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**Department of Planning**  
Report for Kwinana Intermodal Terminal  
Review of terminal options  
September 2009





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# 1. Introduction

## 1.1 Background

An intermodal terminal site evaluation report undertaken by GHD/Meyrick and commissioned by the Western Australian Planning Commission was released by the Minister for Planning, John Day, on 27th November 2008. This follows broad-ranging work undertaken over a number of years that has pointed to the need to plan for expanded intermodal facilities in the Kwinana/Cockburn area.

The report discusses possible location options, concept designs and layout for a modern terminal in the style of a 'freight village'. A preferred site is identified in the report. The primary purpose of this work is to consider whether a feasible site option exists that can be protected for future use by the freight industry.

It is anticipated that the terminal would primarily service the interstate container rail freight task, with a smaller proportion of the throughput originating from intrastate rail and international shipping operations. This terminal is not specifically designed to service a private port in this area, although there may be some logistics linkages.

The public, industry and other stakeholders were given three months to provide comment on the GHD report.

Following public release of the report, 320 written submissions were received by Department for Planning and Infrastructure (DPI). A number of concerns, such as opposition to additional heavy traffic, property value decline, uncertainty of the project timeframe and unassigned liability for negative impacts on the community, were raised by a range of stakeholders.

However, submissions from government, business and industry groups were overwhelmingly in support of a Kwinana Intermodal Terminal in principle, and a majority have stated their support for the preferred option as outlined in the report.

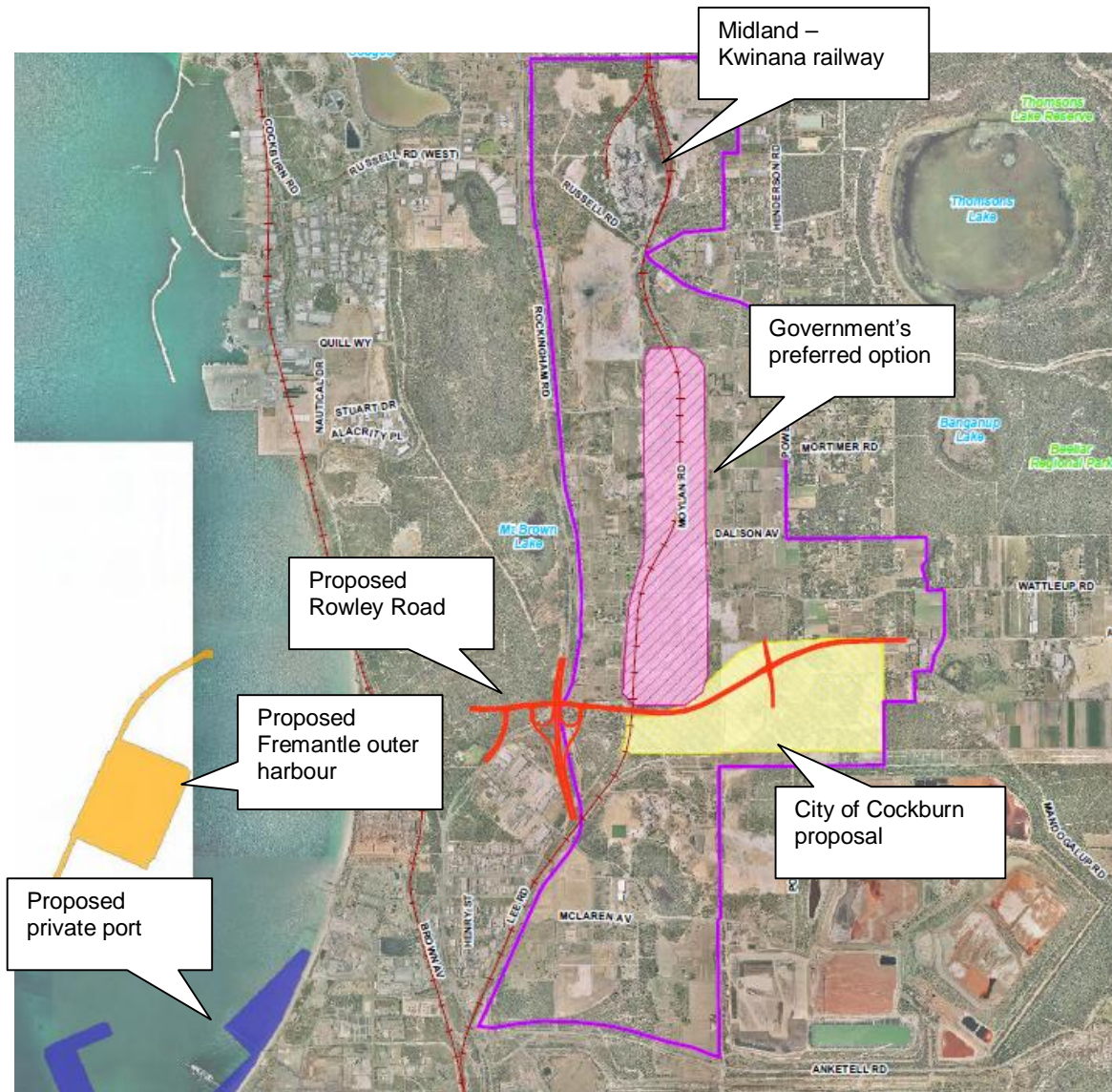
The City of Cockburn and Hon. Fran Logan, MLA Member for Cockburn opposed the preferred location option. Alternative sites were proposed by these stakeholders.

As a follow up, DPI organised a stakeholder workshop on the 18th June 2009 to consider alternative site options that surfaced during the submissions phase. The purpose of the workshop was to consider in greater detail the proposed new sites and the key criteria which might support their selection.

A total of 51 attendees were present at the workshop representing industry associations, Government agencies (State and Local), community associations, businesses, port operators and private rail operators.

Community representatives were asked to register their interest to attend the workshop after an information brochure and covering letter were sent to all persons who submitted a comment during the public advertising period.

The principal outcome of the workshop was the recommendation that DPI (now the Department of Planning) coordinate a study to examine the feasibility of only one new site, the City of Cockburn proposed site immediately south of Rowley Road in Hope Valley (refer Figure 1 ).



**Figure 1: Locality plan**

## 1.2 Objectives of this study

The objectives of the project are the following:

### a) Site Evaluation

To determine whether the City of Cockburn site realistically presents a feasible, cost effective, terminal development option. This will need to be based on an assessment of the site against previously determined operational characteristics and physical requirements that would be required for a new interstate intermodal terminal and associated industrial land uses and supporting services.

Previously established site selection criteria include the following:

- Environment constraints
- Geotechnical conditions
- Topographical factors and future ground levels





- ▶ Existing infrastructure, including ability to relocate major services
- ▶ Planning and zoning
- ▶ Ability to effectively connect to the existing rail network and provide the necessary rail services i.e. train length, shunting capability, track configuration
- ▶ Ability to effectively connect to the existing and planned road network
- ▶ Ability to develop a core terminal area and supporting infrastructure
- ▶ Ability to develop integrated terminal support areas
- ▶ Ability to interface with an associated industry park / cluster development
- ▶ Ability to effectively integrate transport connections with the proposed Outer Harbour and the proposed private port at James Point.

#### **b) Comparative Analysis**

Undertake a comparative site analysis of the City of Cockburn site and the Government's preferred site (Option 5 of the GHD Meyrick 2007 report).

### **1.3 Scope**

The study considered a wide range of factors in relation to the City of Cockburn proposal. These included an examination of the GHD Meyrick 2007 report '*Kwinana Intermodal Terminal Site Evaluation and Planning Study*' in detail. Using the design and planning parameters established in this report as a guide, the consultants investigated whether the City of Cockburn site presents a feasible site option.

Broad consultation with industry and government stakeholders provided valuable input into the evaluation process.

An analysis of the City of Cockburn site was carried out taking into consideration its ability to accommodate the terminal layout, separated into the main functional areas and whether it could provide a terminal design capable in the long term of handling 1,200,000 TEU per annum with maximum flexibility to accommodate future developments. Consideration was given to the potential interaction with the future Outer Harbour freight task and a potential new port at James Point.

Consideration was also given to land suitability and site configuration to accommodate a range of commercial terminal development options in the future. Key to this consideration was an examination of the topography, geological or geotechnical considerations, such as mining operations and future ground levels, groundwater, and drainage.

The study reviewed environmental issues, including bush forever sites and noise factors. It also considered land availability based on compatible uses and constraints, including broad land ownership issues, any known future zoning changes that could impact on land availability, State agreements and extractive/mining leases. Surrounding land uses, including the suitability of land for freight related purposes and buffer areas, including proximity to existing rural residential areas, Urban Deferred areas and possible impact on proposed new urban communities.

Key issues included constraints associated with existing or planned network services, such as major power lines, road reserves, and constraints and cost associated with possible relocation of gas pipelines and pipeline reserves.





Rail access and rail network constraints were considered, along with road access to and from the site, including access to the wider freight network and possible impact on the surrounding road network, including planned network improvements.

The study considered critical site works and other engineering constraints, and provided a comparative analysis of the City of Cockburn site and the Government's preferred site.

## 2. Government's preferred terminal site option

### 2.1 Location

Subsequent to a number of earlier studies, in 2006 the government commissioned Meyrick & Associates, ARRB and GHD to investigate the potential development of an intermodal freight terminal in the Kwinana area. The report concluded that a business case for such a terminal could be feasible, and that the terminal should be planned for an ultimate throughput of up to 1.2MTEU/a<sup>1</sup>.

