Proposed Segment Factory for Snowy 2.0

Scoping Report

June 2019

Scoping report for proposed segment factory for Snowy 2.0

Polo Flat Road, Polo Flat

Report Number

J17188 RP#69

Client

Snowy Hydro Limited

Date

19 June 2019

Version

v1 Final

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19 June 2019

Approved by

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19 June 2019

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1 Introduction

1.1 Snowy 2.0

Snowy Hydro Limited (Snowy Hydro), the operator of the Snowy Mountains Hydro-electric Scheme (Snowy Scheme), is proposing to build and operate Snowy 2.0. Snowy 2.0 is a project that would increase the pumped hydro-electric capacity within the existing Snowy Scheme by linking the Tantangara and Talbingo reservoirs with tunnels feeding a new underground power station. The project would involve tunnelling and excavation works between the two reservoirs to depths of up to 1 kilometre (km).

Snowy 2.0 would provide large-scale storage of energy that will be available as quick-start electricity generation at critical times of peak demand. Pumping water at times of low electricity demand means that Snowy 2.0 would have water ready to use for energy generation at times when consumers need it most. Snowy 2.0 would make efficient use of water resources to generate electricity without impacting on the supply of irrigation and town water supplies for the Murray-Darling Basin.

When operational, Snowy 2.0 would function primarily as an energy storage facility; pumping water out of Talbingo Reservoir (the lower reservoir) to Tantangara Reservoir (the upper reservoir) in the storage mode and allowing the water to flow from Tantangara Reservoir into Talbingo Reservoir in the generating mode. Decisions concerning the operational mode, flow rates and flow duration would be made remotely by Snowy Hydro on the basis of the state of the national electricity market (NEM) with due regard given to operational and licensing constraints, including the need to maintain downstream supply and environmental flows.

Snowy 2.0 has been declared Critical State Significant Infrastructure (CSSI) in accordance with the provisions of the New South Wales (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act) with the declaration coming into effect on 9 March 2018. As a result, Snowy 2.0 may be carried out without obtaining development consent under Part 4 of the EP&A Act. However, Snowy 2.0 is subject to Division 5.2 of the EP&A Act, which requires the preparation of an environmental impact statement (EIS) or EISs and the approval of the NSW Minister for Planning.

Snowy 2.0 would be developed in two phases. The first phase, the Exploratory Works, includes an exploratory tunnel and portal and other exploratory and construction activities primarily in the Lobs Hole area of the Kosciuszko National Park (KNP).

The second phase, the Main Works, covers the major construction elements of Snowy 2.0, including permanent infrastructure (such as the underground power station, power waterways, access tunnels, chambers and shafts), temporary construction infrastructure (such as construction adits, construction compounds and accommodation), management and storage of extracted rock material and establishing supporting infrastructure (such as road upgrades and extensions, water and sewage treatment infrastructure, and the provision of construction power). Snowy 2.0 Main Works also includes the operation of Snowy 2.0.

Exploratory Works was approved by the NSW Minister for Planning on 7 February 2019 and preliminary works have already commenced. The EIS for Main Works is expected to be lodged with the NSW Government later in 2019.

The tunnels for Snowy 2.0, including the exploratory tunnel for Exploratory Works, would be excavated, in part, using tunnel boring machines (TBMs) and would be lined using precast concrete tunnel segments. These segments are proposed to be constructed at a factory (the proposed segment factory) to be located on the eastern side of Polo Flat (the site), which is an industrial area located to the east of Cooma.

The proposed segment factory would contain a covered area for the manufacture of the tunnel segmental linings, uncovered storage areas for raw material and segments, vehicle parking areas and associated offices and workshops.

Primary inputs for the proposed segment factory include aggregate, sand, cement and rebar steel. Primary outputs include the precast tunnel segmental linings which would be transported to the construction sites of Snowy 2.0 within the Kosciusko National Park (KNP).

Approximately 130,500 segments would be manufactured and transported over a 3.5-year operational period.

The location of the proposed segment factory in its regional and local contexts can be seen in Figure 1.1 and Figure 1.2 respectively.

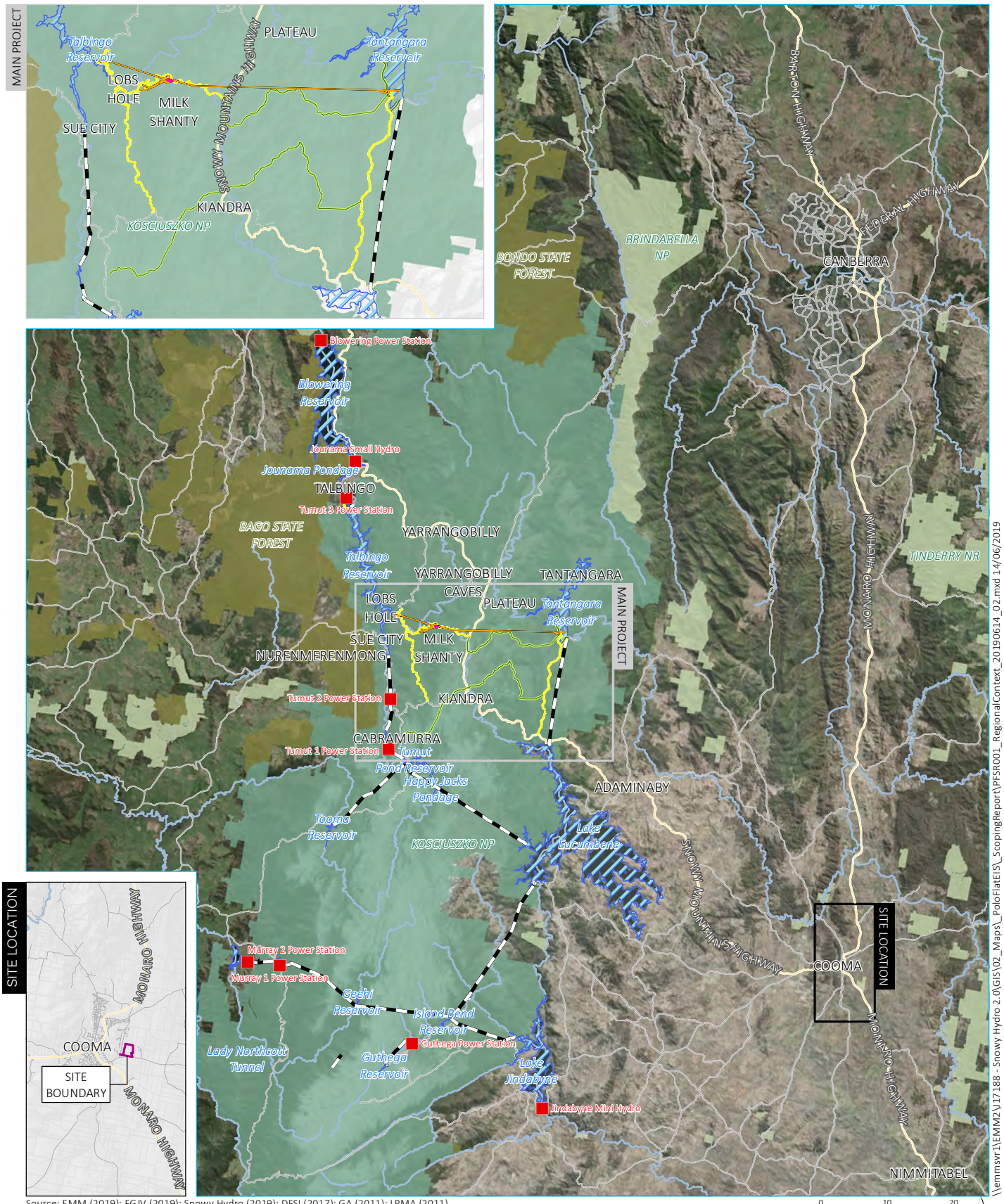
As discussed in Chapter 2, while the proposed segment factory will manufacture segments for the tunnels for Snowy 2.0, and transport the segments to the construction sites within KNP, the scope of the Exploratory Works and Main Works phases of Snowy 2.0 are excluded from this project and this scoping report.

1.2 Purpose of report

This scoping report has been prepared by EMM Consulting Pty Limited (EMM) on behalf of Snowy Hydro, the proponent for Snowy 2.0. It has been prepared with input from Future Generation Joint Venture (FGJV) which has been contracted by Snowy Hydro to undertake the detailed design and construction of Snowy 2.0, including the proposed segment factory.

The purpose of this report is to request and inform the content of the Secretary's Environmental Assessment Requirements (SEARs) for the proposed segment factory, which will specify the requirements for the EIS that will be prepared to accompany the application for the factory.

This report provides details of the proposed scope, approval process, consultation process and technical assessments to be undertaken for the proposed segment factory.



Source: EMM (2019); FGJV (2019); Snowy Hydro (2019); DFSI (2017); GA (2011); LPMA (2011)

0 10 20 km

GDA 1994 MGA Zone 55

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KEY

- Site boundary

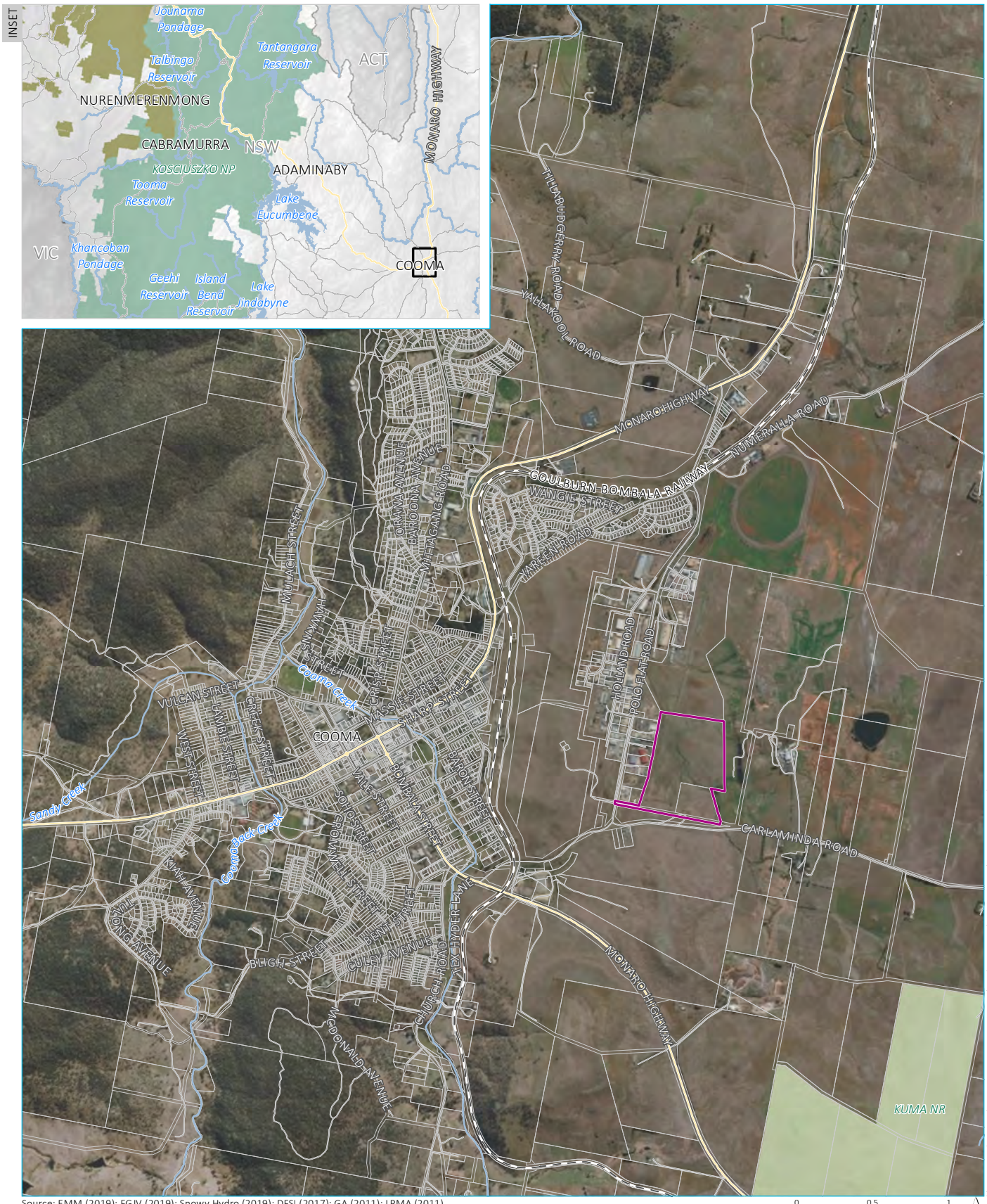
Snowy 2.0 project elements
- Utilities
- Tunnels, portals, intakes
- Power station
- Permanent roads and surface infrastructure

Existing Snowy Scheme
- Existing power station
- Existing pipeline tunnel
- Scheme storage

- Main road
- Local road or track
- Watercourse
- Kosciuszko National Park
- NPWS reserve
- State forest

Site location in regional context

Snowy 2.0
Scoping Report
Proposed Segment Factory
Figure 1.1



Source: EMM (2019); FGJV (2019); Snowy Hydro (2019); DFSI (2017); GA (2011); LPMA (2011)

0 0.5 1 km

GDA 1994 MGA Zone 55

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KEY

- Site boundary
- Rail line
- Main road
- Local road or track
- Watercourse
- Cadastral boundary
- NPWS reserve

Site location in local context

Snowy 2.0
Scoping Report
Proposed Segment Factory
Figure 1.2

snowy 2.0

EMM creating opportunities

2 The scope

2.1 Introduction

This section of the report provides a summary of the scope of the proposed segment factory for Snowy 2.0. A detailed description of the proposed segment factory is contained in Appendix A.

2.2 Proponent details

Details on the proponent for the proposed segment factory, as well as details on the person who prepared this scoping report and the site owner are as follows:

Table 2.1 Proponent details

Requirement	Detail
Proponent	Snowy Hydro Limited
Postal address	Monaro Highway Cooma NSW 2630
ABN	17 090 574 431
Nominated contact	Andrew Nolan General Manager Water and Environment
Contact details	PO Box 332 Cooma NSW 2630 Phone: 02 6453 2888 Email: snowy2.0@snowyhydro.com.au
Name and qualifications of persons who prepared report	Brett McLennan - Bachelor of Town Planning (Hons)
Site owner	• Lot 14 in Deposited Plan (DP) 250029 – Snowy Hydro • Lot 3 in DP 238762 – Snowy Hydro • unmade road corridor to the south of the above lots – the State of NSW

2.3 Site details

The site of the proposed segment factory is located on the south eastern side of the Polo Flat industrial area, predominantly on the southern part of the land owned by Snowy Hydro. The site is located to the east of Polo Flat Road and to the north of Carlaminda Road (see Figure 1.1 and Figure 1.2).

