AMENDMENT REPORT

Dunedoo Solar Farm

March 2021

Project Number: 20-764

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W. www.nghconsulting.com.au

E. ngh@nghconsulting.com.au

BEGA - ACT & SOUTH EAST NSW
Suite 11, 89-91 Auckland Street
(PO Box 470) Bega NSW 2550
T. (02) 6492 8333

NEWCASTLE - HUNTER & NORTH COAST
Unit 2, 54 Hudson Street
Hamilton NSW 2303
T. (02) 4929 2301

BRISBANE
Suite 4, Level 5, 87 Wickham Terrace
Spring Hill QLD 4000
T. (07) 3129 7633

SYDNEY REGION
Unit 18, Level 3, 21 Mary Street
Surry Hills NSW 2010
T. (02) 8202 8333

CANBERRA - NSW SE & ACT
Unit 8, 27 Yallourn Street
(PO Box 62) Fyshwick ACT 2609
T. (02) 6280 5053

WAGGA WAGGA - RIVERINA & WESTERN NSW
35 Kincaid Street (PO Box 5464)
Wagga Wagga NSW 2650
T. (02) 6971 9696

GOLD COAST
19a Philippine Parade
(PO Box 466 Palm Beach QLD 4221)
Tugun QLD 4224 **T.** (07) 3129 7633

WODONGA
Unit 2, 83 Hume Street
(PO Box 506) Wodonga VIC 3690
T. (02) 6067 2533

NSW • ACT • QLD • VIC
W. www.nghconsulting.com.au
ABN 31 124 444 622 ACN 124 444 622

TABLE OF CONTENTS

Figures

Table

ACRONYMS AND ABBREVIATIONS

ACHA	Aboriginal Cultural Heritage Assessment
ACHCRP	Aboriginal cultural heritage consultation requirements for proponents
AHD	Australian Height Datum
BCD	Biodiversity Conservation Division
BDAR	Biodiversity Development Assessment Report
BOM	Australian Bureau of Meteorology
BSAL	Biophysical strategic agricultural land
dB(A)	Decibels, a measure of A-weighted *(c.f.)* sound levels.
DECC	Department of Climate Change (now BCD)
DECCW	Department of Climate Change and Water (now BCD)
DP	Deposited Plans
DPIE	Department of Planning Industry and Environment
EIS	Environmental Impact Statement
EL	Exploration Licence
EMFs	Electromagnetic fields
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EPA	(NSW) Environment Protection Authority
GDE	Groundwater Dependent Ecosystems
ha	hectares
ICNG	Interim Construction Noise Guideline
ICNIRP	International Commission on Non-Ionizing Radiation Protection
km	Kilometres
kV	kilovolts
LGA	Local Government Area
m	metres
ML	Megalitres
MW	Megawatt

MWh	Megawatt hours
NML	Noise Management Level
NPfI	NSW Policy for Industry
NSW	New South Wales
OEH	(NSW) Office of Environment and Heritage (formerly DECC, DECCW; now BCD)
PV	Photovoltaic
RAPs	Registered Aboriginal Parties
RBL	Rating Background Level - the level of background noise
RNP	*Road Noise Policy*
SEARs	Secretary's Environmental Assessment Requirements
SSD	State Significant Development

1. INTRODUCTION

1.1. Background

A photovoltaic (PV) solar farm is proposed approximately 2 kilometres (km) north of the township of Dunedoo in Central Western NSW by ib vogt GmbH. (the Proponent) on behalf of Sun Spot 4 Pty Ltd. The solar farm would generate approximately 55 Megawatt (MW) of Alternating Current (AC) and would sit on 79-hectares (ha) of land (Development Footprint) comprised of a number of lots zoned RU1 Primary Production under the Warrumbungle LEP. For the purpose of this report, the solar farm and its associated infrastructure is collectively known as the Proposal. Refer to Figure 1-1 for the location context of the Proposal and Figure 1-2 for its proposed boundaries.

NGH prepared an Environmental Impact Statement (EIS) on behalf of the Proponent addressing the key environmental issues as specified in the Secretary's Environmental Assessment Requirements (SEARs). Major impact items, such as but not limited to biodiversity (flora and fauna), soil impacts, Aboriginal heritage, visual impact, land use impacts, noise impact, and traffic impacts were assessed via specialist assessments and desktop studies to ensure that all environmental impacts identified could be managed appropriately.

The EIS was prepared in accordance with Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) and Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation). The EIS was submitted to the DPIE and placed on public exhibition from Tuesday 20 October 2020 until Tuesday 17 November 2020.

Following consideration of the issues raised and comments received during public exhibition, the Proposal has remained generally unchanged to that presented in Section 4 of the EIS (NGH Consulting, 2020a). Some improvements have been made in response to submissions, including changes to the intersection design at the Castlereagh Highway and All Weather Road following consultation with Transport for NSW (TfNSW) as detailed in Section 2.2 of this report.