In 2007, the government appointed GHD and Meyrick & Associates to identify a suitable site for the terminal, provide a conceptual design, and report on the constraints and opportunities afforded by the preferred site. Five options were identified and investigated,

The Government's preferred option is located within the Latitude 32 industrial development area at Hope Valley / Wattleup, near Kwinana. The site abuts the east side of the Kwinana freight railway, and stretches from south of Russell Road to just north of Rowley Road.



**Figure 2: Government's preferred option - general view**

<sup>1</sup> Container capacity is measured in TEU, where TEU stands for "twenty-foot equivalent unit". The twenty foot unit is a small standard container. The commonly used forty foot containers are each 2TEU. High throughputs are measured in millions of TEU per annum (ie MTEU/a).

The key attributes of this site include:

- ▮ Topography: The site is located adjacent to the existing north-south leg of the Midland – Kwinana railway, and runs along a nearly level valley floor. Minimal earthworks would be required to achieve the necessary flat gradients for the spurs and sidings. Earthworks required to provide relatively flat areas for the container handling and warehousing functions would be relatively minor.
- ▮ Rail access: The location of the site on the Midland – Kwinana Railway enables direct access into and out of the site. Approach sidings could be provided on the northern approach to the terminal to allow trains to wait for access to the terminal without congesting the main line.
- ▮ Road access: The main entry point for the terminal would be on the proposed Latitude 32 north-south industrial road. This in turn gives access to the southern parts of the Latitude 32 industrial area, to Rowley Road and (to a lesser extend) Russell Road.
- ▮ Port access: The terminal location and layout allows ready access to the proposed freight corridor along Rowley Road, thereby providing convenient access to the Fremantle outer harbour and the proposed private port at James Point.
- ▮ Integrated transport industry: The terminal has been designed to integrate closely with the business, industrial and eco-industry activities proposed for Latitude 32.
- ▮ Flexibility: The location, orientation and size of the terminal provide for additional expansion if required in future. An area has been incorporated for the handling of shorter trains (600 – 900 metres) for intrastate and metropolitan area running.
- ▮ Major services: The site is clear of major gas pipelines, high voltage power corridors or water mains. Service relocations would be relatively minor.

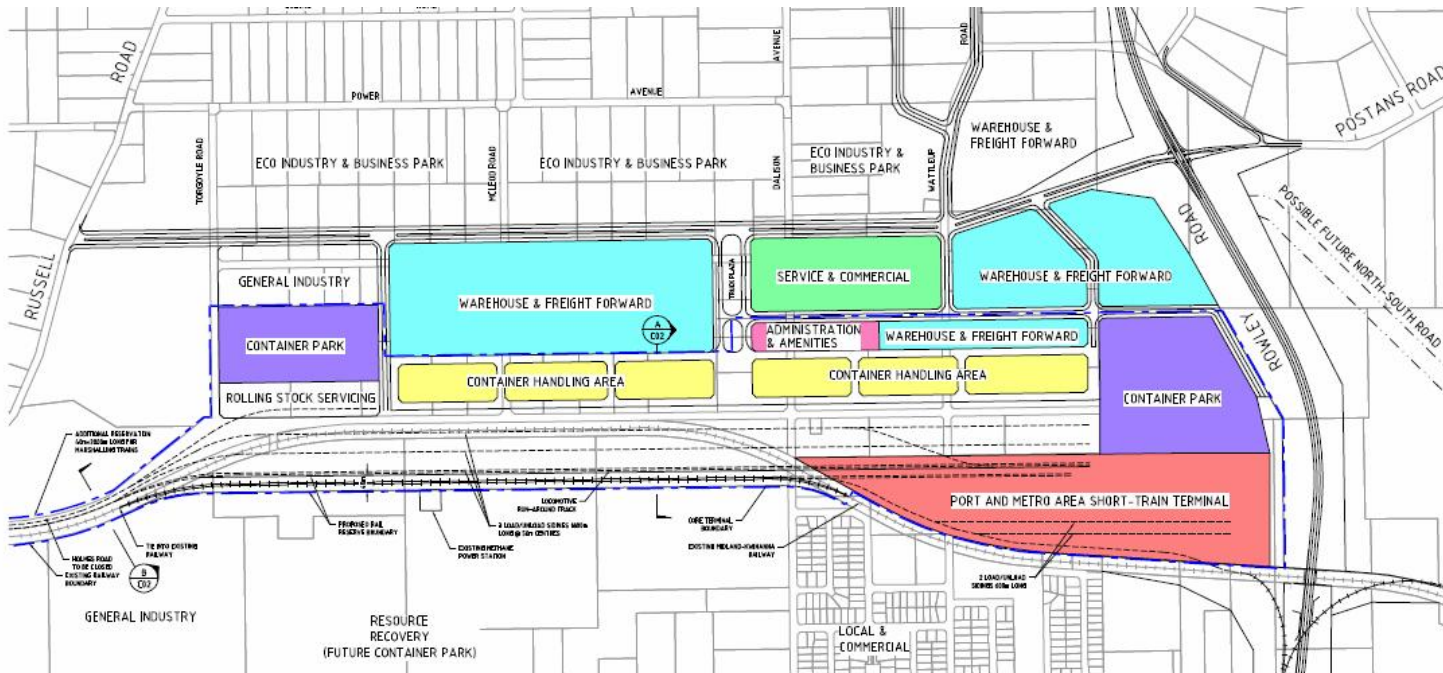


**Figure 3: Government's preferred option - general site view**



## 2.2 Layout

The concept design for the core terminal comprises a rail and container handling area, approximately 1800 metres long by 300 metres wide, together with an adjacent terminal for handling port and intrastate short trains (600 – 900 metres long).



**Figure 4: Government's preferred option layout**

Administration and amenities areas, limited warehouse facilities, two container parks and a rolling stock servicing centre are also provided within the core terminal.

The main Midland – Kwinana railway is realigned, and located as far west as possible without encroaching on the landfill areas. The core terminal activities are located east of the main line. A short-train terminal suitable for intrastate and port trains, is provided in the south-west corner of the site, adjacent to Rowley Road.

Container storage facilities may eventually be provided west of the main line, on the refuse disposal site. The availability of land for this purpose is subject to future closure and rehabilitation of the site. However for efficiency of operation it was recommended that container parks also be located contiguous with the main working areas of the core terminal.

## 2.3 Rail access

The Midland to Kwinana railway runs the full length of the site in a generally north-south orientation. The railway is a dual-gauge, single track section. The rail network in this area is managed and maintained by Westnet Rail and has open access arrangements for above rail operators. The main line would be realigned westwards to the edge of the City of Cockburn refuse facility, with spur and sidings located east of the main line.



The option allows for three parallel load/unload sidings each with a working length of 1800 metres. Depending on the ownership / operation model adopted, these could be sub-divided into 900 metre lengths. All sidings are extended to the limits of the site, giving additional shunting and train assembly length.

The proposal allows for a future rail connection to the Fremantle outer harbour along Rowley Road.

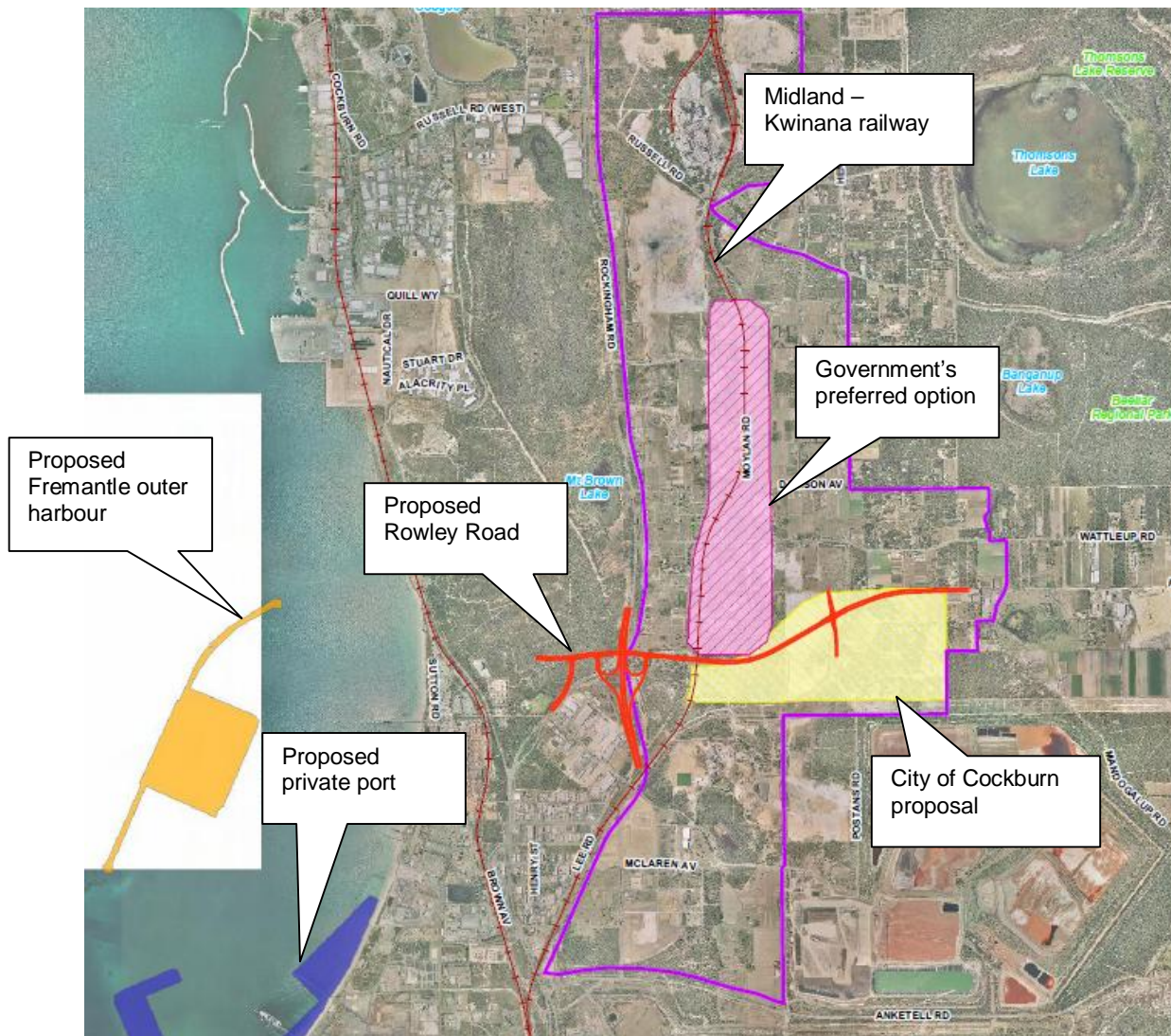
A 40m rail reserve was nominated, to provide for future duplication of the Midland – Kwinana railway. An additional 40 metre reservation, approximately two kilometres long, would provide arrival / departure and storage sidings sufficient for 1800+ metre trains. This is the preferred length for trains transporting interstate freight over very long distances as it maximises efficiency of the transportation task.

