluvium may occur locally near Molong Creek, these deposits are shallow, discontinuous, with limited hydraulic connection to the regional aquifer system.

Groundwater is predominantly hosted within the fractured volcanic rocks, where secondary porosity from fracturing provides the primary pathways for flow and storage. Standing water levels from nearby bores vary between 3 and 48 meters below ground level, averaging around 15 meters, reflecting local topography, fracture heterogeneity, and climatic influences. Groundwater flow follows subdued topographic gradients toward ephemeral drainage features in the Project Area, with perennial Molong Creek further downstream. The fractured volcanic aquifer is considered to be unconfined, although perched or semi-confined conditions may occur locally within weathered regolith near drainage lines.

Limited groundwater quality data from within 3 km of the site, mostly collected in the 1980s and 1990s, suggest slightly brackish conditions, with near-neutral pH. Groundwater quality is generally suitable for stock, irrigation, and domestic uses, with no evidence of contamination risk related to the site.

The hydrogeological setting suggests moderate to low permeability in the underlying volcanics and limited regional groundwater flow. Recharge is expected to occur via rainfall infiltration and creek interaction during high-flow events, while discharge likely occurs as baseflow to Molong Creek during dry periods.

4.8.1 Groundwater Users

This section provides a summary of groundwater users based on available data, with further detail provided in **Appendix A**.

A review of the NSW Water Register and surrounding bore data identified several registered groundwater bores within a 3 km radius of the Molong Development Footprint. These bores are predominantly screened within the fractured volcanic aquifer associated with the Fairbridge Volcanics and are understood to be used primarily for stock watering, domestic supply, and irrigation.

No Water Access Licenses (WALs) or groundwater extraction entitlements are recorded within or immediately adjacent to the Development Footprint, suggesting minimal commercial-scale groundwater use in the local area.

Given the nature of the proposed BESS development, which does not involve groundwater extraction or significant subsurface infrastructure, no direct impacts to existing groundwater users are anticipated.

4.8.2 Groundwater Dependent Ecosystems

This section provides a summary of potential groundwater dependent ecosystems (GDEs), with further detail available in Appendix A.

Potential GDEs within and near the project area were identified through spatial analysis of the Bureau of Meteorology's GDE Atlas and regional datasets. These include:

- Moderate potential aquatic GDEs associated with Molong Creek approximately 1.2 km southeast of the Development Footprint, potentially influenced by groundwater baseflow during dry periods.
- Low potential terrestrial GDEs corresponding to White Box grassy woodland communities within the project boundary, which may rely on shallow subsurface moisture sustained by groundwater.

Down-gradient or laterally adjacent GDEs are considered the only potentially susceptible receptors, given regional groundwater flow directions. No direct groundwater-dependent ecological impacts are expected given the limited extent of shallow alluvial sediments and no significant groundwater drawdown or contamination predicted from the development.

5.0 BESS Impact Assessment

5.1 Flooding

Changes to ground levels, including new embankments and a raised BESS pad can result in changes to drainage or flooding behaviour during construction and operation.

The flooding impact of the proposal is considered in the Flood Impact Assessment (SLR Consulting, 2025). Flood behaviour upstream and downstream of the proposed development has been modelled using TUFLOW software. Flood mapping for the range of events modelled, is provided along with discussion on the impacts from the proposal on flooding.

5.2 Site Water Management and Water Source Assessment

Water extraction from surface water or groundwater sources is not proposed for the Project.

5.2.1 Construction Water Management

As discussed in the Onsite Facilities (Water & Sewerage) Report, the Project will not be connected to a potable water main during construction due to its remote location. During the construction period, potable water will be delivered to the site by truck, as required, and stored in on-site tanks.. Water will be supplied in accordance with the Australian Drinking Water Guidelines and supported by an on-site treatment system that may include filtration, ultraviolet disinfection, and chlorine dosing.

Potable water will be used for staff drinking and welfare purposes (e.g., food preparation, washing), with an estimated daily requirement of up to 5.2 litres per worker for drinking and 10 litres for welfare. A temporary welfare unit with hand basins and water storage will be provided to meet SafeWork requirements.

Non-potable water for dust suppression, landscaping, and toilet flushing will also be delivered by truck, with delivery frequency managed according to project demand. Water reuse may be undertaken in accordance with best-practice construction water management. Stormwater captured in sediment basins may supplement construction water needs, where water quality and quantity are appropriate. Water take from disturbed areas is considered excluded works under the *Water Management (General) Regulation 2018*, and the Project is not expected to require any surface water licensing.

5.2.2 Operation Water Management

During operation, the potable water requirement will be significantly reduced. Drinking and welfare water will primarily be supplied by a water dispensing system using sealed bottled water delivered by an authorised supplier. The potable water system used during construction may be retained for welfare purposes such as handwashing and food preparation, but this will be confirmed during detailed design.

Toilet flushing will use elevated or in-ground tanks installed in the proposed Operation and Maintenance (O&M) building, with micro flush systems proposed to minimise water use. Rainwater collected from roof areas may be used to supplement this system where feasible.

Fire water supply will be provided via a dedicated on-site fire water tank constructed during the construction phase and retained for operation. This tank, estimated at approximately 150 kL, will be topped up as needed by water trucks and may include a rainwater catchment system for maintenance purposes.

5.2.3 Water Balance Modelling

There will be no operational requirement for water within the battery systems themselves. Potable water usage will vary depending on site occupancy, with estimated daily use ranging from 0 to approximately 100 litres/day, based on two intermittently present staff. Water tank refill frequency will depend on actual usage, with significant buffer capacity provided on-site to ensure supply continuity.

5.3 Surface Water Quality

The water quality at sensitive receptors near the Project are unlikely to be impacted during construction, operation and decommissioning of the proposal. There are no drainage lines that pass through the Development Footprint and any stormwater runoff generated by the increase in hardstand will be treated on site by the bioretention basin. Discharge from the bioretention basin will be at the southwestern end of the Development Footprint, on the western side of the proposed basin.

There are no requirements within the SEARs, or Cabonne Shire Council documents and guidelines that require reductions in surface water pollutant loads. This assessment has been undertaken to determine potential changes to existing export rates.

5.3.1 Construction

Surface water quality across the Development Footprint will most likely be impacted the most during the construction stage of the proposal. The placement of temporary works, stockpiles, equipment and plant can result in impacts on surface water quality, potentially leading to increases in sediment transport and increases in nutrients leaving the site.

Erosion from construction sites has the potential to contribute large sediment loads to downstream receiving environments. Construction works for the proposal are to be managed to minimise land disturbance, soil erosion and the discharge of sediment and other pollutants to surface waters. A *Construction Soil and Water Management Plan* (CSWMP) will outline measures to manage the impacts on receiving environments and will be developed as part of the *Construction Environmental Management Plan* (CEMP).

An Erosion and Sediment Control Plan will be developed to provide robust management and solutions to control erosion and sediment during the construction process.

The CSWMP and CEMP will be developed in accordance with the principles and requirements of the Landcom 2004 Managing Urban Stormwater: Soils and Construction – Volume 1 (commonly known as the 'Blue Book').

Temporary construction erosion and sediment control measures that would be implemented prior to construction of the Project include sediment fences, temporary sediment basins, shaker grids and/or wash down areas at the vehicle access point.

The operational bioretention basin within the BESS Footprint has been sized in accordance with the Blue Book to act as a sediment basin during the construction period.

Water supplies may be required during construction for controlling dust and other miscellaneous purposes. Quantities of water for construction purposes are expected to be relatively low and are covered in more detail in Section 3.1.3. Water will be sourced from the sediment basin during the construction period, when available and as suitable for the required activity.

5.3.2 Operation

Stormwater runoff from the Project will be conveyed to the bioretention basin via general site grading and cut-off swales, as shown in Figure 2. The bioretention basin is the same basin referred to as the stormwater basin during the construction stage. It will function initially as a stormwater basin for sediment control and subsequently operate as a bioretention basin during the operation. A diversion channel along the northern boundary will redirect runoff from the upstream catchment towards the west. This arrangement allows upstream flows to bypass the proposed bioretention basin to ensure it only captures stormwater from the proposed hardstand areas.

This basin has been sized to provide treatment of stormwater to mitigate off site impacts from increased levels of pollutants resulting from the Development Footprint.

An analysis of the potential impacts and pollutant exports has been carried out using the water quality modelling software package, MUSIC 6 modelling.

The MUSIC 6 water quality modelling was undertaken to assess the performance of the water quality treatment devices against the existing runoff conditions for agricultural land uses. This assessment has modelled pollutant loads for developed conditions, including the stormwater basin compared to existing conditions. The pollutants modelled were TSS, TN and TP.

The rainfall and evapotranspiration data adopted in the model is listed in Table 1, Six-minute rainfall data and daily evapotranspiration data from the Orange (Roseteague) station (0063253) was used in the analysis. All available data was used over the 10 years, which is representative of the site including wet and dry years and mean rainfall in accordance with the MUSIC Modelling Guidelines.

Table 1 Meteorological Data

Parameter	Value
Model Time Step	6 minutes
Modelling Period	11 April 2011 – 7 April 2021
Mean Annual Rainfall	995 mm
Annual Evapotranspiration	1160 mm

The soil type for the study area was determined using the eSpade database from NSW Planning, Industry & Environment. The closest representative soil profile for the site was identified as Profile 31 with Survey Number 1004750. The topsoil was classified as Clay Loam, which was used to select the soil parameters in accordance with the NSW MUSIC Modelling Guidelines. This approach ensures that the model accurately reflects site-specific conditions based on verified soil data. The adopted parameters are shown in Table 2.

MOLONG BESS

GENERAL LAYOUT

FIGURE 2

LEGEND

- Proposed Stormwater (Bioretention) Basin
- Proposed Swale Drains
- Proposed Diversion Drain
- MUSIC Model Catchment
- Catchment Upstream of Development Footprint
- Battery Storage Facility
- Substation

0 15 30 60 Meters

Coordinate System:	GDA2020 MGA Zone 55
Scale:	1:2,000 at A3
Project Number:	620.041615
Date:	22-Aug-2025
Drawn by:	GN

SLR

Table 2 Source Node Rainfall-Runoff Parameters

Parameter	Adopted Value
Impervious Area – Rainfall Threshold (mm/day)	1
Pervious Area – Soil Storage Capacity (mm)	119
Pervious Area – Initial Storage (% of Capacity)	10
Pervious Area – Field Capacity (mm)	99
Pervious Area – Infiltration Capacity Coefficient – a	180
Pervious Area – Infiltration Capacity Coefficient – b	3.0
Groundwater Properties – Initial Depth (mm)	50
Groundwater Properties – Daily Recharge Rate (%)	25
Groundwater Properties – Daily Baseflow Rate (%)	25
Groundwater Properties – Daily Deep Seepage Rate (%)	0

Conceptual design details of the bioretention basins, as adopted in the MUSIC 6 model, are provided in Table 3 and the results.

Table 3 MUSIC Model Treatment Node Parameters – Bioretention Basins

Parameter	Basin
Surface Area (m^2)	80
Filter Area (m^2)	80
Extended Detention Depth (m)	0.3
Filter Media Depth (m)	0.50
Saturated Hydraulic Conductivity (mm/h)	100
TN content of filter media (mg/kg)	400
OP content of filter media (mg/kg)	40
Overflow weir width (m)	10

These results of the modelling are outlined in Table 4, and indicate that the unmitigated pollutant loads for the Development Footprint would increase when compared to existing agricultural conditions.

