Snowy 2.0 Main Works - Modification 1

Main Access Tunnel to Marica Services Connection

Prepared for Snowy Hydro
September 2021

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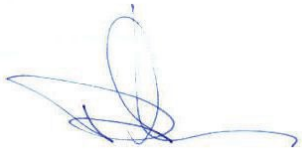
Prepared by	**Approved by**
	
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21 September 2021	21 September 2021

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1 Introduction

Snowy Hydro Limited (Snowy Hydro) propose to modify the critical State Significant Infrastructure approval (CSSI 9687) for the Snowy 2.0 Main Works, to undertake horizontal directional drilling (HDD) to establish water and electricity services between the Lobs Hole and Marica areas of the Project. This report provides the environmental assessment for the proposed modification.

1.1 Overview of Snowy 2.0

Snowy Hydro owns and operates the Snowy Mountains Hydro-electric Scheme (Snowy Scheme), which is a large water storage and diversion scheme in the Australian Alps in southern New South Wales (NSW).

Snowy Hydro is developing Snowy 2.0, which is the largest committed renewable energy Project in Australia and is critical to underpinning system security and reliability as Australia transitions to a decarbonised economy. Snowy 2.0 will increase the pumped hydro-electric capacity of the existing Snowy Scheme by linking Tantangara and Talbingo reservoirs with tunnels and a power station constructed between the reservoirs, almost one kilometre (km) below the ground.

Snowy 2.0 was declared to be State significant infrastructure (SSI) and critical State significant infrastructure (CSSI) in accordance with the provisions of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

Snowy 2.0 is being developed in two stages:

- The Exploratory Works Project (SSI 9208), which involves developing a 3.1 km exploratory tunnel and portal and undertaking other exploratory and construction activities primarily in the Lobs Hole area of Kosciuszko National Park (KNP). The Exploratory Works Project was approved by the former NSW Minister for Planning on 7 February 2019. Construction of the Exploratory Works is underway.

- The Main Works Project (CSSI 9687), which involves the construction and operation of Snowy 2.0. The Main Works were approved by the NSW Minister for Planning and Public Spaces (Minister) on 20 May 2020. Construction works under the Main Works approval are currently underway, with the establishment of key construction elements underway. This includes construction of accommodation camps, access roads, utility supply and excavation of portals to enable the commencement of tunnelling works.

There is also a project connected with Snowy 2.0 which involves the development and operation of a concrete segment factory, which was approved by the Minister on 31 March 2020.

Snowy Hydro is also seeking approval for a new transmission connection between the main works project and the existing transmission network (SSI 9717) which is at the response to submissions stage of the assessment process.

Snowy 2.0 will increase the generation capacity of the Snowy Scheme by almost 50%, to provide an additional 2,000 megawatts (MW) of generating capacity, and make approximately 350,000 megawatt hours (MWh) (175 hours of energy storage) available to the National Electricity Market (NEM).

1.2 Summary of project elements

A summary of the key elements that form Snowy 2.0 Main Works is provided in Table 1.1.

Table 1.1 Snowy 2.0 Main Works summary

Project element	Summary of the Project
Project area	The project area is the broader region within which Snowy 2.0 will be built and operated, and the extent within which direct impacts from Snowy 2.0 Main Works are anticipated.
Permanent infrastructure	Snowy 2.0 infrastructure to be built and operated for the life of the assets include the: • intake and gate structures and surface buildings at Tantangara and Talbingo reservoirs; • power waterway tunnels primarily comprising the headrace tunnel, headrace surge structure, inclined pressure tunnel, pressure pipelines, tailrace surge tank and tailrace tunnel; • underground power station complex comprising the machine hall, transformer hall, ventilation shaft and minor connecting tunnels; • access tunnels (and tunnel portals) to the underground power station comprising the Main Access Tunnel (MAT) and Emergency Cable Ventilation Tunnel (ECVT); • fish control structures in proximity to Tantangara Reservoir wall; • establishment of a portal building and helipad at the MAT portal; • communication, water and power supply including the continued use of the Lobs Hole substation; • cable yard adjacent to the ECVT portal to facilitate the connection of Snowy 2.0 to the NEM; and • access roads, permanent bridge structures and barge launch ramps needed for the operation and maintenance of Snowy 2.0 infrastructure.
Temporary infrastructure	Temporary infrastructure required during the construction phase of Snowy 2.0 Main Works are: • construction compounds, laydown, ancillary facilities and helipads; • accommodation camps for construction workforce; • construction portals and adits to facilitate tunnelling activities; • barge launch ramps; • water and wastewater management infrastructure (treatment plants and pipelines); • communication and power supply; and • temporary access roads.
Disturbance area	The disturbance area is the extent of construction works required to build Snowy 2.0. The maximum disturbance area is about 1,680 ha which is approximately 0.25% of the KNP. Most of the disturbance area will be rehabilitated and landformed and other parts will be retained permanently for operation (operational footprint).
Operational footprint	The operational footprint is the area required for permanent infrastructure to operate Snowy 2.0. The maximum operational footprint is about 99 ha which is approximately 0.01% of the KNP.
Tunnelling and excavation method	The primary tunnelling method for the power waterway is by TBM, with portals and adits using drill and blast methods. Excavation for other underground caverns, chambers and shafts will be via combinations of drill and blast, blind sink, or raise bore techniques.

Table 1.1 Snowy 2.0 Main Works summary

Project element	Summary of the Project
Excavated rock management	Excavated rock will be generated as a result of tunnelling activities and earthworks. The material produced through these activities will be stockpiled and either reused by the contractor (or NPWS), placed permanently within Tantangara or Talbingo reservoirs, used in final land forming and rehabilitation of construction pads in Lobs Hole, or transported offsite.
Construction water and wastewater management	Water supply for construction will be from the two existing reservoirs (Talbingo and Tantangara) and reticulated via buried pipelines (along access roads). Raw water will be treated as necessary wherever potable water is required (eg at accommodation camps). Water to be discharged (comprising process water, wastewater and stormwater) will be treated before discharge to the two existing reservoirs (Talbingo and Tantangara) as follows: • treated process water will be reused onsite where possible to reduce the amount of discharge to reservoirs, however excess treated water will be discharged to the reservoirs; • collected sewage will be treated at sewage treatment plants to meet the specified discharge limits before discharge and/or disposal; and • stormwater will be captured and reused as much as possible.
Rehabilitation	Rehabilitation of areas disturbed during construction including reshaping to natural appearing landforms or returning to pre-disturbance condition, as agreed with NPWS and determined by the Rehabilitation Strategy (see Appendix F). This includes construction areas at Lobs Hole which comprise surplus cut materials. Areas to be used by Snowy Hydro in the long-term may be re-shaped and rehabilitated to maintain access and operational capabilities (eg intakes and portal entrances)
Construction workforce	The construction workforce for the Project is expected to peak at around 2,000 personnel.
Operational life	The operational life of the Project is estimated to be 100 years.
Operational workforce	The operational workforce is expected to be 8-16 staff, with fluctuations of additional workforce required during major maintenance activities.
Hours of operation	Construction of Snowy 2.0 will be 24/7 and 365 days per year. Operation of Snowy 2.0 will be 24/7 and 365 days per year.
Capital investment value	Estimated to be $4.6 billion.

1.3 Overview of proposed modification

Snowy Hydro is seeking to modify CSSI 9687 (Modification 1) pursuant to section 5.25 of the EP&A Act. The proposed modification seeks to allow the installation of the power, communications and water supply infrastructure to be optimised. Snowy Hydro and FGJV are continuing to optimise the design of the Project, in order to realise efficiency in the delivery of the Project and minimise the overall environmental impacts.

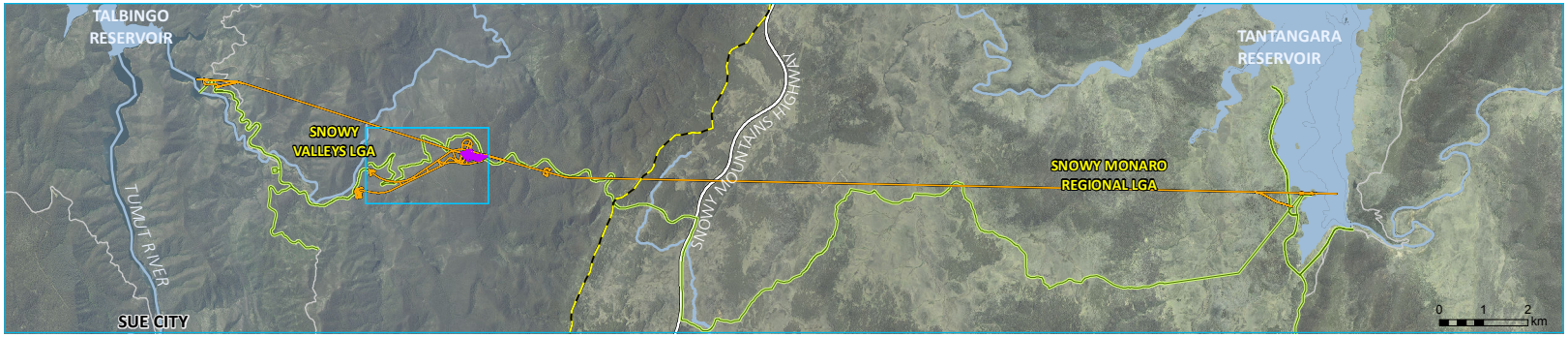
One of the design elements that Snowy Hydro has sought to optimise is the installation of services cabling between the MAT portal and Marica, and in particular within the Marica Road West alignment. Marica Road West traverses challenging terrain, with changes in topography in the road of around 600 m throughout its alignment. In order to make the installation of cabling more efficient and as an alternative to trenching the cables within the road alignment, and the project proposes to instead use a borehole to install and deliver the required services.

