Tables

1 Introduction

Central Queensland Coal Proprietary Limited (Central Queensland Coal) and Fairway Coal Proprietary Limited (Fairway Coal) (the joint Proponents) are seeking the approval of the Australian and Queensland Governments to develop the Central Queensland Coal Project (the Project) located near Marlborough, approximately 130 km northwest of Rockhampton in Central Queensland (Figure 1). If approved, Central Queensland Coal would commit to substantial capital investment to develop the Project which would provide opportunities for employment and businesses and generate government and export revenues.

The Project comprises the Central Queensland Coal mine where open-cut coal mining will occur. Support infrastructure would also be built including a train loadout facility (TLF) and a haul road to truck coal from the mine to the TLF. The mine is expected to be in operation for approximately 20 years producing mostly coking and some thermal coal and including final rehabilitation and mine closure activities.

An Environmental Impact Statement (EIS) is required as part of the Project's approval process under the *Environmental Protection Act 1994* (Qld) (EP Act) and *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) respectively. An EIS was prepared by CDM Smith on behalf of Central Queensland Coal to addresses the scope set out in the Project's EIS Terms of Reference (ToR). Two amended EISs (referred to herein as Supplementary EIS (SEIS) Version (v) 1 and SEIS v2), prepared to address agency comments on the EIS, were lodged in May 2018, and December 2018, respectively.

This SEIS (SEIS Version 3 or SEIS v3) has been prepared to address the comments arising from the adequacy review of the SEIS v2. Substantial work has been undertaken to provide comprehensive assessment and responses to these comments.

This Executive Summary provides an overview of the content and conclusions of this SEIS, to which readers should refer to for more detailed information. The following sections of the Executive Summary set out:

- information about Central Queensland Coal, the need for the Project, its benefits and approval requirements
- the existing receiving environment
- key Project activities
- the objectives of the EIS process and its methodology
- the results and conclusions of the EIS and
- Central Queensland Coal's major commitments.

5 Land

The Project will occupy land that is presently used for cattle grazing for both fattening and breeding of stock. There are no occupied homesteads within the proposed mining lease boundaries but there are various farm access tracks, two windmills, two dams, two vacant homesteads and farming infrastructure and fence lines along paddock boundaries. No other infrastructure such as water, power, telecommunications or gas pipelines are present within the Project Disturbance Area.

Although some areas of mapped Environmentally Sensitive Areas occur within the Mining Lease, none will be cleared or otherwise directly affected by the Project. There are no National Parks, nature refuges or declared catchments within the Project Site, or registered areas of existing contaminated land.

Soils within the Project Site have a low to moderate erosion potential although sodicity and fertility issues were identified in soils to be stripped, stockpiled and reused in rehabilitation – a soil management and amelioration program will be undertaken to protect soils to both minimise on-site erosion and ensure availability for and success of rehabilitation works.

In terms of agriculture, the soils provide moderate quality grazing pastures with some areas of good quality grazing land over Vertosols in the north of the Project Site. A small area of mapped SCL will be disturbed by the Project, however the soil assessment work conducted has shown this not to be SCL – a Regional Interests Development Approval is required to be lodged, with the intent to demonstrate land is not SCL (addressing Required Outcome 1 under the Regional Planning Interests Regulation 2014). A small area of mapped ALC Class A / B land will also be impacted. However, the soil survey work has revised down the area and the boundary of the soil unit, and so only a very small part is impacted (0.8 ha or less than 0.02% of the total ALC Class A / B land in the Styx Basin).

Physical impacts to the land will include land clearing and topsoil removal for the open-cut pits, mineral waste rock stockpiles, water storage dams and other surface infrastructure including the haul road and TLF. Measures to minimise these impacts include:

- sensitive clearance, handling and storage of topsoils
- establishing appropriate soil erosion and sediment controls and
- progressive rehabilitation of disturbed land will occur in a manner which allows the land to be returned to land suitable for a post-mining grazing landuse.

Grazing management on the site will include destocking, protection of remaining vegetation areas and improvement to riparian vegetation. Restocking post-closure will be accommodated by the rehabilitation of the site to a post-mining grazing land use generally consistent with ALC Class C2 land.

5.1 Visual Amenity

The Project is likely to be visible from three homesteads (Oakdean, Brussels and Neerim-2) and the Bruce Highway. The visual impact assessment presented in the EIS did not account for vegetation. Vegetation has the potential to screen the visibility of the Project. Appropriately designed and located night lighting for the Project will minimise the risk of sky-glow impacts regionally; however, there is anticipated to be some light spill that will be evident during the night. In addition, an analysis has been undertaken to assess the impact the Project is likely to have on people travelling along the Bruce Highway and local road network surrounding the Project. The topography and

existing vegetation in the area is unlikely to provide a natural screen, and as such mining operations would be visible from the road. Bund Walls will be constructed alongside the Bruce Highway to block visibility of the mining operations.

6 Traffic and Transport

All traffic associated with the Project is assumed to access the site via a single vehicular access point to the east and a single access point to the west proposed on the Bruce Highway. The eastern access will be utilised from 2021 whilst the western will be utilised for the commencement of construction of Open Cut 1 in year 10 (2030). Both entry points will be designed in accordance with the DTMR design guidelines and standards. Both will remain open until completion of mine closure activities.

The operational phase of the Project when Open Cut 2 is operational and Open Cut 1 is under development will generate most traffic with the total movements during peak operations equating to approximately five heavy vehicle movements in and five heavy vehicle movements out per hour at both the eastern and western access off the Bruce Highway. It is anticipated that 50% of the traffic will use the eastern access and 50% will use the western access during peak operations.

All materials, plant and equipment are intended to be delivered to the Project via road-based transport. It is expected that construction traffic will primarily involve a mix of rigid trucks, articulated vehicles (i.e. semi-trailers) and B-Doubles. Some oversize loads are also expected, particularly during the CHPP, dump station, stacker / reclaimer and heavy mining equipment construction and installation phase. These loads will be hauled from either the Port of Brisbane, Port of Mackay, or the Port of Gladstone.

The Project will result in traffic delays because of construction and operation. Analysis of potential pavement impacts predict impacts of less than 5% on the Bruce Highway for the entirety of the Project operation.

Central Queensland Coal will not undertake any construction or operational activity (i.e. blasting activities) that requires the closure of the Bruce Highway. Central Queensland Coal will continue to work with DTMR to establish appropriate excavation methods that facilitate the mining of coal within the 500 m buffer area adjacent to the Bruce Highway to avoid the need for road closures. Procedures to safely manage blasting will be articulated in a Blast Management Plan which will be prepared prior to the commencement of any blast activities to safeguard the users of the Bruce Highway.

The geotechnical assessment has shown that excavation of coal mining pits on either side of the highway is feasible without disruption to the highway. Additional geotechnical investigations will be undertaken within six months of the Project commencing within the 500 m blasting buffer zone, and will be undertaken thereafter bi-annually.

Workers who reside within one hour's drive of the mine are likely to make their own way to work at the beginning of each shift or commute using a project bus service. For workers who live further afield but in the region, Central Queensland Coal is considering a bus operation from strategically located places, depending on the source of the workforce. It is considered likely that a bus operation would be operating between Rockhampton and the mine and consideration given to extending the service to Yeppoon, as well as from the communities to the north of the mine, including Clairview and St Lawrence. Central Queensland Coal will manage risks associated with driver fatigue and safety.

7 Waste Management

Waste will be generated throughout the construction, operation and decommissioning phases of the Project and has the potential to impact the existing environmental values and human health.

For general and recyclable waste, it is estimated that a total volume of 151 tonnes per annum of solid waste will require offsite disposal and 127 tonnes per annum of solid waste can be recycled during the construction period. Annually during the operational period 383 tonnes of solid waste will require disposal and 317 tonnes of solid waste can be recycled. This will be removed from site by a licensed contractor and Central Queensland Coal will work with the contractor to adopt sustainable reuse and the reprocessing of marketed recyclable wastes. The closest local municipal landfill is located at Rockhampton.

The RRC has confirmed the current annual and long-term capacities of the landfill can receive general waste for the duration of operations. Cumulative impacts are anticipated to be low and within current capacity of the existing landfill operations.

Regulated wastes produced include sewage sludge, oils and chemical waste which will also be stored in designated areas and segregated in clearly labelled containers. Regulated wastes will be removed by the licensed contractor and oils recycled using the new Gladstone lube oil recycling plant. Sewage effluent waste will be taken by licenced contractor to Rockhampton for disposal.