Table 4 MUSIC Model Results

Pollutant	Existing (agriculture)	BESS (industrial)	BESS Basin outflow
Total Suspended Solids (kg/yr)	1,780	2,910	213
Total Phosphorus (kg/yr)	3.51	4.86	1.59
Total Nitrogen (kg/yr)	26.3	35.7	19.7

The results of the modelling in Table 4 indicate that without the proposed bioretention basin, there would be a potential impact on downstream receiving environments. The annual average pollutant load in stormwater runoff from the BESS Footprint with the proposed stormwater basin included in the proposal would be lower than the annual average pollutant load under existing conditions. These results demonstrate that increases in pollutant loads have been modelled as not significant.

The infiltration media within the stormwater basin, along with the basin storage volume, will act to manage any on site spills. In the event of an uncontrolled spill, the infiltration media will sorb the spilled material and prevent discharge to surface or groundwater.

5.3.3 Decommissioning

Surface water impacts during the decommissioning phase of the project relate to earthworks modifications and demolition of buildings and battery infrastructure.

The placement of temporary works, demolition material stockpiles, decommissioned equipment and plant can result in impacts on surface water quality, potentially leading to increases in sediment transport and increases in nutrients leaving the site.

Temporary demolition erosion and sediment control measures that would be implemented prior to decommissioning of the Project include sediment fences, temporary sediment basins, shaker grids and/or wash down areas at the vehicle access point.

5.4 Site Stormwater Management

The increase in impervious surfaces during construction and operation due to the proposal has the potential to increase stormwater runoff volume and flow rates at outfall locations.

There are no requirements within the SEARs, or Cabonne Shire Council documents and guidelines that require reductions in surface flow rates from the developed site. This assessment has been undertaken to determine potential changes to existing export flow rates. Stormwater impacts and detention requirements have been developed to limit site flow conditions. This includes the appropriate sizing of detention basins and drainage design to manage excess stormwater generated from the increase in impervious surfaces.

The stormwater basin will be constructed early on the construction process to manage and mitigate stormwater and sediment from the proposed construction, i.e. to act as a construction period sediment basin. The overall site fall will direct stormwater to the basin as shown in Figure 2**.**

A Watershed Bounded Network Model (WBNM) has been developed to assess the hydrologic impacts of the proposed development, including changes in impervious area and their effect on stormwater runoff. The model incorporates the stormwater basin, with a total surface area of 80 m^2 and a basin floor area of 43 m^2, consistent with the MUSIC 6 modelling. Climate change was considered in accordance with the *Climate Risk Ready NSW Guide* (DPIE, 2021). The Shared Socioeconomic Pathways (SSP) 5-8.5 has been adopted as the design scenario, consistent with the methodology outlined in *Australian Rainfall and Runoff* (ARR v4.2). This high-emissions scenario reflects a plausible upper-bound future climate condition for long-term infrastructure planning and provides a precautionary basis for scaling design rainfall intensities and losses.

Table 5 Stormwater Quantity Modelling Results

AEP Event	Peak Flow (m^3/s)		
	Existing	BESS	BESS Basin outflow
1%	3.53	1.79	1.71
2%	2.8	1.54	1.46
5%	2.17	1.28	1.15

AEP Event	Peak Flow (m^3/s)		
	Existing	BESS	BESS Basin outflow
10%	1.81	1.09	0.98
20%	1.47	0.84	0.82
50%	0.78	0.49	0.48
63%	0.63	0.44	0.44

The results of the WBNM modelling are presented in Table 5, comparing peak flows at the BESS outlet under the existing and design scenarios. In the design scenario without the stormwater basin, reductions in peak flow are observed across all assessed AEP events. With the stormwater basin included, further reductions in peak flow are observed for all AEPs with no further detention necessary. The modelling of the proposed BESS development demonstrates that the Proposal is not expected to result in significant downstream impacts.

5.5 Groundwater

The proposed BESS development primarily involves fill operations, with only minor excavation or cutting anticipated, to a maximum depth of five metres below ground level. While detailed groundwater level data across the site are limited, the nearest borehole to the west recorded a standing water level of approximately fifteen metres below ground level at the time of drilling. This suggests a separation of at least ten metres between the expected excavation depth and the water table. Therefore, groundwater impacts associated with excavation are not expected.

Potential risks to groundwater during the operational phase of the project primarily relate to accidental spills (e.g. fuels, chemicals), sediment disturbance, or mismanagement of stormwater. If such incidents occur, there is a possibility of contaminant infiltration to the underlying groundwater system, potentially degrading water quality.

Risk levels for these potential impacts have been assessed based on the consequence and likelihood matrix outlined in Section 8.1 of Appendix A. The likelihood ratings also consider the intrinsic vulnerability of the site, as discussed in Section 7.0.

Where impacts to groundwater quality may occur, they are expected to be minor and adequately managed through the site's stormwater control measures. In particular, the infiltration media within the BESS stormwater basin must be inspected following any spill event and replaced if contamination is identified.

6.0 Cumulative impact assessment

The following nearby major development that may affect the Project are as follows:

- Molong Solar Farm
- Golf Course Heights Estate
- Molong Community Centre
- Molong Hospital Additions
- Karma Yiwong Samten Tiebetan Buddhist Centre expansion (Sandy Creek Road, Molong)

The Surface and Groundwater Impacts of the Project, outlined in this report and mapping are limited to the immediate vicinity of the development footprint. The nearby developments are the subject of separate surface and groundwater impact assessments and are not anticipated to have any relevant impacts at the proposed BESS footprint, or to be impacted by the proposed development in the BESS footprint.

7.0 Mitigation and management measures

Design flood events have been assessed to understand the likelihood of potential surface and groundwater impacts from the proposed development to the surrounding floodplain areas. The runoff management elements as they are currently proposed are predicted to cause minimal impacts on surrounding areas for events up to and including the 1% AEP.

Potential impacts from the proposed development are shown in Table 6.

Table 6 Potential impacts and recommended design considerations for the proposed development

Risk	Potential impacts	Measures to avoid, mitigate or minimise impacts
Impact on surface flow in watercourse, flows in channels/drainage structures and flows in floodplains	Modified surface flow volume or rate downstream of the proposal	Design drainage elements, such as the stormwater basin proposed for the BESS within the proposal to minimise risk of localised surface water ponding
	Changed surface flow paths across the BESS Footprint	Minimise regrading of terrain for the proposed development pad. Install appropriately sized stormwater drainage infrastructure across the Development Footprint
Impact of additional development hardstand	Increased runoff to watercourses and pollutant loads in downstream watercourses	The impact of increased runoff and pollutant loads to minor drainage lines should be managed by onsite stormwater management measures, such as the stormwater basin proposed for the Development Footprint.
Impacts to surface water quality	Decreases in water quality in receiving surface water environments	Site specific erosion and sediment control plan will be prepared and implemented for the construction period. Water quality impacts during operation are managed by the incorporation of a stormwater basin in the Development Footprint.
Groundwater impacts	Impacts to groundwater from construction	Impacts on groundwater during construction will be minimised as far as practicable by: • Entirely avoiding the need to extract groundwater • minimising groundwater inflows and volumes into excavations into the building pad (above the natural ground surface)

Risk	Potential impacts	Measures to avoid, mitigate or minimise impacts
		• managing any groundwater encountered during excavations
Accidental spillage of oil, greases and other pollutants	Decrease in water quality in receiving surface and ground water environments due to spills during construction and operation of the Project	Impacts on groundwater during construction and operation will be minimised as far as practicable by the implementation of the *Construction Soil and Water Management Plan.* The stormwater basin will retain pollutants in the event of accidental spillage, with the basin and infiltration medium retaining pollutants.
Loss of supply (yield) from third party bores.	Reduction in, or complete loss of, supply (yield) from third party bores.	This risk is considered highly unlikely. All proposed infrastructure is above ground. No excavation/disruption to groundwater table/aquifers expected. As a result of this very low risk, no mitigation measures are required.
Reduction in water quality at third party bores.	Bore water quality no longer suitable for the intended use.	This risk is considered highly unlikely. Potential contamination during fire events only where active fire suppression is applied. Fire events subject to extensive controls within engineered facility design. Further engineering controls related to potential contaminants are in place throughout design (water run-off management and containment, ground covers etc.). As a result of this very low risk, no mitigation measures are required.
Reduction in flow in surface water systems	Impact to environmental receptors reliant on flow in surface water systems	This risk is considered highly unlikely. Baseline groundwater system characterisation indicates that where it occurs, groundwater within the basal alluvium is recorded at depths of around 6 to 15 mbGL, typically significantly disconnected from the streambed elevation. Watercourses within the Project Lots are likely highly ephemeral where surface water flow is only sustained for hours to several days following rainfall events. Overall, these factors indicate a distinct lack of groundwater discharge to these watercourses from the regional aquifer, and therefore no potential for groundwater drawdown to manifest as a decrease in surface water flow. As a result of this very low risk, no mitigation measures are required.

Risk	Potential impacts	Measures to avoid, mitigate or minimise impacts
Reduction in water quality in surface water systems.	Surface water quality no longer suitable for environmental users/aquatic ecosystems.	This risk is considered highly unlikely. Notwithstanding the fact that groundwater does not discharge to surface water systems under current conditions, no excavation or subsurface works are proposed that would intercept the water table during construction, operation, or decommissioning of the BESS. As a result of this very low risk, no mitigation measures are required.
Loss of groundwater availability to Terrestrial GDEs	Decline in health of Terrestrial GDEs	This risk is considered highly unlikely. The level of groundwater reliance by terrestrial vegetation within the Project Lots is uncertain and has not been formally assessed. However, given the lack of expected impact to the groundwater system, the risk to mapped low-potential terrestrial GDEs (e.g. White Box Grassy Woodland) is considered to be minimal. As a result of this very low risk, no mitigation measures are required.
Reduction in water quality used by terrestrial GDEs	Decline in health of Terrestrial GDEs	As above.
Temporary contamination during construction	Temporary degradation of shallow groundwater quality	This risk is considered unlikely. Construction activities are temporary and limited in scope. All work will occur within shallow soils (to a depth of up to 4–5m below ground level), with standard environmental controls in place (e.g. sediment fences, spill kits, bunded fuel storage). Risk of infiltration to groundwater is therefore low. As a result of this low risk, no mitigation measures are required.

8.0 Conclusion

This report has assessed and identified surface water and groundwater impacts that could occur as a result of the construction and operation of the Proposal.

The assessment indicated that the Proposal is unlikely to result in serious adverse impacts to surface water and groundwater, and the potential construction and operation impacts discussed in this report are common on construction projects.

Construction and operation of the Proposal is not predicted to intercept groundwater and therefore the proposal is not predicted to impact groundwater receptors, including groundwater dependent ecosystems and surrounding landholder bores.

Operational impacts on water quality would be mitigated by the construction of a stormwater basin within the Development Footprint. The potential increases in pollutant loads resulting from the increase in hard surfaces and imperviousness over the Development Footprint is unlikely to result in any measurable changes to the water quality of the downstream receiving environments of the minor tributaries of the Macquarie-Bogan River catchment.

With the implementation of the safeguards and management measures provided in this report, and the installation of the proposed stormwater basin located within the Development Footprint, potential impacts on surface water and groundwater are considered minor and manageable.