The site contains the following land parcels:

- southern part of Lot 14 in DP 250029 – also known as 9 Polo Flat Road, Polo Flat;
- Lot 3 in DP 238762 – also known as 33 Carlaminda Road, Polo Flat; and
- an unmade road corridor, directly south of 9 Polo Flat Road, Polo Flat and 33 Carlaminda Road, Polo Flat.

Except for a few buildings located on southern part of Lot 3 in DP 238762, the site is vacant and dominated by grassland. A drainage line, or dry creek, flows in a north east direction through the middle of the site.

Lot 14 in DP 250029 is a large parcel of land (about 57 hectares (ha)) which contains a private airfield predominantly located in the middle and northern part of the land. This airfield was originally established in 1921 and further developed in the late 1950s and 1960s to service the Snowy Scheme. It became the base for the Snowy Mountains Hydro-electric Authority's (the predecessor to Snowy Hydro) flying unit and aircraft. The land was sold by Snowy Hydro in 2001 where it continued use as a private airfield. Snowy Hydro purchased the land again in early 2019.

The site is surrounded by industrial development to the west and predominantly vacant land to the south and east. To the north of the site is the remainder of Lot 14 in DP 250029 which contains the private airfield, and other industrial development. Snowy Hydro's private airfield contains a main north-south aligned runway, hangers and offices. It also contains an above ground fuel tank for the refuelling of planes and helicopters.

Lot 3 in DP 238762 contains a communications tower which is being decommissioned in August 2019.

There is an isolated industrial operation located about 150 metres (m) to the south east, and an abattoir located about 350 m to the east of the site.

The nearest rural residence is located about 450 m to the south south-east of the site. The nearest residences within Cooma are located about 1 km to the west of the site.

Photos of the site can be seen in Appendix B.

2.4 The proposal

2.4.1 The proposed segment factory

The manufacture of the precast tunnel segments for Snowy 2.0 (both Exploratory Works and Main Works) is proposed to be undertaken at a factory to be located on the site.

The proposed segment factory would contain a covered area for the manufacture of the tunnel segmental linings (the precast yard), uncovered storage areas, vehicle parking areas and associated office and workshops.

Primary inputs for the proposed segment factory include aggregate, sand, cement and rebar steel. The aggregate and sand would be sourced from local quarries. The cement would be sourced from the Southern Highlands of NSW. Primary outputs include the tunnel segments which would be transported to the construction sites within KNP.

The construction phase of the proposed segment factory would last about five months utilising a workforce of about 30 people. The factory would operate over a period of about 3.5 years utilising a workforce of about 125 people.

The proposed segment factory would be operational 24 hours a day, seven days a week.

Approximately 130,500 segments (making up 14,500 concrete rings) would be manufactured over the 3.5-year operational period.

At the completion of the construction of Snowy 2.0, the proposed segment factory would be decommissioned.

As previously stated, the proposed segment factory would be constructed and operated by FGJV which has been contracted by Snowy Hydro to construct Snowy 2.0.

The layout of the proposed segment factory can be seen in Figure 2.1 and a layout of the precast yard can be seen in Figure 2.2. Cross sections of the precast yard can be seen in Figure 2.3 and Figure 2.4.

A detailed description of the proposed segment factory is contained in Appendix A.

Source: EMM (2019); FGJV (2019); Snowy Hydro (2019); DFSI (2017); GA (2011); LPMA (2011)

0 100 200 m

GDA 1994 MGA Zone 55

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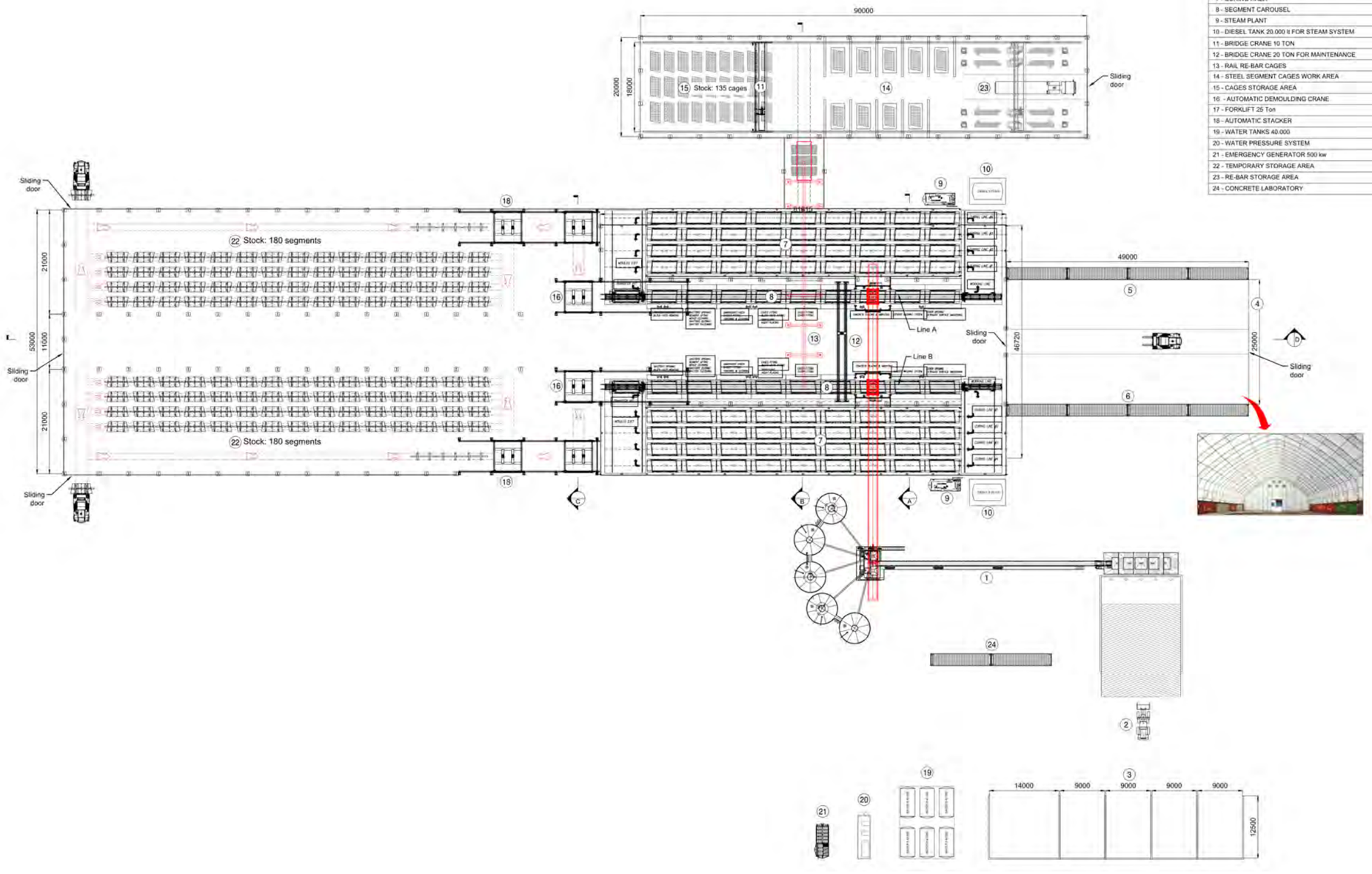
KEY

- Site boundary
- Local road or track
- Cadastral boundary
- Indicative site layout
- Precast yard, concrete plant, aggregates area, precast warehouse, segment storage
- Bus stop and parking
- Offices, guard house and first aid
- Mechanical and plant workshop with parking
- Trailer parking
- Storage area
- Emergency storage area

Proposed site layout

Snowy 2.0
Scoping Report
Proposed Segment Factory
Figure 2.1

DESCRIPTION
1 - BATCHING PLANT
2 - WHEEL LOADER CAT 950
3 - AGGREGATES STOCKPILE
4 - SHED OFFICE/WAREHOUSE PRECAST YARD
5 - OFFICE PRECAST YARD
6 - WAREHOUSE PRECAST YARD
7 - CURING AREA
8 - SEGMENT CAROUSEL
9 - STEAM PLANT
10 - DIESEL TANK 20.000 lt FOR STEAM SYSTEM
11 - BRIDGE CRANE 10 TON
12 - BRIDGE CRANE 20 TON FOR MAINTENANCE
13 - RAIL RE-BAR CAGES
14 - STEEL SEGMENT CAGES WORK AREA
15 - CAGES STORAGE AREA
16 - AUTOMATIC DEMOULDING CRANE
17 - FORKLIFT 25 Ton
18 - AUTOMATIC STACKER
19 - WATER TANKS 40.000
20 - WATER PRESSURE SYSTEM
21 - EMERGENCY GENERATOR 500 kw
22 - TEMPORARY STORAGE AREA
23 - RE-BAR STORAGE AREA
24 - CONCRETE LABORATORY



Proposed precast yard layout

Snowy 2.0
Scoping Report
Proposed Segment Factory
Figure 2.2

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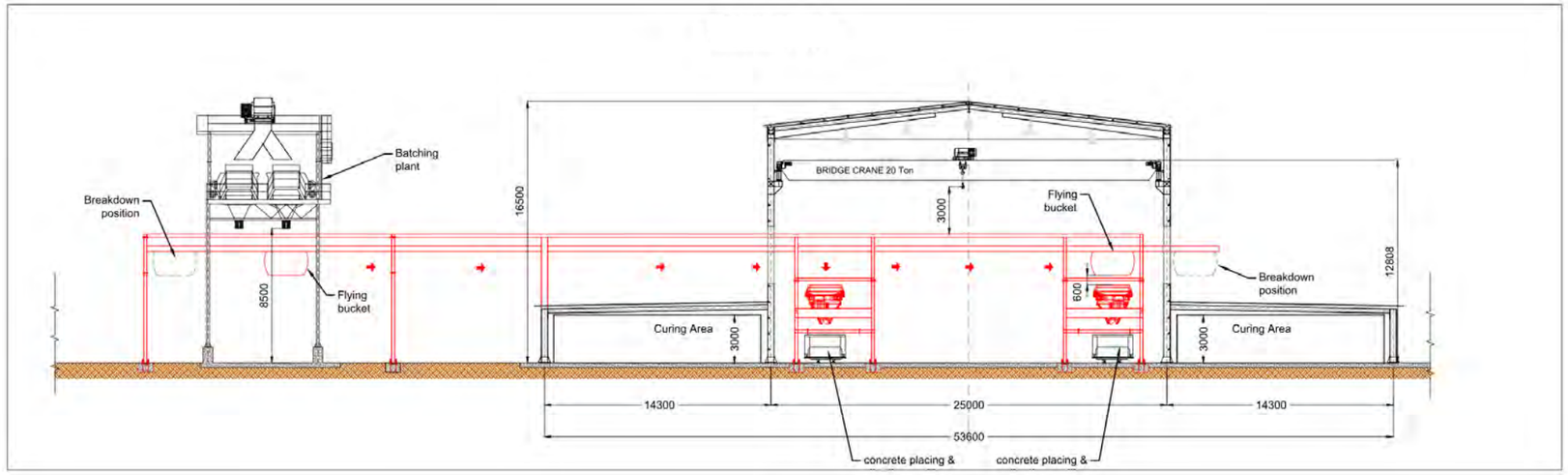
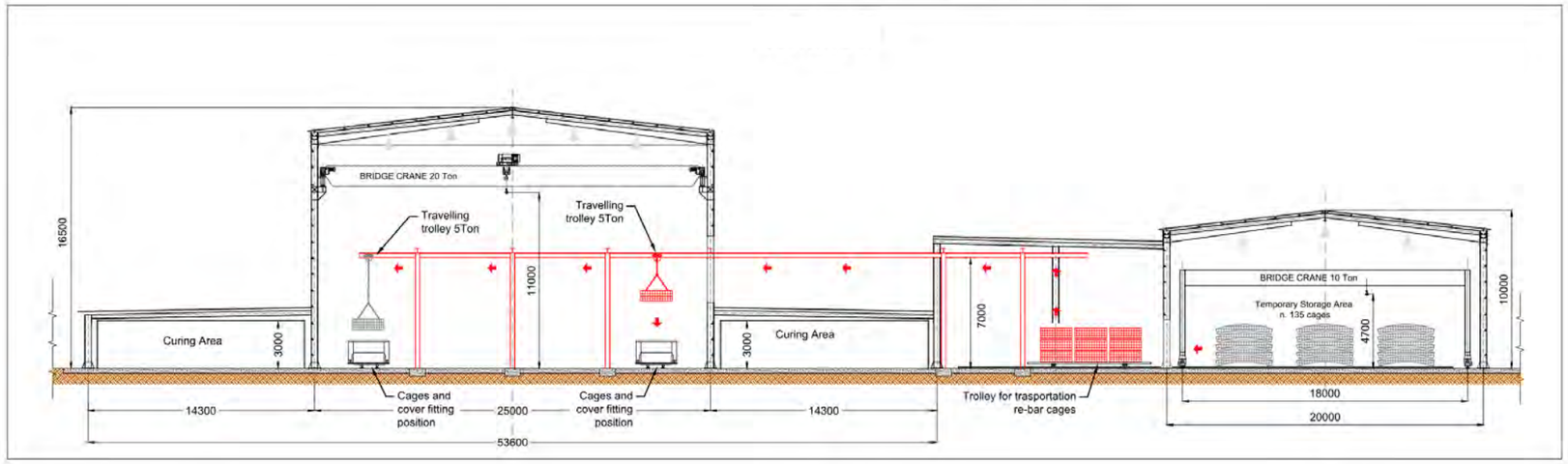
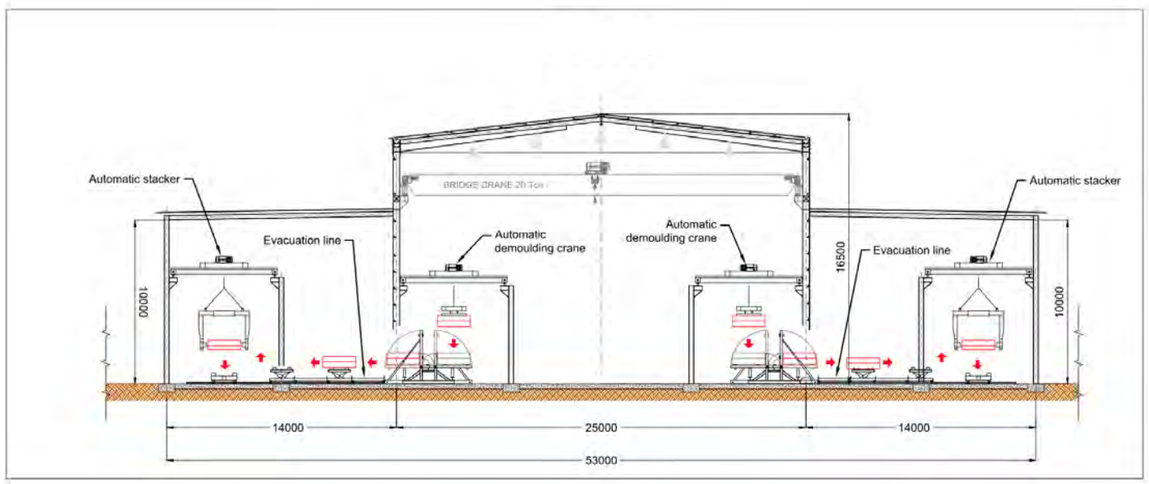
Source: EMM (2019); Snowy Hydro (2019)