Waste management and mitigation measures put forward in this assessment reduce the impacts resulting from uncontrolled releases via methods such as bunding, containing and segregating potentially hazardous and odorous wastes. Management measures also aim to reduce pressures on existing land fill locations via implementing the waste management hierarchy (avoid, reduce, reuse, recycle, recover, treat and dispose).

8 Waste Rock and Rejects

Geochemical characterisation was undertaken for a total of 195 samples (including waste rock and potential fine coal reject samples) from 15 bore holes covering a range of depths from 11.6 Mbgl to 147 Mbgl in various lithologies.

The results found that the bulk waste rock and rejects are anticipated to be Non-Acid Forming (NAF) with net acid neutralising capacity, have low to moderate salinity and generally low metals concentrations, although most samples were identified as sodic. Very few Potentially Acid Forming (PAF) samples were identified, and can be visually distinguished in the field as pyritic material, which will be selectively handled (although inclusion in the bulk material is expected to have little overall effect).

Based on works to date, the waste rock and coarse / fine rejects generated during the extraction and processing of the resource have limited potential to impact upon the environmental values described in throughout this SEIS.

Without appropriate management there is some potential for sediment laden surface runoff and leachate from the extracted waste rock and fine rejects to enter local waterways and degrade water quality. Although the waste rock is expected to have a low capacity to generate acidity, it does have moderate saline drainage and sodic potential and the Kinetic Leach Column (KLC) results indicated that leachate may contain elevated concentrations of dissolved As, Mo, Se and V when compared to potential water quality monitoring criteria. The leachate derived from the kinetic leach study generally showed that there is an initial flush of soluble metals / metalloids and salts which decreased after the first two to three flushes. This initial flush is likely related to the particle size; the fine materials with smaller particle size have a larger surface area for chemical reactions to occur and thus tend to yield higher leached metals / metalloids and salts concentrations.

There is likely to be a smaller average grain-size in the laboratory experiments compared to the average grain-size in the waste rock stockpiles. This will likely result in a comparatively reduced ‘first flush effect’. The KLC study, although a short-term study, indicates a reduction in leached concentrations of most species with time. The study appears to show that the release of aluminium, arsenic, molybdenum, selenium and vanadium are not controlled by pyrite oxidation, indicated by the steady decline in leached concentrations.

The waste rock management plan incorporates filter pressing (to reduce water content) and co-disposal with overburden, which is likely to decrease infiltration and subsequent leaching potential of these materials. According to the management plan, the dried coarse rejects and filter pressed rejects will be mixed with overburden waste and strategically placed within both the out-of-pit waste rock stockpiles and in the open cut mine void. The waste water generated by the filter press process will be captured and treated (sedimentation or other process). Discharge of mine affected water as part of the mine water management system assessed as part of Chapter 9 – Surface Water, which included specific consideration of several of the elements identified in the KLC assessment, found no impacts (negligible changes) to downstream surface water quality.

Management measures have been determined in response to mitigating potential impacts and best reflects the requirements for land management through the construction, operation and rehabilitation phases of the Project. These measures include further characterisation of overburden and waste materials which will inform the placement strategy (or treatment) of any PAF and potentially sodic materials.

In addition to engineering controls, water monitoring will be undertaken at the environmental dams, mine-affected water dams, discharge locations and locations both upstream and downstream of the Project area to identify potential risks as they may arise. As identified in the risk assessment, although potential risks and impacts have been identified (associated with the waste rock and coal reject materials) through implementation of adequate controls and monitoring measures the residual risks will be adequately mitigated.

9 Surface Water

The Project is located within the North East Coast Drainage Division, within the Styx River basin (Queensland river basin 127), a small basin of around 3,000 km^2 discharging into the Broad Sound and Coral Sea. Landuse in the basin is predominantly 'Production from relatively natural environments' (91%) – predominantly grazing - followed by 'Conservation and natural environments' (8%) and 'Intensive uses' (1%) which comprise transport and communication, residential and farm infrastructure, services and mining (DES 2019). The remainder is predominantly water (saline coastal wetland areas, rivers and dams), with minor areas of dryland and irrigated agriculture (0.5%). The Styx basin has been extensively cleared for grazing.

No Water Plan is in force over the basin.

The Project is bordered by two watercourses as defined under the *Water Act 2000*, namely Tooloombah Creek to the west, and Deep Creek to the east, but is located predominantly within the Deep Creek sub-catchment, within the Southern Styx Freshwaters EPP (Water and Wetland Biodiversity) catchment area. These creeks meet at a confluence 2.3 km downstream of the Project Site and drain into the Styx River. T.

The majority of the lower reaches of the catchment where the Project is located are characterised by generally flat terrain with slopes less than 0.5%. The main watercourses are deeply incised, with Tooloombah Creek channel significantly larger than the Deep Creek channel.

The lower part of the Styx River catchment is characterised by coastal and estuarine conditions, with the Styx River becoming tidally influenced downstream of the confluence of Deep and Tooloombah Creeks. The Styx River discharges to the Styx River Estuary approximately 8 km downstream of the Project, to the Broad Sound. The Broad Sound estuary is listed in the Directory of Important Wetlands of Australia (DIWA) and it's boundary is located approximately 11 km downstream of the Project.

Both Deep and Tooloombah creeks are ephemeral waterways, and flow for approximately 24% of the time, predominantly during the wet season. At other times, the creeks are dry or form a series of disconnected pools, which gradually reduce in size over time, due to evaporation. Some pools are fed by groundwater from the water table aquifers and bank storage return water, resulting in their persistence during the dry season.

Other watercourses in proximity to the Project include Granite and Montrose Creeks to the north, discharging into the Styx River; Barrack Creek to the east, joining into Deep Creek; Mamelon Creek to the west, joining into Tooloombah Creek; and a number of drainage features within and adjacent to the mining leases.

A number of un-named drainage lines leave the Project Site and discharge into Deep Creek, along the eastern boundary of the ML. The most distinct drainage feature is the 2nd order stream that runs through Open Cut 1 in a northeast direction passing under the Bruce Highway and finally discharging to Deep Creek to the northwest of MIA 2. This drainage feature is impounded by two existing farm dams, one of which is located within the proposed Open Cut 1 pit shell. The upper catchment of this 2nd order stream will be diverted towards Deep Creek as a clean water diversion around the proposed mine pits. The middle portions of the drainage feature will be mined out as the pits progress.

There are four unnamed surface water features that drain the western section of the Project Site into Tooloombah Creek. These features are not clearly defined, with three classified as 1st order drainage features and one a 2nd order drainage feature.

There are four existing farm dams of varying size within the Project Site, all dams are located adjacent to the Bruce Highway. These dams are predominantly used for stock water, are highly disturbed and do not support vegetation communities. There is also catchment contouring within the Mamelon property to the south of the Bruce Highway for capturing and storing overland runoff and preventing erosion. Existing contour bunds will be upgraded to environment dams that capture runoff from overburden stockpiles and remove sediment prior to discharge to Deep Creek.

The data shows exceedances of the Aquatic Ecosystem guideline values for dissolved oxygen, ammonia and total nitrogen at all sites. Total phosphorous was exceeded in Deep Creek, and at the St2 Styx River site, while suspended solids and turbidity were exceeded at Deep Creek, and a marginal exceedance for suspended solids at the Styx River St1 confluence site.

For toxicants, For metals and metalloids, aluminium, copper and zinc are consistently high and above the guideline value at all sites, with exceedances also found for arsenic (marginal at the St2 Styx River site), lead (Deep Creek), uranium (St1 and St2 sites) and possibly selenium in the Styx River, although the marine arsenic and selenium and both fresh and marine uranium guideline values are low reliability. Iron is above the low reliability guideline value at all sites other than St1.

A number of other sites recorded medians less than the limit of reporting, but which was above the guideline value, and so whether the parameter is actually above the guideline value cannot be determined with certainty.

The results of the water quality assessment for the current (baseline) water quality conditions indicate that the existing aquatic ecosystem guideline values will be routinely exceeded under natural conditions for a number of parameters.

Water in Deep and Tooloombah Creeks appears generally suitable for stock watering and irrigation (although a salt / sodicity / chloride assessment is required on a use-specific basis for irrigation), with the exception of high total phosphorous at Deep Creek.

Guideline values for stock watering are exceeded for total dissolved solids at the St2 Styx River site, for chloride at both the St1 and St2 sites and for total phosphorous at the St2 site. The statistics for selenium resulted in a range (due to limits of reporting, the specific statistic could not be precisely computed) at the St2 Styx River site which indicates exceedance for this parameter as well.

There are some exceedances of the aesthetic criteria related to drinking water, which could be managed, although arsenic and manganese levels are at or above the relevant health criteria.

