2. Description of the project

2.1 Overview of the project

The proposal is to develop new railway infrastructure to service the increasing demand for the export of coal from Queensland's coalfields. In particular, the proposed railway infrastructure will service exports through the planned WICT but may also service other facilities within the Port of Gladstone and the GSDA.

The proposed railway infrastructure will be developed in parallel with WICT Project, which was approved under both the *State Development Public and Works Organisation Act 1971* in January 2008 and the EPBC Act in April 2008.

The WICT Project included a proposal for rail infrastructure from the western extent of Mount Stowe State Forest, east of the township of Yarwun, to the proposed WICT rail unloading facilities. The proposal consisted of two new tracks parallel to the existing NCL, tracks through the coal unloading stations and multiple approach tracks to the rail loops. A full description of the rail and supporting infrastructure proposed within the original WICT Project scope can be found within the WICT Supplementary EIS (Connell Hatch 2007).

This EIS has been prepared in support of the required rail infrastructure proposed to the north west of Gladstone (refer Figure 1.1 within previous section).

An outline of the project scope was described in the MLARP Initial Advice Statement issued in September 2007. Subsequent engineering studies have refined the scope, extent and location of the Project components culminating in a Preliminary Engineering Study which has run concurrently with the development of this EIS.

The Project comprises the following rail infrastructure:

- New rail lines to carry Moura/Surat traffic arriving via the MSL in the south to the NCL southeast of the Mount Larcom township that will connect with the proposed WICT rail loops and other rail tracks in the Gladstone region (defined as Moura Link)
- A rollingstock maintenance yard and provisioning facilities at Aldoga in the northern area of the GSDA (defined at Aldoga Rail Yard)
- Quadruplication of the NCL from east of the township of Mount Larcom to the proposed WICT rail infrastructure
- Additional tracks along the EEMBL
- Provision for future tracks within the project area
- Provision of rail access for potential third party operators at Aldoga

The Project also includes investigating and identifying suitable construction accommodation village locations.

The Department of Infrastructure and Planning commissioned Connell Hatch in 2007 to prepare the Gladstone Land, Port, Rail and Road Infrastructure Study. The study has identified a major rail/road and pipeline/conveyor corridor through Aldoga Bank Deviation area which is located to the north east of the project area (refer Figure 2.1). This would require part of the existing NCL and proposed NCL quadruplication to be relocated along the new deviation.

QR has considered as an option the development of a permanent access road to the Aldoga Rail Yard from Targinie Road via the Aldoga Bank Deviation area. However, the development of this access road is dependent on the recommendations and outcomes of the Gladstone Land, Port, Rail and Road Infrastructure Study.

The Aldoga Bank Deviation area does not form part of the current scope of works, however some environmental studies (eg flora survey) within this area were conducted as part of this EIS.

It is proposed that the Project components will be delivered in a number of stages based on response to market pressures for the export of coal. The nominal coal tonnage capacity for the proposed four (4) stages of the Project, at the time of the preliminary engineering phase is:

- Stage 1 – 25 Mtpa
- Stage 2 – 40 Mtpa
- Stage 3 – 65 Mtpa
- Stage 4 – 90 Mtpa (ultimate coal handling capacity estimate)

Depending on industry demand, some of the proposed construction stages within the Project life cycle could be brought forward, be amended or become subdivided into smaller stages.

2.2 Operational scope

The operational function of the proposed provisioning and maintenance yard at Aldoga is to service trains from the Blackwater and Moura/Surat systems accessing the WICT and some other rail traffic accessing the Gladstone area and the GSDA. It may also relieve pressure on the currently heavily used servicing and maintenance facilities at Callemondah.

Provisioning sheds have been located to allow for provisioning of loaded or unloaded trains. Trains not required to provision in either direction can bypass the yard. Moura/Surat trains bound for the proposed coal terminal at Wiggins Island will generally travel along the proposed Moura Link and EEMBL onto the NCL thereby bypassing the Aldoga Rail Yard. Additional tracks will be provided along the EEMBL to increase rail capacity.

It is likely that almost all loaded Moura/Surat trains will go via the EEMBL to the WICT before returning to the Aldoga Rail Yard for provisioning. Trains entering the yard outbound from the terminal can enter directly from the east. Blackwater system bound trains can join onto the west bound NCL directly from the yard, while Moura bound trains travel to the Moura Link via a rail overpass to cross the NCL.

The yard will include the facilities to maintain and service locomotives and wagons. The facilities at the yard will be designed to cater for both electrified and non electrified locomotives.

Provision has been made in the design to allow access for third-party operators to the north of the proposed Aldoga Rail Yard (for access to future third-party operator yards).

2.3 Project components

2.3.1 Rail capacity

The assumed nominal coal handling capacity of the proposed Moura Link and the Aldoga Rail Yard is estimated to be sufficient to service a 90 Mtpa WICT, whilst through a series of staging, supplement the capacity of the existing Callemondah Rail Yard and service part of future and existing developments in the GSDA and Port of Gladstone.

QR is therefore seeking approval for the rail infrastructure nominated for the ultimate Stage 4 of the scope of works.

2.3.2 Moura Link

General description

The Moura Link involves the construction of a new rail link between the existing MSL, NCL and the EEMBL. This link will allow trains travelling to/from the Moura/Surat system to enter the proposed WICT unloading loops and other rail facilities in the Gladstone region from the same direction as those travelling from the Blackwater system without travelling through the Gladstone and Calliope rural residential suburbs.

Multiple route options were initially investigated for the portion of the Moura Link to the south of the Bruce Highway crossing. During the preparation of this EIS, the DNRW was consulted. DNRW has Castle Hope Dam to be constructed on the Calliope River at Castlehope (DNRW register) as a long term water supply option in its water resource planning.

Although this dam site has been ranked very low on the list of water supply options for the Gladstone area by the Gladstone Area Water Board (GAWB), the Project concept design has considered the possibility that this dam may be constructed in the future.