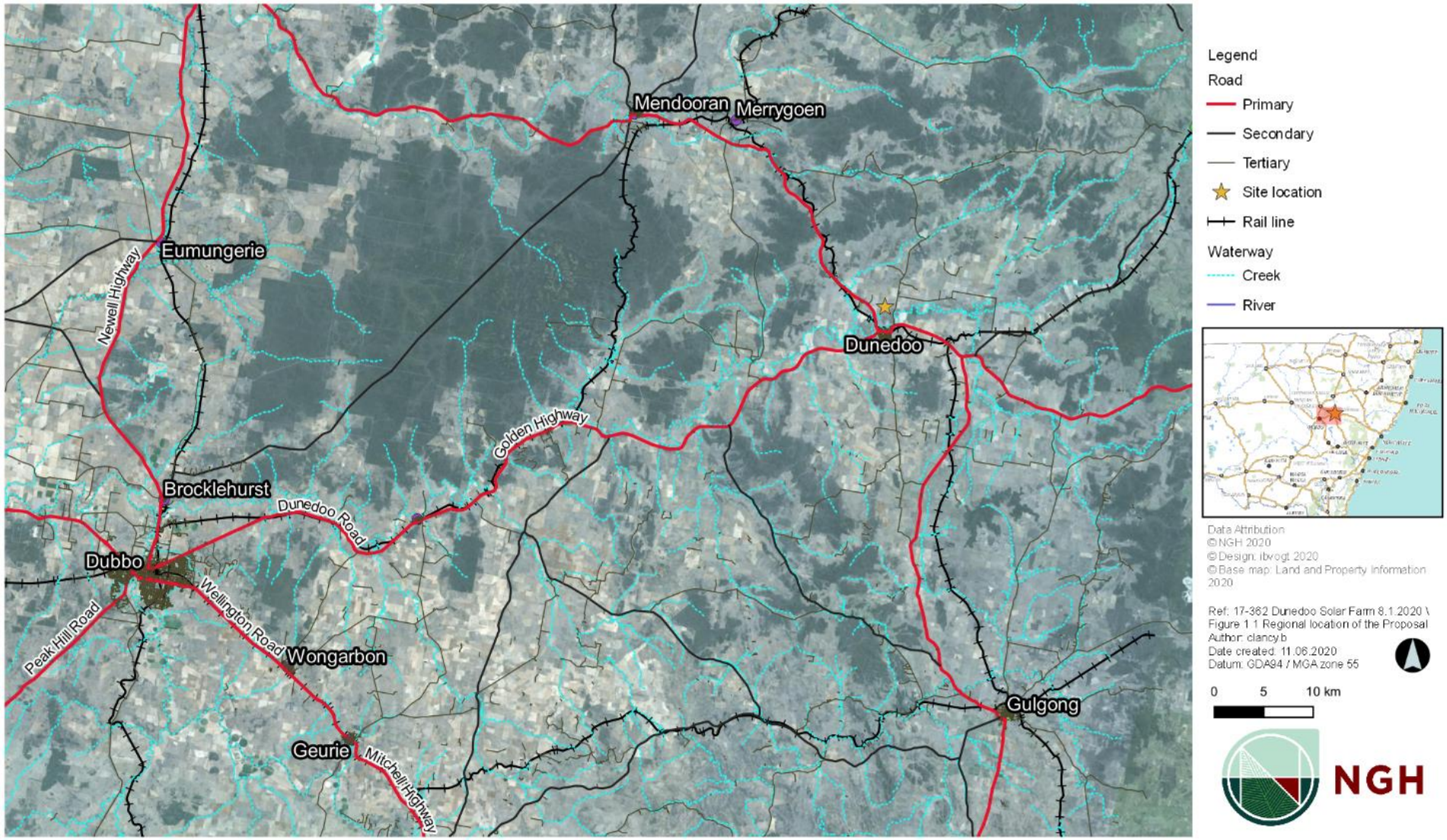

Figure 1-1 Locality and regional context

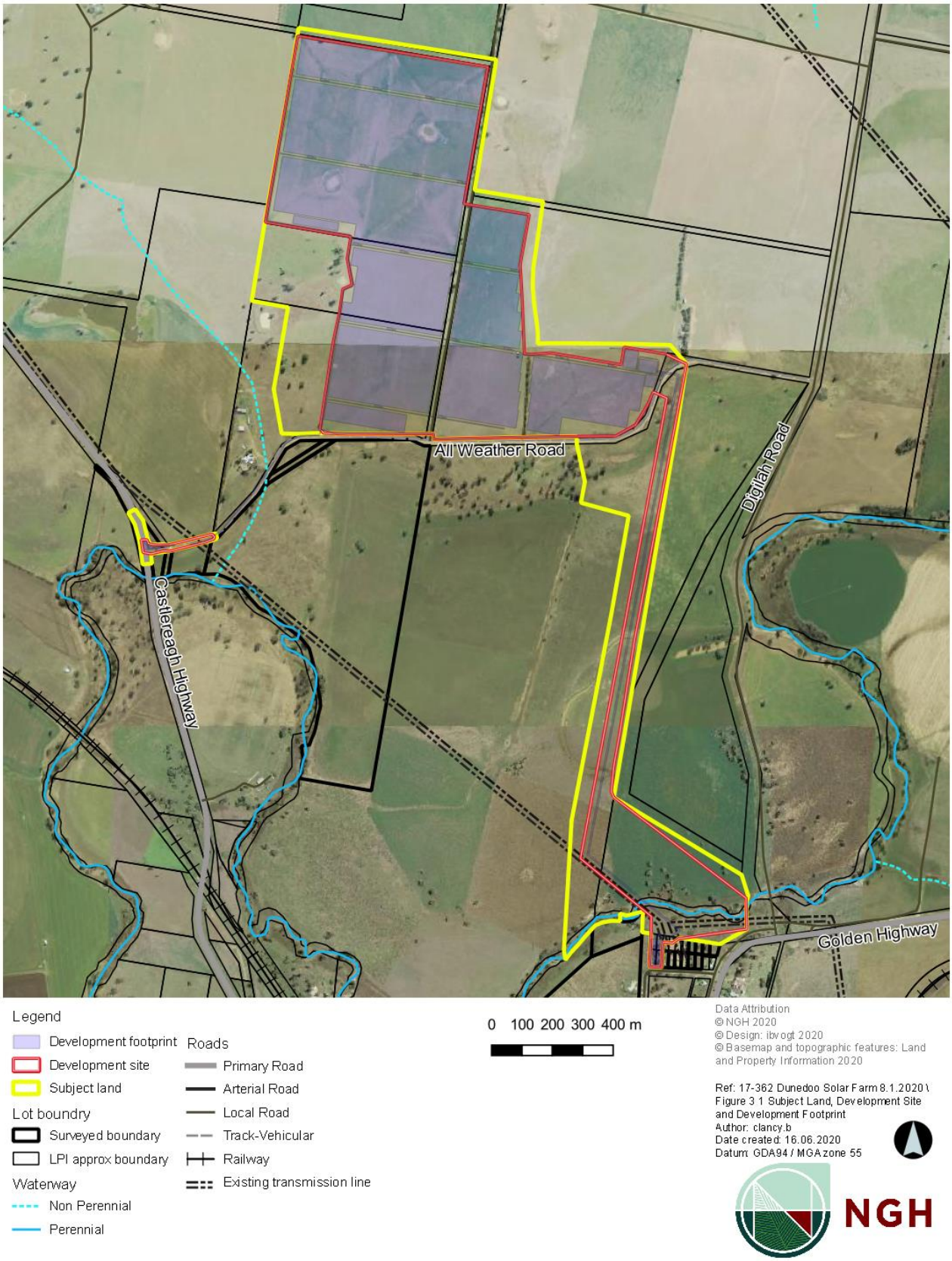

Figure 1-2 Proposal boundaries and surrounding features

1.1.1. Legislative context for this SSD amendment

The proposal requires development consent under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The proposal is considered State Significant Development (SSD) as it is development for the purpose of electricity generating works with a capital cost of greater than $30 million (clause 20, Schedule 1 of the *State Environmental Planning Policy (State and Regional Development) 2011).*

An Environmental Impact Statement (EIS) was prepared by NGH Consulting (NGH Consulting, 2020a) on behalf of the proponent at the time, and was submitted to NSW Department of Planning, Industry and Environment (DPIE). The EIS was placed on public exhibition from Tuesday 20 October 2020 until Tuesday 17 November 2020. During this period, submissions were invited from the local community, government agencies, interested parties and other stakeholders. DPIE received a total of 20 submissions during the exhibition period, including:

- Three submissions were received from members of the public. Two supported the Proposal and one objected.
- Three submissions were received from organisations. Two supported the Proposal and one objected.
- 14 submissions were received from public authorities commenting on the Proposal. No agency objections to the Proposal were received.

The Submissions Report (NGH Consulting, 2020d) provides a response to all the issues and comments raised during the public exhibition.

The Dunedoo Solar Farm proposal remains generally as detailed in Section 4 of the EIS (NGH Consulting, 2020a).

This report is to supplement the EIS submitted by NGH on behalf of the proponent. The proponent has made changes to the intersection upgrades as a result of further consultation with TfNSW as well as identified heavy vehicle route.

1.2. Purpose of this report

The purpose of this document is to describe any substantive changes made to the proposal since the public exhibition of the documents listed in Table 1-1. This Amendment Report provides an updated report assessing the environmental impacts of the relatively minor changes to the proposal. Measures of avoidance, management and mitigation added and other removed are outlined.

Table 1-1 Environmental Assessment documentation lodged to date.

Date	Event/Document	Reference document
30/09/2020	Environmental Assessment (EIS) lodged with the Department of Planning, Industry and Environment (DPIE).	NGH Consulting (2020) Dunedoo Solar Farm Environmental Impact Statement V1 .
08/03/2021	Submissions Report lodged with DPIE.	NGH Consulting (2021) Dunedoo Solar Farm Submissions Report V1.

1.3. Legislation

This application is made under Clause 55 of the *Environmental Planning and Assessment Regulation 2000*. This Amendment Report describes proposed changes to an SSD application that are considered to be substantially the same as the development described in the EIS. This report considers whether the proposed amendments are comparable to the development described within the EIS, specifically relating to:

- Development size, scale and footprint.
- Intensity, including existing developments.
- Use of the land.
- Project life and hours of operation.
- Extent, duration and severity of impacts.

The proposed safeguards and mitigation measures described in the EIS and the few additional measures outlined in this report would enable impacts to be either avoided, minimised or appropriately managed.

2. PROPOSED AMENDMENTS

The Dunedoo Solar Farm proposal remains generally as detailed in Section 4 of the EIS (NGH, 2020a). A Preliminary Hazards Analysis (PHA) has been undertaken and consultation with TfNSW has occurred in relation to the upgrades at Castlereagh Highway and All Weather Road.

There are no changes to the development footprint or subject site as a result of the Response to Submissions (RTS), the findings from the PHA, or the intersection upgrade as agreed to by TfNSW. There are, however, updates to the mitigation measures in relation to groundwater and surface water use, and the consideration on the significance of the Black Swan nesting area as part of the Aboriginal heritage component of the Proposal. Findings and changes are detailed in this section.

The Proponent has made the following changes to the proposal:

- Removal of the opening of new bores, to meet the project's water requirements. (Section 2.1)
- Updates to the intersection upgrades and provision of heavy vehicle transport route (Section 2.2)
- Results from the PHA (Section 2.3).
- Addition of a new mitigation measure for Aboriginal Heritage (Section 4.1) – no further assessment was deemed necessary.

The amendments are considered to result in a development that would be the same or lower impact as the development described in the EIS. The justification for the amendments is provided within Section 2.4 of this report. Updated consultation and assessment are provided in Section 2.5 and Section 3.

2.1. Water demand and groundwater use

After consideration of the Proposal's water demands, the Proponent has decided to exclude the opening of a new bore to meet the Proposal's water demand for construction, operation and decommissioning; and will utilise existing licensed water suppliers in the area. Therefore, the Proposal is no longer scheduled to intercept any groundwater sources on the basis of not opening a new bore, and will not restrict access to the groundwater bores identified in the EIS and water demands will remain as presented in the EIS.

Impacts on water use during decommissioning would be similar to those during construction, and they are considered low risk and manageable.

2.2. Traffic and Transport

The EIS described a heavy vehicle access route to the Proposal site as being from Castlereagh Highway and All Weather Road, an unsealed Council managed roadway. Digilah Road connects to All Weather Road from the east and would be used by light construction vehicles and worker shuttle buses.

During the preparation of the Response to Submission Report and this Amendment Report, the Proponent engaged with TfNSW and WSC to agree the following amendments to the traffic and transport approach presented in the EIS.

- All heavy vehicle construction site access would be off the Castlereagh Highway and All Weather Road intersection in a left turn only manner. This includes a prohibition on heavy construction vehicles turn right at this intersection and safe turn around locations in Mendooran and Dunedoo.
- Junction treatment to the standard of a short auxiliary left turn lane (AUL(S)) only consistent with Part 4A Austroads Guide to Road Design.
- Reduction in the largest heavy vehicle to a 26 m B-Double
- Preparation of a Construction Traffic Management Plan prepared in consultation with TfNSW and WSC prior to construction commencing and consistent with Stantec memo in Appendix C.

2.3. Preliminary Hazards Analysis results

A PHA was undertaken to assess the risk profile for the Proposal. The PHA determined that the risk profile is considered to be tolerable in So Far As Reasonably Practicable (SFARP); concluding that there is no potential for offsite fatality or injury identified, and that therefore the project meets the land use planning criteria, as:

- The majority of the medium risk events relate to fire events.
- The exposure to fire events will primarily be to the project's construction and operations workforce.
- Offsite impacts will be minimal.

2.4. Justification for the amendment

The amendments described within this report result in a development that has impacts that are considered to be substantially the same as or less than the development described in the EIS (NGH, 2020a). Justification for the amendments is provided below.

2.4.1. Groundwater use

The Proposal has been amended to remove the need for creation of new bores to meet the Proposal's water requirements. The consideration will be replaced with the provision of water through local licensed providers. This is considered to provide the most feasible option for the Proposal's to meet its water requirement while minimising project impacts.

An assessment of the changes in environmental impacts for the removal of new groundwater use or aquifer interference not already licensed has been undertaken. Investigation has shown that this amendment would result in lesser impacts, although originally considered to be minor, and that no substantive additional impacts or changes to mitigation strategies as detailed in Section 3.1 of this report are necessary.

2.4.2. Traffic and Transport

The EIS included a consideration for upgrading the intersection at All Weather Road and Castlereagh Highway for use by heavy vehicles with a Basic Left Turn (BAL) treatment but no Basic Right Turn (BAR) due to physical restriction on the Castlereagh Highway. After exhibition of the EIS, TfNSW provided comments that it could not support right turns at the All Weather Road intersections without a BAR due to safety reasons, and requested that the Proponent undertake further consultation with TfNSW to produce a safer option. An assessment of the changes in traffic impacts for the intersection upgrade was undertaken following consultation with TfNSW, WSC, and the Proponent. This is provided in the meeting minutes and the Stantec Memo attached as Appendix B and Appendix C respectively of this report.

In summary, it was determined that the most appropriate option is to upgrade the Castlereagh Highway and All Weather Road intersection for use by heavy vehicles during construction with a short auxiliary left turn lane (AUL(S)). Left turns only be allowed at this intersection (including construction vehicles being prohibited from turning right), safe turn around locations would be provided in Mendooran and Dunedoo and traffic management would be agreed and implemented in consultation with TfNSW and WSC prior to commencement of construction.

The agreed heavy construction access via left turns only at the Castlereagh and All Weather Road intersection and AUL(S) has equivalent impacts to residences and the road network as assessed in the EIS. A summary of the consultation with TfNSW and its outcome is provided in Section 3.2 of this report.

2.4.3. Preliminary Hazards Analysis

Although requested through the SEARs, the EIS did not include a PHA as it found that the Proposal did not meet the screening thresholds in the *Hazard Industry Planning Advisory Paper No.6 – Guidelines for Hazard Analysis* and *Multi-Level Risk Assessment*; and therefore, not considered a potentially hazardous development (Refer to Section 9.7 in the EIS). Notwithstanding, following public exhibition of the EIS, DPIE requested that a PHA be undertaken for the Proposal given is proximity to the APA gas pipeline. The PHA is attached in Appendix D.

2.5. Consultation

2.5.1. Summary and outcomes of consultation with Transport for NSW

Consultation was undertaken with TfNSW and WSC in relation to the necessary upgrades and safest reasonable use of the Castlereagh Highway and All Weather Road intersection for heavy vehicle access during construction. The consultation outcome can be seen in the Stantec Memo attached as Appendix C.

