AF Railway Corridor – Rail Camp Description

HANCOCK COAL PTY LTD

Calibre Rail

Alpha Coal Project
Rail Bankable Feasibility Study

Temporary Infrastructure Report

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CJVP10007-REP-C-006

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CONTENTS

1.0 PURPOSE

The purpose of this report is to summarise the temporary infrastructure required to construct the Alpha Coal Railway. This includes an assessment of:

- The size of the facilities required;
- Location options;
- The standard and range of the facilities to be provided;
- Services required to operate the temporary infrastructure during the construction phase;
- Strategies for obtaining the infrastructure and services;
- Risks and opportunities associated with the required facilities and services.

2.0 PROJECT OVERVIEW

2.1 General

Hancock Coal Pty Ltd (HCPL) is undertaking a Bankable Feasibility Study (BFS) into the development of a 30Mtpa open pit thermal coal mine within the Galilee Basin 70 km northwest of the Alpha township in central Queensland. This project is known as the Alpha Coal Project.

Of the major scope areas of the study, Calibre Rail (CAR) has been contracted to produce a BFS-level engineering study to optimise the preferred 500 km standard gauge rail configuration, including all necessary services and utilities along the route from the rail loops at Alpha Coal through to the port at Abbot Point Coal Terminal, north of Bowen.

The proposed railway alignment and location of the key temporary facilities is shown in Figure 1.

2.2 Temporary Infrastructure

Temporary infrastructure for the Alpha Coal Rail Project can be summarised into four main categories:

- **Rail construction camps** required to provide accommodation for the workforce at locations convenient to the construction works;
- **Construction offices** for use as a base to manage the construction works;
- **Construction depots** and facilities to undertake construction activities such as production of sleepers, concrete batching or maintaining construction plant and vehicles; and
- **Essential infrastructure** such as access roads, power and water required to operate the facilities.

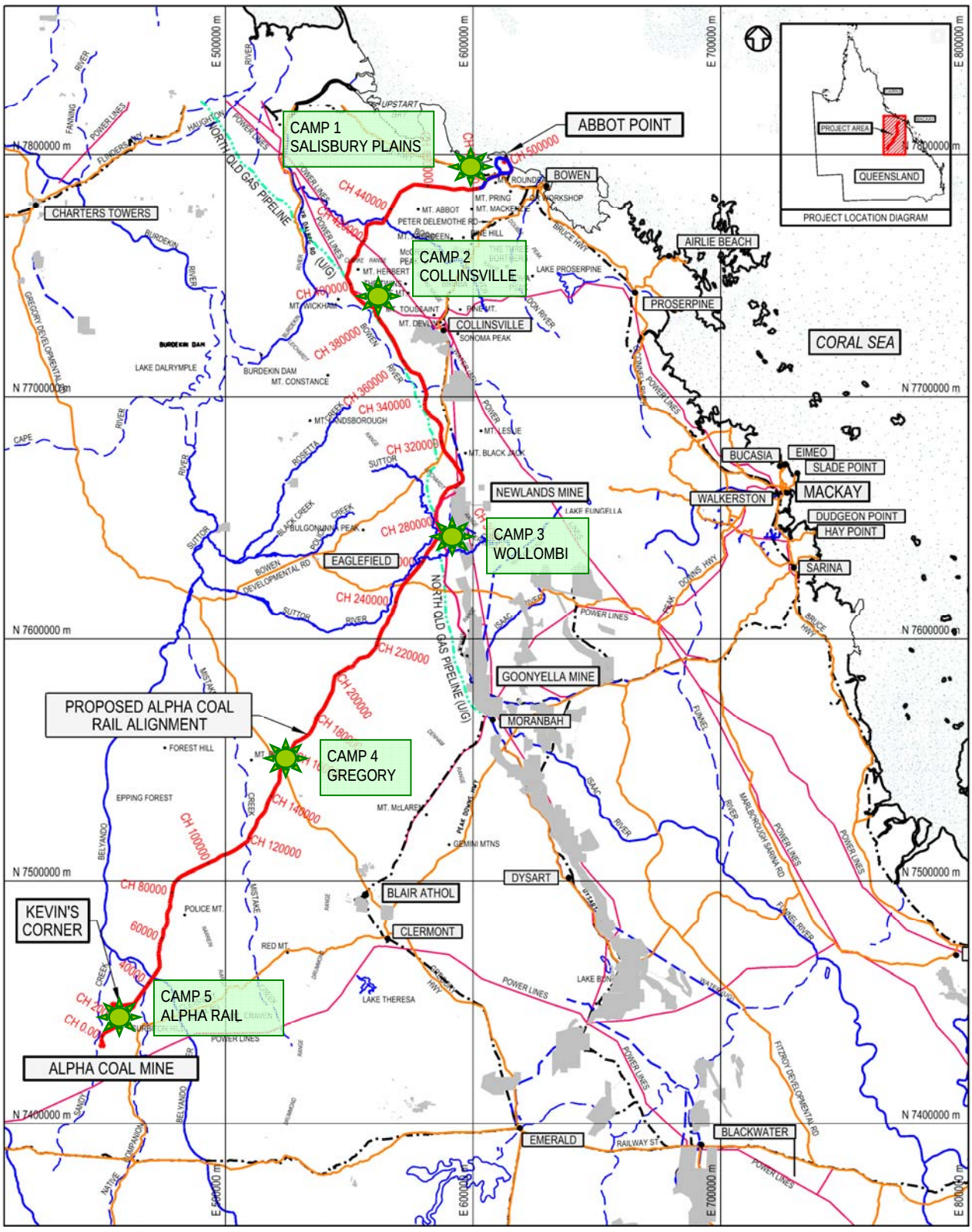


Figure 1 – Proposed Alpha Coal Railway Alignment and Construction Camps

2.3 Construction Services

In addition to the built infrastructure, a range of services will be needed to support the construction works and manage the facilities. These include:

- Camp management (accommodation bookings and maintenance of buildings and grounds);
- Catering including supply of food and consumables;
- Emergency response coordination services, vehicles and equipment;
- Medical services and fitness for work assessments;
- Waste management and recycling services;
- Security services;
- Bus services;
- Health and lifestyle services;
- Diesel fuel supply;
- Maintenance services for specialist infrastructure such as power stations and waste water treatment plants;
- Regulatory monitoring and reporting.

2.4 Summary of Temporary Infrastructure

The BFS has resulted in a recommendation for five rail construction camps, with construction offices and depots co-located with the camps where possible. The recommended camp locations, from north to south along the alignment, are:

- Camp 1 – Salisbury Plains;
- Camp 2 – Collinsville;
- Camp 3 – Wollombi & Track Construction Depot;
- Camp 4 – Gregory;
- Camp 5 – Alpha (by others).

Camps 1 – 4 will be stand alone rail construction camps and are discussed in detail in this report. The two key sites are Camp 3, which will be the main work front for track construction, and Camp 1, which will be the base for constructing the marshalling yards and associated buildings and infrastructure.

Accommodation for rail construction personnel at the southern end of the alignment will be provided by HCPL in the Alpha Mine construction camp. Apart from a discussion on manning requirements, Camp 5 is not covered by this report.

3.0 DEFINITIONS

BCA	Building Code of Australia
Owner's Representative	Appointed Hancock Coal Representative
Contractor	A person or company who enters into a formal agreement to design, supply, install or commission part of the rail construction works
DA	Development Approval
DERM	Department of Environment and Resource Management
DGL	Dangerous Goods License
EIS	Environmental Impact Statement
ERP	Emergency Response Plan
ERT	Emergency Response Team
HCPL	Hancock Coal Pty Ltd ("the Company")
LGA	Local Government Area
LV (electrical)	Low Voltage
LV (transport)	Light Vehicle
NGERS	National Greenhouse Emissions Reporting Scheme
NQBPC	North Queensland Bulk Port Corporation's
R&R	Rest and Recreation
SMP	Safety Management Plan
WRC	Whitsunday Regional Council
WTP	(Potable) Water Treatment Plant
WWTP	Waste Water (Sewage) Treatment Plant

4.0 MANNING

Developing a realistic construction manning and accommodation forecast will assist in successful implementation of the Project. If the workforce and accommodation requirements are underestimated, the Project won't be able to ramp up properly and the schedule will suffer. If needs are significantly overestimated, then money will be wasted on providing oversized facilities and unnecessary rooms.

Manning and accommodation needs have been assessed as far as practical given that the Project is in a feasibility study phase and some key human relations decisions have not yet been finalised by HCPL. Similarly, manning requirements will need to be adjusted as design progresses and bulk material quantities and construction details are refined.

Individual construction contractors have different views on achievable productivity rates and the workforce required to deliver a given package. This means that the manning forecasts for a fixed work scope can't be fully locked-in until the package is awarded. It is appropriate to keep some flexibility in facility sizing at this stage of the Project development.

4.1 Construction Manning Basis

Manning has been determined from first principles by considering work crew composition and the number of crews required to manage the design bulk material quantities process in the time available to meet HCPL's construction completion date.

4.1.1 Implementation Strategy and Schedule

The project schedule and construction strategy are the key factors in determining the workforce size and location. These areas are discussed in detail in the Construction Methodology Report (CJVP10007-REP-G-026), Project Execution Plan (CJVP10007-PLN-G-006), Basis of Schedule (CJVP10007-REP-G-035) and the Project Schedule (CJVP10007-SCH-G-006).

Key points to note with respect to workforce sizes:

- Multiple earthworks work fronts are required to complete the formation earthworks in the time available. The alignment has been broken into five separable portions and work will proceed roughly in parallel on all fronts.
- The proposed alignment runs through some remote areas where travel can be difficult, particularly in the wet season. An accommodation camp and construction office facility will be provided for each separable portion to overcome productivity losses and safety issues associated with long daily commutes.
- The railway (track, ballast, signals, etc) needs to be constructed on two fronts to achieve the date for first shipment of product. A major construction depot will be established near the mid point of the rail and the track will be constructed north to the Port and south to the Mine from this point.
- Construction will occur over three wet seasons. During these periods individual or multiple work fronts could be isolated and some loss of productivity will occur due to the weather. Allowance has been made in the schedule for this loss of productivity.

4.1.2 Methodology for Determining Manning

Manning has been assessed using the following basis:

- A 12 hour standard workday, including travel time to and from accommodation has been used.
- An average working week of 6.5 days per week has been used (13 work days followed by 1 rest and recreation day).
- The direct workforce has been determined by:
  - Firstly, estimating the composition of a typical work crew for the various work activities required (such a drainage works crew, concreting crew or tracklaying crew).
  - Using materials quantities obtained from Calibre's BFS.
  - Adopting a mid-range productivity rate (i.e. neither the most optimistic nor conservative position) to determine the number of crews required for any given task. Productivity rates have been determined from in-house experience and discussion with a range of contractors.
- An indirect workforce loading of 15% has been applied to all direct construction activities to cover contractor personnel working in supervisory, management, safety and administration roles.
- Organisation charts have been prepared for the construction management team, and an assessment made of the likely number of visitors and owner's representatives. These are included in Appendix B. A loading factor of 20% has been applied to the contractor direct manning to estimate construction management and visitors etc, capped at the level determined in the organisation charts.
- Manning levels for paramedics and security personnel have been obtained from a specialist consultant, consistent with the proposed emergency management and security strategy for the Rail construction.
- Manning levels provide by industry representatives have been used for catering and camp management personnel. Catering manning levels vary as the on-site population changes, but the relationship is not strictly linear. Catering personnel loading factors between 7% - 21% have been used (for high to low occupancy respectively), as appropriate to the calculated manday increment range of the total workforce on site.

4.2 Rail Camp Sizes

When the workforce size required to complete construction work and provided support services is known, there are still several other factors that have a major impact on how this translates into the number of accommodation rooms required. The three areas of primary interest are:

- HCPL's room allocation policy;
- The work roster being adopted for the Project; and
- The level of certainty in planning and contracting.

4.2.1 Room Allocation Policy

Motel style accommodation has been adopted for the base case of the Rail Camps strategy and sizing. This results in a capital cost saving as fewer rooms need to be constructed. However, this saving is partly offset due to an increased cleaning cost, a larger janitorial workforce on site and the need to provide shower blocks and locker rooms for residents' use during roster change-over.

An alternative for the Rail Camps is for rooms to be held-over for long-term construction personnel during their off-roster breaks. That is, each person has a dedicated room and there is no motel style accommodation.

The Construction workforce generally perceives being provided with a dedicated room to be very important, so a dedicated room allocation policy is a potential drawcard in a highly competitive market. A key risk of motel style accommodation is that workers will prefer to work on other projects that allocate dedicated rooms.

4.2.2 Work Rosters

The majority of the workforce employed on the Alpha Coal Rail Project will be engaged on a fly-in fly-out basis. There are several common rosters used for remote construction, and these are shown in Table 1. A "good" roster that enables workers to return home frequently is perceived by the workforce as one of the key factors that will attract them to a project.

Table 1 – Impact of Work Rosters on Camp Size

Roster	Additional Rooms Required	Maximum Camp Occupancy (% of Built Rooms)
Motel style accommodation, Any roster	10% (capped at 50) Allowance for unavailable rooms due to quick turn-over, cleaning and maintenance. (e.g.: workforce of 100 requires 110 rooms)	90 %
2 weeks on / 1 week off	50% (e.g.: workforce of 100 requires 150 rooms)	67%
10 days on / 4 days off	40 % (e.g.: workforce of 100 requires 140 rooms)	71%
3 weeks on / 1 week off	33% (e.g.: workforce of 100 requires 133 rooms)	75%
4 weeks on / 1 week off	25% (e.g.: workforce of 100 requires 125 rooms)	80%

Alpha Coal Rail construction camps have been sized on the basis of a 3:1 motel style roster, as advised by HCPL. However, conditions of engagement have not yet been finalised for the Project, and the work roster may change before implementation. If this is the case, the camp sizes proposed in the BFS should be reviewed.

4.2.3 Contingency Allowance

It is appropriate to include a contingency allowance in camp infrastructure size planning at the current feasibility stage of the Project. The contingency covers factors such as:

- Uncertainty in HCPL's human resources and industrial relations policies. This will impact room allocation policies and work rosters.
- Uncertainty in bulk material quantities. For example – geotechnical groundbreaking tests have not yet been completed.
- Uncertainty in contract packaging. Cost saving opportunities may arise during the tender phase that change the number or scope of packages. This can result in changes in contractor direct and indirect manning levels.
- Weather and other delays. It may be necessary to ramp-up additional personnel and equipment to avoid work in high-risk periods or maintain schedule if significant delays occur.
- Nightshift work. It may become necessary to double-shift some activities to maintain schedule.

A general 10% allowance has been made for space planning and communal infrastructure sizing purposes at this stage (but not for room numbers, other than incorporating the motel allowance). This should be reviewed closer to implementation as specific risks are identified through the construction and project risk review process.

4.2.4 Recommended Rail Camp Sizes

The recommended rail construction camp sizes are given in Table 2. These camp sizes have been determined by consideration of the manning requirements and how these translate to camp rooms through factors such as work rosters and room allocation policy as described above.

Minimal resource levelling has been undertaken, and as such the camp sizes should be adjusted to suit the final project schedule and contracting strategy. Some manning peaks have not been catered for in the total camp sizes, and accommodation in these isolated weeks will rely on utilising the 10% motel allowance, resource levelling, overall management across camps, utilising external camps or other temporary accommodation.

Table 2 – Recommended Rail Construction Camp Size

Location	Base Room Requirement (Inc Motel)	Contingency Planning (10% of Base Room Requirement)	Infrastructure and Layout Size
Camp 1 – Salisbury Plains	580	58	638
Camp 2 - Collinsville	500	50	550
Camp 3 - Wollombi	700	70	770
Camp 4 - Gregory	500	50	550
Camp 5 - Alpha Mine (Rail)	400	40	440

Note: Catering and camp management personnel have not been included in the Camp 5 figures as rail construction personnel will be accommodated by HCPL in the Alpha Mine Construction Camp.

4.3 Rail Operations Manning

Personnel will be required to operate and maintain the railway and rolling stock during the operational phase.

The majority of the operations personnel will be based at the northern end of the alignment, at the marshalling yard and control centre facility. HCPL has advised that the operations workforce will be sourced locally, and a rail operations village will not be provided at the northern end of the alignment. Figures for both a local workforce and a fly-in / fly-out workforce are given in Table 3 to show the sensitivity of the manning requirements to work roster options. Dedicated rooms have been allowed for the even time fly-in / fly-out workforce.

A small satellite maintenance camp will be provided at Wollombi, which is roughly mid-way along the railway.

Some rooms will also be required at the Alpha Mine Village for train crews and maintenance personnel.

Table 3 – Rail Operations Manning

Workforce Function	Location	Manning Requirement	Notes
Northern End Train Crews, Rail Operations, Rolling Stock Maintenance and Permanent Way & Signals Maintenance	Option 1: Bowen & Merinda	110	Based on a local workforce
	Option 2: Camp 1 – Salisbury Plains	140	FIFO workforce on a 2:2 even time roster
Mid-Point Permanent Way & Signals Maintenance	Camp 3 - Wollombi	30	Short-term FIFO contractors
Southern End Train Crews, Permanent Way & Signals Maintenance	Camp 5 - Alpha Mine (Rail)	70	FIFO workforce on a 2:2 even time roster

4.3.1 Permanent Rail Camp Sizes

Given the manning requirements above, the following permanent rail camp sizes are recommended.

Table 4 – Permanent Rail Camp Sizes

Location	Permanent Rail Camp Size	Notes
Camp 1 – Salisbury Plains	150	Optional – maximum village size should HCPL change from the proposed local workforce to a fly-in fly-out workforce
Camp 3 - Wollombi	50	Short-term FIFO contractors plus catering.
Camp 5 - Alpha Mine (Rail)	100	Estimated workforce plus allowance for shutdown work crew.

5.0 RAIL CONSTRUCTION CAMP AND DEPOT LOCATIONS

5.1 Site Selection Basis

Initially, a desktop assessment was undertaken to determine possible locations for temporary rail construction camps.

The desktop study involved:

- Firstly, determining the ideal camp locations to minimise travel distance for construction personnel. For this study, a maximum travel time of 1 hour each way between the camp and worksite has been assumed. This equates to a 60 km one-way travel distance with an average driving speed of 60 km/hr along "average" construction roads.

  Two likely scenarios were initially investigated:

  – Case 1 – rail construction personnel are based in camps provided by others at the northern (Port) and southern (Mine) end of the alignment. The ideal locations of camps from a travel perspective for this scenario are given in Table 5.

Table 5 – Case 1 Ideal Rail Camp Chainages

Camp	Chainage	Comments
1	500 km	Port Camp - Room allocation for rail construction works
2	375 km	Rail Construction Camp
3	250 km	Rail Construction Camp
4	125 km	Rail Construction Camp
5	0 km	Mine Camp - Room allocation for rail construction works

  – Case 2 – no room allocation is provided in the Port and Mine camps for rail construction personnel and separate rail construction camps are used at the northern and southern ends of the alignment. The ideal locations of camps from a travel perspective for this scenario are given in Table 6.

Table 6 – Case 2 Ideal Rail Camp Chainages

Camp	Chainage	Comments
1	440 km	Rail Construction Camp
2	355 km	Rail Construction Camp
3	185 km	Rail Construction Camp
4	60 km	Rail Construction Camp

- Secondly, identifying suitable sites along the rail alignment based by visually interpreting orthophoto files. Factors considered here were the site topography (e.g. slope, flooding potential), proximity of existing access tracks, and ease of access to the rail alignment.
- Finally, a typical footprint for a 700 room camp was overlaid onto the potential sites to confirm that enough space was available.

Through the desktop study, a total of 24 possible locations were identified for construction camps.

Following this, a site visit was conducted to ground truth the identified options and confirm existing access arrangements and general site suitability. Feedback from HCPL on land availability was provided, which ruled out some sites. As the BFS progressed, topographical, hydrological and geographical data was reviewed to determine the suitability of the remaining locations.

Options for utilising existing accommodation camps were also investigated at a high level, as discussed in Section 5.2.

Further discussions throughout the course of the BFS resulted in an amended accommodation scenario whereby the rail construction team is independent of the Alpha Coal Port project at the northern end of the alignment but utilises rooms set aside for rail construction in the Alpha Mine Construction Village.

The outcome of the BFS study is a recommendation for four dedicated rail construction camps, with the rail construction team at the southern end of the alignment being accommodated in the Alpha Mine Construction Camp. The recommended sites are discussed further in Section 5.3.

5.2 Options for Using Existing Accommodation

Existing accommodation in the Project locality includes rental of private dwellings (houses or units) and use of existing transient workforce accommodation camps. There are insufficient private rentals available to contribute significantly to the Project accommodation demands, however there are three known construction camps in the vicinity of the proposed rail alignment to which it would be very beneficial to gain access.

These are the North Queensland Bulk Port Corporation's (NQBPC's) 380 room camp at Merinda, Queensland Rail's Coal Connect 350 room camp at Eaglefield and the 200 room Collinsville Village camp managed by Morris Corporation. Preliminary discussions have

been undertaken with these camp operators, and they require financial commitment as soon as possible to secure rooms for the construction period. Existing camp accommodation is at high demand in this area, so priority should be given to securing rooms which will avoid the need for temporary fly camps to be constructed during the ramp up stage of the project.

5.2.1 Private Dwellings

The assessment of private dwellings has only been made for the northern end of the alignment, as travel distances between existing communities and the southern portion of the proposed alignment are too long for daily commuting.

The Bowen Abbot Point Accommodation and Community Infrastructure Study Report, released in April 2010, forecasts an upcoming shortage of up to 3,900 short-term accommodation units in the Whitsunday Regional Council LGA[1], with a large influx of construction workers over the next three years. In addition to the Alpha Coal Project, the accommodation shortage will be pressured by several large projects already underway or forecast for construction between now and 2015:

- Abbott Point Coal Terminal Stage 3;
- Abbott Point Multi Cargo Facility;
- Queensland Rail's 69 km Missing Link Rail Project / Duplication;
- Sunwater's Water for Bowen Project, a 150 km pipeline from Burdekin to Bowen;
- Powerlink's 132kV Collinsville-Bowen Power Line from the Strathmore Power Station to a new substation at Merinda;
- The proposed Chalco Alumina Refinery in the Abbott Point State Development Area;
- Waratah Coal's Galilee Coal Project.

The demand for construction accommodation in the region is forecast to be potentially as high as 5,200 rooms[1].

The agriculture, forestry and fishing industries combined employ 22% of the workforce in the Whitsunday Regional Council and already generate a large seasonal demand for transient workforce accommodation, mainly in the picking season between April and September. This will continue through the Alpha Coal Railway construction period. Seasonal agricultural workers generally have low incomes and seek cheaper accommodation options such as tourist parks, caravans and hostels that wouldn't be acceptable long-term to railway construction workers.

Construction of new houses and units will not be adequate to meet the needs of the combined transient workforce needs. The Whitsunday Regional Council approved 196 new dwellings in 2009 (the latest figures currently available), a decrease from 287 approvals in

[1] Figures exclude accommodation demands from HCPL's Alpha Coal Project (Rail and Port) and Waratah Coal's Galilee Coal Project. Accommodation figures for these projects were not available early enough in *The Bowen Abbot Point Accommodation and Community Infrastructure Study* to incorporate.

the previous year. High land prices are making it unattractive for developers to provide new low-cost housing.

The Bowen Abbot Point Accommodation and Community Infrastructure Study Report (2010) noted that the average weekly rent in Bowen was approximately $180-$250 for 2 bedroom units and $220-$350 for higher quality units, while a 3 bedroom house was $300-$400. Rental properties generally have a low vacancy rate, with most properties being rented very quickly unless they are in poor condition. The use of existing rental properties for temporary construction workers can have a detrimental impact on the community as it pushes prices up and makes accommodation unaffordable for people engaged in lower paid industries.

The report recommends that the use of new transient workforce accommodation camps is appropriate for the forecast influx of construction workers and considers that:

- Small worker populations (when compared to the existing population size) can be integrated into existing towns in workforce villages or new housing.
- Larger camps should be on the periphery of towns where infrastructure and services can be supplied and the camp can have a positive social and economic impact on the town.
- Camps should provide a range of accommodation options (e.g. for couples or family stay-overs), be finished to a high standard and provide a range of facilities for residents.
- Camps should not be located in the State Development Area as this sets a precedent for housing development in a non-compatible industrial zone.
- High quality agricultural land should be protected from development.
- Consideration should be given to ways in which major projects can contribute to the community, and limit the potentially detrimental impact of project completion and workforce demobilisation. This may include provision of training and skill sharing with local residents or potential to use the camp on completion of construction for other uses, such as seasonal agricultural workers.

5.2.2 NQBPC Merinda Camp

A transient workforce accommodation camp was constructed to house workers associates with the North Queensland Bulk Port Corporation's Abbott Point Port expansion works.

The camp currently has 380 constructed rooms, with development approval for an additional 120 rooms (up to 500 constructed rooms). Preliminary development approval has been given for a total of 1,000 accommodation rooms in this camp.

To house the rail construction workforce, the existing camp would need to be more than doubled.

Initial discussions with WRC indicate that Council would approve expansion of the camp up to the 1,000 rooms covered by the existing preliminary DA, but is not in favour of increasing the size of the camp past this limit. The forecast room requirement for rail construction is 580 rooms, with a similar or greater number anticipated for the Alpha Coal

Port works. Even if HCPL can negotiate use of the entire Merinda Camp with NQBPC (which is unlikely), it may not be able to meet the needs of both the Port and Rail projects.

NQBPC's Merinda Camp is located approximately 51 km by road from the Alpha Coal Rail marshalling yards (the centroid of work hours in Separable Portion 1), which is at the outer range of the acceptable daily travel distance. Ideally, the workforce accommodation should be much closer than this. Use of the Merinda Camp as a base to build a dedicated rail construction camp closer to the marshalling yards would be very advantageous as it would save the time and cost associated with providing a fly camp.

The Merinda camp is 21 km from the Port loop and is therefore better positioned to house workers associated with the Alpha Coal Port Project rather than the Rail Project. HCPL should aim to secure the camp for the Port Project, with interim use by the Rail Project during the site establishment phase.

5.2.3 Queensland Rail Coal Connect Camp

The workforce engaged by Queensland Rail to build the 69 km Northern Missing Link, which will connect the Goonyella coal rail system to the Newlands rail system is being accommodated in a 350 room construction camp at Lancewood, adjacent to the Eaglefield area. The project is well underway, with construction works scheduled for completion in January 2012.

It is recommended that HCPL negotiate with QR for access to accommodation rooms in the camp as the Missing Link workforce ramps down, and then full access to the camp on completion of the Missing Link project.

The Coal Connect Camp is approximately 21 km from the proposed Alpha Coal alignment, and is ideally located for use as either an initial base during the site establishment phase or as an ongoing accommodation location for some contractor groups. For example, the workforce associated with rail string production, sleeper production and/or quarrying operations could be housed here to reduce the number of rooms required at the Wollombi Camp.

5.2.4 Collinsville Village

There is a 200 room camp in the Collinsville area managed by Morris Corporation, which is utilised by the Northern Missing Link project and various mining companies with projects in the area. The camp is approximately 30 km from the proposed Alpha Coal alignment.

Again, it is recommended that HCPL negotiate for access to accommodation rooms in the camp as the Missing Link workforce ramps down, and then as ongoing vacancy allows. The camp manager has advised that HCPL should make a financial commitment as soon as possible to secure rooms, and there is significant risk that rooms will be unavailable due to competing projects in the area.

5.3 Recommended Sites for Rail Construction Sites

Table 7 shows the preferred location and applicable local government area (LGA) for the rail construction camps resulting from the BFS. A summary of the sites and existing services follows. Refer to Figure 1 for a map of camp locations.

Table 7 – Recommended Rail Construction Camp Locations

Location	Approximate Location	Local Authority
Camp 1 – Salisbury Plains	E 591800 N 7785400 1 km S of CH 472 km	Whitsunday Regional Council
Camp 2 – Collinsville	E 576600 N 7732600 14km E CH 383 km	Whitsunday Regional Council
Camp 3 – Wollombi	E 586400 N 7641600 1km E of CH 273 km	Isaac Regional Council
Camp 4 – Gregory	E 522200 N 7549400 1km W of CH 156 km	Isaac Regional Council
Camp 5 – Alpha Mine (Rail)	E 456600 N 7435600 7 km E of CH 010 km	Barcaldine Regional Council

5.3.1 Locality Description: Camp / Depot 1 – Salisbury Plains

The first of the dedicated rail construction camps will be located in the vicinity of Alpha Rail marshalling yards, south of Guthalungra.

The camp will be co-located with a major construction depot and key infrastructure will be shared between the camp and construction depot.

Camp 1 will be fully decommissioned and rehabilitated upon completion of the rail construction, based on current strategy of utilising a local workforce for operations and maintenance.

Access to the site is via Glenore Road (unsealed), off the Bruce Highway.

- Potable water - New bore(s) with raw water piped to a treatment plant at the camp. It is expected that the local groundwater will not require desalination to create a potable supply and that treatment will consist of filtration and disinfection only.
- Power - On site power generation using diesel generators.

- Communications - Initially Telstra NextG and VSAT satellite communications will be used for construction needs, with a VSAT entertainment system solution for the camp. An existing Telstra fibre optic cable runs parallel to the Bruce Highway, approximately 9 km to the north of the marshalling yards and a permanent connection to this may be feasible.
- Sewage Treatment and Disposal - On-site WWTP, with disposal of treated effluent primarily by spray field and recycling for use in construction. A local black water holding tank with off-site disposal of septic waste may be used initially until the WWTP and spray field are operational.

5.3.2 Locality Description: Camp / Depot 2 – Collinsville

The second of the dedicated rail construction camps will be located in the vicinity of Collinsville. A suitable site has been located approximately 13 km WNW of the town site on Strathmore Road. This proposed camp site has been used previously for a construction accommodation camp but has since been rehabilitated.

The Collinsville Camp will be co-located with a construction depot and key infrastructure will be shared between the camp and construction depot.

This camp will be fully decommissioned and rehabilitated upon completion of the rail construction.

- Potable water - New bore(s) with raw water piped to a treatment plant at the camp. It is expected that the local groundwater will require desalination to create a potable supply and that full treatment will be required. A connection to Sunwater's regional scheme may be possible as an alternative to on-site treatment, but this has yet to be confirmed.
- Power - On site power generation using diesel generators.
- Communications - The site is covered by the Telstra NextG network. NextG and VSAT satellite communications are recommended for used for construction needs, with a VSAT entertainment system solution for the camp.
- Sewage Treatment and Disposal - On-site WWTP, with disposal of treated effluent primarily by recycling for use in construction. A local black water holding tank with off-site disposal of septic waste may be used initially until the WWTP is operational.

5.3.3 Locality Description: Camp 3 – Wollombi

The third rail construction camp will be located in the vicinity of Eaglefield. A site has been selected on Wollombi Station, approximately 20 km N of the Eaglefield area and 30 km W of Glenden. This proposed camp site is a greenfield site, located on freehold farming land.

Work will be undertaken to improve road access to the Camp. The site is currently accessible by a 10 km station homestead access road running south from the Newlands Access Road, west of Glenden. There are good quality sealed roads from the Newlands Access Road back to the Mackay area.

Camp 3 will be co-located with a major construction depot, and key infrastructure will be shared between the camp and construction depot.

The Wollombi Camp is centrally positioned between the mine and port and will be scaled back for use as a rail maintenance depot when the mine is operating.

- Potable water - The site is located immediately adjacent to a SunWater pipeline, and gaining access to the pipeline is the preferred water source in the vicinity. However, access to the pipeline has yet to be confirmed and for planning purposes full on site treatment, including desalination, should be assumed.
- Power - On site power generation using diesel generators.
- Communications - The site is covered by the Telstra NextG network. NextG and VSAT satellite communications are recommended for used for construction needs, with a VSAT entertainment system solution for the camp.
- Sewage Treatment and Disposal - On-site WWTP, with disposal of treated effluent primarily by spray field and recycling for use in construction. A local black water holding tank with off-site disposal of septic waste may be used initially until the WWTP and spray field are operational.

5.3.3.1 Locality Description: Construction Depot 3 – Wollombi

The construction depot at Wollombi will house several key functions, given that it is the approximate midpoint of the alignment. In addition to the standard depot, the site will have a sleeper preparation facility (subject to supply agreements) and a rail string production facility.

Key services will be shared between the camp and the depot, and sized accordingly.

5.3.4 Locality Description: Camp / Depot 4 – Gregory

The Gregory Camp is probably the most isolated of the rail construction camps. It will be located approximately 85 km NW of Clermont, where the Gregory Developmental intersects the proposed rail formation. This proposed camp site is a greenfield site, located on freehold farming land.

There is already good road access to the Gregory Camp via the Gregory Developmental Road.

Camp 4 will be co-located with a construction depot, and key infrastructure will be shared between the camp and construction depot.

This camp will be fully decommissioned and rehabilitated upon completion of the rail construction.

- Potable water - New bore(s) with raw water piped to a treatment plant at the camp. It is expected that the local groundwater will require desalination to create a potable supply and that full treatment will be required.
- Power - On site power generation using diesel generators.

- Communications - Telstra NextG coverage of the locality is marginal and advice from a Telstra representative is required to confirm the extent of network coverage in the vicinity. VSAT satellite communications will be used for construction needs, with a VSAT entertainment system solution for the camp.
- Sewage Treatment and Disposal - On-site WWTP, with disposal of treated effluent primarily by recycling for use in construction. A local black water holding tank with off-site disposal of septic waste may be used initially until the WWTP and spray field are operational.

5.3.5 Locality Description: Camp 5 – Alpha (Rail)

Rail Construction workers will be accommodated in an area of the Alpha Mine Construction Camp.

The proposed location for the camp is located adjacent to Degulla Road, approximately 7 km east of CH 010 km. Investigation of site conditions and services at the Alpha (Rail) Camp is outside the scope of the Rail BFS and has not been considered, but has been assessed as part of the Mine study.

5.3.5.1 Locality Description: Construction Depot 5 – Alpha (Rail)

A rail construction depot will be built in the vicinity of the Mine light industrial area adjacent to Degulla Road near CH 012 km. The following design basis has been agreed with HCPL for BFS pricing purposes:

- Earthworks, drainage and access from Degulla Road have been included in the Alpha (Rail) Depot price.
- A stand-alone diesel-fired power station and fuel storage is included in the Alpha (Rail) Depot price.
- Treated water will be provided (by others) to a tie-in point on the boundary of the Depot.
- Sewage will be pumped (by others) from a pump station within the Alpha (Rail) Depot back to the main Camp and Village WWTP for treatment.
- The Alpha (Rail) Depot will be self-sufficient for communications.
- Diesel storage for light vehicles and other construction needs will not be provided as part of the Alpha (Rail) Depot. Fuel will be available for rail construction personnel and contractors from the main Alpha Mine construction fuel facility, nominally located in the adjacent LIA. Fuel supply will be back-charged at a standard Project rate.