An options study was undertaken to assess the advantages and disadvantages of a number of alignments for the Moura Link. The study confirmed two options for further consideration, including:

- The Moura Link Eastern Option – preferred alignment linking the MSL and NCL
- The Moura Link Western Option – alternative alignment linking the MSL and NCL

The Moura Link design has also taken into account the cultural heritage value of Lot 1 on SP147877 (refer Section 14) with the alignment being moved further east to bypass this area.

This Moura Link corridor will generally comprise of duplicated narrow gauge lines with land take allowance for a third additional bi-directional standard dual gauge line plus passing and holding tracks. All tracks and structures will be built to cater future electrification.

It is proposed that the Moura Link will be constructed in two stages, as defined by the proposed coal haulage capacities as follows:

- Stage 1 – 25 Mtpa haulage capacity (assumed nominal capacity), which is likely to include:
  - A single rail line from the MSL to the EEMBL
  - A single passing loop
  - Duplication of the existing EEMBL (may form part of Stage 2)
  - A duplicated rail line from the EEMBL to the NCL
- Stage 2 – 40 Mtpa haulage capacity (assumed nominal capacity), which is likely to include:
  - Duplication of the Moura Link from south of the Calliope River to the NCL
  - A single holding line

The staging and components of each stage may change to suit actual demand from individual mines. Some of the works may be pushed back to Stages 3 and 4.

Rail infrastructure crossings

The proposed Moura Link crossings of highways, watercourses and existing rail infrastructure are summarised below:

- Two crossing structures (rail over road) over the Dawson Highway for both the Moura Link Eastern and Western Options
- Four crossing structures over Scrubby Creek for the Moura Link Eastern Option
- One crossing structure over Calliope River for both the Moura Link Eastern and Western Options

- One crossing structure over Farmer Creek for Moura Link Eastern Option
- One Bruce Highway structure (road over rail) for both the Moura Link Eastern and Western Options
- One crossing structure over Larcom Creek for both the Moura Link Eastern and Western Options
- Rail over rail structure under the EEMBL for both the Moura Link Eastern and Western Options
- Two crossing structures over drainage paths (Vallis Creek) near Mount Larcom township for both the Moura Link Eastern and Western Options
- Two crossings structures (rail over road) over Gladstone-Mount Larcom Road and the NCL for both the Moura Link Eastern and Western Options

The proposed EEMBL duplication crossings of watercourses and road infrastructure are summarised below.

- Two crossing structures over unnamed watercourses
- One Gladstone-Mount Larcom Road structure (road over rail) for EEMBL

The crossing structures mentioned above are likely to be bridges. The type and nature of each crossing will be confirmed during the detailed design phase of the Project. The design of these structures will be in accordance with appropriate engineering design standards.

Appendix B1 contains the concept design for the proposed crossings.

Works associated with the Moura Link will also intersect other linear infrastructure including the Queensland Gas Pipeline and GAWB water pipeline. Refer to Section 3 for further details.

During detailed design consultation with key stakeholders will be undertaken to address potential constraints.

Road access

The road access requirements for the proposed Moura Link are likely to be limited to ensuring access for rail maintenance personnel from the nearest public road, such as the Dawson and Bruce Highways. In general, it is envisaged that existing access tracks will be utilised where possible.

During detailed deign local landowners and key stakeholders will be consulted concerning access requirements (eg location of occupational crossings).

2.3.3 Aldoga Rail Yard

Due to the scope of rail operations and the increased number of trains accessing the network to service the WICT, a rollingstock maintenance facility for wagons and locomotives (both electric and non-electric) will be required.

The proposed Aldoga Rail Yard and associated infrastructure is likely to be developed in four stages to meet future coal haulage demands. The early stages will be developed in line with future coal demand and are expected to consist of the following rail infrastructure components:

- Bidirectional locomotive provisioning facility
- Provisioning rail line infrastructure
- Rollingstock maintenance facility
- Wagon holding rail lines
- Shunting rail lines
- Supporting infrastructure (eg roads, admin etc)

Rail infrastructure and facilities will be designed based on future coal haulage contracts in addition to the results of operations modelling for the overall coal network. Provision will be made for the expansion of existing facilities and additional tracks as required.

It is important to note that the expansion of the facility, as constructed, within the previous stage, details of which will be developed during the detailed design phase of the Project.

Rollingstock maintenance facility

The rollingstock maintenance facility will include facilities and trackwork for the maintenance of locomotives and coal wagons.

Train examination (TE) inspections are required to be carried out on all train consists at appropriate intervals. TE inspection roads will be located in the rollingstock maintenance facility. These roads will have lock-in pits, access roads on both sides of the track for facilitating inspections, yard lighting and storage for vehicles. The maintenance yards and loop will be provided with lighting and fencing to facilitate a safe working environment and a secure site. Specific lighting solutions will be provided in administration, crew change, and provisioning and rollingstock examination areas.

Locomotive provisioning facility

A locomotive provisioning facility will be located within the rail maintenance yard for both scheduled and ad-hoc provisioning of locomotives. The provisioning facilities may include depressed floors and pits for inspections. There will be storage facilities for sand, lube oils, and diesel fuel.

Facilities for provisioning locomotives will be on all inroads. The clear length of approximately 2,700 m (to accommodate anticipated future train lengths) will be provided on the approach to the locomotive provisioning sheds. Non-electric locomotives may be provisioned every trip, whilst electric locomotives can be operated up to several days without provisioning.

A new station building with a crew change facility is proposed to be situated adjacent to the provisioning facilities. An area has been reserved for possible future holding lines close to the NCL.

Rail infrastructure crossings

The rail infrastructure crossings for the Aldoga Rail Yard include:

- Multiple parallel crossing structures over Larcom Creek and realigned NCL
- Yard roads over rail infrastructure

The crossing structures mentioned above are likely to be a combination of bridges and culverts. The type and nature of each crossing will be confirmed during the detailed design phase of the Project. The design of these structures will be in accordance with appropriate engineering design standards.

Appendix B1 contains the concept design for the proposed crossings.

Works associated with the Aldoga Rail Yard will also intersect other linear infrastructure including the optic fibre cables and Ergon Energy powerlines. Refer to Section 3 for further details.