3. AMENDED ASSESSMENT

The changes described in Section 2 of this Report would have the same type and magnitude of impacts as those previously presented. As a result of the submissions received during the exhibition period, and as described above four changes have been made and considered in this amendment report. The changes have been summarised in the Response to Submissions, and are also provided in this report, including:

- Removal of the use groundwater to meet the Proposal's water requirements. Section 3.1
- Meeting minutes from consultation with TfNSW, dated 28 January 2021 and agreed outcomes memo dated 11 February 2021 (Appendix B and Appendix C). Updated intersection upgrades, as well as identifying heavy vehicle routes. The outcome of the consultation is summarised in Section 3.2.
- Preliminary Hazards Analysis (PHA) (Appendix D) (NGH Consulting, 2021). PHA concluded that there is no potential for offsite fatality or injury identified and therefore the project meets the land use planning criteria. The report is summarised in Section 3.3 of this report.
- No further assessment was required in relation to the Black Swan nesting area, however additional mitigation and future consultation with WVWAC and Dunedoo Coolah Landcare has been added to address the site's significance.

All specialist reports prepared for the Dunedoo EIS were considered as part of the assessment of the Proposal's amendments. As the amendments do not involve additional work or equipment to those considered in the EIS, no changes to the specialist reports are required.

3.1. Hydrological value and water quality

3.1.1. Approach

This section updates chapter 9.3 of the EIS which identifies the main issues associated with water use and wastewater management, resulting from the construction and operational activities of the Proposal. The provision of water through commercially licenced water providers will replace groundwater use to meet the Proposal's water requirements. The impacts associated with the provision of water are detailed below.

3.1.2. Assessment Summary

Existing Environment

Section 9.3.1 of the EIS, noted that there are 34 registered bores within 1,500 metres of the Development Site (NSW DPI database). The alluvium within the Development Site is considered a fractured or fissured, extensive aquifer of low to moderate productivity (BOM 2020). Three (3) bores are situated within the Development Site (refer to Table 9-12 and Figure 9-11 in the EIS):

- GW032946

- GW096124
- GW03052

Warrumbungle Shire Council advised that *'the water supply for Dunedoo is drawn from a well on the southern end of the proposed development area'*. Therefore, Council had significant concerns of the impact on the water supply at the well, if water was intended to be drawn from the groundwater aquifers.

The closest groundwater bore to the development footprint is GW096124. This bore is south of All Weather Road, as shown in Figure 9-11 in the EIS. This and all other bores are outside the development footprint and will not be affected by the Proposal.

The sections below updates the discussion on the proportion of water and source that would be used for the construction and operation of the Proposal.

3.1.3. Potential Impacts

Construction and Decommissioning

Water Use

Water usage during construction would be about 41,760 KL over a 10-12 month construction period, mainly for dust suppression, cleaning, concreting, on-site amenities, and landscaping. This equates to approximately 3.480 KL per month and 114 KL/day or 2 to 3 water trucks with a capacity of 44 KL. This water requirement is likely to vary depending on weather conditions.

A small amount of potable (drinking) water (approximately 90 KL) would be imported to the site during the construction period. The potable water supply would be augmented by rainwater collection in tanks installed beside the site buildings as constructed. Any requirement for potable water would be limited and confined to the construction phase, and would not place pressure on local drinking water supplies.

The source for water for the concrete batching plant would be provided from licenced commercial providers. The batching plant's water use minimisation policy provides for mechanisms and procedures to re-use the wastewater generated during the wash down of the concrete trucks. Such practices target to re-use 100% of the wastewater, and only top up with new water lost to evaporation and concrete curing. As such over the entire construction period, the total demand on water resources from the concrete batching process would also be minimal and will not be drawn from groundwater bores.

Water Sourcing

The water required for the Proposal construction (41,760 KL) is 0.78% of the available aquifer water. Several water sources may be utilised during construction. Under the EP&A Act, SSDs do not require approvals for water use or water management work as per the WMA (refer to Section 5.1.9 of the EIS). However, a permit for aquifer interference as per section 4.41(g) of the EP&A Act would be required to penetrate the aquifer.

As water sourced via bores is no longer proposed, the Proposal would commercially source water through licenced water providers in the area.

Similarly, water can be secured through commercial arrangements with local water supply providers in the event that additional water is required during drought conditions.

Impacts on water use during decommissioning would be similar to those during construction. They are considered low risk and manageable.

Water Quality – Turbid Runoff and Sedimentation

The construction phase of the Proposal involves a range of activities that would disturb soils and potentially lead to sediment-laden runoff, affecting local waterways. These risks and the relevant pollution control measures have been discussed in Section 9.1 of the EIS.

Water Quality – Chemical Pollution Risks

The construction phase would entail the following water chemical pollution risks:

- A hydrocarbon spill risk from use and re-fuelling of construction vehicles and machinery
- On-site concreting for building and equipment foundations
- Wash-off from curing asphalt pavement and road seal
- Storage and use of paints, cleaning solvents and other chemicals
- Pesticide storage and use for pest plant and animal control
- Escape of fertilisers used for revegetation
- Runoff from waste materials.

Construction activities at the site have minimal potential to degrade the water quality of Talbragar River as the substation and associated facilities, which are sites of the main earthworks, are located over 1.5 km from the river. Furthermore, All Weather Road acts as a berm, impeding the overflow of any surface runoff resulting from construction activities, to the southern portion of the Development Site.

Equally, there is no direct connection to watercourses subject to the relevant Water Quality Objectives and River Flow Objectives identified for the Macquarie-Bogan River Catchment.

Contamination and spill risks would be managed using best practice and mitigation measures coordinated through the Environmental Management Plan. The limited excavation depths involved in the Proposal (up to 2.4 metres) would avoid physical impacts to the groundwater resource. These areas of disturbance would be small and sparsely distributed, and the surrounding groundcover would be retained, helping maintain sediments onsite. These risks are considered minimal and manageable with standard sediment and erosion control safeguards.

Groundwater

Considering the relatively shallow depth of local groundwater, and with the provision of water through a commercial provider for the construction activities, contamination of groundwater would be highly unlikely given that chemicals and fuels would be appropriately stored, and spills procedures would be implemented (spill management is discussed in Section 9.1 of the EIS.).

Subject to the implementation of the Blue Book measures and additional safeguards presented in Section 9.1 and Table 9-3 of the EIS, the proposed works are not considered likely to significantly affect surface water quality at or downstream of the site, or groundwater quality in the shallow aquifer under the site.

As indicated in the EIS, the risks of impacts to Groundwater Dependant Ecosystems (GDE) and Inflow Dependent Ecosystems (IDE) systems are considered very low. The Proposal ’s

construction demand for water would be limited in duration (10 months) and the proportion of water-use, relative to agriculture and farming water demand, would be minimal (<2%).

Additionally, it is noted that there are currently no high-priority GDEs as listed on Schedule 6 of the Water Sharing Plan for the Macquarie Bogan Unregulated and Alluvial Water.

Impacts on groundwater during commissioning would be similar to those during construction. They are considered low risk.

Operation

Water Use

The operation of the solar farm would require approximately 171.4 KL per year of non-potable water, which would be used for:

- Staff amenities for up to three people at the control and maintenance building
- Cleaning of PV modules and other maintenance activities.

The solar farm would include washroom facilities for maintenance and administration workers. Potable water would be via a bottled source. Sanitary/domestic wastewater requirements for the solar farm are anticipated to be no more than 100 litres per day per person. This is a conservative estimate as office consumption of water is significantly less than household consumption.

With regards to potential contamination of soils and groundwater, this may occur if containment and disposal mechanisms are inadequately managed resulting with uncontrolled discharge to ground. The appropriate design and installation of a septic system in accordance with Council requirements and regular wastewater removal by a licensed service supplier would minimise any risks of contamination. The potential negative impacts are considered negligible.

Solar panels would require regular cleaning to remove settled particulates and ensure optimal operation. Silt laden runoff would be directed to ground where it is likely to be lost to evaporation, the risk of any adverse impact is therefore considered minimal.

Water consumption is anticipated to be approximately 0.8 litres per panel, per cleaning exercise. A 20-KL rainwater tank would be installed on site to provide water for panel cleaning, irrigation and other non-potable uses, such as sanitary/domestic water and cleaning of equipment and plant.

If rainwater volumes are not sufficient, alternative water sources would be required and sought through a commercial water provider. The Proposal will not construct a bore or interfere the aquifer.

Alternatively, if local water utility were used, it would represent 0.04% of the 400 -ML allocation. As such it is reasonable to assume the operational needs of the Proposal can be easily met from the local water utility allocation.

It should also be noted that in the event of drought conditions, water purchases may still be available as a temporary supply on the open market. Additionally, the Proposal's draw on this supply would be a low percentage and may form part of the unutilised proportion of the allocation. As such, the potential impact on agricultural users especially those who rely on low cost water is likely to be minor.

3.1.4. Safeguards and mitigation measures

Mitigation measures to avoid and minimise impacts to water use and water quality are provided in Table 4-2which replaces those mitigation relevant to Table 9-14 in the EIS. Many of the measures identified for soil protection in Section 9.1 of the EIS, are also relevant for the protection of water values and are not repeated in Table 4-2. Updates to the measures have been ~~struck through~~ to show removal.

3.2. Traffic and transport

3.2.1. Approach

The Traffic Impact Assessment for the Proposal, prepared by Stantec (2020), has been updated based on the proposed changes set out in Section 2 of this report. The updated report, in a Memo form, is provided in Appendix C and its conclusions are summarised below. It includes consideration of consultation with TfNSW on relevant road upgrades that may be required for the proposal in accordance with the SEARs.

3.2.2. Assessment Summary

The list below summarises the Stantec memo (dated 11 February 2021) which captures the agreed solution from the meeting dated 28 January 2021 between TfNSW, WSC, Stantec and the Proponent.

Heavy Vehicle Construction Routes:

- Heavy vehicles would generally enter south along Castlereagh Highway and turn left via the intersection into All Weather Road and left into the site entry as shown in Figure 3-1 below. Right turns from Castlereagh Highway via the intersection into All Weather Road will be prohibited and vehicles approaching All Weather Road from the south travelling along the Castlereagh Highway will be required to travel north to Mendooran and turn around to allow entry to site from the north. Two options are proposed for the turnaround (see turn around detail in Figure 3-2 and Figure 3-3 below); and
- Vehicles would exit the site and turn right to travel west along All Weather Road and then turn left into Castlereagh Highway via the intersection as shown in Figure 3-1 below. Right turn from All Weather Road into Castlereagh Highway via the intersection will be prohibited and vehicles needing to travel north on the Castlereagh Highway will be required to travel south to Dunedoo and turn around (see turn around detail below in Figure 3-4 below) before re-entering the north bound Castlereagh Highway.