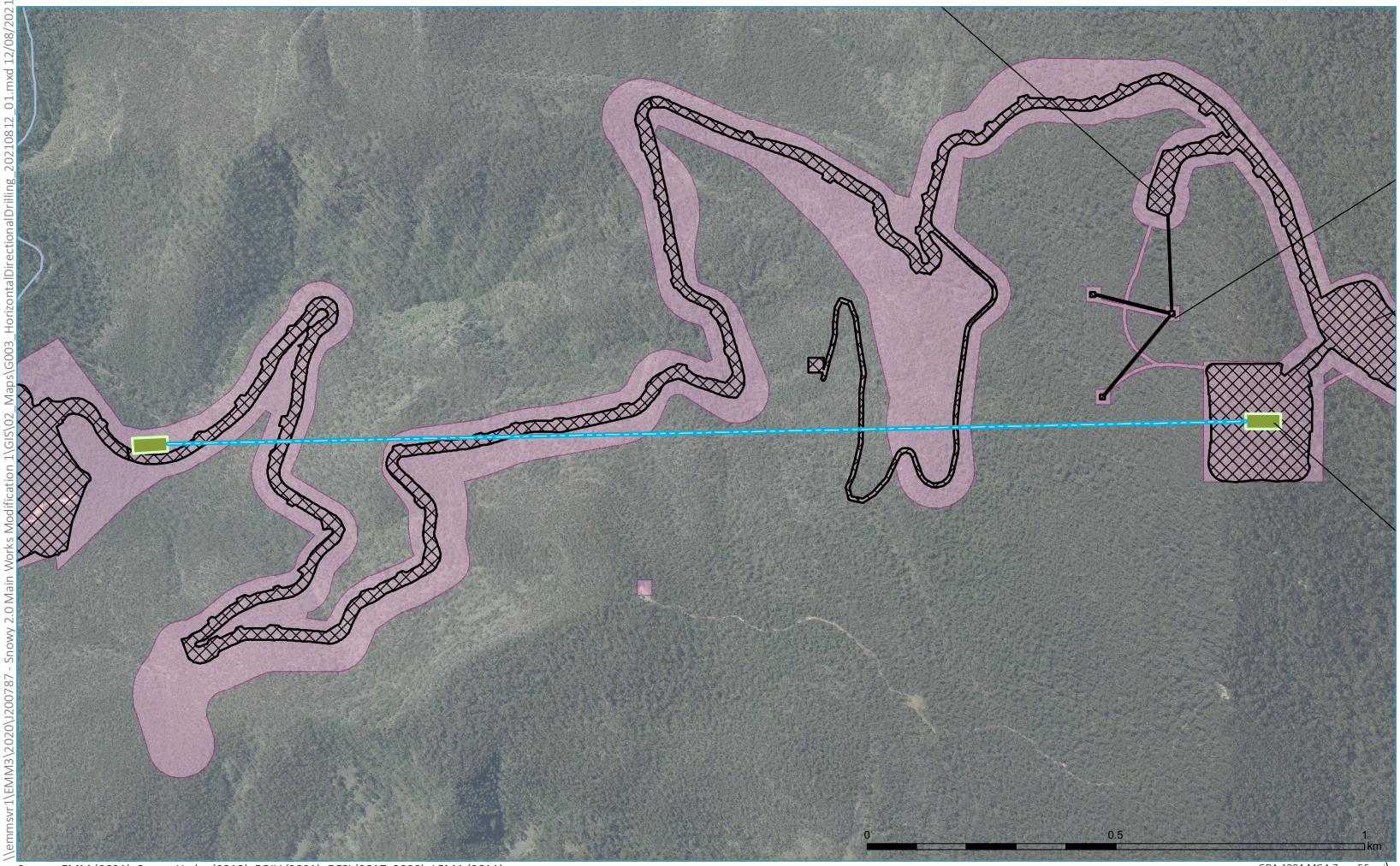
The Project has determined that it could realise significant efficiencies in the construction schedule and can avoid service installation complexity due to the challenging terrain, by using Horizontal Directional Drilling (HDD) to develop a services borehole to link the MAT portal to Marica. The HDD alignment would entirely replace the need to trench service cables in an almost 5 km section of Marica Road West.

The proposed modification involves the following activities.

- Horizontal directional drilling across an alignment of approximately 2,200 m between the MAT portal and Marica areas of the Project. This would involve establishing up to 7 temporary services comprising 4holes of approximately 450 mm diameter for power, and three holes of approximately 350 mm diameter for water and communications.
- Development of two temporary drill pads of 40 m x 100 m, within the approved indicative disturbance footprint and construction envelope.
- Installation of temporary construction water and power within the drill holes.
- Installation of permanent power and communications services within the drill holes.
- Management and disposal of excavated rock and water generated during the drilling.
- Decommissioning of temporary services at the completion of construction in accordance with the Main Works infrastructure approval requirements for decommissioning and rehabilitation.

An overview of the Modification 1 components is provided in Figure 1.1.





KEY

Existing environment

- Major road
- Minor road
- Watercourse
- Waterbodies
- Local government area boundary

Snowy 2.0 Main Works operational elements

- Tunnels, portals, intakes, shafts
- Power station
- Utilities
- Approved disturbance area
- Approved construction envelope

Modification to Snowy 2.0 Main Works

- Proposed underground drilling alignment
- Proposed drilling pad

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Source: EMM (2021); Snowy Hydro (2019); FGJV (2021); DFSI (2017, 2020); LPMA (2011)

GDA 1994 MGA Zone 55

N

Proposed Horizontal Directional Drilling – Marica West

Snowy 2.0
Modification to Snowy 2.0 Main Works
Figure 1

snowy 2.0

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creating opportunities

1.4 Location of the proposed modification

The location of the proposed drilling would be between the MAT portal and the Marica area as shown in Figure 1.1. The eastern (ie receival pad) drill pad would be wholly within the approved disturbance area for the Project. The western drill pad (ie launch pad) would be partially within the disturbance area and within the approved construction envelope.

The eastern drill pad would be in an area already designed to develop laydown areas for the Marica Road construction. The western drill pad would be in an area approved for clearing and is yet to be cleared.

1.5 Need for the proposed modification

Snowy 2.0 Main Works needs a supply of power, water, and communications across its construction zones. The key construction elements and activities that require utility supply are:

- the commissioning and operation of the three Tunnel Boring Machines (TBMs);
- the three accommodations camps at the Talbingo, Marica and Tantangara Project zones ;
- workshops and construction offices at the Main Yard (Lobs Hole), Marica and Tantangara zones;
- construction pads at the MAT portal, ECVT portal, Tailrace tunnel portal and Headrace tunnel portal;
- other ancillary construction activities, including spoil placement, intake construction and geotechnical investigations.

In addition to the utility requirements for the above activities, a dedicated wired communication network is required for operational elements of the Project including the underground power station and gates to the power waterway.

To provide the required power supply, a substation has been constructed and is being commissioned within Lobs Hole, with a capacity of 80 megavolts (MVA). To deliver power from the substation, a network of high voltage cables is being constructed. This network of cables will deliver power to each of the key project elements and abovementioned activities.

As approved for the Project and described in the Snowy 2.0 Main Works EIS, the service cables are allowed to be developed either as overhead lines or buried in trenches from Lobs Hole to Marica and from there to Tantangara, or along either existing or proposed access roads within the project area.

To supply water for construction activities, Snowy Hydro is approved to supply water from the Talbingo and Tantangara reservoirs. These water supply pipelines are allowed to be reticulated via buried pipelines along access roads. Therefore, in order to change the way the services are installed and delivered, and to undertake the HDD as proposed, a modification to the infrastructure approval is requested.

The proposed modification will contribute to efficient development of the Main Works project in three key ways.

1. It would limit the risk of potential delays to the overall construction and delivery of the Snowy 2.0 project by removing the requirement to complete construction of the Marica West Road prior to installing power and water linking the Lobs Hole area to the Marica area. This would ensure that the benefits of the project as a whole can be realised as early as possible and reduces the level of temporary power generation and Marica and Tantangara sites

2. It reduces the risk of the installation and operation of services for construction being affected by natural events such as bushfire. This risk is evident given the most recent bushfire in KNP in 2019.

3. It provides operational security for the services, and ensures that long term asset maintenance can be greatly controlled.

The proposed modification will also result in some reduction to the amount of clearing that would be required to construct Marica Road West, and reduces the amount of cabling required to be installed overall to supply the services.

1.6 Purpose of this report

This report provides the environmental assessment for the proposed modification of the Snowy 2.0 Main Works Project, and it has been prepared in accordance with section 5.25 of the EP&A Act. This report covers:

- a description of the proposed modification to the approved project;
- justification for the proposed modification;
- an assessment of the potential environmental impacts of the proposed modification;
- details of the changes to the conditions of the project approval required by the proposed modification; and
- details of the changes to the approved environmental management measures that are required as a result of the proposed modification.

1.7 Approval conditions to be modified

Only a minimal change to the conditions of approval CSSI 9687 would be required for the proposed modification. The proposed change is outlined in Table 1.2.