During detailed design consultation with key stakeholders will be undertaken to address potential constraints.

Road access

Main site access

The main site access from the public road network will be located towards the eastern end of the yard. Construction and operational access is currently envisaged to be via Flynn Road which has a current at grade connection to the existing Gladstone-Mount Larcom Road. The intersection may require some upgrade depending on expected traffic load at the intersection. This will be subject to further discussions with DMR and GRC during the detailed design phase of the Project.

Flynn Road is currently an unsurfaced track of varying width and quality. The road will be upgraded to provide construction access into the site during Stage 1 (improved unsurfaced access) and later for operational access (possibly surfaced, but dependant on expected lifespan, refer to "Aldoga Bank Deviation" below). Options for the route of the quadruplicated NCL may require the re-routing of part of the road, otherwise the road is likely to follow the current alignment for the majority of its length. Access needs to be maintained for the use of adjacent land and leaseholders and for access to Powerlink's proposed Larcom Creek Substation.

A T-junction on the Flynn Road corridor connects a dedicated rail access road to the rail yard area. The access road to the Aldoga Rail Yard leading off Flynn Road will be a standard QR surfaced access road.

Aldoga Bank Deviation

The possibility exists for the development of a major rail/road and pipeline/conveyor corridor through the Aldoga Bank Deviation area to the east of the proposed yard (refer Figure 2.1). This option is currently under consideration as part of the Gladstone Land, Port, Rail and Road Infrastructure Study.

Subject to the outcomes of this study alternative permanent access into the proposed Aldoga Rail Yard via the existing Targinie Road may be possible. A road extension from the Gladstone-Mount Larcom Road intersection passing beneath the NCL running north east with side road access to the east of the Aldoga Rail Yard may be considered as a viable future operational access.

Emergency site access

An emergency access to the public road network will be provided at the western end of the yard. It is considered that this access will be used infrequently for emergency cases only. This access would use The Narrows Road which leads to Mount Larcom township. This makes use of an existing level crossing in Mount Larcom township to cross the NCL. A T-junction on The Narrows Road would connect the public road to a six (6) m wide unsurfaced access track which would lead into the yard site and connect into the site road network.

A gate near the T-junction will be locked to control access. Other rail crossings within the site would be at grade, but these have been minimised and sited in areas with minimal chance of blockage.

2.3.4 Additional NCL tracks

The existing NCL will be quadruplicated from approximately 600 m west of the existing EEMBL/NCL connection through to the Project boundary with the proposed WICT rail infrastructure. The route through the Aldoga Bank Deviation area is subject to further investigations as discussed above.

The rail infrastructure crossings for the additional NCL tracks include:

- Underpass structure for Gladstone-Mount Larcom Road
- Bridge structure over Calliope River Road and Sandy Creek

Appendix B1 contains the concept design for the proposed crossings.

The rail infrastructure crossings and road access for the additional NCL tracks are generally the same as the Aldoga Rail Yard discussed in Section 2.3.3. Works associated with the NCL quadruplication will also intersect other linear infrastructure including the Queensland Gas Pipeline and GAWB water pipeline. Refer to Section 3 for further details.

During detailed design consultation with key stakeholders will be undertaken to address potential constraints.

2.3.5 Environmental considerations when spanning watercourses

To minimise the potential ecological and water quality impacts of the Project on watercourses, due consideration during the concept design has been given to:

- Reducing/limiting the number of culvert crossings over watercourses.
- Construction of a number of rail bridge structures to effectively limit works within the watercourse and adjoining riparian zone.

Additional environmental design requirements to be considered during the detailed design phase of the Project are provided in Section 20.

2.4 Construction activities

The proposed construction activities will address the planned future rail infrastructure expansions needed for the Project. The expansions will be staged based on response to market pressures for the export of coal.

2.4.1 Pre-construction activities

Pre-construction activities are likely to include:

- Obtaining environmental approvals
- Surveys and geotechnical drilling and investigations
- Detailed design
- Utility service relocations
- Construction of possible accommodation village (dependent on the level of concurrent construction in the Gladstone region)
- Document strategy for sourcing long-lead materials

2.4.2 Proposed site offices and construction compounds

Likely proposed site offices and compounds include:

- Aldoga Rail Yard construction site office
- Moura Link construction site office
- Smaller construction offices and compounds at major rail over road, rail over rail and rail over river/creek crossings

The location, scale and nature of construction site offices and compounds will be defined during the detailed design and early construction phase of the Project.

2.4.3 Activities during the construction phase of the project

General construction activities

The general construction activities for the Project will include:

- Site set out and pegging.
- Establishment of construction site offices, laydowns and compounds, including vehicle inspection and cleaning facilities as required.

- Clearing – utilising dozers, chainsaws, excavators, trucks and similar equipment. Where practical to do so, the remaining felled material will be stockpiled and mulched for later reuse on batters and within landscaping. If weed infestations are encountered, the cleared vegetation will be disposed in an appropriate manner to minimise the spread of infestation.
- Bulk earthworks – major cut to fill operations include the winning of suitable construction material from sections of cut along the railway alignment or from borrow areas external to the site.
- It is expected that all cut and borrow activities will be achieved by mechanical means (dozers, scrapers, excavators), however there may be a need for blasting if less fractured rock is encountered (subject to detailed geotechnical survey during detailed design).
- Equipment used in the bulk earthworks construction for road works and rail yard earthwork platforms will include scrapers, excavators, haul trucks, water carts, compactors and graders as well as other sundry equipment.
- Ballast – supply, delivery and installation.
- Concrete sleepers – supply, delivery and installation.
- Construction of drainage facilities – cut off drains, table drains and culvert structures.
- Rail mounted equipment will be utilised for the installation of rail track, over head line equipment and other items of rail infrastructure.
- Construction of concrete railway bridges and culverts. This will include piling and construction of concrete piers and headstocks. Precast concrete units or girders will be used to form the bridge superstructure and may be incrementally launched over the crossings. It is envisaged that all materials for bridge structures will be delivered by road.
- Overhead line electrification materials. Bulk and component materials for this will be delivered by road.
- Long welded rail delivery and turnout installation.
- Installation of railway signalling and communications equipment.
- Construction of railway maintenance facilities, administration and amenities buildings, car and truck parking and bulk fuel provisioning and storage areas.
- Other miscellaneous activities to complete the works.

