CHAPTER 3
PROJECT ALTERNATIVES

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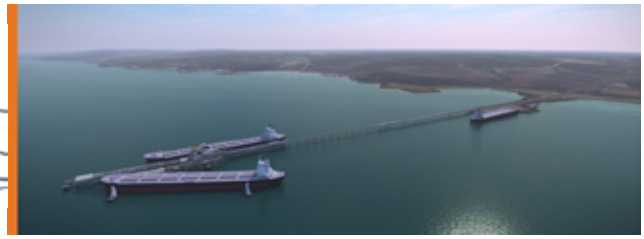

3 Project Alternatives

Iron Road investigated numerous infrastructure alternatives during the feasibility studies for the CEIP, each of which were evaluated against environmental, social, design and economic criteria to identify preferred options for each of the project components. This chapter presents the major infrastructure alternatives that were considered during the evaluation process, all of which are listed in Table 3-1, with the final selected option identified in bold. The evaluation criteria for the individual project components and the reasons for adopting the selected option and discounting the alternatives are presented in the following sections.

Table 3-1 Major Infrastructure Options Investigated (selected options in bold type)

Project Component	Alternatives Investigated
Port facility (refer to Section 3.1)	Port of Thevenard Port Bonython Port Lincoln Whyalla Port Spencer (proposed by Centrex Metals) Lucky Bay (proposed by IronClad Mining) Greenfield location near Elliston (Upper West Eyre Peninsula) Greenfield location near Drummond Point (Lower West Eyre Peninsula) Greenfield location near Coles Point (Lower West Eyre Peninsula) Greenfield location near Arno Bay (Spencer Gulf) Greenfield location near Gibbon Point (Spencer Gulf) **Greenfield location at Cape Hardy (Spencer Gulf)**
Iron Concentrate Transport (refer to Section 3.2)	Slurry Pipeline Shared use of the existing Cummins Buckleboo Railway line Alternative Railway Line Option A Alternative Railway Line Option B **Proposed Railway Line**
Mine Site Water Supply (refer to Section 3.3)	Desalination plant at Elliston Sea water supply from Cape Hardy **Proposed borefield near Kielpa**
Power Supply (refer to Section 3.4)	Gas fired power station Private transmission line from Cultana **Private transmission line from Yadnarie**

3.1 Location of Port Site

A three stage site selection process was undertaken to select a preferred port site for the export of iron concentrate from the proposed CEIP Mine.

The first stage considered both existing export facilities and other proposed export facilities on the Eyre Peninsula (refer to Section 3.1.1). The second stage sought to identify potential greenfield port locations which satisfied environmental, social, cultural and engineering design criteria (refer to Section 3.1.2). Three broad zones which could be suitable for a deep water port were identified from the analysis which were then refined into six port site options. The third stage of the study compared those six port site options to each other for development suitability based on a set of evaluation criteria (refer to Section 3.1.2).

The zones and port site options identified for analysis are shown on Figure 3-1. They are:

- Upper West Eyre Peninsula
  - Greenfield location near Elliston (refer to Section 3.1.3)
- Lower West Eyre Peninsula
  - Greenfield location near Drummond Point (refer to Section 3.1.4)
  - Greenfield location near Coles Point (refer to Section 3.1.5)
- Spencer Gulf
  - Greenfield location near Arno Bay (refer to Section 3.1.6)
  - Greenfield location near Gibbon Point (refer to Section 3.1.7)
  - Greenfield location at Cape Hardy (refer to Section 3.1.8)

A summary of the evaluation of the existing export facilities and greenfield options, which identified Cape Hardy as the most preferred location for a port facility for Iron Road, is provided below.

3.1.1 Existing Export Facilities

There are four existing ports in the Eyre Peninsula region:

- Thevenard
- Port Bonython
- Port Lincoln
- Whyalla

In addition to these four ports, two other port facilities were proposed on the eastern Eyre Peninsula:

- SeaTransport is proposing a Bulk Shipping Port at Lucky Bay to provide a facility to export iron concentrate from Iron Clad's proposed Wilcherry Hill mine and improve the integration of facilities for the Spencer Gulf ferry service.
- Centrex Metals is proposing a greenfield port facility at Port Spencer to export iron ore and/or concentrate from the proposed Wilgerup, Fusion, Carrow, Bungalow and Greenpatch projects.

These existing and planned export facilities were reviewed against Iron Road's requirements of:

- Capacity to export an additional 21.5 Mtpa, with future expansion potential
- Minimising the distance from the mine to the port (as the total cost of constructing rail transport from the mine to a port is approximately $5 million per kilometre)
- Sufficient depth of water to accommodate Capesize vessels without the need for transhipment
- Certainty that the facility would be developed and available for use within Iron Road's project timeframes

The Port of Thevenard, located 3 km from Ceduna and approximately 210 km from the CEIP Mine, is managed by Flinders Ports. Approximately 2 Mt of goods including gypsum, grains, seeds and salt were moved through the port in 2012/2013 (Flinders Ports 2015). Additional capacity for export is constrained by the depth of water and the site has limited room for expansion as it abuts residential and recreation areas (Deloitte 2013). In addition, due to the water depth and significant distance, Thevenard is not suitable or capable of accommodating the required Capesize vessels for the CEIP.