The ephemeral watercourses and wetlands (including farm dams) within the Project Site and surrounding region are classified as moderately disturbed, with the background water quality reflecting that the land is largely given over to grazing.

Intermittent flooding is a natural feature of the landscape, reflected in the predominance of ephemeral watercourses. Flood modelling identified that the majority of flow is confined within the creek banks, with minor flooding through the mine site in the 1% AEP event. The probable maximum flood event modelling shows that the Open Cut 1 processing and waste storage areas (MIA & CHPP 1, Environmental Dam 1C, Waste Rock Stockpile 1) are outside of the maximum floodplain extent, and so will be unaffected. The pre-mining 0.1% AEP event overlaps part of the MIA & CHPP 2 area, as

well as the haul road crossing of Deep Creek, but developed modelling shows that development flood levels provides for suitable Project immunity to the 0.1 % AEP event.

The modelling shows that the Project results in minimal changes to the overall flood levels external to the site, the Bruce Highway retains its flood immunity up to the 1% AEP event. No significant increases in flood velocities were identified, with overall geomorphic impacts from the Project on nearby waterways considered low.

Following mining and rehabilitation of the site, some final landforms remain within the floodplain, but all are outside the main channel flood extent of Tooloombah and Deep creeks. Detailed design will be undertaken to include the site drainage system, including over the reinstated final landform, and will be incorporated into the overall Project rehabilitation plan to be presented in the Progressive rehabilitation and closure plan (PRCP).

The mine water balance generally shows that the planned mining and processing water demands will be met by water sourced from catchment rainfall, groundwater dewatering from mining activities, and reuse of water around the site. During drier conditions, there may be some potential shortfalls in water supply. These will be addressed through advanced dewatering and demand management on the site, including production changes such as increasing the amount of coal bypassed (and so reducing the amount to be washed). Pit and dam inventories confirm that there is only a very small risk that the full supply volume of Dam 1 would be reached at some point over the life of the Project, and that both pits can be dewatered effectively over their mining life.

A controlled release strategy has been developed, which aims to reduce the chance of uncontrolled releases occurring and to maintain water levels within the stated operating volumes within the site storages. The modelling has shown that there is a very small risk of an overflow from Dam 1 during the first 10 years of the Project, increasing to around 10% in the latter half of the Project. Other dams maintain a very low risk of overflow over the life of the Project.

Assessment of streamflows in both Deep and Tooloombah Creeks shows that there will be negligible changes to streamflow, and that the highly ephemeral nature of pools, as well as local reliance on bank flow storage and return, rather than baseflow from elevated water table aquifers, will likely have negligible effects on the persistence of pools in general. There could be impacts to pools to the west of Open Cut 2 in Tooloombah Creek, if local water table aquifers are lowered affecting wet season recharge of bank storage. Otherwise, there are not expected to be significant impacts to pools within the Project Area.

The site water management system has been configured to manage the different water types on the site, and to selectively contain, store, reuse and treat waters, with dirtier water preferentially reused and clean water diverted around the site. Controlled releases have been designed into the system, which result in very low likelihoods of uncontrolled discharges from the site over the Project life, and result in negligible changes to downstream water quality. Improvements in overall site management from the existing grazing landuse have also been shown to result in a reduction of around 55% in sediment flowing from the site into the downstream environment, with commitments to improving overall riparian vegetation across the Mamelon property adding to stream resilience.

Mitigation has been proposed, and a management and monitoring program provided, detailed in the draft ESCP, the draft Receiving Environment Monitoring Program and draft Mine Site Water Management Plan, provided with this SEIS (Appendices A15a, A10f and A5c respectively), and summarised in Section 9.7 in this Chapter.

Overall, the assessment has identified that mitigation and management measures can be employed to effectively manage the potential for adverse impacts on the area's surface waters, and that the resultant impacts to the downstream receiving environments will be negligible.

9.1 Reef 2050 Water Quality Targets

An assessment of potential Project impacts against the Reef 2050 Water Quality Triggers (WQT) has been completed. The assessment takes into consideration the benefits associated with the installation of specifically designed and engineered erosion and sediment control measures, the removal of grazing from the majority of the Mamelon Property, and the provision of environmental offsets in undisturbed areas of Mamelon. The assessment concluded the Project would result in a positive contribution to the Reef 2050 WQT through:

- A reduction in nutrients because of the cessation of grazing activities. and subsequent managed regeneration of native vegetation on the majority of the Mamelon Property.
- Under average climatic conditions, a reduction of sediment load reporting to Tooloombah and Deep Creek of about 50%, reducing the current estimated baseline sediment generation rate of 5,037 t/year to approximately 2,297 t/year, and hence resulting in an ongoing reduction in sediments reporting to the GBR. Based on this assessment the Project will reduce the sediment load to the downstream environment by approximately 2,740 t/year. This equates to a reduction in the total Styx Basin sediment load of 2.74 % and a reduction in the total Fitzroy Basin sediment load of 0.15%.
- A reduction of grazing lands, either as disturbed land associated within mining activities, or land where cattle have been destocked. The destocked land will positively contribute to achieving WQTs associated with increasing late dry season groundcover and increasing the extent of riparian vegetation.
- An increase of the extent of riparian vegetation through the cessation of grazing on the vast majority of Mamelon property. In addition, revegetation will include the expansion of the existing riparian corridor by a width of 10 m. The destocking of cattle and subsequent Project management of native revegetation will enable vegetation to regenerate within the riparian corridors associated with Deep and Tooloombah Creeks, both of which currently remain as narrow bands of vegetation within heavily cleared lands (as they occur adjacent to the ML).

10 Groundwater

The Styx River Basin lies outside of any declared underground water areas or groundwater management areas. On a catchment scale, the general direction of groundwater flow is toward the Styx River and the coast. However, groundwater flow patterns vary across the catchment in response to local-scale recharge and discharge mechanisms. The water table surface is likely a subdued reflection of topography, and generally occurs within 10 – 20 m of the ground surface in the less elevated parts of the Basin, being very shallow in lower areas close to the Styx River and Broad Sound. Groundwater flows converge on the lower reaches of the creeks, whilst lower in the catchment the flowlines converge on the Styx River.

Groundwater is present as four main groundwater systems, comprising the:

- Quaternary Alluvial system, an unconfined aquifer generally confined to the watercourses and local drainages, with high permeability.
- Quaternary Pleistocene Alluvial system, an unconfined aquifer on higher terraces, overlying the coal measures, and more consolidated and less permeable than the Quaternary Alluvium.
- Styx Coal Measures, a shallow rock Early Cretaceous Sedimentary Rock system, a confined aquifer with generally lower permeability, but incorporating higher permeability coal seams/plies, and with reducing permeability with depth.
- Permian Measures, sedimentary and fractured (basement) rock systems, including shallow and deep rock groundwater bearing structures, considered to be generally confined aquifers.

Diffuse rainfall recharge occurs across the Styx River catchment at varying rates with higher recharge expected where less consolidated Cainozoic sediments (i.e. Quaternary Alluvium) are present, as opposed to Quaternary Pleistocene Alluvium, and less again for Tertiary and weathered regolith (i.e. outcropping Early Cretaceous, Permian and Volcanic basement rocks). Flood recharge events occur over extensive areas of Quaternary Alluvium during large and sustained streamflow events and are expected to result in the highest rates of recharge, albeit episodic. Recharge of the alluvium close to streams occurs each wet season, recharging the bank store.

Groundwater discharge occurs from the catchment via evapotranspirative losses from shallow water tables (direct evaporation) and riparian vegetation (transpiration), and in some locations discharge to surface water bodies (including permanent and semi-permanent pools).

Based on the geology of the area and groundwater quality and characteristics, six hydrostratigraphic units (HSUs) have been adopted for the Project Area, comprising the two alluvial groundwater systems, and splitting out the Styx Coal Measures and the Permian Measures groundwater systems into two units each. This is based broadly on the draft EPP (Water and Wetland Biodiversity) consultation materials prepared by McNeil et al. (2018), which has four units. The adopted HSUs are as follows:

- HSU 1: Quaternary Alluvium (Qa) – equivalent to the McNeil et al. (2018) Alluvial zones (AZ6)
- HSU 2: Quaternary Pleistocene Alluvium (Qpa) - equivalent to the McNeil et al. (2018) Cainozoic deposits overlying the GAB zones (CZ2)
- Styx Coal Measures (Kx), equivalent to the McNeil et al. (2018) Basins partially underlying the GAB zones (GZ11), Eastern Bowen Coal Measures, and split into the:
  - HSU 3: Upper coal measures - Overburden / Weathered Regolith

  - HSU 4: Lower coal measures - Overburden / Coal Seams, Interburden / Coal Seams, Underburden / Weathered Regolith
- Permian Measures (Pb), equivalent to the McNeil et al. (2018) Fractured Rock (FZ10) system, Eastern Fitzroy Trap rocks, and split into the:
  - HSU 5: Back Creek Group
  - HSU 6: Carmila Beds.