Proposed precast yard layout
cross sections A

Snowy 2.0
Scoping Report
Proposed Segment Factory
Figure 2.3

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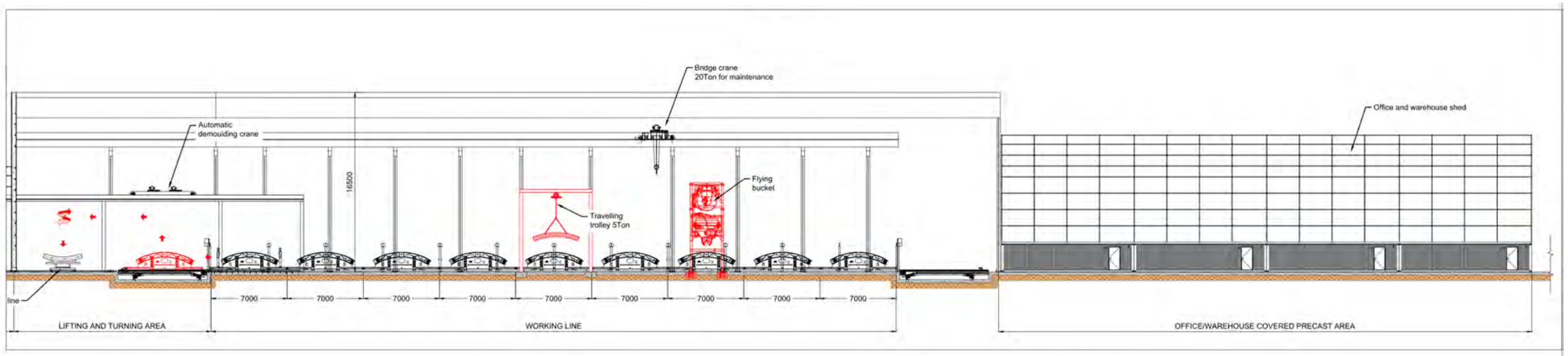
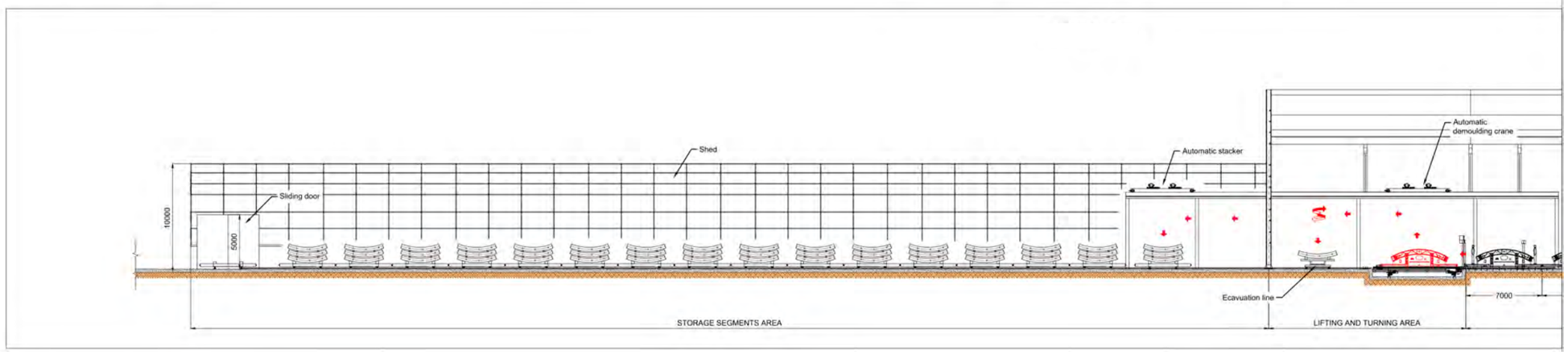
Source: EMM (2019); Snowy Hydro (2019)





Proposed precast yard layout
cross sections B

Snowy 2.0
Scoping Report
Proposed Segment Factory
Figure 2.4

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Source: EMM (2019); Snowy Hydro (2019)

2.4.2 Private airfield

The current use of Lot 14 in DP 250029 as a private airfield would continue, for the use of light planes and helicopters. It is understood that the use of the southern part of Lot 14 in DP 250029 for the proposed segment factory would not impact this use.

2.5 Alternatives

In developing Snowy 2.0, Snowy Hydro and FGJV considered a range of alternative designs, layouts and locations for the proposed segment factory. Some of these were considered during the *Snowy 2.0 Feasibility Study* (Snowy Hydro 2017). Others were the subject of more recent and more detailed investigations and resulted in the location of the proposed segment factory at Polo Flat in its proposed configuration on the site.

The alternatives and options considered included:

- Within KNP –Snowy Hydro considered siting of the proposed segment factory within KNP at Tantangara Dam to maximise operational efficiencies and minimise the traffic movements associated with the segments, inclusive of material that was proposed to be sourced from within KNP (quarries).
- Overseas – FGJV considered the manufacture of the segments at an existing factory in Malaysia which constructs segments for tunnelling projects in Asia. These segments would be transported to Australia via ship to the port of Eden, which is the closest port to Polo Flat. In order to receive and unload the segments onto trucks, facilities at the port would need to be upgraded.
- Site of an existing quarry – FGJV considered constructing and operating the proposed segment factory at the site of an existing quarry at Culcairn which is located about half-way between Wagga Wagga and Albury to minimise traffic movements associated with raw materials required for the segments.
- Private land adjacent to KNP – the construction and operation of the proposed segment factory on private land adjacent to KNP was considered by Snowy Hydro and FGJV to reduce traffic movements associated with the delivery of the segments to the KNP.
- Other sites – several alternative sites, including sites within Canberra were considered for the location of the proposed segment factory.
- Alternative site configurations – several alternative layouts and configurations at the site were considered by FGJV for the proposed segment factory to maximise the efficiency of the factory but also minimise environmental impacts, particularly impacts on native grasslands.

Ultimately the site and layout of the proposed segment factory was chosen by Snowy Hydro and the FGJV as it:

- reduces the amount of land (and, in turn, amount of clearing) required in the KNP;
- is likely to provide the best opportunities for the local community with regards to direct employment and additional flow on economic benefits from using other local companies and facilities;
- minimises environmental impacts on the site, particularly to native grasslands; and
- minimises travel distance for raw material supply.

All feasible options and alternatives will be identified and documented within the EIS.

2.6 Relationship with other projects

While the proposed segment factory would construct and supply tunnel segments for Snowy 2.0, including for Exploratory Works and Main Works, the scope of these phases of Snowy 2.0 are excluded from this project and this scoping report. Details of the Exploratory Works phase of Snowy 2.0 are contained in the Exploratory Works EIS (EMM 2018, see Application Number SS I-9208). Details of the Main Works phase of Snowy 2.0 can be found in the Scoping Report for Main Works (EMM 2019, see Application Number SSI - 9687).

3 Strategic and statutory context

3.1 Strategic context and the need for Snowy 2.0

3.1.1 Historical development of the Snowy Scheme

The Snowy Scheme was initially designed to collect and store water, divert it through trans-mountain tunnels and power stations and then release it west of the Snowy Mountains into the catchments of the Murray and Murrumbidgee rivers. This long-term water regulation was designed to counteract the effects of severe drought sequences and increase agricultural productivity in the Murray Darling Basin (Snowy Hydro 2017). The additional potential for the Snowy Scheme to generate hydro-electricity was realised early on and embedded into the design. Snowy 2.0 involves linking Talbingo and Tantangara reservoirs. This tunnel link can be seen to have been contemplated by a number of historical plans for the Snowy Scheme but was not built at the time.

The *Snowy 2.0 Feasibility Study* (Snowy Hydro 2017) identified that a key study regarding the connection of the two reservoirs was a study completed in 1991, titled *Snowy Mountains Scheme Augmentation Ranking Study* (Dunn 1991). This analysis included a summary of studies undertaken before 1991 and stated that augmentation studies of pumped storage schemes were first considered in 1966 during the design and construction phase of the Snowy Scheme. Further studies concerned with energy reserve capability and mostly of pumped storage schemes were undertaken from 1980-1986.

The Snowy Scheme plays a critical role in the NEM today and has been modernised and well maintained over the decades since its construction. To meet the future needs of a rapidly-changing NEM, a major pumped-hydro expansion of the Scheme would enable the delivery of significant quantities (ie up to 2,000 megawatts (MW)) of electricity to major load centres at any time within minutes, and store large amounts of energy (ie up to 350 gigawatt hours (GWh)) in times of low demand.

Snowy 2.0's fast start, dispatchable generation would provide energy security and reliability across the NEM at times of high energy demand. It is expected that as the economy continues to decarbonise, the demand for the energy products and services that Snowy Hydro provides today backed by the existing Scheme will increase significantly. Snowy 2.0 has been proposed to respond to the rising challenges facing the NEM.

The existing Snowy Scheme has been operating since 1949.

3.1.2 History of Polo Flat airfield

The airfield at Polo Flat was originally established in 1921 to provide a runway for a visit from Charles Kingsford-Smith.

In 1957, the Snowy Mountains Hydro-electric Authority established a flying unit to service the Snowy Scheme. The Authority began constructing airstrips at several key locations within the mountains, including Jindabyne, Island Bend, Geehi, Blowering, Khancoban, Talbingo, Cabramurra and Eucumbene. The runway at Polo Flat was upgraded and facilities such as a terminal building and radio equipment installed. It formed the main and home airfield for the Authority throughout the construction of the Snowy Scheme (Journal of Aviation Historical Society Australia, Vol 18, No 4).

Source: Journal of Aviation Historical Society Australia (Vol 18, No 4)

Photograph 3.1 Most of the Snowy Mountains Hydro-electric Authority's aircraft fleet assembled at Polo Flat in November 1967

The Polo Flat airfield was sold by Snowy Hydro in 2001 where it continued use as a private airfield. Snowy Hydro purchased the land again in early 2019. The airfield continues to be used by private aircraft, including light planes and helicopters.

3.1.3 Current national and State energy policies

Under Australian constitutional arrangements, the regulation of energy is the responsibility of the various states and territories. In NSW, the minister with responsibility for general matters relating to electricity is the Minister for Energy and Utilities, with the electricity system, comprising generation, transmission and distribution through to retail business spread across separate operators.

These assets and transmission lines form part of a larger interconnected network that covers Australia's eastern and south eastern seaboard and forms the NEM. The NEM provides transmission of electricity to almost 10 million homes and businesses across state and territory based networks and six cross-border connections.

The NSW energy system (and broader NEM) is facing several challenges through rising energy costs, deterioration in energy system security and reliability, and a transition in the generation mix away from coal-fired, dispatchable, baseload power to renewable wind and solar power characterised by intermittency. This energy transition is driven by several strategic plans and policies set out by the Australian and NSW governments.

An Integrated System Plan for the NEM was recently released by the Australian Energy Market Operator (AEMO 2018). The plan evaluates the likely changes to the NEM over the next 20 years. Snowy 2.0 is identified in the plan as a development in the medium term to enhance trade between regions, provide access to storage, and support extensive development of renewable energy zones. Some of the other key legislation, plans and policies encouraging and supporting the transition to renewable energy (and directly relevant to Snowy 2.0) are:

- Commonwealth *Renewable Energy (Electricity) Act 2000* – which aims to encourage additional generation of electricity from renewable sources, to reduce emissions of greenhouse gases in the electricity sector and to ensure that renewable energy sources are ecologically sustainable;

- Australian Renewable Energy Target scheme – a scheme intended to reduce emissions of greenhouse gases in the electricity sector and encourage additional generation of electricity through investment in sustainable and renewable sources;

- the *Paris Agreement* – a global agreement signed by the Commonwealth Government that sets in place a durable and dynamic framework for all countries to take climate action from 2020;

- *NSW Renewable Energy Action Plan* (2014) – a plan that positions NSW to increase the use of energy from renewable sources at least cost to the energy customer and with maximum benefits to NSW, and designed to support broader environmental objectives to reduce carbon emissions; and

- NSW Energy Security Taskforce and Energy Zones – investigates and recommends management of NSW's energy security and resilience over the long-term. Energy zones in NSW have been recommended to provide opportunities to better match supply and demand across the NEM, minimising transmission losses.

3.1.4 Need and benefits of Snowy 2.0

Snowy 2.0 is a critical project for the NEM as it moves to a low-emissions future. As the transition to renewables accelerates, reliable supply cannot be achieved without large scale energy storage. Snowy 2.0 is the least cost option to build large scale storage and is centrally located between the NEM's two biggest load centres, Sydney and Melbourne.

Snowy 2.0 would build on the Snowy Scheme's existing capabilities and meet the needs of the market and consumers by providing fast-start, clean energy generation to address supply volatility, as well as fast-start capability and large-scale storage to address the intermittency issues associated with renewables.

The high degree of urgency with which Snowy Hydro is progressing the project reflects the rate of change being experienced across the NEM and the critical need for the energy market products that Snowy Hydro sells. The falling costs of new renewable projects makes them economically favourable, even with a cost added for 'firming'.

As the transition to renewables accelerates, the need for energy storage will only increase and pumped-hydro projects across the NEM, gas and diesel peakers, commercial scale batteries and demand-side solutions will play a role.

Snowy 2.0's 350 GWh of energy storage is enough to underpin the stability and reliability of the NEM even during prolonged weather events, such as wind or solar 'droughts'. The *Independent Review into the Future Security of the National Electricity Market - Blueprint for the Future* (Finkel et al 2017) (also known as the Finkel review) concluded that a secure power system is a necessary condition for a reliable supply of electricity to consumers and recommended options for improving security, including large-scale pumped hydro-electric storage.

Snowy 2.0 would bring much-needed competition to the market by not only adding new generation supply but also underpinning the supply of additional 'firmed' energy. This will turn place downward pressure on peak energy prices, providing economic benefits to the consumer.

Snowy 2.0 has the capacity to service numerous retailers and generators in the market, covering the needs of each at different times. A large, centrally connected asset is more cost effective than individual companies all building their own plants to cover the absolute peak demand within their portfolios, which does not often occur. Given the peaks and troughs in energy loads, some portion of their assets will be underutilised, and the system will be 'over-built' at a cost that will be ultimately be borne by consumers.

