Appendix H
Risk assessment for impacts to threatened species

No.	Risk description and controls			Risk level (without controls)				Risk level (post controls)			Performance objective	Monitoring measures	Risk treatment plan
	Environmental value impacted	Impact	Impact description	Likelihood	Consequence	Risk level	Avoidance and mitigation measures	Likelihood	Consequence	Risk level			
1	Lowland rainforest of subtropical Australia TEC (critically endangered)	Clearing (habitat loss and fragmentation)	The lowland rainforest TEC occurs in the Exploratory Works footprint and approximately 2.5 ha will be cleared for the Exploratory Works activities. In addition 5.6 ha of vegetation within 50 m of the TEC will be cleared. Vegetation clearing and impacts associated with fragmentation of remnants are some of the main ongoing threats to these TECs (DSEWPAC, 2011), (DCCEEW, 2022b). The risk to the TEC by clearing is considered high. Approximately 2.5 ha of the TEC is expected to be cleared. Clearing may increase edge effects in some cases (e.g., additional light entering the forest, weed encroachment, and increased bushfire risk). These risks including weed encroachment, and increased bushfire risks are addressed in impact item 6 and 8 below. To limit impacts to the remnant (uncleared) patch, a 50 m buffer around the cleared area has been included. The buffer area has been considered in the total 2.5 ha. The impact to the TEC includes isolated but substantial instances of disturbance, including loss of native vegetation and habitat for species.	Highly Likely	High	High	In accordance with conservation advice, Exploratory Works seek to avoid clearing of TECs as far as possible. The portal pad for the exploratory tunnel drilling was relocated to avoid impact to 8 ha of Lowland Rainforest TEC. However, up to 2.5 ha of lowland rainforest TEC may be cleared. • The boundaries of the 50 m buffer zone around all patches of lowland rainforest TEC will be clearly marked to avoid unauthorised clearing and construction activities occurring outside of the approved disturbance footprint within the buffer zone. • Clearing boundaries and exclusion/buffer zones will be clearly delineated with flagging tape or fluorescent marker or signage prior to clearing commencing to avoid unnecessary clearing and to ensure personnel and vehicles stay within the approved footprint, avoiding contravention of disturbance limits. • Clearing boundary maps will be provided to contractors. Personnel will only be allowed on foot beyond the boundary of the exclusion/buffer zones. • Works will be conducted within existing cleared areas wherever practicable. • Access roads will be aligned along existing tracks wherever practicable to minimise vegetation clearing. • Access road width will be minimised where practicable, particularly across creek lines. In accordance with the Flora and Fauna Management Plan (FFMP), a pre-clearing survey will be undertaken by a suitably qualified Fauna Spotter/Catcher (FSC) for threatened fauna and an ecologist for threatened flora and weeds. All clearing activities will be overseen by a suitably qualified FSC and undertaken in a sequential method.	Highly Likely	Moderate	High	Minimise clearing Lowland Rainforest TEC.	• Ongoing inspections and monitoring of clearing activities will be undertaken to ensure clearing has been undertaken in approved boundaries and limits. • Monitoring will be undertaken to ensure exclusion fencing and signage remains in serviceable condition. • Daily inspection of TECs next to works areas prior to works commencing, during works and after works are completed.	• Proposed works that may affect the Lowland Rainforest TEC are primarily within the Conondale Resources Reserve, which is under the management of QPWS. Works in this area will need to be undertaken under an Authority from QPWS, which will require preparation and implementation of a Rehabilitation Plan for any disturbed areas. • Once geotechnical investigation works are complete, the area will be rehabilitated in accordance with the approved plan and maintained and monitored until the rehabilitation works have reached a self-sustaining stage. • Inspect and repair damaged fencing; replace any flagging tape or respray fluorescent marker. • Where clearing extends outside the approved disturbance limits, a record must be taken of the incident and an investigation will occur. • Temporarily disturbed areas that are no longer required to be cleared will be assessed for restoration and revegetation.
2	Lowland rainforest of subtropical Australia TEC (critically endangered)	Hazardous materials	The lowland rainforest TEC occurs in the Exploratory Works Project. Exploratory Works Project activities have the potential to lead to accidental releases of hazardous materials, such as fuels and oils from vehicles and machinery. These hazardous materials can lead to localised soil contamination and contamination of water resources, which in turn can cause injury, reduced vigour or mortality to flora and fauna. The severity of the impact is dependent on the location and magnitude of the release.	Possible	High	Medium	No works within 50 m of the dip on Lot 3 LX2754 (where contamination has been identified) as per the Site Management Plan. Noting that testing of other areas of the footprint have not identified any contaminated land Spoil reuse targets have been identified across material categories expected from design. Reuse categories are linked to spoil contamination risk and provisional potential reuse targets have been identified for each category as below: • unrestricted spoil – 100 % • other clean earth – 80 % • non-regulated waste (general waste – 25 % • category 2 regulated waste – 10 % • category 1 regulated waste – 0 % • potentially contaminated soils – 50 % • acid sulfate soils – 20 % • acid-forming rock – 20 % • naturally occurring asbestos material – 0 %. • Testing of material as it is removed from disturbed areas, including the exploratory tunnel, to determine any acid sulfate soil, potential acid sulfate soil or contaminants. • Implement recommendations form the contaminated land investigations. • All chemicals, fuel and oil will be stored in above ground tanks in bunded areas, with accurate records maintained of volumes purchased and stored, to ensure any contamination of land or water is prevented, and any spill is detected quickly. • Contain poor quality discharge water and treat prior to disposal, subject to achieving water quality guidelines. • Disposal methods and responses are identified within the Spoil Management Plan (refer to Appendix B) and are linked to the spoil material category. • Design storage areas to consist of a compacted base, bunding to contain spillages and roofing to prevent contamination and infiltration of stormwater (as per AS1940 and AS3780). • Management plans for select (as required) discoverable contaminants (i.e. acid-rock drainage, naturally occurring asbestos) will be developed upon identification from preliminary drilling/earthworks during Exploratory Works. • Residual hazardous materials will be removed from the construction site and returned to an appropriate storage area or a suitable waste facility. Control of potential offsite mobilisation of contamination will be implemented through the following: • during excavations, materials that are contaminated and not suitable for remediation and onsite storage will be loaded directly onto licensed transport vehicles for offsite disposal • stockpiling of contaminated soils will be avoided where possible via the in-situ waste classification and identification of potentially contaminated materials	Unlikely	High	Medium	No degradation of the overall health of the Lowland Rainforest TEC	• Ongoing inspections and monitoring will be undertaken to ensure works are being undertaken within approved boundaries and limits. • Visual inspections noting: evidence of dust deposition on plants, plant health generally (evidence of dead/dying individuals, flowering, seeding, etc), evidence of disturbance/ maintenance of buffers and exclusion zones.	• Assessment of spoil to be conducted as part of excavation tracking. Where disposal method is deemed inappropriate, further controls to be compiled and managed upon discovery of unknown contaminant. • Weekly assessment of any stockpiling and where controls are inappropriate or damaged, reinstatement or improvement of controls are to be conducted. • In the event of a spillage/leak of potentially hazardous substances: - Comply with the Emergency Spill Containment Plan. - Investigate the nature and extent of the spillage/leakage, and implement clean-up and mitigation measures, as necessary.
3	Lowland rainforest of subtropical Australia TEC (critically endangered)	Air quality/ dust	The lowland rainforest TEC occurs in the Exploratory Works footprint. Dust emissions from vegetation clearing, earthworks and vehicle movements during construction has the potential to impact threatened flora, temporarily and locally, in the vicinity of the Exploratory Works Project footprint. Dust is expected to only be a potential issue during vegetation clearing and construction. Excess generation of dust and subsequent deposition on leaves can impair plant photosynthesis and productivity and alter soil properties resulting in reduced vigour or mortality to threatened flora and degrade habitat	Possible	Moderate	Medium	• Areas which have potential to generate airborne dust will be wetted down regularly or covered wherever practicable. • Reshaping and sealing of roads and tracks to minimise dust generation. • Regular cleaning of machinery and vehicle tyres to reduce dust emissions. • Low speed limits will be implemented across the Exploratory Works Project to minimise dust generation. • Any areas no longer required for operational activities will be rehabilitated as soon as practicable. • Machinery and vehicle tyres will be regularly cleaned to reduce wheel entrained dust emissions or consider use of vibration grids. • Spraying of herbicides, aerosols and other chemicals to be undertaken in suitable weather conditions (i.e. low wind speed). • Use of dust suppression to reduce offsite dust impacts.	Possible	Moderate	Medium	No degradation of the overall health of the Lowland Rainforest TEC	• Ongoing inspections and monitoring will be undertaken to ensure works are being undertaken within approved boundaries and limits. • Visual inspections noting: evidence of dust deposition on plants, plant health generally (evidence of dead/dying individuals, flowering, seeding, etc), evidence of disturbance/ maintenance of buffers and exclusion zones.	• Increase frequency of dust suppression if dust nuisance is observed by site construction or environmental manager or if a complaint is received.
4	Lowland rainforest of subtropical Australia TEC (critically endangered)	Erosion and sedimentation	The lowland rainforest TEC occurs in the Exploratory Works footprint. Vegetation clearing, earthmoving and general construction activities may all result in an increase to natural erosion and sedimentation within the Exploratory Works footprint. This increased erosion and sedimentation could potentially have localised impacts upon overland flow rates within the vicinity of the proposed works. Changes in the hydrology of the Exploratory Works footprint may occur through alteration of surface flows and stormwater runoff, including obstruction of flow. This can result in scouring or waterlogging occurring in some areas.	Likely	High	High	A preliminary Erosion and Sediment Control Plan has been developed and will be implemtned for the Project, the plan includes the following mitigation measures: •Minimising risk of dispersible subsoils Strategies to minimise risk include limiting their disturbance, use of gypsum and covering dispersive material (e.g. buried under a minimum of 100 mm layers of non-dispersive soils before placing any revegetation or erosion control measures). Preclearance surveys and soil mapping to be developed identifing areas of concern •Controls during construction and clearing To minimise erosion in or adjacent to the proposed Exploratory Works Project footprint, soil disturbance will be minimised and clearing methods of blading and grubbing are avoided. Activities will be scheduled, where practicable, to avoid the summer months where high intensity storms are more prevalent. Avoid locating works within watercourses, drainage lines or overland flow paths, and known areas of erosion. Designing and constructing waterway crossings in accordance with riverine protection permit and ADR expectations (though exemptions from the need to obtain the permit may be available). Implementing a buffer zone around the spoil disposal area so spoil is located a sufficient distance from the riparian zone of Yabba Creek and Sandy Creek. The use of control measures such as sediment traps/rock filter dams/modular sediment traps, along with soil management and stockpiling practices will be implemented to minimise erosion and sedimentation. Maintaining the ESC components via regular removal of water after storm events and de-silting. Water quality discharge requirements specified in the Erosion and Sediment Control Plan are to be met prior to discharge of any separated slurry to the environment. Sizing ESC components and water recycling/reuse components with appropriate redundancy/buffer capacity as determined by Queensland Hydro. A register that details sediment basin inspections, maintenance, discharge volumes and dates, flocculation details, discharge-water quality and volumes of sediment removed will be maintained. Site inspections are to be conducted (weekly routine) and prior to forecast rain of 25 mm over 24 hours to identify repair, maintenance or improvement works.	Unlikely	High	Medium	Minimise clearing Lowland Rainforest TEC. No degradation of the overall health of the Lowland Rainforest TEC	• Ongoing inspections and monitoring will be undertaken to ensure works are being undertaken within approved boundaries and limits. • Visual inspections noting: evidence of maintenance and effectiveness of ESC controls, plant health generally (deposition of sediments, chnages to hydrology/flows, evidence of dead/dying individuals, flowering, seeding, etc), evidence of disturbance/ maintenance of buffers and exclusion zones.	• Ongoing assessment of ESC with weekly checklist. Where controls are inappropriate or damaged, reinstatement or improvement of controls are to be conducted.
5	Lowland rainforest of subtropical Australia TEC (critically endangered)	Weeds	The lowland rainforest TEC occurs in the Exploratory Works footprint. Exploratory Works activities have the potential to increase the abundance of invasive plants in the Exploratory Works Project footprint and facilitate dispersal to previously unaffected areas. Movement of vehicles, equipment and personnel throughout the Project footprint is the key vector of transmission, in particular vehicles and equipment sourced from regions beyond the Exploratory Works Project footprint which may introduce new species. Seeds and fruits have the potential to be spread by clearing activities and vehicle movement, whilst establishment into new areas is highly likely after heavy rainfall as several thousand seeds can be produced per square metre that can remain viable for several years. Weed infestation could degrade the patches of the TEC.	Likely	Major	High	Hygiene control procedures will be in place throughout multiple stages of the Exploratory Works Project activities, including measures to reduce potential for introduction and spread of weeds: •Decontamination Washdown facilities will be installed at the two entrances to Queensland Hydro land so all vehicles will be washed prior to entry and exiting site. Decontamination practices will be implemented for all personnel and regular vehicle and machinery wash downs, especially when transferring between sites will assist in minimising the spread of weeds and Myrtle Rust. Multiple methods are available for treatment of vehicles including wet decontamination, heat and/or fumigation procedures. Hygiene checks will be conducted on all machinery or equipment being moved onto or out of the Exploratory Works Project site to minimise distribution of weed species and fungal pathogens. • Training Training and inductions for site employees and contractors to educate on the risks and mitigation requirements for weed spread. •Preclearing surveys and weed treatment Pre-clearance surveys will be performed to identify weeds, and large infestations to be treated prior to clearing to minimise the spread of weed seed and material. A weed register will be developed and maintained by Queensland Hydro for the duration of the Exploratory Works Project to manage weeds and ensure that management actions are having the desired effect. •High risk areas Identified areas of high risk weed or disease infestations (including 50 m buffer zone from TECs) will be signed and demarcated where required to avoid transporting plant reproductive material from these areas to areas that are not infested. •Weed management Weeds will be actively monitored and managed adjacent to Exploratory Works activities occurring within 50 m of TEC patches. Spraying herbicides, unless approved for use in the area including targeted spraying, will be avoided. Weed material will be disposed of in accordance with the *Biosecurity Act 2014* Site vehicle access will be restricted to existing roads and tracks.	Unlikely	Moderate	Low	No degradation of the overall health of the Lowland Rainforest TEC	• Quarterly weed monitoring in response to events which may trigger pest dispersion • Monitoring of designated management zones Bi annually for the project life span	• Increase Hygiene Control requirements if vehicles or equipment are found to introduce or spread new weeds. • Increase weed control efforts where required (i.e. after heavy rainfall) or if current controls are ineffective. • Review and update of the Biosecurity Management Plan and the species specific management actions.
6	Lowland rainforest of subtropical Australia TEC (critically endangered)	Disease	The lowland rainforest TEC occurs in the Exploratory Works footprint. Exploratory Works Project activities have the potential to spread harmful pathogens that cause the dieback of ecologically important species within the Lowland Rainforest of Subtropical Australia TEC, especially myrtaceous plants such as eucalypts, tea-trees and lillypillies. There are two main pathogens that pose a risk to the TEC including Myrtle Rust, caused by the microfungus, Austropuccinia psidii, and Phytophthora disease, caused by the root-rot fungus Phytophthora cinnamomic and other Phytophthora species. Movement of vehicles, equipment, and personnel throughout the Project footprint are key vectors of transmission, in particular vehicles and equipment sourced from regions beyond the Exploratory Works Project footprint. Myrtle rust was recorded during the site assessments and is present in broad areas within the surveyed area. Fungal pathogens are most likely to spread in infected soils, plant material, and water, therefore access within the Exploratory Works Project footprint during rainfall should be kept to a minimum to prevent soils adhering to vehicles and pedestrians. Exploratory Works Project activities could spread myrtle rust into areas of previously uninfected habitat, affecting individual species and preventing them from flowering or fruiting, and therefore, reproducing.	Likely	High	High	Hygiene control procedures will be in place throughout multiple stages of the Exploratory Works Project activities, including measures to reduce potential for introduction and spread of pathogens (e.g. myrtle rust, Armillaria root rot or Phytophthora disease): •Decontamination Washdown facilities will be installed at the two entrances to Queensland Hydro land so all vehicles will be washed prior to entry and exiting site. Decontamination practices will be implemented for all personnel and regular vehicle and machinery wash downs, especially when transferring between sites will assist in minimising the spread of weeds and Myrtle Rust. Multiple methods are available for treatment of vehicles including wet decontamination, heat and/or fumigation procedures. Hygiene checks will be conducted on all machinery or equipment being moved onto or out of the Exploratory Works Project site to minimise distribution of weed species and fungal pathogens. • Training Training and inductions for site employees and contractors to educate on the risks and mitigation requirements for weed spread. •Preclearing surveys and weed treatment Pre-clearance surveys will be conducted to identify pre-existing outbreaks of diseases including Myrtle Rust, Armillaria root rot, and Phytophthora disease impacting site TECs and terrestrial flora including Scrub turpentine within and adjacent to the Exploratory Works footprint. A pathogens register will be developed and maintained by Queensland Hydro for the duration of the Exploratory Works Project to manage weed and disease infestations and ensure that management actions are having the desired effect. •High risk areas Identified areas of high risk weed or disease infestations (including 50 m buffer zone from TECs) will be signed and demarcated where required to avoid transporting plant reproductive material from these areas to areas that are not infested. Where myrtle rust, Armillaria root rot or Phytophthora disease is known or a risk, avoid parking near myrtaceous plants – for example bottle brushes, tea trees, lily pillies and eucalypts – and thoroughly clean vehicles inside and out between site visits, along with equipment and personnel. •Weed management Weeds will be actively monitored and managed adjacent to Exploratory Works activities occurring within 50 m of TEC patches. Spraying herbicides, unless approved for use in the area including targeted spraying, will be avoided. Weed material will be disposed of in accordance with the *Biosecurity Act 2014* Site vehicle access will be restricted to existing roads and tracks. .	Possible	High	Medium	No degradation of the overall health of the Lowland Rainforest TEC	• Opportunistic observations. Targeted monitoring if required	• Increase Hygiene Control requirements if vehicles or equipment are found to introduce or spread new pathogens. • Increase pathogen control efforts where required (i.e. after heavy rainfall) or if current controls are ineffective. • Review and update of the Biosecurity Management Plan and the species specific management actions.
7	Lowland rainforest of subtropical Australia TEC (critically endangered)	Fire	The lowland rainforest TEC occurs in the Exploratory Works footprint. Fire of any severity may initiate transformational changes in vegetation communities such as the lowland rainforest of subtropical Australia TEC. The vegetation community is particularly vulnerable especially due to its slow recovery from structural transformation. The increased presence of construction vehicles and personnel in the Exploratory Works Project footprint may increase fire risk through use of machinery that may generate sparks, use of flammable liquids and idling vehicles being present in areas of ground vegetation.	Possible	Major	High	• For hot-work activities, a risk assessment will be completed considering forecast weather, fire hazard ratings and site conditions. • Vehicles are not to idle or be parked in areas of long grass. • Access tracks, fence lines and cleared overhead powerline easements will be maintained and used as firebreaks within the Project footprint and regularly maintained during clearing and construction activities. • Smoking is permitted on site in designated areas. • Fuel loads across the Exploratory Works Project will be monitored and appropriately managed through activities such as weed management, slashing and low intensity burns. • Firebreaks to be established on Queensland Hydro land.	Unlikely	Major	High			• If fuel loads have increased following heavy rainfall, control methods will be implemented as required (i.e. weed control or cool burns). • Prescribed burns are to be conducted based on present fuel load and ecosystem (Peeters & Butler, 2014).
8	Subtropical eucalypt floodplain forest and woodland TEC (endangered)	Clearing (habitat loss and fragmentation)	The subtropical eucalypt floodplain forest and woodland TEC occurs in the Exploratory Works Survey area though no clearing is proposed in this TEC. Clearing will occur within 50 m of the TEC, approxiamtely 1.2 ha. The area to be cleared is a conservative estimate as the Exploratory Works activities can mostly avoid clearing vegetation associated with the community. Therefore, the actual area to be cleared will be much smaller. Vegetation clearing and impacts associated with fragmentation of remnants are some of the main ongoing threats to these TECs (DSEWPAC, 2011). (DCCEEW, 2022b). The risk to the TEC by clearing is considered high. Approximately 0 ha of the TEC is expected to be cleared. Clearing may increase edge effects in some cases (e.g., additional light entering the forest, weed encroachment, and increased bushfire risk). These risks including weed encroachment, and increased bushfire risks are addressed in impact item 6 and 8 below. To limit impacts to the remnant (uncleared) patch, a 50m buffer around the cleared area has been included. The impact to the TEC includes isolated but substantial instances of disturbance, including loss of native vegetation and habitat for species.	Highly Likely	Moderate	High	• In accordance with conservation advice, Exploratory Works avoids theclearing of TECs as far as possible. However, 1.2 ha of vegetation within 50 m of the TEC will be cleared. • The boundaries of the 50 m buffer zone around all patches of subtropical eucalypt floodplain forest and woodland TEC will be clearly marked to avoid clearing and construction activities occurring outside of the approved disturbance footprint within the buffer zone. • Clearing boundaries and exclusion/buffer zones will be clearly delineated with flagging tape or fluorescent marker or signage prior to clearing commencing to avoid unnecessary clearing and to ensure personnel and vehicles stay within the approved footprint, avoiding contravention of disturbance limits. • Clearing boundary maps will be provided to contractors. Personnel will only be allowed on foot beyond the boundary of the exclusion/buffer zones. • Works will be conducted within existing cleared areas wherever practicable. • Access roads will be aligned along existing tracks wherever practicable to minimise vegetation clearing. • Access road width will be minimised where practicable, particularly across creek lines. • In accordance with the Flora and Fauna Management Plan (FFMP), a pre-clearing survey will be undertaken by a suitably qualified Fauna Spotter/Catcher (FSC) for threatened fauna and an ecologist for threatened flora and weeds. All clearing activities will be overseen by a suitably qualified FSC and undertaken in a sequential method.	Highly Likely	Minor	Medium	• No clearing Subtropical eucalypt floodplain forest and woodland TEC • Minimise clearing Subtropical eucalypt floodplain forest TEC buffer area	• Ongoing inspections and monitoring of clearing activities will be undertaken to ensure clearing has been undertaken in approved boundaries and limits. • Monitoring will be undertaken to ensure exclusion fencing and signage remains in serviceable condition.	• Inspect and repair damaged fencing, replace any flagging tape or respray fluorescent marker. • Where clearing extends outside the approved disturbance limits, a record must be taken of the incident and an investigation will occur. Ocurrences will be reported to DETSI/ DCCEEW. • Temporarily disturbed areas that are no longer required to be cleared will be assessed for restoration and revegetation. • Where required, the area will be rehabilitated in accordance with the Decommissioning and Rehabilitation Strategy and maintained and monitored until the rehabilitation works have reached a self-sustaining stage.
9	Subtropical eucalypt floodplain forest and woodland TEC (endangered)	Hazardous materials	The subtropical eucalypt floodplain forest and woodland TEC occurs in the footprint. Exploratory Works activities have the potential to lead to accidental releases of hazardous materials, such as fuels and oils from vehicles and machinery. These hazardous materials can lead to localised soil contamination and contamination of water resources, which in turn can cause injury, reduced vigour or mortality to flora and fauna. The severity of the impact is dependent on the location and magnitude of the release.	Possible	High	Medium	Spoil reuse targets have been identified across material categories expected from design. Reuse categories are linked to spoil contamination risk and provisional potential reuse targets have been identified for each category as below: • unrestricted spoil – 100 % • other clean earth – 80 % • non-regulated waste/general waste – 25 % • category 2 regulated waste – 10 % • category 1 regulated waste – 0 % • potentially contaminated soils – 50 % • acid sulfate soils – 20 % • acid-forming rock – 20 % • naturally occurring asbestos material – 0 %. • Testing of material as it is removed from disturbed areas, including the exploratory tunnel, to determine any acid sulfate soil, potential acid sulfate soil or contaminants. • Implement recommendations form the contaminated land investigations. • All chemicals, fuel and oil will be stored in above ground tanks in bunded areas, with accurate records maintained of volumes purchased and stored, to ensure any contamination of land or water is prevented, and any spill is detected quickly. • Contain poor quality discharge water and treat prior to disposal, subject to achieving water quality guidelines. • Disposal methods and responses are identified within the Spoil Management Plan (refer to Appendix B) and are linked to the spoil material category. • Design storage areas to consist of a compacted base, bunding to contain spillages and roofing to prevent contamination and infiltration of stormwater (as per AS1940 and AS3780). • Management plans for select (as required) discoverable contaminants (i.e. acid-rock drainage, naturally occurring asbestos) will be developed upon identification from preliminary drilling/earthworks during Exploratory Works. • Residual hazardous materials will be removed from the construction site and returned to an appropriate storage area or a suitable waste facility. Control of potential offsite mobilisation of contamination will be implemented through the following: • during excavations, materials that are contaminated and not suitable for remediation and onsite storage will be loaded directly onto licensed transport vehicles for offsite disposal • stockpiling of contaminated soils will be avoided where possible via the in-situ waste classification and identification of potentially contaminated materials • assigning secure location for storage of reusable and recyclable materials on site	Unlikely	High	Medium	No degradation of the overall health of the Subtropical Eucalypt Floodplain Forest TEC	• Ongoing inspections and monitoring will be undertaken to ensure works are being undertaken within approved boundaries and limits. • Visual inspections noting: evidence of dust deposition on plants, plant health generally (evidence of dead/dying individuals, flowering, seeding, etc), evidence of disturbance/ maintenance of buffers and exclusion zones.	• Assessment of spoil to be conducted as part of excavation tracking. Where disposal method is deemed inappropriate, further controls to be compiled and managed upon discovery of unknown contaminant. • Weekly assessment of any stockpiling and where controls are inappropriate or damaged, reinstatement or improvement of controls are to be conducted. • In the event of a spillage/leak of potentially hazardous substances: - Comply with the Emergency Spill Containment Plan. - Investigate the nature and extent of the spillage/leakage, and implement clean-up and mitigation measures, as necessary.

No.	Risk description and controls			Risk level (without controls)				Risk level (post controls)			Performance objective	Monitoring measures	Risk treatment plan
	Environmental value impacted	Impact	Impact description	Likelihood	Consequence	Risk level	Avoidance and mitigation measures.	Likelihood	Consequence	Risk level			
10	Subtropical eucalypt floodplain forest and woodland TEC (endangered)	Air quality/ dust	The subtropical eucalypt floodplain forest and woodland TEC occurs in the footprint. Dust emissions from vegetation clearing, earthworks and vehicle movements during construction has the potential to impact threatened flora temporarily and locally, in the vicinity of the Exploratory Works Project footprint. Dust is expected to only be a potential issue during vegetation clearing and construction. Excess generation of dust and subsequent deposition on leaves can impair plant photosynthesis and productivity and alter soil properties resulting in reduced vigour or mortality to threatened flora and degrade habitat.	Possible	Moderate	Medium	• Areas which have potential to generate airborne dust will be wetted down regularly or covered wherever practicable. • Resheeting and sealing of roads and tracks to minimise dust generation. • Regular cleaning of machinery and vehicle tyres to reduce dust emissions. • Low speed limits will be implemented across the Exploratory Works Project to minimise dust generation. • Any areas no longer required for operational activities will be rehabilitated as soon as practicable. • Machinery and vehicle tyres will be regularly cleaned to reduce wheel entrained dust emissions or consider use of vibration grids. • Spraying of herbicides, aerosols and other chemicals to be undertaken in suitable weather conditions (i.e. low wind speed). • Use of dust suppression to reduce offsite dust impacts.	Possible	Moderate	Medium	No degradation of the overall health of the Subtropical Eucalypt Floodplain Forest TEC	• Visual inspections noting: evidence of dust deposition on plants, plant health generally (evidence of dead/dying individuals, flowering, seeding, etc), evidence of disturbance/ maintenance of buffers and exclusion zones.	• Increase frequency of dust suppression if dust nuisance is observed by site construction or environmental manager or if a compliant is received.
11	Subtropical eucalypt floodplain forest and woodland TEC (endangered)	Erosion and sedimentation	The subtropical eucalypt floodplain forest and woodland TEC occurs in the footprint. Vegetation clearing, earthmoving and general construction activities may all result in an increase to natural erosion and sedimentation within the Exploratory Works footprint. This increased erosion and sedimentation could potentially have localised impacts upon overland flow rates within the vicinity of the proposed works. Changes in the hydrology of the Exploratory Works footprint may occur through alteration of surface flows and stormwater runoff, including obstruction of flow. This can result in scouring or waterlogging occurring in some areas.	Likely	High	High	A preliminary Erosion and Sediment Control Plan has been developed and will be implemtned for the Project, the plan includes the following mitigation measures: •Minimising risk of dispersible subsoils Strategies to minimise risk include limiting their disturbance, use of gypsum and covering dispersive material (e.g. buried under a minimum of 100 mm layers of non-dispersive soils before placing any revegetation or erosion control measures). Preclearance surveys and soil mapping to be developed identifing areas of concern •Controls during construction and clearing To minimise erosion in or adjacent to the proposed Exploratory Works Project footprint, soil disturbance will be minimised and clearing methods of blading and grubbing are avoided. Activities will be scheduled, where practicable, to avoid the summer months where high intensity storms are more prevalent. Avoid locating works within watercourses, drainage lines or overland flow paths, and known areas of erosion. Designing and constructing waterway crossings in accordance with riverine protection permit and ADR expectations (though exemptions from the need to obtain the permit may be available). Implementing a buffer zone around the spoil disposal area so spoil is located a sufficient distance from the riparian zone of Yabba Creek and Sandy Creek. The use of control measures such as sediment traps/rock filter dams/modular sediment traps, along with soil management and stockpiling practices will be implemented to minimise erosion and sedimentation. Maintaining the ESC components via regular removal of water after storm events and de-silting. Water quality discharge requirements specified in the Erosion and Sediment Control Plan are to be met prior to discharge of any separated slurry to the environment. Sizing ESC components and water recycling/reuse components with appropriate redundancy/buffer capacity as determined by Queensland Hydro. A register that details sediment basin inspections, maintenance, discharge volumes and dates, flocculation details, discharge-water quality and volumes of sediment removed will be maintained. Site inspections are to be conducted (weekly routine) and prior to forecast rain of 25 mm over 24 hours to identify repair, maintenance or improvement works.	Unlikely	High	Medium	No degradation of the overall health of the Subtropical Eucalypt Floodplain Forest TEC	• Ongoing inspections and monitoring will be undertaken to ensure works are being undertaken within approved boundaries and limits. • Visual inspections noting: evidence of maintenance and effectiveness of ESC controls, plant health generally (deposition of sediments, chnages to hydrology/flows, evidence of dead/dying individuals, flowering, seeding, etc), evidence of disturbance/ maintenance of buffers and exclusion zones.	• Ongoing assessment of ESC with weekly checklist. Where controls are inappropriate or damaged, reinstatement or improvement of controls are to be conducted.