Several third-party bores are located within the Styx River Basin, most of which appear to source water from alluvial aquifers or residual (weathered) basement in places where relatively shallow groundwater occurs. In general, groundwater resources report salinity concentrations that are not suitable for livestock, as is evidenced by allowing stock access to instream pools of Deep and Tooloombah Creeks. The exception is the Qa unit, which had relatively low salinity and is generally suitable for all uses, with generally minor limitations. Otherwise, groundwater is generally unsuitable for potable use without treatment. The bore census undertaken for the Project suggests that most, if not all, wells are used for stock supply. There may be some small-scale irrigation development around 16 km downstream of the proposed mine but there is no evidence of irrigation within the Tooloombah and Deep Creek catchments.

Available data show that metals concentrations at some sites in all units exceed the default guideline values for aquatic ecosystem protection, particularly for aluminium, chromium, copper, zinc; and against the low reliability guideline values for cobalt, iron, molybdenum, uranium and vanadium. The available major ion data for Styx Coal Measures groundwater do not show a distinctly seawater signature, but do show evidence of direct recharge from rainfall or interaction with surface water. Concentrations of major ions in Styx Coal Measures groundwaters also vary widely but the waters are typically sodium-chloride dominant, which may be representative of the depositional environment. Seasonal variability in water quality is not evident in the Styx Coal Measures groundwaters.

Concentrations of major ions in Basement groundwater generally display calcium-chloride dominance, likely indicating reverse ion exchange processes where sodium is exchanged with calcium.

When compared to the current EPP (Water and Wetland Biodiversity) default guideline values, and also the draft EPP (Water and Wetland Biodiversity) consultation materials prepared by McNeil et al. (2018), numerous exceedances are found, although the latter draft values provide a better fit to the data.

The Queensland Government has identified the following Environmental Values for groundwater in the Styx River Basin – aquatic ecosystems, irrigation, farm supplies, stock water, drinking water, industrial use and cultural and spiritual values. Aquaculture is also included for the Styx Coal Measures, though it is unknown where this is practiced or where it would be suitable, and as noted above most groundwater systems are unsuitable for irrigation, farm supplies, stock water or drinking water.

Groundwater Dependent Ecosystems (GDEs) are addressed in Section 14 and Section 15.

The numerical groundwater flow model developed for the Project has been substantially revised and updated, based on existing and new data collected for the Project. The Central Queensland Coal geological block model and available geological mapping, along with drillhole data and Transient Electromagnetic Survey findings, was combined with the previous groundwater model structure

from the SEIS v2 and related supporting information to develop a conceptual model. The basement rock was based on interpretation of the available geological mapping and in consultation with Central Queensland Coal's geologists. The model also incorporates the mapped structures and faults within the basement rock at the interface of the Early Cretaceous Styx Coal Measures and the Permian Measures to the east/north-east of the Project. The model area was also expanded to meet the surface water flow catchment boundaries, and was based on the above HSUs.

Model predictive uncertainty and sensitivity in relation to adopted hydraulic properties and boundary conditions has been comprehensively assessed and reported, including non-uniqueness of hydraulic property sets, and hydraulic loading of the alluvial aquifer beneath waste landforms (i.e. surface mounding). A staged peer review process was also adopted throughout the development, modelling and reporting cycle.

The mining activity having the most potential to significantly result in direct groundwater effects is the quarrying and dewatering of mine pits and the subsequent progressive backfilling of pit voids during mining. Other activities associated with mining that may have the potential to impact on groundwater resources include, for example, waste rock stockpiles, water storage dams, storage and use of hazardous chemicals dust suppression, monitoring infrastructure and hydraulic loading of ground beneath waste landforms.

The following sections present a summary of the groundwater effects assessment undertaken for the Project.

10.1 Groundwater quantity

The model predictions demonstrate substantial drawdown within the proposed open cut extent, down to the depth of the pit. Results indicated that three years after commencement of mining the drawdown was largely contained within the Styx Coal Measures (i.e. open cut with a lesser degree of observed drawdown beyond the open cut). After 10 years of mining the drawdown impacts extend towards the north, but are unlikely to extend to the downstream reach of the Tooloombah Creek or Styx River. At the end of mining there is some temporal drawdown predicted in the Cainozoic Deposits and the Back Creek Group but predicted to gradually recover to pre mining levels after about 150 years, with a further slight mounding effect occurring over the 100 years after that.

In terms of nearby sensitive receivers:

- There would be no drawdown impacts at the location of the Broad Sound declared FHA.
- Given the above, there would be no impacts to areas considered part of the Great Barrier Reef Marine Park (GBRMP).
- There would be no drawdown impacts at the bores where stygofauna have been identified for the Project, other than at the STX093 drillhole site, which is situated on the edge of Open Cut 1 near to Deep Creek. Impacts to stygofauna are discussed further in Section 15.

Groundwater inflows into the open cut area are predicted to average 0.5 ML/day during the operational life of the mine, peaking at around 1.2 ML/day in the first 6 years of the mine, and declining thereafter. The Project open cut pits are approximately 150 m from Tooloombah Creek and Deep Creek. Based on the modelling results and the proposed mine water supply system, plus the discontinuous nature of the Quaternary Alluvial (Qa) system, no direct take of the water from higher permeability surficial Qa units are proposed for the Project.

The water table beneath the mid- to lower reaches of both Tooloombah and Deep Creeks, immediately adjacent to the mining pits, is predicted to decline due to mining, with a maximum of about 4.7 m beneath Tooloombah Creek, and about 60 m beneath Deep Creek.

However, further conceptualisation and modelling work conducted for the SEIS v3 to investigate the mechanisms of groundwater-surface water interactions (refer to the Surface Water / Groundwater Interactions Report in Appendix A6d) has found that Tooloombah Creek is groundwater fed, in some locations, but primarily from bank storage , and this is evident particularly in the stretch adjacent to the Project site. Deep Creek also feeds wet season and flood flows into bank storage, but due to differing geology, this is much lower in magnitude, and bank storage return flow may not reach the creek in some areas. In particular, they conclude that pools are unlikely to be sustained during the dry season in this area of Deep Creek.

The available data (observed pools persistence, water quality data particularly EC and water level changes over time, lithological descriptions and groundwater levels in alluvial and regolith cross sections across the creeks) supports increasing persistence of pools moving downstream (i.e. downstream of the Project site) in Tooloombah Creek; the lack of persistence in Deep Creek (other than potentially downstream near the confluence); the primary source of baseflow to pools being bank flow return rather than the dry season water table, which is typically lower than the creek bed; and saline water sourced from seasonally elevated water tables – the exception to this is some locations where the Styx Coal Measures outcrop into these pools (particularly the pool identified at the location of the stream flow gauge).

Essentially, the assessments and the data show that while seasonally elevated water tables recharge bank storage, which feeds back to the pools during part of the dry season, the water table declines typically to below the creek bed during the dry season, and so an unsaturated zone exists underneath most sections of the creeks. Therefore, direct drawdown impacts on the pools within both creeks are unlikely – i.e. since water table aquifers do not supply the creeks in the dry season directly, and since an unsaturated zone exists underneath the creeks (the water table is already below the base of the creeks), any further drawdown within the water table would not change this, and seepage would remain limited by the existing rate of infiltration from the creeks. The assessment on the Tooloombah Creek stream gauge pool found that, should dewatering cause the saline inflows to cease, the permanent pool would continue to contain water about 96% of the time, only drying out during major drought conditions. Ecological assessments found that since most pools in both creeks are ephemeral, the aquatic ecosystem is adapted to these cycles, and recolonisation of pools will occur naturally as it currently does under existing conditions following rainfall, once the creeks begin flowing again.

Flow currently occurs approximately 24% of the time and will not be affected by the Project. In addition, aquatic fauna recorded in pools during field surveys are all common species considered typical of a Central Queensland coast catchment, so there will not be any impacts on threatened aquatic fauna

10.2 Groundwater quality

Geochemical characterisation concluded that the overwhelming majority of the waste rock and potential coal reject materials have a very low risk of acid generation, with runoff being alkaline and having a low level of salinity. Dissolved metal/metalloid concentrations are expected to be low and unlikely to pose a significant risk to the quality of surface and groundwater resources in site

storages. As the advancing open cut areas will act as groundwater sinks during mining, this would also act to intercept any groundwater affected by waste rock leachate, and as such there would be no deleterious effect in terms of water quality from waste rock and rejects on groundwater.