Table 1.2 Approval conditions proposed to be modified

Condition of approval	Proposed modified condition
DEFINITIONS	DEFINITIONS
Main Works	*Main Works*
The development of an underground power station and associated infrastructure described in the Environmental Impact Statement for the Snowy 2.0 Main Works (CSSI 9687) dated September 2019, and modified by the: • *Preferred Infrastructure Report and Response to Submissions – Snowy 2.0 Main Works, dated February 2020; and* • *Additional information provided to the Department by EMM on 24 March 2020 and 7 April 2020*	*The development of an underground power station and associated infrastructure described in the Environmental Impact Statement for the Snowy 2.0 Main Works (CSSI 9687) dated September 2019, and modified by the:* • *Preferred Infrastructure Report and Response to Submissions – Snowy 2.0 Main Works, dated February 2020;* • *Additional information provided to the Department by EMM on 24 March 2020 and 7 April 2020; and* • ***Snowy 2.0 Main Works Modification1* – Main Access Tunnel to Marica Services Connection.**

2 Proposed modification

2.1 Overview

The proposed modification seeks to change the way services are delivered between the MAT portal in Lobs Hole to the Marica area. The modification application is seeking approval for the following activities:

- HDD across an alignment of approximately 2,200 m between the MAT portal and Marica areas of the Project. This would involve establishing up to 7 temporary services comprising 4 holes of approximately 450 mm diameter for power, and three holes of approximately 350 mm diameter for water and communications.
- Development of two temporary drill pads within the approved disturbance area and construction envelope.
- Installation of temporary construction services within the drill holes once established.
- Management and disposal of spoil and water generated during drilling activities.
- Decommissioning of temporary services at the completion of construction in accordance with the Main Works infrastructure approval requirements for decommissioning and rehabilitation.

The works are minor in nature in the context of the overall approved project. The works are therefore expected to have minimal environmental and amenity impacts as they would result in no additional vegetation clearing or impacts to the ground surface outside of the approved disturbance area and approved construction envelope.

Further, the revised construction method would reduce the vegetation clearing and ground disturbance required to establish Marica West Road by removing the need for services trenching within the road alignment. The disposal of spoil and water generated during the works would be managed effectively using existing facilities, processes and controls in place under the approved project and the Surface Water Management Plan and Spoil Management Plan.

An overview of the Modification 1 elements is provided in Figure 2.1.

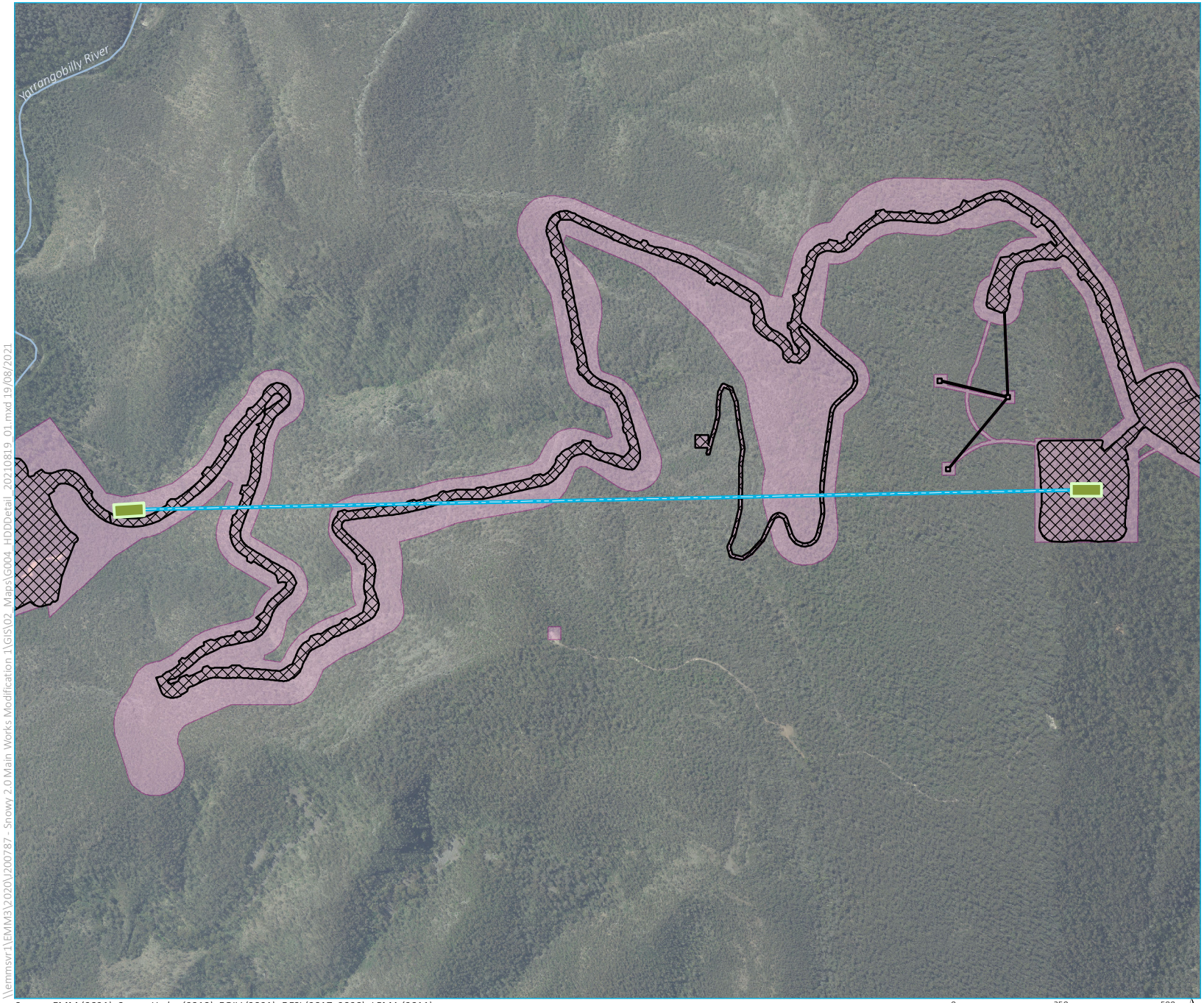
2.2 Construction

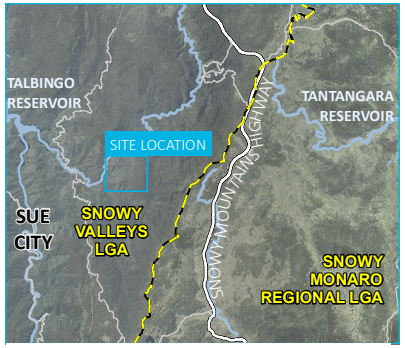
This section outlines the proposed HDD methods for service installation between the MAT portal and Marica.

2.2.1 Horizontal directional drilling

HDD would be used to establish construction utilities connection for water, power and communications between the MAT portal and Marica areas of the Project. The proposed horizontal directional drilling alignment is shown in Figure 2.1 and the elevation change can be seen in the cross section provided in Figure 2.2.

The HDD would commence from the western drill pad and proceed to the eastern drill pad, which is around 2,200 m. The proposed HDD configuration would comprise up to 7 individual drill holes, with four being approximately 450 mm diameter for water supply, and three approximately 350 mm diameter for power and communications. Based on the current conceptual HDD alignment, it is expected that the maximum depth of the hole below the surface will be around 100 m, dependent on the final design. Drilling is expected to take approximately 100 days to complete.





KEY

Existing environment

- Major road
- Minor road
- Watercourse
- Waterbodies
- Local government area boundary

Snowy 2.0 Main Works operational elements

- Approved disturbance area
- Approved construction envelope

Modification to Snowy 2.0 Main Works

- Proposed underground drilling alignment
- Proposed drilling pad

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Source: EMM (2021); Snowy Hydro (2019); FGJV (2021); DFSI (2017, 2020); LPMA (2011)

0 250 500 m

GDA 1994 MGA Zone 55

N

Horizontal Directional Drilling – Marica West

Snowy 2.0
Modification to Snowy 2.0 Main Works
Figure 2.1

snowy 2.0

EMM creating opportunities

Drilling would commence with pilot holes drilled from the pad near the MAT. After pilot holes are established on the designed path a larger back reamer may be used to enlarge the drill holes to the required size by pulling back through the pilot bore hole.

During drilling a drilling fluid would be used to facilitate the removal of cuttings, stabilize the bore hole, cool the cutting head, and lubricate the passage of the product pipe. The drilling fluid would be a mixture of water and bentonite (if required).

At the completion of drilling the holes would be cased with steel or fibreglass. It is expected that the casings can be inserted from the pad near the MAT Portal and pressed through the drill holes upwards, or subject to final design may be pulled into the hole by the drilling rig at the western pad with insertion at the easterly drilling pad. The casing will result in a sturdy liner that will provide protection to the installed cables.