9.0 References

Australian Government and Engineers Australia (2019) *Australian Rainfall and Runoff: A Guide to Flood Estimation* (ARR v4.2)

Australian Guidelines for Water Quality Monitoring and Reporting (the ANZECC guidelines) *National Water Quality Management Strategy* (NWQMS) (ANZECC/ARMCANZ, 2000)

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Bureau of Meteorology (BOM), (2017) Groundwater Dependent Ecosystems (GDE) Atlas map (Retrieved from http://www.bom.gov.au/water/groundwater/gde/)

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Groundwater Resources Assessment

Proposed Molong BESS:
1 Deight Street & 19 Back Saleyards Road, Molong NSW 2866

FOR: StorEnergy 3 Pty Limited

SLR PROJECT No: 620.041615.00029 Revision: 4.0

19 August 2025

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1.0	5 August 2025	Gabrielle Killalea	Daniel Ashton	Daniel Ashton
2.0	4 July 2025	Gabrielle Killalea	Daniel Ashton	Daniel Ashton
3.0	25 July 2025	Gabrielle Killalea	Daniel Ashton	Daniel Ashton
4.0	19 August 2025	Gabrielle Killalea	Daniel Ashton	Daniel Ashton

Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with StorEnergy 3 Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

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Tables

Figures

1.0 Introduction

StorEnergy 3 Pty Ltd (Stor) has engaged SLR Consulting Australia (SLR) to provide a groundwater resources assessment for a proposed Battery Energy Storage System (BESS) facility located within Molong NSW 2866. The proposed project extends across two (2) lots, 1 Deight Street (Lot 99 DP 1020247), and 19 Back Saleyards Road (Lot 1 DP 542283). This report presents a technical assessment for potential groundwater risks related to the project, supporting a State Significant Development application to the NSW Department of Planning, Housing and Infrastructure (DPHI).

2.0 Objectives

The following report presents a quantitative risk assessment for groundwater resources and outlines environmental and site constraints influencing design to mitigate the potential risks to groundwater receptors. This assessment is based on publicly available scientific data and information administered by the Federal Government (GDE Atlas-BoM, Elvis-GA, Australian Groundwater Explorer).

3.0 Assessment Methodology

The scope of the desktop groundwater resources assessment undertaken to address the Secretary's Environmental Assessment Requirements (SEARs) is outlined as follows:

- Collation and assessment of available information for existing bores in the vicinity of the Project including (where available) hydrostratigraphy, standing water level, and water quality from public databases (BoM-Australian Groundwater Explorer, GDE Atlas) or previous studies.
- Identify the groundwater values in the development area or that are potentially impacted by the development.
- Review of the NSW Aquifer Interference Policy and the Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020.
- Based on available data, assess the local hydrogeology and aquifer properties, groundwater flow pathways to potential receptors and if possible, the likelihood of impact from contamination events at the facility relating to floods and fires.
- Provide a high-level intrinsic vulnerability assessment for the aquifer(s) within the proposed Development Footprint using available information on groundwater confinement, overlaying lithology and depth to the water table.
- Provide preventative and mitigatory measures to protect groundwater (on-site) during construction, operation, and decommissioning.
- Discussion of potential containment measures if contamination is released from the Project into the local groundwater environment.

4.0 Site Settings

4.1 Location

The Project is located in Molong, a rural locality within the Cabonne Shire Council area in central-west New South Wales. The land immediately surrounding the Development Footprint is predominantly cleared land used for agricultural purposes. An unnamed tributary of Molong Creek traverses the Project Lots from east to west, and a small, isolated dam is also present within the local catchment. Vegetation is largely absent apart from scattered mature trees and riparian shrubs and grasses along the drainage line (Figure 4-2).

4.2 Climate

The Project lies in Central West New South Wales which has a sub-tropical climate, characterized by warm, dry summers and cold, wet winters. Long-term rainfall (mm) and evaporation – Class A pan (mm) data was sourced through the Scientific Information for Land Owners (SILO) database (Jeffrey et al., 2001) as a patch point dataset for the closest location (Lat: -33.10S / Long: 148.90E).

Rainfall trends for the area are indicated by analysis of the Cumulative Rainfall Departure (CRD) from long term mean rainfall (Figure 4-1). Positive gradients on the CRD (rising trends) indicate wetter-than-average climatic conditions, whereas negative gradients (declining trends) reflect drier-than-average conditions. Broadly horizontal sections of the CRD indicate average rainfall conditions. Figure 4-1 illustrates that between 2000 and 2025, the wettest period occurred from 2020 to 2022, with November 2021 recording over 300 mm of rainfall. Following 2022, the CRD trend declined for one year, indicating drier conditions over this period. The most prolonged dry period on record, with below-average rainfall, was observed between 2001 and 2010. Since late 2023 the CRD has remained broadly horizontal indicating a period of average rainfall conditions.

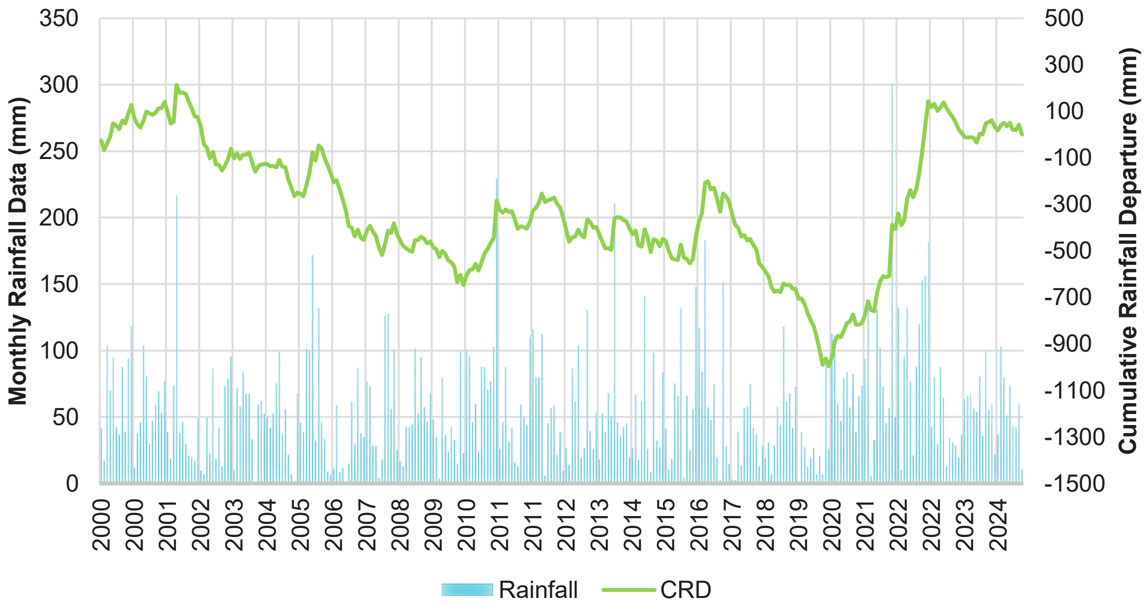
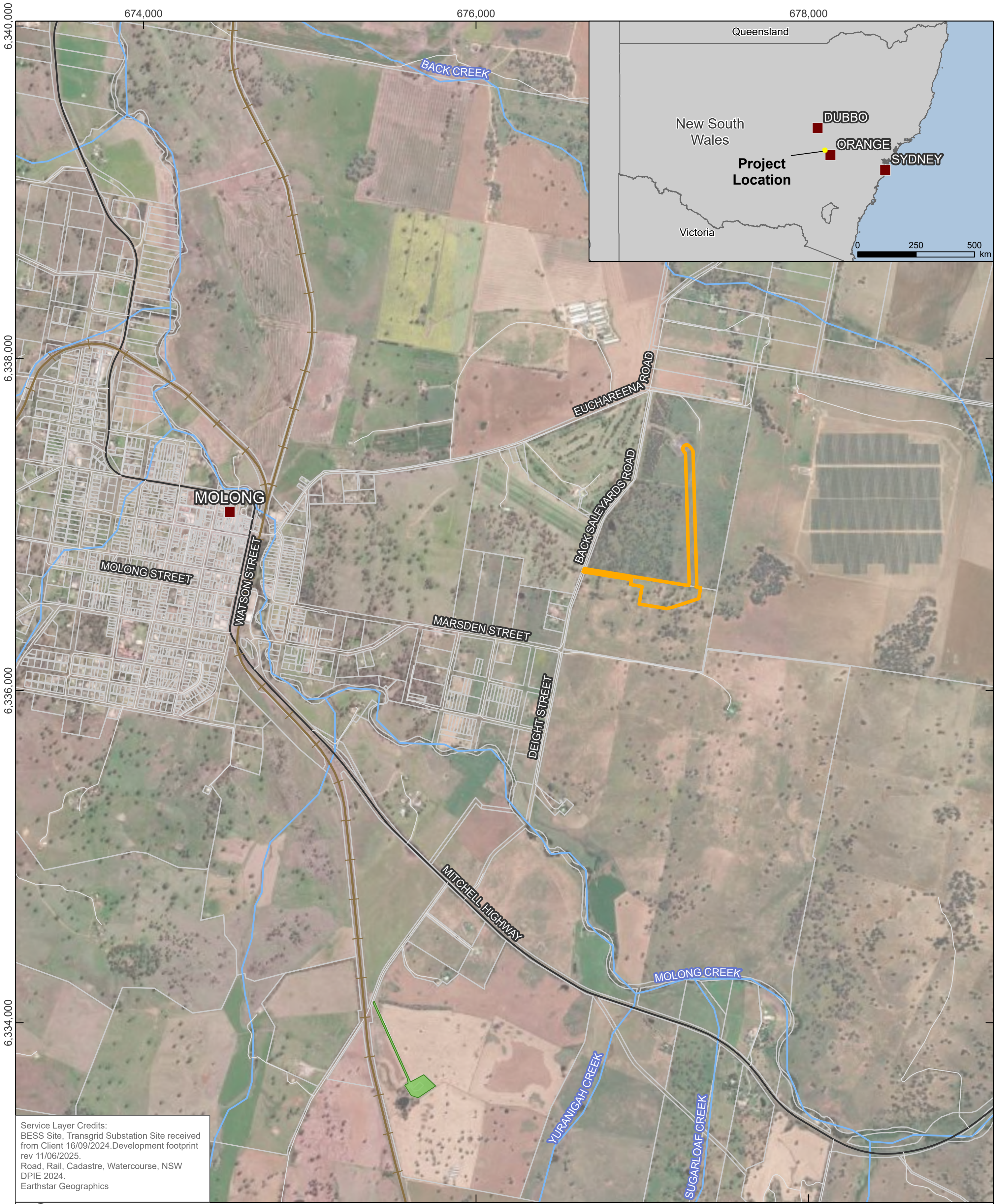


Figure 4-1 Monthly Rainfall and Cumulative Rainfall Departure from Average Rainfall



Service Layer Credits:
BESS Site, Transgrid Substation Site received from Client 16/09/2024.Development footprint rev 11/06/2025.
Road, Rail, Cadastre, Watercourse, NSW DPIE 2024.
Earthstar Geographics

0 0.5 1 km

Coordinate System:	GDA2020 MGA Zone 55
Scale:	1:30,000 at A4
Project Number:	620.041615
Date Drawn:	04-Jul-2025
Drawn by:	NT

SLR

LEGEND
- Town/City
- Watercourse
- Primary Road
- Road
- Rail
- Development Footprint
- Cadastre
- NPWS Reserve

MOLONG BESS

PROJECT LOCATION

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FIGURE 4-2

Path: H:\Projects-SLR\620-BNE\620-BNE\620.041615.00001 Stor Energy NSW\06 SLR Data\01 GIS\GIS\NSW_Stor.aprx\620041615_GW_F01 Location Plan