Post-mining, when the effects of dewatering cease and local mounding effects and stabilisation occurs, water would flow through the remaining elevated landforms and backfilled pits. However, as noted above, this water would still be unlikely to be contaminated and given the material is native rock, would not be anticipated to result in long term changes to groundwater quality.

The potential for ASS in the Styx River catchment is restricted to the coastal zone below Ogmore on the Styx River, and is well outside of the predicted drawdown extent for the Project.

The seawater-fresh water interface is well beyond the influence of the Project, based on both theoretical and observational data. Further, groundwater flow directions in the Cainozoic/regolith and Styx Coal Measures layers for pre-mining, during operations, and post mining, show that Project influence on groundwater flow directions diminishes to effectively nil at the Tooloombah – Deep Creek confluence, which is only 2.2km downstream of the Project, where the theoretical seawater interface surface would be below -280 mAHD which is well beneath the predicted extent of drawdown. At the Ogmore bridge and WMP29 bore locations, both well outside the drawdown extent, and approximately 4km downstream of the Project, the theoretical fresh-seawater interface is still at least -40 to -80 mAHD. Any fresh-seawater interface at a shallower depth closer to the coast is well beyond the influence of the drawdown zone and any influence of the Project on groundwater flow direction.

With regard to the handling and storage of hazardous goods and chemicals on site, engineering design of storage and handling infrastructure along with strict handling, use and storage controls, as mandated by specific and relevant legislation, will reduce the potential for uncontrolled release of pollutants to the environment and contamination of groundwater.

10.3 Groundwater and surface water interaction

Changes in baseflow conditions from the model were predicted to be less than 0.009 m^3/s for Tooloombah Creek, in the reach between the confluence with Mamelon Creek upstream of the Project, and with Deep Creek downstream of the Project. This relates to a 9.3 km section of the creek, equating to ~1 L/s per km.

Changes in baseflow conditions within Deep Creek were predicted to be approximately 0.005 – 0.006 m^3/s, in the reach between the confluence with Brussels Creek upstream of the Project, and where Deep Creek joins into Tooloombah Creek downstream of the Project. The predicted change relates to a 17.5 km section of the creek, equating to ~0.3 L/s per km.

However, these predictions can be considered a worst-case prediction, unlikely to be reached in reality, since where drawdown occurs within losing zones beneath the unsaturated zones of the watercourse, the additional model predicted flux (i.e. leakage) from the watercourse would not eventuate. As described above, water tables appear to fall below the creek bed during the dry season, and direct baseflow contributions from the water table aquifer are not considered to be the source of baseflow to creeks (instead bank storage return flow).

For the Styx River, predicted baseflow changes were less than 0.0003 m^3/s. When considered in context with the large tidal range experienced within the Styx River, as well as influences from other

contributing catchments, including Montrose and Granite Creeks, these changes are considered negligible.

As the invert of other drainage features across ML 80187 are generally not as incised and deep-cut as the watercourses of Tooloombah Creek and Deep Creek, and groundwater levels in lower lying topographic areas and drainages are typically greater than 8-10 m, model predicted changes in baseflow and/or enhanced leakage in the local surface water drainages across the tenement are considered to be negligible. There may be some locations where an inflow sourced from the water table or outcropping coal measures into the creek does occur, and one such pool (the Tooloombah Creek stream gauge) has been identified, although separated upstream and downstream by other pools not evidencing this reliance.

No groundwater springs were identified in the Project area, and so no impacts identified.

10.4 Aquifer disruption

Pit voids will not remain after closure as the pits will be progressively backfilled during mining. However relatively small (remnant) waste rock stockpiles will remain after mining (most of the waste storages will be used to backfill the mine pits). The rehabilitation of the mine area by backfilling of mine pits will enhance the hydraulic properties of the aquifers intersected by mining. However, given that the pits will be completely filled following mine closure and that the model predictions show the system will recover in the long term, any disruption to the passage of water through these aquifers will disappear as water levels and pressures recover and stabilise.

11 Rehabilitation and Decommissioning

Over the Project's life approximately 1,360 ha of land may be disturbed within the MLs. All disturbed areas will be rehabilitated and maintained as mining progresses rather than at the end of the mine's life, including the development of trial rehabilitation areas early in the mine life to ensure long term rehabilitation activities will be successful. Infrastructure areas will be decommissioned, dismantled and removed once mining operations are complete. Rehabilitation will occur progressively throughout the life of the Project to create a low maintenance, geotechnically stable landform commensurate with the agreed final land use.

Detailed mine scheduling, rehabilitation planning and final landform assessment and design work has been undertaken, in particular development of final landforms to support a post mining low intensity cattle grazing landuse. In the previous SEIS (v2), final elevated landforms were located within the floodplain in both the north and south final landform areas. This SEIS (v3) has redesigned the landforms such that the southern final elevated landform has been moved out of the floodplain and the northern area have been adjusted to minimise floodplain coverage, improving post closure landform stability and reducing flood impacts.

Post closure, it is proposed to remove all catchment diversion drains and dams, fill all voids, flatten slopes to a maximum 7 degree overall grade and rehabilitate and stabilise all previously disturbed areas to achieve a post mining land use that is stable, vegetated and self-sustaining and supports the intended final land use. Rehabilitation works on drainage lines and creeks will maintain fish passage opportunities.

It may be the case that the best beneficial use of some of the supporting infrastructure is to leave the infrastructure in place to support the region. This will be discussed with the relevant authorities and landholders prior to formalising the decommissioning strategy. If the preferred outcome is to leave some of the infrastructure components *in situ* as operating infrastructure, Central Queensland Coal will facilitate the transfer of operating licences and obligations to the relevant parties.

The strategy presented in the Rehabilitation and Decommissioning Chapter is intended to be incorporated into the EA and the PRCP, and will be finalised and require approval prior to the commencement of mining operations, including development of a detailed Progressive Rehabilitation and Closure Schedule. Specific rehabilitation and decommissioning measures to avoid or minimise any impacts will be identified and the PRCP will be reviewed and updated during the mining life. The PRCP will be continuously updated during operations to ensure closure matters are appropriately addressed prior to the commencement of mine closure activities.

Overall, the work undertaken with reference to the rehabilitation and decommissioning of the Project indicates that there should be no impediment to achieving a final landform that is safe, stable, and non-polluting.

12 Air Quality and Greenhouse Gases

Air quality within the existing environment is relatively good and typical of rural areas. The closest homestead to the mining operations is the TSC Res 1 homestead located approximately 1.9 km northwest of the mine area boundary and is the closest dwelling to the Project. The predominant wind directions are from the north northeast or southeast, depending on the season.

Air quality modelling was updated as part of the SEIS v3 to ensure that changes to the Project layout (in particular, the movement of MIA 1 and CHPP 1 to the north-west of their former locations) were taken into account.

Air quality standards will not be exceeded at any homestead, or any other sensitive location. Nevertheless, appropriate mitigation measures will be implemented as best practice.

Mitigation to control potential air emissions will include:

- preparation and implementation of an Air Quality Management Plan prior to commencing construction activities on site
- monitoring in the event of a complaint
- engineering control measures
- dust suppression measures
- rehabilitation of exposed surfaces and
- operational procedures.

12.1 Greenhouse Gases

The Project will unavoidably generate greenhouse gases through the consumption of electricity, extracting coal and diesel combustion. Equipment usage was calculated to be the largest contributor to greenhouse gas release.

A greenhouse gas assessment has also been undertaken for the Project. This assessment determines the carbon dioxide equivalent (CO2-e) emissions from the Project according to international and Federal guidelines. The estimated maximum annual operational phase emissions (428,460 tonnes CO_2-e) represents approximately 0.08% of Australia's latest greenhouse inventory estimates of 532.5 $MtCO_2$-e (2019) and 0.28% of Queensland's latest published estimates of 152.9 $MtCO_2$-e (2016). Equipment onsite is the major contributor to the release of GHGs. Other significant contributors include fugitive emissions from the open cut mining operations. Abatement measures, including opportunities for improved energy efficiency of equipment will be evaluated for their cost effectiveness.

Annual greenhouse gas rates are expected to exceed 25,000 t CO_2-e and therefore this Project will trigger National Greenhouse Energy Reporting (NGER) requirements.