12	Subtropical eucalypt floodplain forest and woodland TEC (endangered)	Weeds	The subtropical eucalypt floodplain forest and woodland TEC occurs in the footprint. The extent of weeds was generally low, though *Lantana camara* was noted in several areas. Exploratory Works activities have the potential to increase the abundance of invasive plants in the Exploratory Works Project footprint and facilitate dispersal to previously unaffected areas. Movement of vehicles, equipment and personnel throughout the Project footprint is the key vector of transmission, in particular vehicles and equipment sourced from regions beyond the Exploratory Works Project footprint which may introduce new species. Seeds and fruits have the potential to be spread by clearing activities and vehicle movement, whilst establishment into new areas is highly likely after heavy rainfall as several thousand seeds can be produced per square metre that can remain viable for several years. Exploratory works activities could spread weeds including *Lantana camara* into areas of the TECs where weeds are not established.	Likely	Major	High	Hygiene control procedures will be in place throughout multiple stages of the Exploratory Works Project activities, including measures to reduce potential for introduction and spread of weeds: •Decontamination Washdown facilities will be installed at the two entrances to Queensland Hydro land so all vehicles will be washed prior to entry and exiting site. Decontamination practices will be implemented for all personnel and regular vehicle and machinery wash downs, especially when transferring between sites will assist in minimising the spread of weeds and Myrtle Rust. Multiple methods are available for treatment of vehicles including wet decontamination, heat and/or fumigation procedures. Hygiene checks will be conducted on all machinery or equipment being moved onto or out of the Exploratory Works Project site to minimise distribution of weed species and fungal pathogens. •Training Training and inductions for site employees and contractors to educate on the risks and mitigation requirements for weed spread. •Preclearing surveys and weed treatment Pre-clearance surveys will be performed to identify weeds, and large infestations to be treated prior to clearing to minimise the spread of weed seed and material. A weed register will be developed and maintained by Queensland Hydro for the duration of the Exploratory Works Project to manage weeds and ensure that management actions are having the desired effect. •High risk areas Identified areas of high risk weed or disease infestations (including 50 m buffer zone from TECs) will be signed and demarcated where required to avoid transporting plant reproductive material from these areas to areas that are not infested. •Weed management Weeds will be actively monitored and managed adjacent to Exploratory Works activities occurring within 50 m of TEC patches. Spraying herbicides, unless approved for use in the area including targeted spraying, will be avoided. Weed material will be disposed of in accordance with the *Biosecurity Act 2014* Site vehicle access will be restricted to existing roads and tracks.	Unlikely	Moderate	Low	No degradation of the overall health of the Subtropical Eucalypt Floodplain Forest TEC	• Quarterly weed monitoring in response to events which may trigger pest dispersion • Monitoring of designated management zones Bi annually for the project life span	• Increase Hygiene Control requirements if vehicles or equipment are found to introduce or spread new weeds. • Increase weed control efforts where required (i.e. after heavy rainfall) or if current controls are ineffective. • Review and update of the Biosecurity Management Plan and the species specific management actions.
13	Subtropical eucalypt floodplain forest and woodland TEC (endangered)	Disease	The subtropical eucalypt floodplain forest and woodland TEC occurs in the footprint. Exploratory Works Project activities have the potential to spread harmful pathogens that cause the dieback of ecologically important species within the Subtropical eucalypt floodplain forest TEC, including myrtaceous plants such as eucalypts, tea-trees and lillypillies. There are three main pathogens that pose a risk to the TEC including Myrtle Rust, caused by the micro fungus, *Austropuccinia psidii*, Armillaria root rot caused by the honey fungus, Armillaria spp., and Phytophthora disease, caused by the root-rot fungus *Phytophthora cinnamomic* and other Phytophthora species. Movement of vehicles, equipment, and personnel throughout the Project footprint are key vectors of transmission, in particular vehicles and equipment sourced from regions beyond the Exploratory Works Project footprint. Myrtle rust was recorded during the site assessments and is present on broad areas within the surveyed area. Fungal pathogens are most likely to spread in infected soils, plant material, and water, therefore access within the Exploratory Works Project footprint during rainfall should be kept to a minimum to prevent soils adhering to vehicles and pedestrians. Exploratory Works Project activities could spread myrtle rust into areas of previously unreflected habitat, potentially infecting species within the TEC, affecting individual species and preventing them from flowering or fruiting, and therefore, reproducing.	Likely	High	High	Hygiene control procedures will be in place throughout multiple stages of the Exploratory Works Project activities, including measures to reduce potential for introduction and spread of pathogens (e.g. myrtle rust, Armillaria root rot or Phytophthora disease): •Decontamination Washdown facilities will be installed at the two entrances to Queensland Hydro land so all vehicles will be washed prior to entry and exiting site. Decontamination practices will be implemented for all personnel and regular vehicle and machinery wash downs, especially when transferring between sites will assist in minimising the spread of weeds and Myrtle Rust. Multiple methods are available for treatment of vehicles including wet decontamination, heat and/or fumigation procedures. Hygiene checks will be conducted on all machinery or equipment being moved onto or out of the Exploratory Works Project site to minimise distribution of weed species and fungal pathogens. •Training Training and inductions for site employees and contractors to educate on the risks and mitigation requirements for weed spread. •Preclearing surveys and weed treatment Pre-clearance surveys will be conducted to identify pre-existing outbreaks of diseases including Myrtle Rust, Armillaria root rot, and Phytophthora disease impacting site TECs and terrestrial flora including Scrub turpentine within and adjacent to the Exploratory Works footprint. A pathogens register will be developed and maintained by Queensland Hydro for the duration of the Exploratory Works Project to manage weeds and disease infestations and ensure that management actions are having the desired effect. •High risk areas Identified areas of high risk weed or disease infestations (including 50 m buffer zone from TECs) will be signed and demarcated where required to avoid transporting plant reproductive material from these areas to areas that are not infested. Where myrtle rust, Armillaria root rot or Phytophthora disease is known or a risk, avoid parking near myrtaceous plants – for example bottle brushes, tea trees, lilly pillies and eucalypts – and thoroughly clean vehicles inside and out between site visits, along with equipment and personnel. •Weed management Weeds will be actively monitored and managed adjacent to Exploratory Works activities occurring within 50 m of TEC patches. Spraying herbicides, unless approved for use in the area including targeted spraying, will be avoided. Weed material will be disposed of in accordance with the *Biosecurity Act 2014* Site vehicle access will be restricted to existing roads and tracks. -	Possible	High	Medium	No degradation of the overall health of the Subtropical Eucalypt Floodplain Forest TEC	• Opportunistic observations. Targeted monitoring if required	• Increase Hygiene Control requirements if vehicles or equipment are found to introduce or spread new weeds. • Increase weed control efforts where required (i.e. after heavy rainfall) or if current controls are ineffective. • Review and update of the Biosecurity Management Plan and the species specific management actions.
14	Subtropical eucalypt floodplain forest and woodland TEC	Fire	The subtropical eucalypt floodplain forest and woodland TEC occurs in the footprint.	Possible	High	Medium	• Isolated protection zone has been allowed for around the Explosive store, along with appropriate emeghency response plans	Unlikely	High	Medium			• If soil dries have increased following heavy rainfall, control methods will be implemented as required (i.e. weed control or cool burns)
15	Coleus torrenticola (syn. Plectranthus torrenticola) (endangered) Brush sophora (Sophora fraseri) (vulnerable) Scrub turpentine (Rhodamnia rubescens) (critically endangered)	Clearing (habitat loss and fragmentation)	The threatened flora species are located in and adjacent to the Exploratory Works footprint, and habitat for these species also occurs in and adjacent to the footprint. Approximately 1 record of scrub turpentine and 5 records of brush sophora are located in the Exploratory Works footprint. A total of 1 record of *C. torrenticola* is located within the creek line of Sandy Creek, within the Exploratory Works footprint. Approximately 0.3 ha of *C. torrenticola* known habitat, 0.3 ha of *Sophora fraseri* (brush sophora) known habitat and 0.7 ha of *Rhodamnia rubescens* (scrub turpentine) known habitat will be cleared to upgrade existing tracks and construct new tracks and geotechnical work sites. While known records will be avoided through micrositing, it is possible that new records that cannot be avoided may be identified in the disturbance footprint during pre-clearance surveys. Clearing linear corridors through habitats has the potential to isolate plant populations by causing barriers to the dispersal of seeds and fruit and increasing edge effects (additional light entering the forest, weed encroachment, increased feral animal abundance and increased risk of bushfire), thereby reducing the ecological functioning of those areas and plant populations. If the Borumba PHES Project does not proceed, these features will be decommissioned and the environment rehabilitated (i.e., the impacts will be temporary). If the Borumba PHES Project proceeds, the features will form part of the existing environment for that project.	Highly Likely	High	High	•Pre-clearance survey Pre-clearance surveys will be undertaken by a suitably qualified ecologist to identify any additional individuals within and adjacent to the Project footprint. Noting that the Project footprint and 100 m buffer has already been comprehensively surveyed for the purposes of protected plants (i.e. clearing permit under the *Nature Conservation Act 1992*). •Minimising clearing requirements Working with the construction contractor to relocate infrastructure or optimise clearing (including micro-siting) extents to avoid or minimise habitat loss. Prior to the commencement of vegetation clearing, flagging tape, barricade fencing, fluorescent markers, signage, or a combination of these measures will be installed to clearly delineate restricted areas and clearing boundaries. This will avoid unnecessary clearing and ensure personnel and vehicle(s) stay within the approved Exploratory Works Project footprint, avoiding contravention of disturbance limits. Flagging tape, fencing, fluorescent markers and signage will be inspected daily and any damaged fencing, missing flagging tape or fluorescent markers will be repaired to ensure they remain in serviceable condition. •Unexpected find Works will be undertaken in accordance with the unexpected finds procedure, which involves: –stop works in the vicinity of the find –demarcate and prevent access to area –comprehensively survey the population of the threatened species to determine the number of plants potentially impacted and spatial extent –explore options for avoidance –if impacts cannot be avoided engage with DCCEEW and DETSI in relation to approvals to clear.	Highly Likely	High	High	Clearing is limited to 0.3 ha of *C. torrenticola* known habitat, 0.3 ha of *Sophora fraseri* (brush sophora) known habitat and 0.7 ha of *Rhodamnia rubescens* (scrub turpentine) known habitat respectively	• Monitoring will be undertaken to ensure exclusion zones and signage remains in serviceable condition. • Daily visual inspections of records next to works areas noting: evidence of dust deposition on plants, plant health generally (evidence of dead/dying individuals, flowering, seeding, etc), evidence of disturbance/ maintenance of buffers and exclusion zones.	• Implementation of the unexpected threatened species finds procedure (refer to the FFMP). • This CEMP and FFMP will be reviewed and updated as required.
16	Coleus torrenticola (syn. Plectranthus torrenticola) (endangered) Brush sophora (Sophora fraseri) (vulnerable) Scrub turpentine (Rhodamnia rubescens) (critically endangered)	Hazardous Materials	The threatened flora species have been recorded within and adjacent to the Exploratory Works footprint, and habitat for these species also occurs in and adjacent to the footprint. Approximately 1 record of scrub turpentine and 5 records of brush sophora are located in the Exploratory Works footprint. A total of 1 record of *C. torrenticola* is located within the creek line of Sandy Creek, within the Exploratory Works footprint. Exploratory Works Project activities have the potential to lead to accidental releases of hazardous materials, such as fuels and oils from vehicles and machinery. These hazardous materials can lead to localised soil contamination and contamination of water resources, which in turn can cause injury, reduced vigour, or mortality to threatened flora and degrade habitat. Improper disposal of hazardous waste, such as chemical waste, can also lead to soil pollution, and if not properly manage can leach into the soil and contaminate it leading to vegetation dieback or disease (Hamonia & Sharma, 2020).	Possible	High	Medium	Spoil reuse targets have been identified across material categories expected from DETSIgn. Reuse categories are linked to spoil contamination risk and provisional potential reuse targets have been identified for each category as below: • unrestricted spoil – 100 % • other clean earth – 80 % • non-regulated waste/general waste – 25 % • category 2 regulated waste – 10 % • category 1 regulated waste – 0 % • potentially contaminated soils – 50 % • acid sulfate soils – 20 % • acid-forming rock – 20 % • naturally occurring asbestos material – 0 %. • Testing of material as it is removed from disturbed areas, including the exploratory tunnel, to determine any acid sulfate soil, potential acid sulfate soil or contaminates. • Implement recommendations form the contaminated land investigations. • All chemicals, fuel and oil will be stored in above ground tanks in bunded areas, with accurate records maintained of volumes purchased and stored, to ensure any contamination of land or water is prevented. and any spill is detected quickly. • Contain poor quality discharge water and treat prior to disposal, subject to achieving water quality guidelines. • Disposal methods and responses are identified within the Spoil Management Plan (refer to Appendix B) and are linked to the spoil material category. • Design storage areas to consist of a compacted base, bunding to contain spillages and roofing to prevent contamination and infiltration of stormwater (as per AS1940 and AS3780). • Management plans for select (as required) discoverable contaminants (i.e. acid-rock drainage, naturally occurring asbestos) will be developed upon identification from preliminary drilling/earthworks during Exploratory Works. • Residual hazardous materials will be removed from the construction site and returned to an appropriate storage area or a suitable waste facility. Control of potential offsite mobilisation of contamination will be implemented through the following: • during excavations, materials that are contaminated and not suitable for remediation and onsite storage will be loaded directly onto licensed transport vehicles for offsite disposal • stockpiling of contaminated soils will be avoided where possible via the in-situ waste classification and identification of potentially contaminated materials • assigning secure location for storage of reusable and recyclable materials on site	Unlikely	High	Medium			• Assessment of spoil to be conducted as part of excavation tracking. Where disposal method is deemed inappropriate, further controls to be compiled and managed upon discovery of unknown contaminant. • Weekly assessment of any stockpiling and where controls are inappropriate or damaged, reinstatement or improvement of controls are to be conducted. • In the event of a spillage/leak of potentially hazardous substances: · Comply with the Emergency Spill Containment Plan. · Investigate the nature and extent of the spillage/leakage, and implement clean-up and mitigation measures, as necessary.
17	Coleus torrenticola (syn. Plectranthus torrenticola) (endangered) Brush sophora (Sophora fraseri) (vulnerable) Native guava (Rhodomyrtus psidioides) (critically endangered) Scrub turpentine (Rhodamnia rubescens) (critically endangered)	Air quality/ dust	The threatened flora species have been recorded within and adjacent to the Exploratory Works footprint, and habitat for these species also occurs in and adjacent to the footprint. Approximately 1 record of scrub turpentine and 5 records of brush sophora are located in the Exploratory Works footprint. A total of 1 records of *C. torrenticola* is located within the creek line of Sandy Creek, within the Exploratory Works footprint. Dust emissions from vegetation clearing, earthworks and vehicle movements during construction has the potential to impact threatened flora temporarily and locally in the vicinity of the Exploratory Works Project footprint. Dust is expected to only be a potential issue during vegetation clearing and construction (e.g., due to vehicle movements). Excess generation of dust and subsequent deposition on leaves can impair plant photosynthesis and productivity and alter soil properties resulting in reduced vigour or mortality to threatened flora and degrade habitat.	Highly Likely	High	High	• Areas which have potential to generate airborne dust will be wetted down regularly or covered wherever practicable. • Resheeting and sealing of roads and tracks to minimise dust generation. • Regular cleaning of machinery and vehicle tyres to reduce dust emissions. • Low speed limits will be implemented across the Exploratory Works Project to minimise dust generation. • Any areas no longer required for operational activities will be rehabilitated as soon as practicable. • Machinery and vehicle tyres will be regularly cleaned to reduce wheel entrained dust emissions or consider use of vibration grids. • Spraying of herbicides, aerosols and other chemicals to be undertaken in suitable weather conditions (i.e. low wind speed). • Use of dust suppression to reduce offsite dust impacts.	Possible	High	Medium			• Increase frequency of dust suppression if dust nuisance is observed by site construction or environmental manager or if a compliant is received.
18	Coleus torrenticola (syn. Plectranthus torrenticola) (endangered) Brush sophora (Sophora fraseri) (vulnerable) Native guava (Rhodomyrtus psidioides) (critically endangered) Scrub turpentine (Rhodamnia rubescens) (critically endangered)	Erosion and sedimentation	The threatened flora species have been recorded within and adjacent to the Exploratory Works footprint, and habitat for these species also occurs in and adjacent to the footprint. Approximately 1 record of scrub turpentine and 5 records of brush sophora are located in the Exploratory Works footprint. A total of 1 record of *C. torrenticola* is located within the creek line of Sandy Creek, within the Exploratory Works footprint. Vegetation clearing, earthmoving and general construction activities may all result in an increase to natural erosion and sedimentation within the Exploratory Works footprint. This increased erosion and sedimentation could potentially have localised impacts upon overland flow rates within the vicinity of the proposed works. Changes in the hydrology of the Exploratory Works footprint may occur through alteration of surface flows and stormwater runoff, including obstruction of flow. This can result in scouring or waterlogging occurring in some areas.	Highly Likely	High	High	A preliminary Erosion and Sediment Control Plan has been developed and will be implemtned for the Project, the plan includes the following mitigation measures: •Minimising risk of dispersible subsoils Strategies to minimise risk include limiting their disturbance, use of gypsum and covering dispersive material (e.g. buried under a minimum of 100 mm layers of non-dispersive soils before placing any revegetation or erosion control measures). Preclearance surveys and soil mapping to be developed identifing areas of concern •Controls during construction and clearing To minimise erosion in or adjacent to the proposed Exploratory Works Project footprint, soil disturbance will be minimised and clearing methods of blading and grubbing are avoided. Activities will be scheduled, where practicable, to avoid the summer months where high intensity storms are more prevalent. Avoid locating works within watercourses, drainage lines or overland flow paths, and known areas of erosion. Designing and constructing waterway crossings in accordance with riverine protection permit and ADR expectations (though exemptions from the need to obtain the permit may be available). Implementing a buffer zone around the spoil disposal area so spoil is located a sufficient distance from the riparian zone of Yabba Creek and Sandy Creek. The use of control measures such as sediment traps/rock filter dams/modular sediment traps, along with soil management and stockpiling practices will be implemented to minimise erosion and sedimentation. Maintaining the ESC components via regular removal of water after storm events and de-silting. Water quality discharge requirements specified in the Erosion and Sediment Control Plan are to be met prior to discharge of any separated slurry to the environment. Sizing ESC components and water recycling/reuse components with appropriate redundancy/buffer capacity as determined by Queensland Hydro. A register that details sediment basin inspections, maintenance, discharge volumes and dates, flocculation details, discharge-water quality and volumes of sediment removed will be maintained. Site inspections are to be conducted (weekly routine) and prior to forecast rain of 25 mm over 24 hours to identify repair, maintenance or improvement works.	Unlikely	High	Medium			• Ongoing assessment of ESC with weekly checklist. Where controls are inappropriate or damaged, reinstatement or improvement of controls are to be conducted.
19	Coleus torrenticola (syn. Plectranthus torrenticola) (endangered)	Weeds	Crofton weed (*Ageratina adenophora*) and mistflower (*Ageratina riparia*) are significant threats to the *Coleus torrenticola* (DCCEEW, 2008). They infest areas of suitable habitat and outcompete *Coleus torrenticola* . Crofton weed and mistflower occur in the Exploratory Works footprint but are absent from the area where the *Coleus torrenticola* population has been identified. Exploratory Works activities could spread crofton weed and mistflower into areas of potential habitat for *Coleus torrenticola* where the weeds are not established. Exploratory Works could encroach on habitat, leading to habitat loss and degradation via weed introduction to previously vegetated areas.	Possible	High	Medium	• Particular care should be taken to ensure that any fill is sourced from areas free of Crofton Weed (*Ageratina adenophora*) and Mistflower (*Ageratina riparia*) which compete for habit and are known to be a significant threat to *Coleus torrenticola* . Hygiene control procedures will be in place throughout multiple stages of the Exploratory Works Project activities, including measures to reduce potential for introduction and spread of weeds: •Decontamination Washdown facilities will be installed at the two entrances to Queensland Hydro land so all vehicles will be washed prior to entry and exiting site. Decontamination practices will be implemented for all personnel and regular vehicle and machinery wash downs, especially when transferring between sites will assist in minimising the spread of weeds and Myrtle Rust. Multiple methods are available for treatment of vehicles including wet decontamination, heat and/or fumigation procedures. Hygiene checks will be conducted on all machinery or equipment being moved onto or out of the Exploratory Works Project site to minimise distribution of weed species and fungal pathogens. •Training Training and inductions for site employees and contractors to educate on the risks and mitigation requirements for weed spread. •Preclearing surveys and weed treatment Pre-clearance surveys will be performed to identify weeds, and large infestations to be treated prior to clearing to minimise the spread of weed seed and material. A weed register will be developed and maintained by Queensland Hydro for the duration of the Exploratory Works Project to manage weeds and ensure that management actions are having the desired effect. •High risk areas Identified areas of high risk weed or disease infestations (including 50 m buffer zone from TECs) will be signed and demarcated where required to avoid transporting plant reproductive material from these areas to areas that are not infested. •Weed management Weeds will be actively monitored and managed adjacent to Exploratory Works activities occurring within 50 m of TEC patches. Spraying herbicides, unless approved for use in the area including targeted spraying, will be avoided. Weed material will be disposed of in accordance with the *Biosecurity Act 2014* Site vehicle access will be restricted to existing roads and tracks.	Unlikely	High	Medium	Avoid weed infestation of known Coleus torrenticola populations	• Quarterly Monitoring in response to events which may trigger pest dispersion • Monitoring of designated management areas Bi annually for the project life span	• Increase Hygiene Control requirements if vehicles or equipment are found to introduce or spread new weeds. • Increase weed control efforts where required (i.e. after heavy rainfall) or if current controls are ineffective. • Review and update of the Biosecurity Management Plan and the species specific management actions.

No.	Risk description and controls			Risk level (without controls)			Risk level (post controls)			Performance objective	Monitoring measures	Risk treatment plan
	Environmental value impacted	Impact	Impact description	Likelihood	Consequence	Risk level	Avoidance and mitigation measures	Likelihood	Consequence	Risk level			
20	Scrub turpentine (Rhodamnia rubescens) (critically endangered)	Weeds	Rhodamnia rubescens records and habitat are located in and adjacent the Exploratory Works footprint. Exploratory Works activities have the potential to increase the abundance of weeds in the Exploratory Works footprint and facilitate dispersal to previously unaffected areas. Movement of vehicles, equipment and personnel throughout the Exploratory Works Project footprint is the key vector of transmission, in particular vehicles and equipment sourced from regions beyond the Project footprint which may introduce new species. Many weed species thrive on disturbed ground and will rapidly colonise disturbed areas in advance of native species recolonisation. Seeds and fruits have the potential to be spread by clearing activities and vehicle movement, whilst establishment into new areas is highly likely after heavy rainfall as several thousand seeds can be produced per square metre that can remain viable for several years. The spread of weeds is also a risk during ongoing Exploratory Works activities associated with the Project. Exploratory works activities could spread weeds or encourage the spread of weeds into areas of potential habitat previously free of weeds, potentially outcompeting Rhodamnia rubescens and leading to decline of the population locally.	Possible	Moderate	Medium	•Hygiene control procedures will be in place throughout multiple stages of the Exploratory Works Project activities, including measures to reduce potential for introduction and spread of weeds: •Decontamination Washdown facilities will be installed at the two entrances to Queensland Hydro land so all vehicles will be washed prior to entry and exiting site. Decontamination practices will be implemented for all personnel and regular vehicle and machinery wash downs, especially when transferring between sites will assist in minimising the spread of weeds and Myrtle Rust. Multiple methods are available for treatment of vehicles including wet decontamination, heat and/or fumigation procedures. Hygiene checks will be conducted on all machinery or equipment being moved onto or out of the Exploratory Works Project site to minimise distribution of weed species and fungal pathogens. • Training Training and inductions for site employees and contractors to educate on the risks and mitigation requirements for weed spread. •Preclearing surveys and weed treatment Pre-clearance surveys will be performed to identify weeds, and large infestations to be treated prior to clearing to minimise the spread of weed seed and material. A weed register will be developed and maintained by Queensland Hydro for the duration of the Exploratory Works Project to manage weeds and ensure that management actions are having the desired effect. •High risk areas Identified areas of high risk weed or disease infestations (including 50 m buffer zone from TECs) will be signed and demarcated where required to avoid transporting plant reproductive material from these areas to areas that are not infested. •Weed management Weeds will be actively monitored and managed adjacent to Exploratory Works activities occurring within 50 m of TEC patches. Spraying herbicides, unless approved for use in the area including targeted spraying, will be avoided. Weed material will be disposed of in accordance with the *Biosecurity Act 2014* Site vehicle access will be restricted to existing roads and tracks.	Unlikely	Moderate	Low	Avoid weed infestation of known Rhodamnia rubescens populations	• Quarterly Monitoring in response to events which may trigger pest dispersion • Monitoring of designated management areas Bi annually for the project life span	• Increase Hygiene Control requirements if vehicles or equipment are found to introduce or spread new weeds. • Increase weed control efforts where required (i.e. after heavy rainfall) or if current controls are ineffective. • Review and update of the Biosecurity Management Plan and the species specific management actions.
21	Brush sophora (Sophora fraseri) (vulnerable)	Weeds	Sophora fraseri records and habitat are located in and adjacent to the Exploratory Works footprint The invasive lantana (Lantana camara) is known to infest areas of suitable habitat and outcompete Sophora fraseri. It is listed as a known threat to the species (DCCEEW, 2008a). Lantana camara is widespread throughout historically disturbed areas of the Exploratory Works footprint. Exploratory Works activities could spread weeds or encourage the spread of weeds including lantana into areas of habitat previously free of weeds, potentially outcompeting Sophora fraseri and leading to decline of the population locally.	Possible	Moderate	Medium	Hygiene control procedures will be in place throughout multiple stages of the Exploratory Works Project activities, including measures to reduce potential for introduction and spread of weeds: •Decontamination Washdown facilities will be installed at the two entrances to Queensland Hydro land so all vehicles will be washed prior to entry and exiting site. Decontamination practices will be implemented for all personnel and regular vehicle and machinery wash downs, especially when transferring between sites will assist in minimising the spread of weeds and Myrtle Rust. Multiple methods are available for treatment of vehicles including wet decontamination, heat and/or fumigation procedures. Hygiene checks will be conducted on all machinery or equipment being moved onto or out of the Exploratory Works Project site to minimise distribution of weed species and fungal pathogens. • Training Training and inductions for site employees and contractors to educate on the risks and mitigation requirements for weed spread. •Preclearing surveys and weed treatment Pre-clearance surveys will be performed to identify weeds, and large infestations to be treated prior to clearing to minimise the spread of weed seed and material. A weed register will be developed and maintained by Queensland Hydro for the duration of the Exploratory Works Project to manage weeds and ensure that management actions are having the desired effect. •High risk areas Identified areas of high risk weed or disease infestations (including 50 m buffer zone from TECs) will be signed and demarcated where required to avoid transporting plant reproductive material from these areas to areas that are not infested. •Weed management Weeds will be actively monitored and managed adjacent to Exploratory Works activities occurring within 50 m of TEC patches. Spraying herbicides, unless approved for use in the area including targeted spraying, will be avoided. Weed material will be disposed of in accordance with the *Biosecurity Act 2014* Site vehicle access will be restricted to existing roads and tracks.	Unlikely	Moderate	Low	Avoid weed infestation of known Sophora fraseri populations	• Quarterly Monitoring in response to events which may trigger pest dispersion • Monitoring of designated management areas Bi annually for the project life span	• Increase Hygiene Control requirements if vehicles or equipment are found to introduce or spread new weeds. • Increase weed control efforts where required (i.e. after heavy rainfall) or if current controls are ineffective. • Review and update of the Biosecurity Management Plan and the species specific management actions.