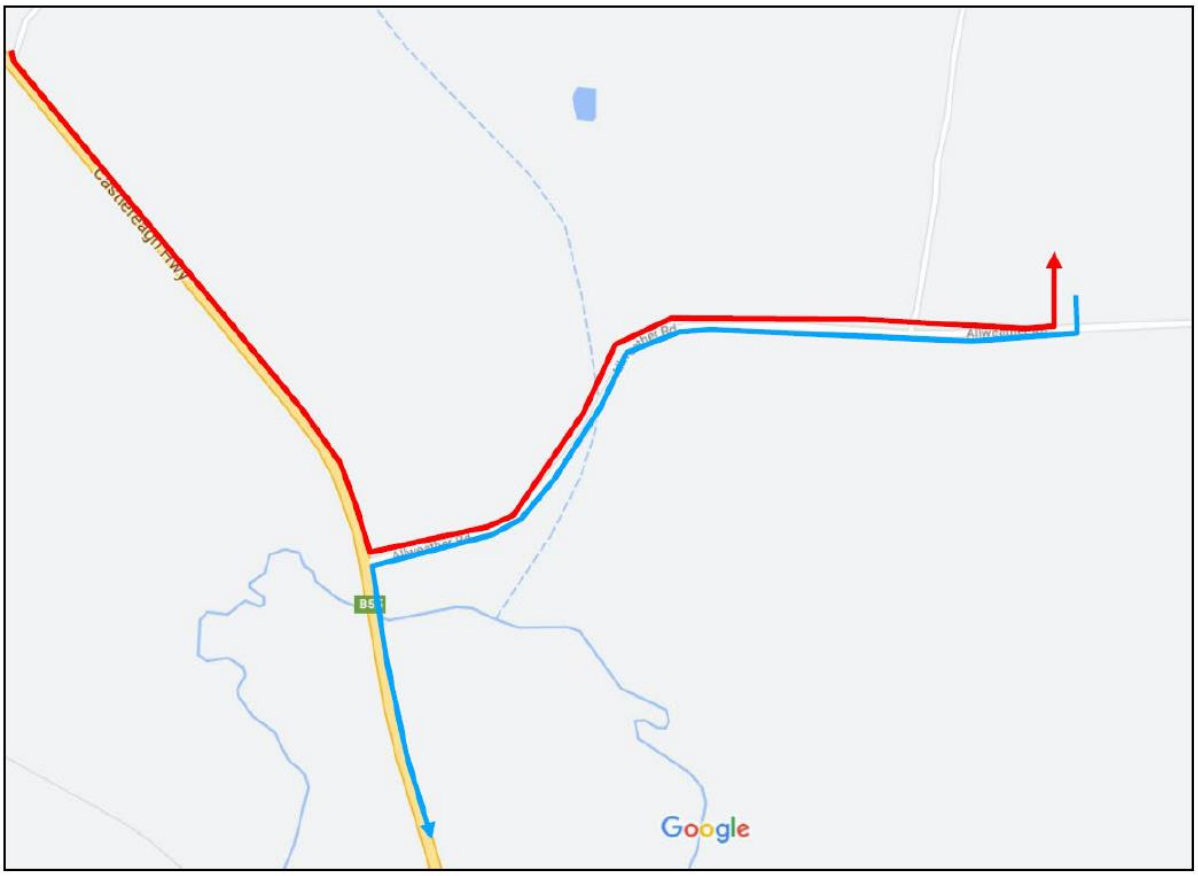

Figure 3-1 Heavy vehicle construction entry (red) and exit (blue) routes (Memo Figure 4)

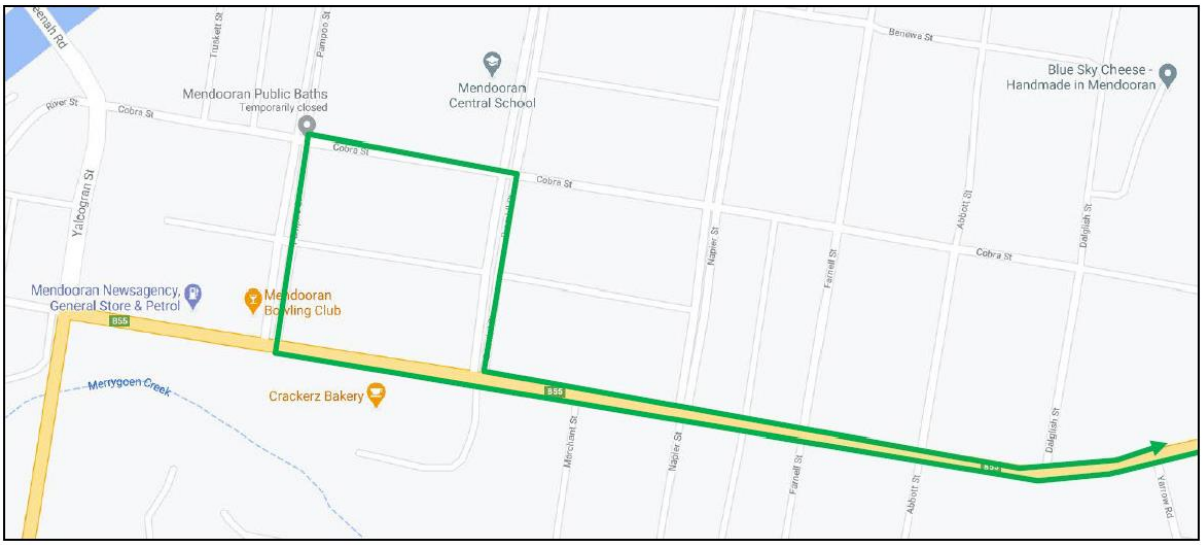

Figure 3-2 Mendooran turn around Option 1 detailed (following Castlereagh Highway, Pampoo St, Cobra St, Brambil St and Castlereagh Highway) (Memo Figure 5)

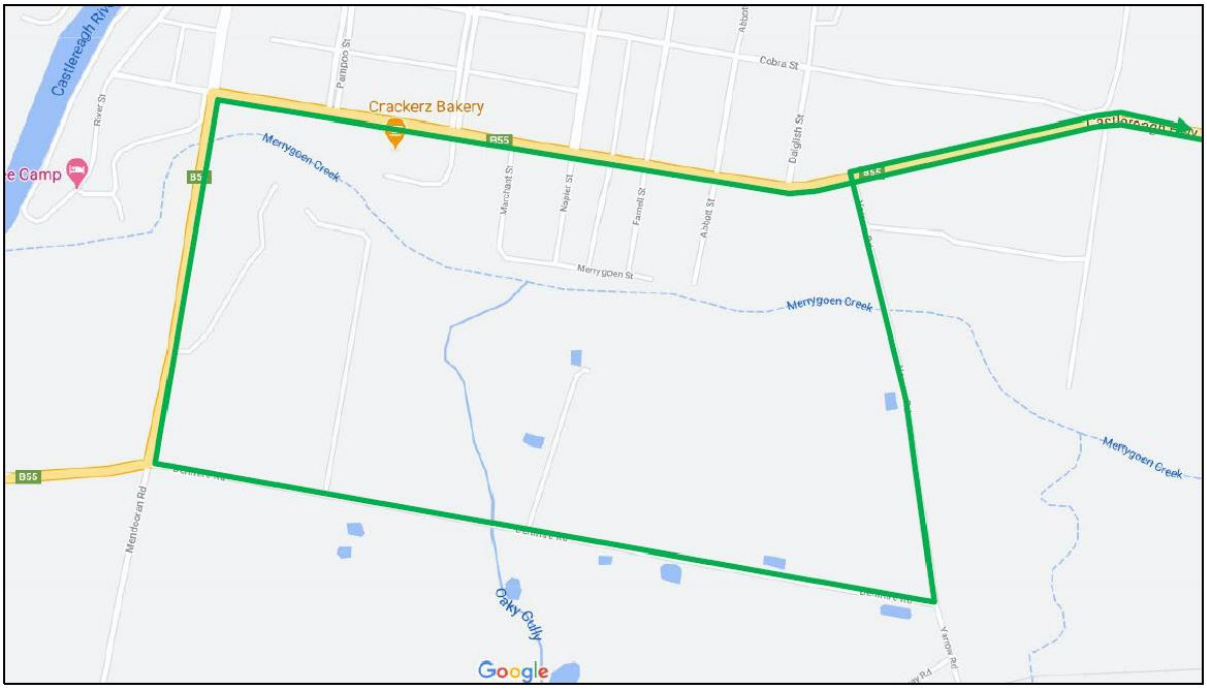

Figure 3-3 Mendooran turn around Option 2 detailed (following Castlereagh Highway, Denmire Road, Yarrow Road, and Castlereagh Highway) (Memo Figure 6)

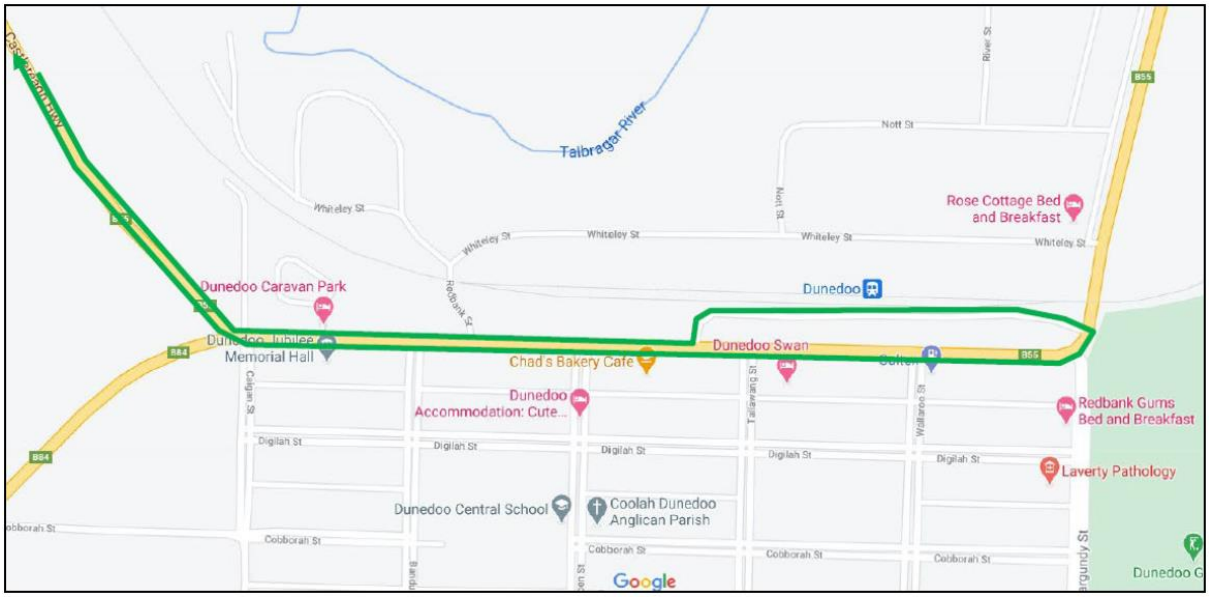

Figure 3-4 Dunedoo turn around detail (following Castlereagh Highway, Milling Park Heavy Vehicle Parking Are and Castlereagh Highway) (Memo Figure 7)

Heavy vehicle delivery of material through regional and state roads would travel from Newcastle, Mudgee and Dubbo to the Castlereagh Highway. Materials may be delivered from other locations but these are considered sufficient to demonstrate feasibility of the regional and state road networks to provide access to the Castlereagh Highway for use of the access arrangements described above.