Port Bonython, located at the head of the Spencer Gulf and approximately 190 km from the proposed CEIP Mine, is owned by the State Government and operated by Santos for the export of approximately 250,000 tpa including crude oil, naptha, propane and butane (Deloitte 2013). A proposal for an expanded operation to support the export of bulk commodities through construction of a new jetty is currently under consideration by the State Government. The expansion would initially provide for the export of up to 25 Mtpa, and could be expanded to be capable of export of up to 50 Mtpa. A newly constructed railway line of approximately 215 km (greater distance due to topography and avoidance of sensitive receptors) would be required to connect the proposed CEIP Mine to Port Bonython. This represents an additional 80 km of railway line, or $400 million above the preferred CEIP case. As the Port Bonython expansion is subject to Government approval, finance, and a confirmed customer base, it does not provide certainty to Iron Road with respect to when the facility would be available for use. Additionally, due to the narrowing of the shipping channel as a result of reduced depth in the upper Spencer Gulf, the number and size of vessels that could visit the port at any one time would be constrained (DPTI pers comms 2013).

Port Lincoln is managed by Flinders Ports, is located approximately 210 km from the proposed CEIP Mine and exports between 1 and 3 Mt of agricultural product, depending on the amount requiring export in a given year (Deloitte 2013). Expansion of Port Lincoln is constrained by the need to move product through the township, impacts to the amenity of the community, congestion at the port as a result of existing grain export and potential land use conflicts with nearby fisheries and aquaculture industries.

The Port of Whyalla is South Australia's largest export facility, located approximately 170 km from the proposed CEIP Mine, with an export capacity of approximately 12 Mtpa. The Port is owned and operated by Arrium. As the port berths have insufficient depth, barges are used to transport material to two transhipment points where it is loaded on to Panamax and Capesize vessels. A newly constructed railway line of approximately 210km (greater distance due to topography and avoidance of sensitive receptors) would be required to connect the mine to the port. This represents an additional 60 km of railway line, or $300 million above the preferred CEIP case. Further, as transhipment is required for the loading of Capesize vessels at Whyalla, this facility does not meet Iron Road's requirements in capacity or as a low operating cost logistics solution.

The proposed Bulk Shipping Port at Lucky Bay is located approximately 120 km from the proposed CEIP Mine and would also use transhipment and would only have capacity to export approximately 1 Mtpa. As such it would not have sufficient capacity to support the export of 21.5 Mtpa.

The Port Spencer facility proposed by Centrex Metals is located approximately 160 km from the proposed CEIP Mine and is intended to be capable of exporting up to 20 Mtpa, over a four stage development. The increased distance with respect to the preferred case would equate to higher costs with no identified benefits. To date, only the first stage of the development (capable of exporting up to 2 Mtpa of iron ore and grain) has been designed and received Development Approval from the State Government and anticipated timing for subsequent stages of development is currently unknown. Centrex Metals are also considering an alternative transhipment option for the proposed port (Centrex Metals 2014). Due to these factors, there is no certainty that the port will be developed and able to accommodate Iron Road's needs. Port Spencer is therefore considered not suitable for the CEIP.

None of the existing or proposed export facilities on the Eyre Peninsula provides sufficient capacity, certainty or benefits beyond the preferred case of Cape Hardy. They also do not represent an economic solution to be upgraded to meet Iron Road's requirements. Therefore a new greenfield port site is required for the CEIP.

Figure 3-1 Alternative Port Locations

3.1.2 Greenfield Port Option Evaluation Criteria

The evaluation criteria for the greenfield port broad location zones (Stage 2) and the port site options (Stage 3) are outlined in Table 3-2. During stage three, each of the port options were scored against the evaluation criteria, with a lower score representing a lower level of constraint and therefore a more preferable site.

Table 3-2 Summary of Port Option Evaluation Criteria

Category	Stage 2 – Greenfield Port Locations Evaluation Criteria	Stage 3 – Greenfield Port Options Evaluation Criteria
Environment	· Constraint - proximity to Conservation Parks · Constraint - proximity to Marine Parks	· Constraint - impact to known habitat of EPBC listed species · Constraint - impact to native vegetation and areas of high biodiversity value · Constraint - impact to water quality and air quality
Social and Cultural	· Constraint - proximity to sites of recognised heritage value · Constraint - proximity to aquaculture zones	· Constraint - impact to aquaculture · Constraint - proximity to homesteads, dwellings, schools, churches, cemeteries and townships. · Constraint - impact to cultural heritage sites or areas · Constraint - impact to tourist areas · Constraint - impact to visual amenity · Constraint - impact to landowners
Design	· Proximity to deep water (a natural water depth of 20m within reasonable proximity to the shore is preferred to accommodate Capesize ships without the need to undertake significant dredging) · Exposure risk (sites with low exposure risk to the prevailing wave/swell are preferred) · Suitable for exporting a minimum of 21.5 Mtpa	· Avoid areas that require extensive dredging to provide vessel access to the berth area · Topographical features (avoid areas with cliffs that require extensive engineering) · Suitable for exporting a minimum of 21.5 Mtpa
Economic	· Proximity to proposed mine site (sites with a shorter distance are preferred)	· Avoid areas that require a long jetty structure · Avoid areas that require breakwaters to provide adequate shelter for berth areas · Ease of access for workforce and port services