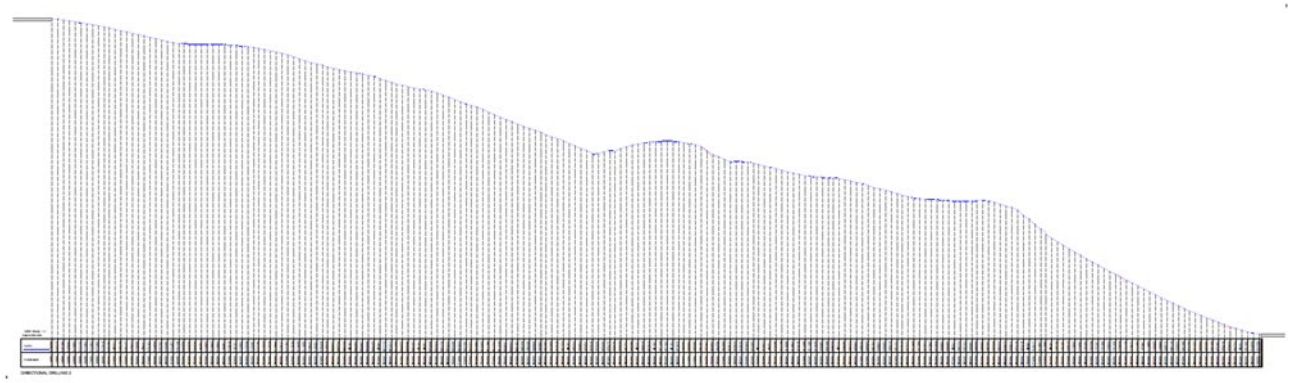

Figure 2.2 Cross-section of terrain between the two drill pads

2.2.2 Ancillary areas

Two drill pads would be required for the work with one near the MAT portal and the other in the Marica area as shown in Figure 2.1.

The drill pads would need to be developed before the drilling could commence. To facilitate the drilling activities the following key pieces of plant and equipment will be required within the drill pad:

- 1 drill rig (as shown in Figure 2.3);
- water holding tanks;
- drilling fluid mixing system;
- mud pumps;
- drilling fluids processing system;
- water treatment system
- drill rods rack;
- personnel facilities including ablutions, lunch sheds, and office
- container with down hole tooling, bits, reamers; and

- drill fluids storage.

Figure 2.4 shows a concept and Figure 2.5 shows and artist impression of the drill pad layout that has been developed as part of the on-going planning for this methodology. All plant and equipment mention above will be situated within two newly established 40 m x 100 m drill pads. The lower drill pad will be established off to the northern side of the Marica Road West alignment, within the approved construction envelope for the Project, around 400 m to the north-east of the MAT site. The upper drill pad will be established on the southern side of the Marica Road West, to the east of the surge tank site.

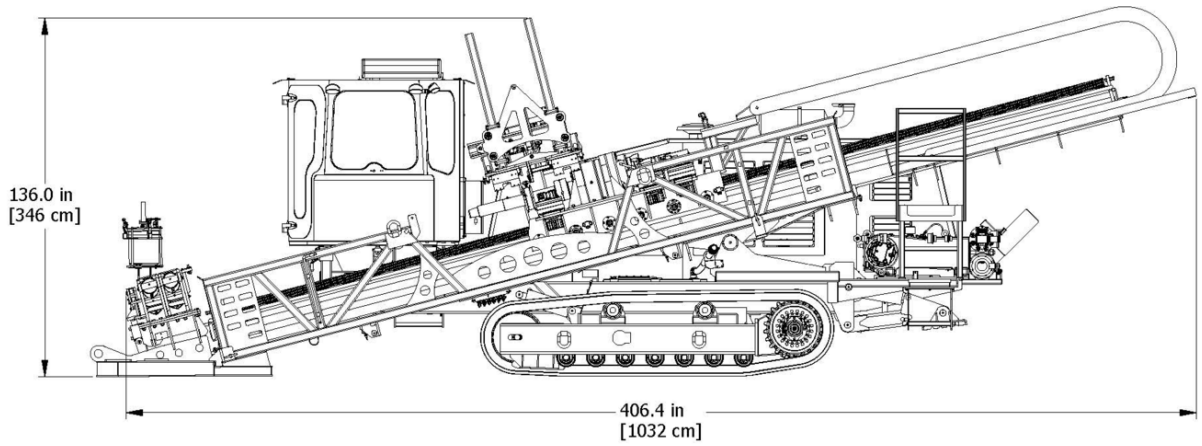

Figure 2.3 Indicative drill rig for proposed works

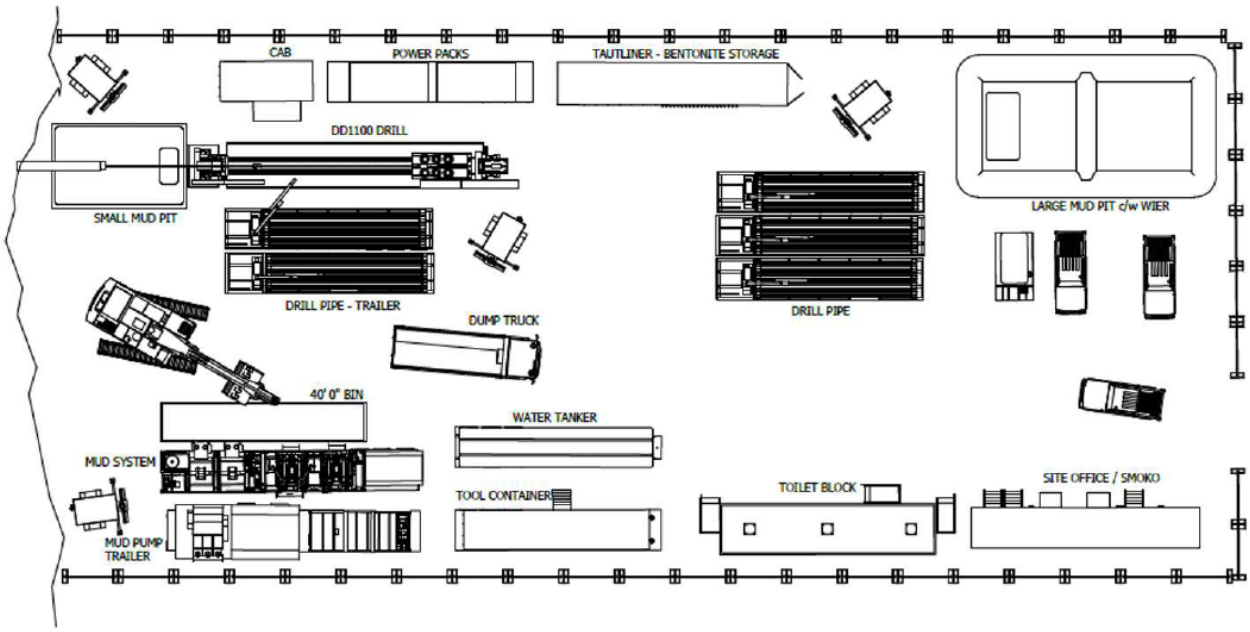

Figure 2.4 Example drilling site layout (source: FGJV)

Figure 2.5 Artist impression of the example drill site layout (source: FGJV)

2.2.3 Water supply

In total, approximately 189,000 kilolitres (kL) of water would be required for drilling fluid during the proposed works. Drill fluid would be required at a rate of approximately 2.5 kL / minute during works. Around 75% of drilling water would be recycled, which results in approximately 2,700 kL of additional water being required per day during drilling operations.

Water would be supplied to the drill pad near the MAT portal by HDPE piping from the MAT portal existing water supply system. The piping would be reticulated to the drill pad within the area already impacted by the Project and would require no additional clearing.

2.2.4 Wastewater

There would be approximately 900 kL of wastewater generated per day by the drilling. This water would be pumped to the MAT drill pad for storage and treatment. Drill cuttings would be removed from the drill fluid using shakers and cones at the drill pad. The drill fluid would also be filtered through a filtration system as well as polyethylene bags to remove clay content. All drill cuttings and clay generated by the drilling would be collected and managed for disposal under the approved spoil management plan for the Project. Further details of the management of spoil generated by the drilling is provided in Section 2.2.5

Subject to ground conditions encountered, it is currently anticipated that approximately 75% of drilling water would be recycled through the drill pad. Excess drilling water that is unable to be re-used would be piped to the existing process water treatment plant at the MAT tunnel and Talbingo. Excess wastewater generated by drilling would be combined with other streams of process water for the Project and managed for treatment and discharge in accordance with the water quality limits documented in the approved surface water management plan for the Project.

2.2.5 Spoil management

Approximately 2,500 m^3 of spoil material would be generated during the proposed drilling. The spoil generated by the drilling would not increase the total volume of spoil generated by the Project as there would be a corresponding reduction in spoil generated by trenching for service installation.

2.2.6 Workforce

It is expected that the total work force requirements will be up to 25 personnel during initial site establishment and site setup activities, with a drilling crew of up to 25 required once underboring commences. It is expected that the existing workforce for the Snowy 2.0 Main Works will be utilised for site establishment (eg earthworks required for drill pad construction), while an expert drilling sub-contractor will be engaged to oversee the drilling program of works.

2.2.7 Staging and hours

All working hours and site access arrangements would be consistent with the approved project construction. Construction would occur 24 hours per day 7 days a week.

Once access to the two sites has been established it is expected that the underbore drilling will take approximately six months. This includes the site establishment activities associated with the leveling of the two new drill pads. The main HDD construction activity is expected to take approximately 100 days. An indicative schedule for the works is provided in Figure 2.6 below.