5.3.5.2 Dedicated Camp 5 for Rail Construction

An alternative location for a dedicated rail camp was briefly investigated adjacent to the proposed Kevin's Corner spur line, west of CH 032 km. The site is a greenfield location and would need to be fully self-supporting for all services. The Kevin's Corner location offers several advantages as a site for Rail Camp 5 should HCPL choose to keep the rail and mine workforces separate:

- It is closer to the centroid of rail construction works for separable portion 5 and minimises travel distances.
- It limits the interface between rail and mine construction personnel.
- It enables the rail construction offices and rail construction depot for the southern works to be located outside the mine construction area without establishing separate infrastructure (i.e. services for the camp and offices could be shared).
- The facilities constructed for the Alpha Rail Project could then be utilised by the Kevin's Corner development, should this proceed.

5.4 Interaction with Alpha Coal Port and Mine Construction Teams

No allowance has been made for accommodating the Alpha Coal Port workforce at Rail Camp 1. Both Projects could be competing for access to existing accommodation at Merinda and HCPL will need to decide the best room allocation policy to suit its overall needs.

Rail construction personnel will need to work within and travel through the Mine and Port construction areas to build and commission the rail loops at both ends of the alignment. Protocols for interaction between the workforces will need to be established in the respective construction management plans.

6.0 ACCOMMODATION CAMPS

6.1 Design Philosophy

All aspects of the rail construction camps need to meet the following objectives:

- Provide welcoming and homely living conditions;
- Provide safe, secure and efficient operation;
- Maximise staff productivity;
- Minimise whole of life costs;
- Provide environmental responsibility and energy efficiency;
- Allow for future expansions;
- Provide portable solutions to reduce site rehabilitation costs and enable buildings to be on-sold or relocated when the railway construction is complete; and
- Buildings must comply in all respects with the requirements of the Building Code of Australia 2010.

Resident facilities need to be provided to attract and retain a competent, committed workforce. The level of amenity needs to be balanced with the cost and time required to set-up facilities. In a scheduled constrained project, the first goal is always to provide accommodation rooms and must-have facilities to allow the workforce to ramp-up.

Rail Camps should be standardised to present generally the same appearance and same level of accommodation and user amenity at all rail construction camps. It is likely that some rail construction personnel will move from one camp to another throughout the course of construction works. Utilising the same design for individual facilities across all sites also reduces design and production set-up costs for "one-off" buildings.

The building structures, site layout and level of camp facilities provided need to comply with the Queensland Government Development Code MP 3.3 – Temporary Accommodation Buildings and Structures, which came into force on 1 July 2010. This document describes the minimum standard for accommodation camps acceptable in Queensland. It generally represents industry standard practise, however there are some conditions (such as restrictions on walking distance between accommodation rooms and dining halls) that will be challenging to meet for the camp sizes required to construct the Alpha Coal Railway.

6.2 Layout Design

Layouts for each location should take the following aspects into consideration:

- Conformance with the objectives and concept layout of HCPL's architect's accommodation master plan;
- Local environmental aspects (including wind direction, rainfall, sun orientation, natural slope, soil conditions, existing vegetation);
- Logical and attractive paths of travel for residents and safe, efficient access to all areas for the camp management and caretaking personnel.
- Efficient provision of service infrastructure, including positioning of essential infrastructure such as water treatment and storage, power generation, fuel storage and dispensing and communications head-end building;
- The location of the sewerage treatment plant in compliance with DERM requirements and to minimise odour control;
- Accessibility for delivery vehicles, emergency vehicles, camp management and maintenance personnel;
- Noise and dust minimisation in accommodation areas; and
- Operating cost considerations.

6.3 Design Life

A design life of 20 years for transportable buildings has been adopted. This ensures that the buildings will be durable enough to be relocated and re-used or on-sold after construction is complete.

The design and construction of other site infrastructure that cannot be re-used, such as in-situ concrete and services runs should have a lower design life, in line with the expected site operation timeframe. Nominated design life periods are shown in Table 8.

Table 8 – Design Life

Locality	Design Life for Non Re-Usable Components	Building Design Life
Camp 1 – Salisbury Plains	5 years	20 years
Camp 2 – Collinsville	5 years	20 years
Camp 3 – Eaglefield	30+ years	20 years
Camp 4 – Gregory	5 years	20 years

6.4 Design Criteria

6.4.1 General

The following general design criteria are proposed for the rail camps:

- All accommodation buildings will be of modular design, utilising transportable units fabricated off-site and requiring minimum on-site installation and finishing works.
- All rooms will be air conditioned.
- Verandahs, balconies, access landings and breezeway structures will be fabricated off-site and flat-packed in kit-form for assembly on site.
- New buildings, materials, equipment and fittings will be used for rail construction camps.
- External and internal finishes will be selected to provide a cohesive appearance across the entire site.
- Steel sections will be used for building frames and chassis (i.e. no wooden structural members). Building chassis will utilise fully welded steel members. Members within wall and ceiling frame panels will be fully welded, however the individual panels may be bolted to each other. Other proprietary systems will be considered if of equivalent or higher degree of durability.
- Floors will utilise 19 mm marine grade structural plywood as a minimum. Other proprietary systems will be considered if of equivalent or higher degree of durability.
- Painted plasterboard, cement sheeting, magnesium board or other similar systems will be used for wall and ceiling linings.
- A minimum ceiling height of 2,600 mm will be provided for all accommodation rooms, breezeways and verandahs. A minimum internal ceiling height of 2,400 mm is proposed for all back of house areas, storage areas, laundries, ice rooms, communications buildings and ablution facilities.
- En-suite floors will have vinyl floor covering and carpet or carpet tiles will be used for all bedrooms.
- Laminated splashbacks will be used in wet areas for all rail construction buildings.
- Block-out curtains are proposed for all accommodation rooms.

- Sliding glass doors with thermal treatments are proposed for accommodation rooms to provide a better connection to the external environment.

6.4.2 Wind Loads

All transportable buildings should be built to withstand Region C cyclonic wind loads when installed at any site in any orientation. This enables buildings to be re-used again anywhere in Queensland and provides maximum schedule flexibility for installation of the Alpha Coal Rail Camps

All non-transportable/non-reusable site infrastructure, including tie-downs and ground anchors, should be designed and installed to withstand wind loads for the specified site. These are listed in Table 9.

Table 9 – Design Wind Regions

Region C	Region B	Region A4
Manufacture of all transportable buildings	Camp / Depot 2 - Collinsville	Camp / Depot 3 - Wollombi
Camp / Depot 1 – Salisbury Plains		Camp / Depot 4 – Gregory
		Depot 5 - Alpha (Rail) Construction Depot

Note: Refer to AS/NZS1170.2 for full definition of applied wind loads

The Building Code of Australia designates different “importance levels” for building design depending on the proposed use of the building. For the Rail Camps, this applies particularly to buildings that are used to provide shelter to people during an emergency event, or for post-event recovery management.

For the Alpha Coal Rail Project, it is recommended that the kitchen/diner building for camps in cyclonic areas is designed for use as the site cyclone shelter. Therefore, in addition to meeting normal operating requirements, the Camp 1 – Salisbury Plains kitchen/diner building should be built and equipped in accordance with the Queensland Department of Public Works’ *Design Guidelines for Queensland Public Cyclone Shelters*.

Table 10 – Design Importance

Level 4	Level 2
Kitchen / diner buildings designated as cyclone shelters	All other transportable and in-situ constructed buildings.
Essential services (power, water, sewer, ventilation) to cyclone shelters.	All other site infrastructure.

Note: Refer to the Building Code of Australia for full definition of designated importance factor

6.4.3 Drainage Design

The regions in which the Alpha Coal Railway will be built is generally susceptible to downpours and flooding during the Australian monsoon season between November and March (the wet season).

Internal stormwater drainage and maintenance tracks for camps and construction facilities shall be designed for a 5 year average recurrence interval rainfall event.

Large drainage channels should not be located through accommodation areas where alternative routes exist as this limits the movement of people and vehicles around the site. Where a drainage channel needs to be located in a position that impedes pedestrian or vehicle routes (formal or informal), pathways with culverts underneath need to be provided to ensure all-weather access to rooms.

6.4.4 Accessibility

Shared facilities and universal access accommodation rooms will comply with the requirements of the BCA and AS 1428 for access by disabled persons. Accessible paths of travel are required to these facilities.

6.4.5 Sustainability Options

Some sustainability initiatives above the “base level” requirements of the BCA and relevant regulatory requirements, have a long-term benefit for the development. These will be incorporated into the final design as far as possible within budget constraints.

- Passive Solar Design by optimising building orientation and inclusion of items such as heat sinks, cross-flow ventilation louvers, adjustable window shades, tropical roofs over the buildings and use of clothes lines in lieu of clothes dryers.
- Air Conditioning control; down-sizing air conditioning units and supplementing them with ceiling fans.
- Daylight Sensors and occupancy sensors for lighting control.
- Improving thermal performance by use of building materials with higher intrinsic R-rating; higher R-rating insulation added to the walls and roof space; optimising the relationship of the building floor height to natural ground level; floor insulation; use of double glazed windows with uPVC frames.
- Low Energy Appliances.
- Low water usage plumbing fittings and equipment, use of rain water for toilet flushing or grey water re-cycling for landscape irrigation.
- Use of Recycled and Recyclable Materials.

6.4.6 Services Reticulation

Innovative methods to deliver essential infrastructure and services at a lower cost will be considered.

All proposed service installation techniques must provide a high degree of safety for residents and maintenance personnel and must comply with Australian Standards and other regulatory requirements as a minimum.

The following options all have merit for the Project:

- Shallow-buried under concrete paths;
- Vacuum sewer;
- Service runs affixed to the back of buildings or over building roofs; or
- A combination of the options described above.

To ensure an acceptable level of aesthetic amenity and durability is maintained, services suspended over un-roofed pathways/roads are services run above ground with no protection (e.g.: in corridors behind buildings) are not recommended.

6.5 Recommended Facilities

To fulfil the rail camp design objectives, the following built facilities are recommended:

- Camp administration office and retail outlet;
- Bus shelter;
- Kitchen-diner building;
- Tavern and beer garden;
- Gymnasium;
- Recreation room / internet café;
- Accommodation buildings with 3 en-suited rooms per building;
- Universal access accommodation room;
- Laundries;
- Ice Room;
- Toilets (tavern, sports and recreation areas, others as dictated by layout);
- Medical centre and ambulance shelter (shared with construction depot);
- Communications head-end building (shared with construction depot);
- Bulk Linen / Chemical Store;
- Maintenance shed (with office) and secure maintenance compound;
- Multi-use sports court (basketball, tennis and volleyball);
- Cricket pitch;
- Golf putting green;
- Golf driving range (nets);
- Gazebos;

- Multi-use path / fitness trail;
- Landscaping.

A more detailed scope table for each site is included in Appendix C and the functional specification for each building / facility is discussed below.

6.6 Summary Functional Specification for Key Facilities

The following section summarises key points from the functional specification proposed for all camp facilities. For more information, refer to the *Technical Specification for Rail Construction Camps* CJVP10007-SPE-C-005.

6.6.1 Accommodation Rooms

Accommodation rooms are the only private space occupied by each resident on site, and the size and standard of the rooms is therefore arguably the most important camp design consideration. In consultation with HCPL, the following room standard is proposed so that the Alpha Coal Rail Project is competitive with the other major projects taking place in the same region at the same time.

- All accommodation rooms will have en suites.
- The nominal room size will be 16 m^2 (including en suite).
- Rooms will generally be grouped using transportable buildings (14.4 m x 3.3 m) containing 3 rooms each.
- Accommodation buildings will be either single storey, multi storey (to a maximum of three levels) or a combination of levels.
- Accommodation buildings will have external verandahs to provide undercover access to rooms and for use by residents to relax in an outdoor environment. 2.1 m wide verandahs are proposed. Multi level buildings, if used, will have access landings for each room.

Standard accommodation room provisions include:

- Main bedroom:
  - King size single bed
  - Work desk and book shelf
  - Cupboard and bedside drawer unit
  - Bar fridge
  - Security screen door
  - Workstation chair, sofa chair and outdoor chair
- En suite:
  - Shower
  - Dual flush toilet

  - Basin with vanity cupboard underneath
  - Mirror above basin, with GPO and shaver plug.
- Telephones will be provided in rooms, with a user pays system for outward calls.
- Internet data points will be provided in accommodation rooms, with a user pays access system. (No computers will be provided in rooms – residents to supply their own laptops or use internet kiosk located in camp recreation rooms.)
- Flat screen televisions (nominally 49-54 cm) will be provided. Residents will be able to access re-broadcast free-to air television and radio services and a basic Foxtel package free of charge.

6.6.2 Universal Access Accommodation Rooms

A single universal access accommodation room is proposed for each site, of nominal size 6 m x 3.3 m. Universal access rooms will incorporate the same features and be fitted out to the same level as standard accommodation rooms, with fittings and floor layouts suitably modified for use by a person in a wheelchair. In addition, fire alarms will have a visual as well as audible signal.

The universal access accommodation room in each camp will be located close to core facilities such as the kitchen/dining room, administration building and a laundry.

6.6.3 Camp Kitchens and Dining Rooms

A single kitchen/diner facility is proposed for each rail camp.

Minimum space requirements for dining halls are set by MP3.3 and, where the kitchen/diner is being designed as a cyclone refuge, the design guidelines for cyclone shelters. Based on recent experience, a slightly more generous space allowance than required by MP3.3 is recommended.

Table 11 - Kitchen/Diner Sizing

Camp Location	Dining/Crib Floor Area (m^2)	Seating Capacity (chair count)	Notes
Camp 1 – Salisbury Plains	580	180	Designated cyclone shelter
Camp 2 – Collinsville	340	150	
Camp 3 – Wollombi	475	210	
Camp 4 – Gregory	340	150	
Camp 5 – Alpha Rail	N/A	N/A	Outside Rail BFS Scope

To improve aesthetics for the dining room, the following actions are recommended:

- Include internal partitions/separate dining areas to reduce the cavernous feel of a single large dining hall. This also allows areas to be closed-off during periods of low occupancy.
- Separating thoroughfares, such as main pathways from the access doors, toilets, to the servery area, etc, from seating zones. Half-height wall partitions can be used.
- Higher quality tables & chairs that are comfortable for residents to use – i.e. not cheap plastic furniture.
- A range of table sizes to accommodate groups of work colleagues and individuals.
- Choice of colours (paint, flooring, window trims, benches, etc) to add vibrancy and visual interest
- Providing adequate window openings in seating areas (and trying to arrange the building so that they have views) to provide visual interest and connection to the surrounding environment.
- Acoustic ceiling linings and use of other soft elements for noise attenuation.

Consideration should also be given to extending hours for the evening meal service. A longer meal period gives residents more time to relax after work, enjoy the sunset from the fitness track, phone their family, go to the gym or attend to personal laundry without feeling pressured to hurry to the dining hall before the dinner service finishes. Providing flexibility to choose helps make the camp more like living conditions at home.

Design and construction of the kitchen back of house areas must comply with requirements and principles of the *Food Standards Code: Standard 3.2.3 – Food Premises and Equipment and Safe Food Australia's A Guide to the Food Safety Standards 2001*
Modern catering contractors deliver their services through a combination of on-site and off-site food preparation techniques. This ranges in complexity from:

- Off-site preparation of vegetables (e.g. peeling and slicing potatoes and other hard vegetables) and bakery goods; to
- Use of vacuum packed meat cold cuts and pre-prepared soups; through to
- Full off-site preparation of wet dishes and compounded salads.

Caterers choose the level of service most applicable to the locality considering issues such as location relative to suppliers, transport access and potential for the site to become isolated in inclement weather. The kitchen and storage area design must be adequate for a range of catering arrangements). In both cases, provision of adequate and well designed storage is critical for good stock management and food hygiene practises.

An increased level of off-site catering reduces the amount of on-site waste and also provides a small reduction in the number of kitchen-hands required.

Back of house kitchen layouts need to maximise staff safety and work efficiency. Attention needs to be given to the movement of incoming deliveries to minimise manual handling and maximise access by pallet trolleys and the like.

General back of house kitchen requirements include:

- Food preparation and cooking areas;
- Storage areas – dry goods, frozen products, chilled products, day use (e.g. prepared salads);
- Pot washing and dishwashing;
- Kitchen manager's office;
- Staff facilities – toilets, lockers and lunch nook;
- Washing machine and dryer (for tea towels, aprons, etc);
- Cleaner's room;
- Bin room;
- Bin wash down area;
- Deliveries receival area.

For the kitchen at Rail Camp 1 – Salisbury Plains, additional cyclone shelter facilities are required. These include an emergency management office / first aid room and an entertainment and messaging system.

6.6.4 Administration Building and Retail Outlet

The administration office is the main "welcome" point to the site. It is also the administrative hub for each camp. The administration building should be positioned close to, or be easily accessible from, the main site entry and adjacent to the main bus shelter.

The recommended administration building size is approximately 150 m^2 (three transportable building floors) separated into administration office, reception, retail outlet and store.

An office should be provided for the camp manager and 4-5 workstations for personnel undertaking general administration duties, accommodation management and travel bookings.

Other recommendations include:

- Clear and welcoming external signage;
- Reception desk / shop servery counter;
- EFTPOS facility (at reception);
- Small reception waiting area with 2 or 3 tub sofa chairs and small coffee table;

- Sign-in and key collection point – external pick-up counter for arrival of scheduled airport buses and use of main reception desk for individual arrivals;
- Key storage peg-board or smart key registration and validation point;
- Pigeon holes for residents' incoming mail deliveries and postal outlet for external mail.

Providing a small retail outlet for residents allows them the freedom of choice to purchase additional items that are not provided as part of the base catering package. This "corner" store should also sell personal items, newspapers and magazines.

The retail shop can be operated as part of the camp management service and needs to be accessible to residents prior to and after work shifts. Providing access to the retail outlet through the camp administration office reception allows staff to undertake both functions. The access needs to be lockable / controlled to minimise theft risk after hours or when the reception desk is unoccupied.

6.6.5 Bus Shelter

To reduce traffic movements, personnel will be transported to and from camps and the worksites by bus as far as practical. A bus shelter is required at the designated bus pick-up and drop off zone to provide residents with shade and rain/wind protection while waiting for transport.

The bus shelter will nominally be located adjacent to the Administration Building as this is the check-in location for residents arriving at the site. One end of the bus shelter should extend to the Administration Building to provide shaded access to an external key pick-up counter.

Other elements required at the bus shelter include:

- Adequate space for 50 passengers to congregate (to align with the maximum coach size proposed);
- Seating and some tables;
- Landscaping of adjacent areas – a turfed area and green space;
- Paved or concrete floor, with wheelchair accessible access between the shelter and the bus door (i.e. no steps);
- Lighting for night time use;
- A smokers zone, downwind of and appropriately segregated from the main waiting area.

A site map should be provided in the vicinity of the bus shelter and administration building and consideration should also be given to inclusion of a PA messaging system.

6.6.6 Tavern and Beer Garden

The tavern / wet mess is traditionally the main social centre of the camp. However, as camps get larger it can become harder to manage antisocial behaviour and binge drinking. Provision of a tavern is still recommended for the rail construction camps and the Village, but its importance should not be placed above other facilities such as local gazebos, the gymnasium or internet cafe.

Recommendations for inclusions:

- Internal and external servery hatches (to the tavern and beer garden respectively).
- Provision of facilities that can be used for formal or informal sports competitions – such as a darts station and pool tables.
- Bar-style A/V system with large screen televisions and stereo system. PA system in the beer garden for special occasions use (speeches at milestone celebration barbeques, fundraisers, etc).
- Breaking the single large beer garden area up into smaller areas.
- Designated “quieter” areas with a café/bar feel.
- Sale of more substantial bar snacks, non-alcoholic beverages and espresso coffee.
- EFTPOS facility.

An internal tavern size of 150 m^2 (3 transportable building floors), plus back of house area is recommended for the rail construction camps.

The beer garden / alfresco dining area will nominally provide half of the undercover outdoor recreation space at each locality (the other half being provided by gazebos). Using a basis of 0.5 m^2 total outdoor space per person, the area will be in the order of 150 – 190 m^2 for the rail construction camps.

6.6.7 Recreation Room / Internet Cafe

Recreation rooms are traditionally alcohol-free areas for camp residents to congregate and relax away from their accommodation rooms. Their usage varies considerably from camp to camp, and there is a risk that they can become underused “empty” buildings. To maximise the productivity of the recreation room in each camp, it’s recommended that it is developed as a multi-use facility incorporating the following features:

- Internet café with user pays terminals and printer.
- Wireless hot-spots for residents to access the internet using their own laptops on a pay for use basis.
- Work tables, bench-style seating and local power outlets. These facilities are intended for use by laptop users or by groups of residents for hobby or interest group meetings.

- Kitchenette with tea and coffee facilities. Vending machines for soft drinks, juices and snacks could also be considered.
- Lounge area. To create a relaxing atmosphere features such as soft armchair and sofa seating, coffee tables, floor lamps and carpeting are recommended.
- Book exchange/library.
- A/V or stereo system to provide background music (controlled by the facility users).
- Landscaped external patio area with comfortable outdoor seating and large windows or sliding glass doors connecting the internal and external spaces.

A building of 150 m^2 – 190 m^2 floor area (3 to 4 standard transportable building floors) is recommended to provide the features described above for the rail construction camps.

The facility could also be used as a waiting area for residents waiting for bus transport off site on completion of their work roster.

6.6.8 Gazebos / Recreation Nodes

The Queensland Development Code MP3.3 requires undercover outdoor recreational space such as gazebos and building verandahs to be provided proportional to the number of residents in a camp. This can be further developed to support a local community concept with a landscaped gazebo provided as a central focus point for each group of accommodation buildings.

Between 6-8 gazebos are recommended as a minimum for each rail camp to meet the requirements of MP3.3.

Recommendations for gazebos include:

- Concrete or paved floor with Colorbond cladding roof;
- 1-2 picnic tables with bench seating each;
- Drinking water fountain;
- Barbeque;
- Local lighting for night time use; and
- Localise landscaping and a small grass area.

6.6.9 Laundry Buildings

Laundry buildings are proposed to be standard-sized (14.4 m x 3.3 m) transportable buildings, divided into three rooms internally:

- The main laundry for resident's use;
- A cleaners'/chemical store; and
- A local linen store/depot.

The key equipment proposed for the residents' laundry includes:

- Commercial grade front loading washing machines and dryers (Maytag or Speed Queen) at a ratio of 1 machine for every 6 camp rooms;
- Stainless steel wash tubs;
- One or two laundry sorting tables; and
- Built-in ironing stations with irons and ironing board.

Facilities will not be provided on-site for laundering accommodation room linen. It is expected that the camp management contractor will arranged for linen to be cleaned off-site through a commercial laundry service.

6.6.10 Ice Rooms

Each construction camp should be provided with an ice machine room for use by residents.

Each ice room should contain at least two high-capacity ice machines, with output and storage capacity of 600 kg/day and a high capacity chilled water unit. The facility should be located on a main path of travel so that residents can collect ice to keep drinks cool on their way to work.

A nominal building size of 8 m x 3.3 m is proposed. Ice machines and storage bins are quite bulky, so oversized doors are recommended to provide adequate access for replacement equipment. Air conditioning and external venting of equipment is also recommended to improve the efficiency of the machines.

6.6.11 Medical Facility

A medical facility is proposed for each site. Where a construction depot is co-located with a construction camp, the same facility would be shared between the two areas.

A transportable building of nominal size 14.4 m x 3.3 m is proposed, separated into the following areas:

- Paramedic's office and consultation room, with external access doors.
- Treatment room, with treatment bed and lamp, hand-wash basin, work bench, sink, fridge (pad-lockable) and lockable storage cupboards (external double width access doors);
- Recovery and observation room with king size single bed, sofa chair, bedside table, television and en suite toilet;
- Universal access shower and toilet.

An ambulance shelter will be located adjacent to each medical centre. The ambulance shelter should be drive-through and be wide enough to enable easy manoeuvring of stretchers. Stretcher trolley access should be provided directly between the ambulance and medical facility (no steps or trip hazards).

6.6.12 Gymnasium

The gymnasium is essential to provide residents with facilities to maintain their personal fitness programs or develop healthy lifestyle habits while away from home. It is also an important informal social centre.

Typically, usage peaks for approximately 1.5 hours after work each day (dayshift), with lesser peak in the early morning, and no more than 5-10% of residents could be expected to be using the facility at any given time. A typical ratio of 1.5 fitness stations per concurrent user can be used as a guideline to avoid queuing.

Recommendations include:

- Office for use by Health and Lifestyle officer for administration, fitness consultations and assessments.
- Space for group fitness classes. Ideally this should be separable from the main gym area by a concertina wall or even a separate room.
- Cardio zone with cardio equipment such as treadmills, bikes, rowers, cross trainers. Equipment should be durable and robust to minimise down-time.
- Boxing station with speed balls, floor to ceiling balls, punch/kick bags and mitts / kick shields. This equipment can also be used in group fitness classes.
- Free-weights areas with a range of bar bells, dumb-bells and benches. Building flooring should be reinforced in this area to withstand dropped weights, and rubber mats provided for shock absorption.
- Cable weight machine area for conditioning specific body areas. Multi-station units can be used to reduce the footprint, provided that they are designed so that more than one station can be used simultaneously.
- Stretch, core and cool down area with floor mats, fit balls, medicine balls, etc. Industrial carpet is recommended for the floor in this area. If possible, providing glass sliding doors from the internal area to an undercover outdoor stretch / meditation area can be useful.
- General facilities such as toilets (may be external, shared with other sports facilities), storage pigeon-holes, chilled water fountains, music system, block mounted posters (stretching, heart rate training zones, fit ball exercises, etc).

The recommended gymnasium size to provide a good range of facilities as described above is 300 m^2 floor area for the rail construction camps.

6.6.13 Multi-Use Sports Court

A sports court provides another opportunity for residents to interact in an active social environment. Courts can be used by individuals, groups of colleagues and also for organised sports rosters run by the Health and Lifestyle Coordinator.

Sports courts have a large footprint and relatively high capital cost due to the size of the concrete slab required. One multi-use court only is recommended for each rail camp.

A typical multi-use court specification includes:

- A footprint of approximately 35 m x 19 m.
- Reinforced concrete slab treated with an acrylic sports surface and surrounding chain mesh fencing.
- Line markings and equipment for 4 or 5 sports, such as tennis, basketball, netball, volleyball and “indoor” soccer.
- Nets, swing-away basket ball towers, netball hoops and free standing soccer goals.

- Lighting for night time games.
- Drinking water fountain.
- Localised landscaping.
- Access to toilets nearby (may be shared with another facility).

6.6.14 Cricket Pitch

An indoor-cricket pitch (located outdoors) is usually popular with residents, and residents are keen to get involved in either ad-hoc matches organised by their company or ongoing trophy competitions between teams from the various contractors.

A typical cricket pitch specification includes:

- A footprint of approximately 30 m x 12 m.
- Reinforced concrete slab base with synthetic turf surface
- Netting and posts with bracing to fully enclose the cricket court.
- Electronic score board, umpire's chair and fixed bench spectator seating.
- Lighting for night time games.
- Fixed spectator bench seating.
- Localised landscaping and water fountain.
- Access to toilets nearby (may be shared with another facility).

6.6.15 Multi-Use Track

An unsealed multi-use track around the camp and environs provides a low-cost opportunity to provide residents with freedom to move and something to do outdoors. It is usually possible to integrate the track in to other essential facilities, such as service vehicle access roads or firebreak tracks, or to utilise pre-existing tracks in the locality and grade them.

An advantage of the multi-use track is that a basic track can be provided early, so that the first camp occupants have access to use it while some of the non-essential recreation facilities are still being constructed.

Recommendations to enhance the basic track include:

- Distance markers so users can see how far they've walked/run/cycled.
- Occasional bench seating at the most scenic points for relaxation/meditation.
- Outdoor fitness stations such as those seen in neighbourhood parks.

6.6.16 Golf Putting Green and Driving Nets

Driving nets and putting greens have a relatively small footprint, can be constructed simply and provide another opportunity for residents to keep fit and stay involved in everyday sports while on site.

Recommendations for a golfing facility include:

- A putting green with 6-8 putting cups imbedded in a nominal area of 5 m x 10 m. The recommended construction is for synthetic turf on an unreinforced free-form undulating concrete slab.
- 3 golf driving bays protected with safety nets. The recommended size of each bay is would be in the order of 2.5 m x 15 m, depending on space availability at each site.
- Gazebo & picnic table for spectator or people waiting to take their turn.
- Area lighting for night time use.
- Access to toilets nearby (may be shared with another facility).

The facility should be separated from accommodation areas to avoid noise issues.

6.6.17 Swimming Pools

Provision of swimming pools is not recommended for the rail construction camps due to the high capital and running costs. Pool construction and operation also has a high level of regulatory compliance requirements compared to other facilities.

6.6.18 Bulk Linen and Cleaning Materials Store

A bulk linen and cleaning store is required for each site. The facility acts as both a receiving depot for clean linen being returned from commercial laundries before it is distributed to local stores throughout the camp and as a collection depot for used linen awaiting off-site laundering. Providing inadequate facilities for linen management results in higher camp management costs due to replacement of mouldy/rain damaged linen.

Typical features of the linen and cleaning store include:

- Space for cleaning chemicals and bulky paper goods; a dirty linen depot; and a clean linen storage area.
- Heavy duty shelving in the clean linen and chemical store areas, and floor space for the storage of used linen tubs/bags.
- Dirty and clean linen rooms require air conditioning to assist with mildew control.
- Door widths sized for pallet trolley access, and floors designed for pallet trolley loads.
- Wide breezeway along the front of the building to facilitate undercover pick-up and drop off of linens and other stores. The breezeway should be trafficable, and support columns arranged to allow drive-through access

A minimum nominal building size of 100 m^2 (two transportable modules) is recommended, with a 3 m wide undercover loading breezeway.

6.6.19 Communications Head-End Building

The communications head-end building will be used to house the head-end equipment required to de-code communications signals incoming to the site to and distribute communications and audiovisual entertainment services throughout each site.

The building should be positioned in a reasonably central location to minimise the length of reticulation runs as far as practicable. The building should also be positioned close to the satellite dish compound.

A building size of 8.0 x 3.3 m is sufficient for each of the rail construction camps.

Specific requirements include:

- A reinforced floor designed to support the weight of a fully-loaded communications rack.
- Double-width external doors to facilitate movement of equipment into the building.
- Smooth ramp entry to the building (no stairs), with landings and handrails if required by site layout.
- Air conditioning.
- Uninterruptible Power Supply (UPS).
- Communication racks and suspended cable trays for cable routing.
- GPO, data ports and small desk for use by technicians.

6.6.20 Waste Management & Recycling Facilities

The site layout must include an area for storage and sorting of waste and recyclable streams and loading onto vehicles for off-site disposal. The recyclable storage / sorting area will nominally be in the vicinity of the camp maintenance depot. An undercover dry area is required for storage of paper and cardboard products. Three phase power outlets are required at this location for paper balers and glass crushers (equipment by to be provided by the service provider).

The kitchen/diner building is the largest generator of putrescibles waste in a camp. A bin room will be incorporated into the back of the kitchen building for interim storage of this waste. The room should be air conditioned to minimise the rate of waste decomposition prior to its removal. Facilities to wash-down and sanitise wheelie bins to keep them hygienic are also required.

6.6.21 Maintenance Shed and Compound

A maintenance shed of nominal size 12 m x 12 m is proposed for each site. This will be used to manage basic maintenance work and for storage of equipment and materials. Key requirements include:

- Forklift accessible (trafficable concrete floor, high-clearance roller doors and adequate internal ceiling clearances)
- Secure store area
- Lockable dangerous goods cabinet
- Work bench and tool rack
- GPO's throughout and 3-phase power at nominated locations welding outlets
- Office area and kitchenette for the maintenance supervisor
- Double width roller door and additional personnel access door
- Breezeway adjacent to the shed with external single phase and 3-phase power outlets. This will be used for re-charging maintenance buggies and for recyclable sorting/baling/crushing, etc.

The shed should be located adjacent to a secure maintenance/storage compound, with a recommended size in the order of 20 m x 20 m.

6.6.22 Footpaths

The minimum requirements for footpaths are set by the *Queensland Development Code for Temporary Accommodation Buildings and Structures (MP3.3)*. This code requires:

- Paths to be sealed (concrete or bitumen);
- Paths between accommodation rooms and the dining hall to be undercover; and
- A minimum path width of 1.5 m.

Paths are also used by janitorial personnel servicing rooms and need to be suitable for cleaning carts and buggies. A width of 1.8 m is proposed for all arterial footpaths to accommodate this, and a minimum width of 1.5 m for minor paths only.

Unreinforced concrete paths are proposed for the temporary rail construction camps.

6.6.23 Landscaping

The *Queensland Development Code for Temporary Accommodation Buildings and Structures (MP3.3)* requires accommodation buildings to be surrounded by a minimum of 6 m of ground cover (such as plants, mulch or coarse aggregate) for dust control on unsealed sites.

Council building approvals usually require a degree of landscaping to maintain or enhance the aesthetics of the adjoining area where the camp is located close to an existing town or visible from public roads.

The proposed landscaping scheme for the rail camps includes:

- In-situ natural vegetation, especially mature trees, left in-situ where practicable;
- An emphasis on the use of native vegetation appropriate to the climate;
- Generally medium – low density planting. With the exception of Wollombi, rail construction camps will only be in use for 2 years and landscaping plants will be removed when the sites are rehabilitated. Small, fast maturing species are best suited.
- Landscaping of paths of travel between accommodation buildings and the central facilities buildings;
- A focus on providing landscaping in communal gathering areas, such as the tavern, bus shelter, gazebos and sports facilities;
- Turf lawn adjacent to the recreation areas (beer garden/alfresco dining, gazebos);
- A landscaped noise buffer between accommodation rooms and noisy recreation areas (beer garden, golf driving range, sports courts and cricket nets);
- Shade vegetation, or other sun screening device on the north-western edge of accommodation areas to minimise heat loads to accommodation buildings;
- An automated irrigation system; and
- The use of mulch, pine bark or aggregates to assist with dust minimisation.

7.0 FLY CAMPS AND INTERIM ACCOMMODATION

Rail construction camps need to be built very quickly once Project funding is released to meet the rail construction schedule ramp-up requirements. Large fly camps will be needed to house the camp construction workforce and other early works contractors such as water source development crews and pioneering earthworks contractors.

Existing accommodation should be used at Merinda (for Camp 1), Collinsville (for Camp 2) and Lancewood (for Camp 3), but early commitment is required to secure rooms in these existing facilities. Temporary accommodation is in high demand in these areas due to competing projects.

A 150 room fly camp will be required for initial accommodation at Camp 4 – Gregory, and possibly at Camps 1-3 should existing rooms be unavailable.

Fly camps will be utilised for a period of approximately 6 months at each location, until rooms are available in the rail construction camps.

Fly Camps will be hired or leased, and not purchased outright by the Company. Fly camps will nominally be provided by the rail camp construction contractor(s) as part of the rail

camp scope of works. However, they could be provided as a stand-alone contract. This should be determined by the market availability closer to implementation.