3.1.3 Greenfield Location near Elliston, Upper West Eyre Peninsula

This option, in the southern corner of Anxious Bay, was not preferred as it is subject to reasonable wave exposure and would therefore require the construction of an offshore breakwater. It would also require substantial piling work over potentially hard reefs. The site is in relatively close proximity to the Lake Newland Conservation Reserve and the Waldegrave Islands Conservation Park and the wharf and breakwater would be approximately 1 km from the Anxious Bay Aquaculture Zone. For these reasons the site scored poorly against all of the criteria categories.

3.1.4 Greenfield Location near Drummond Point, Lower West Eyre Peninsula

This option, located approximately 10 km south west of the locality of Mount Hope, was not preferred as a port location as it offers no natural protection from dominant waves and as such a breakwater to provide protection would be essential. Even with the breakwater, vessel arrivals and departures during bad weather would be difficult and could lead to delays in the shipping schedule.

3.1.5 Greenfield Location near Coles Point, Lower West Eyre Peninsula

This location near Coles Point, approximately 10 km west of the town of Coulta, scored poorly against the design criteria and was not considered a preferred location for a deep water exporting port. Point Sir Isaac would provide some indirect protection from south-west waves at this location, however a breakwater would still be required. Additionally, the adjacent land side topography is not ideal for a port facility, with cliff faces in some locations.

3.1.6 Greenfield Location near Arno Bay, Spencer Gulf

A site approximately 4.5 km north of Arno Bay was considered as a port option but did not score well against the criteria compared to the other site options in the Spencer Gulf. The Inner Arno Bay Aquaculture zone is located approximately 3 km off the coast in this location and, although the jetty and wharf could be located outside the aquaculture zone, vessels arriving and departing from the port would have to traverse the zone. Heritage agreement areas, which protect native vegetation, also adjoin the site to the north, east and west. The distance to deep water capable of supporting cape-sized vessels at the site is approximately 2.5 km, which is relatively long. For these reasons this port option was not pursued.

3.1.7 Greenfield Location near Gibbon Point, Spencer Gulf

The Gibbon Point port option was not pursued as it is located on the southern boundary of the Franklin Harbour Marine Park. The jetty for the port would be located within the Marine Park, however the wharf and berth for vessels would be located outside of the Park. In this location there is also only a small area of land that is likely to be suitable for port site infrastructure.

3.1.8 Greenfield Location at Cape Hardy

The option evaluation clearly identified Cape Hardy as the most appropriate location for a port site. The site scored the best (or equal best) out of all the options for three of the four criteria. It scored the best of all options against the environment criteria as it is not in close proximity to a marine park or a conservation reserve and the port land area has been predominantly cleared of vegetation for farming. The option scored equal best of all options against the engineering criteria as deep water is located relatively close to shore (approximately 1.3 km) and the site has some natural protection from ocean swells and waves therefore a breakwater would not be required. The option also scored well against the social criteria as it is not located in close proximity to towns or registered heritage sites.

Further supporting the development of a port facility at the Cape Hardy location, is that it will provide a viable export alternative for the central Eyre Peninsula region, with sufficient capacity to accommodate third party exports (subject to necessary consents), such as the export of grain.

3.2 Iron Concentrate Transport

The consideration of alternatives for the transport of the iron concentrate from the proposed CEIP Mine to a proposed port site was a three stage process. First, transport options such as a slurry pipeline were considered, with rail transport ultimately selected as the most appropriate (refer to Section 3.2.1). Secondly, shared use of the existing Cummins Buckleboo Railway was considered and ruled out as an option (refer to Section 3.2.2). A number of alternative rail corridors were then evaluated to select the preferred corridor for a new railway line. These alternatives are discussed in Sections 3.2.3 to 3.2.5.

The alignment of the iron concentrate transport route has been driven by environment, social, cultural, design and economic criteria (refer to Table 3-3). The alternative options considered for the transport route are shown on Figure 3-2.