Bulk earthwork activities

Moura Link

Major bulk earthworks activities will consist of four sections defined as that:

- From the MSL to the Calliope River
- From the Calliope River to the Bruce Highway
- From the Bruce Highway to the EEMBL
- From the EEMBL to the NCL, western end of the Aldoga Rail Yard and to the current NCL/EEMBL junction

The design objective will be to maintain cut and fill balances within each major section of the works to minimise haulage distances, however some areas will generate an excess of cut for use as fill in other areas. Within these sections, excess materials excavated from one section of the site will be used for the fill in another section, therefore maintaining an earthworks balance across the Project. In the event that excess material can not be utilised, local industry will be approached to accept surplus material as fill for their fixed operations.

Aldoga Rail Yard and additional NCL tracks

The proposed Aldoga Rail Yard and additional NCL tracks will traverse the Larcom Creek floodplain. Higher natural ground levels occur at the western end of the project area. There is also a tendency for the natural surface to rise gradually from southeast to northwest across the proposed yard. Excavated materials from the western side of the yard will be utilised for fill construction activities across the lower areas on the eastern side of the yard to prepare a levelled platform for the yard.

The top 600 mm layer of the proposed rail embankments will need to be constructed of materials from a suitable source. It is anticipated that suitable material will be accumulated from within the cut sections of the works, but this requires confirmation by detailed geotechnical investigations.

The construction activities for bulk earthworks for the ultimate yard (all stages of rail infrastructure) may be completed during Stages 1 and 2 of the proposed construction programme. The balance of the bulk earthwork activities is expected to be completed during Stage 3 of the Project, with little or no bulk earthwork activities foreseen during Stage 4 of the Project.

Figure 2.2 illustrates the bulk earthwork activity areas.

Rail infrastructure construction

Track will be constructed in accordance with relevant QR standards. This will include the installation of ballast, sleepers, rail installation, tamping, stressing, boxing in and welding. This installation will use a combination of engineering trains and road/rail plant.

Overhead line and signal masts will likely be installed using road/rail plant to lift the structures onto pre-installed foundations. Overhead line support cantilevers and wiring will likely then be installed from road/rail vehicles. Signalling equipment will be installed from line side using small items of plant.

Rail construction materials

It is intended that ballast may be sourced from an approved quarry within the Gladstone region. This material will likely be extracted and processed by the quarry and loaded onto rail ballast wagons. This material will likely be transported by rail to the construction site and will be installed directly from the ballast wagon to track laying equipment. There will be minimal need to store or handle ballast on site. All concrete sleepers will be transported to site by road.

Long welded rail will be delivered to site by rail and installed directly from the flat bed wagons by use of rail threading machinery.

Overhead line and signalling equipment will be delivered by road and stored at the main site compound and issued by store personnel as required by construction teams.

2.4.4 Indicative construction timetable

The scheduling of activities will be governed by constructor preferences and will be based on potential future QR coal haulage contracts.

The construction works for the Moura Link, Aldoga Rail Yard and additional NCL tracks are likely to commence at the same time and may be controlled and managed by separate construction timetables. However, potential exists for some of the construction stages work to be brought forward. The indicative construction timetable for the Project is provided in Table 2.1.

Table 2.1 Indicative programme for Project construction staging

Proposed construction staging	Possible start date of construction	Possible end date of construction
Stage 1	Early 2010	Early 2012
Stage 2	Early 2012	Mid 2013
Stage 3	Mid 2014	Late 2015
Stage 4	Late 2019	Unknown at this stage

Table notes:
QR will confirm staging based on industry endorsement, commercial contracts and the results of capacity modelling for the Blackwater and Moura/Surat systems.

The bulk of the construction activities (Stage 1) are expected to be completed by late 2011, this will enable commissioning to be completed by early 2012 (Stage 1 only).

Variations to the construction sequences in relation to programme optimisation, constructability, resource availability and local conditions (weather and industry) will be investigated during the detailed design phase of the Project.

2.4.5 Construction materials, handling and storage

Construction will initially be dominated by earthworks activities for both the Moura Link and Aldoga Rail Yard aspects of the Project. This will be achieved by a combination of scraper fleet, excavators with rear dump trucks and where haul distances are necessarily long additional excavators, front end loaders and trucks. In all cases considerable effort will be made to optimise the earthworks operations to minimise volumes and haulage distances.

Based on concept design engineering approximately 4 million m^3 of earthworks is required for the Project. The design will consider a cut-fill balance however, during detailed design a comprehensive geotechnical investigation will need to be undertaken to assess the availability and suitability of construction materials. The detailed design will also identify whether additional construction material will need to be sourced from the local region (eg borrow pits) and investigate opportunities to reduce earthwork activities where possible.

Bulk materials will be stored in designated areas to ensure that the storage and handling of materials do not affect land outside the project area.

Fuel

Fuel will be handled and stored in accordance with Australian Standard AS1940/2004. The storage and handling of flammable and combustible liquids, and with self bunded relocatable fuel pods with a nominal capacity of about 40,000 L. During refilling of the pods they will be placed in an area with a drainage system capable of isolation from the surrounding area so as to contain spill. Refuelling of mobile plants will be conducted using a mobile service truck with an appropriate spill control kit on board. The Project may have low volumes of hazardous materials onsite with only diesel having reserved volumes accessing the site. All risks associated with this activity will be managed in accordance with the Construction EMP.

Construction water

Construction will increase potable water demand by approximately 20 kL per day and peak flow rates by up to 4 L/s.

Non-potable water is also required for construction, mainly for water truck usage for dust control and soil moisture conditioning of earthworks for the various stages. Peak daily demand is approximately 576 kL per day, assuming two 8 kL water trucks operating on a 20 minute cycle for 12 hours per day.