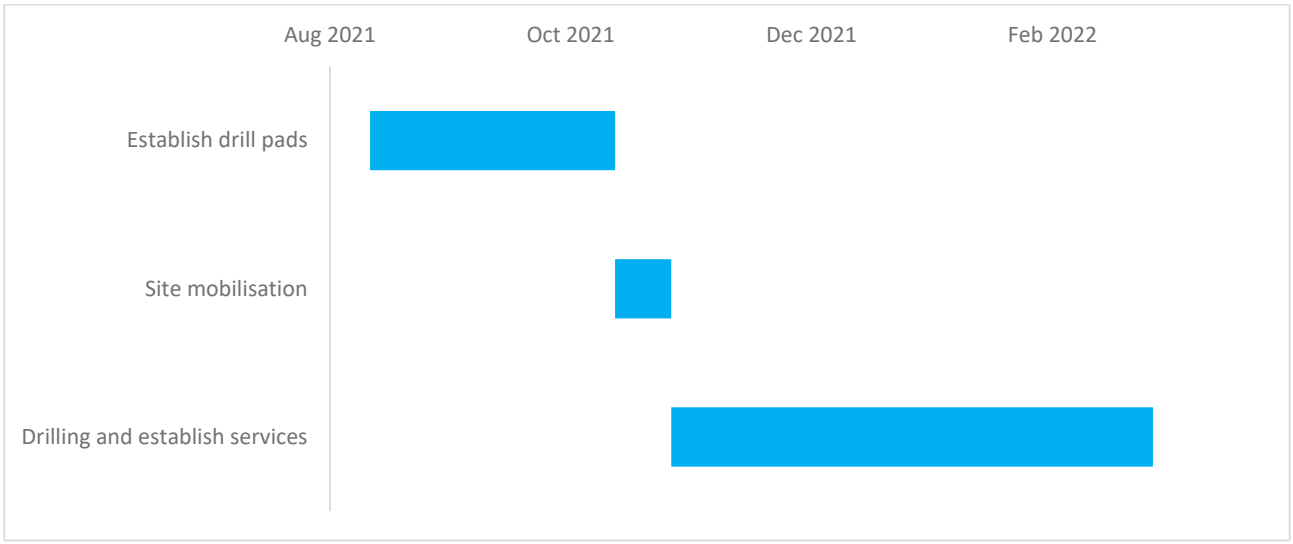

Figure 2.6 – Indicative construction schedule

2.3 Operation

2.3.1 Access and maintenance

Once the HDD alignment is established and the proposed service cabling is installed, the proposed services would be regularly checked and maintained as necessary throughout the operation period. It is not expected that any maintenance would be required throughout the Main Works construction period. However, if maintenance is required, access to the installed services would be from within existing construction areas at the ends of the

alignment where the drill pads are established for construction. No additional disturbance or access is required for ongoing maintenance of the installed services.

2.3.2 Decommissioning

Once the Snowy 2.0 Main Works construction is completed the temporary construction services would be decommissioned and rehabilitated in accordance with the rehabilitation requirements in the Main Works infrastructure approval.

This would include the removal of the drill pads if they are not required further and their rehabilitation, and the removal of all temporary service cabling which is no longer required. Permanent services would remain in place for operational power and communications services.

Decommissioning would be consistent with the approach to removal of temporary construction services for the Project and would follow consultation with NPWS and DPIE at the end of construction. Decommissioning of services across the HDD alignment would involve removal of the service connections and in-fill sealing of the drill holes.

3 Statutory context

This section provides a summary of legislation relevant to the Modification 1 application.

3.1 Introduction

Snowy Hydro is a company incorporated under the Commonwealth *Corporations Act 2001*, with an independent board of directors and shareholders. Snowy Hydro is fully owned by the Australian Government.

On 26 October 2017, Snowy Hydro requested that the NSW Minister for Planning declare Snowy 2.0 to be CSSI to which Part 5, Division 5.2 of the EP&A Act applies. On 7 March 2018 the NSW Minister for Planning declared Snowy 2.0 to be CSSI with the declaration coming into effect on 9 March 2018. Main Works, as a component of Snowy 2.0, may be carried out without development consent under Part 4 of the EP&A Act and is declared to be CSSI for the purposes of the EP&A Act. The Main Works was approved by the Minister for Planning on 20 May 2020 pursuant to section 5.19 of the EP&A Act.

3.2 Kosciuszko National Park

The existing Snowy Scheme has a unique approval mechanism where it operates within land that is reserved as a national park under NSW legislation. The components of the existing Snowy Scheme within the KNP operate under the Snowy Park Lease from the NSW Minister for the Environment. Snowy Hydro also operates the Snowy Scheme under a stringent water licence administered by DPIE Water that allows for water collection, storage, diversion and release to generate electricity.

The existing Snowy Scheme and assets have long been part of the KNP landscape and are a key feature in park recreation and visitation. The KNP is reserved as a national park under Part 4, Division 3 of the NSW *National Parks and Wildlife Act 1974* (NPW Act). NSW national parks are the responsibility of the NPWS which is a part of DPIE.

KNP contains unique sub-alpine values and declared wilderness areas and is listed on the Australian National Heritage List. All activities on reserved land must be consistent with the objects and purpose of the NPW Act.

All activities within KNP must be consistent with the KNP PoM, prepared in accordance with Part 5 of the NPW Act. Various references are made to the existence and continued operation of the Snowy Scheme throughout the KNP PoM, including within park zoning provisions and Chapter 12. The PoM also incorporates the Snowy Management Plan to more specifically deal with the operations of the existing Snowy Scheme within KNP.

As such, should approval be granted for the proposed modification, the Snowy Management Plan will be reviewed and updated to incorporate management obligations with respect to the Snowy 2.0 project in accordance with the timetable imposed by the NSW *Snowy Hydro Corporatisation Amendment (Snowy 2.0) Act 2018* (SHC Amendment Act).

3.3 Snowy Hydro

The former Commonwealth Snowy Mountains Hydro-electric Authority was corporatised under the NSW SHC Act (and corresponding legislation passed in Victoria and by the Commonwealth) as Snowy Hydro Limited on 28 June 2002. Snowy Hydro is now fully owned by the Commonwealth following the acquisition of all remaining shares by the Commonwealth from the States of NSW and Victoria in July 2018.

In addition to providing for the corporatisation of Snowy Hydro Limited, the SHC Act implemented a range of measures to transition the operations of the Snowy Scheme as regulated under NSW environmental laws and other regulatory requirements for the first time. As part of this transition Snowy Hydro was entitled to be granted the Snowy Water Licence and the Snowy Park Lease to enable the continued operation of the existing Snowy Scheme and in addition its operations were recognised as having the necessary approvals and consent for the purposes of the EP&A Act and as authorised under the NPW Act.

3.3.1 Snowy Park Lease

Part 6, section 37(2) of the SHC Act entitled Snowy Hydro to the grant of a lease, licence, easement or right of way over KNP, for the purposes of the existing Snowy Scheme. The Snowy Park Lease was granted to Snowy Hydro by the former NSW Minister for Environment in 2002 and has a term of 75 years. The lease covers land where infrastructure associated with the existing Snowy Scheme has been constructed. Section 41(5) of the SHC Act provides that development that is for a purpose for which a lease has been granted under Part 6 of the Act, is taken to be authorised under the NPW Act.

3.3.2 Amending legislation to authorise Snowy 2.0

The SHC Amendment Act was passed by the NSW Parliament in November 2018. The SHC Amendment Act authorised further leases and other tenures to be granted over the KNP to facilitate the construction and ongoing operation of Snowy 2.0 including the supporting electricity transmission upgrades.

Section 37A(2) of the SHC Act entitles Snowy Hydro to the grant of a lease, licence, easement or right of way over the KNP, for the purposes of and in connection with, Snowy 2.0 and confers similar entitlements for the transmission assets. Snowy Hydro entered into an Agreement for Lease (AFL) with the NSW Minister for the Environment on 18 December 2018 in respect of Snowy 2.0. Subject to the terms of the AFL, Snowy Hydro (and its contractors) will be granted rights to access the areas required for construction under Works Access Licences and Construction Leases. On practical completion of construction of Snowy 2.0, Snowy Hydro will be granted an Operational Lease to allow the ongoing operation of Snowy 2.0. This operational lease will expire at the same time as the Snowy Park Lease issued in 2002. Snowy Hydro must satisfy a number of conditions precedent before it will be granted rights to access and use KNP.

Section 38(1) of the SHC Act, provides that a plan of management may deal with the activities of Snowy Hydro within the KNP and impose obligations on the company to comply with the plan of management. This compliance obligation is supported by Part 4 of the *NSW National Parks and Wildlife Regulation 2009* (NPW Regulation). The SHC Amendment Act also provided for a transitional period for the KNP PoM and the Snowy Management Plans to be revised to reflect Snowy 2.0. Clause 7 of Schedule 4 to the SHC Act provides a period of three years from when first planning approval is granted for any part of the Snowy 2.0 project, for the KNP PoM to be amended for the purposes of including the Snowy 2.0 project. A further period until 1 January 2024 is then allowed for the Snowy Management Plan to be updated. During that transitional period, section 81(4) of the NPW Act does not operate to prohibit operations being undertaken in relation to the Snowy 2.0 project that are not in accordance with those plans.

3.3.3 Snowy Water Licence

The Snowy Water Licence is a special purpose statutory approval issued under Part 5 of the SHC Act. It embodies the operating and accounting principles of the Snowy Scheme. The Snowy Water Licence confers several rights and obligations on Snowy Hydro for the collection of all water from the rivers, streams and lakes within the Snowy Water Catchment. Snowy Hydro has the right to divert, store and use that water to generate electricity and for purposes that are incidental or related to the generation of electricity, and the obligation to release that water from storage.

3.4 Commonwealth approvals

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the primary piece of Commonwealth legislation that governs the protection of the environment.