If Snowy 2.0 is not developed, the likely alternative is that a combination of gas-fired and diesel peak electricity generating plants would be built.

Compared with other alternatives, Snowy 2.0 provides:

- increased supply of energy generation and competition for the NEM putting downward pressure on energy prices;
- increased efficiency of the NEM by absorbing excess energy;
- increased storage capacity, longer lifespan for storage, and cheaper full life cycle cost when compared to current lithium-ion storage batteries;
- more efficient dispatch of electricity to major load centres and less emission generation when compared to traditional electricity generating plants; and
- improved security and reliability of supply when compared to the intermittency of primary renewable energy sources (such as wind and solar).

While Snowy 2.0 is a critical project for the NEM, more developments will be needed to meet the future needs of a decarbonising NEM. Other pumped-hydro projects, gas and diesel peakers, commercial scale batteries and demand-side solutions will all be needed.

The *Snowy 2.0 Feasibility Study* delivered in December 2017 confirmed that Snowy 2.0 is economic, technically feasible and financeable (Snowy Hydro 2017). Snowy Hydro progressed to a Financial Investment Decision (FID) in December 2018 to proceed with the project, with shareholder approval confirmed in March 2019.

3.2 NSW approval framework

The EP&A Act and NSW *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) form the statutory framework for planning approval and environmental assessment in NSW. This legislation is supported by environmental planning instruments (EPIs) including State environmental planning policies (SEPPs) and local environmental plans (LEPs).

Source: EMM (2019); FGJV (2019); Snowy Hydro (2019); DFSI (2017); DPE (2017); GA (2011); LPMA (2011)

0 100 200 m

GDA 1994 MGA Zone 55

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KEY

- Site boundary
- Local road or track
- Cadastral boundary
- Indicative site layout

Zoning

- E2 Environmental Conservation
- IN1 General Industrial
- RE1 Public Recreation
- RU1 Primary Production

Zoning plan

Snowy 2.0
Scoping Report
Proposed Segment Factory
Figure 3.1

snowy2.0

EMM
creating opportunities

3.2.1 Local zoning

The site is zoned General Industrial IN1 under the *Cooma-Monaro Local Environmental Plan 2013* (the LEP). The objectives of this zone are:

- To provide a wide range of industrial and warehouse land uses.
- To encourage employment opportunities.
- To minimise any adverse effect of industry on other land uses.
- To support and protect industrial land for industrial uses.

Within this zone a range of industrial land uses are permissible, including the use of the site as a segment factory.

The zoning of the site and its surrounds can be seen in Figure 3.1.

3.2.2 Critical State Significant Infrastructure

i Declaration

Section 5.12 of the EP&A Act provides for the declaration of State significant infrastructure (SSI), and Section 5.13 enables the Minister for Planning to declare SSI to be CSSI if 'it is of a category that, in the opinion of the Minister, is essential for the State for economic, environmental or social reasons'.

On 7 March 2018 the NSW Minister for Planning declared Snowy 2.0 to be SSI and CSSI. The declaration came into effect on 9 March 2018 and is reflected in clause 9 of Schedule 5 of the *State Environmental Planning Policy (State and Regional Development*) 2011 (SRD SEPP).

Clause 9 of Schedule 5 of the SRD SEPP identifies Snowy 2.0 as follows:

> **9 Snowy 2.0 and Transmission Project**
>
> (1) The Snowy 2.0 and Transmission Project is a proposed program of works for the expansion of the generating capacity of the Snowy Mountains Hydroelectric Scheme and for associated upgrades and additions to the electricity transmission network. The object of this clause is to declare development for the purposes of the Snowy 2.0 and Transmission Project that is set out in this clause to be State significant infrastructure and critical State significant infrastructure.
>
> (2) This clause applies to development on land in any of the following local government areas:
>
> (a) Cootamundra-Gundagai Regional,
>
> (b) Goulburn Mulwaree,
>
> (c) Snowy Monaro Regional,
>
> (d) Snowy Valleys,
>
> (e) Upper Lachlan Shire,
>
> (f) Yass Valley.

(3) **Snowy 2.0**

Development for the purpose of pumped hydro and generation works to be known as Snowy 2.0 on land between Tantangara Reservoir and Talbingo Reservoir that involves:

(a) the carrying out of exploratory geotechnical works or engineering investigations, and

(b) the construction and operation of an underground hydroelectric power and pump station capable of supplying approximately 2,000 megawatts of hydroelectric power, and

(c) the construction of water and access tunnels, surge tank and intake and outlet structures at and between the two reservoirs.

(4) **Transmission works**

Development that involves:

(a) the construction and operation of new electricity transmission lines and an electricity substation to the west of the Talbingo Reservoir to connect Snowy 2.0 to the existing electricity transmission network at Nurenmerenmong, east of Tumbarumba, and

...

(5) The development referred to in this clause does not include:

(a) the carrying out of surveys, sampling, environmental investigations, geotechnical borehole drilling, test drilling, test excavations, or other tests or investigations, for the purposes of feasibility assessment and the preliminary design of the Snowy 2.0 and Transmission Project, or

(b) the carrying out of works to upgrade or modify electricity transmission lines, works within existing switchyards, and the installation of communications infrastructure.

(6) **Ancillary development**

Development that is ancillary to any other development in this clause, including the carrying out of works to upgrade or construct access roads, utilities infrastructure, construction accommodation, construction compounds and construction power supply.

Development that is Snowy 2.0, transmission works or ancillary to Snowy 2.0 or transmission works is development of the kind specified in Schedule 5, clause 9, subclause (6) of the SRD SEPP and, therefore, may be carried out without obtaining development consent under Part 4 of the Act and is declared to be SSI and CSSI. As such, the project requires assessment and approval under Division 5.2 of the EP&A Act.

ii Ancillary use

The principles by which development is to be characterised have been summarised by Preston CJ in *Chamwell v Strathfield City Council* (2007) 151 LGERA 400. In essence:

1. it is necessary to determine the purpose of the proposed land use, that purpose being informed by determining the end to which the land is to be used should the proposed development proceed (*Shire of Perth v O'Keefe* (1964) 110 LR 529);

2. the characterisation of the purpose of a use of land should be done at a level of generality necessary and sufficient to cover the individual activities or processes carried on, not in terms of the detailed activities or processes; and

3. notwithstanding the principles laid down in *Foodbarn*, it does not follow that a use which can be said to be ancillary to another use is thereby automatically precluded from being an independent use of the land. It is a question of fact and degree in all the circumstances of the case whether such a result ensues or not (*Baulkham Hills Shire Council v O'Donnell* (1990) 69 LGRA 404).

In *Foodbarn Pty Ltd v Solicitor-General* (1975) 32 LGRA 157 the NSW Court of Appeal held that where premises are being used for more than one purpose and one purpose is subordinate to the other, it is legitimate to disregard the subordinate purpose and treat the premises as being used for the dominant purpose.

The issue was further considered by the NSW Court of Appeal in *Bob Blakemore Pty Ltd v Anson Bay Company (Australia) Pty Ltd* [1990] NSWCA 25, with the Court observing that:

> Where there are two uses of property the question whether there are one or two existing uses is resolved upon a consideration whether both are independent uses, in which case they are both treated as existing uses, or whether one is ancillary to, or subserves, the other in which case the latter constitutes the sole existing use. It may be a nice question in a given case whether one use subserves the other. The question will always be one of fact and degree.

Accordingly, whether a purpose of development is ancillary to a dominant use is a question of fact and degree in every case.

In relation to clause 9(6) of Schedule 5 of the SRD SEPP case law generally confirms that the use of the word "including" in a statutory definition is not a word of limitation, and therefore does not restrict the operation of the definition only to the specific works identified.

The proposed segment factory would fall within the above definition of ancillary development, on the basis that:

1. it is located within the local government areas prescribed by clause 9(2) of Schedule 5 of the SRD SEPP;

2. it will be operated solely for the purposes of the 'Snowy 2.0 and Transmission Project', and in particular as ancillary to the following aspects of the project identified in clause 9(3) of Schedule 5 of the SRD SEPP:

    - the carrying out of exploratory geotechnical works or engineering investigations – segments produced from the proposed segment factory would be used within the exploratory tunnel which will provide access to the proposed site of the underground power station for geotechnical works and engineering investigations; and

    - the construction of water and access tunnels, surge tank and intake and outlet structures at and between the two reservoirs – segments produced from the proposed segment factory would be used within the construction of water and access tunnels between Tantangara and Talbingo reservoirs;

3. it will not produce concrete segments for any other project, and therefore will serve the dominant purpose of the 'Snowy 2.0 and Transmission Project' and not be capable of independent use; and

4. its use would cease, and the factory decommissioned following the construction of Snowy 2.0.

Accordingly, the proposed segment factory is deemed to be CSSI as it is ancillary to the dominant use of Snowy 2.0 as it is a development of the kind specified in Schedule 5, clause 9(6) of the SRD SEPP. As such, the project requires assessment and approval under Division 5.2 of the EP&A Act.

3.2.3 Approval pathway

Division 5.2 of the EP&A Act sets out the assessment and approval framework for SSI and CSSI. The NSW Minister for Planning is the determining authority for CSSI.

3.2.4 Other State approvals and licences

Under sections 5.23 and 5.24 of the EP&A Act, certain separate environmental approvals would not be required for the proposed segment factory or would be required to be issued consistent with the planning approval granted for the factory. Each of these separate environmental approvals is considered in Table 3.1. Further environmental and other approvals may be required in addition to those referred to under section 5.23 and 5.24 of the EP&A Act, and these would be considered and outlined where relevant to the assessment of the project as part of the EIS.

Table 3.1 Other State approvals and licenses

Approval	Relevance to project	Comment
Approvals not required under section 5.23		
A permit under section 201, 205 or 219 of the NSW *Fisheries Management Act 1994* (FM Act)	Not relevant	N/A
An approval under Part 4 or an excavation permit under section 139 of the NSW *Heritage Act 1977*	Not relevant	N/A
An Aboriginal heritage impact permit under section 90 of the NSW *National Parks and Wildlife Act 1974*	Unknown at this stage	The results of survey for the Aboriginal cultural heritage assessment will determine whether a permit is required for the proposed segment factory.
A bushfire safety authority under section 100B of the NSW *Rural Fires Act 1997*	Not relevant	N/A
A water use approval under section 89, a water management work approval under section 90 or an activity approval (other than a groundwater interference approval) under section 91 of the NSW *Water Management Act 2000*	Not relevant	N/A
Approvals required to be issued consistently under section 5.24		
An aquaculture permit under section 114 of the FM Act	Not relevant	The proposed segment factory does not involve aquaculture.
Approval under section 15 of the NSW *Mine Subsidence Compensation Act 1961*	Not relevant	The proposed segment factory is not within a mine subsidence district.
A mining lease under the NSW *Mining Act 1992*	Not relevant	The proposed segment factory does not involve mining.
A production lease under the NSW *Petroleum (Onshore) Act 1991*	Not relevant	The proposed segment factory does not involve petroleum production.
An environment protection licence (EPL) under Chapter 3 of the NSW *Protection of the Environment Operations Act 1997*	Yes	An EPL will be required for the applicable scheduled activity (concrete works). Under section 5.24(1) of the EP&A Act, an EPL cannot be refused if it is necessary for carrying out approved SSI and is to be substantially consistent with the EP&A Act approval.

Table 3.1 Other State approvals and licenses

Approval	Relevance to project	Comment
A consent under section 138 of the NSW *Roads Act 1993*	Yes	The proposed segment factory involves interaction and works within public road reserves, including the connection of the access road to Polo Flat Road.
A licence under the NSW *Pipelines Act 1967*	No	The proposed segment factory does not involve the construction and operation of major pipelines.

3.2.5 Consistency with State and regional policies

Two State and regional policies are relevant to the proposed segment factory. Consideration of its consistency with these policies and plans is given in Table 3.2. It is noted that EPIs, including SEPPs, do not apply to SSI by virtue of section 5.22(2) of the EP&A Act. Nevertheless, the SEPPs that would have otherwise applied to Snowy 2.0 in the absence of section 5.22(2) of the EP&A Act are detailed in Table 3.2.

Table 3.2 Consideration of relevant State policies and plans

Policy/plan	Relevant project elements	Consistency of proposed segment factory
State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33)	Storage and transport of dangerous goods.	Consideration of the NSW Department of Planning and Environment's (DPE) guideline *Applying SEPP 33* (2011) and, if required, preparation of a Preliminary Hazard Assessment (PHA) would be undertaken.
State Environmental Planning Policy No 55 – Remediation of Land	Historic activities undertaken on the site have potential for land contamination.	A contamination assessment will be undertaken which will identify any land contamination.

3.3 Commonwealth approval framework

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the primary Commonwealth legislation that governs the protection of the environment. Snowy Hydro became a 'Commonwealth agency' for the purposes of the EPBC Act on 2 July 2018 following the acquisition of all remaining shares of Snowy Hydro by the Commonwealth. In addition, given that Snowy Hydro acquired Lot 14 in DP 250029 in early 2019, that part of the site is deemed to be 'Commonwealth land'.

An approval under the EPBC Act is required for Snowy Hydro, which is a Commonwealth agency for purposes of the EPBC Act, to undertake the proposed segment factory if:

- it will have or is likely to have a significant impact on matters of national environmental significance (MNES); or
- it will have or is likely to have a significant impact on the environment inside or outside the Australian jurisdiction.

A search of the Commonwealth's protected matters search tool was used to generate a list of MNES or other matters protected by the EPBC Act likely to occur within the site. The results of the search are summarised in Table 3.3 and provided in full in Appendix C.

Table 3.3 MNES under the EPBC Act

MNES	Matters relevant to the proposed segment factory
World heritage properties	Not applicable – there are no world heritage within the site or its surrounds.
National heritage places	Not applicable – there are no world heritage within the site or its surrounds.
Wetlands of international importance	Not applicable – there are no wetlands of international importance within the site or its surrounds.
Commonwealth listed threatened ecological communities	One community is known to occur within the site and its surrounds: • Natural Temperate Grassland of the South Eastern Highlands Three other listed threatened communities may occur within site and its surrounds and are listed at Appendix B.
Commonwealth listed threatened species	A number of threatened species may occur within the site and its surrounds, including: • five bird species; • one fish species; • two frog species; • four mammal species; • nine plant species; and • three reptile species. A full list of species is provided in Appendix B.
Commonwealth listed migratory species	Twelve migratory wetland species may occur within the site or its surrounds. A full list of species is provided in Appendix B.
Commonwealth marine areas	Not applicable – there are no Commonwealth marine areas within the site or its surrounds.
The Great Barrier Reef Marine Park	Not applicable – the project is not within the Great Barrier Reef marine park.
Nuclear actions (including uranium mines)	Not applicable – the project does not involve a nuclear action.
A water resource, in relation to coal seam gas development and large coal mining development	Not applicable – the project is not a coal seam gas development or a large coal mining development.