22	Scrub turpentine (Rhodamnia rubescens) (critically endangered) Native guava (Rhodomyrtus psidioides) (critically endangered)	Disease	Rhodamnia rubescens records and habitat are located in and adjacent the Exploratory Works footprint, and Rhodomyrtus psidioides was located in the Borumba PHES Survey area approximately 10 m from the Exploratory Works footprint. *Rhodamnia rubescens* and *Rhodomyrtus psidioides* are highly susceptible to myrtle rust (Austropuccinia psidii), which is highly transportable. It is spread by contaminated clothing, infected plant material, equipment and hand tools (TSSC, 2020). Myrtle rust is the key threat to the species (TSSC, 2020). Myrtle rust was recorded during the site assessments and is present in the vicinity of the Exploratory Works Project. A number of *Rhodamnia rubescens* individuals were observed to be infected with myrtle rust, however their location (away from roadsides) indicates that the fungus is likely not being spread by purely anthropogenic means. Exploratory Works activities could spread myrtle rust into areas of previously uninfected potential habitat, potentially infecting Rhodamnia rubescens individuals preventing them from flowering or fruiting, and therefore reproducing. Spreading myrtle rust could lead to a decline in health and/or loss of *Rhodamnia rubescens* and *Rhodomyrtus psidioides* populations locally.	Possible	Major	High	Hygiene control procedures will be in place throughout multiple stages of the Exploratory Works Project activities, including measures to reduce potential for introduction and spread of pathogens (e.g. myrtle rust, Armillaria root rot or Phytophthora disease): •Decontamination Washdown facilities will be installed at the two entrances to Queensland Hydro land so all vehicles will be washed prior to entry and exiting site. Decontamination practices will be implemented for all personnel and regular vehicle and machinery wash downs, especially when transferring between sites will assist in minimising the spread of weeds and Myrtle Rust. Multiple methods are available for treatment of vehicles including wet decontamination, heat and/or fumigation procedures. Hygiene checks will be conducted on all machinery or equipment being moved onto or out of the Exploratory Works Project site to minimise distribution of weed species and fungal pathogens. • Training Training and inductions for site employees and contractors to educate on the risks and mitigation requirements for weed spread. •Preclearing surveys and weed treatment Pre-clearance surveys will be conducted to identify pre-existing outbreaks of diseases including Myrtle Rust, Armillaria root rot, and Phytophthora disease impacting site TECs and terrestrial flora including Scrub turpentine within and adjacent to the Exploratory Works footprint. A pathogens register will be developed and maintained by Queensland Hydro for the duration of the Exploratory Works Project to manage weed and disease infestations and ensure that management actions are having the desired effect. •High risk areas Identified areas of high risk weed or disease infestations (including 50 m buffer zone from TECs) will be signed and demarcated where required to avoid transporting plant reproductive material from these areas to areas that are not infested. Where myrtle rust, Armillaria root rot or Phytophthora disease is known or a risk avoid parking near myrtaceous plants – for example bottle brushes, tea trees, lily pillies and eucalypts – and thoroughly clean vehicles inside and out between site visits, along with equipment and personnel. •Weed management Weeds will be actively monitored and managed adjacent to Exploratory Works activities occurring within 50 m of TEC patches. Spraying herbicides, unless approved for use in the area including targeted spraying, will be avoided. Weed material will be disposed of in accordance with the *Biosecurity Act 2014* Site vehicle access will be restricted to existing roads and tracks. -	Unlikely	Major	High	Maintain overall health of known Rhodamnia rubescens and Rhodomyrtus psidioides populations	Opportunistic observations. Targeted monitoring if required	• Increase Hygiene Control requirements if vehicles or equipment are found to introduce or spread new weeds. • Increase weed control efforts where required (i.e. after heavy rainfall) or if current controls are ineffective. • Review and update of the Biosecurity Management Plan and the species specific management actions.
23	*Coleus omissus* (syn. *Plectranthus omissus*) (endangered) Ball Nut (*Floydia praealta*) (vulnerable) Macadamia Nut (*Macadamia integrifolia*) (vulnerable) Native guava (*Rhodomyrtus psidioides*) (critically endangered) Small-fruited Queensland nut (*Macadamia ternifolia*) (vulnerable) Three-leaved bosistoa (*Bosistoa transversa*) (vulnerable)	Clearing (habitat loss and fragmentation)	These threatened flora species are known or likely to occur in or adjacent to the Exploratory Works footprint as habitat occurs in and adjacent to the footprint. There is no known habitat for *Rhodomyrtus psidioides* in the Project footprint (known habitat associated with gullies in the upper reservoir where rainforest species are present), however 10 ha of potential habitat occurs within the Project footprint. Noting that the design has avoided known habitat for this species. No known habitat for the following species will be cleared, however, approximately 1.1 ha of *C. omissus* potential habitat, 2.7 ha of *Floydia praealta* potential habitat, 2.7 ha of *Macadamia integrifolia* potential habitat, 2.7 ha of *Macadamia ternifolia* potential habitat and 7.3 ha of *Bosistoa transversa* potential habitat will be cleared for the Exploratory Works. Habitat for threatened flora will be cleared to upgrade existing tracks, construct new tracks, and for geotechnical work sites. It is possible that new records of these species may be identified in the footprint during pre-clearance surveys. Clearing linear corridors through habitat has the potential to isolate plant populations by causing barriers to the dispersal of seeds and fruit and increasing edge effects (additional light entering the forest, weed encroachment, increased feral animal abundance and increased risk of bushfire), thereby reducing the ecological functioning of those areas and plant populations. If the Borumba PHES Project does not proceed, these features will be decommissioned and the environment rehabilitated (i.e., the impacts will be temporary), if the Borumba PHES Project proceeds, the features will form part of the existing environment for that project.	Highly Likely	High	High	•Pre-clearance survey Pre-clearance surveys will be undertaken by a suitably qualified ecologist to identify any additional individuals within and adjacent to the Project footprint. Noting that the Project footprint and 100 m buffer has already been comprehensively surveyed for the purposes of protected plants (i.e. clearing permit under the *Nature Conservation Act 1992*). •Minimising clearing requirements Working with the construction contractor to relocate infrastructure or optimise clearing (including micro-siting) extents to avoid or minimise habitat loss. Prior to the commencement of vegetation clearing, flagging tape, barricade fencing, fluorescent markers, signage, or a combination of these measures will be installed to clearly delineate restricted areas and clearing boundaries. This will avoid unnecessary clearing and ensure personnel and vehicle(s) stay within the approved Exploratory Works Project footprint, avoiding contravention of disturbance limits. Flagging tape, fencing, fluorescent markers and signage will be inspected daily and any damaged fencing, missing flagging tape or fluorescent markers will be repaired to ensure they remain in serviceable condition. •Unexpected find Works will be undertaken in accordance with the unexpected finds procedure, which involves: –stop works in the vicinity of the find –demarcate and prevent access to area –comprehensively survey the population of the threatened species to determine the number of plants potentially impacted and spatial extent –explore options for avoidance –if impacts cannot be avoided engage with DCCEEW and DETSI in relation to approvals to clear.	Possible	Moderate	Medium	No clearing of individuals	• Monitoring will be undertaken to ensure exclusion zones and signage remains in serviceable condition. • Daily visual inspections of records next to works areas noting: evidence of dust deposition on plants, plant health generally (evidence of dead/dying individuals, flowering, seeding, etc), evidence of disturbance/ maintenance of buffers and exclusion zones.	• Implementation of the unexpected threatened species finds procedure (refer to the FFMP). • This CEMP and FFMP will be reviewed and updated as required.
24	*Coleus omissus* (syn. *Plectranthus omissus*) (endangered) Ball Nut (*Floydia praealta*) (vulnerable) Macadamia Nut (*Macadamia integrifolia*) (vulnerable) Native guava (*Rhodomyrtus psidioides*) (critically endangered) Small-fruited Queensland nut (*Macadamia ternifolia*) (vulnerable) Three-leaved bosistoa (*Bosistoa transversa*) (vulnerable)	Hazardous materials	These threatened flora species are known or likely to occur in or adjacent to the Exploratory Works footprint as habitat occurs in and adjacent to the footprint. Exploratory Works Project activities have the potential to lead to accidental releases of hazardous materials, such as fuels and oils from vehicles and machinery. These hazardous materials can lead to localised soil contamination and contamination of water resources, which in turn can cause injury, reduced vigour or mortality to threatened flora and degrade habitat. The severity of the impact is dependent on the location and magnitude of the release.	Possible	High	Medium	Spoil reuse targets have been identified across material categories expected from design. Reuse categories are linked to spoil contamination risk and provisional potential reuse targets have been identified for each category as below: • unrestricted spoil – 100 % • other clean earth – 80 % • non-regulated waste (general waste – 25 % • category 2 regulated waste – 10 % • category 1 regulated waste – 0 % • potentially contaminated soils – 50 % • acid sulfate soils – 20 % • acid-forming rock – 20 % • naturally occurring asbestos material – 0 %. • Testing of material as it is removed from disturbed areas, including the exploratory tunnel, to determine any acid sulfate soil, potential acid sulfate soil or contaminants. • Implement recommendations form the contaminated land investigations. • All chemicals, fuel and oil will be stored in above ground tanks in bunded areas, with accurate records maintained of volumes purchased and stored, to ensure any contamination of land or water is prevented, and any spill is detected quickly. • Contain poor quality discharge water and treat prior to disposal, subject to achieving water quality guidelines. • Disposal methods and responses are identified within the Spoil Management Plan (refer to Appendix B) and are linked to the spoil material category. • Design storage areas to consist of a compacted base, bunding to contain spillages and roofing to prevent contamination and infiltration of stormwater (as per AS1940 and AS3780). • Management plans for select (as required) discoverable contaminants (i.e. acid-rock drainage, naturally occurring asbestos) will be developed upon identification from preliminary drilling/earthworks during Exploratory Works. • Residual hazardous materials will be removed from the construction site and returned to an appropriate storage area or a suitable waste facility. Control of potential offsite mobilisation of contamination will be implemented through the following: • during excavations, materials that are contaminated and not suitable for remediation and onsite storage will be loaded directly onto licensed transport vehicles for offsite disposal • stockpiling of contaminated soils will be avoided where possible via the in-situ waste classification and identification of potentially contaminated materials • assigning secure location for storage of reusable and recyclable materials on site	Unlikely	High	Medium			• Assessment of spoil to be conducted as part of excavation tracking. Where disposal method is deemed inappropriate, further controls to be compiled and managed upon discovery of unknown contaminant. • Weekly assessment of any stockpiling and where controls are inappropriate or damaged, reinstatement or improvement of controls are to be conducted. • In the event of a spillage/leak of potentially hazardous substances: · Comply with the Emergency Spill Containment Plan. · Investigate the nature and extent of the spillage/leakage, and implement clean-up and mitigation measures, as necessary.
25	*Coleus omissus* (syn. *Plectranthus omissus*) (endangered) Ball Nut (*Floydia praealta*) (vulnerable) Macadamia Nut (*Macadamia integrifolia*) (vulnerable) Native guava (*Rhodomyrtus psidioides*) (critically endangered) Small-fruited Queensland nut (*Macadamia ternifolia*) (vulnerable) Three-leaved bosistoa (*Bosistoa transversa*) (vulnerable)	Air quality/ dust	These threatened flora species are known or likely to occur in or adjacent to the Exploratory Works footprint as habitat occurs in and adjacent to the footprint. Dust emissions from vegetation clearing, earthworks and vehicle movements during construction has the potential to impact threatened flora temporarily and locally, in the vicinity of the Exploratory Works Project footprint. Dust is expected to only be a potential issue during vegetation clearing and construction. Excess generation of dust and subsequent deposition on leaves can impair plant photosynthesis and productivity and alter soil properties resulting in reduced vigour or mortality to threatened flora and degrade habitat.	Highly Likely	High	High	• Areas which have potential to generate airborne dust will be wetted down regularly or covered wherever practicable. • Reshearing and sealing of roads and tracks to minimise dust generation. • Regular cleaning of machinery and vehicle tyres to reduce dust emissions. • Low speed limits will be implemented across the Exploratory Works Project to minimise dust generation. • Any areas no longer required for operational activities will be rehabilitated as soon as practicable. • Machinery and vehicle tyres will be regularly cleaned to reduce wheel entrained dust emissions or consider use of vibration grids. • Spraying of herbicides, aerosols and other chemicals to be undertaken in suitable weather conditions (i.e. low wind speed). • Use of dust suppression to reduce offsite dust impacts.	Possible	High	Medium			• Increase frequency of dust suppression if dust nuisance is observed by site construction or environmental manager or if a complaint is received.
26	Coleus omissus (syn. Plectranthus omissus) (endangered) Ball Nut (Floydia praealta) (vulnerable) Macadamia Nut (Macadamia integrifolia) (vulnerable) Small-fruited Queensland nut (Macadamia ternifolia) (vulnerable) Three-leaved bosistoa (Bosistoa transversa) (vulnerable)	Erosion and sedimentation	These threatened flora species are known or likely to occur in or adjacent to the Exploratory Works footprint as habitat occurs in and adjacent to the footprint. Vegetation clearing, earthmoving and general construction activities may all result in an increase to natural erosion and sedimentation within the Exploratory Works footprint. This increased erosion and sedimentation could potentially have localised impacts upon overland flow rates within the vicinity of the proposed works. Changes in the hydrology of the Exploratory Works footprint may occur through alteration of surface flows and stormwater runoff, including obstruction of flow. This can result in scouring or waterlogging occurring in some areas.	Highly Likely	High	High	A preliminary Erosion and Sediment Control Plan has been developed and will be implemtmned for the Project, the plan includes the following mitigation measures: •Minimising risk of dispersible subsoils Strategies to minimise risk include limiting their disturbance, use of gypsum and covering dispersive material (e.g. buried under a minimum of 100 mm layers of non-dispersive soils before placing any revegetation or erosion control measures). Preclearance surveys and soil mapping to be developed identifing areas of concern •Controls during construction and clearing To minimise erosion in or adjacent to the proposed Exploratory Works Project footprint, soil disturbance will be minimised and clearing methods of blading and grubbing are avoided. Activities will be scheduled, where practicable, to avoid the summer months where high intensity storms are more prevalent. Avoid locating works within watercourses, drainage lines or overland flow paths, and known areas of erosion. Designing and constructing waterway crossings in accordance with riverine protection permit and ADR expectations (though exemptions from the need to obtain the permit may be available). Implementing a buffer zone around the spoil disposal area so spoil is located a sufficient distance from the riparian zone of Yabba Creek and Sandy Creek. The use of control measures such as sediment traps/rock filter dams/modular sediment traps, along with soil management and stockpiling practices will be implemented to minimise erosion and sedimentation. Maintaining the ESC components via regular removal of water after storm events and de-silting. Water quality discharge requirements specified in the Erosion and Sediment Control Plan are to be met prior to discharge of any separated slurry to the environment. Sizing ESC components and water recycling/reuse components with appropriate redundancy/buffer capacity as determined by Queensland Hydro. A register that details sediment basin inspections, maintenance, discharge volumes and dates, flocculation details, discharge-water quality and volumes of sediment removed will be maintained. Site inspections are to be conducted (weekly routine) and prior to forecast rain of 25 mm over 24 hours to identify repair, maintenance or improvement works.	Unlikely	High	Medium			• Ongoing assessment of ESC with weekly checklist. Where controls are inappropriate or damaged, reinstatement or improvement of controls are to be conducted.
27	Ball Nut (Floydia praealta) (vulnerable) Native guava (Rhodomyrtus psidioides) (critically endangered) Small-fruited Queensland nut (Macadamia ternifolia) (vulnerable) Three-leaved bosistoa (Bosistoa transversa) (vulnerable)	Weeds	These threatened flora species are known or likely to occur in or adjacent to the Exploratory Works footprint as habitat occurs in and adjacent to the footprint. Exploratory Works activities have the potential to increase the abundance of invasive plants in the Exploratory Works Project footprint and facilitate dispersal to previously unaffected areas. Movement of vehicles, equipment and personnel throughout the Project footprint is the key vector of transmission, in particular vehicles and equipment sourced from regions beyond the footprint which may introduce new species. Seeds and fruits have the potential to be spread by clearing activities and vehicle movement, whilst establishment into new areas is highly likely after heavy rainfall as several thousand seeds can be produced per square metre that can remain viable for several years. Weed infestation can degrade habitat and outcompete threatened flora, if they are present.	Possible	Major	High	Hygiene control procedures will be in place throughout multiple stages of the Exploratory Works Project activities, including measures to reduce potential for introduction and spread of weeds: •Decontamination Washdown facilities will be installed at the two entrances to Queensland Hydro land so all vehicles will be washed prior to entry and exiting site. Decontamination practices will be implemented for all personnel and regular vehicle and machinery wash downs, especially when transferring between sites will assist in minimising the spread of weeds and Myrtle Rust. Multiple methods are available for treatment of vehicles including wet decontamination, heat and/or fumigation procedures. Hygiene checks will be conducted on all machinery or equipment being moved onto or out of the Exploratory Works Project site to minimise distribution of weed species and fungal pathogens. • Training Training and inductions for site employees and contractors to educate on the risks and mitigation requirements for weed spread. •Preclearing surveys and weed treatment Pre-clearance surveys will be performed to identify weeds, and large infestations to be treated prior to clearing to minimise the spread of weed seed and material. A weed register will be developed and maintained by Queensland Hydro for the duration of the Exploratory Works Project to manage weeds and ensure that management actions are having the desired effect. •High risk areas Identified areas of high risk weed or disease infestations (including 50 m buffer zone from TECs) will be signed and demarcated where required to avoid transporting plant reproductive material from these areas to areas that are not infested. •Weed management Weeds will be actively monitored and managed adjacent to Exploratory Works activities occurring within 50 m of TEC patches. Spraying herbicides, unless approved for use in the area including targeted spraying, will be avoided. Weed material will be disposed of in accordance with the *Biosecurity Act 2014* Site vehicle access will be restricted to existing roads and tracks.	Unlikely	Moderate	Low	Avoid weed infestation of known individuals and populations	• Quarterly Monitoring in response to events which may trigger pest dispersion • Monitoring of designated management zones Bi annually for the project life span	• Increase Hygiene Control requirements if vehicles or equipment are found to introduce or spread new weeds. • Increase weed control efforts where required (i.e. after heavy rainfall) or if current controls are ineffective. • Review and update of the Biosecurity Management Plan and the species specific management actions.
28	Coleus omissus (syn. Plectranthus omissus) (endangered)	Weeds	While C. omissus was not identified in the Exploratory Works footprint, it is considered likely to occur. Habitat mapping identifies that potential habitat for C. omissus occurs in and adjacent to the footprint. Weed infestation can degrade habitat and outcompete C. omissus. The invasive lantana (Lantana camara) is known to infest areas of suitable habitat and outcompete C. omissus. It is a known threat of C. omissus (DCCEEW, 2008).	Possible	Major	High	Hygiene control procedures will be in place throughout multiple stages of the Exploratory Works Project activities, including measures to reduce potential for introduction and spread of weeds: •Decontamination Washdown facilities will be installed at the two entrances to Queensland Hydro land so all vehicles will be washed prior to entry and exiting site. Decontamination practices will be implemented for all personnel and regular vehicle and machinery wash downs, especially when transferring between sites will assist in minimising the spread of weeds and Myrtle Rust. Multiple methods are available for treatment of vehicles including wet decontamination, heat and/or fumigation procedures. Hygiene checks will be conducted on all machinery or equipment being moved onto or out of the Exploratory Works Project site to minimise distribution of weed species and fungal pathogens. •Training Training and inductions for site employees and contractors to educate on the risks and mitigation requirements for weed spread. •Preclearing surveys and weed treatment Pre-clearance surveys will be performed to identify weeds, and large infestations to be treated prior to clearing to minimise the spread of weed seed and material. A weed register will be developed and maintained by Queensland Hydro for the duration of the Exploratory Works Project to manage weeds and ensure that management actions are having the desired effect. •High risk areas Identified areas of high risk weed or disease infestations (including 50 m buffer zone from TECs) will be signed and demarcated where required to avoid transporting plant reproductive material from these areas to areas that are not infested. •Weed management Weeds will be actively monitored and managed adjacent to Exploratory Works activities occurring within 50 m of TEC patches. Spraying herbicides, unless approved for use in the area including targeted spraying, will be avoided. Weed material will be disposed of in accordance with the *Biosecurity Act 2014* Site vehicle access will be restricted to existing roads and tracks.	Unlikely	Moderate	Low	Avoid weed infestation of known individuals and populations	• Quarterly Monitoring in response to events which may trigger pest dispersion • Monitoring of designated management zones Bi annually for the project life span	• Increase Hygiene Control requirements if vehicles or equipment are found to introduce or spread new weeds. • Increase weed control efforts where required (i.e. after heavy rainfall) or if current controls are ineffective. • Review and update of the Biosecurity Management Plan and the species specific management actions.

No.	Risk description and controls			Risk level (without controls)			Risk level (post controls)			Performance objective	Monitoring measures	Risk treatment plan
	Environmental value impacted	Impact	Impact description	Likelihood	Consequence	Risk level	Avoidance and mitigation measures	Likelihood	Consequence	Risk level			
29	Macadamia Nut (Macadamia integrifolia) (vulnerable)	Weeds	While *M. integrifolia* was not identified in the Exploratory Works footprint, it is considered likely to occur. Habitat mapping identifies that potential habitat for *Macadamia integrifolia* occurs in and adjacent to the footprint. Lantana camara is widespread throughout historically disturbed areas of the Exploratory Works footprint. It is known as having a major impact on *M. integrifolia*. Exploratory Works activities could spread weeds or encourage the spread of weeds including lantana into areas of potential habitat previously free of weeds, potentially outcompeting M. integrifolia and leading to decline of the population locally.	Possible	Major	High	•Hygiene control procedures will be in place throughout multiple stages of the Exploratory Works Project activities, including measures to reduce potential for introduction and spread of weeds: •Decontamination Washdown facilities will be installed at the two entrances to Queensland Hydro land so all vehicles will be washed prior to entry and exiting site. Decontamination practices will be implemented for all personnel and regular vehicle and machinery wash downs, especially when transferring between sites will assist in minimising the spread of weeds and Myrtle Rust. Multiple methods are available for treatment of vehicles including wet decontamination, heat and/or fumigation procedures. Hygiene checks will be conducted on all machinery or equipment being moved onto or out of the Exploratory Works Project site to minimise distribution of weed species and fungal pathogens. • Training Training and inductions for site employees and contractors to educate on the risks and mitigation requirements for weed spread. •Preclearing surveys and weed treatment Pre-clearance surveys will be performed to identify weeds, and large infestations to be treated prior to clearing to minimise the spread of weed seed and material. A weed register will be developed and maintained by Queensland Hydro for the duration of the Exploratory Works Project to manage weeds and ensure that management actions are having the desired effect. •High risk areas Identified areas of high risk weed or disease infestations (including 50 m buffer zone from TECs) will be signed and demarcated where required to avoid transporting plant reproductive material from these areas to areas that are not infested. •Weed management Weeds will be actively monitored and managed adjacent to Exploratory Works activities occurring within 50 m of TEC patches. Spraying herbicides, unless approved for use in the area including targeted spraying, will be avoided. Weed material will be disposed of in accordance with the *Biosecurity Act 2014* Site vehicle access will be restricted to existing roads and tracks.	Unlikely	Moderate	Low	Avoid weed infestation of known individuals and populations	• Quarterly Monitoring in response to events which may trigger pest dispersion • Monitoring of designated management zones Bi annually for the project life span	• Increase Hygiene Control requirements if vehicles or equipment are found to introduce or spread new weeds. • Increase weed control efforts where required (i.e. after heavy rainfall) or if current controls are ineffective. • Review and update of the Biosecurity Management Plan and the species specific management actions.
30	Ball Nut (*Floydia praealta*) (vulnerable)	Pests	Ball nut is known or likely to occur in or adjacent to the Exploratory Works footprint as habitat occurs in and adjacent to the footprint. Pest fauna including grazing livestock, European brown hares, rabbits and rusa deer are present in the study area. Operational activities may increase pest fauna abundance in the Exploratory Works footprint. Creation of new access points into areas of intact vegetation may create pathways for feral fauna species to disperse, increasing habitat degradation from vegetation trampling and grazing (e.g., feral pig wallowing, cattle grazing).	Likely	High	High	• Waste disposal (especially food waste) will be removed from site regularly to discourage presence of pest fauna. Any additional measures outlined in the Waste Management Plan will also be implemented across the site. • Install cameras along access tracks to monitor pest fauna traffic. • A Biosecurity Management Plan for the entire Project has been developed. This plan and is currently being updated to reflect the recent surveys on site and risks posed by the species present, along with outlining proposed design treatments. As part of the finalisation of the plan Queensland Hydro will work with other stakeholders to align the measures to be implemented, noting that some of the practices may not be implemented in the short term given they may impact the proposed surveys works. • The Biosecurity Management Plan includes appropriate thresholds for management action, linked to the risk posed by the species. The plan includes measures for trapping and controlling pest fauna in accordance with relevant threat abatement plans, along with relevant legislation and guidelines.	Unlikely	High	Medium			• Review and update the Biosecurity Management Plan if evidence of increased predation or pests is observed. • Implement additional pest fauna management measures where controls do not appear to be adequate. • Notify the landholder (i.e. QPWS) and/or adjacent landholder about the risk and support the implementation of their plans.
31	Austral Toadflax (*Thesium australe*) (vulnerable) Hairy Joint Grass (*Arthraxon hispidus*) (vulnerable) Nightcap coleus (*Coleus nitidus*) (endangered) Quassia (*Samadera bidwillii*) (vulnerable) Blotched sarcochilus (*Sarcochilus weinthalii*) (vulnerable)	Clearing (habitat loss and fragmentation)	Although these species have not been identified in the Exploratory Works footprint, they are considered possibly occurring. Habitat mapping identifies that habitat for these species occurs within and adjacent to the Exploratory Works footprint. 19.6 ha of potential *Thesium australe* habitat, 5.1 ha of potential *Arthraxon hispidus* habitat, 0.2 ha of potential *Sarcochilus weinthalii* habitat, 0.1 ha of potential *Coleus nitidus* habitat and 32.6 ha of potential *Samadera bidwillii* habitat will be cleared to upgrade existing tracks, construct new tracks, and for geotechnical work sites. It is possible that new records that cannot be avoided may be identified in the footprint during pre-clearance surveys. Clearing linear corridors through habitats has the potential to isolate plant populations by causing barriers to the dispersal of seeds and fruit and increasing edge effects (additional light entering the forest, weed encroachment, increased feral animal abundance and increased risk of bushfire), thereby reducing the ecological functioning of those areas and plant populations.	Unlikely	Major	High	•Pre-clearance survey Pre-clearance surveys will be undertaken by a suitably qualified ecologist to identify any additional individuals within and adjacent to the Project footprint. Noting that the Project footprint and 100 m buffer has already been comprehensively surveyed for the purposes of protected plants (i.e. clearing permit under the *Nature Conservation Act 1992*). •Minimising clearing requirements Working with the construction contractor to relocate infrastructure or optimise clearing (including micro-siting) extents to avoid or minimise habitat loss. Prior to the commencement of vegetation clearing, flagging tape, barricade fencing, fluorescent markers, signage, or a combination of these measures will be installed to clearly delineate restricted areas and clearing boundaries. This will avoid unnecessary clearing and ensure personnel and vehicles stay within the approved Exploratory Works Project footprint, avoiding contravention of disturbance limits. Flagging tape, fencing, fluorescent markers and signage will be inspected daily and any damaged fencing, missing flagging tape or fluorescent markers will be repaired to ensure they remain in serviceable condition. •Unexpected find Works will be undertaken in accordance with the unexpected finds procedure, which involves: –stop works in the vicinity of the find –demarcate and prevent access to area –comprehensively survey the population of the threatened species to determine the number of plants potentially impacted and spatial extent –explore options for avoidance –If impacts cannot be avoided engage with DCCEEW and DETSI in relation to approvals to clear.	Unlikely	High	Medium	No clearing of individuals	• Monitoring will be undertaken to ensure exclusion zones and signage remains in serviceable condition. • Daily visual inspections of records next to works areas noting: evidence of dust deposition on plants, plant health generally (evidence of dead/dying individuals, flowering, seeding, etc), evidence of disturbance/ maintenance of buffers and exclusion zones.	• Implementation of the unexpected threatened species finds procedure (refer to the FFMP). • This CEMP and FFMP will be reviewed and updated as required.
32	Austral Toadflax (*Thesium australe*) (vulnerable) Hairy Joint Grass (*Arthraxon hispidus*) (vulnerable) Nightcap coleus (*Coleus nitidus*) (endangered) Quassia (*Samadera bidwillii*) (vulnerable) Blotched sarcochilus (*Sarcochilus weinthalii*) (vulnerable)	Hazardous materials	Although these species have not been identified in the Exploratory Works footprint, they are considered possibly occurring. Habitat mapping identifies that habitat for these species occurs within and adjacent to the Exploratory Works footprint. Exploratory Works Project activities have the potential to lead to accidental releases of hazardous materials, such as fuels and oils from vehicles and machinery. These hazardous materials can lead to localised soil contamination and contamination of water resources, which in turn can cause injury, reduced vigour, or mortality to threatened flora and degrade potential habitat.	Unlikely	High	Medium	Spoil reuse targets have been identified across material categories expected from design. Reuse categories are linked to spoil contamination risk and provisional potential reuse targets have been identified for each category as below: • unrestricted spoil – 100 % • other clean earth – 80 % • non-regulated waste/general waste – 25 % • category 2 regulated waste – 10 % • category 1 regulated waste – 0 % • potentially contaminated soils – 50 % • acid sulfate soils – 20 % • acid-forming rock – 20 % • naturally occurring asbestos material – 0 %. • Testing of material as it is removed from disturbed areas, including the exploratory tunnel, to determine any acid sulfate soil, potential acid sulfate soil or contaminants. • Implement recommendations form the contaminated land investigations. • All chemicals, fuel and oil will be stored in above ground tanks in bunded areas, with accurate records maintained of volumes purchased and stored, to ensure any contamination of land or water is prevented, and any spill is detected quickly. • Contain poor quality discharge water and treat prior to disposal, subject to achieving water quality guidelines. • Disposal methods and responses are identified within the Spoil Management Plan (refer to Appendix B) and are linked to the spoil material category. • Design storage areas to consist of a compacted base, bunding to contain spillages and roofing to prevent contamination and infiltration of stormwater (as per AS1940 and AS3780). • Management plans for select (as required) discoverable contaminants (i.e. acid-rock drainage, naturally occurring asbestos) will be developed upon identification from preliminary drilling/earthworks during Exploratory Works. • Residual hazardous materials will be removed from the construction site and returned to an appropriate storage area or a suitable waste facility. Control of potential offsite mobilisation of contamination will be implemented through the following: • during excavations, materials that are contaminated and not suitable for remediation and onsite storage will be loaded directly onto licensed transport vehicles for offsite disposal • stockpiling of contaminated soils will be avoided where possible via the in-situ waste classification and identification of potentially contaminated materials • assigning secure location for storage of reusable and recyclable materials on site	Rare	High	Low			• Assessment of spoil to be conducted as part of excavation tracking. Where disposal method is deemed inappropriate, further controls to be compiled and managed upon discovery of unknown contaminant. • Weekly assessment of any stockpiling and where controls are inappropriate or damaged, reinstatement or improvement of controls are to be conducted. • In the event of a spillage/leak of potentially hazardous substances: · Comply with the Emergency Spill Containment Plan. · Investigate the nature and extent of the spillage/leakage, and implement clean-up and mitigation measures, as necessary.