It is intended to utilise the following sources for construction water:

- Existing GAWB treated water supply to the extents of existing system capacity
- Recycled water from construction sewage treatment plant (STP)
- Local groundwater (existing/new bores) subject to suitability and obtaining licence approval
- Stormwater pond on proposed Aldoga Aluminium Smelter site (subject to access and availability)
- Calliope River (subject to availability and obtaining licence approval)
- Local farm dams (subject to availability and approval)

Storage tanks and/or dams may be required to store water for use during construction.

A detailed construction water supply strategy will be developed during the detailed design phase of the Project.

Concrete

It is expected that most concrete will be delivered to site pre-mixed and ready for use. All daily unused concrete will be returned to their origin of manufacture.

Concrete batching (if utilised)

Concrete batching (if utilised) will require the storage of small volumes of potentially hazardous additives. These will be delivered directly to the concrete batching plant and placed in a secure bunded area as recommended by the Material Safety Data Sheet (MSDS) for the product. Storage of cement powder will be either in purpose built silos or in a road tanker adjacent to the batch plant. Aggregates will be stored in a location as close as practical to the batch plant to maximise process efficiency. If concrete batching is utilised on site, washout facilities will be installed on site. All excess concrete will be removed and disposed of at an approved disposal site.

Hazardous materials

To manage other hazardous materials project staff will be granted access to the “Chemwatch” chemical management system. The “Chemwatch” system is a database containing thousands of independently researched and verified chemical product records. To ensure rigorous management it will be a requirement to notify a nominated officer if a hazardous material is being delivered to the Project. All efforts will be made to replace hazardous materials with non-hazardous materials. These hazardous materials must have an MSDS. All hazardous materials will only be used in compliance with the MSDS.

Planned and unplanned inspections of hazardous substances and the storage areas/facilities will be conducted to ensure compliance with the Construction EMP and the relevant guidelines.

Other construction materials will generally be delivered to site by road transport and stored in designated laydown areas until required. To minimise safety and environmental risks, all facilities will be maintained with the highest regard for good housekeeping practices. Monitoring of housekeeping standards will be carried out during routine safety and environmental inspections.

Further details on hazardous materials management and disposal are contained in Sections 12 and 18.

2.4.6 Cleanup and restoration

Following completion of construction and prior to vacating the site, the following cleanup and restoration works will be undertaken:

- Removal of all temporary structures erected during the construction process, including site offices and site amenities.
- Removal of all construction waste and surplus construction materials for reuse or for transport to an appropriate and legal place of disposal.
- Removal of temporary fencing, gates and signage.
- Repair damage to offsite roads, where the damage can be directly attributed to the construction process.
- Where practicable, restore site office areas, compounds and hardstand areas to existing condition.
- Re-spread surplus stockpiles of topsoil subject to weed constraints
- Establish appropriate vegetation over disturbed areas.

2.5 Commissioning activities

It is proposed that QR will undertake some or all of the following testing and commissioning activities or ensure they are undertaken by others:

- Factory testing
- Static testing (post installation)
- Static commissioning (Civil/structural items)
- System testing (discipline specific)
- Combined system testing
- Dynamic testing

Commissioning tasks will involve testing of the track, 50 kV overhead and signalling systems to ensure safe working and reliability. It is proposed that commissioning will be staged to allow new infrastructure to be brought online as soon as it becomes available. The commissioning of the Project will be in line with an agreed/approved testing and commissioning plan which will form part of an overall Quality Plan. It is envisaged that commissioning activities will have a minimal impact on the local community.

2.6 Operational activities

It is proposed that QR will undertake the following activities within the proposed Aldoga Rail Yard, namely:

- Maintenance of wagons and locomotives
- Provisioning including sanding and decanting of locomotives
- Rollingstock examinations including attaching and detaching of wagons and locomotives
- Provision to diesel main line locomotives
- Washing of wagons, locomotives and vehicles
- Fuelling of road and maintenance vehicles
- Other rail related servicing and maintenance

An industrial wastewater treatment plant will be installed as part of the Aldoga Rail Yard. Whilst subject to further investigation, it is envisaged treatment plant capability will meet Class A (Queensland Water Recycling Guidelines 2005) and allow for reticulation/recycling where possible back into site facilities. Alternatively irrigation to land will also be examined during detailed design to minimise discharge to surface waters.

Domestic wastewater will be generated by domestic water uses through showering and use of amenities onsite. The estimated dry weather flow for domestic wastewater from the Aldoga Rail Yard is shown in Table 2.2.

Table 2.2 Estimated dry weather flow (DWF) for domestic wastewater from the Aldoga Rail Yard

Developed facility	Staff persons#	Average DWF kL/day	Peak hour flow rate L/s	Equivalent person load (ep)
Stage 1	202	13	0.78	54
Stage 2	400	27	1.5	107
Stage 3	561	37	2.2	150
Stage 4	702	47	2.7	188

Table note
- Staff persons are based on 3-shift 24 hour day

It is likely that a new sewage treatment plant (STP) will be installed within the Aldoga Rail Yard. Connection to the existing Aldoga STP is constrained for this Project due to low loads proposed and the licence conditions for the facility. Details of the proposed STP for the Project will be confirmed during the detailed design phase.

Emergency procedures will be established in line with QR's commitment to zero harm at work (refer Sections 18 and 19).

2.7 Decommissioning

Decommissioning of the rail infrastructure is unlikely to occur in the foreseeable future, as the minimum design life for the facility is 50 years. However, decommissioning from construction phases will involve demobilisation from laydown areas and areas dedicated to the construction offices and workshop areas. Demountable sheds and offices will be removed and if in good order used for other projects.

All operating areas will be thoroughly cleaned of debris and other containments to a standard suitable for the purpose of a future facility. If landscaping of these areas is required these areas will be planted out to establish the appropriate vegetation.

Options that would be considered at decommissioning of the entire facility include:

- Handling of an alternative product through the facility. This would require retrofitting/modification of the entire facility to suit the alternative product.
- Dismantle and change land use. The plant is to be designed to achieve minimal contamination of the site during operations and decommissioning will therefore involve removal of materials that could lead to contamination when the plant is no longer in operation. Rehabilitation of the site will be consistent with the proposed change in land use.