Accordingly, MNES with the potential to be impacted by the proposed segment factory include:

- nationally threatened species and ecological communities; and
- migratory species protected under international agreements.

While survey work has been carried out to date, additional detailed surveys are needed to determine potential impacts of the proposed segment factory on MNES and the environment generally. Accordingly, Snowy Hydro, on a precautionary basis, will refer the proposal to the Commonwealth Minister for the Environment and nominate that it has potential to have a significant impact on MNES and the environment generally (and therefore is a proposed or controlled action). This will allow potential impacts to relevant MNES and the environment generally to be considered in the EIS.

The approval process under the EPBC Act has yet to be determined and will be discussed with the Commonwealth Department of the Environment and Energy (DoEE). Proposed actions can be assessed using different methods, depending on a range of considerations. Actions can be assessed using one of the following assessment approaches:

- accredited assessment (eg bilateral agreements);

- assessment on referral information;
- assessment on preliminary documentation;
- assessment by EIS or public environment report; or
- assessment by public inquiry.

Notwithstanding the above, it is Snowy Hydro's preference that the proposed segment factory be assessed using preliminary documentation which would include the EIS being prepared under the NSW approval process. This EIS will consider impacts to relevant MNES and the environment generally.

4 Consultation

4.1 Introduction

Stakeholder engagement and consultation for Snowy 2.0 commenced in mid to late 2017 and have been ongoing. Stakeholder activities have been led by Snowy Hydro with the support of EMM, FGJV and technical specialists as required.

4.2 Stakeholder engagement framework

To ensure its objectives are addressed, Snowy Hydro developed an end-to-end framework for stakeholder engagement based on the International Association for Public Participation (IAP2) *Public Participation Spectrum* (2014). The key phases and how they have been implemented for Snowy 2.0 to date are:

- identify - identification of stakeholders and impacts;
- design and prepare - definition of desired level of engagement (to inform, consult, involve, or collaborate), and the development of corresponding stakeholder engagement tools and methods;
- engage - commence stakeholder engagement in line with the level identified in the previous phase, and implement relevant methods;
- provide feedback - create mechanisms for timely two-way feedback on stakeholder needs and concerns; and
- review - implement a continuous improvement loop to assess the adequacy and effectiveness of engagement, and where required, change the nature of engagement.

This framework has and will be applied during development of the EIS for the proposed segment factory and throughout the lifespan of Snowy 2.0, with the ability to adapt as Snowy 2.0 progresses from Exploratory Works to the construction and operational phases of the proposed segment factory and Main Works.

4.3 Stakeholder identification

Identified stakeholder groups with an interest in the proposed segment factory include:

- Cooma and nearby townships and communities;
- State and Commonwealth government agencies that have an interest in and regulate the factory, particularly DPE and DoEE, the NSW Environment Protection Authority (EPA), NSW Office of Environment and Heritage (OEH) and NSW Roads and Maritime Services (RMS);
- Snowy Monaro Regional Council (SMRC) and Snowy Valleys Council (SVC);
- Aboriginal groups;
- chambers of commerce and community groups;
- the general public; and
- media.

The NSW National Parks and Wildlife Service (NPWS) as owner and manager of KNP where Snowy 2.0 is being constructed would also have an interest in the proposed segment factory.

4.4 Stakeholder engagement

Stakeholder engagement for Snowy 2.0 has been comprehensive to date and reflects the importance Snowy Hydro places on this aspect of its business.

Stakeholder engagement commenced with the introduction of Snowy 2.0 to all stakeholders in mid-to-late 2017, including provision of information on Snowy Hydro's website, publication of newsletters and booklets, a round of community drop-in sessions held in Adaminaby, Cooma, Talbingo and Tumut in November 2017, briefing sessions and meetings. These engagement activities have continued throughout the development of Snowy 2.0, including development of the scope of Main Works.

Further details of the engagement activities undertaken to date are contained in the EIS for Exploratory Works (EMM 2018).

4.5 Ongoing stakeholder engagement

Snowy Hydro is committed to continuing to engage with stakeholders during the approval processes for Snowy 2.0, including the proposed segment factory.

Engagement targeted specifically for the proposed segment factory will comprise several initiatives, as follows:

- community consultation sessions to be held in key local communities – these sessions will provide an update on Snowy 2.0 as a whole, including information on the proposed segment factory;
- Chamber of Commerce-led engagement with businesses around impacts and opportunities associated with the proposed segment factory;
- engagement with Indigenous leaders, groups, and organisations around mobilisation for opportunities associated with the proposed segment factory;
- engagement such as meetings with State and Commonwealth government agencies, and SMRC and SVC (see Table 4.1); and
- engagement with businesses within the Polo Flat industrial area.

The key government stakeholders and consultation activities planned for the proposed segment factory are summarised in Table 4.1.

Table 4.1 Government stakeholder engagement summary

Stakeholder	Key matters	Planned consultation
DPE	• Approval process under CSSI provisions of EP&A Act • Understanding of key issues and stakeholders • Whole of environment considerations	Meetings
DoEE	• Approval process under EPBC Act • Potential impacts to MNES particularly Natural Temperate Grassland • Whole of environment considerations	Meetings

Table 4.1 Government stakeholder engagement summary

Stakeholder	Key matters	Planned consultation
SMRC	• Potential impacts on local road network, including roundabouts within Cooma • Use of alternative transport route to reduce traffic movements through Cooma • Use of unmade road corridor for access to the site • Potential impacts on local amenity (noise, air quality and traffic) • Potential impacts to local hydrology • Potential impacts to local services • Potential economic benefits to local area	Meetings
OEH	• Impacts to potential threatened species and Aboriginal cultural heritage	Meetings
EPA	• Potential impacts on local amenity (air quality and noise) • Potential impacts to receiving waters • Licencing arrangements through environment protection licence (EPL)	Meetings
RMS	• Potential impacts on regional and State road networks • Use of alternative transport route to reduce traffic movements through Cooma	Meetings
NPWS	• Movement of tunnel segments within the KNP	Meetings
SVC	Potential impacts on Council's local road network	Letter/email notification to Council Offer face to face meeting as an option

In addition to the direct stakeholder and community engagement initiatives outlined above, project information will also be provided to the local community and targeted stakeholders via the following:

- project information booklets and video;
- Snowy 2.0 pages on the Snowy Hydro website (www.snowyhydro.com.au);
- emails to key groups including groups registered on the Snowy 2.0 Business Directory;
- Snowy 2.0 display in the Snowy Hydro Discovery Centre, Cooma.
- Snowy Hydro quarterly newsletter will contain project updates; and
- a project email address (snowy2.0@snowyhydro.com.au) to directly respond to concerns and enquiries.

Consultation with key stakeholders has commenced and results will be incorporated into the EIS.

5 Key issues

5.1 Introduction

A review of the environmental matters relevant to the proposed segment factory has been undertaken to identify issues and assessment approach for the EIS. The environmental matters and proposed assessment approach are described in the following sections.

It should be noted that all assessments would undergo a design integration and assessment (DIAA) process where the preliminary results of technical assessments based on preliminary design information are reported back so that designs can be updated to incorporate these preliminary results.

5.2 Noise

The site is located within an industrial area with noise-generating industries nearby. The site is predominantly vacant land to the south and east. To the north of the site is the remainder of Lot 14 in DP 250029 which contains Snowy Hydro's private airfield, and other industrial development. Snowy Hydro's private airfield contains a north-south aligned runway, hangers and offices. It also contains an above ground fuel tank for the refuelling of planes and helicopters.

There is an isolated industrial operation located about 150 m to the south east, and an abattoir located about 350 m to the east of the site.

The nearest rural residence is located about 450 m to the south south-east of the site. The nearest residences within Cooma are located about 1 km to the west of the site.

The State government's noise policies require proponents to characterise background noise levels for developments and assess the likely impact of the predicted or measured noise levels from the proposed development. Accordingly, a quantitative noise assessment will be undertaken to assess noise impacts from the proposed segment factory. The scope of the assessment would include:

- characterisation of background noise levels;
- identification of sensitive receptors (ie residential properties);
- development of a predictive noise model;
- assessment of the noise impacts associated with construction and operational phases;
- assessment of road traffic noise effects; and
- if required, development of measures to avoid, reduce and mitigate potential impacts.

The assessment would be undertaken in consultation with the EPA to ensure that noise matters are adequately assessed.

Noise levels would be predicted using a computer-generated model using Brüel & Kjær Predictor software (the model). The model calculates total noise levels at assessment locations from concurrent operations of multiple noise sources. It considers factors that influence noise propagation such as the lateral and vertical location of plant, source-to-receptor distances, ground effects, atmospheric absorption, topography of the site and surrounding area and applicable meteorological conditions. The model would assess prevailing adverse weather conditions including temperature inversions in accordance with the requirements of the EPA 2017, *NSW Noise Policy for Industry* (NPfI).

The assessment would be prepared following the appropriate guidelines, policies and industry requirements, as follows:

- NSW Department of Environment Climate Change (DECC) 2009, *The Interim Construction Noise Guideline* (ICNG);
- NSW Department of Environment Climate Change and Water (DECCW) 2011, *Road Noise Policy* (RNP); and
- EPA 2017, NPfI.

The noise assessment would be documented in a report which will be appended to the EIS.

5.3 Air quality

An air quality assessment will be undertaken to review the potential air quality (dust) impacts associated with the proposed segment factory in accordance with the EPA's *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA 2016).

The scope of the assessment will include:

- characterisation of background air quality, including dust deposition, total suspended particles (TSP), and particulate matter with a diameter of 10 micrometres and 2.5 micrometres or less (PM_{10} and $PM_{2.5}$);
- identification of sensitive receptors (ie residential properties) consistent with the noise assessment;
- development of a predictive air quality model;
- assessment of the air quality impacts associated with the construction and operational phases of the proposed modification;
- presentation of the results of the modelling showing location of sensitive receptors (same as those identified for the noise assessment);
- comparison of the predicted dust deposition and suspended particulates levels against relevant criteria; and
- if required, development of measures to avoid, reduce and mitigate potential impacts.

The air quality assessment will also include an assessment of greenhouse gas (GHG) emissions using the *National Greenhouse Accounts Factors* (July 2017).

The assessment would be undertaken in consultation with the EPA to ensure that air quality matters are adequately assessed.

The air quality assessment would be documented in a report which will be appended to the EIS.

5.4 Traffic

The key roads most likely to be used by the proposed segment factory during constructions and operations include:

- the Monaro Highway;
- the Snowy Mountains Highway; and
- Polo Flat Road which connects the two highways.

Note that within Cooma, the Monaro and Snowy Mountains highways are also known as Sharp Street.

In addition to these key roads, an alternative route for heavy vehicles between the proposed segment factory and the Snowy 2.0 construction sites which bypasses Cooma is being pursued by Snowy Hydro in consultation with SMRC and the State Government. This route includes Yallakool, Mittagang, Shannons Flat and Bobeyan roads.

The alternative route would reduce traffic volumes generated by the proposed segment factory in Sharp Street in Cooma, including during peak holiday periods.

Use of this alternative route by heavy vehicles generated by the proposed segment factory would require upgrade works including:

- the sealing of Shannons Flat and Bobeyan roads; and
- upgrades to the intersections of Bobeyan Road and Snowy Mountain Highway, Yallakool Road/Polo Flat Road and Monaro Highway.

Snowy Hydro has advised that the State Government would provide funding to undertake these upgrades.

The existing road users who use the road networks for a combination of local and regional access and recreational travel, include local residents and tourists and business operations and other visitors to the region.

A traffic and access impact assessment will be prepared as part of the EIS and will include:

- characterisation of the existing road network, including the existing road widths and the condition of the road surface, existing road capacity (or 'level of service'), daily and peak traffic volumes (considering the peak holiday period and at other times of the year), and the proportion of light and heavy vehicle traffic movements;
- review of key intersection performance on designated access routes, including the alternative route which is proposed to bypass Cooma, and document relevant accident history and safety requirements;
- quantifying expected traffic movements, including the maximum and average light and heavy vehicle traffic movements; and
- if required, recommendation of management measures to mitigate identified potential impacts of the project.

The assessment of traffic and access impacts would be prepared using the following the appropriate guidelines, policies and design requirements, as follows:

- NSW Roads and Traffic Authority (now RMS) 2002, *Guide to Traffic Generating Developments*;
- *Austroads Guides to Road and Intersection Design* (various publications) 2009 and 2010;
- *Austroads Guides to Traffic Management* (various publications);
- Australian Standard AS 2890 Parts 1 and 2, requirements for the design of access and car parking areas for cars and commercial vehicles; and
- *Australian Code for Dangerous Goods Transport*.

The assessment will be undertaken in consultation with key regulatory authorities (SMRC and RMS) to ensure that traffic matters are adequately assessed.

The traffic assessment would be documented in a report which will be appended to the EIS.

5.5 Surface water and flooding

The site is located within a drainage line that is subject to flooding.

The design of the proposed segment factory is preliminary and will be refined prior to submission of the EIS. In relation to surface water management and flooding, the design process will include:

- consideration of land use within potential flood prone areas with a view of minimising filling or placement of large objects (that could form blockages) in areas where flooding will occur;
- development of a solution to convey runoff from upslope areas through the factory;
- development of a stormwater management solution that addresses relevant guidelines, including:
  - specific controls for managing any cementitious water;
  - water quality controls to manage runoff from disturbance areas; and
  - consideration of detention storage to mitigate increases in peak flows that will occur from impervious areas.

A surface water and flooding assessment will be prepared as part of the EIS that will consider both water quality and flood risk management. The assessment will be undertaken in consultation with the EPA and SMRC to ensure that matters are adequately assessed.

The surface water assessment would be documented in a report which will be appended to the EIS.

5.6 Soils and contamination

State Environmental Planning Policy No. 55 - Contamination of Land (SEPP 55) requires:

> A consent authority must not consent to the carrying out of any development on land unless:
>
> (a) it has considered whether the land is contaminated, and

(b) if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and

(c) if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.

The site is zoned for industrial land uses and has partly been used for aviation purposes.

To address SEPP 55, a contamination assessment will be undertaken for the proposed segment factory, targeted at areas where soils will be disturbed.

The contamination assessment will be undertaken in consultation with the EPA and SMRC to ensure that matters are adequately assessed.

The contamination assessment would be documented in a report which will be appended to the EIS.

5.7 Biodiversity

The habitat on site has historically been modified as a result of its used as a private airfield, including the introduction of many non-native grassland species and forbs. The habitat has also been grazed by cattle, with evidence of cows having an impact on the grassland habitat. Non-native arable grassland dominated the site with some patched of degraded natural temperate grassland, listed as Natural Temperate Grassland of the South Eastern Highlands, a critically endangered ecological community (CEEC) under the EPBC Act. While the natural temperate grassland consists mainly of native grasses and forbs, it contains a number of weeds, particularly African Lovegrass.