33	Austral Toadflax, *Thesium australe* (vulnerable)	Weeds	Although *Thesium australe* was not identified in the Exploratory Works footprint, the species is considered possibly occurring. Habitat mapping identifies that habitat for this species occurs within and adjacent to the Exploratory Works footprint. Exploratory Works activities could spread weeds or encourage the spread of weeds into areas of potential habitat previously free of weeds, potentially outcompeting these species and leading to decline of their populations locally, if they are present.	Unlikely	High	Medium	•Hygiene control procedures will be in place throughout multiple stages of the Exploratory Works Project activities, including measures to reduce potential for introduction and spread of weeds: •Decontamination Washdown facilities will be installed at the two entrances to Queensland Hydro land so all vehicles will be washed prior to entry and exiting site. Decontamination practices will be implemented for all personnel and regular vehicle and machinery wash downs, especially when transferring between sites will assist in minimising the spread of weeds and Myrtle Rust. Multiple methods are available for treatment of vehicles including wet decontamination, heat and/or fumigation procedures. Hygiene checks will be conducted on all machinery or equipment being moved onto or out of the Exploratory Works Project site to minimise distribution of weed species and fungal pathogens. • Training Training and inductions for site employees and contractors to educate on the risks and mitigation requirements for weed spread. •Preclearing surveys and weed treatment Pre-clearance surveys will be performed to identify weeds, and large infestations to be treated prior to clearing to minimise the spread of weed seed and material. A weed register will be developed and maintained by Queensland Hydro for the duration of the Exploratory Works Project to manage weeds and ensure that management actions are having the desired effect. •High risk areas Identified areas of high risk weed or disease infestations (including 50 m buffer zone from TECs) will be signed and demarcated where required to avoid transporting plant reproductive material from these areas to areas that are not infested. •Weed management Weeds will be actively monitored and managed adjacent to Exploratory Works activities occurring within 50 m of TEC patches. Spraying herbicides, unless approved for use in the area including targeted spraying, will be avoided. Weed material will be disposed of in accordance with the *Biosecurity Act 2014* Site vehicle access will be restricted to existing roads and tracks.	Unlikely	Moderate	Low			• Increase Hygiene Control requirements if vehicles or equipment are found to introduce or spread new weeds. • Increase weed control efforts where required (i.e. after heavy rainfall) or if current controls are ineffective. • Review and update of the Biosecurity Management Plan and the species specific management actions.
34	Hairy Joint Grass (*Arthraxon hispidus*) (vulnerable)	Weeds	Although *Arthraxon hispidus* was not identified in the Exploratory Works footprint, the species is considered possibly occurring. Habitat mapping identifies that habitat for this species occurs within and adjacent to the Exploratory Works footprint. The main identified threat to the species is weed invasion. In particular, mistflower, crofton weed and Lantana pose a threat along creeks in forested habitats (DSWPA, 2008). Exploratory Works activities could spread weeds or encourage the spread of weeds including lantana into areas of potential habitat previously free of weeds, potentially outcompeting *A. hispidus* and leading to decline of the population locally.	Unlikely	High	Medium	Hygiene control procedures will be in place throughout multiple stages of the Exploratory Works Project activities, including measures to reduce potential for introduction and spread of weeds: •Decontamination Washdown facilities will be installed at the two entrances to Queensland Hydro land so all vehicles will be washed prior to entry and exiting site. Decontamination practices will be implemented for all personnel and regular vehicle and machinery wash downs, especially when transferring between sites will assist in minimising the spread of weeds and Myrtle Rust. Multiple methods are available for treatment of vehicles including wet decontamination, heat and/or fumigation procedures. Hygiene checks will be conducted on all machinery or equipment being moved onto or out of the Exploratory Works Project site to minimise distribution of weed species and fungal pathogens. • Training Training and inductions for site employees and contractors to educate on the risks and mitigation requirements for weed spread. •Preclearing surveys and weed treatment Pre-clearance surveys will be performed to identify weeds, and large infestations to be treated prior to clearing to minimise the spread of weed seed and material. A weed register will be developed and maintained by Queensland Hydro for the duration of the Exploratory Works Project to manage weeds and ensure that management actions are having the desired effect. •High risk areas Identified areas of high risk weed or disease infestations (including 50 m buffer zone from TECs) will be signed and demarcated where required to avoid transporting plant reproductive material from these areas to areas that are not infested. •Weed management Weeds will be actively monitored and managed adjacent to Exploratory Works activities occurring within 50 m of TEC patches. Spraying herbicides, unless approved for use in the area including targeted spraying, will be avoided. Weed material will be disposed of in accordance with the *Biosecurity Act 2014* Site vehicle access will be restricted to existing roads and tracks.	Unlikely	Moderate	Low			• Increase Hygiene Control requirements if vehicles or equipment are found to introduce or spread new weeds. • Increase weed control efforts where required (i.e. after heavy rainfall) or if current controls are ineffective. • Review and update of the Biosecurity Management Plan and the species specific management actions.
35	Austral Toadflax (*Thesium australe*) (vulnerable) Hairy Joint Grass (*Arthraxon hispidus*) (vulnerable) Nightcap coleus (*Coleus nitidus*) (endangered) Quassia (*Samadera bidwillii*) (vulnerable) Blotched sarcochilus (*Sarcochilus weinthalii*) (vulnerable)	Erosion and sedimentation	Although the species listed were not identified in the Exploratory Works footprint, they are considered possibly occurring. Habitat mapping identifies that habitat for these species occurs within and adjacent to the Exploratory Works footprint. Vegetation clearing, earthmoving and general construction activities may all result in an increase to natural erosion and sedimentation within the Exploratory Works footprint. This increased erosion and sedimentation could potentially have localised impacts upon overland flow rates within the vicinity of the proposed works. Changes in the hydrology of the Exploratory Works footprint may occur through alteration of surface flows and stormwater runoff, including obstruction of flow. This can result in scouring or waterlogging occurring in some areas.	Possible	Moderate	Medium	A preliminary Erosion and Sediment Control Plan has been developed and will be implemented for the Project, the plan includes the following mitigation measures: • Minimising risk of dispersible subsoils Strategies to minimise risk include limiting their disturbance, use of gypsum and covering dispersive material (e.g. buried under a minimum of 100 mm layers of non-dispersive soils before placing any revegetation or erosion control measures). Preclearance surveys and soil mapping to be developed identifing areas of concern •Controls during construction and clearing To minimise erosion in or adjacent to the proposed Exploratory Works Project footprint, soil disturbance will be minimised and clearing methods of blading and grubbing are avoided. Activities will be scheduled, where practicable, to avoid the summer months where high intensity storms are more prevalent. Avoid locating works within watercourses, drainage lines or overland flow paths, and known areas of erosion. Designing and constructing waterway crossings in accordance with riverine protection permit and ADR expectations (though exemptions from the need to obtain the permit may be available). Implementing a buffer zone around the spoil disposal area so spoil is located a sufficient distance from the riparian zone of Yabba Creek and Sandy Creek. The use of control measures such as sediment traps/rock filter dams/modular sediment traps, along with soil management and stockpiling practices will be implemented to minimise erosion and sedimentation. Maintaining the ESC components via regular removal of water after storm events and de-silting. Water quality discharge requirements specified in the Erosion and Sediment Control Plan are to be met prior to discharge of any separated slurry to the environment. Sizing ESC components and water recycling/reuse components with appropriate redundancy/buffer capacity as determined by Queensland Hydro. A register that details sediment basin inspections, maintenance, discharge volumes and dates, flocculation details, discharge-water quality and volumes of sediment removed will be maintained. Site inspections are to be conducted (weekly routine) and prior to forecast rain of 25 mm over 24 hours to identify repair, maintenance or improvement works.	Possible	Moderate	Medium			• Ongoing assessment of ESC with weekly checklist. Where controls are inappropriate or damaged, reinstatement or improvement of controls are to be conducted.
36	Austral Toadflax (*Thesium australe*) (vulnerable) Hairy Joint Grass (*Arthraxon hispidus*) (vulnerable) Nightcap coleus (*Coleus nitidus*) (endangered) Quassia (*Samadera bidwillii*) (vulnerable) Blotched sarcochilus (*Sarcochilus weinthalii*) (vulnerable)	Air quality/ dust	Although the species listed were not identified in the Exploratory Works footprint, they are considered possibly occurring. Habitat mapping identifies that habitat for these species occurs within and adjacent to the Exploratory Works footprint. Dust emissions from vegetation clearing, earthworks and vehicle movements during construction has the potential to impact threatened flora temporarily and locally in the vicinity of the Exploratory Works Project footprint. Dust is expected to only be a potential issue during vegetation clearing and construction. Excess generation of dust and subsequent deposition on leaves can impair plant photosynthesis and productivity and alter soil properties resulting in reduced vigour or mortality to threatened flora and degrade potential habitat.	Possible	Moderate	Medium	• Areas which have potential to generate airborne dust will be wetted down regularly or covered wherever practicable. • Reshaping and sealing of roads and tracks to minimise dust generation. • Regular cleaning of machinery and vehicle tyres to reduce dust emissions. • Low speed limits will be implemented across the Exploratory Works Project to minimise dust generation. • Any areas no longer required for operational activities will be rehabilitated as soon as practicable. • Machinery and vehicle tyres will be regularly cleaned to reduce wheel entrained dust emissions or consider use of vibration grids. • Spraying of herbicides, aerosols and other chemicals to be undertaken in suitable weather conditions (i.e. low wind speed). • Use of dust suppression to reduce offsite dust impacts.	Possible	Moderate	Medium			• Increase frequency of dust suppression if dust nuisance is observed by site construction or environmental manager or if a compliant is received.
37	Australian lungfish (*Neoceratodus forsteri*) (vulnerable) Mary River Cod (*Maccullochella mariensis*) (endangered)	Clearing (habitat loss and fragmentation)	The species is known to occur in or adjacent to the Exploratory Works footprint. Habitat mapping identifies that habitat for these species occurs within and adjacent to the footprint. Approximately 0.2 ha of foraging and 0.3 ha of spawning and foraging habitat for the Australian lungfish, and 0.2 ha of foraging and 0.2 ha of spawning and foraging habitat for the Mary River cod, will be cleared for geotechnical investigations and access tracks at the proposed new Borumba dam wall and two new bed level crossings, in Area 4 (Borgan). The construction of a temporary bed level crossing and geotechnical investigations downstream of the existing Borumba Dam, and construction of two new bed level crossings in Area 4 (Borgan) will have an impact on habitat for the Australian lungfish and the Mary River cod. Further impacts include the disturbance of the substrate and riparian zone to install four bailey bridges in Area 4 (Borgan), along with temporary impoundments to allow for construction of the bridges and access tracks. Once installed however, the design will allow for flows to be maintained minimising the impact on the species. Despite this there will be some loss of habitat including reduced foraging, spawning and sheltering habitat for the fish species.	Likely	Moderate	Medium	• Exploratory Works have been designed to avoid the clearing of threatened fauna habitat as far as possible by placing temporary infrastructure in existing cleared areas. • Clearly delineate clearing boundaries and exclusion/buffer zones with flagging tape or fluorescent marker or signage prior to clearing commencing to avoid unnecessary clearing and to ensure personnel and vehicles stay within the approved footprint, avoiding contravention of disturbance limits. • Clearing boundary maps, along with exclusion/buffer zones to be provided to contractors. • Works will be conducted within existing cleared areas wherever practicable. • Micro-siting of works to avoid spawning and/or foraging habitat, and access road width to be minimised where practicable, particularly across creek lines. •No bank or instream disturbance will be undertaken until a suitably qualified person has checked for suitable breeding places, as outlined within the FFMP. A minimum of 30 m upstream and downstream of the Exploratory Works in creeks will be inspected. •Restricted areas: –Riparian areas near work areas will be marked as restricted areas to ensure no clearing or works in these areas. –Clearing boundary maps and restricted areas will be provided to contractors, with permitted personnel only allowed access on foot beyond the boundary of the restricted areas. •Work sites will be micro-sited to avoid potential breeding and/or foraging habitat, wherever possible. •Bailey bridges will be installed across Yabba Creek and Sandy Creek, with the bridges designed to minimise changes to flows (e.g. velocity, depth etc.) and water quality, which have the potential to impede fish movement. •As the bridges are prefabricated, works necessary to install the bridges will mainly be isolated to the stream banks. •Limited bed level crossings (associated with and independent of Bailey bridges): –Bed level crossings will be constructed in accordance with the ADR. –All bed level crossings will be constructed to avoid the introduction of barriers to fish movement, including vertical drops between upstream and downstream reaches. As such, the works are not anticipated to create barriers that may lead to species fragmentation. The bed level crossings required for the Project will be rehabilitated. •Directional drilling under or suspension over Yabba Creek for the pipeline crossings will minimise the extent of disturbance and prevent the introduction of structures into the waterway that could serve as a barrier to movement for the species. · All animal breeding places will be managed under the protocols developed under an approved high-risk or low-risk Species Management Program (SMP) · Where newly identified MNES fauna species are recorded within the footprint during pre-clearance surveys or Exploratory Works, actions will be undertaken in accordance with the procedure outlined in Section 5.1.1:	Likely	Minor	Low	Minimise habitat disturbance	• Monitoring will be undertaken to ensure exclusion zones and signage remains in serviceable condition. • FSC will keep a record of any fauna relocated during clearing activities.	• No bank/riparian or instream disturbance will be undertaken until a suitably qualified person has checked the banks for breeding habitat. A minimum of 30 m upstream and downstream of the crossing site will be inspected. • Exclusion zones will be established with riparian areas adjacent to the work areas marked as "exclusion/buffer" areas, to ensure no clearing or works in these areas. • Inspect and repair damaged fencing; replace any flagging tape or respray fluorescent marker. • Where clearing extends outside the approved disturbance limits, a record must be taken of the incident and an investigation will occur. • Temporarily disturbed areas that are no longer required to be cleared will be assessed for restoration and revegetation. • Directional drilling under Yabba Creek for the pipeline crossings to minimise disturbance and prevent the introduction of structures that may serve as a barrier to movement. • Any fauna injuries or deaths are required to be reported firstly to the Project environmental manager and then DETSI and/or DCCEEW. The cause of injury or death will be investigated, and any required changes will be implemented. • Any injured fauna will be taken to the nearest suitable vet or wildlife carer for treatment.

No.	Risk description and controls			Risk level (without controls)			Risk level (post controls)			Performance objective	Monitoring measures	Risk treatment plan
	Environmental value impacted	Impact	Impact description	Likelihood	Consequence	Risk level	Avoidance and mitigation measures.	Likelihood	Consequence	Risk level			
38	Mary River Turtle (*Elusor macrurus*) (endangered) White-throated Snapping Turtle (*Elseya albagula*) (critically endangered)	Clearing (habitat loss and fragmentation)	The species are known to occur in or adjacent to the Exploratory Works footprint. Habitat mapping identifies that habitat for these species occurs within and adjacent to the footprint. Approximately 0.5 ha of foraging and 0.1 ha of nesting habitat for Mary River turtle, and 0.5 ha of foraging and 0.1 ha of nesting habitat for the white-throated snapping turtle is within the Exploratory Works footprint. These areas will have a varying degree of impact as a result of the geotechnical investigation activities and construction of associated access tracks in riparian and aquatic habitat. Impacts include the disturbance of the substrate and riparian zone to install bed level crossings and bailey bridges, along with temporary impoundments to allow for construction of the bridges and access tracks. However, once installed the design will allow for flows to be maintained minimising the impact on the species. Despite this there will be some loss of habitat including reduced nesting, foraging, and sheltering habitat for the species. Habitat within 50 m of the existing Borumba Dam wall will not be cleared, therefore potential dispersal habitat for turtles that may walk around the dam wall will not be impacted.	Likely	Moderate	Medium	• Exploratory Works have been designed to avoid the clearing of threatened fauna habitat as far as possible by placing temporary infrastructure in existing cleared areas. • Clearly delineate clearing boundaries and exclusion/buffer zones with flagging tape or fluorescent marker or signage prior to clearing commencing to avoid unnecessary clearing and to ensure personnel and vehicles stay within the approved footprint, avoiding contravention of disturbance limits. • Clearing boundary maps, along with exclusion/buffer zones to be provided to contractors. • Personnel will only be allowed on foot beyond the boundary of the exclusion/buffer zones. • Works will be conducted within existing cleared areas wherever practicable. • Micro-siting of works to avoid breeding places and feeder trees. • Pre-clearance surveys will be undertaken by a suitably qualified FSC/ecologist and will include measures outlined in the FFMP. • All clearing activities will also be overseen by a suitably qualified FSC who will follow the sequential clearing method wherever practicable. The FSC must also operate under an approved SMP and will be responsible for the following: - checking areas immediately prior to any clearing for the presence of any native fauna and habitat features (i.e.reptiles under fall logs), and breeding places (i.e. nests and burrows) - any captured species will be relocated to an agreed release site - FSC to advise construction contractors as to best practice approach to avoid impacts on breeding places and fauna species. Woody debris, hollow logs and rock piles will be retained for use in rehabilitation wherever possible. - Access roads will be aligned along existing tracks wherever practicable to minimise vegetation removal, loss of habitat and fragmentation. - All vehicles associated with clearing and construction activities will travel at slow speeds to minimise the chance of any fauna strikes occurring. Speed limit signage will be placed at the entrance to the site and other key access tracks. - Access road width to be minimised where practicable, particularly across creek lines. - Speed limits will be clearly signed on roads during construction. - Movement within the Exploratory Works Project area will be via approved access tracks with speed limits enforced. The requirement to enter and traverse the area will be minimised and limited to those required for essential Exploratory Works Project activities. - Known fauna crossing points will be highlighted with signage.	Likely	Minor	Low			• No bank/riparian or instream disturbance will be undertaken until a suitably qualified person has checked the banks for breeding habitat. A minimum of 30 m upstream and downstream of the crossing site will be inspected. • Exclusion zones will be established with riparian areas adjacent to the work areas marked as "exclusion/buffer" areas, to ensure no clearing or works in these areas. • Inspect and repair damaged fencing; replace any flagging tape or respray fluorescent marker. • Where clearing extends outside the approved disturbance limits, a record must be taken of the incident and an investigation will occur. • Temporarily disturbed areas that are no longer required to be cleared will be assessed for restoration and revegetation. • Directional drilling under Yabba Creek for the pipeline crossings to minimise disturbance and prevent the introduction of structures that may serve as a barrier to movement. • Any fauna injuries or deaths are required to be reported firstly to the Project environmental manager and then DETSI and/or DCCEEW. The cause of injury or death will be investigated, and any required changes will be implemented. • Any injured fauna will be taken to the nearest suitable vet or wildlife carer for treatment.
39	Australian Lungfish (*Neoceratodus forsteri*) (vulnerable)	Injury/mortality	Australian lungfish were recorded in Yabba Creek immediately downstream of the existing Borumba dam wall. Foraging and spawning/foraging habitat is mapped within Area 4 (Borgan). Construction and use of bed level crossings at these locations could result in injury or mortality to Australian lungfish. Removing large rocks and placing approximately 10-20 m3 of D50-100 mm rock on the creek bed at the designated gravel bed level crossings could result in injury or mortality to individuals in the area. Activities associated with construction of concrete and temporary piped culvert bed level crossings in Area 4 (Borgan) could result in injury or mortality to individuals in the area. Concrete may cause injury or mortality through increasing the local water temperature by radiant heat. Use of all crossings could also cause injury or mortality from vehicle strike.	Possible	Moderate	Medium	• Activities will be minimised during breeding seasons (August to December for Australian lungfish). If it is not possible to undertake works outside breeding seasons, pre-clearance surveys upstream and downstream from the works area will identify, map, and mark out potential and active breeding habitat. • Vehicles will only traverse the bed level crossing when low flows permit, to allow for visual inspection of any individuals present. • Should any individuals be present, vehicle movements across the stream will be halted until the individual moves upstream or downstream. • Should any individuals be observed to be injured at the site of the crossing, the injured individual will be transported to a vet, if possible. • Relocate aquatic fauna from areas where Exploratory Works activities are to occur in accordance with the Fish Salvage Guideline (DAF, 2024) .	Unlikely	Moderate	Low			• If any new threatened species not discussed in this FFMP are identified, works will cease immediately and the unexpected threatened species finds protocol will be followed (refer to the FFMP), including notifying DETSI and DCCEEW. The FFMP will be updated to incorporate additional mitigation and management measures as required. • Any fauna injuries or deaths are required to be reported firstly to the project environmental manager and then DETSI and/or DCCEEW if it involves a threatened species. The cause of injury or death will be investigated, and any required changes will be implemented. • Any injured fauna will be taken to the nearest suitable vet or wildlife carer for treatment.
40	Mary River Cod (*Maccullochella mariensis*) (endangered)	Injury/mortality	Mary River cod were recorded in Yabba Creek immediately downstream of the existing Borumba Dam wall and upstream of Lake Borumba. Construction and use of temporary bed level crossings at these locations and construction of bridges across Yabba Creek, upstream of Lake Borumba, could result in injury or mortality to Mary River cod. Removing large rocks and placing approximately 10-20 m3 of D50-100 mm rock on the creek bed at the designated gravel bed level crossings could result in injury or mortality to individuals in the area. Activities associated with construction of concrete and temporary piped culvert bed level crossings in Area 4 (Borgan) could result in injury or mortality to individuals in the area. Concrete may cause injury or mortality through increasing the local water temperature by radiant heat. The use of all crossings could also cause injury or mortality from vehicle strike. Depending on the construction method chosen for the bridge at Yabba Creek upstream of Lake Borumba, pile driving or placement of infrastructure within the waterway could result in injury or mortality to individuals in the area.	Possible	Moderate	Medium	• Activities will be minimised during breeding seasons (August to October for Mary River cod). If it is not possible to undertake works outside breeding seasons, pre-clearance surveys upstream and downstream from the works area will identify, map, and mark out potential and active breeding habitat. • Vehicles will only traverse the bed level crossing when low flows permit, to allow for visual inspection of any individuals present. • Should any individuals be present, vehicle movements across the stream will be halted until the individual moves upstream or downstream. • Should any individuals be observed to be injured at the site of the crossing, the injured individual will be transported to a vet, if possible. • Relocate aquatic fauna from areas where Exploratory Works activities are to occur in accordance with the Fish Salvage Guideline (DAF, 2024) .	Unlikely	Moderate	Low			• Inspect and repair damaged fencing; replace any flagging tape or respray fluorescent marker. • Temporarily disturbed areas that are no longer required to be cleared will be assessed for restoration and revegetation. • If any new threatened species not discussed in this FFMP are identified, works will cease immediately and the unexpected threatened species finds protocol will be followed (refer to the FFMP), including notifying DETSI and DCCEEW. The FFMP will be updated to incorporate additional mitigation and management measures as required. • Any fauna injuries or deaths are required to be reported firstly to the project environmental manager and then DETSI and/or DCCEEW if it involves a threatened species. The cause of injury or death will be investigated, and any required changes will be implemented. • Any injured fauna will be taken to the nearest suitable vet or wildlife carer for treatment.
41	Mary River Turtle (*Elusor macrurus*) (endangered)	Injury/mortality	Mary River turtles were recorded in Yabba Creek immediately downstream of the existing Borumba Dam wall and upstream of Lake Borumba in Yabba Creek and Sandy Creek. Juveniles were recorded in Yabba Creek upstream of Lake Borumba demonstrating that recruitment occurs in this reach. Construction and use of the temporary bed level crossings and construction of bridges could result in injury or mortality to Mary River turtle. Removing large rocks and placing approximately 10-20 m3 of D50-100 mm rock on the creek bed at the temporary bed level crossing downstream of the existing Borumba Dam wall could result in injury or mortality to individuals in the area. Activities associated with construction of concrete and temporary piped culvert bed level crossings in Area 4 (Borgan) could result in injury or mortality to individuals in the area. Concrete may cause injury or mortality through increasing the local water temperature by radiant heat. Use of all crossings could also cause injury or mortality from vehicle strike. Depending on the construction method chosen for the bridges at Yabba Creek and Sandy Creek in the upper reaches of Lake Borumba, pile driving or placement of infrastructure within the waterways could result in injury or mortality to individuals including juveniles in the area.	Possible	Moderate	Medium	• Instream activities and riparian works will be minimised during breeding seasons (October to January for the Mary River turtle). If it is not possible to undertake works outside breeding seasons, pre-clearance surveys upstream and downstream from the works area will identify, map and mark out turtle nesting sites. Any active turtle nests will be identified during pre-clearance surveys and will be mapped out and marked. A restricted area around the waterway crossing works will prevent personnel, vehicles and machinery from approaching active turtle nests. • Conduct pre-clearing surveys to determine whether breeding is occurring for any species. This will include inspection for burrows, fresh turtle tracks, etc. • No bank disturbance will be undertaken until a suitably qualified person has checked the banks for threatened fauna and fauna burrows in the direct construction area. Inspections of the creeks upstream will also be conducted for a minimum of 30 m upstream and downstream. •Nests will also be protected from predators by fixing 70-100 cm plastic or wire mesh covers with 5-10 cm grid-size over nests, which will be kept in place with turf pegs, tent pegs or something suitably similar . The nest will be positioned in the centre of the mesh. The plastic mesh covers will prevent predators from burrowing, while allowing emerging hatchlings to pass through the mesh. Mesh covers over turtle nests are regularly used in conservation efforts and are proven to be effective at protecting them from predators. • Fauna exclusion fencing appropriate for turtles will be installed perpendicular to the water's edge along the banks between instream works areas and nesting reaches, and around works on banks. • Conduct daily inspections of fenced areas to inspect for adult and hatching turtles. • Vehicles will aim to traverse the bed level crossing when low flows permit, to allow for visual inspection of any individuals present. • Should any individuals be present, vehicle movements across the stream will be halted until the individual moves upstream or downstream. • Should any individuals be observed to be injured at the site of the crossing, the injured individual will be transported to a vet, if possible. • Relocate aquatic fauna from areas where Exploratory Works activities are to occur in accordance with the relevant guidelines and procedures	Unlikely	Moderate	Low			• Inspect and repair damaged fencing; replace any flagging tape or respray fluorescent marker. • Temporarily disturbed areas that are no longer required to be cleared will be assessed for restoration and revegetation. • If any new threatened species not discussed in this FFMP are identified, works will cease immediately and the unexpected threatened species finds protocol will be followed (refer to the FFMP), including notifying DETSI and DCCEEW. The FFMP will be updated to incorporate additional mitigation and management measures as required. • Any fauna injuries or deaths are required to be reported firstly to the project environmental manager and then DETSI and/or DCCEEW if it involves a threatened species. The cause of injury or death will be investigated, and any required changes will be implemented. • Any injured fauna will be taken to the nearest suitable vet or wildlife carer for treatment.
42	White-throated Snapping Turtle (*Elseya albagula*) (critically endangered)	Injury/mortality	White-throated snapping turtles were recorded in Yabba Creek immediately downstream of the existing Borumba Dam wall and in Lake Borumba. Construction and use of the temporary bed level crossings and construction of bridges could result in injury or mortality to white-throated snapping turtles. Removing large rocks and placing approximately 10-20 m3 of D50-100 mm rock on the creek bed at the temporary bed level crossing downstream of the existing Borumba Dam wall could result in injury or mortality to individuals in the area. Activities associated with construction of concrete and temporary piped culvert bed level crossings in Area 4 (Borgan) could result in injury or mortality to individuals in the area. Concrete may cause injury or mortality through increasing the local water temperature by radiant heat. Use of all crossings could also cause injury or mortality from vehicle strike.	Possible	Moderate	Medium	• Instream activities and riparian works will be minimised during breeding seasons (March to August for the white-throated snapping turtle). If it is not possible to undertake works outside breeding seasons, pre-clearance surveys upstream and downstream from the works area will identify, map and mark out turtle nesting sites. Any active turtle nests will be identified during pre-clearance surveys and will be mapped out and marked. A restricted area around the waterway crossing works will prevent personnel, vehicles and machinery from approaching active turtle nests. • Conduct pre-clearing surveys to determine whether breeding is occurring for any species. This will include inspection for burrows, fresh turtle tracks, etc. • No bank disturbance will be undertaken until a suitably qualified person has checked the banks for threatened fauna and fauna burrows in the direct construction area. Inspections of the creeks upstream will also be conducted for a minimum of 30 m upstream and downstream. •Nests will also be protected from predators by fixing 70-100 cm plastic or wire mesh covers with 5-10 cm grid-size over nests, which will be kept in place with turf pegs, tent pegs or something suitably similar . The nest will be positioned in the centre of the mesh. The plastic mesh covers will prevent predators from burrowing, while allowing emerging hatchlings to pass through the mesh. Mesh covers over turtle nests are regularly used in conservation efforts and are proven to be effective at protecting them from predators. • Fauna exclusion fencing appropriate for turtles will be installed perpendicular to the water's edge along the banks between instream works areas and nesting reaches, and around works on banks. • Conduct daily inspections of fenced areas to inspect for adult and hatching turtles. • Vehicles will aim to traverse the bed level crossing when low flows permit, to allow for visual inspection of any individuals present. • Should any individuals be present, vehicle movements across the stream will be halted until the individual moves upstream or downstream. • Should any individuals be observed to be injured at the site of the crossing, the injured individual will be transported to a vet, if possible. • Relocate aquatic fauna from areas where Exploratory Works activities are to occur in accordance with the relevant guidelines and procedures	Unlikely	Moderate	Low			• Inspect and repair damaged fencing; replace any flagging tape or respray fluorescent marker. • Temporarily disturbed areas that are no longer required to be cleared will be assessed for restoration and revegetation. • If any new threatened species not discussed in this FFMP are identified, works will cease immediately and the unexpected threatened species finds protocol will be followed (refer to the FFMP), including notifying DETSI and DCCEEW. The FFMP will be updated to incorporate additional mitigation and management measures as required. • Any fauna injuries or deaths are required to be reported firstly to the project environmental manager and then DETSI and/or DCCEEW if it involves a threatened species. The cause of injury or death will be investigated, and any required changes will be implemented. • Any injured fauna will be taken to the nearest suitable vet or wildlife carer for treatment.