Relevantly, under the Commonwealth EPBC Act:

- a person is prohibited from taking an action that has, will have or is likely to have a significant impact on certain aspects of the environment (being matters of national environmental significance (MNES)); and
- the Commonwealth or a Commonwealth agency must not take inside or outside the Australian jurisdiction an action that has, will have or is likely to have a significant impact on the environment inside or outside the Australian jurisdiction;
- without the Commonwealth Minister for the Environment having given approval under the EPBC Act or decided that approval is not needed.

Snowy Hydro became a 'Commonwealth agency' only for the purposes of the EPBC Act on 2 July 2018, following the acquisition of all remaining shares by the Commonwealth from the States of NSW and Victoria.

Snowy 2.0 Main Works is a controlled action and has been assessed by accredited assessment process under Part 5, Division 5.2 of the EP&A Act. On 29 June 2020 the Minister for the Environment provided approval (EPBC 2018/8322) for the Main Works under Section 130(1) and 133(1) of the EPBC Act subject to conditions

An assessment of the environmental impacts of the proposed modification, including to MNES, is provided in Section 4 of this report. Based on the assessment of impacts, Modification 1 is not expected to have any significant impacts on MNES or the environment generally and therefore has not been referred to the Department of Agriculture, Water and Environment (DAWE) under the EPBC Act.

3.5 NSW planning 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).

3.5.1 Critical State Significant Infrastructure

Section 5.12 of the EP&A Act provides for the declaration of 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 to the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP).

Snowy 2.0 is development of the kind specified in clause 9(3) of Schedule 5 to the SRD SEPP and, accordingly, may be carried out without 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.

3.5.2 Approval pathway

Snowy Hydro is seeking to modify infrastructure approval CSSI 9687 pursuant to section 5.25 of the EP&A Act, which includes the following relevant provisions:

5.25 Modification of Minister's approval

(1) In this section:

Minister's approval *means an approval to carry out State significant infrastructure under this Division, and includes an approval granted on the determination of a staged infrastructure application.*

Modification *of an approval means changing the terms of the approval, including revoking or varying a condition of the approval or imposing an additional condition on the approval.*

(2) The proponent may request the Minister to modify the Minister's approval for State significant infrastructure. The Minister's approval for a modification is not required if the infrastructure as modified will be consistent with the existing approval under this Division.

(3) The request for the Minister's approval is to be lodged with the Planning Secretary. The Planning Secretary may notify the proponent of environmental assessment requirements with respect to the proposed modification that the proponent must comply with before the matter will be considered by the Minister.

(4) The Minister may modify the approval (with or without conditions) or disapprove of the modification.

Snowy Hydro met with DPIE on 10 August 2021 to notify the Department of its intention to lodge an application for a modification to the Main Works approval and proposed assessment methodologies for the likely key environmental impacts. This report is intended to accompany the application for Modification 1 and provides an environmental impact assessment of the proposed works.

Snowy Hydro considers that the application is generally consistent with the approved Project but can be characterised as a modification to the Main Works approval, given it involves a minor change to the way approved services would be delivered between construction areas within the Project, no additional clearing over that already approved for the Project and would result in a potential reduction in impact during the construction of Marica Road West

3.5.3 Other state approvals and licences

Table 3.1 summarises Snowy Hydro's consideration of Modification 1 against other NSW regulatory requirements, including those required outside of the EP&A Act. Although EPIs do not apply to SSI or CSSI due to the effect of section 5.22(2) of the EP&A Act, this report considers the compliance of the proposed modification with the instruments that would have applied to the Main Works project area. The requirements of the Biodiversity Conservation Act 2016 are addressed in Chapter 4.

Table 3.1 Consideration of other regulatory requirements

Approvals not required under section 5.23	Required for modification	Consideration
A permit under section 201, 205 or 219 of the NSW *Fisheries Management Act 1994* (FM Act)	Relevant but not required	A permit under section 201, 205 or 219 of the NSW *Fisheries Management Act 1994* (FM Act)

Table 3.1 Consideration of other regulatory requirements

Approvals not required under section 5.23	Required for modification	Consideration
An approval under Part 4 or an excavation permit under section 139 of the NSW *Heritage Act 1977*	Relevant but not required	An approval under Part 4 or an excavation permit under section 139 of the NSW *Heritage Act 1977*
An Aboriginal heritage impact permit under section 90 of the NSW *National Parks and Wildlife Act 1974*	Relevant but not required	An Aboriginal heritage impact permit under section 90 of the NSW *National Parks and Wildlife Act 1974*
A bushfire safety authority under section 100B of the NSW *Rural Fires Act 1997*	Relevant but not required	A bushfire safety authority under section 100B of the NSW *Rural Fires Act 1997*
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*	Relevant but not required	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*
Approvals required to be issued consistently under section 5.24		
An aquaculture permit under section 114 of the NSW *Fisheries Management Act 1994*	No	The Project does not involve aquaculture.
Approval under section 15 of the NSW *Mine Subsidence Compensation Act 1961*	No	The Project is not within a mine subsidence district.
A mining lease under the NSW *Mining Act 1992*	No	The Project does not involve mining.
A production lease under the NSW *Petroleum (Onshore) Act 1991*	No	The Project does not involve petroleum production.
An environment protection licence (EPL) under Chapter 3 of the NSW *Protection of the Environment Operations Act 1997*	Yes	EPL 21266 was issued by the EPA on 9 May 2019 and will apply or be expanded as necessary for the applicable scheduled activities the subject of this modification application. 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.
A consent under section 138 of the NSW *Roads Act 1993*	Yes	The Project involves interaction and works within public road reserves.
A licence under the NSW *Pipelines Act 1967*	No	The Project involves the construction of pipelines for construction water supply, but would not trigger any requirement to hold a licence under the NSW *Pipelines Act 1967.*

4 Environmental impact assessment

As proposed by Snowy Hydro in its letter to DPIE dated 19 August 2021, no new environmental assessments are deemed to be required to be undertaken for this modification application, given the minor nature of the proposed works.

EMM has undertaken a scoping exercise to determine the level of assessment that would be required to support the proposed modification. HDD is a well understood and well managed activity which is already being undertaken by Snowy Hydro in other areas of the Project. The proposed works subject to the modification are relatively minor, and the potential impacts of the Project overall would not be expected to materially change when compared to the impacts already assessed and approved.

There is a well established suite of controls that are implemented to manage the impacts of HDD in other areas of the Project. Given this, the scoping exercise has found that no new assessments would be required to support the modification application.

Notwithstanding, Snowy Hydro has undertaken a risk review, and based on the outcomes of the review, has undertaken due diligence assessments for the following issues: groundwater, surface water, geodiversity, terrestrial ecology, aquatic ecology, noise, air quality and waste management. This section outlines the key environmental aspects as identified during the risk assessment. Table 4.1 details a summary of the potential impacts, and any additional corresponding mitigation measures that may be required to avoid and minimise the resulting impacts.

Table 4.1 Summary of assessment

Environmental aspect	Consideration	Mitigation measures
Groundwater	A review of the existing environment and potential groundwater impacts was prepared and is provided in technical memorandum for groundwater assessment provided in Appendix A. The assessment found that the proposed drilling will intercept the poorly productive fractured rock groundwater system, hosted within the Ravine Beds, Boraig Group and Byron Range Group at an average depth of 50 metres below ground level (mBGL). Groundwater is known to occur at depths starting at between 10-15 mBGL across the Project footprint and as such, minor inflows to subsurface workings are expected during construction. There are no sensitive environmental receivers that are either proportionally or entirely dependent on access to groundwater within the area directly impacted by the proposal, and therefore any unforeseen drawdown impacts arising from construction activities are not expected to have an impact on the environment in this respect. The drilling methodology will use biodegrable, environmentally friendly additives which are unlikely to alter the groundwater chemistry or present a potential source of contamination during construction works.	The following management/mitigation measures are consistent with the approved groundwater management plan and would be implemented to address any residual impacts and compliance obligations associated with the proposal: • All groundwater intercepted during the drilling works will be metered, diverted to the MAT water treatment plant and disposed of in accordance with the approved Environmental Protection Licences. All intercepted 'take' will be reported in accordance with the licence requirements of existing Water Access Licences (40AL418132, 40AL418133). • All contamination sources, such as solvents, fuels and oils required to facilitate construction activities will be bunded and stored in accordance with relevant material safety data sheet advice. • All drill holes will be sealed at the bottom following the completion of the drilling works and thereby prevent further flow of intercepted groundwater. • Groundwater level and water quality triggers established for BH8108, BH8106 and BH5105 in the approved Snowy 2.0 Main Works Groundwater Management Plan will apply to the proposal, with corresponding Trigger Action Response Plans applicable to construction activities for this work.