2.8 Workforce, accommodation and support infrastructure

2.8.1 Projected project workforce

The delivery of the Project will require a workforce with a wide range of skills where specific skills are dependant on the stage of construction. In the broadest of terms the Project construction phase can be divided into the following parts namely:

- Earthworks
- Structures
- Building works
- Railway works
- Management and administration

Earthworks

The earthworks workforce is anticipated to peak at approximately 100 persons with potential to be as large as 120 persons. It is expected that this will be comprised of a 60:40 split between operators of plant and general labourers. Major plant will comprise of graders, loaders, large excavators, backhoes, dozers and tip trucks. Labourers will principally be involved in drainage works and grade checking.

Structures

Structures (bridges, culverts etc) will require approximately 70 people at peak production. This will include formworkers, steelfixers, labourers, crane drivers and excavator operators.

Building works

The facilities workforce will be of a similar size to the structures team with a projected peak of around 65 people. The workforce composition will vary considerably over time with certain skills required at peak times. Skilled workers such as formworkers, steelfixers, riggers, operators and specialised tradesmen (electricians, mechanical (a/c piping, hydraulic and systems) and building trades will be required).

It is anticipated that the tradesmen/building staff will be taking over from the structures trades in the latter stages of the Project.

Rail infrastructure works

The rail infrastructure workforce will comprise a mix of QR staff and contractors, and will be resourced from local and regional track, overhead line and signalling installation operatives were possible.

Management and administration

To support and manage this workforce, a management, administration and engineering support system will need to be provided. Peak management and administration workforce is expected to be around 30-35 persons consisting of project managers, construction managers, engineers, quality assurance, occupational health and safety officers, general administration and other miscellaneous staff.

2.8.2 Recruitment

Local area recruitment

There is benefit both to the local community and the constructor in sourcing as much of the workforce as possible from the local area. The project team will liaise with local employment agencies and training providers regarding the provision of suitable training opportunities. Where possible this will specifically target opportunities for unemployed people.

Estimated construction workforce numbers

The construction workforce numbers contained in Tables 2.3 and 2.4 are likely peaks in the individual stages of the Project and can not necessarily be added together to generate the overall size of the workforce. Different areas experience their peaks at different stages in the Project. The maximum construction workforce to be accommodated within the dedicated workforce accommodation village is estimated to be between 250 and 300 at peak capacity.

Table 2.3 Estimated construction workforce numbers for Moura Link

Proposed staging of Construction	Peak for calendar year	Average @ month over calendar year
Stage 1	65	50
Stage 2	30	25

Table 2.4 Estimated construction workforce numbers for Aldoga Rail Yard and NCL

Proposed staging of Construction	Peak for calendar year	Average @ month over calendar year
Stage 1	170	140
Stage 2	115	90
Stage 3	185	150
Stage 4	25	20

2.8.3 Accommodation

Given the probable high proportion of imported skills within the project workforce, it may be necessary to develop a temporary accommodation village to avoid over stretching the accommodation resources within the Gladstone area and to prevent any negative social impacts.

QR is committed to the development of a construction accommodation village in the Gladstone Regional Council (GRC) area if required, and will actively seek a site that is not only practical for the Project needs but one that offers some potential for a lasting benefit to the community.

The project team explored opportunities to redevelop existing tourism facilities (eg caravan parks, motels) within the area for workers accommodation. However, no suitable sites occurred within the Gladstone region that meet the Project needs.

Currently the following accommodation village sites are being investigated by QR:

- Maroon Group proposal for 2,265 room/units on Calliope River Road (preferred option)
- The development of a portion of Lot 8 on RP620660 near Mount Larcom township (alternative option)
- The development of a portion of Lot 200 on SP116496 (Euroa Homestead) within the GSDA (alternative option)

QR's preferred option is the Maroon Group construction accommodation village location. QR has provided a Letter on Intent to the Maroon Group acknowledging the site as a preference during construction, subject to approval and commercial arrangements (refer Appendix B2). Figure 2.3 shows the potential locations for the construction accommodation village.

The accommodation village site which is likely to be in the order of 2 to 3 ha in size and will include the following amenities and facilities:

- Residential accommodation within a block type layout – three blocks in total
- Serviced access road and associated drainage structures
- Emergency access tracks
- Carpark – asphalt serviced area
- Security control area
- Surrounding security fencing
- Concrete lined – open channel stormwater drainage (internal)

- Onsite amenities
- Onsite power supply facilities
- Emergency response infrastructure (eg fire fighting facilities, first aid facilities)

QR will pursue a construction accommodation strategy to cater for the proposed construction workforce during detailed design. This will be conducted in accordance with relevant State and Local legislation, including (if required) obtaining the necessary material change of use approval for the accommodation village.

A traffic assessment has been undertaken for the first two options (refer Section 13). The cultural heritage assessment also included the second option (refer Section 14).

2.9 Energy

The rail infrastructure requires both diesel fuel and electrical energy for operation.

2.9.1 Diesel

Diesel power supply

Diesel fuel is required for non-electric locomotives reprovisioned within the proposed Aldoga Rail Yard. Non-electric locomotives will consume a large amount of diesel fuel and may require refuelling on each delivery run from the mines to the port.

Diesel may also be utilised by small diesel powered emergency generators within the proposed rail facilities. This requirement will be confirmed during the detailed design phase of the Project. There is a possibility that a certain number of QR onsite vehicles may be refuelled from the proposed diesel storage facility onsite. This will most likely be confirmed within a QR Operational Plan for the yard prepared during the detailed design and procurement phases of the Project.

Diesel storage facility

The proposed diesel storage facility which forms part of the Aldoga Rail Yard will be modular in nature. Each module area will be separately bunded and comply with the relevant storage, drainage and fire control requirements of AS1940/2004. An initial fuel storage facility will be required for Stage 1 of the Project.