14 Terrestrial Ecology

The Project Site is predominantly located within the Marlborough Plains subregion, one of the 14 subregions of the Brigalow Belt North bioregion. A small portion of the western Project Site and the Mount Bison Road realignment occurs in the adjacent Nebo-Connors Ranges subregion. The Project Site is located close to the boundary of the Brigalow Belt South bioregion.

Large sections of the Brigalow Belt North bioregion have been cleared of remnant vegetation for grazing, agriculture and mining. Remaining vegetation is generally confined to rockier hilly areas, linear strips of roadside vegetation, riparian vegetation and relatively small isolated remnants. Thus, clearing over the past 150 years has resulted in a highly fragmented landscape with remnant vegetation patches separated by large expanses of cleared land.

Eleven REs were identified within the Project Site during field surveys and a total of 339 ha of remnant vegetation was mapped. Of these 11 REs, four are mapped within the Disturbance Footprint including RE 11.3.25, 11.3.4, 11.4.2 and 11.5.8.Terrestrial GDEs across the Project Site and Near Surrounds include Wetland 1 and vegetation communities existing along the riparian corridors of Tooloombah and Deep Creek comprising REs 11.3.4, RE 11.3.25, RE 11.3.12, RE 11.3.27 and RE 11.3.35, where they are accessing groundwater located less than 15 Mbgl and that has an EC below the conservative tolerance of 10,000 µS/cm.

Two threatened ecological communities were recorded within the Project Site during field surveys:

- Brigalow (*Acacia harpohylla)* dominant and co-dominant ecological community (Brigalow TEC) and
- SEVT of the Brigalow Belt (north and south) and Nandewar Bioregions (SEVT TEC).

No currently threatened flora species were recorded within the Study Area during field surveys.

The assessment presented in SEIS v3 (Chapter 14 – Terrestrial Ecology) concludes that there are 11 conservation significant species (listed under the *Nature Conservation Act 1992* or EPBC Act) which are known or likely to occur within the Project Site and Near Surrounds including greater glider, koala, ornamental snake, squatter pigeon, short-beaked echidna, fork-tailed swift, glossy ibis, Latham's snipe, oriental cuckoo, rufous fantail and white-throated needletail. In addition, a total of 24 bird species listed under the *Nature Conservation Act 1992* and/or EPBC Act have been identified as known or likely to occur in the downstream environment. Of these, 16 are migratory shorebirds.

The Project has the potential to result in direct and indirect impacts on these values through vegetation clearing, groundwater drawdown, surface water changes, erosion, and increases in dust, noise, lighting, weeds, pest animals and fire. The impact assessment demonstrates that the primary pathway to impact on these values is through vegetation clearing and groundwater drawdown. Significant impact assessments were undertaken for MNES and MSES identified as having the potential to be impacted by the Project. As a result of this assessment it is concluded that these Project activities will result in a significant residual impact on the following MNES and MSES:

- Habitat for greater glider, koala and squatter pigeon
- Of Concern RE 11.3.4 and RE 11.4.2 and
- Watercourse RE 11.3.4 and RE 11.3.25.

The scale of these impacts will be primarily mitigated through the implementation of the Project's Environmental Management Plan (EMP), Significant Species Management Plan (SSMP) and

Groundwater Dependent Ecosystem Management and Monitoring Plan (GDEMMP). The purpose of the SSMP is to reduce the environmental impacts of the Project on listed species and their habitat, through the development of mitigation and monitoring measures for implementation prior to construction, during construction, during operations and as part of the decommissioning process.

Offsets will be provided in accordance with the Project's Biodiversity Offset Strategy (BOS). As outlined in the BOS, the Project's offset package involves a combination of direct land-based offsets and a financial settlement offset (MSES only). Two land based offset properties have been identified to acquit the majority of the Project's offset requirements. These are Mamelon Station and Mellaluka. Watercourse RE 11.3.25 is unable to be completely offset on Mamelon and Mellaluka and a financial settlement offset is proposed for the shortfall. The total cost of the financial settlement offset for impacts on 33.95 ha of watercourse RE 11.3.25 is $665,835.65[1]. It is noted that in CDM Smith (2018) an offset was proposed for impacts on potential remnant ornamental snake habitat, despite the Project not having a significant impact on the species. Whilst the assessment presented in this SEIS also concludes that the Project will not have a significant residual impact on the species, the commitment made in CDM Smith (2018) continues to be honoured and an offset for ornamental snake will also be delivered as part of the BOS.

[1] This amount is based on a combined financial settlement payment for all MSES as presented in Chapter 15 – Aquatic and Marine Ecology. The total payment for all combined MSES offsets is $874,585.65.

15 Aquatic Ecology

Aquatic and marine ecology values identified within the Project Area through the SEIS v3 assessment include:

- Wetland 1 – a GBR wetland of High Ecological Significance located in a Great Barrier Reef (GBR) Wetland Protection Area (WPA)
- Wetland 2 – a wetland of General Ecological Significance
- Subterranean, Aquatic and Terrestrial GDEs
- Broad Sound DIWA and FHA
- the Great Barrier Reef World Heritage Area (GBRWHA), Great Barrier Reef Marine Park (GBRMP) and Great Barrier Reef Coast Marine Park (GBRCMP)
- marine plants located downstream along the margins of the Styx River and Broad Sound including marine couch, stands of saltmarsh and mangrove species and
- seven conservation significant species including estuarine crocodile, green turtle, flatback turtle, Australian hump-back dolphin, Australian snubfin dolphin, dugong and humpback whale.

The Project has the potential to result in direct and indirect impacts on these values as a result of the establishment of Project infrastructure, groundwater drawdown, surface water changes, increased erosion and sedimentation (including erosion of stream banks), increased abundance or diversity of pest and weeds, and increased dust.

The impact assessment demonstrates that the primary impact of the Project on these values is the establishment of Project infrastructure which will result in the direct removal of aquatic habitat within the Project Site. Specifically, 8.35 ha of waterways providing fish passage will be significantly impacted.

Overall, impacts on stygofauna are considered to be acceptable, as they will result in the localised loss of assemblages that are likely to be well represented in adjacent areas.

Impacts to downstream values are considered to be acceptable as there will be no change to the existing hydrological regime, water quality or groundwater inflows. There will be no change in the location of the freshwater – saltwater interface within surface waters of the Styx River. In addition, the Project will reduce the estimated baseline sediment generation rate of 5,037 t/year to approximately 2,297 t/year. An assessment against the Reef 2050 Water Quality Targets indicate that the Project will result in a positive contribution through the expected reduction in sediment load reporting to Tooloombah Creek and Deep Creek.

Measures to minimise, mitigate and monitor impacts on aquatic and marine values will be delivered through the implementation of the EMP and the sub-plans including the Draft WMP, Erosion and ESCP, REMP, GDEMMP, SSMP and PRCP. In addition, Central Queensland Coal is committed to providing offsets to compensate for the unavoidable direct significant residual impacts on waterways providing fish passage. To acquit this offset requirement a financial settlement offset is proposed to be made in accordance with the Queensland Environmental Offset Policy (QEOP) (Version 1.8; DES 2020). In accordance with this policy, the financial settlement offset for impacts on fish passage is $208,750.00. The details of the financial settlement offset are provided in the Project's BOS and following DES approval, payment will be made to the Queensland Government's Offset Fund prior to Project commencement.

16 Matters of National Environmental Significance

MNES identified as known or likely to occur within the Project Site and Near Surrounds or in the downstream environment through this assessment include:

- the GBRWHA, located approximately 10 km downstream of the northernmost Project boundary
- the GBR National Heritage Place, located approximately 10 km downstream of the northernmost Project boundary
- the GBRMP, located approximately 41 km downstream of the Project
- Brigalow TEC and SEVT TEC located within the Project Site and Near Surrounds
- 11 listed threatened or migratory species located within the Project Site and Near Surrounds
- 30 listed threatened or migratory species located within the downstream environment and
- surface water and groundwater resources.

The Project has the potential to result in direct and indirect impacts on MNES as a result of the direct clearing of vegetation, establishment of Project infrastructure leading to loss of habitat connectivity, changes to surface and groundwater quality, direct disturbance of waterways, physical disruption of aquifers, groundwater drawdown, altered surface – groundwater interactions, movement of the groundwater-seawater interface, increased dust, noise and lighting, increased traffic and transport, increased abundance or diversity of pests and weeds, increased fire risk and post-mining impacts.

An impact assessment has been completed to assess the direct, indirect and cumulative impacts of the Project on MNES. The primary potential impacts are considered to arise from changes to the groundwater regime as a result of mine dewatering, and vegetation clearing to facilitate the mine infrastructure.