43	Australian Lungfish (*Neoceratodus forsteri*) (vulnerable) Giant barred frog (*Mixophyes iteratus*) (vulnerable) Mary River Cod (*Maccullochella mariensis*) (endangered) Mary River Turtle (*Elusor macrurus*) (endangered) White-throated Snapping Turtle (*Elseya albagula*) (critically endangered)	Weeds	Habitat for threatened aquatic species including Australian lungfish, Giant barred frog, Mary river cod, Mary river turtle and the White-throated snapping turtle occurs within and adjacent to the Exploratory Works footprint. Notably within the bed level crossings upstream and downstream of Borumba Dam and particularly within watercourses and associated riparian vegetation. Exploratory Works activities have the potential to increase the abundance of invasive plants in the Exploratory Works Project footprint and facilitate dispersal to previously unaffected area. Movement of vehicles, equipment and personnel throughout the Exploratory Works Project footprint is the key vector of transmission, in particular vehicles and equipment sourced from regions beyond the footprint which may introduce new species. This could occur at or near crossings at Yabba Creek upstream of Lake Borumba and downstream of the existing dam wall. Riparian vegetation is most likely to be affected. Seeds and fruits have the potential to be spread by clearing activities and vehicle movement, whilst establishment into new areas is highly likely after heavy rainfall. Weed infestation can degrade habitat, reducing the quality of spawning and feeding/foraging habitat for these threatened aquatic species.	Unlikely	High	Medium	Hygiene control procedures will be in place throughout multiple stages of the Exploratory Works Project activities, including measures to reduce potential for introduction and spread of weeds: •Decontamination Washdown facilities will be installed at the two entrances to Queensland Hydro land so all vehicles will be washed prior to entry and exiting site. Decontamination practices will be implemented for all personnel and regular vehicle and machinery wash downs, especially when transferring between sites will assist in minimising the spread of weeds and Myrtle Rust. Multiple methods are available for treatment of vehicles including wet decontamination, heat and/or fumigation procedures. Hygiene checks will be conducted on all machinery or equipment being moved onto or out of the Exploratory Works Project site to minimise distribution of weed species and fungal pathogens. • training Training and inductions for site employees and contractors to educate on the risks and mitigation requirements for weed spread. •Preclearing surveys and weed treatment Pre-clearance surveys will be performed to identify weeds, and large infestations to be treated prior to clearing to minimise the spread of weed seed and material. A weed register will be developed and maintained by Queensland Hydro for the duration of the Exploratory Works Project to manage weeds and ensure that management actions are having the desired effect. •High risk areas Identified areas of high risk weed or disease infestations (including 50 m buffer zone from TECs) will be signed and demarcated where required to avoid transporting plant reproductive material from these areas to areas that are not infested. •Weed management Weeds will be actively monitored and managed adjacent to Exploratory Works activities occurring within 50 m of TEC patches. Spraying herbicides, unless approved for use in the area including targeted spraying, will be avoided. Weed material will be disposed of in accordance with the *Biosecurity Act 2014* Site vehicle access will be restricted to existing roads and tracks.	Unlikely	Minor	Low			• Training and inductions for site employees and contractors regarding the risks and mitigation requirements for weed spread • Decontamination practices for personnel, as well as regular vehicle and machinery washdowns. • Increase Hygiene Control requirements if vehicles or equipment are found to introduce or spread new weeds. • Increase weed control efforts where required (i.e. after heavy rainfall) or if current controls are ineffective. • Review and update of the Biosecurity Management Plan and the species specific management actions.
44	Australian Lungfish (*Neoceratodus forsteri*) (vulnerable) Giant barred frog (*Mixophyes iteratus*) (vulnerable) Mary River Cod (*Maccullochella mariensis*) (endangered) Mary River Turtle (*Elusor macrurus*) (endangered) White-throated Snapping Turtle (*Elseya albagula*) (critically endangered)	Pests and Predation	Habitat for threatened aquatic species including Australian lungfish, Giant barred frog, Mary river cod, Mary river turtle and the White-throated snapping turtle occurs within and adjacent to the Exploratory Works footprint and within the bed level crossing locations upstream and downstream of Borumba Dam. Particularly within watercourses and associated riparian vegetation. Exploratory Works Project activities have the potential to increase the abundance of pest fauna in Lake Borumba and Yabba Creek. Increasing abundance of pest fauna can lead to increased competition with and predation of threatened aquatic fauna. In addition, habitat degradation may occur through vegetation trampling (e.g. feral pig wallowing and cattle grazing). Clearing riparian vegetation and creating tracks at creek crossings could facilitate movement of invasive pests. Invasive fauna may also destroy or predate on nests of white-throated snapping turtle and Mary River turtle, and on eggs or hatchlings of Australian lungfish and Mary River cod.	Unlikely	High	Medium	• Waste disposal (especially food waste) will be removed from site regularly to discourage presence of pest fauna. Any additional measures outlined in the Waste Management Plan will also be implemented across the site. • Install cameras along access tracks to monitor pest fauna traffic. • Erect physical structures (70-100 cm square plastic mesh covers, 10cm grid-size over nests) around key turtle nesting reaches to prevent predators from burrowing and accessing eggs. • A Biosecurity Management Plan for the entire Project has been developed. This plan and is currently being updated to reflect the recent surveys on site and risks posed by the species present, along with outlining proposed design treatments. As part of the finalisation of the plan Queensland Hydro will work with other stakeholders to align the measures to be implemented, noting that some of the practices may not be implemented in the short term given they may impact the proposed surveys works. • The Biosecurity Management Plan includes appropriate thresholds for management action, linked to the risk posed by the species. The plan includes measures for trapping and controlling pest fauna in accordance with relevant threat abatement plans, along with relevant legislation and guidelines.	Rare	Minor	Low			• Review and update the Biosecurity Management Plan if evidence of increased predation or pests is observed. • Implement additional pest fauna management measures where controls do not appear to be adequate. • Notify the landholder (i.e. QPWS) and/or adjacent landholder about the risk and support the implementation of their plans.
45	Australian Lungfish (*Neoceratodus forsteri*) (vulnerable) Giant barred frog (*Mixophyes iteratus*) (vulnerable) Mary River Cod (*Maccullochella mariensis*) (endangered) Mary River Turtle (*Elusor macrurus*) (endangered) White-throated Snapping Turtle (*Elseya albagula*) (critically endangered)	Contamination - water quality	Habitat for threatened aquatic species including Australian lungfish, Giant barred frog, Mary river cod, Mary river turtle and the White-throated snapping turtle occurs within and adjacent to the Exploratory Works footprint. Particularly within watercourses and associated riparian vegetation. Habitat for these species could be affected by contamination from the installation of water infrastructure and accidental spillage, leakage or general release of contaminants from equipment and Exploratory Works. A spoil disposal area is proposed to be located east of Borgan Road and south of the Yabba Creek and Sandy Creek confluence within a predominantly cleared area. The spoil disposal area is largely within the proposed FSL of the new Borumba Dam reservoir. The spoil stockpile has been designed to allow a 50 m buffer to the riparian zone of Yabba Creek and Sandy Creek. The proposed spoil disposal area is approximately 8.7 ha, to allow for disposal of approximately 395,000 cubic metres of excavated waste rock material (500 mm minus material) expected to be generated from the Exploratory Works. Contaminants in material placed in the spoil disposal area could reach nearby watercourses including Yabba Creek and Sandy Creek, potentially impacting water quality within these watercourses and thus degrading potential aquatic habitat in those watercourses. Other Exploratory Works Project activities that could potentially contaminate water quality within Yabba Creek include the installation and operation of the submerged water intake pump in Yabba Creek upstream of the lake, and geotechnical drilling and the bed-level crossings upstream and downstream of the existing Borumba Dam. These activities have the potential to accidentally release hazardous materials, such as fuels and oils from vehicles and machinery. These hazardous materials can lead to localised contamination of water resources, which in turn can cause injury, reduced vigour or mortality to threatened aquatic species and their habitat	Likely	Moderate	Medium	Spoil reuse targets have been identified across material categories expected from design. Reuse categories are linked to spoil contamination risk and provisional potential reuse targets have been identified for each category as below: • unrestricted spoil – 100 % • other clean earth – 80 % • non-regulated waste/general waste – 25 % • category 2 regulated waste – 10 % • category 1 regulated waste – 0 % • potentially contaminated soils – 50 % • acid sulfate soils – 20 % • acid-forming rock – 20 % • naturally occurring asbestos material – 0 %. • Testing of material as it is removed from disturbed areas, including the exploratory tunnel, to determine any acid sulfate soil, potential acid sulfate soil or contaminants. • Implement recommendations form the contaminated land investigations. • All chemicals, fuel and oil will be stored in above ground tanks in bunded areas, with accurate records maintained of volumes purchased and stored, to ensure any contamination of land or water is prevented, and any spill is detected quickly. • Contain poor quality discharge water and treat prior to disposal, subject to achieving water quality guidelines. • Disposal methods and responses are identified within the Spoil Management Plan (refer to Appendix B) and are linked to the spoil material category. • Design storage areas to consist of a compacted base, bunding to contain spillages and roofing to prevent contamination and infiltration of stormwater (as per AS1940 and AS3780). • Management plans for select (as required) discoverable contaminants (i.e. acid-rock drainage, naturally occurring asbestos) will be developed upon identification from preliminary drilling/earthworks during Exploratory Works. • Residual hazardous materials will be removed from the construction site and returned to an appropriate storage area or a suitable waste facility. Control of potential offsite mobilisation of contamination will be implemented through the following: • during excavations, materials that are contaminated and not suitable for remediation and onsite storage will be loaded directly onto licensed transport vehicles for offsite disposal • stockpiling of contaminated soils will be avoided where possible via the in-situ waste classification and identification of potentially contaminated materials • assigning secure location for storage of reusable and recyclable materials on site	Possible	Minor	Low			• Storage and handling requirements, spill kits and trained personnel in handling hazardous materials. • Water treatment plant, to treat water to environmental standards for Yabba Creek catchment and basins to store dirty and clean water. • Assessment of spoil to be conducted as part of excavation tracking. Where disposal method is deemed inappropriate, further controls to be compiled and managed upon discovery of unknown contaminant. • Weekly assessment of any stockpiling and where controls are inappropriate or damaged, reinstatement or improvement of controls are to be conducted. • In the event of a spillage/leak of potentially hazardous substances: Comply with the Emergency Spill Containment Plan. Investigate the nature and extent of the spillage/leakage, and implement clean-up and mitigation measures, as necessary.

No.	Risk description and controls			Risk level (without controls)			Risk level (post controls)			Performance objective	Monitoring measures	Risk treatment plan
	Environmental value impacted	Impact	Impact description	Likelihood	Consequence	Risk level	Avoidance and mitigation measures	Likelihood	Consequence	Risk level			
46	Australian Lungfish (Neoceratodus forsteri) (vulnerable) Giant barred frog (Mixophyes iteratus) (vulnerable) Mary River Cod (Maccullochella mariensis) (endangered) Mary River Turtle (Elusor macrurus) (endangered) White-throated Snapping Turtle (Elseya albagula) (critically endangered)	Sedimentation - water quality	Yabba Creek and Sandy Creek upstream from Lake Borumba, including the associated riparian vegetation provides habitat for threatened aquatic species including Australian lungfish, Giant barred frog, Mary river cod, Mary river turtle and the White-throated snapping turtle. Water quality Yabba Creek and Sandy Creek is generally good and typically achieves the water quality objectives (WQO) for the protection of relevant environmental values for upland freshwaters. Suspended solids and turbidity levels were lower than the WQO. Increased suspended solids and turbidity can take time to settle out of the water column. Sediment may also be deposited in the stream beds, which changes the aquatic habitat. During construction activities, sediment may be mobilised and transported by surface water during rainfall events, ultimately discharging into watercourses and drainage lines and potentially reducing water quality in downstream aquatic habitats. Increased suspended sediments can reduce light penetration into the water column, reducing photosynthesis of aquatic macrophytes and decreasing dissolved oxygen levels. Watercourses within the Exploratory Works footprint include both permanent and ephemeral features, which may be at higher risk of these impacts. Exploratory Works activities that would disturb soils including use of the temporary and permanent creek crossings and construction of bridges across these watercourses could lead to sediments being transported into Yabba Creek and Sandy Creek, and downstream of Lake Borumba. This could potentially increase concentrations of turbidity and suspended solids in the water column, degrading habitat for threatened aquatic species.	Likely	Moderate	Medium	• Erosion and sediment controls (ESC) to be implemented on site for the duration of Exploratory Works (in accordance with the Preliminary Erosion and Sediment Control Plan). • Placing infrastructure and investigations away from known or possible sources of contamination (i.e. cattle dips), wherever possible. • Designing and constructing waterway crossings in accordance with riverine protection permit expectations (though exemptions from the need to obtain the permit may be available). • Implementing a buffer zone around the spoil disposal area so spoil is located a sufficient distance from the riparian zone of Yabba Creek and Sandy Creek. • Avoiding blading and grubbing clearing methods (as possible) to reduce direct mobilisation of soil and contaminants. • Implementing soil erosion control measures for soils with dispersible subsoils, including limiting disturbance, and the use of gypsum and covering of dispersive material. • Sizing ESC components and water recycling/reuse components with appropriate redundancy/buffer capacity as determined by Queensland Hydro. • Maintaining the ESC components via regular removal of water after storm events and de-silting. • Water quality discharge requirements specified in the Erosion and Sediment Control Plan are to be met prior to discharge of any separated slurry to the environment. • A register that details sediment basin inspections, maintenance, discharge volumes and dates, flocculation details, discharge-water quality and volumes of sediment removed will be maintained. • Site inspections are to be conducted (weekly routine) and prior to forecast rain of 25 mm over 24 hours to identify repair, maintenance or improvement works. • Use of dust suppression to reduce offsite dust impacts.	Possible	Minor	Low			• Ongoing assessment of ESC with weekly checklist. Where controls are inappropriate or damaged, reinstatement or improvement of controls are to be conducted. • Measures from the ESC, such as: - undertaking clearing for the geotechnical investigation areas immediately prior to the investigation to limit the time bare ground is exposed. - rehabilitating exposed areas as soon as possible to reduce the likelihood of sedimentation causing turbid run-off in the waterways. - Installing suitable site-specific controls, such as earth basins, filters, rock check dams, sediment fences and sediment traps.
47	Australian Lungfish (Neoceratodus forsteri) (vulnerable) Giant barred frog (Mixophyes iteratus) (vulnerable) Mary River Cod (Maccullochella mariensis) (endangered) Mary River Turtle (Elusor macrurus) (endangered) White-throated Snapping Turtle (Elseya albagula) (critically endangered)	Sedimentation - water quality	Yabba Creek downstream of Lake Borumba and associated riparian vegetation provides habitat for threatened aquatic species including White-throated snapping turtles, Giant barred frog, Mary River cod, Australian lungfish and the Mary River turtle. Water quality in Yabba Creek downstream of the existing Lake Borumba dam wall exceeds WQOs for suspended solids, chlorophyll-a and nutrients, consistent with agricultural development, forestry and urbanisation in the catchment. Vegetation clearing, earthmoving and general construction activities may all result in an increase to natural erosion and sedimentation within the Project's disturbance footprint. This increased erosion and sedimentation is likely to have localised impacts upon water quality and flow rates within the vicinity of the proposed works. Exploratory works activities could disturb soils near Yabba Creek downstream of the lake, including: •geotechnical drilling at the new lower dam wall location •excavation of coolseats at the new lower dam wall location •construction of associated access tracks including a bed-level crossing approximately 450 m downstream of the existing Borumba dam wall. Disturbing soils in these locations could lead to sediments being transported into the Yabba Creek, potentially increasing concentrations of turbidity and suspended solids in the water column further degrading habitat for threatened aquatic species.	Likely	Moderate	Medium	• Erosion and sediment controls (ESC) to be implemented on site for the duration of Exploratory Works (in accordance with the Preliminary Erosion and Sediment Control Plan). • Placing infrastructure and investigations away from known or possible sources of contamination (i.e. cattle dips), wherever possible. • Designing and constructing waterway crossings in accordance with riverine protection permit expectations (though exemptions from the need to obtain the permit may be available). • Implementing a buffer zone around the spoil disposal area so spoil is located a sufficient distance from the riparian zone of Yabba Creek and Sandy Creek. • Avoiding blading and grubbing clearing methods (as possible) to reduce direct mobilisation of soil and contaminants. • Implementing soil erosion control measures for soils with dispersible subsoils, including limiting disturbance, and the use of gypsum and covering of dispersive material. • Sizing ESC components and water recycling/reuse components with appropriate redundancy/buffer capacity as determined by Queensland Hydro. • Maintaining the ESC components via regular removal of water after storm events and de-silting. • Water quality discharge requirements specified in the Erosion and Sediment Control Plan are to be met prior to discharge of any separated slurry to the environment. • A register that details sediment basin inspections, maintenance, discharge volumes and dates, flocculation details, discharge-water quality and volumes of sediment removed will be maintained. • Site inspections are to be conducted (weekly routine) and prior to forecast rain of 25 mm over 24 hours to identify repair, maintenance or improvement works. • Use of dust suppression to reduce offsite dust impacts.	Likely	Minor	Low			• Ongoing assessment of ESC with weekly checklist. Where controls are inappropriate or damaged, reinstatement or improvement of controls are to be conducted. • Measures from the ESC, such as: - undertaking clearing for the geotechnical investigation areas immediately prior to the investigation to limit the time bare ground is exposed. - rehabilitating exposed areas as soon as possible to reduce the likelihood of sedimentation causing turbid run-off in the waterways. - Installing suitable site-specific controls, such as earth basins, filters, rock check dams, sediment fences and sediment traps.
48	Australian Lungfish (Neoceratodus forsteri) (vulnerable) Giant barred frog (Mixophyes iteratus) (vulnerable) Mary River Cod (Maccullochella mariensis) (endangered) Mary River Turtle (Elusor macrurus) (endangered) White-throated Snapping Turtle (Elseya albagula) (critically endangered)	Sedimentation - water quality	Lake Borumba including the associated riparian vegetation provides habitat for threatened aquatic species including white-throated snapping turtle, Mary River turtle, Giant barred frog, Mary River cod and the Australian lungfish. Water quality in Lake Borumba is typical for a freshwater lake. Observed nutrient levels within the water column was found to be double guidelines outlined in the WQOs, with TN and TP median values reported to be 0.61 and 0.02 mg/L, respectively. Increased suspended solids and turbidity can take a long time to settle out of the water column. Sediment may also be deposited in the stream beds which changes the aquatic habitat. During construction activities, sediment may be mobilised and transported by surface water during rainfall events, ultimately discharging into watercourses and drainage lines and potentially reducing water quality in downstream aquatic habitats. Increased suspended sediments can reduce light penetration into the water column, reducing photosynthesis of aquatic macrophytes and decreasing dissolved oxygen levels. Watercourses within the Project footprint include both permanent and ephemeral features, which may be at higher risk of these impacts. Water is required for construction of access tracks and roads (dust suppression and material conditioning), exploratory tunnel drilling and geotechnical drilling. Raw water will be extracted from Lake Borumba via an electric submersible pump. Water will be extracted at a rate of 2-5 L/s over 6-12 hours. The pump will rise and fall with water levels in the lake. The water will be transferred via shallow buried poly pipe to a number of 'tank farms' which will store the bulk water. There will be minor disturbance of bank and bed sediments during installation but the area will be isolated. The extraction could theoretically disturb lake sediments though the pump will draw from near the surface and the site was selected to provide ample depth to allow for lake water level fluctuations. The pumping rate will also be kept low to limit any entrainment. Hydrological investigations suggest the impact of extraction on lake water levels will be minimal. The lake capacity is 46,000 ML at FSL and the rate of extraction is approximately 0.12 ML per day or approximately 66 ML over the full construction period. This equates to 0.15% of the capacity of the storage. This is extremely unlikely to impact on lake water quality unless it was occurring during a period of extreme drought.	Possible	Moderate	Medium	• Erosion and sediment controls (ESC) to be implemented on site for the duration of Exploratory Works (in accordance with the Preliminary Erosion and Sediment Control Plan). • Placing infrastructure and investigations away from known or possible sources of contamination (i.e. cattle dips), wherever possible. • Designing and constructing waterway crossings in accordance with riverine protection permit expectations (though exemptions from the need to obtain the permit may be available). • Implementing a buffer zone around the spoil disposal area so spoil is located a sufficient distance from the riparian zone of Yabba Creek and Sandy Creek. • Avoiding blading and grubbing clearing methods (as possible) to reduce direct mobilisation of soil and contaminants. • Implementing soil erosion control measures for soils with dispersible subsoils, including limiting disturbance, and the use of gypsum and covering of dispersive material. • Sizing ESC components and water recycling/reuse components with appropriate redundancy/buffer capacity as determined by Queensland Hydro. • Maintaining the ESC components via regular removal of water after storm events and de-silting. • Water quality discharge requirements specified in the Erosion and Sediment Control Plan are to be met prior to discharge of any separated slurry to the environment. • A register that details sediment basin inspections, maintenance, discharge volumes and dates, flocculation details, discharge-water quality and volumes of sediment removed will be maintained. • Site inspections are to be conducted (weekly routine) and prior to forecast rain of 25 mm over 24 hours to identify repair, maintenance or improvement works. • Use of dust suppression to reduce offsite dust impacts.	Rare	Minor	Low			• Ongoing assessment of ESC with weekly checklist. Where controls are inappropriate or damaged, reinstatement or improvement of controls are to be conducted. • Measures from the ESC, such as: - undertaking clearing for the geotechnical investigation areas immediately prior to the investigation to limit the time bare ground is exposed. - rehabilitating exposed areas as soon as possible to reduce the likelihood of sedimentation causing turbid run-off in the waterways. - Installing suitable site-specific controls, such as earth basins, filters, rock check dams, sediment fences and sediment traps.
49	Glossy black-cockatoo, *Calyptorhynchus lathami lathami* (vulnerable)	Clearing (habitat loss and fragmentation)	2,722.8 ha of breeding habitat occurs within the Borumba PHES Survey area, of which 643 ha of habitat occurs in the Exploratory Works Survey area. Additionally, 101.8 ha of foraging habitat occurs within the Borumba PHES Survey area, with only 2.3 ha of this habitat intersecting with the Exploratory Works Survey area. This potential habitat is critical to the survival of the species. Glossy black-cockatoos have been recorded a total of 39 times during the field surveys. The Exploratory Works Project occurs at the northern extent of the Conondale Range extending into adjacent Conondale National Park and bordered by Imbil State Forest, and Yabba State Forest. The surrounding state forest areas are production and plantation forests. The Exploratory Works Project is at the intersection of several mapped biodiversity significant terrestrial and riparian corridors, with contiguous vegetation acting as a corridor between Conondale National Park and Wrattens National Park within a mosaic of vegetated freehold land and state forest reserves. Exploratory works will encroach on Glossy black-cockatoo habitat, leading to habitat loss and degradation. Approximately 2.3 ha of known habitat for glossy black-cockatoo will be impacted by the Exploratory Works. Habitat which could potentially be impacted includes some scattered areas containing Allocasuarina torulosa. Exploratory Works could encroach on glossy black-cockatoo habitat, leading to habitat loss and degradation. Habitat loss, degradation and fragmentation are key threats to the species (DCCEEW, 2022).	Highly Likely	High	High	•Minimise works in Glossy black-cockatoo habitat during the breeding period (March to September). •Pre-clearance surveys will identify, map and mark out large hollow-bearing trees and hollows that could be used or are actively used by Glossy black-cockatoos. •Where not in use hollows that meet the species' requirements will be 'blocked' to prevent breeding during Exploratory Works activities. When Exploratory Works activities are completed in the area, blocked hollows will be reopened as part of site reinstatement / rehabilitation activities. •Minimise clearing hollow-bearing trees and large trees (i.e. >50 cm DBH in case hollows are not visible). •Works around active breeding locations will be halted until the animals have moved on or individuals can be safely relocated in accordance with Rehabilitation/Damage Mitigation Permit conditions, or as otherwise directed by the suitably qualified FSC. • Works will be moved to alternative locations if these options are not possible. •Trees with active breeding activities will be recorded in the Animal Breeding Place Register discussed in the Exploratory Works SMP and reported to the department as required. •Exclusion and/or buffer zones to be established around known active breeding sites. •Exclusion and/or buffer zones to be maintained until bird fledges. •Implement the hollow replacement strategy. •Any additional management measures outlined for this species in the SMP should also be implemented.	Highly Likely	Moderate	High	Minimise habitat disturbance	• Monitoring will be undertaken to ensure exclusion zones and signage remains in serviceable condition. • FSC will keep a record of any fauna relocated during clearing activities.	• Once geotechnical investigation works are complete, the area will be rehabilitated in accordance with the approved plan and maintained and monitored until the rehabilitation works have reached a self-sustaining stage. • Inspect and repair any flagging tape or respray fluorescent marker. • Any fauna injuries or deaths are required to be reported firstly to the project environmental manager and then DETSI and/or DCCEEW. The cause of injury or death will be investigated, and any required changes will be implemented. • Any injured fauna will be taken to the nearest suitable vet or wildlife carer for treatment.
50	Greater glider, *Petauroides Volans* (endangered) Yellow-bellied glider (southern subspecies), *Petaurus australis australis* (vulnerable)	Clearing (habitat loss and fragmentation)	3,066.2 ha of greater glider habitat occurs within the Borumba PHES Survey area, of which 676.7 ha of habitat occurs in the Exploratory Works Survey area. Approximately 35.2 ha of known greater glider habitat is within the Project footprint. 3,066.2 ha of habitat for yellow-bellied gliders occurs within the Borumba PHES Survey area, of which 676.7 ha of habitat occurs in the Exploratory Works Survey area. Approximately 35.2 ha of known yellow-bellied glider habitat is within the Project footprint. Greater gliders and yellow-bellied gliders were detected during targeted surveys adjacent to an existing track in the proposed upper reservoir area where the main geotechnical program will occur. The Exploratory Works Project occurs at the northern extent of the Conondale Range extending into adjacent Conondale National Park and bordered by Imbil State Forest, and Yabba State Forest. The surrounding state forest areas are production and plantation forests. The Exploratory Works Project is at the intersection of several mapped biodiversity significant terrestrial and riparian corridors, with contiguous vegetation acting as a corridor between Conondale National Park and Wrattens National Park within a mosaic of vegetated freehold land and state forest reserves. habitat within the Exploratory Works Project footprint is primarily foraging habitat with occasional larger trees capable of providing hollows suitable for denning. Tree species preferentially favoured by the greater glider (e.g. *E. tereticornis*, *E. crebra*, *C. intermedia*) are present in the Exploratory Works footprint. Potential greater glider and yellow-bellied glider habitat occurs in and around the Exploratory Works Project footprint. Hollow-bearing trees are particularly important denning and breeding habitat for greater gliders and yellow-bellied gliders. The Exploratory Works could encroach on habitat for the species, including hollow-bearing trees, leading to habitat loss and degradation. Habitat loss and fragmentation are key threats to the species (DCCEEW, 2022a), (DAWE, 2022b).	Likely	High	High	•Minimise works in glider habitat during the breeding period (spring – summer). •Pre-clearance surveys will identify, map and mark out large hollow-bearing trees, and hollows that could be used or are actively used by greater gliders and/or yellow-bellied gliders. •Where not in use, hollows that meet the species' requirements will be 'blocked' to prevent breeding during Exploratory Works activities. When Exploratory Works activities are completed in the area, blocked hollows will be reopened as part of site reinstatement / rehabilitation activities. •Additional pre-clearance for the yellow-bellied glider will include the mapping of all sap trees (with any type of sap scar) to account for the wide variety of sap groove patterns and aid in identifying suitable habitat for the species •For the greater glider, additional pre-clearance surveys employing the use of infrared-drone technology will be undertaken to identify greater glider individuals prior to the commencement of clearing. •Avoid clearing large trees (>30 cm DBH) and sap trees, where possible. •Works around active breeding locations will be halted until the animals have moved on or individuals can be safely relocated in accordance with Rehabilitation/Damage Mitigation Permit conditions, or as otherwise directed by the suitably qualified FSC. •Trees with confirmed breeding activities will be recorded in the Animal Breeding Place Register discussed in the Exploratory Works SMP and reported to the department as required. •Establish exclusion and/or buffer zones around active breeding trees. Exclusion and buffer zones to be maintained until fauna disperse. •Implement the hollow replacement strategy. •Wherever possible, the use of barbed wire fencing will be avoided across the Exploratory Works. Any additional management measures outlined for this species in the SMP should also be implemented.	Possible	Moderate	Medium	Minimise habitat disturbance	• Monitoring will be undertaken to ensure exclusion zones and signage remains in serviceable condition. • FSC will keep a record of any fauna relocated during clearing activities.	• Inspect and repair damaged fencing; replace any flagging tape or respray fluorescent marker. • Where clearing extends outside the approved disturbance limits, a record must be taken of the incident and an investigation will occur. • Temporarily disturbed areas that are no longer required to be cleared will be assessed for restoration and revegetation. • Any fauna injuries or deaths are required to be reported firstly to the Project environmental manager and then DETSI and/or DCCEEW. The cause of injury or death will be investigated, and any required changes will be implemented. • Any injured fauna will be taken to the nearest suitable vet or wildlife carer for treatment.