The system will be expanded as the volume of traffic produces higher diesel consumption and greater storage capacities are required. The ultimate capacity of the proposed diesel facility will likely be adequate to maintain non-electric locomotive operations for up to seven days, approximately 3.5 million litres.

2.9.2 Electrical

Detailed design will investigate the energy consumption requirements for the Aldoga Rail Yard in addition to that required to accommodate the additional rail traffic (electric) along the NCL as a result of the Project.

Powerlink Queensland

Electrical power is required for operation of electric locomotives by means of Powerlink Queensland overhead power lines with a power delivery capacity greater than 132 kV. This main power supply will originate from the existing NRG Gladstone Power Station via the 275kV transmission line to the north of the yard. It is proposed to connect the yard to this power supply via an existing south to north transmission easement across the proposed Aldoga Rail Yard. The construction of a line side feeder station/track sectioning cabin is also planned within the yard in order to reduce the main Powerlink Queensland electrical power supply to lower than 132 kV and to provide Ergon Energy with a power transmission facility.

Section 3 details the location of Powerlink's easements which is intersected by the Project. During detailed design consultation with key stakeholders will be undertaken to address potential constraints.

Ergon Energy Pty Ltd

A separate (<132 kV) power supply to the proposed Aldoga Rail Yard administration, sheds and operational facilities will be obtained from Ergon Energy by power supply transmission lines originating from the above mentioned Powerlink Larcom Creek substation. This power supply will be required for all internal rail yard facilities (<132 kV) in addition to the rail yard lighting. Where practicable, energy efficient maintenance and operational equipment will be selected to minimise energy consumption and overall life cycle costs.

Section 3 details the location of existing Ergon Energy infrastructure which is intersected by the Project. During detailed design consultation with key stakeholders will be undertaken to address potential constraints. Detailed design will also examine the use of natural light and solar options to reduce demands on main supply for buildings and support infrastructure.

2.10 Telecommunications requirements

All telecommunications for the Aldoga Rail Yard will be provided by the existing QR's trackside telecommunications network facility adjacent to the existing NCL. Section 3 details the location of existing telecommunication infrastructure which is intersected by the Project. During detailed design consultation with key stakeholders will be undertaken to address potential constraints.

Telecommunications along the Moura Link may be constructed. Beyond this no additional telecommunications installations or connections are envisaged at this stage.

2.11 Operational water supply and management

2.11.1 Water demands

Potable demand

Potable water for operations is required for domestic uses and amenities. Water for potable uses will comply with Australian drinking water guidelines (Australian and New Zealand Environment and Conservation Council (ANZECC)/National Health and Medical Research Council (NHMRC) – National Water Quality Management Strategy). Mean potable water demands are based upon staff numbers that will vary with project staging and construction. Peak potable demands are determined by scaling between the probable number of simultaneous uses in the early stages, and a peaking factor of 7.5 for the last stage when demands would be more evenly distributed.

Table 2.5 Estimated QR workforce numbers and potable water demands

Stage	Capacity mtpa	Total persons	Demand kL/d	Peak instantaneous flow	
				Factor	L/s
1	25	252	18.7	12.3	2.7
2	40	400	29.7	10.4	3.6
3	65	561	41.6	8.9	4.3
4	90	702	52.1	7.5	4.5

Operational workforce (total persons) is based on a 3-shift 24 hour work rotation, with the yard operating 24 hours day seven days a week. Maximum workforce at any one time is likely to 1/3 the total anticipated workforce number.

Where possible detailed design will examine reuse reticulation options back into facilities and stormwater capture to reduce demand on potable supply.

Non-potable demand

Non-potable water for operations is required for:

- Vehicle and general washdown activities within the Aldoga Rail Yard
- Wagon and locomotive washing within the Aldoga Rail Yard
- Landscaping within the Aldoga Rail Yard

Net non-potable demands will vary with staging and site throughput (refer Table 2.6).

Table 2.6 Estimated non-potable water demands for each stage of the Project

Stage	Capacity Mtpa	Demand kL/d
1	25	2.3
2	40	3.8
3	65	6.1
4	90	8.5

This demand would need to be buffered by an onsite storage tank. Such a tank is also required for fire fighting and normal operational security.

Water for non-potable uses must be suitable for secondary human contact in accordance with ANZECC Guidelines and the Queensland Water Recycling Guidelines.

2.11.2 Current water supply infrastructure

Awoonga Dam is the only major water resource in the region that is currently used for water supply purposes. GAWB delivers raw and treated water to municipal and industrial clients in the Gladstone region from Awoonga Dam. The total construction and operational demands can be satisfied by the available (un-allocated) yield of Awoonga Dam. The GAWB currently delivers water treated to potable standards to the town of Mount Larcom and Cement Australia's East End Mine via an existing 300DN pipeline that runs through the GSDA, south of the proposed Aldoga Aluminium Smelter site.

Works associated with the NCL quadruplication and the Moura Link will intersect this pipeline. Refer to Section 3 for further details.

2.11.3 Proposed water supply infrastructure and arrangements

Operational potable water and non-potable water demands could be met with treated water from GAWB. A supply to the eastern end of the Aldoga Rail Yard from the GAWB system to satisfy operational water demands would require a 150DN pipeline approximately 2 km long. This is the shortest possible connection that does not cross the proposed Aldoga Aluminium Smelter site, and connects to the GAWB system close to where a future treated water reservoir may be constructed. The pipeline would run inside existing road reserves.

2.12 Operational stormwater management

The Project will require various stormwater drainage systems to convey stormwater through the site. Drainage systems will be generally required for:

- Road and rail cross drainage
- Yard drainage
- Maintenance facilities

The stormwater drainage design will use natural drainage measures (eg grass swales) where possible.

Stormwater from buildings will be collected and stored for operational use within the yard where possible.

It is proposed that 'dirty water' (eg washdown water, stormwater and runoff from hardstand areas) will be treated in a wastewater treatment plant. The treatment plant design will aim to reduce the level of pollutants and contaminants to a nominated level (eg water quality suitable for secondary human contact in accordance with ANZECC Guidelines and the Queensland Water Recycling Guidelines). Options to reuse treated water from the pollution plant will be investigated during detailed design to reduce discharge into the waterway.