Routes have been split as inbound and outbound (including north towards Coonabarabran) and the analysis showed that implementing the left turn only access at the intersection would add journey time from the major supply centres considered. The Proponent and TfNSW are satisfied with this approach is a reasonable trade off to allow for safer operation of the intersection. These options are presented in detail in the Stantec Memo in Appendix C.

It is recommended however, that regional and state access route options are excluded from any conditions of consent to allow transport operators to develop their own most efficient routes at time of construction.

Intersection upgrade

TfNSW had requested an investigation into the possibility of installing a median at the intersection to provide a physical barrier preventing right turns and a BAR cannot be built at the intersection.

The existing road environment, site restrictions, predicted solar farm traffic volumes and the requirements of Austroads Guide to Road Design Part 4A Unsignalised and Signalised Intersections have been considered in this assessment. The detailed analysis can be found in the Stantec Memo Appendix C.

The analysis concluded, based on Austroads Guide Part 4A, that a median on Castlereagh Highway or All Weather Road would be substandard and is therefore not recommended. In addition, installation of a median will impact existing road users and emergency services from making convenient right turns at the intersection. Access to site is critical especially during emergency events such as Talbragar River floods, and a median may increase risks to other road users at the intersection. A median at the intersection was therefore not recommended especially with the relatively low traffic volumes, short duration of construction and other recommendations in the memo.

To address TfNSW request, LG Civil prepared a concept design for the intersection as shown in Attachment C of the memo which considered:

- AUL(S) design as shown in Figure 3-5. This is in advance of the BAL treatment requirement under the Austroads design requirements;
- Caters for the largest design vehicle, which is a 26m B-Double (refer Figure 3-6);
- Includes a 42m exit slip road for use by vehicles travelling south on Castlereagh Highway entering All Weather Road to minimise potential interactions with other south bound road users or stationary vehicles on the high speed carriageway of the Castlereagh Highway as far as reasonably possible and beyond what is required by Austroads;
- Swept paths (refer Figure 3-6), prepared by LG Civil, shows simultaneous in and out bound left turns of the largest design vehicle are maintained with the correct direction of travel, minimising the chance of stationary vehicles on the Castlereagh Highway as far as reasonably possible;
- Fits within the constraints at the intersection location such as bridge, culverts, barriers, lot boundaries etc; and
- The road will be sealed up to the existing seal location along All Weather Road.

The concept design is an appropriate treatment for the intersection and significantly increases its safety during construction and in the long term.

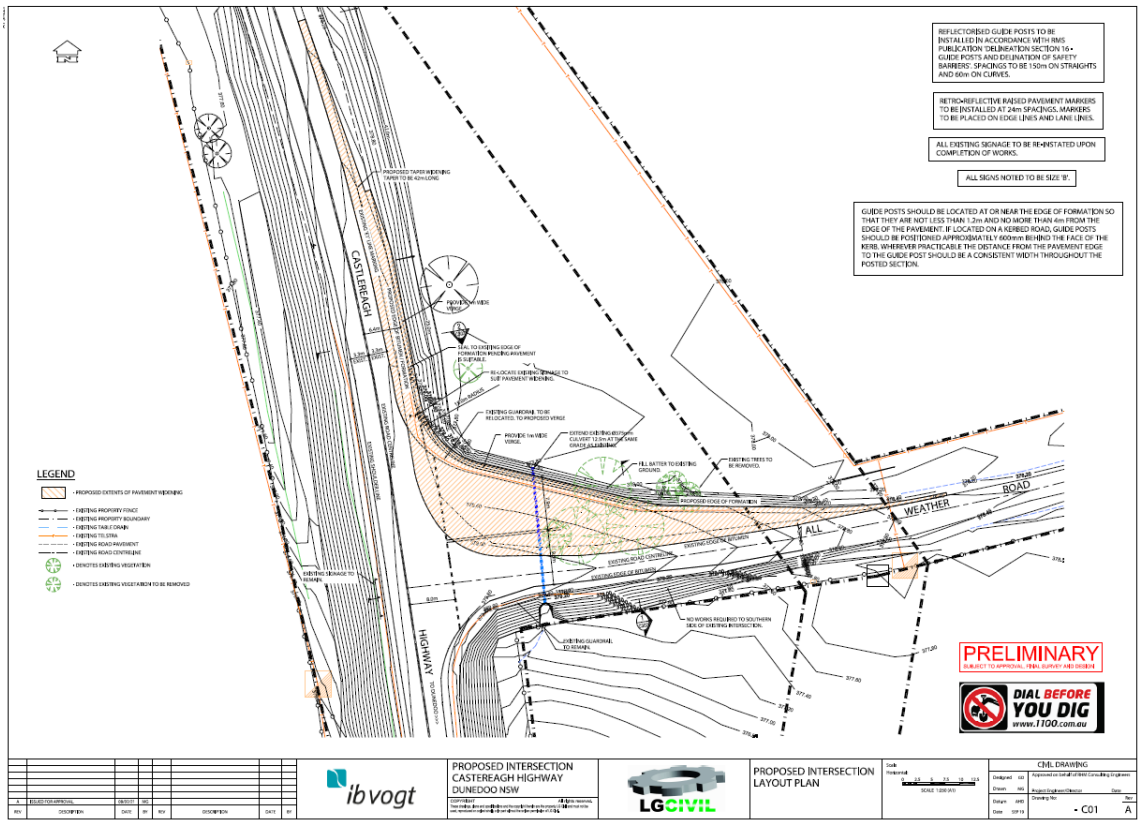

Figure 3-5 AUL(S) concept design by LG Civil on Castlereagh Highway and All Weather Road

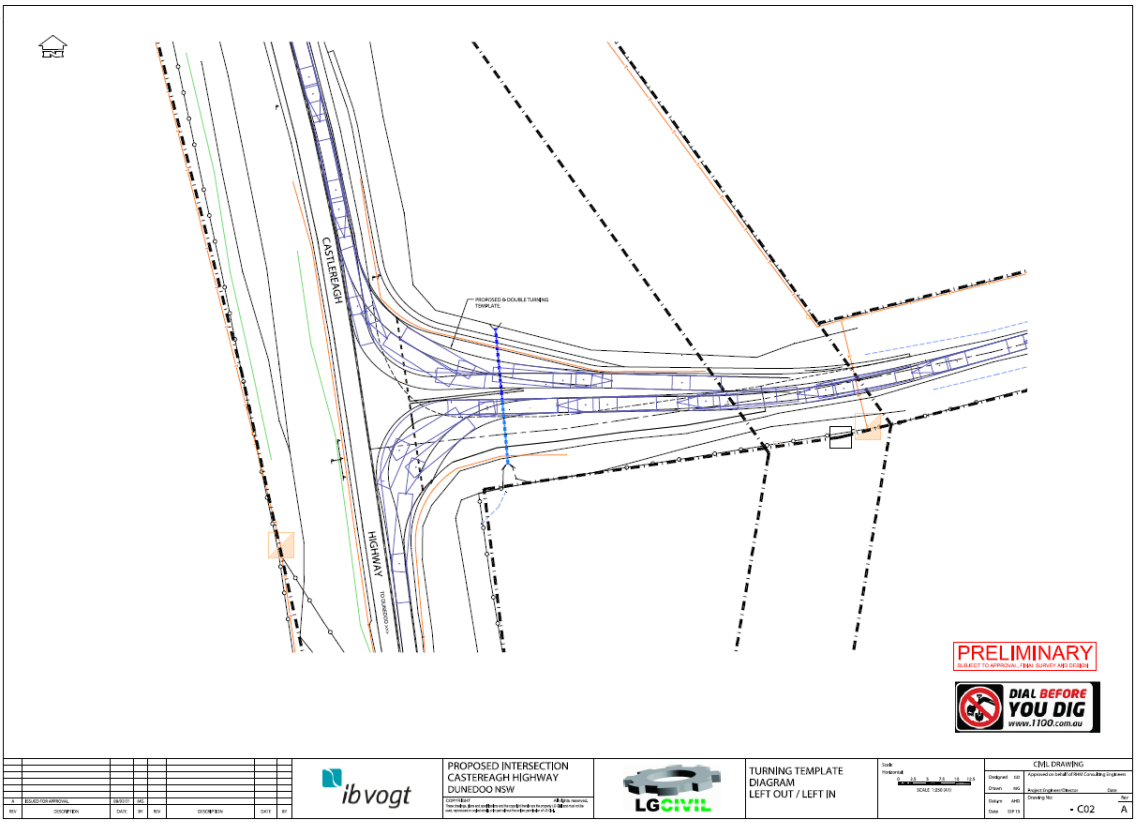

Figure 3-6 Swept path analysis for AUL(S) concept design by LG Civil on Castlereagh Highway and All Weather Road

3.2.3. Potential impacts

The potential construction impacts associated with the amendments to the intersection upgrades and the heavy vehicle routes are considered to be equivalent to that presented in the EIS. Use of the Castlereagh Highway and existing heavy vehicle route was most appropriate in minimising impacts on the Dunedoo road network and local community. Noise, dust and visual impacts associated with these amendments are considered to be as originally proposed given the number of vehicle and heavy vehicles movements, light vehicles number have not increased; and the routes avoid the local road network to ensure safer road conditions.

In Mendooran, Pampoo Street was selected as the preferred right turn location due to its wide entry, the passing lane to the left and avoidance of other obstacles such as low overhead wires (see Figure 5 above). Similarly, the other three intersections discussed in Section 3.2.2 above, have wide and appropriate geometry. However, it is noted that this route will direct construction vehicles through residential streets of Mendooran, and as such, a second route is proposed which will require construction vehicles to use Denmire Road and turn right onto Castlereagh Highway from Yarrow Road (see Figure 3-3).

The largest heavy vehicle that will be used during the construction of the proposal, has been reduced to a 26 m B-Double. This responds to RAVMAP requirements. Swept paths at the intersection have been updated (Refer to Figure 3-6) to reflect the new requirements and demonstrate the smaller design vehicle can safely negotiate the concept AUL(S).(Refer to Section D and Attachment C of Appendix C).