The location of the Natural Temperate Grassland on the site can be seen in Figure 5.1.

The modified nature of the site contains limited features to support terrestrial mammals as the grass cover is mostly patchy and no features such as fallen wood are on site. No trees are present, and the site contains no features suitable for arboreal mammals. The site contains some habitat for foraging and ground nesting birds. No permanent water features are on site with only a drainage line located within the middle of the site.

Three listed reptile species are known to be associated with natural temperate grassland and have the potential to occur on site. These species include; Grassland Earless Dragon (*Tympanocryptis pinguicolla*) listed as endangered under the NSW *Biodiversity Conservation Act 2016* (BC) and EPBC acts, Striped Legless Lizard (*Delma impar*) listed as vulnerable under the BC and EPBC acts and Little Whip Snake (*Suta flagellum*) listed as vulnerable under the BC Act. Features that are suitable to support these reptile species such as surface rocks, clay cracks from the drying soil and some suitable tussocky grasses are scatted throughout the site. Micro-habitats that are known to be favoured by the Grassland Earless Dragon, such as Wolf Spider (*Lycisa* sp.) burrows have been observed on site. While the site contains features suitable to support these species, the habitat has been modified and is no longer considered as optimal habitat.

An assessment of the biodiversity values and the likely biodiversity impacts of the project will be undertaken in accordance with the BC Act and EPBC Act, the Biodiversity Assessment Method (BAM) and be documented in a Biodiversity Development Assessment Report (BDAR).

The assessment of biodiversity would be undertaken in accordance with relevant NSW and Commonwealth legislation and guidelines, including:

- *Commonwealth EPBC 1.1 Significant Impact Guidelines – Matters of National Environmental Significance* (Commonwealth of Australia 2013);

- *Commonwealth Department of the Environment – survey guidelines for nationally threatened species* (various);
- *Biodiversity Assessment Method* (OEH 2017);
- *Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities* (DEC 2004); and
- *NSW Guide to Surveying Threatened Plants* (OEH 2016).

The BDAR will be appended to the EIS.

Source: EMM (2019); FGJV (2019); Snowy Hydro (2019); DFSI (2017); GA (2011); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

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KEY

- Site boundary
- Local road or track
- Cadastral boundary
- Indicative site layout

Southern Temperate Grassland

- Within site boundary
- Outside site boundary

Location of Southern Temperate Grassland

Snowy 2.0
Scoping Report
Proposed Segment Factory
Figure 5.1

5.8 Aboriginal heritage

The Monaro is country to many Aboriginal people, who have cultural and spiritual associations that have long histories embodied in objects which can be seen on the ground and other intangible values related to the past and current concerns and aspirations.

Archaeologists believe that Aboriginal people had been living on Monaro for as long as 20,000 years before Europeans arrived. Although it was originally thought, by Europeans, that the Monaro Aboriginal people only resided in the high country during the warmer months (heading to the south coast district during winter), it is now understood that some groups lived on Monaro year-round. Other groups travelled through this region to the high country for Bogong moth season.

The two main groups on Monaro were the Ngarigo people of the tablelands and the Wogul or Wolgalu group in the high country.

A comprehensive Aboriginal cultural heritage assessment (ACHA) of the proposed segment factory would be undertaken. The ACHA would develop initiatives to avoid and minimise impacts. Mitigation and management measures would be designed to address any residual impacts which are not able to be avoided.

The assessment would be conducted in accordance with the OEH (2011) *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* and Code *of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (NSW DECCW 2010a).

A process of Aboriginal community consultation has already commenced and is being undertaken in accordance with the OEH *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW DECCW 2010b). The consultation process is regular and ongoing.

In addition to consultation, the heritage assessment would include a review of the relevant anthropological, historical and archaeological literature, a program of comprehensive field survey and archaeological test excavation of required.

The ACHA would be appended to the EIS.

5.9 Historic heritage

As previously stated, the site has been used an airstrip since the 1920s, including its use as the base for the Snowy Mountains Hydro-electric Authority's flying unit to service the construction of the Snowy Scheme. While the site is not listed on any heritage register, a historic heritage assessment would be undertaken to assess the potential impact of the proposed segment factory on the site and its surrounds.

The assessment of historic cultural heritage assessment would be undertaken in accordance with the principles of the *Australia ICOMOS Burra Charter* (Australia ICOMOS 2013a) and its relevant practice notes (Australia ICOMOS 2013b, 2013c, 2017). It would also comply with the *Historical Archaeology Code of Practice* (Heritage Council of NSW 2006) and the *NSW Heritage Manual* (1996) and its various updates and other guidelines published by the NSW Heritage Office (1996, 2001, 2009). The assessment would include a review and synthesis of the historical context of the area based on primary and secondary sources, including historical maps and various published and unpublished sources (eg academic theses and consultant reports).

The assessment of historic cultural heritage assessment would be appended to the EIS.

5.10 Hazard and risk

State Environmental Planning Policy No. 33 - Hazardous and Offensive Development (SEPP 33) requires that consent authorities ensure that in considering any application to carry out potentially hazardous or offensive development, they have sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impact.

In determining whether a development is potentially hazardous or offensive consideration must be given to current circulars or guidelines published by DPE relating to hazardous or offensive development.

As such, an assessment of the proposed segment factory will be undertaken against the *Hazardous and Offensive Development Application Guidelines - Applying SEPP 33 (2011)* (Applying SEPP 33). First, a risk screening analysis will be undertaken in accordance with Applying SEPP 33 to determine if the proposal is potentially hazardous or offensive. If it is deemed to be potentially hazardous or offensive, a PHA will be undertaken.

It should be noted that the proposal does not envisage fuel storages or storage hazardous chemicals. Admixtures used in the production of concrete are not deemed to be dangerous goods and do not require licensing.

The risk screening would be documented within the EIS. Should a PHA be required, this would be appended to the EIS.

5.11 Visual

The proposed segment factory will alter the external of the site. While the development will not be significant in the industrial setting of the local area, a qualitative visual assessment will be prepared to assess potential impacts of the proposal. The visual assessment will consider potential impacts from potentially sensitive viewing locations in the surrounding area.

5.12 Social and economics

The proposal will likely have social and economic benefits to the local community and wider region associated with direct and indirect economic benefits of the construction and operational phases of the proposed segment factory.

Consideration of potential social and economic impacts associated with the proposed segment factory will be provided in the EIS, however separate social and economic assessments are not proposed to be undertaken and appended to the EIS.

6 Conclusion

6.1 Request for assessment requirements

The purpose of this PEA is to request and inform the content of the SEARs for the proposed segment factory. The SEARs will specify the requirements for the EIS that will be prepared to accompany the application for the factory.

6.2 Scope of proposed segment factory

The manufacture of the precast tunnel segments for Snowy 2.0 (both Exploratory Works and Main Works) is proposed to be undertaken at the proposed segment factory. It would contain a covered area for the manufacture of the tunnel segmental linings (the precast yard), uncovered storage areas, vehicle parking areas and associated office and workshops.

Primary inputs for the proposed segment factory include aggregate, sand and cement. The aggregate and sand would be sourced from local quarries near Cooma and possibly near Canberra. The cement would be sourced from the Southern Highlands of NSW. Primary outputs are the tunnel segments which would be transported to the construction sites for Snowy 2.0 within KNP.

The construction phase of the proposed segment factory would last about five months utilising a workforce of about 30 people. The factory would operate over a period of about 3.5 years utilising a workforce of about 125 people.

The proposed segment factory would be operational 24 hours a day, seven days a week.

Approximately 130,500 segments (making up 14,500 concrete rings) would be manufactured over the 3.5-year operational period.

At the completion of the construction of Snowy 2.0, the proposed segment factory would be decommissioned.

While the proposed segment factory would construct and supply tunnel segments for Snowy 2.0, including for Exploratory Works and Main Works, the scope of these phases of Snowy 2.0 are excluded from this project and this PEA.

6.3 Approval requirements

Snowy 2.0 and ancillary development to Snowy 2.0 has been declared SSI and CSSI in accordance with the provisions of the EP&A Act with the declaration coming into effect on 9 March 2018. The proposed segment factory can be defined as ancillary to Snowy 2.0. As a result, the proposed segment factory may be carried out without development consent under Part 4 of the EP&A Act. However, the project is subject to Division 5.2 of the EP&A Act that requires preparation of an EIS and approval from the NSW Minister for Planning

With respect to the provisions of the EPBC Act, further detailed survey work is needed to determine potential impacts of the proposed segment factory on MNES and the environment generally. Therefore, Snowy Hydro has nominated that the factory has the potential to result in a significant impact on MNES and has considered the action is likely to be a controlled action by the Commonwealth Minister for the Environment.

The approval process under the EPBC Act has yet to be determined and will be discussed with DoEE in due course.

APPENDIX A

PROJECT DESCRIPTION

A.1 Introduction

It is proposed to construct and operate a factory on the site to supply precast segmental linings for the tunnels Snowy 2.0, including both during its Exploratory Works and Main Works.

The construction phase of the proposed segment factory would last about five months utilising a workforce of about 30 people. The proposed segment factory would operate over a period of about 3.5 years utilising a workforce of about 125 people.

In total, approximately 14,500 precast reinforced concrete tunnel rings (containing 130,500 segments) would be manufactured over the operational period.

The proposed segment factory would be constructed and operated by Future Generation Joint Venture (FGJV) which has been contracted by Snowy Hydro Limited (Snowy Hydro) to construct Snowy 2.0.

A.2 Construction

A.2.1 Main activities

At the commencement of construction, the main activities which will be undertaken include:

- demolition and removal of buildings on southern part of site, and removal of the decommissioned telecommunications tower;
- installation of temporary fencing and security measures as well as any necessary construction environmental management measures;
- confirmation of all utility services and any affected services which will be relocated or required to be made safe to allow construction to proceed;
- clearing and removal of topsoil and vegetation. Excavated topsoil excavated will be stockpiled on site for later use;
- minor earthworks to establish the site amenities. These earthworks will include:
    - cut and fill to establish a level area for the pads;
    - trenching to install services (power, water and communications);
    - laying a concrete pad for the plant area;
    - (cement soil) for the storage area;
- establishment of primary access road; and
- establishment of plant, office(s) and any other temporary buildings, compounds, carparks, workshop area and facilities.

A.2.2 Plant and equipment

An indicative list of plant and equipment likely to be required for construction of the proposed segment factory is provided below in Table A.1. Note that not all the equipment identified below will be required for all phases of the proposed construction.

Table A.1 Indicative construction equipment

Backhoes	Dump trucks	Pneumatic jackhammers
Bob cats	Elevated working platforms	Rigid tippers
Bulldozers	Excavators (various sizes)	Crushers
Concrete agitators	Flatbed Hiab trucks	Rollers
Concrete pumps	Drilling machines	Semi-trailers
Cranes, including gantry cranes - various sizes up to approximately 200 tonnes (t)	Transport trucks	Tilt tray trucks
Crawler crane with grab attachments	Generators	Trenchers

Source: FGJV

i Excavation and filling

Excavation will be carried out at the site to provide a level surface, establish the access roads and create the required trenches for drainage, earthing, and electrical conduits within the site. Excavation works will be carried out using excavators, dozers and crushing plant.

Excavated material may be reused on site for filling and compaction (including benching areas of the site where required). Where excavated material is determined not to be appropriate for re-use on site, it may be necessary to import additional material to site to make up any identified deficit. Where this is required, this will be sourced from suitable local quarries.

ii Waste

All waste generated during construction will be reused if appropriate, or removed, transported and disposed from the site in accordance with the *New South Wales* (NSW) *Waste Classification Guidelines* (EPA 2014), NSW *Protection of the Environment Operations Act 1997* (POEO Act) and the NSW *Protection of the Environment Operations (Waste) Regulation 2005*.

iii Traffic

Construction vehicle movements will comprise vehicles transporting equipment, waste, materials and spoil, as well as workers' vehicles. The revised average and peak daily heavy vehicle movements expected during the precast yard construction are outlined in Table A.2.

Table A.2 Estimated vehicle movements during substation construction

Vehicles	Movement Type	Estimated one-way movements
Light vehicles	Indicative daily movements (typical day)	30
	Maximum daily movements (critical peak/peak construction period)	40
Heavy vehicles	Indicative daily movements (typical day)	15
	Maximum daily movements (critical peak/peak construction period)	25

Source: FGJV

For heavy vehicle movements, FGJV has made the following assumptions:

- 10,000 cubic metres (m^3) of fill imported from outside;
  - 10 truck per day average;
  - 15 truck per day peak;
- 70 containers transported to site in three weeks:
  - five container per day average; and
  - 10 container per day peak.

A.2.3 Workforce

The construction phase of the proposed segment factory would last about five months (starting March 2020) utilising a workforce of about 30 people.

A.2.4 Construction hours

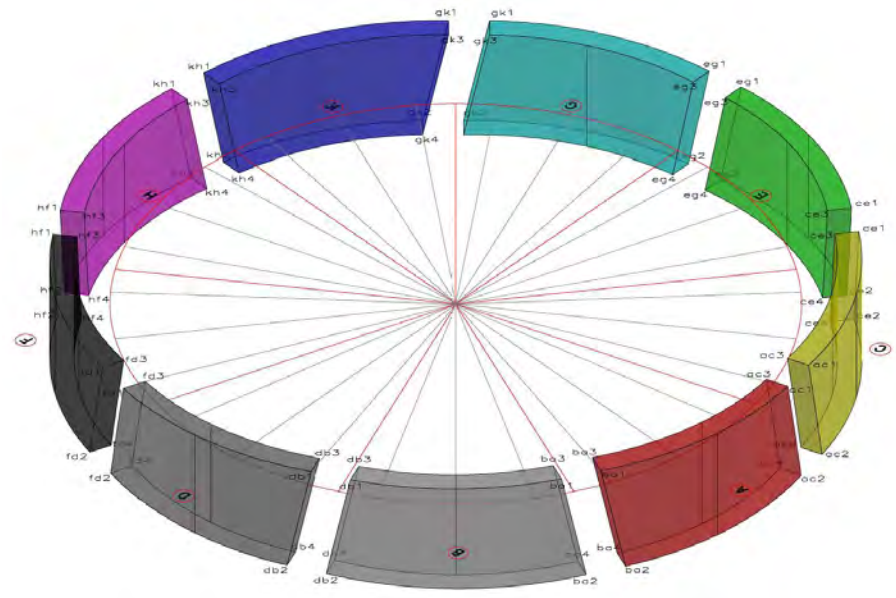
Construction will occur over a six day week (from Monday to Saturday) and for 10 hours per day. Access to Polo Flat Area will generally only occur from 7 am to 6 pm.