Fly camp buildings and equipment do not need to be new. Well-maintained, fit for purpose, second hand buildings and equipment, or buildings from a hire pool are acceptable.

The proposed fly camp specification includes:

- 150 accommodation rooms. Rooms will have private en-suites and nominally be of 12 m^2 size (4 rooms per standard 14.4 m x 3.3 m transportable building);
- Laundries, with storage room for linen and cleaning supplies;
- Kitchen / diner building, of suitable size to prepare and serve meals to all residents over a 2 hour dining period;
- Camp administration office;
- First aid room;
- Small recreation room for residents' use;
- Small gymnasium;
- Small bar (capable of being licensed) and undercover beer garden;
- Basic level of public phone and internet access for residents;
- Footpaths, parking and area lighting as required to meet safety requirements and provide a basic level of amenity to camp occupants;
- On-site power generation (diesel generators), main switchboard and power and distribution network;
- Diesel fuel tanks for power station supply;
- Sewerage system and black-water holding tanks. Tanks should be sized for off-site disposal of septic waste by vacuum tanker no more than twice a week to help control operating costs;
- Potable water treatment plant, storage tanks and pumping system. Raw water will nominally be supplied from a construction water bore. However, it is likely that potable water will need to be tankered in from the nearest town for the first month or two of operation; and
- Fire protection.

It is recommended that the Gregory, and the other fly camps if constructed also include vehicle refuelling facilities due to the distance between the camp and nearest town.

Building approvals are required from the relevant Regional Council for fly camps. Because each camp will be required for longer than 42 days, the requirements of the *Queensland Development Code MP3.3 – Temporary Accommodation Buildings and Structures* also apply. It is recommended that HCPL works closely with representatives from each Regional Council to seek an exemption from the more onerous requirements of MP3.3 for

the fly camps on the grounds that these camps are only being used as an interim measure to provide an accommodation camp that fully complies with the Code requirements.

Approval timeframes make it impractical to provide on-site waste water treatment for the fly camps. Frequent off-site sewage disposal will be needed, with the higher associated operational costs.

8.0 CONSTRUCTION DEPOTS AND FACILITIES

Construction facilities are required for each of the five separable portions defined by the Construction Methodology. The size of each depot, and the facilities included, will vary from location to location to suit the Project requirements.

One regular construction depot is proposed for each separable portion, with a larger track construction facility at Wollombi. Depot 3 at Wollombi will be the base for the two track laying work fronts, and contain a sleeper manufacturing facility and rail welding facility.

8.1 Design Philosophy

Construction offices and facilities, with the exception of some of the Wollombi facilities, have no identified use by HCPL past the initial rail construction phase. The approach to construction facility design is to provide the minimum facilities required to run the Project efficiently in order to minimise cost.

Construction facilities will generally be located adjacent to each rail construction camp, with a suitable separation buffer. This enables site infrastructure and access roads to be shared between the camps and construction facilities and saves duplication.

Good access is required between the construction depots and work fronts along the rail alignment. Access tracks will be established or upgraded in parallel with site construction, prior to ramp-up of the bulk earthworks crews.

8.2 Design Criteria

The same criteria outlined in Section 6.4 are applicable for the construction office and depot facilities.

8.3 Required Facilities

Construction depot facilities include:

- Construction management offices;
- Crib Room / meeting rooms;
- Security gatehouses and induction room (shared with camp);
- Gatehouse toilets;
- Breezeways;
- Owners' representative's offices;

- Toilets;
- Sea containers (storage);
- Contractor offices;
- Workshops;
- Materials laydown areas;
- Concrete batching plants;
- Culvert rolling facilities;

Track construction facility, in addition to the above includes:

- A rail string welding facility;
- A sleeper production facility;
- Ballast stockpiles.

Construction facilities at each location will be provided by either the Construction Management Contractor or by contractors delivering the various work packages. The proposed strategy is discussed for each facility later in this Section.

A more detailed scope table for each site is included in Appendix C and the functional specification for each building / facility is discussed below.

8.4 Summary Functional Specification for Key Facilities

The following section summarises key points from the functional specification proposed for all construction facilities. For more information, refer to the *Technical Specification for Rail Construction Camps* CJVP10007-SPE-C-005.

8.4.1 Offices

8.4.1.1 Construction Management Office

The proposed construction management office sizes shown in Table 11 have been determined after consideration of the construction management organisation chart (refer to Appendix B).

The buildings need to be easily identifiable for people arriving at the site for the first time and be fitted with clear and welcoming external signage. The reception area should be positioned adjacent to the main point of access from the car park.

Construction office communications rooms will be fitted out with sufficient rack space for housing equipment to distribute communications throughout the construction management office, crib/meeting room and owners' office.

Table 11 – Construction Management Office Sizing

	Office 1 Salisbury Plains	Office 2 Collinsville	Office 3 Eaglefield	Office 4 Gregory	Office 5 Alpha Rail
Large Offices	1	1	3	1	1
Small Offices	6	6	6	6	6
Workstations	37	30	39	30	29
Reception Desk/Counter	1	1	1	1	1
Document Control Room	1	1	1	1	1
(Minimum total no. work desks)	*(46)*	*(39)*	*(50)*	*(39)*	*(38)*
Communications Room	1	1	1	1	1
Kitchenette	1	1	1	1	1
Printing Areas	2	1	2	1	1
Reception Waiting Area	1	1	1	1	1

8.4.1.2 Owners' Representative's Office

An allowance has been included in the BFS pricing for the provision of an Owner's Representative's Office at each site. This office will nominally be located adjacent to the main construction management office, with the two buildings connected by a breezeway.

The Owner's Representatives' office specification includes:

- A single floor transportable office (nominally 14.4 m x 3.3 m);
- One small office and two open-plan workstations;
- A small kitchenette;
- A meeting/lunch table;
- Communications rack;
- Printing area; and
- Peripherals such as noticeboards and white boards.

8.4.1.3 Contractor Offices

Contractors will be required to provide their own construction office accommodation and crib rooms.

Each contractor will be provided with a serviced hardstand area for establishment of their site offices. Each contractor "bay" will nominally be 25 m x 25 m and the number of contractor bays proposed at each site is shown in Table 12. More bays are proposed at Depot 1 and Depot 3 to accommodate the diverse range of activities required at these sites.

Table 12 – Contractor Office Bays

Construction Depot Location	Number of Contractor Office Bays Proposed
Camp 1 – Salisbury Plains	12
Camp 2 - Collinsville	8
Camp 3 - Wollombi	12
Camp 4 - Gregory	8
Camp 5 – Alpha Rail	8

The following services will be reticulated from the site infrastructure to each contractor office bay:

- Potable water;
- Sewerage collection; and
- Power (single phase).

Services will be provided to a nominated take-off point at the boundary of each bay and contractor office areas will be protected by the site fire hydrant and hose reel system.

8.4.2 Crib/Meeting Room

The crib/meeting room will be located adjacent to the construction management office, and the two buildings connected by a breezeway. The building will be used as a lunch area for construction management personnel and also for holding meetings such as contractor progress meetings, safety workshops, pre-starts and the like.

The proposed building size is 14.4 m x 6.6 m (two transportable building floors) partitioned into:

- A small lunch (crib) room; and
- A meeting room area.

The crib room specification includes a kitchenette, lunch tables with chairs, water fountain and peripherals such as notice boards.

The meeting room specification includes:

- Bi-fold panel wall to enable the room to be used as a single large meeting room or two smaller meeting rooms;
- Data projector system, connected to the site IT network;
- Large wall mounted white boards (not electronic) and noticeboards;
- Two meeting tables, each capable of seating 12 people;
- Additional stackable chairs for larger meetings; and
- Lighting split into zones to match the meeting rooms (i.e. to enable one room to be dimmed for projector use while a meeting is taking place in the adjacent room).

8.4.3 Security Gatehouse / Induction Room

It is recommended that each rail construction camp will have a security gatehouse located on the entry road to the site in a position that enables control of traffic to both the construction depot and main camp. As well as being the control point for personnel movements on and off site, the facility will house a common alarm panel for site infrastructure alarms and provide an induction room for running site induction training for new arrivals on site.

A 12.0 m x 3.0 m transportable building is appropriate to house the security office, reception / waiting room, and an induction room.

The building will be located adjacent to the site boom gate, and parking/slip lanes are required on both entry and exit sides of the gate to minimise traffic queues. A small toilet block should also be provided adjacent to the gatehouse.

8.4.4 Sleeper Production

A single large sleeper production facility will be used for the Alpha Coal Rail Project. The facility will be located at the Wollombi Construction Depot. Track construction will proceed northwards and southwards from this site, and sleepers will be distributed along the formation via rail as works progress.

The sleeper production facility requires an area of approximately 5 ha. A compacted hardstand of this size will be incorporated into the earthworks design for the Wollombi Construction Depot.

The sleeper fabrication contractor will be required to establish their own buildings and facilities on the hardstand. These include:

- A production shed, of nominal size 200 m x 30 m;
- A concrete batching facility. This will be a dedicated batching facility, separate to the facility used to provide concrete for camps and bridges;
- A stockpile of approximately 3 ha size;
- Crib room, ablutions and office.

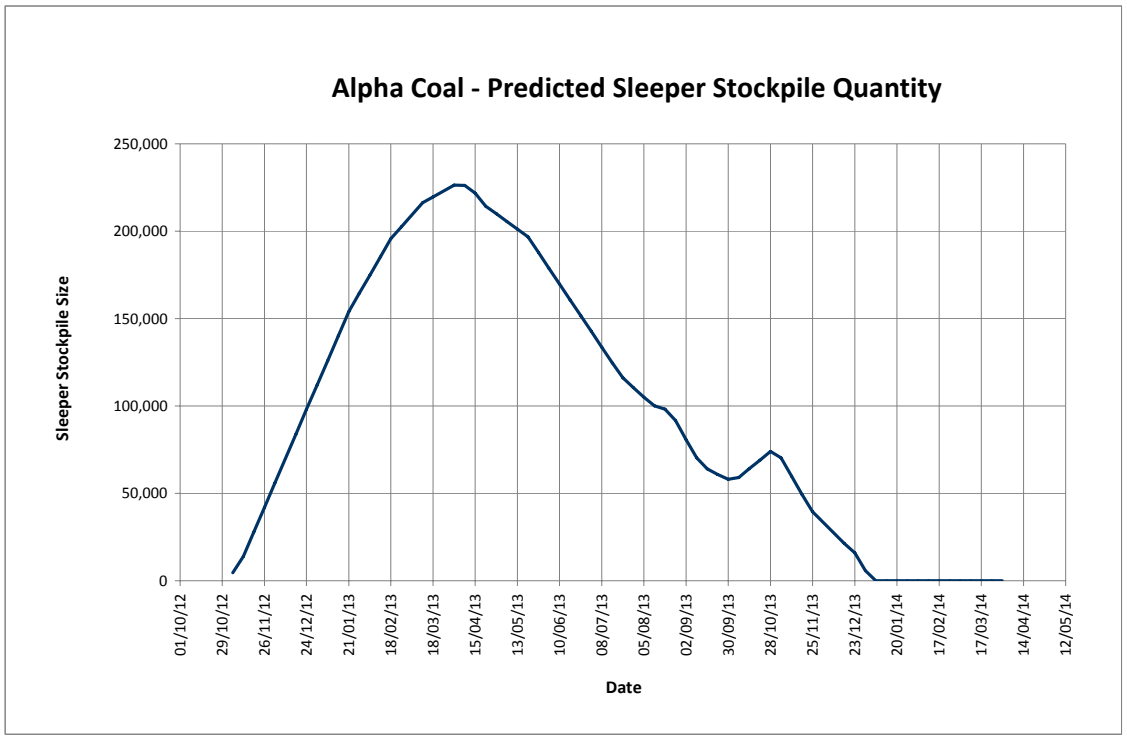
The facility will be located in a fixed location for the duration of the project, so key essential services will be included in the camp and construction depot design:

- Water for sleeper production has been included in the site water balance.
- Power for the facility will be provided from the on-site Wollombi power station.
- The fabrication contractor's crib rooms and offices will be connected to the site sewer network. Process waste water (from concrete batching and cleaning processes) will need to be managed by the contractor as this is incompatible with the camp WWTP.

Some 900,000 sleepers need to be produced for the Project, and sleeper production is on the critical path to ensure sleeper stockpiles are established before tracklaying starts in Q2 2013. The facility will take approximately 6 months to set up, with a workforce of up to 65 people. This will be one of the first contractors to mobilise to site at Wollombi as soon as accommodation rooms are available.

Sleeper production will occur around the clock, and this is one of the areas where nightshift work is anticipated from the start. A sleeper fabrication rate of 14,000 units per week has been assumed based on industry advice. A maximum stockpile size of 225,000 sleepers is expected prior to the start of tracklaying.

Figure 2 – Forecast Sleeper Stockpile



8.4.5 Rail String Welding

A rail string welding facility will be established at the Wollombi depot to service the Project. Track construction will proceed northwards and southwards from this site, and long welded rail strings will be hauled by rail train to the work fronts as tracklaying works progress.

The rail welding facility requires an area of approximately 450 m x 150 m. It will include:

- Short rail stockpile for 25 m rail sections;
- Processing sheds for:
  - Pre-weld surface preparation (grinding, brushing);
  - Flash butt welding;
  - Straightening;
  - Weld cleaning (grinding);
  - Heat treatment; and
  - Weld QA testing.
- Long welded rail string (LWR) stockpile and gantry system for loading the 400 m long rail sections onto the rail train for distribution to the work front.
- Crib room, ablutions and office.

A spur line will be constructed from the mainline into the LWR string stockpile area to accommodate rail train loading. The facility needs to be located relatively close to the mainline alignment to minimise spur construction costs.

The preferred option for delivering short rail sections to site is by utilising Queensland Rail's freight service. This minimises the number of truck movements required between Wollombi and Mackay, where short rail segments are proposed to be imported to Australia. The "Missing Link" rail section currently under construction by QR would be used for deliveries. An off-loading spur and gantry are proposed at Wollombi, and the rail welding facility has been positioned close to the narrow-gauge QR alignment to minimise local haul distances to the short rail stockpile.

Road freight may still be required for some or all of the rail string. Road train access to the short rail stockpile, with space for manoeuvring and unloading freight trucks, will be provided.

As for the sleeper facility, the rail string welding facility will be located in a fixed location for the duration of the project. Key essential services will be included in the camp and construction depot design:

- Power for the facility will be provided from the on-site Wollombi power station.
- The contractor's crib rooms and offices will be connected to the site water and sewer network.

The flash butt welding equipment is a high-capital, long-lead item. Supply and installation of the flash butt welder is on the Project critical path. Two options are being pursued:

- A single fixed and fully automated flash butt welder. An installation using this technology has a lower manning requirement for operations (approximately 7 people per shift) and a very high production rate (up to 70 welds per 8 hour shift). On the downside, it is expensive and the lead time could be up to 2 years from order to operations. The vendor is currently investigating options to reduce the timeframes.
- Two mobile flash butt welders installed in parallel in fixed locations. An installation using this technology has a higher manning requirement for operations (approximately 15-20 people per shift) and lower production rates (approximately 30 welds per 8 hour shift for each machine). The "mobile" installation still has a long lead time of approximately 18 months from order to operation.

With either option, rail string production will occur around the clock, and this is one of the areas where nightshift work is required from the start. Three 8-hour shifts per day are proposed.

A single automated flash butt welder is the preferred option as the lower production rate offered by two mobile welding machines results in an excessive long welded rail stockpile size and provides no float for production delays.

Figure 3 – Forecast Long Welded Rail String Stockpile

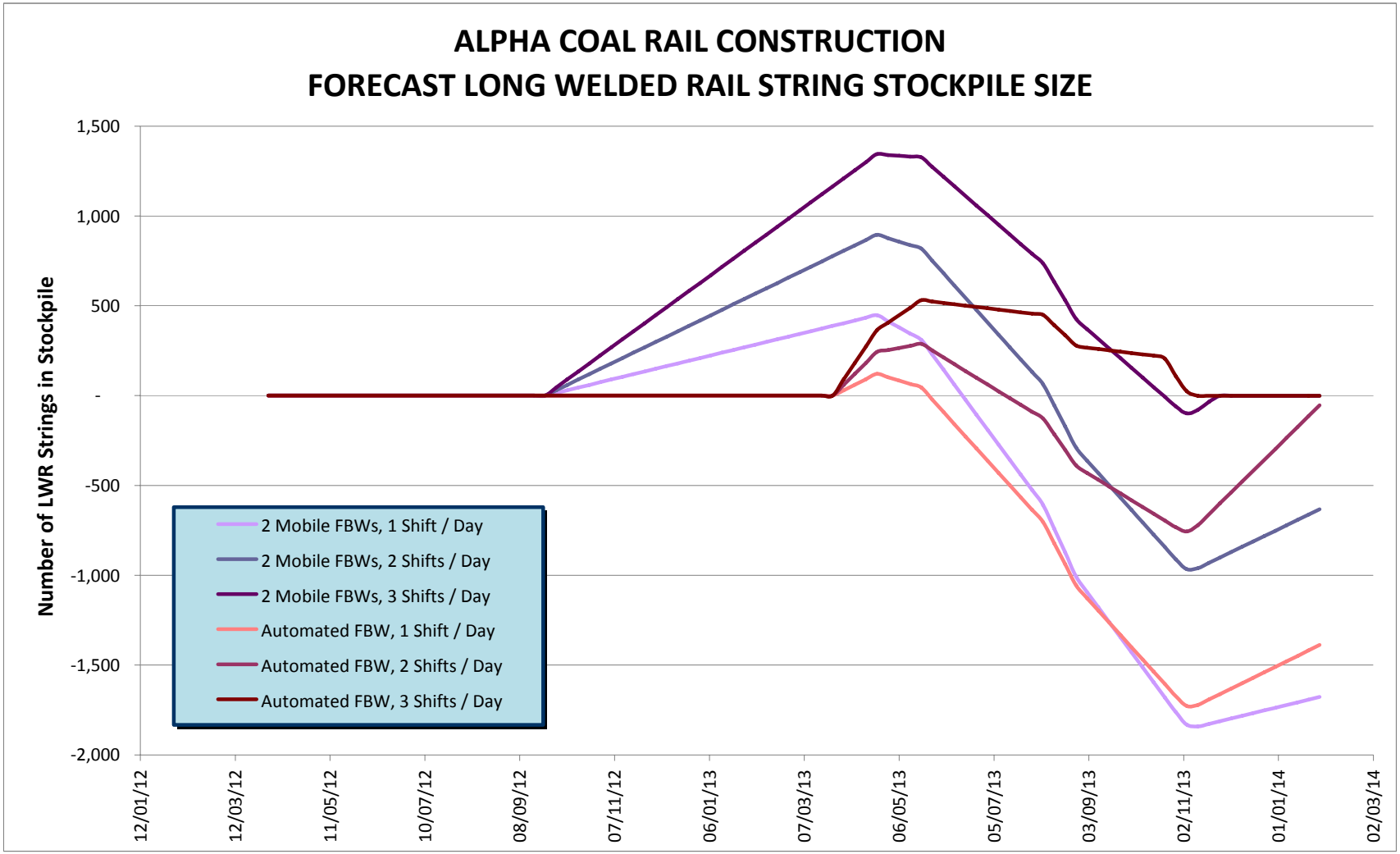
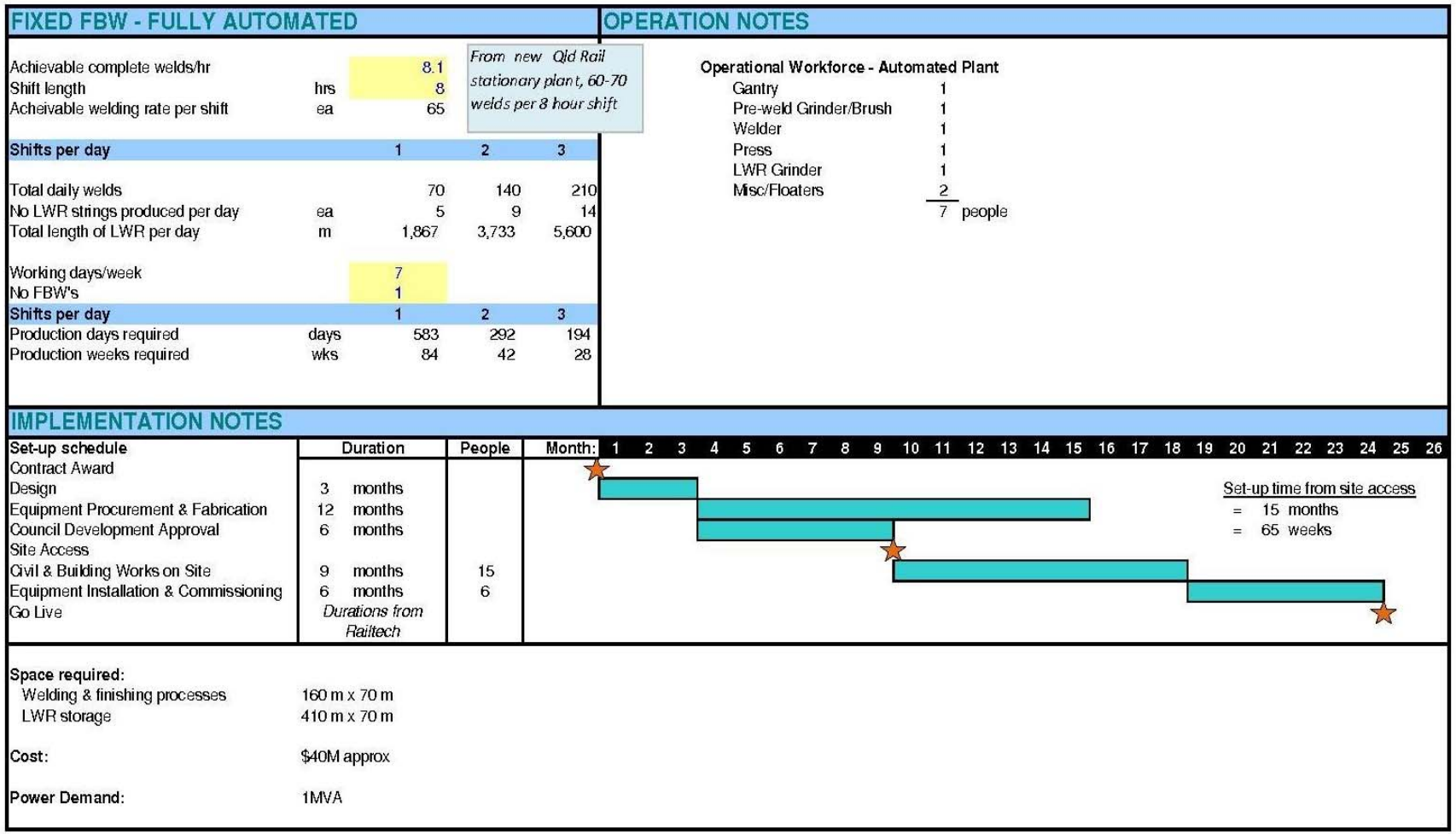


Figure 4 – Automated Flash-Butt Welding Installation Summary



FIXED FBW - FULLY AUTOMATED

Achievable complete welds/hr		8.1		
Shift length	hrs	8		
Acheivable welding rate per shift	ea	65		
Shifts per day		**1**	**2**	**3**
Total daily welds		70	140	210
No LWR strings produced per day	ea	5	9	14
Total length of LWR per day	m	1,867	3,733	5,600
Working days/week		7		
No FBW's		1		
Shifts per day		**1**	**2**	**3**
Production days required	days	583	292	194
Production weeks required	wks	84	42	28

From new Qld Rail stationary plant, 60-70 welds per 8 hour shift

OPERATION NOTES

Operational Workforce - Automated Plant

Gantry	1
Pre-weld Grinder/Brush	1
Welder	1
Press	1
LWR Grinder	1
Misc/Floaters	2
	7 people

IMPLEMENTATION NOTES

Set-up schedule	Duration	People
Contract Award		
Design	3 months	
Equipment Procurement & Fabrication	12 months	
Council Development Approval	6 months	
Site Access		
Civil & Building Works on Site	9 months	15
Equipment Installation & Commissioning	6 months	6
Go Live	*Durations from Railtech*	

Month: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26

Set-up time from site access
= 15 months
= 65 weeks

Space required:

Welding & finishing processes	160 m x 70 m
LWR storage	410 m x 70 m

Cost: $40M approx

Power Demand: 1MVA

Figure 5 – Mobile Flash-Butt Welding Installation Summary

MOBILE FBW - INSTALLED IN A FIXED LOCATION

Achievable complete welds/hr		4	*3-4 welds/hr advised by Railtech*
Shift length	hrs	8	
Acheivable welding rate per shift	ea	32	

Shifts per day		**1**	**2**	**3**
Total daily welds		32	64	96
No LWR strings produced per day	ea	2.1	4.3	6.4
Total length of LWR per day	m	853	1,707	2,560
Working days/week		6.5		
No FBW's		2		
Shifts per day		**1**	**2**	**3**
Production days required	days	638	319	213
Production weeks required	wks	99	50	33

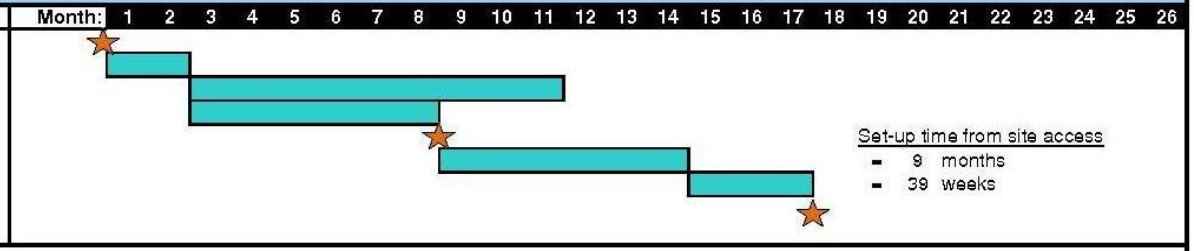
OPERATION NOTES

Operational Workforce - Manual Plant

15-20 people
(Figure advised by Railtech)

IMPLEMENTATION NOTES

Set-up schedule	**Duration**	**People**
Contract Award		
Design	1.5 months	
Equipment Procurement & Fabrication	9 months	
Council Development Approval	6 months	
Site Access		
Civil & Building Works on Site	6 months	15
Equipment Installation & Commissioning	3 months	6
Go Live	*Durations from Railtech*	



Space required:
- Welding & finishing processes: 160 m x 70 m
- LWR storage: 410 m x 70 m

Cost: $20M each

Power Demand: 1MVA

8.4.6 Concrete Supply

On-site concrete batch plants will be established to provide the concrete required for camps, infrastructure works and bridge construction. A concrete supply contract will be awarded, and the successful contractor will be required to provide all facilities required for establishing and running the concrete batching operations. A 100 m x 100 m hardstand has been included at each construction depot for the concrete contractor's use.

Provision of treated water to the concrete batching facility has been included in the water balance for each site. Treated effluent from the WWTP will be preferentially used for concrete production to minimise raw water demands.

After rail camp construction is complete, the main demand for concrete (with the exception of the marshalling yard infrastructure) will be at bridge sites. It may be advantageous to relocate one or all of the batch plants from the construction depots to specific bridge sites. This needs to be evaluated further in the detailed implementation planning phase.

Table 13 shows the proposed batch plant capacities for each site.

Table 13 – On-Site Concrete Batching Capacity

Construction Depot Location	Proposed Batch Plant Capacity (m^3/day)
Camp 1 - Salisbury Plains	300
Camp 2 - Collinsville	200
Camp 3 - Wollombi	200
Camp 4 - Gregory	300
Camp 5 - Alpha Rail	300

8.4.7 Quarries and Ballast Handling

Ballast will be quarried from 3 proposed locations:

- A northern quarry near CH 486 km (Mt Roundback);
- A mid-section quarry near CH 316 km (Weetalaba); and
- A southern quarry near CH 020 km (Surbiton Hill).

Approximately 800,000 m^3 of ballast needs to be quarried for the railway construction, including an allowance for losses. Weetalaba quarry is located close to the Wollombi track construction depot, and is the preferred source for the bulk of the ballast supply. The northern and southern quarries will primarily be used to source ballast for the extremities of the track, the marshalling yards (Mt Roundback only) and the two loops.

Geotechnical drilling is proposed to commence during the detailed design phase to firm-up expected material yields at each quarry. If test results are favourable, the preferred ballasting strategy involves:

- Central Section:

  A large ballast stockpile will be established at Weetalaba and a ballast siding will be constructed. Ballast trains will be loaded and watered on this siding. The ballast trains will then distribute ballast north and south to coincide with the tracklaying progress. The stockpile size is forecast to peak at 300,000 m^3 just prior to track construction and will require an area of 15 ha.

  Initially, some ballast will need to be hauled by road to the Wollombi Depot until tracklaying on the northern workfront reaches the Weetalaba Quarry siding. An area of up to 12 ha has been allowed at Wollombi for this use. Alternatively, the construction trains can operate on skeleton track until the tracklaying passes the quarry location, at which time the ballasting can commence from the quarry chainage.

  Under the preferred scenario, Weetalaba Quarry will provide 540,000 m^3 of ballast, sufficient to ballast the track between CH 050 km and CH 431 km. The optimal productivity rate for quarrying and crushing/screening operations is in the order of 2,000 m^3/day.

- Northern Section:

  Ballast from the Mt Roundback Quarry will be road-hauled to a stockpile within the marshalling yard area.

  Mt Roundback Quarry will provide 190,000 m^3 of ballast, sufficient to ballast the track between CH 431 km and the Port Loop, including the marshalling yard. The optimal productivity rate for quarrying and crushing/screening operations is in the order of 600 m^3/day.

  When the central section of the track has been ballasted, the northern ballasting train will travel approximately 50 km on skeleton track from the CH 431 km turnout to the marshalling yard stockpile. The train will then work backwards to ballast the skeleton track while the track laying front proceeds ahead towards the Port.

  There will be some lost ballasting time while track is laid between the CH 431 km turnout and the marshalling yard area. Extra ballasting shifts may need to be run for a period of time to recover schedule. Alternatively, the amount of time lost could be minimised by running a nightshift for tracklaying between CH 431 km and the marshalling yard.

- Southern Section:

  Ballast from the Surbiton Hill Quarry will be road-hauled to a stockpile at the Alpha (Rail) Depot.

  Surbiton Hill Quarry will provide 70,000 m^3 of ballast, sufficient to ballast the track between CH 050 km and the Mine Loop. The optimal productivity rate for quarrying and crushing/screening operations is in the order of 600 m^3/day.

  When the central section of the track has been ballasted, and the southern track laying has reached the Alpha (Rail) Depot, the southern ballasting train will travel approximately 30 km on skeleton track from the CH 050 km turnout to the Alpha

(Rail) stockpile. The train will then ballast the skeleton track while the track laying train proceeds ahead towards the Mine Loop.

There will be some delays in completed ballast while track is laid between the CH 050 km turnout and the Alpha (Rail) Depot. Extra ballasting shifts may need to be run for a period of time to recover schedule. Alternatively, the amount of time lost could be minimised by running a nightshift for tracklaying between CH 050 km and Alpha (Rail) Depot.

The strategy outlined above minimises the road haul of ballast. As works progress outwards from Wollombi and ballast from Weetalaba Quarry runs out, there is a trade-off between hauling ballast from the northern and southern quarries a longer distance by road to create an interim stockpile at the start of each workfront or allowing the rail to be laid ahead of ballasting and then running the ballast train over skeleton rail to access the next stockpile.

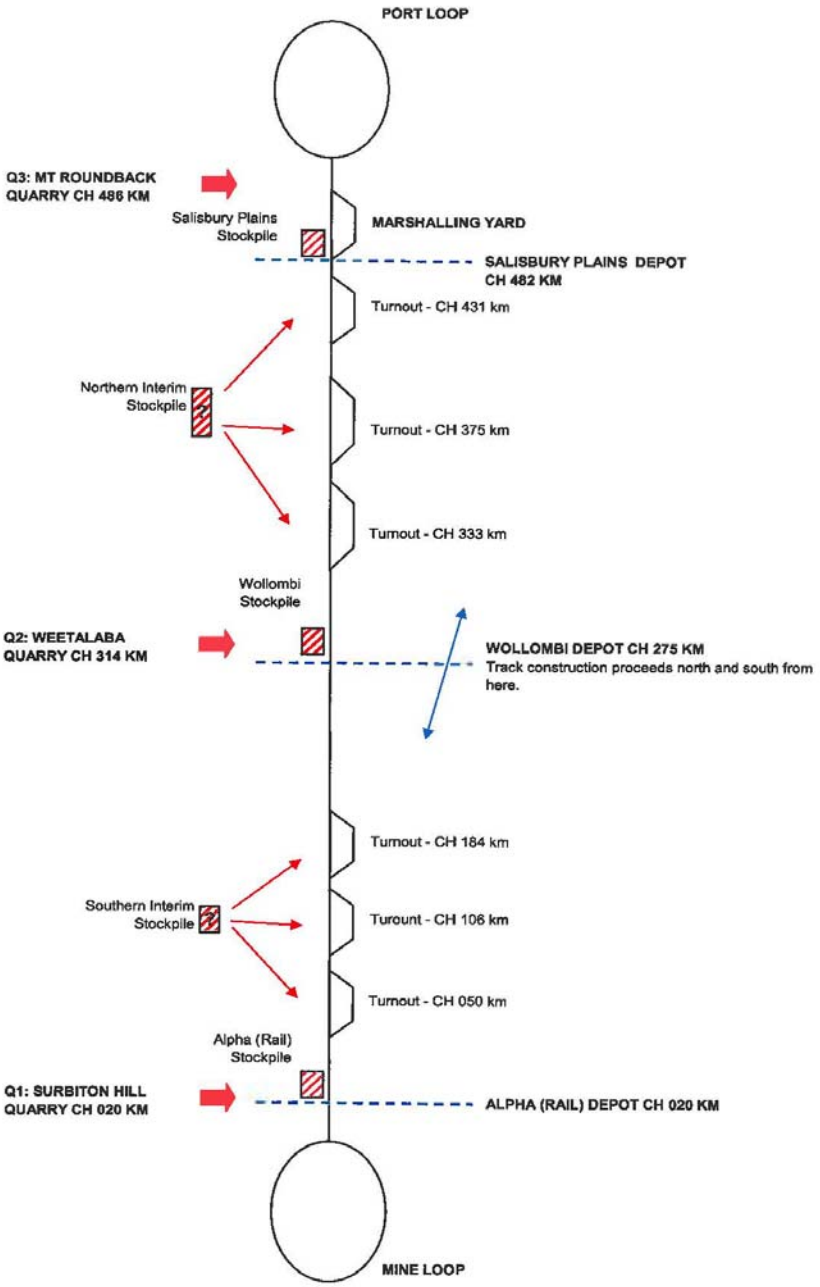
If it is not possible to wait for the rail train to work so far ahead, or geotechnical investigations indicate lower yields from Weetalaba, ballast will be road-hauled to interim stockpiles located at the permanent mainline turnouts as shown in Figure 6. The turnouts will then be used as a temporary ballasting spur for the construction phase.