An assessment of the Project's impacts on the GBRWHA, the GBR National Heritage Place, and the GBRMP has been undertaken in accordance with the MNES Significant Impact Guidelines 1.1 (DE 2013), and considering advice provided in EPBC Act referral guidelines for the Outstanding Universal Value of the Great Barrier Reef World Heritage Area (DE 2014). The outcomes of the assessment were that there is not considered to be any potential for significant impacts on the GBRWHA, the GBR National Heritage Place, or the GBRMP. There will be no changes in downstream water quality as a result if the Project. Flow regimes from the upstream areas surrounding the Project site will not be altered hence there is no potential for alteration of tidal regimes via a movement of the seawater- freshwater interface. Groundwater drawdown will not occur beneath the Styx River, Broad Sound or the GBR hence there is no potential for reduced baseflow or any alteration of a groundwater-seawater interface.

The Project has been designed to avoid direct and indirect impacts on Brigalow TEC and SEVT TEC. There will be no clearing within areas of Brigalow TEC and SEVT TEC. Retained TEC within and adjacent to the Project Site will be protected and managed through the implementation of the Project's EMP. Brigalow TEC and SEVT TEC are not Terrestrial GDEs and will not be impacted by groundwater drawdown associated with the Project. There is only a very low risk of impact on TECs associated with dust, weeds, pests and fire. Impacts to Brigalow TEC and SEVT TEC have been assessed in accordance with the MNES Significant Impact Guidelines 1.1 (DE 2013). Based on this assessment, the Project is not expected to result in a significant residual impact to Brigalow TEC or SEVT TEC.

A total of 11 listed or migratory species are known or likely to occur within the Project Site or Near Surrounds. These are the greater glider, koala, ornamental snake, squatter pigeon (southern subspecies), fork-tailed swift, glossy ibis, Latham's snipe, oriental cuckoo, rufous fantail, white-throated needletail and the estuarine crocodile. The direct and indirect impacts of the Project on habitat for these species have been assessed in accordance with the MNES Significant Impact Guidelines 1.1 (DE 2013) or the EPBC Act Policy Statement 3.21 (DEE 2017). These significant impact assessments conclude that the Project will result in significant residual impacts on:

- 281.00 ha of remnant habitat for the greater glider - this impact represents 2.9 % of potential habitat for the species within 10 km of the Project.
- 324.62 ha of remnant and non-remnant habitat for the koala - this impact represents 3.9 % of potential habitat for the species within 10 km of the Project.
- 306.51 ha of remnant habitat for squatter pigeon - this impact represents 1.5 % of potential remnant habitat for the species within 10 km of the Project.

The Project will not result in any direct or indirect significant impact to ornamental snake, fork-tailed swift, glossy ibis, Latham's snipe, oriental cuckoo, rufous fantail, white-throated needletail and the estuarine crocodile.

A total of 30 listed threatened or migratory species are considered known or likely to occur in the downstream environment. The direct and indirect impacts of the Project on habitat for these species have been assessed in accordance with the MNES Significant Impact Guidelines 1.1 (DE 2013) and/or the EPBC Act Policy Statement 3.21 (DEE 2017). As outlined above, there is no potential for impacts on the downstream environment as a result of the Project and as such there is not expected to be any significant impacts on these 30 listed or migratory species.

An assessment of the significance of the impact on the hydrological characteristics and water quality of the water resources (surface waters and groundwater) has been undertaken in accordance with the Significant impact guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources' (DE 2013), and with regard to the environmental and other third-party users/uses reliant on these water resources. The assessment concludes that the Project will not result in a significant impact on water resources primarily because:

- The Project will not significantly alter the quality or hydrological characteristics or the quality of surface water.
- The Project will not significantly alter the quality of groundwater.
- Outside of the local scale there will be no impact upon groundwater quantity because:
  - Changes in the groundwater levels will be localised, (extending around 3 km to the north-north-west of Open Cut 2 and 3 km to the south-south-east of Open Cut 1 at its maximum extent temporary) and there are no consequential impacts to groundwater levels outside of this local scale.
  - Within this local area, recovery to pre-mining groundwater levels will occur at around 150 years, and equilibrium will be reached at around 250 years post closure.

Furthermore, the Project will reduce the sediment load to the downstream environment by approximately 2,740 t/year. This equates to a reduction in the total Styx Basin sediment load of 2.74 % and a reduction in the total Fitzroy Basin sediment load of 0.15%. Even under non-average wet and very wet conditions, the sediment load from the Project will be less than that of current baseline conditions.

Measures to minimise, mitigate and monitor impacts on MNES will be delivered through the implementation of the Project's EMP and the sub-plans. This will include implementation of the Mineral Waste Management Plan (MWMP), Surface Water Management Plan (SWMP), Groundwater Management and Monitoring Plan (GMMP), WMP, ESCP, REMP, SSMP, GDE, GDEMMP and the PRCP.

Offsets for significant residual impacts on greater glider, koala and squatter pigeon habitat will be provided in accordance with the Project's BOS. The BOS outlines how the Project's offset requirements will be acquitted in accordance with the EPBC Act Environmental Offsets Policy (DSEWPaC 2012). Whilst the Project is not expected to result in a significant residual impact to ornamental snake habitat, it is noted that in SEIS v1 and v2 by CDM Smith (2018), an offset was proposed ornamental snake. As such, this commitment continues to be honoured and an offset for ornamental snake is also presented in the BOS.

As outlined in the BOS, the Project's offset package for MNES involves delivery of direct land-based offsets. Two land based offset properties have been identified to acquit the Project's MNES offset requirements. These are Mamelon Station and Mellaluka. The Project's BOS provides a detailed analysis of the MNES habitat quality scoring method and habitat quality scores for the impact and offset areas, as well as the assessment against the offsets assessment guide including inputs and supporting justification for MNES proposed to be offset on Mamelon and Mellaluka. A draft Offset Area Management Plan (OAMP) for Mamelon and Mellaluka has been developed to guide the ongoing management and monitoring of the MNES offset areas. Following regulator endorsement of the offset's assessment guides and the OAMPs will be finalised and submitted to the Australian Government for approval. The approved OAMPs will be implemented by CQC. Offset areas on the Mamelon property are proposed to be legally secured through a Voluntary Declaration under the VM Act, as are offset areas on the Mellaluka property, subject to necessary further discussions between CQC, the regulators and the landholders. CQC is committed to legally securing the offset areas and commencing implementation of the OAMPs in Q3 2021.

17 Biosecurity

The increased movement of people and machinery in the area, storage of wastes and clearing of vegetation may result in the increase in pest and weed species to the region. Site-specific controls that are consistent with LSC pest and weed management strategies, will be developed and will mitigate these potential risks by ensuring equipment is free from soil and pests before entering the area. Wastes will be handled and stored in an appropriate manner, to minimise access to pest fauna. During construction and operations, disturbed areas will be progressively rehabilitated, and buffers will be created around undisturbed areas of remnant vegetation to minimise the risk of weed incursion.

There is the potential for weeds, pests and, to a much lesser likelihood, plant disease to be introduced to the area by equipment and machinery brought to site. The risk of the Project activities resulting in the introduction of plant disease is anticipated to be low given national and state regulatory requirements.

The appropriate management of the risks associated with vector borne diseases, including mosquitos, has been addressed in a high-level Land Use Management Plan (LUMP) (contained within the draft EMP), which will be expanded upon receipt of Project approvals, in line with the Project's EA. The objective of biting insect management measures is to ensure the public health well-being of the employees and visitors to the site. Management includes a framework for identifying and monitoring mosquito populations as well as outlining procedures for implementing management strategies during the construction and operation phases of the Project. Wastes will be handled and stored in an appropriate manner, to minimise access to pest fauna. During construction and operations, disturbed areas will be progressively rehabilitated, and buffers will be created around undisturbed areas of remnant vegetation to minimise the risk of weed incursion.

18 Cultural Heritage

The assessment of Indigenous and non-Indigenous cultural heritage collated site data throughout the Project area from a range of sources including database searches, consultation with relevant Aboriginal parties and field surveys. There are no registered or known significant Indigenous or non-Indigenous sites within the Project area.

The potential historical heritage places identified during the field survey were assessed as being below the threshold for places of either local or state heritage significance. No areas within the Project were identified as having any non-Indigenous archaeological potential.

The closest site listed on a National, State or local register is the GBRWHA, with the nearest boundary located approximately 8 km to the north of the Project area. With the lack of known non-Indigenous cultural heritage at the site there is a low risk of discovery of unknown sites during construction and operation. Management and mitigation measures will be implemented as a precaution to identify any items and, where necessary, appropriately deal with any discovery in accordance with the *Queensland Heritage Act 1991*.