## **2.4 Road access**

The primary point of access for the intermodal terminal would be onto the proposed north-south road between Rowley Road and Russell Road, as planned under the Latitude 32 structure plan. It would be the Government's intention to ensure that truck traffic associated with the terminal is directed to roads that are purpose built for heavy traffic, i.e. Rowley Road. This road will form the eastern perimeter of the terminal area.

### 3. City of Cockburn proposal

#### 3.1 Location



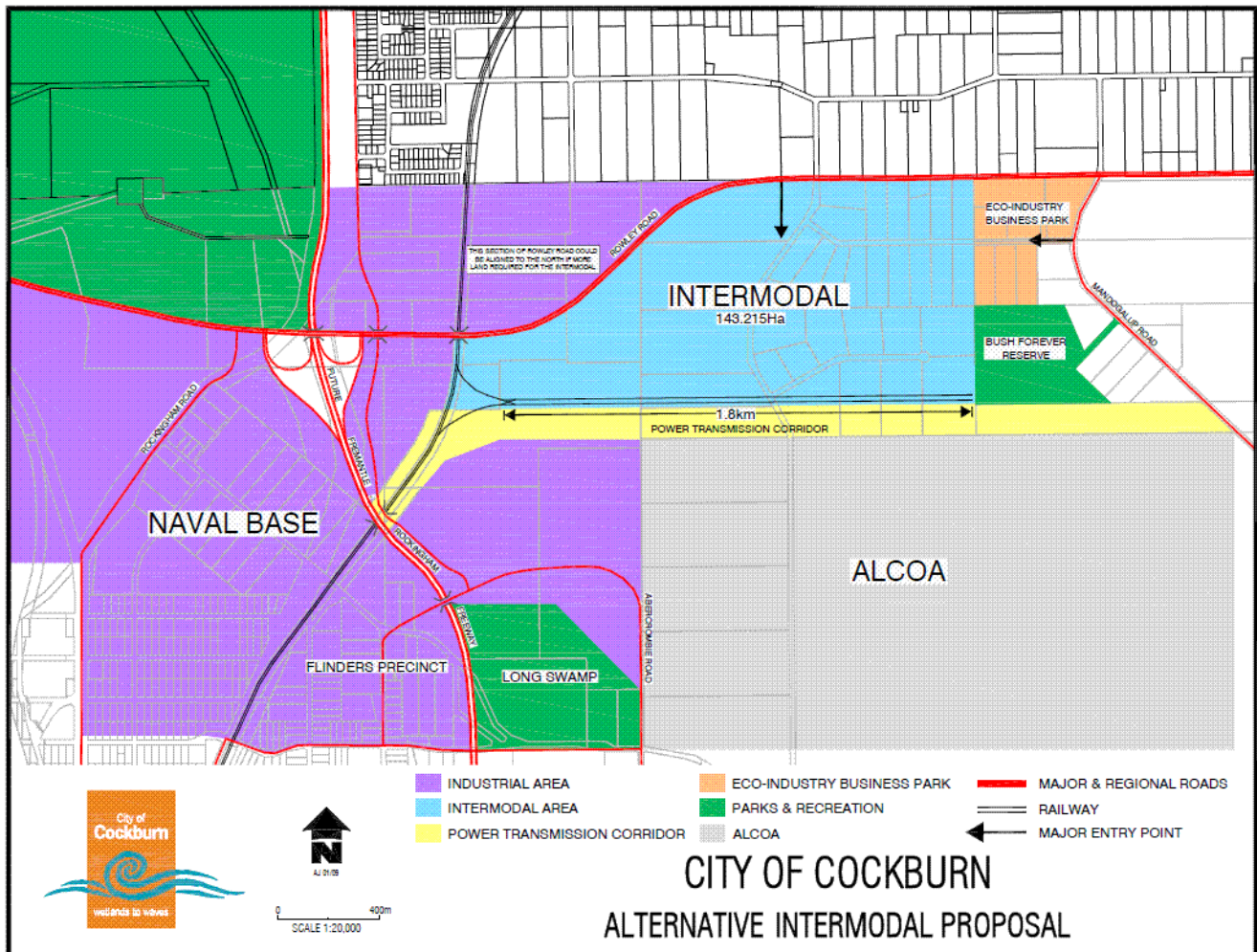
**Figure 5: City of Cockburn proposal - Locality**

The City of Cockburn proposal is for an intermodal terminal located immediately south of Rowley Road, east of the Midland – Kwinana railway (see Figure 5). The site is bounded on the south by a Western Power high voltage power line corridor, and on the east by a Bush Forever site and land identified as industrial under the Hope Valley Wattleup redevelopment scheme.

Further east is land currently zoned rural, while to the south of the Western Power easement is land utilised by Alcoa for bauxite residue disposal.



The concept plan shows 143.215 ha available for the intermodal facility. However, the alignment of Rowley Road shown in the concept sketch is not in accordance with current planning, and the actual area available is approximately 120 hectares.



**Figure 6: City of Cockburn proposal - layout**

### 3.2 Layout

As shown in Figure 6, the City of Cockburn proposal utilises a pair of parallel spur lines each 1.8km long, located along the south boundary of the site. The spurs run east – west, perpendicular to the Midland – Kwinana railway. The balance of the intermodal facility is located between the spurs and Rowley Road.

### 3.3 Rail access

Rail access is via a triangle off the Midland – Kwinana Railway. Direct access to the main line is unlikely to be approved due to the potential for causing congestion on the line. Arrival roads (ie approach sidings) would need to be provided parallel with the main line north of the triangle. This is similar in concept to the arrival roads proposed for the Government's preferred option.





To provide suitable rail access, the two curves of the triangle should each have an absolute minimum radius of 200 metres (preferably more), be tangential to the main line and have connection at the main line and spur with a “turnout” angle of 1 in 12. These requirements will help control wear of rails and wheels and noise generated by the trains turning into and out of the terminal. However, imposing these requirements would either reduce the available spur length substantially, or require realignment of the main line to the west. This matter is discussed further in section 5.7 on page 22

### **3.4 Road access**

The primary road access to the site is from Rowley Road, with a secondary access through the eco-industry site to the east (off Mandogalup Road). The primary access point would be via the Postans Road connection shown on current Main Roads planning for Rowley Road. However, rather than being part of the north-south freight road (via Postans and Abercrombie Roads), the connection would only service the proposed terminal.

Main Roads have advised that the connection to Rowley Road would require grade separation, which would in turn reduce the area of land available within the intermodal terminal.

