Appendix E.
Mitigation measures

Shoalhaven Hydro Expansion Project - Main Works Environmental Impact Statement

SSI-10033

Origin Energy Eraring Pty Ltd

November 2022

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Appendix E. Mitigation measures

This Appendix provides a consolidated and comprehensive set of environmental mitigation measures to avoid, mitigate and/or manage the potential impacts of the Project. In the event of an inconsistency, this table supersedes the measures presented elsewhere in the Environmental Impact Statement (EIS).

E.1 Project environmental commitments

E.1.1 Ongoing design strategy

As detailed in **Section 3.2**, detailed design for the Project is yet to be completed. The EIS is based on a current design status for each Project component which may be amended through the detailed design process. Construction methods may also vary subject to design refinements and the selection of the construction contractor.

The assessment of the Project within the EIS is based on consideration of reasonable worse case environmental impacts to allow flexibility in design and construction methodology. The ongoing design of Project components would deliver the identified performance outcomes for the Project as identified in the EIS.

Following the engagement of a contractor, a risk assessment would be completed on the actual methods to be implemented and environmental management plans prepared that incorporates the Project commitments and conditions of approval. Further consultation with relevant agencies would be undertaken and necessary approvals of final designs and methods sought. The risk assessments, final design plans and management plans would be used to confirm that no greater impact than that assessed in this EIS would occur.

E.1.2 Construction environmental management strategy

Origin proposes to develop an overarching Construction Environmental Management Strategy (CEMS) for the Project that would be adopted and implemented through the development of contractor's construction environmental management plan (CEMP) and sub-plans. The CEMS would document the required environmental performance outcomes, management commitments and conditions of approval for the Project. The contractor's CEMP and sub-plans would document reasonable and feasible measures to achieve established performance expectations and compliance obligations.

E.1.3 Management plans

The following management plans are proposed to document detailed design and selected construction methods and the necessary consultation requirements such that impacts remain consistent with those assessed in the EIS:

- Environmental management strategy - Origin's approach to environmental management and compliance oversight
- Stakeholder and Community Engagement Plan - prepared to guide communication and engagement activities to ensure the timely and accurate provision of information to the community and stakeholders during construction
- Construction environmental management plan - Contractor's detailed environmental management processes and procedures for the Project
- Spoil management plan based on spoil management strategy in EIS to document and resolve spoil generation rates and volumes, haulage details, potential acid forming material testing and management, emplacement design and emplacement drainage and water management in consultation with WaterNSW and NSW Environment Protection Agency (EPA)
- Construction traffic management plan - to confirm traffic controls, over size and over mass vehicle licencing, detailed route analysis based on Contractor's construction methodology in consultation with Transport for NSW, Council, WaterNSW and NSW National Parks and Wildlife Service (NPWS)

- Noise and vibration management plan including blast management plan adopting contractor construction methodology and confirming predicted noise impacts and reasonable and feasible mitigation measures to be adopted in consultation with Water NSW and EPA
- Construction soil and water management plan including first iteration of progressive erosion and sediment control plans, dewatering management plan including water treatment plant details and results of discharge impact assessment to establish discharge criteria in consultation with WaterNSW and EPA
- Accommodation strategy in consultation with Council and NSW Department of Planning and Environment
- Biodiversity management plan including rehabilitation management plan in consultation with BCS, WaterNSW and NPWS
- Cultural Heritage Management Plan in consultation with Registered Aboriginal Parties, Heritage NSW, NPW and WaterNSW
- Construction Safety Plan including Bush Fire Emergency Management and Evacuation Plan and Emergency Response Plan in consultation with NSW Rural Fire Service (RFS), NPWS and WaterNSW
- Waste management plan.

E.1.4 Operational environmental management plan

An Operational Environmental Management Plan (OEMP) would be prepared for the Project and would document the required environmental performance outcomes, management commitments and conditions of approval for the operation of the Project and how compliance would be monitored, document and reported.

E.2 Consolidated summary of environmental management measures

A summary of environmental management measures for the Project are shown in **Table E-1**. Given the design status of the Project, mitigation measures are largely management based or prescriptive.

Table E -1. Compiled list of EIS mitigation measures

Reference	Impact	Mitigation Measure	Timing
Biodiversity			
BIO1	Impacts to biodiversity	A Biodiversity Management Plan (BMP) will be prepared and implemented. The BMP will be prepared by a qualified ecologist and include a plan for implementing, evaluating and reporting on the effectiveness of all mitigation measures outlined in this BDAR, but not be limited to these measures. The overarching framework of the BMP will be based on SMART principals (Specific, Measurable, Achievable, Realistic, Timebound) and will focus on monitoring the performance of measures and informing any adaptive management required based on performance triggers for remedial action or additional offsets where further impacts are identified. The BMP will detail required mitigation actions for the Project for all biodiversity, including indirect, and prescribed impacts..	Construction
BIO2	Removal of native vegetation and habitat	Mitigation measures for avoiding harm to animals and threatened hollow dependent fauna during pre-clearing survey and any translocation activities include: ▪ Pre-clearing surveys to be conducted with a suitably qualified and licenced wildlife handler to rescue and re-locate fauna ▪ Protocol for the removal of hollow bearing trees - hollow inspection /lowering limbs to the ground ▪ Protocol to mitigate harm to hollow dependent threatened fauna known or with potential to be utilising breeding habitat in the Project area and disturbance footprint, e.g. Gang-gang Cockatoo (*Callocephalon fimbriatum*), Glossy Black-cockatoo (*Calyptorhynchus lathami*), Eastern Pygmy-possum *(Cercartetus nanus)*, and Greater Glider (Petauroides volans).	Pre-clearing
BIO3	Pre-clearance surveys	Pre-clearance surveys will be undertaken prior to tree felling works by suitably qualified and experienced persons/personnel and will include: ▪ Scheduling the clearing works for a time of year to avoid the breeding seasons of identified potential threatened species and other threatened fauna that may breed on site, where practicable. In the event that works cannot be scheduled outside of breeding times, additional controls will be implemented prior to clearing to further manage the risk. This could include, but is not limited to, additional pre-clearance surveillance of potential den tree (stag watching or cameras) and sectional removal of suspected habitat trees ▪ Comparative habitat assessments conducted on clearing sites and proposed release sites to ensure that habitat features are available in the released sites	Pre-clearing