The ballasting strategy needs to be finalised during detailed implementation planning.

The proposed ballast trains have a capacity of 2,200 m^3. Two trains will be required with the proposed construction strategy and schedule. One train will operate north of Wollombi to the Port, and the second train will operate south of Wollombi to the Mine. Each full train can provide ballast for 1.56 km of track.

Using two front end loaders (Caterpillar 966G), it will take approximately 8 hours to load and water each ballast train. Based on a 12 hour work day, and making an allowance for maintenance, refuelling and travel to the workfront, the maximum distance at which the ballast train can operate from the ballast stockpile in a single shift day is 58 km. The ballast train will need to be loaded on nightshift when the track construction progresses more than 58 km north or south of Wollombi. The maximum operating distance for the ballast train increases to 284 km under this scenario – far enough to enable a single train to provide ballast to the northern or southern rail loop and return for re-loading in a 24 hour cycle.

Figure 6 – Ballasting Schematic



8.4.8 Culvert Rolling

A hardstand area (100 m x 100 m) has been included at each construction depot for culvert rolling activities. Mobile culvert rolling plants will be used and relocated along the alignment as required. Additional temporary hardstand areas will be required for culvert rolling near bridges and major drainage works to suit.

Approximately 61 km (7,000 t) of rolled steel culvert sections are required for the Alpha Coal Railway. Production rates of 25 t/day can be achieved, so a minimum of two culvert rolling facilities operating concurrently will be required to meet the construction schedule.

8.4.9 Borrow Pits

A series of borrow pits will be established along the rail alignment to facilitate earthworks construction. Pits will be opened and managed by the earthworks contractor requiring the material. All borrow pits will be closed and rehabilitated when construction works are complete in the area.

The proposed location and estimated material yields are discussed in the Geotechnical Report (CJVP10007-REP-C-002), and will be confirmed by an on site investigation program.

8.4.10 Laydown Areas

Compacted hardstand areas will be provided at each depot for equipment laydown. A secure (fenced) laydown will be provided at each site.

An additional unfenced area of up to 100 m x 50 m will also be provided for general laydown at each depot. Construction Depot 1 (Salisbury Plains) will have the greatest need for a concentrated laydown area as a large volume of local infrastructure works will be managed from the site.

Contractors will be required to manage their own materials and vehicles. This means that contractors will be responsible for providing storage containers where needed, or fencing-off approved areas for material and vehicle storage should they believe it's warranted. (Note: A 24 hour security presence is recommended at each site.)

Separate local laydowns along the alignment will be used for earthworks, bridge works and trackworks.

8.4.11 Maintenance Workshops

Facilities will be required for maintaining heavy earthworks plant and light vehicles during the construction phase.

Workshops will generally not be provided by the Project. The main earthworks contractor in each separable portion will be required to provide facilities for servicing their plant. A hardstand area will be made available in the construction depot for the earthworks contractor's use. For pricing purposes, a 50 m x 50 m pad has been allowed at the construction depot.

In some circumstances, the travel distance back to the depot may not be practical for heavy plant. Contractors may choose to relocate their workshops closer where their plant is working as construction progresses.

A maintenance contract will be established for light vehicle servicing. Vehicles will either be serviced on-site or sent to a local mechanic in one of the regional towns. Using existing services helps the local economy but generally results in a greater down-time for the Project. The capacity of existing maintenance workshops needs to be investigated in the next phase of the Project.

8.5 Vehicle Washdowns

A light vehicle wash down facility will be located at each construction depot. A low-cost design has been specified, including a reel-mounted washdown hose, concrete washdown apron, graded to a collection sump, oily water separator and evaporation pond.

Higher specification oily water treatment is available that enables full recycling of washdown water. This hasn't been included due to the higher capital and operating costs and the short-term nature of the site use.

8.5.1 Remote Facilities

Temporary facilities such as toilets and lunchrooms will be required as construction fronts move further away from the central construction depots. The earthworks contractor in each area will be required to provide these facilities for their workforce.

Construction management personnel will generally use facilities provided by the contractors. However, at some fixed sites, such as the larger bridges, a small office / lunch room may be hired for a period of time for the construction manager's personnel.

9.0 ROADS AND PARKING

9.1 Roads and Maintenance Access Tracks

Camp and depot access roads will be designed for 2-way traffic flow with a 7 m nominal width carriageway.

Roads will generally be unsealed. Localised sealing may be appropriate to control specific safety or environmental hazards, or in high traffic areas such as Wollombi and Salisbury Plains.

Maintenance and emergency service access tracks are required throughout the camp and to all infrastructure areas (power station, waste water treatment plant, etc). These tracks will generally be unsealed single-lane tracks with a nominal carriageway width of 3 m and occasional vehicle passing bays.

Emergency access tracks (e.g. fire hydrant access) need to be trafficable in inclement weather.

9.1.1 Parking

Parking is required for light vehicles, buses, service trucks and multi-combination freight trucks.

Parking areas will be generally unsealed. Localised sealing will be provided if required to overcome dust hazards or maintain the required degree of accessibility (surface deterioration in wet weather).

Buses are the primary mode of personnel transport. Each site will have a 50 seater coach plus a number of mini-buses (mini-buses by individual contractors). General service trucks will also be required for infrastructure maintenance. Provision will be made for 15 bus and service vehicle parking bays at each camp.

Light vehicle parking spaces will be provided at a ratio of approximately 1 space per 4 occupants, where forecast occupancy is approximately 75% of the constructed rooms for the FIFO roster proposed.

Road train (triple trailer) coupling/decoupling areas, turning areas and parking lay-bys are required. These will be sized to handle two vehicles simultaneously.

9.1.2 Delivery Areas

It is expected that fuel, food and beverages, etc will generally be delivered to the sites as part of a regional distribution-run by the largest vehicle permitted on the local road network.

Where possible, delivery areas will be sized to accommodate triple road trains without trailer unhitching. When trailers need to be unhitched, lay-bys will be conveniently sited and the need to de-couple trailers well signed.

9.1.3 Fire Break

A 20 m wide fire break (with no vegetation or flammable material permitted) will be provided around the camp and depot sites.

Roads, access tracks and drains should be incorporated in the fire break wherever possible to minimise the extent of extra clearing required.

10.0 POWER TO SITE

A preliminary power demand calculation was undertaken for each site to determine the size of the power supply required. Options of supplying power via the existing regional power grid and by on-site generation were then evaluated.

The basis of the BFS pricing is the provision of stand-alone diesel-fired power stations at each site. The power station will be used to reticulate power to both the camp and construction depot. The power demand and proposed generator configuration for each site is shown in Table 14.

Table 14 – Power Demand and Power Station Configuration

Location	Peak Load (kVA)	Diversified Load (kVA)	Generator Size (kVA)	Number of Units (Duty + Standby)
Camp 1 – Salisbury Plains	4450	3340	1250	3 + 1
Camp 2 - Collinsville	3920	2940	1250	3 + 1
Camp 3 - Wollombi	6080	4560	1250	4 + 1
Camp 4 - Gregory	3760	2820	1250	3 + 1
Alpha (Rail) Construction Depot	1100	825	1000	1 + 1

10.1 Power Demand

The power demand calculation for each site is included in Appendix D.

In calculating the power demand, it has been assumed that power will be reticulated to all camp facilities, common infrastructure and construction offices (including contractor offices). However, power supply has not been included for some construction depot facilities and the contractors operating these facilities will be responsible for providing their own power. These include facilities that may be relocated to another site as works progress (e.g. it will be more efficient to roll culverts locally at a major causeway rather than transporting completed culverts from a “fixed” rolling facility at the main depot).

Power demand has not been included for:

- Concrete batch plants;
- Culvert rolling facilities;
- Heavy vehicle workshops; and
- Remote “mobile” offices and facilities along the alignment that are remote to the main construction depot.

Power supply to “fixed” construction depot facilities such as the flash butt welder and the sleeper manufacturing workshop has been included.

Electrical loads have been determined using typical values from similar facilities designed by Calibre Rail previously. When contracts have been awarded for camp design and construction, feedback will be required from the vendor to confirm the power station sizes proposed in this report.

10.2 Regional power grid vs on-site generation

Ergon energy operates the regional power supply system in the region and in most cases, the proposed rail construction camps and depots are reasonably close to existing infrastructure. An initial cost comparison was completed that showed permanent grid connections could offer significant cost savings over on-site generation.

Ergon representatives advised that the existing networks would not have the capacity to supply the loads required by the construction camps and depots without significant upgrades to the power distribution network. Calibre was advised that the maximum available capacity of the existing was around 300 kVA.

The option of grid connections was not pursued further in the BFS due to the long lead time needed to complete the network upgrade works. The upgrades may not be delivered to meet camp start-up dates. It is recommended that this opportunity is pursued further in detailed design, especially for the Salisbury Plains site (ongoing power need at the marshalling yards during operations), the Collinsville site (potential source from adjacent HV lines) and the Wollombi site (permanent maintenance camp) as the generator operating costs are very high.

Table 15 – Cost Comparison of Grid Connections versus On-Site Power Generation

Location	Grid Connection			On-Site Power Generation		
	Capital	Operating	Total	Capital	Operating	Total
Camp 1 – Salisbury Plains	$1.50 M	$4.47 M	$5.97 M	$3.81 M	$14.93 M	$18.74 M
Camp 2 - Collinsville	$1.70 M	$3.14 M	$4.84 M	$2.91 M	$10.65 M	$13.56 M
Camp 3 - Wollombi	$ 0.87 M	$4.47 M	$5.34 M	$3.85 M	$15.75 M	$19.60 M
Camp 4 - Gregory	$0.80 M	$2.45 M	$3.25 M	$2.90 M	$8.77 M	$11.67 M
Camp 5 - Alpha (Rail)	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

- Capital costs exclude contributions required to upgrade existing regional power distribution networks.
- Camp 5 requirements have not been assessed as this site is outside the scope of the Alpha Coal Rail BFS.

11.0 DIESEL FUEL STORAGE AND DISPENSING

Diesel will be stored on site to supply the power station, light vehicles and buses.

It has been assumed that diesel will be available on site for contractors to use for construction purposes, and fuel tanks have been sized accordingly. Storage tanks have not been sized to cater for earthworks plant. The earthworks contractors will be required to provide their own fuel facilities at a location convenient to their current work area.

Diesel will be freighted to site by road. Storage tanks have been sized to hold two weeks of fuel needs on site, to provide security in times of inclement weather when supply may be cut-off. Table 16 shows proposed fuel tank sizes.

Table 16 – Diesel Fuel Storage Requirements

Location	Fuel Storage	Re-Fill Period	Notes
Camp 1 – Salisbury Plains	4 x 110 kL	Fortnightly	
Camp 2 - Collinsville	3 x 110 kL	Fortnightly	
Camp 3 - Wollombi	4 x 110 kL	Fortnightly	
Camp 4 - Gregory	3 x 110 kL	Fortnightly	
Alpha (Rail) Construction Depot	1 x 30 kL	Fortnightly	For depot generators only. Vehicle refuelling will be from the Mine construction fuel supply (provided by others).

The volume of diesel required at each site requires a Large Dangerous Goods License (DGL). Tanks will be designed and installed in accordance with AS1692 and AS1940 and be suitable for obtaining a Large DGL for Class 1 flammable and combustible liquids.

A high and low volume dispensing bowser will be provided at each site. Bowsers will be operated by a swipe card system or similar, linked to a datalogger that records the fuel dispensing details (i.e. who obtained fuel, the volume, date, time, vehicle, contracting company, etc). Very good record keeping is required to meet the Project's NGERs reporting responsibilities.

There is a high risk of hydrocarbon contamination from spilt diesel in refuelling areas. Trafficable concrete slabs will be provided in the refuelling and diesel tanker offloading areas to prevent spilt fuel seeping into the ground. Spill kits will be provided.

Above ground, self bunded storage tanks will be used as leaks can be detected and contained more readily before causing an environmental incident.

12.0 COMMUNICATIONS

Communications considerations for the temporary infrastructure include:

- Options for connecting the site to regional communications networks;
- Preferred methodology for reticulating communications and entertainment systems around the camps;
- Options for servicing remote or mobile offices;
- The level of communications and entertainment systems to be provided in accommodation rooms; and
- Requirements for construction communications.

These issues are discussed in the following Section. Further detailed information can be found in the Rail Communications Options Report CJVP10007-REP-H-002.

12.1 Existing Regional Network

The majority of the proposed Alpha Coal Railway runs through regional areas, and existing communications services are characterised by limited bandwidth.

None of the proposed camp and office sites are serviced by existing landlines.

Telstra NextG mobile communications services are available in some areas. Coverage at the northern sites is generally expected to be good. However, sites along the southern end of the alignment are on the margins of the NextG coverage area, and signals may be patchy or inadequate for data transmission.

Appendix F shows the Next G coverage maps for the region. The current level of service to the camp locations is described in Table 17.

There are no optical groundwire services available in Ergon Energy's power distribution network to which the Project could connect.

Table 17 – Existing Communications Services

Location	NextG Service	Notes
Camp 1 – Salisbury Plains	Yes	The site is covered by the Telstra NextG network. An existing Telstra fibre optic cable runs parallel to the Bruce Highway, approximately 9 km to the north of the marshalling yards.
Camp 2 - Collinsville	Yes	The site is covered by the Telstra NextG network. The camp site is more than 10 km to the nearest optic fibre location at Collinsville.

Location	NextG Service	Notes
Camp 3 - Wollombi	Yes	The site is covered by the Telstra NextG network. The camp is more than 30 km from the nearest Telstra exchange. The exchange is likely to be fed via a low capacity digital radio, meaning bandwidth capacity would be low.
Camp 4 - Gregory	Marginal	Telstra NextG coverage of the locality is marginal and advice from a Telstra representative is required to confirm the extent of network coverage in the vicinity. A Telstra inter-exchange fibre is located within a few kilometres of the site, however Telstra is very unlikely to allow customer access to this fibre.
Camp 5 - Alpha Mine (Rail)	Yes	The site is covered by the Telstra NextG network. There is no existing fibre optic network in the vicinity.

12.2 Communications Backhaul

Initially, communications to each site will leverage off the existing NextG services, where available. Communications to site will be set-up during the site establishment phase. VSAT satellite systems are proposed for all voice and data communications, and this is the base-case used for BFS pricing.

Camp 1 (Salisbury Plains) and camp 2 (Collinsville) are both close enough to existing optic fibre networks that it is worth investigating optic fibre connections to these sites. Installation of fibre will provide a higher level of service and may be cost competitive over the 2-year life of the project.

Expansion of the Telstra NextG mobile network for the temporary camps and construction depots is not recommended. Previous project experience has shown that this is not feasible cost-wise for short-term projects. For sites that have an ongoing use into the operations phase (such as the marshalling yards, Wollombi and Alpha Mine) it is worth pursuing this option further with Telstra.

An alternative long-term communications solution for Wollombi Camp would be to make a connection to the trackside optic fibre, should this proceed.

12.3 Communications Reticulation

The methodology for reticulating communications and entertainment services around the camps will be largely driven by the level of service provided. The options available, in decreasing level of service, include:

- Fibre optic cable, with gigabyte passive optical network (GPON) topology, suitable for full triple-play services or in-room VOIP phones and internet with MATV entertainment systems;
- Fibre optic cable and coaxial RG6 cable, suitable for in-room VOIP phones and internet with MATV entertainment systems;
- Two-wire copper telephone cabling and coaxial RG6 cable (TV signal), suitable for in-room analogue phones, MATV entertainment systems and limited internet access at communal facilities.

The cost of reticulating optic fibre throughout the site is cost comparable to reticulating copper cable, but offers more flexibility. The bulk of the cost for both options is in trenching, which will be the same for either case. The higher materials and termination costs associated with optic fibre are offset by savings in lightning protection requirements. The only significant cost differential between the two options arises in the peripheral in-room equipment associated with triple-play systems and the service provider's fees.

The use of copper telephone cabling for data communications limits the separation distance between the user and the communications head-end building to 90 m. After this distance, data transfer rates become too low to provide an acceptable level of service.

If coaxial cable is installed for entertainment system reticulation, it is not possible to cheaply upgrade the MATV service to a triple play service at a later date.

There are currently no wireless systems available with sufficient bandwidth to reticulate entertainment services and full data communications services throughout a camp. The maximum data transfer rate for current off-the-shelf units is around 300 mbps, which is inadequate to provide multi-channel video streaming to all rooms.

Optic fibre reticulation is required to some areas of each site to provide remote-alarm capabilities for essential infrastructure such as the power station, fuel facility, wastewater treatment plant and potable water treatment plant.

A GPON optic fibre system is the recommended solution for each camp. This provides a cost competitive system to deliver the entertainment and communications services HCPL should be offering to be competitive with other major projects in the region, with the flexibility to quickly and economically upgrade the service level if required to remain competitive as technology advances.

12.4 Communications Services for Construction Contractors

Communications services to contractor offices will not be provided by the Project. Each contractor will be required to provide their own systems. The basis of this recommendation is that:

- The contractors likely to be engaged on the Alpha Coal Railway are used to working in remote areas and will already have service agreements set up.
- The level of service provided by each contractor will be consistent with their work processes (e.g. on-line document transfer, cost control packages, etc).

- The Project will not be exposed to potential contractual claims if/when communications are lost for a period of time and will not be required to provide IT support for third parties.

12.4.1 In-Room Communications and Entertainment Systems

The technology available to deliver in-room communications and audiovisual entertainment systems has changed rapidly over the last few years. It is now becoming economical to deliver a "hotel style" services to each room, and workers' expectations are changing accordingly.

The level of service HCPL chooses to deliver to camp residents is perceived to be one of the main marketing tools in attracting a workforce to the Project. Table 18 shows the level of service recommended for the Alpha Coal Rail camps to be competitive with other upcoming major projects. The BFS pricing has been based on this level of service.

Table 18 – Recommended Communication and Entertainment Service Level

Service	Option	Recommended
Audiovisual entertainment services	(a) Nothing	
	(b) MATV free to air TV, radio (re-broadcast over the TV system), movie, sports, music & lifestyle package ("Foxtel" or similar)	✓
	(c) Free to air TV, radio (re-broadcast over the TV system), limited cable TV package and user-pays video on demand	
Telephone	(a) Public phone booths only.	
	(b) Analogue system, limited to key managers & supervisors' rooms only. Public phone booths for other residents.	
	(c) Accommodation buildings "future proofed" and wired/cabled for phones but system not activated. Public phone booths for residents' use.	
	(d) VOIP system, available in all rooms, user pays. Limited number of public phones (e.g. for use by delivery drivers).	✓
Internet / Data Communications	(a) Public internet terminals only.	
	(b) Communal area wired for wireless internet access (residents use own laptops).	
	(c) Accommodation buildings "future proofed" and wired/cabled for data communications but system not activated. Public internet terminals and communal wireless access areas for residents' use.	
	(d) Internet available in rooms on a user pay's basis (residents use own laptops). Public internet terminals and communal wireless access areas for residents' use.	✓

12.5 Construction Communications

12.5.1 Satellite Phones

A number of satellite phones (nominally 3-5) will be acquired for each construction office. Project personnel travelling remotely, outside of areas covered by the construction radio network, will be required to take a satellite phone with them. This is particularly important in the establishment phase of the project, before the radio network is available.

Contractors will be required to provide satellite phones for their own personnel.

12.5.2 Construction Radio

A licensed construction radio network will be set up as part of the site establishment phase. The network will consist of a base station at each of the five construction offices and a number of repeater stations, as dictated by the topography.

The construction radio network will enable anyone working along the rail alignment to communicate with their “home” office location and for people working in the same area to communicate with each other.

All vehicles and construction plant entering project areas will be required to be fitted with radios. Supervisors will be required to carry hand-held radios.

13.0 WATER

The temporary infrastructure pricing basis for the BFS includes development of new water sources with on-site treatment of raw water and access to existing regional infrastructure.

13.1 Water Demands

During the construction phase water will be required for potable use, process use and other construction use.

- Potable use:
  - Camp (kitchens, accommodation rooms, laundries, toilet blocks, cleaning etc);
  - Construction offices (kitchenettes, toilet blocks, cleaning).
- Process use:
  - Concrete batching;
  - Fire water system;
  - Camp landscaping.
- Construction use:
  - Earthworks material conditioning;
  - Dust suppression.

Raw water will be used for construction needs and the requirements are covered in the *Hydrogeology Report (CVJP10007-REP-C-003)*.

A water balance showing the expected water demand range has been developed for each site (see Appendix E). To reduce overall water demand, treated effluent from the wastewater treatment plant will be recycled for process and construction use as far as practicable. In particular, treated effluent can be used for concrete production, as the raw water is expected to be too brackish to use without prior treatment.

The following demand basis has been used for the water system design.

Table 19 – Water Demand

Parameter	Design Basis
Daily water demand - camp resident	300 L/p/d
Daily water demand - construction office occupant	50 L/p/d
Concrete water demand (includes production, pour and clean-up)	600 L per m^3 of concrete produced
On Site Storage – Potable Water	48 hours
On-Site Storage – Process Water	24 hours
On-Site Storage – Fire Water Reserve	288 kL (4 hours for 2 hydrants at 10 L/s)
Raw water supply rate	Average day of peak week

13.2 Water Sources

13.2.1 Existing Water Infrastructure

Existing water networks exist in the vicinity of the proposed Alpha Railway alignment in the northern and central regions.

The proposed Collinsville Camp is close enough to the town that use of the town water network was considered as a supply for the camp. However, the Regional Council advised that the camp should plan on being self sufficient as there is inadequate spare capacity in the existing Council infrastructure (the camp previously built on this site was not connected to the town supply).

The proposed Wollombi Camp is adjacent to a SunWater distribution pipeline. Gaining access to the pipeline is the preferred water source solution in this area and has been used as the basis for the BFS pricing. A supply price of $3.00/kL has been assumed, approximately the same fee paid by Queensland Rail for the Missing Link Project.

13.2.2 New Water Sources

A network of groundwater bores will be established for rail construction purposes where there is no existing water source. Raw water from these bores will also be pumped to each camp and treated locally for drinking and process water supply.

Raw water quantity and quality generally decreases along the alignment, with the most plentiful and freshest water at the northern end. Groundwater further south is generally brackish, and will require some degree of desalination for both potable use and for concrete production.

- Camp 1 – Salisbury Plains. It is expected that the local groundwater will not require desalination to create a potable supply and that treatment will consist of filtration and disinfection only.
- Camp 2 – Collinsville. Local groundwater is brackish to saline (in the order of 3,000-9,000 mg/L TDS). The Australian Drinking Water Guidelines (ADWG) classify water with TDS >1,000 mg/L as unacceptable for human consumption and water with <500 mg/L TDS is considered to be of good quality. Reverse osmosis desalination will be required to generate a potable water supply from the local groundwater source.
- Camp 3 – Wollombi. No new source will be developed. It is proposed to utilise the existing SunWater distribution scheme.
- Camp 4 – Gregory. Initial investigations show that the local groundwater is saline (with the mean TDS of available bore samples being 8,300 mg/L). Reverse osmosis desalination will be required to generate a potable water supply from the local groundwater source. Initially, potable water may be tankered in from the town supply at Clermont.

Further information on potential water sources, yield and quality is included in the *Hydrogeology Report (CVJP10007-REP-C-003)*.

13.3 Water Treatment

Bores have not yet been drilled and tested, so water treatment parameters have been established on regional data available in the public domain. Raw water characteristics will be required to finalise the preliminary BFS water treatment specification prior to tendering the water treatment plants.

Water treatment plants for the camps and construction depots will produce potable grade water that meets the health and aesthetic guideline parameters specified in the *Australian Drinking Water Guidelines*.

Water treatment for concrete production will comply with the following requirements as a minimum:

- TSS < 200 mg/L
- TDS < 1,500 mg/L
- pH >5.0

Blending of treated drinking water, treated effluent from the WWTP and raw water to produce a supply for concrete production will be pursued in the detailed design phase to minimise raw water usage and treatment requirements.

Table 20 outlines the proposed water treatment process for each locality.

Table 20 – Water Treatment Requirements

Location	Proposed Water Treatment Process
Camp 1 – Salisbury Plains	Filtration for sediment reduction Disinfection
Camp 2 - Collinsville	Pre-treatment filtration for sediment reduction Reverse osmosis desalination Disinfection
Camp 3 - Wollombi	Disinfection of scheme water
Camp 4 - Gregory	Pre-treatment filtration for sediment reduction Reverse osmosis desalination Disinfection
Camp 5 - Alpha (Rail)	N/A - Treatment by others as part of the Alpha Mine Construction Camp infrastructure.

Pre-treatment is required to remove larger particles prior to desalination. If this step is not included, the reverse osmosis membranes clog quickly. This reduces the WTP capacity and seriously reduces the membrane life, resulting in a much higher WTP operating and maintenance cost.

Chlorination is the recommended disinfection process as this provides a traceable residual that can be monitored throughout the reticulation network as a water quality indicator. Chlorine also continues to disinfect the water throughout the pipe network as long as there is a free chlorine residual present. Disinfection by UV sterilisation doesn't provide any protection against re-contamination downstream of the initial treatment (disinfection) point.

Water treatment plants will be modularised as far as possible, with the majority of assembly completed off-site to minimise on-site installation timeframes and manning requirements. The water treatment plants will be housed in an insulated, climate controlled building or modified sea container. Air conditioning will be provided to maintain a satisfactory temperature range for instrumentation and control system components. External conditions could be very dusty, and maintaining a positive air pressurise within building is recommended for control of dust.

13.4 Water Storage

Two water storage tanks are proposed for each locality:

- A treated drinking water storage tank;
- A combined process water and fire water reserve tank.

Storage tanks will be enclosed to maintain water quality and minimise evaporation losses.

Incorporating the fire water reserve into the process water tank rather than the potable water tank is recommended to maintain drinking water quality, where high water turn-over rates are advantageous.

Turkey's nests will also be constructed for construction water storage. Refer to the Hydrolgeology Report for further information on turkey's nests.

13.5 Potable Water Distribution Pumps

Potable water distribution pumps are required to distribute water from the treated water storage throughout the camp and construction office facilities. The topography of each site provides insufficient elevation to distribute water by gravity alone.

Skid-mounted or containerised pump modules incorporating centrifugal, variable speed pumps with standby capacity will be used. Pumps will be controlled to automatically rotate duty and standby units on start-up to promote even wear.

13.6 Fire Pumps

Fire pump assemblies will comply with AS 2941 and generally comprise electric pumps, a diesel back-up pump, jockey pump and accumulator.

13.7 Regulatory Requirements

DERM licences are required for the following activities:

- Development and use of groundwater bores;
- Raw water desalination plants with a capacity of more than 0.5 ML/day (Environmentally relevant activity 64 - Water treatment under Schedule 2 of the Environmental Protection Regulation 2008).

All sites within the Alpha Coal Rail BFS scope will require bore licences with the exception of Wollombi. The forecast treated water demand ranges from 280 – 460 kL/day. Given a typical RO desalination plant recovery rate of 60-70%, the majority, if not all, sites will also require registration for the water treatment plant.

14.0 WASTE WATER

14.1 Regulatory Framework

Treatment of waste water is regulated to protect both public health and the surrounding environment.

WWTPs with a design capacity of more than 21 EP (i.e. an equivalent population of 21 people) require development approval and a registration certificate as environmentally relevant activity 63 (sewage treatment) under Schedule 2 of the Environmental Protection Regulation 2008.

This requirement applies to all of the camp WWTPs required for the Alpha Coal Rail construction.

DERM has delegated the approval of small on-site WWTPs of less than 21 EP capacity, to the local Councils. This delegation generally covers small aerobic and septic tank systems for isolated farm homesteads or semi-rural developments in un-sewered areas. It is only applicable to the Alpha Coal Rail construction for temporary workfront facilities or isolated sites with a small number of workers – such as the quarry sites. In reality, off-site removal of septic waste is likely to be used for these locations due to the short-term nature of the occupation.

14.2 Specification for Treated Effluent

There is no single set specification for treated waste water quality in Queensland. The required quality is determined on a case-by-case basis based on the proposed use for the treated effluent, the volume of waste generated, and the sensitivity of the receptor environment.

It is imperative that Project personnel make contact with DERM and work closely with the appointed DERM wastewater officer throughout the preliminary and detailed design phases to ensure that construction and licensing proceeds smoothly.

The BFS price covers a WWTP capable of producing treated effluent suitable for re-use is concrete production and dust suppression. A “Class A” treatment specification with disinfection, as shown in Table 21, has been assumed at this stage.

Table 21 - Treated Effluent Quality Specification

Parameter	Specification
5-Dday Biochemical Oxygen Demand (BOD_5)	<10mg/L
Total suspended solids (TSS)	<10mg/L
Total Nitrogen (TN)	<10 mg/L
Total Phosphorus (TP)	<5 mg/L
pH	7.0 – 8.0
Residual Free Chlorine (30 minutes after initial contact time)	0.5 – 2.0 mg/L
Thermotolerant coliforms (TTC)	<10 cfu/100mL

14.3 Treatment Solutions

Waste water treatment processes involve a combination of anaerobic, aerobic and anoxic phases, perhaps with reagent dosing to help precipitate nutrients and disinfection to address public health concerns.

- Screening is often employed as the first stage of the treatment process to remove incompatible materials such as plastics, rags or feminine hygiene products. The

volume of screened solids generated is small, but the recovered solid waste stream is highly contaminated with raw sewage and can cause odour problems if not handled properly. Screened solids are usually binned and sent to landfill.

- The aerobic phase involves aeration of the effluent to increase the natural rate of decomposition due to bacteria inherent in the waste. This process reduces the biological oxygen demand (BOD) of the raw sewage, which is the primary function of wastewater treatment. Sludge is generated as a by-product.
- Anaerobic treatment - will also reduce the waste stream BOD over time due to bacteria found in the raw waste stream, but requires a much longer detention time to achieve the same result. Less sludge is generated as a result.
- An anoxic phase – is used to remove nitrogen from the waste stream. The anoxic phase involves turning off aeration blowers to remove the oxygen source. In this state, bacteria that would otherwise use oxygen start to breakdown ammonia in the waste instead and release nitrogen as a result. Excessive levels of this nutrient will promote algae growth and cause eutrification of waterways if not removed.
- Phosphorous is commonly removed by dosing with a reagent such as ferric sulphate to form a precipitate that is then removed from the effluent stream with the sludge. Many Australian plant species are intolerant to high levels of this nutrient.
- After adequate BOD and nutrient reduction, the treated effluent is separated from the waste sludge. This is done by skimming the clear supernatant off the surface or leaving the liquor to settle and then decanting off the clear liquor. A flocculent may be used to assist sludge settling and reduce carry-over of unwanted solids with the treated effluent.
- Depending on the proposed effluent disposal method, the treated effluent is often disinfected before being discharged from the WWTP. Chlorination and UV sterilisation are the two processes commonly employed for plants in construction camps.
- The rate of sludge generation is specific to the treatment process used. Some plants require frequent de-sludging and may include a sludge settling tank or thickening cyclone. In other plants, a vacuum tanker will be used to periodically reduce the sludge volume directly from one of the process tanks. Sludge disposal can become expensive if not planned carefully beforehand. On-site sludge drying beds can be used but these have a high capital cost and are more suited to long-term operation. For a temporary plant, sludge is usually tinkered off-site when a sufficient volume is accumulated.
- A portion of the sludge is often recycled back to the start of the process as “seed material” to speed up the growth of beneficial bacteria.

The treatment systems typically employed in camps (incorporating the processes outlined above) are:

- Sequenced batch reactors (SBR);
- Moving bed bioreactors (MBBR);
- Membrane bioreactors (MBR)

- Oxidation ditches (generally seen in larger applications);
- Anaerobic and aerobic lagoons (more common in rural towns with long term use).

14.4 Treated Effluent Disposal Solutions

As noted previously, the treated effluent should be recycled for use in concrete production, earthworks conditioning and dust suppression wherever possible. This reduces the amount of raw water that would otherwise be used for these processes and also reduces the size of the WWTP waste stream requiring disposal.

It is not realistic to expect that the demand for recycled water will always match the treated effluent production rate. For example: in wet weather effluent will still be generated by camp occupants, but construction work may be on-hold. An alternative treated effluent disposal system needs to be provided to cater for these situations. The available options include:

- Surface spray or drip irrigation

  This is the most common treated effluent disposal method in construction camps as it has a relatively low cost and small footprint. An area of land is usually fenced off and a network of sprinklers or surface drippers established. Sprinklers systems can result in spray drift – a potential health hazard – if the water drop size is too fine. Conversely, coarse water drop sizes from sprinklers and drippers can result in run-off outside the irrigation area. Natural vegetation should be left in-situ to help absorb the water and slow the surface flow speed on sloped sites.
- Subsurface irrigation of camp landscaping

  Treated effluent can be pumped back to the camp and used for irrigating landscaped areas. This benefits the water cycle by reducing the demand for “new” water for gardening purposes. However, it is generally more costly than an isolated irrigation field and has a higher level of health and contact control requirements due to the proximity of residents’ facilities.
- Evaporation ponds

  Ponds have a high capital cost and require a large surface area. If DERM require an evaporation pond for waste brine from the potable water plant, the pond could be sized to also accommodate treated effluent from the camp WWTP. Ponds can also be used where the existing site is not suitable for surface or drip irrigation. For example, if the ground is impermeable due to heavy clay soils or rocks, or the slope is >10%.
- Off-site release into a natural drainage system

  Release into an existing waterway is unlikely due to the location of the proposed camp sites and the stringent environmental controls associated with treated wastewater release into waterways.

15.0 ACCOMMODATION CAMP AND OTHER CONSTRUCTION SERVICES

It is recommended to appoint a professional camp management and catering company to operate each of the rail construction camps. The use of a third party contractor enables the construction management team to focus on constructing the railway, not operating the camp.

The camp manager will generally provide all of the services listed below, however it's expected that the camp manager will subcontract work in some cases, such as waste management or fire system maintenance. Personnel for other specialist services, such as medical and security, may be engaged directly under a separate contract. Both options are common.

Rail camp operation is an area where the Project can build links with the local communities at grass-roots level. Establishing life-of-Project contracts with local service providers or suppliers will generate a stable income for existing businesses and generate a cash flow locally. Local personnel can also be engaged on a full time or part time basis in generalist roles such as camp administration, kitchen hands, cleaners, etc.

Through the camp operation, HCPL also has the opportunity to support community events by, for example, donating catering services for events, providing free use of the site buses for special events, or assisting local authorities if required through use of the site emergency response team. This helps to build a good rapport with the community and enhances the Company's reputation as a good corporate citizen.

15.1 Camp Management

The way the camps are run and their overall cleanliness and tidiness has an impact on the way the workforce, often subconsciously, perceives the Project. Poor quality and badly maintained facilities are more likely to be abused and damaged further. Choosing a camp manager that helps provide a welcoming place to live and sets a good tone and standard for the camp will help contribute to workforce retention.