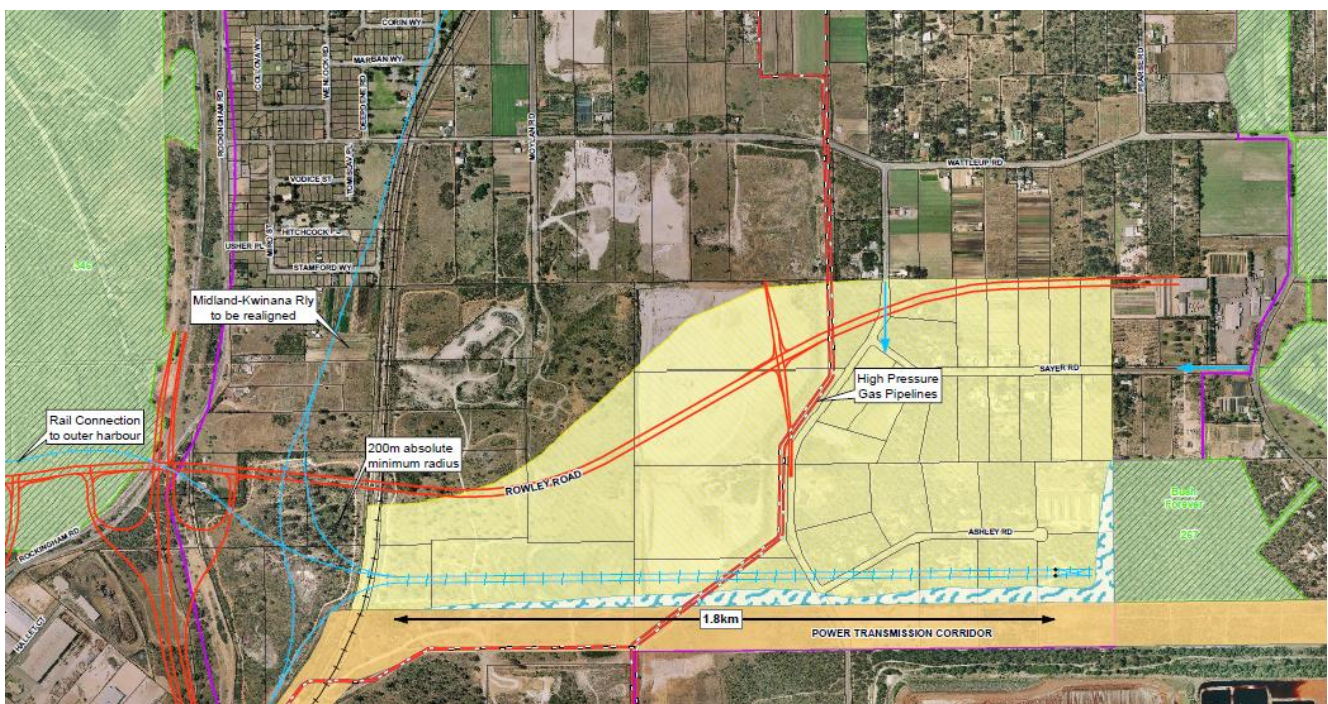
The connection to Rowley Road would provide an excellent road link to the intermodal terminal, but would sever the important north-south freight road.

## 4. Technical appraisal of Cockburn option

### 4.1 Overview

The following section reviews the City of Cockburn proposal in relation to a number of technical criteria.

Figure 7 indicates the proposed terminal with the correct alignment of Rowley Road superimposed, along with the high pressure gas pipelines. The figure also indicates the batter areas required for deep excavation, and the modifications to the railway system necessary to accommodate the 1800m standard train length.



**Figure 7: City of Cockburn proposal - technical constraints**

### 4.2 Topography and earthworks

The western end of the terminal area is bounded by the Midland – Kwinana freight railway, and the rail spurs and sidings within the terminal will connect to that railway. Levels on the existing railway near the point of connection are between 5m and 8m AHD. Along the alignment of the rail spur (parallel to the southern boundary of the site), the existing ground levels range up to 42m AHD. Because the spurs need to be constructed at a very flat grade of not more than 1 in 300 (and ideally flatter), it will be necessary to cut down nearly 30 metres to achieve the required levels.



**Figure 8: City of Cockburn proposed site**

The site is bounded on its northern side by the proposed extension of Rowley Road. Preliminary design of the road shows two potential profiles – one in deep cut (up to 28 metres), fairly closely matching the floor levels of the limestone quarries, and one which more nearly follows the existing ground level and is labelled “Potential alternative alignment through quarries”. The deep cut profile appears to be the preferred option.

Assuming the site is graded uniformly from the rail spur to Rowley Road (preferred profile), average grades across the site of less than 2% could be achieved, thereby facilitating the provision of flat areas for container handling and warehousing.

The deepest cuts would be along the southern and western boundaries of the site, where cuts in excess of 30 metres would be required. It would not be economical to provide retaining walls of that height, so provision of batter slopes would be required. Assuming a slope of 1h:2v, a width of over 60 metres would be lost over the length of the spur (approximately 10 ha over the length of the site).

### 4.3 Geotechnical

The site is located on the Spearwood Dune System, which comprise of Spearwood Sand and coastal limestone known as Tamala Limestone. The Spearwood Sand comprises yellow, medium to coarse grained quartz dominant sand. Remnants of calcareous sand may be present in close proximity of calcarenite outcrops.



The geological mapping indicates the subsurface geology consists of coastal limestone with transitional boundaries of unlithified lime sand, calcarenite outcrop, kankar outcrop and leached quartz sand.

The undulating topography of the site is characteristic of the Spearwood Dunal system.

### **Tamala Limestone**

Limestones give an uneven and irregular surface configuration with development of pinnacles of hard rock, and deep sand filled cavities. This can be problematic with regards to foundations and earthworks on the site. Limestone outcrops exposed to weathering conditions will undergo hardening and produce caprock characteristics known as Calcrete. Calcretised layers have been known to cause problems with excavations and engineering pilings to lose their verticality (Gordon; 2003).

Cavities are sized variably from sinkholes and dolines to large caves. It is documented that Yanchep and areas north of Wanneroo hosts such karstic examples. Although the site is not in close proximity to these areas, karsts are found in the same geological unit as that which underlies the site, the Tamala Limestone.

The strength of the Tamala Limestone is also highly variable and dependent on the degree of cementation. This may vary the settlement and bearing capacity of foundations. Detailed site investigation would be required prior to any construction in the area, to ensure that foundations are appropriately designed.

It will be necessary to bear these factors in mind during the detailed planning and design of the intermodal terminal, especially with respect to bulk earthworks and drainage.



**Figure 9: Limestone pinnacles within the proposed site**



### **Fly ash disposal**

Verve Energy operates a disposal area for fly ash from the Kwinana power station within the site. The area is referred to as the Perron Quarry and is located on the southern boundary of the site, adjacent to the Western Power transmission line reserve.

Verve has advised that the site contains 800,000 to 900,000 tonnes of material. Although fly ash has some limited commercial value, the material in the stockpile is up to 30 years old, and hence is not suitable for cement making. The site would need to be rehabilitated, with the fly ash removed.

Removal of the fly ash will be necessary whether the site is developed for an intermodal terminal or general industrial uses. Landcorp's consultants have advised that consideration has been given to blending the fly ash with sand or other soils for use in general fill within Latitude 32.

## **4.4 Hydrogeology**

- ▮ Groundwater within the new project area flows in a westerly direction.
- ▮ The groundwater is hosted in the superficial aquifer in the Tamala limestone.
- ▮ The Perth Groundwater Atlas shows a May 2003 groundwater level where groundwater lies between 1m AHD in the west and 9m AHD in the east. However the actual levels could be up to 2m higher in the wet season i.e. 3m AHD in the west and 11m AHD in the east.
- ▮ Since the orientation of the development has changed from predominantly north-south to east-west the development footprint will move inland where higher groundwater levels have been recorded. If excavation levels are down to 10m AHD as has been discussed, excavations will be below the groundwater table during winter months and significant dewatering via drains will need to occur. This will impact on the regional groundwater levels by reducing the regional groundwater level.
- ▮ The impact of this reduction of groundwater level may be significant for any groundwater dependant ecosystems west of the development. However the only system visible is the Long Swamp which probably occurs too far south of the development for any significant impact. A monitoring program should be put in place to assess the implications for Long Swamp if the development goes ahead.
- ▮ The bushland forever reserve which is located immediately east of the development could have reduction in underlying groundwater levels if dewatering via drains occurs. It is not known if the vegetation in the Bushland Forever reserve is groundwater dependant and this would be necessary to establish.
- ▮ Reorientation of the development will have a beneficial outcome for Brownman Swamp and Mount Brown Lake as any potential groundwater contamination will move in a westerly direction and probably miss the swamps.
- ▮ Reorientation will have little impact on the acid sulfate soils generation potential as there is a similar soils type/geology underlying both areas. The South Metropolitan Regional Scheme Acid Sulfate Soils by the Western Australian Planning Commission indicates that the majority of the site is at low to no risk of actual acid sulfate soils (AASS) and potential acid sulfate soils (PASS).

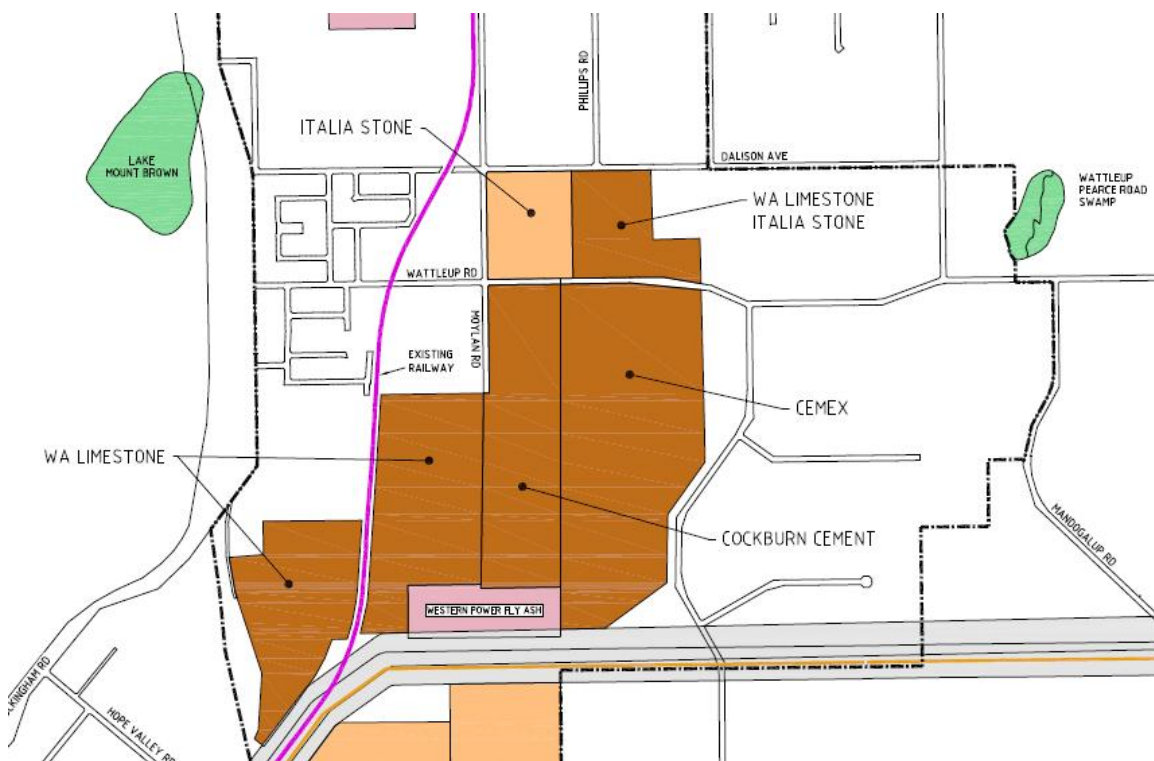
## **4.5 Current and future quarrying**

Two quarries are present on the site, for mining of the local limestone, and several worked-out quarries exist at the western end of the site. Depending on required land uses, these quarries may have to be