Table 3-3 Summary of Iron Concentrate Transport Option Evaluation Criteria

Category	Option Evaluation Criteria
Environment	· Constraint - Impact to native vegetation and fauna habitat · Constraint - Impact to conservation areas · Constraint - Impact to Environment Protection and Biodiversity Conservation Act (1999) listed species, communities or protected matters · Constraint - Impact to water usage
Social and Cultural	· Constraint - Proximity to dwellings · Constraint - Impacts to useable property (corridor located as close as practicable to property boundaries is preferred) · Constraint - Number of properties affected · Constraint - Impact to known heritage places
Design	· Suitability to transport iron concentrate that is 130 microns in particle size · Minimum transport capacity of 21.5 Mtpa · Natural topography (for railway line options) to minimise the volume of cut and fill needed to achieve the required grade of the railway line · Minimum radius for turns of 2 km (for railway line options) · Sufficient line of sight to provide visibility at level crossings (for railway line options)
Economic	· Constraint - Length of transport route · Constraint - Impact to known mineral deposits · Constraint - Distance for a possible future connection to the national standard gauge network at Whyalla (for railway line options) · Constraint - Number and length of bridges required for road or water crossings (for railway line options)

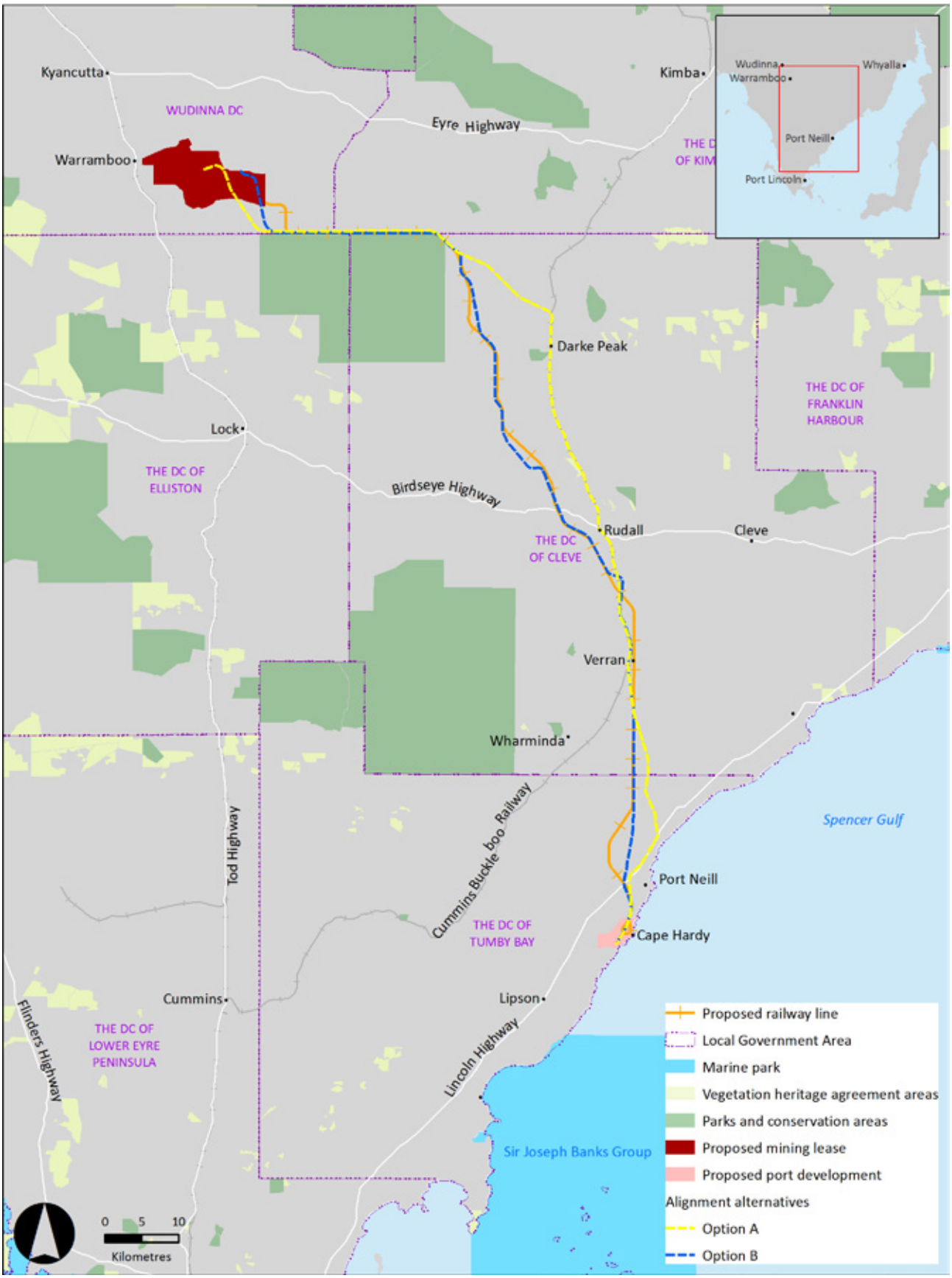

Figure 3-2 Railway Line Alignment Alternatives

3.2.1 Slurry Pipeline

The slurry pipeline iron concentrate transport option would involve mixing the concentrate with water at the mine site and pumping it as slurry to the port site. The slurry would be dewatered at the port site before stockpiling the concentrate and the water returned to the mine site by a return pipeline. Slurry pipelines are typically used for transporting concentrate that is below 80 microns in size. Concentrates with coarser particle sizes are generally not suitable for slurry transport as the heavier particles can make it difficult to maintain the flow within the pipeline and to re-mobilise particles if the flow is stopped. The concentrate from the proposed CEIP Mine would be greater than 130 microns in size, which means that it would not be suitable for transport as slurry. The slurry pipeline option is also not scalable, cannot be shared for third party use and would require a larger volume of water than the preferred option of railing the concentrate. As such, a slurry pipeline is not a preferred option to transport the concentrate from the mine site to the port site.