Reference	Impact	Mitigation Measure	Timing
		▪ Release sites identified and mapped prior to clearing and all appropriate approvals granted by the landholders ▪ The demarcation of areas approved for clearing to reduce risk of accidental clearing ▪ Habitat resources and habitat trees will be identified and marked. Other habitat features to be identified include fallen timber/hollow logs, burrows, and boulder piles ▪ The identification of potential presence of threatened flora and fauna species, endangered populations and Threatened Ecological Communities (TECs) ▪ The identification of threatened species or habitat features that are suitable for translocation or salvage ▪ Disturbance activities will be targeted to specific times of the year to minimise impacts to threatened species' usage of habitat features for breeding and roosting, where practicable.	
BIO4	Habitat clearing	Tree felling will be completed as close to the completion of pre-clearance surveys as practicable to limit the potential for new issues to arise (such as new active nests being built). Tree felling supervision will be undertaken by an appropriately qualified and experienced person after pre-clearance surveys have identified potential habitat features. The tree-felling process will include the following: Prior to Felling Habitat Trees: ▪ Completion of actions recommended from the pre-clearing surveys, including (but not limited to) salvage of identified habitat features, additional surveys to determine threatened fauna usage of the area (if required), identification of active dens or burrows, any actions required to discourage fauna occupation and weed or feral fauna management requirements ▪ Removal of non-habitat trees/vegetation as close to the habitat tree felling date as possible in order to create disturbance to discourage fauna usage of the habitat trees ▪ Shaking of habitat trees (with heavy machinery) as appropriate to encourage fauna to abandon trees. On the Day of Felling Habitat Trees: ▪ Tree clearing should not be conducted above 35°C for the interests of animal welfare ▪ Communication with rescue agencies and local veterinarians prior to the commencement of clearing to confirm the availability of resources for any captured/injured fauna that is unable to be released	Pre-clearing

Reference	Impact	Mitigation Measure	Timing
		▪ Clearing should be conducted sequentially and directionally towards areas of refuge to prevent the creation of vegetation islands ▪ All habitat trees will be subject to a visual inspection to survey for threatened species ▪ Trees previously identified as containing fauna will be shaken and then felled, providing no threatened species are identified ▪ The lowering of hollow-bearing trees will be done as gently as possible with heavy machinery ▪ If a threatened species is identified in a habitat tree on the day of felling, the supervising person is to advise the most appropriate method to minimise potential harm. This may include leaving the tree overnight, further shaking to encourage the animal to vacate the tree, gradual removal of branches to discourage ongoing use, soft felling of the tree with the animal in the tree, or measures to capture and relocate the animal to secure habitat ▪ Uninjured animals should be released on the day of capture into nearby suitable secure habitat and should not be held for extended periods of time ▪ Injured animals will be taken to the nearest veterinary clinic or wildlife carer as soon as possible for assessment and treatment ▪ Felled trees are to be rolled where appropriate so that the number of hollows blocked against the ground is minimised ▪ All felled habitat trees should remain in place for a least one night to allow any remaining fauna to escape ▪ Ensure that trees felled are positioned so that hollows are facing upwards and out to allow fauna to escape overnight ▪ Habitat features identified for translocation or salvage operations should be extracted and stored appropriately.	
BIO5	Gang-gang and Glossy Black-cockatoos	Specific measures to mitigate the impact to individual breeding pairs of Gang-gang cockatoo (*Callocephalon fimbriatum*) and Glossy Black-cockatoo (*Calyptorhynchus lathami*) (adults, chicks and eggs) will be confirmed. The pre-clearing protocol of breeding habitat for cockatoos needs to comprise: ▪ Hollow-bearing potential nest tree(s) is to be clearly identified on construction planning maps ▪ Hollow bearing tree(s) are to be removed outside the breeding season where practicable (April to August and Oct to Jan).	Pre-clearing

Reference	Impact	Mitigation Measure	Timing
		▪ A pre-clearing protocol will include inspection of the tree to determine if live cockatoos are present and potentially nesting. If nesting cockatoos are present, additional mitigation is to be implemented and could include clearing of identified potential habitat trees outside the breeding season and installation of nest boxes by a suitably qualified and experienced ecologist. Where nesting is identified as occurring at the proposed time of clearing, the subject trees are to be clearly marked as no-go zones and removal delayed until the chicks have fledged. There is to be no disturbance within 100 m of the tree, and disturbance between 100 -200 m is to be minimised. The removal of the tree must allow time for fauna to vacate the habitat.	
BIO6	Exclusion zones	The boundary of the clearing limits for each disturbance zone will be clearly marked on site by a surveyor before vegetation clearing commences: Exclusion zones, or 'No-Go' zones, will be clearly marked at the edge of the clearing zones to protect the vegetation to be retained outside the project from inadvertent direct impacts. These will be in place for pre-clearing, construction and remain in place until post-construction rehabilitation objectives have been met.	Pre-clearing, construction and early operation
BIO7	Staged Habitat Removal	A staged habitat removal process will be required for removal of habitat (hollow-bearing trees, habitat trees, and bushrock) Staged habitat removal minimises direct impacts on fauna by providing them with an opportunity to vacate hollows and relocate naturally. The process includes: ▪ Avoiding clearing during times when hollow-dependent fauna is breeding ▪ Contact vets and wildlife carers before works commence ▪ Ensure that licensed wildlife carers and/or ecologists are on site during habitat removal ▪ Adopt two staged removal clearing non-habitat first (e.g. shrubs, regrowth, ground cover and non-habitat trees). Allow at least 24 hours for fauna to vacate habitat before removing habitat trees ▪ Ensure wildlife carers and/or ecologists are present during removal of habitat trees, and that habitat trees are felled carefully, using equipment that allows habitat trees to be lowered to the ground with minimal impact ▪ A procedure for the ethical handling of injured or displaced fauna ▪ Record the effort and outcomes of the habitat removal process ▪ Save and reuse cleared habitat material	Construction

Reference	Impact	Mitigation Measure	Timing
		▪ Preparation of an '**Unexpected threatened species finds procedure**' to be implemented during construction and operation. Applies to all activities that have potential to impact upon threatened flora and fauna species which have not already been assessed and approved. Any threatened entities found in a location previously unknown during construction or operation must be immediately notified to NPWS ▪ Preparation of a **Fauna handling and rescue procedure** to be implemented during construction.	
BIO8	Impacts on water quality and hydrological processes	▪ Erosion and sedimentation will be managed through implementation of effective sediment control measures ▪ Disturbed areas will be stabilised to reduce erosion potential ▪ Only native indigenous species will be used for landscaping of disturbed surfaces ▪ Soil loss will be minimised by immediate stabilisation of exposed surfaces (e.g. use of Jute mesh and/or soil binder).	**Prior to construction and construction**
BIO9	Increase in weeds and disease pathogens	A weed monitoring and control program(s) will include the following: ▪ Identify, map, and remove all weeds before clearing for construction, and record location of weed and sprayed area for use in ongoing weed monitoring and management programs. ▪ Prepare a vehicle and machinery hygiene strategy and implement during construction. The strategy will include specific locations, timing and methods for removing soil and plant matter from vehicles and machinery. Ensure vehicle and machinery hygiene measures in the strategy are applied during construction. ▪ During the clearing works, weeds will be disposed and managed appropriately to stop the spread of weed species ▪ Wash down stations will be constructed at suitable locations to wash down vehicles and employee shoes to stop the spread of weeds, pathogens (including amphibian chytrid fungus, *Phytophthora cinnamomi* and exotic rust fungi) and the introduction of new species	Prior to construction and construction
BIO10	Increase in predatory and pest species	▪ Personal waste / refuse generated during construction will be stored appropriately in accessible bins and disposed at appropriate waste disposal facilities off-site. Any personal waste generated during operation will be removed from the site (including power station) and disposed in an appropriate waste facility ▪ A feral animal monitoring program will be developed and implemented based on performance triggers for adaptive management. Data will be shared with NPWS. Increased predator activity will trigger the need for predator control based on performance measures. Control will be implemented in consultation with NPWS.	During construction