2.13 Transport – road and rail

2.13.1 Construction

The majority of the transport required for the Project will utilise the existing road network within the GSDA area. This would typically include transport of:

- Gravel deliveries
- Concrete
- Pre-cast concrete
- Materials for concrete batching
- Bituminous materials
- Construction equipment
- Workers – construction and QR operational staff
- Machinery items
- Building elements and equipment
- Fuel
- Waste removal

Rail transport is limited by the availability of train paths on the NCL, which are generally reserved for coal, general freight and passenger transport. It is proposed to transport ballast stone and rails to the site using the rail network in order to minimise or reduce impacts on existing road infrastructure in the GSDA area.

2.13.2 The origin of construction materials

The origin of material delivered to site will be subject to contractor and supplier availability. Proportions of delivery origins have been assumed for the assessment of road impacts as part of the traffic impact assessment (refer Section 13).

Moura Link

The origin of construction materials delivered to site via road networks will be divided between the four construction sections within the Moura Link project area, including:

- Section 1 – MSL to Calliope River
- Section 2 – Calliope River to Bruce Highway intersection
- Section 3 – Bruce Highway and EEMBL
- Section 4 – EEMBL to NCL

Aldoga Rail Yard and additional NCL tracks

The likely origins of the proposed construction materials delivered by road to the main construction site from various origins are as follows:

- Readymix and pre-cast concrete materials from the Clinton Industrial Estate (west), the southern Gladstone and the Rockhampton areas.
- Road pavements materials from both the Calliope River and Yarwun quarry areas.
- Prefabricated steelworks from the Clinton Industrial Estate, Hanson Road Industrial area, Mount Larcom areas and Rockhampton,.
- Miscellaneous supplies from the Auckland Point Area, Clinton Industrial Estate, Hanson Road Industrial area, Mount Larcom area and Rockhampton.

Further details are included within Section 13.

2.13.3 Operation

During operation of the rail yard, road transport will be used for the delivery of:

- Sand
- Maintenance parts and equipment
- Consumables
- Fuel
- Waste fuels

Rail operation and maintenance staff will use road transport as the primary method of travelling to and from the site.

The majority of operational traffic will be via Gladstone-Mount Larcom Road, the Bruce Highway and the Dawson Highway, with the majority of traffic likely to originate from Gladstone, Yarwun, Calliope and Rockhampton area.

Further detail is included within Section 13.

2.14 Waste

The estimated waste produced from construction and operational activities will likely consist of:

- Building materials, scrap steel
- Domestic waste (cans, bottles, glass), plastics
- Green waste
- Oil and lubricants
- Electrical cables
- Sewage
- Timber crates and pallets
- Paints and solvents

- Trade waste
- Sludge

The waste streams produced during the construction and operational phases of the Project will be distinctly different. Section 12 outlines the likely waste streams generated during the different phases of the Project.

The principal objectives for project waste management are:

- Minimise waste generation and the cost of waste to construct and operate waste facilities.
- Prevent damage to the environment.
- Move the company and community towards ecologically sustainable development.
- Ensure the operation complies with Environmental Licence conditions.
- Implement the requirements of the *Environmental Protection (Waste) Regulation 2000*.

Trade waste including dirty water and sewage will be removed offsite by a licensed contractor in accordance with the necessary permits. It is likely that trade waste will be disposed via the Yarwun STP.

General waste will be transport by a licensed contractor to GRC's Benaraby Landfill. A licensed operator will also be engaged to remove acceptable regulated waste to Benaraby Landfill.

2.15 Sewerage

Domestic wastewater is generated by domestic water uses by showering and non-showering staff. The estimated dry weather flow for domestic wastewater from the Aldoga Rail Yard is shown in Table 2.2.

Table 2.7 Estimated dry weather flow for domestic wastewater from the Aldoga Rail Yard

Developed facility	Staff persons	Average DWF kL/day	Peak hour flow rate L/S	Equivalent person load ep
Stage 1	202	13	0.78	54
Stage 2	400	27	1.5	107
Stage 3	561	37	2.2	150
Stage 4	702	47	2.7	188

A number of options for handling sewage on the new site are available. These include:

- Utilise and upgrade the existing Aldoga Sewage Treatment Plant (STP) adjacent to the proposed Aldoga Aluminium Smelter site - approximately 1 km south of the proposed Aldoga Rail Yard site. This treatment plant has not been commissioned, and currently is not receiving sewage from any sources, but is structurally complete.
- Construction of a new treatment plant onsite, with onsite reuse and/or licensed discharge to Larcom Creek.
- Construction of a sump to store sewage for road transport via tanker offsite to Gladstone Regional Council STPs. Tankering is only likely to be an option for temporary operations with loads < 100 Equivalent Persons (EP).
- Construction of modular STPs to treat sewage from the construction workforce.

The Aldoga STP would require an additional organic food source for loads less than approximately 400 EP and could not be operated without major process changes with a catchment load of less than 100 EP. Operating the Aldoga STP with a load of less than approximately 200 EP is unlikely to be economic in the long term, compared with onsite treatment. The use of Aldoga STP to treat effluent from the Aldoga Rail Yard would require changes to its approval conditions if the Aldoga Aluminium Smelter was not operational, as the STP Environmental Authority is linked to effluent reuse on the smelter site.

Further detail on waste management is included within Section 12.

2.16 Air and noise emissions

In order to control dust emissions related to construction activities and thus reduce the risk of dust nuisance at the location of nearby residences, a number of dust control measures will be implemented and incorporated into the Construction EMP (refer Section 20).

QR is currently undertaking a Coal Loss Environmental Evaluation which includes identifying strategies to reduce the risk of coal loss from loaded coal wagons in Central Queensland (refer Section 10).

Noise sources associated with the maintenance and rail yard activities typically include gantry cranes, shunting, forklifts, idling locomotives, wagon coupling and refrigeration units (wagons). The noise impact assessment undertaken for this EIS predicts that operational rail activities will comply with QR's operational criteria applicable for noise (refer Section 11).