3.2.2 Shared Use of Cummins Buckleboo Railway

The option of using the existing Cummins Buckleboo Railway was not selected due to social and economic criteria. It is an isolated narrow gauge network that is owned, operated and maintained by Genesee Wyoming Australia (GWA). It is currently used to carry grain to the Port Lincoln wharf and the existing track is only suitable for trains travelling at low operating speeds. Deloitte (2013) estimate that without substantial track upgrades, the existing line would only be able to carry an additional 1 Mtpa which would be subject to train scheduling. The CEIP Mine requires a minimum of 21.5 Mtpa of iron concentrate to be transported.

In order to utilise the existing Cummins Buckleboo Railway, significant track upgrades would be required, as well as new spur lines to connect the existing railway to both the proposed CEIP Mine and the port site. As the Cummins Buckleboo Railway is narrow gauge, the spur lines would also need to be narrow gauge. This removes the future opportunity to connect the line to the national standard gauge network and significantly constrains the train options available for material transport.

Additionally, the use of the Cummins Buckleboo Railway is considered to have higher impact on community amenity compared to the preferred new rail line as the communities of Darke Peak and Rudall are located along the existing Cummins Buckleboo Railway. If this option was selected, a greater number of individuals would be impacted by the increase in train movements along the line.

3.2.3 Alternative Railway Line (Option A) Following Cummins Buckleboo Railway

An alternative railway line adjacent to the existing Cummins Buckleboo Railway between Darke Peak and Verran (shown on Figure 3-2) is not a preferred option due to social and environmental criteria. Although it would have a reduced impact on landowner connectivity due to the existing rail corridor, a greater number of individuals would be impacted. It also had a greater impact on remnant native vegetation than the preferred option due to the extent of remnant vegetation within the existing rail easement. Additionally, due to the configuration of the existing rail easement, this option does not allow for a 2 km horizontal curve radius as preferred by ARTC track design standards.

3.2.4 Alternative Railway Line (Option B)

The alternative railway line Option B is similar to the proposed railway line, with the exception of the corridor between the Lincoln Highway and the Cummins Buckleboo Railway (refer to Figure 3-2). In this section, Option B travelled in a relatively straight line north, while the proposed railway line curves to the west. Option B is not possible due to the potential impact to Centrex Metal's Carrow prospect, which is located in this area. Carrow is a potential magnetite deposit that may be developed in the future. The State Government does not support the sterilisation of its mineral resources as they are an asset with the capability of providing community benefit.

3.2.5 Selected Option – Proposed Railway Line

The proposed railway line was selected as it best satisfies the environmental, social, cultural, economic and design selection criteria. The alignment avoids the Hambidge Wilderness Protection Area and other conservation parks and reserves in the region. Intact areas of remnant vegetation are also avoided to the extent practical. The railway line is located away from the townships of Rudall, Darke Peak and Port Neill, and property impacts are minimised where practicable by locating the railway line close to existing property boundaries rather than cutting across paddocks. This option was also refined in several locations following discussions with impacted landowners.

Some landowners and other community members have questioned why the proposed railway line will not traverse the Hambidge Wilderness Protection Area. The Wilderness Protection Act 1992 (SA) does not allow for the construction of any infrastructure and discussions with the Department of Environment, Water and Natural Resources staff have confirmed Iron Road's legal advice that amendments to that Act would likely be unsuccessful due to the inconsistency of the proposed land use with the established wilderness values. Pursuing a resolution would likely take several years with no guarantee of success.

3.3 Mine Site Water Supply

The processing of iron ore at the proposed CEIP Mine will be very simple and can be undertaken using saline water. During the design process water saving strategies were implemented within the ore processing facility at the proposed CEIP Mine, including tailings dewatering allowing recycling of process water, that resulted in a 70% reduced demand for raw water and associated reduction in water pumping energy demands. The mine site will require approximately 15 GL of water per year for the processing of the iron ore in the process plant. The current water supply capacity for the Eyre and Western region is 28.6 GL, with use in the order of 27.7 GL per year (Deloitte 2013), hence there is not sufficient capacity in the existing water supply to accommodate the CEIP. Iron Road therefore requires an alternative sustainable water supply for ore processing, dust suppression and potable use.

The existing water supply on the Eyre Peninsula is primarily made up of River Murray water and groundwater from two Prescribed Well Areas (SA Water 2008a). Iron Road investigated three alternative water supply options that did not involve using the existing water supply:

- Desalination plant at Elliston (refer to Section 3.3.1)
- Seawater supply from Cape Hardy (refer to Section 3.3.2)
- Borefield near Kielpa (refer to Section 3.3.3)

The options were evaluated using criteria which are summarised in Table 3-4

A site selection process identified Elliston as the most appropriate location for a desalination plant if that option was to be pursued. The location of the seawater supply intake at Cape Hardy was determined by the location of the proposed port and railway line, with the seawater intake to be located at the port site and the seawater pipeline to follow the railway line within the infrastructure corridor. The location of the proposed borefield and water supply pipeline was determined by the location of a suitable aquifer and the location of the proposed railway line. The alternative water supply options, including the alternative desalination plant and pipeline locations, are shown in Figure 3-3.