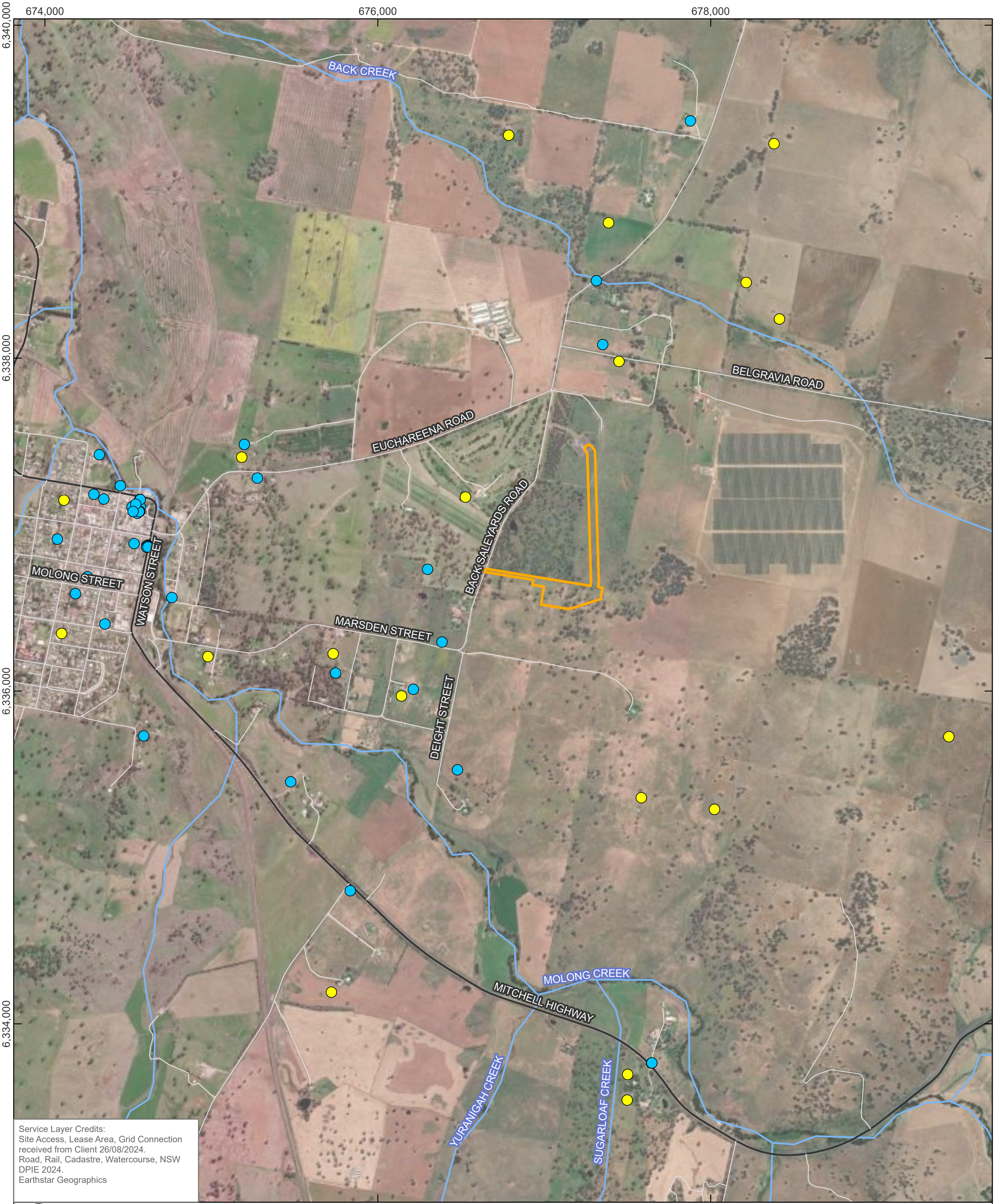
4.3 Available Bore Data

Bore data has been collated from the Australian Groundwater Explorer (Bureau of Meteorology, 2025) and SEED (New South Wales Government, 2025) spatial datasets for the local area.

Data on groundwater depth are available for 59 bores within 3 kilometres (km) of the Project. Water level data from registered bore reports are mostly limited to measurements collected during bore construction (most recent in 2015), which may be unrepresentative of stable aquifer water levels due to drilling influence. There is little post construction monitoring available, and hence there are no time series data for water levels at most locations. It is noted that the rainfall analysis presented in Section 4.2 describes significant climatic changes over this dataset time period, which has been considered when assessing groundwater levels for the Project Lots through time.

Bore reports for the bores shown in Figure 4-3 detail the shallow geology of the area which is discussed in Section 5.0. Minimal elevation data is available on these bore reports, and conversion of water level measurements to elevation was carried out using the 1 metre LIDAR Elevation Foundation Spatial Dataset (Geosciences Australia, 2025).

No groundwater Water Access Licences (WALs) were identified within the Project Lots as part of this assessment.



Coordinate System: GDA2020 MGA Zone 55
Scale: 1:30,000 at A4
Project Number: 620.041615
Date Drawn: 04-Jul-2025
Drawn by: NT

LEGEND

- Watercourse
- Primary Road
- Road
- Development Footprint

Registered Groundwater Bore - Status

- Functioning In Use
- Unknown

MOLONG BESS

PUBLIC GROUNDWATER BORE DATA

SLR

FIGURE 4-3

Path: H:\Projects-SLR\620-BNE\620-BNE\620.041615.00001 Stor Energy NSW\06 SLR Data\01 GIS\GIS\NSW_Stor.aprx\620041615_GW_F04_3_Bore Location

5.0 Geology

This section outlines the key geological information relevant to hydrostratigraphic characterisation of the Project Lots.

According to the State (New South Wales Government, 2025) Detailed Surface Geology (SDSG) mapping (Figure 6-1), the Project Lots are underlain predominantly by Ordovician-aged volcanic and volcaniclastic rocks of the Fairbridge Volcanics, which form part of the Cabonne Group.

5.1.1 Unconsolidated Sediments/Regolith

While unconsolidated sediments such as alluvium are likely to occur locally along drainage features, no alluvial deposits have been formally mapped in association with Molong Creek to the south and west of the Project Lots, nor along the unnamed tributary that drains southwest across the southernmost portion of the Project Lots.

Despite the lack of mapped geology, cross-sectional interpretation (Figure 6-2) suggests a shallow, discontinuous deposit of alluvium may be present in close proximity to the Molong Creek channel. These sediments are not considered laterally extensive or hydraulically connected and are therefore not represented in regional geological datasets.

Based on available data, the hydrostratigraphic characterisation has focused on the fractured rock aquifer within the Fairbridge Volcanics, rather than any overlying unconsolidated sediments or regolith.

5.1.2 Fairbridge Volcanics

The solid geology underlying the Project Lots is the Fairbridge Volcanics, which comprise interbedded andesitic to dacitic lava flows, volcanic breccias, and volcaniclastic sandstones, with local limestone units likely related to the Reedy Creek or Molong Limestone formations (New South Wales Government, 2025). These Ordovician-aged extrusive volcanic rocks are part of the broader Molong Volcanic Belt, within the Lachlan Orogen - a major Palaeozoic structural province that developed through subduction-related accretion between the Ordovician and Early Carboniferous. The Fairbridge Volcanics were deposited in a marine volcanic arc setting during the Middle Ordovician and represent a complex sequence of submarine to possibly subaerial volcanic activity interspersed with carbonate deposition.

Within the Project Lots, the unit exhibits a variable regolith profile, with weathered volcanic rocks forming clay-rich soils at the surface and decomposed volcanics extending to depths of approximately 5 mbGL. Borehole logs from the surrounding area commonly describe subsurface materials as "basalt" or "limestone," which likely reflect weathered volcanic units and localised carbonate-rich zones, respectively. These local limestone units are possibly associated with the Reedy Creek or Molong Limestone formations at a regional scale, although no discrete carbonate formation has been mapped within the Project Lots.

For the purpose of this groundwater assessment, the underlying fractured rock aquifer is referred to as basalt, in line with regional hydrostratigraphic conventions. However, it is important to note that certainty regarding subsurface lithology is not attainable due to the high degree of heterogeneity in the Molong area. Therefore, this designation is an informed assumption based on available data.

6.0 Hydrogeology

6.1 Hydrostratigraphy

6.1.1 Unconsolidated Sediments/Regolith

Where present, clay-rich weathered materials may support perched or semi-confined conditions, particularly near drainage lines. However, these are not considered regionally significant aquifers.

Fifteen bores screened within the shallow weathered zone (less than 10 m total depth) may derive groundwater from perched saturation within the regolith. Groundwater level records from these bores indicate water presence within the weathered zone, but these data are limited and generally dated.

6.1.2 Fairbridge Volcanics

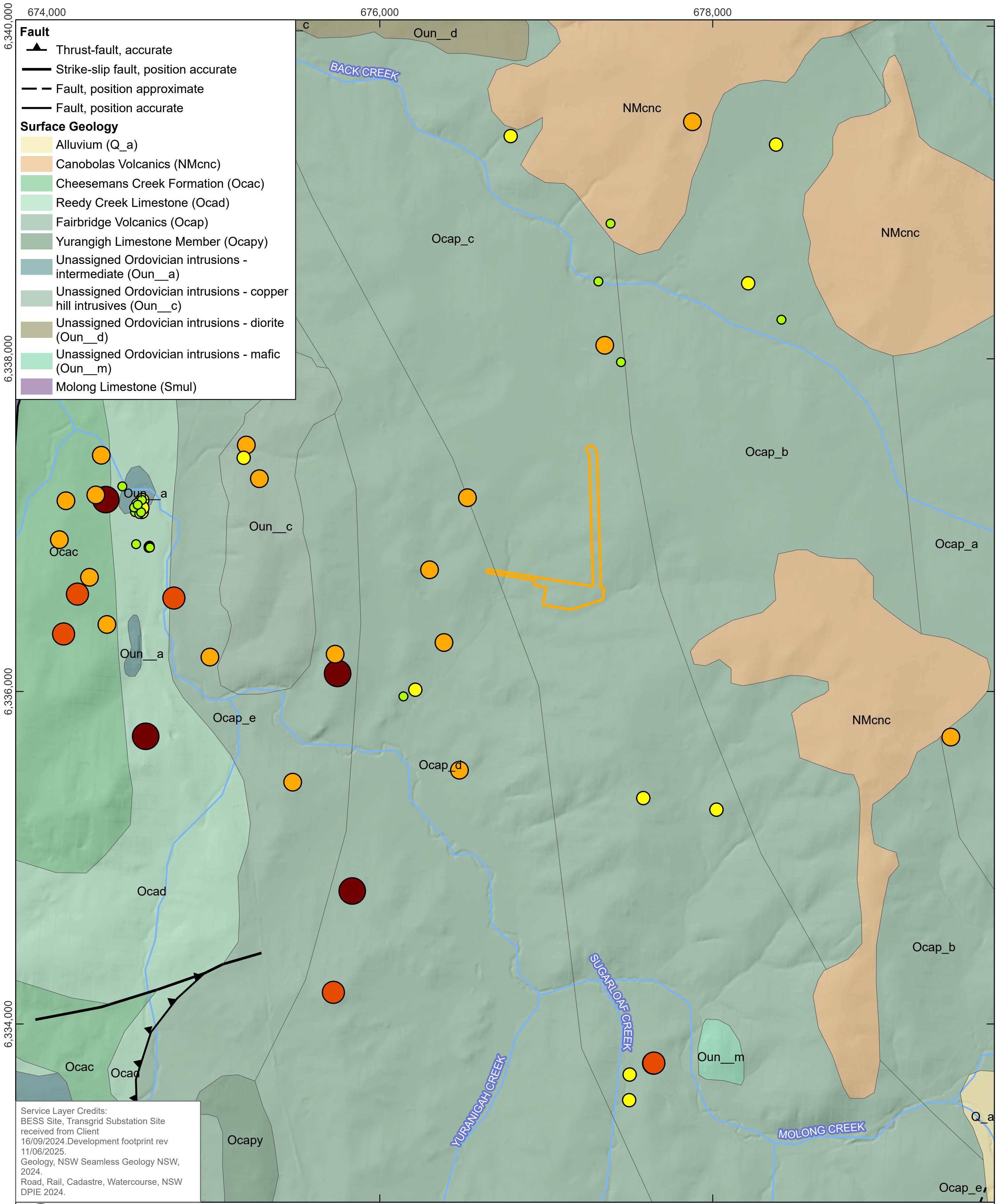
Groundwater bores in the area commonly describe fractured basalt, interpreted as part of the Fairbridge Volcanics. Although this unit includes a variety of volcanic lithologies, bore data within the surrounding area lacks the resolution to differentiate between them. For the purposes of this assessment, the fractured rock aquifer is assumed to be broadly basaltic in composition, as the balance of bore logs note that water strike was associated with intercepts of basaltic material.