Reference	Impact	Mitigation Measure	Timing
BIO11	Light impacts	▪ Directional lighting will be used for any permanent lighting required as part of the permanent infrastructure to minimise light spill as much as possible ▪ Artificial lighting required during construction in the early morning and late afternoon in winter or night periods will be minimised consistent with the requirements of Australian Standard 4282-1997 Control of the obtrusive effects of outdoor lighting.	Construction and operation
BIO12	Noise impacts	Minimise noise from equipment through measures such as: ▪ Selecting equipment with the lowest noise rating that meets task requirements and minimise operating loud machinery simultaneously in close proximity. For example, operating a jackhammer and concrete saw ▪ Keeping both stationary and mobile plant and equipment in good working condition (including mufflers, enclosures etc.) ▪ Avoid leaving engines running on standby when machinery is not being used.	Construction
BIO13	Dust pollution	Dust management and standards to control air quality will be implemented.	Construction
BIO14	Wildlife impacts from vehicle strike	Vehicle movements on internal access tracks will be limited to 20km/h speed limit implemented to reduce the risk of vehicle strike to fauna.	Construction and operation
Aboriginal heritage			
AH1	Potential impact to Promised Land Trail ST01 (AHIMS ID 52-4-0730)	An exclusion zone and fencing with a 10m buffer will be established around AHIMS ID 52-4-0730.	Prior to construction
AH2	Harm to Bendeela Hydro AS01 (AHIMS ID 52-4-0729)	Salvage excavations will take place prior to any impacts to Bendeela Hydro AS01 (AHIMS ID 52-4-0729). The salvage excavation will be carried out as described in the ACHAR (Appendix G) to record the full extent of the intact artefact concentration.	Prior to construction
AH3	Impacts on Aboriginal heritage during construction	A Cultural Heritage Management Plan (CHMP) will be developed and implemented to management Aboriginal objects recovered through the testing and the salvage excavation program.	Construction

Reference	Impact	Mitigation Measure	Timing
		The long-term storage of any recovered Aboriginal objects will be developed during the completion of the CHMP, in consultation with the RAPs and other stakeholders including WaterNSW, but is likely to include (in preferential order): ▪ Re-burial on site, in an appropriate location in the vicinity of the Project ▪ Lodged with a RAP under a Care and Control Agreement ▪ Deposition with the Australian Museum. The CHMP will be provided to WaterNSW for review and to consult and negotiate on potential locations to rebury Aboriginal objects on WaterNSW land.	
AH4	Unexpected finds	The unexpected finds procedure in the ACHAR will be followed for any unidentified Aboriginal heritage objects found during the works. If suspected human remains are located during any stage of the project, work should stop immediately, and the NSW Police will be notified. Heritage NSW will be notified if the remains are found to be Ancestral Aboriginal remains.	Construction and operation
AH5	Changes to the Project area	If changes are made to the Project to include impacts outside the disturbance area as delineated in ACHAR, further archaeological investigation will need to be conducted.	Construction
Historical heritage			
HH1	Unexpected historical archaeology	Should any unexpected historical heritage, including archaeological relics, be uncovered during the course of the works, works will stop, and the area cordoned off. If any heritage items (either on the surface or buried archaeological items) are discovered on land in the ownership of WaterNSW. WaterNSW must be notified about the discovery. A qualified archaeologist and, if necessary, Heritage NSW will be contacted to assess significance and advise on further requirements before work can recommence.	Construction
HH2	Historical heritage items	Where feasible and reasonable the design and construction planning will avoid or minimise incidental physical impacts to historical heritage. This includes the following site-specific management measures at the heritage listed Hampden Bridge: ▪ Ensure the existing heavy vehicle load limit of 42.5 t is in place. ▪ Ensure no more than one non-OSOM vehicles to be on the bridge at any one time	Prior to construction and construction

Reference	Impact	Mitigation Measure	Timing
		▪ Ensure all non-OSOM vehicles using the bridge have adequate height clearances ▪ Any accidental damage is reported to the site supervisor and advice sought from a qualified heritage specialist.	
HH3	Training and awareness	All contractors and subcontractors should be made aware of the presence of a heritage item and associated elements in the vicinity of the proposed works should be communicated to all staff during toolbox talks.	Prior to construction and construction
Land			
L1	Geotechnical stability	▪ The strategy for managing the geotechnical stability of the Project landforms during construction and operation will continue to be refined through detailed design ▪ Detailed design of the Project will consider and address geotechnical stability risks in accordance with applicable design standards where feasible and reasonable ▪ The permanent landform changes based on the final land use and operational requirements will be considered in the rehabilitation management plan.	Detailed design
L2	Potential surface contamination	Potential surface contamination-related impacts associated with the Project will be managed by: ▪ An unexpected finds protocol, during the extent of the construction works. This will include guidance on identifying potential contaminated land characteristics (visual, odours, etc), steps to cease works in the affected area, further investigation to assess the extent, magnitude and type of contaminants and appropriate remedial actions ▪ Management of surface water when present to minimise the mobilisation of any potential residual soil impacts that could migrate to sensitive off-site ecological receptors.	Construction
L3	Soil Management	A spoil management plan will be prepared for the Project. The spoil management plan will outline appropriate management procedures for the generation, management of spoil. It will include, but not be limited to: ▪ Confirming spoil quantities ▪ Procedures for classification and testing of spoil, including classification of PAF and any other hazardous spoil materials based on site-specific data and testing currently available and additional data obtained during details design, to facilitate management of materials and ensure appropriate treatment and placement of materials ▪ Identification of spoil reuse measures, including segregation of soils as subsoils and topsoils	Detailed design, construction and operation

Reference	Impact	Mitigation Measure	Timing
		▪ Spoil stockpile management procedures, include the management of PAF spoil ▪ Spoil haulage routes ▪ Spoil disposal and reuse locations ▪ Measures for managing PAF spoil including methods to safely handle, segregate, transport and contain materials, including treatment of PAF ▪ Rehabilitation of the spoil emplacement facility with native vegetation similar to existing and to the extent it will not impact any encapsulation integrity. The plan will also include a monitoring program. The plan will follow recommendations from relevant guidelines.	
L4	Hydrocarbon and chemical spills	Chemicals will be stored in accordance with their safety data sheets, and where practical, will be stored within bunded areas.	Construction and operation
L5		Refuelling of construction plant and equipment will occur only within controlled areas.	Construction and operation
L6		Spill kits will be maintained on site during construction, and spill clean-up material will be placed in dedicated covered skip bin for collection for off-site disposal.	Construction
L7	Rehabilitation management	A rehabilitation management plan will be prepared to guide the long term rehabilitation of the project. The rehabilitation plan will: ▪ Include a detailed plan for rehabilitation of the site including any permanent new landforms ▪ Characterise the soil types within the disturbance area ▪ Include details of soil management measures ▪ Include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the sites, and triggering any remedial action (if necessary) ▪ Describe the measures that will be implemented to: – Comply with the rehabilitation objectives and associated performance and completion criteria – Progressively rehabilitate the site. Include a program to monitor and report the effectiveness of these measures.	Construction