Table 3-4 Summary of Mine Site Water Supply Option Evaluation Criteria

Category	Option Evaluation Criteria
Environment	· Constraint - Impact to terrestrial native vegetation and sea grass · Constraint - Impact to Environment Protection and Biodiversity Conservation Act (1999) listed species, communities and protected matters · Constraint - Impact to groundwater
Social and Cultural	· Constraint - Number of properties impacted · Constraint - Impact to visual amenity · Constraint - Impact to cultural heritage sites or areas · Constraint - Relative scarcity of freshwater
Design	· Water quality suitable for use in iron ore processing and water treatment requirements
Economic	· Operational costs · Construction costs

3.3.1 Desalination Plant at Elliston

A new desalination plant close to the town of Elliston on the west coast of the Eyre Peninsula was considered as an option for providing the primary water source to support the CEIP mining operations. A pipeline approximately 90 km long would connect the desalination plant near Elliston to the mine site. This option was not selected as due to ore processing optimisation fresh water will not be required for processing the iron ore and the desalination plant would increase the project footprint geographically to extend from the west coast of the Eyre Peninsula to the east coast. This option would also have higher construction and operational costs than the proposed borefield water supply option.

3.3.2 Seawater Supply from Cape Hardy

A seawater pipeline co-located with other project components (within the infrastructure corridor), was considered as an option given that saline water is suitable for processing the iron ore. The co-location reduces the project footprint and subsequent property impacts compared to the desalination option. The seawater intake could also be located along the proposed jetty at the port site, which avoids impacts to the seabed from pipeline construction. A seawater supply option avoids the unnecessary operating costs of desalinating water for use in the process plant. It is also likely to have lower construction costs than the desalination plant option. The seawater option avoids potential impacts to the marine environment from brine output from a coastal desalination plant. However, this option would involve the construction of approximately 150 km of pipeline and would have higher construction and operational costs than the proposed borefield and water pipeline. In addition through ore processing optimisation water requirements were reduced by approximately 70% therefore making a groundwater supply rather than seawater supply a feasible option.

3.3.3 Selected Option – Proposed Borefield near Kielpa

A groundwater supply with sufficient capacity to supply the 15 GL per year required for the proposed CEIP mine site operation was identified following groundwater exploration drilling near Kielpa, approximately 60 km south of the proposed CEIP Mine. This area is not part of a Prescribed Wells Area.

The groundwater in the area of the proposed borefield is highly saline, with salinity ranging from 25,000 to 41,300 mg/L (which is comparable with seawater). The saline groundwater is not used as a potable water source or for stock purposes due to the high salinity levels (groundwater salinity greater than 5,000 mg/L is generally considered unsuitable for stock). Potable quality groundwater is mostly found along the south and west coasts of the Eyre Peninsula, with localised occurrences around the east coast and across the central Eyre Peninsula. These potable quality aquifers are generally shallower and would not be impacted by the proposed borefield. Additionally, the proposed borefield will be a sustainable water supply as the predicted groundwater demand over the 25 year life of the CEIP Mine will be less than 1% of the total volume of the targeted aquifer (GWS 2015). Refer to Chapter 16 for further information on groundwater impacts.

The proposed borefield near Kielpa satisfies the water supply option evaluation criteria and is the preferred mine site water supply option.