Basalt aquifers are generally described as fractured rock aquifers, with groundwater hosted in the secondary porosity associated with fracturing. It is unclear if there are flow tube features associated with these basaltic emplacements. Bore logs typically describe the volcanic units as “fractured basalt,” though the degree of fracturing is often only broadly characterised. These fracture networks within the Fairbridge Volcanics are interpreted to provide the primary pathways for groundwater flow and storage. The highest yields reported from regional bores are generally associated with those screened in the basalt, indicating the fractured volcanic rock as the dominant productive aquifer unit in the area.

Regarding regional continuity, the Fairbridge Volcanics are considered laterally extensive within the project vicinity, although heterogeneity in fracturing and weathering likely leads to spatial variability in hydraulic properties.

Evidence for confined conditions is limited. Available water level data do not conclusively demonstrate hydraulic confinement, and the fractured basalt is generally considered an unconfined or locally semi-confined aquifer, dependant on fracture orientation and rheology of weathered horizon.

A minor subset of bores is screened within limestone units, consistent with localised carbonate formations such as the Reedy Creek or Molong Limestone formations. However, these intercepts are isolated, with no clear stratigraphic continuity or lateral extent evident within the Project Lots. Given their limited spatial distribution and the likelihood that they occur as thin lenses or interbeds within the Fairbridge Volcanics, they are not considered hydraulically distinct from the surrounding fractured volcanic aquifer and have not been treated as a separate hydrostratigraphic unit in this assessment.



0 0.5 1 km

Coordinate System:	GDA2020 MGA Zone 55
Scale:	1:30,000 at A4
Project Number:	620.041615
Date Drawn:	04-Jul-2025
Drawn by:	NT

LEGEND

- Watercourse
- Development Footprint

Registered Groundwater Bore - Depth (m)

- 0 - 10
- 10 - 25
- 25 - 50
- 50 - 75
- 75 - 121

MOLONG BESS

SURFACE GEOLOGY

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FIGURE 6-1

Path: H:\Projects-SLR\620-BNE\620-BNE\620.041615.00001 Stor Energy NSW\06 SLR Data\01 GIS\GIS\NSW_Stor.aprx\620041615_GW_F06_1_Surface Geology

6.2 Groundwater Levels Flow Direction

Groundwater depths in the surroundings area have been collected for 18 bores through SEED (New South Wales Government, 2025) spatial datasets Appendix A. Reference elevation data from the 1m LIDAR Elevation Foundation Spatial Dataset (Geoscience Australia, 2025) has been used to obtain standing water levels (SWL) as the difference between reference elevation and the reported depth to groundwater on registered bore records.

Detailed water level analysis was limited by the available data, which primarily consists of single measurements recorded at the time of bore installation. Consequently, hydrographs could not be developed, and direct comparison of water levels across different time periods is limited. Figure 6-2 depicts groundwater level and hydrostratigraphic data, highlighting the influence of topographic features in the immediate area . Due to the lack of time series data, the degree of fluctuation in water levels from seasonal variations or local groundwater use remains unclear.

6.2.1 Unconsolidated Sediments/Regolith

Of the 18 bores with standing water level (SWL) data within a 3 km radius of the Development Footprint, one bore is interpreted to be screened within the regolith, with a total depth of 10 m and a recorded SWL of approximately 4 m below ground level. No lithological information is available for this bore to confirm stratigraphy or aquifer conditions. Nearby bore logs describe the regolith as comprising reddish clay to brown clay, consistent with weathered volcanic materials. These shallow clay-rich units may support perched or semi-confined groundwater conditions, particularly near drainage features, though there is insufficient data to determine their extent or hydrogeological significance. Due to this, the regolith is not considered a regionally significant aquifer.

6.2.2 Fairbridge Volcanics

Within a 3 km radius of the Project Lots, 18 bores with standing water level (SWL) information were identified, most of which are registered as “water supply bores” targeting the fractured volcanic aquifer commonly referred to as “basalt water supply.” Recorded SWLs range from approximately 3 to 48 metres below ground level (mbGL), with an average depth to water of around 15 mbGL. This broad range likely reflects a combination of factors, including variations in local topography, bore elevation, degree of weathering and fracturing, the presence or absence of perched or semi-confined conditions in the weathered zone, and temporal variation in groundwater recharge due to climatic fluctuations over time. Only one bore reported a depth to water greater than 30 mbGL, suggesting that the 48 metre deep measurement may be erroneous in nature or reflective of a drilling time observation rather than a stabilised standing water level.

Groundwater levels generally show a trend of shallowing toward surface water features, particularly along local drainage lines. Within the immediate vicinity of the Project, these drainage lines are highly ephemeral, typically sustaining flow only for hours to several days following rainfall events (DCCEEW, 2025) and are unlikely to receive sustained groundwater baseflow due to their intermittent nature and the typically deep groundwater levels. However, further downstream, Molong Creek is a perennial surface water feature, and its flow permanence suggests that some degree of groundwater discharge likely contributes to maintaining baseflow conditions. Overall, the groundwater flow regime is interpreted to follow subdued topographic gradients, with recharge primarily occurring through rainfall infiltration across the weathered regolith and fractured rock. This is consistent with typical fractured rock aquifers in similar geological settings. While the fractured volcanic aquifer is interpreted as predominantly unconfined based on available data, shallow water levels in some bores and the presence of clays suggest that semi-confined or perched conditions may occur locally.

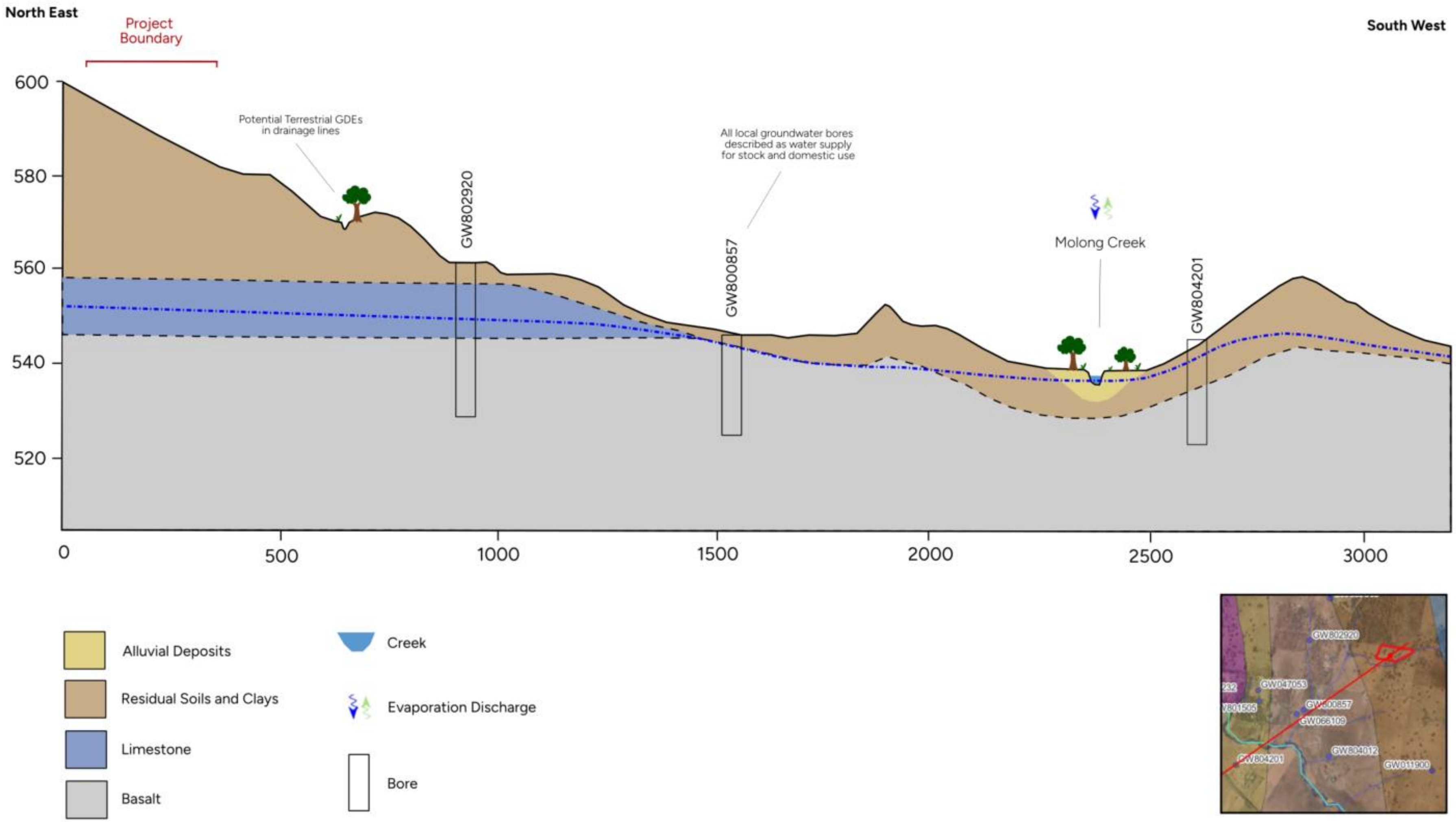


Figure 6-2 Hydrogeological cross section of Project Lots

6.3 Groundwater Quality

Limited groundwater quality data is available in registered bore database for the Project Lots. The groundwater quality information presented in Table 6-1 is derived from bores located within 3 km from the Project Lots , where comprehensive major ion analysis and physicochemical data (pH and Electrical Conductivity) are available. Different symbols were used to distinguish bore locations based on the geological formations in which they are screened, as shown in Figure 6-3. The data, collected between 1983 and 1990, has been utilised to establish a baseline groundwater quality reference for the broader area.

The physicochemical and major ion data have been visually represented using a Piper plot (Table 6-1), which facilitates the classification of aquifer water types, identification of geochemical processes influencing groundwater composition, and assessment of potential hydraulic connectivity between aquifers and recharge sources.

The available samples predominantly indicate a magnesium-bicarbonate water type, consistent with rainfall recharge. Minor magnesium concentrations likely reflect aquifer mineral interactions, while variability in sulfate and calcium, and occasional elevated sodium and chloride (notably in GW023907 and GW047053), suggest localised soil influence during infiltration. The relatively low Electrical Conductivity (EC) values indicate slightly brackish conditions for bores screened within the Fairbridge Volcanics unit, with little variation observed between varying lithologies (regolith, interbedded limestone, and basalt). Additionally, water quality records reflect a neutral pH.

Table 6-1 compares available data (1985–1990) to the groundwater quality objectives for freshwater ecosystem protection (ANZECC, 2000), stock water use (ANZECC, 2000), irrigation use (ANZECC, 2000), and the NHMRC Australian Drinking Water Guidelines (2022). The results indicate that natural background groundwater quality is generally suitable for stock, irrigation, and domestic use across most major anions and cations. Occasional exceedances of sulfate and TDS are observed, typically against ecosystem protection and aesthetic guideline values (domestic use). These exceedances are considered reflective of naturally elevated concentrations associated with the regional aquifer, rather than evidence of anthropogenic impacts. Other parameters such as potassium and carbonate, while lacking defined thresholds, fall within expected ranges for the local hydrogeological setting.