Central Queensland Coal commits to continue to engage with the Darumbal People, the Barada Kabalbara Yetimarala People #1 and Barada Kabalbara Yetimarala People #2 to develop the Project specific Cultural Heritage Management Plans (CHMP). The CHMP will address the management of cultural heritage on land within the two MLs. This will include pre-clearance surveys where required. Central Queensland Coal aims to promote an understanding of Indigenous cultural heritage in the workplace through employee induction programs and other specific training activities.

19 Social and Economic

A Social Impact Assessment and an Economic Impact Assessment were carried out as part of the EIS. The Social Impact Assessment was updated as part of SEIS v3. The Social and Economic assessments considered local and regional communities and economies that could be affected by the Project. The local study area for the SIA includes the state suburbs within an approximate one hour drive of the project, being Clairview and St Lawrence in Isaac Regional Council, and Ogmore, Marlborough, Canoona and Kunwarara in Livingstone Shire Council.

Overall, there is a strong expectation for the project to reinvigorate the communities in the local study area through employment of local residents, in-migration and project spend. Some of these communities have suffered recent population decline, and many residents hope the project will contribute to reversing this trend.

The Project's operational workforce will be sourced from the local study area as a daily commute and supplemented with workers from the broader region, most likely from Yeppoon and Rockhampton. The Project will provide bus services both from the north and south to minimise health and safety risks of travel. Non-residential workforces – primarily construction related – will be accommodated at the Marlborough Caravan Park. The proponent has entered into a preliminary agreement with a camp provider to support the expansion of this facility to cater for the project workforce.

The opportunities associated with the project include opportunities for local employment, reinvigorating the communities in the local study area, reversal of population decline, as well as opportunities for local and regional business to supply to the project.

The project may also contribute to negative social impacts. In particular, there is a risk that the project's proposed housing and accommodation solution is not effective or timely, leading to negative impacts on the local housing markets, that potential health and safety incidents leads to drain on existing emergency services, and that the project leads to a change in the rural values in the local study area. There is also a concern about the social aspects of amenity impacts such as noise and dust.

The Project intends to enhance benefits and manage negative impacts through the implementation of a social impact management plan consisting of five action plans:

- Community and Stakeholder Engagement
- Workforce Management
- Local Business and Industry Content
- Health and Community Wellbeing and
- Housing and Accommodation.

It is expected that following the application of mitigation measures and management strategies, the Project will have an overall positive social effect on the local and regional area. The associated ongoing monitoring, reporting and review processes will ensure the appropriateness of mitigation measures and management strategies by enabling continual improvement of strategies.

The Project has the potential to generate economic benefits for the region, state and nation. Economic stimulus is likely to result from the construction and operation of the Project along with

increased regional supply chain and employment opportunities. Key benefits of the Project identified in the social and economic assessment include:

- Economic stimulus to the regional, state and national economies during the construction and operational phases of the project.
- Export revenues from coal produced across the life of the mine is estimated to be in the order of $7.78 billion to $8.23 billion, which assuming royalty rates remain unchanged would yield royalties of approximately $703.3 million to $766.0 million over the life of the mine.
- Increased employment opportunities within Central Queensland which would help to reverse the trend of increasing unemployment within the region.
- Opportunities for suppliers in the Central Queensland region to support the construction and operation of the Project.

Central Queensland Coal will monitor changes in demand on government and community services and facilities caused by the Project through consultation with affected providers. Central Queensland Coal will also seek to promote positive interactions between the non-residential workforce and existing communities and families.

20 Health and Safety

The potential impacts to existing values relating to the community health and safety for the Project area have been examined. Within a 10 km radius of the Project area there are 11 identified residential receptors, and one commercial place (Tooloombah Creek Service Station). The Ogmore township is approximately 6.8 km to the northeast (measured from the mine boundary), the Tooloombah Creek service station on the Bruce Highway is 2.2 km from the western boundary of the Project area, and the Tooloombah Creek Conservation Park and truck stop is 600m further west of the service station. The Project has potential health and safety impacts involving dust, noise and vibration, contamination of groundwater and surface water, pests and diseases and traffic incident risks.

The community values can be measured against clean air quality and relatively low background noise. Modelling for the Project predicts that the impacts to air quality will not exceed the health and wellbeing criteria at any identified offsite sensitive receptors. Dust from the construction and operational phase is unlikely to exceed the air quality objectives for health impacts at the nearest sensitive receptor. Noise mitigation measures are likely to achieve compliance at four nearby receptors that may be affected at night during peak operations (year 12). A Noise Management Plan is to be developed in consultation and engagement with the potentially affected receptors to achieve alternative arrangements, in order to provide for compliance for noise criteria.

The surface water in the region holds limited recreational use as the creeks generally only flow during rain events. There is no known community consumption of water for domestic purposes downstream of the site. There is cattle access evidence into Deep and Tooloombah Creeks which suggests stock watering values.

The Project will result in an increase in traffic on the surrounding roads, thereby increasing the potential for vehicle incidents to occur. This will be managed through a RMP which will minimise impacts to roads and particularly any school bus routes. It is anticipated that there will be cumulative impacts because of the Project; however, these will be managed via the RMP.

Other community impacts from the Project could be through the spread of pests, illness or disease. Central Queensland Coal will manage this through onsite waste management, pest control and provision of health care services for employees. Any outbreak which may pose a risk to the community health and safety will be managed in coordination with the Environmental Health Officer from the Livingstone Shire Council and the Rockhampton Regional Council.

Through the adoption and implementation of management and mitigation strategies, it is expected that these health and safety implications identified have a low residual risk. As well as providing these mitigation strategies, Central Queensland Coal will implement a Safety and Health Management System (SHMS) that integrates risk management elements and practices to ensure the safety of workers, contractors and the community.

21 Hazard and Risk

The main hazard and risks arising from a coal mine include natural hazards, coal hazards, major operational hazards, general worksite hazards and hazards associated with dangerous goods transport and storage. The site is relatively free from natural hazards other than flooding which presents a potential risk. Coal poses several hazards from spontaneous combustion and respirable dust; the highest risk areas of the Project are the stockpiles and processing plants. Measures to minimise the risks of spontaneous combustion and dust have been included into the design and operation planning for the site.

Impacts to people and property were considered as part of this assessment. The people with potential exposure to hazards included surrounding residents, road users, downstream water users and mine workers and contractors. Importantly, no hospitals, libraries, schools, or kindergartens are located within 10 km of the site. There are only nine residential receptors within 10 km of the site. The nearest residential and commercial receptors (Tooloombah Creek Service Station complex which consists of a service station and two residential receptors) are located approximately 2.2 km from the edge of Open Cut 1. Past the service station, the next nearest commercial businesses are in the townships of Ogmore and Marlborough, located approximately 6.8 km and 25.3 km to the northeast and southeast of the closest edge of the Project, respectively.

Three downstream water users were identified between the Project area and the point where the Styx River enters Broad Sound. The surrounding land in proximity to the Project area is rural agricultural leasehold lands.

A review of Queensland and Australian incident statistics identified the high risk operational hazards which cause the greatest number of incidents and fatalities within coal mines. These hazards and risk will be examined and areas which could pose these hazards will have a prevention and detection system in place to manage the risk to the lowest possible levels. General workplace hazards have also been identified and will be managed through onsite training and the health and safety management system.

A preliminary risk screen was undertaken of all the identified dangerous goods storage and transportation volumes against the NSW SEPP 33 which was adopted as guidance to offsite hazard and risk. None of the stored hazardous materials exceeded the trigger limits and required further assessment or consequence modelling.

Project construction and operational preliminary risk assessment results indicated that the baseline safety and health risk profile varied from low to high. Once mitigation measures and design treatments were applied to the assessed hazards, residual risk scores were reduced. The residual medium risks identified for the Project include:

- coal hazards such as spontaneous combustion
- major operational hazards including:
  - vehicle collisions
  - exposure to high voltage
  - contact with electrified wires
  - toxic atmospheres in confined spaces and
  - entrapment or wall failure and

- general worksite hazards including falling objects, body and heat stress, fatigue, fitness for duty, manual handling, fauna related injury and potential for disease from biting insects.

Mining is inherently a higher risk industrial activity and controls and design will minimise these risks as far as possible.

Overall, the risks to community receptors, environmental sensitive receptors and State and local government-controlled roads can be considered acceptable. A robust and detailed integrated risk management process and safety plans will, however, be required and implemented to ensure that the hazards and risks onsite are kept as low as practically possible.