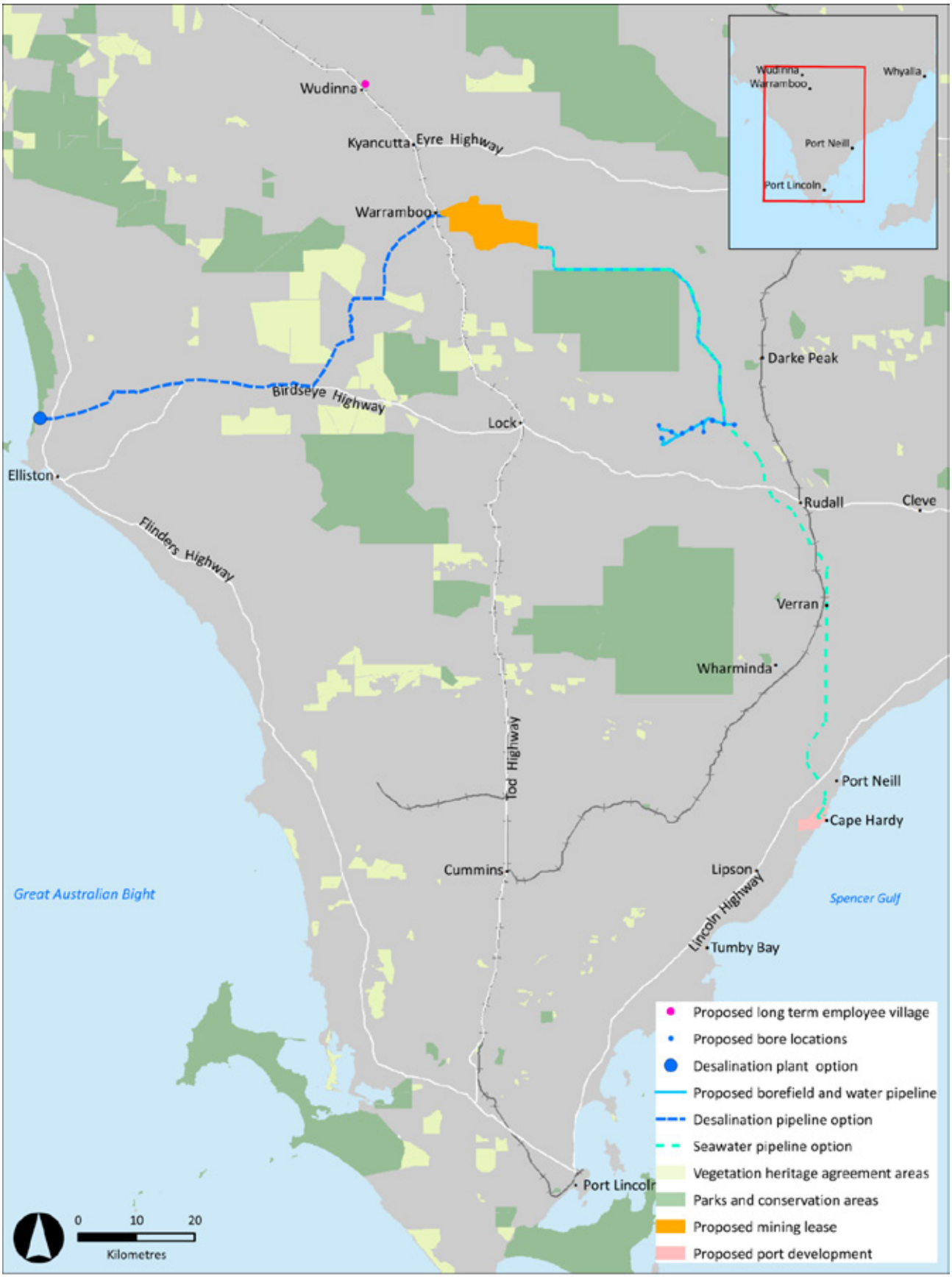

Figure 3-3 Water Supply Alternatives

3.4 Power Supply

Power is currently supplied to the Eyre Peninsula from the South Australian Electricity Grid and National Electricity Market via ElectraNet's high voltage transmission network. The 275 kV network extends as far south as Cultana, near Whyalla. From Cultana, there is a 132 kV network, which splits at the Yadnarie substation to extend to Wudinna in the northwest and Port Lincoln in the south (refer to Figure 3-4). This network is able to supply approximately 100 MW to the Eyre region and is currently utilised near to capacity (Deloitte 2013).

The CEIP will require approximately 280 MW of electricity to operate, the majority (260 MW) of which will be used to power the ore processing facility on the mine site. As such, additional transmission line infrastructure will be required to support a power supply from the National Electricity Market.

Separate from Iron Road's requirements, it is understood that ElectraNet are considering a project to reinforce the Eyre Peninsula transmission network.

Iron Road investigated three main alternatives for the provision of power to the proposed mine site (shown in Figure 3-4):

- A gas fired power station
- A private transmission line connecting to the National Electricity Market at Cultana
- A private transmission line connecting to the National Electricity Market at Yadnarie

A stand-alone renewable energy power supply was not considered appropriate for the CEIP due to the large electrical load and the 24 hour nature of the power demand. Renewable energy may be purchased via the preferred supply solution discussed below.

Due to the potential multi-user nature of the proposed port development, electricity can be supplied to the port site through the regulated transmission network by ElectraNet. As such, a new transmission line connection to the proposed port site is not included in the proposed CEIP Infrastructure.

3.4.1 Option A Gas Fired Power Station

A gas fired power station was considered as a potential power source as an alternative to a connection to the National Electricity Market. This option was not preferred by Iron Road due to capital cost and limited gas supply options.

3.4.2 Option B Private Transmission Line to the Proposed Mine from Cultana

This alternative would have involved the construction of a new 275 kV transmission line from the 275 kV substation at Cultana to the proposed CEIP Mine near Warramboo. This option does not rely on the reinforcement of the existing Eyre Peninsula transmission network and is not preferred due to the capital cost of an additional 150 km of transmission line compared to the preferred option.

3.4.3 Selected Option - Private Transmission Line to the Proposed Mine from Yadnarie

This option will involve construction of a new 275 kV transmission line from the existing Yadnarie substation to the proposed CEIP Mine and assumes that ElectraNet's proposed Eyre Peninsula Reinforcement project proceeds. This option is preferred as it allows the majority of the proposed transmission line to be co-located within the proposed infrastructure corridor, minimising the project footprint and will have the lowest capital cost of the three options.