The camp management role encompasses activities such as:

- Managing accommodation bookings, arrivals and departures;
- Cleaning and janitorial services for the camp and construction office;
- Providing linen and other consumables for accommodation rooms and camp facilities;
- Managing an off-site laundry service;
- Holding a liquor license for the tavern;
- Infrastructure management including the operation of on-site potable water treatment plants, waste water treatment plants and power stations;
- General maintenance of buildings and grounds. (Minor building repairs, air conditioning systems, hot water systems, etc);
- Arranging for inspection and maintenance of fire systems;
- Management of the diesel fuel supply (monitoring on-site stock and re-ordering)

- Retail shop management and operation;
- Running a postal service for residents;
- Television and radio re-broadcasting and managing the camp audiovisual entertainment system;
- Public internet terminal operation and maintenance; and
- Gardening.

The camp manager will keep records of accommodation room usage to enable contractors to be back-charged for their accommodation. They will also monitor the forecast room demand to ensure the available rooms are used in the most effective way possible.

Facilities will not be provided on-site for laundering accommodation room linen. The camp management contractor will be required to arrange for linen to be cleaned off-site through a commercial laundry service for hygiene reasons and to keep site manning numbers as low as possible.

15.2 Catering

"Full board" catering services will be provided to all camp residents and visitors. All meals will be served buffet-style with a range of hot and cold food options to choose from. A cold food buffet will be available at breakfast for resident's to pack their own take-away lunches.

Catering will be included in the standard daily accommodation rate charged for each site. General catering obligations include:

- Providing all "tools of the trade" for kitchen personnel, and all crockery, cutlery, and other consumables required to fit-out the dining hall.
- Preparing and serving (buffet-style) all meals and clearing away and washing used dishes.
- Maintaining adequate stocks of food and consumables on site.
- Complying with all food hygiene regulations and industry best practises.
- Ensuring appropriate food handling, storage and delivery processes are followed prior to and during transportation of food to site.
- Ensuring kitchen facilities and equipment are kept in a well maintained and hygienic condition.
- Providing catering for meetings and other special events (for an additional fee).
- Stocking kitchenettes in recreation rooms, meeting and induction rooms and offices (for an additional fee).

The range and quality of food provided to camp residents is very important to camp residents. As for the general camp management, the quality of the catering service is one of the factors that helps to retain a workforce on site, and it doesn't have a significant cost impact to provide.

Modern catering contractors deliver their services through a combination of on-site and off-site food preparation techniques. This ranges in complexity from:

- **Low level:** including off-site preparation of vegetables (e.g. peeling and slicing potatoes and other hard vegetables) and bakery goods; to
- **Medium level:** including use of vacuum packed meat cold cuts and pre-prepared soups; through to
- **High level:** being full off-site preparation of wet dishes and compounded salads.

Caterers will choose the level of service most applicable to each camp considering issues such as location relative to suppliers, accessibility for transport and the potential for sites to become isolated in inclement weather. An increased level of off-site catering reduces the amount of on-site waste and also provides a small reduction in the number of kitchen-hands required.

In all cases, provision of adequate and well designed storage is critical for good stock management and food hygiene practises.

The use of re-usable crib lunch containers is recommended on environmental grounds as an alternative to use of disposable lunch containers. As well as having a positive environmental impact, re-usable containers reduce waste management costs for the Project.

15.3 Emergency Response

An emergency response coordinator is required for each site. This person may be sourced from a specialist company or may be part of the construction manager's safety team. Either way, they work closely with the construction manager and safety manager to ensure the site can respond effectively to any incidents or situations that arise.

The role of the emergency response coordinator includes:

- Coordinating and managing the response to major incidents (in conjunction with the Construction Manager and Camp Manager).
- On-call 24 hours to assist with response to alarms where required (for example reagent spills, major diesel leaks, etc).
- Managing the emergency response team (ERT) and conducting training sessions for a range of different situations.
- Conducting evacuation and safety drills for residents, and providing briefings on topical issues at pre-start meetings.
- Ordering and maintaining appropriate emergency response equipment.
- Engaging with local police and emergency services agencies (fire, medical, etc) to build rapport and tailor ERP's to suit local requirements.
- Provision and maintenance of fire truck and all emergency response equipment at each site.

15.4 Medical Services

Provision of on-site medical personnel for incident response is recommended for the Alpha Rail Emergency Response Plan. In addition to emergency management, the medical personnel also serve an important role through the provision of a general medical consultation service for camp residents on non work related issues.

The following medical and related services are proposed for each site:

- Clinic for residents (before and after work);
- 24 hour on-call service;
- Workplace medical checks and training (pre start meetings, visits to work sites, etc);
- Doctor on call (phone consultation service);
- Operation of the medical centre and provision of an ambulance at each site;
- Disposal of medical waste;
- Emergency response, patient care and transfer;
- Supply and maintenance of medical equipment and consumables.

Based on discussion with industry representatives, one medical officer on site will suffice for the Alpha Rail camp sizes. This person would generally work a 13 hour day (so they can run a clinic before and after standard work hours), and be on-call for emergency response after hours. To properly manage fatigue issues with the longer work days, medical officers would typically work a 2 week on / 1 week off roster rather than the standard Project work roster.

Ambulances will generally be used by the medical officer when visiting work sites throughout the day. Should any medical incidents occur, the vehicle will be used to transfer patients to an appropriate regional medical centre or medivac point.

15.5 Waste Management and Recycling

A complete waste management and recycling service is needed for the rail construction camps and construction depots. Landfills will not be created on site, and materials will need to be removed off site by a licensed contractor.

The scope of the waste management and recycling services generally includes:

- Provision, distribution and maintenance of bins, skips and other storage receptacles.
- Emptying of bins, skips, drums, etc.
- Aggregating waste products and recyclables at a central point for off-site disposal.
- Provision of vehicles and transport from each site to a licensed waste receival or recycling facility as appropriate.
- Obtaining and paying for licences and permits required to carry or dispose of the waste and recyclable materials.

The following waste and recyclable streams will need to be handled in the course of the Alpha Coal Rail Project:

- General putrescibles waste;
- Recyclable product streams including cardboard, office paper, aluminium cans, steel (e.g.: cans and construction scrap), glass, and plastics;
- Green waste from gardening and WWTP treated effluent disposal area maintenance;
- Kitchen grease (from grease traps) and used cooking oil;
- Septic waste from black water holding tanks and portaloos;
- Sanitary bins;
- Inert construction waste;
- Hydrocarbon wastes such as oily rags, used filters and soil or other material contaminated by hydrocarbons;
- Medical and biohazard waste; and
- Other controlled waste streams such as used car/truck batteries' empty paint or solvent containers and used spill kits.

Transport and disposal of waste is an environmentally relevant activity (ERA) defined under the Environmental Protection Regulations and must be conducted by a licensed operator. It is anticipated that waste management and recycling services will be provided by a specialist contractor, either engaged directly by the construction manager or subcontracted by the camp manager.

It's worthwhile noting that the provision of waste management services can contribute greatly to the camp operation cost, particularly with respect to regular disposal of septic wastes using a vacuum tanker service.

15.6 Health and Lifestyle

The provision of health and lifestyle is not strictly essential for operation of the rail construction camps. However, it is becoming standard for larger camps and is highly recommended to ensure that the Alpha Rail Project remains competitive in attracting and retaining its workforce.

As well as providing health and fitness services, health and lifestyle personnel have a large roll to play in developing the social atmosphere and character of the camps.

Typical health and lifestyle services include:

- Managing social and recreational activities such as quiz nights, pool competitions, and activities for other special events such as Australia Day and Anzac Day.
- Managing a social sports rosters.

- Managing fitness activities such as gymnasium programs and group classes.
- Providing fitness assessments, exercise and nutritional information for residents.
- Attending pre-start meetings to promote healthy lifestyle habits and leading group stretching programs and the like.
- Preparation and distribution of a camp newsletter and "upcoming events" calendar.
- Promoting charity fundraising events and managing fundraisers on site.
- Organising activities for rostered days off, such as bus tours to local places of interest, day walks, attending local events such as community theatre performances, etc.
- Supporting special interest and hobby groups on site.
- Organising periodic on-site performances by theatre groups, bands, and the like.

Health and lifestyle services are usually priced separately and charged on a weekly or monthly basis.

It is important to support mental health as well as physical health for residents on site. This can be assisted through:

- Site social programs (such as those above) that encourage people to get involved and build networks of friends on site;
- Arranging periodic pastoral visits to the site; and
- Providing residents with access to a personal counselling service, such as a phone help service, with periodic visits to site by a professional councillor as/when needed.

15.7 Security

Security personnel on site serve two main functions. The first role is in control of people and vehicles accessing the site, and the second is to provide a guarding/patrolling function. It is easier and safer to turn-away a non compliant vehicle or unauthorised person before they enter the site than to manage a situation after they enter the site.

The following security services are recommended for each site:

- 24 hour security coverage, manning the security gatehouse at the site entrance and monitoring site CCTV images (boom gate and tavern / beer garden).
- Controlling/monitoring the movement of people and vehicles on and off site. This includes checking that the person is authorised to access the site, they have appropriate site safety clothing and that vehicles comply with site requirements.
- Undertaking driver random breathalyser tests for vehicles arriving at the site.
- Night patrols around the grounds. This includes monitoring camp areas and construction storage and laydown areas.
- On-call assistance for incident response, crowd control and tavern close-up time.

- Acting as an after-hours point of contact for residents requiring assistance – for example, if someone locks themselves out of their room.
- 24 hour monitoring of the site infrastructure alarm panel. The security officer will call out the designated site maintenance officer to respond to critical after hours alarms associated with infrastructure such as power stations, pump stations, water supply.

Security personnel should be trained and licensed for both crowd control and for guarding/patrolling. It is proposed that the security contractor provides their own vehicles for undertaking patrols, and these are usually electric buggies as they are highly mobile and quiet.

Based on discussion with industry representatives, one day-shift officer based at the gatehouse will suffice for the Alpha Rail camp sizes. Two night-shift personnel are recommended – one on active patrolling duty, and one based in the gatehouse. The second officer routinely checks on the wellbeing of the patrolling officer (working alone) and would act as a back-up should the first officer need assistance.

15.8 Bus Service

Bus services are required to transport the workforce between camps and airports. The arrival and departure time of the bus service needs to coincide with scheduled commercial or charter flight arrivals and departures.

Bus services can be provided by the camp manager or sourced through a local tour operator or coach line. For the purposes of the BFS, it has been assumed that a coach will be provided for each site and operated by the camp manager. Availability of local operators and vehicles should be pursued in later stages of the Project as a potential cost saving opportunity.

Depending on the frequency and duration of the coach trips, the bus driver can be utilised by the camp manager to undertake other functions when not required to operate the bus service. This is expected to be the case for most of the rail construction camps.

Further information on personnel transport requirements can be found in the *Alpha Coal Rail Project BFS Logistics Plan CJVP10007-REP-G-024*.

15.9 Fuel Supply

HCPL have advised they are establishing a Project agreement for the supply of diesel with an attractive rate. It is expected that a fuel supply contract will be established with one of the existing licensed fuel distributors.

The camp management contractor will be responsible for ordering diesel, and for controlling access to the fuel bowsers through a swipe card or similar system.

16.0 REGULATORY FRAMEWORK AND APPROVALS

16.1 Key Regulatory Authorities

Key regulatory authorities for temporary infrastructure construction and operation are:

- Department of Resources and Minerals (DERM);
- Regional Councils (Whitsundays, Isaac and Barcaldine);
- Queensland Fire and Rescue Services;
- Queensland Health;
- Workplace Health and Safety Queensland (Department of Justice and Attorney General);
- Office of Liquor, Gaming and Racing;
- Transport and Main Roads Queensland.

Each of these bodies is required to approve or license one or more of the temporary infrastructure works as outlined below.

16.2 Pre-Construction Approvals

A brief environmental assessment of the indicative camp locations proposed in accordance with the Alpha Coal Project EIS has been undertaken. This assessment, found in Appendix H includes a review of potential clearing impacts on native vegetation and regional ecosystems under the Vegetation Management Act 1999. It outlines the identified environmental impacts and recommendations for consideration, supported by a figure.

Table 22 summarises the approvals and licenses required prior to building the rail construction camps and certain site infrastructure.

Table 22 – Pre-Construction Approvals

Approval / License	Regulatory Body	Required For
Development Approval	DERM	All proposed WWTPs (ERA 63) All proposed desalination plants (ERA 64) Quarry establishment, all 3 proposed quarries (ERA 16) Concrete batching, all sites (ERA 43) Drilling groundwater bores Disturbing a natural water course
Development Approval	Relevant Regional Council	Camp and construction depot planning approval
Building Approval	Relevant Regional Council	Approval of detailed design for buildings and other structures

Approval / License	Regulatory Body	Required For
Engineering Approval	Relevant Regional Council	Intersections of new access roads/driveways with existing Council roads.
Engineering Approval	Transport & Main Roads Queensland	Intersections of new access roads/driveways with existing State roads.
Fire Safety Approval	Queensland Fire & Rescue Service	Building and site layout compliance with fire design codes.
Notice of intended electrical works	Department of Justice & Attorney General (Electrical Safety)	Electrical installation works

In particular, the long lead time for development approvals will influence the contracting strategy for the temporary infrastructure. Sufficient detailed design for camps will need to be undertaken prior to award of design and construction contracts to submit development approval applications to the relevant authorities.

Power stations required for the Alpha Coal Rail construction camps and depots are under the 10 MW capacity threshold specified for ERA 14 in the Environmental Protection Regulations.

The use of a qualified third-party building surveyor is proposed to expedite the building approval process.

16.3 Operational Licences and Approvals to Use

Some facilities require regulatory inspection or certification after they have been constructed before they can be used for their intended purpose.

Table 23 – Post-Construction Approvals

Approval / License	Regulatory Body	Required For
Building Certification	Relevant Regional Council	Issue of a building classification certificate prior to use/occupation.
License to Operate a Food Premise	Relevant Regional Council	Camp kitchens
Liquor License	Office of Liquor, Gaming and Racing	Sale of alcoholic beverages from camp taverns.
Fire Safety Approval	Queensland Fire & Rescue Service	Issue of a fire safety certificate for buildings, hydrants, fire pumps and fire panels prior to use/occupation.
Dangerous Goods License	Workplace Health and Safety Queensland	Diesel fuel storage facilities at all camps.
Water License	DERM	Extraction of groundwater.

Other services required during the rail construction phase require the use of an authorised service provider. The most relevant of these are:

- Off-site transportation and disposal of solid and septic (controlled) wastes;
- Bulk transportation of diesel to site;
- Inspection of fire safety equipment; and
- Electrical equipment inspection and tagging.

16.4 Regulatory Monitoring and Reporting

Several of the operating licenses/approvals required during the Alpha Coal involve annual (or more frequent) regulatory reporting. These include:

- Annual groundwater bore performance report (volume abstracted, groundwater draw-down levels, raw water characteristics, etc);
- WWTP treated effluent discharge (volumes, water quality).

In addition, the Project will need to comply with the reporting requirements of Federal legislation for the:

- National Greenhouse Emissions Reporting Scheme;
- National Pollutant Inventory.

17.0 TEMPORARY INFRASTRUCTURE DELIVERY STRATEGY

17.1 General

Camps and construction depots will generally be awarded as design and construct packages, with separate contracts for specialist systems such as power stations, water treatment plants and potable water treatment plants. Access road design to the sites, scopes of work and functional specifications for the various contract packages will be required.

The primary drivers behind the package breakdown are to manage schedule risk, minimise cost and minimise exposure to common camp constructor capability shortfalls. Packages need to be limited to a number that can be managed effectively, especially as the camps need to move into the “implementation” phase early while the remainder of the Project is still in the “design” phase.

Some points for consideration from BFS investigations and other recent experience include:

- It is essential to discuss proposed design concepts with regulatory authorities early and gain their buy-in of the proposed works before submitting designs for approval.

- Transportable building manufacturers have limited engineering and design capabilities. In-house design is usually limited to transportable buildings only, and any design requirements for other infrastructure elements is outsourced.
- Transportable building manufacturers often have a limited capability to manage third party design, especially multi-discipline design. They usually have a limited number of technical people (due to design outsourcing) and hence often merely funnel outsourced design back to the EPCM, rather than adding any value in cross-checking design from different disciplines or QA checking the deliverables.
- Transportable kitchens are a long lead delivery item.
- Importing transportable accommodation buildings from overseas is becoming more common. These buildings generally have a higher rate of non-compliance with Australian design codes than buildings fabricated on-shore, particularly if the supplier is new to the Australian market. The cheaper price often quoted by offshore vendors doesn't properly capture the additional (significant) owners' costs for placing quality inspectors full-time in the vendor's premise. Off-shore fabrication contracts should only be awarded to suppliers with a proven track record.
- The number of suitable contractors is limited and the Project will be competing for contractors with other major resources projects underway at the same time.
- Personnel turnover in the transportable building industry is high. Continuity of key personnel for the duration of the Project cannot be relied upon.

17.2 Recommended Contract Packages

The following contract packages are recommended:

- Pioneering earthworks:
  - To establish all-weather access to each site as early as possible;
  - There are benefits in including the camp bulk earthworks in this package as limits the number of contractors mobilising heavy earthmoving equipment to site.
- Rail construction camp and depot design and construction:
  - For the detailed design and installation of all camp and construction depot buildings and general infrastructure;
  - The package includes the provision of fly camps where required;
  - The Contract should be awarded in separable portions (one for each location) for ease of management;
  - Tender pricing and market capacity closer to the time of award may dictate that this package is broken-down into small packages either geographically or by building type;
  - A separate contract for kitchens and other high risk items.
- Power stations:
  - For the detailed design and installation of all power stations;

  - The Contract should be awarded in separable portions (one for each location) for ease of management;
  - The decision of “hire versus purchase” should be made on the merit of tender pricing offered;
  - Ongoing servicing of the power station should not be overlooked and needs to be included as part of the supply contract or as a separate service order.
- Potable and waste water treatment:
  - A single contract for all WTPs, WWTPs, storage tanks and pumping systems is proposed;
  - The Contract should be awarded in separable portions (one for each location) for ease of management;
  - Ongoing servicing of the treatment plants should be included as part of the supply contract or as a separate service order.
- Communications backhaul and VSAT entertainment systems.
- Construction radio.
- Rail string welding facility design and construction:
  - To be operated by the tracklaying contractor.
- Sleeper fabrication facility supply and operation.
- Supply of culvert rolling facilities and production of corrugated steel culverts.
- Concrete batch plant supply and operation.
- Camp Management and Catering Services.

  This package includes camp management; catering; cleaning and janitorial services; off-site waste disposal; provision of bus drivers; provision of health and lifestyle coordinators.
- Medical and emergency response personnel and facilities.
- Project vehicle supply.

17.3 Implementation Schedule

A high level camp implementation schedule is included in Appendix G.

A staged handover plan is recommended for each camp so that accommodation rooms and critical facilities can be utilised as soon as possible. The proposed staging plan is shown in Table 24 and target dates for achieving the milestone stages are shown in Table 25.

Table 24 - Rail Construction Camp Handover Staging Plan

Stage 1	Stage 2	Stage 3	Subsequent Stages (per Stage)
Camp			
200 accommodation rooms	200 accommodation rooms	200 accommodation rooms	100 accommodation rooms
3 laundries	4 laundries	3 laundries	2 laundries minimum
2 gazebos	2 gazebos	2 gazebos	1 gazebo minimum
Landscaping to accommodation rooms	Landscaping to central facilities and new accommodation rooms	Landscaping to additional accommodation rooms	Landscaping of new accommodation areas
Communications head-end building	Tavern/beer garden (including toilet block)	Golf putting green and driving bays	
Camp administration office	Gymnasium	Cricket nets	
Recreation building and patio	Medical facility	Multi use sports court	
Ice room	Bus shelter	Remaining toilet blocks	
Kitchen / diner building	Fitness track		
	Linen/chemical store		
	Maintenance shed and compound		
Construction Depot			
50 % of contractor office bays	Remainder of contractor office bays	All remaining construction depot facilities	
50% of other hardstand areas	Construction management office		
50% of contractor toilet blocks	Crib / meeting room		
	Owners' office		

Stage 1	Stage 2	Stage 3	Subsequent Stages (per Stage)
	All remaining toilet block		
	Security gatehouse		
	Vehicle wash-down		
Shared Services and Infrastructure			
Access road (exc lighting)	Perimeter fence	Boom gate	
Fire break	Remote infrastructure alarms	CCTV system	
Fuel storage and dispensing	Remaining vehicle parking areas	Parking area and access road lighting	
50% of vehicle parking areas		Flagpoles	

Table 25 – Target Camp Milestone Dates

Milestone	Camp 1 – Salisbury Plains	Camp 2 - Collinsville	Camp 3 - Wollombi	Camp 4 - Gregory	Alpha (Rail) Construction Depot
Contract Award	Start Jul 2011	Start Jul 2011	Start Jul 2011	Start Jul 2011	Start Jul 2011
Access to Site	Start Oct 2011	Start Oct 2011	Start Oct 2011	Start Oct 2011	Start Oct 2011
Fly Camp Available	N/A	End Oct 2011	N/A	End Dec 2011	N/A
Handover – Stage 1	Mid Mar 2012	Mid Apr 2012	Mid Mar 2012	End Apr 2012	Mid Jun 2012
Handover – Stage 2	Mid Apr 2012	Mid May 2012	Mid Apr 2012	Mid Jun 2012	Mid Aug 2012
Handover – Stage 3	Mid May 2012	Mid Jul 2012	Mid May 2012	End Jul 2012	Mid Aug 2012
Completion	Mid Jul 2012	Mid Jul 2012	Mid May 2012	End Jul 2012	Mid Aug 2012

17.3.1 Early Award Recommendations

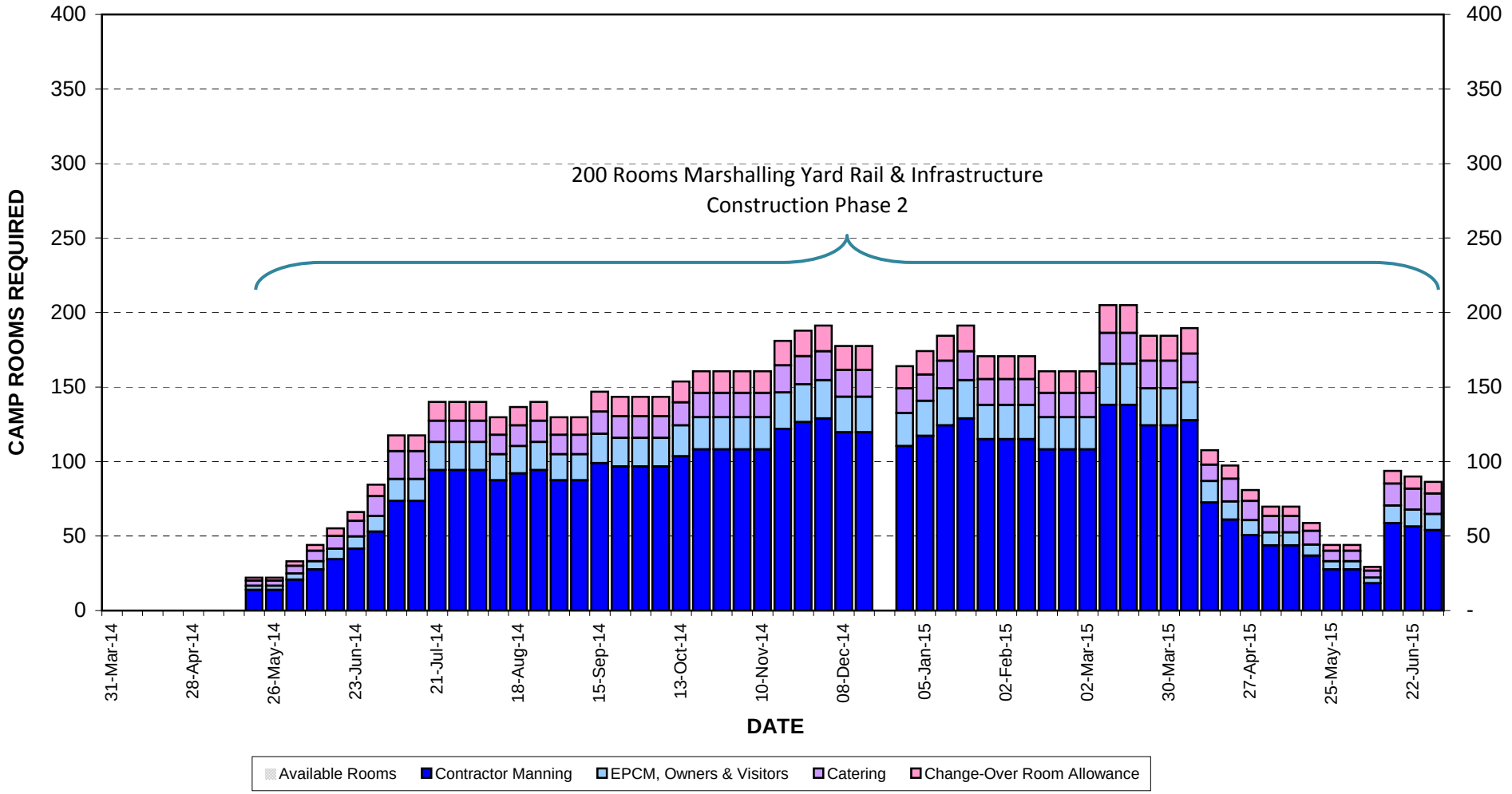
Provision of camps at all sites on the critical path for delivering the Alpha Coal Rail Project. Some packages, or elements of some packages, will need to be awarded prior to the Project Funding date in Q3 2011 to suit regulatory approval timeframes or manage manufacture and delivery lead times. Key early milestones for timely delivery of the camps are:

- Awarding a contract for WWTP design in late Q2- early Q3 2011. This is required to provide design information necessary to obtain the long-lead development approval prior to construction.
- Awarding a contract for kitchen/diner fabrication in Q3 2011. The fabrication lead-time kitchen/diner building is currently 6 months minimum, followed by an 8-10 week site installation period. This may be part of a larger camp design and construction contract, or smaller kitchen-only package if funding cannot be released for the full camp design and construct package.
- Awarding a contract for accommodation room and other transportable building fabrication in Q3 2011. To minimise site installation durations (and costs), buildings should be stockpiled so that a ready supply of units is available when needed. Vendors approached during the BFS investigation have all indicated that they expect numerous large contracts to be awarded around the same time as the Alpha Coal Rail Project. Locking the preferred vendor into a delivery schedule as early as possible is recommended to reduce schedule risk.
- Awarding a contract for supply and installation of the rail string welding facility. Given the lead times quoted by the equipment vendor, this package needs to be awarded immediately to meet the construction schedule.
- Awarding a pioneering earthworks package in Q3 2011 to upgrade existing roads and establish new access routes. This is particularly important for Wollombi, which is the key rail construction depot site but has the worst existing site access.

APPENDIX A - MANNING HISTOGRAMS

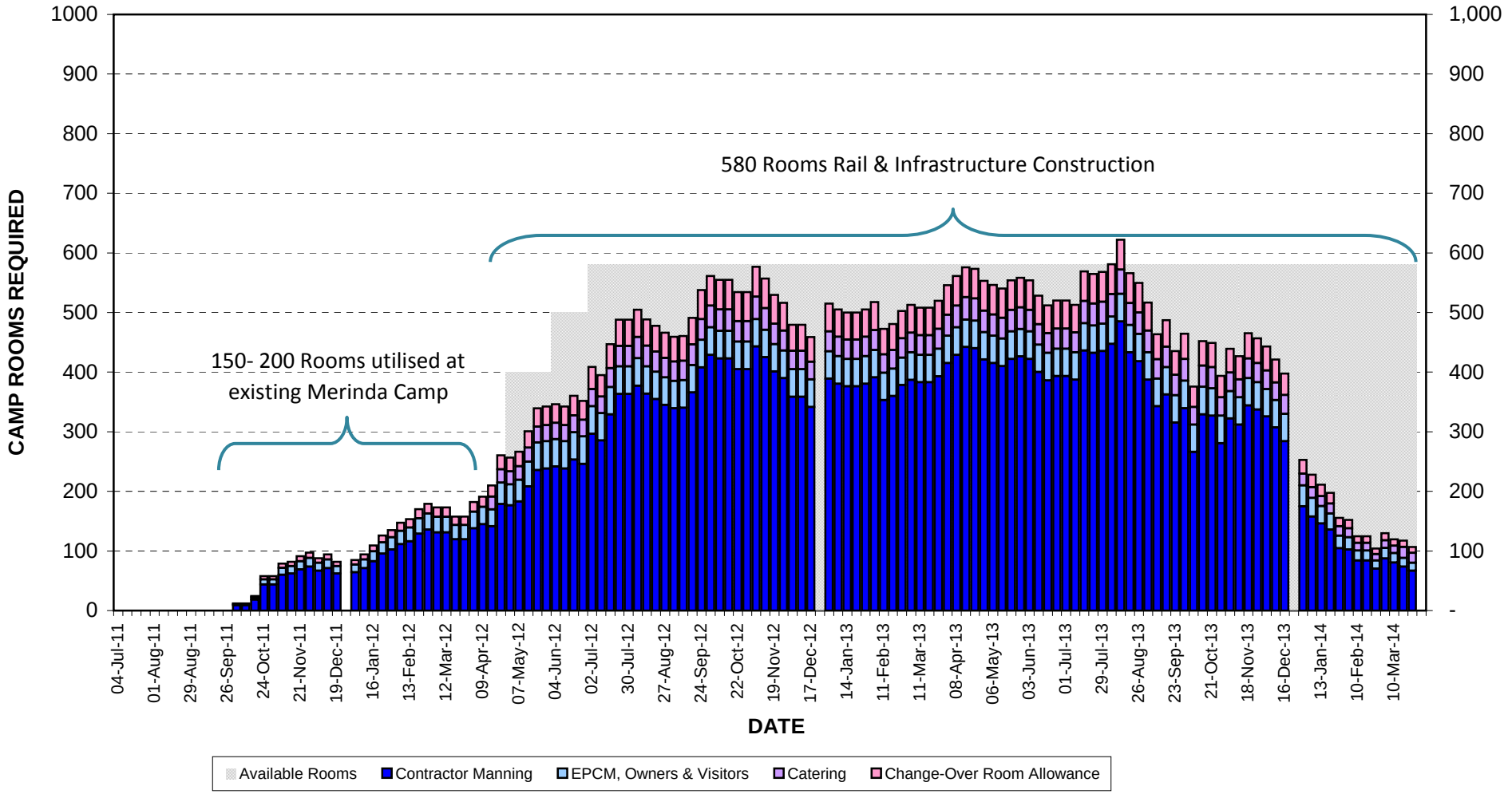
ALPHA COAL RAIL CONSTRUCTION MANNING

CAMP 1 - SALISBURY PLAINS (PHASE 2)



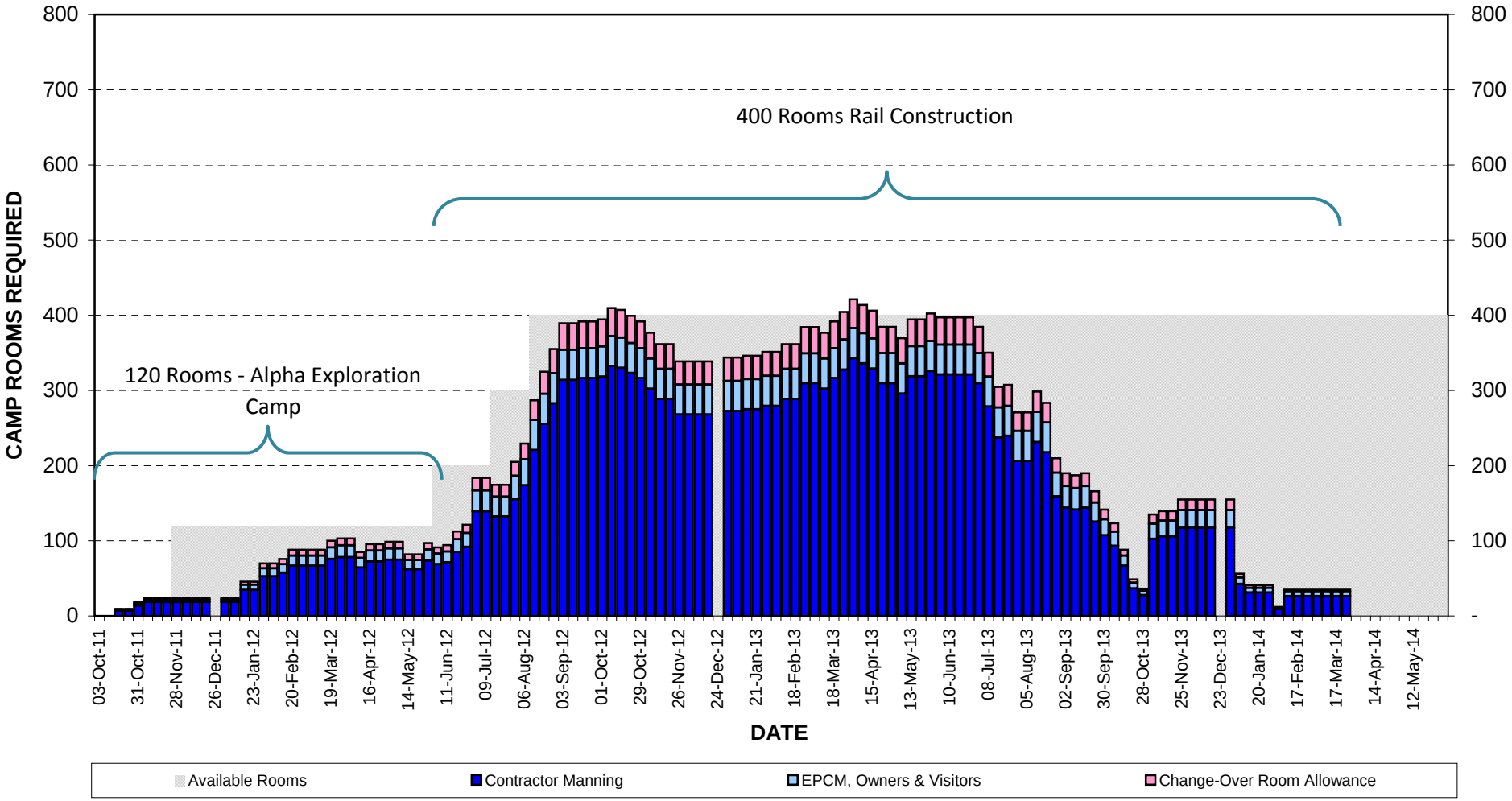
ALPHA COAL RAIL CONSTRUCTION MANNING

CAMP 1 - SALISBURY PLAINS (PHASE 1)