It is important to note that the traffic volume calculations considered a more conservative heavy vehicle than the current 26 m B-Double. Therefore, traffic volume impacts considered in the impact assessment are worst case and no update to the traffic volumes is required.

3.2.4. Safeguards and mitigation measures

Traffic, transport and road safety impacts would be managed by implementing the mitigation measures provided in Table 4-2 which updates Table 9-45 in the EIS. New mitigation measures are underlined.

3.3. Preliminary Hazards Analysis

3.3.1. Approach

The SEARs relevant to this project required for the Battery Storage component that a Preliminary Hazard Assessment (PHA) be prepared in accordance with *Hazard Industry Planning Advisory Paper No.6 – Guidelines for Hazard Analysis* (DoP, 2011a) and *Multi-Level Risk Assessment* (DP&I, 2011).

The SEARs also required that an assessment of potential hazards and risks be prepared, including but not limited to bushfires, spontaneous ignition, electromagnetic fields or the proposed grid connection infrastructure, against the International Commission on Non-

Ionizing Radiation Protection (ICNIRP) *Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields.*

Notwithstanding, SEPP 33 Hazardous and Offensive Development also requires a PHA to be prepared for potentially hazardous or offensive development. Appendix 3 of the Applying SEPP 33 guidelines (DOP, 2011b) lists industries that may fall within SEPP 33; the guidelines do not include solar farms and energy storage facilities. Appendix 2 of the guidelines provides a risk screening procedure and a checklist to identify Hazardous and Offensive Development in instances where the applicability of SEPP 33 is not immediately apparent. Information relevant to the risk screening and the checklist is provided below.

3.3.2. Analysis Summary

The PHA methodology undertaken included:

- Identification of the nature and scale of all hazards at the Proposal, including its proximity to the APA gas pipeline, and the selection of representative incident scenarios.
- Analysis of the consequences of these incidents on people, property, and the biophysical environment.
- Evaluation of the likelihood of such events occurring and the adequacy of safeguards.
- Calculation of the resulting risk levels of the facility.
- Comparison of these risk levels with established risk criteria and identification of opportunities for risk reduction.

Hazards identification

Consideration of the identification of hazards included the systematic identification of possible hazards, both on-site and off-site including:

- Activities and infrastructure at the Proposal.
- Type of equipment.
- Hazardous materials present.
- Natural events such as floods, cyclones, earthquakes, or lightning strikes.
- Hazardous events on neighbouring sites.

The identified hazards and events are presented in Table 4-1 of the PHA. A summary of the hazards and the relevant project infrastructure (where the hazards are applicable) is provided in Table 4-2 of the PHA.

Consequence

For each identified event, the resulting consequence was qualitatively described. These include impacts to personnel (e.g., fatality/injury), environment and/or assets.

Likelihood

Using a qualitative approach, the likelihood of an event was estimated using the category scale shown in Table 4-3 of the PHA. The likelihood ratings were assigned based on quantitative knowledge of historical incidents in the industry. The likelihood ratings were assigned accounting for the initiating causes, resulting consequences with controls (prevention and mitigation) in place.

The identified hazards, events, applicable infrastructure and the relationships with causes, consequences, controls, and likelihood ratings are summarised in the hazard register provided in Table 4-5 of the PHA.

3.3.3. Risk Assessment Results

Consequence

The risk assessment indicates that the worst-case consequence is a fire from a variety of causes (e.g. release of flammable materials, battery thermal runaway, infrastructure fire). These fires may have the potential to initiate bushfire to surrounding grasslands but is limited with appropriate control listed herein.

Likelihood

The risk assessment indicates that the highest likelihood rating for the identified events is unlikely (i.e. could occur in the next 10 years). This relates to unauthorised personnel access to the BS resulting in vandalism/asset damage to the project infrastructure.

Risk Assessment

A total of 11 risk events were identified. The breakdown of these events according to their risk ratings are as follows:

- 8 medium risk events
- 3 low risk events.

Based on the risk acceptance criteria used for the study, the risk profile for the project, subject to the implementation of controls described in Table 4-5 of the PHA, is considered to be tolerable in 'So Far As Reasonably Practicable' (SFARP).

The majority of the medium risk events relate to fire events resulting from a variety of causes (e.g. release of flammable materials, battery thermal runaway, infrastructure fire, bushfire, etc). The study identified proposed prevention controls to reduce the likelihood of these fire events and mitigation controls to contain the fires to minimise potential for escalated events (e.g. fire management plan, APZs, vegetation management etc.). Based on the identified controls, the highest likelihood for these events were rated as very unlikely (i.e. heard of in the industry, but not expected to occur).

Based on the size of the Proposal's Development Footprint, proposed location for project infrastructure within the Development Site, proposed controls and distance to neighbouring land uses (including neighbouring properties and agricultural operations), the exposure to fire events will primarily be to the project's construction and operations workforce. Offsite impacts would be expected to be minimal.

The risk assessment concluded that there is no potential for offsite fatality or injury. Therefore, the project meets the land use planning criteria. Risk events identified are onsite impacts and assessed against *Work Health and Safety* (WHS) *Act* requirements to reduce risk to SFARP. Risks were assessed by the project as tolerable if SFARP.

3.3.4. Safeguards and mitigation measures

Mitigation measures resulting from the PHA are provided in Table 4-2 which update the measures identified in tables 9-3 and 9-50 in the EIS. Updates to the measures have been underlined to show their incorporation.

4. ENVIRONMENTAL MANAGEMENT CHANGES

4.1. Summary of Amendments

Table 4-1 Summary of amendments and associated changes to impacts and mitigation measures.

Amendment	Proposed amendment	Impact change?	Additional mitigation measures?
Removal for groundwater use	Proposal will seek to meet its water requirements through commercially licenced water providers.	Yes. This change results in lesser impact to groundwater.	No.
Intersection upgrades and heavy vehicle routes	The intersection will undergo a AUL(s) to allow for heavy vehicles to enter and exit the site in a safer manner and without impacting the Dunedoo local road network.	Yes. This change results in a change to the intersection treatments and a lesser impact from what originally proposed in the EIS.	Yes. Refer to Section 3.2 3.1
Undertake a PHA	A PHA was undertaken to assess the hazards and risks associated with the operation of the Proposal, including the Battery Storage (BS) (also known as Battery Energy Storage System (BESS)) and the adequacy of safeguards.	No. The PHA recommends additional measures	Yes. Refer to Section 3.3

In consideration of the additional assessment for the proposed amendments described in this report, the following additional/updated mitigation measure is proposed for Aboriginal Heritage.

Table 4-2 New/updated mitigation measure, that also now form a commitment of the proposal.

PC: Pre-Construction, C: Construction, PO: Pre-operation, O: Operation, D: Decommissioning

Safeguards and mitigation measures	C	O	D
Hydrological Values and Water Quality Mitigation measures			
~~If ground water is to be used, A Groundwater Management Plan would be incorporated into the CEMP to manage impacts on groundwater. This~~	~~**PC**~~		

Safeguards and mitigation measures	C	O	D
~~would be informed by onsite survey by an appropriately trained expert and include:~~ ~~• Pollution controls~~ ~~Management of dewatering.~~			
~~If a new bore is to be constructed, the construction and maintenance of the groundwater extraction bore will be in accordance with the *Minimum Construction Requirements for Water Bores in Australia (3rd edition)* produced by the National Uniform Drillers Licencing Committee (NUDLC). The minimum requirements for consideration include:~~ ~~• Only a licensed driller shall carry out the bore installation works and shall be present at all times during bore construction activities.~~ ~~• The bore design should aim to ensure the protection of the groundwater resource from surface contamination. The headworks and casing are sealed so that there is no potential for flow outside the casing.~~ ~~• To minimise the possibility of contaminating the bore and any surrounding bores, the new bore should be located away from existing bores, surface water sources and any sources of pollution (e.g. dairies, septic tanks and absorption trenches, refuse dumps, landfill, effluent discharges from drainage ditches, cattle/stock dips).~~ ~~Chemicals and other drilling fluid additives that could leave a residual toxicity should not be added to any drilling fluids or cement slurries (i.e. grouts) used to drill and complete any water bore.~~	~~**PC C**~~	~~**O**~~	~~**D**~~
Traffic and Transport			
Install 'Trucks Turning' signs, during construction, on the Castlereagh Highway approaches to the Castlereagh Highway and All Weather Road intersection	**PC C**		**D**
Evaluation of any additional road or intersection upgrade requirements and associated traffic controls, apart from the AUL(s) agreed in the Stantec Memo, in consultation with Council and TfNSW (and consistent with Austroads guides and TfNSW supplements)	**PC C**		**D**
Install a VMS board, during construction, along the southern approach to the Castlereagh Highway and All Weather Road intersection, approx. 1.0km	**PC C**		**D**

Safeguards and mitigation measures	C	O	D
distance, which informs drivers of 'No Right Turn for Construction Vehicles at All Weather Road'			
Details of the traffic management measures to be implemented at the Castlereagh Highway and All Weather Road intersection for heavy vehicles during construction are to be included in the Construction Traffic Management Plan developed prior to construction commencing in consultation with TfNSW and WSC. Traffic Control Plans will also be included in the Construction Traffic Management Plan.	**PC C**		**D**
Soils and Landform			
Prior to the commencement of any works on the land within 50 metres of the pipeline easement, a construction management plan must be submitted to and approved by APA. The plan must: • Prohibit the use of rippers or horizontal direction drills unless otherwise agreed by APA. • Avoid significant vibration, heavy loadings stored over the pipeline and heavy vehicle / plant crossings of the pipeline within the easement. • Be endorsed by APA where the works are within or crossing the pipeline alignment. All plans for the electrical transmission line to Essential Energy Substation must have the gas pipeline easement clearly identified with hatching on the full width of the easement. The easement must also be clearly labelled as 'high pressure gas pipeline easement – no works to occur without the prior authorisation of the pipeline operator'. The ability of the pipeline operator to access the pipeline easement must be maintained at all times to facilitate prompt maintenance and repairs. APA field officers will undertake any necessary site induction to facilitate unaccompanied access.	**PC C**	**O**	**D**
Buildings, structures, roadways, pavement, pipeline, cable, fence, on-site waste treatment (or irrigation area), or any other improvement on or under the land within the gas transmission pipeline easement must not be constructed without prior consent in writing from APA. No structure or vegetation will be permitted on the easement that prohibits maintenance online of sight along the pipeline easement.	**PC C**	**O**	**D**

Safeguards and mitigation measures	C	O	D
Hazards			
Prior to the development commencing, and to inform the detailed design, the applicant must conduct an electrical hazards studies in accordance with (the requirements of) Australian Standard 4853 – 2012 (for Low Frequency Induction and Earth Potential Rise threats for personnel and pipe corrosion). The applicant must address any relevant requirements and any recommendations and/or actions must be implemented to the satisfaction of APA. All cost associated with the study and implementing its recommendations and/or actions are to be borne by the applicant. The applicant must complete validation testing upon completion of construction.	**PC**		
The applicant must conduct electrical interference studies in accordance with the requirements of AS 2832 once detailed design is complete.	**PC**		
The applicant must design to comply with the applicable Australian Standard as required and provide copies of the electrical interference studies and electrical hazard studies to APA.	**PC**		
The applicant must make good (at the applicant's cost) any hazards or risks to the Central Ranges Pipeline (including cathodic protection systems), caused by any powerlines.	**PC C**	**O**	**D**
Aboriginal Heritage			
The significance of the Black Swan nesting area and any required mitigation measures are to be included in the management plan and would be discussed with the WVWAC during the development of the plan.	**PC**	**O**	**D**

5. CONCLUSION

This report has considered the amendments to the proposed Dunedoo Solar Farm proposal. The investigation of potential environmental impacts of the proposed amendments has shown there are no substantive additional impacts to those proposed in the EIS. The amendments result in some changes to the mitigation strategies for the Proposal; however this is limited to management of traffic, mitigation measures regarding hazards at the gas pipeline and a mitigation measure to address the cultural significance of the Black Swan nesting site.