Table 4.1 Summary of assessment

Environmental aspect	Consideration	Mitigation measures
Surface water	Drilling is expected to generate 900 kL of waste water per day over the 100 day period of drilling. This water would be supplied from the existing construction water supply, and no new water sources would be required to supply the proposed HDD activities. Consistent with the controls for process water management in the approved Site Water Management Plan, drilling water would be captured, contained and reused as much as practicable in order to avoid further treatment and discharge into surrounding water environments. As around 75% of drilling water is anticipated to be recycled as process water, the remaining 25% would require careful management to ensure it is not discharged prior to its treatment. Water from the drilling operations would be directed to the on-site retention basin and re-used in the drilling process and for other on-site purposes. Surplus water would be preferentially used on site for dust suppression, or if it cannot be used on-site would be piped to the process water treatment plant at the MAT where it would be combined with process water from other construction activities. Licensed discharge locations in accordance with the Project EPL 21266 exist in both Talbingo and Tantangara reservoirs for the effluent waste streams from the wastewater and process water treatment plants.	• The approved water management hierarchy would continue to be implemented throughout the proposed HDD activities. This includes whereby surplus water is re-used as process water, or for dust suppression at the construction sites. Excess water not required for these purposes is allowed to be discharged under licence conditions at Talbingo Reservoir following treatment. • The drill pads would be developed so that clean water runoff from upslope areas and watercourses is diverted. They would also include appropriate erosion and sediment controls, source controls to isolate potentially polluting construction activities from the stormwater system and stormwater basins to manage runoff from construction pads. • The activities would be undertaken in strict observance of the conditions of approval, the Surface Water Management Plan and the EPL

Table 4.1 Summary of assessment

Environmental aspect	Consideration	Mitigation measures
Waste	The proposed HDD is expected to produce a total of around 2,500 m^3 of spoil considering all boreholes. This material would be managed by loading it on to trucks at the western drill pad site and transporting it to the approved spoil locations using both the internal construction road network and the external road network. Spoil generated from the proposed modification would be handled in the same way as spoil from mobilisation and establishment activities and construction of permanent assets in the Talbingo area including the MAT, ECVT, Main Yard and Marica West Road. The approved uses include: • Fill material for the MAT, ECVT and Talbingo and Tantangara portals (permanent operational pads and structures); • selected fill and tunnel and shaft backfill and rock armour; • permanent roads in the project area; and • transport to designated emplacement areas at Main Yard, GF01 and Ravine Bay. The proposed modification would not change these approved uses of the spoil.	Spoil generated from the Talbingo zone will temporarily stockpiled within the construction footprint then loaded on to trucks and transported to designated permanent emplacement areas at GF01 or Main Yard. Ongoing testing of spoil material would be undertaken during the HDD works to determine the most appropriate end-use of the spoil.

Table 4.1 Summary of assessment

Environmental aspect	Consideration	Mitigation measures
Contamination	Spoil generated by the drilling is expected to by geochemically consistent with the rock types excavated approved for disposal in the Talbingo spoil management zone as it is from the same geological units (Byron Range Group, Boraig Group and Ravine Beds) as other Project excavations in this location including tunnelling for the MAT and tailrace, road construction and portal establishment. Spoil would be collected and stored at the drill pad near the MAT and would then be subject to the requirements for testing, classification, handling, temporary storage and disposal of spoil in the approved spoil management plan. If spoil generated during the works is found to be suitable for disposal within the approved emplacement areas it would be disposed at either GF01 or Main Yard. Any materials found to be re-active, contain naturally occurring asbestos (NOA) or unsuitable would be disposed according to the approved management of those spoil types.	Extracted spoil which is proposed to be transported offsite would be tested and characterised in accordance with the approved Spoil Management Plan. The protocols that would be applied include on-site testing of the material and classification into one of the following categories: • Non-reactive spoil suitable for use or placement within the Project, or elsewhere within Kosciuszko National Park. • Reactive spoil suitable for use or placement within the Project with appropriate treatment (if required) and engineering and environmental controls. • Naturally occurring asbestos (both reactive or non-reactive) spoil to be placed within designated encapsulation cells at the Tantangara Peninsula emplacement area with appropriate engineering and environmental controls. • Unsuitable spoil to be disposed of off-site to facilities lawfully permitted to receive it (waste). If spoil generated during the works is found to be suitable for disposal within the approved emplacement areas it would be disposed at either GF01 or Main Yard. Any materials found to be re-active, contain NOA or unsuitable would be disposed according to the approved management of those spoil types.

Table 4.1 Summary of assessment

Environmental aspect	Consideration	Mitigation measures
Geodiversity	The works are not in the vicinity of any known geodiversity features and would have no impacts on the geodiversity values of the KNP. The Main Works EIS involved a comprehensive assessment of known and potential geodiversity features in the project area. The sites identified in the EIS geodiversity assessment were reviewed in relation to the proposed works. The Cenozoic Geodiversity Assessment (Troedson 2019) identified known and potential geodiversity features from the Cenozoic era including deposits for periglacial block streams and tufa in the Snowy 2.0 project area none of which occur near the proposed works. The nearest block stream is located approximately 5 km away on Lobs Hole Ravine Road and the nearest Tufa deposits approximately 2 km away in Cave Gully and Lick Hole Gully. The Paleozoic Geodiversity Assessment (Percival 2019) identified known and potential geodiversity features from the Paleozoic era including karst and fossil features. The nearest Paleozoic geodiversity features to the works are the Lobs Hole Ravine Road fossil section approximately 2.5 km away and the Milk Shanty formation at the Walls, approximately 2 km away. The Yarrangobilly Caves are also distant to the works at approximately 7 km from the proposed drilling.	The Project has strict measures in place to ensure geodiversity impacts are limited. The proposed drilling will be sufficiently distanced from the identified known and potential geodiversity features. Spoil transport will be undertaken in accordance with strict protocols to ensure that truck movements do not affect the identified known geodiversity features Spoil generated from the Marica zone will temporarily stockpiled within the construction footprint then loaded on to trucks and transported to Rock Forest via the Snowy Mountains Highway.
Terrestrial ecology	The eastern drill pad would be within the approved disturbance area for the Marica Road West construction zone. It would cover an area of 40 m x 100 m. This area has been previously subject to vegetation clearing and is approved to be developed as a construction area for the Main Works. As establishment and use of the eastern drill pad would not involve any additional vegetation clearing to that assessed in the previous biodiversity assessments for the Main Works no additional impacts to any threatened terrestrial species are expected to occur due to the work. The western drill pad would be located within the approved construction envelope and just outside the indicative disturbance area that was presented in the Main Works PIR-RTS. This western drill pad would also cover an area of 40 m x 100 m. While the drill pad is partially outside the approved indicative disturbance area, it would remain completely within the approved construction envelope and therefore any clearing required for the western drill pad has already been contemplated and anticipated to be cleared and has been factored into the limits on disturbance area and native vegetation clearing allowed in the existing project approval.	• Apply the controls outlined in the biodiversity management plan for drilling operations to the HDD works. • Minimise clearing at the western drill pad by ensuring that the drill pad area is marked out and no go zones are identified. • Implement the existing clearing protocol in the biodiversity management plan for the development of the western drill pad. This includes undertaking a pre-clearing survey prior to the commencement of clearing. The site inspection will flag key habitat features, and identify nearby habitat suitable for the release of any wildlife that may be encountered during clearing works.

Table 4.1 Summary of assessment

Environmental aspect	Consideration	Mitigation measures
	The HDD would be undertaken underground and would therefore not affect terrestrial ecology. There are no high priority Groundwater Dependent Ecosystems located in the area proposed to be used for the HDD activities. Notwithstanding, the GDE monitoring processes approved for the Project would be implemented for unforeseen impacts. The strict clearing controls in place for the Project would be implemented for the drill pad site establishment. It was anticipated that the disturbance area for the Project would be refined as the Project design evolved and the approval therefore allowed for variation to the disturbance area under the following conditions: • the disturbance area is to be contained wholly within the defined construction envelope; and • the native vegetation clearing impact of the final disturbance area does not exceed 425 ha for the Main Works Project. It would therefore remain the responsibility of Snowy Hydro and FGJV to ensure that the clearing limits in the approval are not exceeded. It is anticipated that the small amount of clearing for the western drill pad would be within the allowed limits. Therefore, and in accordance with Section 7.17 of the BC Act, Snowy Hydro is satisfied that a further biodiversity development assessment report is not required to be submitted for the proposed modification as the modification will not increase the approved impact on biodiversity values.	
Aquatic ecology	The proposed modification is unlikely to have any additional impact to aquatic ecology. However the potential discharge of water from the drill pads to the Talbingo reservoir would be carefully managed in accordance with water treatment protocols to ensure discharges do not affect aquatic ecology in the receiving environment.	Manage discharges in accordance with licence conditions and protocols set out in the Surface Water Management Plan.