rehabilitated to meet environmental guidelines. Some quarries may need to be backfilled to the design level or over-excavated in order to meet construction requirements.

On crown land, tenement M70/75 is owned by Cockburn Cement and covers 18.92ha. The tenement was issued in March 1987 and expires March 2029.

On private land, there are operations by WA Limestone, Italia Stone and Cemex. The Cemex operation is currently the largest of the operating quarries. Much of the WA Limestone holding at the western end of the site appears to have been worked out.



**Figure 10: Quarry operations and leases (Source: Cardno)**



**Figure 11: Cemex quarry**

## 4.6 Environmental

The City of Cockburn alternative proposal has been considered following a review of the initial Preliminary Environmental Impact Assessment report of August 2007. To ensure up to date reporting of legislative environmental constraints, the proposed area has been overlaid on current environmental constraints mapping using the resources of available websites.

### ***Known Environmental Constraints***

*Native vegetation* – The City of Cockburn location appears to contain more native bushland than the Latitude 32 location. There is very little native vegetation within the original proposal but there are some patches which appear to be of good quality in the City of Cockburn area. This can only be confirmed through a ground survey.

*Bush Forever Site* – The City of Cockburn location adjoins Bush Forever Site 267 along its eastern boundary. Although there could be no direct impact on the Bush Forever Site, it is likely that there would be a significant indirect impact on the bushland. This could be caused by changes in hydrology due to the requirement for deep excavation in the eastern section of the new location. A deep excavation could intersect the water table and draw water further down, reducing its availability to the Banksia woodland in the Bush Forever site. Such bushland is susceptible to groundwater drawdown and could be badly impacted.

Other likely indirect impacts to the Bush Forever site include weed invasion, wind erosion due to adjacent clearing and the potential for dieback introduction.





*Potential contamination from Alcoa's red mud lakes* – the adjacent red mud lakes are lined with clay but there is a possibility that they leach into the water table. Deep excavation of material in the City of Cockburn location has the potential to draw contaminated groundwater to the area, which would have to be treated and removed.

## **4.7 Rail operations**

The City of Cockburn proposal drawing on page 10 indicates that two closely spaced parallel spurs will run east west, joining the Midland – Kwinana railway via a triangle. The Midland – Kwinana railway runs generally north-south in this location.

Key issues for consideration in relation to the railway operations discussed in the following sections, and reflect the required scheme modifications depicted in Figure 7.

### **4.7.1 Length of available spur**

The terminal will primarily serve interstate freight trains running to and from the eastern states. For economy of operation, the trains are made as long as possible, commensurate with operational and infrastructure constraints. At present trains are limited to 1800 metres by the size of passing loops on the rail network. Consequently the terminal should be sized to service trains of this length.

If the terminal cannot service the full 1800 metre trains length, trains will need to be broken into smaller units at the arrival roads (approach sidings), then reassembled into 1800 metre trains after unloading / loading. This would involve shunting and the multiple movement of wagons and locomotives, which is inefficient, leading to higher operating costs and increased noise.

Therefore the available spur or siding must accommodate a train of not less than 1800 metres. In addition, there is the need for a locomotive escape at the end of the siding. The escape requires a parallel track with turnouts to allow two locomotives to come off the end of the train, cross to the parallel track, and run back to the main line. This requires an additional length of approximately 100 metres.

The drawing indicates that the spurs will be 1800 metres long. However, as discussed in Section 3.3 on page 10, the triangle curves should have an absolute minimum radius of not less than 200 metres with a 1 in 12 turnout<sup>2</sup>. This is required to avoid excessive rail and wheel wear and to limit noise generated by the flanges of the wheels against the rail.

By providing a 200 metres radius curve, the available length of the spur is reduced to about 1750 metres. As noted above some 60 metres would be lost at the end of the spur due to the need to batter down the deep excavations, and 100 metres would be required for the locomotive run-around. This reduces the available length to 1590 metres. It is noted that realigning the Kwinana Midland railway to the west would provide the additional length. However, this would involve realignment of approximately two kilometres of the main line, being almost the whole section between Wattleup Road and Hope Valley Road. This would move the crossing of Rowley Road over the railway very close to the proposed Rowley Road / Fremantle Rockingham Highway interchange, and may impact on the interchange design.

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<sup>2</sup> The turnout is the angle at which the rails merge or diverge. Flatter turnouts (ie higher numbers) provide a more gradual change of direction (with consequent reduction in noise and rail wear) but occupy a longer distance.



#### **4.7.2 Rail network connections**

The City of Cockburn proposal allows for a connection to the Midland – Kwinana railway via a triangle. This allows connections both north and south of the site. It would be necessary to provide arrival roads where trains waiting to enter the terminal can be held off the main line. A widened rail reserve (as proposed for the Government's preferred option) should be included in planning for the terminal.

#### **4.7.3 Connection to the outer harbour**

Rowley Road is planned to be the prime arterial connecting to the outer harbour, with a freight rail corridor along the north side of the road, between Latitude 32 and the harbour.

Connection of the City of Cockburn proposed intermodal to the freight corridor would be problematic – a reverse curve (with desirable radii of 400 metres) would be required. However such a curve would pass directly through the proposed Rowley Road / Fremantle – Rockingham Highway interchange. A complete redesign of the interchange (which may not prove feasible) would be required.

It is questioned whether a rail connection to the outer harbour along the Rowley Road transport corridor is feasible.

#### **4.7.4 Flexibility of operations and provision for expansion**

The City of Cockburn proposal has a twin spur line running along the southern boundary of the site. The spurs appear to be about 20 metres apart. It is generally considered that the spurs should be 50 metres apart for container equipment access and laydown requirements.

To support the potential ultimate development of the intermodal freight task, three parallel spurs would be the minimum number required. To provide the turnouts for three spurs, an additional length of 100 metres would be required, which is not available within the proposed site.

### **4.8 Industrial development**

Industrial development in the context of the City of Cockburn proposal for an intermodal terminal relates primarily to the way in which the proposal supports the development of the Latitude 32 industrial area. Latitude 32 is oriented north-south.

The east-west orientation of the terminal and its rail spurs divide Latitude 32 into separate northern and southern sections. Because the existing railway would need to be deviated west to provide adequate lengths for the spurs, the area of development south of Wattleup Road, between the railway and proposed Fremantle Rockingham Highway would effectively be sterilised. North-south linkage within Latitude 32 would be limited to a single service road parallel to the highway. It is considered that this would have a serious deleterious effect on the industrial development of Latitude 32.

It has been noted by some stakeholders that the Government's preferred option would divide the northern part of Latitude 32 into separate east and west sections, with similarly limited connectivity. Construction of the intermodal terminal at the City of Cockburn proposed location would greatly improve development flexibility through the northern part of Latitude 32.



## **5. Appraisal of options against criteria**

### **5.1 Background**

Criteria for the evaluation of intermodal terminal options were developed by GHD / Meyrick as part of the 2007 study. The options considered in that report were all rated against these criteria. The criteria were further refined and confirmed at the stakeholder workshop held in Fremantle on 18 June 2009, and included in the brief for this present study. A detailed evaluation of the City of Cockburn proposal against the criteria is given in the following sections, with a comparison of the Government's preferred option and the City of Cockburn proposal in Table 1.

### **5.2 Environment constraints**

Environmental constraints on the City of Cockburn proposal are similar to those applicable to the Government's preferred option. In addition, the City of Cockburn proposal has a larger area of undisturbed bushland, and butts against a bush forever site. It is considered likely that the development of the terminal, with the very extensive earthworks required, could have a significant impact on the bush forever site.

### **5.3 Geotechnical conditions**

The geotechnical conditions of the City of Cockburn proposed site are similar to those found at the Government's preferred option. The site is located on the Spearwood dune system, which comprise of Spearwood sand and coastal limestone known as Tamala Limestone. The geology is conducive to the development of an intermodal terminal, in conjunction with the prior use of the land for resource (sand and limestone) extraction.

The Verve Energy fly ash disposal area would need to be rehabilitated and the fly ash disposed off site.