The benefits of the Proposal would remain generally the same. The proposal would result in a number of benefits including:

- Supporting Commonwealth and NSW climate change commitments.
- Contributing enough clean renewable energy to provide electricity to about 24,415 average NSW homes and displace approximately 48,236 metric tonnes of carbon dioxide annually.
- Enhancing electricity reliability and security by contributing 144,540 MWh of clean energy to the national grid and supporting the energy transition from coal fired to renewables.
- Direct and indirect employment opportunities during all phases of the proposal, including around 100 direct construction jobs and 160 indirect supply chain jobs during the peak construction phase and around 3 equivalent direct full time jobs and 9 indirect service contractors once the proposal is operational.
- Investment of about $76M in capital expenditure in total.
- Development of a new land use thereby diversifying local land uses within the locality and offering host landholders an alternative income stream.

The Project has been assessed in accordance with the *Environmental Planning and Assessment Act 1979* and has taken into consideration the *Environment Protection and Biodiversity Conservation Act 1999*, along with other Federal, State and Local Government legislation, policy and guidelines. The scope of the assessment covered the Secretary's Environmental Assessment Requirements, the requirements of other State and Federal agencies, and consideration of the wellbeing of community stakeholders. Specialists were also engaged to provide impact assessment expertise in key environmental areas including traffic, biodiversity, noise and Aboriginal heritage.

The specialist's reports found that impacts would be generally managed consistent with the measures set out in the initial EIS. The only minor amendments made to the wording of the existing mitigation measures are required for:

1. Hydrological Values and Water Quality– removal of those mitigations that would triggered if groundwater was to be used.
2. Traffic, transport and safety – to upgrade the site access intersection to provide a short Auxiliary Left turn lane AUL(S) at the Castlereagh Highway and All Weather Road intersection.
3. Hazards – inclusion of the protocols to be followed prior to the construction of easements.
4. Aboriginal Heritage – cultural significance of the Black Swan nesting areas.

In consideration of the assessment of the impacts from the proposal contained in the EIS, and the proposed mitigation measures committed to in the revised mitigation measures (included in Appendix A of this report), it is believed that all relevant matters have been addressed and that the Project should now proceed for approval by the Minister.

6. REFERENCES

Department of Planning (DOP) (2011a) *Hazardous Industry Planning Advisory Paper No. 6.* Available online at <https://www.planning.nsw.gov.au/-/media/Files/DPE/Other/hazardous-industry-planning-advisory-paper-no-6-hazard-analysis-2011-01.pdf?la=en>

DOP (2011b) *Applying SEPP 33*. Available online at <https://www.planning.nsw.gov.au/-/media/Files/DPE/Guidelines/hazardous-and-offensive-development-application-guidelines-applying-sepp-33-2011-01.pdf?la=en>

Department of Planning and Infrastructure (DP&I) (2011) *Multi-level Risk Assessment*. Available online at <https://www.planning.nsw.gov.au/-/media/Files/DPE/Guidelines/assessment-guideline-multi-level-risk-assessment-2011-05.pdf?la=en>

Moir Landscape Architecture (2020) *Visual Impact Assessment, Proposed Dunedoo Solar Farm*. Prepared for ib vogt GmbH.

NGH Consulting (NGH) (2018), *Aboriginal Cultural Heritage Assessment Dunedoo Solar Farm*. Prepared for ib vogt GmbH.

NGH (2020a) *Dunedoo Solar Farm Environmental Impact Statement*. Prepared for ib vogt GmbH.

NGH (2020b) *Biodiversity Development Assessment Report.* Prepared for ib vogt GmbH.

NGH (2020c) *Historical Archaeological Assessment.* Prepared for ib vogt GmbH.

NGH (2020d) *Dunedoo Solar Farm Submissions Report.* Prepared for ib vogt GmbH.

NGH (2021) *Preliminary Hazards Analysis*. Prepared for ib vogt GmbH.

Renzo Tonin and Associates (2020) *Dunedoo Solar Farm Construction and Operation Noise and Vibration Assessment*. Report prepared for ib vogt GmbH.

Stantec (2020) *Traffic Impact Assessment Report.* Prepared for ib vogt GmbH.

APPENDIX A REVISED MITIGATION MEASURES

Updated mitigation measures are presented below as per the relevant amendments discussed in Section 3, including Aboriginal heritage. New and amended measures from this additional assessment are <u>underlined</u>, removed measures based on the Submissions Report (NGH Consulting, 2020d) are ~~stroked through~~.

Hydrological Values and Water Quality Mitigation measures	Phase
The Spill and Contamination Response Plan prepared as part of the Emergency Response Plan would include measures to: • Respond to the discovery of existing contaminants at the site (e.g. Pesticide containers or asbestos), including stop work protocols and remediation and disposal requirements • Manage the storage of any potential contaminants on-site • Mitigate the effects of soil and water contamination by fuels or other chemicals (including emergency response and EPA notification procedures) • Ensure that machinery and materials arrive on site in a clean and secure condition • Prevent contaminants affecting adjacent pastures, irrigation channels, dams and native vegetation • Monitor and maintain spill equipment including spill kits in relevant machinery • Induct and train site staff. • Detail fuels, chemicals, and liquids storage locations that are at least 50 metres from any waterways or drainage lines, in an appropriate bunded area • Disposal process for contaminated materials.	Construction Operation Decommissioning
If the substation is oil-cooled, the layout, design, size etc of the oil containment bunding and drainage would comply with the relevant standards and guidelines. The bund would be regularly inspected and cleaned, including removal of rainwater.	Pre-construction Construction Operation
A Soil and Water Management Plan will be developed to incorporate the following: • That no detergents or other chemicals would be added to the solar panel cleaning water • Specify concrete washout process and location • Specify the procedures for testing, treatment and discharge of construction wastewater • Detail staff training required	Construction Operation

Hydrological Values and Water Quality Mitigation measures	Phase
~~If ground water is to be used, A Groundwater Management Plan would be incorporated into the CEMP to manage impacts on groundwater. This would be informed by onsite survey by an appropriately trained expert and include:~~ ~~• Pollution controls~~ ~~• Management of dewatering.~~	~~Pre-Construction~~
~~If a new bore is to be constructed, the construction and maintenance of the groundwater extraction bore will be in accordance with the *Minimum Construction Requirements for Water Bores in Australia (3rd edition)* produced by the National Uniform Drillers Licencing Committee (NUDLC). The minimum requirements for consideration include:~~ ~~• Only a licensed driller shall carry out the bore installation works and shall be present at all times during bore construction activities.~~ ~~• The bore design should aim to ensure the protection of the groundwater resource from surface contamination. The headworks and casing are sealed so that there is no potential for flow outside the casing.~~ ~~• To minimise the possibility of contaminating the bore and any surrounding bores, the new bore should be located away from existing bores, surface water sources and any sources of pollution (e.g. dairies, septic tanks and absorption trenches, refuse dumps, landfill, effluent discharges from drainage ditches, cattle/stock dips).~~ ~~• Chemicals and other drilling fluid additives that could leave a residual toxicity should not be added to any drilling fluids or cement slurries (i.e. grouts) used to drill and complete any water bore.~~	~~Pre-Construction~~ ~~Construction~~ ~~Operation~~ ~~Decommissioning~~

Traffic and Transport Mitigation Measures	Phase
A Construction Traffic Management Plan (CTMP) would be developed as part of the CEMP and DEMP, in consultation with Warrumbungle Shire Council and TfNSW. The plan would include: • Confirmation of designated routes for construction and haulage traffic • Install ‘Trucks Turning’ signs, during construction, on the Castlereagh Highway approaches to the Castlereagh Highway and All Weather Road intersection • Evaluation of any additional road or intersection upgrade requirements and associated traffic controls, apart from the AUL(S) agreed in the Stantec Memo, in consultation with Council and TfNSW (and consistent with Austroads guides and TfNSW supplements) • Install a VMS board, during construction, along the southern approach to the Castlereagh Highway and All Weather Road intersection, approx. 1.0km distance, which informs drivers of ‘No Right Turn for Construction Vehicles at All Weather Road’	Preconstruction Construction Decommissioning

Traffic and Transport Mitigation Measures	Phase
• Scheduling of deliveries • Carpooling/shuttle bus arrangements changes required from Milling Park to site to minimise staff vehicle movements in the event of flooding • Consultation and notification arrangements regarding traffic impacts for nearby residents and local road users, particularly when traffic delays are expected • Arrangements and locations for traffic controls (speed limits, signage, stop/go) • Procedure to monitor traffic impacts and adapt controls (where required) to reduce the impacts • Provision of a contact phone number for stakeholders and the public to obtain information and to enable rapid response to any issues or concerns • Assessment of road condition prior to construction on all local roads that would be utilised (All Weather Road and relevant section of Digilah Road),a road condition monitoring program, and process for rectifying road conditions should deterioration in road quality be attributable to the proposal. • <u>Details of the traffic management measures to be implemented at the Castlereagh Highway and All Weather Road intersection for heavy vehicles during construction are to be included in the Construction Traffic Management Plan developed prior to construction commencing in consultation with TfNSW and WSC. Traffic Control Plans will also be included in the Construction Traffic Management Plan.</u> • Address the temporary increase in traffic across the low-level bridge crossing on Digilah Road to the north of Golden Highway • Reduce predicted impact (where possible) from transport during peak tourism periods (such as during local festivals), and morning and evening commuting or school bus operating periods • Link with the requirements of the Flood Response Plan	
Invite TfNSW education staff to provide information, guidance and discussion on fatigue management and road safety to site staff.	Preconstruction Construction Decommissioning
Consultation with stakeholders including TfNSW, Warrumbungle Shire Council, local landholders and emergency services would continue during construction and decommissioning to advise of any changes to road use and conditions.	Construction Decommissioning