Table 6-1 Comparison of Groundwater Quality Results Against Relevant Water Quality Objectives for Environmental and Beneficial Uses

Bore	Aquifer	Date	pH	TDS	Na	K	Ca	Mg	HCO3	CO3	Cl	SO4
WQO – Ecosystem (ANZECC & ARMCANZ, 2000)			6.5 – 8.0	< 1000	No specific trigger	No specific trigger	No specific trigger	No specific trigger	No specific trigger	No specific trigger	< 100	< 50 – 100
WQO – Stock (ANZECC & ARMCANZ, 2000)			6.5 – 9.0	< 4000	< 900	No specific trigger	< 1000	< 250	< 1000	< 100	< 1500	< 1000
WQO – Irrigation (ANZECC & ARMCANZ, 2000)			6.5 – 8.5	< 2000	< 230 (sensitive crops)	< 10	< 400	< 60	< 180	< 15	< 175 (sensitive crops)	< 500
WQO – Domestic (NHMRC, 2022)			6.5 – 8.5	< 600	< 180	No specific trigger	No specific trigger	No specific trigger	No specific trigger	No specific trigger	<250	<250
GW023907	Basalt	18/01/1990	7.53	729.2	158.8	1.69	45.5	61.16	376.2	0	40.7	520.0
GW047053[1]	Basalt	26/03/1985	6.98	857.0	40.5	0	173.4	77.53	422.1	0	73.4	641.7
GW062046	Basalt	20/06/1985	7.2	444.2	46.7	3.3	199.4	12.3	353.1	0.2	110	146.8
GW0578203	Limestone	1/02/1983	7.6	661.2	42.1	1.17	95.4	13.61	340.8	0	123.4	178.4
GW057821	Regolith[2]	1/02/1983	7.01	588.8	44.6	1.56	151.9	23.33	354.9	0	83.3	119.4

Blue highlight reflects exceedance of Freshwater Ecosystem Protection WQOs
Khaki highlight reflects exceedance of Stock Water Use WQOs
Green highlight reflects exceedance of Irrigation WQOs
Yellow highlight reflects exceedance of Domestic Use WQOs
Orange highlight reflects exceedance of multiple WQOs
[1] reflects town water supply bore
[2] based on nearby bore lithology, only total depth information available

This analysis is based on limited available data, which may not represent current conditions. However, this data is likely to represent natural background conditions for groundwater in the surrounding environment.

The proposed development is not expected to influence groundwater chemistry through contaminant discharge, increased evaporation, or recharge interruption.

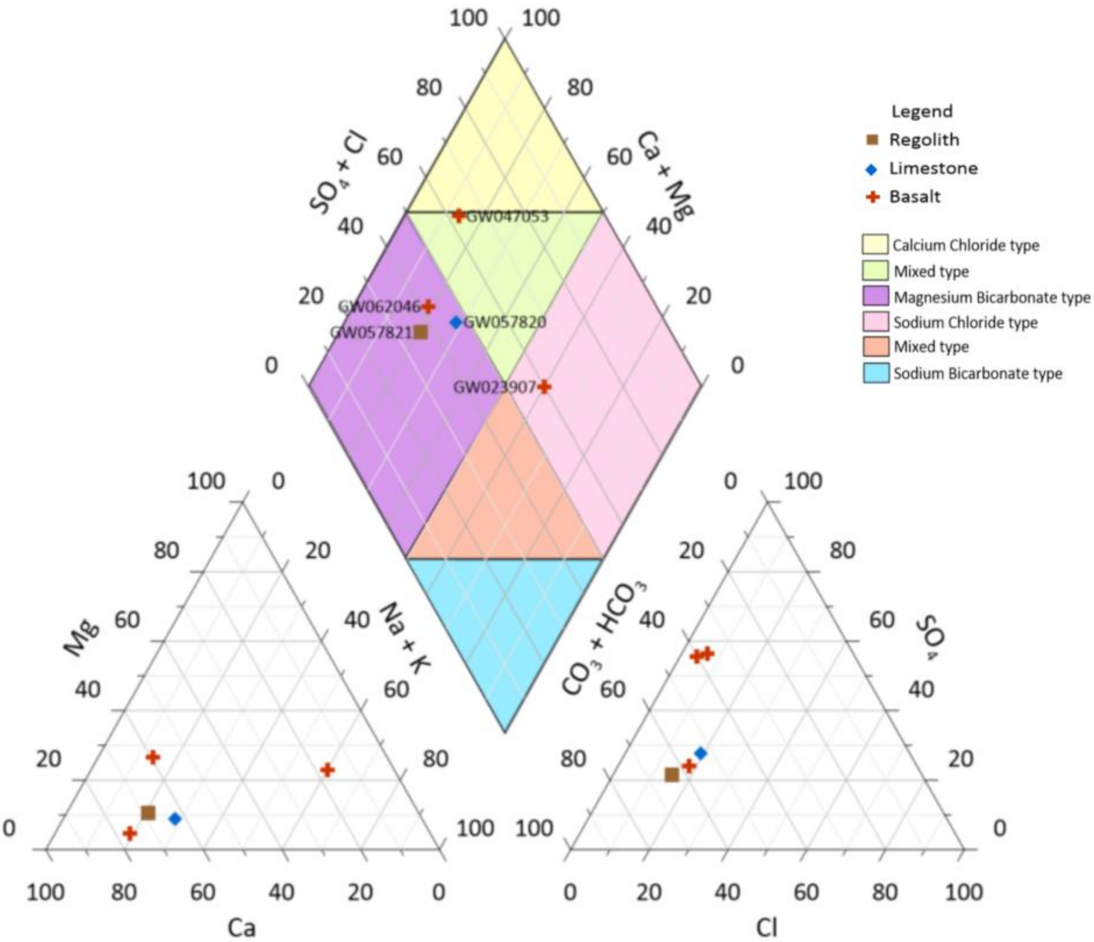


Figure 6-3 Piper Plot for bores in within 3 km of Project Lots

6.4 Beneficial Uses of Groundwater and Environmental Values

Environmental values associated with groundwater in the nearby area, are informed by the NSW Aquifer Interference Policy, Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020, and the broader ANZECC/ARMCANZ (2000) Guidelines for Fresh Water Quality. These values reflect both environmental and extractive uses of groundwater in the region.

Key groundwater-related beneficial uses applicable to the Project Lots include:

1. Aquatic Ecosystems
2. Irrigation
3. Domestic/farm supply and use
4. Stock water
5. Primary recreation
6. Drinking water
7. Cultural and spiritual values

Of these, the most relevant to the Project Lots are values 1 to 4, reflecting the agricultural and ecological setting. Informal recreational use of Molong Creek (particularly fishing) is evident downstream and may extend into nearby reaches. While some groundwater baseflow from perched unconsolidated sediment is possible, available data does not confirm consistent or significant groundwater discharge near the Project Lots. Groundwater is not used for drinking water supply locally. Cultural and spiritual values have not been identified.

The Project Lots is also mapped as groundwater vulnerable under the Cabonne Local Environmental Plan (LEP). As required in Cabonne Local Environmental Plan 2012 (Sheet CL1_004; Map ID: 1400_COM_CL1_004_160_20121002), this vulnerability requires assessment of likelihood of groundwater contamination, potential for adverse impact on groundwater dependent ecosystems, cumulative impact on local groundwater system, and appropriate measures to avoid, minimise or mitigate impacts on groundwater. The aquifer vulnerability and risk assessment, as detailed in Section 7.0 and 8.0 of this report satisfies the requirement for this assessment.

The following sections examine the non-extractive beneficial uses of groundwater (groundwater dependent ecosystems) and the extractive beneficial uses (irrigation, domestic supply, stock water).

6.4.1 Non-Extractive Groundwater Use

A review of the Bureau of Meteorology's Groundwater Dependent Ecosystems Atlas (Bureau of Meteorology, 2024) and available NSW Water Register data (DCCEEW, 2024) identified potential groundwater-dependent ecosystems (GDEs) and several registered groundwater bores within the vicinity of the Development Footprint. These represent key non-extractive environmental values associated with the local groundwater system.

Figure 6-4 illustrates mapped GDEs in proximity to the Development Footprint. Aquatic GDEs are reliant on the surface expression of groundwater - such as baseflow-fed creeks, wetlands, and springs - while terrestrial GDEs depend on shallow or near-surface groundwater to sustain root-zone moisture for vegetation. These ecosystems are categorised by the Bureau of Meteorology (BoM) using a likelihood classification (low, moderate, high), which incorporates predictive modelling and acknowledges inherent uncertainty in regional datasets. There is insufficient data in the local public groundwater bore database to validate or provide evidence for the presence or absence of these GDEs.

Spatial analysis identified the following relevant GDEs:

- A moderate potential aquatic GDE associated with Molong Creek is located approximately 1.2 km southeast of the Development Footprint boundary. This creek segment may exhibit some groundwater interaction, particularly during dry periods, although the Project Lots are not directly adjacent to the GDE.
- Low potential terrestrial GDEs occur within and across the Project Lots, consistent with the mapped extent of White Box grassy woodland within the Upper Slopes sub-region of the NSW South Western Slopes Bioregion. These areas are scattered and represent vegetation communities that may partially rely on shallow subsurface moisture.

GDEs located up hydraulic gradient relative to the Project Lots are excluded from further consideration in this assessment, as groundwater flow direction governs the potential for interaction with any project related effects (e.g. changes to recharge, water quality, or drawdown). Based on topographic and regional groundwater flow patterns, only down-gradient or laterally adjacent GDEs are considered potentially susceptible to change from Project activities.

6.4.2 Extractive Groundwater Use

Table 6-2 shows the registered bores used for water supply closest to the Development Footprint. Most bores are located up hydraulic gradient of the Project Lots, with the closest bore (GW802920) located approximately 500m to the west of the proposed BESS footprint.