Reference	Impact	Mitigation Measure	Timing
L8	Landform stability	Where relevant, batter slopes will be designed by a geotechnical engineer and will consider the long-term stability of the landform, including appropriate drainage and erosion measures. Slope stability measures, including shotcrete and rock bolts, will be utilised if required. The option of backfilling excavated areas to pre-disturbed conditions will be investigated as part of the detailed design.	Detailed design
L9		Final landform design will be developed as part of the detail design where opportunities to reinstate local landform changes to complement the surrounding topography and reduce visual impacts will be investigated.	Detailed design
Surface water quality, hydrology, geomorphology			
SW1	General	A Construction Soil and Water Management Plan (CSWMP) will be prepared and implemented for the project. The plan will outline measures to manage soil and water impacts associated with the construction works. The CSWMP will include but not be limited to: ▪ Measures to minimise/manage erosion and sediment transport within the construction footprint and offsite including requirements for the preparation of ESCPs for all stages of construction ▪ Measures to manage stockpiles, sediment controls and stabilisation ▪ Measures to manage accidental spills in accordance with WaterNSW incident management protocols, including the requirement to maintain materials such as spill kits ▪ Measures to manage potential tannin leachate where stockpiling of mulch is undertaken ▪ Details of surface water quality monitoring to be undertaken ▪ Measures to treat water collected in sediment basins for reuse on-site or discharge to downstream waterways ▪ Measures to manage tunnel process water (including dewatering), groundwater ingress into vertical shafts and tunnels, drilling fluids, grout and cement contaminated water from construction, including water collection protocols, water quality standards to be achieved for-release to downstream receiving environment. The Construction Contractor will be required to obtain and comply with an EPL and any other approvals to discharge treated water off site. The EPL will specify: ▪ Discharge locations to be identified in detailed design, ▪ Water quality concentration limits to be met prior to discharge.	Construction

Reference	Impact	Mitigation Measure	Timing
SW2	Erosion and sedimentation	ESCPs will be developed progressively as set out in the CSWMP and will detail the erosion and sediment control measures to be implemented at all work sites in accordance with the principles and requirements in *Managing Urban Stormwater – Soils and Construction Volume 1* (Landcom, 2004) and *Volume 2D* (NSW department of Environment, Climate Change and Water, 2008), commonly referred to as the "Blue Book". The Construction ESCP will include but not be limited to: ▪ Plans for temporary drainage, scour protection and control measures to reduce erosion and water quality impacts from increased sediment loads from construction sites, ancillary sites and access tracks. These water quality controls will likely consist of sediment fencing, sediment sumps and sediment basins. ▪ The locations of construction sediment basins, sediment sumps, sediment fences, diversion drains etc considering detailed design and selected construction methods.	Prior to construction and construction
SW3	Spills and leakages	Site specific controls and procedures will be developed and implemented to reduce the risk of the release of potentially harmful chemicals from spills entering downstream watercourses and include the following measures: ▪ All fuels, chemicals and liquids will be stored on level ground at least 20 m away from waterways and will be stored in a sealed bunded areas within works areas ▪ Spill response kits will be kept at all sites in the event of a spill, and site personnel will be appropriately trained in the use of spill response equipment ▪ An emergency spill response procedure will be prepared to minimise the impact of accidental spillages of fuels, chemicals and fluids during construction. The procedure will have regard to notification and reporting of incident to relevant authorities, eg WaterNSW and EPA ▪ Regular visual water quality checks (for hydrocarbon spills/slicks, turbid plumes and other water quality issues) will be carried out when working near waterways.	Prior to construction and construction
SW4	Impacts of Stockpiles	Stockpiles, spoil loading, processing, transport and emplacement activities will be managed to minimise the potential for mobilisation and transport of dust, sediment, contamination and leachate in runoff. This will include: ▪ Minimising the number of stockpiles, the area used for stockpiles and time that they are left exposed ▪ Locating temporary stockpiles away from drainage lines and waterways and managing stockpile areas (including during inclement weather events)	Prior to construction and construction

Reference	Impact	Mitigation Measure	Timing
		▪ Establishing appropriate sediment controls and suppressing dust as required.	
SW5	Concrete works	To avoid ingress of concrete waste material into downstream waterways, the CSWMP will outline procedures to capture, contain and appropriately dispose of any concrete wastes from concrete works associated with foundations, lining of vertical shaft and tunnels and for installation of the anchor block at the Penstock. Concrete structures will be pre-fabricated prior to installation instream, where practicable.	Prior to construction and construction
SW6	Construction discharge	▪ Prior to disposal of construction water collected in sediment basins, water will be treated to the appropriate standard specified in the CSWMP and reused on site wherever possible. For instance, for dust suppression activities ▪ A construction discharge water treatment plant will be designed to treat tunnel process water including groundwater seepage ▪ Site specific trigger values will be developed during construction planning to set the discharge water treatment plant and sediment basin discharge criteria to minimise pollution of water.	Prior to construction and construction
SW7	Water quality monitoring - construction	A construction surface water monitoring Program will be developed and included in the CSWMP to establish baseline conditions, to observe any changes in surface water quality and condition in watercourses withing 500 m of the Project footprint that maybe be attributable to construction of the Project and inform management responses. Monitoring during pre-construction and construction will occur at representative locations. Monitoring sites will be located upstream and downstream of the construction footprint areas and will include sampling for key indicators of concern. Should the results of monitoring identify that the water quality management measures are not effective in adequately mitigating water quality impacts adaptive, corrective management would be undertaken to resolve the exceedances.	Prior to construction and construction
SW8	Instream works	All works in the bed of bank of Lake Yarrunga would occur within a sediment curtain, coffer dam or alternate measure to manage water quality.	Construction
SW9	Water quality monitoring - operation	The operational surface water quality monitoring program will be based on the construction monitoring program but refined to target issues relating to the operation of the Project	Operation

Reference	Impact	Mitigation Measure	Timing
		Erosion and sediment controls during operation will be outlined in the Operational Management Plan and will detail procedures and protocols for maintaining scour protection measures at the outlets, groundwater seepage, and ongoing rehabilitation of disturbed areas and spoil emplacement facility.	
SW10	Water discharges	A permanent water treatment facility will be designed to treat ground water seepage generated from groundwater ingress in the main access tunnel and caverns and runoff from operation in the caverns. The collected water will be separated via an oily water separator and treated to an acceptable standard (where required) prior to being injected into the tailrace tunnel where it will further dilute to the water quality of inside the tailrace tunnel, which will flow out to Lake Yarrunga during generation. The level of treatment provided will consider the characteristics of the receiving environment. Following treatment and dilution via the tailrace tunnel, water quality of the groundwater seepage that reaches Lake Yarrunga or Fitroy Canal is expected to be indistringuishable from the water quality of the intake water and as the project will operate in accordance with the WAL that authorises water transfers between the two reservoirs.	Operation
Groundwater			
GW1	Groundwater monitoring	Groundwater monitoring, including the installation of additional monitoring locations, will be undertaken to collect additional baseline information and to assess and monitor for potential impacts during construction.	Prior to construction and construction
GW2	PAF forming materials	The spoil management strategy will be developed to a spoil management plan as part of detailed design and construction planning and identify mitigating and remedial measures in the event that actual acid rock drainage is identified.	Prior to construction and construction
GW3	Dewatering	A dewatering management plan will be prepared and implemented. The dewatering management plan will outline responsibilities, controls and procedures to mitigate potential environmental impacts associated with temporary construction dewatering and ongoing operational dewatering.	Construction and operation
GW4	Groundwater discharge	In conjunction with the DWMP, discharge of groundwater will be managed in accordance with CSWMP.	Prior to construction, construction and operation