### **5.4 Topographical factors and future ground levels**

The site rises from RL 5 at the western end to approximately RL 42 near the eastern boundary. Within the site the land is undulating, with substantial level differences over the area. Limestone quarries within the area have a floor level of around RL 13. The preliminary design of Rowley Road has accommodated the undulations, and more-or-less matches the quarry floor levels.

To provide suitable grades on the rail spurs, excavations along the southern boundary of the site will be up to 30 metres deep. Having achieved that depth, it would be feasible to shape the land between the rail spurs and Rowley Road at grades which are suitable for development. It should be noted that the grading would be quite different to that currently contemplated by Landcorp, which does not contemplate such deep excavations along the southern and eastern boundaries.

### **5.5 Existing infrastructure, including ability to relocate major services**

Existing major services affecting the site include:

- ▶ Dampier Bunbury natural gas pipeline
- ▶ Parmelia natural gas pipeline



- Western Power transmission lines
- Water Corporation 1200mm water pipeline.

### **Gas mains**

It is understood that Landcorp are investigating the possibility of relocating the gas mains and water pipeline to the reserve of the planned north-south road. Discussions with Westnet Energy have indicated that relocation of the mains would be a major project in its own right, and one which Westnet would prefer to avoid. The mains are in a reservation created by act of Parliament, and a further act would be required to establish a new corridor. The new corridor must have adequate width for the pipeline, plus a buffer zone between the mains and other development.

Relocation of the pipelines under the terminal is highly undesirable. The operators need free and unimpeded access at all times for pipeline maintenance and for the construction of future pipelines as they are required. Further, there have been occurrences overseas of pipelines constructed under infrastructure rupturing, with multiple fatalities resulting.

It is anticipated that the cost of relocation would be \$2 - \$3 million per kilometre for each of the two pipelines, giving a total cost of up to \$18 million. Further, a major changeover to a new pipeline alignment would require a shutdown of the line for up to a week, affecting the whole of Kwinana (including the power station) and other parts of the metropolitan area.

### **Western Power transmission lines**

There are three transmission lines running parallel to the proposed rail spur, two 330kV lines and a 132kV line.

The easement / restriction zone for the 330kV lines are 60m (+/-30m either side of the centre line of the towers. The easement/restriction zone for the 132kV line is 22m (+/-11m either side of the centre line of the poles).

The transmission lines are outside the proposed intermodal terminal area. However it is likely that any realignment of the Midland Kwinana railway may require relocation of one or more of the transmission lines. It is also possible that the southern leg of the rail triangle would impact on one or more of the transmission lines. These issues should be examined in more detail if the City of Cockburn proposal proceeds.

### **Water mains**

A 1200mm diameter water pipeline has recently been constructed crossing the proposed intermodal terminal site, then running along the transmission line easement. This pipeline is the main supply line from the desalination plant to the metropolitan water network.

A detailed assessment of the cost of relocating the pipeline has not been undertaken as part of this study, but is likely to run into several million dollars.

## **5.6 Planning and zoning**

The area of the City of Cockburn proposal is within the Latitude 32 development and subject to the Hope Valley Wattleup redevelopment Act. Under the initial structure plan, the area has been identified as part of the Long Swamp industrial area. The site is located within the Town of Kwinana.



Under Town of Kwinana town planning scheme No 2, adjacent land is zoned Rural A and Rural B. The land immediately south of the site is within the rural zoning, but is currently used by Alcoa for the disposal of bauxite residue.

The council is working on the eastern residential intensification corridor (ERIC) plan (also known as the Jandakot regional structure plan), which could see the extension of residential zoning close to the east side of Mandogalup Road.

Apart from the bush forever site and bauxite residue disposal areas, the nearest rural zoned land is about 550 to 600 metres from the terminal.

Within the City of Cockburn, the nearest land to the terminal is in Wattleup Road and the future Rowley Road. The land is zoned rural and residential under the City of Cockburn town planning scheme. Rural or residential properties would be approximately 1,000 metres from the nearest point of the railway sidings, and 600 metres from the terminal support areas.

## **5.7 Ability to effectively connect to the existing rail network**

Ability to effectively connect to the existing rail network and provide the necessary rail services i.e. train length, shunting capability, track configuration

As discussed in section 4.7 above, the site does not provide sufficient length to accommodate 1800 metres trains in multiple spurs, unless the Kwinana Midland railway is deviated to the west. Approach roads (sidings) would need to be provided along the railway to enable trains to park off the main line while awaiting entry to the terminal. The layout of the site is not conducive to a flexible arrangement of spurs and sidings. Rail connection to the Fremantle outer harbour is problematic.

## **5.8 Ability to effectively connect to the existing and planned road network**

The proposed site would have a single connection to Rowley Road, which would give satisfactory access to the northern part of Latitude 32, Kwinana industrial areas, outer harbour and Kwinana Freeway.

The access point would be at the location identified for a realigned Postans Road. Current Main Roads planning shows a four-way at-grade intersection with provision for a future grade-separated interchange. (However discussions with Main Roads indicated that a grade separation is likely to be required from the outset). The incremental cost for a suitable grade separation would be in the order of \$20 million.

It is noted that Main Roads planning for Rowley Road involves very deep cuttings, and shows a 200 metre wide road reserve. If this width of reserve was actually required, it would very significantly impact on the area of land available for the intermodal terminal.

The City of Cockburn proposal would sever the main north-south industrial road through Latitude 32, which would incorporate parts of Postans and Abercrombie Roads. Landcorp have indicated that the north-south road is a key part of the Latitude 32 structure plan. Both Landcorp and Main Roads have expressed concern that severing this road would have significant disbenefits for the industrial development of the area.

A second access point via the eco-industry area off Mandogalup Road has been identified in the City of Cockburn proposal. There is some doubt whether this would be suitable for the heavy vehicle traffic require to transport large numbers of containers.



## **5.9 Ability to develop a core terminal area and supporting infrastructure**

The core activities of the terminal include:

- ▶ provision of a rail siding, spur or loop;
- ▶ provision of road access for trucks carrying containers;
- ▶ provision of working areas to allow containers and/or units to be removed from or loaded on to rail wagons;
- ▶ provision of hardstand for short term storage of empty or full containers;
- ▶ provision and operation of the lifting equipment required to transfer containers to/from rail transport to the storage area (and in the case of inland terminals, from trucks to storage); and
- ▶ management of both hard and soft infrastructure to facilitate the seamless movement of goods or containers through the facility. This includes a number of necessary support activities that take place on a terminal, including maintenance of the infrastructure and machinery used on the terminal, traffic management associated with the road and rail operations, control of access and egress by vehicles, and managing documentation.

The City of Cockburn proposal generally meets these minimum requirements, subject to the rail infrastructure issues mentioned in section 5.7 above. If Rowley Road requires a 200 metre reserve as shown on Main Roads planning drawings, the width of the site will be more limited.

## **5.10 Ability to develop integrated terminal support areas**

An integrated terminal provides additional functionality to support the core functions. These include warehousing and storage, road-to-road cross-docking, empty container storage, wash, repair and preparation.

The City of Cockburn proposal would support the warehousing, storage, and road-to-road cross-docking functions. However its location and configuration would limit the area that could be devoted to container storage and management. This is a significant issue because of the need to reduce the quantity of empty containers which are currently moved by road.

## **5.11 Ability to interface with industry park / cluster development**

Many intermodal terminal developments are alongside industry park cluster proposals allowing mutual benefit for improved transport access and services. The location and layout of the City of Cockburn proposal limits its ability to interface with the balance of the adjacent industry and business park developments. Its only point of contact to the north would be via an interchange crossing of Rowley Road. There no real potential to interface with that part of Latitude 32 south of the site, and the north-south connecting road is severed by the terminal proposal.

## **5.12 Transport connections with the proposed Outer Harbour**

Ability to effectively integrate transport connections with the proposed Outer Harbour and the proposed private port at James Point.

Road connections via Rowley Road would be satisfactory. However, a rail connection from the site to the ports is extremely problematic, as discussed in section 4.8.3 above.



**Table 1: Comparison of site options**

Number	Criterion	Government's preferred option	City of Cockburn proposal
1	Environment constraints	Very good – the majority of the site is disturbed land, currently used for turf farms and similar activities.	Adequate – there are extensive areas of remnant bushland, which will need to be cleared. The bush forever site at the east end of the rail spurs may be susceptible to lowering of the water table.
2	Geotechnical conditions	Very good – the site is remote from current quarrying activities. Site works could result in extraction of commercially valuable quantities of limestone and sand.	Good – the site is subject to a number of existing and proposed quarry operations. Once quarrying is concluded the site has good geotechnical properties. Rehabilitation of the fly ash site may be problematic.
3	Topographical factors and future ground levels	Very good – the terminal follows the existing railway with a gradient suitable for development of the rail spurs.	Poor – the site will require up to 30 metres of cut to achieve suitable rail spur levels.
4	Existing infrastructure, including ability to relocate major services	Very good – there are no major services within the terminal area.	Poor – two major gas lines and a 1200mm water pipeline cross the site. Relocation of these services will be required because of the bulk earthworks required.
5	Planning and zoning	Very good – the site is wholly contained within Latitude 32, and is primarily in areas identified for transport industry.	Very good – the site is wholly contained within Latitude 32.