51	Grey-headed flying-fox, *Pteropus poliocephalus* (vulnerable)	Clearing (habitat loss and fragmentation)	Habitat in the Borumba PHES Survey area supports foraging habitat only, with approximately 3,829.1 ha mapped within the Borumba PHES Survey area, and approximately 717.4 ha mapped within the Exploratory Works Survey area. There is 38 ha of foraging habitat mapped in the Project footprint. Grey-headed flying-foxes were detected during surveys within both the upper and lower reservoir footprints. There are no current camps within the Exploratory Works footprint or the study area. However, a known nationally important camp is located 17 km from the study area, well within the known foraging range for the species (approximately 40 km). The Exploratory Works Project occurs at the northern extent of the Conondale Range extending into adjacent Conondale National Park and bordered by Imbil State Forest, and Yabba State Forest. The surrounding state forest areas are production and plantation forests. The Exploratory Works Project is at the intersection of several mapped biodiversity significant terrestrial and riparian corridors, with contiguous vegetation acting as a corridor between Conondale National Park and Wrattens National Park within a mosaic of vegetated freehold land and state forest reserves. Approximately 38 ha of potential foraging habitat for grey-headed flying foxes, will be cleared for geotechnical investigation activities and construction of associated access tracks. Habitat within the Exploratory Works Project footprint includes important winter and spring foraging resources such as *Eucalyptus tereticornis*, *E. crebra*, *E. robusta*, *E. sudrophloia*, *Corymbia citriodora*, *Grevillea robusta* , and *Castanospermum* . Breeding habitat is not present within the study area. The Exploratory Works could encroach on grey-headed flying-fox habitat, leading to habitat loss and degradation. Loss and degradation of foraging and roosting habitat is the primary known threat to the species (TSSC, 2001).	Highly Likely	Moderate	High	•Establish exclusion and buffer zones around Exploratory Works Project footprint to avoid accidental clearing of habitat. •If a camp / roost site is identified within the Exploratory Works footprint, operational activities in these areas are to cease immediately and DETSI/DCCEEW are to be notified immediately.	Likely	Moderate	Medium	Minimise habitat disturbance	• Monitoring will be undertaken to ensure exclusion zones and signage remains in serviceable condition. • FSC will keep a record of any fauna relocated during clearing activities.	• Inspect and repair damaged fencing; replace any flagging tape or respray fluorescent marker. • Where clearing extends outside the approved disturbance limits, a record must be taken of the incident and an investigation will occur. • Temporarily disturbed areas that are no longer required to be cleared will be assessed for restoration and revegetation. • Any fauna injuries or deaths are required to be reported firstly to the Project environmental manager and then DETSI and/or DCCEEW. The cause of injury or death will be investigated, and any required changes will be implemented. • Any injured fauna will be taken to the nearest suitable vet or wildlife carer for treatment.
52	Koala, *Phascolarctos cinereus* (endangered)	Clearing (habitat loss and fragmentation)	2,026.6 ha of foraging and breeding habitat for koalas and 1,516 ha of dispersal and refuge habitat for koalas occurs within the Borumba PHES Survey area, of which 676.5 ha of foraging and breeding habitat and 202.8 ha of dispersal and refuge habitat occurs in the Exploratory Works Survey area. Koalas were detected during targeted surveys, 67 records from visually, camera trap, drones, detector dogs and evidence of koala was detected at ten SAT sites. Koala habitat occurs in and around the Exploratory Works footprint. Approximately 35.3 ha of potential foraging/breeding habitat and 52.3 ha of dispersal/refuge habitat for koalas will be impacted by the Exploratory Works. Habitat to be removed includes eucalypt dominated communities which represent foraging, breeding and dispersal habitat for the species. Whilst direct impacts to individual koala is unlikely, potential habitat will be removed. There will also be no permanent impediments to movement. Exploratory Works activities could encroach on koala habitat, leading to habitat loss and degradation. Habitat loss is a significant threat to koala populations (DAWE, 2022).	Highly Likely	High	High	•Install fauna exclusion fencing around civil construction compound, explosives magazine store, and if required the portal pad and exploratory tunnel. •Pre-clearance surveys will identify, map and mark out evidence of koala presence. •Additional pre-clearance surveys employing the use of infrared-drone technology will be undertaken to identify koala individuals prior to the commencement of clearing. •A suitably qualified FSC will be present during clearing as per the Nature Conservation (Koala) Conservation Plan 2017. •Clearing in accordance with the sequential clearing method in Section 6.1.6, including allowing koalas to naturally move from the clearing footprint in preference to active relocation. •Exploratory Works Project activities will implement relevant measures and principles identified in the Koala Sensitive Design Guideline (DES, 2022).	Highly Likely	Moderate	High	Minimise habitat disturbance	• Monitoring will be undertaken to ensure exclusion zones and signage remains in serviceable condition. • FSC will keep a record of any fauna relocated during clearing activities.	• Inspect and repair damaged fencing; replace any flagging tape or respray fluorescent marker. • Where clearing extends outside the approved disturbance limits, a record must be taken of the incident and an investigation will occur. • Temporarily disturbed areas that are no longer required to be cleared will be assessed for restoration and revegetation. • Any fauna injuries or deaths are required to be reported firstly to the Project environmental manager and then DETSI and/or DCCEEW. The cause of injury or death will be investigated, and any required changes will be implemented. • Any injured fauna will be taken to the nearest suitable vet or wildlife carer for treatment.
53	Long-nosed potoroo (northern), *Potorous tridactylus tridactylus* (vulnerable)	Clearing (habitat loss and fragmentation)	Potential long-nosed potoroo (northern) habitat occurs in the vicinity of the Exploratory Works Project. Potential habitat includes eucalyptus trees associated with fungi that are an important part of the potoroo's diet. 1,775.1 ha of habitat occurs within the Borumba PHES Survey area, of which 715.1 ha of habitat occurs in the Exploratory Works Survey area, which represents about 6.5% of the species' area of occupancy (51,200 ha total) (DAWE 2022). Long-nosed potoroos were recorded in the upper reservoir adjacent to the exploratory works footprint and along Wrattens Top Road. Approximately 38 ha of known habitat for long-nosed potoroo will be impacted by the Exploratory Works, primarily as a result of geotechnical investigation activities and construction of associated access tracks. Habitat to be removed is likely to be used for both foraging and breeding. It is possible that trees associated with preferred fungi for the species could be cleared. The Exploratory Works Project also intersects a state significant terrestrial corridor that runs east-west from the Elgin Vale State Forest to the coast at Peregian via Mapleton National Park, Imbil State Forest, Conondale National Park and Yabba State Forest. The current extent of Lake Borumba acts as a connectivity barrier from north to south. The eastern extent of the Exploratory Works Project associated with the lower reservoir occurs partially within a regionally significant terrestrial corridor that runs south-north from Imbil State Forest to Curra State Forest via Marys Creek State Forest and Brooyar State Forest. Exploratory Works could encroach on existing home ranges for the species, leading to habitat loss, fragmentation and degradation through spreading weeds and increasing predation. Habitat loss, fragmentation and degradation are key threats to the species (DAWE, 2022a).	Highly Likely	High	High	•Minimise clearing of mature trees known to be associated with Mycorrhizal fungi – the preferred food of the long-nosed potoroo. •Pre-clearance surveys will identify potential and actively used breeding habitat. •Establish exclusion (and buffer zones around the Exploratory Works Project footprint and identified active breeding habitat. •Lantana control at forest edge margins of areas known or likely to support long-nosed potoroo will be minimised, with clearing in these areas using a staged approach that will aim to remove lantana over several phases. • Clearly delineate clearing boundaries and exclusion/buffer zones with flagging tape or fluorescent marker or signage prior to clearing commencing to avoid unnecessary clearing and to ensure personnel and vehicles stay within the approved footprint, avoiding contravention of disturbance limits. • Clearing boundary maps, along with exclusion/buffer zones are to be provided to contractors. • Works will be conducted within existing cleared areas wherever practicable. • Extensive pre-planning of work locations has been undertaken to avoid and minimise direct impact to potential habitat wherever possible. • Pre-clearance surveys to be undertaken in all woodlands proposed to be cleared that have been identified as potential habitat for these species. Trees where koalas, gliders and flying fox have been identified will be clearly marked, and GPS locations recorded. • Pre-clearance surveys will be completed no more than 48 hours prior to clearing commencing. • Sequential clearing will be undertaken in accordance with the FFMP. • Micrositing of works to avoid breeding places and feeder trees. • Any additional management measures outlined for these species in the Exploratory Works Project's SMP will also be implemented.	Highly Likely	Moderate	High	Minimise habitat disturbance	• Monitoring will be undertaken to ensure exclusion zones and signage remains in serviceable condition. • FSC will keep a record of any fauna relocated during clearing activities.	• Inspect and repair damaged fencing; replace any flagging tape or respray fluorescent marker. • Where clearing extends outside the approved disturbance limits, a record must be taken of the incident and an investigation will occur. • Temporarily disturbed areas that are no longer required to be cleared will be assessed for restoration and revegetation. • Any fauna injuries or deaths are required to be reported firstly to the Project environmental manager and then DETSI and/or DCCEEW. The cause of injury or death will be investigated, and any required changes will be implemented. • Any injured fauna will be taken to the nearest suitable vet or wildlife carer for treatment.
54	Glossy black-cockatoo (south-eastern) (*Calyptorhynchus lathami lathami*) (vulnerable) Greater glider (southern and central) (*Petauroides volans*) (endangered) Grey-headed flying-fox (*Pteropus poliocephalus*) (vulnerable) Koala (*Phascolarctos cinereus*) (endangered) Long-nosed potoroo (northern) (*Potorous tridactylus tridactylus*) (vulnerable) Yellow-bellied glider (southern subspecies) *Petaurus australis australis* (vulnerable)	Hazardous materials	Threatened terrestrial fauna including glossy-black cockatoo, greater glider, grey-headed flying-fox, koala, long-nosed potoroo and yellow-bellied glider were recorded within the Exploratory Works footprint during field surveys. Habitat for these species occurs in the Exploratory Works footprint and could be impacted by the accidental release of hazardous chemicals. Exploratory Works activities have the potential to lead to accidental releases of hazardous materials, such as fuels and oils from vehicles and machinery. These hazardous materials can lead to localised soil contamination and contamination of water resources, which in turn can cause injury, reduced vigour or mortality to fauna. The severity of the impact is dependent on the location and magnitude of the release. Direct impacts to these species as a result of hazardous material release are unlikely. The severity of the impact on habitat is dependent on the location and magnitude of the release.	Possible	High	Medium	Spoil reuse targets have been identified across material categories expected from design. Reuse categories are linked to spoil contamination risk and provisional potential reuse targets have been identified for each category as below: • unrestricted spoil – 100 % • other clean earth – 80 % • non-regulated waste/general waste – 25 % • category 2 regulated waste – 10 % • category 1 regulated waste – 0 % • potentially contaminated soils – 50 % • acid sulfate soils – 20 % • acid-forming rock – 20 % • naturally occurring asbestos material – 0 %. • Testing of material as it is removed from disturbed areas, including the exploratory tunnel, to determine any acid sulfate soil, potential acid sulfate soil or contaminants. • Implement recommendations form the contaminated land investigations. • All chemicals, fuel and oil will be stored in above ground tanks in bunded areas, with accurate records maintained of volumes purchased and stored, to ensure any contamination of land or water is prevented, and any spill is detected quickly. • Contain poor quality discharge water and treat prior to disposal, subject to achieving water quality guidelines. • Disposal methods and responses are identified within the Spoil Management Plan (refer to Appendix B) and are linked to the spoil material category. • Design storage areas to consist of a compacted base, bunding to contain spillages and roofing to prevent contamination and infiltration of stormwater (as per AS1940 and AS3780). • Management plans for select (as required) discoverable contaminants (i.e. acid-rock drainage, naturally occurring asbestos) will be developed upon identification from preliminary drilling/earthworks during Exploratory Works. • Residual hazardous materials will be removed from the construction site and returned to an appropriate storage area or a suitable waste facility. Control of potential offsite mobilisation of contamination will be implemented through the following: • during excavations, materials that are contaminated and not suitable for remediation and onsite storage will be loaded directly onto licensed transport vehicles for offsite disposal • stockpiling of contaminated soils will be avoided where possible via the in-situ waste classification and identification of potentially contaminated materials • assigning secure location for storage of reusable and recyclable materials on site	Unlikely	High	Medium			• Assessment of spoil to be conducted as part of excavation tracking. Where disposal method is deemed inappropriate, further controls to be compiled and managed upon discovery of unknown contaminant. • Weekly assessment of any stockpiling and where controls are inappropriate or damaged, reinstatement or improvement of controls are to be conducted. • In the event of a spillage/leak of potentially hazardous substances: · Comply with the Emergency Spill Containment Plan. · Investigate the nature and extent of the spillage/leakage, and implement clean-up and mitigation measures, as necessary.

No.	Risk description and controls			Risk level (without controls)				Risk level (post controls)			Performance objective	Monitoring measures	Risk treatment plan
	Environmental value impacted	Impact	Impact description	Likelihood	Consequence	Risk level	Avoidance and mitigation measures	Likelihood	Consequence	Risk level			
55	Glossy black-cockatoo (south-eastern) (Calyptorhynchus lathami lathami) (vulnerable) Greater glider (southern and central) (Petauroides volans) (endangered) Grey-headed flying-fox (Pteropus poliocephalus) (vulnerable) Koala (Phascolarctos cinereus) (endangered) Long-nosed potoroo (northern) (Potorous tridactylus tridactylus) (vulnerable) Yellow-bellied glider (southern subspecies) Petaurus australis australis (vulnerable)	Air quality/ dust	The study area provides habitat values for threatened species including foraging, roosting and dispersal values. Habitat, particularly vegetation, adjacent to the Exploratory Works footprint could be affected by air emissions and increased dust generated during construction. Potential impacts related to air quality during construction will be local and temporary and are specific to each species, or group of species. Dust emissions can be generated from construction activities, particularly vehicle movements on unsealed roads, land clearing, drilling and blasting, earthmoving, material handling and surface preparation and stockpiling material (wind erosion). Gases generated by fuel combustion come from numerous sources such as oxides of nitrogen, carbon monoxide, sulphur dioxide, fine particulate matter, trace amounts of volatile organic compound. Fugitive emissions from fuels, chemicals, oils, and greases stored at construction sites odour emissions can arise from disturbance of contaminated land, asphalt laying activities and construction camp wastewater treatment. Increased dust from vegetation clearing, earthworks and vehicle movements during construction has the potential to temporarily and locally impact fauna habitat used for foraging, roosting or dispersal in the vicinity of the Exploratory Works Project footprint. Anthropogenic air pollutants such as fuel combustion from vehicles negatively affect avian species including the glossy black-cockatoo a as birds tend to uptake aerially suspended compounds quickly due to their efficient respiratory systems (Richard, et al., 2021). Therefore, the species are very sensitive to air quality (Richard, et al., 2021). Specific effects to the grey-headed flying-foxes includes risks on disrupting olfactory-dependent foraging techniques (Ecosure, 2021). This is because grey-headed flying foxes locate their food using their sense of smell rather than visual cues (Ecosure, 2021). For mammals, including greater gliders, koalas, long-nosed potoroos, and yellow-bellied gliders, dust affects the species directly and indirectly. Directly, increased dust can impact on respiratory systems of fauna (Burr, Karani, Holmes, Williams, & Davies, 2004). Indirectly, dust impacts critical foraging and denning material for mammals, by impairing plant photosynthesis and productivity of trees, resulting in reduced habitat quality for fauna. Dust is expected to only be a potential issue during vegetation clearing and construction.	Highly Likely	Moderate	High	• Areas which have potential to generate airborne dust will be wetted down regularly or covered wherever practicable. • Resheeting and sealing of roads and tracks to minimise dust generation. • Regular cleaning of machinery and vehicle tyres to reduce dust emissions. • Low speed limits will be implemented across the Exploratory Works Project to minimise dust generation. • Any areas no longer required for operational activities will be rehabilitated as soon as practicable. • Machinery and vehicle tyres will be regularly cleaned to reduce wheel entrained dust emissions or consider use of vibration grids. • Spraying of herbicides, aerosols and other chemicals to be undertaken in suitable weather conditions (i.e. low wind speed). • Use of dust suppression to reduce offsite dust impacts.	Likely	Moderate	Medium			• Increase frequency of dust suppression if dust nuisance is observed by site construction or environmental manager or if a complaint is received.
56	Glossy black-cockatoo (south-eastern) (Calyptorhynchus lathami lathami) (vulnerable) Greater glider (southern and central) (Petauroides volans) (endangered) Grey-headed flying-fox (Pteropus poliocephalus) (vulnerable) Koala (Phascolarctos cinereus) (endangered) Long-nosed potoroo (northern) (Potorous tridactylus tridactylus) (vulnerable) Yellow-bellied glider (southern subspecies) Petaurus australis australis (vulnerable)	Noise	The study area provides habitat values for threatened species including foraging, roosting and dispersal values. Habitat, particularly vegetation, adjacent to the Exploratory Works footprint could be affected by noise generated during construction. Noise may adversely affect these species by interfering with communication (e.g., territorial bird song), masking the sound of predators and prey, causing avoidance reactions and displacement from habitat. Construction noise will be generated by the Exploratory Works Project through machinery and drill and blast activities for the exploratory tunnel (noting the tunnel excavation will be at a sub-surface depth of more than 100 m below ground after the first month). This will vary from short intermittent bursts of noise from operational activities to more persistent noises from generators. Whilst these disturbances would only be temporary, the generation of construction noise has the potential to force resident fauna species to relocate. Species may temporarily avoid construction areas.	Highly Likely	Moderate	High	• Works will be undertaken outside of breeding periods, where possible. • Prior to blasting or other high intensity vibratory works commencing, pre-clearance surveys will be undertaken to determine whether breeding is occurring within 200 m of the works. • No blasting or other high intensity vibratory works will be undertaken within 200 m of known active breeding sites during breeding seasons unless otherwise approved by a noise/vibration specialist and experienced ecologist. • The 200 m buffer area will be inspected daily during drilling/blasting works and if a listed threatened species is located works, will cease until the individual has moved out of the area of its own accord or it is relocated in accordance with Rehabilitation/Damage Mitigation Permit conditions.	Likely	Moderate	Medium			• If a noise or vibration complaint is received, an investigation will be undertaken to determine what additional controls can be put in place
57	Glossy black-cockatoo (south-eastern) (Calyptorhynchus lathami lathami) (vulnerable) Greater glider (southern and central) (Petauroides volans) (endangered) Grey-headed flying-fox (Pteropus poliocephalus) (vulnerable) Koala (Phascolarctos cinereus) (endangered) Long-nosed potoroo (northern) (Potorous tridactylus tridactylus) (vulnerable) Yellow-bellied glider (southern subspecies) Petaurus australis australis (vulnerable)	Light	The study area provides habitat values for threatened species including foraging, roosting and dispersal values. Habitat, particularly vegetation, adjacent to the Exploratory Works footprint could be affected by artificial light emitted during construction. Artificial lighting from infrastructure and machinery may impact fauna within the Exploratory Works Project footprint during works. Artificial lighting can have a range of impacts which can vary from species to species. Particularly for the glossy-black cockatoo, mobile light sources may cause birds to fly away from feeding or resting sites (DCCEEW, 2023). Threatened mammals including the greater glider, yellow-bellied glider, long-nosed potoroo, and koala are nocturnal, thus light can have negative impacts as artificial lighting may affect the circadian rhythm of these local fauna populations. Artificial light reduces feeding opportunities, limits travel between habitat patches and exposes native mammals to predators. Sudden changes in light levels will orient and temporarily blind native mammals (DCCEEW, 2023). Nocturnal mammal's eyes are adapted to dim light, but not artificial bright light, and their night-time vision is particularly sensitive to blue, green, UV and broad spectrum white light. For the grey-headed flying-foxes, artificial lights attract flying insects, and so bats hunting these insects are exposed to predators (DCCEEW, 2023). Furthermore, light exposes bats to predators when leaving roost sites, and causes them to abandon roost sites altogether. The migratory white-throated needle-tail are mostly found aerially, and will rarely come down to roost during the night. Artificial light will also impact this species as it will cause migrating birds to lose their way and choose low-quality rest and feeding sites, disrupting breeding and migratory patterns and causing general disorientation (DCCEEW, 2023). Conversely, some species such as nocturnal reptiles, frogs and bats may congregate at artificial light sources to feed on insects attracted to light. These increases predation risks for species such as the greater glider, yellow-bellied glider and long-nosed potoroo. See 64 for risk assessment of predation for greater glider, yellow-bellied glider and long-nosed potoroo. Artificial lighting impacts will probably occur during the Exploratory Works Project although the impacts will be primarily isolated to the portal pad and the construction camps since the majority of the geotechnical investigations will not occur at night and therefore, artificial lighting is not required in those locations.	Likely	Moderate	Medium	• Construction activities will be limited to daytime hours wherever practicable. • Minimal lighting will be required around buildings at night. • Lighting design and placement will consider the National Light Pollution Guidelines for Wildlife (DCCEEW, 2023), including directing light and use of shades to minimise light spillage and use of lighting with little or no blue wavelengths.	Likely	Moderate	Medium			• If a lighting complaint is received, an investigation will be undertaken to determine what additional controls can be put in place.
58	Greater glider (southern and central) (Petauroides volans) (endangered) Grey-headed flying-fox (Pteropus poliocephalus) (vulnerable) Giant barred frog (Mixophyes iteratus)(vulnerable) Yellow-bellied glider (southern subspecies) Petaurus australis australis (vulnerable)	Vibration	Long-nosed potoroo is a ground-dwelling species that may be impacted by vibration created during construction activities. Vibration from vehicles and equipment may cause temporary disturbance to fauna, and displacement or structural damage to suitable fauna habitat (i.e. rock or log piles). Blasting will be required for construction of the exploratory tunnel (noting the tunnel excavation will be at a sub-surface depth of more than 100 m below ground after the first month).	Highly Likely	Moderate	High	• Works will be undertaken outside of breeding periods, where possible. • Prior to blasting or other high intensity vibratory works commencing, pre-clearance surveys will be undertaken to determine whether breeding is occurring within 200 m of the works. • No blasting or other high intensity vibratory works will be undertaken within 200 m of known active breeding sites during breeding seasons unless otherwise approved by a noise/vibration specialist and experienced ecologist. • The 200 m buffer area will be inspected daily during drilling/blasting works and if a listed threatened species is located works, will cease until the individual has moved out of the area of its own accord or it is relocated in accordance with Rehabilitation/Damage Mitigation Permit conditions.	Likely	Moderate	Medium			• If a noise or vibration complaint is received, an investigation will be undertaken to determine what additional controls can be put in place.
59	Glossy black-cockatoo (south-eastern) (Calyptorhynchus lathami lathami) (vulnerable) Koala (Phascolarctos cinereus) (endangered) Long-nosed potoroo (northern) (Potorous tridactylus tridactylus) (vulnerable)	Injury or mortality (clearing and construction activity)	These species were recorded and have habitat in and adjacent to the Exploratory Works footprint. Fauna roosting, foraging or dispersing through the Exploratory Works footprint during construction or operation could be affected. Injury or mortality of these species could occur during Exploratory Works activities, including from: • the process of clearing vegetation • collisions with vehicles • falling into or becoming trapped in open trenches/excavations constructed for geotechnical works.	Possible	Moderate	Medium	• Exploratory Works have been designed to avoid the clearing of threatened fauna habitat as far as possible by placing temporary infrastructure in existing cleared areas. • Clearly delineate clearing boundaries and exclusion/buffer zones with flagging tape or fluorescent marker or signage prior to clearing commencing to avoid unnecessary clearing and to ensure personnel and vehicles stay within the approved footprint, avoiding contravention of disturbance limits. • Particular care should be taken to ensure that any fill is sourced from areas free of Crofton Weed (Ageratina adenophora) and Mistflower (Ageratina riparia) which compete for habit and are known to be a significant threat to Coleus torrenticola. • Clearing boundary maps, along with exclusion/buffer zones to be provided to contractors. • Personnel will only be allowed on foot beyond the boundary of the exclusion/buffer zones. • Works will be conducted within existing cleared areas wherever practicable. • Micrositing of works to avoid breeding places and feeder trees. • Pre-clearance surveys will be undertaken by a suitably qualified FSC/ecologist and will include measures outlined in the FFMP. All clearing activities will also be overseen by a suitably qualified FSC who will follow the sequential clearing method wherever practicable. The FSC must also operate under an approved SMP and will be responsible for the following: • checking areas immediately prior to any clearing for the presence of any native fauna and habitat features (i.e. tree hollows, reptiles under fall logs), and breeding places (i.e. nests and burrows) • any captured species will be relocated to an agreed release site • FSC to advise construction contractors as to best practice approach to avoid impacts on breeding places and fauna species. Woody debris, hollow logs and rock piles will be retained for use in rehabilitation wherever possible. • In accordance with conservation advice for the species, wherever possible, the use of barbed wire fencing will be avoided across the Exploratory Works Project. • Access roads will be aligned along existing tracks wherever practicable to minimise vegetation removal, loss of hollow-bearing trees and fragmentation. • All vehicles associated with clearing and construction activities will travel at slow speeds to minimise the chance of any fauna strikes occurring. Speed limit signage will be placed at the entrance to the site and other key access tracks. Access road width to be minimised where practicable, particularly across creek lines. • Speed limits will be clearly signed on roads during construction.	Unlikely	Moderate	Low			• Inspect and repair damaged fencing; replace any flagging tape or respray fluorescent marker. • Where clearing extends outside the approved disturbance limits, a record must be taken of the incident and an investigation will occur. • Temporarily disturbed areas that are no longer required to be cleared will be assessed for restoration and revegetation. • If any new threatened species not discussed in this FFMP are identified, works will cease immediately and the unexpected threatened species finds protocol will be followed (refer to the FFMP), including notifying DETSI and DCCEEW. The FFMP will be updated to incorporate additional mitigation and management measures as required. • Any fauna injuries or deaths are required to be reported firstly to the project environmental manager and then DETSI and/or DCCEEW if it involves a threatened species. The cause of injury or death will be investigated. and any required changes will be implemented. • Any injured fauna will be taken to the nearest suitable vet or wildlife carer for treatment.
60	Glossy black-cockatoo (south-eastern) (Calyptorhynchus lathami lathami) (vulnerable) Greater glider (southern and central) (Petauroides volans) (endangered) Grey-headed flying-fox (Pteropus poliocephalus) (vulnerable) Yellow-bellied glider (southern subspecies) Petaurus australis australis (vulnerable)	Injury or mortality (fencing/barbed wire)	These species were recorded and have habitat in and adjacent to the Exploratory Works footprint. Gliders and bats flying in the vicinity of the Exploratory Works footprint may become entangled in fencing or barbed wire. Barbed wire is present in the area being associated with the existing Borumba Dam and its infrastructure. Individuals are known to have died from entanglement in barbed wire fencing. Mortality by barbed wire fencing is a threat to these species (DCCEEW, 2022a), (DAWE, 2022b), (TSSC, 2001), (TSSC, 2019). The Exploratory Works activities will not use netting or barbed wire, and therefore will not increase the threat of these impacts on the species.	Possible	Moderate	Medium	• Exploratory Works have been designed to avoid the clearing of threatened fauna habitat as far as possible by placing temporary infrastructure in existing cleared areas. • Clearly delineate clearing boundaries and exclusion/buffer zones with flagging tape or fluorescent marker or signage prior to clearing commencing to avoid unnecessary clearing and to ensure personnel and vehicles stay within the approved footprint, avoiding contravention of disturbance limits. • Particular care should be taken to ensure that any fill is sourced from areas free of Crofton Weed (Ageratina adenophora) and Mistflower (Ageratina riparia) which compete for habit and are known to be a significant threat to Coleus torrenticola. • Clearing boundary maps, along with exclusion/buffer zones to be provided to contractors. • Personnel will only be allowed on foot beyond the boundary of the exclusion/buffer zones. • Works will be conducted within existing cleared areas wherever practicable. • Micrositing of works to avoid breeding places and feeder trees. • Pre-clearance surveys will be undertaken by a suitably qualified FSC/ecologist and will include measures outlined in the FFMP. All clearing activities will also be overseen by a suitably qualified FSC who will follow the sequential clearing method wherever practicable. The FSC must also operate under an approved SMP and will be responsible for the following: • checking areas immediately prior to any clearing for the presence of any native fauna and habitat features (i.e. tree hollows, reptiles under fall logs), and breeding places (i.e. nests and burrows) • any captured species will be relocated to an agreed release site • FSC to advise construction contractors as to best practice approach to avoid impacts on breeding places and fauna species. Woody debris, hollow logs and rock piles will be retained for use in rehabilitation wherever possible. • In accordance with conservation advice for the species, wherever possible, the use of barbed wire fencing will be avoided across the Exploratory Works Project. • Access roads will be aligned along existing tracks wherever practicable to minimise vegetation removal, loss of hollow-bearing trees and fragmentation. • All vehicles associated with clearing and construction activities will travel at slow speeds to minimise the chance of any fauna strikes occurring. Speed limit signage will be placed at the entrance to the site and other key access tracks. Access road width to be minimised where practicable, particularly across creek lines. • Speed limits will be clearly signed on roads during construction.	Unlikely	Minor	Low			• Inspect and repair damaged fencing; replace any flagging tape or respray fluorescent marker. • Where clearing extends outside the approved disturbance limits, a record must be taken of the incident and an investigation will occur. • Temporarily disturbed areas that are no longer required to be cleared will be assessed for restoration and revegetation. • If any new threatened species not discussed in this FFMP are identified, works will cease immediately and the unexpected threatened species finds protocol will be followed (refer to the FFMP), including notifying DETSI and DCCEEW. The FFMP will be updated to incorporate additional mitigation and management measures as required. • Any fauna injuries or deaths are required to be reported firstly to the project environmental manager and then DETSI and/or DCCEEW if it involves a threatened species. The cause of injury or death will be investigated, and any required changes will be implemented. • Any injured fauna will be taken to the nearest suitable vet or wildlife carer for treatment.