Reference	Impact	Mitigation Measure	Timing
Traffic and transport			
TT1	Impacts to the local road network	A CTMP will be prepared in consultation with WaterNSW and implemented by the construction contractor. The CTMP will include: ▪ Confirmation of haulage routes ▪ Access to construction site including entry and exit locations ▪ Times of transporting to minimise impacts on the road network ▪ Measures to minimise the number of workers using private vehicles ▪ Management of oversized vehicles and OSOM movements ▪ Confirm maximum vehicle movements during peak periods ▪ Site specific traffic control measures (including signage) to manage and regulate traffic movement ▪ Relevant traffic safety measures including driver induction, training, safety measures and protocols ▪ Identify requirements for, and placement of, traffic barriers. ▪ Requirements and methods to inform the local community of impacts on the local road network due to the development-related activities ▪ Consultation with Transport for NSW, National Heavy Vehicle Regular and Council ▪ Consultation with the emergency services to ensure that procedures are in place to maintain safe, priority access for emergency vehicles ▪ A response plan for any construction related traffic incident ▪ Monitoring, review and amendment mechanisms ▪ Individual traffic management requirements at each phase of construction.	Construction
TT2		Heavy vehicle movements to and from the Project area will be scheduled to minimise traffic disruption to the surrounding road network. This may include, but is not limited to: ▪ Scheduling the movement of construction material, equipment and waste to occur outside of peak periods where practical ▪ Scheduling heavy vehicle deliveries to be evenly dispersed as far as practical to minimise convoying or platoons and queuing outside the Project or on the road network.	Construction

Reference	Impact	Mitigation Measure	Timing
TT3		The loading and unloading of trucks will be planned to ensure each individual truck haulage capacity is fully utilised to reduce the total number of truck movements.	Construction
TT4	OSOM vehicles	An oversized vehicle permit will be sought for all OSOM vehicle movements where required. The OSOM movements will be in accordance with the permit requirements and be outside of peak traffic periods where possible. In addition, a separate OSOM transport management plan will be prepared and will include: ▪ Identification of routes ▪ Potential impacts to the road network including road condition ▪ Measures to provide an escort for the loads ▪ Times of transporting to minimise impacts on the road network ▪ Location of rest areas and require rest stops along the route ▪ Identification of the maximum parameters of the OSOM vehicles ▪ Notification strategy and liaising with emergency services and police ▪ Any minor temporary civil infrastructure works may be required to accommodate OSOM movements.	Construction
TT5	Road Safety	A Driver Code of Conduct will be prepared as part of the CTMP in consultation with WaterNSW and be used to outline the rules and behaviours which drivers associated with the Project will be required to adhere to. The Driver Code of Conduct will outline arrangements for light and heavy vehicle drivers including: ▪ General requirements including site induction requirements ▪ Travelling speeds and safe driving practices, particularly through residential areas and school zones ▪ Fatigue management ▪ Adherence to designated transport routes and heavy vehicle noise ▪ Public complaint resolution.	Prior to construction, construction and operation
TT6		A detailed intersection design will be developed for the upgrade of the Moss Vale Road (B73) / Promised Land Trail intersection. This design will be developed in consultation with and to the satisfaction of TfNSW and Council as appropriate under Section 138 of the NSW Roads Act 1993. As the Austroads warrants for turn treatments provides guidance on the preferred minimum turn treatments for major roads based on traffic flows only, the intersection design will also consider geometric minimal (e.g. limited sight distance, steep	Prior to construction

Reference	Impact	Mitigation Measure	Timing
		grade). This may result in the adoption of a turn treatment of a higher order than that indicated by the warrants. An indicative design has been included in Section A.1.9 of **Appendix L** of the EIS (Traffic and transport impact assessment) as a placeholder for discussion purposes and will be updated as Project progresses.	
TT7		Vehicles will be required to enter and leave the Project area in a forward direction where possible, to minimise collision and safety risks.	Construction and operation
TT8		Public roads and Crown roads will not be obstructed by any materials, vehicles, skip bins or the like, under any circumstances. A designated truck parking space for trucks to wait to get confirmation when there is capacity to approach the construction site may need to be implemented to avoid truck queuing on the road to enter the sites at Bendeela and Promise Land Trail. For Bendeela, the laydown area, spoil stockpile area or the hardstand area in front of the Kangaroo Valley Power Station are likely to be suitable. Details such as suitability will be investigated during the detailed design stage of the Project.	Construction and operation
TT9		'Trucks Turning' warning signs will be installed on both approaches to the intersection of Moss Vale Road (B73) / Promised Land Trail and Moss Vale Road (B73) / Bendeela Road to advise existing road users of the increased heavy vehicle volumes. The signs will be removed upon the completion of the construction works.	Construction
TT10		Project vehicle speed reductions, use of fog lights during periods of low visibility and limitation of works will be implemented as required during periods of adverse weather.	Construction and operation
TT11	Access	Affected parties including emergency services will be notified in advance of any disruptions to traffic and restriction of access impacted by Project activities.	Prior to construction, construction and operation
TT12	Road condition	All vehicles transporting loose materials will have the entire load covered and/or secured to prevent any large items, excess dust or dirt particles depositing onto the roadway during travel to and from the Project area. Contamination with weeds and mud tracking from trucks leaving the Promised Land Trail, will be managed using standard controls.	Construction
TT13		All vehicles leaving the site would be cleaned of materials that may fall on the roadway before they are allowed to leave the site.	Construction
TT14		No tracked vehicles will be permitted on any paved roads.	Construction