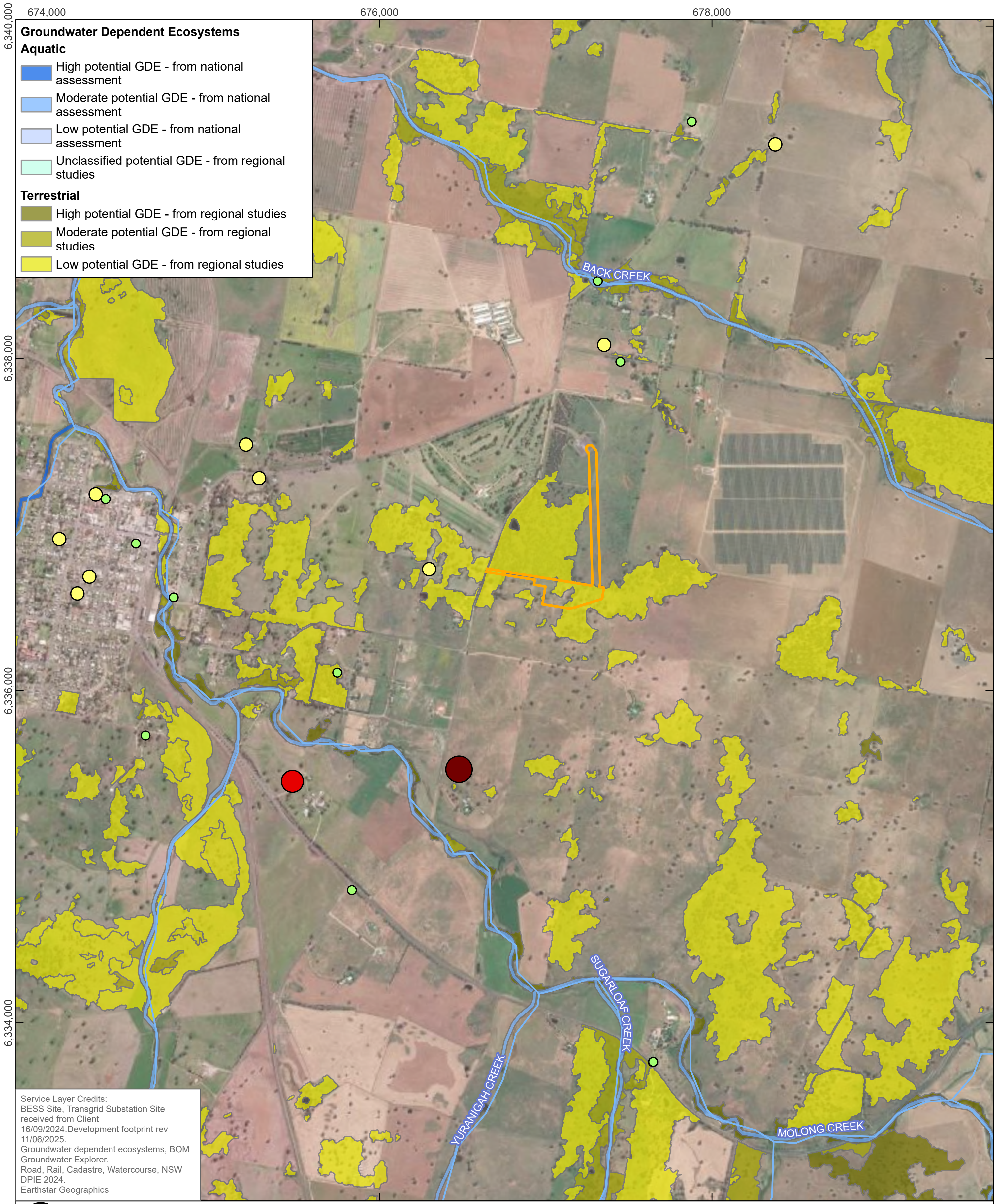
No water level impact is anticipated on the existing groundwater users from the development as the project does not require a groundwater licence, nor is it planning groundwater extraction for the operation of the BESS facility. Furthermore, no groundwater Water Access Licences (WALs) were identified within or adjacent to the Project Lots as part of this assessment, further reducing the potential for cumulative impacts on licensed extraction.

While Molong Creek is mapped as a perennial watercourse (NSW DCCEEW, 2025), no associated groundwater-dependent extraction or nearby surface water licences were identified in the vicinity of the Project Lots.

Table 6-2 Bores with available information proximal to the Project Lots

Bore ID	Drilled Date	Distance from Project (km)	Bore Depth	Logged Geology	Use*	Bore Yield (L/sec)
GW011900	1/04/1955	1.2 SE	11	Basalt	Stock	
GW057315	1/09/1982	0.74 NW	11.9	Basalt	Stock	
GW700141	9/09/1994	2.81 S	32	Andesite	Domestic, Stock	
GW703851	15/02/2010	2.78 SE	25	Basalt	Domestic, Stock	
GW704494	15/02/2010	2.73 SE	54	Basalt	Domestic	0.43
GW800857	24/10/1991	0.93 SW	54	Basalt	Domestic	0.43
GW802920	1/06/1993	0.72 W	25	Limestone	Domestic, Stock	
GW804012	15/02/2000	1.1 SW	41.1	Limestone & Basalt	Domestic, Stock	0.61
GW805559	20/07/2015	2.01 SW	45.72	Limestone & Andesite	Domestic, Stock	12.5

(*) Water use as reported in bore log reports.



0 0.5 1 km

Coordinate System:	GDA2020 MGA Zone 55
Scale:	1:30,000 at A4
Project Number:	620.041615
Date Drawn:	04-Jul-2025
Drawn by:	NT

LEGEND

- Watercourse
- Development Footprint

Registered Groundwater Bore - Yield (L/s)

- 0.026 - 0.5
- 0.5 - 1.5
- 1.5 - 2.5
- 2.5 - 5
- 5 - 12.5

MOLONG BESS

GROUNDWATER USERS AND GDES PROXIMAL TO THE PROJECT AREA

SLR

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FIGURE 6-4

Path: H:\Projects-SLR\620-BNE\620-BNE\620.041615.00001 Stor Energy NSW\06 SLR Data\01 GIS\GIS\NSW_Stor.aprx\620041615_GW_F06_4_GW_Users and GDE

7.0 Aquifer Vulnerability Assessment

The following section outlines the assessment of intrinsic aquifer vulnerability assessment related to a pollution event for the proposed Project activities. This approach corresponds to the GOD methodology (Groundwater confinement, Overlying strata, and Depth to groundwater) (Foster et al., 2007) and is considered to be suitable for this assessment based on the size of the proposed activity and the available groundwater data. This methodology assigns a score to each component to obtain a combined index of aquifer pollution vulnerability ranging between 0 (negligible) and 1 (extreme) (Figure 7-1). The advantage of this methodology is the low data requirement to assess intrinsic aquifer vulnerability, providing a good approximation in data-scarce regions. This method additionally allows for the layering of potential risk mitigation in the aquifer system and provides a relatively robust conceptual argument for contamination propagation risk, independent of specific contaminant.

The closest bores to the project with groundwater level measurements available (GW802920,GW804012 and GW803798) show groundwater depth between 6.1 and 15 metres below ground level[1]. As a conservative assumption in the absence of detailed hydrographs, the volcanic fractured rock aquifer in the Fairbridge Volcanics is considered to be an unconfined aquifer, allowing uninhibited infiltration of potential contaminants through the vadose zone to the water table (classified as 1.0). At the Project, this vadose zone is expected to be mainly composed of highly weathered basalt that expresses as clay (residual soils). The degree of consolidation, and the depth of this overlying feature is uncertain and therefor a conservative value of 0.5 is considered to be appropriate.

Applying the GOD methodology quantification system for intrinsic aquifer vulnerability yields a value of 0.45, corresponding to a categorisation in the moderate (0.3-0.5) range. This vulnerability level is defined by Foster et al. (2007) as:

Moderate vulnerability class: "Aquifer vulnerable to some pollutants but only when continuously discharged or leached."

As stated, the vulnerability definition rests on pollutants being continuously discharged or leached into the aquifer. The subsequent section includes semi-quantitative risk assessment of the proposed development establishing controls intended to prevent discharge of contaminants or other groundwater impacts.

[1] Noting that most of these measurements are one-off observations and likely reflect a range of climatic conditions due to the wide spread of monitoring dates (1993 to 2000).

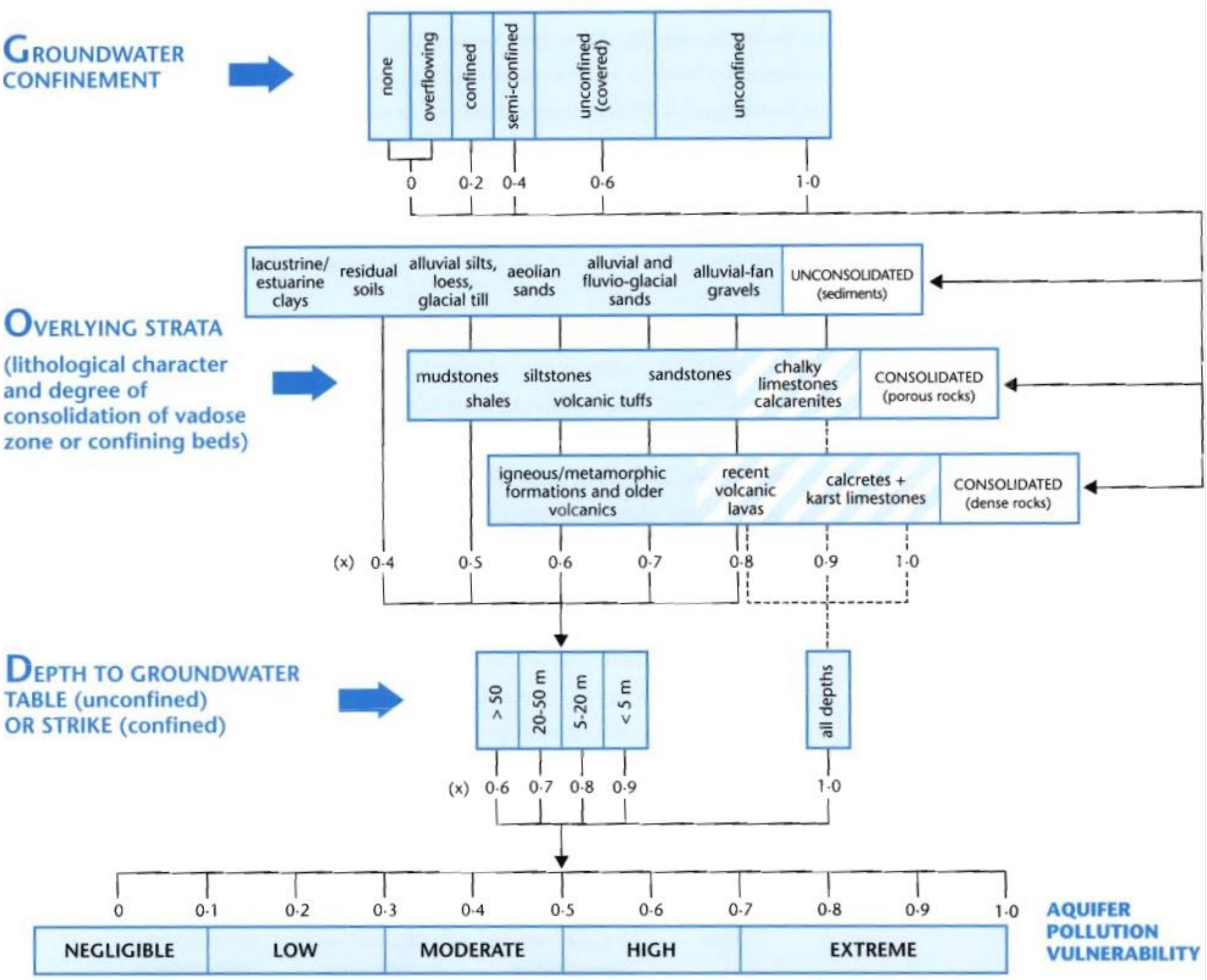

Figure 7-1 Intrinsic vulnerability assessment flow chart with risk multiplier values and assessment scale (Foster et al., 2007)

8.0 Risk Assessment

The proposed Battery Energy Storage System (BESS) involves the installation of above ground infrastructure within an area underlain by shallow regolith deposits (consisting of clays) and deeper fractured rock. As discussed in the intrinsic vulnerability assessment, while the development is unlikely to alter or remove the aquifer system within the Project Lots, there remains potential for interaction with the groundwater system via pathways such as infiltration of surface contaminants or disturbance of recharge processes.

This risk assessment evaluates potential impacts of the proposed BESS development on local groundwater resources, particularly with regard to groundwater quality, recharge function, and nearby environmental receptors. It considers plausible hazard scenarios during construction, operation, and emergency events (e.g. fire), in line with the Project Lots' hydrogeological setting. The assessment aims to identify key risks and recommend mitigation measures to ensure the protection of groundwater values throughout the life of the project. The methodology used for this risk assessment is generally consistent with the steps for ecological risk assessment outlined in Beer & Ziolkowski (1995) for environmental risk assessment in Australia.

8.1 Methodology

For each of the key groundwater impacts introduced in the earlier sections of this assessment, the following elements have been considered and described. Brief description of the risk:

- Likely cause
- Potential consequence
- Potential likelihood
- Risk rating and rank

To support this analysis, descriptive definitions of the consequence and likelihood levels used to assign risk ratings are provided in Table 8-1.