Soils and Landform Mitigation measures	Phase
The solar array would be designed and installed to allow sufficient space between panels to establish and maintain perennial groundcover (subject to climatic conditions). Groundcover management details (including stocking levels etc) and rehabilitation of civil work completed during construction are to be included in the Construction Environmental Management Plan and Operational Environmental Management Plan.	Preconstruction Construction Operation
A Construction Environmental Management Plan (CEMP) would be implemented to manage runoff, soil erosion and sedimentation and pollution risks at the site. The CEMP would be prepared in accordance with the 'Blue Book' Volume 1 Managing Urban Stormwater: Soils and Construction (Landcom 2004), Volume 2A Installation of Services (DECC 2008a) and Volume 2C Unsealed Roads (DECC 2008b).	Pre-construction Construction
Prior to the commencement of any works on the land within 50 metres of the pipeline easement, a construction management plan must be submitted to and approved by APA. The plan must: • Prohibit the use of rippers or horizontal direction drills unless otherwise agreed by APA. • Avoid significant vibration, heavy loadings stored over the pipeline and heavy vehicle / plant crossings of the pipeline within the easement. • Be endorsed by APA where the works are within or crossing the pipeline alignment. All plans for the electrical transmission line to Essential Energy Substation must have the gas pipeline easement clearly identified with hatching on the full width of the easement. The easement must also be clearly labelled as 'high pressure gas pipeline easement – no works to occur without the prior authorisation of the pipeline operator'. The ability of the pipeline operator to access the pipeline easement must be maintained at all times to facilitate prompt maintenance and repairs. APA field officers will undertake any necessary site induction to facilitate unaccompanied access.	Preconstruction Construction Operation Decommissioning
Buildings, structures, roadways, pavement, pipeline, cable, fence, on-site waste treatment (or irrigation area), or any other improvement on or under the land within the gas transmission pipeline easement must not be constructed without prior consent in writing from APA. No structure or vegetation will be permitted on the easement that prohibits maintenance online of sight along the pipeline easement.	Preconstruction Construction Operation Decommissioning
As part of the CEMP, a Soil and Water Management Plan (incorporating a Site Drainage Plan and Erosion and Sediment Control Plan) would be	Pre-construction Construction

Soils and Landform Mitigation measures	Phase
prepared, implemented and monitored during the Proposal to minimise soil and water impacts. These plans would include provisions to: • Install, monitor and maintain erosion controls • Identify and protect sensitive features such as native vegetation, dams and Talbragar River • Ensure that machinery leaves the site in a clean condition to avoid tracking of sediment onto public roads • Manage topsoil: in all excavation activities, separate subsoils and topsoils to restore natural soil profiles and assist revegetation, guided by the findings of the pre-works soil survey. Topsoils stockpiled for extended periods would be managed to avoid contact with overland runoff, minimise weed risks, and maintain soil organic matter, soil structure and microbial activity • Minimise the area of disturbance from excavation and compaction and rationalise vehicle movements to minimise soil impacts • Ensure any discharge of water from the site is managed to ensure ANZECC (2000) water quality criteria are met as far as practicable, ensure excavations are not scheduled when heavy rainfall events are predicted, or soils are saturated.	
The Spill and Contamination Response Plan prepared as part of the Emergency Response Plan would include measures to: • Respond to the discovery of existing contaminants at the site (e.g. Pesticide containers or asbestos), including stop work protocols and remediation and disposal requirements • Manage the storage of any potential contaminants on-site • Mitigate the effects of soil and water contamination by fuels or other chemicals (including emergency response and EPA notification procedures) • Ensure that machinery and materials arrive on site in a clean and secure condition • Prevent contaminants affecting adjacent pastures, irrigation channels, dams and native vegetation • Monitor and maintain spill equipment including spill kits in relevant machinery • Induct and train site staff. • Detail fuels, chemicals, and liquids storage locations that are at least 50 metres from any waterways or drainage lines, in an appropriate bunded area Disposal process for contaminated materials.	Construction Operation Decommissioning
The site design and, if required the CEMP, OEMP and DEMP and relevant sub-plans should incorporate where possible the management	Preconstruction Construction

Soils and Landform Mitigation measures	Phase
recommendations in the site soil survey report (Soil Management Designs 2018), including: • Maintain protective ground cover in the north-western corner (3%-slope) where possible • Maintain protection with perennial ground cover on Brown Chromosols in the vicinity of Pit 4 • Consider engineering and design solutions for the installation of the piles in all Vertosol areas, which have a high shrink-swell potential in top and sub soils • Apply Gypsum (6t/ha) in areas with Grey and Brown Vertosols, to improve drainage and avoid trafficability issues following heavy rain events. • Apply Gypsum (3t/ha) for the remainder of the area • Apply lime at a rate of 2t/ha to help overcome a slight acidity issue that will be difficult to treat once the solar panels have been installed • Apply fertilizer produce rich in nitrogen and zinc for the Vertosol zone represented by Pit 5 • Moderate salinity in the depth interval 60-100 cm was observed at Pits 2 and 3; this may have an impact on susceptibility to corrosion of piles.	Operation Decommissioning

Hazards Mitigation Measures	Phase
An Emergency Response Plan, incorporating an Evacuation Plan, Fire Response Plan, Flood Response Plan and Spill and Contamination Response Plan, would be developed prior to construction the solar farm. A copy of the plan would be kept on site.	Preconstruction Construction Operation Decommissioning
Hazardous materials and development	
Dangerous or hazardous materials would be transported, stored and handled in accordance with AS1940-2004: *The storage and handling of flammable and combustible liquids* and the ADG Code where relevant. All potential pollutants kept on-site would be stored in accordance with relevant HAZMAT requirements and bunded.	Construction Operation Decommissioning
The transportation of new and waste lithium-ion batteries would comply with the requirements of the Dangerous Goods Code, including specific 'special provisions' and 'packing instructions' applying to the transportation of Li-ion batteries.	Construction Operation Decommissioning
EMF	
All electrical equipment would be designed in accordance with relevant codes and industry best practice standards in Australia.	Preconstruction Construction

Hazards Mitigation Measures	Phase
All design and engineering would be undertaken by qualified and competent person/s with the support of specialists as required and would aim to minimise EMFs.	Preconstruction Construction
Prior to the development commencing, and to inform the detailed design, the applicant must conduct an electrical hazards studies in accordance with (the requirements of) Australian Standard 4853 – 2012 (for Low Frequency Induction and Earth Potential Rise threats for personnel and pipe corrosion). The applicant must address any relevant requirements and any recommendations and/or actions must be implemented to the satisfaction of APA. All cost associated with the study and implementing its recommendations and/or actions are to be borne by the applicant. The applicant must complete validation testing upon completion of construction.	Preconstruction
The applicant must conduct electrical interference studies in accordance with the requirements of AS 2832 once detailed design is complete.	Preconstruction
The applicant must design to comply with the applicable Australian Standard as required and provide copies of the electrical interference studies and electrical hazard studies to APA.	Preconstruction
The applicant must make good (at the applicant's cost) any hazards or risks to the Central Ranges Pipeline (including cathodic protection systems), caused by any powerlines.	Preconstruction Construction Operations Decommissioning
Aviation	
The materials and colour of on-site infrastructure would, where practical, be low reflectivity and in keeping with the colouring of the local landscape.	Preconstruction Construction

Aboriginal Heritage	
The sites Dunedoo Solar AFT 1 to Dunedoo Solar AFT 14 which are located within the Development Footprint for the Dunedoo Solar Farm must be salvaged via surface collection prior to construction works commencing for the Dunedoo Solar Farm. Until surface collection salvage has occurred at the sites a minimum 5-metre buffer must be observed to ensure no inadvertent impacts occur.	Preconstruction

Aboriginal Heritage	
The collection and relocation of the surface artefacts within the Dunedoo Solar Farm Subject land should be undertaken by an archaeologist with representatives of the registered Aboriginal parties and be consistent with Requirement 26 of the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales. The salvage of Aboriginal objects can only occur following development consent that is issued for State Significant Developments and must occur prior to any construction works commencing.	Preconstruction
No mitigation is required prior to impacts to the previously recorded site AHIMS# 36-2-0049/ DTG/OC27 - Dunedoo 1. Following development consent that is issued for State Significant Development to allow impacts to the Aboriginal site AHIMS# 36-2-0049 an Aboriginal *Site Impact* Recording Form must be completed to list the site as destroyed.	Preconstruction
The sites Dunedoo Solar AFT 15 to Dunedoo Solar AFT 23 which are located outside the Dunedoo Solar Farm Subject land must not be impacted. Any future activities that may potentially pose a risk of impacts to these sites by this project would need to be assessed by an archaeologist and additional consultation with the registered Aboriginal parties would be required.	Preconstruction
An Aboriginal Site Impact Recording Form must be completed and submitted to AHIMS following harm for each site collected or destroyed from salvage and/or construction works as approved for impacts in line the development consent for this State Significant Development.	Preconstruction
For any additional impacts to sites and areas outside the Subject land, as assessed in this report a modification application would need to be submitted to the to the Department of Planning, Industry and Environment (DPIE) for this State Significant Development which includes consideration of impacts on Aboriginal Heritage as determined by an archaeologist, additional Aboriginal consultation and survey may be required.	Preconstruction
The Proponent should prepare a Cultural Heritage Management Plan (CHMP) to address the potential for finding additional Aboriginal artefacts during the construction of the Dunedoo Solar Farm and for the management of known sites and artefacts within the Subject land. The Plan should include the unexpected finds procedure to deal with construction activity. Preparation of the CHMP should be undertaken in consultation with the registered Aboriginal parties.	Preconstruction
In the unlikely event that human remains are discovered during the construction of the Dunedoo Solar Farm, all work must cease in the immediate vicinity. The appropriate heritage team within the Department of Planning, Industry and Environment (DPIE) and the local police should be notified. Further assessment would be undertaken to determine if the remains were Aboriginal or non-Aboriginal. If the remains are deemed to	Construction

Aboriginal Heritage	
be Aboriginal in origin the Registered Aboriginal Parties should be advised of the find as directed by the appropriate heritage team within DPIE.	
The significance of the Black Swans nesting area and the potential for any mitigation measures to be included in the management plan would be discussed with the WVWAC during the development of the relevant plan.	Preconstruction Construction Decommissioning
Further archaeological assessment would be required if the proposal activity extends beyond the area assessed in this report. This would include consultation with the registered Aboriginal parties and may include further field survey.	Preconstruction

APPENDIX B TFNSW AND WSC MEETING 28/01/2021 MINUTES

APPENDIX C STANTEC MEMO

APPENDIX D PHA