Reference	Impact	Mitigation Measure	Timing
TT15		A Road Dilapidation Report will be prepared prior to and following construction of the Project. Any impacts identified as caused by the Project will be rectified.	Prior to and following construction
Noise and vibration			
NV1	Management of construction noise and vibration	A construction noise and vibration management plan will be prepared in consultation with WaterNSW. The construction noise and vibration management plan will include measures, processes and responsibilities to manage noise and vibration and minimise the potential for impacts during construction. The construction noise and vibration management plan will: ▪ Identify nearby sensitive receivers ▪ Include a description of the construction activities, equipment and working hours ▪ Identify relevant noise and vibration performance criteria for the Project and licence and approval requirements ▪ Describe the process(es) that will be adopted to assess actual construction methods adopted and identify reasonable and feasible controls to mitigate impacts, including assessment of cumulative impact ▪ Outline standard and additional mitigation measures to be adopted ▪ Outline requirements for the development and implementation of an Out-of-hours Work Protocol ▪ Include or provide reference to a Blast Management Strategy (where blasting is required) ▪ Outline the noise and vibration monitoring program to validate predictions and evaluate whether the mitigation measures in place are adequate or require revision ▪ Describe community consultation and complaints handling procedures in accordance with the community communication strategy to be developed for the Project.	Construction
NV2	Assess construction noise and vibration impact	Detailed noise assessments will be carried out to predict noise and vibration impact from the detailed design project is consistent with the outcomes of this EIS. The requirement for physical mitigation measures and/ or other appropriate noise management measures, is to be assessed and implemented prior to the commencement of activities which have the potential to cause noise or vibration impacts.	Pre-construction and construction
NV3	General construction noise and vibration measures	To the extent reasonable and feasible, the following measures should be adopted: ▪ Limit surface works that result in noise levels above NMLs to standard hours of construction. Where this is not feasible and reasonable, the work would be undertaken as early as possible in each work shift	Construction

Reference	Impact	Mitigation Measure	Timing
		▪ Select low-noise plant and equipment and ensure equipment mufflers operate in a proper and efficient manner ▪ Use quieter and less vibration emitting construction methods ▪ Only have necessary equipment on-site and turn off when not in use ▪ Concentrate noisy activities at one location and move to another as quickly as possible ▪ Vehicle movements, including deliveries outside standard hours should be minimised and avoided where possible ▪ Ensure all plant and equipment is well maintained and where possible, fitted with silencing devices ▪ Use only the necessary size and powered equipment for tasks ▪ Implement training to induct staff on Project noise and vibration sensitivities ▪ Consider the application of less intrusive alternatives to reverse beepers such as 'squawker' or 'broadband' alarms ▪ Consider the installation of temporary construction noise barriers for concentrated, noise-intensive activities ▪ Where practicable, install enclosures around noisy mobile and stationary equipment as necessary ▪ Avoid simultaneous operation of two or more noisy plant close to receivers ▪ The offset distance between noisy plant and sensitive receivers should be maximised ▪ Plan traffic flow, internal haulage routes, parking and loading/unloading areas to minimise the need for reversing movements and hard braking ▪ Delivery and loading / unloading of materials should occur as far as possible from sensitive receivers ▪ Select site access points and roads as far as possible from sensitive receivers ▪ Limit speed limits along internal haulage routes to reduce associated noise emissions ▪ Consider the use of quieter spoil transport technologies (e.g., conveyors) rather than trucks as appropriate ▪ Implement consultation, respite, notification, verification and additional requirements as appropriate, as listed in Section 5 of the Draft CNG (EPA). ▪ Complete routine monitoring to evaluate construction noise levels and evaluate whether the mitigation measures in place are adequate or require revision.	
NV4	Out of hours works	All out of hours works would be undertaken in accordance with an out of hours works protocol that includes the following: ▪ Justification of requirement to undertake the works out of hours ▪ Further consideration of noise impacts	Construction

Reference	Impact	Mitigation Measure	Timing
		▪ Identification of reasonable and feasible mitigation measures as necessary to achieve NML or otherwise mitigate impacts ▪ Communication protocols for impacted receptors.	
NV5	Notification	Where exceedances of noise mitigation measures are predicted, affected residents would be notified of works and potential disruptions. The notification would detail work activities, time periods over which the works will occur, impacts and mitigation measures. Notifications should be given a minimum of five days prior to works commencing.	Construction
NV6	Verification and adaptive management	Attended noise measurements would be undertaken to verify the noise levels predicted in this noise assessment are accurate and whether mitigation measures are appropriate. Attended noise measurements would also be undertaken to address any noise complaints raised as a result of the proposed works.	Construction
NV7	Ground-borne noise and vibration	Detailed design and construction planning should consider final tunnel alignment and construction methodology and develop necessary mitigation measures to address any remaining predicted exceedances. Where likely to be perceptible, affected receivers would be consulted on impacts to be expected and how they are to be avoided or otherwise effectively managed.	Pre-construction
NV8	Blasting	Blasting would be subject to stringent processes in accordance with the legislative and project requirements. The Interim Construction Noise Guideline recommends blasting on the surface occur between Monday to Friday (9am to 5pm) and Saturday (9am to 1pm) with no blasting on Sundays or public holidays unless otherwise agreed by the NSW Environment Protection Authority. Blasting on the surface would be planned during hours that would cause the least disruption and disturbance to the nearest receivers. Notification protocols prior to blasting for the nearest sensitive receivers would be established. Blasting underground may occur 24/7 where there is no material impact to sensitive receivers. Should the contractor undertake blasting to construct the project, a Blast Management Strategy would be prepared to address: ▪ Details of blasting to be performed ▪ Identification of all potentially affected sensitive sites including heritage buildings and utilities ▪ Establishment of appropriate criteria for blast overpressure and ground vibration ▪ Details of the transportation, storage and handling arrangements for explosive materials ▪ Determination of potential noise and vibration and risk impacts and appropriate best management practices, including:	Prior to undertaking blasting

Reference	Impact	Mitigation Measure	Timing
		– A trial blast strategy – Additional pre- and post-dilapidation surveys – Community consultation and information program – Reasonable and feasible mitigation ▪ The necessary blast trials to establish conformance with the criteria. The Blast Management Strategy would be prepared in consultation with Water NSW and endorsed by a suitably qualified and experienced person.	
NV9	Changes in traffic noise during construction	The following controls would be considered in the traffic management plan for the Project: ▪ Schedule Project construction transport to avoid sensitive periods and locations to the extent reasonable and feasible ▪ Ensure drivers operate in a manner that avoids unnecessary impacts (e.g. from air braking) ▪ Ensure that vehicles are adequately silenced before allowing them access to site and consider selection of quieter vehicle types to the extent reasonable and feasible ▪ Review and update measures as necessary through construction.	Construction
NV10	Operational noise impacts	Operational noise sources for the Project should be reviewed as part of detailed design to ensure that the resulting noise levels and outcomes do not exceed predictions or are otherwise managed to achieve Project noise trigger levels during all relevant meteorological conditions.	Detailed design and operation
Air quality			
AQ1	Dust due to spoil haulage	Measures will be included in the CEMP and spoil management plan to reduce dust due to spoil haulage, including: ▪ Watering of haul routes ▪ Maintenance of haul routes ▪ Restricting vehicle speeds ▪ Clearly marked haul routes ▪ Prompt clean up of any material spillage	Construction
AQ2	Wind erosion from emplacement areas	The extent of exposed areas will be minimised where practicable to reduce wind erosion. In addition, wind fences and dust suppression using water sprays and water carts would also be used where practicable.	Construction