Table 8-1 Consequence Assessment

Rating		Description
5	Severe	Environmental damage or effect (permanent; >10 years), affecting areas >5km^2
4	High	Long term (2 to 10 years) impact, affecting areas >1-5km^2
3	Moderate	Medium term (<2 years impact), affecting areas 0.1–1 km^2
2	Low	Short term (<1 year) impact, affecting areas <0.1 km^2
1	Negligible	No lasting environmental damage or effect

The level of risk for each potential impact was determined by combining consequences defined in Table 8-1 with likelihood as defined in Table 8-2. The intrinsic vulnerability assessment (Section 7.0) informs the likelihood ratings applied in this analysis. The GOD method, discussed within Section 7.0, returned a moderate vulnerability score (0.45), reflecting an unconfined fractured rock aquifer with a moderate depth to water. This indicates moderate susceptibility to contaminants, particularly those that may be continuously discharged or poorly contained at the surface.

Additionally, spatial planning constraints were reviewed as part of this risk assessment. The Project Lots are mapped as groundwater vulnerable under the Cabonne Local Environmental Plan 2012 (Groundwater Vulnerability Map, Sheet CL1_004), reinforcing the need for effective mitigation of potential contaminant migration to groundwater.

The resulting risk analysis matrix (combining consequence and likelihood) is presented in Table 8-3.

Table 8-2 Likelihood Assessment

Likelihood	Probability	Basis of Rating
A	Highly Likely	Expected to occur
B	Likely	More likely to occur than not to occur
C	Possible	As likely to occur as not to occur
D	Unlikely	More likely to not occur than to occur
E	Highly Unlikely	Very unlikely to occur

Table 8-3 Risk Analysis Matrix

		Likelihood				
		E	D	C	B	A
Consequence	5	Insignificant	Low	High	High	High
	4	Insignificant	Low	Moderate	High	High
	3	Insignificant	Low	Moderate	Moderate	Moderate
	2	Insignificant	Low	Low	Low	Low
	1	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant

The risk assessment is presented as Table 8-4.

Table 8-4 Risk Assessment

Potential Receptor	Risk Description	Likely Cause	Potential Impact	Consequence	Likelihood	Risk Rating
Third Party Bores	Loss of supply (yield) from third party bores.	Drawdown of groundwater levels in the bore source aquifer.	Reduction in, or complete loss of, supply (yield) from third party bores.	High (4). Drawdown and therefore reduction or loss of bore yield may persist in the long term.	Highly Unlikely (E). All proposed infrastructure is above ground. No excavation/disruption to groundwater table/aquifers expected.	Insignificant
Third Party Bores	Reduction in water quality at third party bores.	Release of contaminants to the groundwater system from the Project that enter the bore source aquifer and migrate to the bore.	Bore water quality no longer suitable for the intended use.	High (4). Water quality change may persist in the long term.	Highly Unlikely (E). Potential contamination during fire events only. Fire events subject to extensive controls within engineered facility design. Further engineering controls related to potential contaminants are in place throughout design (stormwater management and containment, ground covers etc.)	Insignificant
Surface water systems (including potential aquatic GDEs)	Reduction in flow in surface water systems	Drawdown of groundwater level in the shallow groundwater system either reduces baseflow to the surface	Impact to environmental receptors reliant on flow in surface water systems	High (4). Surface flow changes may persist in the long term.	Highly Unlikely (E). Baseline groundwater system characterisation indicates that where it occurs, groundwater within the basal alluvium is recorded at depths of around 6 to 15 mbGL, typically significantly disconnected from the streambed elevation. Watercourses within the Project Lots are likely highly ephemeral where surface water flow is only sustained for hours to several days following rainfall events. Overall, these factors indicate a distinct lack of groundwater discharge to these	Insignificant

Potential Receptor	Risk Description	Likely Cause	Potential Impact	Consequence	Likelihood	Risk Rating
					watercourses from the regional aquifer, and therefore no potential for groundwater drawdown to manifest as a decrease in surface water flow.	
Surface water systems (including potential aquatic GDEs)	Reduction in water quality in surface water systems.	Release of contaminants to the groundwater system from the Project that then enter the surface water systems.	Surface water quality no longer suitable for environmental users/aquatic ecosystems.	High (4). Water quality change may persist in the long term.	Highly Unlikely (E). Notwithstanding the fact that groundwater does not discharge to surface water systems under current conditions, no excavation or subsurface works are proposed that would intercept the water table during construction, operation, or decommissioning of the BESS.	Insignificant
Terrestrial GDEs	Loss of groundwater availability to Terrestrial GDEs	Loss of groundwater availability to Terrestrial GDEs	Decline in health of Terrestrial GDEs	High (4). Vegetation change may persist in the long term.	Highly Unlikely (E). The level of groundwater reliance by terrestrial vegetation within the Project Lots is uncertain and has not been formally assessed. However, given the lack of expected impact to the groundwater system, the risk to mapped low-potential terrestrial GDEs (e.g. White Box Grassy Woodland) is considered to be minimal.	Insignificant
Terrestrial GDEs	Reduction in water quality used by terrestrial GDEs	Reduction in water quality used by Terrestrial GDEs	Decline in health of Terrestrial GDEs	High (4). Vegetation change may persist in the long term.	As above.	Insignificant
Shallow Groundwater[1]	Temporary contamination	Fuel, chemical or sediment-laden	Temporary degradation of shallow	Low (2). Limited extent of area potentially	Unlikely (D). Construction activities are temporary and limited in scope. All work will	Low

Potential Receptor	Risk Description	Likely Cause	Potential Impact	Consequence	Likelihood	Risk Rating
	during construction	runoff infiltrating through soils	groundwater quality	affected. Water quality change may persist in the short term.	occur within shallow soils (to a depth of up to 4–5m below ground level), with standard environmental controls in place (e.g. sediment fences, spill kits, bunded fuel storage). Risk of infiltration to groundwater is therefore low.	

[1] Shallow groundwater refers to groundwater sitting between 0 – 10 mbGL

9.0 Recommendations and Conclusions

While there are groundwater values including extractive groundwater use and GDEs located down hydraulic gradient of the Project Lots, the potential for impacts to groundwater quality are considered to be relatively low and likely to be of limited magnitude during the construction, operation and decommissioning of the BESS facility. Risks to groundwater can be reduced through management and infrastructure design measures presented below.

9.1 Mitigation Recommendations

9.1.1 Construction Phase

The Project's construction phase may influence groundwater through excavations required for foundations, involving cut-and-fill to level the Development Footprint, specifically removing topographic high in the western area and emplacing material in the eastern area. It is not expected that this will involve excavation interaction with groundwater level, as maximum depth of construction is anticipated to be four to five metres below ground level. Recommended considerations for contaminant release mitigation at this stage includes:

1 Bunded storage of bulk fuel (and any other chemicals) used for plant or stored on-site during construction.

2 Ensure good vehicle maintenance to avoid leakages of liquids/chemicals/lubricants into the soil profile. Provide a dedicated surface for vehicle parking.

3 Develop an environmental management plan for the construction phase of the project including emergency response plan to deal with spillages in unlined areas. This would include keeping spill kits on-site and ensuring staff are trained in their use and spill response as detailed in the environmental management plan.

9.1.2 Operational Phase

For the operation phase, the potential risks to groundwater relate to the potential release of contaminants due to incidents such as fires or leakages of pollutants from the BESS facility. Considerations for management and mitigation of risk at this stage include:

1 Collect waste liquids from wash-down facilities in lined on-ground small-scale basins or impermeable containers to prevent contaminated runoff from leaching into groundwater.

2 Design bund walls/retention basins to prevent contaminated runoff from wash-down facilities reaching unlined areas.

3 External hardstand areas should be graded or designed to manage surface water runoff in a controlled manner. Runoff from these areas should be directed via swales to the proposed downstream retention basin.

4 Appropriate storage of any chemicals or fuels kept on-site.

5 Design an emergency response plan to deal with chemical / fuel spillages.

6 Ensure groundwater contamination and adverse impacts are included in the environment risk register of the project and that their management and mitigation measures are included in the Operational Environment Management Plan to be developed for the project.

7 Develop a dedicated firewater management plan in consultation with Fire and Rescue NSW (FRNSW), detailing procedures for containment, collection, and appropriate disposal of contaminated runoff. Mitigation measures may include emergency bunding of external hardstand areas, installation of interception drains, and the use of collection pits or tanks to prevent uncontrolled migration of contaminants.

9.1.3 Decommissioning Phase

For the decommissioning phase, the potential risk to groundwater relates to the safe removal and disposal of batteries, fuels, oils, lubricants, cooling water/coolants/refrigerants, etc., in accordance with local regulations to minimise the risk of contaminant releases to the groundwater environment. Considerations for management and mitigation of risk at this stage include:

1 Adhere to protocols for the safe disposal of batteries and waste liquids remaining from the operation of the BESS facility.

2 Collect soil samples in areas of potential contamination to validate that the Development Footprint is clean. If the concrete slab is to be removed, then soil samples would also be collected once the slab is removed. In the event that significant soil contamination is identified, a remediation strategy would need to be developed which may include groundwater monitoring to determine the presence and extent of any groundwater contamination.

3 Where significant concrete installations were used, validation sampling of soils should be carried out to confirm no impacts to soil quality or potential for leachate migration to groundwater .

9.2 Conclusion

The construction, operation, and decommissioning of the project are not expected to significantly impact groundwater resources. Though this work is based on limited site-specific data, this report presents a review of the available relevant geological and hydrogeological data. The assessment concludes that the groundwater system is unlikely to be affected by the construction activities, if standard environmental management practices are put in place during construction.

The assessment has identified potential down-hydraulic gradient receptors, including privately owned water supply bores and potential groundwater dependent ecosystems. However, mapped surface water features in the Project Lots are highly ephemeral and generally disconnected from the underlying aquifer, reducing the likelihood of groundwater discharge supporting these ecosystems. Overall, the risk to groundwater receiving environments is considered low. This is based on the assessed moderate intrinsic vulnerability (as per Section 7.0), the groundwater vulnerability mapping under the Cabonne Local Environmental Plan 2012 (Map Sheet CL1_004), and the assumption that good environmental management practices will be employed during all project phases to minimise the risk of contaminant release.

The primary risks to groundwater from the proposed BESS facility are associated with fuel spills and fire events. In the event of a fire, current guidance from Fire and Rescue NSW (FRNSW) and battery manufacturers indicates that water should not be applied directly to battery fires. Instead, water may be used to cool surrounding infrastructure to prevent fire escalation. This approach significantly reduces the risk of contaminant mobilisation from battery-related incidents. However, in the event that water is used during a fire response -

whether related to battery incidents or other infrastructure - there remains a low potential for contaminants to be mobilised via surface runoff and infiltration into the underlying unconfined aquifer system. This scenario is identified as an insignificant risk in Table 8-4, reflecting the low likelihood of occurrence and limited potential impact given the proposed site controls.

To manage this risk, a firewater management plan should be developed in consultation with FRNSW and RFS and included as part the Project's management plans. This plan should detail procedures for the containment, collection, and appropriate disposal of any contaminated runoff. Mitigation measures will be confirmed during detailed design stage but will likely include stormwater management measures, installation of interception drains, and the use of collection basins or tanks to prevent uncontrolled migration of contaminants. These measures are particularly important given the Project Lots' shallow regolith and fractured rock geology, which may enhance the potential for downward seepage to groundwater.

In summary, the assessment has considered:

1. The likelihood of groundwater contamination from the development (including from on-site fuel or chemical storage).
2. Potential adverse impacts on groundwater dependent ecosystems.
3. Cumulative impacts to nearby users such as stock or potable supply bores.
4. Appropriate measures to avoid, minimise or mitigate these risks.

With mitigation in place, the Project is not expected to pose a significant or lasting impact on local groundwater values.

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