61	Glossy black-cockatoo (south-eastern) (Calyptorhynchus lathami lathami) (vulnerable) Greater glider (southern and central) (Petauroides volans) (endangered) Grey-headed flying-fox (Pteropus poliocephalus) (vulnerable) Koala (Phascolarctos cinereus) (endangered) Long-nosed potoroo (northern) (Potorous tridactylus tridactylus) (vulnerable) Yellow-bellied glider (southern subspecies) Petaurus australis australis (vulnerable)	Weeds	The study area provides habitat values for these species including foraging, roosting and dispersal values. Exploratory Works Project activities have the potential to increase the abundance of weeds in the footprint and facilitate dispersal to previously unaffected areas, decreasing the quality of habitat for these species. Movement of vehicles, equipment and personnel throughout the Exploratory Works footprint is the key vector of transmission, in particular vehicles and equipment sourced from regions beyond the footprint which may introduce new species. Many weed species thrive on disturbed ground and will rapidly colonise disturbed areas in advance of native species recolonisation. Seeds and fruits have the potential to be spread by clearing activities and vehicle movement, whilst establishment into new areas is highly likely after heavy rainfall as several thousand seeds can be produced per square metre that can remain viable for several years. Weed infestation can degrade habitat, reducing the quality of foraging habitat for the species. The spread of weeds is also a risk during ongoing activities associated with the Exploratory Works Project.	Likely	Major	High	Hygiene control procedures will be in place throughout multiple stages of the Exploratory Works Project activities, including measures to reduce potential for introduction and spread of weeds: •Decontamination Washdown facilities will be installed at the two entrances to Queensland Hydro land so all vehicles will be washed prior to entry and exiting site. Decontamination practices will be implemented for all personnel and regular vehicle and machinery wash downs, especially when transferring between sites will assist in minimising the spread of weeds and Myrtle Rust. Multiple methods are available for treatment of vehicles including wet decontamination, heat and/or fumigation procedures. Hygiene checks will be conducted on all machinery or equipment being moved onto or out of the Exploratory Works Project site to minimise distribution of weed species and fungal pathogens. • Training Training and inductions for site employees and contractors to educate on the risks and mitigation requirements for weed spread. •Preclearing surveys and weed treatment Pre-clearance surveys will be performed to identify weeds, and large infestations to be treated prior to clearing to minimise the spread of weed seed and material. A weed register will be developed and maintained by Queensland Hydro for the duration of the Exploratory Works Project to manage weeds and ensure that management actions are having the desired effect. •High risk areas Identified areas of high risk weed or disease infestations (including 50 m buffer zone from TECs) will be signed and demarcated where required to avoid transporting plant reproductive material from these areas to areas that are not infested. •Weed management Weeds will be actively monitored and managed adjacent to Exploratory Works activities occurring within 50 m of TEC patches. Spraying herbicides, unless approved for use in the area including targeted spraying, will be avoided. Weed material will be disposed of in accordance with the *Biosecurity Act 2014* Site vehicle access will be restricted to existing roads and tracks.	Unlikely	Moderate	Low			• Increase Hygiene Control requirements if vehicles or equipment are found to introduce or spread new weeds. • Increase weed control efforts where required (i.e. after heavy rainfall) or if current controls are ineffective. • Review and update of the Biosecurity Management Plan and the species specific management actions.
62	Glossy black-cockatoo (south-eastern) (Calyptorhynchus lathami lathami) (vulnerable) Grey-headed flying-fox (Pteropus poliocephalus) (vulnerable) Koala (Phascolarctos cinereus) (endangered)	Pests	Habitat for glossy black-cockatoo, grey-headed flying-fox and koala occurs in and adjacent to the Exploratory Works footprint. Exploratory Works Project activities have the potential to increase the abundance of pest fauna in the footprint and facilitate dispersal to previously unaffected areas including threatened species habitat. This can lead to increased competition with, and predation of native fauna. In addition, habitat degradation may occur through vegetation trampling (e.g. feral pig wallowing or cattle grazing). Creation of new access points into areas of intact vegetation may create pathways for feral fauna species to disperse. Uncontained waste sources may also attract feral fauna such as wild dogs.	Likely	High	High	• Waste disposal (especially food waste) will be removed from site regularly to discourage presence of pest fauna. Any additional measures outlined in the Waste Management Plan will also be implemented across the site. • Install cameras along access tracks to monitor pest fauna traffic. • A Biosecurity Management Plan for the entire Project has been developed. This plan and is currently being updated to reflect the recent surveys on site and risks posed by the species present, along with outlining proposed design treatments. As part of the finalisation of the plan Queensland Hydro will work with other stakeholders to align the measures to be implemented, noting that some of the practices may not be implemented in the short term given they may impact the proposed surveys works. • The Biosecurity Management Plan includes appropriate thresholds for management action, linked to the risk posed by the species. The plan includes measures for trapping and controlling pest fauna in accordance with relevant threat abatement plans, along with relevant legislation and guidelines.	Possible	High	Medium			• Review and update the Biosecurity Management Plan if evidence of increased predation or pests is observed. • Implement additional pest fauna management measures where controls do not appear to be adequate. • Notify the landholder (i.e. QPWS) and/or adjacent landholder about the risk and support the implementation of their plans.
63	Greater glider (southern and central) (Petauroides volans) (endangered) Long-nosed potoroo (northern) (Potorous tridactylus tridactylus) (vulnerable) Yellow-bellied glider (southern subspecies) Petaurus australis australis (vulnerable)	Pests and Predation	Habitat for greater glider, long-nosed potoroo and yellow-bellied glider occurs in and adjacent to the Exploratory Works footprint. Introduced pest animals including European red foxes (Vulpes vulpes) and feral cats (Felis catus) are established in the Exploratory Works footprint and surrounds. Exploratory Works activities could introduce other pest animals to the area or exacerbate risk of predation from pest animals established in the area. Both cats and foxes could benefit from the creation of new access tracks and intrude further into previously undisturbed areas. Predation by pest animals, particularly European red foxes (Vulpes vulpes) and feral cats (Felis catus) is a key threat to the long-nosed potoroo (DAWE, 2022a) and greater glider (DCCEEW, 2022a).	Likely	High	High	• Waste disposal (especially food waste) will be removed from site regularly to discourage presence of pest fauna. Any additional measures outlined in the Waste Management Plan will also be implemented across the site. • Install cameras along access tracks to monitor pest fauna traffic. • A Biosecurity Management Plan for the entire Project has been developed. This plan and is currently being updated to reflect the recent surveys on site and risks posed by the species present, along with outlining proposed design treatments. As part of the finalisation of the plan Queensland Hydro will work with other stakeholders to align the measures to be implemented, noting that some of the practices may not be implemented in the short term given they may impact the proposed surveys works. • The Biosecurity Management Plan includes appropriate thresholds for management action, linked to the risk posed by the species. The plan includes measures for trapping and controlling pest fauna in accordance with relevant threat abatement plans, along with relevant legislation and guidelines.	Possible	High	Medium			• Review and update the Biosecurity Management Plan if evidence of increased predation or pests is observed. • Implement additional pest fauna management measures where controls do not appear to be adequate. • Notify the landholder (i.e. QPWS) and/or adjacent landholder about the risk and support the implementation of their plans.

No.	Risk description and controls			Risk level (without controls)				Risk level (post controls)			Performance objective	Monitoring measures	Risk treatment plan
	Environmental value impacted	Impact	Impact description	Likelihood	Consequence	Risk level	Avoidance and mitigation measures.	Likelihood	Consequence	Risk level			
64	Black-breasted button-quail (Turnix melanogaster) (vulnerable)	Clearing (habitat loss and fragmentation)	Black-breasted button-quail is considered likely to occur. 659.9 ha of habitat occurs within the Borumba PHES Survey area, of which 32.2 ha of habitat occurs in the Exploratory Works Survey area. Approximately 0.2 ha of habitat for black-breasted button-quail will be impacted by the Exploratory Works for geotechnical investigation activities and construction of associated access tracks. Clearing eucalypt woodland will potentially reduce breeding, foraging and sheltering habitat for terrestrial fauna species that are likely to occur. Terrestrial habitat connectivity may be reduced by the Exploratory Works Project due to small scale linear clearing, which may hinder fauna movements between areas of retained remnant vegetation. Habitat fragmentation will be more prominent where clearing corridors are wider and where this clearing affects larger patches of vegetation. Clearing linear corridors through habitats also has the potential to isolate plant populations by causing barriers to the dispersal of seeds and fruit, and to increase edge effects (additional light entering the forest, weed encroachment, increased feral animal abundance and increased risk of bushfires), thereby reducing the ecological functioning of those areas. If the Borumba PHES Project does not proceed, project features will be decommissioned and the environment rehabilitated, i.e., the impacts will be temporary. If the Borumba PHES Project proceeds, the features will form part of the existing environment for that project.	Highly Likely	High	High	•Works will be undertaken outside of breeding periods (September to April-May), where possible. •The pre-clearance surveys are to include searches for black-breasted button-quail ground nests. •Clearing will be carried out sequentially which will include the use of a FSC and retention of potential nesting habitat overnight to allow individuals to move on their own accord. This process will significantly mitigate potential impacts associated with clearing provided that procedures are followed and spotters are allowed ample opportunity to check areas prior to construction. Potential nest sites will be marked and inspected for the presence. •Lantana control at forest edge margins of areas known or likely to support black-breasted button-quail will be minimised, with clearing in these areas using a staged approach that will aim to remove lantana over several phases. •Healthy individuals will be captured and released, while any injured birds will be taken to a vet for treatment. •Staff will be educated on the potential presence of black-breasted button-quail. •Off-track driving will not be permitted and reduced speed limits will be enforced near suitable habitat, with appropriate signage on site. •Exclusion and/or buffer zones to be established around known active breeding sites. Exclusion and buffer zones to be maintained until bird fledges, unless otherwise directed by the suitably qualified FSC. • Clearing boundary maps, along with exclusion/buffer zones to be provided to contractors. • Works will be conducted within existing cleared areas wherever practicable. • Micrositing of works to avoid breeding places. All clearing activities will also be overseen by a suitably qualified FSC who will follow the sequential clearing method wherever practicable. The FSC must also operate under an approved SMP and will be responsible for the following: • checking areas immediately prior to any clearing for the presence of any native fauna and habitat features (i.e. tree hollows, reptiles under fall logs), and breeding places (i.e. nests and burrows) • any captured species will be relocated to an agreed release site • FSC to advise construction contractors as to best practice approach to avoid impacts on breeding places and fauna species. Woody debris, hollow logs and rock piles will be retained for use in rehabilitation wherever possible. • In accordance with conservation advice for the species, wherever possible, the use of barbed wire fencing will be avoided across the Exploratory Works Project. • Access roads will be aligned along existing tracks wherever practicable to minimise vegetation removal, loss of hollow-bearing trees and fragmentation.	Likely	Moderate	Medium	Minimise habitat disturbance	• Monitoring will be undertaken to ensure exclusion zones and signage remains in serviceable condition. • FSC will keep a record of any fauna relocated during clearing activities.	• Inspect and repair damaged fencing; replace any flagging tape or respray fluorescent marker. • Where clearing extends outside the approved disturbance limits, a record must be taken of the incident and an investigation will occur. • Temporarily disturbed areas that are no longer required to be cleared will be assessed for restoration and revegetation. • If any new threatened species not discussed in this FFMP are identified, works will cease immediately and the unexpected threatened species finds protocol will be followed (refer to the FFMP), including notifying DETSI and DCCEEW. The FFMP will be updated to incorporate additional mitigation and management measures as required. • Any fauna injuries or deaths are required to be reported firstly to the project environmental manager and then DETSI and/or DCCEEW if it involves a threatened species. The cause of injury or death will be investigated, and any required changes will be implemented. • Any injured fauna will be taken to the nearest suitable vet or wildlife carer for treatment.
65	Black-breasted button-quail (Turnix melanogaster) (vulnerable)	Hazardous materials	Black-breasted button-quail and diamond firetail are considered likely to occur. Suitable habitat for both species is present in the Exploratory Works footprint that could be impacted by the accidental release of hazardous chemicals. Exploratory Works activities have the potential to lead to accidental releases of hazardous materials, such as fuels and oils from vehicles and machinery. These hazardous materials can lead to localised soil contamination and contamination of water resources, which in turn can cause injury, reduced vigour or mortality to flora and fauna. The severity of the impact is dependent on the location and magnitude of the release.	Unlikely	High	Medium	Spoil reuse targets have been identified across material categories expected from design. Reuse categories are linked to spoil contamination risk and provisional potential reuse targets have been identified for each category as below: • unrestricted spoil – 100 % • other clean earth – 80 % • non-regulated waste (general waste – 25 % • category 2 regulated waste – 10 % • category 1 regulated waste – 0 % • potentially contaminated soils – 50 % • acid sulfate soils – 20 % • acid-forming rock – 20 % • naturally occurring asbestos material – 0 %. • Testing of material as it is removed from disturbed areas, including the exploratory tunnel, to determine any acid sulfate soil, potential acid sulfate soil or contaminants. • Implement recommendations form the contaminated land investigations. • All chemicals, fuel and oil will be stored in above ground tanks in bunded areas, with accurate records maintained of volumes purchased and stored, to ensure any contamination of land or water is prevented, and any spill is detected quickly. • Contain poor quality discharge water and treat prior to disposal, subject to achieving water quality guidelines. • Disposal methods and responses are identified within the Spoil Management Plan (refer to Appendix B) and are linked to the spoil material category. • Design storage areas to consist of a compacted base, bunding to contain spillages and roofing to prevent contamination and infiltration of stormwater (as per AS1940 and AS3780). • Management plans for select (as required) discoverable contaminants (i.e. acid-rock drainage, naturally occurring asbestos) will be developed upon identification from preliminary drilling/earthworks during Exploratory Works. • Residual hazardous materials will be removed from the construction site and returned to an appropriate storage area or a suitable waste facility. Control of potential offsite mobilisation of contamination will be implemented through the following: • during excavations, materials that are contaminated and not suitable for remediation and onsite storage will be loaded directly onto licensed transport vehicles for offsite disposal • stockpiling of contaminated soils will be avoided where possible via the in-situ waste classification and identification of potentially contaminated materials • assigning secure location for storage of reusable and recyclable materials on site	Rare	High	Low			• Assessment of spoil to be conducted as part of excavation tracking. Where disposal method is deemed inappropriate, further controls to be compiled and managed upon discovery of unknown contaminant. • Weekly assessment of any stockpiling and where controls are inappropriate or damaged, reinstatement or improvement of controls are to be conducted. • In the event of a spillage/leak of potentially hazardous substances: - Comply with the Emergency Spill Containment Plan. - Investigate the nature and extent of the spillage/leakage, and implement clean-up and mitigation measures, as necessary.
66	Black-breasted button-quail (Turnix melanogaster) (vulnerable) Giant-barred frog (Mixophyes iteratus) (vulnerable)	Air quality/ dust	Black-breasted button-quail and giant barred frog are considered likely to occur. Suitable habitat is present in the Exploratory Works footprint that could be impacted by air emissions during construction. Potential impacts related to air quality during construction could include: • the impact of dust emissions generated from construction activities, particularly vehicle movements on unsealed roads, land clearing, drilling and blasting, earthmoving, material handling and surface preparation and stockpiling material (wind erosion) • gases generated by fuel combustion from numerous sources such as oxides of nitrogen, carbon monoxide, sulphur dioxide, fine particulate matter, trace amounts of volatile organic compound • fugitive emissions from fuels, chemicals, oils, and greases stored at construction sites • odour emissions from disturbance of contaminated land, asphalt laying activities and construction camp wastewater treatment. Increased dust from vegetation clearing, earthworks and vehicle movements during construction has the potential to temporarily and locally impact flora and fauna values in the vicinity of the Project footprint. Excess generation of dust and subsequent deposition on leaves can impair plant photosynthesis and productivity, resulting in reduced habitat quality for fauna. Increased dust can also impact on respiratory systems of fauna, alter soil properties impacting on plant species assemblages and reduce water quality in aquatic habitats. Dust is expected to only be a potential issue during vegetation clearing and construction. These emissions could cause black-breasted button-quail and diamond firetail to avoid affected areas, reducing the area of habitat used by the species or limiting species dispersal by impacting on home ranges.	Likely	Moderate	Medium	• Areas which have potential to generate airborne dust will be wetted down regularly or covered wherever practicable. • Resheeting and sealing of roads and tracks to minimise dust generation. • Regular cleaning of machinery and vehicle tyres to reduce dust emissions. • Low speed limits will be implemented across the Exploratory Works Project to minimise dust generation. • Any areas no longer required for operational activities will be rehabilitated as soon as practicable. • Machinery and vehicle tyres will be regularly cleaned to reduce wheel entrained dust emissions or consider use of vibration grids. • Spraying of herbicides, aerosols and other chemicals to be undertaken in suitable weather conditions (i.e. low wind speed). • Use of dust suppression to reduce offsite dust impacts.	Possible	Moderate	Medium			• Increase frequency of dust suppression if dust nuisance is observed by site construction or environmental manager or if a complaint is received.
67	Black-breasted button-quail (Turnix melanogaster) (vulnerable)	Noise	Black-breasted button-quail is considered likely to occur. Suitable habitat for both species is present in the Exploratory Works footprint that could be impacted by noise during construction. Noise may adversely affect fauna by interfering with communication (e.g. territorial bird song), masking the sound of predators and prey, causing avoidance reactions and displacement from habitat. Construction noise will be generated by the Exploratory Works Project by machinery and drill and blast activities for the exploratory tunnel (noting the tunnel excavation will be at a sub-surface depth of more than 100 m below ground after the first month). This will vary from short intermittent bursts of noise from operational activities to more persistent noises from generators. Whilst these disturbances would only be temporary, the generation of construction noise has the potential to force resident fauna species to relocate.	Likely	Moderate	Medium	• Works will be undertaken outside of breeding periods, where possible. • Prior to blasting or other high intensity vibratory works commencing, pre-clearance surveys will be undertaken to determine whether breeding is occurring within 200 m of the works. • No blasting or other high intensity vibratory works will be undertaken within 200 m of known active breeding sites during breeding seasons unless otherwise approved by a noise/vibration specialist and experienced ecologist. • The 200 m buffer area will be inspected daily during drilling/blasting works and if a listed threatened species is located works, will cease until the individual has moved out of the area of its own accord or it is relocated in accordance with Rehabilitation/Damage Mitigation Permit conditions.	Possible	Moderate	Medium			• If a noise or vibration complaint is received, an investigation will be undertaken to determine what additional controls can be put in place.
68	Black-breasted button-quail (Turnix melanogaster) (vulnerable)	Light	Black-breasted button-quail and diamond firetail are considered likely to occur. Suitable habitat for both species is present in the Exploratory Works footprint that could be impacted by artificial light during construction. Artificial lighting from infrastructure and machinery may impact fauna within the Exploratory Works Project footprint during works. Artificial lighting can have a range of impacts which can vary from species to species including: • artificial lighting may affect the natural circadian rhythms of local fauna populations • artificial lighting may lead to certain species avoiding areas of habitat that they previously relied upon for foraging/dispersal activities • artificial lighting may lead to an increase in the risk of predation for some fauna species • artificial lighting has the potential to disrupt the breeding and migratory patterns of some species or cause general disorientation. Artificial lighting impacts will probably occur during the Exploratory Works Project although the impacts will be primarily isolated to the portal pad and the construction camps since the majority of the geotechnical investigations will not occur at night and therefore, artificial lighting is not required in those locations.	Possible	Moderate	Medium	• Construction activities will be limited to daytime hours wherever practicable. • Minimal lighting will be required around buildings at night. • Lighting design and placement will consider the National Light Pollution Guidelines for Wildlife (DCCEEW, 2023), including directing light and use of shades to minimise light spillage and use of lighting with little or no blue wavelengths.	Possible	Moderate	Medium			• If a lighting complaint is received, an investigation will be undertaken to determine what additional controls can be put in place.
69	Black-breasted button-quail (Turnix melanogaster) (vulnerable)	Vibration	Black-breasted button-quail is considered likely to occur. Suitable habitat for the species is present in the Exploratory Works footprint that could be impacted by vibration during construction. Vibration from vehicles and equipment may cause temporary disturbance to fauna, and displacement or structural damage to suitable fauna habitat (i.e. rock or log piles). Blasting will be required for construction of the exploratory tunnel. Tunnel excavation will be at a sub-surface depth of more than 100 m below ground after the first month.	Likely	Moderate	Medium	• Works will be undertaken outside of breeding periods, where possible. • Prior to blasting or other high intensity vibratory works commencing, pre-clearance surveys will be undertaken to determine whether breeding is occurring within 200 m of the works. • No blasting or other high intensity vibratory works will be undertaken within 200 m of known active breeding sites during breeding seasons unless otherwise approved by a noise/vibration specialist and experienced ecologist. • The 200 m buffer area will be inspected daily during drilling/blasting works and if a listed threatened species is located works, will cease until the individual has moved out of the area of its own accord or it is relocated in accordance with Rehabilitation/Damage Mitigation Permit conditions.	Unlikely	Moderate	Low			• If a noise or vibration complaint is received, an investigation will be undertaken to determine what additional controls can be put in place.
70	Black-breasted button-quail (Turnix melanogaster) (vulnerable)	Injury or mortality (clearing and construction activity)	Black-breasted button-quail was recorded in the study outside of the Exploratory Works footprint . Suitable habitat is present in the Exploratory Works footprint, and therefore they are considered likely to occur. Exploratory Works activities could cause injury to or mortality to these species, including: • the process of clearing vegetation • collisions with vehicles • falling into or becoming trapped in open trenches/excavations constructed for geotechnical works.	Unlikely	Moderate	Low	• Exploratory Works have been designed to avoid the clearing of threatened fauna habitat as far as possible by placing temporary infrastructure in existing cleared areas. • Clearly delineate clearing boundaries and exclusion/buffer zones with flagging tape or fluorescent marker or signage prior to clearing commencing to avoid unnecessary clearing and to ensure personnel and vehicles stay within the approved footprint, avoiding contravention of disturbance limits. • Clearing boundary maps, along with exclusion/buffer zones to be provided to contractors. • Personnel will only be allowed on foot beyond the boundary of the exclusion/buffer zones. • Works will be conducted within existing cleared areas wherever practicable. • Micrositing of works to avoid breeding places and feeder trees. • Pre-clearance surveys will be undertaken by a suitably qualified FSC/ecologist and will include measures outlined in the FFMP. All clearing activities will also be overseen by a suitably qualified FSC who will follow the sequential clearing method wherever practicable. The FSC must also operate under an approved SMP and will be responsible for the following: • checking areas immediately prior to any clearing for the presence of any native fauna and habitat features (i.e. tree hollows, reptiles under fall logs), and breeding places (i.e. nests and burrows) • any captured species will be relocated to an agreed release site • FSC to advise construction contractors as to best practice approach to avoid impacts on breeding places and fauna species. Woody debris, hollow logs and rock piles will be retained for use in rehabilitation wherever possible. • In accordance with conservation advice for the species, wherever possible, the use of barbed wire fencing will be avoided across the Exploratory Works Project. • Access roads will be aligned along existing tracks wherever practicable to minimise vegetation removal, loss of hollow-bearing trees and fragmentation. • All vehicles associated with clearing and construction activities will travel at slow speeds to minimise the chance of any fauna strikes occurring. Speed limit signage will be placed at the entrance to the site and other key access tracks. Access road width to be minimised where practicable, particularly across creek lines. • Speed limits will be clearly signed on roads during construction. • Movement within the Exploratory Works Project area will be via approved access tracks with speed limits enforced. The requirement to enter and traverse the area will be minimised and limited to those required for essential Exploratory Works Project activities.	Unlikely	Moderate	Low			• Inspect and repair damaged fencing; replace any flagging tape or respray fluorescent marker. • Where clearing extends outside the approved disturbance limits, a record must be taken of the incident and an investigation will occur. • Temporarily disturbed areas that are no longer required to be cleared will be assessed for restoration and revegetation. • If any new threatened species not discussed in this FFMP are identified, works will cease immediately and the unexpected threatened species finds protocol will be followed (refer to the FFMP), including notifying DETSI and DCCEEW. The FFMP will be updated to incorporate additional mitigation and management measures as required. • Any fauna injuries or deaths are required to be reported firstly to the project environmental manager and then DETSI and/or DCCEEW if it involves a threatened species. The cause of injury or death will be investigated, and any required changes will be implemented. • Any injured fauna will be taken to the nearest suitable vet or wildlife carer for treatment.
71	Black-breasted button-quail (Turnix melanogaster) (vulnerable)	Weeds	Suitable habitat for black-breasted button-quail is present in and adjacent to the Exploratory Works footprint. Exploratory Works Project activities have the potential to increase the abundance of weeds in the footprint and facilitate dispersal to previously unaffected areas. Movement of vehicles, equipment and personnel throughout the Exploratory Works footprint is the key vector of transmission, in particular vehicles and equipment sourced from regions beyond the footprint, which may introduce new species. Many weed species thrive on disturbed ground and will rapidly colonise disturbed areas in advance of native species recolonisation. Seeds and fruits have the potential to be spread by clearing activities and vehicle movement, whilst establishment into new areas is highly likely after heavy rainfall as several thousand seeds can be produced per square metre that can remain viable for several years. The spread of weeds is also a risk during ongoing activities associated with the Exploratory Works.	Possible	Major	High	Hygiene control procedures will be in place throughout multiple stages of the Exploratory Works Project activities, including measures to reduce potential for introduction and spread of weeds: •Decontamination Washdown facilities will be installed at the two entrances to Queensland Hydro land so all vehicles will be washed prior to entry and exiting site. Decontamination practices will be implemented for all personnel and regular vehicle and machinery wash downs, especially when transferring between sites will assist in minimising the spread of weeds and Myrtle Rust. Multiple methods are available for treatment of vehicles including wet decontamination, heat and/or fumigation procedures. Hygiene checks will be conducted on all machinery or equipment being moved onto or out of the Exploratory Works Project site to minimise distribution of weed species and fungal pathogens. • Training Training and inductions for site employees and contractors to educate on the risks and mitigation requirements for weed spread. •Preclearing surveys and weed treatment Pre-clearance surveys will be performed to identify weeds, and large infestations to be treated prior to clearing to minimise the spread of weed seed and material. A weed register will be developed and maintained by Queensland Hydro for the duration of the Exploratory Works Project to manage weeds and ensure that management actions are having the desired effect. •High risk areas Identified areas of high risk weed or disease infestations (including 50 m buffer zone from TECs) will be signed and demarcated where required to avoid transporting plant reproductive material from these areas to areas that are not infested. •Weed management Weeds will be actively monitored and managed adjacent to Exploratory Works activities occurring within 50 m of TEC patches. Spraying herbicides, unless approved for use in the area including targeted spraying, will be avoided. Weed material will be disposed of in accordance with the *Biosecurity Act 2014* Site vehicle access will be restricted to existing roads and tracks.	Possible	High	Medium			• Increase Hygiene Control requirements if vehicles or equipment are found to introduce or spread new weeds. • Increase weed control efforts where required (i.e. after heavy rainfall) or if current controls are ineffective. • Review and update of the Biosecurity Management Plan and the species specific management actions.
72	Black-breasted button-quail (Turnix melanogaster) (vulnerable)	Pests and Predation	Black-breasted button-quail was recorded in the study outside of the Exploratory Works footprint and suitable habitat for the species is present in and adjacent to the Exploratory Works footprint. Introduced pest animals including European red foxes (Vulpes vulpes) and feral cats (Felis catus) are established in the Exploratory Works Project area and surrounds. Exploratory Works could introduce other pest animals to the area or exacerbate risk of predation from pest animals established in the area. Predation by pest animals, particularly European red foxes (Vulpes vulpes) and feral cats (Felis catus) is a key threat to the Black-breasted button-quail. Clearing habitat for access tracks could increase predation on the species by creating cleared pathways for invasive animals (predators).	Likely	High	High	• Waste disposal (especially food waste) will be removed from site regularly to discourage presence of pest fauna. Any additional measures outlined in the Waste Management Plan will also be implemented across the site. • Install cameras along access tracks to monitor pest fauna traffic. • A Biosecurity Management Plan for the entire Project has been developed. This plan and is currently being updated to reflect the recent surveys on site and risks posed by the species present, along with outlining proposed design treatments. As part of the finalisation of the plan Queensland Hydro will work with other stakeholders to align the measures to be implemented, noting that some of the practices may not be implemented in the short term given they may impact the proposed surveys works. • The Biosecurity Management Plan includes appropriate thresholds for management action, linked to the risk posed by the species. The plan includes measures for trapping and controlling pest fauna in accordance with relevant threat abatement plans, along with relevant legislation and guidelines.	Possible	High	Medium			• Review and update the Biosecurity Management Plan if evidence of increased predation or pests is observed. • Implement additional pest fauna management measures where controls do not appear to be adequate. • Notify the landholder (i.e. QPWS) and/or adjacent landholder about the risk and support the implementation of their plans.