Number	Criterion	Government's preferred option	City of Cockburn proposal
6	Ability to effectively connect to the existing rail network and provide the necessary rail services i.e. train length, shunting capability, track configuration	Excellent – the site provides direct connection from the Midland Kwinana railway with adequate length for 1800m trains and substantial flexibility in the layout of spurs and sidings.	Poor – the site is not long enough to accommodate 1800m trains without deviation of the Midland Kwinana railway. There is limited opportunity for expansion and limited flexibility in track configuration.
7	Ability to effectively connect to the existing and planned road network	Very good – the terminal connects directly to the planned north-south road which in turn connects to Russel and Rowley Roads, and those parts of Latitude 32 south of Rowley Road.	Adequate – the proposal connects directly to Rowley Road. However it severs the planned north-south road and disrupts network planning within Latitude 32.
8	Ability to develop a core terminal area and supporting infrastructure	Excellent – The site has adequate length and width to provide all necessary core functions.	Adequate – the site has adequate width to provide the necessary core functions, but will be limited by the land requirements for Rowley Road.
9	Ability to develop integrated terminal support areas	Excellent - The site has adequate length and width to provide all necessary support functions, including rolling stock maintenance etc.	Adequate – the limited site length impacts the ability to provide some support functions.
10	Ability to interface with an associated industry park / cluster development	Very good – the site is central within the industrial and business park areas. Access to the west of the railway will require grade separated crossings.	Poor – the site connects with the northern part of Latitude 32 via an interchange at Rowley Road. However there is no provision for a connection to the industrial areas to the south.



Number	Criterion	Government's preferred option	City of Cockburn proposal
11	Ability to effectively integrate transport connections with the proposed Outer Harbour and the proposed private port at James Point.	Rail: Good – provision is made for direct connection to the proposed freight corridor in Rowley Road.  Road: Good – access will be via the north-south road, thence Rowley Road.	Rail: Poor – direct connection of the site to the freight corridor is problematic.  Road: Excellent – direct connection via Rowley Road.



## 6. Consultation

### 6.1 Introduction

Following public submissions in relation to the 2007 study and the Government's preferred option, a stakeholder workshop was held in Rockingham on 18 June 2009 to consider alternative site options that surfaced during the submissions phase. The workshop recommended that there is sufficient merit in the City of Cockburn proposal to warrant further investigation. A wide range of stakeholders was represented at the workshop. A total of 51 attendees were present at the workshop representing industry associations, Government agencies (State and Local), community associations, businesses, port operators and private rail operators.

During the current study, the study leader held a series of meetings with stakeholders to gauge their views on the City of Cockburn proposal in comparison with the Government's preferred option.

### 6.2 City of Cockburn

Key points:

- Council had concerns relating to the Government's preferred option, including traffic impacts, and noise effects on local residents.
- The council proposal has been prepared to a sketch stage only, with no detailed analysis undertaken. Noted that there are constraints such as the major gas pipelines and terrain.
- Noted that Rowley Road is in deep cuttings adjacent to the proposed terminal site. Regrading to suit the proposed terminal location may be more feasible given the road grades.
- The council had not examined the rail geometrics in any detail. It may be necessary to realign the main line further to the west to provide the necessary length of siding.
- Noted that there is a bush forever site at the western extremity of the proposed terminal. This may be banksia woodland, which is relatively immune to water table movements.

### 6.3 Town of Kwinana

Key points

- Council are working on the eastern residential intensification corridor (ERIC) plan (also known as the Jandakot regional structure plan), which could see the extension of residential zoning close to the east side of Mandogalup Road.
- Alcoa are opposed to the extension of residential zoning because of potential dust emissions from the bauxite residue areas.
- Council has made a submission to the Fremantle Ports Optimum Planning Group. Main points in relation to the terminal are:
  - Council is very happy with the Government's preferred option for the intermodal terminal;
  - Council is somewhat concerned that the development of Rowley Road could cause community severance.
- Council is not in favour of the City of Cockburn proposal.



- ▶ Noted that both potential sites are within the Hope Valley Wattleup redevelopment area, which is subject to its own act of parliament. The local government authorities have no planning control within the redevelopment area.
- ▶ The City of Cockburn proposal could be less intrusive in terms of the overall development of Latitude 32.

## 6.4 Westnet Rail

Key points:

- ▶ There was concern that the triangle required to access the proposed spur would generate high levels of flange squeal, as currently experienced at Woodbridge.
- ▶ Westnet Rail are concerned that the noise generated by the council's proposed terminal could be of higher nuisance than that from the Government's preferred option.
- ▶ The Kwinana Industry Council expressed concern about future rezoning to residential and it was an action item for the group to advise the appropriate zoning body that no further residential be allowed within such close proximity to the proposed Industrial Park.
- ▶ The length of the City of Cockburn proposal does not appear adequate to generate a number of parallel sidings, thus limiting the capacity of the terminal. Realignment of the main line further west to increase the available length is an option.
- ▶ The Government's preferred option offers superior port access opportunities.
- ▶ The Government's preferred option has superior rail access and offers a degree of flexibility which would be difficult to achieve with the City of Cockburn proposal.
- ▶ It was noted that the City of Cockburn proposal could be a useful backup or overflow facility if the capacity of the Government's preferred option s exceeded in future.

## 6.5 Landcorp

Key points:

- ▶ Landcorp structure planning for Latitude 32 is progressing. The southernmost section has now been completed. A north-south arterial road remains a key feature of the structure plan. Landcorp support the Government's preferred option, and have based their planning around this concept.
- ▶ Landcorp have a number of concerns regarding the City of Cockburn proposal
  - The intermodal facility would be more isolated from the surrounding industrial developments.
  - The terminal would actually be closer to some rural / residential areas than the Government's preferred option.
  - The east-west alignment of the City of Cockburn proposal would impede the permeability (ie the ability of road traffic to circulate freely) of the industrial area.
  - The City of Cockburn proposal would require the relocation of two major gas pipelines.
- ▶ Although Landcorp supports the Government's preferred option, it was noted that there are some issues in relation to east-west traffic that need to be addressed.



- ▶ There are two operating quarries in the City of Cockburn proposed terminal area, with another to commence in the near future.

## 6.6 Fremantle Ports

Key points:

- ▶ The Port considers the preferred option to be the minimum that should be provided, taking into account the need for future expansion.
- ▶ An alternative site must provide the same capacity as the preferred site, taking into account:
  - Number of sidings
  - Shunting capacity
  - On-site land for support activities such as repairs, quarantine, container cleaning and servicing etc.
- ▶ The proposed Fremantle outer harbour planning is based on using 600m trains, though longer trains may be required.
- ▶ Container movements on the wharf will be direct between ship and truck or train, with no provision for container storage at the wharf. Container storage areas would therefore be a key consideration for the proposed terminal.

The storage area would need to be similar to that currently provided at North Quay (approximately 240,000m<sup>2</sup> or 24 ha).

## 6.7 Main Roads

Key points:

- ▶ Main Roads support a north-south road through Latitude 32 via an extension of Abercrombie Road. Planning is also in place for a north-south service road and future transitway along the Fremantle Rockingham controlled access highway.
- ▶ The north-south connectivity through Latitude 32 would be severely compromised by the City of Cockburn proposal.
- ▶ Access from Rowley Road to the terminal would require some form of interchange or grade separation, which could require a significant amount of land out of the City of Cockburn proposed terminal area.
- ▶ The required very deep excavation required for the rail spur and adjacent freight handling areas could impact the profile of Rowley Road. This impact could extend to the east, out of the industrial area.
- ▶ Rail access from the City of Cockburn proposal site to the outer harbour via the Rowley Road heavy freight corridor could be difficult.
- ▶ It is expected that the bulk of truck traffic into the area from the north would come via the Roe Highway extension and Stock Road, alleviating pressure on Russell Road.



- ▶ Main Roads would support an interchange on the Fremantle Rockingham controlled access highway between Russell and Rowley Roads. This would provide superior access to the Government's preferred option.
- ▶ Rather than accessing the intermodal directly from Rowley Road, consideration could be given to an access from Mandogalup Road. It was noted, however, that this would be on the fringe of the industrial area and remote from the balance of Latitude 32.
- ▶ The City of Cockburn proposal would reduce fragmentation of the balance of the Latitude 32 caused by the Government's preferred option.
- ▶ The Government's preferred option provides for supporting infrastructure and industries on all sides. The City of Cockburn proposal is strictly constrained along its southern edge.

## 6.8 Alcoa

Key points:

- ▶ Any significant lowering of groundwater as a result of the deep excavations may draw contaminants from under the older bauxite disposal areas.
- ▶ The oldest disposal areas (areas F and H, near Mandogalup Road) have simple clay linings which may deteriorate over time. The newer areas have synthetic linings or double clay linings.
- ▶ Over time, the bauxite disposal areas will grow to stacks up to 70 or 80 metres high. The nearest stack would be about 500 metres from the proposed terminal.
- ▶ Dust in the residue areas is controlled by sprinklers. Only fresh water is used at present, though water with a low residue concentration has been used in the past. Over-spray from the sprinklers could cause a nuisance.
- ▶ Dust blowing from the residue areas could have some nuisance value. It is unlikely to have any health effects.
- ▶ Residue dust settling on motor vehicles can cause corrosion. However this is unlikely to be other than an isolated event.
- ▶ Alcoa would support the expansion of Latitude 32 to the east to help contain impacts and act as a buffer between the residue disposal areas and future residential development.

## 6.9 Department of State Development

Key points:

DSD would generally like to see the terminal located as far west as possible. The department does not support any expansion of residential areas within the Kwinana air quality buffer zone, which includes the terminal site and some of the nearby rural lots.