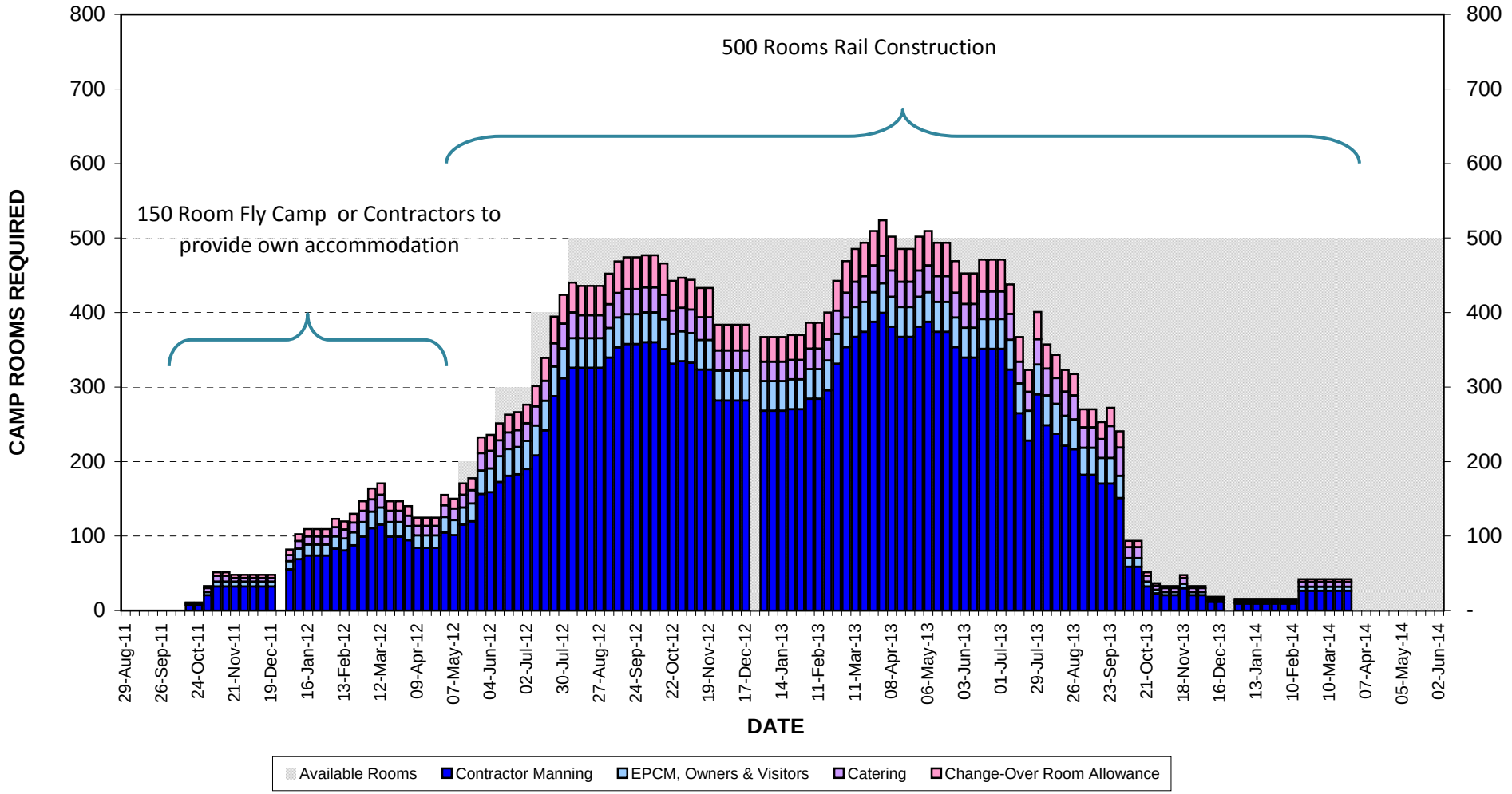
ALPHA COAL RAIL CONSTRUCTION MANNING

CAMP 5 - ALPHA RAIL



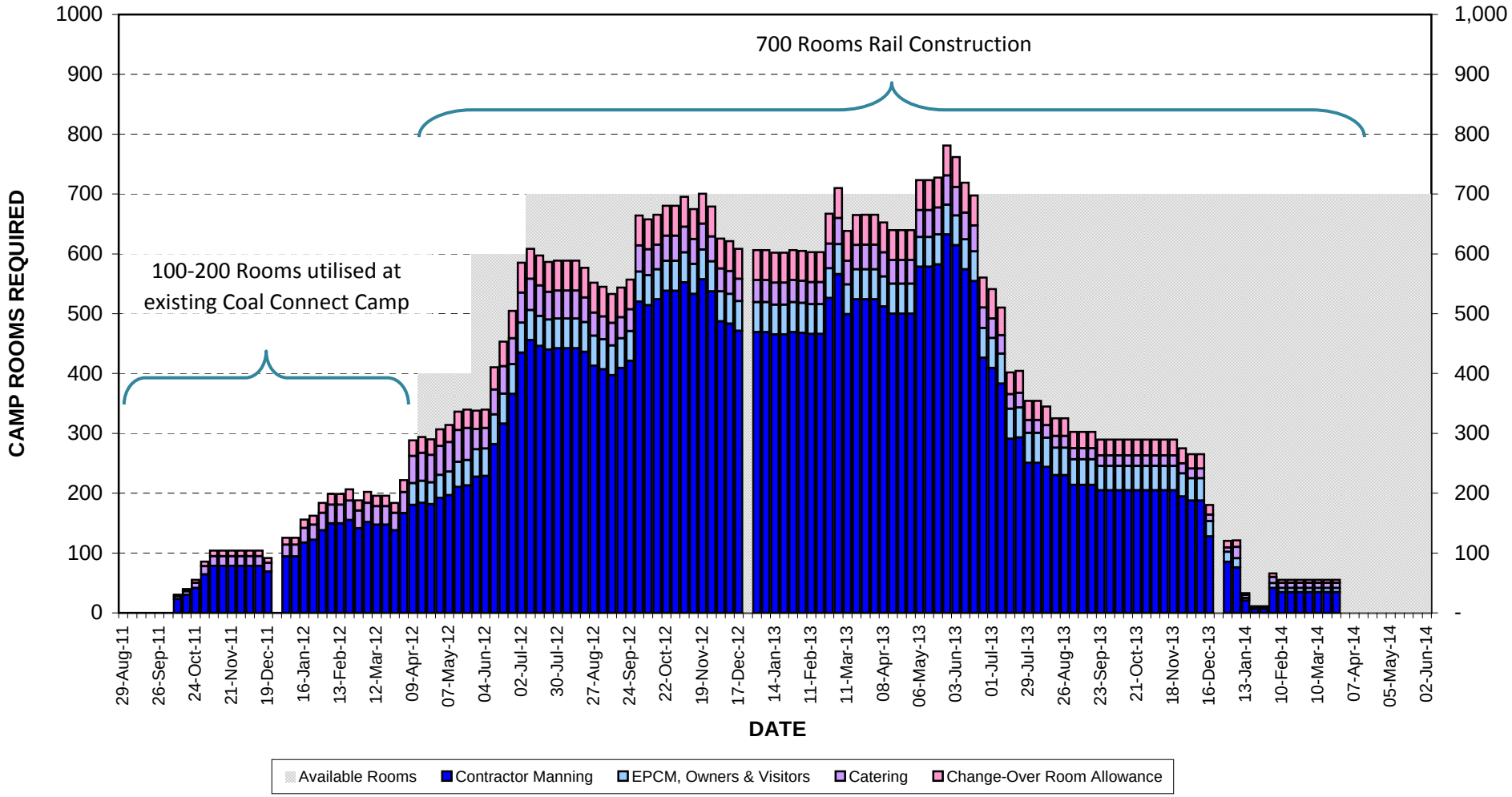
ALPHA COAL RAIL CONSTRUCTION MANNING

CAMP 4 - GREGORY



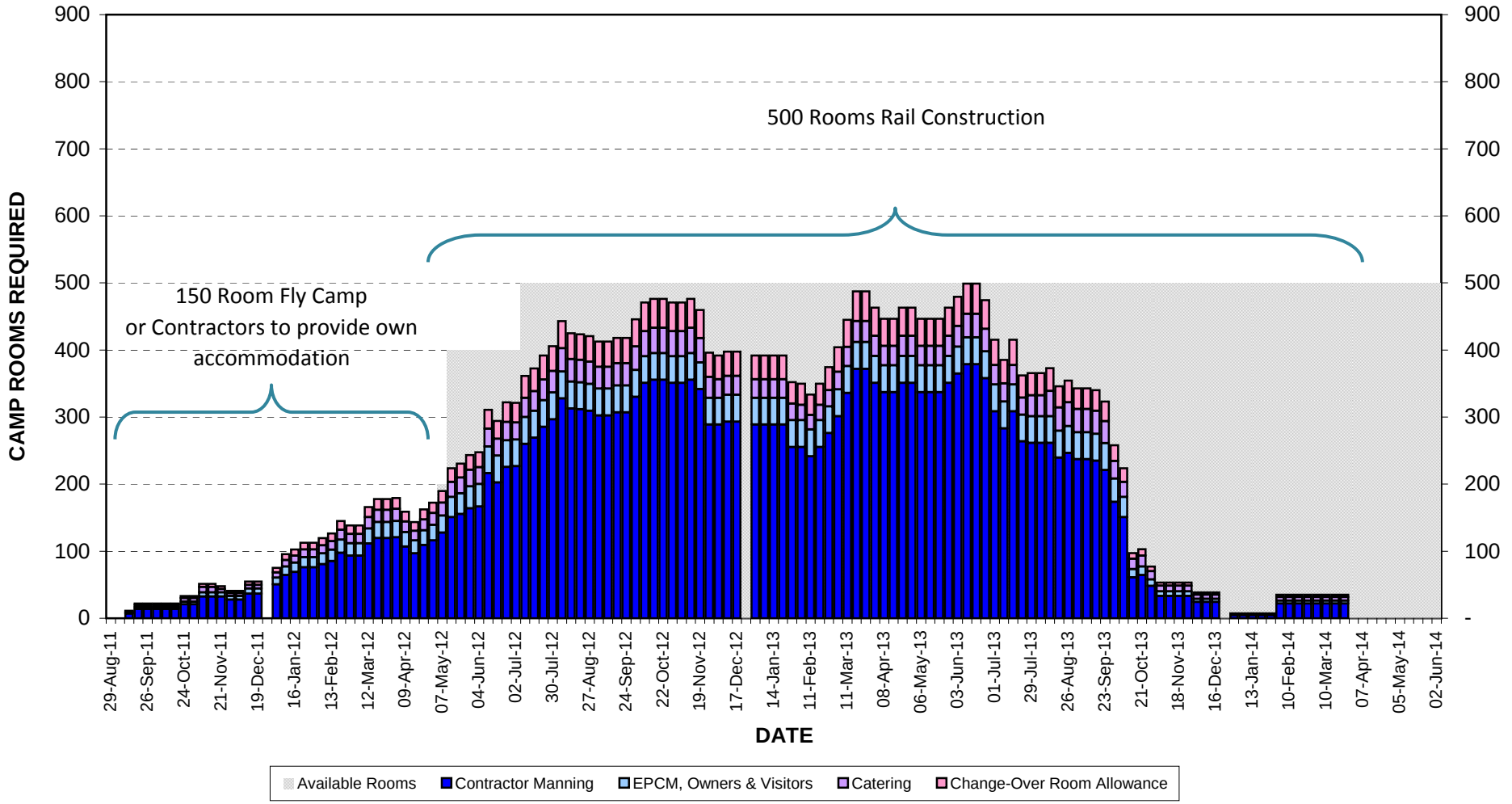
ALPHA COAL RAIL CONSTRUCTION MANNING

CAMP 3 - WOLLOMBI



ALPHA COAL RAIL CONSTRUCTION MANNING

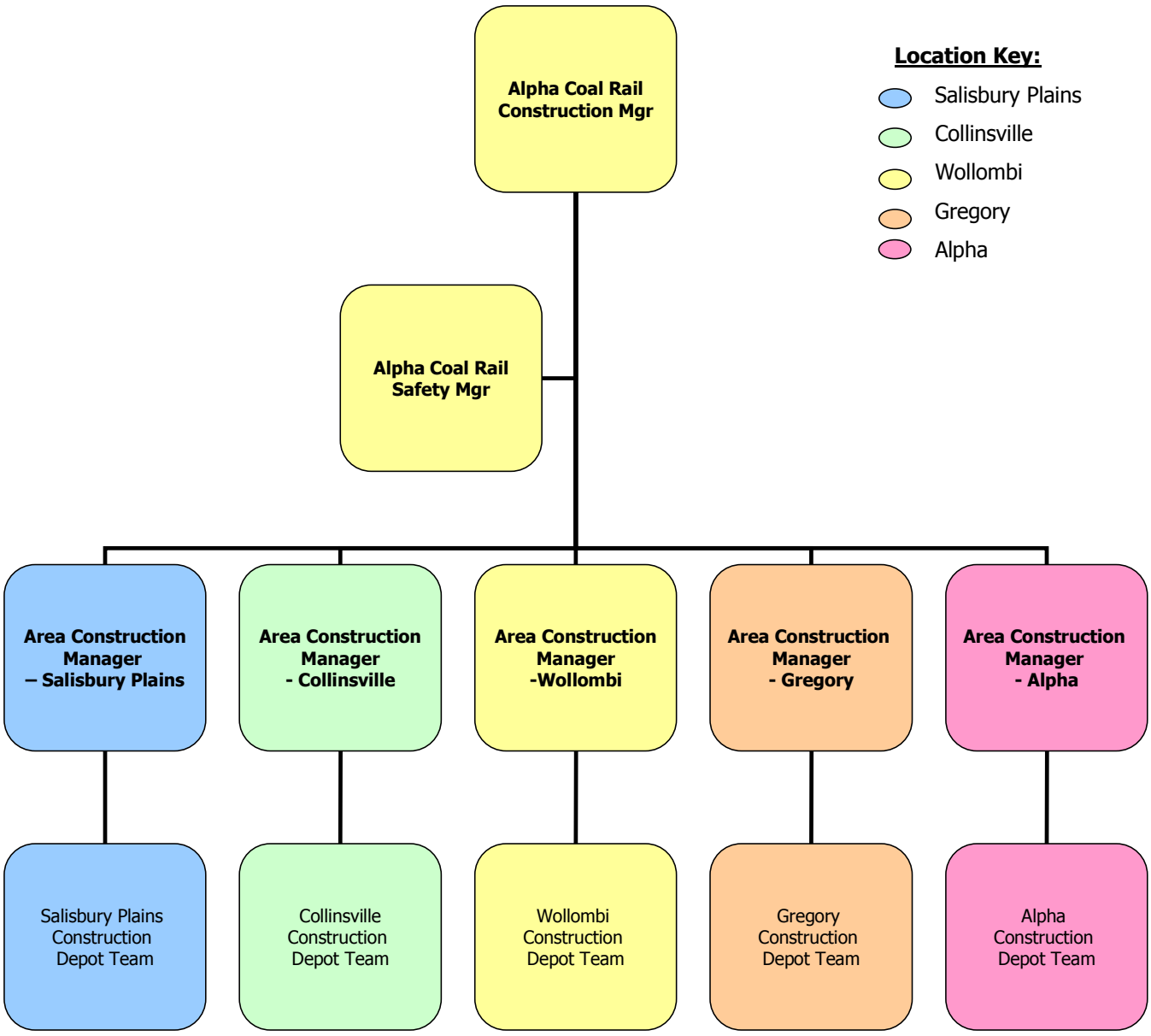
CAMP 2 - COLLINSVILLE



APPENDIX B -
CONSTRUCTION MANAGEMENT ORGANISATION CHART

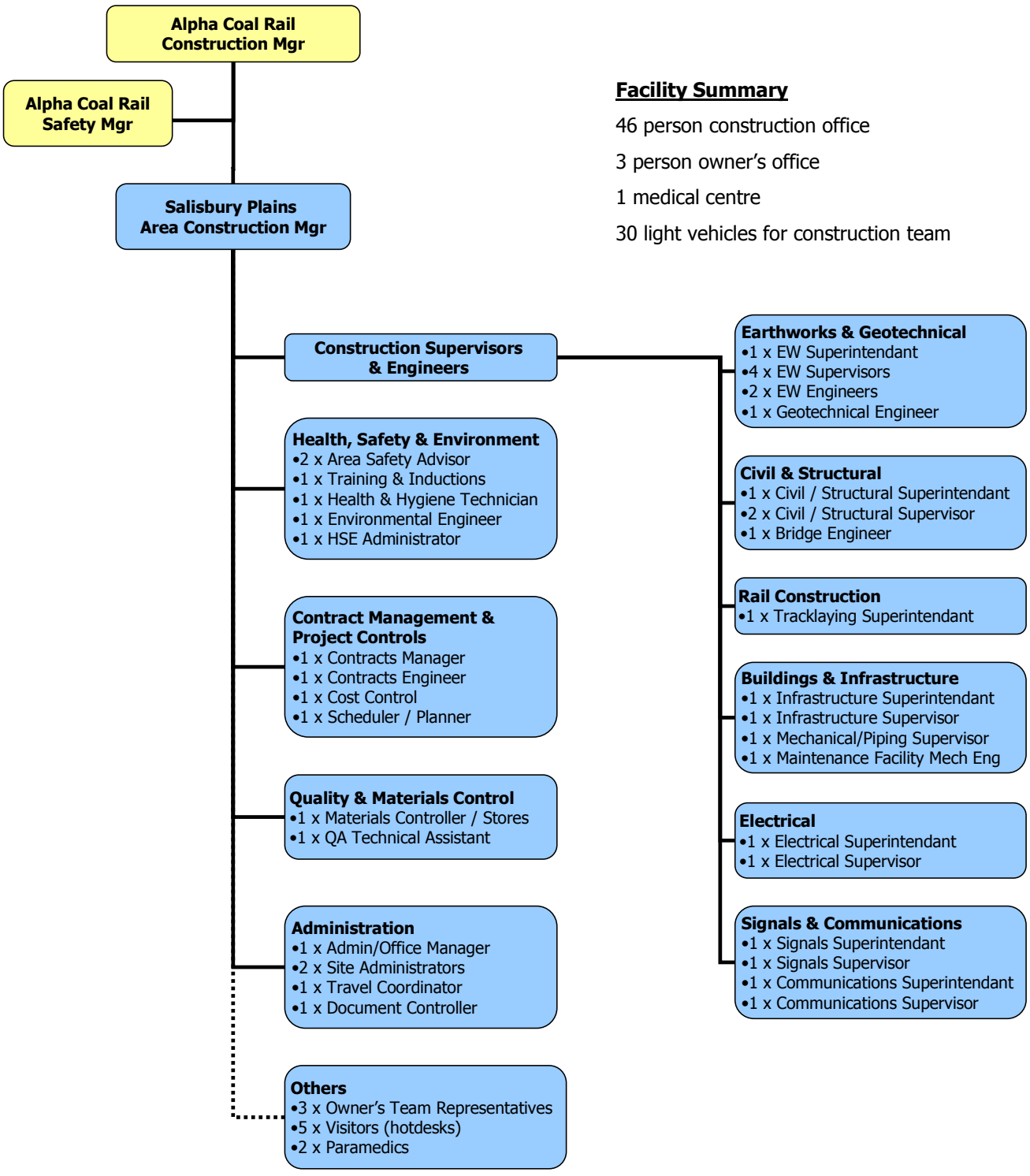
Alpha Coal Rail BFS

Preliminary Construction Team Structure



Alpha Coal Rail BFS

Salisbury Plains Construction Depot Team



Facility Summary

46 person construction office

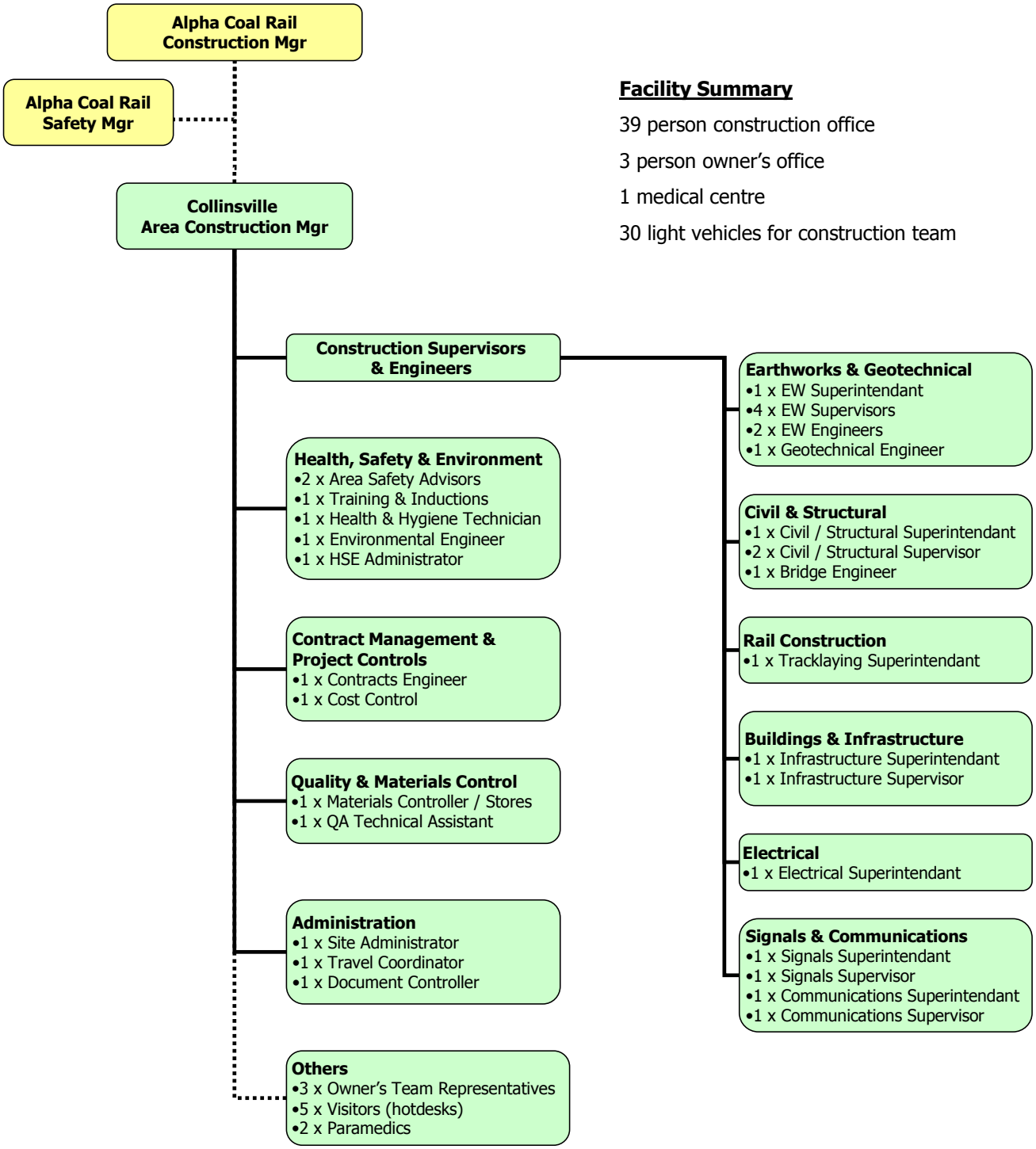
3 person owner's office

1 medical centre

30 light vehicles for construction team

Alpha Coal Rail BFS

Collinsville Construction Depot Team



Facility Summary

39 person construction office

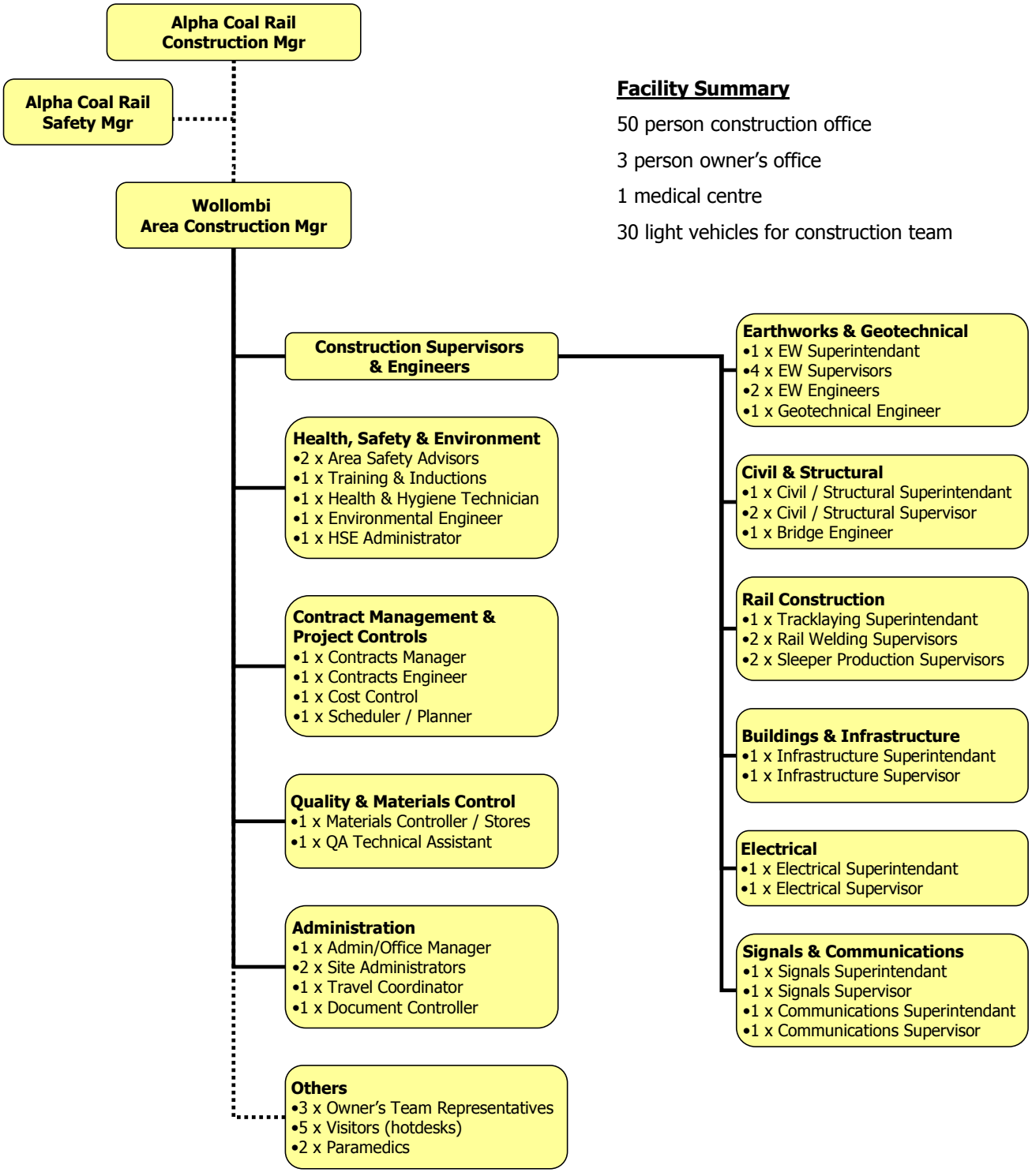
3 person owner's office

1 medical centre

30 light vehicles for construction team

Alpha Coal Rail BFS

Wollombi Construction Depot Team



Facility Summary

50 person construction office

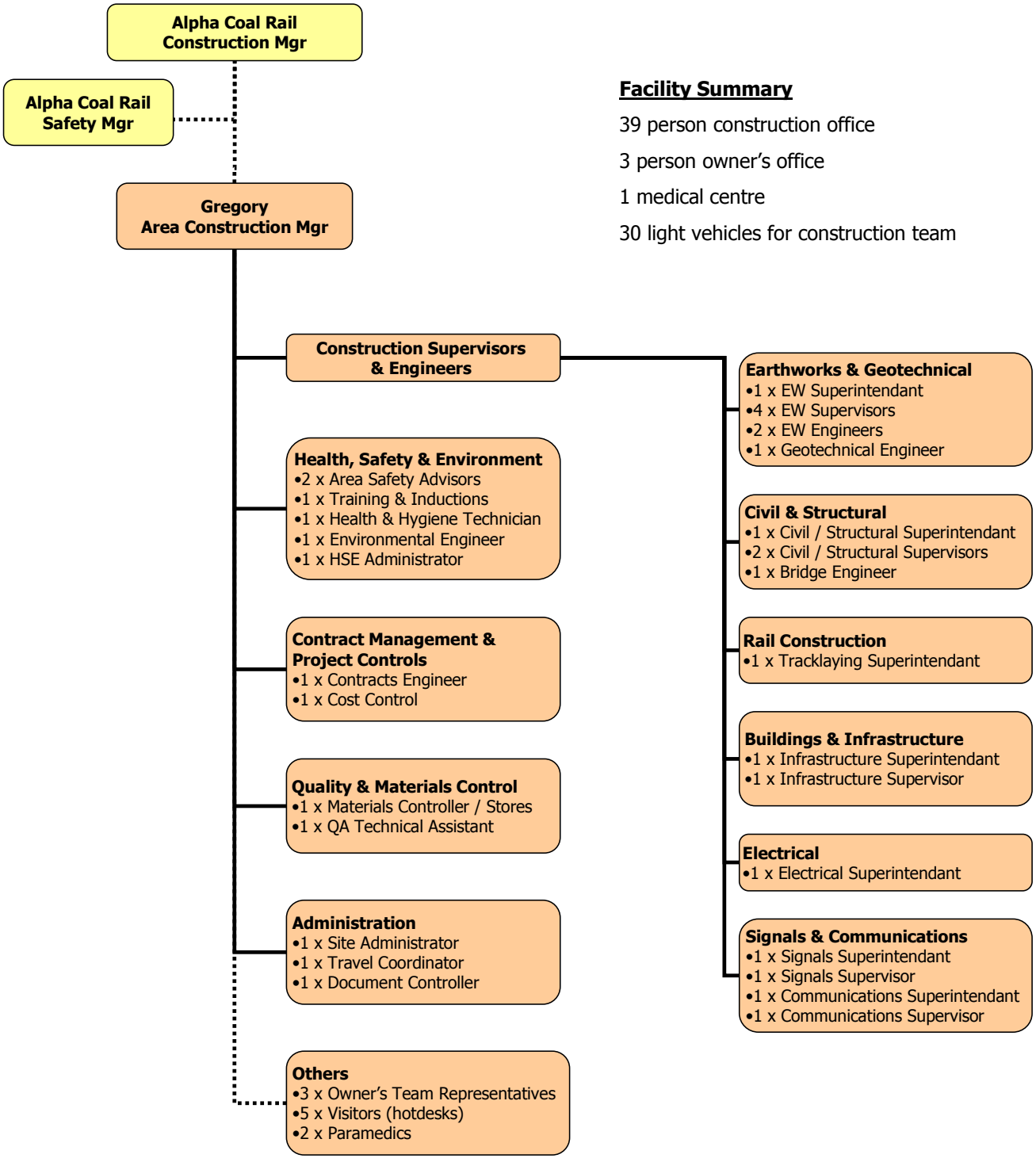
3 person owner's office

1 medical centre

30 light vehicles for construction team

Alpha Coal Rail BFS

Gregory Construction Depot Team



Facility Summary

39 person construction office

3 person owner's office

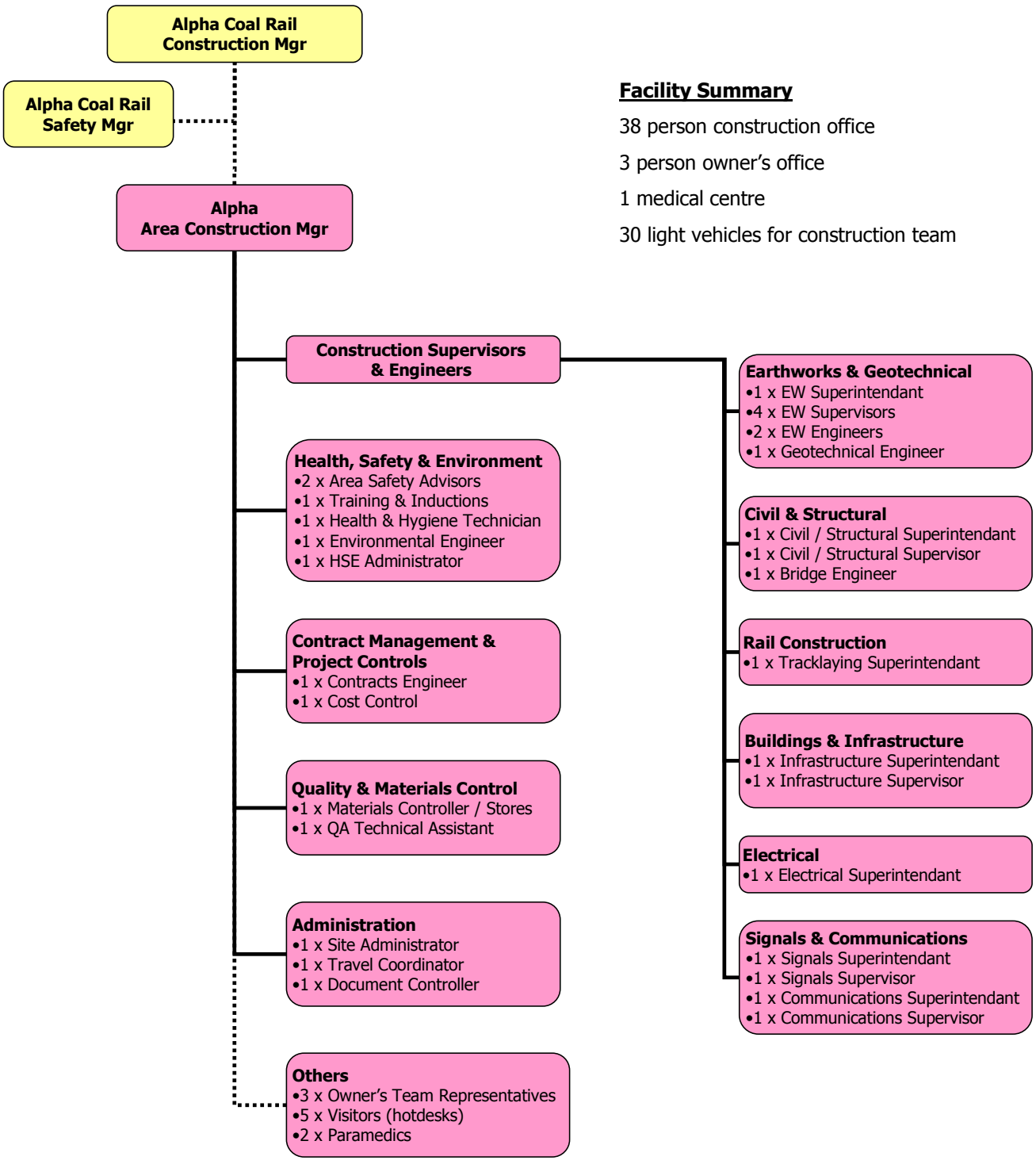
1 medical centre

30 light vehicles for construction team

calibre

Alpha Coal Rail BFS

Alpha Construction Depot Team



Facility Summary

38 person construction office

3 person owner's office

1 medical centre

30 light vehicles for construction team

APPENDIX C -
CAMP SCOPE SUMMARY TABLE

ALPHA COAL RAIL BFS - RAIL CONSTRUCTION CAMP SCOPE SUMMARY

Description	Nominal Size	Number of Units Required / Service Required				
		Camp 1 - Salisbury Plains	Camp 2 - Collinsville	Camp 3 - Wollombi	Camp 4 - Gregory	Alpha (Rail) Construction Depot
Base Number of Accommodation Rooms Required	**peak manning forecast**	**580**	**500**	**700**	**500**	**400**
Contingency Rooms	**10% allowance**	**58**	**50**	**70**	**50**	**40**
Infrastructure & Layout Sized For	**base + contingency**	**638**	**550**	**770**	**550**	**440**
CAMP BUILDINGS & FACILITIES						
3 Room Accommodation Buildings	14.4 m x 3.3 m	193	167	233	167	N/A Excluded from Alpha Coal Rail BFS Scope
Accommodation Building Verandahs	14.4 m x 2.1m	193	167	233	167	
Universal Access Accomodation Room	6.4 x 3.3 m	1	1	1	1	
Universal Access Accommodation Room Verandah	6.4 x 2.1 m	1	1	1	1	
Kitchen/Diner	Site specific - minimum requirement shown	580 m^2 dining + back of house	340 m^2 dining + back of house	475 m^2 dining + back of house	340 m^2 dining + back of house	
Tavern	14.4 m x 19.8 m	1	1	1	1	
Beer Garden	Site specific	150 m^2	150 m^2	190 m^2	150 m^2	
Tavern Toilets	10.0 m x 3.0 m	1	1	1	1	
Administration Office & Retail Outlet	14.4 m x 9.9 m	1	1	1	1	
Bus Shelter	Site specific, approx 50 m^2	1	1	1	1	
Gymnasium & Aerobics Room	12.0 m x 24.0 m	1	1	1	1	
Gymnasium Breezeway	10.0 m x 2.5 m	1	1	1	1	
Recreation Room with Telephones & Internet Café	14.4 m x 13.2 m	1	1	1	1	
Recreation Room Verandah	6.0 m x 3.6 m	1	1	1	1	
Recreation Room Toilets	8.0 m x 3.0 m	1	1	1	1	
Laundries	14.4 m x 3.3 m	10	8	12	8	
Laundry Verandahs	14.4m x 2.1 m	10	8	12	8	
Laundry Drying Courts (with privacy fencing)	3.3 m x 2.1 m	10	8	12	8	
Ice Room	8.0 m x 3.3 m	1	1	1	1	
Ice Room Verandah	8.0 m x 2.1 m	1	1	1	1	
Bulk Linen / Chemical Store	14.4 m x 6.6 m	1	1	1	1	
Bulk Linen / Chemical Store Undercover Loading Area	14.4 m x 3.0 m	1	1	1	1	
Maintenance Shed & Maintenance Office	12.0 m x 12.0 m	1	1	1	1	
Maintenance Shed Breezeway	12.0 m x 5.0 m	1	1	1	1	
Fenced Maintenance Compound	20 m x 20 m	1	1	1	1	
Multi sports court (basketball, tennis and volleyball)	35.0 m x 19.0 m	1	1	1	1	
Cricket Pitch & Nets	30.0 m x 12.0 m	1	1	1	1	
Golf Putting Green	5.0 m x 10.0 m free form	1	1	1	1	
Golf Driving Range (Nets)	2.5 m x 15.0 m per bay	3 bays	3 bays	3 bays	3 bays	
Sports Area Toilets	8.0 m x 3.0 m	1	1	1	1	
Gazebos	5 m x 5 m	6	6	8	6	
Walking/running path (unsealed)	3 m wide path in 5 m clearing	2.5 km	2.5 km	2.5 km	2.5 km	
Landscaping	To inner edge of fire break	Required	Required	Required	Required	
CONSTRUCTION DEPOT						
Construction Management Office	Site Specific	1 bldg for 46 people	1 bldg for 39 people	1 bldg for 50 people	1 bldg for 39 people	1 bldg for 38 people
Crib Room / Meeting Room	14.4 m x 6.6 m	1	1	1	1	1
Construction Office Breezeway	14.4 m x 5.0 m	1	1	1	1	1
Owners' Representative's Office	14.4 m x 3.3 m	1	1	1	1	1
Owners' Representative's Office Breezeway	14.4 m x 3.0 m	1	1	1	1	1
Construction Manager/Owners' Toilets	8.0 m x 3.0 m	1	1	1	1	1
Contractor Toilets	10.0 m x 3.0 m	2	2	2	2	2
Unpowered Sea Containers - 20'	6.0 m x 2.5 m	3	2	3	2	2
Powered Sea Containers - 20'	6.0 m x 2.5 m	1	1	1	1	1
Contractor Office Areas	25 m x 25 m	12	8	12	8	8
Contractor Workshop Area	50 m x 50 m	1	1	1	1	1
Secure Laydown	50 m x 50 m	1	1	1	1	1
Contractor Laydown	50 m x 50 m	2	1	2	1	1
Culvert Rolling Area	100 m x 100 m	1	1	1	1	1
Concrete Batch Plant Area	100 m x 100 m	1	1	1	1	1
Rail String Production Area	450 m x 150 m	0	0	1	0	0
Sleeper Production Area	500 m x 100 m	0	0	1	0	0
Temporary Rolling Stock Commissioning Area	100 m x 50 m	0	0	1	0	0
Ballast Stockpile Area (or nearby)	675 m x 175 m	1	0	1	0	1
SHARED SERVICES & INFRASTRUCTURE						
Bulk Structural Earthworks & Major Drainage	Site specific	Required	Required	Required	Required	Required
Fire Break	20 m clear, inc roads	Required	Required	Required	Required	Required
General Stormwater Drainage	Site specific	Required	Required	Required	Required	Required
Access Road	8 m carriageway, unsealed	Required	Required	Required	Required	Required
Vehicular emergency & maintenance access paths through the camp	3 m wide clearway	Required	Required	Required	Required	No
Car Park	1 bay per 4 residents	Required	Required	Required	Required	Required
Service Truck Park (inc mini-buses and coaches)	15 bays	Required	Required	Required	Required	Required
Road Train Coupling/Decoupling Area, Turning Area & Lay-By	2 x triple road train simultaneously	Required	Required	Required	Required	Required
Footpaths - arterial	1.8 m wide	Required	Required	Required	Required	Required
Footpaths - minor	1.5 m wide	Required	Required	Required	Required	Required
Medical Facility	14.4 m x 3.3 m	1 (Camp)	1 (Camp)	1 (Camp)	1 (Camp)	1 (Depot)
Medical Facility Verandah	14.4 m x 2.1m	1 (Camp)	1 (Camp)	1 (Camp)	1 (Camp)	1 (Depot)
Ambulance Shelter	9.5 m x 4.5 m	1 (Camp)	1 (Camp)	1 (Camp)	1 (Camp)	1 (Depot)
Communications Head-End Building	10 m x 3.3 m	1 (Camp)	1 (Camp)	1 (Camp)	1 (Camp)	1 (Depot)
Security Gatehouse / Induction Room	12.0 m x 3.0 m	1	1	1	1	1
Security Office Verandah (wrap-around)	15.0 m x 1.2 m	1	1	1	1	1
Gatehouse Toilet	8.0 m x 3.0 m	1	1	1	1	1
Site Entry Boom Gate	-	Required	Required	Required	Required	Required
CCTV System	-	Gate - in/out Tavern/beer garden	Gate - in/out Tavern/beer garden	Gate - in/out Tavern/beer garden	Gate - in/out Tavern/beer garden	Gate - in/out
Flagpoles	8.0 m high	3	3	3	3	3
Evacuation / cyclone alert siren	-	1	1	1	1	1
Potable Water Storage Tank(s)	Site Specific	324 kL	271 kL	400 kL	300 kL	No
Process and Fire Water Storage (kL)	Site Specific	468 kL	408 kL	486 kL	468 kL	468 kL
Potable Water Treatment Unit(s)	Site Specific	212 kL/D	147 kL/D	237 kL/D	210 kL/D	No
Potable Water Pump(s)	Site Specific	Required	Required	Required	Required	No
Potable Water Distribution System	Site Specific	Required	Required	Required	Required	Required
Fire Water Pump(s)	Site Specific	Required	Required	Required	Required	No
Fire Water Distribution System	Site Specific	Required	Required	Required	Required	No
Sewerage Collection System	Site Specific	Required	Required	Required	Required	Required
Sewerage Pump Stations	Site Specific	Required	Required	Required	Required	Required
Waste Water Treatment Plant	Site Specific	131 kL/D	109 kL/D	163 kL/D	121 kL/D	No
Effluent Disposal System	Site Specific	Required	Required	Required	Required	No
Diesel Fired Power Station	Site Specific	3 x 1250 kVA duty 1 x 1250 kVA standby	3 x 1250 kVA duty 1 x 1250 kVA standby	4 x 1250 kVA duty 1 x 1250 kVA standby	3 x 1250 kVA duty 1 x 1250 kVA standby	1 x 1250 kVA duty 1 x 1250 kVA standby
Power Distribution	Site Specific	Required	Required	Required	Required	Required
Area Lighting (paths, buildings & sports facilities)	Site Specific	Required	Required	Required	Required	Required
Car Park Lighting	Site Specific	Required	Required	Required	Required	Required
Truck Park Lighting	Site Specific	Required	Required	Required	Required	Required
Communications Backhaul	Site Specific	No - by others	No - by others	No - by others	No - by others	No - by others
Communications Distribution	Site Specific	Required	Required	Required	Required	Required
Diesel Fuel Store	Site Specific	4 x 110 kL	3 x 110 kL	4 x 110 kL	3 x 110 kL	1 x 30 kL
Refueling Bowsers - high flow	-	1	1	1	1	No
Refueling Bowsers - low flow	-	1	1	1	1	No
Heavy Vehicle Wash Down	1 bay	1	1	1	1	1
Light Vehicle Wash Down	1 bay	1	1	1	1	1

APPENDIX D -
POWER DEMAND CALCULATIONS

HCPL Alpha Coal Project (Rail)

Construction Camps & Depots

Power Demand Calculations

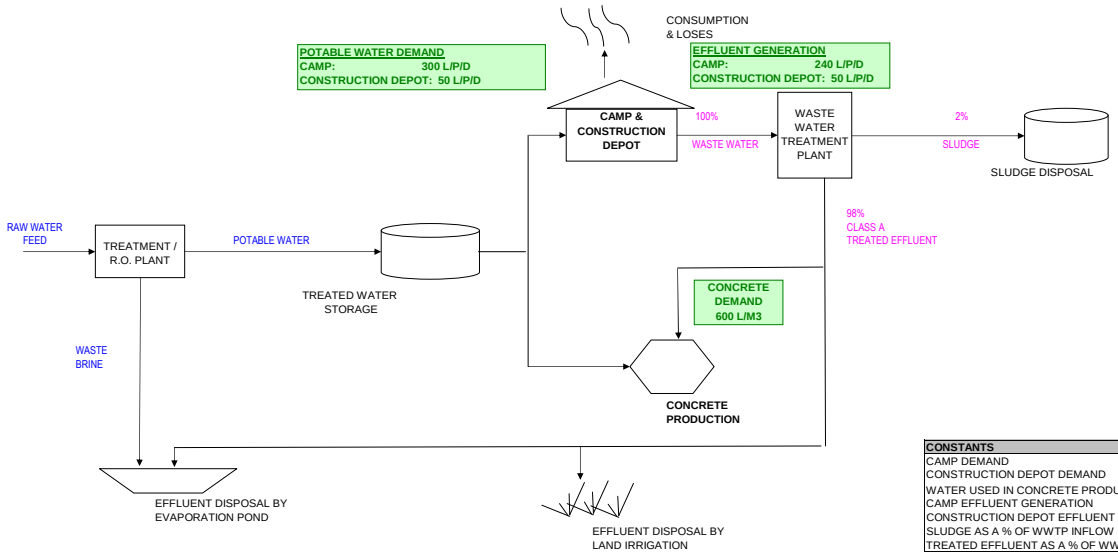
PROJECT NO.: CJVP10007
DOCUMENT NO.: CJVP10007-REP-C-006 Appendix D

Preliminary	G	TW				1/02/2011
Description	**Rev**	**Author**	**Checked**	**Approved**	**Authorised**	**Date**

		Camp 1 AND Construction Depot		**Camp 2 AND Construction Depot**		**Camp 3 AND Construction Depot**		**Camp 4 AND Construction Depot**		**Alpha (Rail) Construction Depot**	
Camp Size (rooms, excluding contingency allowance)		580		500		700		500		400	
	kVA per Unit	No. of Units	Sub-total	No. of Units	Sub-total	No. of Units	Sub-total	No. of Units	Sub-total	No. of Units	Sub-total
CAMP											
Accommodation Unit (3 rooms per bldg)	7	194	1358	167	1169	234	1638	167	1169	0	0
Maximum Occupy factor			0.75		0.75		0.75		0.75		0.75
Accommodation Unit Maximum Demand			1019		877		1229		877		0
Laundry	40	10	400	8	320	12	480	8	320	0	0
Kitchen		1	925	1	800	1	800	1	800	0	0
Tavern		1	160	1	120	1	120	1	120	0	0
Beer Garden		1	120	1	120	1	120	1	80	0	0
Recreation Room/Internet café		1	55	1	50	1	55	1	50	0	0