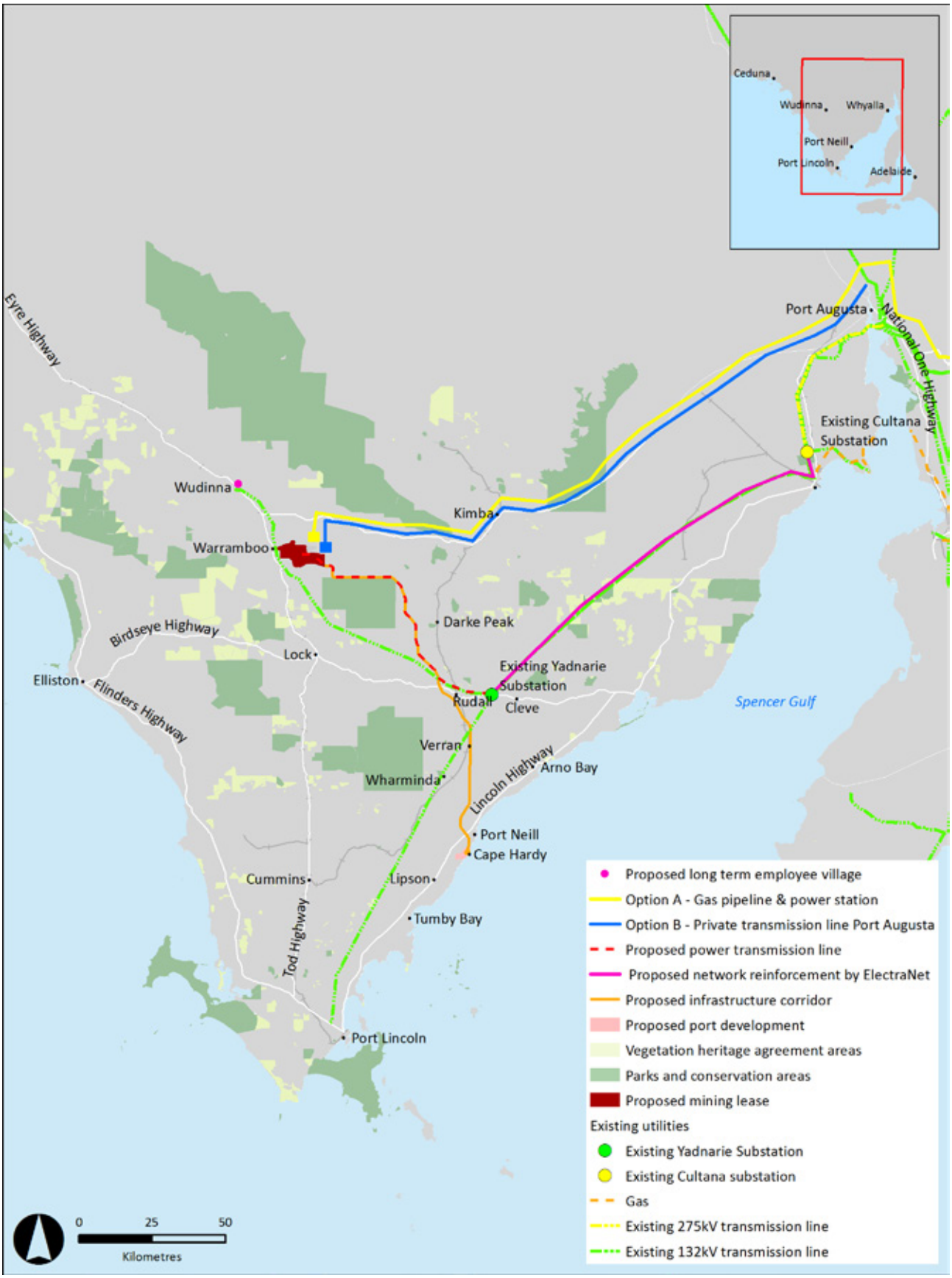

Figure 3-4 Existing Eyre Peninsula High Voltage Transmission Network

3.5 Process Optimisation

As the design of the CEIP Infrastructure continues to progress, opportunities to further optimise the proposed development will be pursued. The objective of optimisation studies is to minimise environmental and/or social impacts of the project, whilst maximising benefits to the local communities and other third parties. Optimisation studies are ongoing, and are currently focussed on:

- Energy and/or water efficiency improvements in habitable buildings or equipment to be used during construction and operation
- Procurement options of renewable energy sources as a component of the overall electricity supply
- Module route options, including the potential utilisation of the railway access road as opposed to, or in addition to, the existing local roads
- Maximising opportunities for improved habitat for threatened species by restoring linkages between remnant vegetation as part of offset requirements.
- Improved road safety outcomes, reduced disruption to traffic and minimisation of overall traffic volumes
- Minimising the overall footprint of the project and limiting the overall loss of native vegetation and/or productive agricultural land
- Mine and process waste material handling, placement and rehabilitation

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