Reference	Impact	Mitigation Measure	Timing
Waste			
W1	Construction	A waste management plan will be developed for the Project with the following criteria: ▪ A hierarchical waste management approach will be used, from the most preferable (reduce, reuse or recycle wastes) to the least preferable (disposal) to prioritise waste management strategies to avoid waste generation ▪ The plans will promote the use of materials with minimal packaging requirements, removal of packaging off-site by suppliers and fabrication of parts off-site ▪ Where waste cannot be avoided, waste materials will be segregated by type for collection and removal (for processing or disposal) by licensed contractors ▪ All waste types will be separated at source for recycling ▪ A licensed service provider will be appointed to collect waste during construction and operation ▪ Each waste type will be classified for transport to ensure correct handling ▪ Any waste that cannot be recovered or recycled will be disposed of to a suitably authorised or licensed treatment or disposal facility where it will be treated and disposed of according to its classification.	Detailed design
W2	Spoil and topsoil	Spoil and topsoil will be reused onsite where practicable. Where spoil and topsoil cannot be used on site, it will be used for other environmental or development projects, land restoration or landfill management.	Construction
W3	Vegetation	Cleared vegetation will be either mulched for on-site reuse or used to create habitat piles where practicable, noting that any weeds and pathogens will be managed according to requirements under the NSW Biosecurity Act 2015.	Construction
GHG			
GH1	General	Detailed design and construction planning will be undertaken to consider opportunities for less carbon intensive methods and materials to the extent reasonable and feasible.	Pre-construction

Reference	Impact	Mitigation Measure	Timing
GH2	Vehicle and plant emissions	Management practices will be implemented during construction, including: ▪ Operation and maintenance of construction plant and equipment to maximise efficiency and reduce emissions ▪ Lower emission plant and vehicles and alternative fuels will be used where feasible and reasonable ▪ Construction planning to minimise vehicle wait times and idling onsite ▪ Where feasible and reasonable earthwork balances will be managed to ensure that transport of material is minimised.	Pre-construction/ Construction
GH3	Electricity consumption	Where feasible and reasonable, electricity consumption will be sourced from renewable sources.	Pre-construction/ Construction
GH4	Material emissions	The use of materials with recycled and low-carbon content, including recycled steel and low carbon cement, will be investigated and incorporated to the extent reasonable and feasible.	Pre-construction/ Construction
GH5	Fuel use	Where feasible and reasonable biofuel would be used for operational inspection vehicles and maintenance equipment.	Operation
GH6	Operational electricity use	The potential to purchase operational electricity from renewable sources or offset GHG emissions would be further investigated and considered in accordance with Origin's net zero commitments.	Operation
Public safety			
PS1	Hazards and risks	▪ Undertake Safety in design workshops with specific attention on construction and operation of underground elements, as well as operational control processes ▪ Specify requirements for designers and contractors to demonstrate robust designs that include redundancy to prevent, monitor and (where unable to eliminate the possibility) control hazards including through: – Underground works flood assessment and design controls – Underground works fire risk assessment and design controls – Implementing robust safety in design process – Occupational noise assessment. ▪ Specification of industry standards and requirements that are most relevant and applicable to the Project and for the hazards and risks which require management	Detail design and construction

Reference	Impact	Mitigation Measure	Timing
		▪ Develop and implement suitable management plans for the construction of the project, including CEMP, Construction Safety Plan and Emergency Response Plan ▪ Engage reputable and experienced design consultants and construction contractors who are knowledgeable in good industry standards to design and construct the facility.	
PS2	Bushfire	The following bushfire risk mitigation measures will be applied during construction and operation: ▪ Asset Protection Zones (APZ): provide a buffer zone between a bushfire hazard and buildings or other structures. APZ will be managed to minimise fuel loads and reduce radiant heat levels, flame, ember, and smoke attack ▪ Siting and construction of sensitive infrastructure: buildings and other infrastructure and any hazardous material storage areas with sensitivity to radiant heat exposure will generally be provided with an APZ and where possible constructed in accordance with the relevant Bushfire Attack Level as per the National Construction Code and *Planning for Bushfire Protection (NSW RFS, 2019)*. Where such construction is not possible due to conflicts with infrastructure function, design will aim to maximise the resilience of the infrastructure to bushfire where practicable ▪ Access roads: which provide safe operational access to and within the Project area for emergency services personnel. Access roads will also provide safe egress for site personnel in case of a bushfire or other emergency ▪ Fire water supply: access to water for fire suppression and/or protection of structures or equipment located on site will be provided ▪ Emergency and evacuation planning will be addressed with other hazards as part of the contractor's and operator's site emergency management planning The APZs will be implemented to mitigate fire sensitive infrastructure. The final location of infrastructure will be determined during the detailed design process. The design will aim to maximise the resilience of all infrastructure to bushfire where practicable.	Construction and operation
PS3	Bushfire	A Bush Fire Emergency Management and Evacuation Plan will be prepared consistent with the NSW RFS publication: *A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan,* and the AS 3745:2010; and includes: ▪ Daily readiness and preparation for bushfire: including awareness of forecast fire weather conditions, monitoring fire incidence and bushfire warnings in the landscape	Pre-construction

Reference	Impact	Mitigation Measure	Timing
		▪ The effective management or shutdown of the ǂ worksites during a bushfire to reduce the risk of exacerbating fire behaviour or increasing risk to fire fighters The risk of ignition and fire spread from operations is managed to an acceptable level including considering: ▪ Infrastructure ▪ Hazardous materials ▪ Use of a flame ▪ Hot works (activities that generate sparks, heat or hot material) ▪ vehicles and plant (e.g. ignition from exhaust systems) ▪ on-site fire response capability: water supply, hand tools, etc ▪ vegetation management at construction sites and laydown areas.	
PS4	Dangerous goods and hazardous substances	▪ All chemicals or other hazardous substances will be stored in a bunded area and away from any natural drainage lines. The capacity of the bunded area will be at least 110% of the largest chemical volume contained within the bunded area. The location of the bunded enclosure/s will be shown on Site Plans ▪ The storage, handling and use of dangerous goods and hazardous substances will be carried out in accordance with the WHS Act and Regulations, the *Storage and Handling of Dangerous Goods Code of Practice* (WorkCover NSW, 2005) and relevant Australian Standards. Safety plans including Safe Working Method Statements (SWSM) will be prepared by the contractor to identify risk and mitigation measures during constructions. The SWSM will be developed as per guidelines from Safe Work Australia.	Construction and operation
Social and economic impacts			
SE1	General	A Stakeholder and Community Engagement Plan (SCEP) will be prepared to guide communication and engagement activities to ensure the timely and accurate provision of information to the community and stakeholders during construction. The elements of the SCEP will be consistent with the International Association of Public Participant (IAP2) principles and outline (as a minimum): ▪ Engagement principles and objectives ▪ Project stakeholders who either have an interest in the Project or may possibly be impacted by the proposed expansion ▪ Communication and consultation tools that provide:	Prior to construction, and construction