Gymnasium		1	65	1	65	1	65	1	65	0	0
Toilet Block	5	3	15	3	15	3	15	3	15	0	0
Camp Admin	20	1	20	1	20	1	20	1	20	0	0
Medical Facility	20	1	20	1	20	1	20	1	20	0	0
Communications Head-end Building	10	1	10	1	10	1	10	1	10	0	0
Ice Room	15	1	15	1	15	1	15	1	15	0	0
Maintenance Shed & Compound	50	1	50	1	50	1	50	1	50	0	0
Bulk Linen / Chemical Store	20	1	20	1	20	1	20	1	20	0	0
CONSTRUCTION DEPOT											
Security Gatehouse and Boom Gate	5	1	5	1	5	1	5	1	5	1	5
Construction Office	180	1	180	1	180	1	180	1	180	1	180
Owner's Representatives' Office	20	1	20	1	20	1	20	1	20	1	20
EPCM Crib / Meeting Room	50	1	50	1	50	1	50	1	50	1	50
Contractor Construction Offices and Crib Rooms	70	8	560	6	420	8	560	6	420	6	420
Toilets	5	3	15	2	10	3	15	2	10	2	10
Parking	10	1	10	1	10	1	10	1	10	1	10
Secure Laydown Area - Area Lighting	10	1	10	1	10	1	10	1	10	1	10
General Laydown Area - Area Lighting	20	1	20	1	20	1	20	1	20	1	20
Sea Containers	20	2	40	2	40	2	40	2	40	2	40
Temporary Diesel Fuel Storage and Dispensing	50	1	50	1	50	1	50	1	50	1	50
Vehicle Wash Down Bay	20	1	20	1	20	1	20	1	20	1	20
Flash Butt Welding Facility	1000	0	0	0	0	1	1000	0	0	0	0
Sleeper Manufacturing Depot	500	0	0	0	0	1	500	0	0	0	0
Heavy Vehicle Workshop (separate generator by others)	0	1	0	1	0	1	0	1	0	1	0
Culvert Rolling Facility (mobile, separate generator by others)	0	1	0	1	0	1	0	1	0	1	0
Concrete Batching Plant (mobile, separate generator by others)	0	1	0	1	0	1	0	1	0	1	0
ESSENTIAL SERVICES											
Potable Water		1	200	1	200	1	200	1	140	0	0
Fire Water		1	60	1	60	1	60	1	60	0	0
Sewer		1	160	1	160	1	160	1	100	1	100
Power		1	50	1	50	1	50	1	50	1	50
Area Lighting		1	60	1	60	1	60	1	60	1	60
Communications		1	40	1	40	1	40	1	40	1	40
Security		1	10	1	10	1	10	1	10	1	10
TOTAL kVA			4454		3917		6079		3757		1095
Diversity			0.75		0.75		0.75		0.75		0.75
Diversified kVA			**3341**		**2938**		**4559**		**2818**		**822**
Genset Size (kVA)			**1250**		**1250**		**1250**		**1250**		**1000**
No. of Gensets	***14***		**3**		**3**		**4**		**3**		**1**
No. of Back-Up Gensets	***5***		**1**		**1**		**1**		**1**		**1**
Total No. of Gensets	***19***		**4**		**4**		**5**		**4**		**2**
Maximum Power generated			**3750**		**3750**		**5000**		**3750**		**1000**
Maximum Loading on Generators			89%		78%		91%		75%		82%

APPENDIX E -
WATER BALANCE CALCULATION

ALPHA COAL TEMPORARY FACILITIES
PRELIMINARY WATER BALANCE FOR CAMPS & CONSTRUCTION OFFICES
MINIMUM DEMAND SCENARIO



CONSTANTS		
CAMP DEMAND	300	L/P/D
CONSTRUCTION DEPOT DEMAND	50	L/P/D
WATER USED IN CONCRETE PRODUCTION	600	L/M^3 CONCRETE PRODUCED
CAMP EFFLUENT GENERATION	240	L/P/D
CONSTRUCTION DEPOT EFFLUENT GENERATION	50	L/P/D
SLUDGE AS A % OF WWTP INFLOW	1%	
TREATED EFFLUENT AS A % OF WWTP INFLOW	99%	

SCENARIO A - PEAK CONCRETE PRODUCTION, WITH RECYCLED EFFLUENT USED AS PLANNED

LOCATION	PLANNED CAMP SIZE	CAMP SIZE WITH 10% CONTINGENCY	MIN OCCUPANCY FACTOR	FORECAST EP	CONSTN DEPOT %	MAX CNSTN DEPOT POPULATION	CONCRETE PRODUCTION CAPACITY	CAMP / OFFICE DEMAND	CONCRETE DEMAND	TOTAL TREATED WATER DEMAND	WWTP INFLOW	SLUDGE VOLUME	CLASS A EFFLUENT PRODUCED	TREATED EFFLUENT TO CONCRETE PRODUCTION	RO PLANT WATER TO CONCRETE	WATER TREATMENT PLANT CAPACITY REQUIRED	WATER SOURCE	RAW WATER TREATMENT PROCESS EFFICIENCY	RAW WATER FEED	EFFLUENT TO DUST SUPRESSION, IRRIGATION OR EVAPORATION	WASTE BRINE TO EVAPORATION	TOTAL WASTE STREAM
	ppl						m^3/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D			kL/D			
Camp 1 - Salisbury Plains	580		17%	100	50%	50	150	33	90	123	27	0.3	26	26	64	96	BORE & RO	60%	160	0	64	64
Camp 2 - Collinsville	500		15%	75	30%	23	100	24	60	84	19	0.2	19	19	41	65	BORE & RO	60%	108	0	43	43
Camp 3 - Wollombi (rail construction)	700		14%	100	50%	50	130	33	78	111	27	0.3	26	26	52	84	SCHEME	100%	84	0	0	0
Camp 3 - Wollombi (rail maintenance)	50		20%	10	20%	2	0	3	0	3	3	0.0	2	0	0	3	SCHEME	100%	3.1	2.5	0.0	2.5
Camp 4 - Gregory	500		15%	75	30%	23	150	24	90	114	19	0.2	19	19	71	95	BORE & RO	60%	158	0	63	63
Alpha (Rail) Construction Depot	400		-	-	30%	20	150	1	90	91	-	-	-	-	-	-	SCHEME	100%	-	-	-	-

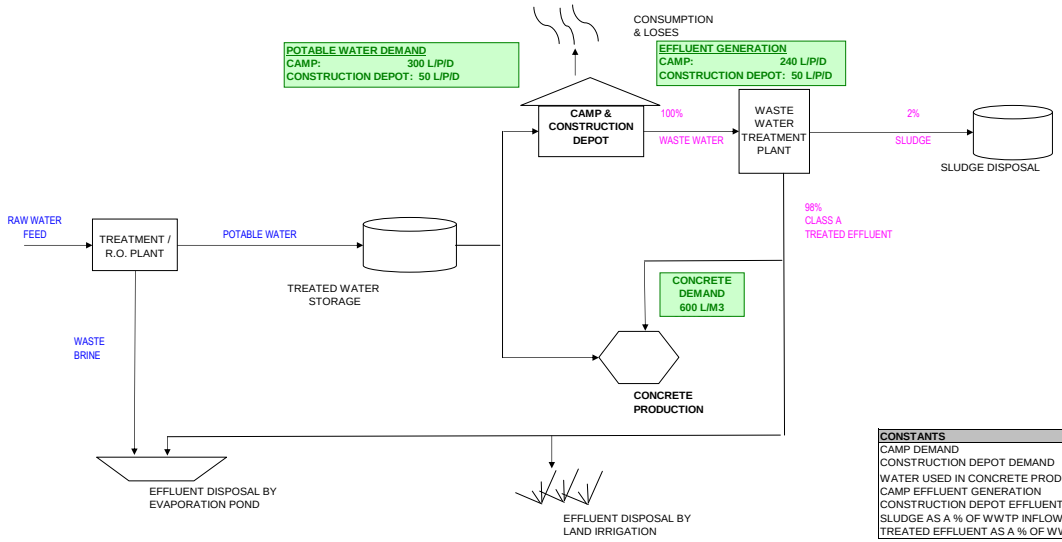
SCENARIO B - NO CONCRETE PRODUCTION (MINIMUM WATER TREATMENT REQUIREMENT)

CONCRETE PRODUCTION CAPACITY	CAMP / OFFICE DEMAND	CONCRETE DEMAND	TOTAL TREATED WATER DEMAND	WWTP INFLOW	SLUDGE VOLUME	CLASS A EFFLUENT PRODUCED	TREATED EFFLUENT TO CONCRETE PRODUCTION	RO PLANT WATER TO CONCRETE	WATER TREATMENT PLANT CAPACITY REQUIRED	WATER SOURCE	RAW WATER TREATMENT PROCESS EFFICIENCY	RAW WATER FEED	EFFLUENT TO DUST SUPRESSION, IRRIGATION OR EVAPORATION	WASTE BRINE TO EVAPORATION	TOTAL WASTE STREAM
m^3/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D			kL/D			
0	33	0	33	27	0.3	26	0	0	32.5	BORE & RO	60%	54	26	22	48
0	24	0	24	19	0.2	19	0	0	23.6	BORE & RO	60%	39	19	16	35
0	33	0	33	27	0.3	26	0	0	32.5	SCHEME	100%	33	26	0	26
0	3	0	3	3	0.0	2	0	0	3.1	SCHEME	100%	3.1	2.5	0.0	2.5
0	24	0	24	19	0.2	19	0	0	23.6	BORE & RO	60%	39	19	16	35
0	1	0	1	-	-	-	-	-	-	SCHEME	100%	-	-	-	-

SCENARIO C - CONCRETE PRODUCTION WITH NO RECYCLED EFFLUENT USE (MAXIMUM RAW WATER TREATMENT REQUIREMENT, MAXIMUM COMBINED WASTE STREAM)

CONCRETE PRODUCTION CAPACITY	CAMP / OFFICE DEMAND	CONCRETE DEMAND	TOTAL TREATED WATER DEMAND	WWTP INFLOW	SLUDGE VOLUME	CLASS A EFFLUENT PRODUCED	TREATED EFFLUENT TO CONCRETE PRODUCTION	RO PLANT WATER TO CONCRETE	WATER TREATMENT PLANT CAPACITY REQUIRED	WATER SOURCE	RAW WATER TREATMENT PROCESS EFFICIENCY	RAW WATER FEED	EFFLUENT TO DUST SUPRESSION, IRRIGATION OR EVAPORATION	WASTE BRINE TO EVAPORATION	TOTAL WASTE STREAM
m^3/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D			kL/D			
150	33	90	123	27	0.3	26	0	90	123	BORE & RO	60%	204	26	82	108
100	24	60	84	19	0.2	19	0	60	84	BORE & RO	60%	139	19	56	75
130	33	78	111	27	0.3	26	0	78	111	SCHEME	100%	111	26	0	26
0	3	0	3	3	0.0	2	0	0	3	SCHEME	100%	3	2	0	2
150	24	90	114	19	0.2	19	0	90	114	BORE & RO	60%	189	19	76	95
150	1	90	91	-	-	-	-	-	-	SCHEME	100%	-	-	-	-

ALPHA COAL TEMPORARY FACILITIES
PRELIMINARY WATER BALANCE FOR CAMPS & CONSTRUCTION OFFICES
MAXIMUM DEMAND SCENARIO



CONSTANTS	
CAMP DEMAND	300 L/P/D
CONSTRUCTION DEPOT DEMAND	50 L/P/D
WATER USED IN CONCRETE PRODUCTION	600 L/M^3 CONCRETE PRODUCED
CAMP EFFLUENT GENERATION	240 L/P/D
CONSTRUCTION DEPOT EFFLUENT GENERATION	50 L/P/D
SLUDGE AS A % OF WWTP INFLOW	1%
TREATED EFFLUENT AS A % OF WWTP INFLOW	99%

SCENARIO A - PEAK CONCRETE PRODUCTION, WITH RECYCLED EFFLUENT USED AS PLANNED

LOCATION	PLANNED CAMP SIZE	CAMP SIZE WITH 10% CONTINGENCY	MAX OCCUPANCY FACTOR	PEAK EP	PEAK CONSTN DEPOT %	MAX CNSTN DEPOT POPULATION	CONCRETE PRODUCTION CAPACITY	CAMP / OFFICE DEMAND	CONCRETE DEMAND	TOTAL TREATED WATER DEMAND	WWTP INFLOW	SLUDGE VOLUME	CLASS A EFFLUENT PRODUCED	TREATED EFFLUENT TO CONCRETE PRODUCTION	RO PLANT WATER TO CONCRETE	WATER TREATMENT PLANT CAPACITY REQUIRED	WATER SOURCE	RAW WATER TREATMENT PROCESS EFFICIENCY	RAW WATER FEED	EFFLUENT TO DUST SUPRESSION, IRRIGATION OR EVAPORATION	WASTE BRINE TO EVAPORATION	TOTAL WASTE STREAM
	ppl						m^3/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D			kL/D			
Camp 1 - Salisbury Plains	580	638	80%	510	35%	179	300	162	180	342	131	1.3	130	130	50	212	BORE & RO	60%	353	0	141	141
Camp 2 - Collinsville	500	550	80%	440	15%	66	200	135	120	255	109	1.1	108	108	12	147	BORE & RO	60%	246	0	98	98
Camp 3 - Wollombi (rail construction)	700	770	80%	616	50%	308	330	200	198	398	163	1.6	162	162	36	237	SCHEME	100%	237	0	0	0
Camp 3 - Wollombi (rail maintenance)	50	55	100%	55	15%	8	0	17	0	17	14	0.1	13	0	0	17	SCHEME	100%	17	13	0	13
Camp 4 - Gregory	500	609	80%	487	15%	73	300	150	180	330	121	1.2	119	119	61	210	BORE & RO	60%	351	0	140	140
Alpha (Rail) Construction Depot	400	515	-	-	15%	62	300	3	180	183	-	-	-	-	-	-	SCHEME	-	-	-	-	-

WATER STORAGE REQUIREMENTS

No. days drinking water storage to be held on site:-	2
No. days process water storage to be held on site:-	1
Fire water volume (kL, for 2 hydrants)	288

Location	Potable Water Storage (kL)	Process and Fire Water Storage (kL)	Total Storage (kL)
Camp 1 - Salisbury Plains	324	468	792
Camp 2 - Collinsville	271	408	679
Camp 3 - Wollombi (rail construction)	400	486	886
Camp 3 - Wollombi (rail maintenance)	34	288	322
Camp 4 - Gregory	300	468	768
Alpha (Rail) Construction Depot	-	468	-

Sleeper production:
7000 units/week/plant
117 L concrete/unit
10% wastage
900.9 cm concrete/week
128.7 cm concrete/day @ 7 days/wk continuous operation.

SCENARIO B - NO CONCRETE PRODUCTION (MINIMUM WATER TREATMENT REQUIREMENT)

CONCRETE PRODUCTION CAPACITY	CAMP / OFFICE DEMAND	CONCRETE DEMAND	TOTAL TREATED WATER DEMAND	WWTP INFLOW	SLUDGE VOLUME	CLASS A EFFLUENT PRODUCED	TREATED EFFLUENT TO CONCRETE PRODUCTION	RO PLANT WATER TO CONCRETE	WATER TREATMENT PLANT CAPACITY REQUIRED	WATER SOURCE	RAW WATER TREATMENT PROCESS EFFICIENCY	RAW WATER FEED	EFFLUENT TO DUST SUPRESSION, IRRIGATION OR EVAPORATION	WASTE BRINE TO EVAPORATION	TOTAL WASTE STREAM
m^3/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D			kL/D			
0	162	0	162	131	1.3	130	0	0	162	BORE & RO	60%	270	130	108	238
0	135	0	135	109	1.1	108	0	0	135	BORE & RO	60%	226	108	90	198
0	200	0	200	163	1.6	162	0	0	200	SCHEME	100%	200	162	0	162
0	17	0	17	14	0.1	13	0	0	17	SCHEME	100%	17	13	0	13
0	150	0	150	121	1.2	119	0	0	150	BORE & RO	60%	250	119	100	219
0	3	0	3	-	-	-	-	-	-	SCHEME	100%	-	-	-	-

SCENARIO C - CONCRETE PRODUCTION WITH NO RECYCLED EFFLUENT USE (MAXIMUM RAW WATER TREATMENT REQUIREMENT, MAXIMUM COMBINED WASTE STREAM)

CONCRETE PRODUCTION CAPACITY	CAMP / OFFICE DEMAND	CONCRETE DEMAND	TOTAL TREATED WATER DEMAND	WWTP INFLOW	SLUDGE VOLUME	CLASS A EFFLUENT PRODUCED	TREATED EFFLUENT TO CONCRETE PRODUCTION	RO PLANT WATER TO CONCRETE	WATER TREATMENT PLANT CAPACITY REQUIRED	WATER SOURCE	RAW WATER TREATMENT PROCESS EFFICIENCY	RAW WATER FEED	EFFLUENT TO DUST SUPRESSION, IRRIGATION OR EVAPORATION	WASTE BRINE TO EVAPORATION	TOTAL WASTE STREAM
m^3/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D	kL/D			kL/D			
300	162	180	342	131	1.3	130	0	180	342	BORE & RO	60%	570	130	228	358
200	135	120	255	109	1.1	108	0	120	255	BORE & RO	60%	426	108	170	278
330	200	198	398	163	1.6	162	0	198	398	SCHEME	100%	398	162	0	162
0	17	0	17	14	0.1	13	0	0	17	SCHEME	100%	17	13	0	13
300	150	180	330	121	1.2	119	0	180	330	BORE & RO	60%	550	119	220	339
300	3	180	183	-	-	-	-	-	-	SCHEME	100%	-	-	-	-