A.3 Operations

A.3.1 Tunnel segments

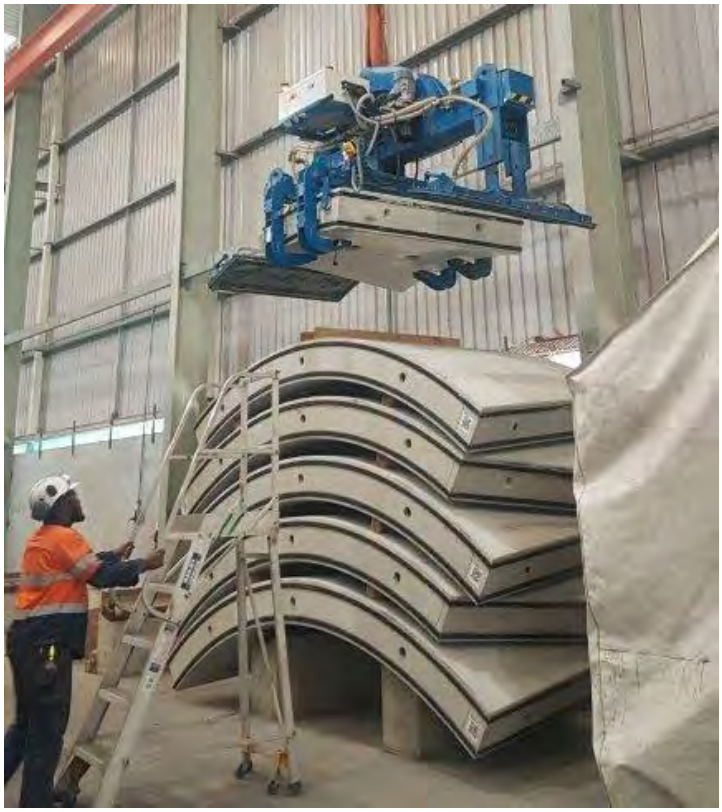
As previously stated, approximately 14,500 precast reinforced concrete tunnel rings (containing 130,500 segments) would be manufactured over the operational period. Each tunnel ring consists of a nine individual precast tunnel segments and would have the following properties (see Figure A.1 and Photograph A.1).

- internal diameter of 9,800 millimetres (mm);
- external diameter of 10,560 mm and
- width of 2,000 mm.



Source: FGJV

Figure A.1 Precast tunnel segmental lining ring



Source: FGJV

Photograph A.1 Typical precast segment linings

Precast tunnel segments would be constructed utilising steel moulds specifically designed to meet the specifications of Snowy 2.0. The steel moulds would be used in conjunction with a double carousel with four production lines on each carousel, one active production line and three lines in the curing chamber. In the carousel system, the moulds are moved on rails to pass through the various workstations in the production process before storage and transport to the project site.

The key elements in the fabrication of the precast tunnel segments include carousel production cycle, curing of segments, repair works, packer placement, quality control, and precast tunnel segment handling and transport.

A.3.2 Site layout

i Location on site

Based on FGJV's analysis of Snowy Hydro's private airfield at Polo Flat (Lot 14 in DP 250029), the southern part of the land was determined to be the preferred location for the proposed segment factory. With the additional of land to the west (Lot 3 in DP 238762) this section of site:

- provides enough area to accommodate the factory and storage area, whilst maintaining access to the north-south runway on the airfield;
- is located closer to road access to the south; and
- limits impact to native grasslands.

Key elements of the proposed segment factory are described in the following sections.

ii Ingress and egress

Vehicular ingress and egress to the site would be off Polo Flat Road along an existing service road located on an unmade road (part of Lot 3 DP 863686) which is located immediately north of Carlaminda Road.

iii General layout

A concrete batch plant (CBP) and precast yard containing the casting room and curing chamber would be located at the southern end of the site. The precast yard would be located within a covered shed structure. The primary storage area would be to the north of the shed. The storage area would be in the open, with overhead gantry cranes to move the precast tunnel segments from the factory into storage, and then onto trucks for transport to the project site. A secondary (or emergency) storage area is also proposed to the east of the main storage area.

iv Raw materials storage

Cement silos, and an aggregate and sand storage area for the CBP would be sized to hold approximately three days production to ensure any potential disruption on raw material supply will limit its impact on the precast tunnel segment production.

Cement deliveries would by via 28 tonne (t) tankers, whilst aggregate and sand would be delivered via truck and dog configuration (about 32 t per truck).

iv Crib area

A crib area would be located adjacent to the factory to provide toilet facilities, change rooms, lockers showers, lunchroom and break out areas for the factory workers.

v Offices

Offices, meeting rooms, training rooms and induction facilities are proposed to be located on the western part of the site.

vi Carparking

A large car parking facility is proposed adjacent to the main access to the south of the site. In addition to a parking area for the workforce, space would be provided on the western part of the site for the trucks and trailers that would be required for raw material deliveries, and to transport completed precast tunnel segments to Snowy 2.0.

A.3.3 Resources

i Plant and equipment

The plant and equipment to be utilised for production of the precast tunnel segments include:

- CBP with conveyor system;
- fibre dosing units;
- segment production plant;
- carousel system;
- working line transfer system;
- curing chamber;
- steam boiler;
- control room and casting station;
- segment moulds;
- vacuum handling devices;
- segment tilting devices;
- segment lifting devices;
- overhead cranes;
- gantry cranes; and
- forklifts.

Photographs of typical plant and equipment likely to be used at the proposed segment factory can be seen in Photographs A.2 to A.11.

Source: FGJV

Photograph A.2 Typical CBP and associated aggregate and sand stockpile bins

Source: FGJV

Photograph A.3 Typical concrete delivery conveyor system

Source: FGJV

Photograph A.4 Typical carousel system production line

Source: FGJV

Photograph A.5 Typical tunnel segment lining mould

Source: FGJV

Photograph A.6 Typical concrete casting

Source: FGJV

Photograph A.7 Typical overhead cranes

Source: FGJV

Photograph A.8 Typical steam curing chamber

Source: FGJV

Photograph A.9 Typical vacuum lifter

Source: FGJV

Photograph A.10 Typical segment turning table

Source: FGJV

Photograph A.11 Typical gantry crane

ii Materials

The following materials would be required for the construction of the precast tunnel segments, and would comply with relevant Australian standards and project specifications:

- concrete mix supplied from the onsite CBP and tested in accordance and in compliance with FGJV specifications;
- concrete raw materials;
- coarse aggregates in compliance with AS2758.1;
- fine aggregates in compliance with AS2758.1;
- cement in compliance with AS3972;
- ground slag in compliance with AS 3582.1;
- silica fume in compliance with AS3582.3;
- mixing water in compliance with AS 1379-2007;
- chemical admixtures in compliance with AS 1478.1;
- steel fibres 4D 80/60BG in compliance with BS EN14889-1-2006;
- steel reinforcement supplied in compliance with AS 4671-2007;
- anchored gasket type Fama UG029A or equivalent;
- circumferential connector Fama smart blockn110-140 300-60 or equivalent;
- dowels smart block 110-140/300.60 or equivalent;
- guiding rod type Sofrasar or equivalent;
- threaded grout/lift socket type Fama or equivalent;
- mould release agent Crete-Lease 20-VOC or equivalent;
- evaporation retardant/finishing aid A-Film or equivalent; and
- curing compound Masterkure 250 or equivalent.

A.3.4 Staff and manpower

A workforce of about 125 people would be required to operate the proposed precast segment factory. Most of this workforce will be sourced locally from Cooma and/or the surrounding rural localities.

Table A.3 Project management workforce

Designation	Number on site
Construction Manager	1
Tunnel Manager	1
Quality Manager	1
Plant Manager	1
Senior QC Engineer	1
QA Engineer	2
WHS Manager	1
E & S Manager	1

Source: FGJV

Table A.4 management workforce

Designation	Number on site
Precast Manager	1
Precast Engineers	3
Production Supervisors	3
Maintenance / Mechanical Supervisor	1
Leading Hands (not incl. in Workforce)	5
Workforce	>100

Source: FGJV

A.3.5 Hours of operation

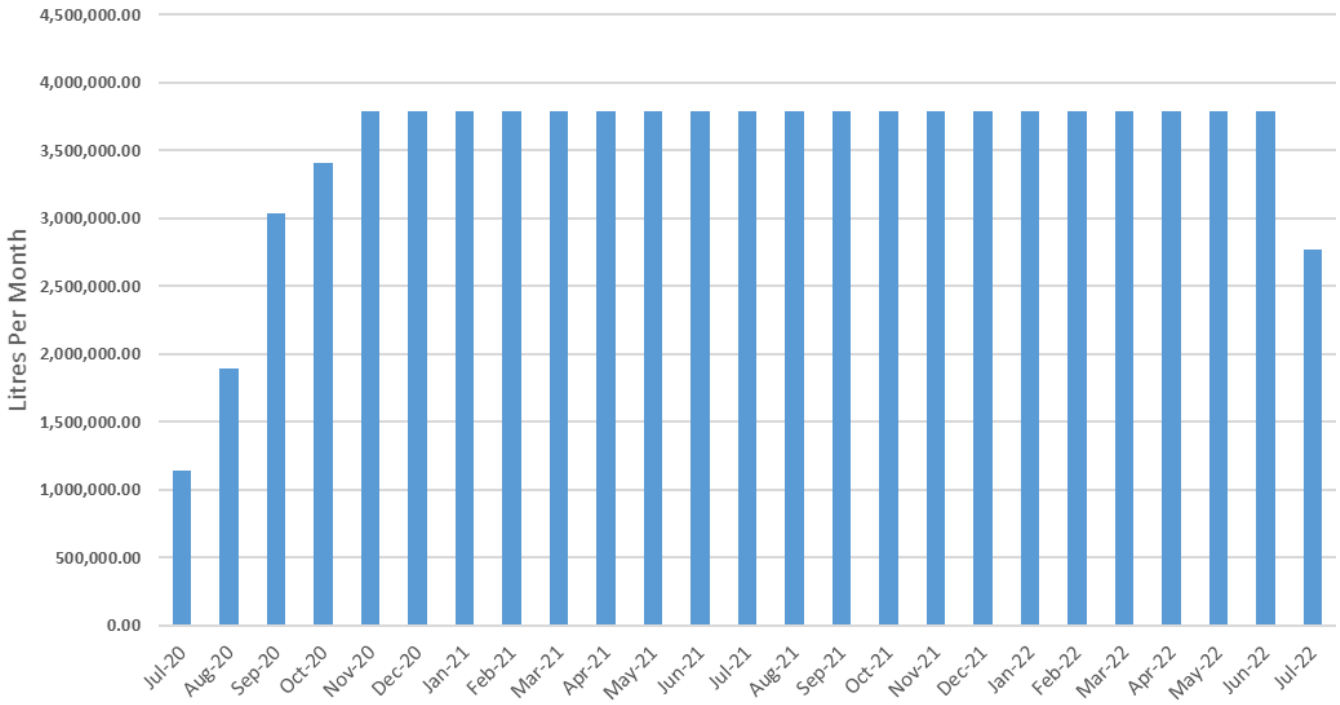
It is proposed to operate the proposed segment factory 24 hours a day, seven days a week.

A.3.6 Utility requirements

i Water and sewage

Water demand for the proposed segment factory would predominantly be driven by the production of the concrete within the CBP.

Figure A.2 below provides an overview of the water demand for the project based on an initial demand curve of the operations. Water is expected to be provided from the mains supply. The requirement for any upgrade to existing services is currently being investigated.



Source: FGJV

Figure A.2 Potential water demand

Wastewater would be generated be from the ablution block at the factory and the office block. Wastewater would be handled using Council's mains.

vii Power

Initial analysis indicates a power draw of 1,100 kilo volt amps (kVa) for the proposed precast tunnel segment factory with a load factor of 80%. Power would be connected from Essential Energy's main grid.

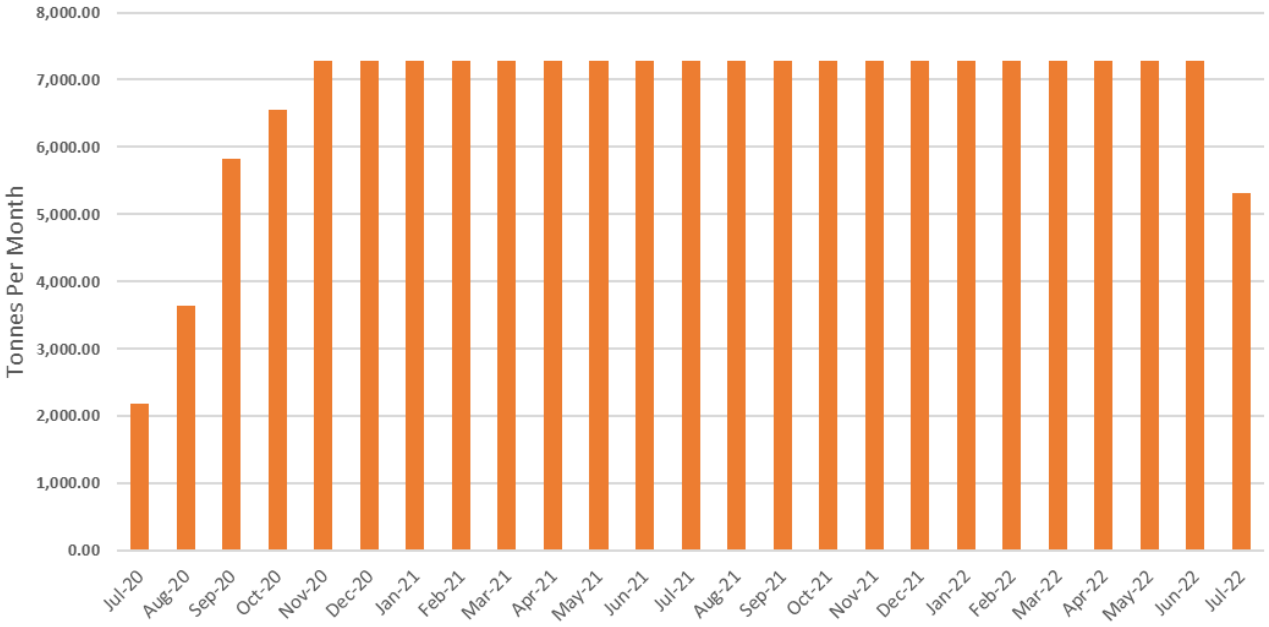
viii Gas

Gas would be typically used to supply the boiler system that runs the concrete curing chamber for the proposed segment factory. Demand for gas would be approximately 60 litres per hour (L/hr) hour for each heating system (or total of 120 L/hr). The gas used at the boiler would be supplied from the main grid.

6.3.2 Raw material requirements

i Cement

The current mix design for the concrete for the segments contains shrinkage limited cement and enviro (slag) cement. Based on the current mix design the figure below (see Figure A.3) provide a summary of the requirements for cement for the operational phase of the proposed segment factory.