Table 4.1 Summary of assessment

Environmental aspect	Consideration	Mitigation measures
Aboriginal heritage	The Aboriginal cultural heritage impacts are unlikely to be any different to that previously assessed and approved for the Project. The eastern drill pad was extensively surveyed for the Main Works EIS. This assessment found that the Marica Road West area has low potential for cultural heritage significance. The approved Heritage Management Plan would continue to apply to the proposed works. In the event that any heritage items, or potential/suspected heritage items, are identified during the course of the development of the drill pads or the HDD works, the works in the immediate vicinity of the find would cease and Project heritage specialist and environmental manager notified. Works will not recommence in that area until all necessary management measures are implemented, and a heritage clearance certificate is provided by the heritage specialist.	The works would be undertaken in accordance with the approved heritage management plan, which includes unexpected finds protocols and mitigation measures, including reporting protocols and relevant stop work protocols (ie if a burial site or skeletal remains are found).
Historic heritage	The studies undertaken for the Main Works Project did not identify any items of historic heritage in the areas that would be required to be used for the proposed modification. The activities would therefore not increase the overall impacts to historic heritage previously assessed and approved.	The works would be undertaken in accordance with the approved heritage management plan, which includes unexpected finds protocols and mitigation measures, including reporting protocols.
Noise and vibration	There would be no residential or recreational receivers near the proposed HDD or drill pad sites during the works. The approved Project anticipated construction activities with comparable plant and equipment at the drill pads where the drilling equipment would be sited. The noise and vibration impacts of the proposed modification are not expected to affect the recreational amenity of the KNP.	The HDD works will be undertaken underground and the site would use best endeavours to minimise noise from the drill pad sites.
Air quality	The air quality impacts of the proposed construction works would not be materially different to that already assessed and approved for the Main Works Project. This is because construction activities were always anticipated in the areas where the construction zones and disturbance would be located. Standard air quality measures for managing impacts at construction sites would be implemented, including minimising the disturbance area and the use of water carts as necessary. Air quality impacts at the spoil management locations is not expected to increase, given the small amount of spoil that would require to be handled.	• The drill pad sites would be sized to the minimum extent practicable to minimise surface disturbance and limit dust emissions. • HDD activities would be undertaken to minimise dust generation. • Water carts would be used as necessary to minimise dust emissions at the drill pads and to prevent wind erosion from spoil disposal areas. • The spoil from the HDD works would be handled in accordance with the approved spoil management plan

Table 4.1 Summary of assessment

Environmental aspect	Consideration	Mitigation measures
Visual	The introduction of the HDD methodology will remove the potential for the installation of above ground powerlines, cables and piping between Marica and the MAT portal. From a visual impact perspective, the adoption of HDD method will ensure the visual impacts of temporary and permanent services in this section of the Project will be minimised. The drill pad sites would be in areas where construction sites were already anticipated to be developed. Therefore the visual impact of the drill pads would not be materially different to that already assessed and approved for the Project. The HDD works would be temporary, and run for around 100 days. The drilling would be required to be undertaken continuously, which would require site lighting. Following the completion of drilling the rig would be demobilised and following the installation of service cables the infrastructure required for the drilling at the drill pads would be taken away. Overall, the proposed modification when compared to the approved project would result in reduced visual impacts due to the reduced clearing requirements for construction of Marica Road West.	• Snowy Hydro and FGJV would use its best endeavours to minimise the visual impacts of the proposed modification. • Site lighting would comply with AS Australian Standard 4282 (AS4282) *Control of Obtrusive Effects of Outdoor Lighting.* • The controls described to minimise visual impacts set out on the Visual Impact Management Plan would apply to the proposed works.
Social and recreation	The proposed modification will utilise existing areas already disturbed and/or contemplated to be disturbed for construction of the Project. These areas will be managed so that no recreational access would be allowed. Therefore it is not expected that the proposed modification will result in any impacts to the social and recreational values of the KNP or further limit the community enjoyment of the KNP. The workforce carrying out the HDD would be accommodated within the existing Project construction accommodation camps and would not result in any increase to the peak construction workforce. The works would be short-term and are not expected to result in any impacts to demand for infrastructure and services in the locality.	Comply with existing conditions of approval, including the Recreation Management Plan. Recreation offset payment has already been made to NPWS to offset the recreational impacts of the Main Works Project.

Table 4.1 Summary of assessment

Environmental aspect	Consideration	Mitigation measures
Traffic	The traffic impacts of the proposed modification are unlikely to be materially different to the traffic impacts already assessed and approved. This is because the traffic movements would be strictly controlled at the drill pad sites, where there would be appropriate turning areas provided. All traffic movements related to the proposed works would use transport routes already identified for the Main Works project. There are no roadworks or upgrades required to facilitate the proposal. The traffic movements would be limited to around 15 heavy vehicle trips during site establishment and demobilisation. Once drilling has commenced vehicle movements associated with the work will be within the site internal road network only for the transport of spoil, construction materials and equipment between the drill pads and the existing project construction facilities.	• The current Vehicle Management Plan will detail internal haulage routes, vehicle types and traffic controls to ensure the safe and efficient movement of vehicles (including those related to transport of spoil) across the Project. • Spoil will be transported from the MAT portal to Main Yard or GF01 emplacement areas via the Project internal road network. • Details on external truck movements are presented in the Traffic Management Plan (S2-FGJV-ENV-PLN0008) will be complied with throughout construction.

5 Conclusion

Snowy Hydro is seeking to modify its CSSI approval for the Snowy 2.0 Main Works Project (CSSI 9687). The proposed modification has been made under Section 5.25 of the EP&A Act.

The proposed modification involves undertaking HDD to install service cabling between the MAT Portal and the Marica area. To facilitate the HDD, a launch drill pad and a receival drill pad would also require to be developed, each with a range of minor ancillary infrastructure. There are no other works proposed for the Project other than these minor works.

The HDD would drill a 2.2 km series of boreholes to facilitate the installation of water pipelines, and power and communications cabling.

The proposed modification would enable a range of benefits to be realised for the Project. In terms of impacts, the proposed works will avoid the need to cable trench the services cables through challenging terrain on Marica West Road. In terms of operational benefits, the proposed modification would ensure that almost 5 km of cabling would not need to be installed in the road alignment of Marica Road West. Installing cabling within the boreholes will also provide long-term security of operations, and protect the services infrastructure from natural events such as bushfire.

It will also be far more efficient to the overall project delivery to install the cabling within the proposed boreholes.

The HDD and drill pad works would not result in significant impacts. The impact assessment for the proposal has concluded that the works would be able to be undertaken within the strict regulatory framework set out in the conditions of approval.

Water needed for the HDD operations would be supplied from existing construction water sources. Waste water from the drilling would be stored in retention basins and re-used. Surplus water would be treated with other construction process water and discharged if necessary under existing licenced conditions. Groundwater impacts would be negligible, given that the HDD would not intercept high-yielding aquifers.

Vegetation clearing would be required for one of the two drill pad sites. However this clearing has already been considered, approved and compensated for under the existing conditions of approval.

All other impacts would be negligible in the context of the existing Project construction of the Main Works Project and would be managed in accordance with the strict controls set out in the approved management plans.

Therefore, given the range of benefits documented in this Modification Report and the likely level of impact that would result from the proposed works, the proposed modification is considered to be in the public interest and should be approved.

Appendix A

Groundwater assessment

Memorandum

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19 August 2021

To: Ms Nicole Brewer
From: Sean Cassidy
Subject: E210745 – Snowy 2.0 HDD modification – Marica West – Groundwater Assessment

Dear Nicole,

This short technical memorandum presents an assessment of impacts to groundwater resources arising from the proposed HDD modification (the proposal).

1 Overview

The proposal seeks to amend the construction methodology for installation of services between the main access tunnel (MAT) portal to the Marica camp, as described in EMM 2021a and shown on Figure 1.

The principal activity assessed in this memo is the proposed subsurface construction activities, specifically the drilling works. The proposal will involve the drilling of seven (7) inclined holes of between 350 – 450 millimetres (mm) in diameter over a distance of approximately 2.2 km. Drilling works will occur at an average depth of 50 metres below ground level (mBGL) and are likely to intercept groundwater.

2 Existing environment

The existing environment, characterised in the Snowy 2.0 Main Works EIS (ref) and intercepted by this proposal, is dominated by steep terrain, bisected by a north-east – south-west trending escarpment which separates the low-lying Ravine area from the elevated plateau region. The escarpment is dominated by tall open forest (Ribbon Gum – PCT 300) which is known to have an opportunistic dependence on groundwater.

The groundwater units within the project area are defined as:

- a low permeability fractured rock groundwater system associated with the weathered and oxidised shallow component of the geology across the plateau area; and
- a low permeability regional fractured rock groundwater system associated with the volcanic and metasedimentary rock across the plateau and ravine areas.

The fractured rock volcanic and metasedimentary rock is the main hydrogeological unit in the project area. The unit is accessed opportunistically by various environmental users, including deep rooted Eucalypt species and gaining creeks and rivers. There are no recorded landholder bores located within the project area.

Reported yields from test production and operational production bores (owned by Snowy Hydro) within the project area generally vary between 0.5 and 4 L/s.

3 Impact assessment

The proposal will intercept the poorly productive fractured rock groundwater system, hosted within the Ravine Beds, Boraig Group and Byron Range Group at an average depth of 20 mBGL. Groundwater is known to occur at depths of between 10-15 mBGL across the project footprint and as such, minor inflows to subsurface workings are expected during construction.

There are no sensitive environmental receivers that are either proportionally or entirely dependent on access to groundwater within the area directly impacted by the proposal, and therefore any unforeseen drawdown impacts arising from construction activities are not expected to have an impact on the environment in this respect.

The drilling methodology will use biodegrable, environmentally friendly additives which are unlikely to alter the groundwater chemistry or present a potential source of contamination during construction works.

4 Management/mitigation

The following management/mitigation measures are proposed to address any residual impacts and compliance obligations associated with the proposal:

- All groundwater intercepted during the drilling works will be metered, diverted to the MAT water treatment plant and disposed of in accordance with the approved Environmental Protection Licences. All intercepted 'take' will be reported in accordance with the licence requirements of existing Water Access Licences (40AL418132, 40AL418133).
- All contamination sources, such as solvents, fuels and oils required to facilitate construction activities will be bunded and stored in accordance with relevant material safety data sheet advice.
- All drill holes will be sealed at the bottom following the completion of the drilling works and thereby prevent further flow of intercepted groundwater.
- Groundwater level and water quality triggers established for BH8108, BH8106 and BH5105 in the approved Snowy 2.0 Main Works Groundwater Management Plan will apply to the proposal, with corresponding Trigger Action Response Plans applicable to construction activities for this work.

5 Closing

Please feel free to contact me on 0431 413 790 if you have any questions or require further clarification.

Yours sincerely

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