No.	Risk description and controls			Risk level (without controls)			Risk level (post controls)			Performance objective	Monitoring measures	Risk treatment plan
	Environmental value impacted	Impact	Impact description	Likelihood	Consequence	Risk level	Avoidance and mitigation measures.	Likelihood	Consequence	Risk level			
73	Australian painted snipe (Rostratula australis) (endangered) Northern quoll (Dasyurus hallucatus) (endangered) Spotted-tail Quoll (Dasyurus maculatus maculatus) (endangered) Cowen's fig-parrot (Cyclopsitta diophthalma coxeni) (critically endangered)	Clearing (habitat loss and fragmentation)	Clearing eucalypt woodland would potentially reduce breeding, foraging and sheltering habitat for terrestrial fauna species that are possibly occurring. Terrestrial habitat connectivity may be reduced by the Exploratory Works Project due to small scale linear clearing, which may hinder fauna movements between areas of retained remnant vegetation. Habitat fragmentation will be more prominent where clearing corridors are wider and where this clearing affects larger patches of vegetation. Clearing linear corridors through habitats also has the potential to isolate plant populations by causing barriers to the dispersal of seeds and fruit, and to increase edge effects (additional light entering the forest, weed encroachment, increased feral animal abundance and increased risk of bushfire), thereby reducing the ecological functioning of those areas. Approximately 38 ha of potential habitat for spotted-tail quoll and the northern quoll, along with approximately 2.7 ha of potential habitat for Coxen's fig parrot will be impacted by the Exploratory Works primarily as a result of the geotechnical investigation activities and construction of associated access tracks. No habitat for the Australian painted snipe is expected to be impacted by the Project.	Likely	High	High	•Pre-clearance surveys will identify potential and active breeding habitat. •Establish exclusion and buffer zones around the Exploratory Works Project footprint and identified active fauna breeding habitat. •Clearing in accordance with the sequential clearing, including allowing quolls to naturally move from the clearing footprint in preference to active relocation. •Salvage and relocate large logs from clearing areas to adjacent habitat provide potential shelter sites and, if large enough, potential den sites. If any Australian painted snipe or Coxen's fig-parrot are recorded during pre-clearance surveys the following actions will be undertaken: •significant impact assessments will be updated and provided to DCCEEW for approval. •Additional species-specific management measures will be developed and added to this management plan. •Exclusion and/or buffer zones to be established around any active breeding sites within the Project area. Exclusion and/or buffer zones to be maintained until bird fledges, unless otherwise directed by the suitably qualified FSC. • Pre-clearance surveys will be undertaken by a suitably qualified FSC/ecologist and will include measures outlined in the FFMP. All clearing activities will also be overseen by a suitably qualified FSC who will follow the sequential clearing method wherever practicable. The FSC must also operate under an approved SMP and will be responsible for the following: • checking areas immediately prior to any clearing for the presence of any native fauna and habitat features (i.e. tree hollows, reptiles under fall logs), and breeding places (i.e. nests and burrows) • any captured species will be relocated to an agreed release site • FSC to advise construction contractors as to best practice approach to avoid impacts on breeding places and fauna species. Woody debris, hollow logs and rock piles will be retained for use in rehabilitation wherever possible. • In accordance with conservation advice for the species, wherever possible, the use of barbed wire fencing will be avoided across the Exploratory Works Project. • Access roads will be aligned along existing tracks wherever practicable to minimise vegetation removal, loss of hollow-bearing trees and fragmentation. • All vehicles associated with clearing and construction activities will travel at slow speeds to minimise the chance of any fauna strikes occurring. Speed limit signage will be placed at the entrance to the site and other key access tracks. Access road width to be minimised where practicable, particularly across creek lines. • Speed limits will be clearly signed on roads during construction. • Movement within the Exploratory Works Project area will be via approved access tracks with speed limits enforced. The requirement to enter and traverse the area will be minimised and limited to those required for essential Exploratory Works Project activities.	Possible	Moderate	Medium	Minimise habitat disturbance	• Monitoring will be undertaken to ensure exclusion zones and signage remains in serviceable condition. • FSC will keep a record of any fauna relocated during clearing activities.	• Inspect and repair damaged fencing; replace any flagging tape or respray fluorescent marker. • Where clearing extends outside the approved disturbance limits, a record must be taken of the incident and an investigation will occur. • Temporarily disturbed areas that are no longer required to be cleared will be assessed for restoration and revegetation. • If any new threatened species not discussed in this FFMP are identified, works will cease immediately and the unexpected threatened species finds protocol will be followed (refer to the FFMP), including notifying DETSI and DCCEEW. The FFMP will be updated to incorporate additional mitigation and management measures as required. • Any fauna injuries or deaths are required to be reported firstly to the project environmental manager and then DETSI and/or DCCEEW if it involves a threatened species. The cause of injury or death will be investigated, and any required changes will be implemented. • Any injured fauna will be taken to the nearest suitable vet or wildlife carer for treatment.
74	Australian painted snipe (Rostratula australis) (endangered) Northern quoll (Dasyurus hallucatus) (endangered) Spotted-tail Quoll (Dasyurus maculatus maculatus) (endangered) Cowen's fig-parrot (Cyclopsitta diophthalma coxeni) (critically endangered)	Hazardous Materials	Spotted-tail quoll and Coxen's fig parrot are possible to occur as stated in the LOO. Potential habitat for both species is present in the Exploratory Works footprint that may be impacted by the accidental release of hazardous chemicals. Exploratory Works activities have the potential to lead to accidental releases of hazardous materials, such as fuels and oils from vehicles and machinery. These hazardous materials can lead to localised soil contamination and contamination of water resources, which in turn can cause injury, reduced vigour or mortality to spotted-tail quoll or Coxen's fig parrot and their respective habitats. The severity of the impact is dependent on the location and magnitude of the release.	Rare	High	Low	Spoil reuse targets have been identified across material categories expected from design. Reuse categories are linked to spoil contamination risk and provisional potential reuse targets have been identified for each category as below: • unrestricted spoil – 100 % • other clean earth – 80 % • non-regulated waste (general waste – 25 % • category 2 regulated waste – 10 % • category 1 regulated waste – 0 % • potentially contaminated soils – 50 % • acid sulfate soils – 20 % • acid-forming rock – 20 % • naturally occurring asbestos material – 0 %. • Testing of material as it is removed from disturbed areas, including the exploratory tunnel, to determine any acid sulfate soil, potential acid sulfate soil or contaminants. • Implement recommendations form the contaminated land investigations. • All chemicals, fuel and oil will be stored in above ground tanks in bunded areas, with accurate records maintained of volumes purchased and stored, to ensure any contamination of land or water is prevented, and any spill is detected quickly. • Contain poor quality discharge water and treat prior to disposal, subject to achieving water quality guidelines. • Disposal methods and responses are identified within the Spoil Management Plan (refer to Appendix B) and are linked to the spoil material category. • Design storage areas to consist of a compacted base, bunding to contain spillages and roofing to prevent contamination and infiltration of stormwater (as per AS1940 and AS3780). • Management plans for select (as required) discoverable contaminants (i.e. acid-rock drainage, naturally occurring asbestos) will be developed upon identification from preliminary drilling/earthworks during Exploratory Works. • Residual hazardous materials will be removed from the construction site and returned to an appropriate storage area or a suitable waste facility. Control of potential offsite mobilisation of contamination will be implemented through the following: • during excavations, materials that are contaminated and not suitable for remediation and onsite storage will be loaded directly onto licensed transport vehicles for offsite disposal • stockpiling of contaminated soils will be avoided where possible via the in-situ waste classification and identification of potentially contaminated materials • assigning secure location for storage of reusable and recyclable materials on site	Rare	Moderate	Low			• Assessment of spoil to be conducted as part of excavation tracking. Where disposal method is deemed inappropriate, further controls to be compiled and managed upon discovery of unknown contaminant. • Weekly assessment of any stockpiling and where controls are inappropriate or damaged, reinstatement or improvement of controls are to be conducted. • In the event of a spillage/leak of potentially hazardous substances: - Comply with the Emergency Spill Containment Plan. - Investigate the nature and extent of the spillage/leakage, and implement clean-up and mitigation measures, as necessary.
75	Australian painted snipe (Rostratula australis) (endangered) Northern quoll (Dasyurus hallucatus) (endangered) Spotted-tail Quoll (Dasyurus maculatus maculatus) (endangered) Cowen's fig-parrot (Cyclopsitta diophthalma coxeni) (critically endangered)	Air quality/ dust	Spotted-tail quoll and Coxen's fig parrot are possible to occur as stated in the LOO. Potential habitat for both species is present in the Exploratory Works footprint that may be impacted by air emissions including dust during construction. Potential impacts related to air quality during construction could include: •the impact of dust emissions generated from construction activities, particularly vehicle movements on unsealed roads, land clearing, drilling and blasting, earthmoving, material handling and surface preparation and stockpiling material (wind erosion) •gases generated by fuel combustion from numerous sources such as oxides of nitrogen, carbon monoxide, sulphur dioxide, fine particulate matter, trace amounts of volatile organic compound fugitive emissions from fuels, chemicals, oils, and greases stored at construction sites •odour emissions from disturbance of contaminated land, asphalt laying activities and construction camp wastewater treatment. Increased dust from vegetation clearing, earthworks and vehicle movements during construction has the potential to temporarily and locally impact flora and fauna values in the vicinity of the Project footprint. Excess generation of dust and subsequent deposition on leaves can impair plant photosynthesis and productivity, resulting in reduced habitat quality for fauna. Increased dust can also impact on respiratory systems of fauna, alter soil properties impacting on plant species assemblages and reduce water quality in aquatic habitats. Dust is expected to only be a potential issue during vegetation clearing and construction	Possible	Moderate	Medium	• Areas which have potential to generate airborne dust will be wetted down regularly or covered wherever practicable. • Resheeting and sealing of roads and tracks to minimise dust generation. • Regular cleaning of machinery and vehicle tyres to reduce dust emissions. • Low speed limits will be implemented across the Exploratory Works Project to minimise dust generation. • Any areas no longer required for operational activities will be rehabilitated as soon as practicable. • Machinery and vehicle tyres will be regularly cleaned to reduce wheel entrained dust emissions or consider use of vibration grids. • Spraying of herbicides, aerosols and other chemicals to be undertaken in suitable weather conditions (i.e. low wind speed). • Use of dust suppression to reduce offsite dust impacts.	Unlikely	Moderate	Low			• Increase frequency of dust suppression if dust nuisance is observed by site construction or environmental manager or if a complaint is received.
76	Australian painted snipe (Rostratula australis) (endangered) Northern quoll (Dasyurus hallucatus) (endangered) Spotted-tail Quoll (Dasyurus maculatus maculatus) (endangered) Cowen's fig-parrot (Cyclopsitta diophthalma coxeni) (critically endangered)	Noise	Spotted-tail quoll and Coxen's fig parrot are possible to occur as stated in the LOO. Potential habitat for both species is present in the Exploratory Works footprint that may be impacted by noise during construction. Noise may adversely affect fauna by interfering with communication (e.g. territorial bird song), masking the sound of predators and prey, causing avoidance reactions and displacement from habitat. Construction noise will be generated by the Exploratory Works Project by machinery and drill and blast activities for the exploratory tunnel (noting the tunnel excavation will be at a sub-surface depth of more than 100 m below ground after the first month). This will vary from short intermittent bursts of noise from operational activities to more persistent noises from generators. Whilst these disturbances would only be temporary, the generation of construction noise has the potential to force resident fauna species to relocate.	Possible	Moderate	Medium	• Works will be undertaken outside of breeding periods, where possible. • Prior to blasting or other high intensity vibratory works commencing, pre-clearance surveys will be undertaken to determine whether breeding is occurring within 200 m of the works. • No blasting or other high intensity vibratory works will be undertaken within 200 m of known active breeding sites during breeding seasons unless otherwise approved by a noise/vibration specialist and experienced ecologist. • The 200 m buffer area will be inspected daily during drilling/blasting works and if a listed threatened species is located works, will cease until the individual has moved out of the area of its own accord or it is relocated in accordance with Rehabilitation/Damage Mitigation Permit conditions.	Unlikely	Moderate	Low			• If a noise or vibration complaint is received, an investigation will be undertaken to determine what additional controls can be put in place.
77	Australian painted snipe (Rostratula australis) (endangered) Northern quoll (Dasyurus hallucatus) (endangered) Spotted-tail Quoll (Dasyurus maculatus maculatus) (endangered) Cowen's fig-parrot (Cyclopsitta diophthalma coxeni) (critically endangered)	Light	Artificial lighting from infrastructure and machinery may impact fauna within the Exploratory Works Project footprint during works. Artificial lighting can have a range of impacts which can vary from species to species. Impacts to avian species including the Coxen's fig parrot from artificial light involve birds flying away from feeding or resting sites (DCCEEW, 2023). Artificial lighting can also lead the Coxen's fig parrot to avoid areas of habitat that they previously relied on for foraging and dispersal activities. For nocturnal mammals such as the spotted-tail quoll, light can have negative impacts as artificial lighting may affect the circadian rhythm of these local fauna populations. Artificial light reduces feeding opportunities, limits travel between habitat patches and exposes native mammals to predators. Sudden changes in light levels will orient and temporarily blind native mammals (DCCEEW, 2023). Nocturnal mammal's eyes are adapted to dim light, but not artificial bright light, and their night-time vision is particularly sensitive to blue, green, UV and broad spectrum white light. Lighting may also affect the circadian rhythm of local populations of species including the spotted-tail quoll. Conversely, some species such as nocturnal reptiles, frogs and bats may congregate at artificial light sources to feed on insects attracted to light. These increases predation risks for species such as the spotted-tail quoll. See item B4 for predation impacts to the spotted-tail quoll. Artificial lighting impacts will probably occur during the Exploratory Works Project although the impacts will be primarily isolated to the portal pad and the construction camps since the majority of the geotechnical investigations will not occur at night and therefore, artificial lighting is not required in those locations.	Unlikely	Moderate	Low	• Construction activities will be limited to daytime hours wherever practicable. • Minimal lighting will be required around buildings at night. • Lighting design and placement will consider the National Light Pollution Guidelines for Wildlife (DCCEEW, 2023), including directing light and use of shades to minimise light spillage and use of lighting with little or no blue wavelengths.	Unlikely	Moderate	Low			• If a lighting complaint is received, an investigation will be undertaken to determine what additional controls can be put in place.
78	Northern quoll (Dasyurus hallucatus) (endangered) Spotted-tail quoll (SE mainland population) (Dasyurus maculatus maculatus) (endangered)	Vibration	Vibration from vehicles and equipment may cause temporary disturbance to fauna, and displacement or structural damage to suitable fauna habitat (i.e. rock or log piles). Blasting will be required for construction of the exploratory tunnel (noting the tunnel excavation will be at a sub-surface depth of more than 100 m below ground after the first month).	Possible	Moderate	Medium	• Works will be undertaken outside of breeding periods, where possible. • Prior to blasting or other high intensity vibratory works commencing, pre-clearance surveys will be undertaken to determine whether breeding is occurring within 200 m of the works. • No blasting or other high intensity vibratory works will be undertaken within 200 m of known active breeding sites during breeding seasons unless otherwise approved by a noise/vibration specialist and experienced ecologist. • The 200 m buffer area will be inspected daily during drilling/blasting works and if a listed threatened species is located works, will cease until the individual has moved out of the area of its own accord or it is relocated in accordance with Rehabilitation/Damage Mitigation Permit conditions.	Rare	Moderate	Low			• If a noise or vibration complaint is received, an investigation will be undertaken to determine what additional controls can be put in place.
79	Australian painted snipe (Rostratula australis) (endangered) Northern quoll (Dasyurus hallucatus) (endangered) Spotted-tail Quoll (Dasyurus maculatus maculatus) (endangered) Cowen's fig-parrot (Cyclopsitta diophthalma coxeni) (critically endangered)	injury or mortality (clearing and construction activity)	Spotted-tail quoll and Coxen's fig parrot were not detected within the Exploratory Works footprint or the study area during field surveys. Records of the species nearest to the Exploratory Works Project were observed more than 20 years ago. Therefore, these species have a possible likelihood of occurrence. Exploratory Works activities could cause injury to or mortality of native fauna, including the process of clearing vegetation, collision with vehicles, and falling or becoming trapped in open trenches/excavations constructed for geotechnical works. Particularly for the Coxen's fig parrot, direct vehicular collisions may occur, however will be rare. Nocturnal works will not be done during construction period in the Exploratory Works phase therefore vehicular collision risk for the spotted-tail quoll will be rare.	Rare	Moderate	Low	• Exploratory Works have been designed to avoid the clearing of threatened fauna habitat as far as possible by placing temporary infrastructure in existing cleared areas. • Clearly delineate clearing boundaries and exclusion/buffer zones with flagging tape or fluorescent marker or signage prior to clearing commencing to avoid unnecessary clearing and to ensure personnel and vehicles stay within the approved footprint, avoiding contravention of disturbance limits. • Clearing boundary maps, along with exclusion/buffer zones to be provided to contractors. • Personnel will only be allowed on foot beyond the boundary of the exclusion/buffer zones. • Works will be conducted within existing cleared areas wherever practicable. • Micrositing of works to avoid breeding places and feeder trees. • Pre-clearance surveys will be undertaken by a suitably qualified FSC/ecologist and will include measures outlined in the FFMP. All clearing activities will also be overseen by a suitably qualified FSC who will follow the sequential clearing method wherever practicable. The FSC must also operate under an approved SMP and will be responsible for the following: • checking areas immediately prior to any clearing for the presence of any native fauna and habitat features (i.e. tree hollows, reptiles under fall logs), and breeding places (i.e. nests and burrows) • any captured species will be relocated to an agreed release site • FSC to advise construction contractors as to best practice approach to avoid impacts on breeding places and fauna species. Woody debris, hollow logs and rock piles will be retained for use in rehabilitation wherever possible. • In accordance with conservation advice for the species, wherever possible, the use of barbed wire fencing will be avoided across the Exploratory Works Project. • Access roads will be aligned along existing tracks wherever practicable to minimise vegetation removal, loss of hollow-bearing trees and fragmentation. • All vehicles associated with clearing and construction activities will travel at slow speeds to minimise the chance of any fauna strikes occurring. Speed limit signage will be placed at the entrance to the site and other key access tracks. Access road width to be minimised where practicable, particularly across creek lines. • Speed limits will be clearly signed on roads during construction. • Movement within the Exploratory Works Project area will be via approved access tracks with speed limits enforced. The requirement to enter and traverse the area will be minimised and limited to those required for essential Exploratory Works Project activities.	Rare	Minor	Low	• Any fauna injuries or deaths are required to be reported firstly to the Project Environmental Manager and then DES and/or DCCEEW if it involves a threatened species. The cause of injury or death will be investigated, and any required changes will be implemented. •Any injured fauna should be taken to the nearest suitable vet or wildlife carer for treatment.	• Inspect and repair damaged fencing; replace any flagging tape or respray fluorescent marker. • Where clearing extends outside the approved disturbance limits, a record must be taken of the incident and an investigation will occur. • Temporarily disturbed areas that are no longer required to be cleared will be assessed for restoration and revegetation. • If any new threatened species not discussed in this FFMP are identified, works will cease immediately and the unexpected threatened species finds protocol will be followed (refer to the FFMP), including notifying DETSI and DCCEEW. The FFMP will be updated to incorporate additional mitigation and management measures as required. • Any fauna injuries or deaths are required to be reported firstly to the project environmental manager and then DETSI and/or DCCEEW if it involves a threatened species. The cause of injury or death will be investigated, and any required changes will be implemented. • Any injured fauna will be taken to the nearest suitable vet or wildlife carer for treatment.
80	Coxen's fig-parrot (Cyclopsitta diophthalma coxeni) (critically endangered)	Weeds	Habitat degradation by invasive weeds is a key threat to the Coxen's fig-parrot (DCCEEW, 2023a). A suite of invasive weed species were recorded within the study area including Lantana camara, corky passionflower, Noogoora burr, crofton weed and mistflower. Exploratory Works Project activities have the potential to increase the abundance of pest flora and fauna in the footprint and facilitate dispersal to previously unaffected areas. Movement of vehicles, equipment and personnel throughout the Exploratory Works Project footprint is the key vector of transmission, in particular vehicles and equipment sourced from regions beyond the footprint which may introduce new species. Many weed species thrive on disturbed ground and will rapidly colonise disturbed areas in advance of native species recolonisation. Seeds and fruits have the potential to be spread by clearing activities and vehicle movement, whilst establishment into new areas is highly likely after heavy rainfall as several thousand seeds can be produced per square metre that can remain viable for several years. The spread of weeds is also a risk during ongoing activities associated with the Exploratory Works Project.	Possible	Moderate	Medium	Hygiene control procedures will be in place throughout multiple stages of the Exploratory Works Project activities, including measures to reduce potential for introduction and spread of weeds: •Decontamination Washdown facilities will be installed at the two entrances to Queensland Hydro land so all vehicles will be washed prior to entry and exiting site. Decontamination practices will be implemented for all personnel and regular vehicle and machinery wash downs, especially when transferring between sites will assist in minimising the spread of weeds and Myrtle Rust. Multiple methods are available for treatment of vehicles including wet decontamination, heat and/or fumigation procedures. Hygiene checks will be conducted on all machinery or equipment being moved onto or out of the Exploratory Works Project site to minimise distribution of weed species and fungal pathogens. •Training Training and inductions for site employees and contractors to educate on the risks and mitigation requirements for weed spread. •Precleaning surveys and weed treatment Pre-clearance surveys will be performed to identify weeds, and large infestations to be treated prior to clearing to minimise the spread of weed seed and material. A weed register will be developed and maintained by Queensland Hydro for the duration of the Exploratory Works Project to manage weeds and ensure that management actions are having the desired effect. •High risk areas Identified areas of high risk weed or disease infestations (including 50 m buffer zone from TECs) will be signed and demarcated where required to avoid transporting plant reproductive material from these areas to areas that are not infested. •Weed management Weeds will be actively monitored and managed adjacent to Exploratory Works activities occurring within 50 m of TEC patches. Spraying herbicides, unless approved for use in the area including targeted spraying, will be avoided. Weed material will be disposed of in accordance with the *Biosecurity Act 2014* Site vehicle access will be restricted to existing roads and tracks.	Unlikely	Moderate	Low			• Increase Hygiene Control requirements if vehicles or equipment are found to introduce or spread new weeds. • Increase weed control efforts where required (i.e. after heavy rainfall) or if current controls are ineffective. • Review and update of the Biosecurity Management Plan and the species specific management actions.
81	Northern quoll (Dasyurus hallucatus) (endangered) Spotted-tail Quoll (Dasyurus maculatus maculatus) ((endangered)	Pests and Predation	Feral cats, European red foxes and wild dogs predate on spotted-tail quolls. Wild dogs also compete with spotted-tail quolls for prey. Spotted-tail quolls can also be poisoned by cane toads, and by controlling measures implemented for non-native predators. Exploratory Works could introduce other pest animals to the area or exacerbate risk of predation from pest animals established in the area. Pest fauna present key threats to spotted-tail quoll through predation, competition or poisoning (TSSC, Commonwealth Listing Advice on Northern Quoll (Dasyurus hallucatus), 2005).	Possible	High	Medium	• Waste disposal (especially food waste) will be removed from site regularly to discourage presence of pest fauna. Any additional measures outlined in the Waste Management Plan will also be implemented across the site. • Install cameras along access tracks to monitor pest fauna traffic. • A Biosecurity Management Plan for the entire Project has been developed. This plan and is currently being updated to reflect the recent surveys on site and risks posed by the species present, along with outlining proposed design treatments. As part of the finalisation of the plan Queensland Hydro will work with other stakeholders to align the measures to be implemented, noting that some of the practices may not be implemented in the short term given they may impact the proposed surveys works. • The Biosecurity Management Plan includes appropriate thresholds for management action, linked to the risk posed by the species. The plan includes measures for trapping and controlling pest fauna in accordance with relevant threat abatement plans, along with relevant legislation and guidelines.	Unlikely	Moderate	Low			• Review and update the Biosecurity Management Plan if evidence of increased predation or pests is observed. • Implement additional pest fauna management measures where controls do not appear to be adequate. • Notify the landholder (i.e. QPWS) and/or adjacent landholder about the risk and support the implementation of their plans.

No.	Risk description and controls			Risk level (without controls)				Risk level (post controls)			Performance objective	Monitoring measures	Risk treatment plan
	Environmental value impacted	Impact	Impact description	Likelihood	Consequence	Risk level	Avoidance and mitigation measures	Likelihood	Consequence	Risk level			
82	Giant barred frog (Mixophyes iteratus) (vulnerable) Glossy black-cockatoo (south-eastern) (Calyptorhynchus lathami lathami) (vulnerable) Greater glider (southern and central) (Petauroides volans) (endangered) Grey-headed flying-fox (Pteropus poliocephalus) (vulnerable) Koala (Phascolarctos cinereus) (endangered) Long-nosed potoroo (northern) (Potorous tridactylus tridactylus) (vulnerable) Yellow-bellied glider (Petaurus australis australis) (vulnerable) Black-breasted button-quail (Turnix melanogaster) (vulnerable) Coleus torrenticola (syn. Plectranthus torrenticola) (endangered) Brush isophora (Isophora fraseri) (vulnerable) Scrub turpentine (Rhodamnia rubescens) (critically endangered) Coleus omissus (syn. Plectranthus omissus) (endangered) Rulli nut	Fire	Habitat for known or likely threatened terrestrial fauna and flora, occur in the Borumba PHES Survey area and Exploratory Works footprint. Known terrestrial fauna and flora have been recorded in and adjacent to the Exploratory Works footprint, and likely terrestrial fauna and flora have habitat within or adjacent to the Exploratory Works footprint. Threatened terrestrial fauna are especially vulnerable to fires. The impact constitutes a major threatening factor leading to significant injury or mortality to threatened species, and/or catastrophic loss of habitat and fragmentation, depending on the severity of the fire. The degradation and loss of habitat by fire is a critical threatening factor, especially due to the effects of the 2019-20 bushfires. Species most at risk include the glossy-black cockatoo, greater glider, koala, grey-headed flying-fox, and the yellow-bellied glider, with a significant portion of their known range burnt and/or high mortalities from direct impacts of fire. Another risk from fires involves the increased predation, post-fire, due to reduced vegetation cover, which can affect species like the long-nosed potoroo, diamond firetail, and the black-breasted button-quail which are ground dwellers or rely on shrubby vegetation for foraging and breeding (DAWE, 2022a; TSC, 2015; OCDEW, 2023). Fire is a natural part of the Australian landscape, and most vegetation communities are adapted to periodic fires. However, changes in the natural fire regime may result in changes in the species composition and/or structure of the vegetation, a threat to all threatened flora known or likely to occur. The increased presence of construction vehicles and personnel in the Exploratory Works Project footprint may increase fire risk through use of machinery that may generate sparks, use of flammable liquids and idling vehicles being present in areas of ground vegetation.	Possible	Major	High	• For hot-work activities, a risk assessment will be completed considering forecast weather, fire hazard ratings and site conditions. • Vehicles are not to idle or be parked in areas of long grass. • Access tracks, fence lines and cleared overhead powerline easements will be maintained and used as firebreaks within the Project footprint and regularly maintained during clearing and construction activities. • Smoking is permitted on site in designated areas. • Fuel loads across the Exploratory Works Project will be monitored and appropriately managed through activities such as weed management, slashing and low intensity burns. • Firebreaks to be established on Queensland Hydro land.	Unlikely	Major	High			• If fuel loads have increased following heavy rainfall, control methods will be implemented as required (i.e. weed control or cool burns). • Prescribed burns are to be conducted based on present fuel load and ecosystem (Peeters & Butler, 2014).
83	Giant-barred frog (Mixophyes iteratus) (vulnerable)	Clearing (habitat loss and fragmentation)	Potentially suitable habitat for the giant barred frog is present in the Exploratory Works survery area, however no invividuals have been recorded to date despite targeted surveys. The Exploratory Works Project activities in areas mapped as habitat include the installation and use of temporary water infrastructure. Two bridge crossings of Yabba Creek are located next to areas mapped as habitat. This area of habitat is outside of the Exploratory Works Project footprint and will not be cleared. The Exploratory Works Project will impact approximately 0.6 ha of potential habitat for this species. This is a conservative estimate since the impact will only occur in association with burying the temporary water infrastructure. The pipeline is only 300 mm wide and will be shallow buried. Vegetation clearing is not required to bury the pipeline so although the area of impact is 0.6 ha, the actual area of disturbance will be significantly smaller.	Highly Likely	Moderate	High	• Clearly delineate clearing boundaries and exclusion/buffer zones with flagging tape or fluorescent marker or signage prior to clearing commencing to avoid unnecessary clearing and to ensure personnel and vehicles stay within the approved footprint, avoiding contravention of disturbance limits. • All handling and management of amphibian species will be undertaken in accordance with the Technical Manual - Interim hygiene protocols for handling amphibians (DEHP, no date). • Conduct works during dry/low flow periods where possible. • Conduct instream and riparian works outside the breeding season (spring to autumn), where possible. • If it is not possible to undertake works outside breeding seasons, pre-clearance surveys upstream and downstream from the works area will identify, map and mark out potential and active breeding habitat. • Off-track driving will not be permitted and reduced speed limits will be enforced near potential habitat, with appropriate signage on site. • Undertake a prestart toolbox at commencement of works to inform the work party of potential presence of frogs and key habitat features in the area and planned procedure to manage these values. If a giant barred frog is sighted within 50 m of the activity: –Stop works until a suitably qualified FSC is consulted and advises on next steps. –Frogs to be left to self-disperse or unless otherwise directed by FSC. –Works to commence following the approval from the FSC or the environmental officer. –Capture and release those healthy individuals. Any injured animals will be taken to a wildlife carer and/or a vet for treatment. All handling and management of amphibian species will be undertaken in accordance with the Technical Manual - Interim hygiene protocols for handling amphibians (DEHP, no date). Conduct works during dry/low flow periods where possible. Conduct instream and riparian works outside the breeding season (spring to autumn), where possible.	Likely	Minor	Low	No Giant-barred frogs (Mixophyes iteratus) are injured or killed as a result of the project	• Monitoring will be undertaken to ensure exclusion zones and signage remains in serviceable condition. • FSC will keep a record of any fauna relocated during clearing activities.	• Inspect and repair damaged fencing; replace any flagging tape or respray fluorescent marker.