Source: FGJV

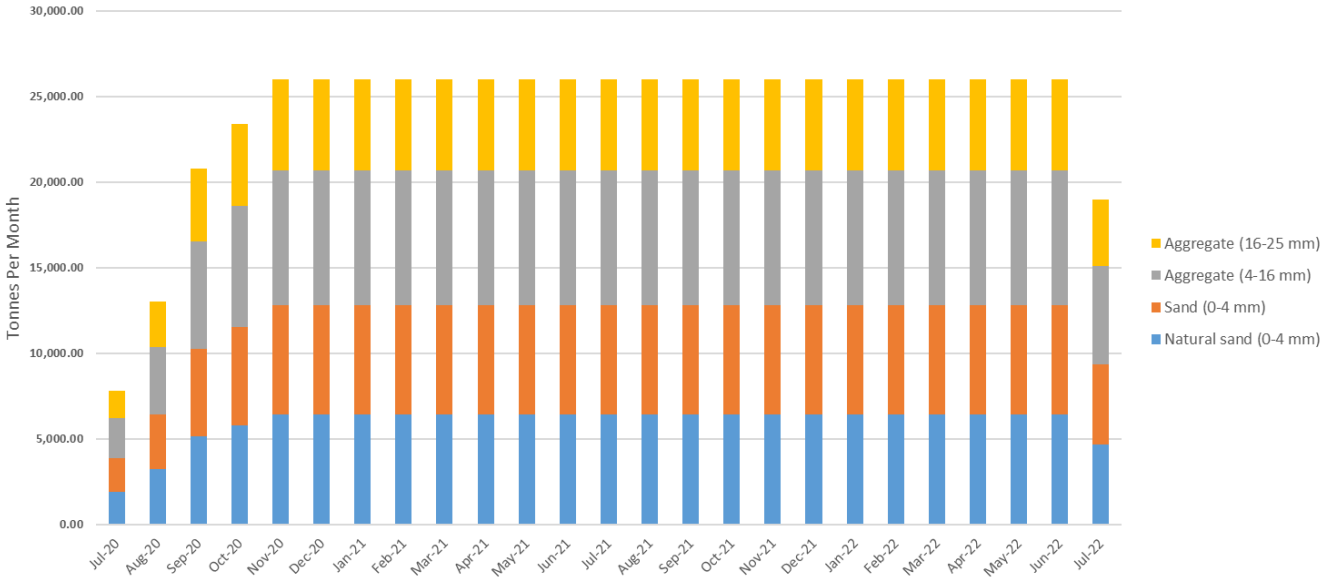
Figure A.3 Potential cement demand

It is likely that the cement would be sourced from the Southern Highlands of NSW and would be transported in road tankers to site using the Hume, Federal and Monaro highways.

From the Monaro Highway, the tankers would turn left onto Polo Flat Road (to the north of Cooma) and travel through the industrial area to the site.

ii Aggregates and sand

The figure below (see Figure A.4) provides a summary of the likely demand for aggregates and sand at the proposed segment factory.



Source: FGJV

Figure A.4 Potential aggregate and sand demand

The likely primary source of aggregates and coarse sand would be from quarries near Flat Rock and Nimmitabel. As such, the likely route from the quarries would likely be along the Snowy Mountains Highway, turning right onto Polo Flat Road.

If there are supply issues with quarries in the Rock Flat and Nimmitabel area, aggregates and coarse sand would likely be sourced from the ACT.

The location of the quarry and/or quarries supplying fine sand have not been identified. Notwithstanding this, FGJV has advised that there are several quarries located to the north of the site adjacent to the Monaro Highway between Cooma and Canberra that could provide fine sand to the project. As such, trucks delivering fine sand would likely access the site via the Monaro Highway and Polo Flat Road.

iii Segment accessories

Several accessories are required to produce the tunnel segment linings, such as steel rebar, reinforcement cages, steel fibres, gaskets and inserts. These would be transported to the site from Sydney via the Hume, Federal and Monaro highways, and Polo Flat Road.

iv Tunnel segments

Once the tunnel segments are cast, they would be transported to the tunnel boring machine (TBM) launch sites within the Kosciusko national Park (KNP). The segments would be transported on standard flatbed trailers.

Source: FGJV

Photograph A.12 Typical flatbed truck used to transport precast tunnel segment linings

The route the trucks would take from the site would be along Polo Flat Road (north bound), left onto the Monaro Highway and then right onto the Snowy Mountains Highway.

Initially all tunnel segments would be delivered to Lobs Hole via Link Road and Lobs Hole Ravine Road as the Exploratory Phase for Snowy 2.0 is executed. During the Main Works for Snowy 2.0, approximately half of the segments would go to Lobs Hole, and the other half of the segments would go to Tantangara via Tantangara Road.

6.3.3 Traffic movements

The predicted average and peak daily light and heavy vehicle movements during the operations of the proposed segment factory are presented in the table below.

Note that within Cooma, the Monaro and Snowy Mountains highways are also known as Sharp Street.

Table A.5 Average and peak daily traffic movements in the Polo Flat area during operation

Road network	Average daily light vehicle movements	Average daily heavy vehicle movements	Peak daily light vehicle movements	Peak daily heavy vehicle movements
Monaro Highway (east of Polo Flat Road north towards Canberra)	16	26	26	44
Monaro Highway (west of Polo Flat Road south towards Cooma)	155	78	195	132
Polo Flat Road (north)	150	104	194	176
Polo Flat Road (south)	210	26	266	44
Monaro Highway (south of Polo Flat Road towards Bombala)	16	26	26	44
Snowy Mountains Highway (west of Bombala Street towards Adaminaby)	16	78	72	132

Source: FGJV

The morning peak periods for the proposed segment factory are expected to be from 5 am to 8 am, with 30% of daily traffic (ie 10% of daily traffic for the actual AM peak hour) occurring during these times. The afternoon peak periods are also expected to include 30% of total daily traffic, between 4 pm to 7 pm (ie 10% of daily traffic for the actual PM peak hour). The expected 24-hour traffic distribution is presented in Figure A.5.

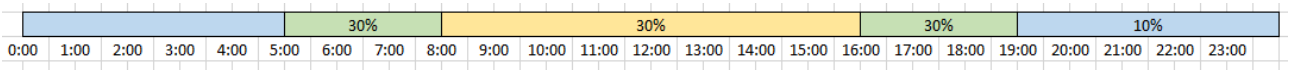


Figure A.5 Daily heavy vehicle distribution

The corresponding peak hourly (two-way total) movements during the operational phase of the proposed segment factory are presented in the table below.

Table A.6 Forecast peak hourly two way traffic movements in the Polo Flat area

Road network	AM Peak Hour (LV/HV)	PM Peak Hour (LV/HV)
Monaro Highway (east of Polo Flat Road north towards Canberra)	3/4	3/4
Monaro Highway (west of Polo Flat Road south towards Cooma)	20/13	20/13
Polo Flat Road (north)	19/18	19/18
Polo Flat Road (south)	27/4	27/4
Monaro Highway (south of Polo Flat Road towards Bombala)	3/4	3/4

Table A.6 Forecast peak hourly two way traffic movements in the Polo Flat area

Road network	AM Peak Hour (LV/HV)	PM Peak Hour (LV/HV)
Snowy Mountains Highway (west of Bombala Street towards Adaminaby)	7/13	7/13

Source: FGJV

In addition to the key roads in Table A.5 and A.6, an alternative route for heavy vehicles between the proposed segment factory and the Snowy 2.0 construction sites which bypasses Cooma is being pursued by Snowy Hydro in consultation with SMRC and the State Government. This route includes Yallakool, Mittagang, Shannons Flat and Bobeyan roads.

This alternative route would reduce traffic volumes generated by the proposed segment factory in Sharp Street in Cooma, including during peak holiday periods. T he reductions in traffic volumes are not reflected in Table A.5 and A.6.

Use of the alternative route by heavy vehicles generated by the proposed segment factory would require upgrade works including:

- the sealing of Shannons Flat and Bobeyan roads; and
- upgrades to the intersections of Bobeyan Road and Snowy Mountain Highway, Yallakool Road/Polo Flat Road and Monaro Highway.

Snowy Hydro has advised that the State Government would provide funding to undertake these upgrades.

APPENDIX B

PHOTOGRAPHS OF THE SITE

Photograph B.1 **Looking south east from the site of the proposed precast yard**

Photograph B.2 **Looking south east from the site of the proposed precast yard**

Photograph B.3 Looking south towards the site from the existing runway at Snowy Hydro's private airfield

Photograph B.4 Looking east to the site (which is located behind the industrial buildings in the foreground)

APPENDIX C

MNES SEARCH

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

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

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

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

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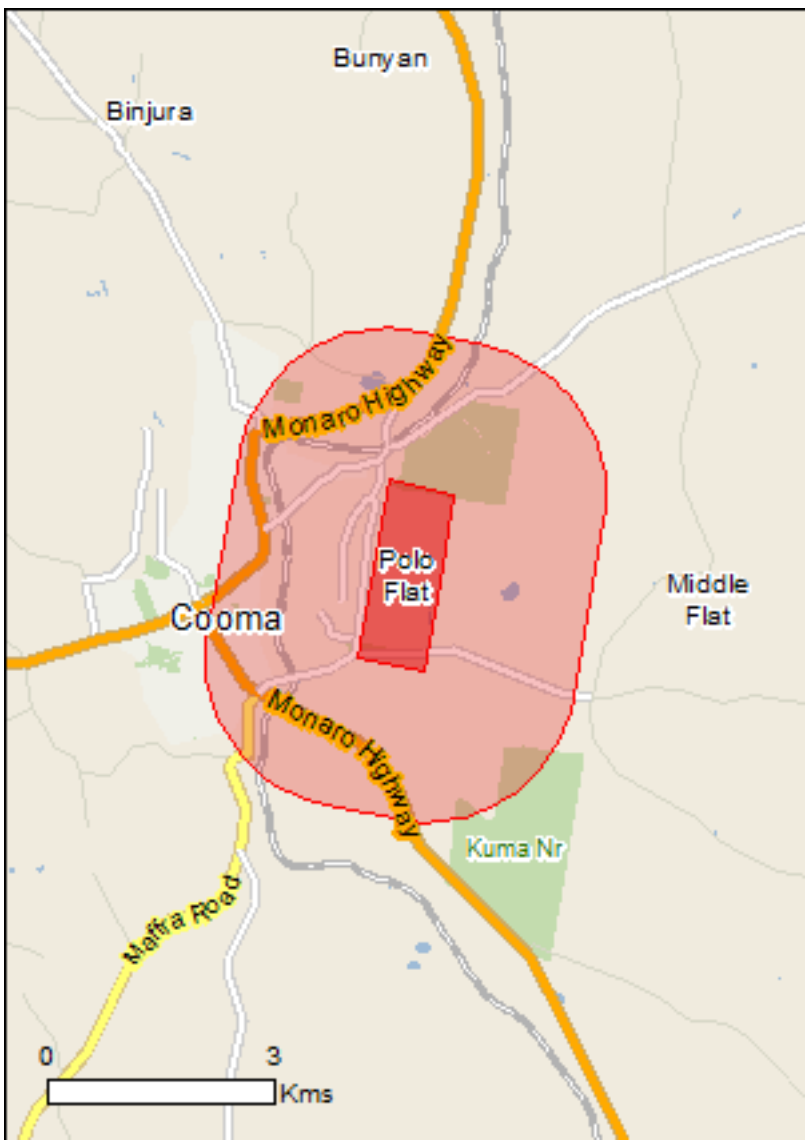

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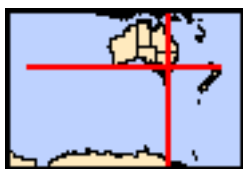

Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	4
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	24
Listed Migratory Species:	12

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	2
Commonwealth Heritage Places:	None
Listed Marine Species:	18
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	1
Regional Forest Agreements:	1
Invasive Species:	24
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Banrock station wetland complex	800 - 900km upstream
Hattah-kulkyne lakes	600 - 700km upstream
Riverland	700 - 800km upstream
The coorong, and lakes alexandrina and albert wetland	800 - 900km upstream

Listed Threatened Ecological Communities [Resource Information]

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

Name	Status	Type of Presence
Alpine Sphagnum Bogs and Associated Fens	Endangered	Community may occur within area
Natural Temperate Grassland of the South Eastern Highlands	Critically Endangered	Community likely to occur within area
Upland Wetlands of the New England Tablelands (New England Tableland Bioregion) and the Monaro Plateau (South Eastern Highlands Bioregion)	Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Fish		
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
Frogs		
Litoria castanea Yellow-spotted Tree Frog, Yellow-spotted Bell Frog [1848]	Endangered	Species or species habitat likely to occur

Name	Status	Type of Presence
		within area
Litoria raniformis		
Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog [1828]	Vulnerable	Species or species habitat may occur within area
Mammals		
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Plants		
Calotis glandulosa		
Mauve Burr-daisy [7842]	Vulnerable	Species or species habitat known to occur within area
Dodonaea procumbens		
Trailing Hop-bush [12149]	Vulnerable	Species or species habitat likely to occur within area
Eucalyptus pulverulenta		
Silver-leaved Mountain Gum, Silver-leaved Gum [21537]	Vulnerable	Species or species habitat likely to occur within area
Leucochrysum albicans var. tricolor		
Hoary Sunray, Grassland Paper-daisy [56204]	Endangered	Species or species habitat known to occur within area
Pomaderris pallida		
Pale Pomaderris [13684]	Vulnerable	Species or species habitat may occur within area
Prasophyllum petilum		
Tarengo Leek Orchid [55144]	Endangered	Species or species habitat may occur within area
Rutidosis leiolepis		
Monaro Golden Daisy [21490]	Vulnerable	Species or species habitat known to occur within area
Rutidosis leptorrhynchoides		
Button Wrinklewort [7384]	Endangered	Species or species habitat may occur within area
Thesium australe		
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Aprasia parapulchella		
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat known to occur within area
Delma impar		
Striped Legless Lizard [1649]	Vulnerable	Species or species habitat known to occur within area
Tympanocryptis pinguicolla		
Grassland Earless Dragon [66727]	Endangered	Species or species habitat known to occur within area

Listed Migratory Species [Resource Information]

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

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Australian Telecommunications Commission
Defence - COOMA ARMY TRAINING DEPOT (COOMA RESERVE DEPOT)

Listed Marine Species [Resource Information]

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

Name	Threatened	Type of Presence

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat likely to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Kuma	NSW

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
Southern RFA	New South Wales

Invasive Species [Resource Information]

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

Name	Status	Type of Presence
Birds		
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella trichotoma Serrated Tussock, Yass River Tussock, Yass Tussock, Nassella Tussock (NZ) [18884]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

Caveat

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

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

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

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

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

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

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

- migratory and
- marine

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

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

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

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

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

Coordinates

-36.222583 149.148432,-36.224037 149.156354,-36.241069 149.15275,-36.239719 149.144612,-36.222583 149.148432

Acknowledgements

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

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

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

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

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