- ▶ DSD has not formulated a view on the City of Cockburn proposal, however the following points were noted:
  - The proposal would need a very large amount of earthworks compared with the Government's preferred option.
  - The gas pipelines which traverse the site will prove both expensive and difficult to relocate.



- Use of the City of Cockburn proposal site would open up the balance of Latitude 32 for a more flexible arrangement of industrial uses.
- The City of Cockburn proposal site looks extremely tight. It is questioned whether it would provide sufficient flexibility and provision for expansion.
- Dust emissions from the Alcoa bauxite residue ponds may be an issue, especially if dust contamination of perishable goods and/or motor vehicles could occur. The Cockburn Cement plant north of Russell Road could generate dust emissions affecting the Government's preferred option. Noted that in both cases the prevailing winds will affect the degree of the effect.

## 6.10 DBP Transmission

Key points:

- DBP operate the Dampier to Bunbury natural gas pipeline. The Parmelia Pipeline is operated by the APA Group.
- DBP would be very reluctant to contemplate moving of the existing pipelines.
- An indicative cost for laying a new pipeline would be in the order of \$2m to \$3m / kilometre (for each pipeline).
- The actual cost to relocate both pipelines (if it is possible to find appropriate land) will be determined by the cost of land acquisition, environmental studies and management requirements, any connections to customers (including the Perth gas distribution system) which may be affected and risk mitigation measures incorporated into the design to optimise the set-back distances. In considering this plan, DBP recommend that it would be prudent to include a provision for many tens of millions of dollars for pipeline relocation costs.
- Changeover would cause disruptions to gas supplies over a period of approximately 1 week. This would affect all of Kwinana (including the power station) and other parts of the metropolitan area.
- The pipelines are in a corridor established by act of parliament. The operators have right of access under the act for pipeline maintenance and new construction. Access must be free and unimpeded at all times.
- A new corridor would need to be at least 30m wide plus a buffer zone whose width is determined by a risk analysis.
- The existing corridor provides for construction of future gas pipelines if necessary. Provision must be made for a new pipeline through the Kwinana area.
- It is extremely unlikely that approval would be given for a pipeline passing under the terminal:
  - Maintenance access must be maintained at all times (extremely difficult or impossible under a rail terminal)
  - Access for construction of a future pipeline must be maintained
  - There have been instances overseas where the construction of commercial and industrial infrastructure in pipeline corridors has led to pipeline rupture, resulting in multiple fatalities





## 7. Summary and conclusion

### 7.1 Background

On the basis of previous studies, the government has selected a location between Russel and Rowley Roads as the preferred site for an intermodal freight terminal at Kwinana. The site is located within the Latitude 32 industrial development area and lies on a north-south orientation along the Midland Kwinana railway.

Following publication of the GHD Meyrick 2007 site evaluation and planning study report, submissions were received from the public and interested parties. The City of Cockburn proposed that the terminal should be located south of Rowley Road on an east-west axis. The Department of Planning has subsequently commissioned GHD to review the City of Cockburn proposal and undertake a critical comparison of the City of Cockburn proposal and the Government's preferred option.

### 7.2 Methodology

The tasks undertaken in the preparation of this report included:

- Review of previous reports
- Discussions with the City of Cockburn, followed by consultation with key stakeholders
- Technical appraisal of the proposal
- Rating of the proposal against agreed criteria
- Comparative evaluation of the City of Cockburn proposal and Government's preferred option.

### 7.3 Key findings

The City of Cockburn proposed that the terminal should be located south of Rowley Road on an east-west axis. The site would be bounded on the south by existing Western Power transmission line corridor, and on the north by the proposed Rowley Road. The site topography means that excavations up to 30 metres will be required to achieve the very flat areas required for the rail sidings and container handling areas.

The proposal was evaluated against the agreed criteria, with the following outcomes:

#### **Environment constraints**

There is a larger area of remnant bush within the site, and a potentially vulnerable bush forever site adjacent. Excavation to the depths indicated may draw down the water table, affecting the bush forever site. There is also a slight possibility that drawdown could cause an inflow of contaminated water from the bauxite residue disposal areas. Note that the areas closest to the terminal site have either synthetic or double clay linings.

#### **Geotechnical conditions**

The site is predominantly Spearwood sand formations with Tamala limestone. Although there are potential problems of differential settlement, the geotechnical conditions will generally be conducive to the site development once quarrying operations are concluded.



### **Topographical factors and future ground levels**

The changes in elevation across the site will require excavations up to 30 metres deep along the southern and eastern boundaries. The batters required to accommodate this depth of excavation will reduce the area available for development. Alternatively, extremely expensive retaining walls would be required.

Given the current planned profile for Rowley Road (which recognises the proposed floor levels of the limestone quarries), it should be feasible to grade the balance of the site to achieve the required flat areas.

### **Existing infrastructure, including ability to relocate major services**

Two major gas pipelines and a major water pipeline will need to be relocated.

Relocation of the gas pipelines would be a significant undertaking, possibly requiring an act of Parliament to establish a new corridor. The corridor would need wide buffer zones free of development. Relocation costs (assuming a suitable corridor was available) would be in the order of \$2 to \$3 million per pipeline, per kilometre. In addition, associated costs could run into many millions of dollars..

The water pipeline is the main connection between the desalination plant and the metropolitan water network. Relocation of the pipeline would not be as difficult as the gas pipeline, but would still be an extremely expensive undertaking.

Three Western Power transmission lines run along the southern boundary of the site. Although they are not directly affected by the terminal, any required relocation of the Midland Kwinana railway and the southern leg of the rail triangle are likely to impact one or more of the lines.

### **Planning and zoning**

The site is within the Hope Valley Wattleup redevelopment area, and is therefore planned for industrial development. Rural and residential land occurs within 600 metres of the site, and about 1000 metres from the rail spurs.

### **Ability to effectively connect to the existing rail network and provide the necessary rail services**

This criterion includes matters such as train length, shunting capability and track configuration.

The site as currently configured will not accommodate 1800 metre trains. It would be necessary to realign section of the Midland Kwinana main line to the west to provide arrival roads and a triangle of suitable radius.

Even assuming the main line could be realigned, there is insufficient length and width in the site to provide for future parallel sidings and spurs.

The site performs poorly against this criterion.

### **Ability to effectively connect to the existing and planned road network:**

The site has a single connection to Rowley Road, plus a secondary connection of Mandogalup Road. The Rowley Road connection would provide good access to the northern part of Latitude 32, the Kwinana industrial area and the proposed outer harbours. A grade-separated interchange is likely to be required. This in turn will increase the cost and take up land from the terminal site.



The planned north-south industrial road is severed by this proposal. Both Landcorp and Main Roads have expressed concern that the north-south road is a key part of the Latitude 32 structure, and its severance would have significant disbenefits for industrial development in the region.

#### **Ability to develop a core terminal area and supporting infrastructure**

The site has sufficient area for this purpose, although the proposed 200 metre corridor for Rowley Road would limit opportunities for expansion.

#### **Ability to develop integrated terminal support areas**

The site has more limited ability in this regard because of its constrained situation and access. The rail access to the site via a triangle limits the number of spurs that can be created within a given length. Therefore facilities such as locomotive servicing, rolling stock repair and container servicing may not be feasible.

#### **Ability to interface with an associated industry park / cluster development:**

The site only has a single point of access to Latitude 32, via an intersection or interchange on Rowley Road. Because the site severs the north-south industrial road there is no convenient connection between the intermodal terminal and the southern part of Latitude 32. The intermodal terminal would be a stand-alone facility with limited opportunities for physical interaction with the wider business and industrial areas.

#### **Ability to effectively integrate transport connections with the proposed Outer Harbour and the proposed private port at James Point**

The road access is excellent via Rowley Road.

Rail access may not be feasible without significant changes to the planning of roads and other infrastructure. In particular a rail line from the City of Cockburn proposal would need to pass through the interchange of Rowley Road and the Fremantle Rockingham highway. Such an alignment is not likely to be feasible.

## **7.4 Conclusion**

It is considered that the City of Cockburn proposal for an intermodal terminal has no significant advantages over the Government's preferred option, and significant disadvantages. In particular, the following points have been identified:

- ▶ The site area is adequate for core terminal activities, but has limited opportunities for support activities or future expansion;
- ▶ Flexibility in site layout and future development is limited;
- ▶ The site has insufficient length to accommodate an 1800 metre train, thus requiring realignment of the Midland Kwinana railway. (This in turn may have significant impacts on the Western Power high voltage power lines).
- ▶ Rail connection between the site and the proposed outer harbour could severely impact the interchange of Rowley Road and the Fremantle Rockingham highway.
- ▶ The site severs the north-south industrial road, causing significant impacts to the planning and operation of Latitude 32;



- ▶ Relocation of two major gas pipelines and a major water pipeline would be required – relocation of the gas pipelines in particular appears to be a significant task.
- ▶ The very deep excavations required may have environmental impacts, especially on the bush forever site and groundwater levels.

Several of the above points are sufficiently serious that they would rule out the feasibility of the City of Cockburn proposal for an intermodal terminal south of Rowley Road. Taken collectively, the issues would render the proposal highly unlikely to succeed.



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## Document Status

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		Name	Signature	Name	Signature	Date
0	Paul Fisher	Jeremy Blake	<i>Jeremy Blake</i>	Chris Mitchell	<i>Chris Mitchell</i>	21-9-09
1	Paul Fisher	Jeremy Blake	<i>Jeremy Blake</i>	Chris Mitchell	<i>Chris Mitchell</i>	23-9-09