APPENDIX F -
EXISTING COMMUNICATIONS (NEXTG) COVERAGE MAPS

Figure 7 – NextG Network at Camp 1 – Salisbury Plains

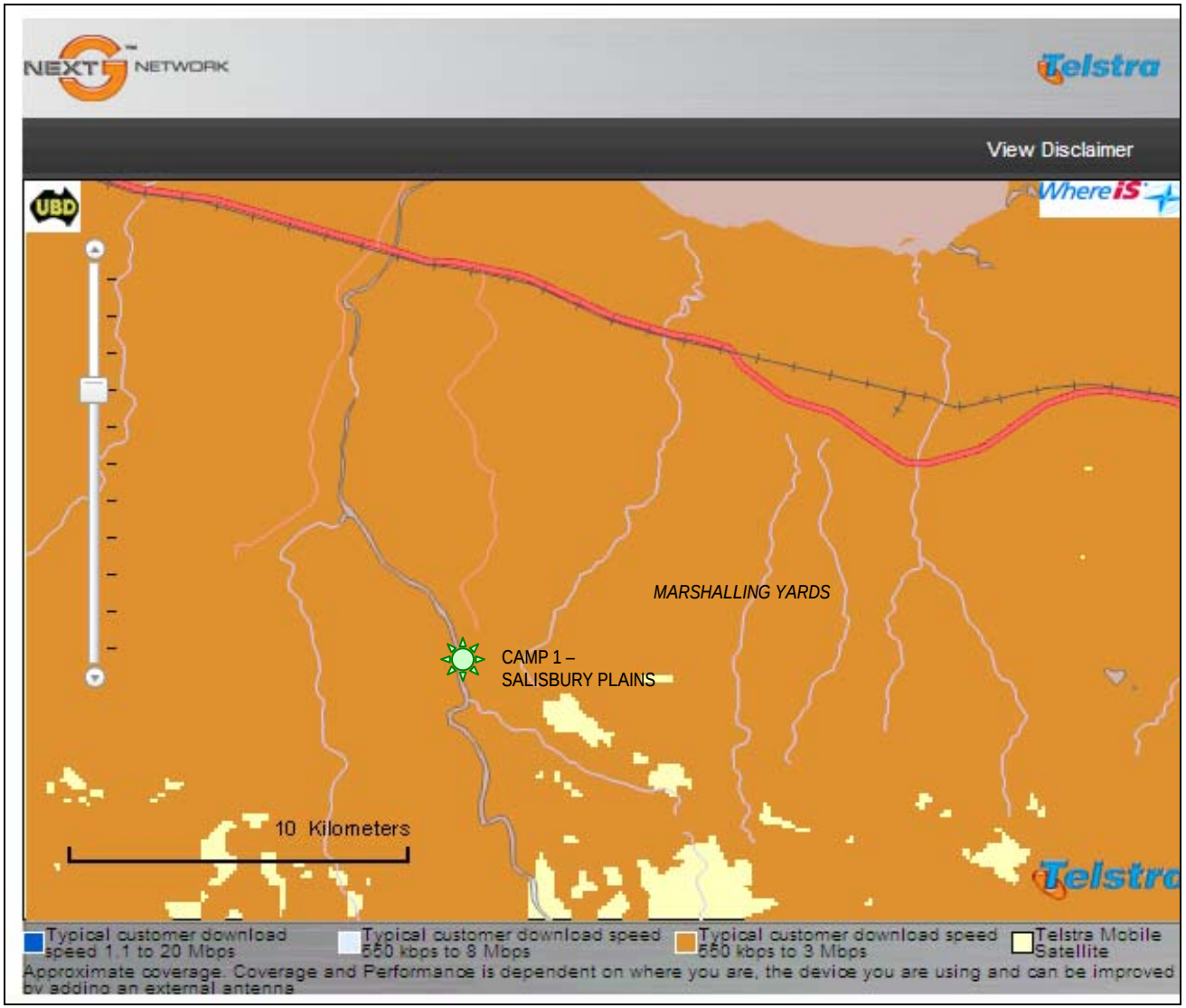


Figure 8 – NextG Network at Camp 2 - Collinsville

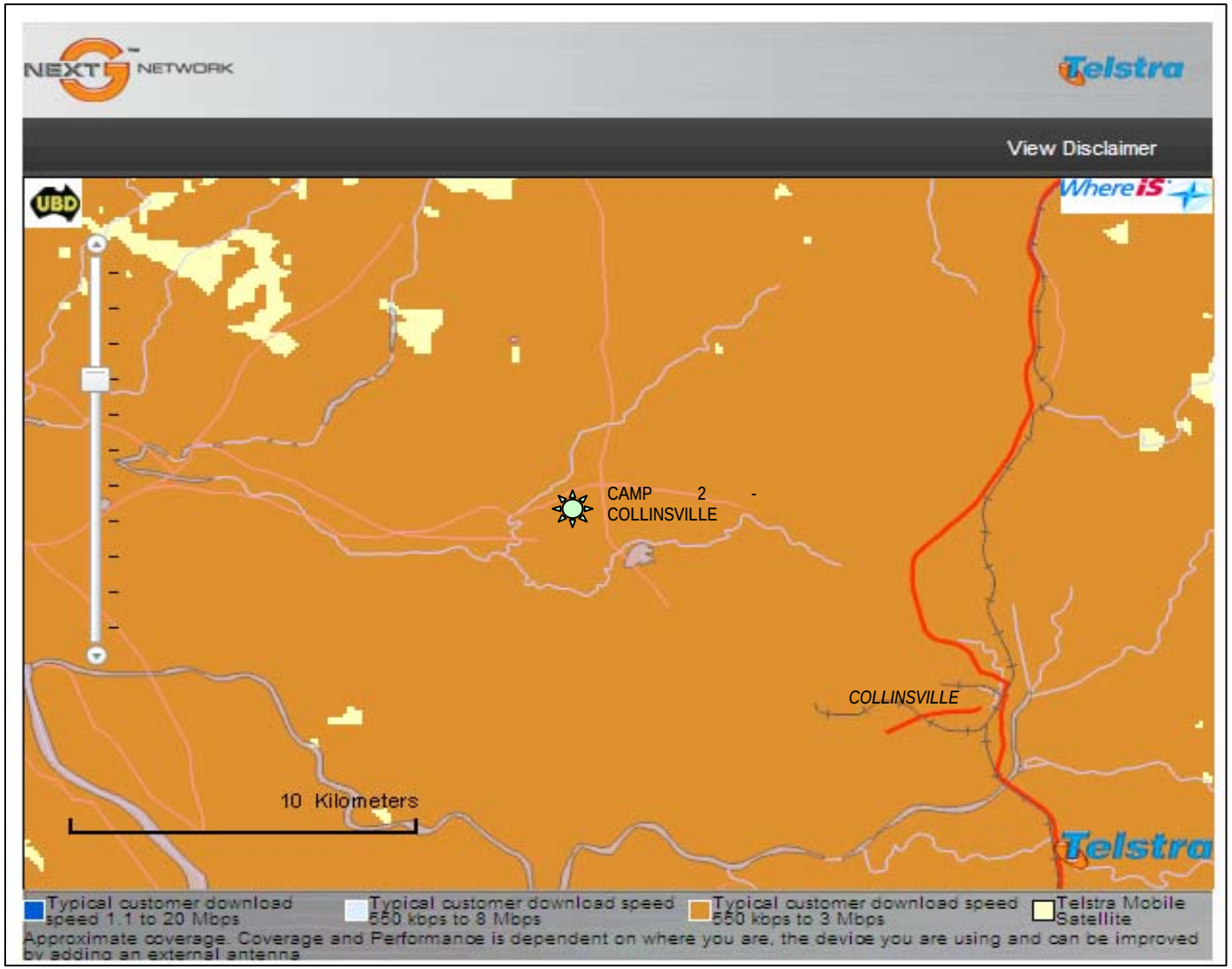


Figure 9 – NextG Network at Camp 3 - Wollombi

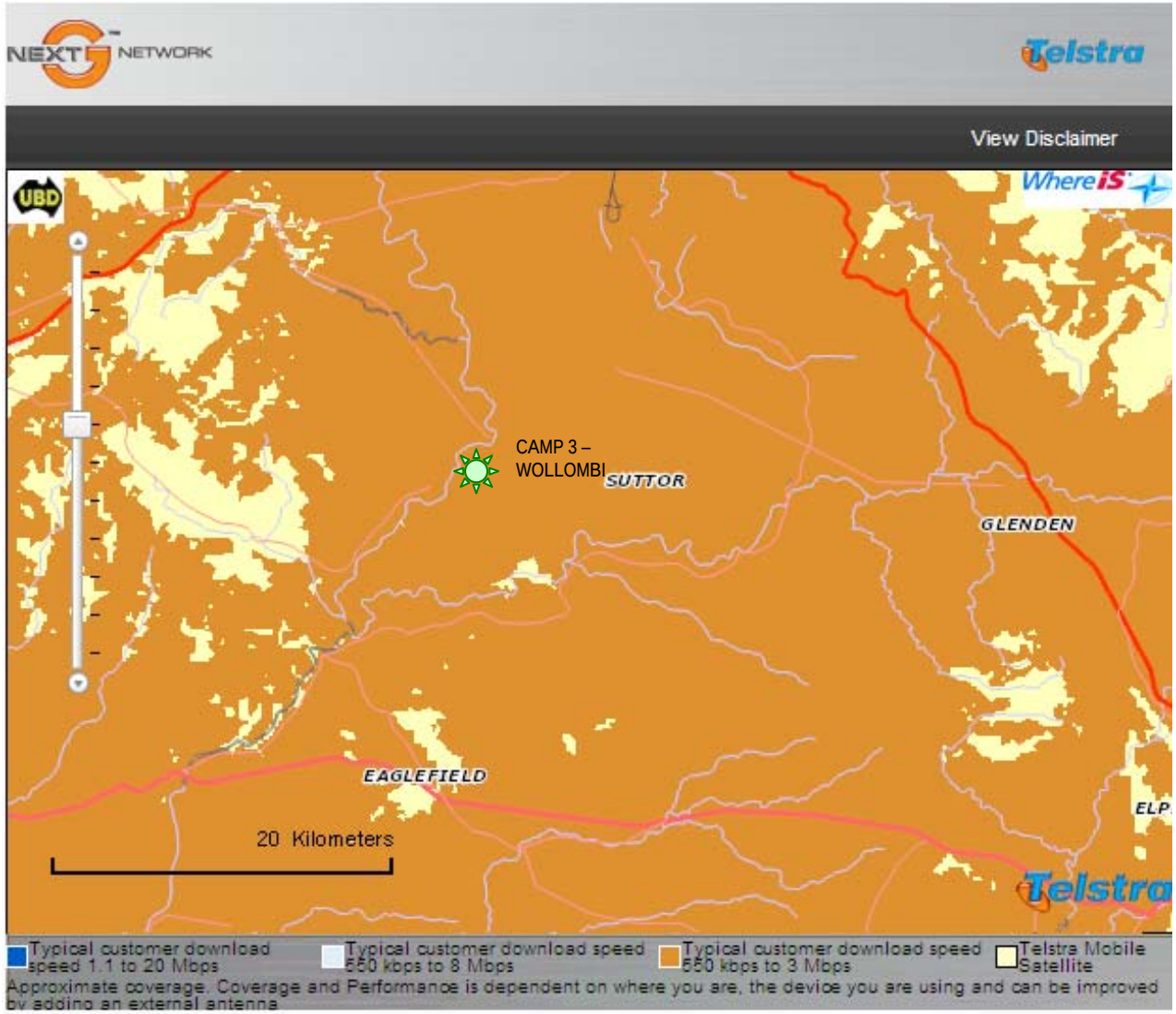


Figure 10 – NextG Network at Camp 4 - Gregory

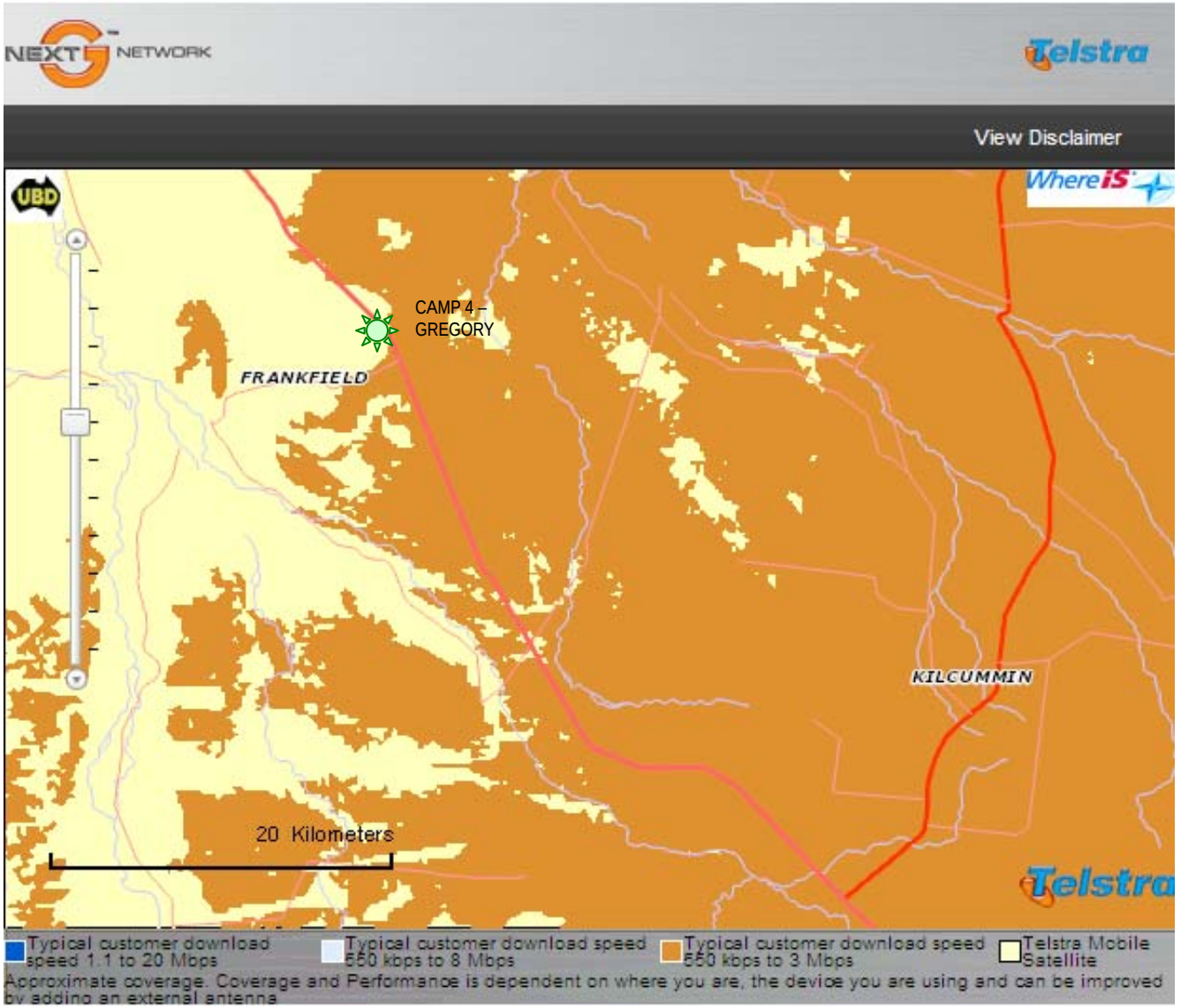
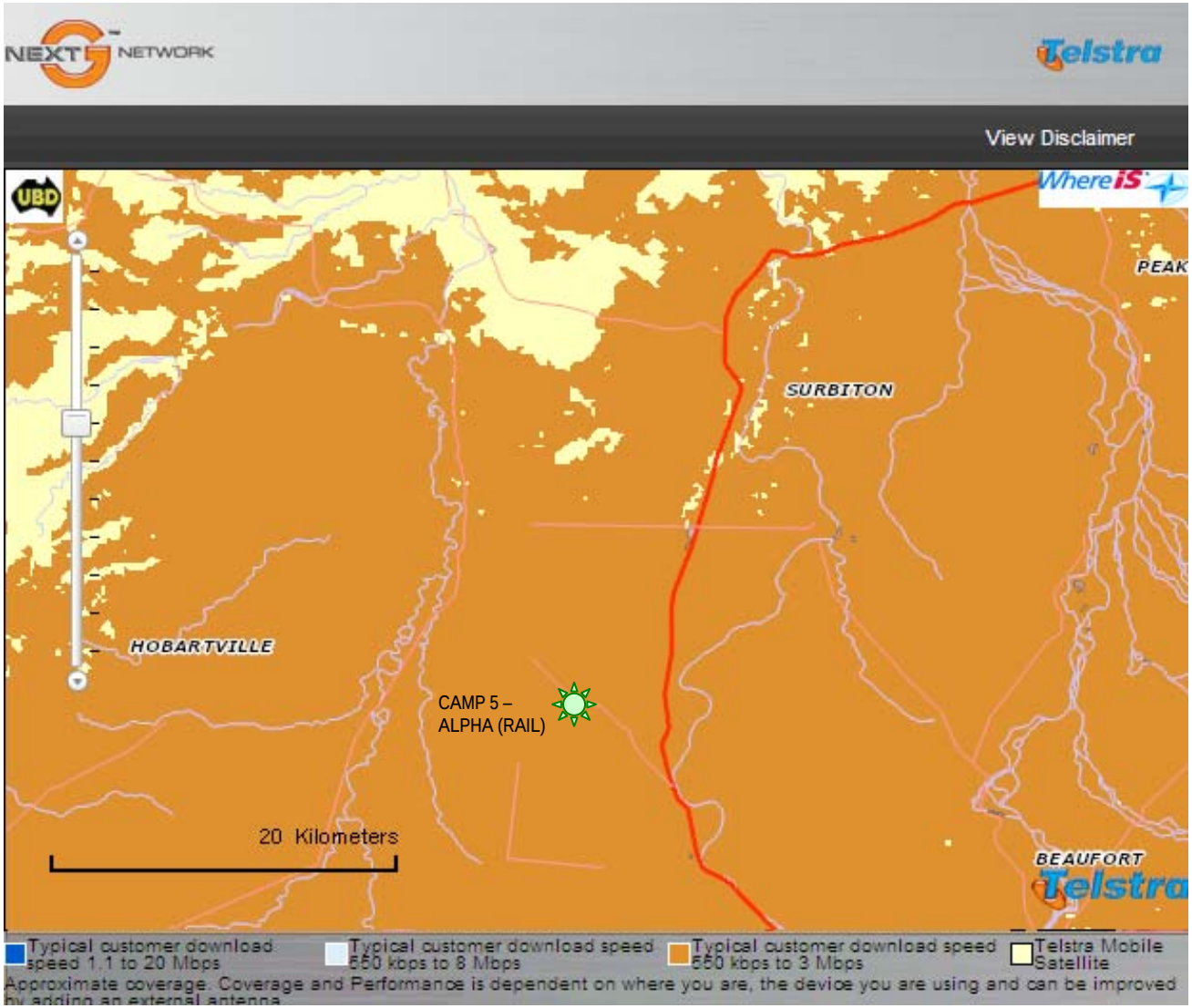
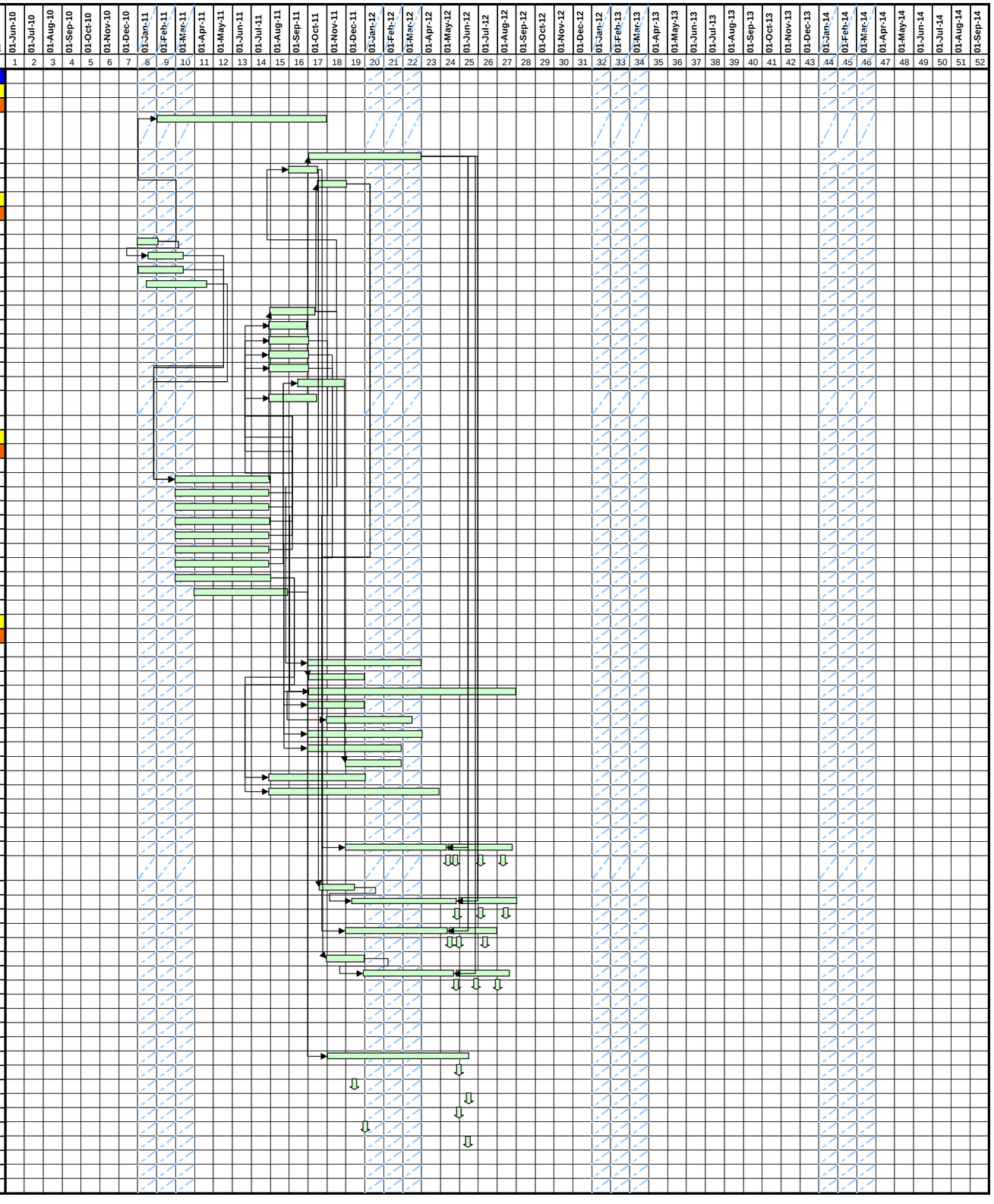


Figure 11 – NextG Network at Camp 5 – Alpha (Rail)



APPENDIX G -
HIGH LEVEL CAMP IMPLEMENTATION SCHEDULE

DESCRIPTION	QUANTITIES	COMMENTS	DURATION (Months)	START DATE	FINISH DATE
ALPHA COAL PROJECT					
APPROVALS					
CAMPS					
General development & environmental approvals for each camp		6 - 12 Months , requries bulk e/w and drainage design & cnstn mgt inputs. Rqd prior to cnstn.	9	01-Feb-11	
WTP & WWTP Environmental and Health Approvals		6 Months, requires vendor design as input	6	01-Oct-11	31-Mar-12
Fire and Building Approvals - Fly Camps		6 weeks, requires vendor design as input	1.5	01-Sep-11	15-Oct-11
Fire and Building Approvals - Rail Camps		6 weeks, requires vendor design as input	1.5	15-Oct-11	30-Nov-11
ENGINEERING					
CAMPS					
Preliminary					
Preliminary Drawings for Approvals		All Camp Designs	1	01-Jan-11	01-Apr-11
Drawings for D&C Tender			2	15-Jan-11	15-Mar-11
Preparation of Functional Specifications / SoW			2.5	01-Jan-11	15-Mar-11
Preparation of HCPL/Project Standard Specs & Drawings			4	15-Jan-11	15-Apr-11
Vendor					
Kitchen Detail Design			2.5	01-Aug-11	15-Oct-11
WTP & WWTP Detail Design			2	01-Aug-11	30-Sep-11
Transportable Building Detail Design			2	01-Aug-11	30-Sep-11
Power Station Detail Design			2	01-Aug-11	30-Sep-11
Temporary Fuel Storage Detail Design			2	01-Aug-11	30-Sep-11
Communications & Entertainment Design		Requires vendor input on camp layout	2.5	15-Sep-11	30-Nov-11
Camp & Const Office Install Detail Design		High level of coordination rqd between all vendor inputs	2.5	01-Aug-11	15-Oct-11
TENDER & AWARD					
CAMPS					
General					
Kitchen Design & Construct			4.5	01-Mar-11	30-Jul-11
Transportable Building Design & Supply			4.5	01-Mar-11	30-Jul-11
WTP & WWTP Design & Construct			4.5	01-Mar-11	30-Jul-11
Power Station Supply & Install			4.5	01-Mar-11	30-Jul-11
Temporary Fuel Storage Supply & Install			4.5	01-Mar-11	30-Jul-11
Camp & Const Depot Design & Install			4.5	01-Mar-11	30-Jul-11
Communications & Entertainment			4.5	01-Mar-11	30-Jul-11
Project Vehicles			4.5	01-Mar-11	30-Jul-11
Camp Catering			4.5	01-Apr-11	31-Aug-11
CONSTRUCTION (inc MANUFACTURE & DELIVERY)					
CAMPS					
Fabrication					
Kitchen Fabrication & Delivery to Site		6-9 Months	6	01-Oct-11	30-Mar-11
WTP & WWTP Fabrication & Delivery to Site			3	01-Oct-11	31-Dec-11
Accommodation Building Fabrication & Delivery to site			11	01-Oct-11	30-Aug-12
Construction Office Building Fabrication & Delivery to site			3	01-Oct-11	30-Dec-11
Other Central Facilities Buillding Fabrication & Delivery to Site			4.5	01-Nov-11	15-Mar-12
Power Station Procurement & Delivery to Site			6	01-Oct-11	30-Mar-12
Fuel Storage Procurement & Delivery to Site			5	01-Oct-11	28-Feb-12
Communications & Entertainment Procurement			3	01-Dec-11	28-Feb-12
Project Vehicle Procurement (Coaches & LV's)			5	01-Aug-11	31-Dec-11
Project Vehicle Procurement (Ambulance)			9	01-Aug-11	30-Apr-12
Procure Materials for Camp Construction			4	01-Oct-11	31-Jan-12
Camp Construction					
Camp 1 Salisbury Plains - Construction (inc Mob)		Start date constrained by approvals		01-Dec-11	31-Aug-12
Camp 1 Room Availability	720 Rooms	Rooms available in 200 Blocks , Kitchen & WWTP critical path for first block.		15-May-12	15-Aug-12
Camp 2 Collinsville - Establish Fly Camp		Start date constrained by approvals	2	15-Oct-11	15-Dec-12
Camp 2 Collinsville - Construction (inc Mob)		Start date constrained by accom availability		15-Dec-11	30-Aug-12
Camp 2 Room Availability	600 Rooms	Rooms available in 200 Blocks		01-Jun-12	15-Aug-12
Camp 3 Wollombi - Construction (inc Mob)		Start date constrained by approvals		01-Dec-11	30-Jul-12
Camp 3 Room Availability	600 Rooms	Rooms available in 200 Blocks		15-May-12	15-Jul-12
Camp 4 Collinsville - Establish Fly Camp			2	01-Nov-11	31-Dec-12
Camp 4 Gregory - Construction (inc Mob)				01-Jan-12	15-Aug-12
Camp 4 Room Availability	552 Rooms	Rooms available in 200 Blocks		01-Jun-12	01-Aug-12
Camp 5 - N/A - By Others					
Camp 5 - N/A - By Others	468 Rooms				
Camp Catering					
Mobilisation & camp Set-Up		6 weeks per site	1.5	01-Nov-11	15-Jun-12
Rail Camp 1 Salisbury Plains - First Meal		Min 2 weeks after kitchen avail to set-up			01-Jun-12
Fly Camp 2 Collinsville - First Meal					15-Dec-11
Rail Camp 2 - First Meal					15-Jun-12
Rail Camp 3 - First Meal					01-Jun-12
Fly Camp 4 Gregory - First Meal					01-Jan-12
Rail Camp 4 - First Meal					15-Jun-12
Rail Camp 5 - N/A - By Others					

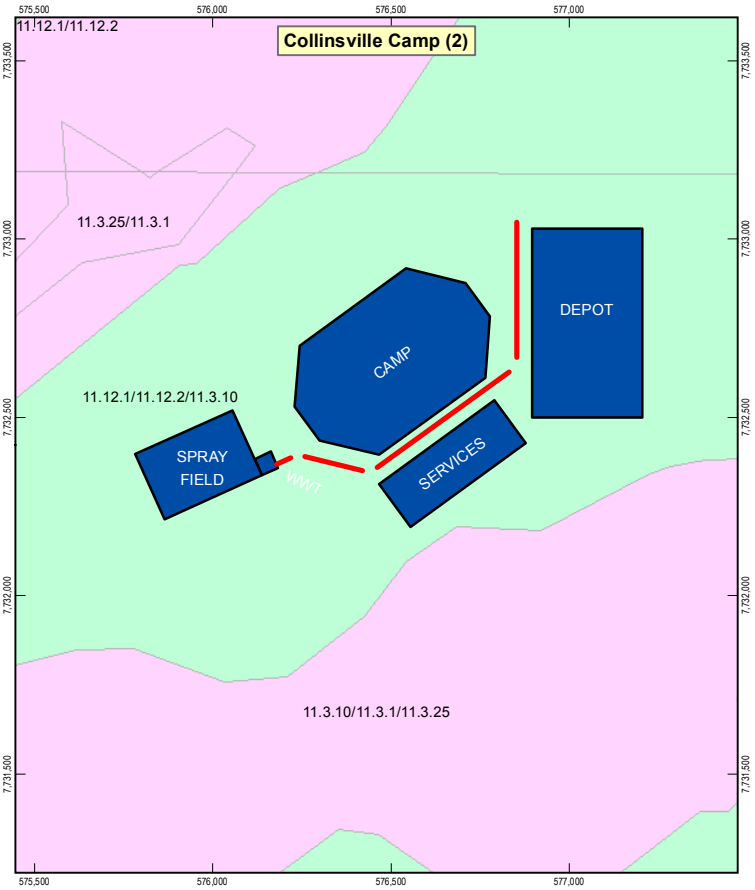


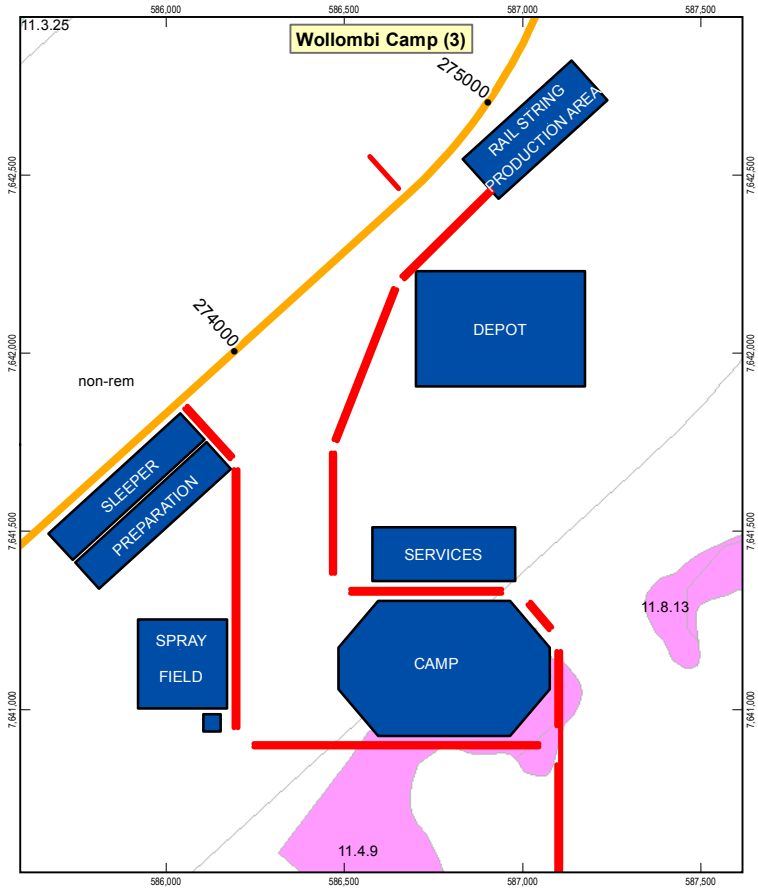
APPENDIX H -
ENVIRONMENTAL ASSESSMENT OF CAMP DEVELOPMENTS

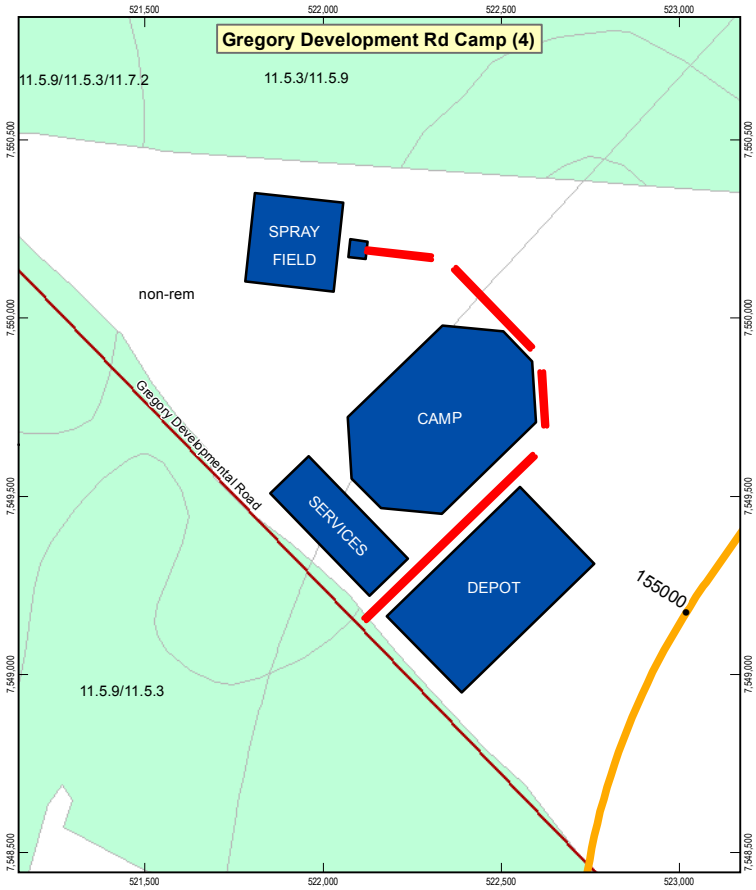
Table 1 Indicative Alpha Coal Project (Rail) camp locations, associated environmental impacts and recommendations

Camp Location	Environmental Impacts	Recommendations
Camp 1 - Salisbury Plains **Approximately CH471 km (indicative only)**	The proposed location of this camp (accessible by Glenore Rd at approximate chainage 471 km) has a potential to impact an area of Least Concern remnant regional ecosystem (RE 11.3.32/ 11.12.1 / 11.3.10 / 11.12.9), and an area of vegetation mapped as Of Concern-dominant vegetation (RE 11.12.10). Vegetation adjacent to the site includes Of Concern- subdominant vegetation (RE 11.3.32/11.3.30/11.3.33) (parallel to the Elliot River), Not of Concern vegetation (east of the camp location), and non-remnant regrowth (immediately south of the camp). The camp development is unlikely to have any environmental impacts on any adjacent watercourse.	Taking into account the impacts of the proposed camp location (relating to vegetation clearing), an alternative position elsewhere on the same allotment with the same level of residential amenity and travelling distances for workers, should be investigated to minimise the extent of clearing.. A potential alternative camp site location can be found at the eastern side of the property adjacent to the Bruce Highway (-19.988998,147.980347). This site would not impact remnant vegetation, therefore avoiding and minimising the overall Project impact on remnant REs and potentially future offset requirements that may be associated with the clearing of vegetation for the camp. The proximity of this site to the Bruce Highway would also minimise travelling distances for employees.
Camp 2 – Collinsville **Approximately 14 km east of the Project alignment**	The proposed location of this camp (accessible via Strathmore Rd approximately 14 km east of the Project alignment chainage 374 km) has a potential to impact an area of Least Concern remnant vegetation (RE 11.12.1/11.12.2/11.310). Although the camp location is mapped as a Least Concern RE, aerial imagery of the area displays the proposed site as being partially cleared and quite	As this camp development will have a minimal impact on the surrounding environment (the site has already been predominantly cleared of vegetation) its use is considered suitable. Should an alternative location closer to the Project be considered for this camp location, it is recommended that the alternative site should only be

Camp Location	Environmental Impacts	Recommendations
	degraded. The camp development is unlikely to have any environmental impacts on any adjacent watercourse.	developed on the basis that minimal impact on the surrounding environment can be achieved.
Camp 3 - Wollombi **Approximately CH 275 km**	The proposed location of this camp (accessible via Strathmore Rd approximately chainage 275 km) has a potential to impact a small patch of Endangered- dominant vegetation (REs 11.4.9 and 11.8.13), as well as an area of high-value regrowth. The proposed camp location exists approx. 1 km from the Suttor River, however the development has the potential to impact a minor ephemeral watercourse which intersects the development.	With respect to environmental impacts of this camp location, a more appropriate site could be located approx. 2 km south of the current proposed location. Development of the current proposed camp location would involve clearing of endangered vegetation, requiring clearing approval and offsets. The site 2 km south of the current location is located in an area of non-remnant regrowth, and is a greater distance from the surrounding watercourses. With respect to transport, the alternative site would provide similar amenity to the current site with access via Strathmore Rd, and is also in comparable proximity to the rail alignment.
Camp 4 – Gregory **CH 155 km**	The proposed location of this camp (accessible via Gregory Developmental Rd approximately chainage 155 km) has a potential to impact a small, isolated patch of high-value regrowth and avoids surrounding Least Concern remnant vegetation (RE 11.5.9/11.5.3). This camp is not in close proximity to any known watercourses.	As this camp development will have a minimal impact on the surrounding environment its use is considered suitable.







LEGEND

- Proposed Alignment
- Camp Track
- State Road
- Camp Structure

Regional Ecosystems

- Endangered - Dominant
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- Not of Concern
- Clear
- Plantation
- Water

Source: See Copyright Details below and for full disclosure please refer to the Volume 2, Appendix B of the SEIS

1:15,000 (at A3)

0 0.1 0.2 0.3 0.4 0.5

Kilometres

Map Projection: Universal Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia, Zone 55

N W E S

HANCOCK PROSPECTING PTY LTD

Alpha Coal Project
Supplementary Environmental Impact Statement

CAMP IMPACT ON REGIONAL ECOSYSTEMS

Job Number	41-23742
Revision	B
Date	05-04-2011

SKETCH

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