Reference	Impact	Mitigation Measure	Timing
		▪ Details and timing of proposed construction activities to local communities and affected stakeholders ▪ Policies and procedures for receiving and responding to queries and about the Project and for handling of grievances and complaints ▪ Procedures for reviewing and monitoring of the effectiveness of the SCEP, including updating the SCEP in response to outcomes of the review and monitoring process or in response to continued community and stakeholder complaints about environmental issues.	
SE2	Housing and accommodation	A Workforce Accommodation Strategy will be prepared for the Project, in consultation with relevant stakeholders, to manage demand for housing and accommodation from the construction workforce during the construction phase, which includes (among other things): ▪ Indication of demand for housing and accommodation by the construction workforce and available options to accommodate the construction workforce ▪ Strategies to maximise the use of short-term accommodation, while also managing potential effects on tourists and holiday makers during peak tourist periods and major regional events, and seasonal workers ▪ Processes for engaging with local accommodation providers, housing support agencies and other relevant stakeholders in accordance with the SCEP, about anticipated demand for housing and accommodation by the construction workforce, peak accommodation periods, construction timing ▪ Processes and procedures for managing potential negative effects on visitor accommodation in the primary study area due to demand by the construction workforce ▪ Encourage non-local operational workers to look at housing in towns across the study areas to minimise housing demand in one town only ▪ Measures for reviewing worker accommodation requirements and monitoring potential impacts due to demand by the construction workforce.	Prior to construction and construction
SE3	Employment and training	A Local Workforce Strategy will be prepared for the Project, in consultation with relevant stakeholders, that includes (among other things): ▪ Strategies to maximise employment opportunities for residents in the primary and secondary study areas, including strategies to communicate to local communities (prior to and during construction) opportunities and requirements for work on the Project	Prior to construction and construction

Reference	Impact	Mitigation Measure	Timing
		▪ Strategies relating to training and apprenticeships for Aboriginal people, young people, and women, including consultation with local contractors and relevant stakeholders (e.g., Aboriginal groups, youth, and women organisations) to identify and develop training and education opportunities.	
SE4	Business and industry	A Local Procurement Strategy will be prepared for the Project, in consultation with relevant stakeholders, aimed at maximising procurement opportunities for regional businesses. Among other things, this will outline: ▪ Communication and engagement strategies with local businesses, and other stakeholders in accordance with the SCEP about potential business opportunities and minimum requirements for workers and businesses (e.g., certifications, procurement standards, etc) ▪ Strategies for maximising the participation of regional businesses in the construction phase, including establishment of a local business register and preferences for regional businesses (subject to meeting relevant minimum standards) ▪ Measures for reviewing business requirements and monitoring the level of participation of regional businesses ▪ Implement training to increase local skills and availability of labour.	Prior to construction and construction
SE5	Local business and industry	Consult with owners of surrounding businesses in accordance with the SCEP about the timing, duration, impacts and management of construction activities, including (but not limited to): ▪ Wildwood Kangaroo Valley, at Lower Bendeela Road ▪ Wirramina, at Lower Bendeela Road ▪ Jack's Corner Retreat, at Jack's Corner Road ▪ Tullawalla, at Jack's Corner Road ▪ Cedarvale Health and Lifestyle Retreat, at Moss Vale Road ▪ Accommodation provides at Bendeela Road and Old Bendeela Road ▪ Kangaroo Valley Safaris ▪ Kangaroo Valley Kayaks ▪ Kangaroo Valley Adventure Company ▪ Valley Outdoors	Prior to construction and construction

Reference	Impact	Mitigation Measure	Timing
		▪ Development and implement processes and procedures, in accordance with the SCEP, for the review and monitoring of potential impacts and the effectiveness of mitigation measures for local businesses near to construction activities, including identifying any additional mitigation measures as required.	
SE6	Social infrastructure	Engage with users and managers of community facilities near to construction activities in accordance with the SCEP about the timing and duration of construction activities and any potential impacts for users. This will include, but not be limited to, the following facilities: ▪ Bendeela Recreation Area ▪ Morton National Park ▪ Scots College Glengarry Campus ▪ Southern Highlands Sailing Club ▪ Communicate to wider communities through the CSEP about any disruptions to social infrastructure from construction and decommissioning activities for the Project. ▪ Monitor community complaints received through the CSEP processes relating to social infrastructure near the Project and review relevant mitigation and management measures as required.	Prior to construction and construction
SE7	Scots College Glengarry Campus	Engage with managers of Scots College in accordance with the SCEP about: ▪ The timing of major college activities that use local roads (e.g., bicycle rides, 24 hour rogaining) and proposed management measure ▪ Any construction activities that may impact on the college's use of Lower Bendeela Road for emergency access ▪ Timing and duration of construction activities that have potential to impact on activities within the college campus (e.g., noise intensive works).	Construction
SE8	Bendeela Recreation Reserve	▪ Engage with WaterNSW in accordance with the SCEP about any construction activities that may impact on public use or access to the Bendeela Recreation Reserve. ▪ Minimise the duration of any short-term closures on Bendeela Recreation Area.	Operation
SE9	Promised Land Trail	▪ Minimise the duration of any closure of the Promised Land Trail ▪ Communicate with local communities and users of the Promised Land Trail about the closure of trail Reinstate the Promised Land Trail as soon as practicable following construction.	Construction

Reference	Impact	Mitigation Measure	Timing
SE10	Southern Highlands Sailing Club use of Fitzroy Falls Reservoir	Development and implement processes and procedures, in accordance with the SCEP, for the review and monitoring of potential impacts on activities of the Southern Highlands Sailing Club from the drawdown or release of water in Fitzroy Falls Reservoir.	Operation
SE11	Community values	▪ Minimise the extent of native vegetation clearing on WaterNSW land and within Morton National Park, as far as practicable ▪ Early and ongoing communication and consultation in accordance with the SCEP with local residents closest to construction activities about the timing, duration and potential impacts on construction and haulage activities ▪ Communication with communities in Kangaroo Valley, Fitzroy Falls, Wildes Meadow, and Barrengarry about the timing and duration of major haulage activities ▪ Where practicable, restrict haulage activities during night-time hours ▪ Develop and implement protocols relating to worker code of conduct to minimise potential disruptions on community cohesion.	Construction
SE12	Cumulative impacts	Consultation and communication with communities and stakeholders through the planning, construction, and operation phases will also be important in avoiding, minimising, or managing identified socio-economic impacts of the Project.	Prior to construction and construction
Visual impacts			
V1	Vegetation clearance	Origin will seek to minimise disturbance associated with the Project, for example by minimising areas of vegetation clearance where practicable in order to limit the visual impact of the Project.	Prior to construction and construction
V2	Presence of construction activities	Where feasible and reasonable, the elements within the construction site will be located to minimise visual impacts (for example storing materials and machinery behind fencing or existing vegetation, maintaining clean and tidy construction sites).	Construction
V3	Lighting impacts	Where required, lighting of the construction sites will be orientated to minimise glare and light spill impacts on receivers	Construction

Reference	Impact	Mitigation Measure	Timing
V4	Presence of Project components in the landscape	A visual impact management plan will be developed and implemented that includes consideration of colour of proposed structures and built form in a suitable muted palette to visually integrate the Project within the landscape and Existing Scheme infrastructure.	Detailed design and operation